

**Study Report on Safety Management  
of  
On-going Japanese ODA Loan Project  
in Vietnam and Sri Lanka**

**May 2013**

**Japan International Cooperation Agency (JICA)**

**IPM Services co., Ltd.**

**Katahira & Engineers International**

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## Chapter 1 Outline of the study

### 1.1 Background and objective of the study

This study is initiated based on the recommendation made by the committee deployed by Ministry of Foreign Affairs, Japan, in order to discuss the measures to prevent re-occurrence of the similar accident as that of Can Tho Bridge in Vietnam in September 2007.

As recommended by the committee, JICA has carried out interim reviews in respect of on-going five projects since 2008. Of the five projects, two were in Vietnam, three were in Turkey, Uzbekistan and Philippines respectively.

The main objectives of this study can be summarized as follows.

- (1) To conduct a survey of up-to-date information on occupational health and safety laws and regulations of Vietnam and Sri Lanka respectively, and a review for safety management on the following ODA loan projects.
  - Noi Bai International Airport Terminal 2 Construction Project in Vietnam
  - Upper Kotmale Hydropower project Lot-2 in Sri Lanka
- (2) To encourage stakeholders to make greater efforts towards the reduction and prevention of occupational accidents and public accidents by feeding back the findings to stakeholders.
- (3) To make recommendations for improvement, if any, and check the status of implementation of safety management and compliance of laws and regulations through visiting the project sites.

### 1.2 Study team members

- (1) Team leader/ Safety specialist  
Seiichi Sato (IPM Services co., Ltd )
- (2) Civil and building work safety specialist  
Akira Iwashita (KATAHIRA & ENGINEERS INTERNATIONAL)

### 1.3 Activity record in Vietnam and Sri Lanka

From January 9<sup>th</sup> through January 24<sup>th</sup>, 2013

Date		Activities
9	Wed	Departure Narita/Tokyo 18:00 (JL751) - Arrival Hanoi 22:25
10	Thu	10:30-12:00 Hearing (JAC) 13:00-14:00 Hearing (TV JV) 14:00-15:00 Site Visit 15:00-16:00 Hearing (TV JV)
11	Fri	09:30-13:50 Documents Review & Hearing (TV JV) 13:50-14:20 Hearing (VNX) 14:40-15:15 Hearing (ACV PMUT2) 15:25-16:30 Documents Review & Hearing (TV JV)
12	Sat	09:30-10:40 Documents Review 10:40-11:30 Hearing (TV JV) 11:30-12:30/14:30-15:00 Documents Review / 13:30-14:30 Site Visit
13	Sun	08:00-17:00 Documents Review, Preparation for Interim Report
14	Mon	08:00-09:00 Hearing (Kumagai Gumi Vietnam Office) 09:20-10:15 Hearing (JICA Expert) 11:00-12:20 Meeting with JICA Vietnam Office 13:00-13:20 Documents Review 13:30-14:15 Hearing (JICA Project Leader) 14:15-16:30 Documents Review
15	Tue	09:00-09:30 Meeting with ACV PMUT2 10:00-10:50 Meeting with TV JV 13:30-14:15 Meeting with JAC 16:20-17:30 Meeting with JICA Vietnam Office
16	Wed	Am Data Compilation Departure Hanoi 13:10 (MH753) – Arrival Colombo 00:45
17	Thu	09:00-09:45 Meeting with JICA Sri Lanka Office 10:20-11:20 Hearing (CEB) 11:20-15:40 Travelling to Kandy
18	Fri	09:20-09:40 Hearing (MN JV) 09:55-10:10 Meeting with CEB, J Power & MN JV 10:15-10:50 Hearing (MN JV) 10:50-13:00 Site Visit 14:10-16:55 Hearing ((MN JV)
19	Sat	08:40-09:30 Hearing (MN JV) 09:30-11:40 Documents Review & Hearing (MN JV)

Date		Activities
		13:20-18:30 Data Compilation、 Preparation for Report
20	Sun	08:00-17:00 Data Compilation、 Preparation for Report
21	Mon	09:10-09:30 Documents Review & Hearing (MN JV) 09:30-11:30 Site Visit & Meeting with MN JV 14:00-14:45 Hearing & Meeting with J Power
22	Tue	07:00-11:00 Travelling to Colombo 11:40-12:10 Meeting with CEB 13:20-14:10 Hearing (Maeda Corporation Colombo Office) 16:30-17:10 Meeting with JICA Colombo Office
23	Wed	08:00-09:30 Data Compilation 09:30-10:00 Hearing (Kumagai Gumi Colombo Office) 10:30-11:35 Hearing (MAGA) 12:00-12:30 Hearing (Kumagai Gumi Colombo Office) 13:00-18:00 Data Compilation
24	Thu	Departure Colombo 00:45 (JL7922) – Arrival Narita 16:05

#### 1.4 List of interviewees and meetings

##### < Project Stakeholders in Vietnam >

##### (1) Japan International Cooperation Agency Vietnam Office (JICA )

Toshio NAGASE (Senior Representative)

Shiro ODA (Representative)

KOGA, Hiroshi (Project Leader, The Project for Support on Establishment of the Program for Operation & Maintenance in Noi Bai International Airport)

SADAFUMI INOUE (EXPERT ON CONSTRUCTION MANAGEMENT)

##### (2) AIRPORTS CORPORATION OF VIETNAM (ACV)

NGUYEN LE DONG (Deputy Director of PMU T2 Noi Bai)

DAM THU THUY (Deputy Manager of Planning & Administrative Department, PMU T2)

##### (3) Japan Airport Consultants, Inc.(JAC)

Kenji Kabutoya (Project Manager)

Norio Kanzaki (Chief Architect)

Nobuyuki KURIHARA (Viaduct structural Engineer)

##### (4) TAISEI-VINACONEX JV (TV JV)

YOSHIAKI TAKIMOTO (Project Manager)

TOSHIHIKO MAKIUCHI (Co-Project Manager)

Shunji Furuya (Chief Construction Manager)

HIDEYASU MATSUMIYA (QA/QC Manager)

EVADAS A.J (EHS Manager)  
ARNOLD BALAIROS (Environment Manager)  
BIJU VERGHESE (EHS Coordinator)

(5) VIETNAM CONSTRUCTION AND IMPORT-EXPORT JOINT STOCK CORPORATION

Ngo The Hung (Safety Manager)  
Nguyen Ngoc Long (Deputy Director Department of Construction)  
Phung Duc Quang (Permanent PPE Manager)  
Dinh Nguen Thu Trang (Vice Manager, Foreign Affairs & Division Department of Legal  
& Foreign Affairs)

< Non-related party in Vietnam >

(6) KUMAGAI GUMI Vietnam Representative Office

YUJI MASUBUCHI (Project Manager)/ NGUYEN MANH TUAN(D. General Manager)

< Project Stakeholders in Sri Lanka >

(7) Japan International Cooperation Agency Sri Lanka Office (JICA )

Hiroyuki ABE (Senior Representative)  
Masatoshi KAIMASU (Project Formulation Advisor)

(8) CEYLON ELECTRICITY BOARD (CEB)

SHAVINDRANATH FERNANDO (ADDITIONAL GERERAL MANAGER)  
Thambirajah Selvajane (Project Manager)  
NIROSHAN S.M. EKANAYAKE (Electrical Engineer)

(9) Electric Power Development Co., Ltd (JP)

Shigeru Uchida (The Engineer's Representative)  
Masafumi Iori (Deputy Project Manager)

(10) Maeda Nishimatsu Joint Venture(NT JV)

Naohiro Maeda (General Manager of Maeda Corporation Colombo Office)  
Tadano Tanaka (Project Director)  
Takahashi Yumikage (Project Manager)  
Yoshimitsu Nakajima (Deputy Project Manager)  
Go Furusawa (Section Manager)

< Non-related party in Sri Lanka >

(11) KUMAGAI GUMI CO., LTD SRI LANKA OFFICE

Minoru TSUTSUI (Deputy General Manager)/ Upari Koswatta (Contracts Manager)

(12) MAGA

Piyadasa Madarasinghe (Chief Executive Director)/Raj Wettasinghe, Manager (QA)

## Chapter 2 Occupational safety in Vietnam

### 2.1 Occupational injury and fatality

In Vietnam, the reported incidences of occupational injuries and fatalities show an increasing trend in recent years as shown in “Labour and Social Trends in Viet Nam 2009/10” -see Table 2.1.(note<sup>1</sup>)

Table 2-1 Occupational injuries and fatalities in Vietnam, 2005-2009

	2005	2006	2007	2008	2009
Number of cases	4,052	5,881	5,951	5,836	6,250
Number of injured workers	4,164	6,088	6,337	6,047	6,421
Number of fatal accidents	443	505	505	508	507
Number of fatalities	473	536	621	573	550

Labour and Social Trends in Viet Nam 2009/10

In 5 years, from 2005-2009 the number of accidents show an increasing trend. The construction industry, mining and chemical industry of Vietnam, they are collectively called “high-risk industries in Vietnam”, have the highest rate of occupational accidents. Since the number of accidents in construction worker has accounted for 36% of the total number of accidents, the construction industry of Vietnam should be regarded as one of the most hazardous industries in Vietnam.

According to the report announced by Ministry of Labour, Invalids and Social Affairs (MOLISA), in 2011, nearly 6,000 labour accidents occurred around the country causing 6,154 casualties, including 574 dead. Last September, MOLISA reported that there has been a 9-percent increase in the number of workplace fatality throughout the country for the first six months of year 2012, while the total number of workplace accidents had decreased by 13 percent to 3,060 during the same period.

MOLISA has stated in its report that the leading causes of workplace accidents are as follows.

- Workers’ lack of respect towards work safety regulations
- Employers’ failure to conduct safety training sufficiently for their workers
- Employers’ failure to equip the workers with proper safety equipment

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<sup>1</sup> This report was developed by the Institute of Labour Science and Social Affairs with the technical support from the International Labour Organization (ILO).

In addition to the causes of accidents mentioned above, the followings might be other possible causes of the workplace accidents.

- almost all those who are working in the construction industry of Vietnam have a lack of understanding toward occupational safety legislation
- they also have not sufficient knowledge to safety practices in construction sites

In order to lower the risk of the accident in the construction sites of Vietnam, it should be one of the most important subjects to make all those who are working in the construction industry and all those who are engaged in construction sites familiar with safety practices and the safety legislation of Vietnam.

In 2011, according to the report published by The Japan Construction Occupational Safety and Health Association, the number of casualties in the workplaces amounted to 105,718 while only 6154 casualties were reported in Vietnam. It, however, might be too early to conclude that the workplaces in Vietnam are far safer than those of its Japanese counterpart, just looking at the number of casualties in Vietnam and Japan. Because it is generally said that the safety statistics in Vietnam is not reliable and there are many evidence supporting this opinion as mentioned below.

- Seemingly, just about 5% of the total accidents in construction sites have been officially reported-----commented by JICA Expert at the review meeting
- That statistics of workplace accidents were only relatively correct as enterprises did not want to report these cases, but that figures of fatal accidents could be trusted-----MOLISA's deputy chief inspector told to the Voice of Viet Nam newspaper in September 2012
- Many workplace accidents often go unreported due to weak monitoring systems----- Labour and Social Trends in Viet Nam 2009/10
- Hanoi saw many workplace accidents while no workplace accidents were reported, for instance, by the Mekong Delta's Tra Vinh Province.----- MOLISA web site

Without knowing the actual number and cause of accidents at workplaces, it is not possible to work out adequate preventive measures for safety and implement it effectively at workplaces.



## 2.2 Occupational Safety and Health administrative organization

State administrative organization of OSH in Vietnam is illustrated in figure 2-1

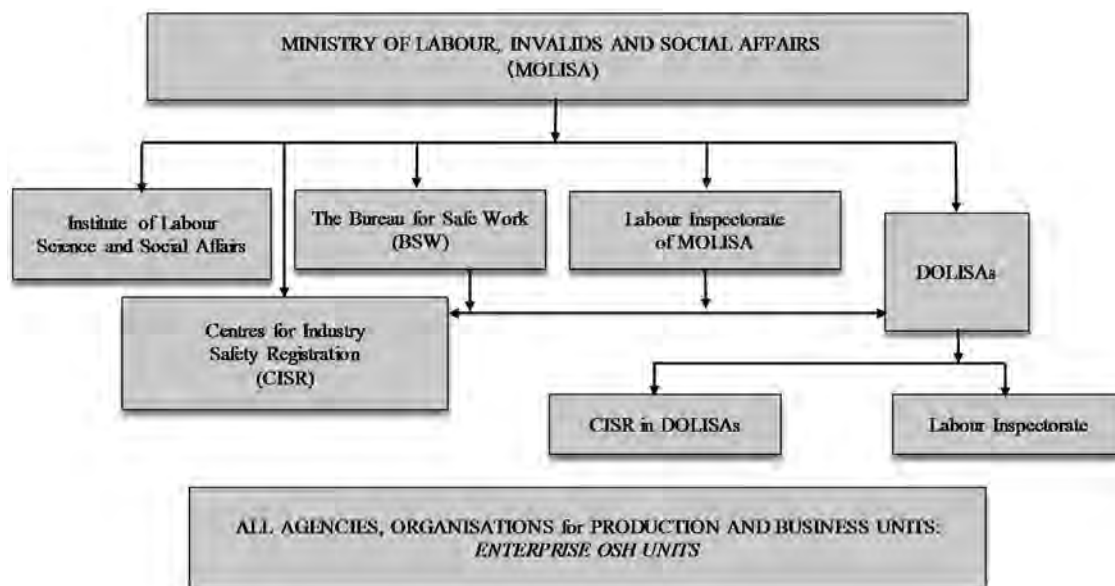


Figure 2-1 OCCUPATIONAL SAFETY AND HEALTH IN VIETNAM, by BSW

MOLISA has the responsibilities of performing the duties and authorities pre-described by the Government's Decree.

## 2.3 Occupational Safety and Health legislation

The main legislative framework related to OSH in Vietnam, is the Chapter IX “Occupation Safety and Health” of the Labour Code and Article 78 “Safety during execution of building works” of the Law on Construction. In addition to that, there are lots of degrees, circulars and standards issued by relevant authorities to supplement it. (note<sup>2</sup>)

Chapter I General Provision of the Labour Code stipulates that “This Labour Code shall regulate the employment relationship between the wage earning worker and the employer, and the social relationships directly connected to this employment relationship”. The Chapter IX of the Labour Code consists of 14 sections, from Section 95 through Section 108, while Article 78 of the Law on Construction consists of only three articles. However, with regard to “protection means to the workers”, for instance, the Section 95 describes briefly as “The employer shall be responsible for providing adequate means of protection to the workers, ensuring occupational

<sup>2</sup> Article 8 of the Law on Construction stipulates that “The Vietnam Fatherland Front ~be responsible for disseminating the laws on construction amongst the citizens and for encouraging the citizens to implement and to supervise implementation of the laws on construction.”

safety and health”. On the other hand, there are 25 degrees, circulars and standards issued by relevant authorities to supplement the Section95. Therefore in order to get the whole picture of the safety legislations of Vietnam, it is indispensable to develop an understanding of such the degrees, circulars and standards in addition to the Labour Code. In this regard, a leaflet “SAFETY AND HEALTH MANUAL IN CONSTRUCTION”, which has been published by MONISTRY OF CONSTRUCTION with the technical support from JICA, describes in greater detail and it should be a very useful educational material to understand the safety legislation of Vietnam.

In the leaflet, safety obligations of respective parties, namely the Employer, PMU, the Consultant and the Contractor are described in details. The safety obligations of the Contractor who plays the most important role to prevent accidents in workplaces are described as in the Table 2-2.

Table 2-2 Safety obligations of the Contractor

Item	Points	Reference law
Make and approve a design of construction measures/statement	Make and approve a design of construction measures, indicating safety measures / statement for workers, machines, equipment and the work.	Circular22/2010/TT-BXD, Chapter III, Article 6, Clause 1
Select and arrange technical workers at the construction site	Select and arrange technical workers at the construction site according to their professional qualifications, capacity. Furnish sufficient personal safety equipment for workers.	Circular22/2010/TT-BXD, Chapter III, Article 6, Clause 2
Establish a safety committee	A committee shall be established and members of committee are nominated. It shall be opened periodically.	Circular22/2010/TT-BXD, Chapter III, Article 6, Clause 3
Organizes periodical safety meeting	A safety meeting among a client, consultant, contractor and sub-contractor (if any) shall be organized at regular interval.	
Organize a daily site inspection	A daily site inspection shall be conducted by a contractor at least once a day	
Safety induction to new employees	Provided safety training for safety work personnel and workers under their management under regulations.	Circular22/2010/TT-BXD, Chapter III, Article 6, Clause 4
Unification of signals for warning/evacuation,	Signal for warning, evacuation and crane shall be unified at the site and shall be notified to all persons concerned with site	Standard TCVN5053:1990

Item	Points	Reference law
crane	works.	
Prepare signboard and safety regulations	Examine the observance of labor safety rules according to approved measures and the compliance with relevant technical regulations and standards. Prepare and install signboard to notice people the work area.	Circular22/2010 /TT-BXD, Chapter III, Article 6, Clause 5, Law on Construction, Article 74
Accident record	Assume the prime responsibility for, and coordinate with investors in, overcoming consequences, declaring, investigating, and making records on incidents or labour accidents at the construction site.	Joint Circular 12/2012/TTLT-BLDTBXH – BYT – TLDLVDN
Construction machine	To inspect, register (if any) and maintain construction machines and equipment in order to ensure safety for workers and works under regulations	Circular22/2010/TT-BXD, Chapter III, Article 6, Clause7

Director of Project Management Unit (PMU) mentions in the “FOREWORD” of the leaflet as follows;

“This Manual is very useful for prevention of potential accidents and injuries on construction site. This Manual is expected to be popularly disseminated to minimize labor accidents in Vietnam, especially in construction.”

And the leaflet (both English and Vietnamese Versions are available) is being used in various safety work-shops and safety seminars as an effective material of enhancing safety awareness in Vietnam.

## Chapter 3 Site inspection and review in Vietnam

### – Noi Bai International Airport Terminal 2 Construction Project

#### 3.1 Project outline

(1) Project Name : Noi Bai International Airport Terminal 2 Construction Project

(2) L/A : Date of L/A March 18, 2010  
Amount of L/A 12,607 Million Yen  
Condition STEP

(3) Project aim : The Project aims to construct a Terminal 2 which is capable to accommodate 10 million international passengers per annum in Noi Bai International Airport in order to meet increasing demand in quality and quantity, thereby contributing to economic and social development of Hanoi and all Vietnam.



(4) Location : Socialist Republic of Vietnam Hanoi City  
Noi Bai International Airport Project Site  
(Site Area 550,000m<sup>2</sup>)

(5) Employer : Airports Corporation of Vietnam(ACV)

(6) Engineer : Japan Airport Consultants, Inc.(JAC)

(7) Contractor : TAISEI-VINACONEX JV(TV JV), Integrated joint venture

(8) Subcontractors : There are 8 subcontractors undertaking different construction activities of the project site, including VINACONEV, who is a joint-venture member and also acting as a subcontractor.

(9) Type of Contract : Civil & Architectural Works BQ Measurement Contract  
Airport special facility D&B (Lump Sum) Contract  
Utilities EPC (Lump Sum) Contract



### 3.2 Stakeholders' safety obligations

Stakeholders of Noi Bai International Airport Terminal 2 Construction Project are as follows.

- Employer : Airports Corporation of Vietnam (ACV)
- Bank : Japan International Cooperation Agency (JICA)
- Engineer : Japanese Airport Consultants, Inc (JAC)
- Contractor : Taisei-Vinaconex Joint Venture (TV JV)

Each stakeholder's obligations or responsibilities in respect of the safety are stipulated in the Conditions of Contract for CONSTRUCTION (CoC) as follows.

#### (1) The Employer

The Employer shall be responsible for ensuring that the Employer's personnel and the Employer's other contractors on the Site: ~take actions similar to those which the Contractor is required to take under sub – paragraphs ~ of Sub-Clause 4.8 [Safety Procedures]~ ----CoC Clause 2.3

#### (2) The Bank

The Bank's obligations or responsibilities in respect of the safety are not stipulated in CoC. On the other hand, the Clause 1.15 thereof stipulates that "the Contractor shall permit the Bank ~ to inspect the Site." This Clause is seemed to give the Bank the authority to inspect the Site including safety matters.

#### (3) The Engineer

- (a)~ if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, ~ instruct the Contractor to execute all such work ~ be necessary to abate or reduce the risk----CoC Clause 3.1
- (b)~ the Contractor shall, whenever required by the Engineer submit details of the arrangements and methods which the Contractor proposes to adopt for the execution---CoC Clause 4.1
- (c)~ the Engineer may instruct the Contractor to ~ execute any work which is urgently required for the safety of the works, whether because of an accident, unforeseeable event or otherwise.---CoC Clause 7.6
- (d)~ the Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works.---- CoC Clause 8.8

#### (4) The Contractor

In the CoC, there are many clauses stipulating the Contractor's obligation to ensure the site safety. The major ones are as follows. The Contractor;

- (a)~ shall be responsible for the adequacy stability and safety of all Site operations and of all methods of construction----CoC Clause 4.1
- (b)~ shall comply with all applicable safety regulations and take care for the safety of all persons entitled to be on the Site----CoC Clause4.8
- (c)~ shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to ~ safety ~.
  - ~ shall require his employees to obey all applicable Laws, including those concerning safety at work.
  - CoC Clause 6.4
- (d)~ shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel.
  - ~ shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents
  - ~ shall send, to the Engineer, details of any accident as soon as practicable
  - CoC Clause 6.7

Compared with the Employer and the Engineer, as mentioned above, the Contractor undertakes more extensive and significant responsibilities to ensure a safety working environment at the construction site. And the Project manager assumes the ultimate responsibility for the site safety, while daily activities of safety are being carried out by EHS Manager (Environment Health and Safety Manager) appointed by the Project manager.

During the hearing of this review, the Employer (ACV) has replied that “we generally leave the overall safety matters to the Contractor and are satisfied with their performance”, while the Engineer (JAC) has remarked that “we have instructed the Contractor to suspend the works several occasions whenever we deemed it necessary for safety reasons.”

### 3.3 Safety management system

TV JV has prepared a Project Health & Safety Plan (PHSP) in accordance with the Contract and local legal requirements, and then the PHSP has been approved by the Engineer. TV JV has been implementing the safety activity in accordance with this PHSP.

As mentioned in the item 3.2(1), the Employer “shall responsible for ensuring that the Employer’s personnel and the Employer’s other contractors on the Site.” Following this Clause the Employer has regularly attended the safety committee meeting held by the Contractor. ACV’s attitude toward the safety is seemingly very typical among most employers in Asia.

The Engineer (JAC) has been executing the following duties to ensure the safety of the project site in accordance with the Contract.

- to approve the PHSP and method statements, including the risk management, submitted by the Contractor prior to the start of every work-activity
- to review safety matters at a monthly progress meeting and attend safety patrols
- to confirm safety conditions at site and instruct to the Contractor in respect of safety matters

TV JV has remarked that “The Engineer has provided two supervising staff and has carried out their duties to secure the site safety strictly following the Contract.”

#### (1) Project Health & Safety Plan (PHSP)

TV JV expresses its firm intention to eliminate any accident in the PHSP, as follows;

”TVJV recognizes the primary business driver of safeguarding and promoting the health and safety of its employees, contractor’s employees and of all those, including members of the public, who may be affected by our work.~ The minimum Health and Safety standards acceptable to us are those required by relevant local legislation and authoritative guidance.~”

The PHSP consists of the 61-page text with six appendices. Of six appendices, four appendices, namely Appendix 2 (Project Fire Safety Plan), Appendix 3 (A Subcontractor’s Guide to Producing Health and Safety Method Statements), Appendix 5 (Key Health and Safety Standards for Subcontractor’s ‘Working Safety Plan), Appendix 6 (Project Health and Safety Risk Assessment and Control Measures Register) are related to OHS. The PHSP is a comprehensive document with high quality. It regulates obligations of all parties concerned in order to ensure the site safety and to follow relevant safety legislations of Vietnam. All legislative requirements, which all those who are working in the project site should comply with, are listed in the item 7.6 of the PHPS “MANDATORY STANDARDS”

#### (2) Project safety organization

The project management structure of TV JV consists of eight departments with 249 staff as of the end of December 2012. Of 8 departments, EHS (Environment Health and Safety) department with 31 staff including security staff, is responsible for the safety and health related activities of the project. EHS Manager should report directly to the Project Manager. A first aid facility is located on the first floor of the TV JV site office and a doctor is working with some first aid personnel in the facility. The doctor and the first aid facility personnel actively cooperate with EHS and EHS manager in order to provide first-aid treatment for TV JV staff and those who may become injured or ill whilst working on the project.

#### (3) Safety policy and safety target

TV JV’s safety policy and safety target has been prepared based on Health and Safety Policy 2012 announced by Taisei Corporation (HSP 2012). In order to familiarize this safety policy and target to all persons who are working in the project site, it is posted at readily visible locations



within the TV JV project office and site.

(a) Safety Policy

The following three safety policies are listed In the HSP 2012.

- Elimination of accident and injury
- Accident prevention to third party
- Improvement of health and safety standards

Of three policies, the policy of “Accident prevention to third party” is especially emphasized by Taisei Corporation as saying that “Accidents to the community must be absolutely avoided by every possible means”.

(b) Safety Target

Item 5.0 of the PHSP stipulates that “It will be the aim of all individuals within the project team to achieve a Zero Harm throughout the duration of the project.” No numerical target in respect of medical leave accidents is mentioned in the PHSP, while HSP 2012 set the following numerical safety targets.

- Accident Death (0) zero
- More than 4 days medical leave accidents less than 0.56

(4) Safety education and training

The primary objectives of safety education and training are to raise an individual’s safety awareness and to improve an individual’s safety know-how. TV JV trains all persons who are working or to be working in the project site depending on their individual job descriptions. Its main safety education and training conducted by TV JV are as follows.

- Inductions (New inductees)
- Site safety rules
- Safety toolbox talk training (to all employees prior to the start of any activities)

To motivate subcontractors to improve their safety standards and to develop a safety culture within workforce TV JV adopts incentive (awarding to well performing subcontractors) and penalizing schemes (withholding payment or stoppage of work).

(5) Routine safety activities

To reduce accident risks and ensure smooth communication within the site in respect of safety matters, TV JV has been implementing various routine safety activities and holds many regular or ad-hoc meetings. These activities and meetings are carried out in accordance with the item

6.0 of the PHSP, and its main activities and meetings are as summarized in the Table3-1 and Table 3-2 below.

Table 3-1 Routine safety activities

Routine safety activities	Frequency
Routine inspection	at least once a week
Compliance monitoring	daily basis
Safety inspection for working platform	once a week
EHS inspection	four times a day
PEHSM monitoring	once a week

PEHSM · · · Project Environment, Health and Safety Manager

Table 3-2 Safety meeting for better communication

Meeting	Frequency
Weekly meeting	at least once a week
HS meeting	once a month
Serious accident/incident meeting	in the event of a serious accident/Incident happened
EHS consultation meeting	once a month
Weekly tool box meeting	every week

To reduce accident risks at the project site, it is inevitable to recognize hazards and notify it to all persons working in the site. In accordance with item 15.0 and 16.0, TV JV identifies, assesses, and prioritizes accident risks in the site. Where it is required by the contract, TV JV submits a method of construction including the risk management for the Engineer’s approval.

(6) Safety audit

In addition to the routine safety activities implemented by TV JV, safety audits to improve the safety activities have frequently been carried out by the headquarters of Taisei Corporation and its Vietnam office. Since the start of the project, eight safety audits, excluding nine safety patrols, have been carried out. The issues identified during the audits are to be discussed at a subsequent monthly safety committee meeting for corrective actions in the workplaces.

(7) Emergency Contact

The item 8.0 of the PHSP stipulates “Fire and Emergency Procedures” and the item 19.0 stipulates “Emergency Contact List” respectively. Copies of the contact list are posted around the site in both Vietnamese and English so that the right person can be contacted in the event of an emergency.

### 3.4 Current situation of the project

#### (1) Progress of the project

The project commenced in February 2012. As of the end of December 2012, 780 piles were already placed and under-ground structural works were nearly completed. Structural works above-ground level, such as rebar-fixing, formwork-setting and placing concrete works of the first-floor columns, are proceeding. Erection-works, by using large-scaled cranes, for the steel-structure of the terminal building also just started. The project site is divided into 9 sections and the works have been carried out by 8 subcontractors with hiring over 1,400 workers. The whole project is expected to be completed in December 2014 while main civil and building works is to be completed around in March 2014. At its peak, more than 2,000 workers are expected to be engaged in the project.

Since the site is adjacent to the premises of Noi Bai International Airport, Contractor is strongly urged to control the followings;

- to prevent unauthorized persons or vehicles from entering the restricted area of the airport
- to control dust in the project site, especially in strong winds, not to affect the planes' navigation
- to comply strictly with height restriction (within 45m) at the time of using cranes

Noi Bai International Airport is the gateway to the nation's capital which is capable of handling 10 million passengers per annum. The national road running in front of the project site leads to the airport and has heavy traffic especially daytime. As such, there exist a high risk of accident between construction equipment entering or leaving the project site and automobiles running on the national road. It is one of the most important tasks for TV JV to reduce risk of traffic accidents by planning and implementing traffic-control properly.



In the vicinity of the airport, there are two other projects, road widening work of the nation road and apron construction work, are being carried out concurrently mainly by Vietnamese contractors. Should the co-operation and co-ordination among three contractors be not going well, the safety and the progress of respective project might be adversely affected by it. Therefore it is important, without delay, to establish a framework which enables three contractors including the Employer and the Engineer can liaise closely with each other.

(2) Accident records and accident descriptions

(a) Accident records

As of the end of December 2012, 10 months elapsed since the commencement date, total man-hours became over 2 million. No accident involving third parties nor affecting the Works have not been reported, while a few first-aid cases and some lost-time accidents were recorded. TV JV submits ENVIRONMENT HEALTH AND SAFETY REPORT (EHS report) every month. Accidents detailed in the EHS report can be summarized as the Table 3-3 below.

Table 3-3 Accident records as of the end of 2012

total man-hours ①	first-aid cases	hospital referred (less than 3 days)	major injuries(more than 3 days) ②	fatal	LTA(major injuries) ③
2,109,290	258	2	2	0	0.95

《Remarks》 LTA=Lost Time Accident Frequency ③= (②÷①) x 1,000,000

In the Table3-4, there are three LTAs, such as the record of this project, the target of Taisei Corporation HSP 2012, and the record of building works in Japan with a contract price more than one-billion yen are listed. (Note<sup>3</sup>)

Table 3-4 Comparison table of LTA

Description	LTA	Remarks
record of this project	0.95	lost-time injuries more than 3 days
target of Taisei Corporation HSP2012	0.56	lost-time injuries more than 4 days
record of building works in Japan with a contract price more than one-billion yen	0.94	Ditto, but a two-year average of year 2011 and 2012

Due to two major injuries (lost-time more than 3 days) both of which occurred in December 2012, LTA of this project has jumped to 0.95 from its previous month LTA of zero and has

<sup>3</sup>Figures published by The Japan Construction Occupational Safety and Health Association are used. The figure listed in the table is a two-year average of year 2010 and 2011.

reached to the similar level of the building works in Japan with a contract price more than one-billion yen.

When asked about the safety target at the review meeting, ACV has replied that “ACV Policy is to minimize accident as much as possible and ACV has no specific target value for this project.” It is, of course, not a common practice even for the project financed by the international financial institution to specify numerical safety target, however, in order to reduce the number of accidents at construction site, it would be very effective to specify numerical safety target for respective construction project.

(b) Accident descriptions

Descriptions of the major accidents which occurred in December 2012 are summarized in the Table 3-5 below. In accordance with item 12.0 of the PHSP “ACCIDENT AND INCIDENT REPORTING”, the major accidents have been investigated, reported and TN JV has taken necessary preventive measures against it.

By the end of December 2012 the progress of the project reached to 9.8%, and the total man-hours exceeded 2 million. The man-hours of December 2012 increased by 57% compared with the previous month. Considering the current progress of the project, the risk of accidents is expected to become higher than ever before and correspondingly TV JV is strengthening the risk management.

Table 3-5 Accident descriptions (lost-time injuries more than 4 days)

Date	December 8 <sup>th</sup> , 2012	December 9 <sup>th</sup> , 2012
Background	A worker was bending rebar at fabrication yard. His hand gloves got caught up by the machine and pulled his fingers in, crushing his thumb and index finger on his left hand.	A carpenter was removing formworks on top of the rebar beam. The rebar beam is covered with plastic sheet and he unknowingly stepped on a gap in the rebar beam. The fall caused him to outbalance and hit his mid-lower right leg on the rebar.
Actions	He was immediately brought to the site clinic and after first aid intervention, was sent to hospital for further medical care	The worker was immediately brought to the site clinic and after applying the necessary first aid, was then immediately brought to Bac Thang Long Hospital.
Cause of accident	Incident was due to the worker’s failure to observe proper work safety	Incident was due to failure in providing a safe working

Date	December 8 <sup>th</sup> , 2012	December 9 <sup>th</sup> , 2012
	procedure while operating the bending machine. Unfortunately, he failed to coordinate the machine operation and the fixing of the rebar.	environment for workers. The worker stepped on a gap in the rebar beam which is covered by plastic sheet that obstructed his view of where he would step.
Preventive measure	<ul style="list-style-type: none"> <li>✓ Only competent operators will be allowed to work as operator of the bending machine.</li> <li>✓ Pre-task briefing will be conducted to remind operators and workers their “duty of care” to themselves and to their co-workers working with them.</li> <li>✓ Toolbox to be conducted to inform the workers about the incident and the control measures to ensure that the same incident will not recur/happen again.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Remove all plastic sheets on top of the rebar beams. Rebar beams should be exposed all the time and no materials that could obstruct the vision should be allowed on top.</li> <li>✓ Conduct a toolbox regarding the incident and necessary precaution measures to ensure that incident will not happen again.</li> </ul>

### 3.5 Site inspection

#### (1) Overall project situations

- (a) In Asian regions, Hong Kong and Singapore are maintaining relatively high safety standards in its construction sites. The TV JV’s current safety standard could favorably compare with those safety standards implemented in both areas.
- (b) By employing leading Vietnamese subcontractors, TV JV has been successfully maintaining a high level of safety standards in the project site. However there are significant difference among such the subcontractors in terms of safety standard and awareness, it is an important task for TV JV to closely monitor subcontractors’ safety performance and to raise their safety awareness constantly.
- (c) Persons who are engaged in the project site are all wearing a three-safety set, namely helmet, reflective safety vest and safety shoes. Since safety supervisors of subcontractors are wearing a helmet with a different color that general workers are wearing, TV JV staff can surely instruct safety-related matters to them.
- (d) Housekeeping is being implemented very well in the site. Materials and equipment are stored properly in designated areas. Each subcontractor has their own site office and work area which are well-organized. Among of all subcontractors, one subcontractor maintains its work-area as a general international standard. Power generators are housed in a

properly insulated area.

- (e) Hazard sign boards, illustrated safety signs, and traffic signs are putting up all around the project site in order to raise awareness of workers against hazards
- (f) In addition to the “Finger Print Register Entry System” which preventing foul entry and allowing central data collection on real time basis. TV JV has been effectively utilizing information technology. For instance, by using short-message-service of mobile phone the information in respect of the site safety can be delivered instantly to all persons concerned, and the safety information can be shared through computer server in which safety images are also stored.
- (g) TV JV has been employing many direct workers, under a Filipino supervisor, in order to promptly deal with safety requirements, such as repairing safety facilities or fabricating safety devices.
- (h) Lifting operations coordinators are appointed for the safety operation of lifting equipment. Appointed persons should review and advice section managers on lifting plan submissions, and undertake regular inspection of all lifting equipment and maintain records of inspections.
- (i) To reduce high-place works, TV JV adopts a prefabrication system for rebar-beams and Japanese experts have been training local workers engaged in rebar-fixing works. In addition, scaffold-coordinators are doing inspection to ensure that all scaffolds are used appropriately.
- (j) As for the fire prevention, TV JV has taken the followings safety measures.
  - to indicate action guidelines in case of a fire and post emergency contact lists around the site (including the telephone number of the emergency services )
  - to provide fire points with fire-extinguishing equipment (one 'Fire Point' per 500 square -meter of floor area and at every fire-exit)
  - to adopt hot-works-permit system
- (k) Safety measures taken by TV JV for night work are as follows.
  - to provide adequate lighting facilities for general access to site including emergency lighting by TV JV
  - to provide adequate lighting facilities for safe operations (20-50 Lux) by subcontractors
  - to allocate Japanese supervisors
  - to provide 24-hour first-aid facility and allocate first-aid staff
- (l) As for the site security, 26 security staff control entry/exit to and from site of all visitors, drivers, workers and contractors by round-the-clock security personnel. TV JV has adopted only one gate system and the construction area is surrounded by the fence provided by

ACV. Construction materials are properly stored in wire-fenced stock yard to reduce the risk of being burglarized.

(2) Impressive safety activities

- (a) To minimize an accident risk involving third parties, TV JV provides only one entrance gate to prevent the entry of unauthorized persons and vehicles (photo3-1). Taking into account of its vast construction area (56,000m<sup>2</sup>), it is desirable to use a multi-entrance-gate system in order to improve work efficiency. In this regard TV JV's firm attitude to prioritize the safety can be highly valued. There is the aforesaid fingerprint register system at the entrance gate, enabling real-time-data-collection of persons entering through the gate (photo3-2).
- (b) Two-step-gate system is adopted to ensure all persons with PPE (Personal Protective Equipment) when they enter the project site through a second gate (photo3-3). Any persons who are not wearing the three-safety set are not allowed to enter workplaces of the project.



photo 3-1



photo 3-2



photo3-3

- (c) Walk ways for workers is separated from the passage for construction equipment by the safety rope. The walkways that are slippery owing to rain are strewn by gravel. (photo3-4).
- (d) Road bumps, with proper signage at each position, are provided with all passages in the project site in order to restrict over-speed of vehicle (photo3-5).
- (e) TV JV adopts three-sticker-system on helmet (photo3-6), providing three-stage warning, first warning, second warning with penalty and third warning with off-site.



photo 3-4



photo 3-5



photo 3-6



(f)TV JV also adopts a full-fledged wheel washer system (photo3-7) provides with smoking huts for preventing fire (photo3-8), installs illustrated straightforward safety sign boards (photo3-9).



photo 3-7



photo 3-8



photo 3-9

### 3.6 Advices after site inspection

#### (1) Maintain current safety standards

TV JV has been maintaining a relatively high safety standard diligently. This safety standard is not achieved immediately after the project has started, but has been achieved by ceaseless efforts of all parties concerned since the commencement of the Works. It is not easy to maintain the current safety standard which has reached a certain level. On an empirical basis, accident risks might inevitably increase when everybody has become not to pay special attention to safety matters mainly due to habituation or rut. It is strongly recommended for the Contractor to spare no effort to maintain the current safety standard.

#### (2) Prevention of thirds parties' accidents and co-ordination with other contractors

JICA has given a high priority to prevent accidents involving third parties. Since the project site faces toward the national road with heavy traffic, TV JV fully recognizes its workplace is surrounded by hazardous working environment and makes every possible effort to prevent third parties' accidents, especially traffic accidents.

In the vicinity of the airport, there are two other projects are concurrently being carried out. Should the co-operation and co-ordination among three contractors be not going well, the safety and the progress of respective project would adversely be affected. Therefore it is important to establish a framework which enables three contractors including the Employer and the Engineer can liaise closely with each other.

#### (3) Interface between different subcontractors and suppliers within project site

Now there are 8 subcontractors and nearly 1400 workers are engaged in the project site. Since the terminal buildings are expected to be completed in March 2014, its finishing works should be completed by the end of 2013 or early 2014. At the peak of the project, over 2000 workers are expected to work in limited space of the project and with the workspace becoming limited,

accident risks would dramatically increase. Thus, in addition to maintain the current safety standard, TV JV should properly deal with newly-emerged hazards.

(4) Fire prevention

A risk of fire is not seemed to be very high at this moment. However, at the peak period of this project when many workers are engaged in the project site and a great deal of construction material delivered into the terminal buildings, the risk of a fire would inevitably increase. The Employer, the Engineer and the Contractor are fully aware of this fire risk and make every possible effort to prevent fire. Since the project site is adjacent to the existing airport, even a small fire would adversely affect the planes' navigation, it is very important to make every possible effort to prevent a fire.

(5) Employer's role to reduce accident risks

Even there has been a sufficient time to complete the project at the beginning, with progress of the Works, the Contractor quite frequently has no other choice but to finish the Works in a rush, and as a result, accident risks should significantly increase. Causes of losing such the spare time are mainly attributed to the Contractors fault, but in many cases it should also attribute to the Employer. For instance;

- (a) Slow decisions by authorities concerned including the Employer
- (b) Inappropriate co-ordinations with other contractors
- (c) Decrease in the work efficiency due to non-cooperative attitude of authorities concerned

Therefore the Employer should proactively involve this matter.

## Chapter 4 Occupational safety in Sri Lanka

### 4.1 Occupational injury and fatality

#### (1) Occupational injury and fatality in overall industries in Sri Lanka

The Factories Ordinance No.45 (1942) stipulates that where any accident occurs in a factory which;

- causes loss of life to a person employed in that factory; or
- disables any such person for more than three days from earning full wages at the work at which he was employed; or
- makes any such person unconscious as a result of heat, exhaustion, electric shock or inhalation of irrespirable or poisonous fumes or gases,

written notice of the accident, in such form and accompanied by such particulars as may be prescribed, shall forthwith be sent by the occupier or manager or the superintendent (in the case of an estate factory) to the District Factory Inspecting Engineer.

In Sri Lanka, the numbers of fatal and non-fatal accidents reported to the Department of Labour (DOL) are shown in the Table 4-1. On average, between 2 and 3 per cent of reported accidents are fatal.

Table 4-1 Non fatal and fatal accidents in Sri Lanka

	2004	2005	2006	2007	2008
Non fatal accidents	1,165	1,566	1,740	1,755	1,523
Fatal accidents	36	48	84	77	49

Labour and Social Trends in Sri Lanka 2009(note<sup>4</sup>)

This report of “Labour and Social Trends in Sri Lanka 2009” mentions that “it should be noted that the actual number of both fatal and non-fatal accidents is likely to be much higher than the numbers reported due to deficiencies in reporting as well as lack of coverage of the informal sector, which represents more than 60 per cent of the workforce”. That is just like the case of Vietnam.

#### (2) Occupational injury and fatality on construction sites

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<sup>4</sup> This report was published by Ministry of Labour Relations and Manpower with the technical support from the International Labour Organization (ILO).

Fatal and non-fatal accidents on construction sites are reported University of Peradeniya by its report “Site Safety of Sri Lankan Building Construction Industry”. -see Table 4-2.

Table 4-2 Fatal and non-fatal accidents on construction sites

Type of accidents	2003	2004	2005	2006	2007
Fatal	86	45	50	89	113
Non-fatal	13	12	14	15	19

Reported by University of Peradeniya

The ethnic conflict of Sri Lanka was over in 2009. Its GDP grew by 8 percent in 2010 and the national economy has demonstrated an upward trend. Since the number of infrastructure development projects is expected to grow at the high rate, correspondingly the number of accidents is expected to increase. As pointed out in the report “Labour and Social Trends in Sri Lanka 2009” and the report by University of Peradeniya, data concerning the number of injured workers is under question, and improvement of accuracy in respect of accident statistic is highly required.

#### 4.2 Occupational Safety and Health administrative organization

In Sri Lanka, Ministry of Labour plays an important role in respect of OHS. Under the Ministry, Industrial Safety Division and National Institute of Occupational Safety and Health (NIOSH) are playing the leading role. The former is the organization to which the District Factory Inspecting Engineer belongs, and where any specified accident occurs written notice is required to the Inspecting Engineer. NIOSH was established after Government of Sri Lanka had expressed its consent to ratify the Occupational Safety and Health Convention (C155).

#### 4.3 Occupational Safety and Health legislation

In Sri Lanka, the Factories Ordinance No.45 (1942) provides for legislation on the safety, health and welfare of workers. This Ordinance was further improved by amendments made in 1946, 1961 and 1976 respectively. The Ordinance No.45 (1942) consists of 14 parts, from Part I through XIV and 130 provisions. Concerning the construction work, the Provision 84 “BUILDING AND OTHER CONSTRUCTION WORKS”. The following provisions shall apply to building and other construction works.

- the provisions of Part I relating to registration;
- the provisions of Part II with respect to sanitary conveniences;
- the provisions of Part III relating to safety;
- the provisions of Part IV with respect to welfare regulations;
- the provisions of Part V with respect to special regulations for safety and health;
- Part VI;

- the provisions of sections 77 and 104 of this Ordinance with such adaptations and modifications as may be made by regulations made by the Minister;
- the provisions of Part X with respect to the abstract of this Ordinance and notices, special regulations, general registers (so far as applicable), preservation of registers and records, and duties of persons employed;
- Part XI, Part XIII, Part XIV and Part XV

As its name indicates, the Factory Code No45 has been enacted mainly to regulate factory-related-matters such as registration of factories, sanitary conveniences and safety and welfare for factories workers. In the Code, there are many provisions which directly can be applied to the construction works, for instance, provisions regulating a lifting equipment and high-place work, however, it is difficult to say that the Code is satisfactory to reduce accident risks in construction site. In Sri Lanka, a new Act, namely The Safety, Health and Welfare Act, is being prepared to further promote safety and health of the workforce. Up until the new act for OHS is to be enacted, recognized and become popular in construction industry, accident risks in construction site would remain high.

## Chapter 5 Site inspection and review in Sri Lanka

### — Upper Kotmale Hydropower project Lot-2(UKHP)

#### 5.1 Project Outline

(1) Project Name : Sri Lank Upper Kotmale Hydropower project Lot-2

(2) L/A : Date of L/A 26<sup>th</sup> March 2002  
Amount of L/A 33,265 Million Yen (Lot1~Lot5) (note<sup>5</sup>)  
Condition Japanese ODA loan

(3) Project aim : The UKHP is likely to be the last large scale hydropower scheme to be developed in Sri Lanka except for few other sites with potential for medium scale plants, and mini-hydropower plants. Forecasts prepared by CEB in 2003 shows that an additional 3228MW of generating capacity would be required over the next 15 years. The 150MW provided by the UKHP would therefore be an essential addition to the country's generating capacity.

(4) Location : Democratic Socialist Republic of Sri Lanka Nuwara Eliya

(5) Employer : Ceylon Electricity Board (CEB)

(6) Engineer : Electric Power Development Co., Ltd. (J Power)

(7) Contractor : Maeda Nishimatsu Joint Venture (MN JV)

(8) Subcontractor : Direct-labour-system has been adopted

(9) Type of contract : BQ Measurement Contract (Partly B & D Lump Sum Contract)

(10) Construction Period : Initial January 2007 - June 2011  
Current January 2007 - May 2013 (based on the approved EOT)

(11) Data of reservoir : Total catchment area 310.6km<sup>2</sup>  
High water level EL 1,194m(effective depth 4m)  
Total ponding area 0.25km<sup>2</sup>  
Effective storage capacity 800,000m<sup>3</sup>

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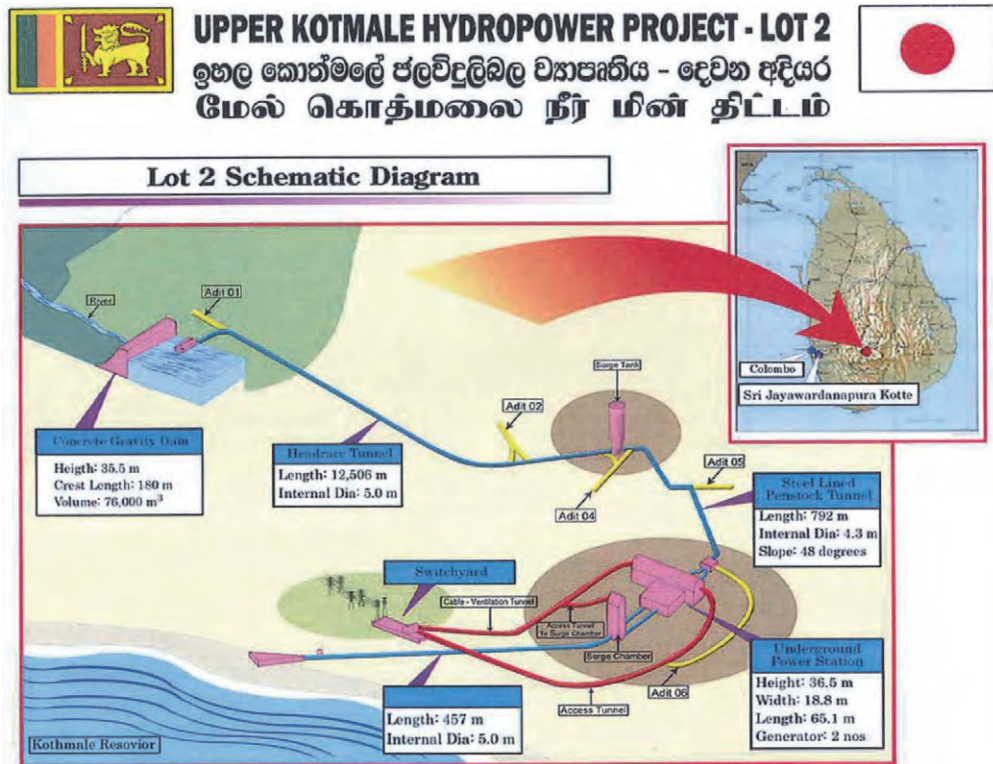
<sup>5</sup>LOT2 cost was estimated 15,785 million Yen at the LA Date and its final contract cost was 11,888 million Yen.(2006 JBIC Yen loan midterm review report)

(12) Dimensional data and works volume

Intake Dam	Concrete Gravity Dam, Height 35.5m Crest Length 180m, Volume 67,000m <sup>3</sup>
Headrace Tunnel	Length 12.5km, Internal Dia. 5.0m
Surge Tank	Internal Dia. 12m, Height 96m
Steel Lined Tunnel	Length 792m, Dia. 4.2m, Slope 48° , Length 600m
Tailrace Tunnel	Length 457m, Internal Dia. 5.0m
Underground PH	Height 36.5m, Width 18.8m, Length 65.1m
Flood Gate	Radial Gate x 5 (Width10m x Height 10m) Capacity 3,300m <sup>3</sup> /s(10,000 year- flood)
Flushing Gate	Radial Gate x 1
Others	Powerhouse, River Improvement ,Bridge
Concrete	155,000m <sup>3</sup>
Excavation	885,000m <sup>3</sup>
Banking	466,000m <sup>3</sup>

(13) Works in progress

Please refer to 5.4(1) “Current situation of the project”.



## 5.2 Stakeholders' safety obligations

Stakeholders of Upper Kotmale Hydropower project Lot-2 are as follows.

- Employer : Ceylon Electricity Board CEB)
- Engineer : Electric Power Development Co., Ltd (J-Power)
- Contractor : Maeda-Nishimatsu JV (MN JV)

Each stakeholder's obligations in respect of safety are stipulated in the CONDITIONS OF CONTRACT FOR WORKS CIVIL ENGINEERING CONSTRUCTION (CoC) and GENERAL SPECIFICATIONS (GS) as follows. (note<sup>6</sup>)

### (1) The Employer

If under Clause 31 the Employer shall carry out work on the Site with his own workmen he shall, in respect of such work:

- (a) ~ have full regard to the safety of all persons entitled to be upon the Site, and
- (b)~ keep the Site in an orderly state appropriate to the avoidance of danger to such persons.

If under Clause 31 the Employer shall employ other contractors on the Site he shall require them to have the same regard for safety and avoidance of danger. ----CoC Clause 19.2

### (2) The Engineer

- (a) Notwithstanding the obligations, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, the Engineer may, ~ ,instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk.

----CoC Clause2.1

- (b) The Contractor shall, on the instructions of the Engineer, suspend the progress of the Works or any part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is necessary for the proper execution of the Works or for the safety of the Works or any part thereof (save to the extent that such necessity arises from any act or default by the Engineer or the Employer or from any of the risks defined in ~----CoC Clause 40.1
- (c) If, by reason of any accident, or failure, or other event occurring to, in, or in connection with the Works, or any part thereof, either during the execution of the Works, or during the Defects Liability Period, any remedial or other work is, in the opinion of the Engineer,

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<sup>6</sup> There is a definition for the Bank in CoC Clause1.1. However, its obligations are not stipulated.



urgently necessary for the safety of the Works and~. ----CoC Clause 64.1

- (d) All security, safety measures and health controls necessary for the execution of the Works such as safe working practices~ safety precautions and fire prevention, shall be established and maintained by the Contractor throughout the period of the Contract. The Contractor shall be responsible for all security and safety measures ~ shall provide personnel, equipment and written programmes necessary to accomplish them. ----GS Clause 14.1
- (e) The Contractor shall prepare and issue to all of his employees, those of his Subcontractors and Engineer's and Employer's staff a booklet on safety precautions ~ , and be of the type and size approved by the Engineer. ----GS Clause 14.5

(3) The Contractor

The contractor shall ;

- (a)~ take full responsibility for the adequacy, stability and safety of all Site operations and methods of construction. ----SC Clause8.2
- (b)~ submit his plan for establishment of such safety measures as may be necessary to provide against accidents, unsafe acts and other detrimental activities as stipulated in the Section 14 of the General Specifications. ----CoC Clause 8.3、 GS Clause 14.1
- (c)~ comply with all pertinent Sri Lankan laws in regard to safety provisions and shall furnish and oversee its use of such safeguards, safety devices and protective equipment as the Engineer or other competent authority may determine to be necessary to protect the life and health of person at Site. ----CoC Clause8.4
- (d)~ before the 10th day of each month, submit 5 copies of the monthly progress report in format acceptable to the Engineer detailing the progress of the work accomplished during the preceding month. The report shall contain, but not be limited to, the following: ~ statement concerning the effectiveness of safety programme and list of all accidents involving hospitalization or death of persons. Also list of any accidents involving equipment, and any fire which occurred. ----CoC Clause14
- (e)~ throughout the execution and completion of the Works and the remedying of any defects therein:~ provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer or by any duly constituted authority, for the protection of the Works or for the safety and convenience of the public or others,  
----CoC Clause19.1, GS Clause14.5
- (f)~ have on his staff on the Site an officer dealing only with questions regarding the safety and protection against fire and accidents of all staff and labour. This officer shall be qualified for this work and shall have the authority to issue instructions and shall take protective measures to prevent fire and accidents----CoC Clause34.6、 GS Clause 14.5
- (g)~ Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labour and, ----CoC Clause 34.7
- (h)~ The Contractor shall prepare and issue to all of his employees, those of his

Subcontractors and Engineer's and Employer's staff a booklet on safety precautions ~, and be of the type and size approved by the Engineer. ----GS Clause 14.5

Compared with responsibilities of the Employer and the Engineer as mentioned above, the Contractor undertakes more extensive and significant responsibilities to ensure a safety and health working environment at the construction site. The contractor should also follow “Safety and health in construction” published by ILO in addition to Sri Lankan Laws and various safety clauses in the Contract. As stipulated in the Safety Manual (to be hereinafter described), the Project manager assumes the ultimate responsibility for the site safety, while daily activities of safety are being carried out by the Safety engineer appointed by the Project manager.

During the review meeting the Employer (CEB) said that “Because of the project being STEP, CEB has expected that the safety standard adopted by the Contractor might be almost the same to those in Japan, but in reality it was not the case.” In this regard, there might be some difference in respect of expectation for the safety standard between the Employer and the Contractor.

### 5.3 Safety management System

MN JV has prepared a Safety Manual in accordance with the Contract and local legal requirements and then the Safety Manual has been approved by the Engineer. MN JV has been implementing the safety activity in accordance with this Safety Manual.

As stipulated in the item 5.2(1), “If the Employer (CEB) ~ shall carry out work ~ with his own workmen~ “, “the Employer ~ have full regard to the safety of all persons entitled to be upon the Site”. In other words, the Employer shall not have to have full regard to the safety of all persons employed by the Contractor. Furthermore, this kind of contract clause might trigger a wait-and-see attitude of some employers toward the site safety.

The Engineer (J Power) has been executing his duties to ensure the safety of the project site in accordance with the Contract. The duties of the Engineer are including but not limited to the following.

- to approve the Safety manual and method statements submitted by the Contractor
- to review safety matters at a monthly progress meeting and attend safety patrols
- to confirm safety conditions at site and instruct to the Contractor in respect of safety matters

Project manager of MN JV has remarked that “The Engineer has carried out their duties to

secure the site safety strictly following the Contract.”

(1) Safety Manual

In the Safety Manual, MN JV expresses its firm intention to eliminate accident risks as follows; “~safety be given high priority in the execution the works. A high standard of safety shall be maintained for all persons including protection of the general public who may be affected by the operations ~”

The Manual consists of 51 pages with 14 forms including a form of monthly safety inspection report and crane checklist. This Manual regulates obligations of all parties concerned in order to ensure the site safety and to follow relevant legislation of Sri Lanka. Since there are lots of straightforward explanations in respect of site safety in the Manual, it can be utilized as a safety guidance. All legislative requirements that all persons working in the project site should comply with are listed in the section 3”AUTHORITIES REGULATIONS”.

(2) Project safety organization

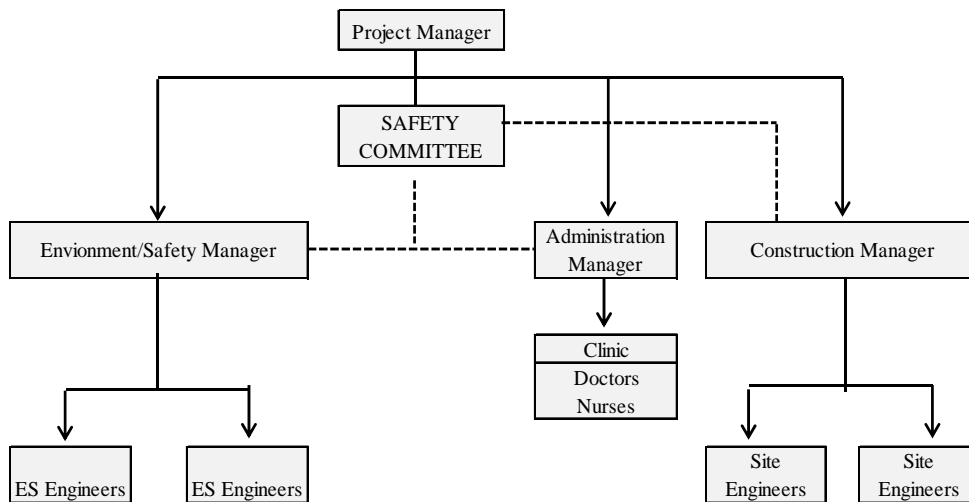


Figure5-1 MN JV Project safety Organization

The Safety manager shall be responsible for advising to management team the daily safety matters of the project site. ES manager and safety engineers are to be appointed by the Safety manager to assist him.

(3) Safety policy and safety target

In addition to the safety policy declared by MN JV, “PM Policy” and “Ten Policies in Safety of Project manager” are posed at a readily visible location of every meeting room in the MN JV project office. In the Safety Manual, MN JV declares a ” No accident and No disaster” policy, however, MN JV has set up no numerical target for safety. In order to keep up with

ever-changing working environment in the project site and to set up safety targets properly, MN JV draws up hazard maps and hazard drawings every month.

(4) Safety education and training

The primary objectives of safety education and training are to raise an individual’s safety awareness and to improve an individual’s safety know-how. MN JV trains all persons who are working or to be working in the project site depending on their individual job descriptions. MN JV provides 7 courses for safety education and training. Its main courses can be summarized as follows;

- Safety orientation course (to educate the workman on the necessity of safety)
- Safety representative course (to educate the persons in safety control positions)
- Safety management course
- Safety practices course for lifting supervisors, rigging supervisors and explosive supervisors

To motivate subcontractors to improve their safety standards and to develop a safety culture within workforce MN JV adopts incentive (awarding to well performing subcontractors) and penalizing schemes (withholding payment or stoppage of work). Part of the penalty system, however, did not work well. (note<sup>7</sup>)

(5) Routine safety activities

To reduce accident risks and ensure smooth communication within the site in respect of safety matters, MN JV has been implementing various routine safety activities and holds many regular or ad-hoc meetings.

These activities and meetings are carried out in accordance with the item 6 and item 11 of the Safety Manual, and its main activities and meetings are as summarized in the Table5-1 and Table 5-2 respectively.

Table 5– 1 Routine safety activities

Routine activities	Frequency
Daily safety inspections	every day
Weekly safety inspections	every week
Monthly safety inspections	every month
Periodic inspections	periodic

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<sup>7</sup> It is illegal to impose a penalty on a worker violating site safety rules. Therefore the penalty is generally imposed on a subcontractor employing such the worker. In this project, since all workers are being supplied by local labour-suppliers and the suppliers are so small that it is also not possible to impose a penalty on them.

Table 5—2 Safety meeting for better communication

Meeting	Frequency
Safety committee meeting	every month
Safety emergency meeting	In the event of a serious accident/Incident happened
Tool box meeting	every day

In order to reduce accident risks at construction site, it is inevitable to recognize hazards and notify it to all persons working in the site. To deal with ever-changing work environment of the site, MN JV, whenever it is required, set up new safety targets and prepares various hazard maps. It includes but not limited to the followings;

- Hazard maps showing hazardous area alongside of hauling roads, including its descriptions and actions required to avert contingent accidents
- Hazard maps with photos of hazardous area and its descriptions
- Hazard drawings showing hazardous area and its descriptions

In addition to the hazard maps and drawings, MN JV has prepared a document “Informing Safety/Health Hazards at Site” periodically and has circulated the same among all persons working in the project site.”

#### (6) Safety Audit

Independent safety audits have regularly been implemented by Labour Department since the commencement of the project. In December 2012, the sixth times audit was carried out. The issues identified during the audits are to be discussed at a subsequent monthly safety committee meeting for corrective actions in the workplaces. In addition to the routine activities implemented by MN JV, safety patrols have frequently been carried out by the headquarters of Maeda Corporation in order to improve its safety activities.

#### (7) Emergency Contact

The Section 7.3 of the Safety Manual stipulates “Emergency Contacts”, and the list of Emergency contact number are posted around the site in English so the right people can be contacted in the event of an emergency. According to the document, any reportable accidents should be informed to the Project manager and the Engineer within 30 minutes of accidents occurring and within one hour to the district authority.

### 5.4 Current situation of the project

#### (1) Progress of the project

Upper Kotmale hydropower project consists of six separated lots. Lot2 has only been targeted

for this Study. Except completed works such as headrace tunnel and tailrace tunnel, outstanding works of Lot2 are proceeding in separated seven areas. The power plant has been in operation since July 2012 and the overall project is expected to be completed by the end of May 2013. Main outstanding works of Lot2 are formwork-fixing and placing-concrete works for the guide wall at the intake dam, a gate-installation work at the surge tank, finishing works at adits, fencing works around the headpond, drainage works and asphalt paving works. At the present stage of the project, accident risks are relatively not very high. Since the workplaces of the finishing works spreads across a wide area, there are still lots of contact points with residents and then accident risks also still remain high.

(2) Accident records and accident descriptions

(a) Accident records

As of the end of December 2012, total working hours recorded over 13.5million hours. No accident involving third parties nor affecting the Works have not been reported, while two fatal accidents occurred in 2008 and 2011 respectively. Table 5-1 shows accident records of the project.

Table 5-1 Accident records

	2007	2008	2009	2010	2011	2012	Total
Total working hours x1000	531	1,291	1,975	2,706	4,642	2,413	13,561
Reportable accident(*1)	1	8	6	7	10	0	32
AFR(*2)	1.88	6.19	3.04	2.59	2.15	0.00	2.36
Fatal accident		Nov. 19			Dec. 19		

Remarks: (\*1) lost-time injuries more than 4days, (\*2) Accident Frequency Report

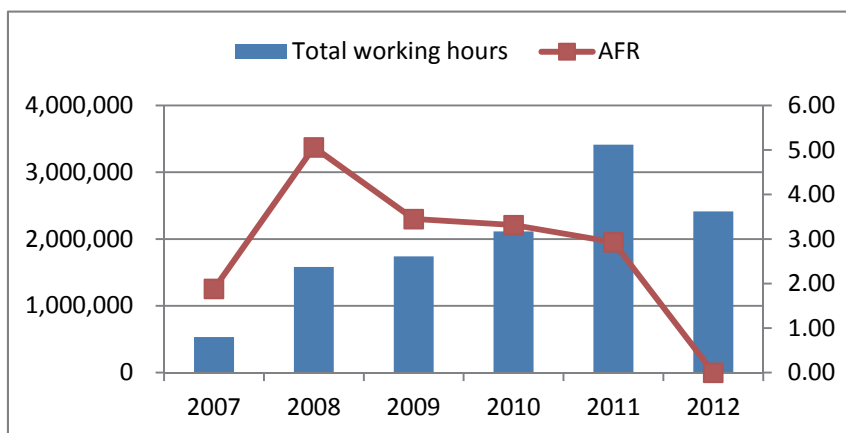


Figure 5-1 Total working hours and AFR



Figure 5-2 Number of reportable accidents per annum

The accident frequency rate of this project was 2.36 as of the end of December 2012, relatively high compared with 0.84 of the similar projects in Japan. (note<sup>8</sup>) The main feature of this project and its general trend in respect of accidents are as follows;

- ① The accident frequency rate of the project sharply increased to 6.19 in the second year after the commencement of the project. Then its rate gradually decreased to zero in 2012.
  - ✓ At the very beginning of the project, MN JV had to employ many inexperienced workers and as a result of that, there occurred many reportable accidents compared to its total working hours at that time. Thereafter, as the workers are moving up their learning curve, the number of accident showed a declining trend.
- ② Even though the total tunnel length of excavation has reached to 17km and the volume of excavation of the underground power house has amounted to 33,000m<sup>3</sup>, there were no fatal accident occurred. However, two fatal accidents, involving heavy equipment operators, have occurred at the very ordinary open spaces.
  - ✓ Accidents likely occur at the workplace where everybody recognizes as a low risk hazard, while no fatal accident likely occurs at the workplace where everybody recognizes as a high risk hazard.
- ③ The fatal accident occurred in the second year of the project when its frequency rate showed an abrupt increase trend and, in 2011 when its frequency rate showed a downward trend.
  - ✓ There are potential risks in the project site that a fatal accident would occur irrespective of whether workers are experienced or not.
- ④ Since subcontractors were basically not approved to employ in this project, MN JV had to employ many inexperienced local workers through local-worker suppliers. The employment of many inexperienced local workers might be another cause of accidents occurring

<sup>8</sup> Figures published by Japan Industrial Safety and Health Association are used. The figure is a two-year average of 2010 and 2011.

frequently. (note<sup>9</sup>)

- ✓ As for the safety training of workers, there might be limits to what contractors can do on their own responsibility. Furthermore, accident risks are relatively very high during the period when the contractors are implementing to raise workers' safety awareness and to improve workers' safety know-how by the safety training.

(b) Accident descriptions

Two fatal accidents occurred in this project are summarized in the Table 5-3 below.

Table 5-3 Summary of fatal accidents

	Fatal accident on 19 <sup>th</sup> September 2008	Fatal accident on 19 <sup>th</sup> December 2012
Background	At the time of the accident happened; the operator had been pushing the tunnel muck to the slope facing to switchyard by D4D dozer, then the dozer was suddenly tilted and slipped downward. The dozer moved on his body and stopped. The victim was rushed to the Kotamale hospital. The medical officer of health of Kotamale hospital confirmed the death of the victim at 17:25.	The 25ton mobile crane which was travelling down along intake dam downstream access road has experienced an accident and overturned. The operator and the helper injured. The operator was immediately transferred to Nuwara Eliya General Hospital after primary medical intervention. He died at 9:50am on 22 <sup>nd</sup> December 2011.
Cause of accident	<ul style="list-style-type: none"> <li>✓ Misunderstanding of the job specification</li> <li>✓ Appropriateness of the operating skill</li> <li>✓ Mistake and error</li> </ul>	<ul style="list-style-type: none"> <li>✓ Mechanical factors (sudden mechanical fault)</li> <li>✓ Human factors (the operator was not familiar with the site and the machine)</li> <li>✓ Environment factor(wetted road surface )</li> </ul> <p>The accident was caused due to the combined effect of the above three factors</p>
Preventive Measure	<ul style="list-style-type: none"> <li>✓ Preparation and education of the job specification</li> <li>✓ Review for the condition of</li> </ul>	<ul style="list-style-type: none"> <li>✓ Review of daily maintenance and checking of machines</li> <li>✓ Identification and display of</li> </ul>

<sup>9</sup> To employ local workers has another aspect to build good neighbor relations with local residents.



	Fatal accident on 19 <sup>th</sup> September 2008	Fatal accident on 19 <sup>th</sup> December 2012
	contract for machine supplier ✓ Safety instruction for each job site ✓ Full time safety officer	hazards ✓ Instructions at site Improvement to road surface

### 5.5 Impressive safety activities

- (1) Because of there being many inexperienced workers and language barrier, MN JV has visualized the work procedure and process as much as possible by three-D or model in order to explain easily to local staff and workers. (figure 5-3)
- (2) As the workplaces spreads across a wide area, MN JV recognizes accident risks involving local residents as very high and MN JV has taken following accident preventive measures.
  - To use public roads as little as possible when preparing transportation plan
  - To pay a special attention to reduce accident risks when drawing up hazard maps
  - To make sufficient preliminary explanation of risks before the blasting work proceeds
- (3) At the surge tank where both of the high-place work and the line splitting work (workplace vertically separated) were inevitable, MN JV has devised special safety means to carry out the scaffold-setting work and the form-fixing work under the safe environment. In addition, to reduce accident risks TV JV has employed Japanese skilled workers to supervise and train local workers.

### 5.6 Advices after site inspection

The power plant has been in operation since July 2012 and outstanding works are proceeding. At the present stage of the project, accident risks seem not to be very high. Since there are still lots of contact points with residents and accident risks also still remain high, the Contractor should continuously pay attention to the followings.

- (1) An accident likely occurs at the workplace where everybody recognizes as a low risk hazard, while no fatal accident occurs at the workplace where everybody recognizes as a high risk hazard. The asphalt paving work itself, for instance, is not so a risky activity, the Contractor, however, should pay careful attention to reduce accident risks because the asphalt paving work requires various heavy machines and is carried out on public roads with sharp turns and steep slopes.
- (2) Since local residents can easily access to such the workplace where the fencing work is ongoing around the head pond, MN JV should pay special attention to eliminate accidents

involving such residents.

- (3) Overall accident risks have become lower compared to as before. However, accident risks still remain because the finishing works have been carried out across a wide area. Therefore MN JV should pay every possible effort to reduce such accident risks.
- (4) Even though there have been various high risk excavation works, such as the underground power house, the ninety-meter-height surge tank, the steel lined tunnel with slope of 48 degrees, and the head race tunnel with 12.5km-length, no serious accident occurred at such the workplaces. On an empirical basis, serious accidents could likely occur at very final stages of the project. Therefore MN JV should make continuous efforts to avert such the accident risks.
- (5) In some projects, the safety slogan of “Safety First” is nothing more than a mere ornament. In order to express strong will of the Employer and the Contractor to reduce accidents, it is very useful that the safety matters should be first on the agenda of monthly progress meeting.

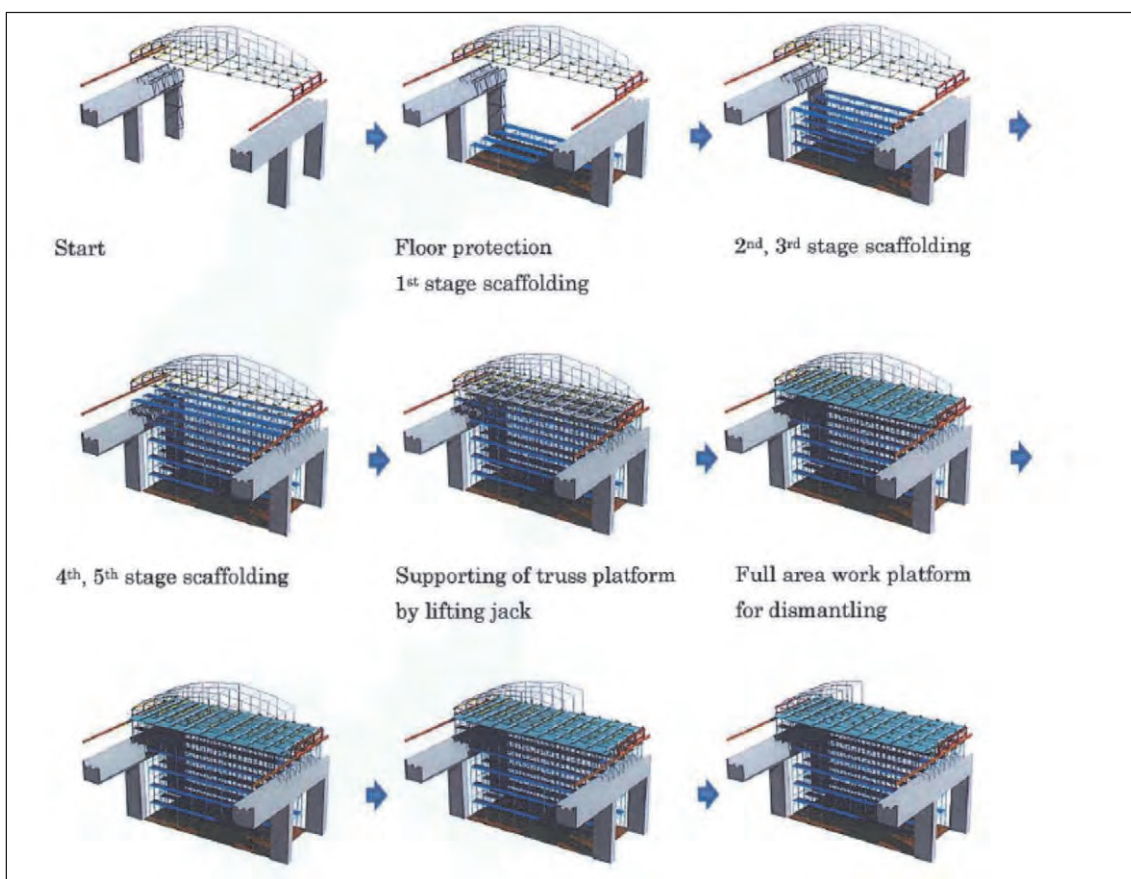


Figure 5-3 3D animated illustration of work procedure for dismantling of truss platform at the under-ground power house

## Chapter 6 Recommendations

Based on the knowledge acquired through this study, the recommendations in the Table 6-1 are made to solve the safety issues at overseas construction sites.

Table 6-1 Safety issues and recommendations

Item	Safety issues	Recommendations	Action by				
			A	B	C	D	E
Safety legislation	There is a shortage of educational materials to understand relevant safety laws and regulations in construction	The leaflet of “Safety and Health Manual in Construction” published by Vietnamese Ministry of Construction with the technical support from JICA is a quite useful educational material. To publish a similar leaflet and to implement educational activities by using such the leaflet in other countries is also recommendable.	○	◎			
Current tendering system	It is difficult to eliminate those contractors who have bad performance in respect of safety.	At the pre-qualification stage, bidders should be asked to submit safety-related information, such as the safety record, safety target and safety management system of bidders, and such the safety-related matters should be included in the pre-qualification criteria.	○		◎	○	
	Those bidders who underestimates safety costs are likely to win a contract	In order to enable bidders to estimate the safety-related costs more accurately and to minimize its variability among bidders, it is recommendable to describe the safety requirement more particularly in the specification, BQ and tender drawings etc.	○		◎	○	
	Individual project aspect is not seemed to be considered in the instruction to bidders	In the instruction to bidders and the specification of the works, all bidders should be required to prepare a safety plan taking into account the individual project aspect, and include its cost in his tender price.	○		◎	○	
Safety control	Accident risk is extremely high during the period when the contractor implements the safety training to its workers and subcontractors	It is recommendable that, prior to the commencement of the works, the preparation of a plan by the contractor to train workers and subcontractors should be a mandatory requirement of the contract. Once the project starts, all stakeholders should be liable for working together to train the subcontractor and workers strictly following the above mentioned training plan.	○		○	○	◎

<Remarks> A: Bank B:Ministry of Construction C: The Employer D:The Engineer E: The Contractor、 ◎: Main player ○:Cooperator

Appendix – 1      Meeting Minutes (Vietnam)

Meeting Minutes	
Time	January 10, 2013 (Thu) 10:30 – 12:00
Venue	Japan Airport Consultants, Inc. (JAC) Noi Bai International Airport T2 Terminal Construction Project Office
Attendance	JAC : Project Manager, Chief Architect, Viaduct Structural Engineer Safety Study Team
Subject	Briefing on the Safety Study and hearing survey on current situation
<p>Record :</p> <p>Safety Study Team held a briefing on the Safety Study. After that, JAC explained as itemized below.</p> <ol style="list-style-type: none"> <li>1. Contractual requirement on safety management <p>Contractual relationship between the Employer and the Consultant : There is no specific requirement for the Consultant in respect of safety issues except for Section 10 Safety Measure in TOR.</p> <p>Contractual relationship between the Employer and the Contractor : It is stipulated in General Conditions (GC) and Particular Conditions (PC) according to JIVA's Guideline.</p> </li> <li>2. The Consultant's points to be considered regarding safety <p>There are three construction packages in this Project. Each package is managed and executed by separate employer and contractor.</p> <ul style="list-style-type: none"> <li>➤ Apron Construction : Management by Civil Aviation of MOT</li> <li>➤ Road Widening in front of Airport : Management by PMU85 of MOT. The Consultant is Joint Venture formed by American firm and Japanese CTI. The Contractor is Korean Keangnam. Actual construction is being carried out local contractor, Cienco 4.</li> <li>➤ Airport Terminal Construction (T2) : JICA's STEP project. Management by PMUT2 of ACV</li> </ul> <p>There is construction interfering between these three packages which is being handled by each package. JAC is recommending the solutions for the interface issues to the Employer (PMUT2). However actual coordination to other packages is out of JAC's scope under their Contract.</p> <p>Management for public incident : Entry of construction vehicle is managed and monitored by T2 project. However there is difficulty of identifying those vehicles among these three packages when they are outside the site.</p> </li> </ol>	

Meeting Minutes	
Time	January 10, 2013 (Thu) 10:30 – 12:00
Venue	Japan Airport Consultants, Inc. (JAC) Noi Bai International Airport T2 Terminal Construction Project Office
<p><u>Traffic Control and Diversion, Handover of Apron Construction Area</u> Kick-Off Meeting as Boundary Management was held last month. PMUT2 notified JAC that restraint of police would be stricter before Tet Holiday. Entry of VIP to Airport is out of the Project's control. Military related information is also provided for PMUT2.</p> <p><u>Interfering Issues on Noise, Waste Water Treatment, Road and Dust with other packages</u> Exclusive construction road is secured by each package.</p> <p>3. Safety Management Organization Airport Safety (Security Centre) is in charge of safety in airport. Commencement of Works was February 29, 2012. Safety meeting with the Employer (PMUT2), the Contractor (TV JV) and the Consultant (JAC) was started from October 2012. It is held on the second Thursday of each month. Deputy Director of PMUT2 is attending the meeting. JAC's engineer in charge of Civil Engineering Section is chairing the monthly safety meeting. Sharing of information among three parties is recognized as main purpose of the meeting. TVJV made a serious effort to establish current strong safety management system since August 2012 to November 2012. There are 1600 workers at site and they will be increased to around 2000 this year. Three parties are sharing intention to manage the Project with ACV's initiative to avoid any cases to be reported by mass media such as TV. Although assignment of the Consultant's staff in charge of safety is not contractual requirement under the Contract, one civil staff and one architect staff in charge of safety are assigned for safety management since October 2012.</p> <p>4. Opinion on involvement with safety management Safety Management for the Project to be applied is preventive management with identification and instruction in advance which is based on principle in Japan.</p>	

Meeting Minutes	
Time	January 10, 2013 (Thu) 10:30 – 12:00
Venue	Japan Airport Consultants, Inc. (JAC) Noi Bai International Airport T2 Terminal Construction Project Office
<p>5. The Consultant’s evaluation on safety management</p> <p>Safety Plan was prepared and submitted by the Contractor to the Consultant and approved by the Consultant. The Employer’s requirement is described in the Specification prepared by the Consultant. The contents of the Specification are including information accumulated by JAC through his past projects. It consists of Sections from 10000 to 70000 and Section 10000 : General includes safety matters. Each construction method statement describes safety preventive and mitigation measures to each construction to be carried out..</p> <p>Weekly three parties meeting : every Wednesday. 51 meetings were held so far.</p> <p>Emergency Communication : Project Manager of JAC is available for taking emergency call 24 hours a day.</p> <p>In general, stricter management is being applied to the Project than HCM Tansonnhat Airport Project.</p> <p>Fire by inflammable material : There is no big risk at this moment. Close attention needs to be taken to smoke generation. The Project does not adjoin the existing Airport. Construction All Risk Insurance for the Project does not cover the existing Airport and the Employer will buy the insurance to cover the existing Airport if necessary.</p> <p>Advance approval is required for stocking any material at site to mitigate risk of fire.</p> <p>Surveying to find unexploded bombs were carried out many times.</p> <p>Industrial waste disposal areas and dangerous goods storage areas are located at site.</p> <p>All piling works are completed and high-place works will start soon. Training of workers, application of manual and adoption of safety harness will be important issues to be addressed.</p> <p>Accident Frequency Rates and Accident Severity Rates will be monitored continuously.</p> <p><u>The Employer’s comments on the Consultant’s safety management</u></p> <p>There is no comment from the Employer.</p> <p>Strict management is applied to the Contractor by issuing Non-Conformance Report when the Contractor’s performance is fail to meet the requirements and/or plans.</p> <p>No further action from the Consultant to the Contractor was requested by the Employer.</p> <p><u>Accident with professional identifications and/or instructions</u></p> <p>Damages to the Employer due to such accident shall be insured. Executive responsibility of</p>	

Meeting Minutes	
Time	January 10, 2013 (Thu) 10:30 – 12:00
Venue	Japan Airport Consultants, Inc. (JAC) Noi Bai International Airport T2 Terminal Construction Project Office
<p>the Consultant shall be insured. Insuring limit is the Contract amount for the Consultant. The Employer seems to have decided this arrangement with reference to the other ODA project. It is not confirmed if the requirement meets the Vietnamese Law.</p> <p>6. Compliance, Safety and Health Regulations in Vietnam It is managed according to each kind of regulations in Vietnam.</p>	



Meeting Minutes	
Time	January 11, 2013 (Tri) 13:50 – 14:20
Venue	Vietnam Construction and Import-Export Joint Stock Corporation (VINACONEX) Noi Bai International Airport T2 Terminal Construction Project Office
Attendance	VINACONEX (VNX) : Safety Manager, Deputy Director of Construction Department, Permanent PPE Manager, Vice Manager of Foreign Affairs & IR Division – Department of Legal & Foreign Division Safety Study Team
Subject	Briefing on the Safety Study and hearing survey on current situation
<p>Record :</p> <p>Safety Study Team held a briefing on the Safety Study. After that, VNX explained as itemized below.</p> <ol style="list-style-type: none"> <li>Any differences in safety measures between JICA’s projects and other projects in Vietnam? Vietnamese regulations are being applied to other projects in Vietnam. Some issues under the JICA’s projects need to be complied with JICA’s guideline. In case of the Contract with Japanese main contractor, management basis of the main contractor is Japanese safety regulations brought by the main contractor in addition to the Vietnamese regulations. It is recognized that Japanese safety regulations are quite useful.</li> <li>How is Japanese firm’s effort to safety management evaluated? VNX has long-term cooperative relation with Taisei Corporation. VNX obtained very useful experiences and knowledge from them through the relationship. It is recognized that there are many matters to be learned from them. While many Japanese firms seem to come to Vietnam for their business, local companies shall establish excellent safety management policy.</li> <li>Safety management section is established in VNX? VNX regards safety management as most important. Safety management committee is established by President and safety section is supporting the committee. Subsidiary companies also have similar committee established by head office director and managed under head office’s committee. In addition, safety unit is set up in each project. Independent safety unit may be formed in large project and managed by the large project independently.</li> <li>How is safety policy and safety management system in VNX?</li> </ol>	

Meeting Minutes	
Time	January 11, 2013 (Tri) 13:50 – 14:20
Venue	Vietnam Construction and Import-Export Joint Stock Corporation (VINACONEX) Noi Bai International Airport T2 Terminal Construction Project Office
<p>No specific policy in VNX. Just according to ISO policy.</p> <p>There are two bases, one is Vietnamese regulations and another is Japanese General Contractor's policy. It is considered that compliance with Japanese policy will bring future benefit to VNX.</p> <p>5. Any target of safety management? Any target value? There is no specific safety target value in Vietnam.</p> <p>6. Any penalty to serious accident, such as fatal accident in Vietnam? There are clear penal provisions stipulated in Decree and Circular. A fine will be imposed to ordinary violation. Criminal action may be taken to fatal accident. Non-compliance of regal documents will be treated as violation of law. Each Vietnamese company establish company regulations according to government safety related regulations to manage the business. There are penal provisions in JV regulations for Noi Bai T2 Project.</p> <p>7. How is safety training for staff? VNX is carrying out safety training for all managers including sub-contractors as commencement of the Works. Trainings for leaders of subsidiaries are provided three to four times per annum. These trained leaders train their subordinates.</p>	

Meeting Minutes	
Time	January 11, 2013 (Fri) 14:40 – 15:15
Venue	Airports Corporation of Vietnam (ACV)'s Project Management Unit for Noi Bai International Airport Terminal 2 (PMUT2) office
Attendance	PMUT2 : Deputy Director, Deputy Manager of Planning & Administrative Department Safety Study Team
Subject	Briefing on the Safety Study and hearing survey on current situation
<p>Record :</p> <p>Safety Study Team held a briefing on the Safety Study. After that, PMUT2 explained as itemized below.</p> <ol style="list-style-type: none"> <li>1. Prevention of accident affecting Airport Operation, Airplane Operation, Aircraft bodies and Passengers  Safety is being managed according to Safety First Policy, JICA's guideline and Vietnamese regulations.  Noi Bai International Airport Authority (NIAA) is taking all over responsibility and having guidance of construction safety management.  Coordination meeting for all construction contract packages is held and chaired by NIAA.  Construction method statement shall be prepared and submitted by each contractor of package and include coordination procedure with other packages.</li> <li>2. Safety section in organization  Five exclusive safety staffs are allocated to PMUT2 as Environment, Safety and Health Section.  Deputy Director (DD) is one of five staffs and listed in emergency communication network.  DD is available for taking emergency call in timely manner.  DD does not attend safety patrol.</li> <li>3. Target of safety management  Policy to minimize accident as less as possible is applied. No specific target value.</li> <li>4. Expectation and evaluation of performance by CS Consultant and Contractor in terms of site safety  Efforts taken by both of them are highly evaluated.</li> </ol>	

Meeting Minutes	
Time	January 11, 2013 (Fri) 14:40 – 15:15
Venue	Airports Corporation of Vietnam (ACV)'s Project Management Unit for Noi Bai International Airport Terminal 2 (PMUT2) office
<p>Their performance is very professional although local workers awareness of safety are different from those in Japan. Their performance so far satisfied PMCT2.</p> <p>The Consultant has coordinated well with other packages too.</p> <p>5. Compliance System</p> <p>Safety management staffs have training certificate of scaffolding and electric works.</p> <p>State company, ACV is timely informed of the latest regulations. Those will be transferred to PMUT2 every updating time and further transmitted to the Consultant and the Contractor.</p> <p>T2 Project is Prime Minister's Project. Therefore compliance system is well established.</p>	

Meeting Minutes	
Time	January 15, 2013 (Tue) 9:00 – 9:30
Venue	Airports Corporation of Vietnam (ACV)'s Project Management Unit for Noi Bai International Airport Terminal 2 (PMUT2) office
Attendance	PMUT2 : Deputy Director, Deputy Manager of Planning & Administrative Department JICA : Project Leader, the Project for Support on Establishment of the Program for Operation & Maintenance in Noi Bai International Airport Safety Study Team
Subject	Interim Study Report
<p>Record :</p> <p>Safety Study Team reports the following Interim Study Results.</p> <ol style="list-style-type: none"> <li>1. Safety Track Record Lost Time Frequency (LTF) is zero as of November 2012. However it became 0.95 due to two accidents occurred in December 2012.</li> <li>2. Safety Policy and Target TVJV strictly follows the Taisei Corporation's safety policy.</li> <li>3. Safety Organization As of December 31, 2012, TVJV had 249 staffs to carry out the project. EHS division is becoming a relatively big organization with 40 staffs including security guards.</li> <li>4. Safety Management plan TVJV has introduced a very sophisticated "Project Health &amp; Safety Management Plan".</li> <li>5. Routine Activity TVJV has set up and has been carrying out routine activities to inspect and monitor the safety performance of the project. And also to maintain timely and effective communication among management, staffs, sub-contractors and workers, different meetings are being held regularly.</li> <li>6. Safety Promotion and Training TVJV has been providing three different programmes, such as General safety training, Job safety training and Safety management training.</li> <li>7. Incentive and Penalty Scheme</li> </ol>	

Meeting Minutes	
Time	January 15, 2013 (Tue) 9:00 – 9:30
Venue	Airports Corporation of Vietnam (ACV)’s Project Management Unit for Noi Bai International Airport Terminal 2 (PMUT2) office
<p>TVJV prepares a contract clause with its subcontractors to implement the safety plans to the satisfaction of TVJV. On the other hand TVJV motivates its subcontractors to improve their safety standard through various incentive schemes.</p> <p>8. Emergency Procedures Emergency Procedures are established for the case of “Fire”, “Security”, “Accident” and “Environmental Accident/Incident” respectively.</p> <p>9. Remarkable Safety Activities and Measures at site Ten remarkable safety activities and measures are introduced with photos.</p> <p>10. Current Safety Level With consistent effort of TVJV and parties concerned, the safety level of the project has reached to the satisfactory level in all respects. The next challenge of TVJV is how to maintain the current safety level. It is always said that the progress of the Works and increased activities would bring about a correspondingly high accident risks. TVJV’s continuous and ceaseless efforts to keep current high level safety standards.</p> <p>11. Safety Recommendation The following three recommendations are made.</p> <p>① Careful coordination and cooperation of adjacent projects are extremely required to reduce accident risks. The leadership taken by ACV is also highly expected.</p> <p>② “Awaiting decisions of relevant authorities”, “idling works due to improper coordination among relevant authorities” and “decrease in production efficiency due to lack of cooperation of relevant authorities” need to be avoided under ACV’s leadership in order to reduce accident risks which are concerned in tight construction schedule.</p> <p>③ Constant discussion and ceaseless reminder in respect of fire risks, which will cause strong impact to public, need to be maintained in order to avert such critical risks.</p>	

Appendix – 2

Meeting Minutes (Sri Lanka)

Meeting Minutes	
Time	January 17, 2013 (Thu) 10:20 – 11:20
Venue	Ceylon Electricity Board (CEB) PMU Office
Attendance	CEB PMU, Project Manager (Main Civil Works) JICA, Project Formulation Advisor Safety Study Team
Subject	Briefing on the Safety Study and hearing survey on current situation
<p>Record :</p> <p>Safety Study Team held a briefing on the Safety Study. After that, CEB PMU explained as itemized below.</p> <p>1. Safety measures of JICA and Japanese Contractor</p> <p>JICA and Japanese Contractor are fully aware of safety in construction site. However standards and measures actually applied in Japan were not always applied to the project in Sri Lanka.</p> <p>They did not take the best safety measures at site and therefore some accidents occurred. Safety Manager was not exclusively appointed and took on the post of Environmental Manager.</p> <p>Appointment of Japanese Safety Manager who had technical career had been expected. Although weekly safety inspection was recommended and executed every Monday, fatal accident occurred.</p> <p>Evaluation on safety plan other than cost offered by the tenderers might be required in tender stage. Tender requirements might not be sufficient.</p> <p>There is no provision for training in the Contract. Tool Box Meeting was held at site. However it is not sufficient as training for workers. The provision for training should be included in tender documents.</p> <p>Communication system had no problem and was well functioned.</p> <p>It was notable that training for hazard prediction was carried out.</p> <p>Different contractor's staffs in charge were allocated to dam, tunnel and power house respectively and different minds and measures for safety were applied by them.</p> <p>Vibration and noise monitoring were carried out during blasting operation.</p> <p>There were many construction vehicles driving in public road. It was controlled with local police.</p> <p>2. Safety section in organization</p>	



Meeting Minutes	
Time	January 17, 2013 (Thu) 10:20 – 11:20
Venue	Ceylon Electricity Board (CEB) PMU Office
<p>It is good to establish safety section in PMU. CEB has Environment Safety Officer.</p> <p>3. Target of safety management Accident shall be minimized. There is no specific target value.</p> <p>4. Evaluation of performance by Consultant and Contractor in terms of site safety It was quite good but was not the best.</p> <p>5. Compliance System There are Factory Inspectors in Sri Lanka. They had come to inspect the Project on a few occasions. It was not routine inspection. The Engineer had stopped the Contractor's works several times in order to rectify ladders and stairs for safety of slope work.</p> <p>6. Local Contractors It is recognized that main contractor shall take responsibility of safety in Sri Lanka. Many inexperienced workers are thinking those helmet and safety boots are restricting their working. Major contractor, such as MAGA has good performance.</p>	

Meeting Minutes	
Time	January 22, 2013 (Tue) 11:40 – 12:10
Venue	Ceylon Electricity Board (CEB) PMU Office
Attendance	CEB Additional General Manager (Projects)
Subject	Interim Study Report
<p>Record :</p> <p>Safety Study Team reports the following Interim Study Results. “Safety and Health Manual in Construction” obtained from JICA in Hanoi was introduced to CEB.</p> <ol style="list-style-type: none"> <li>1. Safety Track Record Accident Frequency Rates (ARF) is 0.24 as of December 2012.</li> <li>2. Safety Policy and Target MNJV applied Ten policies in Safety and PM Policy, and strictly follows the Maeda Corporation’s Safety Targets.</li> <li>3. Safety Organization Project Manager should undertake overall responsibility for safety on the project. Safety organization consists of ESM (Environmental &amp; Safety Manager), ES Engineer, Safety Officer and Safety Supervisors.</li> <li>4. Safety Management Plan MNJV has introduced a very comprehensive “Safety Manual” for the Safety Management Plan.</li> <li>5. Routine Activity MNJV has set up and has been carrying out various routine activities such as “Regular Group Meetings” and “Regular Safety Inspections”.</li> <li>6. Safety Promotion and Training MNJV has been implementing various efforts such as placing “Displays” and “Safety Days” on site and establishing Safety Induction Course.</li> <li>7. Incentive and Penalty Scheme Safety Administrative Charges are applied to Sub-contractor whose staffs ignores JV’s Safety and Health rules and regulations where self regulatory on safety matters do not show</li> </ol>	

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<p>any improvement. Collected charges are utilized for safety promotion including safety award.</p> <p>8. Emergency Procedures Emergency Procedures are established for the cases of “Accident” and “Serious Accident” respectively. Accident is reported to PM as soon as possible, within 30 min.</p> <p>9. Remarkable Safety Activities and Measures at site "High-place work" and "Interface with other Lot contractors" are key issues of this project. MNJV planned and designed their method of construction and these methods of construction are presented, prior to execution, to supervisor and respective workers by Section Managers with 3D sequential drawings to allow them fully understand its process of construction from beginning to completion.</p> <p>10. Recommendation In project management, its key elements are Q(quality), C(cost), D(duration), S(safety), and E(environment) and they should be given each of the elements equal weighting. However it seems that the reality is a little different for contractors and clients. Therefore it is quite important especially for public-sector-clients to clearly declare that “The Safety should be above everything else” and the policy is to be backed by the reasonable budget. In this regard powerful initiatives of the clients are highly required. Risks of accident are relied on contractor’s capacity of management and it is quite difficult to improve the capacity during the construction stage. The following precaution should, at a minimum, be taken during preparation and tender stage of the project.</p> <ul style="list-style-type: none"> <li>➤ To eliminate contractors holding poor safety records from tender</li> <li>➤ To describe more specific terms and conditions in the tender documents in respect of safety</li> <li>➤ To provide specific line items for safety in the BQ allowing contractors to fill in reasonable safety measures price</li> </ul> <p>The project has come to the final stage for completion and some minor works and rectification works are on-going. There are still potential accident risks including public</p>	

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<p>accidents. Since some fatal accidents have reportedly occurred at final stage of projects, then stakeholders' continuous and ceaseless efforts to eliminate accidents risks are highly required.</p> <p>CEB commented on the report as follows:-</p> <ul style="list-style-type: none"> <li>➤ Many accidents are caused by careless workers.</li> <li>➤ Workers for high-place work shall use safety belt as stipulated in Sri Lank regulation. CEB has suspended the works in case of no safety belts at site.</li> <li>➤ “Safety and Health Manual in Construction” obtained from JICA in Hanoi is very useful.</li> <li>➤ CEB fully agreed on recommendation in the report. Budget for safety measure shall be independently allocated for tendering.</li> <li>➤ Since some fatal accidents have reportedly occurred at final stage of project, then stakeholders' continuous and ceaseless efforts to eliminate accidents risks are highly required.</li> </ul>	

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Venue	MAGA Engineering (Pvt) Ltd. (MAGA)
Attendance	MAGA : Manager – Quality Assurance Safety Study Team
Subject	Safety Management of MAGA
<p>Record :</p> <p>Safety Study Team visited MAGA, prime construction company in Sri Lanka to hold a hearing of their opinions on Safety Management.</p> <ol style="list-style-type: none"> <li>1. There are 45 on-going projects in Sri Lanka. MAGA's policy is that safety is their prime concern.</li> <li>2. Management system is based on ISO. MAGA has obtained ISO9001 certificate for quality management and ISO14001 certificate for environmental management by November 2011. Recently MAGA has obtained OHSAS18001 certificate for occupational health and safety management.</li> <li>3. It is recognized that only MAGA as construction company in Sri Lanka was certified under OHSAS18001.</li> <li>4. MAGA has established HSE Procedure Manual, HSE Manual, Quality Procedure Manual, Quality Manual. All of them are in English. MAGA's managers are skilled at English. MAGA's workers can be lectured and trained by the managers in local language.</li> <li>5. MAGA made effort to improve safety awareness of staffs and workers by means of safety promotion activity from commencement of works. Those activities include safety induction course for new-comer and risk evaluation (hazard prediction training).</li> <li>6. Safety officers are appointed to many construction sites. Most of local construction contracts require such appointment of safety officer at site as contract provision.</li> <li>7. Qualification of Safety Officer MAGA are recruiting Safety Officer mainly from former members of army or police who are disciplined well. Newly employed Safety Officer will be trained by two-week company</li> </ol>	

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<p>induction course including site training to improve his awareness and reinforce his knowledge of construction safety. There are some OHS training courses in Sri Lanka. However no definite public training courses are available.</p> <p>Academic qualifications of safety training course or experiences of similar duty in overseas, such as Middle-East become evaluation criteria for employment of safety officer because no definite qualification system is established in Sri Lanka.</p> <p>8. Institute of Construction Training and Development (ICTAD) is controlling all construction companies in Sri Lanka. ISO9001 certificate is compulsory for all construction companies. OHSAS18001 2007 certificate may be introduced as another condition in future.</p> <p>9. General registry of minor, major and fatal accident is required by Labour department. However collected information are not likely formed to reliable statistical data.</p> <p>10. MAGA is carrying out bi-weekly safety patrol to sites around Colombo.</p> <p>11. Testing certificates issued by qualified engineer who is authorized by Labour department are necessary for all lifting equipment and facilities.</p> <p>12. Qualified operators are employed for tower cranes and excavators. The certificates for those operators are issued by private training centre.</p>	