Project Research

Study Report on the Guidelines for the Management of Safety for Construction Works in Japanese ODA Projects

Final Report

Main Text

＜Volume 1/3＞

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Japan International Cooperation Agency (JICA)

The Overseas Construction Association of Japan, Inc.

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Composition of the Outcomes

The outcomes of the Project Research: "Study Report on the Guidelines for the Management of Safety for Construction Works in Japanese ODA Projects" are composed of the 3 volumes shown below.

This volume is the "Main Text" of the reports. See each report, other than this, for the "Guidelines (Preliminary Draft)," and "Samples of Practical Tool for Safety Construction Management on Site."

First of the 3 volumes: This document.

Main Text	
Introduction	Background of Working out the Guidelines (Preliminary Draft)
Chapter 1	Outline of the Field Study Results
Chapter 2	Current Status of Safety Management for Construction Works in Advanced Countries
Chapter 3	Review on Other Guidelines
Chapter 4	Outline of the Guidelines for the Management of Safety for Construction Works
Chapter 5	Considering the Operation Policy on the Guidelines

Second of the 3 volumes:

Guidelines (Preliminary Draft)	
Chapter 1	General Rules
Chapter 2	Basic Policies for Safety Management
Chapter 3	Contents of the "Safety Plan"
Chapter 4	Contents of the "Method Statements on Safety"
Chapter 5	Technical Guideline for Safe Execution (by the Type of Work)
Chapter 6	Technical Guideline for Safe Execution (by the Type of Accident)

Third of the 3 volumes:

Samples of Practical Tool for Safety Construction Management on Site
1. Risk Assessment Form
2. Operating Instructions
3. Record of Meetings
4. Weekly & Monthly Report
5. Site Inspection Check Sheet
6. Occupational Safety & Health Management System
7. Partnership with Locals etc.

◆ Summary of the Report ◆

1. Outline

The report on this project research consists of the following 3 volumes.

- Volume 1: "Main Text"
- Volume 2: "Guidelines (Preliminary Draft)"
- Volume 3: "Samples of Practical Tools for Safety Construction Management on Site"

This volume is "Main Text."

2. Objective of the Study & Abstract

In promoting the prevention of occupational accidents and accidents with general public at construction sites in Japanese ODA projects, this project research aims at drafting "Study Report on the Guideline for the Management of Safety for Construction Works in Japanese ODA Projects" and "Samples of Practical Tools for Safety Construction Management at Site."

In order to draft "Study Report on the Guideline for the Management of Safety for Construction Works in Japanese ODA Projects", legal frameworks and guidelines for administrative systems and occupational safety and health are collected from international organizations, Japan and Western countries, and then analyzed accordingly. In addition, as part of information gathering in Western countries, field research was conducted in France and Belgium. Meanwhile, with the expectation that the completed guideline will be used in various construction sites in developing countries, fact-finding inquiries were conducted in those countries in order to grasp the current situation of safety management at construction sites. To be specific, fact-finding inquiries include studying information sources from "Project Research on the Study on Safety Management for Construction Work in Japanese ODA Project (JICA, Feb 2012)" and field research in Bangladesh, Tanzania and Rwanda.

In drafting "Samples of Practical Tools for Safety Construction Management at Site," samples of practical formats which are used to practice safety management at actual construction sites were collected and among them were selected as good samples of high versatility which will be cited in the report as references.

In the last section of "Main Text," taking into consideration the current frameworks of safety measure plans used in ODA-Loan and Grand Aid projects, operation policy of the Guideline are considered and some specific suggestion are proposed.

3. Outline of the Field Study

(1) Study in Developing Countries

Study team carried out preliminary document research, pre-information collection through interviews with occupational safety and health relevant institutes or corporations. In overseas, the team conducted interviews at governmental ministries and relevant research institute etc. related to occupational safety and health, and at

construction sites (with Consultants and Contractors) in Bangladesh, Tanzania and Rwanda. Major items for the research are listed below.

- Legal framework and administration regarding occupational safety and health
- Safety management in public construction projects
- Safety management in ODA construction projects
- Occupational accidents and countermeasures
- Accidents with general public and countermeasures

Based on the field survey, the issues on safety management in ODA construction projects in developing countries were examined in order to draft "Study Report on the Guideline for the Management of Safety for Construction Works in Japanese ODA Projects" and "Samples of Practical Tools for Safety Construction Management at Site."

(2) Study in Western Countries

In France, the study team carried out interviews at Institut National de Recherche et de Securite (INRS), Confederation of International Contractors' Association (CICA), and implementing agencies of civil engineering works. In Belgium, interviews were conducted at European Commision (EC) and Constructiv, a public organization working on improving occupatinal health and safety in construction industry. The main contents of inteview are shown below. Based on the findings, we have reviewed the contents and composition of the Guidelines.

- EU regulations on safety management in construction works
- Safety management system in construction works
- Guidelines for safety management in construction works
- Examples of operations in which safety measure cost is detached from general construction cost

Some significant points have been found in the field study in European countries. First, regarding EU directives, it is clearly stipulated that persons concerned with construction work are responsible for safety management, and a coordinator who specializes in taking care of occupational safety and health are mostly assigned from project formulation stage such as planning and design as well as construction. In addition, regarding bidding procedures for large-scale construction projects, Belgium has introduced a system in which cost for safety management and cost for general construction work are separately estimated and evaluated at the bidding stage.

4. Fact-finding Study on Safety Management for Construction Works in Developed Countries

The study team carried out fact-finding study on safety management in construction works of Japan, Britain, France, the United States and the EU. Main items for the study are listed below.

- Legal systems of the target countries
- Basic Act for occupational safety and health
- Laws and Regulations regarding construction works based on Basic Act
- Administrative agencies and organizations related to occupational safety and health
- Safety management system in construction works
- Accidents at construction works

We have refered these findings for drafting the Guideline.

5. Review of Other Guidelines

In order to consider the contents of the Guidelines, we reviewed the result of fact-finding survey on the current status of safety management in construction works in developed countries as well as other guidelines published by International Labor Organization (ILO) and World Bank Group. Among them, a set of relevant guidelines are selected and listed below.

Other Guidelines	Publisher
① Technical Guideline for Safe Execution on Civil Engineering Works	Ministry of Land, Infrastructure, Transportation and Tourism (MLIT, Japan)
② Technical Guideline for Safe Execution on Building Works	
③ Safety and Health in Construction	ILO
④ General EHS Guideline	World Bank Group
⑤ Health and Safety in Construction	Health and Safety Executive (HSE, UK)
⑥ Aide-memoire BTP	Institut National de Recherche et de Securite (INRS, France)
⑦ Construction Industry Digest	National Institute of Occupational Safety and Health (NIOSH, US)
⑧ Technical Guideline for Safe Execution on Construction Machinery Works	Ministry of Land, Infrastructure, Transportation and Tourism (MLIT, Japan)
⑨ The Safe Use of Vehicles on Construction Site	Health and Safety Executive (HSE, UK)
⑩ Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works	Ministry of Land, Infrastructure, Transportation and Tourism (MLIT, Japan)
⑪ Guideline of Measures against Third-party	

	Accidents during Construction Works; Building Works	
⑫	Technical Guidelines for Measures against Noise & Vibration during Construction Works	
⑬	Protecting the Public	Health and Safety Executive (HSE, UK)
⑭	IFC Performance Standard	World Bank Group
⑮	Construction (Design and management) Regulation 2007	Regulation in the UK

6. Essential Features of the Safety Management Guidelines

The following framework was defined after reviewing essential features of the Safety Management Guideline based on the findings from field research in both developed and developing countries and other relevant guidelines in developed countries.

【Definitions of Basic Terms】	● Define basic terms in the Safety Management Guideline
【Chapter 1】 General Rules	
● Indicate objective, range of application and points for attention	
【Chapter 2】 Basic Policies for Safety Management	
● Indicate that persons concerned with ODA construction projects should perform safety management with common understanding ● To be specific, indicate basic principles of safety management, roles and resposibilities of the persons concerned with the project ● Indicate that PDCA cycle of safety management should be practiced thoroughly	
【Chapter 3】 Contents of the “Safety Plan”	
● Stipulate Safety Plan ● Stipulate items which should be included in the Safety Plan	
【Chapter 4】 Contents of the “Method Statements on Safety”	
● Stipulate Method Statements on Safety for each type of work ● Stipulate items which should be included in the Method Statements on Safety	
【Chapter 5】 Technical Guideline for Safe Execution (by the Type of Work)	
● Set forth guideline for safe execution by the type of work	
【Chapter 6】 Technical Guideline for Safe Execution (by the Type of Accident)	
● Set forth guideline for safe execution by the type of accident	

7. Considering the Operation Policy on the Guidelines

Regarding the way of operation on the Guidelines, each stage of current ODA construction projects (such as planning, design, bidding, signing contracts and construction) are examined to suggest proposals for operating method at each stage. Additionally, proposals for raising awareness on securing safety, disseminating and reviewing of Safety Management Guideline are also suggested.

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◆ Abbreviations ◆

ACOP	:	Approved Code of Practice
ADB	:	Asian Development Bank
ANSI	:	American National Standard Institute
B/D	:	Basic Design
BoQ	:	Bill of Quantities
CICA	:	Confederation of International Contractors' Associations
CNAMTS	:	Caisse nationale de l'assurance maladie des travailleurs salariés
CRAM	:	Caisses régionales d'assurance maladie
D/D	:	Detailed Design
E/N	:	Exchange of Notes
EC	:	European Committee
EGCB	:	Electricity Generation Company of Bangladesh
EHO	:	Environment Health Office
EU	:	European Union
F/F	:	Fact Finding
F/S	:	Feasibility Study
FIDIC	:	International Federation of Contract Engineers
G/A	:	Grant Agreement
GTC	:	General Terms and Conditions for Japanese ODA Loans
HSC	:	Health and Safety Commission
HSE	:	Health and Safety Executive
HSG	:	Health and Safety Guidance
HSWA	:	Health and Safety at Work etc. ACT 1974
IBRD	:	International Bank for Reconstruction and Development
IDA	:	International Development Association
IFC	:	International Finance Corporation
ILO	:	International Labour Organization
INRS	:	Institut National de Recherche et de Sécurité
ISO 14001	:	International Organization for Standardization, 14001
ISO 9001	:	International Organization for Standardization, 9001
JBIC	:	Japan Bank for International Cooperation
JICA	:	Japan International Cooperation Agency
L/A	:	Loan Agreement
M/D	:	Minutes of Discussion
MIGA	:	The Multilateral Investment Guarantee Agency

NIOSH	:	The National Institute for Occupational Safety and Health
ODA	:	Official Development Assistance
OHSAS 18001	:	Occupational Health and Safety Assessment Series,18001
OPPBTP	:	Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics
OSH	:	Occupational Safety and Health
OSHA	:	Occupational Safety and Health Act of 1970
PPE	:	Personal Protective Equipment
QBS	:	Quality Based Selection
SHP	:	Safety and Health Plan
STEP	:	Special Terms for Economic Partnership
TANROADS	:	Tanzania National Roads Agency
WB	:	World Bank

Introduction:
Background of Working out the Guidelines (preliminary draft)

At the construction site of "Cuu Long (Can Tho) Bridge Construction Project" (ODA-Loan project) having implemented under the assistance of Japanese ODA in the southern part of the Socialist Republic of Vietnam, a serious accident occurred on September 26, 2007 brought lots of casualties due to collapse of the bridge girder. In response to the accident, the Ministry of Foreign Affairs of Japan set up a "Conference for Reviewing Prevention of Recurrence after the Accident of Collapse of the Can Tho Bridge," the cause of the accident was verified and countermeasures for preventing recurrence of accident were reviewed/recommended by collaborating together with the "National Committee for Investigating the Accident" by the Government of Vietnam. Based on the experience, Japan International Cooperation Agency has systematized various countermeasures against accidents.

Specifically, the countermeasures are as follows:

i) Enact standards of construction which require special care in safety measures, and prioritize QBS (quality based selection) in selecting a Construction Supervision Consultant for targeting construction works.

ii) Evaluate safety measures in the method statement as a bidding document.

iii) Investigate the site safety management situations during construction by the international cooperation expert of JICA or the entrusted Consultant.

iv) Submit a report in the case of fatal accidents or serious injuries immediately to JICA, which shall give an advice on response, etc.

v) Accept technical advice of the external professional in the case of a material disaster.

vi) Suspend nomination in the case of a fatal accident or injury resulting from improper safety management, etc.

Nevertheless, occurrence of accidents has not ceased since then: accidents resulting in death or injury of workers during construction, public accidents resulting in death or injury of third parties such as passers-by, or damage to their properties, and property accident such as damage to the object of construction, machine and facilities.

Based on the circumstances, for further improvement on safety issues, JICA carried out in fiscal 2011 a project research of the "Study on Safety Management for Construction Work in Japanese ODA Projects" having targeted for civil engineering, building and other construction works under Japanese ODA-Loans and/or Grant Aids. The project research included an analysis of the tendency of accidents, issues in construction safety management, and the direction of initiatives by parties concerned (Employer, Consultant, Contractor and JICA), covering civil engineering and building works under Japanese ODA-Loans or Grant Aids in and after the year 2000. In the report, it was proposed, as initiatives of JICA, to review of the construction standards requiring special care in terms of safety measures, and enactment of the standards for work safety management in ODA projects (hereinafter "ODA Construction Safety Management Guidelines"). Thereafter, JICA amended the standards of work requiring special care in terms of safety measures, and decided to carry out a new project research in order to draft a guideline

with reference to other guidelines in Japan and abroad, and laws and international standards as follows:

1. Long-span bridges or viaducts: single bridges (elevated) with a length of 1,000 m or more (including approach ways).
2. Suspension bridges, cable-stayed bridges, extradosed bridges or other types of bridge with a maximum span of 100 m or more.
3. Special works above and under the ground and in the water (tunnel construction, dam (including sabo dam), port construction, and ground excavation cofferdam within river areas, works requiring large-scale temporary structures, large-scale foundation works, caisson works, etc.)
4. Works at heights (about 20 m or more from the ground)
5. Works adjacent to existing railways, roads or other public transportation facilities, and work to offer temporary structures for general traffic.
6. Other works involving the possibility of serious accidents.

The specific background having lead JICA to decide to draft the Guidelines for the Management of Safety for Construction Works, hereinafter called “Safety Management Guidelines,” can be summarized as such, following the strengthened safety measures after the collapsing accident of the Can Tho Bridge, continued occurrences of accidents in ODA construction works are found, the delayed establishment of occupational health and safety laws in developing countries which mostly receive assistance, very few guidelines for safe management of the construction works, insufficient supervision, guidance and punishment by the administrative organizations for occupational safety, and the judgment that the system and method of safety management by the Contractors vary. Based on these factors, it has reached a conclusion that JICA take initiative to assist counterpart governments, the Contractors, etc. to prevent and reduce accidents in construction works. In ODA construction works, it is not necessarily Japanese Contractors get involved, local Contractors as well as Contractors from the third countries quite often join these years. In implementing ODA construction project in an assistance receiving country with insufficient legal system or inadequate supervision and guidance by the competent government agency, as the concept, awareness, know-how and human resources may vary among a Japanese firm, a local firm and a third country firm, it is necessary to impose a certain level of norms and regulations for safety management as specific measures to prevent injuries and accidents in ODA construction works. It is clear that the Contractor has to bear the primary responsibility for occupational injuries and accidents in ODA construction works. To promote prevention of accidents, not only the Contractor but also the Employer and the Consultant as the parties to the project need to actively participate in and deal with safety issues together.

Based on the circumstances, JICA has decided to draft ODA Construction Safety Management Guidelines which incorporate specific management items and standards to be complied with by the related parties mainly including the Contractor as the main player of construction works, concerning safety management in the construction site in ODA construction works.

For drafting the Safety Management Guidelines, reviews should be made based on the Guidelines for Environmental and Social Considerations (April 2010), and other guidelines of international organizations and some countries in Europe and America. The Guidelines for Environmental and Social Considerations of JICA clearly states respect for the internationally established human rights standards including the International Covenants on Human Rights in promoting the cooperation project to consider social environment and human rights, and confirmation of the project having no great deviation from the Safeguard Policy of the World Bank concerning socio-environmental considerations. Further, the socio-environmental item covers “labor environment (including occupational safety)”.

Further, in the ODA Charter, the purpose of the Official Development Assistance (ODA) is to “contribute to the peace and development of the international society, and thereby contribute to securing safety and prosperity of our country,” and it stresses the importance of thinking from the viewpoint of “security of humans” as a basic policy in addition to global, regional and national viewpoints. “Security of humans” means protection from direct threat to humans such as dispute, disaster and infection. From a broader viewpoint, it is considered to include protection of safety of lives and bodies of the parties concerned and third parties in ODA construction projects. The “Principles of Assistance” in the ODA Charter expresses “sufficient care in promotion of democracy in developing countries, efforts to introduce market economy, and the status of guarantee of basic human rights and freedom.”

Concerning basic human rights, the General Assembly of the United Nations adopted at its 3rd meeting on December 10, 1948 the “Universal Declaration of Human Rights” for respecting human rights as the common standard that should be achieved by all people and all countries. Article 3 of the declaration states as follows: “Everyone has the right to life, liberty and security of person.”

The International Covenants on Human Rights (adopted by the UN in 1966; took effect in 1976) approved most of the rights stated in the declaration and indicated detailed provisions including the following:

- “International Covenant on Economic, Social and Cultural Rights (Social Rights Covenant: Covenant A)”
  (Article 7) Provides for securing safe and healthy working conditions.
- ”International Covenant on Civil and Political Rights (Freedom Covenant: Covenant B)”
  (Article 9) Provides that “Everyone has the right to liberty and security of person”.

Japan ratified both covenants on June 1, 1979, which have taken effect since September 21, 1979. Therefore, the ODA projects implemented by Japan have to comply with the covenants mentioned above as a matter of course. In other words, the “Security of Humans” provided for in the ODA Charter mentioned above is considered to include the necessity to promise measures

to implement projects taking into account securing safe and healthy working conditions, and everyone’s right to liberty and security of person.

The Safety Management Guidelines (draft) for ODA construction works are not limited to particular country or region but applied to projects globally, and the contents should be internationally applicable. The World Bank Group has enacted “Environmental, Health and Safety General Guidelines” (International Finance Corporation), and the International Labor Organization has enacted “Occupational Safety and Health Convention (No. 155),” “Safety and Health in Construction Convention (No. 167)” and “Safety and Health in Construction” (ILO) reflecting the contents of the conventions. The Ministry of Land, Infrastructure, Transport and Tourism has enacted Guidelines for Safety Management of Construction Works, similar ones of which exist in the U.K., France and the U.S.A. After comparing and reviewing these guidelines, the draft of the Guideline for ODA Construction Safety Management reflects advice and guidance of the meetings of research assistants composed of external experts, etc. and reviews the contents of items and standard of requirements based on the difference in working conditions and execution of environmental conditions between advanced countries and recipient countries.

Chapter 1
Outline of the Field Study Results

Chapter 1 Outline of the Field Study Results

1.1 Summary of the Study

The objectives of this project research are summarized as three main points:

(1) Drafting the Guidelines for the Management of Safety for Construction Works in Japanese ODA Projects, (hereinafter called the Safety Management Guidelines)
(2) Preparation of the Samples of Practical Tool for Safety Construction Management on Site, and,
(3) Survey of Safety Management in ODA Construction Works in Developing Countries

These three tasks have been set as the target in order to prevent labor accidents as well as accidents involved in general public related to construction works implemented by Japanese ODA.

(1) Drafting the Safety Management Guidelines aims at enhancing safety management at construction sites in ODA-Loan and Grant Aid projects. In order to deal with these issues, firstly, it is necessary to refer to guidelines for safety and health applied by international organizations, European and American countries, and to collect information on legal framework and administration system relating to occupational safety and health.

In order to enhance safety management activities in overseas construction sites, it is important that the guidelines being drafted in this study will be applied in various construction sites in developing countries in the near future. For this purpose, it is necessary to give full attention of current status of construction sites in various countries to formulate appropriate and effective guidelines. Also, it is necessary to review the contents with consideration for the natural features, the environment, social conditions, values and awareness of construction workers.

(2) Preparation of the Samples of Practical Tool for Safety Construction Management on Site refers to work contents to prepare tools to assist Contractors and Consultants to systematically control the entire Plan-Do-Check-Action (PDCA) cycle for ensuring safe working condition at sites. Concerning this, it is appropriate to collect excellent cases examples actually used in the sites of construction works as basic resources for creating highly versatile tools.

Based on the above, field survey was conducted for comprehending the present situation of (3) Safety Management in ODA Construction Works in the Developing Countries and for collecting information on various initiatives on safety and health in European countries.

1.1.1 Purposes of the Field Study

The purpose was to collect information that cannot be in Japan and conduct finding of fact comprehended in Japan through interview for government or governmental agencies in target countries, and Consultants, Contractors, etc. working at construction sites. The purpose of interview in developing countries was mainly to observe the status of safety management at construction sites. In European countries, the main purpose of information collection was to comprehend overall occupational safety and health legislations framework and administration as well as the bid and contract systems pertaining to public works projects.

The study items for overseas survey are listed below.

(1) For developing countries
- Legal systems and administration pertaining to safety and health
- Safety management in public works projects
- Confirmation of safety management conditions at construction sites by ODA (site visit)
- Response to labor accidents
- Facts of and response to public accidents

(2) For European countries
- Laws and regulations on safety management for construction works in EU
- Laws and regulations on safety management and its systems in construction works in France
- Separate estimation and evaluation system for safety measures cost and construction cost

1.1.2 Target Countries and Study Schedule

For overseas survey, the study team carried out information collection and interviews in Bangladesh, Tanzania, Rwanda, France and Belgium in November 2012. Overseas survey schedule is shown in the table 1.1.1.

Table 1.1.1 Overseas survey schedule

Date	Itinerary	Stay at:
Nov. 12 (Mon.)	Tokyo ⇒ Bangkok ⇒ Dhaka (Bangladesh)	Dhaka
Nov. 13 (Tue)	09:10 - 10:00 JICA Bangladesh Office 10:50 - 12:00 Courtesy call at Japanese Embassy in Bangladesh 15:00 - 16:10 Ministry of Labor and Employment (◎) Interview	Dhaka
Nov. 14 (Wed.)	10:10 - 14:00 [HARIPUR Power Plant Construction Project (Ⅱ)] Site visit and interview、	Dhaka
Nov. 15 (Thu.)	Dhaka ⇒ Chittagong (by air) 09:30 - 10:45 Chittagong Water Supply and Sewerage Authority (○) (CWASA) 12:30 - 15:30 [Karnaphuli Water Supply Project] Site visit and interview Chittagong ⇒ Dhaka (by air)	Dhaka
Nov. 16 (Fri.)	13:00 - 17:30 [Eastern Bangladesh Bridge Improvement Project] Site visit and interview	Dhaka
Nov. 17 (Sat.)	Dhaka ⇒ Dubai	Dubai
Nov. 18 (Sun.)	Dubai ⇒ Dar es Salaam	Dar es Salaam
Nov. 19 (Mon.)	08:30 - 09:30 JICA Tanzania Office 10:00 - 11:30 Ministry of Labor and Employment (◎) Interview 12:10 - 12:40 Tanzania Ministry of Works (○) Interview 14:00 - 15:30 Tanzania National Roads Agency (○) (TANROADS, interview、)	Dar es Salaam
Nov. 20 (Tue.)	10:00 - 13:00 [The Project for Widening of New Bagamoyo Road] Site visit and interview.	Dar es Salaam
Nov. 21 (Wed.)	Dar es Salaam ⇒ Nairobi ⇒ Kigali (Rwanda)	Kigali
Nov. 22 (Thu.)	10:00 - 14:00 [The Project for Construction of Rusumo International Bridge and One Stop Border Post Facilities] Site visit and interview.	Kigali
Nov. 23 (Fri.)	09:00 - 0940 Rwanda Transport Development Agency (RTDA) (○) Interview Departure from Kigali ⇒	(In flight)
Nov. 24 (Sat.)	Via Amsterdam ⇒ Arrival at Paris	Paris
Nov. 25 (Sun.)	Information collection	Paris
Nov. 26 (Mon.)	14:30 - 16:40 Interview at Confederation of International Contractors' Associations (CICA)	Paris
Nov. 27 (Tue.)	10:00 - 11:20 Interview at Institut national de recherche et de sécurité (INRS) 14:00 - 15:40 Interview at TAKENAKA EUROPE	Paris
Nov. 28 (Wed.)	11:45 - 12:40 Interview at RESEAU FERRE DE FRANCE 14:00 - 16:30 [Work for expansion of sewage treatment facilities] Site visit and interview	Paris
Nov. 29 (Thu.)	10:00 - 11:40 EC Direction generale Ressources Humaines et Securite Interview (Belgium) 15:00 - 17:00 Constructiv interview	Paris
Nov. 30 (Fri.)	Departure from Paris ⇒	(In flight)
Dec. 1 (Sat.)	Arrival at Tokyo	

Destinations in developing countries: legend [ ] : Construction site (◎): Related to Ministry of Labor (○): Employer

1.1.3 Survey Contents in Each Country

(1) Bangladesh, Tanzania, Rwanda

● Ministry of Labor and Employment (Bangladesh, Tanzania)

- Laws and regulations on labor safety and health, occupational safety and health administration, responses to labor accidents and incidents, statistics of labor accidents and incidents, qualifications related to occupational safety and health, insurance and compensation upon occurrence of labor accidents.

● Employers

Bangladesh : Chittagong Water Supply and Sewerage Authority, Bangladesh Power Generation Company, Road Bureau
Tanzania : TANROADS
Rwanda : Rwanda Transport Development Agency

- Laws and regulations on occupational safety and health, initiatives in bid and contracting of construction projects, initiatives upon execution of construction works, responses to labor accidents and incidents, prevention of public accidents, etc.

● Construction sites (Contractors and Consultants)

- Laws and regulations on occupational safety and health, provisions for occupational safety in bidding and contracting of construction works, initiatives in construction sites, status of subcontractors, responses to labor accidents and incidents, initiatives against public accidents and traffic accidents, etc.

The following tables show the outline of each project at which the study team targeted.

For site visit, 3 project sites in Bangladesh (all ODA loan projects) were selected, and other project site in Tanzania and another project site in Rwanda (each Grant Aid project). Checking safety management condition for work places and interview with the Employers, Consultants and Contractors were conducted.

<Bangladesh>

Project site visit No.1

○ Project name	New Haripur Combined Cycle Power Plant Project
○ Employer	Electricity Generation Company of Bangladesh
○ Loan or grant	ODA-Loan

Project site visit No.2

○ Project name	Karnaphuli Water Supply Project
○ Employer	Chittagong Water Supply and Sewerage Authority
○ Loan or grant	ODA-Loan

Project site visit No.3

○ Project name	Eastern Bangladesh Bridge Improvement Project
○ Employer	Roads and Highways Department
○ Loan or grant	ODA-Loan

<Tanzania>

Project site visit No.4

○ Project name	The Project for Widening of New Bagamoyo Road
○ Employer	Tanzania National Roads Agency (TANROADS)
○ Loan or grant	Grant Aid

<Rwanda>

Project site visit No.5.

○ Project name	The Project for Construction of Rusumo International Bridge and One Stop Border Post Facilities
○ Employer	Tanzania National Roads Agency (TANROADS)
	Rwanda Transport Development Agency (Rwanda)
○ Loan or grant	Grant Aid

(2) France

- Confederation of International Contractors' Associations (CICA) and a construction company (Colas Group).
  - Initiatives in safety management by major construction companies in France, initiatives for safety management by the confederation, education campaign, etc.

- Institut national de recherche et de sécurité (INRS)
  - Compilation and issuance of guidelines for safety management in construction works, roles of safety (health) coordinators, etc.

- TAKENAKA EUROPE
  - Positions of coordinators among construction contract framework, etc. and safety management in construction, etc.

- Reseau Ferré De France
  - Initiatives for safety management by the Employer of civil engineering works, specific measures for improved safety management in France (roles of SPS coordinators), etc.

- Contractor (Bouygues Group)
  - Initiatives for safety management by a major civil engineering and construction company.

(3) Belgium

- European Committee
  - EC directives and national laws of Belgium, regulations for treatment of safety expense upon tender, actual cases of safety management in constructions in areas covered by the European Committee.

- Constructiv
  - Labor accidents in the construction industry of Belgium, the legal systems for construction industry in Belgium, qualifications pertaining to safety and health, appointment and roles of coordinators, separate submission & evaluation system of safety costs and construction costs upon tender and its background of introduction.

1.2 Results of Survey in Developing Countries

1.2.1 Legal Systems Related to Occupational Safety and Health

(1) Occupational Safety and Health Law

While labor laws have been enacted in Bangladesh, Tanzania and Rwanda, there are differences in the development of occupational safety and health laws for each country. Tanzania has enacted an occupational safety and health law, but there is no law focusing on occupational safety and health in Bangladesh and Rwanda. However, Bangladesh is currently developing a special policy that deals with occupational safety and health with no binding effect from laws or regulations. Also, Tanzania is about to develop sectorial regulations based on old regulations under the occupational safety and health act.

(Bangladesh)

Provisions for occupational safety and health are incorporated in the Bangladesh Labor Act 2006 as Employers' responsibilities and obligations to protect health, hygiene, and safety. The contents are limited to protection of safety of buildings, electric facilities, and machinery, and there is no provision on specific work methods and steps. The country is preparing for introduction of occupational safety and health provisions in guidelines or national policies instead of a law.

(Tanzania)

Tanzania has enacted Occupational Health and Safety (OHS) Act 2003 separately from Labor Relations Act 2004. As regulations for construction works, the Factories (Building Operation and Works of Engineering Construction) Rules of 1985 as regulations for construction works based on the Factory Ordinance has been enacted on its basis, which was abolished upon enactment of OHS Act, and are still in force. Presently, the country is preparing for new regulations for each sector based on the OHS Act.

(Rwanda)

There are provisions on "Safety and Health for Workplace" in Chapter 4 of the Labor Law (No.13/2009 of 27/05/2009 Law Regulating Labor in Rwanda) which prescribe safety and health for workplaces, use of protective equipment, reporting of work accidents, first-aid, etc. However, there is no law focusing on specific provisions on safety in general, and occupational safety for construction works.

(2) Technical Guidelines and Standards for Construction Safety

As mentioned in the previous section, there are no laws and regulations focusing on occupational safety and health, and construction works in Bangladesh and Rwanda, and it

would take time to develop specific standards for safe execution in construction works. On the other hand, Tanzania is about to review occupational safety and health regulations focusing on construction works. The existing regulations have detailed provisions for each work category, and the regulations to be newly developed will be on a level equivalent to those in advanced countries.

(Bangladesh)

There are no guidelines and standards focusing on construction, and the labor law and policies cover all sectors. There is no plan to develop standards focusing on construction.

(Tanzania)

Currently, the Factories (Building Operation and Work of Engineering Construction) Rules of 1985, based on the abolished Factory Ordinance, are now in force. The country is preparing OSH (Building and Construction Industry) Rules based on the OHS Act. The current regulations have provisions on safety and health for each construction and each work such as excavation, tunneling, caisson, roads, scaffold, erection, etc.

Table 1.2.1 Occupational Safety and Health Regulations under preparation (Tanzania)

Rules under Preparation
Gas Safety (Installations and Use) Rules
OSH (General Administration) Rules
Lifting Appliance and Gear Rules
Occupational First Aid Regulations
OSH (Hazardous Chemical Substances) Rules
OSH (Welfare Facilities) Regulations
OSH (Building and Construction Industry) Rules
Recording and Reporting of Occupational Diseases, Injuries and Dangerous occurrences Rules
Vessel under Pressure Regulations
OSH (Electric Machinery Safety) Rules

(Rwanda)

- There is no Safety Management Guideline. Construction contracts cite provisions, if any, in the Labor Act.
- There is no site rules prescribed for mitigation of accidents by the Rwanda Transport Development Agency (RTDA) alone. However, concerning site signs in road construction, the country applies the “South African Road Traffic Sign Manual-Vol2 Road Works Signing”.
- There is no guideline to prevent public accidents.

(3) Laws and regulations on construction machines and facilities

No information was obtained concerning laws and regulations on construction machines and facilities in Bangladesh and Rwanda, and there is no law focusing on construction machines and facilities in Tanzania. The Contractor for the construction of Haripur Combined Cycle Power Plant of Bangladesh invited operators and construction machines (not limited to heavy and light machines) from Middle East region because they have past experiences for working together in the region. According to the Contractor, it has been concluded that it was difficult to procure operators who have appropriate abilities that satisfies Contractor's demand in local.

(Tanzania)

There is no specialized standard of this country on construction machines and facilities. They are adopting international standards.

(4) Administration related to occupational safety and health

In each country, the Ministry of Labor and Employment basically has jurisdiction over occupational safety and health. Just like the development of laws and regulations, the presence or absence of occupational safety and health organizations and their forms vary among countries. It might be concluded that this is depending on the degree of maturity of social organizations relating to occupational safety and health. On the other hand, if there is an established organization, it is different story whether there are sufficient numbers of staff that can cover all industries or not.

(Bangladesh)

- Occupational safety and health is supervised by the Ministry of Labor and Employment. The Ministry has a Department of Inspection for Factories and Establishments to audit occupational safety and health.
- One problem in Bangladesh is that small size of construction is performed by entities in the informal sector to which the power of law can hardly extend, and 87% or more workers belong to the informal sector, and no education for occupational safety and health is conducted. Therefore, it is difficult to secure compliance of laws and rules. The Government established a bureau in charge and educational programs, but their abilities are insufficient.

(Tanzania)

- The Ministry of Labor and Employment has an employment division, a labor division and some agencies. Occupational Health and Safety Authority (OHSA) is one of the agencies, and in charge of occupational safety and health. OHSA has three divisions (OHS Division, Training, Research and Statistics Division, and Business Assistance Division).
- There is a legal section under the Chief Executive of OHSA, which is in charge of litigations on violation of laws.

- The Chief Executive of OHSA reports to the Permanent Secretary of the Ministry of Labor and Employment, and must give presentations to the Minister Advisory Committee.
- The Contractors Registration Board (CRB), an agent of the Ministry in charge of Public Service Management, conducts safety audit and offers guidance for construction works.

(5) Administrative organizations for supervising and licensing agencies

In Bangladesh, the Directorates or Departments in charge of occupational safety and health in the Ministry of Labor and Employment has the authority to license businesses, and exercises strong authorities for safety and health. In Tanzania, there is a Contractors Registration Board as an agency of the Ministry in charge of Public Service Management, which supervises and licenses construction businesses. The organization has an important role in securing occupational safety and health in construction industry. These organizations are considered to be able to offer incentives for securing occupational safety and health of construction businesses, but lack human resources, and are not considered to have given effective guidance.

(Bangladesh)

The Department of Inspection for Factories and Establishments of the Ministry of Labor and Employment conducts audit for occupational safety and health, and has an authority to issue and cancel licenses of construction businesses. The license may be revoked if the construction business is considered to be unqualified.

(Tanzania)

The Contractors Registration Board (CRB), an agent of the Ministry in charge of Public Service Management, has a primary role of registering all types of Contractors. All Contractors should be registered at the board under the Contractor’s Registration Act 1997. The secondary role of CRB is the control and guidance of Contractor activities and CRB audits safety of construction works by securing construction to be conducted by the registered businesses under the laws and occupational safety and health regulations. The tertiary role of CRB is to bring up local Contractors. To achieve required performance, CRB conducts training, capacity development and assistance including occupational safety and health matters.

(6) Accident reporting and response upon accidents

The countries subject to this survey have rules for accident reporting, but the rules are not fully complied with. The accident reports mainly aim at applications for workmen’s accident compensation. If the bureau for occupational safety and health is separate from the bureau in charge of workmen’s accident compensation, information may not be conveyed to the occupational safety and health bureau. There is no mechanism to share information within the Ministry.

(Bangladesh)

- Employers must submit a report monthly, quarterly and yearly concerning all labor-related matters. They should submit a report on accident involving death to the Chief Inspector of the Ministry of Labor and Employment within two working days. In the case of any injury which involves the enforced absence of the injured person from work for a period exceeding 48 hours, the Employer must register it in the accident record, and submit a report to the Chief Inspector twice a year, who will conduct investigations at his or her discretion.
- The Chapter 2 of the Bangladesh Labor Act of 2006 provides that when any accident occurs in an establishment the Employer shall give notice of the occurrence to the police within two working days, and the on-site investigation is to be carried out.

(Tanzania)

- Article 101 of the OHS Act provides that an accident involving death must be reported within 24 hours, and a trivial accident within 7 days. The Contractor must submit reports to OHSA and the Employer. In practice, most of the accidents are reported to OHSA by the Employers, and the rules are not perfectly complied with.
- Accidents must be reported in writing, and any failure to do so shall be subject to prosecution. The minimum penalty is 10 million shillings (about 500,000 yen) or imprisonment for a term of 2 months. As the country is wide and the number of inspectors is limited, penalties are not imposed actively for they do not cover all accidents. They may go to the site of accident after watching news.

(7) Accident statistics

Accident data are gathered but its precision and utilization is insufficient.

(Bangladesh)

Accident statistics are sorted out and submitted to International Labor Organization. However, they are not publicized.

(Tanzania)

Accident statistics are sorted out by OHSA and reported to SODEC. Accidents reports are often submitted to the Labor Division only to get compensation and not submitted to OHSA. The number of accidents is assumed to be more than the reported data that OHSA holds. In the sense, reported numbers for SODEC are considered estimate value. OHSA has received funds from International Labor Organization and is about to formulate a system to gather information from related parties. Under the new regulations, reports to OHSA are to be mandatory.

(8) Penalty rules

Countries targeted in the survey are in force penalty systems depending on the impact of accidents or the result of inspection. A fatal accident occurred in the construction works in Bangladesh just before the site visit by the study team. In the accident, the responsibility of the Contractor was not pursued, instead, worker's fault was focused by the inspection of police. In Japan, the responsibility of the Contractor will be strictly pursued when accidents occur at construction sites, however in many cases overseas, it is assumed that prosecution of the Contractors is not as strict as that in Japan. In general, the number of inspectors is very small, so that it is a doubt how many accidents and sites are checked by them, and how effective the mechanism of deterrence is.

(Bangladesh)

According to the Ministry of Labor and Employment, the Contractor that caused accidents is subject to the provision of penalty, and there are penalty and penal servitude. The maximum penal servitude is 4 years and decided by litigation. The business license may be canceled to exclude unqualified contractor which often caused accidents.

(Tanzania)

- OHSA have an authority to suspend construction until identified violation of laws is improved. If improvement is not made as a result of re-inspection, it imposes adjustment within 14 days or penalty. For example, work without helmet is subject to penalty.
- The Contractors Registration Board inspects construction sites, and imposes penalty when bad conditions in terms of securing safety are identified. The penalty starts from warning but fine and suspension of construction may be imposed. If the result of inspection is bad, it may change the class of registration or erase registration. There is also a provision to impose a fine of 0.5% of the contract amount.

(Rwanda)

- Penalty is imposed on the Contractor which caused accidents according to the decision, etc. of Rwandan Social Security Board.
- The Rwanda Transport Development Agency penalizes successful bidders (The Contractor, subcontractor and Consultant) for violation of laws. The Contractors are also penalized if they do not manage the sites pursuant to safety plan and method statement. It is also provided in contracts that the Contractors may be penalized if they hide any occurrence of accident.

(9) Education and training for occupational safety and health

All countries subject to the survey conduct education and training on occupational safety

and health, but facilities and trainers are insufficient, and the diffusion of education and training is insufficient in consideration of the site conditions of local firms.

(Bangladesh)

In Bangladesh, there is an education program for workers who are categorized in the informal sector but it can be said the program is insufficient. Ministry of Labor and Employment requires assistance including technical cooperation from ILO and JICA for training and education.

(Tanzania)

- The Training, Research and Statistics Division of OHSA provides various training courses. There are courses for 2 days, 5 days, 6 weeks and for first aid. There are also courses for construction industry.
- The Contractors Registration Board conducts enlightenment activities by using PR videos, TV and radio programs, and conference. It also provides site safety trainings for the Contractors. It conducts activities to emphasize the importance of occupational safety and health, and various surveys.
- The Contractors Registration Board performs trainings for many Contractors, being assisted from JICA as well. It holds 6-10 courses per year, and 50 persons participate for each course. The program enrollment fee is collected from participants but 80% of the cost is subsidized by the Contractors Registration Board. Instructors are invited from the industry. However, facilities and trainers are still in short.

(10) Safety audit and guidance

Ministries of Labor and Employment and OHSAs in charge of occupational safety and health in Bangladesh and Tanzania have divisions and departments for safety audit and guidance. They cover all industries but have insufficient staff. It is doubtful whether construction sites are fully observed. In Tanzania, Contractors Registration Board performs safety audit exclusively for construction sites, but there are only 10 inspectors in the country and it is considered difficult to cover the wide land.

(Bangladesh)

The Department of Inspection for Factories and Establishments of the Ministry of Labor and Employment is in charge of occupational safety and health, and audits the workplaces and secures safety. Any problem may be punished as a result of the audit. The Department does not specialize in construction sites in the audit.

(Tanzania)

- OHSA as the independent agent conducts safety audit on behalf of the Ministry of Labor and Employment. There are safety managers and health managers in OHS Division of OHSA for audit. The safety department conducts site inspection, report, guidance for

compliance with rules, and decides punishment. Some doctors and nurses who conduct medical investigation are in the health department.

- Labor audit is conducted by a division of the Ministry of Labor and Employment, which inspects pays and labor contract conditions.
- There are 60 inspectors in OHSA for safety audit. There are private sector inspectors as well. As OHSA oversees all industries, the inspectors are insufficient.
- In 2001, the Contractors Registration Board established an Enforcement Department, which started guidance for occupational safety and health. As a result of inspection in 2002, violations of laws were found in 63% of the total, but it reduced to about 10% of the total now.
- The Contractors Registration Board focuses its inspection on construction sites differently from OHSA. The Contractors having registered at the Contractors Registration Board will be given Accident Register Book, in which they should honestly fill the situations of accidents. An inspector will monitor compliance at the site, and write a report by referring to the Accident Register Book. Punishment will be imposed for bad situations. Punishment begins from warning but may become fines and suspension of construction.
- The number of technical inspection staff of the Contractors Registration Board is only 10 for the entire country, and they are unable to go to all sites.

(11) Qualifications for occupational safety and health/involvement of experts

OHSA of Tanzania invites and entrusts private persons to conduct safety audit by OHSA. They are assistants of OHSA and not in a position as the private Consultants with national qualifications. The Contractors Registration Board has been recruiting instructors for safety and health training it holds, but the number is insufficient.

(Tanzania)

- OHSA agrees with private persons to be the inspector for safety audit. The inspector should have licenses as an engineer, doctor, or economist. OHSA recruits private inspectors by advertising in newspapers. The number of private inspectors is the applicants to the advertisements. There are 36 inspectors. Qualifications must be authorized by OHSA. Inspectors should have instruments for inspection. The time of entrustment is 2 years. Inspection is conducted by teams, and any inspector having insufficient ability based on the monthly report shall be dismissed in 3 months.
- The Contractors Registration Board trains Contractors, and invites instructors from the industry. But the trainers are still insufficient.

(12) Workmen’s accident compensation and Contractor’s all risks insurance

Each country has legalized compensation system for deaths, etc. for occupational accidents.

As they are developing countries, the amount of compensation is small and there is no incentive for the Contractors to take costly safety measures.

(Bangladesh)

- Occupational accident resulting in death must be compensated by the Employer under the Labor Act. Also, the government has set up a fund under the Labor Welfare Act. The fund is sourced in proportion to the interests from the Employers. Though there are private insurance companies, there is no obligation to use the private insurance, and small construction companies rarely take out insurance.
- There is no compensation system for public accidents. The Contractors are responsible for compensation to the public accidents they caused.
- The Contractor of EGCB (Electricity Generation Company of Bangladesh) has purchased a workers' compensation insurance under laws.
- The FIDIC contract requires the Contractors take out Contractor's all risks insurance and third party liability insurance. Article 18 of the General Conditions of Contract used in Karnaphuli Water Supply Project requires the Contractors to take out Contractor's all risks insurance for personal accident and damage of assets under the regulations of the Government of Bangladesh. The premiums are born by the Contractors.

(Tanzania)

- The Labor Division of the Ministry of Labor and Employment is in charge of state compensation, however, its amount is generally small. An afflicted worker reports to OHSA too, but also reports to the labor inspector to get the accident notification form in order to obtain compensation. The compensation for death is 108,000 shillings (about 5,400 yen), which does not reach 100 dollars. Compensation is administered by the Ministry of Labor and Employment and not monitored by OHSA.
- Worker's Compensation Act has been enacted for compensation but the regulations have not been enacted. Under the old law, compensations were paid by the Government, but a fund was established under the new law. The Employers pay contributions at a certain rate corresponding to the number of workers, and compensations will be paid from the fund. The establishment of the system is delayed. NSSF (National Social Security Fund) can pay allowance for injuries, which, however, is different from compensation.
- The Employers and the Contractors may purchase private insurances. This is dependent on the policy of each company. Private insurances can provide large compensation. The amount of governmental compensation is very small, and large companies take out insurances.
- Compensation for any third party accident is the responsibility of the Contractors. The insurance is generally taken out for work machines and workers only.

(Rwanda)

- There is a system that the state pays compensation for the victims of work accidents. There are private insurance systems as well. For public accidents, there is also a system for state compensation. Also, there is a system of private compensation. The compensation for public accidents from the Employer side will be paid by the Rwanda Social Security Board.

(13) Summary

In occupational safety and health, mainly for the actors including the Contractors and workers, the following things are necessary.

- The norms and grounds for safe work (development of legal system).
- The incentives and legal force to comply with norms (mechanism for compliance).

Without norms, the Contractors and workers may employ the ways for their convenience and interest (oftentimes the method sacrificing securing safety). Generally norms and grounds include laws and regulations, standards, guidelines, contract provisions, and specifications. If laws and regulations, and guidelines are insufficient, the Employer which has responsibility of supervising the Contractors has to clarify the contents in contracts or otherwise.

Even if the legal system is well-developed, it is not guaranteed that the Contractors and workers, or interest-pursuing Contractors always follow it. It is important to guide, inspect and audit operations to enforce work methods and regulations, and penalty for violations cannot be omitted.

From the viewpoints above, the result of overseas survey is summarized as follows: In Tanzania, an independent Occupational Safety and Health Act and regulations focusing on construction business were developed as grounds for securing safety, and legal system to be the binding norms; In Bangladesh and Rwanda, they only have the Labor Acts and the legal system was not developed fully. Without a national standard of sufficient contents, or Employer's independent standard, or contractual provisions, the Employer and Consultants may not be fully guided.

Concerning compliance with and the legal force of laws and regulations, the interviewed Consultant commented that "the obligation for safety and health is not observed at workplaces in Bangladesh." The legal effectiveness is therefore considered to be insufficient.

On the other hand, if there are sophisticated laws and/or regulations like in Tanzania, there is the case that the number of staff in the concerned organization to enforce them is insufficient, and the subjects of safety audit and identification of accidents are inadequate. In the case, it cannot be said that the system is effective.

In the ODA construction projects, the Contractors are obliged to take out state compensation, however the amount for death compensation is very small compared to

Japan, thus it is felt that the weight of life is small. Upon accident, the social sanctions and pursuit of responsibilities of Contractors are not severe, and it is doubtful whether the penalties are effectively imposed. Accordingly, there is little incentive to pay costs in safety measures.

The lack of awareness for securing safety is seen not only in the Contractor but also in the Employer. A person in charge of the Contractors Registration Board in Tanzania commented as follows: “The Employer, the Consultant and the Contractor cause problems by pursuing respective interests in executing a project. The Employer does not pay attention to secure safety, as a result, it does not lead the Contractor to comply with laws and regulations. Even in the tender documents, safety is not prioritized, and generally, the Employer considers safety cost to be unnecessary, and does not incorporate it in the budget. The Contractor therefore considers safety cost to be an extra cost, which hinders compliance with laws and regulations. Also, the Consultant coordinates the Employer and the Contractor in between, but they act more than likely in accordance with the intentions of the Employer as the other side of the contract.” It cannot be said that the social awareness for securing safety is high.

A person in charge of the Contractors Registration Board commented as follows on the other hand: “When CRB was established, we thought it was not necessary to be involved in occupational safety and health. Now, we think it important to be involved to manage the industry. Safety, productivity and quality are required at all construction sites. Productivity will not increase without securing safety. We are acting for this purpose.” It is expected that the awareness of the industry on safety will be improved.

1.2.2 Current Status and Issues on Safety Management

(1) Safety management by the Employers

1) Current status of safety management by each Employer

The results of interview from and questionnaire to the targeted Employer in the study are summarized as follows:

Table 1.2.2 List of Employers for Interviews

Subjects	・EGCB : Electricity Generation Company of Bangladesh (Bangladesh: New Haripur Combined Cycle Power Plant Project) ・Chittagong Water Supply and Sewerage Authority (Bangladesh: Karnaphuli Water Supply Project) ・Ministry of Communication Road and Highway Department (Bangladesh: Eastern Bangladesh Bridge Improvement Project) ・TANROADS : Tanzania National Roads Agency (Tanzania: The Project for Widening of New Bagamoyo Road) ・Rwanda Transport Development Agency (Rwanda: The Project for Construction of Rusumo International Bridge and One Stop Border Post Facilities)

[Employer's standards and guidelines for safety]

- The laws specializing in occupational safety in construction works do not exist in the surveyed countries other than Tanzania. The construction contracts only cite the contents provided for in the Labor Relations Act and are not specific.
- Concerning safety, each Employer has no specialized standards or guidelines. The standards for occupational safety and health are provided for from the Contractor, EPS contract (design and execution contract), and the Contractors' own standards.

[Initiatives upon tender or contracting and contractual provisions]

- There are items for occupational safety and health, and traffic control in the specifications of contracts. However, the contents are not generally specific, but state that the work shall be implemented in accordance with laws. It is provided that the primary responsibility for safety lies in the Contractor.
- TANROADS prescribes that a contract may be cancelled if the Contractor does not comply with laws and contracts under the Occupational Safety and health Act of 2003 and the Environmental Management Act of 2004. If a Contractor does not comply with laws or contracts, the contracts may be cancelled under the Regulations for Management of the Contractors Registration Board. Penalty shall be imposed on the Contractor, and the registration may be downgraded.
- The Rwanda Transport Development Agency creates Environmental and Social Management Plan (ESMP) under the Environmental Impact Assessment which should be conducted before each project (this is mandatory under the Environment Act), and

incorporates safety measures therein and provide it to the Contractors. The Contractors are obliged to maintain safety management of the site thereunder. The Rwanda Transport Development Agency is monitoring the activities day by day.

- The Contractor shall receive the verification and an approval of the safety management plan and the executing plan from the Consultant officially approved by the Employer. The Contractor is required to stipulate certain items in the specifications of the safety management plan. The items depend on the Employer but examples of required items are shown below.

· Formulate rules and policies	· Obligation of workmen's compensation
· Holding safety meetings before commencement of work	· Control of machinery handling hazardous materials
· Preparing work procedure and standards	· Compliance with labor laws
· Safety audit by the Employer	· Working hours
· Measures against noise	· Lodging
· Providing medical staff, first-aid, and ambulance	· Wage
· Safety and health record	· Cleaning
· Providing the specialist for occupational safety and health	· Fire prevention
· Supplying PPE (personal protective equipment)	· Emergency response plan
· Safety and health signs, no-trespassing measures, training	

- There are some Employers requiring HAZOP study for evaluation and modification of occupational safety and health activities at design stage.
- There were no Employers implementing initiatives for safety management by separately appointing a person in charge of safety in the contracts with the Consultants.
- There are some Employers who have introduced systems to disqualify businesses in the black list of international financing institutions or Employer organizations in tender.

[Safety management during construction work]

- The Consultant will examine the safety plan and the construction work plan of the Contractor, and check whether the work is done by the Contractor according to the plans. The Employer will receive reports from the Consultant and approve them.
- Mostly, the staff in charge of the Employer and the Consultant monitor work and safety at the site every day. The Road and Highway Development of Bangladesh has a Safety Division, which inspects, by a person in charge of work, the site from the viewpoint of safety for each project.
- In Tanzania National Roads Agency (TANROADS), the staff of the Employer does not carry out patrolling inspection but the project engineers of TANROADS (the head office) and its regional office attend a monthly meeting, and go to the site as necessary. The Contractor will prepare a report on safety, environment and social matters, and the

Consultant monthly sends the report together with its own report to TANROADS, which monitors it.

- If the work is not implemented in accordance with the safety plan and the construction work plan, the Contractor will receive a warning, and if the work is in violation of laws or the safety plan, the work may be suspended.
- In Tanzania, the Occupational Safety and health Authority (OSHA) has been conducting surprise inspections, and penalty will be imposed on any violation.
- The Contractor may be checked by an insurance company or quality certification organization.
- Chittagong Development Authority said that the Employer will assist the Contractor for discussions with a road administration or a police.
- Only the Rwanda Transport Development Agency said that it uses occupational safety and health management system, and applies OHSAS.

[Responses to occupational accident]

- Many Employers have made provisions for reporting of accidents, first-aid, conveyance of the injured and notice to the police in the required items in technical specifications and safety plans, and demand prompt accident reports from the Contractors.
- As the Consultant is stationed at the site, and the Employer staff monitors the site day by day, it was said that no accident can be hidden.
- As penalties for accident, TANROADS has no construction evaluation system, which does not reflect accidents. The punishment will be given by the Contractors Registration Board, OHSA, and NEMC in accordance with laws and regulations.
- In Rwanda, any work accident is investigated by the police, and punishment will be given according to the decision of Rwanda Social Security Board.
- In Bangladesh, the governmental regulations demand to take out Contractor’s all risks insurance for an accident resulting in injury or death and property damage. The premiums are borne by the Contractors.
- In Tanzania, compensation for the employee who suffered accident is according to the compensation system of the government. The Contractor shall take out 3 kinds of insurance: insurance for the construction objects, third party liability insurance, and insurance for injured workers.
- In Rwanda, there is a system of government compensation to the victims, and also private insurance systems.

[Prevention of public accidents]

- Protection of the third parties is the responsibility of the Contractor. The Contractor shall compensate third party damages resulting from the work. The Employer shall guide the Contractor and make coordination with road administrator, telephone company, gas

company as well as the police. The Employer will give information on works to the related parties, but the actual consultation is conducted by the Contractor.

- The causes of public accident include inappropriate and insufficient traffic control, explosion at quarry or roads, access to the site, insufficient signboards at the site, transportation by trucks, and discharge of dust.
- For example, in the contracted specifications Employers recruit traffic control personnel, request the local police for cooperation and liaison, and request overnight works to prevent traffic accidents and congestion.
- Any public accidents in Bangladesh and Tanzania will be covered by the third party liability insurance. In public accidents in Rwanda, there is a system that the government makes compensation, and also private compensation system. Compensation to the public accidents from the Employer side will be made by the Rwanda Social Security Board.
- Each Employer subject to this survey has no special guidelines for preventing public accident. TANROADS has general guidelines including the Environmental Guidelines for the Road Sector of 2009, the Environmental Code of Practice for Road works, the OHS guidelines of 2003 and the road safety audit guide. The environmental guideline for the road sector covers workers as well as public safety. To avoid entry of the public or children, the site is generally separated by fence, barricade, or tape. Watchmen will be stationed until the end of work period. The guidelines are based on the Environmental Management Act. Contracts have provisions to refer to the guidelines.

[Others]

- TANROADS commented that it would be desirable to have simple, useful and practical guide as the laws are difficult. TANRODS has materials at the level of safety provisions written on small placards only.
- Rwanda Transport Development Agency commented that it will have provisions for developing safety management guidelines to clarify roles in safety management, and to the effect that works will be subject to the safety management guidelines during work. It also expects that the Contractors and Consultants incorporate best practices in the overseas concerning civil engineering works.

2) Issues in safety management by Employers

Under the survey, the initiatives for safety management by Employers varied by country and by institution. From the results of site survey, exchange of opinions and questionnaires, some issues will be reviewed. The review will be arranged by division into “Manpower,” “Contracts,” “Management” and “Work environment” to maintain continuity with the survey in fiscal 2011.

a. Contracts

If the national laws, regulations, and standards are not well developed for securing safety

in construction works, the Employers should indicate specific standards to supplement them. Employers have safety items in the general terms and conditions of the contracts or the specifications. However, the provisions only indicate matters to be covered by the basic concepts or the safety plan, and do not instruct or clarify the specific safety activity contents and standards for the Contractors.

In the agreement with a Consultant, there are no special conditions or provisions for safety (e.g. appointment of Safety Manager of the Consultant). It treats safety management as a part of normal construction management, and does not provide active safety management.

b. Manpower

Even if the Employer checks the site day by day, safety management is not necessarily sufficient as a result of observing the site conditions. This is also due to the Contractor's capacity for securing safety and the guidance by the Consultant, but unsafe conditions are considered to be overlooked due to the insufficient knowledge and experience on safety of Employers.

The Employer cannot take the lead in safety, and appoint a person who has sufficient managerial abilities, and is dependent on the Contractor or Consultant for safety management. Also, there are cases that an Employer cannot give guidance so that construction may be executed according to the safety plan submitted by the Contractor. As a result of reliance on the ability of the Contractors, safety management greatly differs depending on the ability of the Contractor even under the same Employer.

c. Management

There is no organization which has unique safety guidelines as an Employer, and the specific laws and regulations applying to construction works are not developed well. Therefore, unified management for securing safety, and guidance with legal force cannot be executed.

If there is any problem in the construction site, penalties such as suspension of work will be given by the Employer. In the recent accident resulting in death in a site in Bangladesh, the Contractor itself suspended the work at the site. As compared to the response after an accident in Japan, the response was not strict and it does not seem that the Employer took the initiative.

Also, the Employer does not evaluate the construction by the Contractor, and the system to disqualify Contractor and to grant incentives against accident is not working.

d. Working environment

If a site is in a remote area, it will be far from the office of the Employer. Then, the Employer itself cannot supervise the site every day, and the chance for timely guidance may be limited. In a site on the border area of two countries, the national policies of both countries and the timing of construction management may differ. The Contractor has to

deal with double procedures for each Employer, thus the project environment may not be favorable for securing safety.

Concerning construction periods, Consultants commented that “construction periods are determined from the viewpoint of budget only, and not from facility functions and operation, and the schedule control at sites is sometimes severe. Instead of organizing the work by construction periods currently depending on budgets, it will be desirable that the work periods are flexible.” Unreasonable schedule leads to selection of construction methods that sacrifice safety, and there is a room to review how to set the work periods.

Local residents are not familiar with large-scale construction and large construction machines, and come to the site with curiosity. If the residential area is close, construction vehicles and residents come in contact. On the other hand, there are persons who illegally build a house close to the construction site, and claim for compensation for dust, vibration and noise. The Employer should voluntarily educate, negotiate with and guide the residents in cooperation with the local administration for safety aspects.

The issues of safety management by Employers are arranged as follows:

Table 1.2.3 Issues on safety management in Employers’ side

	Background	Issues
Contract	· Laws, standards, and Employers’ guidelines are not developed well. · The contractual provisions are limited to basics only.	· Specific safety activity contents of Contractors and Consultants are not clear.
	· Immature awareness of Employers; budget shortage.	· The active initiatives for Consultants, etc. (appointment of Safety Manager, etc.) are insufficient.
Manpower	· Insufficient knowledge and experience on safety on the part of Employers	· Appointment of human resources having safety management abilities cannot be done. · Dependence on the Consultants and Contractors
Management	· Laws, standards, and Employers’ guidelines are not developed well.	· Unified management and binding guidance cannot be made.
	· Insufficient safety management abilities	· Effective measures such as penalties cannot be made.
	· No introduction of work evaluation system	· Participation of unqualified Contractors · The incentives against accidents do not work.
Working environment	· Construction in remote areas	· Timely guidance cannot be made from Employers.
	· Setting work periods based on budgets	· Influence of severe schedule control on safety
	· Proximity of the site to the residential areas	· In cooperation with the local administration, education, negotiation and guidance for the residents are needed.

(2) Safety management by the Consultants

1) Current status of safety management by each Consultant

The results of interview and response to a questionnaire to the targeted Consultants in the study are summarized as follows:

Table 1.2.4 List of the Consultants for interview

Subjects	· Bangladesh: New Haripur Combined Cycle Power Plant Project · Bangladesh: Karnaphuli Water Supply Project · Bangladesh: Eastern Bangladesh Bridge Improvement Project · Tanzania: The Project for Widening of New Bagamoyo Road · Rwanda: The Project for Construction of Rusmo International Bridge and One Stop Border Post Facilities

[Contract provisions, etc.]

· There is no condition for safety management from the Employer (appointment of person in charge of safety, etc.) upon contracting for consulting services, and only compliance with the laws of the subject country is generally provided for.

· The specifications of safety management at the Project for Widening of New Bagamoyo Road are just copied from applicable provisions in the standard specifications of JICA. The construction was exercised under the Grant Aid, and use of any form other than the form of contract for a Grant Aid project may be rejected upon certification. It takes much time to incorporate safety items in the contract from the current standard. The construction contract is a grant construction and JICA standard is applied. It mentions about securing safety in a sentence only. The specifications of the TANROADS have only some descriptions about safety during works.

· The Contractors are responsible for safety and health matters, and in the case of violation, Consultants will instruct Contractors to improve the situations. If the Contractor and the subcontractor violate any law, the contract specifications with the Employer are limited, and there is no provision on penalties. Actually, there was no case of a Consultant judging violation of laws. It was commented that the violation would be under the judgment of the agency supervising occupational safety and health.

[Safety management activities]

· Consultants check whether a work is in compliance with the specifications and the safety plan day by day, and guide the relevant parties to comply with them. There is no checklist in particular.

· In the Project for Widening of New Bagamoyo Road, it was an obligation to submit a method statement. As no safety plan is obligated to be submitted, safety management methods are incorporated in wok plans for major types of work.

· There are no guidelines for safety management. Safety plans are prepared with reference to contract specifications, safety and health pocket manuals, demanded insurance, past experience in construction and work methods.

- The examples of safety management include periodical inspection by both the Contractor and the Consultant, checking the Contractor's safety management system at the monthly meeting, implementation of safety patrol with participation by the Employer other than the site bodies, and performance of safety committee meeting.
- The Project for Construction of Rusmo International Bridge and One Stop Border Post Facilities is a border project and there are two Employers from Tanzania and Rwanda. Concerning submission of a report to the Employer, Tanzania does not accept mails. It is a burden of the Consultant to go to Dar es Salaam several hundred kilometers away from the site requiring a few days in order to make explanations, which requires much time and labor for the Consultant.

[Restrictions and disturbances in safety management]

- Though Bangladesh has a Bangladesh Labor Act (2006), there were comments that it was not considered to be applied to sites, and that, due to the competitive bids, a company focusing on occupational safety and health was disadvantageous as compared to other companies.
- If a fatal accident occurs in Bangladesh, the police will be notified and investigate the case, and it is only confirmed that very low compensation as compared to international standards was secured to be paid to the bereaved family. There was a comment that it cannot motivate promotion of safety at sites, countermeasure cost for which would be high.

[Response to occupational accident, and occurrence of accident]

- In Bangladesh, the injury due to accident will be covered by Chapter 7, Article 150 of the Bangladesh Labor Act as "Employer's Liability for Compensation." It is obligated as "Contractor's Workmen's Compensation Insurance" in the general terms and conditions of the contract.
- If any serious accident occurs, all works will be investigated and the works will be suspended until preventive measures are taken. If there is any serious violation of safety rules, all works will be suspended until safety and preventive measures are taken for all works. The Consultant or an Employer may exercise authorities to dismiss from the site employees or project managers of the Contractor and subcontractors.
- There are the Consultants who do not know the legal system concerning the investigation agency upon occurrence of accident.

[Prevention of public accident]

- There are no guidelines pertaining to prevention of public accidents. Safety plans for prevention of accidents are prepared by the Contractor and approved by the Consultant.
- There are many traffic accidents in Bangladesh but most of the accidents and injuries stem from overlooking safety control facilities, guide posts and traffic signs. They have become problems of the entire country.
- In the Project for Widening of New Bagamoyo Road, steering committee was held to

explain the construction to the roadside residents, and the site side mainly explained the work schedule and outlines.

[Others]

The following comments were made at the interviews:

- Audit by an independent organization, human resources, JICA, etc. must be implemented, and if the safety standards are not maintained, safety management of an international standard should be performed by applying severe punishment such as temporary suspension of qualification to participate in tenders, etc.
- Most of the locally employed workers have no basic knowledge for securing safety. Site education should be conducted in parallel with the site works, and the risks of fatal accidents and injuries are aggravated extremely in developing countries.
- In assistance projects in developing countries, the guidelines provided by advanced countries or international organizations conflict with the domestic laws. The site is often at a loss what to do for response to each case (e.g. payment for residents relocation), and will be busy responding to the differences in each rule.
- In ODA Loan project, the safety management at the site where the local firms or firms from the third countries are in charge of construction, the conditions of the counterpart will be reflected more strongly than the Grant Aid construction project. There is also a problem of whether the Financer can exercise its influence substantially (weak in reality). Though safety management is important, there are works focusing on quality management and progress control under the circumstances, and the Consultant often cannot emphasize safety management only.
- As an expectation on improvement of safety management for the Employer, the Consultant and the Contractor has its intentions on progress of the work concerning work period, but securing safety will be the responsibility of the Contractor once the construction is started. Considering the layout of equipment by the Contractor, operation situations and the intentions of the Employer, it would be desirable to move away from work periods currently depending on the budget to flexible work periods, though it may be difficult to do so in relation to the Authority to Pay.

2) Issues in safety management by the Consultants

Out of the initiatives for safety management by the Consultants, some issues are reviewed as a result of site tour, exchange of opinions and questionnaires. The review will be arranged by division into “Manpower,” “Contracts,” “Management” and “Working environment” to maintain continuity with the survey in fiscal 2011.

a. Contracts

The provisions of the contract with the Employer concerning safety do not include appointment of Safety Manager, etc. by the Consultants, special work instructions for safety, and generally state compliance with the laws of the country. The Consultants

manage safety as part of wide ranging construction management such as quality control, schedule control, contractual businesses, and technical examination, and do not have a system focusing on securing safety.

The contractual specifications between the Consultants and the Employers against violations by the Contractors are limited and have no penalties. There was no case that the Consultant judged violation of laws, and the administrative organization in charge of violations with executive power should deal with the case. Considering the power given to the Consultant, it is impossible to have excessive expectations on the Consultants for securing safety.

b. Manpower

In construction, the legal systems and regulations vary among countries. Often, complex regulation systems are prescribed by each organization, and they are frequently changed. The Consultants do not know in detail the regulations for occupational safety and health nor they have insufficient knowledge about the administration in charge of infrequent accidents.

In the work site, there is often a language barrier, and they rely on subcontractors who know languages and can communicate with individual workers. Also, work plan must be fully disseminated to workers through the local staff of the Contractor. It is irritating that the Consultants cannot guide or confirm directly.

c. Management

The guidelines and laws for safety management are underdeveloped, and the guidance on the Contractor is not binding. Some Contractors may not obey the guidance from Consultants. Disobedience of the guidance may result in suspension of construction, but guidance of the Consultants is ineffective and actual management is difficult due to the intensions of Employers.

Submission of safety plan may be delayed due to insufficient experience, abilities and awareness. There are Contractors and subcontractors who do not construct in accordance with the submitted plans, which increase burdens on safety audit and guidance.

Some constructions emphasize quality control and process management, and Consultants cannot focus on safety only.

d. Working environment

The construction site may be far from the office of the Employer, and it takes time to submit reports to the Employer and to have consultations with the Employer, or to get approval of the Employer, which hinder appropriate site management.

A summary of issues of safety management by the Consultants is listed below.

Table 1.2.5 Issues on safety management in Consultants' side

	Background	Issues
Contracts	· Immature Employer awareness, shortage of budget	· Insufficient active safety initiatives (appointment of Safety Manager, etc.)
	· Limited specifications in contracts	· No power to judge violations of law by the Contractor and impose severe sanctions.
Manpower	· Complex legal system and regulations, frequent changes · Insufficient investigations	· Lack of the knowledge in occupational safety and health laws, and related regulations
	· Language barrier	· Incomplete communications with the workers · No direct guidance and confirmation
Management	· Underdeveloped laws and regulations, and Employers' guidelines	· No binding guidance can be given.
	· Insufficient experience, abilities, and awareness of the Contractors.	· Safety audit and guidance are burdensome.
	· Insufficient awareness of the Employer. · The issue of setting the construction periods	· Quality and schedule controls are emphasized, and cannot focus on safety management
Working environment	· The construction site is remote.	· It takes time to submit reports to and consult with the Employer, which hinders appropriate site supervision.

(3) Safety management by the Contractors

1) Current status of safety management by each Contractor

The results of interview from and questionnaire to the targeted Contractors in the study are summarized as follows:

Table 1.2.6 List of Contractors for interview

Subjects	・Bangladesh: New Haripur Combined Cycle Power Plant Project ・Bangladesh: Karnaphuli Water Supply Project ・Bangladesh: Eastern Bangladesh Bridge Improvement Project ・Tanzania: The Project for Widening of New Bagamoyo Road ・Rwanda: The Project for Construction of Rusmo International Bridge and One Stop Border Post Facilities

[Safety standards and contractual provisions]

- The safety plan is prepared by a Contractor for submission to the Consultant, and the Contractor resubmits the plan modified in response to instructions from the Consultant for approval. If any change in the work may pose a potential risk, the safety plan will be modified.
- The safety plan will not be an original product of the Employer but prepared on the basis of contracts, related provisions in laws, materials of the company, and past materials.
- A Contractor from Bangladesh commented that there was a law for occupational safety and health but its application was insufficient; and the Contractor was responsible for safety management, which is conducted under Safety Guideline and Rules of the Contractor.
- In Tanzania, it was commented that they had unique guidelines and standards related to occupational safety and health which apply to construction works, and the Contractor did not necessarily had their knowledge. Ministry of Works, Ministry of Labor and environment-related ministry suddenly visit the site, the status is confirmed and suggestions for improvement of the site are given.

[Securing safety during construction]

- Each company conducts safety activities, inspections, and audit activities by setting the daily, weekly or monthly safety management cycle. Some companies have taken initiatives to achieve safety goals such as no-accident hours or near-miss cases. Major activities are summarized as follows:

Timing	Activities
Day	・Morning assembly, radio exercise
	・Safety meeting
	・Checks before work, toolbox meeting
	・Work guidance
	・Patrol by the person responsible for the site
	・Safety steps coordination meeting
	・Checks after work
Week	・Safety steps coordination meeting
	・Weekly inspection
	・Weekly cleaning
Month	・Safety meeting
	・Accident prevention committee meeting
	・Monthly inspection
Others: as needed	・Education of new entrants
	・Joint inspection with the engineers of subcontractors

- The level of completion of PPE, warning devices, fire extinguishers, safety signs in the local languages and other provision of safety environment vary among companies.
- A Contractor or subcontractors provide local workers with PPE, but as the local workers lack in-depth understanding of safety and the significance of wearing PPE, continuous guidance is needed.
- Local workers and residents have no safety consciousness and it cannot be said that they obey instructions of the Contractors 100%. For violations of safety by workers, some Contractors warn them orally and in writing, and dismiss those who received warnings several times. On the other hand, there are the Contractors who give incentives by commending the best worker (with extra prize) upon safety conference.
- Though the level is different depending on country or site, there are the Contractors who bring skilled workers used at other sites in the overseas together with construction machinery, as the skills of operators are low. As some machinery and equipment are secondhand, there exist potential risks.
- Some sites assign 2 local staff (ex-policemen) employed by the Contractor for safety management.
- The factors impeding safety management were said to include bad traffic manners, many ill-maintained vehicles causing congestion, heavy rainfall during a short period, and difficulty in obtaining weather information.
- As one of the site activities, there were cases where safety signboards were made and erected in the local language.

- Procurement of temporary materials and safety materials is generally difficult and differs among sites, but they say they can locally procure materials to some extent.

[Subcontractors concerning safety management]

- Subcontractors are evaluated differently among countries and sites. In the Project for Widening of New Bagamoyo Road, they are in the top 4 in the country and the safety awareness is high as compared to other operators in the country. In the Karnaphuli Water Supply Project, the safety management by subcontractors was bad, and they do not sometimes follow the safety and health plan submitted by the Contractor.
- There was a comment that full-time workers have relatively high safety awareness, but most of the workers are unskilled workers with low safety consciousness and lacking abilities to foresee danger. In the Karnaphuli Water Supply Project, only some workers wear PPE, and the Contractor commented that they had to use extra manpower to monitor the works by the workers.
- The subcontracts have no special provision on penalty upon occupational accident. There are the Contractors who have safety provisions in the Contractor agreement, and the main Contractor gives improvement instructions if the response by the subcontractors is insufficient.

[Responses to occupational accident]

- Accidents must be reported early.
- There are some Contractors who do not know specifically any penalty as a national system.
- In Tanzania, the police will inspect the site to determine whether the case was willful or not. If judged not willful, the procedure goes to compensation. Instead of utilizing the government compensation, payments will be made from the insurance held by the subcontractor. The amount of compensation by the government for death or injury is low, and actually the private insurance is used to compensate 10 times as much as the state insurance.
- At a site in Bangladesh, there was an accident in which a worker died due to landslide while laying a pipe in the cut ground. The police came and investigated but it was determined that the safety management system of the Contractor was not a problem, and carelessness of the worker was the cause. In Japan, the case would be closely investigated as to the safety management by the Contractor.
- The labor law of Rwanda has a system of governmental compensation to the victims of occupational accidents. Also, there is a social security system. Compensation for any fatal accident is covered by the insurance (workmen’s compensation insurance, public accident insurance) which the Social Security Fund and the Contractor joined.

[Initiatives to prevent public accidents]

- There is no guideline on prevention of public accidents and traffic accidents.
- The causes of public accident are lack of safety awareness and ignorance. Repeated education is needed.
- The Contractors try to have good relations with the neighboring residents and local police

office. The project is explained and the work is disseminated to the neighboring residents, but education program for children is also necessary.

· Concerning guidance of vehicles passing near the construction site which may lead to public accidents, the response is varied among Contractors. Also, the fences and approach to the site greatly differs among sites, and some sites were strictly warned by the Consultants.

[Others]

· The difficulty in securing safety and the scale of required safety facilities differ depending on the types of work, and the site ground conditions. Many persons call for securing “budget” for securing safety. Also, many calls for setting sufficient work periods for safe work.

· Each country has no good safety management. It was commented that it was difficult to implement Japanese way of safety management because it was a work led by Japan.

2) Issues of safety management by the Contractor

Concerning the Contractors’ initiatives for safety management, the issues will be reviewed from the results of site survey, exchange of opinions and questionnaire. The review will be arranged by division into “Manpower”, “Contracts”, “Management” and “Working environment” to maintain continuity with the survey in fiscal 2011..

a. Contracts

The surveyed countries are generally underdeveloped in terms of laws and regulations on occupational safety and health. And Employers do not have independent guidelines. The specific instructions in contracts are limited to the basic instruction of compliance with laws and regulations. Therefore, the Employers and the Consultants give guidance and approvals, and the Contractors prepare safety plans and method statements according to their norms for safety management. As a result, the Contractors’ safety awareness, execution technology levels, and corporate policies result in great differences in safety management, the level of which is dependent on the Contractor.

Assuring safety requires considerable costs in terms of personnel and materials, and, under the current contracts, the cost is included in the total construction cost and not a single cost item. The size of the cost corresponding to the site properties is not considered. Some Contractors bid for the contracts without assuming required costs. Some Consultants said that “a company emphasizing safety and health is disadvantageous against other companies without such emphasis. If the safety cost is not included in the estimated construction cost of the Contractor, sufficient response is not expected and issues will occur in safety management.

b. Manpower

Workers’ safety awareness is weak, their risk prediction ability is low and there are

differences in levels between fulltime employees and short-term employees. Contractors have to make efforts in monitoring, educating and guiding workers.

The skilled workers and the professionals have generally low abilities with some differences among countries, and some contractors invite skilled workers they have used from overseas to secure quality including safety and productivity.

Subcontractors' safety management ability is low as well. There are some companies which do not obey instructions from the Contractors or safety plan submitted independently, and there are some examples that the Contractors cannot fully control subcontractors. On the other hand, there are the Contractors which use the best local companies which have high safety awareness. Selection of local subcontractors is an important element in securing safety.

The Contractors themselves do not necessarily know the laws and standards for occupational safety and health of the country in detail. If the Contractor is a Japanese company, great errors will not be made often by taking safety measures which are as same as those in Japan. It may make a mistake in response to contingencies such as accident, and may be held to be in violation of laws and regulations.

c. Management

Safety plans are prepared by the Contractors with differences in the contents. Because some Contractors lack safety awareness and safety costs, they do not necessarily obey the safety plan in construction to pursue interests. The Consultant is in a position to guide the Contractors. Because binding guidance cannot be made by the Consultant, the Contractors may not respond and unsafe works may not be improved.

According to the contents of contracts between the Contractor and the subcontractor, the contractor cannot give strong instruction to the subcontractor, which may not follow the instructions from the Contractor. For example, the Contractors without sufficient managerial abilities cannot properly guide or punish workers violating safe working practices and the unsafe behavior cannot be eliminated.

Due to the low safety awareness and the stance of pursuing interests, there were cases where off-limit fences and entrances at sites were not erected, or management was insufficient even with such devices, residents and workers cannot understand the signs that are not written in the local language, and other careless responses were found.

The Contractors make work plans and safety plans based on own know-how and past cases, but the level differs among companies. In the case of a Japanese or Korean company, the safety management system is substantial with workplace patrol, unique risk assessment system, employment of occupational safety management, and being checked by quality control certification organization. In the case of local Contractor or Contractor of other country, such system is not employed and the level of safety management differs among Contractors.

The level of compensation to the victim of occupational accident is not high but covered by insurance. The police investigation for the cause of the accident is not severe, and the financial and social penalty on contractors which caused accidents is not severe. On the other hand, materials and equipment for safety and temporary structures cannot be easily

procured at the sites, and the incentive for safety measures by paying some costs does not work.

d. Working environment

The local residents are not familiar with a large-scale of construction work, rarely have risk awareness, and come to the site. In particular, children are interested in work machines and the site, and considerable care is needed when the residential areas are close. Public relations for and education of residents will become necessary. In a country where traffic manners of ordinary vehicles are bad, utmost care is needed to prevent accidents with the construction vehicles, and to separate the site from ordinary vehicles.

Issues of safety management by the Contractors are arranged as follows:

Table 1.2.7 Issues on safety management in Contractors' side

	Background	Issues
Contracts	· Underdeveloped laws and Contractors' guidelines · Contractual provisions do not indicate specific safety measures.	· The level of safety management is up to a Contractor, and differs among construction projects.
	· Safety cost is not separately provided. · Competition for a tender reduces safety cost.	· Contractors who do not estimate required cost for securing safety.
Manpower	· Low safety awareness and risk prediction ability of workers · Low abilities of skilled workers	· Unsafe behavior by workers and skilled workers
	· Lack of awareness, experience and abilities for safety management by subcontractors · Lack of managerial ability by the Contractors	· Neglect of unsafe behavior by workers and skilled workers · Unsafe works by subcontractors
	· Contractors have little knowledge on laws and standards	· Possibility of violation of laws, and unsafe works · Wrong response to contingencies
Management	· Lack of safety awareness and budget, and pursuit of interests by the Contractors · Powerless guidance by the Consultants · Problem of subcontracts and lack of power to manage subcontractors by the Contractors	· Execution and neglect of unsafe works · Insufficient safety measures
	· Differences in experience, abilities, awareness, and corporate policies of the Contractors	· The level of safety management differs among Contractors.
	· Low compensation for accidents to workers · Unexacting pursuit of responsibility of the Contractor for accidents · Difficulty in procuring materials and equipment for safety and temporary structures	· Reduction of incentives to pay costs for safety measures
Working environment	· Ignorance of local residents on danger of works · Interests in construction work · Bad traffic manners	· Entry of residents into the construction site and occurrence of accidents · Accidents between ordinary vehicles and construction vehicles

(4) Issues for securing safety

Concerning issues of the parties related to construction, the example of Bangladesh, which had several constructions in the current survey, is depicted in Figure 1.2.1. The parties directly related to the constructions including the Employers, Consultants, Contractors, subcontractors and workers have their own issues. The donor, administration, and society forming the environment have issues to overcome.

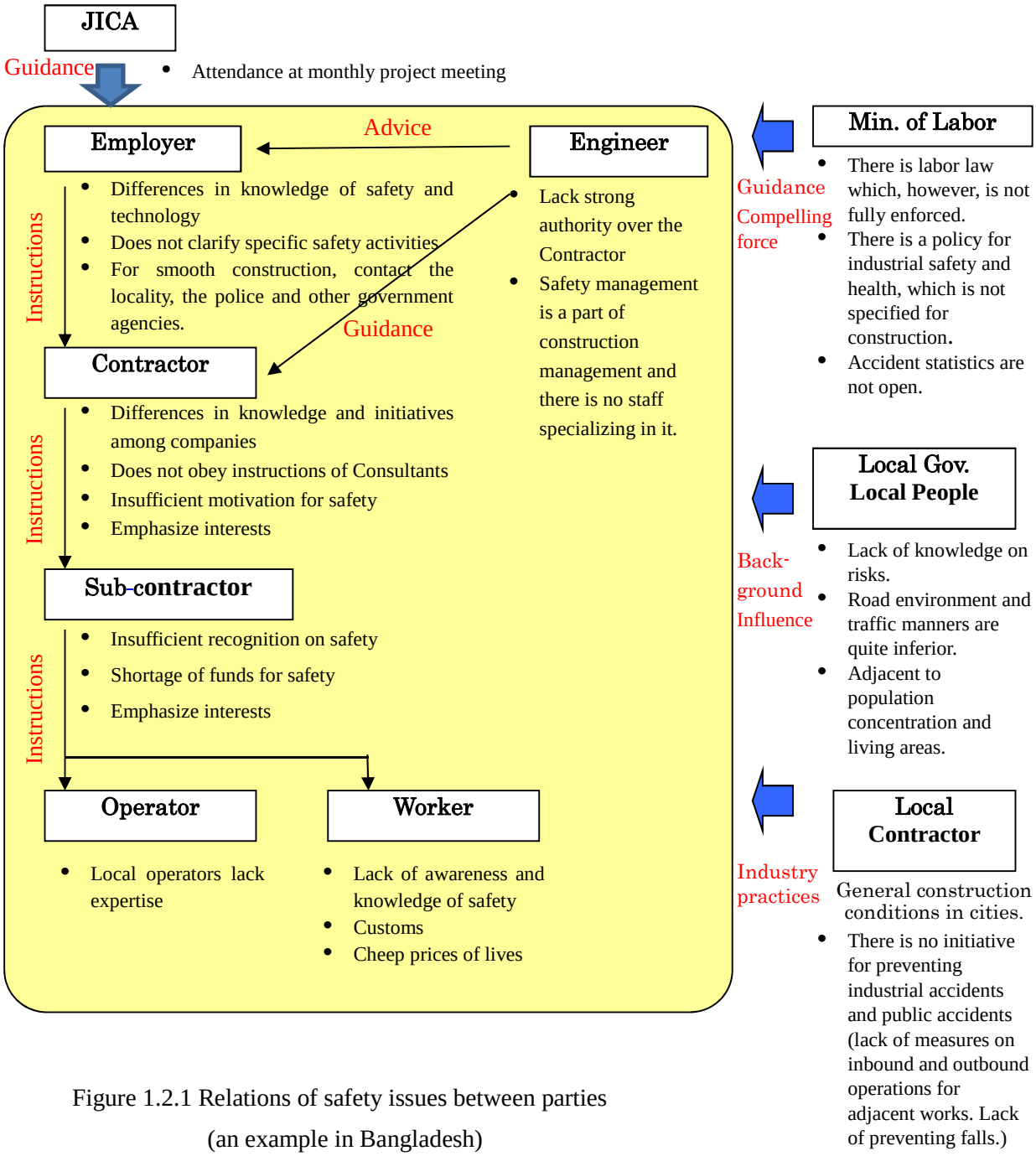


Figure 1.2.1 Relations of safety issues between parties
(an example in Bangladesh)

(5) Directions of considering issues based on the field survey in developing countries

In the Fiscal 2011 Project Research "Study on Safety Management in ODA Construction Projects," the following 11 items are proposed as measures to be reviewed and whether they should be incorporated in the future by JICA. (For details of each item, see the relevant reports.)

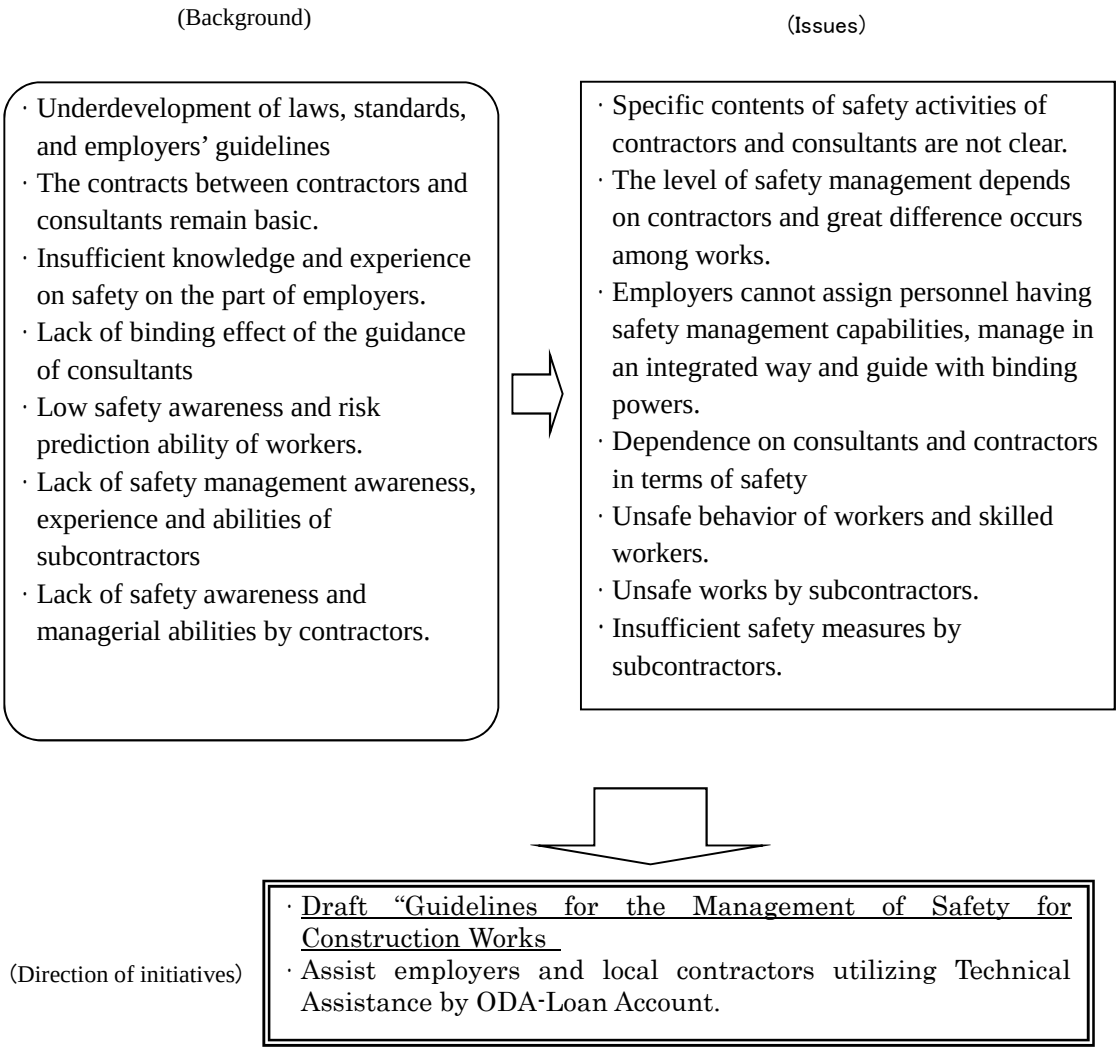
- Add safety provisions to the E/N of Grant Aid projects.
- Add "Safety Consultants (tentative name)" to JICA Preparation Survey.
- Carry out survey, design and estimation by "Safety Consultants (tentative name)".
- Review standards of the "Projects requiring special care on safety measures in construction".
- Draft "Safety Management Guidelines (proposal)".
- Establishment of the "Safety Examination System for ODA Construction Projects (tentative name) (proposal)".
- Draft "Guideline for Preventing Public Accidents (tentative name) (proposal)".
- Assistance to the Employers and Contractors utilizing Technical Assistance by ODA-Loan Account.
- Improvement of accidents reporting system
- Improvement of responses to any accidents
- Review of measures against serious accidents

This study aims at drafting "Guidelines for the Management of Safety for Construction Works (tentative name)" integrated by "Safety Management Guidelines (tentative name) " and "Public Accident Prevention Measures Guidelines (tentative name)."

As directions of initiatives for the major issues extracted during this survey, how "Guidelines for the Management of Safety for Construction Works" subject to this study and the measures mentioned above correspond will be arranged. Here, directions of the initiatives concerning issues will be indicated by roughly classifying the issues into the following 3 items.

① Issues resulting from absence of guidelines for safety management, and unclear required levels.
② Issues resulting from required cost for securing safety and shortage of preparations in advance.
③ Issues resulting from lack of incentives for safety compliance.

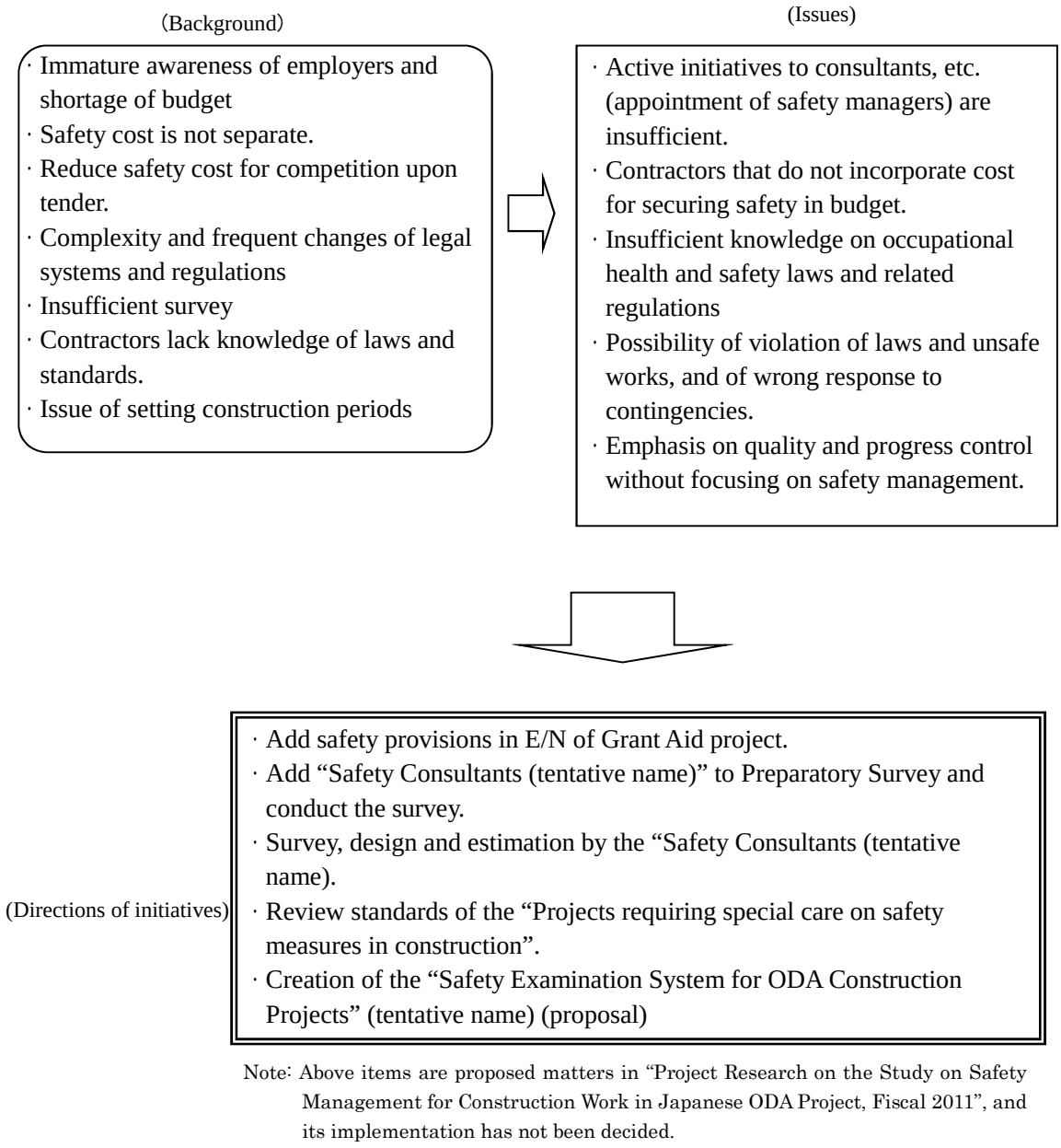
① Issues resulting from absence of guidelines for safety management, and unclear required levels



Note: Above items are proposed matters in "Project Research on the Study on Safety Management for Construction Work in Japanese ODA Project, Fiscal 2011", and its implementation has not been decided.

Figure 1.2.2 Issues resulting from absence of safety management guidelines

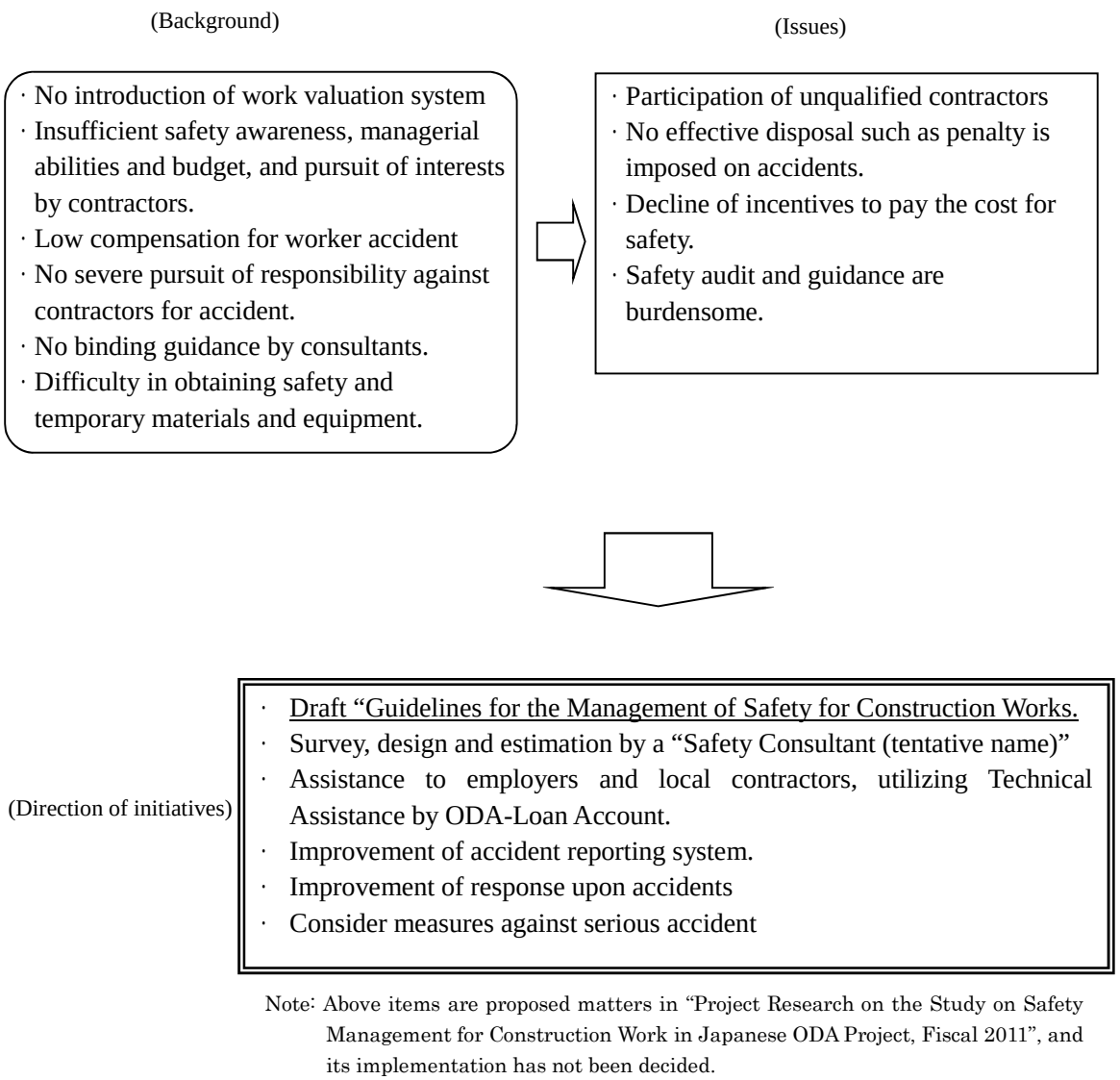
② Issues resulting from required cost for securing safety and shortage of preparations in advance



Note: Above items are proposed matters in "Project Research on the Study on Safety Management for Construction Work in Japanese ODA Project, Fiscal 2011", and its implementation has not been decided.

Figure 1.2.3 Issues resulting from required cost for securing safety and shortage of preparations in advance

③ Issues resulting from lack of incentives for safety compliance



Note: Above items are proposed matters in "Project Research on the Study on Safety Management for Construction Work in Japanese ODA Project, Fiscal 2011", and its implementation has not been decided.

Figure 1.2.4 Issues resulting from lack of incentives for safety compliance

(6) Requests to Japan International Cooperation Agency

1) Bangladesh：Chittagong Water Supply and Sewerage Authority

· On JICA Guidelines: The contract provides that laws and regulations of this country shall be complied with. No guidelines which do not comply with the laws of Bangladesh can be applied. They should have contents to develop what are written in the contract or laws.

· Requests to JICA: Traffic control staff is stationed at each site to control traffic. If there is any sophisticated traffic management, please introduce it.

2) Rwanda: Rwanda Transport Development Agency

· The “Safety Management Guideline” to be developed by JICA is welcomed and evaluated. It is requested that JICA applies best practices in civil engineering works.

3) Bangladesh: The Consultant for the Karnaphuli Water Supply Project

· JICA should understand the situations of Bangladesh. The traffic situations are different from those of advanced countries. We have many problems.

4) Tanzania: The Consultant for the Project for Widening of New Bagamoyo Road

· The Consultant commented on preparation of the draft safety management guideline: No opinion could be raised if it referred to concepts and ideas only. If preparation of provisions for safety and health management was intended, it would be a problem as to how the conflicts with foreign laws would be solved, and the sites were imagined to be embarrassed.

· In fact, the Consultants might be caught in a dilemma between the guidelines of the World Bank and ADB, and the domestic laws of the country where the project was implemented.

5) Rwanda: The Consultant for the Project for Construction of Rusmo International Bridge and One Stop Border Post Facilities

· The request for the guideline was to make it with illustrations. That could be used in any country. It was quite important to express by “pictures”. (Consultant)
· In the site, each sign was written in English, Swahili, and Rwandan. (Consultant)

6) Bangladesh: The Contractor for the New Haripur Combined Cycle Power Plant Project

· The cost for safety measures should be separate. It was desirable to approve contingency cost in Provisional Sum in such cases as HIV/AIDS. Provisions concerning safety management by subcontractors were necessary as well.

· If JICA enacted a safety management guideline, the Employer would follow it. Situation varied among sites, and the guideline should be customized.

1.3 Results of Survey in European countries

The Study Team carried out fact-finding study in France and Belgium (from Nov. 24 to Nov. 30). Targeted organizations for the study in both countries are listed below.

(1) France

1) Institut national de recherche et de sécurité (INRS)
- Outline of the institute
  (Actual state of affairs of overseas aid as the institute)
- Compilation and publication of guidelines focusing on safety management of the construction works
- Acting as SPS Coordinator

2) Confederation of International Contractors' Associations (CICA)
- Proposal in terms of safety management
- Approach to safety management in the leading construction (pavement) company of France (COLAS)

3) Réseau Ferré De France
- Approach to safety management by the civil engineering work ordering party
- Specific measures for improvement of safety management in France: Role of the Safety and Health Coordinator

4) Operators (TAKENAKA ECROPE, BOUYGUES)
- Positioning of AMO, Coordinator, etc.

(2) Belgium

1) Constructiv
- Outline and activity cases of Constructiv
- Outline of occupational accidents in the construction industry of Belgium
- Legal systems, safety- and health-related qualification systems, etc. for the construction industry of Belgium
- Designation and role of the Coordinator
- Background of introduction of the systems of safety-costs separate submission and evaluation during bidding

2) European Commission (EC)
- EC directives and the national laws of Belgium
- Actual examples (two examples) of safety management in the building works within the European Commission
- Safety-costs separate submission and evaluation during bidding

Matters on which information gathering and interview were made in each institute are described in the next.

1.3.1 Results of the Study in France

(1) Guidelines for safety management of the construction works (Aide-memoire BTP)

With publication of the décret on reconsideration of the risks in public works in November, 1965, INRS has issued guidelines for occupational safety and health (OSH) management systems in public works, which is called Aide-memoire BTP aimed at explanation of the above décret. Although application of these guidelines to the works is not legally binding, this document provides explanations in the easy-to-understand manner while using many humorous illustrations and is now the de facto standard in the industry. (See subsequent pages)

Reference materials focusing on individual particular theme (boring, cavity wall) and those providing explanation on the safety operation of each construction machine have also been prepared in conjunction with OPPBTP (L'Organisme Professionnel de Prevention du Batiment et des Travaux Publics).

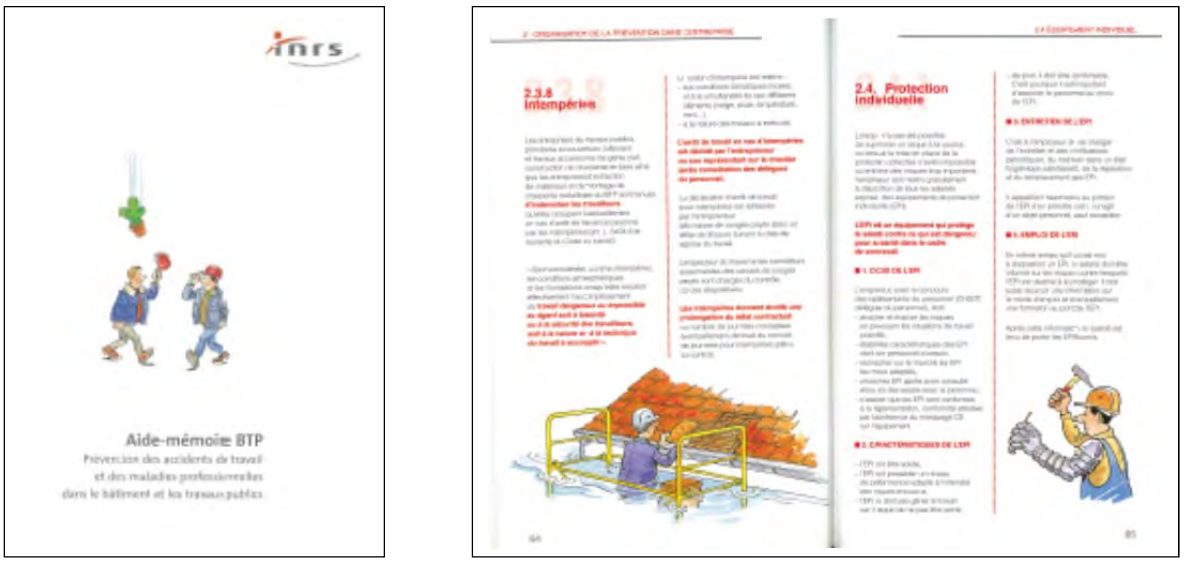


Figure 1.3.1 Cover sheet (left) and contents (right) of Aide-memoire BTP

Reference: “Aide-memoire BTP”

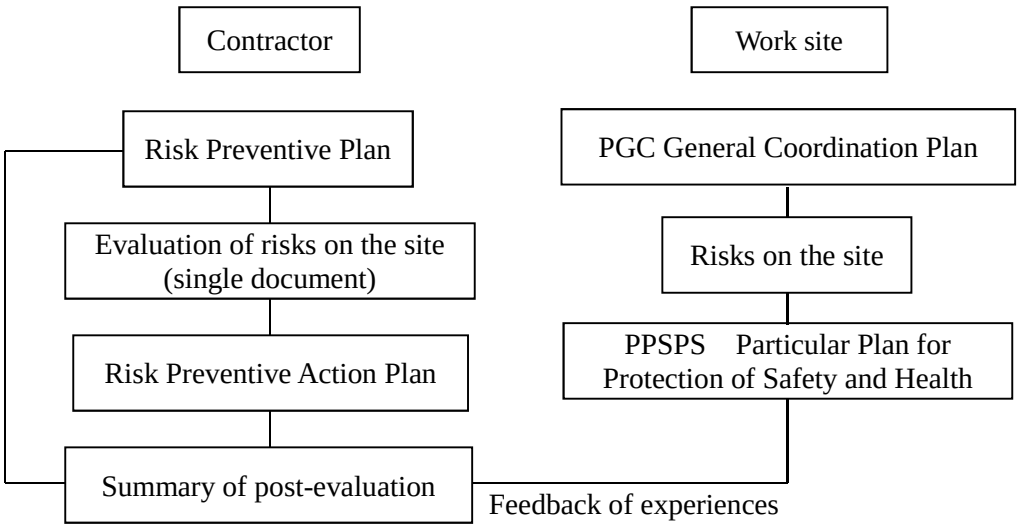
(Partial excerpt from “Introduction” of the document)

In the public works, all entities related to the construction works, such as the Employers, design and construction supervisors, the Consultants, inspection institutes, Safety Coordinators, and Contractors including sub-contractors and self-employed persons, must take part in prevention of the risk. Obligations to the organization and coordination as a whole for risk prevention are imposed on the Employers and the design and construction supervisors who are engaged in design, selection of Contractors, supervision of the work, and predictions of works to be done after opening for service.

To secure the safety and health at the work site, the “PGC Plan General de coordination; General Coordination Plan” will be prepared in the design stage. The “DIUO Dossier d’interventions ulterieures sur l’ouvrage; Post-completion Work Sheet for Structures” will also be prepared for utilization during maintenance after completion.

The Contractor must develop, before commencement of the work, the "PPSPS Plan particulier de securite et de protection de la santé; Particular Plan for Protection of the Safety and Health," in which the contents of general coordination plan as well as the Contractor's own preventive measures are to be incorporated.

General view of the preventive plan



This document compiles information in three chapters as follows for the purpose of searching and harmonizing the solutions related to risk prevention by facilitating communications among entities.

Chapter 1: General information concerning occupational accidents and diseases
Schematic diagram of introduction and safety coordination of the work-related organization other than the Contractor
Chapter 2: Obligations imposed on the management of the Contractor
Rules for utilization of personnel, obligations, penalty
Chapter 3: Information concerning the approach for risk prevention
Organization on the site, selection and use of materials and equipment, prevention of adverse effects, securing of hygienic environment, emergency measures, etc.

For details of items of this document, the publications (pamphlets, booklets, and articles) of INRS may also be referred to. All of these documents may be downloaded from www.inrs.fr.

(2) Outline of the occupational safety and health related authorities in France (government, research institutes etc.)

The occupational safety and health related authorities of France (government, research institutes) are outlined below.

1) Ministry of Labor, Social Relations, Family, Solidarity and City (Ministère du Travail, des Relations Sociales, de la Famille, de la Solidarité et de la Ville)

This is the government agency equivalent to the Ministry of Health, Labor and Welfare of Japan. The Inspector of labor (Inspecteur du travail) of this agency conducts inspection of the construction site, etc.

2) National Health Insurance Fund for Salaried Employees (Caisse nationale d'assurance maladie des travailleurs salariés : CNAMTS)

This is an agency operating the social security service of France and publishes also the guidelines for prevention of accidents.

3) Regional Health Insurance Fund (Caisse régionales d'assurance maladie : CRAM)

This is the lower organization of CNAMTS of 2) above. This organization includes a regional technical committee for building and public works (Comité technique régional bâtiment et travaux publics: CTRB), and the safety service instructor (Controleur du service prevention) belong to this committee conducts guidance on the safety and health. This organization also publishes guidelines for prevention of accidents.

4) National Research and Safety Institute (Institut National de Recherche et de Sécurité: INRS)

This is one of social security organizations undertaking studies for prevention and elimination of occupational accidents and diseases in all industrial fields and publishes guidelines for prevention of accidents. The study focuses on wide-varying fields from toxicology to overturn accident of the power lift. This organization offers information of research outcomes and publications (monthly or quarterly journals via website).

With regard to overseas aids in the field of safety and health, the organization has not many linkages with foreign agencies and no particular programs for African countries.

5) Occupational Risk Prevention Organisation for the Building and Civil Engineering Industries (Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics : OPPBTP)

This organization has no authority with regard to regulation and establishment of laws, but has the authority to access to the site. This organization also publishes guidelines for prevention of accidents.

(3) Safety and Health Coordinator

In European countries including France, the contracting entity called "Coordinator" (Coordinateur in French) exists for supervising the project in terms of securing safety, who is independent from the Employer, design and construction supervisor, and Contractor. The Coordinator supports the progress of the project in terms of the quality and safety. This section deals with the "Safety and Health Coordinator (Coordinateur SPS for France) who assumes a role in terms of safety.

① Safety and Health Coordinator (SPS Coordinator)

In the broad sense, SPS Coordinator becomes involved in the work plan already in the design stage and provides comments on the design of the work to the designer. In the course of work, SPS Coordinator follows Contractors and plays a key role of preventing the risk due to coexisting works during simultaneous execution of multiple works. SPS Coordinator has following specific roles:

- Development of the PGC general coordination plan of the work in the conceptual stage
- Attachment to PGC the safety and health particular plan that the Contractor has prepared on the basis of PGC
- On-the-spot inspection together with the Contractor (including the sub-contractor) before work
- Renewal of PGC in line with progress of the work
- Preparation of the "Document of post-operation for the structure (DIUO)" in the early stage of the construction plan
- Before the commencement of the work, review safety-related training contents appropriate to the type of work and implementation of actual training

* What is PGC ?

This may include the coordination records of tracing all measures related to safety and health coordination, etc.

In large-scale works, individual Contractors are in charge of safety management. One may say that the Coordinator is provided to achieve more detailed safety management through enhancement of the interfaces for multiple Contractors to execute works in parallel and through coordination among Contractors.

In coordination with the government, INRS is making efforts to promote personnel cultivation for SPS Coordinators and wide recognition of importance of their role.

② Designation and employment (agreement) of the SPS Coordinator

The Employer is obliged to designate and employ the SPS Coordinator in the Labor Code. The code stipulates that the "SPS Coordinator shall execute the duties on the responsibilities of the Employer" (reference; « Cadre reglementaire de la coordination de securite »). The labor code also describes that the Employer shall stipulate, in the agreement, the duties assigned to the SPS Coordinator and their execution means while granting the supervising power over other parties involved in the work.

The employer concludes the agreement with the SPS Coordinator in the early stage of the plan.

③ SPS Coordinator's authority of suspending the work

The SPS Coordinator is authorized to stop the work on behalf of the Employer. From the viewpoint of preventing accidents from occurring, not only the Coordinator, but also each worker has the right of suspension "droit de retrait." For example, if there is any urgent critical danger because the scaffold has not been erected correctly, the worker can refuse the work at his own discretion.

(In this case, the worker is obliged to notify the fact to the Labor Inspectorate and CHSCTs (the health, safety, and working conditions committee that consists of labor and management representatives in each business place; this labor regulation applies to the establishment with 50 or more employees), but will not be punished for refusal of work.)This is also clearly prescribed in the Labor Code. The SPS Coordinator has also the role of monitoring access by those other than personnel related to the works, thereby contributing to prevent traffic accident.

④ Meaning of placement of the SPS Coordinator

Apart from the effects that the Employer himself must be involved, the greatest meaning of stationing the SPS Coordinator is its independence from the Contractor. If the Contractor triggers the accident without stationing of the SPS Coordinator, the Employer will be sentenced to imprisonment subject to the Criminal laws. The positioning of SPS Coordinator will be more important if the Employer has not the sufficient knowledge on technical issues and on the safety and health related protections.

⑤ Defect liability of the SPS Coordinator in case of accident

In case of serious accident in the work in which the SPS Coordinator is involved, the Coordinator may naturally be held liable. Actually, however, the companies to which the SPS Coordinator or the personnel to be involved in Bureau de Controle belongs are mostly equivalent in financial power and strength to the Contractors of the work. Needless to say, the SPS Coordinators are highly liable, but they belong generally to such large companies as VERITAS, SCOTEC, etc. According to the interview, such companies will normally not be endangered because of defects of accident because they pay the sufficient amount of social insurance.

⑥ Role of AMO (in case of building projects)

In France, the architect assumes the role of design and construction supervision. AMO has the role of providing the advice when the Employer does not have the knowledge other than design and construction, and also the role of assistant to the design and construction supervisor.

⑦ Role of Bureau de Controle

In Figure 1.3.2, this is defined as Bureau de Controle = Controleur Technique (technology inspector). Bureau de Controle ‘s principal role is to confirm at completion of the work that the electric equipment and thermal insulation structure comply with the industry and technical standards.

⑧ Requirements to be qualified as SPS Coordinator

Qualification requires special trainings. Law amendment is currently under way for stipulation of such training, to which INRS is involved. The SPS Coordinators are originally the personnel who have the sufficient expertise in the construction field and have passed the test after attending the special training course.

Any Consultant with experience in the design and construction management service can be the SPS Coordinator once qualified by the test. Note only that such Consultant may have to change the career to be the Coordinator because concurrent execution of the design and construction management by the Coordinator is not allowed in one site.

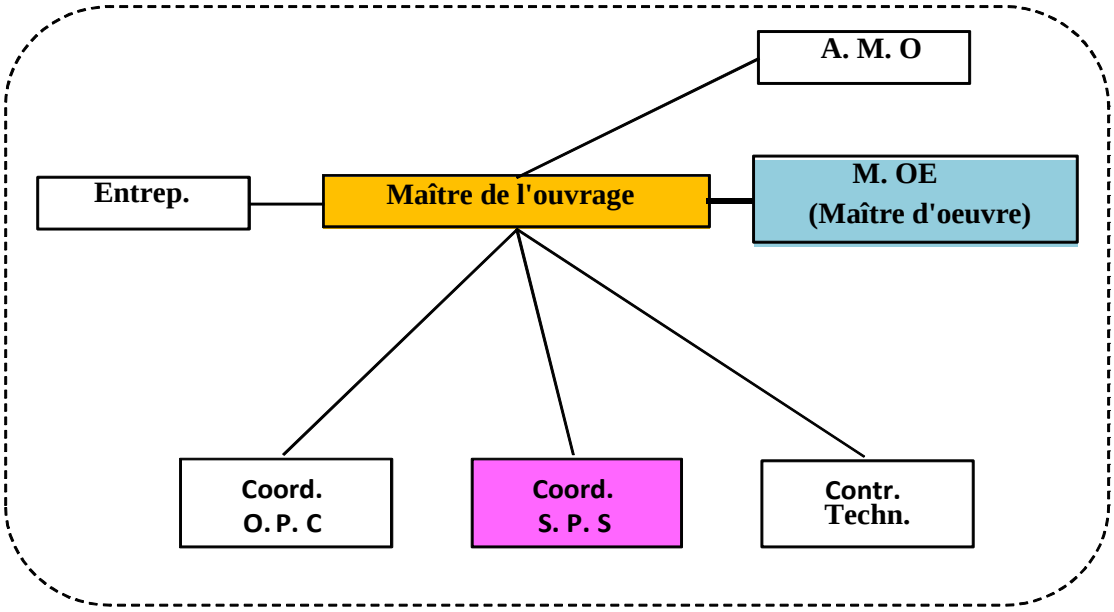


Figure 1.3.2 Safety and quality management system in the construction work of France

[Background of the advent of SPS Coordinator]

In France, similarly to other countries, the Contractors bear the principal responsibilities for safety management for works other than public works. For public works that are never the same and involve many parties concerned, the person specialized in charge of safety and health issues for the entire plan was considered necessary when considering their particularities. In consequence, the “Coordinator” was established. This is the mechanism (institute) for nearly 20 years now. Previously, the design and construction supervisors have had the role as the Coordinator. As the work contents become complicated, the Coordinator has been positioned independent from the architect, and is now acting mainly for smoothing of communications among multiple Contractors.

This Coordinator system has been introduced in EU countries, but was originally established by the French national laws. These laws stipulate details of the authorities of the Coordinator. Later on, various authorities have been further added in the process of introduction of the system in EU countries.

It may be supposed that the Coordinator interfere with Contractors. However, the safety management in the construction site can be improved under multiple interference and involvement of the Employer, design and construction supervisor, the Coordinator, and labor inspector.

(4) Employer’s approach on safety management

Reseau Ferre De France (RFF) is undertaking development and maintenance of railway infrastructure of France (including TGV). At present, RFF is being engaged in civil engineering and track works for construction of the new TGV line over a total length of 106 km in the eastern part of France. The results of interview with the project director concerning the state of safety management on the site are shown below.

The TGV development project is classified into the category of large-scale works (Category 1) by the labor stipulations. For each bidding case, the company and the design and

construction supervisor, the Safety Coordinator and the Employer, and representatives of the social security agencies, person in charge of the safety of public works, and Labor Inspectorate are obliged to establish the Safety Management Committee (Comité de la sécurité).

① Management system

To secure the safety of the construction site, the Employer designates the Safety Coordinator (as described in (4)) who will perform comprehensive monitoring and management of the safety and health aspect, and assigns the Coordinator with the safety-related site management service based on the agreement. Since the project covers the length of 106 km, three to four safety Coordinators are designated for each section and, in conjunction with the Contractor's personnel in charge of safety management, eliminate the risk factors and reduce risks.

② Accident patterns commonly observed in the railway operation

The railway operation must be considered by separating the civil engineering work and the track construction work, and the civil engineering work suffers more frequent occurrences of accidents, such as those during material transport, traffic accidents, etc. The civil engineering work has longer working hours with increased occurrences of accidents. On the other hand, the risk of accident may arise for the track construction work when any inappropriate tools are used for the site where the electric railcars are running already or for placement of rails and sleepers.

Though the safety manual has been provided, the important thing is whether or not the system is working to check if the workers have been trained to read carefully the paragraphs, those paragraphs are actually implemented on the site, etc.

The number of foreign companies bidding for the projects is increasing also in Europe. It is essential in this case to check if the bidding companies and workers have the communication capability. Communications concerning the safety standard is one of mandatory requirements.

③ Arrangements on the site

To prevent third-party accidents and traffic accidents involving related vehicles on the site, efforts are being made to eliminate occurrence unnecessary traffic within the site. Where the site length is long, there are many regional residents, and any contact with the work-related vehicles exists, the temporary fencing is provided.

The work-related information is provided to surrounding residents and the education campaign is made to secure the safety. The outline of the work is explained to the heads of local authorities within the project area to call for attention.

The construction materials and equipment are stipulated to be managed in such a manner that they must be arranged in order in the same place every night to prevent stealing. In addition, the guards are also stationed to ensure the security. For procurement of materials from outside the site, the barrier, in-site signals, signs are provided to prevent traffic accidents. At the same time, speed control of passing vehicles is conducted in cooperation with the police.

The accident preventive campaigns are regularly conducted to enhance the awareness of safety. Besides, the site area is extremely wide, so that badges are distributed to control

the in-site access of workers. By means of ID verification, the workers are checked if they are those to be present in individual sites. The vehicles are also checked if they can enter the site.

On the other hand, considerations to improve efficiency of site management may lead to enhanced safety in certain cases. Reduction of separate orders will result in reduction of the burden on the Coordinator. Namely, bidding must take into account the degree to which separate ordering by types of work can be made. As the Contractor has its own safety manager, arrangements are made to ensure closer linkage with the Contractor's safety manager, so that the thorough safety management by the Contractor is ensured. This will lead finally to restrict the Coordinator's role to "monitoring only."

(5) Undertaker's approach on safety management

COLAS (Cold Asphalt) is the large company with the principal target on Europe while developing its business mainly in terms of road construction in various countries of the world. This company took its trade name from the technique of pavement technology employed by Shell in 1930s and has achieved annual business amount to 12.4 billion Euros (no. of employees: more than 66,000 in Europe). This is also engaged in road-related peripheral businesses, such as traffic signals, and railway business. The number of accidents occurring per one million hours by the companies is 10 on an average in the case of COLAS, as compared to the recent 40 (Europe). COLAS has set a goal of 5 on an average in the near future by means of the safety management policy and specific measures unique to this Group. The results of hearing with the Manager of Procurement of COLAS are summarized below.

① Safety management policy on the management side

Human resources development is essential for improvement of the intra-company safety management level. The most valuable asset of the company is human resources, and the cost for their cultivation must not be reduced. It is also essential to show clearly toward the employees that the company would spare no effort in this respect. Moreover, the management side should step forward to the site to talk with workers. Though ten fatal accidents occurred in 2012, daily efforts are being made to establish in place the motto of "safety management is the corporate culture." It is not enough if the safety procedure has been established. It takes time to establish the safety as the corporate culture. COLAS has acquired OHSAS 18001 and has ratified the ILO standard. Yet, they are not enough.

② Approach on the site

Of workers on the site, 32% have been prepared as the staff capable of emergency medical treatment by means of human-resources training and external employment. In the projects in developing countries, efforts are directed to improve the OSH environment of the site by means of vaccination, HIV education, and seminars.

On each site, 15 minutes per week are taken to encourage site safety briefings. After completion of internal and external audits, daily efforts are being made to raise the safety awareness for each business unit. The rules similar to those applied within France are applied to the overseas works (in developing countries). Materials related to securing of the safety are the same as those used within France.

③ Supplier evaluation system

COLAS has introduced the system to evaluate the supplier by the private credit-ranking agency (ECOVALYS). Individual suppliers are evaluated in ten ranks on the basis of past achievements in terms of the quality, sustainable development, safety, etc. Shell employs the same method. COLAS presents the questionnaire containing 40 questions at a time of bidding, requesting the bidders to submit the reply to the questionnaire and verifying documents.

(6) Proposal for safety management by the Confederation of International Contractors' Associations (CICA)

CICA proposes three points as follows to the countries and agencies (WB and former JBIC) undertaking technical and financial aids to various projects of various countries of the world, in particular, to the employees of the project in emerging countries and developing countries:

① Inclusion of the safety rules in the specifications,

② Provision of the selection standard of short list in the bidding,

③ Allowing ① and ② to be checked by the third-party body.

These must be requested to the main Contractor if any sub-contractor is to be used. The important thing for preliminary review is to use the credit-ranking company (ECOVALYS for France and AGS for China).

The Employer of the project (the government of emerging and developing countries) should be encouraged to utilize and apply the guidelines of international agencies (WB and JICA). The way of encouragement may be to incorporate the requirement that the safety management is to be enforced in the course of work as well as to allow the third party to audit the actual state. Though the audit cost may rise, the request should be made to the organization specialized in audit to dispatch four to five engineers for the third party ranking. In line with this, the method of reviewing if the penalty is to be applied or if the incentive is to be applied may be considered.

As each country has its own laws and their amendment cannot be induced even from the standpoint of financer, the sovereignty issues of a counterpart country always present. The method to set terms for the use of contributed fund may be considered. Namely, the soft power may be utilized to improve the efficiency of aid by encouraging employment widely of the good practice and knowledge.

Lateral linkage among international agencies is also necessary, for which condition setting of safety clauses (incorporation in the agreement) and utilization of the check function of the third-party agency are useful.

1.3.2 Results of the Study in Belgium

In Belgium, interview was made with the safety management division of the European Commission and Constructiv (the public entity in which funds for promotion of the safety and health of the construction industry, for planning and operation of occupational training, and for social protection of construction workers are integrated) concerning the present state of occupational safety and health of Europe as a whole and that of Belgium interior only.

(1) Relationship between European Directive and Belgian national laws

European directives are those established commonly among EU countries for the purpose of bringing different national laws into line with earth other, and activating the European Economy. When the European Commission plans a directive, adjustment is made on the drafted directive before introduction into countries. In other words, the directive sets forth the minimum standards to be observed within Europe because the directive with too many restrictions from the beginning would not be adopted by any country. Accordingly, the mechanism in this case is such that individual countries can introduce the laws reinforcing the directive. For any law in any field, the procedure to take the EU directive into the national law is the same. Regarding the personal safety and health management, individual national laws are to supplement the directive. Now that the number of EU member countries has increased and workers of different nationalities are working in various countries, development of the common rules within EU is necessary.

In other words, the work, even if related to the European Commission, must be subject to the Belgian national law when it is executed within Belgium because the host country of the work is Belgium. At the Arrêté royal, Belgium had stipulations in 2001 concerning temporary or mobile construction sites, which reflected the European directive.

(2) Legal systems in Belgian construction industry

Belgium has laws and directives as follows in the legal system concerning safety and health:

-ILO recommendations

-European Directives

-Belgian Laws

-Belgian Royal Decrees

-Inter-professional Collective Labor Agreements

-Sectorial Collective Labor Agreements (for each industry)

-Corporate collective Labor Agreements (for each company)

Laws as listed above do not show the priority of observance. For example, the ILO recommendations must be complied with in Belgium only after ratification of EU and the government of Belgium.

For example, the process of developing the legal system related to OSH of the construction industry of Belgium is reviewed. In 1988, ILO recommendation No.175 was issued, followed by the directives concerning OSH for temporary and mobile construction sites in

the European Directive 92/57. Belgium transferred this into the national law, establishing the "Belgian Law on the Well-being of Workers at Work" (1996). Though the time is required up to implementation in the field at present, the safety and health decree for temporary and mobile work sites has been established as the Belgian Royal Decree in 2001.

The above legal system for temporary and mobile construction sites is not limited to the construction stage, but also to design and maintenance stages.

In the construction stage, this system also deals with extraction and countermeasures against risk expected when different Contractors are working on the same site.

Essential point here is as follows. Namely, before application of EC Directive within Belgium, the safety management on the site was the matter of Contractors and workers. Once the Directive is introduced, legal responsibilities have been legally extended to a lot of parties that have to take responsibilities on safety and health. Each party has to bear the responsibility on the safety.

(3) Safety-related qualification system

Belgium has developed the safety checklist (SCC/VCA) for construction companies, which is based on OHSAS 18000 for safety, ISO 14000 for environment, and ISO 9000 series for quality.

SCC (VCA in Dutch) is not based on the existing standard, and the Belgium checklist refers to MASE of France. The reason is that the checklist is to identify the Contractors active with focus on the safety in this age of increasing Contractors and diversifying sub-contractors.

SCC/VCA originates back to the petrochemical industry of Rotterdam in 1980s. Initially, individual Employers had and operated the individual Contractor rating systems related to safety and health. Later on, as the needs grew on the development of unified rating system, one independent qualification organization performed corporate evaluation for a certain period of time. Attempt was made through several steps toward unification of the evaluation systems. SCC was the first for internationalization when it was introduced in Belgium in 1994. Apart from Belgium, Germany and France also operate the similar evaluation system.

Since evaluation and rating of companies differing in size by referring to the same indices are not fair, development of the evaluation system and rating appropriate to the company size has been done. At present, evaluation is made by VCA* for the companies with 35 employees or less, VCA** for the companies exceeding 35 employees, and VCA P for the petrochemical industry.

According to the evaluation standard of VCA, evaluation is made for rating by referring to the indices related to the training achievements for labors, audit engineers, and temporary employment agent, countermeasures policy for risk avoidance, promotion of safety culture within the company, etc.

(4) Outline of labor accidents in the construction industry of Belgium

According to the statistics in 2011, the construction industry of Belgium may be summarized as follows:

- About 30,500 construction companies registered (167,000 construction workers)
- Sales: 18.09 billion Euro
- 98% of construction companies are medium to small companies with 50 employees or less.
- 28,963 projects (NAVB received notification of all these projects)

The number of reported accidents was 19,384 in 2010 (including serious and minor accidents). According to the European standard, the construction companies with 200 employees or less is ranked as medium to small companies while, in Belgium, the companies with 50 employees or less are ranked as small and medium in size.

For the statistical values used for the number of accidents, EU uses the frequency index (the number of accidents occurring per 10^6 hours). The statistical values for Belgium shows about 68 cases in 2008, about 63 cases in 2009, and about 58 cases in 2010. Accidents decreased at a rate of 13.4% for a period of 2008-2010.

The percentage of occurrence of serious accidents in Belgium also decreased by about 15% during the period of 2008-2010. The ratio of fatal accident occurrence (for 2011) was 8.38 person per 100,000. Since the construction workers are 167,000, this ratio means that 14 workers were dead.

Accidents involving loss of fingers and arms by crashing and cutting are summarized by means of the global gravity index, which shows substantial decrease during the period of 2008-2010.

(5) Designation and role of the Coordinator

As previous described in “Legal systems of the construction industry of Belgium (2)”, the Employers are now demanded to contribute positively to the safety management on the site after application of the European directive to Belgium.

Specifically, the Employers are stipulated to define the safe and health objective of individual sites and to designate the designer and the Coordinator. The designer is responsible for the design of temporary equipment and facility structures with due consideration on the safety while the Coordinator is responsible for checking if the design has incorporated the concept of safety. In the construction stage, the Contractors continue to have the responsibility to focus on the safety management, but are also stipulated to take the measures to secure the safety and to try establishing linkage with other Contractors for securing the safety at an advice from the Coordinator.

Regarding designation of the Coordinator in Belgium, the Employer designates the Safety and Health Coordinator for the large projects (the site area of 500 m^2 or more, and two or more construction companies involved). The architect may designate the Coordinator for the small projects (500 m^2 or less, and two or more construction companies involved). It was told that this mechanism is unique to Belgium.

The Coordinator prepares the following instruments:

-Safety & Health Plan (SHP): Prepared in the design stage and completed in the construction stage

-Safety & Health File: Applicable to maintenance operation for the construction work

-Safety & Health Log Book: Record of judgment and decision contents concerning safety and health measures, activity details, and securing of the safety throughout design and construction stages.

These instruments are to be referenced, as records of safety and health of the project concerned, during subsequent projects. This is said to be the unique approach of Belgium. SHP must be appropriate to characteristics of individual sites and must describe clearly the measures to avoid risks and to act against hazardous elements. The contents to be incorporated into SHP are as follows:

-Technical viewpoint：risk analysis, structure specifications

-Safety management system

-Specific plan

-Bill of quantity (BoQ) for safety countermeasure means

Incorporation of BoQ into SHP has been systematized for more than a decade in Belgium.

Moreover, SHP has to change its risk evaluation and countermeasures continuously to follow changes in the environment and construction conditions as the work proceeds.

The Coordinator specified in the European Directive (92/57/EEC) is detailed below.

[Coordinator]

Definition by Council Directive (92/57/EEC);

Coordinator means “any natural or legal person entrusted by the client and/or project supervisor during the project preparation stage, with performing the duties referred to in Articles 5 and 6 of 92/57/EEC.”

A. (Coordinator for Safety and Health Matters at the Project Preparations Stage) (；仮訳), having obligations to execute requirements of Article 5

B. (Coordinator for Safety and Health Matters at the Execution Stage) (；仮訳), having obligation to execute requirements of Article 6

Article 5:

(a) The Coordinator shall coordinate implementation of the provisions of Article 4.
Article 4: Account shall also be taken, each time this appears necessary, of all safety and health plans when architectural, technical and/or organizational aspects are being decided, in order to plan the various items or stages of work which are to take place simultaneously or in succession, and when estimating the period required for completing such work or work stages.

(b) The Coordinator shall draw up, or cause to be drawn up, a safety and health plan setting out the rules applicable to the construction site concerned, taking into account where necessary the industrial activities taking place on the site.

(c) The Coordinator shall prepare a file appropriate to the characteristics of the project containing relevant safety and health information to be taken into account during any subsequent works.

Article 6:

(a) The Coordinator shall coordinate implementation of the general principles of prevention and safety:
- when technical and/or organizational aspects are being decided, in order to plan the various items or stages of work which are to take place simultaneously or in succession,
- when estimating the period required for completing such work or work stages;

(b) The Coordinator shall coordinate implementation of the relevant provisions in order to ensure so that the Employers, and if necessary for the protection of workers, self-employed persons:
- where required, follow the safety and health plan referred to in Article 5 (b);

(c) The Coordinator shall make, or cause to be made, any adjustments required to the safety and health plan referred to in Article 5 (b) and the file referred to in Article 5 (c) to take account of the progress of the work and any changes which have occurred;

(d) The Coordinator shall organize cooperation between the Employers, including successive Employers on the same site, coordination of their activities with a view to protecting workers and preventing accidents and occupational health hazards and reciprocal information;

(e) The Coordinator shall coordinate arrangements to check that the working procedures are being implemented correctly;

(f) The Coordinator shall take the steps necessary to ensure that only authorized persons are allowed onto the construction site.

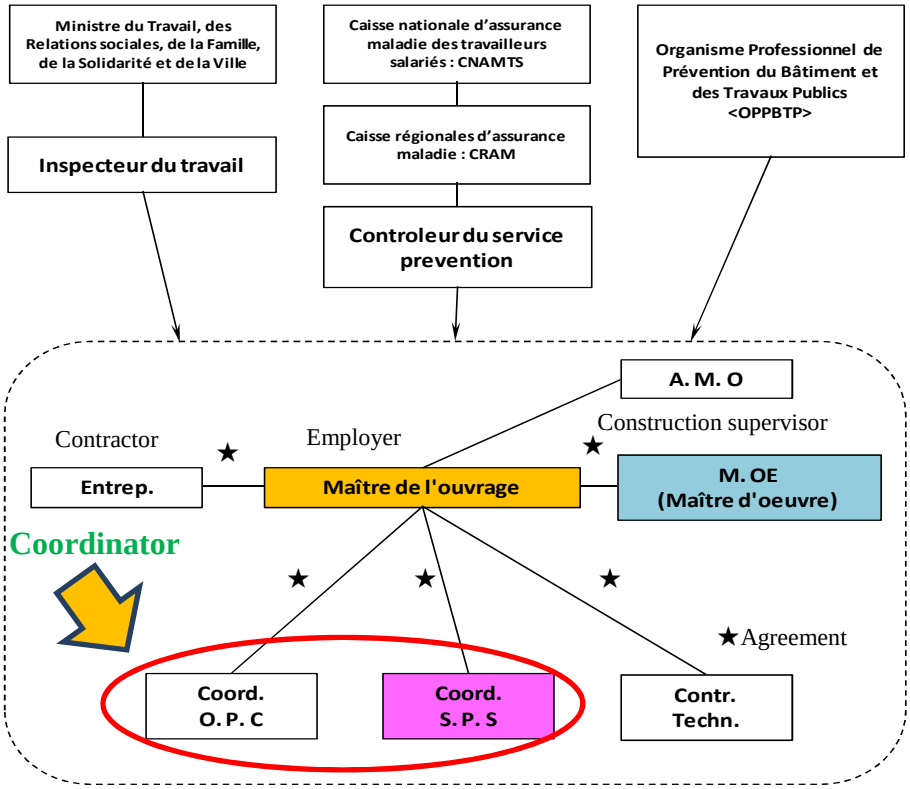


Figure 1.3.3 Position of the Coordinators in the contract framework (the case of France)

The results of interview concerning the role of the Coordinator in the bidding stage are summarized below. (For description concerning BoQ, see (6) below also)

① The Coordinator prepares the BoQ※ form on the quantity of safety countermeasures when preparing SHP.

* For all required materials and equipment necessary to establish the safe work environment including the required quantity of PPE, guardrails, corns, and sanitation-related facilities, toilet, first aid facilities, temporary facilities materials.

② All bidding Contractors must enter details of procurement price of materials and equipment for required safety countermeasure in the above BoQ form and submit the form together with the estimate related to the work proposal.

③ After submission of tender documents to the Employer, the Coordinator must evaluate the validity of purchase price and of required material items and report the result to the Employer. The employer determines the successful bidder on the basis of submitted results.

(6) Background of safety-cost separate estimation system for bidding

In Belgium, the bidding procedure for large projects employs the system of allowing submission of the estimate of work-related cost and the cost related to safety countermeasures separately for evaluation. Information gathered in this respect in Constructiv and in the headquarters of European Commission is described below.

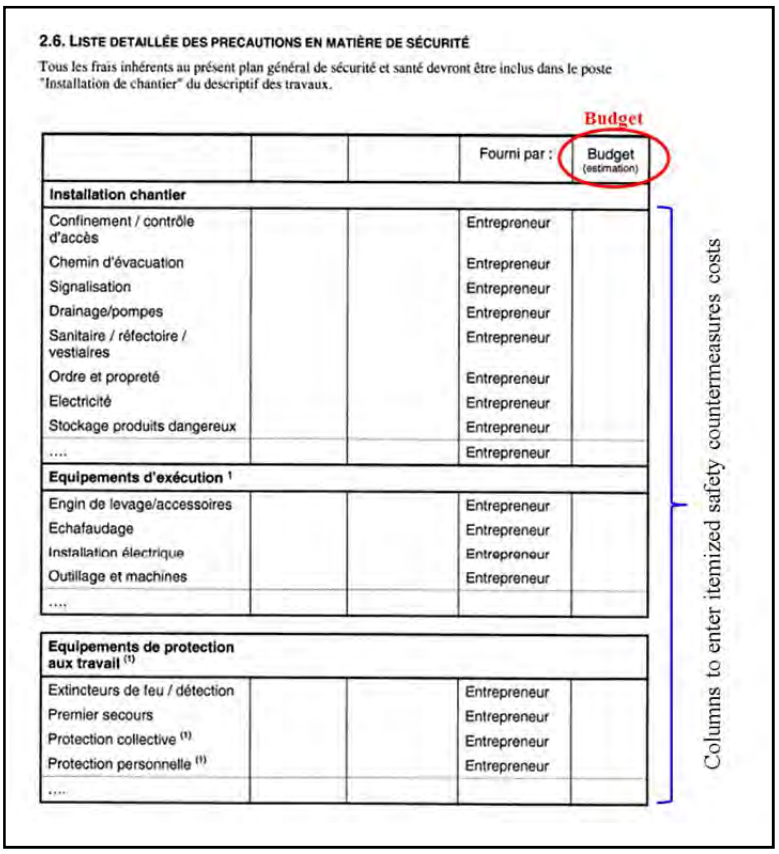
For “separate submission and evaluation of the safety costs,” the Coordinator prepares the BoQ form for the quantity of safety countermeasures at a time when he or she is preparing the Safety & Health Plan (SHP). The Contractor is to enter the prices in this form.

The basic concept when this system was introduced was that the means (costs) to secure the safety of the site should be evaluated outside the scope of “competition” of bidding. Technical proposal for construction of the structures should be the object of “competition,” but the safety of the site should be secured by taking the required and best countermeasures even when any Contractor is to be involved.

An example of above concept is as follows. In the case of bidding including the costs to secure the safety, if the Contractor incorporates the procurement price of scaffold materials, the bidding contents of such Contractor would not be recognized when the Coordinator and other evaluators determine that “the procurement amount of scaffold is small” or “the price is inadequate.”

According to the above system, the Coordinator explains the safety plan of individual sites to respective bidders and requests each Contractor to prepare the price estimate of the plan.

This system that begins with decision of those items related to safety countermeasures (quantity of scaffold materials, safety protection equipment, etc.) proves effective, not only for the Employer, but also for the bidder, of eliminating variances concerning safety countermeasures at the construction site concerned. In this way, this system contributes to efficiency improvement of bidding evaluation.



2.6. LISTE DETAILLÉE DES PRECAUTIONS EN MATIÈRE DE SÉCURITÉ

Tous les frais inhérents au présent plan général de sécurité et santé devront être inclus dans le poste "Installation de chantier" du descriptif des travaux.

Budget

			Fourni par :	Budget (estimation)
Installation chantier				
Confinement / contrôle d'accès			Entrepreneur	
Chemin d'évacuation			Entrepreneur	
Signalisation			Entrepreneur	
Drainage/pompes			Entrepreneur	
Sanitaire / réfectoire / vestiaires			Entrepreneur	
Ordre et propreté			Entrepreneur	
Electricité			Entrepreneur	
Stockage produits dangereux			Entrepreneur	
....			Entrepreneur	
Equipements d'exécution [1]				
Engin de levage/accessoires			Entrepreneur	
Echafaudage			Entrepreneur	
Installation électrique			Entrepreneur	
Outillage et machines			Entrepreneur	
....				
Equipements de protection aux travail [1]				
Extincteurs de feu / détection			Entrepreneur	
Premier secours			Entrepreneur	
Protection collective [1]			Entrepreneur	
Protection personnelle [1]			Entrepreneur	
....				

Columns to enter itemized safety countermeasures costs

Figure.1.3.4 Form to account for individual safety countermeasures costs

More specifically, in the bidding stage, the Contractor completes the BoQ in which details of procurement prices of necessary materials are described while referring to BoQ prepared by the Coordinator, and submits the form. After submission of tender documents to the Employer, the Coordinator evaluates the BoQ submitted by the Contractor in terms of the validity of procurement price and required material items and advises the Employer concerning the seriousness of the Contractor to deal with the safety.

The principal Contractor is obliged to take all countermeasures (required to secure the safety) and plays a role to ensure thorough understanding of such measures by other Contractors including sub-contractors. The sub-contractors and their workers and individual employed workers are obliged to implement such countermeasures.

The Belgian laws authorizes the Employer to eliminate any Contractors who do not or reluctant to implement the measures to secure the safety. For the Contractor – worker relationship, the Contractor can eliminate workers who do not observe the rules if the labor-management agreement contains the exclusion clause.

The Employer side (the person in charge of the European Commission) evaluates on this system as follows. For the bidding proposals with the equivalent project cost and different safety countermeasure costs, the contents of safety countermeasures must be evaluated

individually. If the proposal contains the lower costs for safety countermeasures and yet it is evaluated the sufficient safety countermeasures are planned, the proposal with lower safety costs may be accepted. If not, the proposal with higher safety costs may be accepted.

The ground for the system of separate estimation of the safety countermeasures costs is the Belgian national law, that is, the Belgian Royal Decree on Temporary or Mobile Construction Sites (25 JAN. 2001).

"Article 11, Belgian Royal Decree on Temporary or Mobile Construction Sites" (仮訳)

○ The safety and health plan is a part of tender documents.

○ The Employer must take the necessary measures to prevent occupational accidents. For such purpose, the safety and health plan will becomes a part of specifications, estimates, or contract documents, if necessary, and attached by providing the heading in these documents.

○ The safety Coordinator has a role of ensuring positive implementation of measures described in the safety and health plan.

1. The bid participants must hand in a bid by attaching the safety and health plan describing how the work is done while taking into account the safety and health countermeasures.
2. The bid participants must prepare the separate estimate for the accident preventive measures and for the protective equipment including the special personal protective equipment as described in the safety and health plan.
3. The Coordinator in charge of this duty on the basis of 4 of Article 11. The Coordinator must provide supervision and guidance to ensure that the safety and health plan document is legally acceptable.

<Supplement>

○ Subject to Article 30 of the Decree, the safety and health plan prepared by the Coordinator at the design stage in the course of conclusion of the agreement must be submitted as the separate section from other documents.

○ The Contractor who has contracted for the construction work must read carefully and take into account the clauses concerning individual works in the plan.

1. The Coordinator must describe the procedure of construction to be implemented on the basis of safety and health plan.
2. The second document described in the safety and health plan must have the separate estimates for all preventive measures and protective equipment. For the price of such legally-enforced equipment, the estimate must be submitted for the collective protective equipment as well as special personal protective equipment.

○ The Coordinator at the design stage must examine the clauses of the safety and health plan submitted by the bid participants according to 4 of Article 11. This legal examination does not mean that the Coordinator at the design stage has a certain decision-making authority or certain power. Such coordinator acts as advisor for the Employer and to call attention of the Employer for those who, from viewpoint of the Coordinator, presented the bid not complying with the safety and health plan.

According to the European Commission, the change of accident ratio after introduction of the above system shows downward trend in Belgium since the beginning of separate submission and evaluation of safety costs, though numerical confirmation is not possible.

Note however that introduction of above bidding system into Europe is limited at present to large projects in Belgium. Since this is not transferred into the European directive and not ratified in each country, this remains the system unique to Belgium. The Belgian government is under consideration to improve and simplify the legal system related to safety and health. In this course, the government is seeking how the system utilization range can be expanded.

(7) Examples of safety management on building works within the European Commission

In Belgium, the safety management division of the Commission introduced the case of safety management in the building work of facilities related to the Commission (the case of work executed subject to the Belgian national law because the work was done in Belgium). This case is described below while referring to the reference material whose disclosure was approved by the person in charge of the Commission.

[Case 1] Case of constructing the kindergarten within the European Commission

This is the case in which the European Commission purchased the land for construction of kindergarten within the Commission and the work was done via the competitive bid. The specification incorporates the safety and health plan. The cover sheet shows each responsible person of work, name of the Safety Coordinator, and name of person in charge of emergency measures. The list summarizing the risk expected during work is also shown here. For access to the site, equipment and materials, dismantling, the traffic system of the site, connection with the existing road, and individual risks changing as the work proceeds, the corresponding preventive measures are described. The method may be proposed by the Employer or may be presented by the Contractor. The law establishes the target and the means to achieve such target are in the hand of Contractors.

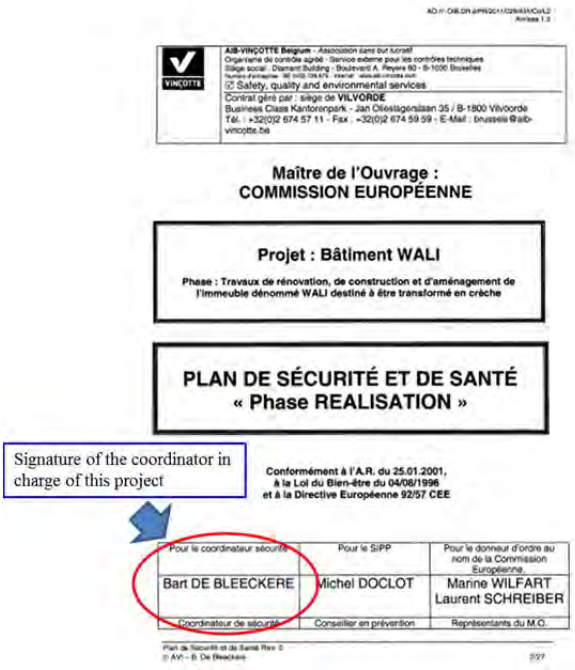


Figure.1.3.5 Cover sheet of the order specifications for the project

The order form shown in Figure 1.3.6 is designed to make entry on what countermeasures are to be taken for each work stage and on the cost necessary for each countermeasure.

When the measures proposed by the Contractor are determined to be insufficient by the Employer, the latter may request additional measures.

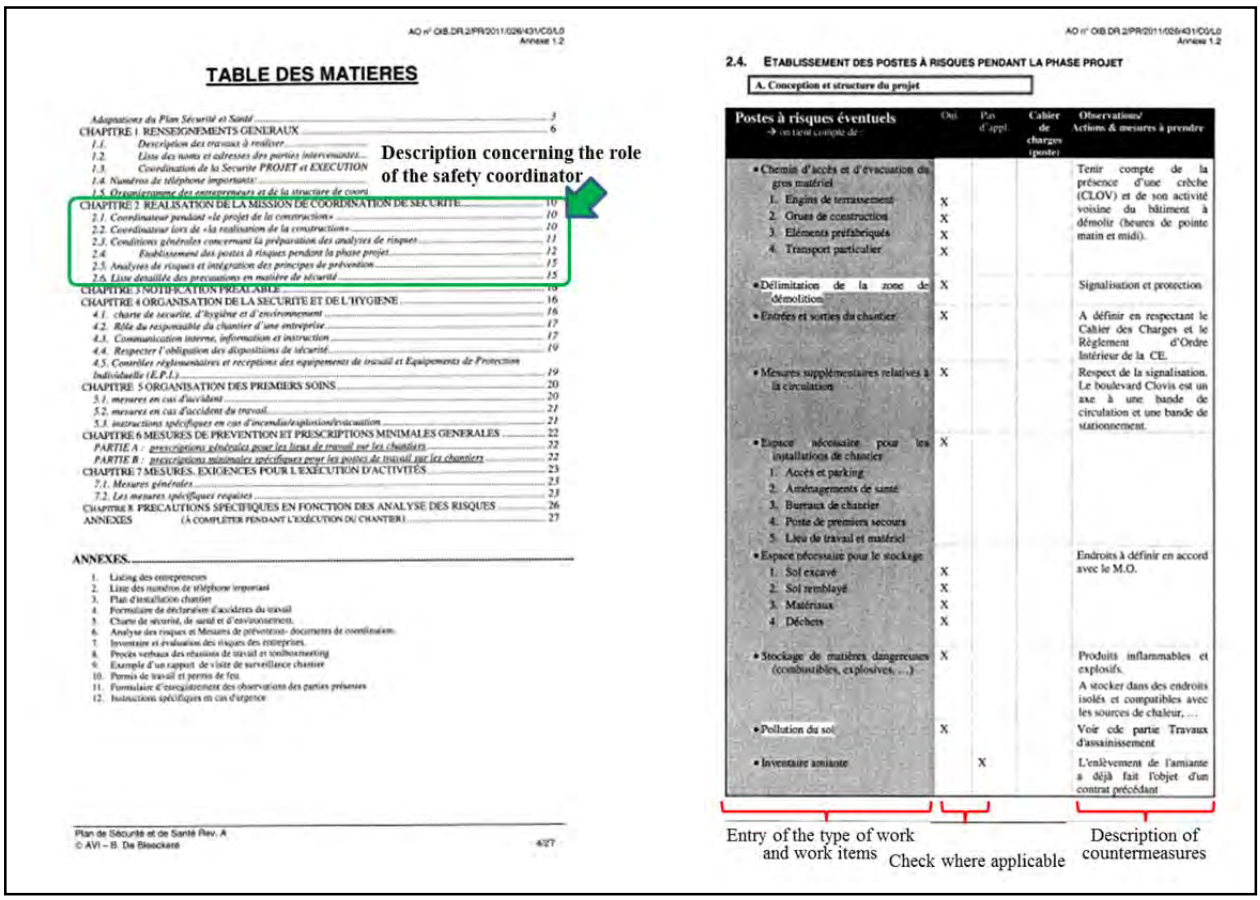


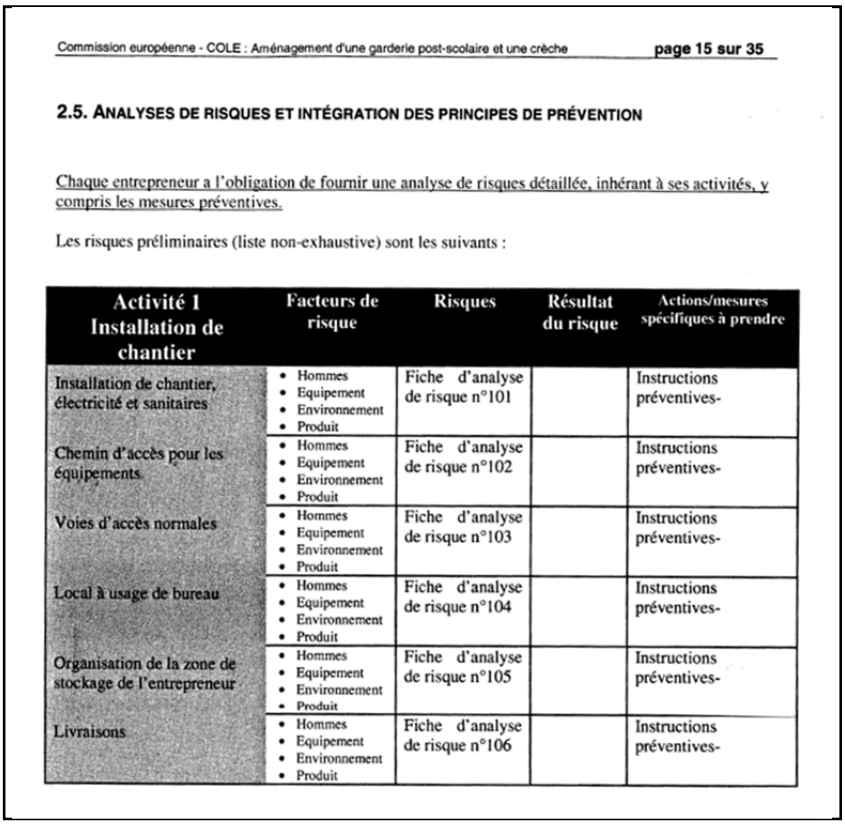
Figure. 1.3.6 Contents of the order specifications (left) and safety countermeasure plan for each type of work (work item)

[Case 2] Case of additional facilities work after opening the kindergarten in the European Commission

Similarly to the above case, the necessary countermeasure items are checked in the form based on the list of items needed for the Contractor to undertake safety measures on the site. The bidding Contractor enters the necessary amount for each safety countermeasure item. This case includes detailed description of risk factors by type of work.

Two cases as above described refer to the bid documents for project according to the Belgian national law, which requires all of bidders to make entry and submission. These documents were prepared according to the bidding system requesting separate submission of the work costs and safety countermeasures costs.

It is said that the evaluation balance between the work proposal (including the price viewpoint) and safety countermeasures proposal (including the cost viewpoint) at a time of bidding is judged by weighing equally by the Commission.



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2.5. ANALYSES DE RISQUES ET INTÉGRATION DES PRINCIPES DE PRÉVENTION

Chaque entrepreneur a l'obligation de fournir une analyse de risques détaillée, inhérant à ses activités, y compris les mesures préventives.

Les risques préliminaires (liste non-exhaustive) sont les suivants :

Activité 1 Installation de chantier	Facteurs de risque	Risques	Résultat du risque	Actions/mesures spécifiques à prendre
Installation de chantier, électricité et sanitaires	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°101		Instructions préventives-
Chemin d'accès pour les équipements	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°102		Instructions préventives-
Voies d'accès normales	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°103		Instructions préventives-
Local à usage de bureau	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°104		Instructions préventives-
Organisation de la zone de stockage de l'entrepreneur	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°105		Instructions préventives-
Livraisons	• Hommes • Equipement • Environnement • Produit	Fiche d'analyse de risque n°106		Instructions préventives-

Figure.1.3.7 Table of risk registers of order documents

The safety countermeasures related cost estimate is entered in ANNEX and submitted separately from the technical estimate. The strict evaluation system is taken from the bidding stage by excluding the proposal with the safety countermeasures cost columns left empty. Such proposal is regarded as insufficient as bid documents.

The Safety Coordinator is designated by the Employer, who performs on-the-spot inspection, attends the meeting of those concerned with the work, and prepares the report on the safety management on the site. The Coordinator has an important role of checking if the individual safety countermeasures proposed by the Contractor together with the cost estimate at a time of bidding are positively implemented during actual work.

The person in charge of the Commission commented that the risk registers are exhaustive without overlooking because the safety management culture on the work site has taken root to a certain degree in EU. For example, it is considered common senses that the “handrail is necessary” for the site with operation at elevated place and that “marking is provided on top and in the bottom” where the building work involves large number of glasses and “the fence is installed on the roof.”

Chapter 2
Current Status of Safety Management for Construction Works in Advanced Countries

Chapter 2 Current Status of Safety Management for Construction Works in Advanced Countries

2.1 Basic Concept of Survey for Current Status

For the study on current status of safety management in advanced countries, information collection and interviews have been conducted in Japan, U.K., France and U.S.A. As U.K. and France are required to comply with the regulations and directives of European Union (EU), current status regarding construction safety in EU was also reviewed. Main survey items are as follows:

① Legislative system in the target countries
② Basic laws for occupational safety and health
③ Laws related to construction works based on the fundamental law
④ Administrative and related organizations for occupational safety and health
⑤ Safety management system in construction works
⑥ Statistics of construction accidents

Other guidelines have been identified as reference for reviewing Safety Management Guidelines. Information on the safety management systems are referred in review of operating the guidelines.

2.2 Current Status in Japan

2.2.1 Legal Systems in Japan

Table 2.2.1 Outline of Japanese Legal Systems

Constitution	○Article 98 of the Constitution of Japan This Constitution shall be the supreme law of the nation and no law, ordinance, imperial rescript or their act of government or part thereof, contrary to the provisions hereof, shall have legal force or validity.
Act	○Article 59 of the Constitution of Japan A bill becomes a law on passage by both Houses, except as otherwise provided by the Constitution.
Cabinet Order	○Article 73 of the Constitution of Japan Enact cabinet orders in order to execute the provisions of this Constitution and of the law. However, it cannot include penal provisions in such cabinet orders unless authorized by such law.
Ministerial Ordinance (Normally: Regulations)	○Cabinet Office Establishment Law, Article 7 The Prime Minister may, in order to enforce an Act or a Cabinet Order in respect of administrative matters under his/her charge, or on the basis of a special delegation under an Act or a Cabinet Order, issue a cabinet ordinance as the order of the Cabinet Office. ○National Government Organization Law, Article 12 A minister may, in order to enforce an Act or a Cabinet Order in respect of administrative matters under his/her charge, or on the basis of a special delegation under an Act or a Cabinet Order, issue a Ministerial Ordinance as an order from the ministry.

2.2.2 Basic Laws on Occupational Safety and Health in Japan

The fundamental acts on occupational safety and health are the Labor Standards Law and the Industrial Safety and Health Law. The fundamental acts are mainly relied on the latter law.

Table 2.2.2 Labor Standards Law of Japan

Labor Standards Law (Act No. 49 of the 7th of April 1947)
Article 1. Working conditions shall be those which should meet the needs of workers who live lives worthy of human beings. (2) The standards for working conditions fixed by this Act are minimum standards. Accordingly, parties to labor relationship shall not reduce working conditions with these standards as an excuse, and instead, should endeavor to raise the working conditions.

Table 2.2.3 Occupational Safety and Health Law of Japan

Industrial Safety and Health Law (Act No. 57 of the 8th of June 1972)
Article 1. (Purpose) The purpose of this Act is to secure, in conjunction with the Labor Standards Act (Act No. 49 of 1947), the safety and health of workers in workplaces, as well as to facilitate the establishment of comfortable working environment, by promoting comprehensive and systematic countermeasures concerning the prevention of industrial accidents, such as taking measures for the establishment of standards for hazard prevention, clarifying the safety and health management responsibility and the promotion of voluntary activities with a view to preventing industrial accidents

The main contents of the Industrial Safety and Health Law are as follows:

○Formulating an industrial accident prevention plan; ○Organization for safety and health management; ○Measures for preventing dangers or health impairment of workers; ○Regulations concerning machines etc. and dangerous objects and harmful substances; ○Measures in placing workers; ○Measures for securing workers' health; ○Measures for creating a comfortable workplace environment; ○License, etc.; ○Safety and health improvement plan, etc.; ○Supervising, etc.; and ○Penalties.

2.2.3 Laws and Regulations Relating to Construction Works Based on the Fundamental Laws in Japan

(1) Laws and regulations

The laws and regulations based on the Occupational Safety and Health Law of Japan are indicated as follows:

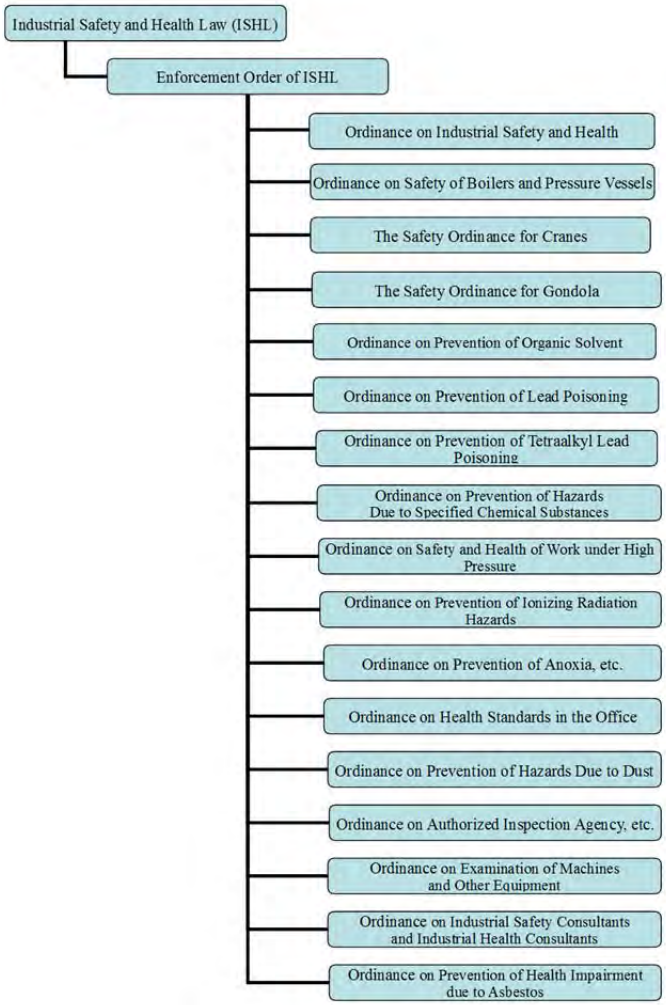

Figure 2.2.1 Laws and regulations relating to construction works of Japan

(2) Guidelines on safety management

The guidelines relating to safety management based on the "Standard Specification for Civil Works" and "Standard Specifications for Public Building Construction Works (Building Works Volume)" issued by the Ministry of Land, Infrastructure, Transport and Tourism are listed below.

Table 2.2.4 Guidelines for safety and health in Japan

Issuer	Guidelines relating to safety management
Ministry of Land, Infrastructure, Transport and Tourism	○Technical Guideline for Safe Execution on Civil Engineering Works
	○Technical Guideline for Safe Execution on Construction Machinery Works
	○Technical Guidelines for Measures against Noise & Vibration during Construction Works
	○Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works
	○Technical Guideline for Safe Execution on Building Works
	○Guideline of Measures against Third-party Accidents during Construction Works; Building Works

★Six types of guidelines above were referential guidelines for reviewing the Safety Management Guidelines.

2.2.4 Administrative Organs/Related Organizations for Occupational Safety and Health

(1) Labor Standards Bureau, Ministry of Health, Labor and Welfare

This bureau is one of subdivisions of the Ministry. The bureau take initiatives for securing and improving working conditions, securing safety and health of workers, and controlling precise workers' compensations, and promotes comprehensive measures for improvement of workers' lives. In particular, the Inspection Division performs works related to supervision performed by Labor Standards Inspectors concerning working conditions, industrial safety (excluding security at mines), occupational health and protection of workers (excluding rescue upon ventilation and disaster at mines).

(2) Prefectural Labor Bureau

The bureau extends services related to implementation of laws including the Labor Standards Law and the Occupational Safety and Health Law, as well as services of workers' compensation.

(3) Labor Standards Inspection Office

In general, the Labor Standards Inspection Office performs guidance for securing and improving working conditions, guidance for safety and health, and payment of workers compensation on the basis of the Labor Standards Law and other acts. The Labor Standards Inspector has an authority to enter workplaces (under Article 91 of the Industrial Safety and Health Law), and can recommend improvement and give instructions on violation of laws. In addition, the Labor Standards Inspector has another authority of investigation as a judicial police officer as provided in Article 92 of the Industrial Safety and Health Law.

(4) Japan Industrial Safety & Health Association

This is an organization to prevent industrial accidents in all industries. It was established in 1964 for the purpose of extinguishing occupational accidents by improving safety and

health through promotion of voluntary activities by the Employers for prevention of occupational accidents. Ever since, it has actively promoted various projects to assist creation of safe, healthy and comfortable workplaces to achieve its public mission.

(5) Japan Construction Occupational Safety and Health Association

This is an organization for the purpose of preventing occupational accidents in the construction industry. It is a body organized by the Employers of construction businesses and organizations of such Employers. It prescribes occupational accident prevention rules for construction, and gives assistance and advice on safety and health measures for workers. It also takes initiatives in prevention of occupational accidents, and promotes activities for prevention of occupational accidents implemented by the Employers' organizations to achieve the objective of preventing occupational accidents in construction.

Based on the "Guidelines on Occupational Safety and Health Management Systems" enacted by the Ministry of Health, Labor and Welfare (Notification No. 53, April 1999), it developed in November 1999 the "Construction Occupational Health and Safety Management System Guidelines" (COHSMS Guidelines) (amended in June 2006), and has promoted and diffused the COHSMS Guideline for the construction industry.

2.2.5 Safety Management System for Construction Works in Japan

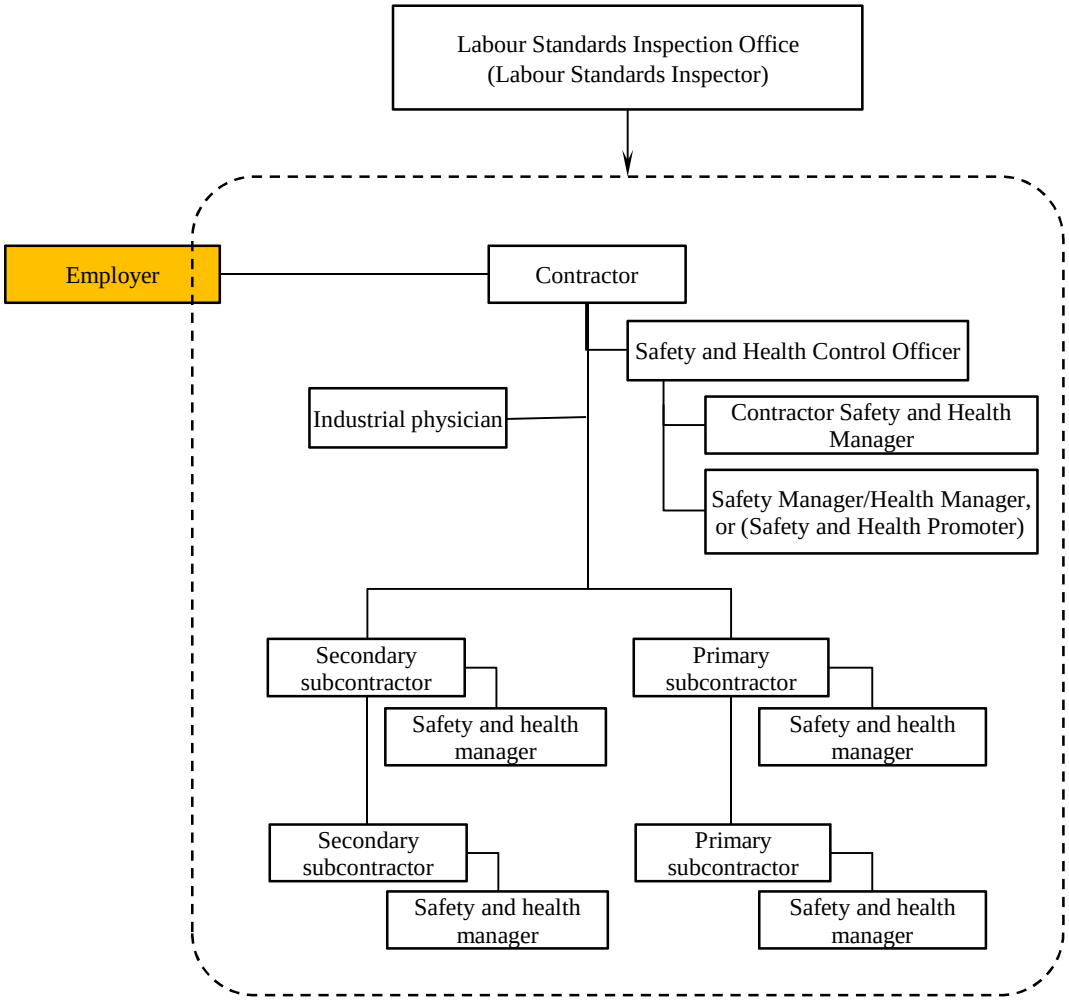

Figure 2.2.2 Safety management framework (Japan)

The safety management system in Japan is mainly provided for by the Occupational Safety and Health Law concerning actions that should be taken by the Employers, the Contractors, and other related parties including the subcontractors. It is required to promote safety management at construction sites by appointing a safety and health control officer, safety manager, health manager or safety and health promoter corresponding to the project scale (number of employees). If any subcontractor is involved, a safety and health manager in the main Contractor should be appointed.

As to the conditions of implementing safety management corresponding to laws and regulations such as the Industrial Safety and Health Law, Labor Standards Inspection Office (Labor Standards Inspector) is supervising them timely.

2.2.6 Statistics of Construction Accidents in Japan

The number of casualties (deaths and injuries) in the construction industry in Japan was 16,143 in 2010. In accidents in construction, 30% or more of the casualties resulted from crashing and falling.

Table 2.2.5 Statistics of Accidents in Japanese Construction Industry

Type of industrial accidents	Share of the casualties (%)
Crashing and falling	33.5
Crushing, trapping	10.9
Cutting, abrasion	10.4
Incoming, downcomming	10.4
Overturn	9.0
Others	25.8

*Data as of 2010

*Source: “Safety Indicators 2011”,
Japan Industrial Safety & Health Association

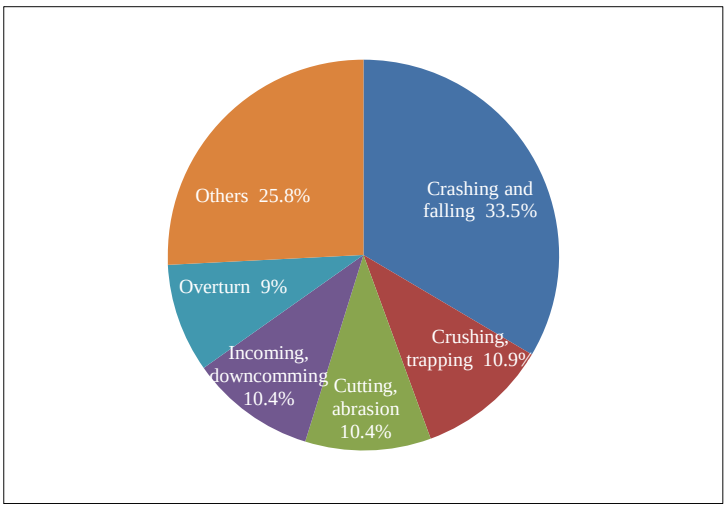

Figure 2.2.3 Accident statistics in Japanese construction industry

2.2.7 Accident Statistics in ODA Construction Works

The ODA construction works are characterized by high percentage of the casualties by traffic accidents, and the casualties by public accidents accounting for about 70% of the total casualties.

Table 2.2.6 The number of casualties of public accidents in ODA construction works

The number of casualties by public accidents
・ The number of casualties by public accidents: 302, total casualties: 435 ・ The percentage of casualties by public accidents: 302/405 = about 70%

Table 2.2.7 Accident statistics in ODA construction works

Type of industrial accidents	Share of the casualties (%)
Traffic accidents (road)	26.9
Traffic accidents (others)	21.8
Collapse, destruction	16.3
Explosion	9.0
Incoming, downcoming	5.5
Crashing and falling	3.9
Others	16.6

*ODA Loan: Fiscal 2008-2010

*Grant Aid: Fiscal 2000-2010

Source: Project Research on the Study on Safety Management for Construction Work in Japan.

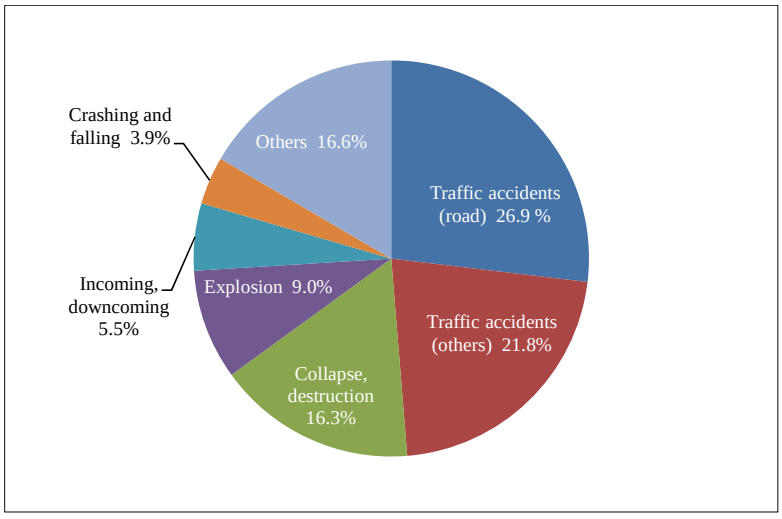

Figure 2.2.4 Accident statistics in ODA construction works

2.3 Current Status of European Union (EU)

2.3.1 Legal Systems in EU

Table 2.3.1 Outline of legal system in EU

Regulation	Directly applied to all member states. It has the binding power as same as the domestic laws. Regulations control actions of governments and the public sector of each country in EU.
Directive	Directives bind the member states after the domestic laws and regulations are amended pursuant thereto. Domestic laws shall be changed within 3 years after insertion in the official gazette of a directive.
Decision	Directly binds specific actions or abolitions by specifying the subjects (member states, firms, individuals, etc.)
Recommendation	This is an expression of the expectation by the European Commission that a member state, firm, individual, etc. takes certain action or measure, and has no legally binding power.
Opinion	This is an expression of intention by the European Commission on certain subjects, and has no legally binding power.

2.3.2 Basic Laws for Occupational Safety and Health in EU

The member states of EU should incorporate the basic directives and individual directives in the domestic laws in principle.

(1) Basic directive

Table 2.3.2 Outline of Council Directive, 89/391/EEC

(89/391/EEC) COUNCIL DIRECTIVE of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work
[Outline] 1) This directive applies entirely to the public and private sectors. 2) Obligations of Employers are specified. “Securing the safety and health of workers related to the work,” “Implementation of risk assessments” “Provision of information and consultation on the issues of safety and health,” “Safety and health education and training of workers,” etc. 3) Obligations and rights of workers are specified. ○ Obligation to obey directions. ○ Obligation to report dangers. ○ Obligation to cooperate with the Employer ○ Right to recommend safety and health measures, right of participation, right to appeal, etc.

(2) Individual directive on construction works

Table 2.3.3 Basic Concept of Council Directive, 92/57/EEC

(92/57/EEC) DIRECTIVE of 24 June 1992 on the implementation of minimum safety and health requirements at temporary or mobile construction sites
[Basic concept] 1) All parties involved in construction process including Employers and designers shall bear respective roles in safety and health. 2) Appoint a safety and health coordinator during the project preparation stage and during the project execution stage, who will have new roles in construction works. 3) Prepare three new documents (prior notice, safety and health plan, and safety and health file) for prevention of occupational accidents.

2.4 Current Status of U.K.

2.4.1 Legal Systems in U.K.

In United Kingdom, under the Health and Safety at Work etc. Act (Primary Legislation), there are regulations (Secondary Legislation), Approved Code of Practice (ACOP) and Guidance.

Table 2.4.1 Outline of legal system in U.K.

Primary Legislation	Act
Secondary Legislation	Regulation
Approved Code of Practice	Approved Code of Practice
Guidance	Guidance

2.4.2 Basic Laws for Occupational Safety and Health in U.K.

Name	Health and Safety at Work etc. ACT 1974 (HSWA)

2.4.3 Laws and Regulations Relating to Construction Works Based on the Fundamental Laws in U.K.

(1) Regulations (Secondary Legislation)

Regulations are to be approved by the Parliament for enforcement, and they are with legally binding. The primary regulations related to construction works are listed below.

Table 2.4.2 Main regulations related to construction works in U.K.

● Management of Health and Safety at Work Regulations 1999
● Work at Height Regulations 2005
● Control of Substances Hazardous to Health Regulations 2002 (COSHH)
● Construction (Design and Management) Regulations 2007(CDM)
● Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
● Provision and Use of Work Equipment Regulations 1998 (LOLER)
● Provision and Use of Work Equipment Regulations 1998 (PUWER)
● Manual Handling Operations Regulations 1992
● Control of Noise at Work Regulations 2005
● Control of Vibration at Work Regulations 2005
● Health and Safety(First Aid) Regulations 1981
● Construction (Design and Management) Regulations 2007
● Personal Protective Equipment Regulations 1992
● Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)

(2) Approved Code of Practice (ACOP)

Approved codes of practice are issued by the Health and Safety Executive (HSE). These codes are not with legally binding but any accident might be treated disadvantageously in court proceedings according to the status of compliance on these codes. The codes are issued by the Health and Safety Executive (HSE) and compiled in Legal Series by L code.

The codes by L code explain each clause of regulations, and indicate specific actions related thereto. The primary codes related to construction works are listed below.

Table 2.4.3 Main Codes for Construction Works in U.K.

L21	Management of health and safety at work. Management of Health and Safety at Work Regulations 1992 – approved code of practice. 1992
L24	Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992 – approved code of practice and guidance 1992
L144	Managing health and safety in construction. Construction (Design and Management) Regulations 2007. (CDM) - approved code of practice.

(3) Guidelines on safety management

Guidance is drafted by the Health and Safety Executive similarly as the approved codes of practice. Although guidance has no binding power, works implemented in accordance with the guidance is deemed to comply with the laws and regulations as the guidance is based on laws and regulations. Guidance is issued by the Health and Safety Executive (HSE) and organized in series by codes of HSG (Health and Safety Guidance). Major guidance related to construction works is listed below.

Table 2.4.4 Main Guidance for Construction Works in U.K.

HSG 144	The safe use of vehicles on construction sites: A guide for clients, designers, Contractors, managers and workers involved with construction transport
HSG 150	Health and safety in construction
HSG 151	Protecting the public: Your next move

★The similar guidelines referred to in the review of safety management guidelines shall be “HSG144”, “HSG150”, “HSG151” and “Construction (Design and Management) Regulations 2007 (CDM)”.

2.4.4 Administrative Organs/Related Organizations for Occupational Health and Safety

(1) Health and Safety Commission: HSC

The Secretary of State for Work and Pensions appoints the members in consultation with the Employers, implementing agencies, municipalities and other related organizations. The commission has a power to recommend regulations and authenticate codes of practice.

(2) Health and Safety Executive: HSE

HSE have responsibilities to enforce the basic laws for safety and health. It also drafts and issues Approved Codes of Practice (ACOP) and guidance. The executive practice may be delegated to municipalities, and the inspectors have lots of authorities:

- ○ If necessary, he or she can inspect the workplace without prior notice.
- ○ Having an authority like police, he or she can arrest persons who intervenes the entry of inspectors.
- ○ If any violation of laws is identified as a result of inspection, he or she can issue “Improvement Order” and “Suspension of Work”.

(3) Environment Health Office: EHO

Though EHO is a local organization, it is in charge of safety and health matters in the office, and environmental problems around the sites. It monitors noise and dust around construction sites. The official in charge of EHO sometimes inspects construction sites.

2.4.5 Safety Management System for Construction Works in U.K.

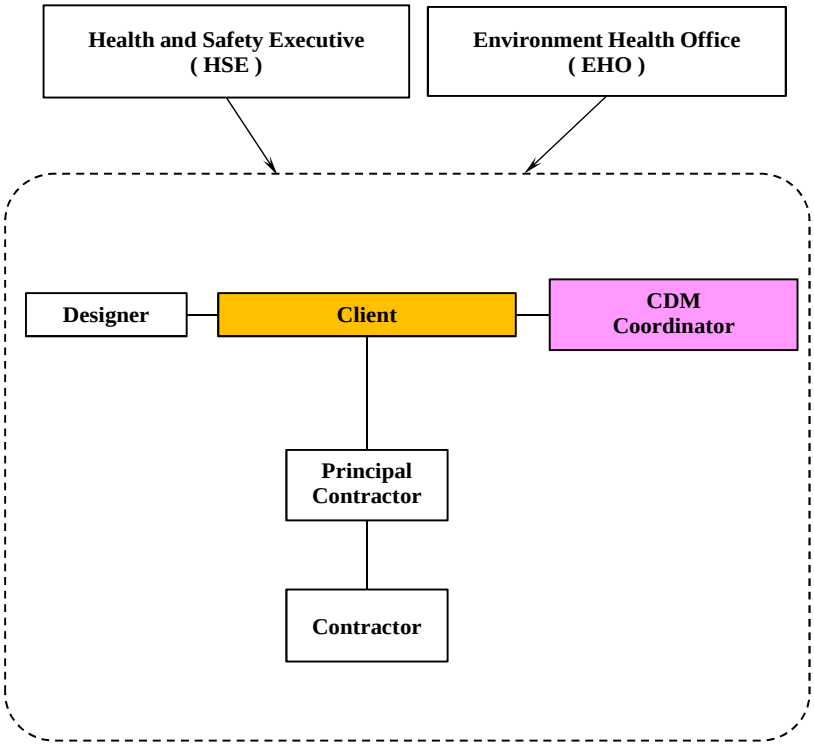

Figure 2.4.1 Safety management framework (U.K.)

The safety management system in U.K. is provided with reference to HSWA (Health and Safety at Work etc. Act 1974). It should be noted that a client employs a CDM Coordinator, in addition to a designer, who takes charge of safety management in construction sites. This is pursuant to the "Construction (Design and Management) Regulations 2007 based on the EU Directives (89/391/EEC and 92/57/EEC). Concerning safety management in construction works, a client, a CDM coordinator and other parties involved in construction, in addition to the main Contractor, have respective roles and responsibilities.

2.4.6 Statistics of Construction Accidents in U.K

Fatalities (deaths) in construction in U.K. is mostly caused by crashing and falling. This tendency is similar to that of Japan. In U.K., about 70% of the fatalities are caused by crashing and falling, incoming and downcoming, and collapse and destruction.

Table 2.4.5 Accident statistics in construction works in U.K.

Cause	The share of the number of deaths (%)
Crashing and falling	47.0
Incoming and downcoming	12.0
Collapse and destruction	12.0
Construction machines, etc.	11.0
Electric accidents	6.0
Others	12.0

*Data over the period 2007/08 to 2011/12

*Source: "Work related injuries and ill health," HSE (Health and Safety Executive)

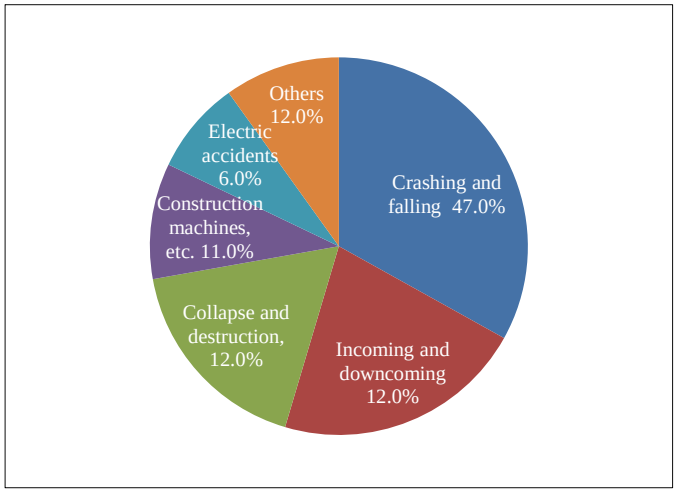

Figure 2.4.2 Accident statistics in construction works in U.K.

2.5 Current Status of France

2.5.1 Legal Systems in France

Table 2.5.1 Outline of legal system in France

Normes constitutionnelles	Constitution	
Lois	Acts	Enacted by the National Assembly.
Normes reglementaires Decret	Décrets	Enacted by the Prime Minister and the President.
Normes reglementaires Arretes	Arrêtés	Enacted by the administrative organizations.

2.5.2 Basic Laws for Occupational Safety and Health in France

Name in French/English	Code du travail/Code of Labor

It provides for roles of government organizations in charge of occupational safety and health, rights and obligations of parties involved in construction projects, and the basic principles to secure occupational safety and health. It was extensively amended in January 2009.

Name in French/English	Code de la sécurité sociale/Code of Social Security

It provides for compensation for occurrence of occupational accidents, penalties for Employers who failed to report accidents, and limitation of the claim for civil damages.

2.5.3 Laws and Regulations Relating to Construction Works Based on the Fundamental Laws in France

Under the Labor Acts, there are regulations called décrets and arrêtés (ministerial ordinances). The guidelines utilized at construction sites are issued by the organizations listed below. They have no binding power but are positioned as industry standards, as they are issued pursuant to laws.

- ○ INRS (Institut National de Recherche et de Sécurité) : National Safety and Research Institute
- ○ CNAMTS (Caisse nationale de l'assurance maladie des travailleurs salariés) : National Health Insurance Fund for Salaried Employees
- ○ CRAM (Caisses régionales d'assurance maladie) : Regional Health Insurance Fund
- ○ OPPBTP (Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics) : Occupational Risk Prevention Organisation for the Building and Civil Engineering Industries

★The similar guidelines referred to in the review of safety management guidelines shall be « Aide-memoire BTP : Public Works Handbook » issued by INRS (National Safety Research Institute).

2.5.4 Administrative Organs/Related Organizations for Occupational Safety and Health

(1) Ministry of Labor, Social Relations, Family, Solidarity and City (Ministère du Travail, des Relations sociales, de la Famille, de la Solidarité et de la Ville)

This government organization is corresponding to the Ministry of Health, Labor and Welfare of Japan. A Labor Inspector (Inspecteur du travail) belonging to this organization

conducts inspections at construction sites.

(2) National Health Insurance Fund for Salaried Employees (Caisse nationale d'assurance maladie des travailleurs salaries: CNAMTS) is in charge of social security in France. It issues guidelines for preventing accidents.

(3) Regional Health Insurance Fund (Caisse régionales d'assurance maladie: CRAM) is a suborganization of CNAMTS. This organization has regional and technical committees for the building and civil engineering industries (Comité technique régional bâtiment et travaux publics: CTRB) and advisors in charge of safety service (Controleur du service prevention) belonging to it give instructions on safety and health. It issues guidelines for preventing accidents.

(4) National Research and Safety Institute (Institut National de Recherche et de Sécurité: INRS)

It is positioned as a social security organization to conduct researches for preventing and eradicating occupational accidents and illnesses, and issues guidelines, etc. for preventing accidents.

(5) Occupational Risk Prevention Organisation for the Building and Civil Engineering Industries (Organisme Professionnel de Prévention du Bâtiment et des Travaux Publics : OPPBTP)

Though it has no authority on regulations and enactment of laws, it has a right to enter construction sites.

2.5.5 Safety Management System for Construction Works in France

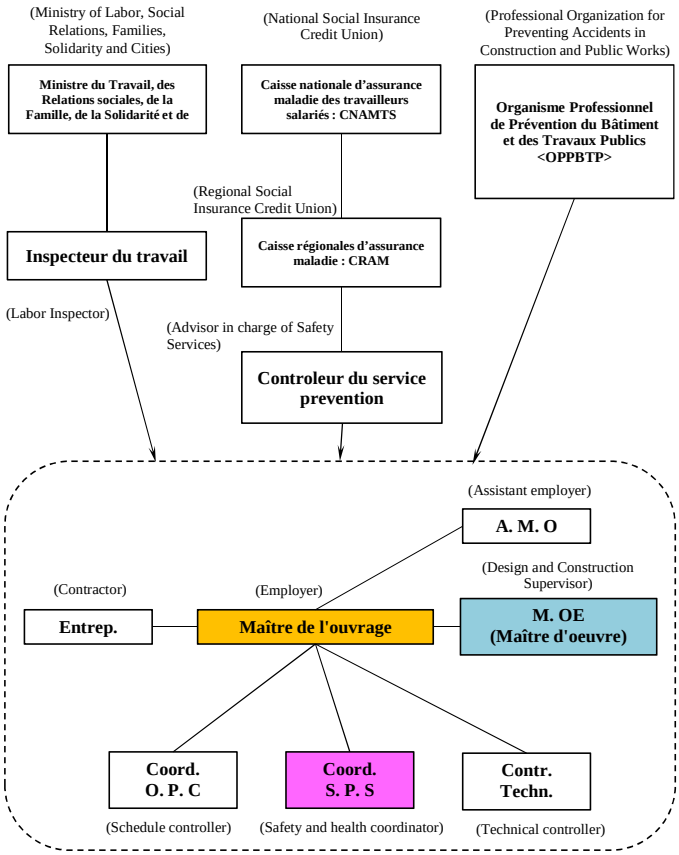

Figure 2.5.1 Safety management framework (France)

The safety management system in France is provided with reference to the Code of Labor (Code du travail) and Code of Social Security (Code de la sécurité sociale).What is noteworthy is the system of an Employer hiring, in addition to the design and execution manager, technical controller, schedule controller, and safety and health coordinator. The safety and health coordinator is in charge of safety management at construction sites. This is based on the EU Directives (89/391/EEC and 92/57/EEC) in the same way as the British system. Concerning safety management in construction works, not only the main Contractor but also the Employer, the safety and health coordinator and other parties related to construction have respective roles and responsibilities.

2.5.6 Statistics of Construction Accidents in France

Thirty percent or more of the cause of accidents requiring days off in France is by the works relating to construction machinery operations.

Table 2.5.2 Accident statistics in construction works in France

Cause	Shares of accidents requiring days off (%)
Construction machines, etc.	33.1
Ground Level Accidents	21.5
Crashing and falling	17.6
Machinery, tools, etc.	9.9
Incoming, downcoming	8.0
Others	9.9

*Data in 2007

*“Aide-momoire BTP”, INRS (National Safety Research Institute)

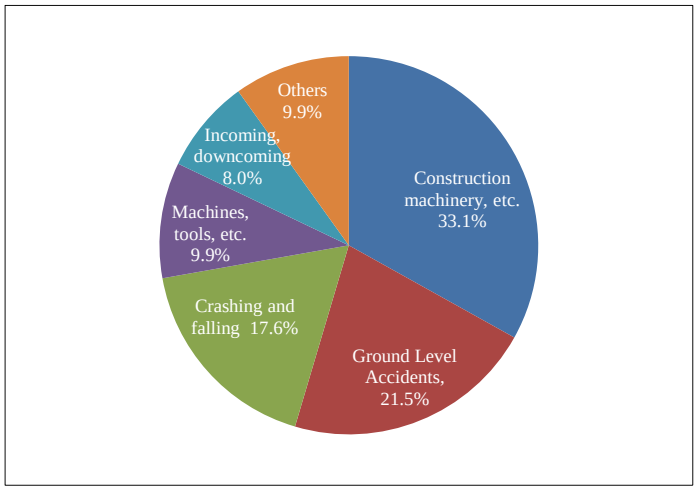

Figure 2.5.2 Accident statistics in construction works in France

2.6 Current Status of U.S.A.

2.6.1 Legal Systems in U.S.A.

Each state has an authority to develop legislations on occupational safety and health. Most of the state laws are in reference to laws and regulations by the federation. Laws with more stringent rules than those in federation can be enacted in each state, but the federal laws and regulations have priority over the state laws in other respects.

Table 2.6.1 Outline of legal system in U.S.A.

The United States Code	Federal acts	A.K.A. USC
The Code of Federal Regulations	Federal regulations	A.K.A. CFR
State Plan Safety and Health Standard	State regulations	Enacted by each state

2.6.2 Basic Laws for Occupational Safety and Health in U.S.A

Name	Occupational Safety and Health Act of 1970 (OSHA)

It is a federal act for occupational safety and health, a.k.a. OSHA.

2.6.3 Laws and Regulations Relating to Construction Works Based on the Fundamental Laws in U.S.A.

The federal regulations for occupational safety and health are compiled in Part 1910 of Title 29 of the Code of Federal Regulations (CFR).

CFR Part 1910 has the federal regulations for all industries.

Name	Part 1910 Occupational Safety and Health Standards

In addition to CFR Part 1910 for all industries, federal regulations are prescribed for construction works as specified below.

Name	PART 1926 Safety and Health Regulations for Construction

<Provisions related to construction works>

- 1910.12 Construction Work
- 1910.19 Special Provisions for Air Contaminants
- 1910.132 General Requirements (Personal Protective Equipment)
- 1910.136 Occupational Foot Protection
- 1910.137 Electrical protective Devices
- 1910.138 Hand protection
- 1910.146 Permit-required confined spaces
- 1910.147 The control of hazardous energy (lockout/tagout).
- 1910.178 Powered industrial Trucks
- 1910.332 Training – Electrical
- 1910.333 Selection and Use of Work Practices
- 1910.335 Safeguards for Personal Protection

The guidelines are issued by each administrative organization and related body as specified in 2.6.4. Most of them are individual and specific guidelines, but there is no guideline to entirely cover construction works.

Similar to guidelines, the "Construction Industry Digest" (Occupational Safety and Health Administration) describing basic standards of application for "Part 1926 Safety and Health Regulations for Construction," a federal regulation for construction works will be the referential guideline in reviewing the safety management guidelines.

2.6.4 Administrative Organs/Related Organizations for Occupational Safety and Health

(1) Occupational Safety and Health Administration: OSHA

OSHA is one division of the Department of Labor of U.S.A., mainly working for securing workers' safety, health and sound working conditions.

An inspector of OSHA has the authority to enter the construction sites for inspection.

(2) National Institute for Occupational Safety and Health: NIOSH

NIOSH is an organization for education to secure workers' safety and health, preparation of educational materials, and investigation and research in safety and health.

(3) American National Standard Institute: ANSI

It issues safety and health guidelines for each industry. The standards are not prepared by ANSI but it has roles to approve standards prepared by organizations and associations as members of the institute.

2.6.5 Safety Management System for Construction Works in U.S.A.

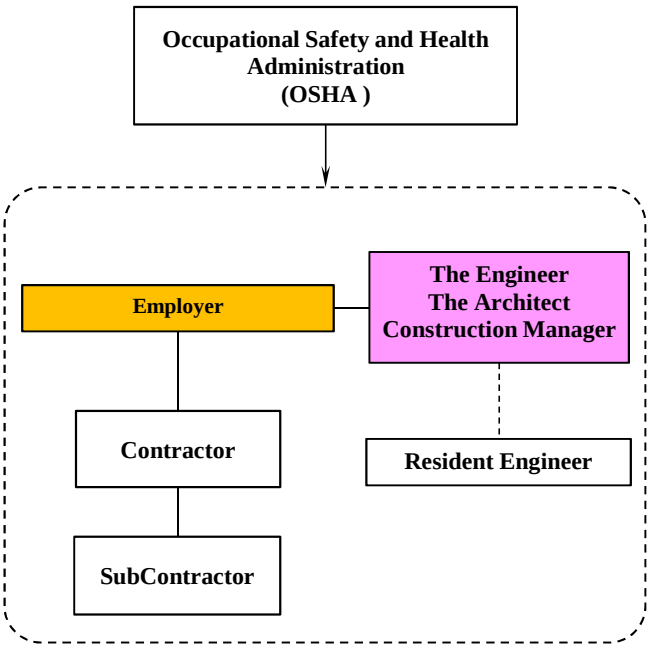

Figure 2.6.1 Safety management framework (U.S.A.)

The safety management system in U.S.A. with some difference among states is prescribed in "Occupational Safety and Health Act of 1970 (OSHA)" and "PART 1926 Safety and Health Regulations for Construction." There is no obligation to employ safety experts by the Employer and the Contractor is responsible for safety management at construction sites in principle.

2.6.6 Statistics of Construction Accidents in U.S.A.

The main cause of deaths in construction works in U.S.A. is fall, just like Japan and U.K.

Table 2.6.2 Accident statistics of construction works in U.S.A.

Cause	The share of deaths (%)
Crashing and falling	35.0
Incoming and downcoming	10.0
Electric shock	9.0
Getting caught in	3.0
Others	43.0

*Data as of 2011

*Source: OSHA (Occupational Safety and Health Administration, the U.S.A.) website

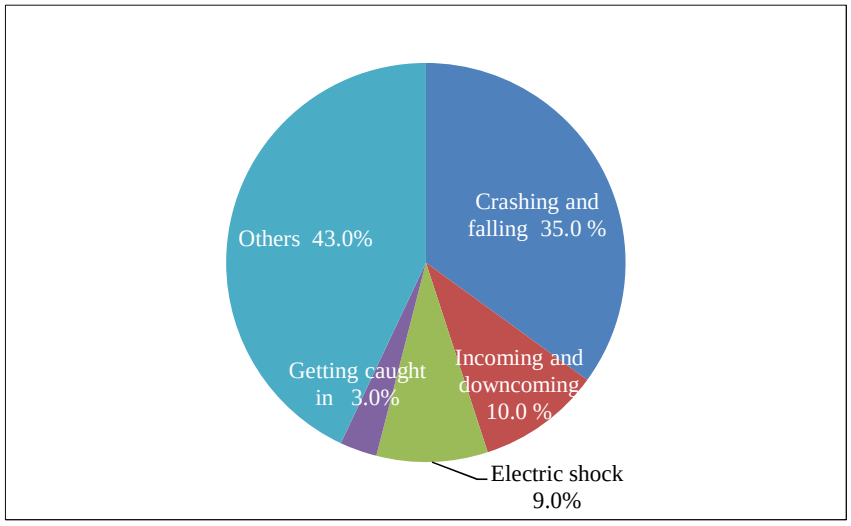

Figure 2.6.2 Accident statistics of construction works in U.S.A.

Chapter 3
Review on Other Guidelines

Chapter 3 Review on Other Guidelines

3.1 Basic Concept of Reviewing Other Guidelines

In this study, other guidelines regarding safety management of construction works published by ILO and WB as well as other guidelines shown in "Chapter 2. Current Status of Safety Management for Construction Works in Advanced Countries" were reviewed.

Table 3.1.1 Other guidelines reviewed in the study

Guidelines covered by the study	
1	Safety management guidelines in Japan
2	Safety management guidelines in ILO
3	Safety management guidelines in the WB Group
4	Safety management guidelines in U.K.
5	Safety management guidelines in France
6	Safety management guidelines in the U.S.A.

Viewpoints of reviewing those guidelines are as follows:

1) Category ("Construction work as a whole," "Construction machine and facilities," "Accident with third parties," and "Others")
2) Objective/Scope of application
3) Outline of the composition

3.2 Safety Management Guidelines in Japan

For safety management guidelines in Japan, following guidelines have been published by MLIT, which are described in "2.2 Current Status in Japan".

Table 3.2.1 Other guidelines in Japan

Issued by	Safety management guidelines, etc.	Category
MLIT	(1) Technical Guideline for Safe Execution on Civil Engineering Works.	Construction work
	(2) Technical Guideline for Safe Execution on Building Works.	
	(3) Technical Guideline for Safe Execution on Construction Machinery Works.	Construction machine and facilities
	(4) Technical Guidelines for Measures against Noise & Vibration during Construction Works	Measures against third-party accidents
	(5) Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works	
	(6) Guideline of Measures against Third-party Accidents during Construction Works; Building Works	

3.2.1 Technical Guideline for Safe Execution on Civil Engineering Works

"Technical Guidelines and Standards for Construction Safety on Civil Engineering Works" is a guideline established and issued by Ministry of Land, Infrastructure, Transport and Tourism, consists of safety requirements, including safety measures in general, common to construction works and the itemized requirements for each type of work. Outline of this guideline is shown below.

Table 3.2.2 Outline of Technical Guideline for Safe Execution on Civil Engineering Works

Category	Guideline for whole construction work
Objective	○ The objective of this guideline is to stipulate the general technical considerations and the technical guidelines for safety management, such as the measures necessary for execution, etc., thereby ensuring the safety management during civil engineering work.
Scope of application	○ This guideline applies to safety management of general civil engineering work conducted under the control of MLIT.

Table 3.2.3 Composition of Technical Guideline for Safe Execution on Civil Engineering Works

Chapter	Item
Chapter 1	General
Chapter 2	Safety Measures in General
Chapter 3	Underground Utilities, and Overhead Facilities in General, such as Overhead Line
Chapter 4	Machines, Units and Equipment in General
Chapter 5	Temporary Works
Chapter 6	Transport
Chapter 7	Earth Work
Chapter 8	Foundation Work
Chapter 9	Concrete Work
Chapter 10	Compressed Air Work
Chapter 11	Work around Railways
Chapter 12	Work Where the Debris Flow May Reach
Chapter 13	Road Works
Chapter 14	Bridge Works (construction)
Chapter 15	Mountain Tunneling
Chapter 16	Shield and Jacking Work
Chapter 17	Rivers and Coastal Works
Chapter 18	Dam Construction Works
Chapter 19	Structures Demolition Work

3.2.2 Technical Guideline for Safe Execution on Building Works

Technical Guidelines and Standards for Construction Safety on Building Works is a guideline established and issued by MLIT and, similarly to the case of (1) "Technical Guideline for Safe Execution on Civil Engineering Works," consists of the general and common requirements and the itemized description for each type of work. Outline of this guideline is shown below.

Table 3.2.4 Outline of Technical Guideline for Safe Execution on Building Works

Category	Guideline for whole construction work
Objective	○ The objective of this guideline is to stipulate the general technical considerations and necessary measures to prevent accidents during building and utilities works of government facilities, thereby ensuring the safety management
Scope of application	○ This guideline applies to the works necessary for new building, addition to the building, modification (repair, alteration) or dismantling (removal). ○ The Contractor must always make the best efforts to ensure the safety management of the work while referring to this guideline.

Table 3.2.5 Composition of Technical Guideline for Safe Execution on Building Works

Volume	Chapter	Item
Volume I General		
Volume II General and common requirements	Chapter 1	General Requirements of Safety Management
	Chapter 2	Temporary Works
	Chapter 3	Construction Machine
Volume III Various works	Chapter 1	Building Works
	Chapter 2	Electric Equipment Work
	Chapter 3	Mechanical Equipment Work
	Chapter 4	Outdoor Facilities Works
	Chapter 5	Remodeling Work
	Chapter 6	Overhauling Work

3.2.3 Technical Guideline for Safe Execution on Construction Machinery Works

Technical Guideline for Safe Execution on Construction Machinery Works is a guideline established and issued by MLIT and consists of the common requirements and the itemized description by type of work concerning the safety management of the construction machines and equipment. Outline of this guideline is shown below.

Table 3.2.6 Outline of Technical Guideline for Safe Execution on Construction Machinery Works

Category	Guideline for the construction machines and equipment
Objective	○ The objective of this technical guideline is to prevent accidents related to the work with construction machines and thus to contribute to ensure the safety management of the work with construction machines by describing general technical considerations and measures necessary for preparation of the construction plan and work execution with, and

	maintenance and operation for the construction machines.
Scope of application	○ This technical guideline applies to the construction works with the construction machines unless otherwise specified in the laws and standards. ○ The construction machine as referred to in this technical guideline means all of construction machines and equipment used in the construction works.

Table 3.2.7 Composition of Technical Guideline for Safe Execution on Construction Machinery Works

Volume	Chapter	Item
Volume I General	Chapter 1	Objective
	Chapter 2	Scope of Application
	Chapter 3	Fundamentals of Safety Measures
	Chapter 4	Safety-related Laws
Volume Ⅱ Common	Chapter 5	On-site Study
	Chapter 6	Construction Plan
	Chapter 7	Site Management
	Chapter 8	General Management of Construction Machines
	Chapter 9	Transport of the Construction Machines
	Chapter 10	Specification of Lease Machines
Volume Ⅲ Various works	Chapter 11	Excavation, Loading
	Chapter 12	Transport
	Chapter 13	Compaction
	Chapter 14	Cofferdam, Retaining and Support
	Chapter 15	Foundation Work, Soil Improvement Work
	Chapter 16	Works with Crane, Lift, etc.
	Chapter 17	Concrete Works
	Chapter 18	Structure Demolition Work
	Chapter 19	Pavement Work
	Chapter 20	Tunneling Work
	Chapter 21	Shield Excavation and Jacking Work
	Chapter 22	Road Maintenance and Rehabilitation
	Chapter 23	Bridge Works

3.2.4 Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works

"Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works" is an outline drafted and issued by MLIT, which covers requirements concerning preventive measures against third-party accidents related to the construction works, specifically, civil works. Outline of this guideline is shown below.

Table 3.2.8 Outline of the Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works

Category	Guideline for third-party accidents
Objective	○ The objective of this guideline is to stipulate the standard for the plan, design, and execution necessary to prevent danger and inconvenience to the life, physical body, and properties of the third party other than those stakeholders related to this work during execution of the civil engineering works, thereby contributing to ensure the safety management of the civil engineering work.
Scope of application	○ This guideline applies to the civil engineering works executed in the area related to the third party. ○ The promoter of the work and the Contractor must observe all requirements of this outline to prevent any third-party accidents during civil engineering works. In this outline, the Contractor is not prevented from executing, subject to the stipulation of the agreement, the contents that this outline stipulates the promoter to execute.

Table 3.2.9 Composition of the Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works

Chapter	Item
Chapter 1	General
Chapter 2	Work Site
Chapter 3	Measures for Traffic
Chapter 4	Maintenance of the Track, etc.
Chapter 5	Underground Utilities
Chapter 6	Retaining Work
Chapter 7	Lining Work
Chapter 8	Auxiliary Method
Chapter 9	Handling of Spring Water, etc.
Chapter 10	Handling of Byproducts from Construction
Chapter 11	Back-filling
Chapter 12	Mechanical and Electrical
Chapter 13	Underground Excavation Work
Chapter 14	Operation at Heights
Chapter 15	Form Support, Scaffold, etc.
Chapter 16	Prevention of Fires and Oxygen Deficiency Disease
Chapter 17	Others

3.2.5 Guideline of Measures against Third-party Accidents during Construction Works; Building Works

“Guideline of Measures against Third-party Accidents during Construction Works; Building Works” is an outline drafted and issued by MLIT, which covers requirements concerning preventive measures against third-party accidents related to the construction works, specifically, building works. Outline of this guideline is shown below.

Table 3.2.10 Outline of the Guideline of Measures against Third-party Accidents during Construction Works; Building Works

Category	Guideline for measures against third-party accidents
Objective	○ The objective of this guideline is to stipulate the standard for the plan, design, and execution necessary to prevent danger and inconvenience to the life, physical body, and properties of the third party other than those stakeholders related to this work during execution of the building works, thereby contributing to ensure the safety management of the building works.
Scope of application	○ This guideline applies to the work necessary for building, repair, remodeling, or removal of the buildings. ○ The Employer (including the designer and construction supervisor, who execute duties on commission) and the Contractor must observe requirements of this outline to prevent any third-party accidents. In this outline, the Contractor is not prevented from executing, subject to the stipulation of the agreement, the contents that this outline stipulates the Employer to execute.

Table 3.2.11 Composition of the Guideline of Measures against Third-party Accidents during Construction Works; Building Works

Chapter	Item
Chapter 1	General
Chapter 2	General Requirements
Chapter 3	Measures for Traffic
Chapter 4	Temporary Facilities
Chapter 5	Mechanical, Electric, and Other Equipment
Chapter 6	Dismantling
Chapter 7	Civil Engineering and Retaining Works
Chapter 8	Foundation and Underground Works
Chapter 9	Remodeling Work
Chapter 10	Various Works

3.2.6 Technical Guidelines for Measures against Noise & Vibration during Construction Works

Technical Guidelines for Measures against Noise & Vibration during Construction Works is a guideline established and issued by MLIT, which covers requirements concerning preventive measures against third-party accidents related to vibration and noise during construction works. Outline of this guideline is shown below.

Table 3.2.12 Outline of Technical Guidelines for Measures against Noise & Vibration during Construction Works

Category	Guideline for measures against third-party accidents

Objective	○ The objective of this guideline is to secure the living environment and ensure smooth execution of the work by preventing occurrence of noise and vibration as much as possible during construction works. ○ This guideline provides technical measures to alleviate noise and vibration during construction works.
Scope of application	○ In principle, this guideline applies to all construction works in areas described below where the living environment of residents must be secured by preventing noise and vibration unless the urgency is required due to accidents and other reasons. 1) Areas where the specific serenity must be maintained so as to conserve the satisfactory residential environment 2) Areas where maintaining the specific serenity is necessary because the area is for residential purposes 3) Areas used for commercial and industrial purposes in addition to residential, in which noise and vibration must be prevented because large number of dwelling houses are concentrated 4) Area within approximately 80 m around the premises of the school and nursery school, hospital, clinic, library, elder care facilities 5) Area where the effects of noise and vibration are expected, such as the areas around the stockyard, precision machine factory, business establishment provided with the electronic computer system, etc.

Table 3.2.13 Composition of Technical Guidelines for Measures against Noise & Vibration during Construction Works

Chapter		Item
General	Chapter 1	Objective
	Chapter 2	Scope of Application
	Chapter 3	Existing Laws
	Chapter 4	Basic Policy of the Measures
	Chapter 5	On-site Study
Particulars	Chapter 6	Earthwork
	Chapter 7	Transport
	Chapter 8	Rock Excavation Work
	Chapter 9	Foundation Work
	Chapter 10	Retaining Work
	Chapter 11	Concrete Work
	Chapter 12	Pavement Work
	Chapter 13	Steel Structure Work
	Chapter 14	Structure Dismantling Work
	Chapter 15	Tunneling Work
	Chapter 16	Shield and Jacking Work
	Chapter 17	Soft Ground Improvement Work
	Chapter 18	Temporary Work
	Chapter 19	Air Compressor and Motor Generator

3.3 Safety Management Guidelines in ILO

3.3.1 Treaties Concerning the Construction Works

As of the end of July, 2012, ILO has 189 conventions and 202 recommendations, which include the Convention concerning Occupational Safety and Health and the Working Environment (No.155) for all of industries and the Convention concerning Safety and Health in Construction (No. 167). Each of these conventions is outlined below. Note that both these conventions are not ratified in Japan.

Table 3.2.14 Outline of Convention concerning Occupational Safety and Health and Working Environment

Convention	Convention concerning Occupational Safety and Health and the Working Environment (No. 155)
Outline	The objective of the convention shall be to prevent accidents and injury to health arising out of, linked with or occurring in the course of work, by minimizing, so far as is reasonably practicable, the cause of hazards inherent in the working environment.
Category	Guideline for the construction work as a whole
Scope of application	○ This applies to all of industries.

Table 3.2.15 Composition of Convention concerning Occupational Safety and Health and Working Environment

Part	Item
Part 1	Scope of Application and Definitions
Part 2	Principle of National Policies
Part 3	Action at the National Level
Part 4	Action at the Level of the Undertaking

Table 3.2.16 Outline of Convention concerning Safety and Health in Construction

Convention	Convention concerning Safety and Health in Construction (No.167)
Outline	This convention consists of four parts; “Scope and Definitions,” ”General Provisions,” “Preventive and Protective Measures” and “Implementation.”
Category	Guideline for the construction work as a whole
Scope of application	○ This convention applies to all construction activities, namely, building, civil engineering, assembly, and dismantling works, including any process, operation or transport on a construction site, from the preparation of the site to the completion of the project.

Table 3.2.17 Composition of Convention concerning Safety and Health in Construction

Part	Item
Part 1	Scope of Application and Definitions
Part 2	General Provisions General provisions include the need of representative organizations of Employers and workers to be consulted on the implementation measures of

	this convention, obligations of the ratifying countries to establish and effectively implement the safety and health laws and regulations which ensure the application of the provisions of the convention, the responsibility system for the application of safety and health measures when multiple Contractors are working simultaneously in the same site, respective obligations of Employers and workers, cooperation between them, etc.
Part 3	Preventive and Protective Measures Preventive and protective measures include stipulation of appropriate principles for 22 items; safety of workplaces, scaffolds, lifting appliances, transport, plants and machines, work at heights, excavations, tunnels, caissons, work in compressed air, demolition, explosives, health hazards, and information and training.
Part 4	Implementation

3.3.2 Code of Practice on Safety and Health in Construction

In accordance with the decision taken by the Governing Body of the ILO at its 244th Session (November 1989), a meeting of experts drew up in 1991 a code of practice on safety and health in construction. The safety and health in construction focuses mainly on requirements of Part 3 of the Convention concerning Safety and Health in Construction (No.167) and consists of the common safety requirements, including the safety of workplaces, and the itemized description for each type of work. Outline of this guideline is shown below.

Table 3.2.18 Outline of the Code of Practice on Safety and Health in Construction

Category	Guideline for the construction work in general
Objective	○ The objective of this code is to provide guidance to those engaged in drafting of this type of provisions, in particular, the government organization and other public agencies, committee, management, and the employment institution and labor organization which are related to the construction sector.
Application	○ Construction activities for the following purposes: Building works: Excavation, construction, structural alteration, renovation, repair, maintenance (including cleaning and painting), and demolition of all buildings and structures Civil engineering works: Excavation, construction, structural alteration, repair, maintenance and demolition of airports, docks, ports and harbors, inland waterways, dams, rivers, collapse, tide prevention structures, roads, trunk roads, railways, bridges, tunnels, and viaducts, as well as those works for providing services, such as communications, drainage, sewerage, water supply, and energy. Assembling and disassembling of pre-fabricated buildings and structures, assembling of pre-fabricated members on the construction site ○ Assembling of the oil rig and other facilities during offshore operation, and assembling of these facilities on the land

Table 3.2.19 Composition of the Code of Practice on Safety and Health in Construction

No	Item
1	General Provisions
2	General Duties

3	Safety of Workplaces
4	Scaffolds and Ladders
5	Lifting Appliances and Gear
6	Transport of Earth–moving and Materials-handling Equipment
7	Plant, Machinery, Equipment, and Hand Tools
8	Work at Heights (including roof work)
9	Excavations, Shaft, Earthworks, Underground Works, and Tunnels
10	Cofferdams, Caissons, and Work in Compressed Air
11	Structural Frames, Formwork and Concrete Work
12	Pile-driving
13	Work on the Water
14	Demolition
15	Electricity
16	Explosives
17	Heath Hazards, First aid and Occupational Health Services
18	Personal Protective Equipment and Protective Clothing
19	Welfare
20	Information and Training
21	Reporting of Accidents and Diseases

3.4 Safety Management Guidelines in WB Group

WB Group consists of the “International Bank of Reconstruction and Development (IBRD)” and “International Development Association (IDA),” and the “International Finance Corporation (IFC),” “Multilateral Investment Guarantee Agency (MIGA),” and “International Center for Settlement of Investment Disputes (ICSID).”

IBRD and IDA, which are collectively called the World Bank, has the Safeguard Policies aiming at the environmental assessment and prevention of the accidental adverse effects to the third party, which however does not contain specific stipulations on the requirements and standards related to the occupational safety. The stipulations concerning the occupational safety of WB correspond to “4.01 Environmental Assessment” of The Bank’s Operational Manual. Here, EA (Environmental Assessment) is obliged to take into account the health and safety of the personnel and the social aspect of the project in the course of request for the aids of WB.

IFC, which is in charge of the private projects in the WB Group, has the so-called IFC standards based on the Equator Principles*, that is, the “IFC Performance Standard,” and “IFC EHS (Environment, Health, and Safety) Guideline.”

* Equator principles: Framework for confirmation that the large-scale projects with the total cost of $10 million or more to be implemented by the private financial institutions are to be implemented with due consideration of their effects on the community and natural environment.

Though WB has no specific substantive stipulation concerning the occupational safety, it is set forth that the IFC standards are to be applied to the occupational safety in the case of the projects jointly invested by WB and IFC. On the basis of these present situations, the applicable similar guidelines of the WB Group include the IFC standards (“IFC Performance Standard”

and “IFC EHS (Environment, Health, and Safety) guidelines.”

The IFC Guideline includes the General EHS Guidelines for all of industries and 62 Industry Sector Guidelines. The contents of General Guideline focus on the common safety requirements of the construction industry, which are also characterized by itemization of dangers in terms of physical, chemical, and biological aspects.

Among the industrial sector guidelines, the guideline for the infrastructure related to the construction works is shown below for reference.

Table 3.4.1 Industry sector guidelines of the “IFC EHS (Environment, Health and Safety) ”

Industry Sector Guidelines- Infrastructure	
Tourism and Hospitality Development	Toll Roads
Railways	Telecommunications
Ports, Harbors and Terminals	Crude Oil and Petroleum Product Terminals
Airports	Retail Petroleum Networks
Airlines	Health Care Facilities
Shipping	Waste Management Facilities
Gas Distribution Systems	Water and Sanitation

The IFC standards (“IFC Performance Standards” and “IFC EHS Guidelines”) are outlined below.

Table 3.4.2 Outline of IFC Performance Standard

Category	Other guidelines
Outline	○ The IFC Performance Standard consists of 8 Parts and defines the responsibilities of clients concerning environmental and social risks.
Scope of application	○ This standard applies over the entire period of the activities covered by the assessment and management in the project.

Table 3.4.3 Composition of IFC Performance Standard

No	Item	
PS1 Social and environmental assessment and management system	Introduction, Objectives, Scope of Application	
	Requirements	Environmental and social management system
		Environmental and social assessment
		Management programs
		Organizational capacity and competency
		Training
		Approach to the communities
		Monitoring
		Reporting
PS2 Labor and working conditions	Introduction, Objectives, Scope of Application	
	Requirements	Working conditions and worker-related management of worker relationship
		Protecting the work force
		Occupational health and safety
		Workers engaged by third parties
		Supply chain

PS3 Resource efficiency and pollution prevention	Introduction, Objectives, Scope of Application	
	Requirements	General requirements
		Consideration of surrounding environment
		Emission of greenhouse gas
		Pesticide use and management
PS4 Community health, safety, and security	Introduction, Objectives, Scope of Application	
	Requirements	Community health and safety
		Security personnel
PS5 Land acquisition and involuntary resettlement	Introduction, Objectives, Scope of Application	
	Requirements	General requirements
		Displacement
		Private sector responsibility under government-managed resettlement
PS6 Biodiversity conservation and sustainable management of living natural resources	Introduction, Objectives, Scope of Application	
	Requirements	Protection and conservation of biodiversity
		Sustainable management of living natural resources
PS7 Indigenous peoples	Introduction, Objectives, Scope of Application	
	Requirements	General requirements
		Development befits
		Special requirements
PS8 Cultural heritage	Introduction, Objectives, Scope of Application	
	Requirements	Protection of cultural heritage in project design and execution
		Project's use of cultural heritage

Table 3.4.4 Outline of IFC General EHS (Environment, Health and Safety) Guidelines

Category	Guidelines for the construction work in general
Outline	○ The IFC General EHS Guidelines consists of four parts; "Environmental," "Occupational Health and Safety," "Community Health and Safety," and "Construction and Decommissioning." The scope of application, excluding "Environmental," is described below.
Occupational health and safety	○ This guideline focuses on the operation stage of the project, but may be applied to construction and decommissioning activities.
Community health and safety	○ This deals with aspects of the project activities outside the boundary of conventional projects. Notwithstanding this, this is related to the project activities and may be applied on the project base.
Construction and decommissioning	○ New project under development, end of the project life-cycle, or expansion or modification of the existing project facilities

Table 3.4.5 Composition of IFC General EHS Guidelines

No	Item
1. Environmental	Scope of application and approach
	Air emissions and ambient air quality
	Energy conservation
	Wastewater and ambient water quality
	Water conservation
	Hazardous materials management
	Waste management
	Noise
	Contaminated land
2. Occupational Safety and Health	Scope of application and approach
	General design and operation
	Communication and training
	Physical hazards
	Chemical hazards
	Biological hazards
	Radiological hazards
	Personal protective equipment (PPE)
	Specific hazard environments
	Monitoring
3. Health and Safety in Local Society	Scope of application and approach
	Water quality and availability
	Structural safety of project infrastructure
	Life and fire safety
	Traffic safety
	Transport of hazardous materials
	Disease prevention
	Emergency preparedness and response
4. Construction and Disposal Treatment	Scope of application and approach
	Environment
	Occupational safety and health
	Health and safety in local society

3.5 Safety Management Guidelines in U.K.

In U.K., there exists a specialist called the "CDM Coordinator" who is employed directly by the Employer. The "Construction (Design and Management) Regulations 2007," which contains the rules concerning the Coordinator, is referred as the similar guideline. The Regulations are outlined below.

Table 3.5.1 Outline of Construction (Design and Management) Regulations 2007

Category	Other guidelines
Objective	○ The principal objective of the Regulations is to integrate the safety and health of the project into the management, allowing the stakeholders of the construction work to improve the plan and safety management from the early stage, to eliminate or reduce hazards in stages of planning and designing, and to control remaining risk adequately.
Outline	○ The Regulations consist of the introduction, "General Management Duties applying to Construction Projects," "Additional Obligations to notifiable Projects", "Obligations concerning Safety and Health on the Construction Site", and "General Requirements."
Scope of application	○ Applicable to the construction works in U.K. and outside UK that are specified in the national laws

Table 3.5.2 Composition of Construction (Design and Management) Regulations 2007

No	Item
Part 1 Introduction	Citation and commencement
	Interpretation
	Application
Part 2 General Management Duties Applying to Construction Projects	Competence (job performance capability)
	Co-operation
	Co-ordination
	General principles of prevention
	Election by the clients
	Client's duty in relation to arrangement for managing projects
	Client's duty in relation to information
	Duties of designers
	Design prepared or modified outside Great Britain
	Duties of the Contractors
Part 3 Additional Duties Where Project is Notifiable	Appointments by the client where a project is notifiable
	Client's duty in relation to information where a project is notifiable
	Client's duty in relation to the start of the construction phase where a project is notifiable
	Client's duty in relation to the health and safety files
	Additional duties of designers
	Additional duties of the Contractors
	General duties of CDM Coordinators

	Notification of project by the CDM Coordinator
	Duties of the main Contractor
	Main Contractor's duty in relation to the construction phase plan
	Main Contractor's duty in relation to co-operation and construction with workers
Part 4 Duties Relating to Health and Safety on Construction Sites	Application of Regulations 26 to 44
	Safe places of work
	Good order and site security
	Stability of structures
	Demolition or dismantling
	Explosives
	Excavations
	Cofferdams and caissons
	Reports of inspection
	Energy distribution installations
	Prevention of drowning
	Traffic routes
	Vehicles
	Prevention of risk from fire, etc.
	Emergency procedures
	Emergency routes and exits
	Fire detection and fire fighting
	Fresh air
	Temperature and weather protection (protection against cold and heat, adverse weather)
	Lighting
Part 5 General	Civil liability
	Enforcement in respect of fire
	Transitional provisions
	Revocations and amendments

As described in "2.4 Current status of U.K.", the Health and Safety Executive (HSE) of U.K. has prepared the guidance for the construction work. Those that are referenced as the referable guidelines are shown below.

Table 3.5.3 Other guidelines in U.K.

Issued by	Safety management related guidelines	Category
HSE	(1) <HSG150> Health and safety in construction	Construction work in general
	(2) <HSG144> The safe use of vehicles on construction sites: A guide for clients, designers, Contractors, managers and workers involved with construction transport	Construction machine, equipment
	(3) <HSG151> Protecting the public: Your next move	Pollution control measures

3.5.1 Health and Safety in Construction <HSG150>

"Health and Safety in Construction" guidance is issued by the HSE of U.K., which focuses on items common to the construction works while itemizing the contents approximately according to the work phases. This guideline is outlined below.

Table 3.5.4 Outline of Health and Safety in Construction <HSG150>

Category	Guideline for the construction in general
Objective	○ This guidance provides important items necessary to achieve the healthy and safe construction site, supporting risk control, and presents the method of health and safety planning, organization, management, and monitoring in each process of the project.
Scope of application	○ All stakeholders related to the construction work (clients, designers, Contractors, workers)

Table 3.5.5 Composition of the Health and Safety in Construction <HSG150>

No	Item
1. Preparing for Work	Planning the work
	Organization structure for work
	Registration to HSE
2. Setting Up the Site	Site access
	Site boundaries
	Welfare facilities
	Instructions, storage areas and waste materials
	Lighting
	Emergency procedures

	Fire
	First aid
	Reporting injuries, diseases and dangerous occurrences
	Site rules
3. Construction-phase Health and Safety Phase	Site management and supervision
	Working at height
	Site traffic and mobile plant
	Moving goods safely
	Ground work
	Demolition, dismantling and structural alteration work
	Occupational health risk
	Electricity
	Slips and trips
	Working in confined spaces
	Prevention of drowning
	Personal protective equipment (PPE)
	Work affecting the public
	Monitoring and reviewing
4. Health and Safety Management and the Law	

3.5.2 The Safe Use of Vehicles on Construction Sites <HSG144>

"The Safe Use of Vehicles on Construction Sites" is issued by HSE of U.K. and is intended to prevent damage involving construction machine. This consists of four parts; "Safe Workplaces," "Safe Vehicles," "Safe Driving and Work Practice," and "Managing Construction Transport." The guideline is outlined below.

Table 3.5.6 Outline of Safe Use of Vehicles on Construction Sites <HSG144>

Category	Guideline for the construction machine and equipment
Objective	○ This guidance is a practical guideline to prevent accidents related to the construction machine during work by means of risk management and hazard removal.
Scope of application	○ Specifying the driving control/planning, selection and maintenance, safe driving/practice ○ Applicable to the client, designer, main Contractor, Contractor, safety manager, and workers

Table 3.5.7 Composition of Safe Use of Vehicles on Construction Sites <HSG144>

No	Item
Preface	
Introduction	Relevant laws
Safe Workplaces	Planning the safety
	Separation of pedestrians and vehicles
	Loading and storage areas

	Public protection
	Information
Safety Vehicles	Vehicles selection
	Vehicle inspection and maintenance
Safe Driving and Work Practices	Reversing
	Loading of vehicles
	Drivers
	Signalers
	Safe working practices for specific vehicles
Managing Construction Transport	Clients
	Designers
	CDM Coordinator
	Main Contractors
	Contractors

3.5.3 Protecting the Public <HSG151>

This guidance is issued by HSE of U.K. and is intended to prevent third-party accidents during construction work. This guideline consists of five parts; “Legal Stipulation,” “Boundary between The Area around Site and Others,” “Authorization Procedure,” “Special Hazard/Risk Management,” and “the Weak and Buildings Requiring Special Attention.” This guideline is outlined below.

Table 3.5.8 Outline of Protecting the Public <HSG151>

Category	Guideline for measures against third-party accidents
Objective	○ This guidance is directed to all stakeholders involved in the construction process and describes the method of designing, planning, maintaining, and execution of the work of how the third party not related to the work from the risk is to be protected.
Scope of application	○ Specifying driving control/planning, selection and maintenance, safe driving/practice ○ Applicable to the main Contractor, client, designer, CDM Coordinator, as required

Table 3.5.9 Composition of Protecting the Public <HSG151>

No	Item
Introduction	How to use this guideline
Provisions of the Law	Health and Safety at Work etc. Act 1974
	Construction (Design and Management) Regulations 2007 (CDM)
	Management of Health and Safety at Work Regulations 1999
	Control of Substances Hazardous to Health Regulations 1999
	Reporting of Injuries, Diseases and Dangerous Occurrences
	Regulations 1995 (RIDDOR)
Site Perimeter and Other Boundaries	Establishment of the boundary and maintenance management plan
	Security precautions
Developing Authorization Procedures	Necessity of authorization
	Control of access to the site
	Informing visitors

Specific Hazards, Risks and their Control	Scaffold, etc.
	Cut and cover
	Slip, trips and falls within pedestrian areas
	Machine and equipment
	Storage of materials
	Electric equipment
	Fine dust, noise, vibration
	Falling objects
	Transport
	Road works
Vulnerable Group and Premises which Require Special Attention	Handicapped persons
	Children
	Closed buildings
	Refurbishment of residential buildings
	Refurbishment of commercial buildings
	Health management in the buildings
	House building

3.6 Safety Management Guideline in France

As described in "2.5 Current Status of France" the following guideline issued by INSR (National Research and Safety Institute) (French: Institut National de Recherche et de Sécurité) of France was referred.

Table 3.6.1 Other guideline in France

Issued by	Safety management related guideline	Category
INSR	Aide-memoire BTP	Construction work in general

This guideline describes the contents of minimum-required safety measures during construction works by itemizing from viewpoints of Contractors and technology. This guideline is outlined below.

Table 3.6.2 Outline of Aide-memoire BTP

Category	Guideline for the construction work in general
Objective	○ This guideline compiles information common to all stakeholders in three divided parts for the view of facilitating communication among stakeholders and of searching and harmonizing the solutions related to risk prevention.
Scope of application	○ Applicable to all stakeholders related to construction works, such as the Employer, design and construction supervisor, the Consultant, inspection agency, Safety Coordinator, and Contractors including subcontractor and those working on freelance base.

Table 3.6.3 Composition of Aide-memoire BTP

No	Item	
1. General Risk Preventive System	1-1. Legal Regulations concerning Accidents	1. Occupational accidents and benefits
		2. Accidents on the way to work
		3. Industrial illness
		4. Accident analysis and risk study
		5. Accident report (sample form)
		6. Reserve for benefit of occupational accident
		7. Statistics
		8. Financial incentives
		9. Regulations and standards
	1-2. Inspection Agency	1. Labor Inspection Office
		2. Social security service
		3. OPPBTP
	1-3. Coordination on the Site	1. Employer and design supervisor
		2. Safety Coordinator
		3. Overall coordination plan PGC
		4. Common expenditure, quota share investment
		5. Safety, health, and working conditions committee among

		corporations
		6. Corrective maintenance, statement of the work (DIUO)
		7. Subcontracting
		8. Casual labor and leasing of work forces
		9. Rental equipment and materials
		10. Outside corporations
2. Risk Preventive System within the Corporation	2-1. Obligation	1. Basic rules and marking of risk prevention
		2. Corporate manager and in-house laws
		3. CHSCT (Corporate Health, Safety, and Working conditions committee) and/or representatives of employees
		4. Notice to proceed
		5. Notice of the intent of the project
		6. Legal record documents
		7. Notice of occupational accidents
	2-2. Support of the Corporate Manager	1. Private preventive agencies
		2. Division in charge of occupational health
		3. Division in charge of safety, and the person in charge of safety management
	2-3. Personnel Employment	1. Contract of employment and irregular work force
		2. Health check-up
		3. Training on safety
		4. Authorization of driving
		5. Qualification for electric work
		6. Emergency measures
		7. Personnel transfer
		8. Bad weather
	2-4. Personal Protection Equipment	1. Personal-protection equipment
		2. Hard hat and safety shoes
		3. Fall preventive equipment
		4. Protective clothing
	2-5. Responsibilities and Punishments	1. Commission of authority
		2. Civil liability and indefensible fault
		3. Criminal liabilities
		4. Competent court and criminal punishments
3. Technical Risk Prevention	3-1. Site Organization	1. Site construction drawing
		2. Individual safety and health protection plan
		3. Collective fall protection

		4. Signal
		5. Electricity
		6. Machine control
		7. Inspection
	3-2. Materials	1. Crane and other lifting machines
		2. Form
		3. Temporary exterior
		4. Scaffold
		5. Scaffold with casters
		6. Mobile scaffold
		7. Nacelle, hoist, platform
		8. Corbel table
		9. Unit platform with casters
		10. Ladders
		11. Guardrails
		12. Column
		13. Construction equipment
		14. Machines
	3-3. Adverse Effects	1. Noise
		2. Hazardous substances
		3. Manual transport
		4. Vibration
		5. Alcoholism, tobacco addiction
	3-4. Health and First-aid	1. Canteen, locker room, toilet
		2. Fire prevention
		3. First aid

3.7 Safety Management Guidelines in U.S.A.

As described in "2.6 Current Status of U.S.A.," most of guidelines concerning the safety management of the construction work in U.S.A. are independent and specific and there is no guideline covering the whole of construction works. Therefore, the following guideline issued by the Occupational Safety and Health Administration (OSHA) was referred.

Table 3.7.1 Other guideline in U.S.A.

Issued by	Safety management related guidelines	Category
OSHA	Construction Industry Digest	Construction work in general

This Digest presents the basic application standards of federal regulations of the U.S.A. This guideline is outlined below.

Table 3.7.2 Outline of Construction Industry Digest

Category	Guideline for the construction work in general
Objective	○ Summary of basic application standards from the "Title 29 of the Code of Federal Regulations (CFR), Part 1926"

Table 3.7.3 Composition of Construction Industry Digest

No	Item	
Foreword		
General		
OSHA worksite Investigations		
Frequently Used Standards in Construction		
Medical records	Aerial lifts	Air tools
Asbestos	Belt sanding machines	Wires
Chemicals	Compressed air	Compressed gas cylinders
Concrete/bricks	Confined spaces	Cranes and derricks
Demolition	Disposal chutes	Driving operation
Drinking water	Electrical installations	Electrical work
Excavation and trenching	Exits	Explosives and blasting
Protection of eyes and face	Fall protection	Flying and fall protection
Protection of the opening	Fire protection	Flaggers
Combustibles	Forklifts	General duty clause
Grinding	Hand tools	Hazard communication
Waste materials management	Head protection	Hearing protection
Heating devices	Hoists	Site clearance
Lighting	Jointers	Ladders
Lasers	Lead	Lift slab
Liquefied petroleum gas	Medical services and first aid	Transport, machine equipment
Noise	Personal protective equipment（PPE）	Powder-actuated tools
Power transmission and distribution	Powered industrial trucks	Power transmission, mechanical
Safety management of hazardous materials	Radiation	Tracks

Recording	Reinforcement bar assembling	Respirators
Rollover protective structures	Safety nets	Saws
Scaffolds	Signal, barricades	Silica
Steel work	Material storage	Toeboards
Toilets	Training	Earth work
Cleaning equipment	Working over or near	Welding, gas welding
Lifting pieces	Woodworking machine	

3.8 Summary of Other Guidelines

3.8.1 Composition Outline of Other Guidelines

Among other guidelines based on basic specifications (draft), the composition of those guidelines for the construction in general is outlined below.

Table 3.8.1 Outline of components of other guidelines

Similar guidelines/developer	Composition type
①Technical Guidelines for Safe Execution on Civil Engineering Works (MLIT)	Common requirements＋type by various works Common requirements for safety management common to construction works in general, and itemized description
②Technical Guidelines for Safe Execution on Civil Engineering Works (MLIT)	Common requirements＋type by various works Common requirements for safety management common to construction works in general, and itemized description, similarly to the case of the guideline for civil engineering
③Safety and Health in Construction (ILO)	Common requirements＋type by various works Common requirements for safety management common to construction works in general, and itemized description
④General EHS Guideline (WB Group)	Common requirements＋type by hazard category This focuses on the safety items common to all construction works while itemizing for each hazard category (physical, chemical, etc.)
⑤Health and safety in construction (HSE: U.K.)	Common items＋type by work phase This focuses on the safety items common to all construction works while itemizing for each work phase.
⑥Aide-memoire BTP (INRS : France)	Guidebook type This consists of itemized description of the contents of minimum-required safety measures from viewpoints of the Contractor and technology.
⑦Construction Industry Digest (OSHA: the U.S.A.)	Rules compliance type This presents basic application standards of federal regulations of the U.S.A.

3.8.2 Outline of Other Guidelines' Items

On the basis of the Guideline for safety management of the civil engineering work developed by MLIT, items of similar guidelines for the construction work in general are summarized in the table below. "Circle" is entered to the applicable items.

Table 3.8.2 Outline of items in each guideline

①Items of Technical Guidelines for Safe Execution on Civil Engineering Works	② Building	③ILO	④ WB Group	⑤ U.K.	⑥ France	⑦the U.S.A.
General Rules	○	○	○	○	○	○
Safety measures in general	○	○	○	○	○	○
Underground utilities, and overhead facilities in general, such as overhead line						
Machine, units, and equipment in general	○	○	○	○	○	○
Temporary works	○	○	○	○	○	○
Transport		○				
Earth work	○	○		○		○
Foundation work	○	○				
Concrete work	○	○				○
Compressed air work		○				
Work around railway						
Work where the debris flow may reach						
Road works						
Bridge works (construction)						
Mountain tunneling						
Shield and jacking work						
Rivers and coastal works		○		○		○
Dam construction works						
Structure demolition work	○	○	○	○		○

Chapter 4
Outline of the Guidelines for the Management of Safety for Construction Works

Chapter 4 Outline of the Guidelines for the Management of Safety for Construction Works

4.1 Flow of Drafting the Guidelines

Flow 1	Set the Basic Specifications of the Safety Management Guidelines

The basic specification for considering the outline of the Guideline was set.

Flow 2	Considering the Framework of the Safety Management Guidelines

On the basis of the study results reported in Chapters 1 through 3 and basic specifications, basic framework of the Guidelines was reviewed.

Flow 3	Review of Items to be Specified

Specifically, how the “Chapters” and “Items” are to be set up in the Safety Management Guidelines was reviewed.

<Sample> Chapter	Item	Required Level
Chapter 1 General Rules		
・ ・ ・		
Chapter ● Safety Measures	Protective equipment	

Flow 4	Review of Required Level of the Guidelines

Review was done on the concept which the contents of safety measures and standards for those items reviewed in Flow 3 was to be established. Note that, in this stage, detailed requirement contents and standards was not dealt with.

<Sample> Chapter	Item	Required Level
Chapter 1 General Rules		
・ ・ ・		
Chapter ● Safety Measures	Protective equipment	

Flow 5	Review of the Table of Contents

On the basis of results up to Flow 4, table of contents was finalized.

4.2 Basic Specifications

4.2.1 Objective

The objective is to utilize the guideline to prevent any occupational and third-party accidents during construction works by ODA.

4.2.2 Projects Concerned

Projects concerned for the Guideline are construction works for public facilities with ODA's financial assistance (regardless of whether it is Grant Aid or ODA-Loan), except for plant constructions.

4.2.3 Scope of Application

1) Safety measures in general for construction
2) Safety measures concerning construction machines' operation, works to use electrical or transport equipment
3) Safety measures for traffic directly related to the work
4) Countermeasures against Third-party accidents
5) Safety measures against vibration, noise, fine dusts, and chemical substances

4.2.4 Cases to Use of the Guidelines

1) "The Employer" and "The Consultant (The Engineer)"

◎This may be used as the guideline to check the Safety Plan and the contents of specific safety measures submitted by the contractor.

○ The safety management of construction works by the Contractor may be confirmed, instructed, and guided according to this guideline.

2) "The Contractor"

◎This may be used as the guideline to develop a Safety Plan and specific safety measures.

○ Safety management for construction works is conducted in accordance with this guideline.

4.2.5 Other Guidelines

In principle, the following guidelines are to be referred, and other guidelines may also be added as required.

Table 4.2.1 Other guidelines to be reviewed

Similar guidelines	Developed by	Scope
① Technical Guideline for Safe Execution on Civil Engineering Works	MLIT	Construction work in general
② Technical Guideline for Safe Execution on Building Works		
③ Safety and Health in Construction	ILO	
④ General EHS Guideline	WB Group	
⑤ Health and safety in construction	Health and Safety Executive (UK)	
⑥ Aide-memoire BTP	National Research and Safety Institute (France)	
⑦ Construction Industry Digest	Occupational Safety and Health Administration (US)	
⑧ Technical Guideline for Safe Execution on Construction Machinery Works	MLIT	Construction machine and equipment
⑨ The safe use of vehicles on construction site	Health and Safety Executive (UK)	
⑩ Guideline of Measures against Third-party Accidents during Construction Works; Civil Engineering Works	MLIT	Countermeasures against third-party accidents
⑪ Guideline of Measures against Third-party Accidents during Construction Works; Building Works		
⑫ Technical Guidelines for Measures against Noise & Vibration during Construction Works		
⑬ Protecting the public	Health and Safety Executive (UK)	
⑭ IFC Performance Standard	WB Group	Others
⑮ Construction (Design and management) Regulations 2007	UK regulations	

4.2.6 Considerations for Drafting the Guidelines

1) Matters concerning the occupational safety and health and the social environmental considerations other than those for the construction work in general was not included in the scope.
2) The Guideline provides for technical requirements to be observed or to be taken into account by the Contractor during planning and execution of the work.
3) The Guideline must have the contents that are valid internationally.
4) The following points must specifically be taken into account depending on the situation of developing countries:
   ① There must be no such a case that the Guideline is practically inapplicable on the work site.
   ② The Guideline contents must be those based on cautions for the procurement situation of equipment, etc.
   ③ The Guideline must take into account the workers environment and the present state of subcontractors to prevent the guideline from becoming incompatible for the Contractor.
   ④ The Guideline contents must not be those incompatible with the national law of the country concerned.

4.3 Framework of the Guidelines

4.3.1 Summary of Current Status on Safety Management in ODA Construction Works

Background and other matters regarding safety management for ODA construction works was sorted out before reviewing the framework.

(1) Background of safety management in ODA construction works

In the study on the Safety Management of the ODA Construction Project (Project Research)," 2011, drafting the Safety Management Guideline (draft) (tentative name) was proposed. The fact behind this proposal can be understood that the developing countries in general do not have anything analogous to the Technical Guideline for Safe Execution and these developing countries where the occupational safety and health regulations integrating construction works are not well established often suffer serious troubles in terms of safety for construction. Under the circumstances where there is no legal force and furthermore no guidelines, it is highly possible that safety management of the construction work is left solely in the hand of the Contractor who has accepted the order. In certain cases, both the Employer and the Consultant may face the difficulty of confirming the safety management status by the Contractor.

The similar background information has been confirmed in this study. (Chapter 1) In this context, development of the safety management guideline is considered extremely effective if all three stakeholders of the Employer (responsible for the project implementation), the Consultant, and the Contractor are to be engaged collectively in safety management of the construction work, instead of leaving it only in the hand of the Contractor. Namely, it is advised that utilization of the safety management guideline should not be limited to the Contractor, the Employer and the Consultant and that utilization by the Employer and the Consultant in each construction stage should be kept in perspective.

In consequence, it is expected that the issues, such as "insufficient knowledge and experience on safety on the part of the Employers," "lack of strong authority by the Engineer (Consultant) relative to the Contractor," etc., are solved through application of the Safety Management Guidelines.

(2) JICA's approach to secure safety of the ODA projects

In the case of ODA construction project, the Contractor accepting the order for the project is to bear fundamentally all of responsibilities for safety management of the work.

Being not the contracting party of the ODA construction project, JICA will never be held liable legally for occurrence of accident. However, JICA is in a position having the responsibility of promoting implementation of ODA projects on behalf of Japanese Government, and thus should take into account securing of the safety of the construction work to achieve the assistance effects as planned. Though not held liable legally, JICA is the implementing agency of ODA project as above described and is expected to act in such a manner.

Therefore, preparation of "the Safety Management Guideline for ODA Construction Works" in this study is extremely significant. Once prepared, this guideline is also expected to provide the opportunity and environment for the counterpart government and implementing agencies to recognize newly their respective role and responsibilities to be executed. For this purpose, this guideline should be formulated in the ODA construction projects to allow the importance of safety management of the work to penetrate and take root in the above government and agencies.

4.3.2 Review of the Framework for Drafting the Guidelines

(1) Existing systems for safety measures

(In case of ODA-Loan projects)

For the ODA construction project with ODA-Loan, all bidders are requested to submit a Safety Plan complying with the work safety requirements stipulated in the contract agreements.

On the other hand, the Consultant must review the Safety Plan by the bidders and observe during the construction work that safety officers are appointed and that the work is done in compliance with safety requirements stipulated in the contract. If Consultants recognize any questions regarding the safety measures including the ones mentioned above, the Consultants shall require the Contractors to take appropriate remedies.

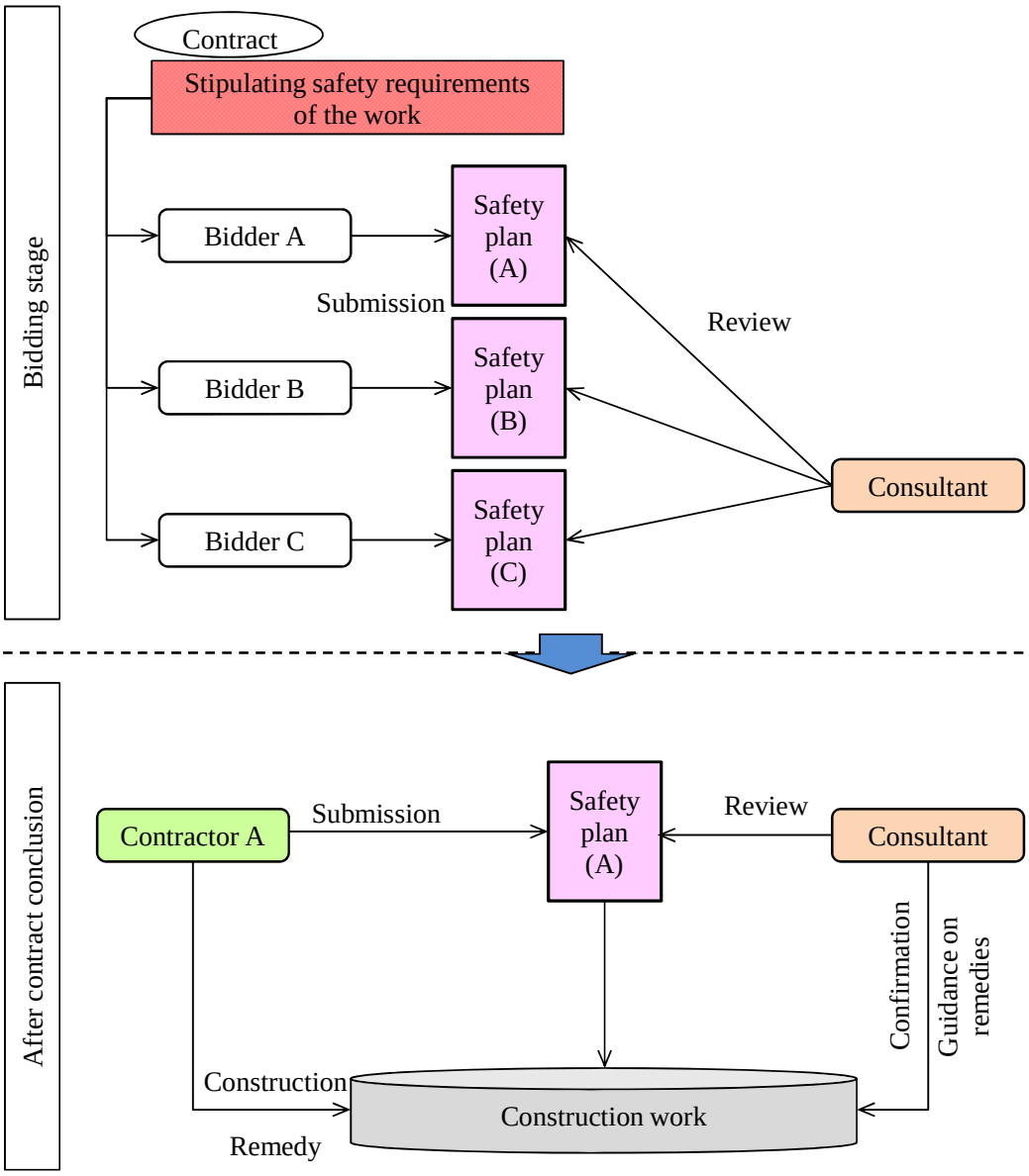

Figure 4.3.1 Existing system (ODA-Loan)

The ODA-Loan system requires that the Safety Plan is submitted from the Contractor at the bidding stage and that the construction is made in compliance with the safety requirements stipulated in the contract after conclusion of the contract.

The Safety Plan is considered to be critical for safety management. However, at present, the regulation that is similar to guideline and requires this plan does not exist and is left totally in the hand of the Contractor. The safety management would not be left totally to the Contractor if the Consultant could review and check the Safety Plan, etc. adequately. As is evident from the study results of Chapter 1, the Consultants lack actually the sufficient capability concerning the safety management in many cases.

On the basis of above description, it may be considered that the specific safety management stipulation must be identified for construction on the basis of the Safety Plan developed according to the safety requirements stipulated in the contract.

(In case of Grant Aid projects)

The Grant Aid project differs institutionally from the ODA-Loan project, but the common requirements of tender documents stipulate the safety measures. Specific contents of stipulations are as shown below.

[Standard Bidding Documents (Standard of the instruction to bidders) / (Facilities/construction project): JICA]

Chapter 6 Common Conditions

1. Safety Procedure

The Contractor shall,

(1) observe all of applicable safety regulations,

(2) pay due attention to the safety of all workers working in the site,

(3) take care not to allow presence of any unnecessary obstructions in the site and works and make the best efforts to protect workers in the site from hazard,

(4) provide fencing, lighting, and guard fence as well as security for the work site till the work is completed and delivered, and

(5) provide temporary facilities (road, sideway, protection fence, and fencing) necessary for the people in general and the owner and occupants of the neighboring land to use and for their protection.

Common requirements of the safety measures contain stipulations of above contents, but they are not the guideline which describes in detail about safety management. Similarly to the case of ODA-Loan project, such safety management is left totally in the hand of the Contractor in many cases. Since the Contractor for the Grant Aid project is the Japanese corporation, the certain safety level is considered to be maintained. For the Employer, the Consultant, and the Contractor to work collectively for safety management of the construction site, the documents equivalent to the Safety Plan should be prepared as in the case of ODA-Loan project, so as to be used as a basis of challenging the safety management.

(2) Formulating of the framework

The Safety Management Guidelines was established its framework focusing on "Safety Plan," which is the base of safety management in the construction site, while referring to the "Objective," "Expected utilization cases," and "Safety measures of the existing systems" in the basic specifications. The framework is outlined below:

1) Setting the items of the "Safety Plan"

Though safety requirements of the work are specified in the contract conditions, it is difficult to develop the detailed safety measures for each type of work because the Safety Plan is prepared before commencement of each work. Therefore, items to be specified should be established while placing the stress not on the safety measures for each type of work, but on identification of how the safety in the construction site should be maintained.

2) Setting the items of the "Method Statements on Safety"

The Safety Plan is a basic plan for safety management and operation in the construction site, but cannot secure the safety in the construction site to the satisfactory degree by itself. In order to secure the safety in the construction site, the Method Statements on Safety must be prepared for each type of work based on the construction plan describing the construction method, etc., which covers specific safety measures appropriate to each operation of the site. The Method Statements on Safety is positioned as the detailed implementation plan. For development of specific safety measures, the construction steps and procedures of each work type are prepared. On the basis of these steps and procedures, the expected accident risk is to be identified and the countermeasures to enable safe construction are to be reviewed.

3) Technical Guideline for Safe Execution

To secure the safety in the construction site, the "Technical Guideline for Safe Execution" must be established as a guideline for safe construction along with development of the Safety Plan and the Method Statements on Safety. Similarly to the case of the Technical Guideline for Safe Execution on Civil Engineering Works, MLIT, the scope of work plan to be covered by the "Guideline" may begin with the safety measures in general and cover the wide fields, such as the temporary works and construction machine, and bridge, road, dam construction works, etc. At the present stage where no standard safety management guideline has been developed, the stepwise approach would be necessary; development of the guideline covering the minimum requirements to be observed, which is applicable to all of ODA construction projects, followed by development of the guideline for each type of work while referring to the operation state of the former guideline. To facilitate operation and considering that the Contractor other than Japanese corporation may become the Contractor, the guideline focusing on the minimum required items, instead of providing the exhaustive details, may readily penetrate and take root in the field while retaining the mandatory power.

The WB Group has developed the "General EHS Guidelines" covering the common items for projects and also the sector-wise guideline separately to deal with details of each project.

On the basis of above description and the advices of the research assistance committee, it was considered desirable that the scope to be covered by the "Technical Guideline for Safe Execution" focuses onto "Items to be observed commonly" and "Principal work items" in the ODA construction projects, while taking into account the similar guidelines and the past work accidents.

"Items to be observed commonly" was to be summarized by type of accidents, and the types of accidents to be selected must be those likely to lead to fatal damage while referring to the features of past accidents and incidents.
"Principal work items" were reviewed mainly in terms of those specified commonly by similar guidelines.

4) Ensuring the effectiveness of the Safety Plan and the Method Statements on Safety

For the Safety Plan and the Method Statements on Safety to be effective, it is essential for implementation of the safety management to execute PDCA of safety management. It is necessary that the Contractor implement the safety management on the basis of the Safety Plan and the Method Statements on Safety and the Consultant check the details and confirm the operation state on the actual site. Then, the safety management guideline must stipulate execution of PDCA of safety management.

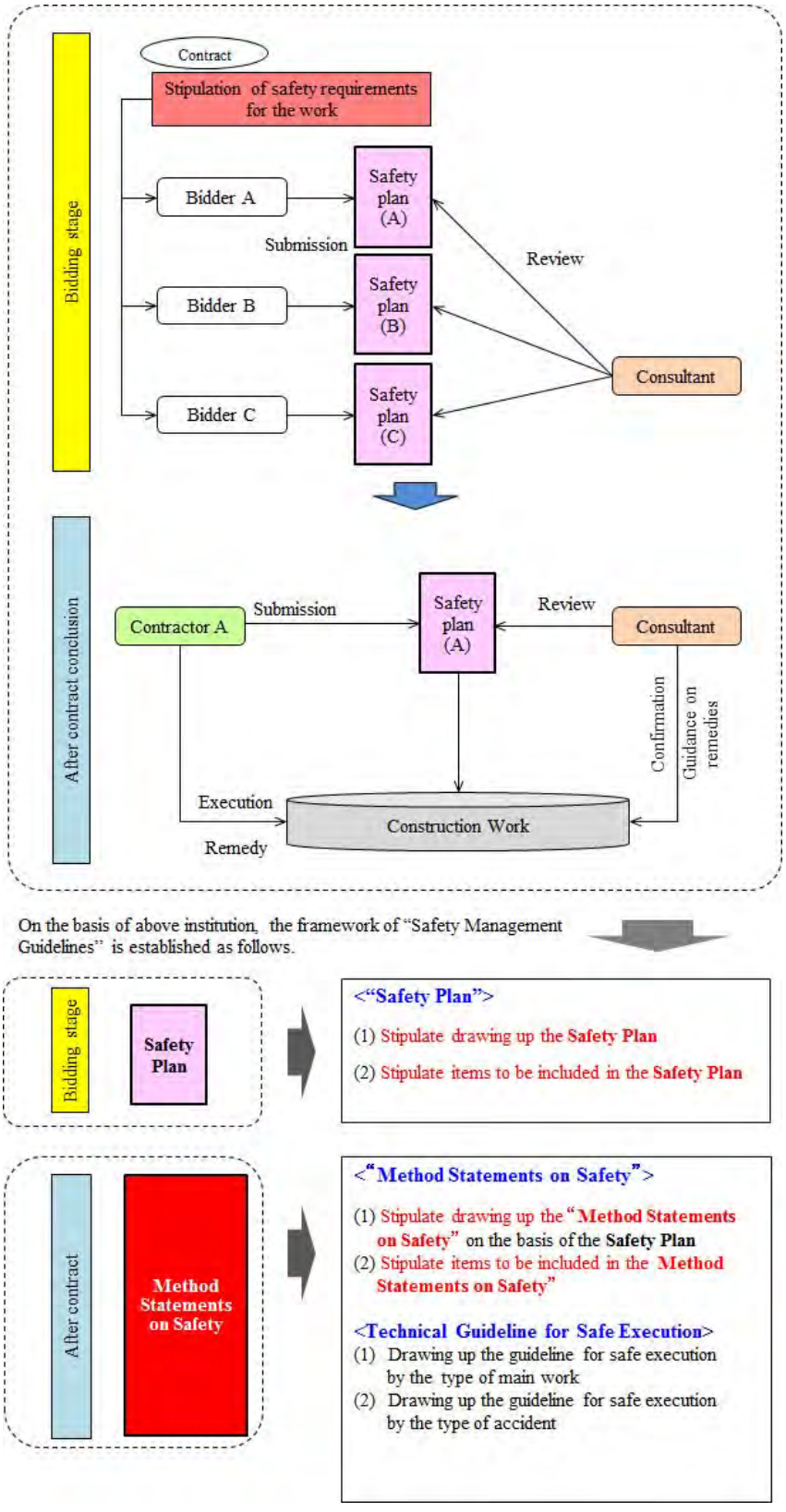

Figure 4.3.2 Outline of the framework

4.4 Contents and Items to be Set Forth in the Guidelines

On the basis of the framework established in 4.3, Chapters and the items to be stipulated were determined.

4.4.1 Compositions of the Safety Management Guidelines

Considering the contents of the framework, the guideline was to consist of the following.

Table 4.4.1 Chapters of the Safety Management Guidelines

[Definition of basic words]	○ Define the basic words & terms in the Guideline.
[Chapter 1] General Rules	
	○ Indicate objective, range of application and points for attention.
[Chapter 2] Basic Policies for Safety Management	
	○ Indicate that persons concerned with ODA construction projects should perform safety management with common understanding. ○ To be specific, indicate basic principles of safety management, roles and resposibilities of the persons concerned with the project. ○ Indicate that PDCA cycle of safety management should be practiced thoroughly.
[Chapter 3] Contents of the “Safety Plan”	
	○ Stipulate Safety Plan ○ Stipulate items which should be included in the Safety Plan
[Chapter 4] Contents of the “Method Statements on Safety”	
	○ Stipulate Method Statements on Safety for each type of work. ○ Stipulate items which should be included in the Method Statements on Safety.”
[Chapter 5] Technical Guideline for Safe Execution (by the Type of Work)	
	○ Set forth guideline for safe execution by the type of work
[Chapter 6] Technical Guideline for Safe Execution (by the Type of Accident)	
	○ Set forth guideline for safe execution by the type of accident.

4.4.2 “Chapter 1. General Rules”

This chapter identifies the objectives and the scope of the Safety Management Guidelines while presenting cautions for application. Items are as shown in the table below.

Table 4.4.2 “Chapter 1. General Rules”

Chapter 1. General Rules	
1. Objective	○ Identifies the objectives of the Guidelines.
2. Scope of Application	○ Identifies the scope of application of the Guidelines.
3. Safety Management Plan	○ Defines the “Safety Plan” and the “Method Statements on Safety”.
4. Role and Responsibilities of Stakeholders	○ Identifies the role and responsibilities by actor

4.4.3 “Chapter 2. Basic Policies for Safety Management”

This chapter stipulates mainly that stakeholders engaged in ODA construction works implement safety management under common recognition and that PDCA of safety management is executed on the basis of the “Safety Plan” and the “Method Statements on Safety” established in Chapters 3 and 4. Items are as shown in the table below.

Table 4.4.3 “Chapter 2 Basic policies for Safety Management”

Chapter 2. Basic Policies for Safety Management	
1. Basic Rules of Safety Management	○ Describe the basic rules of safety management in the ODA construction works.
2. Observation of Related Laws	○ Stipulate observation of the laws of the country where the project is implemented.
3. PDCA of Safety Management	○ Stipulates promotion of PDCA to provide effectiveness to the Safety Plan and the Method Statements on Safety

Chapter 2 stipulates the basic rules of the safety management of ODA construction works. When requirements of each item are to be reviewed, cautions of basic specifications should be taken into account and due care should be taken to avoid incompliance with “Standard Bidding Documents Under Japanese ODA Loans” developed by JICA. For basic rules, the requirement details are to be reviewed while referring to the treaties adopted by ILO, as shown below, and the “Safety and Health in construction.”

○ Convention (No. 155) Convention concerning Occupational Safety and Health and the Working Environment
○ Convention (No. 167) Convention concerning Safety and Health in Construction

4.4.4 “Chapter 3. Contents of the Safety Plan.”

(1) Contents of the Safety Plan and its drafting steps

(Contents of the proposed items)

The framework sets the contents to be stipulated in the Safety Plan as follows.

○ The focus must be placed not on the safety measures by each type of work, but on definition of the items to be determined in positioning of the basic plan of safety management, such as how the safety on the construction work site should be managed and operated.

Accordingly, for the Safety Plan, it is proposed to be set forth the items related to management and operation toward securing of the safety in the construction site, that is, the safety measures of the contents that have to be established before commencement of the construction work, including the safety management system and organization, etc.

The Safety Plan is an important document corresponding to "Plan" of PDCA (Plan-Do-Check-Action) of safety management in the construction work site. Therefore, the items to be set must be those enabling comprehensive management of the site and the versatility must be taken into account to ensure applicability regardless of the type or scale of the work. As the detailed work plan of each work type may not have been established at the Safety Plan development stage, the focus may be placed on not the safety measures by each type of work, but on definition of how the safety in the construction work site should be managed. The safety measures corresponding to the work plan by each principal types of work is stipulated in "Chapter 4 Description of the Method Statements on Safety."

(Item review steps)

The proposed items of the Safety Plan were reviewed as follows.

Table 4.4.4 Considering steps of contents of the Guidelines

<Step 1>	○ The proposed items to be incorporated in the Safety Plan are compiled and extracted from the "Scope" and "Accidents Statistics (Chapter 2, this volume)" established by the basic specifications.
<Step 2>	○ The items to be presented in the Safety Plan are compiled and extracted from those items stipulated in similar guidelines.
<Step 3>	○ The proposed items are finalized on the basis of results of flow 1 and 2.

(2) Step 1: "Scope of Application" and "Accident Statistics (Chapter 2.)"

The proposed items of the Safety Plan are reviewed while referring to "the scope" and "Accident Statistics (Chapter 2, this volume) of 4.2, Basic specifications.

The result of summary is shown in Fig. 4.4.1.

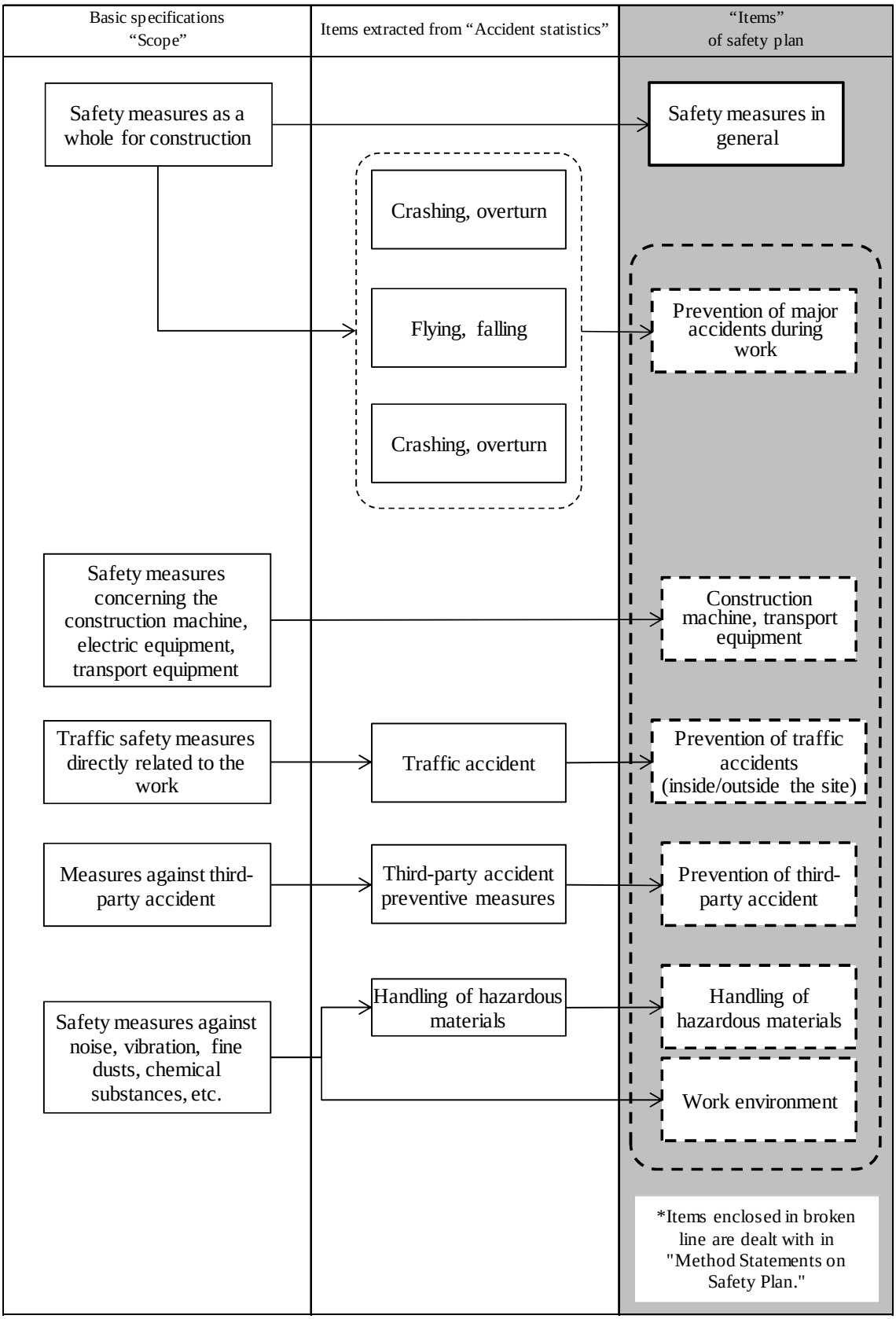

Figure 4.4.1 Step 1: Items review chart

(3) Step 2: Comparing stipulations to other guidelines

Items to be referenced in the course of item selection in the Safety Plan are isolated from those specified in similar guidelines. Extracted result is shown in Fig. 4.4.2.

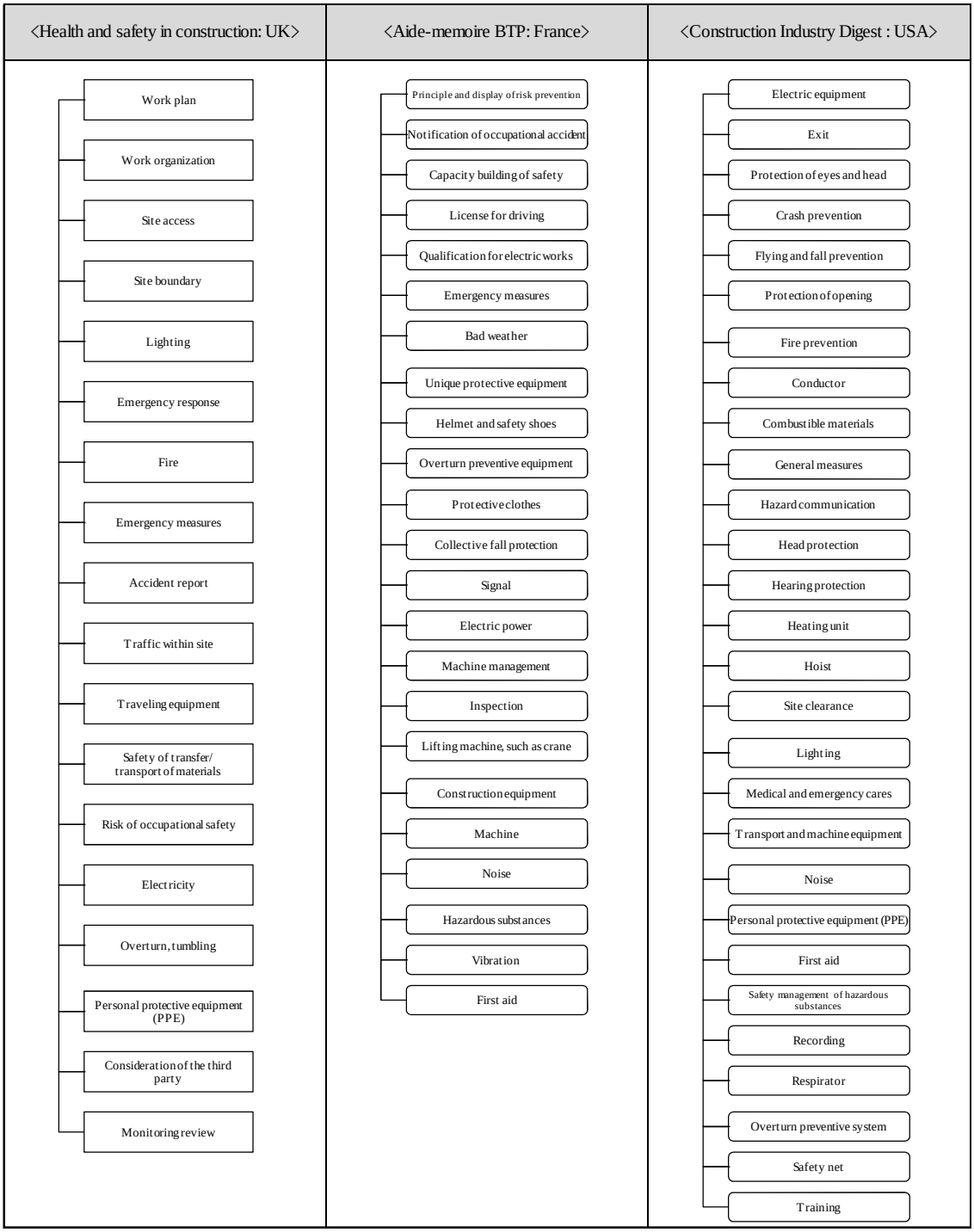

Figure 4.4.2(1) Step 2: Item review chart

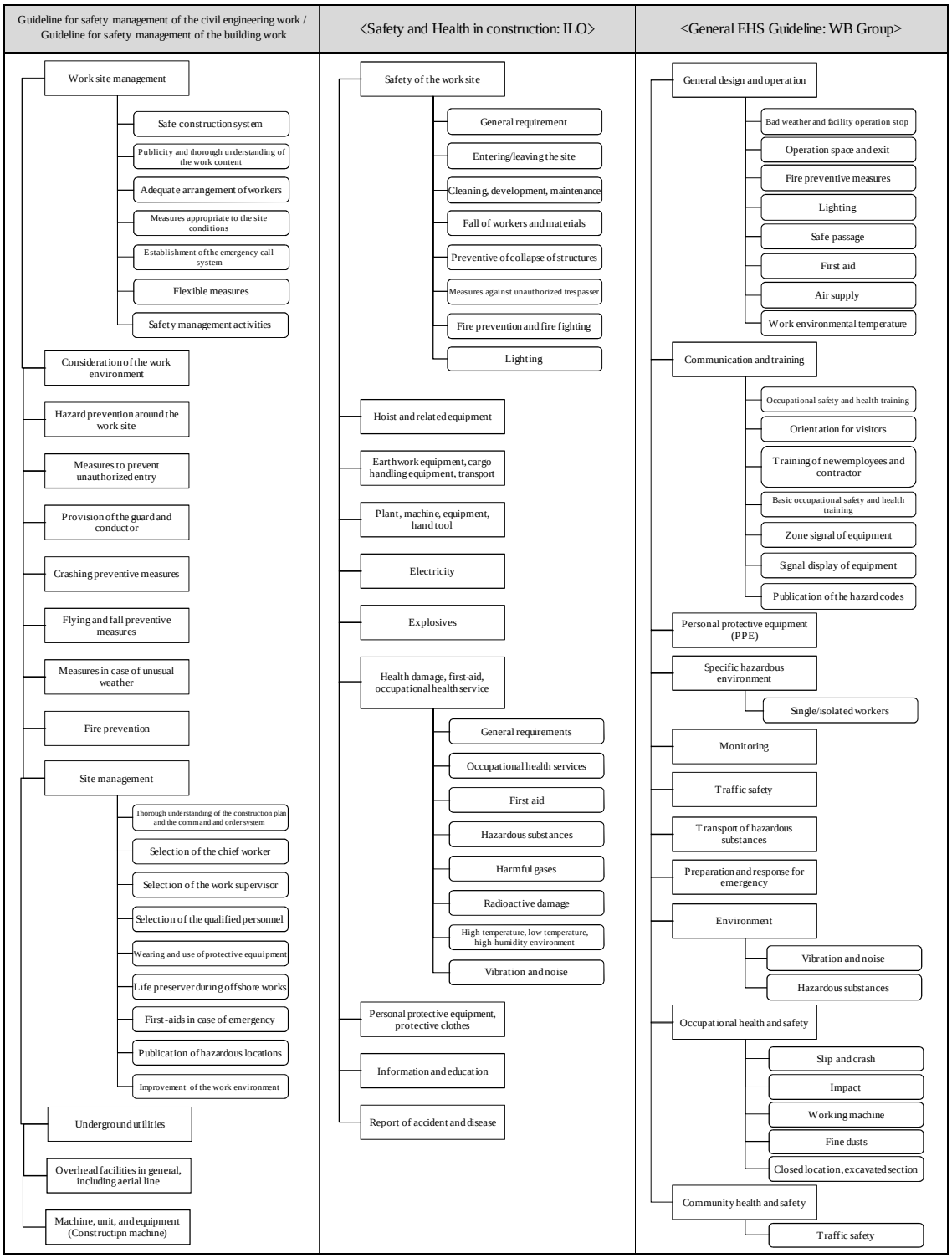

Figure 4.4.2(2) Step 2: Items review chart

On the basis of items extracted from other guidelines, the items of the Safety Plan were summarized according to the review flow of Figure 4.4.2. The result is shown below.

Table 4.4.5 Step 2: Items for Safety Plan in other guidelines

Proposed items of the Safety Plan as extracted from other guidelines
1. Safety Management System
2. Site Maintenance
3. Response in case of Accident
4. Response in case of Emergency Treatment
5. Education and Training on Safety
6. Safety Management Activities
7. Monitoring
8. Information Sharing
9. Prevention of Flying and Fall Accidents
10. Prevention of Crash Accidents
11. Prevention of Collapse Accidents
12. Third-party Accidents
13. Prevention of Traffic Accidents
14. Construction Machines and Equipment

The result of re-compilation of proposed items in Step 1 (“Scope” and “Accident statistics (Chapter 2, this document)”) and Step 2 (“Summary of items specified in similar guidelines”) is shown in Figure 4.4.3.

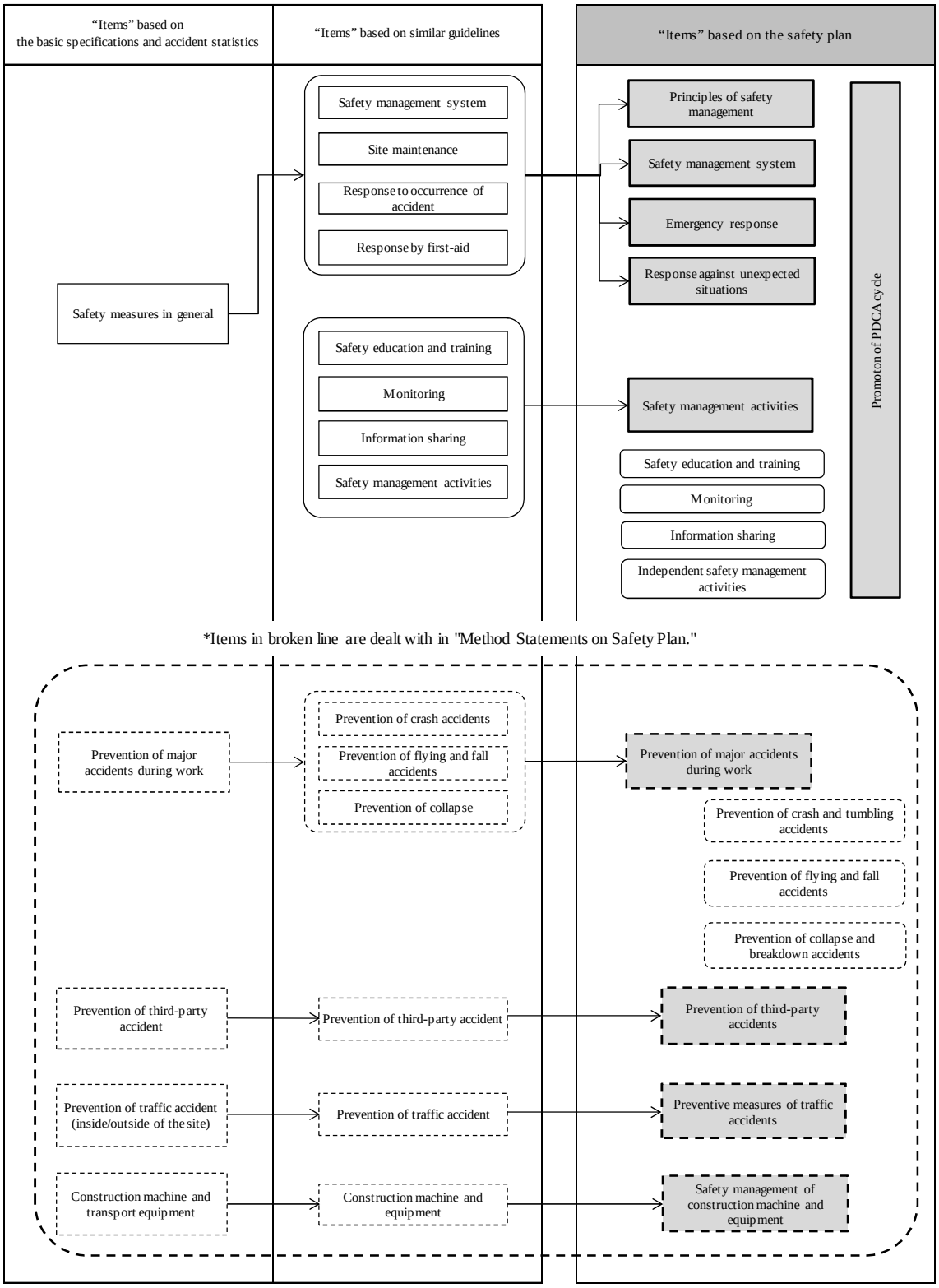

Figure 4.4.3 Review of the items to be specified in the Safety Plan

(4) Step 3: Setting the items in “Chapter 3. Contents of the Safety Plan”

On the basis of review results from Step 1 to Step 3, the items to be specified during development of the Safety Plan are established as follows.

Table 4.4.6 “Chapter 3. Contents of the Safety Plan”

Chapter 3. Contents of the Safety Plan	
1. Composition of the Safety Plan	○ Presents the contents of composition to be included in the Safety Plan. ○ Descriptions of « 2. » and after are the requirements described in the Safety Plan.
2. Basic Policies for Safety Management	○ Specifies description of the basic policies of safety management.
3. Safety Management System	○ Stipulates description of the safety management system in the construction work site.
4. Promotion of PDCA Cycle	○ Stipulates description of the principles for promotion of PDCA cycle for safety management.
5. Monitoring	○ Stipulates description of the principles of monitoring related to safety management in the construction site.
6. Safety Education and Training	○ Stipulates description of the principles of safety education and training from a viewpoint of securing the safety.
7. Voluntary Safety Management Activities	○ Stipulates description of the principles of the independent management activities.
8. Sharing Information	○ Stipulates description of the principles concerning information sharing necessary for safety management.
9. Response to Emergencies and Unforeseen Circumstances	○ Stipulates description of the principles for response in case of emergency and unexpected situations.

4.4.5 “Chapter 4. Contents of the Method Statements on Safety”

(1) Contents of the Method Statements on Safety and its drafting steps

The framework sets the contents of the Method Statements on Safety, as follows:

○ The “Method Statements on Safety” must be developed for each work type based on the construction plan describing the construction method etc., which covers specific safety measures items. This “method” is positioned as the detailed implementation plan and prepares the construction steps and procedures for each work type in the course of development of the specific safety measures, identifying the expected accident risk based on the steps and procedures and reviewing the response measures enabling safe construction.

Accordingly, the Method Statements on Safety is to be prepared for each work type, with items established as follows; “work items,” “work sequence,” “work procedure,” and the “assumed risk” and “response measures” derived from these items, sequence, and procedure.

4.4.6 “Technical Guideline for Safe Execution”

(1) Items to be commonly complied with (Technical Guideline for Safe Execution by the Type of Accident)

These items are to be handled in the Method Statements on Safety during reviewing of the Safety Plan. The items are selected to be observed commonly among the following accident types:

1) Crash accidents
2) Flying and fall accidents
3) Collapse accidents
4) Third-party accidents
5) Traffic accidents
6) Accidents involving construction machinery and equipment

The explosion accidents, fires, and personal protective equipment are added as items to be observed commonly.

(2) Selection of principal work types (Technical Guideline for Safe Execution by the Type of Work)

In “3.8.2 Summary of the outline of items of each similar guideline,” the composition outline of similar guidelines was summarized. Here, the items of similar guidelines are selected as principal work items. These items are summarized as follows.

- Temporary works
- Earth works
- Foundation work
- Concrete work
- Rivers and coastal works
- Structure dismantling works

1) Summary of other guidelines

Figure 4.4.4 shows the summary of other guidelines mainly in terms of common items shown above.

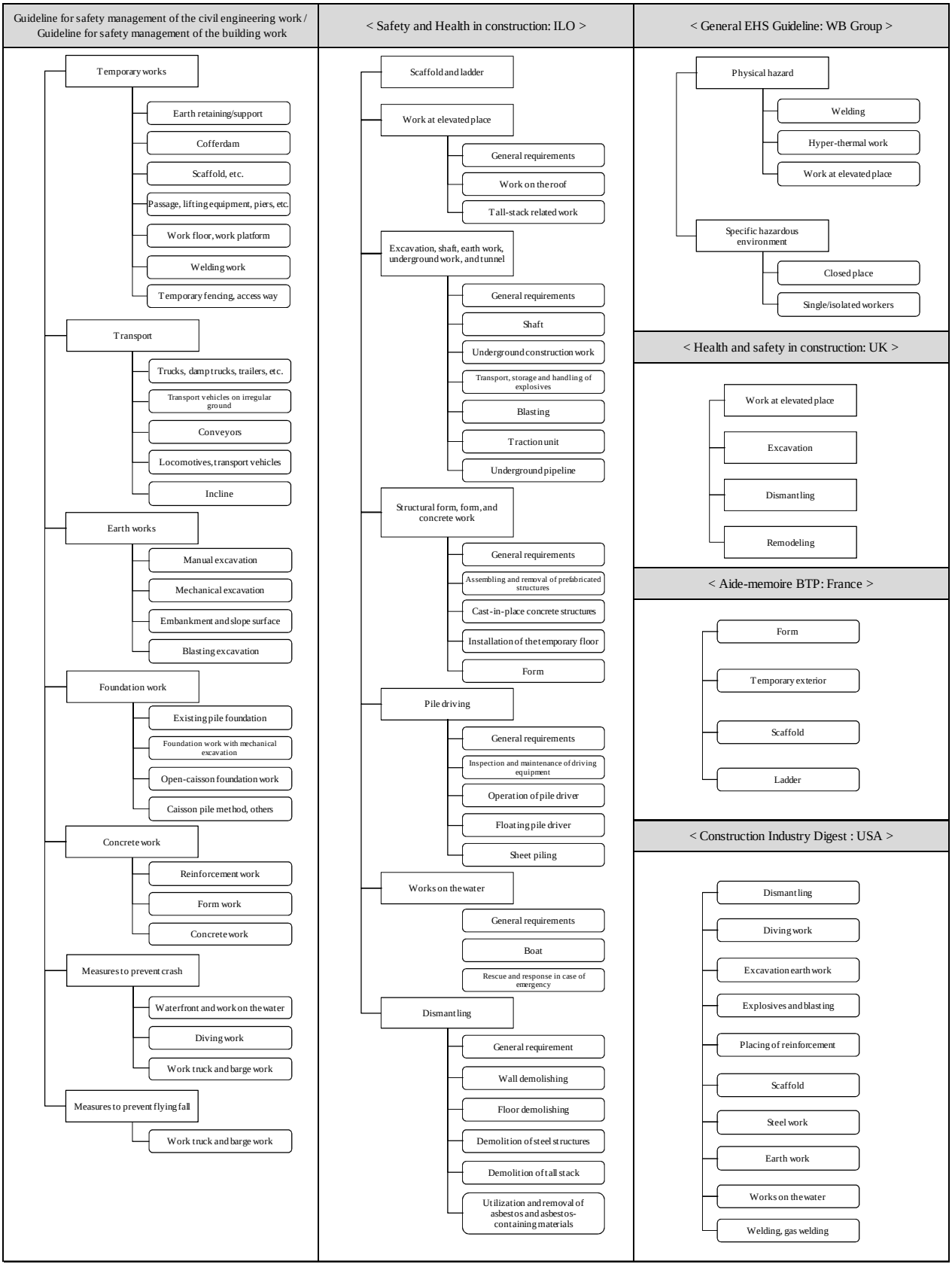

Figure 4.4.4 Comparison in other guidelines

(3) Setting the item of “Technical Guideline for Safe Execution”

On the basis of results of (1) to (2) above, items to be specified in the guideline for safety management are set as follows.

Table 4.4.7 Items of “Technical Guideline for Safe Execution”

Chapter 5. Technical Guideline for Safe Execution (by the Type of Work)	
1. Excavation Work	○ Identifies cautions for safe management of excavation, earth retaining, support, etc. in the course of excavation work.
2. Pile Foundation Work	○ Identifies cautions for safe management concerning the work driving the foundation piles.
3. Formwork/Form Shoring System Work	○ Identifies cautions for safe management of form work and form shoring system work during frame body work.
4. Steel Reinforcement Work	○ Identifies cautions for safe management of placing of reinforcement during frame body work.
5. Concrete Work	○ Identifies cautions for safe management of concrete placement during frame body work.
6. Work over the Water.	○ Identifies cautions for safe management of work over water.
7. Demolition Work	○ Identifies safe management of demolition of buildings, etc.
8. Work where There is Danger of Oxygen Deficiency	○ Identifies cautions for safe management of work in the site where oxygen deficiency may occur.
9. Slinging Work	○ Identifies cautions for safe work during slinging.
Chapter 6. Technical Guideline for Safe Execution (by the Type of Accident)	
1. Measures for Prevention of Fall Accidents	○ Identifies measures to prevent crash accidents.
2. Measures for Prevention of Accidents Involving Flying or Falling Objects	○ Identifies measures to prevent flying and fall accidents.
3. Measures for Prevention of Accidents Involving Collapse of Structures	○ Identifies measures to prevent collapse accidents
4. Measures for Prevention of Accidents Involving Construction Machinery	○ Identifies measures to prevent accidents involving construction machinery and equipment.
5. Measures for Prevention of Explosion Accidents	○ Identifies measures to prevent explosion accidents.
6. Measures for Fire Prevention	○ Identifies measures to prevent fire in the construction site.
7. Measures for Prevention of Public Accidents	○ Identifies measures to prevent the third-party accidents.
8. Measures for Prevention of Traffic Accidents	○ Identifies measures to prevent traffic accident.
9. Personal Protective Equipment	○ Identifies cautions when using the principal personal protective equipment

4.5 Composition of Chapters and Sections

The composition of the table contents of the Safety Management Guidelines is set as follows.

Table 4.4.8 Table of contents of the Safety Management Guidelines

Introduction; Definition of basic terms	
Chapter 1 General Rules	1. Purpose
	2. Scope of Application
	3. Plans for Safety Management
	4. Roles and Responsibilities of Project Stakeholders
Chapter 2 Basic policies for Safety Management	1. Basic Principles of Safety Management
	2. Compliance with Relevant Laws and Regulations
	3. PDCA of Safety Management
Chapter 3 Contents of the “Safety Plan”	1. Composition of a Safety Plan
	2. Basic policies for Safety Management
	3. Internal Organizational Structure for Safety Management
	4. Promotion of the PDCA Cycle
	5. Monitoring
	6. Safety Education and Training
	7. Voluntary Safety Management Activities
	8. Information sharing
	9. Response to Emergencies and Unforeseen Circumstances
Chapter 4 Contents of the “Method Statements on Safety	1. Composition of the “Method Statements on Safety”
	2. Applicable Standards for the "Technical Guideline for Safe Execution of Works"
Chapter 5 Technical Guideline for Safe Execution (by the type of work)	1. Excavation Work
	2. Pile Foundation Work
	3. Formwork and Form Shoring System Work
	4. Steel Reinforcement Work
	5. Concrete Work
	6. Work over the Water
	7. Demolition Work
	8. Work where there is danger of oxygen deficiency
	9. Slinging Work
Chapter 6 Technical Guideline for Safe Execution (by the type of accident)	1. Measures for Prevention of Fall Accidents
	2. Measures for Prevention of Accidents Involving Flying or Falling Accidents
	3. Measures for Prevention of Accidents Involving Collapse of Structures
	4. Measures for Prevention of Accidents Involving Construction Machinery
	5. Measures for Prevention of Explosion Accidents
	6. Measures for Fire Prevention
	7. Measures for Prevention of Public Accidents
	8. Measures for Prevention of Traffic Accidents
	9. Personal Protective Equipment

4.6 Concept of Demand Level

4.6.1 Basic Concept of Demand Level

The safety management guideline developed this time is not always applied to specific countries and regions, so that specifying the standard for all items with uniform requirements and standards as in the case of specifications is considered difficult. Instead of stipulating any specific materials and quantity, the guideline should have the contents and standard levels, in which the environment or state necessary to secure the safety should be determined and the specific countermeasures and methods are to be reviewed and drafted by the Contractor according to the actual situation of the region and the environment of the construction site as well as the cautions of "4.2 Basic specifications."

Points to be considered on "4.2. Basic Specifications"

4) Considering the actual condition of developing countries, the following points must be focused specifically:
   (1) There must be no situation in which practical infeasibility occurs in the work site.
   (2) The contents must take into account procurement of machinery and equipment.
   (3) Considering the workers' environment and the present state of subcontractors, the work must not be such as to be incompatible for the contractors.
   (4) The contents must not be in conflict with the local law of the country concerned.

4.6.2 Demand Level of the "Safety Plan"

The Safety Plan stipulates mainly the contents of the management on how the safety management of construction work should be done.

The required level is basically to ensure no substantial dissociation relative to the international standard while observing the legal regulations of the country concerned because this plan is to be applied to ODA construction works (civil engineering and building) all over the world. Specifically, the required level should be established by referring to the requirement contents and standards stipulated in similar guidelines developed by ILO and WB Group.

4.6.3 Demand Level of the "Method Statements on Safety"

The Method Statements on Safety are to review the countermeasures against accident risk in view of the Technical Guideline for Safe Execution. This guideline is roughly classified into two categories of "by work type" and "by accident type." Specific cautions and measures "by work type" and "by accident type" are stipulated in details in the other guidelines developed by MLIT, Japan, and those of UK. The required level is to be established on the basis of the requirements and levels of other guidelines while taking into the actual situation of developing countries.

Chapter 5
Considering the Operation Policy on the Guidelines

Chapter 5 Considering the Operation Policy on the Guidelines

5.1 Considerations on How To Apply the Guidelines for the Management of Safety for Construction Works

In construction projects under Japanese Grant Aid or ODA-Loan in developing countries, it is necessary to take a variety of approaches to secure safety during the construction stage. "The Guidelines for the Management of Safety for Construction Works", (hereinafter called, "Safety Management Guidelines") which has been drafted in the study, will be prepared as a guideline that stipulates the policy of technical requirements to be complied with and to be taken care of by entities related to the projects at the project planning and the implementing stages while paying attention to avoid site accidents and accidents with third-parties. In this section, it is reviewed how to apply the "Safety Management Guidelines" at each stage of the project and how to deal with the Guideline between the parties involved in the project.

5.1.1 Project Formulation Stage (Preparatory Survey[1], F/S, and F/F Stages)

Concerning fact-finding information collection on safety management in the study carried out having targeted for developed countries in Europe, it has turned out that they took initiatives in securing safety for the new construction projects, utilizing the database on safety management for which safety related data in the past construction works has been accumulated. (see Chapter 1, Item 1.3 and Chapter 2).

In order to reduce the number of accidents, it is important to collect information from an early stage such as project formulation stage to identify risks that might lead accidents in order that proper countermeasures will be nominated and selected to secure safety. Making use of safety management experience in similar construction works in the past is also important.

On the other hand, this is also important in reviewing designation of temporary structures which is deemed important in securing safety of construction sites. In reviewing designation of temporary structure, it is necessary to sufficiently conduct preliminary survey and confirm the labor and/or occupational health & safety related laws and technical guidelines in targeting countries. Conducting a survey pertaining to safety in JICA's Preparatory Survey will contribute to designate temporary structures at the stage of tender.

The way of utilizing "Safety Management Guidelines" at this project formulation stage is stated in detail in the section of 5.3 "Recommendations for Safety Management on Construction Works."

5.1.2 Detailed Design and Estimation Stage

Detailed design and estimation is the stage in which more accurate design is required to finalize the design of permanent structure, temporary structure and detailed points of related facilities based on the further survey. Thus, the Risk/Hazard Registration System should be pieced out, and prediction and prevention of risk/hazard and their assessment should also be added.

In this stage, it is important to deal with detailed design and estimation by fully utilizing the "Safety Management Guidelines," considering not only designed structure/stability of

[1] In this report, this phrase refers to preparatory survey (project formulation survey (grant)), preparatory survey (project formulation survey ODA loan)), and preparatory survey (project formulation supplementation (ODA loan)).

facilities/safety but also safety at the stage of execution and safety in management, operation and maintenance.

Further, based on the acquired information, considerations of safety on construction, identified risks and risk mitigation measures etc., it is necessary to hand these information and/or knowledge over to the next tender and contract stage as part of the results of detailed designing and estimation works. In particular, it is important for the Safety Consultant to provide knowledge and information they acquired during the project formulation stage to JICA, counterpart government and the Employer through identifying danger, hazard, risks assumed at the construction stage, and collection and arrangement of the information required for securing safety in construction.

5.1.3 Tender and Contract Stage

(1) Preparation and Submission of "Safety Plan" with Due Diligence to the "Safety Management Guidelines"

It is imagined that "Safety Plans" are to be submitted as part of the tender documents incorporating specific policies for various safety measures (safety management activities, focused serious accident countermeasures in construction, fire prevention measures, prevention of public accidents and traffic accidents, safety measures for construction machine/equipment, etc.) to be taken during the construction, based on the information provided by the Employer to each Contractor bidding for the work.

In this study, it is proposed that "Safety Plans" are to be prepared with due diligence to the guideline based on the following policies.

"Safety Plan" in the bidding stage:

○To require submission of "Safety Plan" for all bidders as one of the tender documents in order to ensure the fair competitiveness even for evaluation on safety measures. (for ODA-Loan projects)

○"Safety Plan" should include the matters to be stated in the Chapter 3 "Contents of the Safety Plan" in the Safety Management Guidelines.

Some proposals for ODA Grant Aid projects and Loan projects for each are stated below.

[Grant Aid project]

For Grant Aid projects, lump sum contract has been adopted, differs from B/Q contract (unit price contract) for ODA-Loan projects. As it has already been systematized for ODA-Loan that all tenderers have to submit "Safety Plan" at the bidding, it requires careful considerations to apply bid evaluation system for Grant Aid projects. However, it is expected that introducing mandatory submission of the Safety Plan will bring great effects for raising awareness and ensuring safety.

As a whole, the present construction contract for Grant Aid projects does not refer to specific safety measure items or standards, so that it is necessary to clearly set forth minimum safety requirements in special specifications etc. It is therefore considered to set specific measure items and standards for each project, referring to the "Safety Management Guidelines," and the contents shall be clearly stated in the special specifications in the contract.

[ODA-Loan projects]

Considering the present status of ODA-Loan projects except for STEP in which only Japanese companies involve, there are lots of projects in which the third country's Contractors participate. Concerning securing safety at sites during construction, some Contractors execute works while keeping safety in mind by sufficient considerations, abundant knowledge and technologies. On the other hand, there are other contractors doing day-to-day works not paying too much attention to keep safe working condition due to low awareness, insufficient experience and considerations. In order to prevent accidents at construction sites, it is important to exemplify the standard of the Safety Plan and/or strengthen the procedure of reviewing the submitted plans by bidders in order to raise contractors' awareness for ensuring safety at construction sites.

For the institutional point of view, it has already been systematized that JICA and borrower countries are to exchange documents at the appraisal stages for each project on which submission of Safety Plan by each bidder and reviewing those plans by the Consultants are stipulated, so that, it is important to strengthen the procedure from now on.

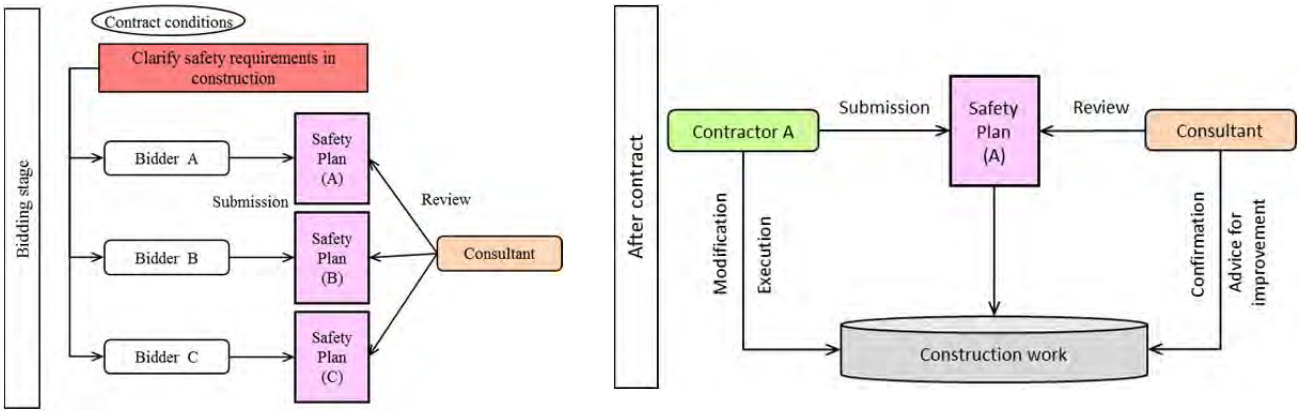

Figure 5.1.1 Position of "Safety Plan" at the bidding stage and after contracting in Loan projects
(Left: Bidding stage Right: After contracting**)**

In order to review that safety plans submitted by bidders had been drafted with reference well to the Safety Management Guidelines or not, it is effective to follow the procedures shown below. However, it requires careful considerations of introducing it.

① As bidding is conducted by Two-Envelope method, the Employer shall indicate safety measures for the targeting project in the bidding document, and obligate each bidder to submit "Safety Plan". It is necessary safety measures are clarified in bidding documents:

1) Basic matters

Matters indicated in Chapter 3, "Contents of the Safety Plan," of the "Safety Management Guidelines";

2) Special notes

Matters categorized as risks extracted at the project formulation stage and the detailed design stage.

② The bidders shall submit “Safety Plan” including the designated items upon bidding. Additionally, required safety plan particulars (B/Q quantity) shall also be prepared and submitted.

③ The Consultant and the Employer shall review the “Safety Plans” upon technical examination referring to the “Safety Management Guidelines.”

④ Next, the Consultant and the Employer shall evaluate the price and contract conditions of bidders who passed technical examination.

⑤ Treatment of safety plan particulars

- Concerning safety plan particulars (B/Q quantity) will be utilized as judgment materials to confirm compliance with the descriptions in “Safety Plan,” and as proposal for safety upon construction by the Contractor.
- The inclusion of safety costs in the bid price evaluation based on the safety plan particulars shall have to be set after arrangement of safety costs and safety items in the present estimation system.
- Concerning changes in bid evaluation, separate sufficient evaluation is needed.

(2) Contract with Main Contractor

Concerning the description of safety issues in the contract between the Employer and the Prime Contractor, proposal shall be made for each of Grant Aid project and ODA-Loan project.

[Grant Aid]

It is proposed to specify submission of Safety Plan with due diligence to the Safety Management Guidelines in the contract document between the Employer and the Contractor for Grand Aid projects.

[ODA-Loans]

For the contract of ODA-Loan projects, the terms and conditions of FIDIC has been adopted.

For, reference, “Contract Management for International Construction Projects < Basic Knowledge and Practice >,” January 2009, Overseas Construction Association of Japan, Inc.” is cited below.

The construction contract in ODA-Loan projects is normally composed of the following documents: They are arranged in the order of priority.

① The Contract Agreement
② The Letter of Acceptance
③ The Letter of Tender
④ The Particular Conditions
⑤ The General Conditions
⑥ The Specifications
⑦ The Drawing
⑧ The Schedules and any other documents

The FIDIC terms and conditions fall under (5) The General Conditions. To reflect individual requirements in the contract, the contents are supplemented mainly by the following documents.

1. Bidding conditions: name of the parties to the contract, work completion date, amount of performance guarantee, and the rates of damage due to delay and other data peculiar to the contract.
2. Particular conditions: (1) supplementation of the general terms and conditions which are imperfect, (2) addition of provisions to be attached to local conditions (uniqueness of project, area and the country) and (3) addition of provisions required or recommended by the lender (World Bank, JICA, etc.).
3. Specifications and drawings: supplementation of technical information to be reflected in a contract.

【Proposal】

It is proposed that the General Conditions shall be maintained unchanged, and any additional clauses or provisions shall be added in the particular conditions. By keeping the General Conditions as they are, it is easy for the Employer and the Contractor to grasp the contents of the tender documents.

The General Conditions are standard terms and conditions having improved and sophisticated through a long history, and it should keep in mind that any revision on Particular Conditions may not lose a balance of whole contract documents.

To ensure the situation that contractors manage safety of the construction site referring to the "Safety Management Guideline," one of possible solutions is to set forth application of the guidelines in contracts. For reference, excerpts of the descriptions related to safety in the items pertaining to "Contractor" and "Staff and Labor" in Red Book of FIDIC are shown in the following pages. "Safety Management Guidelines" drafted in this study refers to points to be considered for preventing accidents and safety measures for typical works more specifically than the description level of the items pertaining to safety in FIDIC. Considering the priorities of each document constituting a contract, stipulations on application of "Safety Management Guidelines" is proposed to be set forth in the Particular Conditions basically.

JICA as a donor and the Consultant sometimes working as an employer's assistant should clearly offer the implementing agencies to introduce application of the "Safety Management Guidelines" in certain contract in order to improve the level of safety management at the stage of construction works.

Table for Reference

Safety Management Relating Clauses on the Conditions of Contract for Construction,
Multilateral Development Bank Harmonized Edition, June 2010

4. The Contractor	
4.1 Contractor's General Obligations	. . . . . . The Contractor shall be responsible for the adequacy, stability and safety of all Site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i) shall be responsible for all Contractor's Documents, Temporary Works, and such design of each item of Plant and Materials as is required for the item to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works. The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer. If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions: (a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract; . . . . . .
4.8 Safety Procedures	The Contractor shall: (a) comply with all applicable safety regulations, (b) take care for the safety of all persons entitled to be on the Site, (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons, (d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [Employer's Taking Over], and (e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.
4.15 Access Route	The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site at Base Date. . . . . . . Except as otherwise stated in these Conditions: (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes; (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;

4.21 Progress Reports	Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Engineer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates. Each report shall include: (a) charts and detailed descriptions of progress, including each stage of design (if any), Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]), (b) photographs showing the status of manufacture and of progress on the Site; (c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of: (i) commencement of manufacture, (ii) Contractor's inspections, (iii) tests, and (iv) shipment and arrival at the Site; (d) the details described in Sub-Clause 6.10 [*Records of Contractor's Personnel and Equipment*]; (e) copies of quality assurance documents, test results and certificates of Materials; (f) list of notices given under Sub-Clause 2.5 [*Employer's Claims*] and notices given under Sub-Clause 20.1 [*Contractor's Claims*]; (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardize the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.
4.22 Security of the Site	Unless otherwise stated in the Particular Conditions: (a) the Contractor shall be responsible for keeping unauthorized persons off the Site, and (b) authorized persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorized personnel of the Employer's other Contractors on the Site.
4.23 Contractor's Operations on Site	The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land. During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

	Upon the issue of a Taking-Over Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Taking-Over Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.
6. Staff and Labor	
6.7 Health and Safety	The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. ・・・・・・・・・・ The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority. The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require. ・・・・・・・・・・(Hereinafter, occupational health items regarding HIV-AIDS etc. are stipulated)

(3) Contract between Prime Contractor and Subcontractor

In construction sites, subcontractors are often under the direction and supervision of the prime Contractor. In the case, the responsibilities for the work and actions in the construction site by workers and operators of the subcontractors will extend to the prime Contractor. In item 4.4 of the FIDIC Conditions (RED BOOK, 2010), it is stated as follows: "The Contractor shall be responsible for the acts or default by any subcontractor, its agent or employees, as if it is the act or default of the Contractor".

Assuming utilization of "Safety Management Guidelines" at construction sites, the subcontractors are often local firms in ODA construction works, and there are not many firms having experience of fully considering safety at construction sites. Therefore, it can be imagined that descriptions in "Safety Management Guidelines" cannot easily be put into practice in day-to-day work by subcontractors because generally they are not familiar with executing works following the guideline stipulated in detail. Therefore, it would be currently appropriate not to refer to the application of "Safety Management Guidelines" in the contract between the prime Contractor and subcontractors, but to proceed with daily work activities while the prime Contractor guides and supervises subcontractors with reference to the guidelines.

In the study of the last year (“the Study on Safety Management for Construction Works in Japanese ODA Projects,” JICA) and the site survey in this study, it is clarified that the safety awareness and the technical level are greatly varied in construction not only among the workers and machinery operators of subcontractors but also among countries. For the prime Contractor, the technical level and quality of the workers, special workers and operators are directly connected with the safety assurance.

At ODA construction sites in each country, various devices and initiatives particularly related to subcontractors are recognized as follows:

- Particular educations for entrants;
- Confirmation of construction machinery operation skill upon recruitment;
- A system of commendation to excellent workers at safety meetings; and
- Penalty for violation of site safety rules.

Based on the current status in which safety awareness and skills of workers, special workers and operators of subcontractors differ greatly corresponding to the construction site, it is not realistic to uniformly systematize the initiatives mentioned above for subcontractors, and it would be appropriate to make respective judgments corresponding to each site and subcontractors case.

5.1.4 Construction Stage

(1) Safety management utilizing “Safety Management Guidelines”

At construction stage, the main issue is the safety management utilizing the “Safety Management Guidelines.” In order to achieve this, the most important point is to create the framework that the Contractors prepare the Method statements on Safety referring to the “Safety Management Guidelines” and submit it to the Employer after contract.

[Grant Aid projects]

In the particular conditions, the Contractor shall submit safety plan documents including specific safety measures in accordance with the “Safety Management Guidelines” considering the work plan before commencement of construction. It is considered to revise the plan if new construction methods become necessary due to any change in the design.

[ODA-Loan projects]

For ODA-Loan projects, there has already been the system for bidders to submit a safety plan as one of the bidding documents upon tender. After contract, the submitted safety plan is not renewed but attached in the work plan. In order to urge construction-related parties to be more aware of the safety management, it is considered to stipulate that the Method statements on Safety including specific safety measures shall be submitted upon commencement of each work during the construction stage. In that instance, the plan shall be prepared in accordance with the “Safety Management Guidelines”.

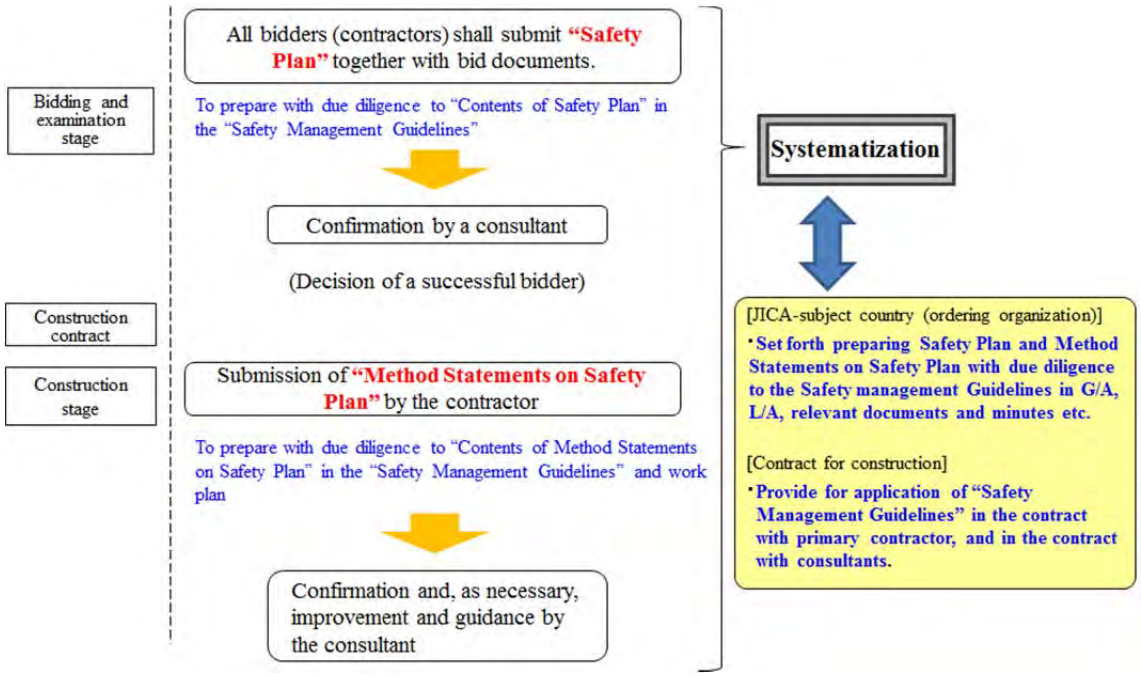

Figure 5.1.2 Submission of safety plan in construction works with reference to “Safety Management Guidelines”

(2) Review and proposal of the method to apply “Safety Management Guidelines” that can respond to any change of contract or design

After contract, occasionally, change of contract contents or design change happens due to various reasons. Generally, construction contracts have provisions on changes, and the Employers can change the construction as necessary without cancelling the contracts.

If the work plan is changed due to the change of work menu or else, because of this, it is found the work contents and steps are changed in each work site. Or new construction machinery or appliances which were not anticipated to be used under the original contract may have to be used, thus new concerns for accidents may arise. Therefore, if the work plan is changed due to the contract changes, and the work contents, materials and equipment undergo extensive change, the Contractor has to renew, based on the changed work plan, the Safety Plan and report it to the Employer and disseminate it to the parties related to the construction after confirmation by the Engineer (Consultant).

Based on the above, one of important points is to state clear provisions in the contract between the Employer and the Prime Contractor to resubmit the revised Safety Plan and follow it at site operations, and in the contract between the Employer and the Safety Consultant to receive the plan and review it by checking Contractor’s operation.

Furthermore, when a need for updating Method statements on Safety due to the change in contract arises, newly required cost on safety measures should understandably be expensed by the Provisional Sum budget.

5.2 Review Concerning Education and Dissemination of the "Safety Management Guidelines"

5.2.1 Education and Dissemination through Seminar or Workshop

The "Safety Management Guidelines" is a guideline identifying the importance of executing the safety management under common recognition among stakeholders of the work concerning the necessity of safety management, basic rules, and general obligations of stakeholders in the course of the ODA construction projects. Therefore, it is proposed that, once the guidelines has been developed, activities must be conducted for dissemination of the guidelines through publication on Website of JICA, distribution in the form of booklet to the Consultants and Contractors in the headquarters, overseas offices and by holding the seminar and workshop in developing countries.

JICA is currently undertaking the technology co-operation project concerning the quality control in Vietnam, Cambodia, etc. It is proposed that the seminar related to the safety management is held in future in other countries. Also effective is the attempt to establish linkage with MLIT with rich experience in the field of safety management in Japan. Typical contents of the seminar plan are shown below.

Table 5.2.1 Typical contents of the seminar

	Theme	Seminar directed to
1	○ Planning and holding of the seminar with a set of three themes; quality control, safety management, and contract control	Employer, personnel concerned with government agency
2	○ Explanation provided by the counterpart government concerning occupational safety and health laws and standards ○ Introduction of industrial accidents ○ Introduction of typical approaches to safety management in the country concerned ○ Introduction of "Safety Management Guidelines"	Mainly the local Contractor and workers

In addition, the Japanese training course of "Project supervision for development of social infrastructure" that JICA provides for the Employers of developing countries include the lectures by the person in charge of safety of Japanese Contractors and visiting to the site of Japanese Contractors. This course involves introduction of the "Safety Management Guidelines" and the operation method incase the work is ordered. These are necessary to activate the approach to enhance the awareness on the safety management on the Employer side.

5.2.2 Review for Safety Management Guidelines

It is proposed that the commencement of operation for the Guidelines will be set down based on considerations of operational methodology. Recommendations for reviewing policy on the guidelines are shown as follows.

[Proposal]

It is proposed that the guidelines will be reviewed based on the fact-finding surveillance, checkout and hearing of opinions of the relevant parties within a certain period after starting its operation.

On top of that, by reviewing condition of actual operation of the guidelines and safety management condition at construction sites in around five years, it is proposed that the guidelines shall be revised on the basis of comprehensive deliberation if it is necessary.

When the request for revising is raised, it is necessary for JICA to consult the government of recipient countries, the Employer, Consultant firms, Contractors and experts etc. to consider.

5.3 Recommendations for Safety Management on Construction Works

In the study, it has been considered the appropriateness of making use of "Safety Consultants (tentative name)" (hereinafter "Safety Consultant(s)") who is expected to take responsibility for incorporating the Safety Management Guidelines into the project formulation procedure such as; design, evaluation, bidding and contract for each in order to secure safety of the site for construction work.

5.3.1 "Safety Consultant"

"Safety Consultant" is imagined to play a role specialized in monitoring "safety" for construction works in order to minimize accidents. It is expected that he or she will collaborate together with supervising Consultants (specializing in detailed survey, detailed design and site management of the project) for securing safety at construction work.

Table 5.3.1 "Safety Consultant"

Image of Safety Consultant:

Human resources that specialize in setting the overall safety management framework as well as safety supervision through all period of project safety management/planning, survey, design, construction, operation and maintenance, and disposal of facilities from a broad viewpoint. Appointment of a foreign consultant familiar with safety supervision is assumed as well.

Roles of Safety Consultant (proposal):

[Stages of project formation, detailed design and estimation]

- Extraction and sorting out of accident risks assumed during the construction stage

  (Introduction of risk/hazard registration system, broad-minded prediction, prevention and assessment of risk/hazard, etc.)

- Provision of information required for securing safety of the construction to the Employer and bidding companies, preparation of contract terms, conditions and technical specifications relating to safety

- Advice on detailed design and estimation work

[Tender/contract-construction stage]

- Reviewing of "Safety Plan" submitted by the bidder

- Reviewing of "Method statements on Safety" upon commencement of construction, improvement suggestion as necessary

- Safety management at sites based on PDCA cycle and "Safety Management Guidelines," reports to the Employer and JICA, etc.

5.3.2 Human Resources to be the "Safety Consultants", Contract, etc.

(1) Human resources to be the "Safety Consultants"

In some countries, Europe, dedicated Consultants specialized in safety management separately exist other than supervising Consultants for lots of construction projects as described in Chapter 1 and Chapter 2. In Japan, Consultants have little experience in managing sites with the viewpoint of safety management especially in the government's public works projects and large-scale civil engineering works. Therefore, in the meantime, it is necessary to assume external (overseas) personnel recruitment as Safety Consultant who have sufficient experience in managing safety at construction sites. For over the medium- and long-term, it is important to develop Japanese personnel resources who can deal with safety management, after undergoing training and education referring to the "Safety Management Guidelines" and practical training at sites to acquire knowledge and experience for safety management. Over the short-term, it is assumed that responses will be made by employing appropriate human resources from the overseas.
When it is difficult to recruit human resources from overseas, it is recommended to employ domestic human resources as shown below, for example.

Excerpt-1. Partial additions to the excerpts of the report "Study on Safety Management for Construction Work in Japanese ODA Project" in fiscal 2011

< Requirements of Safety Consultants (proposal): in the case of employing domestic human resources >

Must be familiar with "Safety Management" and "Construction Plan." Specific conditions are described below.

- ○ Designation of experience years in construction management (criteria: 10-20 years or over), or
- ○ Designation of experience years in safety management (criteria: 5-10 years or over), or
- ○ Designation by qualification (No international qualification exists. Need review.)

In Japan, "The 1st Class Civil Engineering Works Execution Managing Engineer" or "1st Class Building Works Execution Managing Engineer" is relevant. For works involving special foundation work, slope work, pile work, tunnel work, underground work, or dismantling work (*1), it is necessary to deliver human resources who have sufficient experience in the similar works.

Employment of the human resources who have the qualification as "Occupational Safety Consultants (*2)" a national qualification in the field of the Ministry of Health, Labor and Welfare, with sufficient working experience in construction sites, might be another approach.

It is recognized that Professional Engineers (P.E.) are not necessarily familiar with safety management and work plan, so that it is not appropriate as requirements. However, if P.E. is nominated to work as the consultant, assignment of qualified personnel in the field of construction plan or construction plan and facilities, estimation should be considered.

*1 It is desirable to decide by selecting types of work for which serious accidents occurred according to the past data.

*2 Industrial safety Consultant

Experts registered by the Minister of Health, Labor and Welfare specialized in diagnosis and guidance of workplaces by requests of the operator, in order to improve the level of labor safety in workplaces.

[A proposal for executing a trial project by employing external (overseas) Consultants]

One of effective ways for evaluating whether it is applicable or not on introducing Safety Consultant deployment is to do some trials. For example, it is proposed that JICA recruit some overseas Consultants with much experience (equivalent as “Safety Coordinator” in EU) on safety management in construction works and carry out pilot projects to evaluate its appropriateness of the Safety Consultant deployment through the project. In the projects, it is assumed those Consultants are to be deployed from the project formulation stage such as JICA’s Preparatory Survey and to be proactively involved in identifying risks based on the construction type and/or scale, giving advice for basic or detailed design etc. to minimize accidents at the construction stage.

(2) Contract and cost for hiring “Safety Consultant”

The way of contract with Safety Consultant is considered as follows:

① Direct contract between the Employer and the Safety Consultant; or

② Obligating assignment of Safety Consultant under the existing consulting service contract.

As for ①, the Employer will nominate and make an independent contract with Safety Consultant. In the ODA-Loan project, it can be assumed the involvement of the fourth contracting entity, Safety Consultant, causes some impacts to the three-party structure (between The Employer, The Engineer, and The Contractor). For example, in the ODA-Loan projects, new involvement of Safety Consultant might complicate role sharing and responsibility structure, such as direction, decision and arbitration, from the viewpoint of “approval of work plan” and “instructions to change work” closely related to safety management that The Engineer originally enforce their right.

On the other hand, for ②, it is imagined that individual review will be necessary on role sharing and clarification of responsibilities between ordinary consulting service and Safety Consultant service. If any defect arises from the service activities of Safety Consultant, it is imagined that there will be unacceptable points from the viewpoint of the risk allocated to the Consultant side. Careful considerations will be needed for both of the contracting method.

Further, necessary and sufficient budget is required for both of the contracting method with respect to the cost of employing Safety Consultant. The personal cost and activity cost of a Safety Consultant are considered to be allocated from the resource of technical cooperation of JICA at the stages of F/S, D/D, estimation, tender and contracting, and resources of the body receiving funds at the stage of construction.

(3) Project formulation stage suitable for assignment of “Safety Consultant”

Figure 5.3.1 and Figure 5.3.2 show the flow of Grant Aid/ODA-Loan project, and the survey in which allocation of Safety Consultant is assumed.

To secure safety at the stage of construction, it is necessary to collect and arrange the information which can be reflected at the stage of design/estimation for the response and countermeasures to the disaster risk assumed in advance for the subject construction. The Preparatory Survey of Grant Aid is aimed at providing basic information required for the Government of Japan to examine, for the main purposes of (1) confirmation by both countries on the basic concept of the project, (2) working out preliminary design of the project, and (3) cost estimation. Therefore, if installation of designated temporary structures for securing safety at construction sites at an early stage of the main survey is considered necessary, it will be possible to incorporate the cost for the designated temporary structures in the cost estimation as necessary.

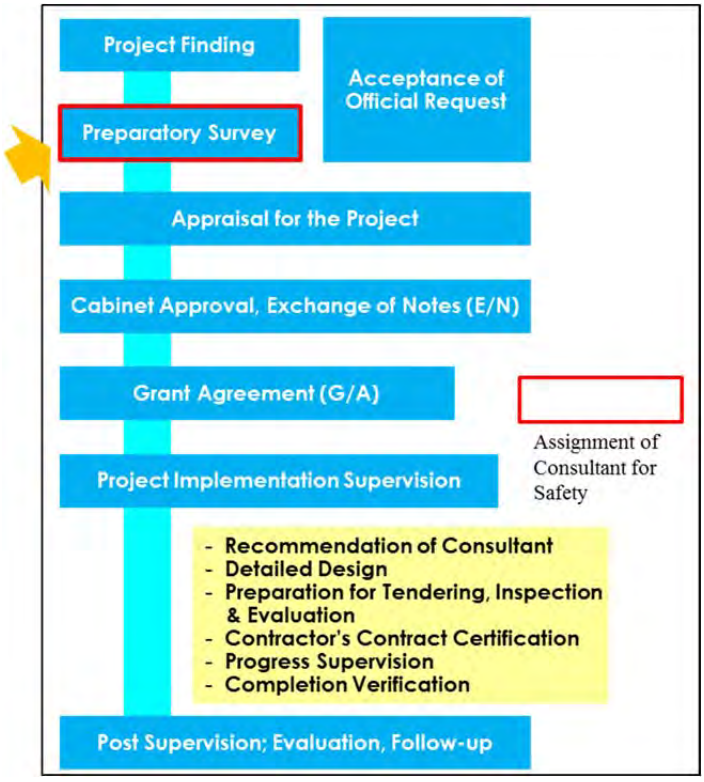

Figure 5.3.1 Flow of a Grant Project
(JICA Website information, partially modified)

At the project formulation stage of ODA-Loan project (STEP Project, general untied project), preparatory surveys including design and estimation are to be carried out similar to the Grant Aid project. Generally, the survey will often include feasibility study (F/S) and fact finding mission (F/F). In these surveys, it is recommended that collection of information related to safety management and necessary reviews will be dealt with by Safety Consultants just like Grant Aid project. However, in some projects directly promoted to ODA-Loan construction projects after F/S conducted by local counterpart, availability of utilizing Safety Consultant needs to be separately considered.

If the Employer separately employs the Safety Consultant (see p160) and collects information on safety for the targeting construction project, it is assumed that information the Safety Consultant needs would be also the target by the Preparatory Survey’s team because of their tasks of the study. Therefore, it is desirable that the survey by the Safety Consultant be carried out in parallel with the preparatory survey or others with similar purposes.

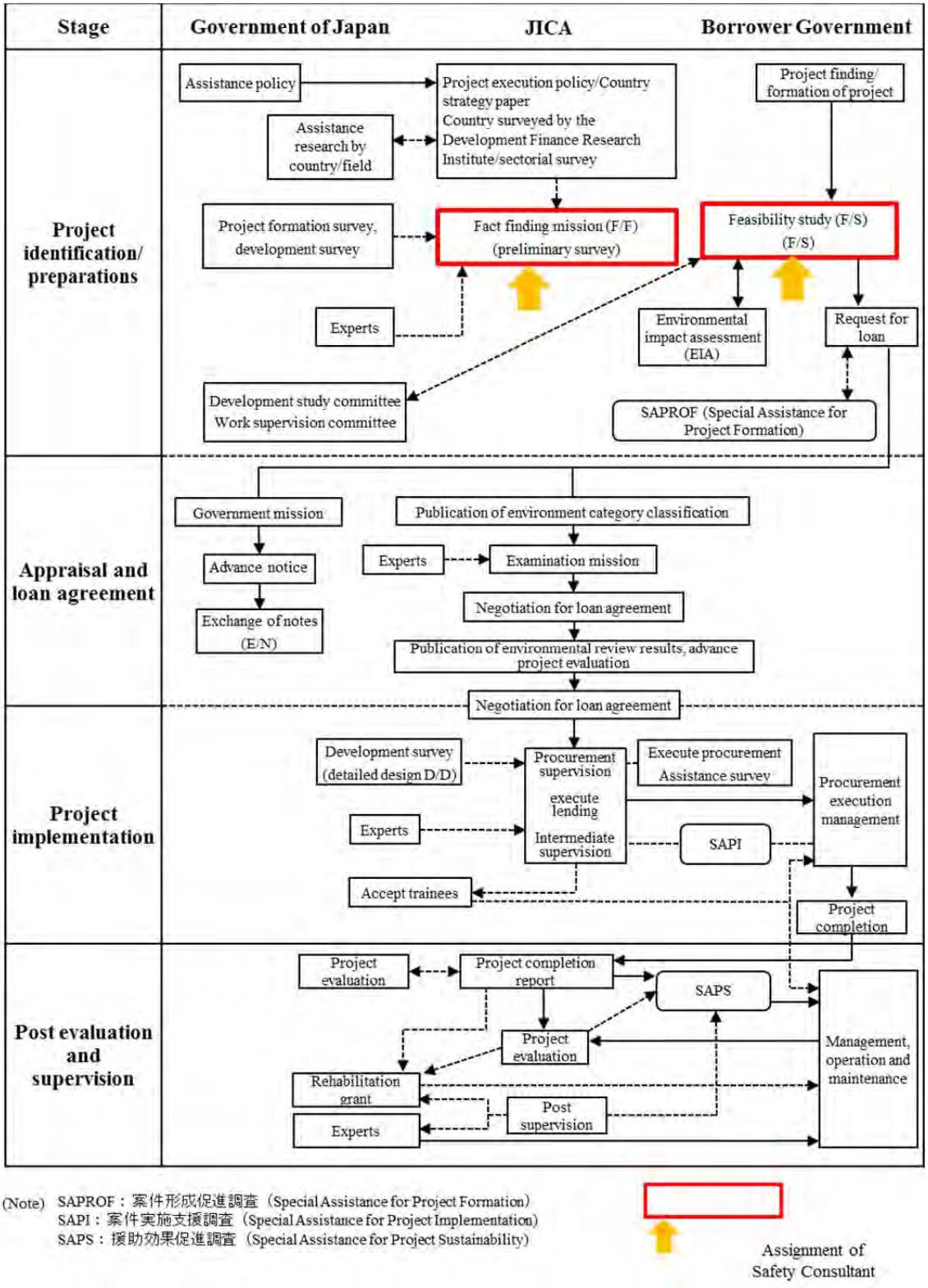

Figure 5.3.2 Flow of Japanese ODA-Loan Projects (JICA Website information with partial additions)

Table 5.3.2 shows the image of survey items concerning those at the stage of JICA's Preparatory Survey (for road/bridge construction project) for example.

Table 5.3.2 Survey items in Preparatory Survey (for road/bridge)

(1) Project Manager/Traffic plan	(1) Project Manager /Traffic plan
(2) Road design	(2) Road design
(3) Design of bridges and structures	(3) Design of bridges and structures
(4) Economic analysis	(4) Economic analysis
(5) Environmental considerations	(5) Environmental considerations
(6) Social considerations/Relocation plan	(6) Social considerations/ Relocation plan
(7) Survey of natural conditions	(7) Survey of natural conditions
(8) Hydraulic and hydrologic survey	(8) Hydraulic and hydrologic survey
(9) Work plan/ Quantity survey & Estimation	(9) Work plan/Quantity survey & Estimation
	(10) Safety plan :Request to be added

Note. If the contract with the Safety Consultant is separate, the image of the table above will not apply. (See Item 5.3.2(2), p160)

(4) Selection of projects to which Safety Consultant should be assigned

The purpose of suggesting deployment of Safety Consultant from an early stage of project formulation is to achieve the goal for reducing the number of accidents at the construction stage. In order to achieve this, it is effective to refer to the past accident data, if it has been collected and sorted out, for selecting projects to which the Safety Consultant shall be assigned.

In the FY 2011 JICA study, “Safety Management for Construction Works in Japanese ODA Projects,” data for types of occupational accidents and their causes were analyzed and arranged from various angles based on the past accident statistics in ODA projects between 2000 and 2010. It is desirable to select projects based on the results.

For selecting projects for which the Safety Consultant system would be adopted, although the project scale for Grant Aid and Loan is quite different in general, a large scale long-span bridge construction project, Neak Loeung Bridge, is now going on in Cambodia. Thus, it is not appropriate to select targeting projects in terms of its project scale only.

Further, the report in the last year stressed there has been lots of accidents with third parties in ODA projects. Based on this, it is recommended that the projects for which various types of accidents with third parties might happen due to the site location, site conditions, and types of work involved should be well considered to be the targeting projects.

Therefore, it is proposed the construction projects with characteristics shown below will be proposed to be the targeting project that the adoption of Safety Consultant deployment should be considered for the time being, and it is recommended to be reviewed the subject projects in the future when the accident data are further accumulated by JICA.

[The projects to which a Safety Consultant should be assigned]

- The projects for which the rate of accident occurrence are high, reported in the study on "Safety Management for Construction Works in Japanese ODA Projects." (FY 2011).

  *The report, however, states that traffic accidents during commuting to the construction sites frequently occur. It should be noted that accident data sometimes include accidents that have not happened within the construction sites.

- The projects "requiring special care for safety measures in construction works" for the ODA-Loan projects by JICA (see Table 5.4.3).
- The projects where occurrence of public accidents are concerned (projects in densely populated areas, neighbors of residential areas, areas with frequent passage of pedestrians, construction works related to important facilities including roads, railways, airports, seaports, and projects with using explosives).

Table 5.3.3 Standard for Projects Requiring Special Care on Safety Measures in Construction under ODA-Loan Projects

1. Long-span bridges or viaducts: single bridges (elevated) having a length of approximately 1000 m or more (including the approach)
2. Suspension bridges, cable-stayed bridges, extradosed bridges, or other types of bridge having a maximum span of 100 m or more
3. Special works above and under the ground and in the water (tunnel, dam (including sabo dam), port construction, ground excavation, cofferdam within river areas, works requiring large-scale temporary structures, large-scale foundation works, caisson works, etc.)
4. Works at heights (approximately 20 m or more from the ground)
5. Works in the vicinity of existing public facilities, such as railways and roads, and the work providing temporary structures for general traffic
6. Other works with possibility of serious accidents

(5) Survey items to be checked by Safety Consultant

At the stage of project formulation, Safety Consultant should have various viewpoints to collect information not only the surrounding environment of the construction site, but also natural and social external environment. Also, other points such as procured materials and equipment to be used at the site and their transportation, circumstances and conditions pertaining to transportation, and labor force assumed to be procured locally which is indispensable for the construction works etc. should be checked and reviewed by Safety Consultant.

Further, for safe and smooth construction, the Employer and the Contractor shall share the same recognition on site conditions that stipulate safety assurance and restrictions, and matters to be naturally complied with for securing safety. For portions being restricted due to site conditions, introduction of designated temporary structures should be considered (for details, see Item 5.4.2).

Especially, in the construction work in which designated structures are introduced, liability of accidents, if happened, might extend not only to the Employer but also to the Consultant whenever inappropriateness or ambiguity for the design of the designated temporary work are pointed out. Therefore, when a construction work that requires designated temporary structures is to be planned, it is important to verify the related laws, implementation structure and technical guidelines etc. in the targeting country at the stage of project formulation.

In Table 5.3.4, items that are recommended to be fully checked at the stage of project formulation are shown, based on the report for "Estimation-related Survey" of the "Preparatory Survey Design and Estimation Manual Supplementation Version (Civil Engineering Area)-Trial Version-" (March 2009, JICA).

Table 5.3.4 Proposed checking items at the stage of project formulation (draft)
Excerpts from "Study on Safety Management for Construction Work in Japanese ODA Project" (Fiscal 2011, JICA)

Points	Items
Surrounding Environment	Surrounding Condition on Work Sites, Density of Neighborhood Residences, Structures, Underground Installations, Aboveground Properties, Relocation Houses, Diversions and Traffic Control, Safety Measures, Public Safety etc.
Natural Environment	Condition on Geography, Geology, Hydrology and Oceanography, Unfavorable Natural Condition, such as Weather, Groundwater, Spring & Swampland, Oxygen Deficiency & Poisonous Gases, Earthquakes, Landslides, Floods, Typhoons, Storm Winds, Eruptions etc.
Material & Equipment for Procurement	Material & Equipment for Temporary Work etc.
Transportation	Pass Control, Safety on Transportation etc.
Approach Road for Work Site	Existing Condition on Approach Road, such as Width, Alignment, Pavement, Bridges, Channels, Aerial Cables and Underground Installations etc., With or Without of necessity of Expansion, Upgrading, Reinforcement, Required Temporary Facilities etc.
Labor Force	Level of Skill for Site Workers etc.
Local Sub-contractor	Qualification, Capacity, Outsourcing Work Types and Work Experiences etc.
Standards/Regulations/ Practices	Design Standard, Construction Standard/Spec, Construction Methods etc.
Labor Regulations & Practice	Laws and/or Regulations on Occupational Safety and Health
Project Implementation Framework	Organization & Staff, Finance & Budget of Implementing Agency and/or Superior Agency of Recipient Country, etc.
Work Plan	Consideration on Points to Remember, Lot Classification, Stage Construction and Work Plan
Construction Supervision Plan	Consideration on Staff for Construction Supervision and on the framework of Construction Supervision

Construction Schedule	Consistent Plans, such as Stage Construction, Lot Classification, Moment of Procurement on Material & Equipment, Fabrication Period, Work Type, Construction Process, Construction Method, Installation & Demolition of Temporary Facilities and Diversions etc., Scale of Construction, Quantities, Pass Control, Restriction in Neighborhood Environment, Rainy Season, the Number of Annual Rainy Days etc.

(6) Contract between the Employer and Safety Consultant

In this study, it is proposed in item 5.3 "Safety Consultant" which specially deal with safety matters be newly assigned from the project formulation stage to the construction stage. Contract terms to be included in the contract document between the Employer and the Safety Consultant through the Employer's designation of the Consultant are shown below.

For reference, the "Consultant Contract Form" in Grant Aid projects (amended version as of October 2012) describes as follows the roles of the Consultant in each stage at Article 3 (Scope of Service of Consultant):

① Design stage

- Preparation of design documents composed of drawings and specifications, and technical documents describing the contents of the projects concerning materials, equipment, workmanship, etc.

② Bidding stage

- Assistance in P/Q examination, bidding procedure/assistance in evaluating bidding documents, negotiations with the successful bidder for contract, and assistance in contract procedure.

③ Stage of construction, procurement and carrying-in and operation training by the Contractor

- Inspection and approval of shop drawings submitted by the Contractor, confirming conformance to the descriptions in contract of quality of materials stated in the design documents, standards, quality of the construction and workmanship, etc.

Based on the descriptions above, it is proposed that the contract between the Employer and the Safety Consultant shall prepare the contents mentioned below for both Grant Aid projects and ODA-Loan projects as the role the Consultant plays.

○ Design stage

- Extraction of disaster/accident risks assumed in the construction stage, and its reflection in the arrangement and design.

○ Bidding stage

- Provision of information required for securing safety in the construction to the Employer and the bidders.
- Review of the "Safety Plan" submitted by bidders.

○ Construction stage

- Conformation of “Method statements on Safety” submitted by the Contractor, and guidance for improvement as necessary.
- PDCA cycle, site safety management based on the “Safety Management Guidelines,” and its report to JICA.

5.4 Temporary Works and Estimation of Safety Measures Cost

In this item, it is shown the result of reviewing and some recommendations in terms of design concept for temporary works and cost estimation of safety measures both of which are critical points in order to secure safety at construction works.

5.4.1 Temporary Works and its Construction Method

Basic concepts for construction method or temporary work design indicated in "Preparatory Survey, Design and Estimation Manual Supplementary Version (Civil Engineering)—(Trial Version): March 2009, JICA applied to Grant Aid projects and "4.1 Contractor's General Obligations, Chapter 4 The Contractor, Conditions of Contract for CONSTRUCTION, MDB Harmonized Edition, FIDIC 2010" applied to ODA-Loan projects are shown as follows.

(1) Basic concepts pertaining to construction method and temporary work plan by "Preparatory Survey, Design and Estimation Manual Supplementary Version (Civil Engineering)—(Trial Version): March 2009, JICA

"2-3-1 Working out Construction Method, 2-3 Construction Plan, Chapter 2 Arrangement of Preconditions of the Supplementary Version (Trial Version) of the captioned manual" refers as follows:

Excerpt-2. "Preparatory Survey, Design and Estimation Manual Supplementary Version (Civil Engineering)—(Trial Version)": JICA, March 2009"

(1) Construction Method

Civil engineering work in Grant Aid project is often executed under severe working environment such as high temperature and humidity, high elevation, isolated island, and dispersed construction sites. Further, it is found difficulties for procurement of materials and equipment. For drawing up a construction plan, construction method (manpower construction, mechanical construction, etc.) and the engineering method (girder erection method, foundation piling method, etc.) must be reviewed and selected to fit the respective construction condition for each work place..

As the costs for temporary works (temporary equipment) and construction with machinery occupy a large share in the total construction cost, applicability of temporary structure plan as well as the construction machinery, kinds, models and standards of materials and equipment for the temporary structures, and their reuse plan greatly affect calculation of the construction cost. It is important to make an appropriate plan which meets and harmonizes with construction scale, construction contents, site environment, site conditions, process, etc.

Concerning the construction/engineering methods, it is desirable to avoid special methods in principle, and to consider improvement of local construction technology after fully considering the abilities and technical levels of local engineers.

Further, sufficient safety measures must be incorporated in the plan to protect the lives and the safety of the bodies of workers from accidents, to secure precise safety for the local residents, passers-by and other third parties, and to consider environmental protection such as prevention of noise and vibration resulting from the construction.

(2) Plan for Temporary Works

For planning temporary works (temporary equipment), the scale and contents of the construction (types of work) and the compatibility with the construction schedule, etc. must be fully examined after comprehending local topography, geology, weather, marine phenomena and other natural conditions, surrounding

environment, related laws, and various other conditions. The plan should also be reviewed from economic points of view and have the scale and contents mostly suitable for the construction (types of work).

The temporary structures (temporary equipment) are not the objects of work (permanent structures) but necessary in the process of the construction (types of work), and removed upon completion of the construction (types of work), and fall under the items included in the following table:

List of Major Temporary Works

Classification	Contents
Direct temporary works	**Temporary works directly required to construct objects** Scaffolding, formwork, timbering, soil retaining works, cofferdam, dewatering, provisional watercourse work, road decking, temporary structures for erecting bridge, etc.
Common temporary works	**Temporary facilities commonly required for the entire work** Roads for construction, detours, temporary bridge, temporary pier, repair of the current road, electricity/water supply facilities, drainage facilities, concrete plant, asphalt plant, various machines, facilities and equipment required for execution, protective facilities (fence to prevent falling or flying objects, temporary enclosure (protective wall for construction), etc.

Supplementation: Handling temporary works, engineering methods, etc.

Among the temporary works and engineering methods falling under any of the following items, it should be noted that they should be properly designated as designated temporary works in the design documents after E/N.

1. Important temporary facilities for safety (cofferdam, temporary pier, etc.)
2. Temporary works offered for general traffic (temporary bridge, road decking, detour, etc.)
3. Temporary works with limiting conditions as a result of consultation with the related government agencies.
4. Cofferdam having the same functions as the river banks
5. Employment of patented method or special method

(2) Basic concepts pertaining to the method of construction and temporary work plan in "Conditions of Contract for CONSTRUCTION – for building and engineering works designed by the Employer; MDB Harmonized Edition, 2010

"4.1 Contractor's General Obligations, Chapter 4 The Contractor, Conditions of Contract for CONSTRUCTION, MDB Harmonized Edition, FIDIC 2010" refers as follows:

Excerpt-3. "Conditions of Contract for CONSTRUCTION – for building and engineering works designed by the employer; MDB Harmonized Edition, 2010

Contractor's General Obligations

The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

All equipment, material, and services to be incorporated in or required for the Works shall have their origin in any eligible source country as defined by the Bank.

The Contractor shall be responsible for the adequacy, stability and safety of all site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i) shall be responsible for all Contractor's Documents, Temporary Works, and such design of each item of Plant and Materials as is required for the item to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works.

The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer.

If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions:

(a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract;

(b) these Contractor's Documents shall be in accordance with the Specification and Drawings, shall be written in the language for communications defined in Sub-Clause 1.4 [*Law and Language*], and shall include additional information required by the Engineer to add to the Drawings for co-ordination of each Party's designs;

(c) the Contractor shall be responsible for this part and it shall, when the Works are completed, be fit for such purposes for which the part is intended as are specified in the Contract; and

(d) prior to the commencement of the Tests on Completion, the Contractor shall submit to the Engineer the "as-built" documents and, if applicable, operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [*Taking Over of the Works and Section*s] until these documents and manuals have been submitted to the Engineer.

5.4.2 Considerations and Recommendations for Designated Temporary Works and Arbitrary Temporary Works

Temporary works tend to be viewed as not so important because they are brought in tentatively during the construction period. For example, ground condition such as soil pressure, groundwater pressure, and soil bearing capacity as well as surrounding conditions are infinite in variety. Furthermore, due to the qualitative and quantitative restriction of equipment or materials on hand for temporary works, Contractors cannot always reutilize the same materials and/or equipment that they used in the previous works. Other than that, it is required to take the appropriate responses as to various factors such as a request for a slight modification from typical structural design, objective of the construction, type of permanent structures, size, degree of importance, construction period, installation cost etc. for planning temporary works.

Arbitrary temporary works are applied in the case Contractors design and set them in by their own ideas without any Employer's regulatory control for which Contractors can save the construction cost depending on their management/construction technique, knowhow, and ideas

etc. within the acceptable range for ensuring safety. However, there is often the case with that the design for arbitrary temporary works are to be subject to control same as the designated temporary works, so that it is necessary for Contractors to check the condition of regulation at on-site orientation and/or reconfirm the contents of design in order to avoid accidents. As a matter of course, Contractors assume responsibilities when accidents happen at sites.

Regarded as high-prioritized temporary work, designated temporary works are applied in the case the Employer designate their structures and specifications and dealt them with the same as the direct construction works. Requests for modifying from original design require Employer's approval, but it can be dealt in a design variation.

In association with increasing demands for growing in size on facility construction projects and on upgrading of permanent structures in recent years, the importance of temporary work has rapidly drawn attentions. In terms of this, Contractors should pay strict attention to avoid accidents with third parties that could cause serious impacts for developing urban function. Also, Contractors' work management capacity, engineering and technical capacity should be seriously checked and monitored. Precarious handling of temporary work should be strictly prohibited and it is expected to give adequate consideration on temporary work same as the permanent structures whenever it is planned to be used for a long period.

It is recommended that the Employer give careful consideration to the given condition and determine the adoption of temporary works as designated or not. However, it needs to be kept in mind that inappropriate planning of temporary works sometimes leads to troubles such as the claim for design variation, increasing construction cost, delaying work period etc.

JICA has renewed the previous designated criteria on projects that should be paid strict attention for securing safety for construction work on ODA loan projects. (Present stipulations are shown as follows.)

Excerpt-4. "Projects requiring special care on safety measures in construction" (reproduced from Table 5.2.3)

1. Long-span bridges or viaducts: single bridges (elevated) having a length of approximately 1000 m or more (including the approach)
2. Suspension bridges, cable-stayed bridges, extradosed bridges, or other types of bridge having a maximum span of 100 m or more
3. Special works above and under the ground and in the water (tunnel, dam (including sabo dam), port construction, ground excavation, cofferdam within river areas, works requiring large-scale temporary structures, large-scale foundation works, caisson works, etc.)
4. Works at heights (approximately 20 m or more from the ground)
5. Works in the vicinity of existing public facilities, such as railways and roads, and the work providing temporary structures for general traffic
6. Other works with possibility of major accidents

［Note］JICA's approach in case of promoting projects categorized in Excerpt-4.

(1) The task management department determines at the joint PC whether or not the projects under consideration correspond to "the projects requiring special care on safety measures during construction". (For the appropriate case, the work concerned and the safety cautions are entered in the joint PC comment form.)

(2) The department for regions and task management department check the safety management system of a counterpart country during review by utilizing the check list.

(3) The department for regions records the necessity of follow-up in the project implementation stage (procurement, construction supervision) by entering the required items in “IV. Cautions for the project implementation and project management” of the review record.

(4) For selection of the Consultant to be engaged in duties including construction supervision, negotiation is made with the borrower and implementing organization according to Clause 3.02 of the Consultant employment guidelines (April, 2012), so that QBS is employed as a selection method.

Originally, the construction work consists of the combination of various works and operations. In JICA’s projects requiring attention, correspondence between the project type and risk hazard may arise only in limited cases, such as risk hazard concerning collapse accidents in the tunneling work for road, railway, headrace, etc. It may be reasonable to consider that generally there is no such correspondence and only the risk hazard corresponding to each of work types and operation exists,

Among the works/work types with possible serious accidents, collapse of frame support, temporary scaffold, and temporary jetty work cannot be prevented even when the workers operating on these temporary works/structures pay the greatest attention. Especially for the third-party accidents and secondary damages, it is essential to give consideration to safety management/accident preventive plan targeting third parties.

(1) Points of concern in general related to the temporary work plan

- The plan must be traceable as much as possible in terms of changes in the method, specifications, etc. of the permanent work materials.
- For temporary work materials, the general commercial products should be procured and the work has to be done following by the unified standard as much as possible. Also, it should be allowed to reuse these materials in other works while always taking into account the type, quantity, and quality of temporary work materials in stock.
- As temporary work materials are generally used for the short period, so that their design is apt to be drawn while discounting the safety factor more or less. However, the adequate safety factor must be ensured when their use extends over a long period of time or they are critical materials.
- These materials must be easy to handle and unitized as much as possible.
- For critical temporary works, care must be taken to avoid deficient setup by focusing too much on the economic efficiency.
- The temporary works must allow labor-saving to cope with shortage of manpower.
- The temporary works must be considered from overall perspective, including transport related to the work, installation, operation, maintenance, and removal.
- Research on applicable laws, regulations, design standard, and guidelines must be done with due care, so as to prevent any change in the plan during construction.
- For example, efforts must be taken to establish close communication with the road administrator, police station, fire department, Labor Standards Supervision Office, utility manager, and other competent authorities.
- To prevent accident, the width of surrounding land, foundation of existing buildings and structures (for example; neighboring private houses, schools, hospitals and other

buildings), and the location, depth, size, and structures on and under the ground must be fully checked.

(2) Points of concern in general related to the survey for temporary works

- For planning temporary works, it must be given the highest priority to safety. The importance of temporary works is rather growing these days because of their recent work environmental conditions, including increase in the scale of main structures, execution of the work in the conurbation area or mountainous district, etc. Adequate research and study must be done naturally by taking these conditions into account, and due care must be taken concerning the safety of the main structures and execution.
- The temporary works must be designed and installed in such a manner that they will fulfill their function continuously for the limited period of time after completion. It is therefore necessary to provide clear design conditions and to establish the appropriate execution conditions. Namely, validation is always necessary whether or not the execution conditions are adjusted to the site condition. The prerequisites for monitoring of the execution conditions in the field are the survey and the test.
- The survey and the test are implemented to ensure rational and reasonable planning, designing, and execution. Inadequate or insufficient survey and test or execution of design and implementation recklessly without certain backup lead accidents or troubles readily. Though accident may not be the direct result, this situation makes smooth execution impossible or results in disagreement between the design and actual products.
- The survey and test for projecting, planning, and designing of main structures and those for temporary works/execution may be similar, but may often be different originally in the targeted objectives. Planning of the main structure must also take into account the issues of temporary structure and execution, and it is necessary to consider the feasibility, difficulty, etc. of construction already in the basic design stage for the main structures. Namely, introduction of the overall risk management is necessary to prevent actual and latent risks, which includes the risk assessment, risk preventive measures, risk mitigation measures, risk register, etc.

Items requiring specific cautions among survey items for temporary work; for example,

(a) Review of various outputs of the investigations during the project formulation phase

Review should be made on the achievements of the activities conducted in the project formulation stage, such as the overall study, overall design/basic design, and calculation of the overall work costs, specifically on establishment of the coming/future safety system/safety framework to be conducted from the safety-related broader perspective. Namely, the review should be made on whether evaluation, composition, setting, etc. of the safety system/safety framework are appropriate and adequate throughout the phases of detail design/estimation, construction, operation and management, and facility disposal. The review should also be made on whether or not the factors related to the organization of international donors, counterpart countries/implementing agencies, budget, manpower, the scope of responsibilities, management and technology levels, operation and maintenance system, etc. are reflected properly in the main detail design and estimation stages. These factors include those inhibiting execution of the project; laws, institutions, and habits; matters to be dealt with by the counterpart country; conditions to secure the land for construction; contract clauses requiring attention; natural and disaster conditions unique to the region that are disadvantageous for construction (terrestrial heat, spring, pressured underground water, swamp, oxygen deficiency and harmful gas, disease and health

conditions; earthquake and landslide; flood, strong wind, typhoon, storm, volcanic eruption; extreme cold, extreme heat, and sudden temperature fluctuation; high humidity and aridity; heavy rain; fog; frozen ground), neighboring environment, crime rate, public pollutions, labor and materials/equipment condition, etc. For study items determined to be insufficient and incomplete, the detailed study will be continued in the main stage.

Individual study items, in particular, to be taken care of are as follows:

(b) Geographical features, terrain and geological formation

- For construction on the site, the original ground conditions should be grasped in the house conurbation areas and mountainous districts while paying attention to the difference in elevation of the terrain, material transport route, etc.
- Before commencement of the work, thorough confirmation should be on the original terrain and the review should be made on what kind of effects occurs during construction. For example, the effects of inclination/undulation of river bed and of scouring and sedimentation must be taken into account for underwater cofferdam work.
- For the material transport route to the site, the width, gradient, radius of curvature, traffic volume, and strength of existing bridges should be taken into account.
- Ground and composition of geological stratum, undulation, gradient, thickness of stratum, continuity, alluvium and diluvium etc. should be respectively paid attention to.

(c) Geology and soil quality

- The study concerning the main structure focuses on dynamic characteristics of bearing stratum. On the other hand, the study for steel sheet pile earth-retaining work, for example, focuses on different factors, such as the stratum near the ground surface, soil quality, N value, gravel size, groundwater level, pressured underground water, spring flow, etc.
- When the temporary works becomes large and influences greatly the work costs, the additional and/or complementary study on temporary works should be carried out as required.

(d) Hydrology and hydrographic conditions

- For the underwater temporary works in rivers and harbors/ports, such as cofferdam, temporary piers, artificial island, thorough study should be made on the maximum, average, and minimum water levels, flow rate, flow direction, past flood record, wave height, wave direction, tsunami.
- Due care should be taken of the timing, interval, accuracy and reliability of measurement data.
- Negotiation should be made with the administrator of rivers and harbors/ports, water police, and coast guard.

(e) Underground utilities, properties on the road, etc.

- Temporary works are often installed outside the foundation of main structure, so that the location, size, structure, etc. of underground utilities (water and sewerage pipes, gas, electric conduits and cables) should be grasped correctly. It is necessary to negotiate and confirm with the proprietor of underground utilities and related agencies beforehand concerning the study results and security.

(f) Surrounding structures/buildings

- In addition to the surrounding structures/buildings, the effects on the civil engineering structures, for example, abutments, piers, earth-retaining walls and facilities/structures such as roads, railways, and dikes should be taken into account.
- When the temporary works are to be conducted in the proximity of surrounding structures, the study should be made on how the existing structures were designed and constructed and in what conditions they are now. This is to take into account the effects of execution of temporary works on the existing structures. In principle, factors to be studied are as follows:
    - Depth of footing
    - Type of foundation
    - Correlation between temporary works and existing structures
    - Mutual effects of both loads
    - Geological and ground characteristics to the extent that they affect the stability of temporary works
    - Degree of consolidated settlement of surrounding ground, measures to prevent settlement, etc. when lowering of the groundwater level is expected
    - In the case drawdown of underground water is envisioned, the degree of consolidation settlement, countermeasures against it. For example, the present status of surrounding facilities, such as wells, etc.

(g) Neighboring environment and public pollutions

- Due attention must be paid on the society and environment by taking into account the effects of noise and vibration during installation of temporary works on houses and structures.
- In particular, special care must be taken in house conurbation areas where the houses are densely constructed in the surrounding. It is desirable to take as much appropriate protection and/or alleviation measures for avoiding accidents with third parties and secondary accidents as possible before starting temporary works. It is also essential to publicize and inform the outline of the work to the neighboring residents via the counterpart government/implementing organization, local police authorities, and influential persons, so as to obtain cooperation of the residents.
- Depending on the construction method, the top-driven pile method may not be allowed or the large machines cannot be carried into the site because of work pollution control regulations.
- Particular attention should be paid on the detour, traffic measures, houses to be relocated, and sentiments of residents during the work.

(h) Work schedule

- Schedule control of temporary works is extremely important. Temporary works are normally executed in advance of the main structures, so that the appropriateness of the schedule exerts considerable effects on the main works. Due care should be taken in terms of conditions at the construction position, selection of construction machines, measures after completion, etc. The temporary works construction sequence, selection of the construction method, and construction technique are all fundamental elements. In this context, thorough review must be made on all conditions, including the site conditions,

environmental conditions, river conditions, for example, in the drought period, seasonal conditions, materials supply schedule, etc.

- The schedules after commencement must always be monitored, such as restrictions on the work by road traffic, gathering and analysis of meteorological and hydrographic detail data, the number of operable/inoperable days, etc. It is also essential to identify in the contract documents and review regularly the required width of working yard, temporary storage site of materials and equipment necessary for the work, storage yard of materials and equipment for emergency cases, as well as the preliminary protection in case of emergency, initial emergency responses, measures to prevent propagation of secondary disasters, etc.
- For the lands left un-acquired and properties not handled within the work area, It is appropriate that the contract documents clearly identify their location, properties, and quantities as well as the division of the responsible areas related to the possibility of their complete handling, the scheduled data of commencement, and no admittance of unauthorized third parties, and maintenance and repair of protective equipment, including where the responsibility lies.
- Generally speaking, the site involving rush-job elements has high possibility of accidents, and the cases with definitely irrational setting of the work period often leads to direct and indirect accidents. In particular, the urban work normally requires considerable time for traffic measures, publicizing and information to nearby residents, environmental measures, and the application for road use to the competent police authorities. Particular attention should be paid when setting the work period for the end of calendar year and fiscal year.

(3) Points of concern in general related to the design for temporary works

Generally speaking, the temporary work is completed within the short period of time, which in turn requires thorough attention on the selection of structural system and the evaluation of the applicable load, stability, safety factor, allowable stress, etc. The temporary work is generally affected greatly by site conditions, and all of field conditions are difficult to predict completely. Accordingly, designing the temporary work is based inevitably on the assumption, that is, estimation of the field conditions from insufficient data. Therefore, it is essential to change and modify the design of temporary work according to site conditions identified after commencement. It is absolutely necessary to establish the organization and system, which allows immediate and appropriate measures if any deformation or abnormality is detected in the course of steady monitoring during the work.

- It is required that vertical, longitudinal, and lateral force balance/stability of basic structure system of the temporary work as well as balance between the displacement, movement, rotation, twisting, and generated stress of the structure as a whole and deformation including strain and deflection are constantly checked.
- Note that there are always multiple invariant/fixed points in the basic structure system.
- Generally, more or less discounted values from those of main structures are employed often for the stability, safety and safety factor because the use period of temporary works is short. When the critical temporary works contain many unbalances between the design conditions and the design technique or uncertain factors, additional increase of values may have to be taken into account. Namely, the adequate values must be employed by applying judgment case by case.
- When the repeated loading or the large impact is applied or when the temporary work is exposed to large load temporarily, the review must be made while applying allowances. For example, reinforcement or other measures may be taken.

- Normally, the short-term load is used for calculation. When the secondhand materials are to be used, application of the short-term load is not necessarily adequate even if these materials are to be used only tentatively.
- Assembling of small members, field welding or bolting for convenience of field connection, transfer, removal tend to present defectiveness in terms of the quality. Design calculation of temporary work must take this fact into account.
- For the support and scaffold, for example, the occupational safety and health regulation of Japan specifies the allowable stress. These stresses should be used as reference.
- Certain Employers do not have the design standard and guidelines for temporary works. It is essential to negotiate thoroughly preliminary concerning which standard or guidelines should be employed.
- For construction of the urban area, strict observation of “outline of preventive measure against third-party accidents during civil engineering work in the urban area” notified by the former Construction Ministry (the present MILT) is demanded. It is adequate to refer to the contents of the outline.
- Design should always take into account prevention of the occurrence of secondary disasters or the third-party accident if they occur.
- Recently, the structural calculation of buildings and facilities is handled mostly by the complex computer software, which applies also to the temporary work. This present the possibility that structural calculation is handled as a black box. It is necessary with utmost care to consider not only the contents of computer software, but also the processing, handling, analysis technique, and analysis of the result for input and output data.

For working on specific structural estimation of temporary work, following points should be paid attention especially for imposed load with special care, materials, stability, safety factor etc., for example;

- When working on design/structural estimation of temporary work, dead loads, live loads, impulses, earth pressure, water pressure, change in temperature and other factors such as regional conditions and additional loads depending on installation site, all need to be taken into consideration. Especially, live loads, impulses, overloading, earth pressure, water pressure, scouring and horizontal loads applied to sediments require well-paid attention.
- When temporary work takes a long period of time and the site is adjacent to permanent structures, the influence of earthquakes should be concerned.
- Regarding loading of heavy machinery for construction of temporary pier etc., when the effective span exceeds 15m, depending on the condition of usage and outrigger, one should assume that loading status with each live load used separately.
- In developing countries, dump trucks or trailers which are excessively overloaded are often spotted. Therefore, one needs to appropriately grasp the loading statuses.
- Impulse factor by live loads should be considered around 0.3 to 0.4. Particularly, the impulse factor of road deckling panel of temporary pier, which tend to receive direct impulse, should be considered around 0.4.
- When it is envisaged such a working situation that cars or heavy machinery operate, any structures are built especially close behind earth retaining work by steel sheet piles, a special consideration should be taken as for active loads.
- When retaining walls are excessively deformed, lateral pressure may significantly increase, backfilling soil and landfilling soil may be consolidated during construction and the ground

may be deteriorated and weakened during rainy season. When the stratum is layered with cohesive soil and sandy soil and when retaining walls are placed in curved section, special care must be taken such as to install small earth-retaining walls of plane curve radius in every short section.

- Seasonal change in water table, abnormal flooding in pump-up regulated areas, spring tide and neap tide should be paid good attention, in particular confined ground water and piping and boiling caused by change in confined ground water to be thoroughly taken care of.
- One should pay attention to the end of running water during cofferdam construction in order to check the bottom of water and soil property, scouring of rainy and dry season, and accumulation of sediment. A section of scouring of the bottom of river may progress 6 to 10m overnight, which may risk the stability of piping, boiling and cofferdam construction itself. Additionally, cofferdam construction at sea and island construction etc. should require similar attention.
- In principle, materials used for temporary works should be free of damage, easily available, and relatively high in frequency of use.

The degree of stability and safety factors of temporary works should not be necessarily given lower value than the case for permanent structure merely because they are impermanent. The reasons are as follows;

- For the estimation of load of temporary structure at the design stage, generally, allowance value is not considered.
- In many cases, site operation is carried out even in the overloaded situation
- Compared to permanent work, accuracy of preparatory survey and construction, level of material management are apt to be inferior.
- Due to repeated use, materials of temporary work are easy to be damaged, transformed and eroded.
- Basically, imposed load on the structure is uncertain and unexpected stress might be applied.
- Appropriate design standards or guidelines are not necessarily prepared.

etc.

For abovementioned reasons, depending on the importance of temporary work, imposed load conditions and period of installation on them and surrounding traffic conditions etc., it has to be seriously considered applying more high degree of stability and safety factors.

- Even for temporary work, it is absolutely necessary to collateralize at least more than medium value between the stability ratio on permanent structure and stability ratio 1.0 at the destruction state on temporary structure. As a rough indication, it should ensure more than two thirds of difference on the stability value of permanent and temporary structures. On top of that, it has to be paid much attention not to hinder functions of materials with observing volume of displacement, removal, rotation and distortion of temporary structure and not to cause collapse of the structures.
- In general, for the pile driving method on the work for permanent structure, more than 3.0 is adopted as the safety factor to the ultimate bearing capacity. On the other hand, 2.0 is adopted approximately for pile driving work on the temporary structures. However, it is necessary to recognize the pile bearing mechanisms for skin friction type and end bearing type are completely different. After reaching yielding load, piles for skin friction type easily lose their bearing capacity to sink rapidly and sometimes run into the situation on continual destruction. It is proposed that the safety factor for piling works on

permanent structures is to be given 3.0 - 4.0 at least, and more than 2.5 - 3.0 for temporary piling work by skin friction type. It should be strictly reminded that adoption of skin friction type piling method requires a deliberate consideration.

- Same as the above, safety factor 3.0 - 4.0 is to be given as an allowable bearing capacity for pile drawing work method and more than 2.5 - 3.0 for temporary piles drawing work method should be considered. Also, it is desirable that deliberate considerations are required to introduce pile drawing method.
- Depending on the construction conditions, it also requires deliberate considerations and handling concern for adopting pre-stressed anchor method that has same bearing mechanism as piles. Sometimes it requires drawing inspections targeting all anchors to check its effect.
- As for operations on driving piles, it is extremely dangerous if seam or sparse layers consists of sand and/or gravel could be easily-distinguished as the bearing layers. Also, it is necessary for paying full attention to continuity of geological stratum and inclination.
- In the case the ground condition is too soft or the length of above-ground pile potion is quite long, for example; temporary jetty work, it is important to check that volume of horizontal displacement, distortion, rotation are within the allowable range or not, and that it is free from the possibility of collapse of structures through considerations on horizontal load of piling work. Also it is necessary to check excessive surface displacement cannot be identified.
- Allowable bearing capacity of temporary piles is being applied safety factor 2.0 in general compared to more than 3.0 for safety factor on tension and compression for axial direction and on bending tensile and compression for piles as permanent structures. It is also important to consider avoiding buckling, shearing, bearing capacity and construction conditions whenever axial compression is focused.
- In the case the bolt connection work or welding operations at site, it is necessary to be recognized that the volume of gap, degree of displacement, differential of piling edges depending on the method of welding etc. before and after piling work should be fully checked.

[Proposal]

① Regardless of whether it is Grand Aid or ODA-Loan, and the scale of the project, it is necessary to give full consideration on the application of temporary work as designated or arbitrary which may cause accidents with third-parties or secondary disasters.

② The design duty of the designated temporary work should be contracted to the “technology Consultant specialized in planning and design of temporary works (temporary title)” (equivalent in qualification to the design and construction management Consultant) to whom the service is ordered separately by JICA/counterpart government/Employer. (The prerequisite is the presence of such specialized Consultant.)

③ If such specialized Consultant does not exist, above planning and design may have to be included in the scope of work of the Contractor.

④ If the temporary work designated in individual projects is to be converted to the arbitrary work as described in ③ above, the planning and design costs for such temporary work should be handled under the provisional sum items respectively, with its stipulation in the written directive for estimation and the particular specification, so as to ensure the safety.

5.4.3 Review and Recommendations on Estimation of the Safety Measures Cost

For estimation, development of the construction plan integrating the construction method that is the backup to execute the work safety, reliably and economically, the procurement plan and construction schedule is the indispensable prerequisite. On the basis of various external restrictions related to the work, various conditions expected by the recipient country government and by taking into account the procedure, technique, and the machines and temporary structures to be used, overall review must be attempted while dealing the required manpower, materials and equipment, schedule, and processes as one unit .

In order to complete the work as scheduled, the study, design, and estimation stages must involve not only specifications of the functions, structure and dimensions, quality, and workmanship for the target work, but also due consideration of various issues in the construction process. The scope, use, order time, construction method, and contents of project costs for the work govern greatly the construction activities after commencement of the work. The plan must be rational and adequate while judging properly their validity and actuality and paying attention to the safety of the work and stakeholders. When the project includes dispersed multiple (large number of) sites, the construction procedure exerts substantial effects on the estimate contents. Therefore, the construction plan must involve adequate and detailed review and summary of mutual relationship among sites.

For development of the construction plan, the project implementation processes must be coordinated with the work schedule to ensure that there is no mutual contradiction between them.

(1) Grant Aid projects

According to the “Project preparation study, design, and estimation manual, Supplement (civil engineering) (trial), dated March, 2009” defines “estimation” in a series of duty execution of study, design, and estimation as developing the estimation method integrating the construction conditions (time, location, natural conditions, and social conditions), construction quantity, standard work procedure/process appropriate for the study and design results under one uniform concept while establishing cost items of the project cost and calculating the cost.

Specifically, “estimation” is to set the material and equipment necessary for the work, manpower unit price, work rate, various expenses on the basis of the estimated quantity and various estimation standards, and to add up all of these costs.

The composition of the project costs in the manual above is shown in Figure 5.4.1 and Tables 5.4.1 to 5.4.4.

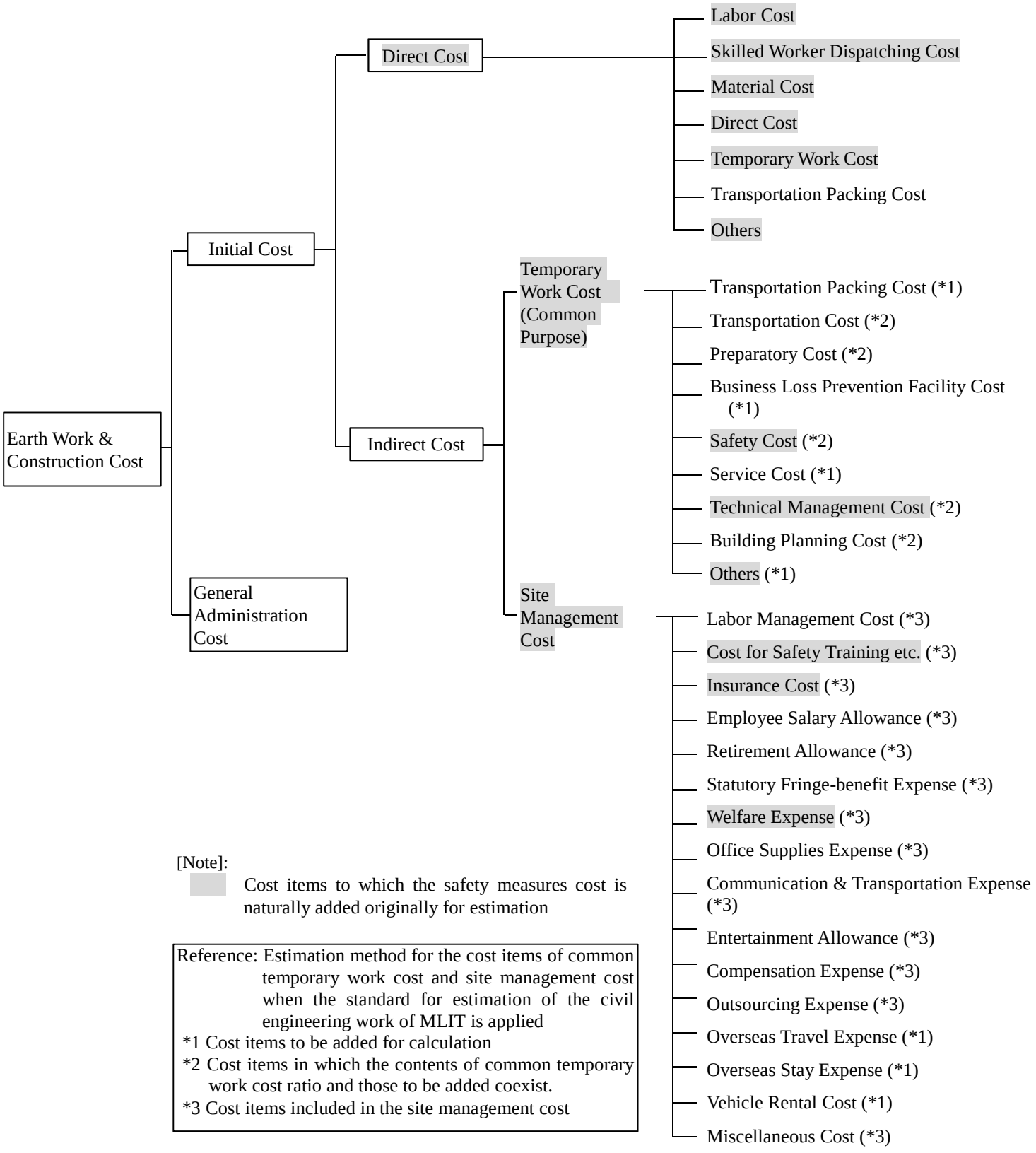

Figure 5.4.1 Composition chart of civil engineering costs in Grant Aid projects

Table 5.4.1 Contents of the direct work cost

(Source: "Project preparation study, design, and estimation manual, Supplement (civil engineering) (trial), dated March, 2009")

Item	Cost item	Description
1. Labor Cost	Labor cost	① Labor cost for construction, removal, etc. of civil engineering structures ② Labor cost for temporary works ③ Labor cost required for machine and equipment operation
2. Skilled Worker Dispatching Cost	Skilled worker dispatching cost	Labor cost for dispatched skilled workers
3. Material Cost	(1) Direct material cost	Material cost (including those purchased as products) directly necessary for construction of the civil engineering structures and the purchase charges
	(2) Consumables cost	Oil/grease and other consumables costs
4. Direct Cost	(1) License fees	License fees for patents and know-how used as specified in the contract documents, and the cost required for dispatched engineers
	(2) Cost of utilities	Utility rate of water supply, fuel and light, electric power, excluding the base cost
	(3) Machine expenses	Equipment rental cost, rental rate, and operation expenses
5. Temporary Work Cost	Temporary work cost	Cost for the temporary work, temporary equipment, temporary machine, electric power and water supply equipment, protective equipment, temporary fencing, etc. necessary for execution of the work
6. Transportation Packing Cost	Transport (material and equipment) packing cost	Costs for transport and packing of materials (materials, equipment) from the place of procurement (Japan, the third country, and site) to the site
7. Others	Others	① Cost for provision and pasting of the nameplate, sticker (logo mark, etc.) ② Other expenses not included in 1. to 6. above

(Note) A part (labor cost, material cost, and direct expenses) of items presented under the direct work cost are those summarized under the direct work cost for the convenience of compilation of the manual. But, they are elements (to be accumulated) that form each component cost item in an overall manner, in the stage of work costs, regardless of the direct work cost or common temporary facilities.

Table 5.4.2 Contents of common temporary work costs

(" Project preparation study, design, and estimation manual, Supplement (civil engineering) (trial), dated March, 2009")

Cost item	Description
1. Transportation Packing Cost	① Cost for transport and packing of construction machine, temporary materials and equipment as procured in Japan and the third country to the site, and the cost associated with disassembly and assembly of the construction machine
2. Transportation Cost	① Cost for transport of the construction machine, temporary materials and equipment as procured in the site (including the land-tied neighboring third-party country) ② Cost for transport of equipment within the site
3. Preparatory Cost	① Cost required for preparation and clearing ② Cost for study, survey, and batter board, etc. ③ Cost for clearing and grubbing, land preparation, and weeding
4. Business Loss Prevention Facility Cost	① Costs for installation, removal and maintenance of temporary facilities for prevention of operation loss due to noise, ground settlement, shut-off of groundwater, etc.
5. Safety Cost	① Cost for traffic control ② Cost for safety facilities ③ Cost for safety management ④ Costs required for safety measures for work execution, in addition to those listed under ① to ③
6. Service Cost	① Cost required for land leasing ② Base cost and charges for electric power, industrial waters
7. Technical Management Cost	① Cost for test, etc. for quality control ② Cost for survey for workmanship control ③ Cost for preparation of data for schedule control ④ Cost for preparation of data necessary for technology control, in addition to those listed under ① to ③
8. Building Planning Cost	① Costs for repair and utilities of the management office of Consultant, site office, and test room ② Costs for repair and utilities of accommodations for workers ③ Costs for repair and utilities for warehouse and material storage yard ④ Costs for transport of workers ⑤ Costs for leasing of the site related to the cost of repair and utilities
9. Others	① Costs of fabrication, installation, and removal of factory information board ② Other costs not included in 1. to 8.

Table 5.4.3 Contents of the site management costs

(Source: "Project preparation study, design, and estimation manual, Supplement (civil engineering) (trial), dated March, 2009")

Cost item	Description
1. Labor Management Cost	Costs related to site workers: (1) Costs for recruiting and dismissal (including the travel expenses to the site of assignment, compensation for dismissal) (2) Costs for relaxation, entertainment, and welfare (3) Costs for work tools and clothes not included in the direct work costs and common temporary work costs (4) Costs for meal, commuting, etc. other than the wages (5) Costs to be born by the Employer in case of accident, other than the benefits according to the workers accident compensation insurance law, etc.
2. Cost for Safety Training etc.	Costs for safety and health of site workers and the costs for education and training
3. Insurance Cost	Insurance costs for the automobile insurance (excluding the costs counted for the loss of machines and equipment), Contractor's all risks insurance, assembly insurance, workers accident insurance not stipulated in the law, fire insurance, and other accident insurances
4. Employee Salary Allowance	Wages, various allowances (danger allowances, commutation allowance, explosives allowance, etc.) and bonus for field employees, excluding the compensation for executives of dispatching company, which are accounted for in the head office and branch office, and the wages of field employees (facilitator, etc.) included in the net work cost
5. Retirement Allowance	Retirement allowance and the provision for retirement allowance for field employees
6. Statutory Fringe-benefit Expense	Legal costs to be borne by the Employer, including the workers accident insurance, employment insurance, health insurance, and welfare pension for site employees and site workers, as well as the amount born by the Employer on the basis of the mutual aid system for retirement allowance of the construction industry
7. Welfare Expense	Costs for relaxation and entertainment, rented clothes, medical care, welfare (congratulatory or condolence payment), and cultural activities for site employees
8. Office Supplies Expense	Purchase costs for official supplied, newspaper, reference documents
9. Communication & Transportation Expense	Cost for communication, transport, and traveling
10. Entertainment Allowance	Costs for dealing with visitors to the site
11. Compensation Expense	Compensation for damage to the properties normally expected in the course of execution of the work, and compensation for operation loss due to noise, vibration, turbid water, traffic, etc, except for the contingency huge amount of compensation
12. Outsourcing Expense	Expenses necessary when outsourcing the work to the specialized Contractors
13. Overseas Travel Expense	Costs for the resident Japanese site employees or for traveling of skilled workers from Japan or the third country
14. Overseas Stay Expense	Expenses required for the resident Japanese site employees or the overseas stay of skilled workers from Japan or the third-country
15. Vehicle Rental Cost	Expenses required to rent management vehicle, such as the vehicle rental cost, purchase loss, fuels, etc.
16. Miscellaneous Cost	Costs not included in 1. to 15.

To secure the safety in the work stage, the safety measures costs to eliminate obstruction in terms of costs are counted under two items; the “safety cost” of common temporary work cost and “cost for safety training, etc.” in the site management cost.

(i) “Safety cost” = Direct work cost × (ratio) + addition

(ii) “Costs for safety training, etc.” = (Direct work cost + common temporary work costs) × (ratio) + addition

It is naturally imperative that the obligations of counterpart government/Employer in terms of securing safety at construction sites are stipulated in E/N or G/A, and that its effectiveness is certainly assured. If it is observed the breach of it during the implementing stage, redesign of the system to ensure rapid implementation and establishment the structure for securing compensation on it are necessary.

However, the safety measures costs are to be counted under both cost items of (i) and (ii), the safety measures costs must not be counted as cost items for the “safety cost” of common temporary costs and the field management costs only. The safety management must be highlighted more. In the actual estimation, the construction plan and construction schedule focusing and considering the safety for each work type and work items must be established within the stage of calculating the direct work costs. Namely, the safety measures cost must have been estimated as the composition costs including the safety of work types and items. Adequate and specific safety costs should be counted from above perspective and preferably be determined, as a rule, through addition.

On the other hand, it is necessary to attempt planning and designing not much deviated from the assumption in the estimation stage. For example, though the plan and design has been made while assuming the road block, such block may be actually impossible (or vice versa). Thorough preliminary confirmation of site conditions is essential to avoid such undesirable situation.

The safety measures cost handled as the additional item should preferably be specified clearly in the particular specifications as required.

For example;

(i) Costs for barricade, fall prevention fence, lighting, work signals, etc.

(ii) Costs for prevention of accident during high-voltage operation

(iii) Costs for traffic control by the traffic and machine conductors

(iv) Costs for traffic control staff arrange at the entrance to the site in the vicinity of railways and airports

(v) Other costs to be added depending on the security staff, site conditions

For supplements in Table 5.5.2, the estimation method for “5. Safety costs” is illustrated as follows.

In the “Preparatory Survey, Design and Estimation Manual Supplementary Version (Civil Engineering) - (Trial Version): JICA, March 2009”, method of estimation of 5. Safety cost is exemplified in Table 5.5.4. as the supplementary remarks for Table 5.5.2 Contents of common temporary work costs.

Table 5.4.4 Safety costs estimation method

(Source: “Project preparation study, design, and estimation manual, Supplement (civil engineering) (trial), dated March, 2009”)

Cost item	Estimation method
5. Safety costs	Supplement: Estimation of the common temporary work costs 1. Costs for traffic control 2. Costs for safety facilities 3. Costs for safety management 4. Costs necessary for safety measures during work execution, in addition to those listed under 1 to 3 Contents of the common temporary work costs：Items below among 1, 2, 3; ① Costs required for monitoring or information for safety management within the site as a whole ② Costs of safety staff during non-working days ③ Costs for installation, removal, and repair of safety facilities (sign boards, signals, safety light, protective fence, barricade, lighting) and costs during use period ④ Costs for lighting during nighttime work ⑤ Costs for life boat in rivers and costal works ⑥ Costs required for prevention of oxygen deficiency disease ⑦ Costs for preventions during fine dust works ⑧ Costs for fire-preventive safety measures in long tunnels, etc. ⑨ Costs for safety appliances ⑩ Costs for the safety committee, etc. Contents to be added; ① Costs for traffic control by traffic and machine conductors ② Costs for traffic control staff arrange at the entrance to the site in the vicinity of railways and airports ③ Costs for decoration of barricade, fall prevention fence, lighting, work signals, etc. ④ Costs for prevention during high-pressure operation ⑤ Costs to be added depending on the security staff and other site conditions

(2) ODA-Loan projects

The ODA-Loan projects are generally large in the work scale and long in the work period. Concerning this ODA-Loan projects, there is no specified design and estimation manual. In general, matters to be taken into estimation, addition policy, or applicable estimation conditions (if any) should be presented in a form of preamble and estimation conditions are presented in the particular specifications.

The composition chart of construction costs for the ODA-Loan project of a certain country, “WEST BANK BYPASS CONSTRUCTION PROJECT (PACKAGE I)”, is show below.

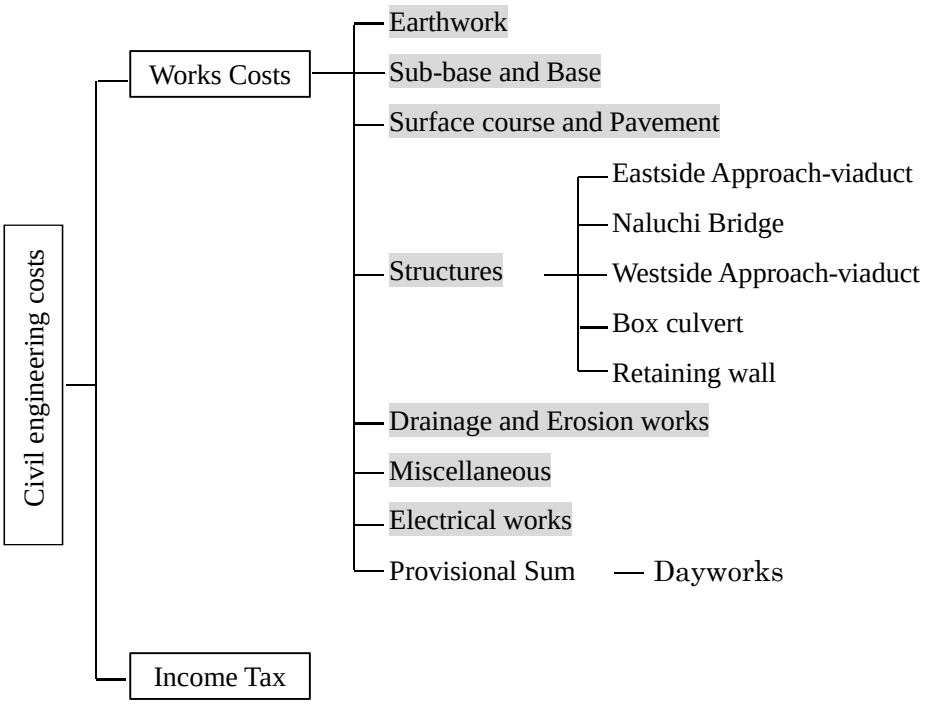

Figure 5.4.2 Typical composition of civil engineering costs in the ODA-Loan project

The breakdown of construction costs of this example shows that the costs consist of the costs by work type and the provision sum items. The income tax is laid on as equal rank with Work Costs. Needless to say, the safety measures costs are included in the cost items by work type.

Setting the Provisional Sum items allows, for example, various measures in terms of costs, including the new safety measures cost when any unexpected costs become necessary due to change in the surrounding environment and construction conditions. Note that the expected safety measures costs are taken into account in the study, design, and estimation stages and clearly specified in the particular specifications.

[Proposal]

① Regardless of Grant Aid or ODA-Loan, all of safety measures costs included in each construction item are integrated and items for the cost of safety measures are to be listed up. Namely, the cost is divided into the “Cost for Safety Measures” and “Cost Excluding the Safety Measures.”

② It is recommended to establish a new evaluation system that “Cost for Safety Measures” and “Cost Excluding the Safety Measures” are to be respectively checked at the bidding stage, or both costs are weighted as necessary and finally added to evaluate as the bidding totals of each bidder. Particularly, the system in which “Cost for Safety Measures” and “Cost Excluding the Safety Measures” are evaluated separately may need to be taken into further considerations as shown below.

③ Needless to say, the prerequisite for above examination and evaluation is based on the thorough understanding of both costs in the present state and to take sufficient time to conduct discussions and reviews how both costs are to be weighted as well as how the new evaluation system is to be formulated.

④ The examination and review system of the bidding amount should be started at an early stage and it should be renewed on the basis of collected required data such as actual status of cost for safety measures, productivity, construction cost and period.

⑤ It should be considered to handle the safety measures costs newly required due to change in the surrounding environment and construction conditions under Provisional Sum.

(Reference)

Regarding the cooperation evaluation system in France, the United Kingdom and the United States, management evaluation including financial information and technical evaluation including records of past construction are dealt separately, unlike the Japanese evaluation system in which the two evaluation results are combined and put in one number. For the bidding of public construction projects to be appropriately proceeded, each element needs to be evaluated separately.

5.5 Others

5.5.1 Training Activities in the Developing Countries

During the field study on this project research, hearing with the ordering organizations of various countries revealed many requests for planning and implementation of the training activities by JICA when the "Safety Management Guidelines" is to be developed. Though developing countries are interested in improvement of the safety management during construction work, they have neither know-how to secure the safety on the site, nor knowledge of necessary materials and equipment in many cases. Accordingly, planning and implementation of, for example, training activities directed to the ordering organization of ODA project, principal local Contractor and Consultant representatives while using the "Safety Management Guidelines" as the training text, along with the seminar and workshop, will prove effective.

5.5.2 Review concerning Cultivation of the Safety Consultant, etc.

As regards the personnel resources who can play the role of Safety Consultant, there are extremely few Consultants who can undertake the safety management on the site while working full-time within the country, as described in 5.2.2, due to the conventional public works implementation system. Accordingly, in parallel with the Safety Consultant arrangement in the ODA project, it is necessary to review the plan and set to the activity of cultivating the personnel resources capable of undertaking the safety management on the site.

From the long to medium term perspective, it would be essential to establish the mechanism of holding the training activities regularly while inviting specialists from America and Europe, of issuing the certain certificate to those who have completed the course, and to provide advantage to the holder of certificate when participating the project as the Safety Consultant. For training, it is not enough just to sit before the desk for studying. It is important to provide the on-site training on the site of construction work for a certain period of time. Details must be considered in the future.

On the other hand, when the Japanese Consultant is to be appointed to be the Safety Consultant, it is necessary to take into account where the responsibility lies in case of accident or incident. In this case, it must be the prerequisite that suppressing accidents or incidents to the zero level is impossible even when the Safety Consultant is appointed. When the damage caused by accidents occurring in the site extends to the Safety Consultant, it must be said that the Japanese Consultants generally have smaller management vitality in terms of the capability of bearing the obligation as compared to those of America and Europe. The countermeasures must be considered while considering that the corporation may be reluctant to participate as Safety Consultant in the project.