No.

Tehran Disaster Mitigation and Management Organization (TDMMO)
Japan International Cooperation Agency (JICA)

The Project on the Establishment of Emergency Response Plan for the First 72 Hours after an Earthquake in the Islamic Republic of Iran

FINAL REPORT OF STAGE I

March 2007

Pacific Consultants International
PACET Corp.

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PREFACE

In response to a request from the Islamic Republic of Iran, the Government of Japan decided to conduct the Project on the Establishment of Emergency Response Plan for the first 72 hours after an earthquake and entrusted the project to the Japan International Cooperation Agency (JICA).

JICA agreed with the Government of the Islamic Republic of Iran to divide the project period in Stage I (preparation period) and Stage II (implementation period) in the preparatory study of the project.

For the activities of Stage I, JICA sent to the Islamic Republic of Iran an expert team, headed by Mr. Shozo Kawasaki of Pacific Consultants International, between November, 2006 and March, 2007.

The team conducted activities with the officials concerned of the Government of the Islamic Republic of Iran, and prepared this Final Report.

I hope that this report will be utilized effectively for Stage II of the project and for enhancement of friendly relationship between two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Islamic Republic of Iran for their close cooperation extended to the team.

March, 2007

Ariyuki Matsumoto
Vice-President
Japan International Cooperation Agency

Mr. Ariyuki MATSUMOTO
Vice-President
Japan International Cooperation Agency
Tokyo, Japan

March 2007

Letter of Transmittal

Dear Mr. MATSUMOTO,

It is indeed our pleasure to submit herewith the Stage I Final Report on the Establishment of Emergency Response Plan for the First 72 Hours after an Earthquake in Tehran, which has been implemented since November 2006. This report, as the final outcome of the Stage I activities of the Project, compiles the results of PDM-1 and PO-1 for Stage II implementation.

This Report also includes some useful information on the implementation of the Stage II that is being undertaken by both Governments of Iran and Japan, so that the concerned parties can understand the objectives of the Project and give their support for the successful implementation of Stage II of the Project.

During the implementation of the Stage I, Tehran Disaster Mitigation and Management Organization and the JICA Expert Team undertook the selection of pilot projects and preparation of PDM-1 and PO-1 for the Stage II implementation through many discussions with close coordination. This is just a first milestone in the process of the improvement of emergency response capability of Tehran Municipality.

In this regard, we would like to express our sincere appreciation to all the parties concerned for your kind and effective cooperation for the successful implementation of Stage I of the Project, and truly hope for your continuous concern and support to the further implementation of the Stage II.

Very truly yours,

Shozo Kawasaki
Chief Advisor, JICA Expert Team
The Project on the Establishment of
Emergency Response Plan
For The First 72 Hours after an Earthquake
In the Islamic Republic of Iran

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Seminar on Stage I（Mar 6, 2007）

LIST OF ABBREVIATIONS

BHRC	Building and Housing Research Center
CBO	Community-based Organization
CEMS	Comprehensive Emergency Management Secretariat
DMG	Disaster Management Group
DRI	Disaster Reduction and Human Renovation Institution
EDM	Earthquake Disaster Mitigation Centre
ER	Emergency Response
ERCC	Emergency Response Commanding Centre
ERP	Emergency Response Plan
ERS	Emergency Response System
FDMA	Fire and Disaster Management Agency
GOI	Government of Islamic Republic of Iran
GOJ	Government of Japan
ICS	Incident Command System
IIEES	International Institute of Earthquake Engineering and Seismology
IRCS	Iranian Red Crescent Society
JICA	Japan International Cooperation Agency
MLTI	Ministry of Land, Infrastructure and Transport
MOE	Ministry of Education
MOI	Ministry of Interior
NCNDR	National Committee for Mitigation of Natural Disaster Effects
NIED	National Research Institute for Earth Science and Disaster Prevention
NGO	Non Governmental Organization
PDM	Project Design Matrix
PJCC	Project Joint Coordination Committee
PO	Plan of Operation
QD&LE	Quick Damage and Loss Estimation
READY	Real time Assessment of Earthquake Disaster in Yokohama System
RRCP	Rescue and Relief Comprehensive Plan
SCI	Statistics Center of Iran
SDC	Swiss Development Corporation
SOPs	Standard Operation Plans
TCEMP	Tehran Comprehensive Emergency Management Plan
TCDMP	Tehran Comprehensive Disaster Management Plan
TDMMC	Teheran Disaster Mitigation and Management Centre
TDMMO	Teheran Disaster Mitigation and Management Organization
TMCSO	Tehran Municipality Computer Service Organization
TGIC	Tehran Geographic Information System Center
UNDP	United Nations Development Programme
WHO	World Health Organization

1. INTRODUCTION

1.1 Project Background

The capital city of Tehran in the Islamic Republic of Iran is located in the world's most active seismic belt, which is thought to produce a severe earthquake once in about 150 years. It has already passed 150 years since the last one in 1830.

Under these circumstances, in response to Government of Islamic Republic of Iran (hereinafter referred to as "GOI"), Japan International Cooperation Agency (hereinafter referred to as "JICA") conducted *The Study on Seismic Microzoning of the Greater Tehran Area in the Islamic Republic of Iran* (hereinafter referred to as "Microzoning Study"). Microzoning Study concluded that the severe earthquake can cause approximately 380,000 casualties in the worst scenario. Considering the damage estimation, GOI requested JICA to implement *The Comprehensive Master Plan Study on Urban Seismic Disaster Prevention and Management for the Greater Tehran Area in the Islamic Republic of Iran* (hereinafter referred to as "Master Plan Study") in order to formulate a systematic seismic disaster management plan presenting framework in each phase of normal situation, emergency response and rehabilitation and reconstruction.

In the course of Master Plan Study, a severe earthquake hit Bam in December 2003, killing and injuring more than 40,000 people and leaving much of the city in ruins. The 2003 Bam Earthquake prompted GOI to take full account of the importance of emergency response system. However, the emergency response plan has not been realistic and effective enough yet since it does not include specific action plans.

Against such a background, GOI requested Government of Japan (hereinafter referred to as "GOJ") to provide technical cooperation. In response to this request, JICA dispatched a preparatory study team from April to May 2006 and made an agreement on Record of Discussions with Tehran Disaster Mitigation and Management Organization (hereinafter referred to as "TDMMO") on August 29, 2006.

1.2 Project Objectives

The Project is divided into two stages, Stage I (preparation period) and Stage II (implementation period) as described in Figure 1.2.1. Based on the additional survey and examination to be undertaken in Stage I, Project Design Matrix (PDM) 0 and Plan of Operation (PO) 0 will be modified to be implemented in Stage II. The contents of Stage II of the Project will be determined on the basis of the discussion between TDMMO and JICA at the end of Stage I.

Therefore, Stage I focuses on Output 0 whereas Stage II aims at producing Outputs from 1 to 4 based on Output 0, as shown below.

<Overall Goal>

Tehran's capacity for emergency response for the first 72 hours after an earthquake is improved.

<Project Purpose>

The emergency response plan and its related systems after an earthquake in Tehran are improved and the implementation bodies including communities are strengthened.

<Outputs>

Output 0

Draft of Project Design Matrix (PDM) and Plan of Operation (PO) for Stage II is established.

Output 1

The emergency response plan (ERP) and operation after an earthquake in Tehran are improved.

Output 2

Quick Damage and Loss Estimation (QD&LE) system is developed and operated.

Output 3

A community level emergency response system (ERS) is established and its implementation organizations are prepared.

Output 4

Emergency response systems related to selected activities are improved and tuned (In addition to quick damage and loss evaluation and promotion of community activities, other activities will be selected at the end of stage I).

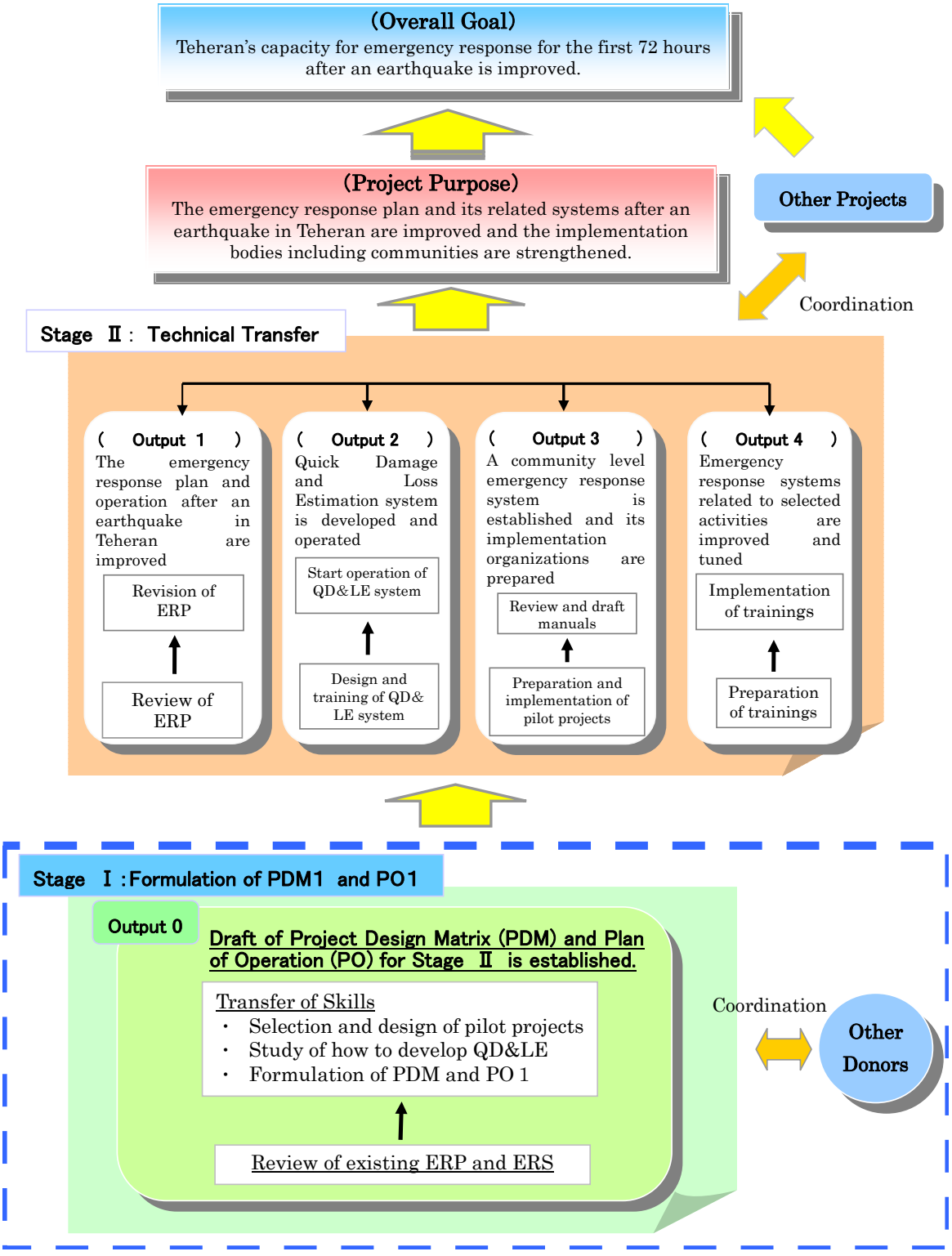

Figure 1.2.1 Framework of the Project

Legend: ERP: Emergency Response Plan PDM: Project Design Matrix QD&LE: Quick Damage and Loss Estimation
ERS: Emergency Response System PO: Plan of Operation

1.3 Project Area

The Project covers the whole municipality area of Tehran as shown in Figure 1.3.1.

Source: The University of Texas at Austin Website, Iran (Political) 2001, 2001

Figure 1.3.1 Project Area

1.4 Project Organization

The Project has been carried out by Iranian Counterpart through technical transfer from the JICA Expert Team. Project Joint Coordination Committee (PJCC) supervises the project implementation.

Steering Committee and Coordinating Committee provide some advice for Project Director and Project Manager respectively as their consultative groups in order to implement the project effectively, efficiently and punctually.

Figure 1.4.1 shows an overall picture of the project organization.

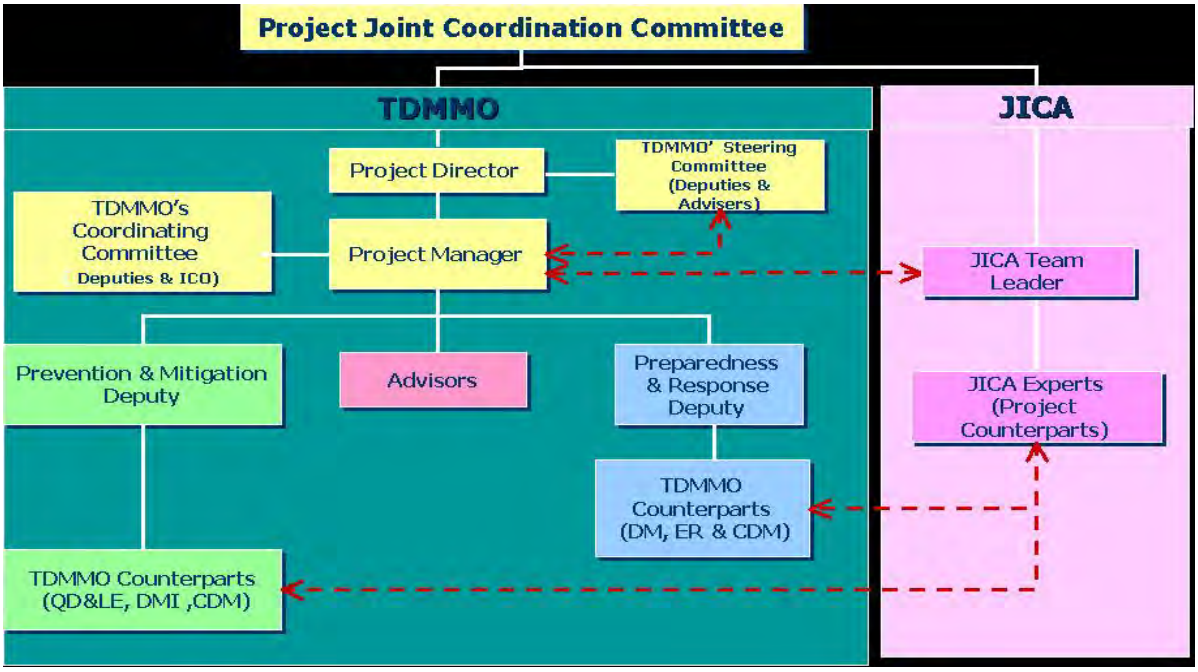

Figure 1.4.1 Project Organization

2. REVIEW OF EXISTING EMERGENCY RESPONSE SYSTEM

2.1 Disaster Management Laws and Regulations

2.1.1 Review of disaster management regulatory framework in Iran

Laws and regulations in the past 20 years have established a disaster management system in Iran. Following is a summary of the important regulatory framework in the disaster management and related aspects.

(a) Constitution

It states the basic principles of the government responsibility regarding disaster management. Two articles are indirectly relevant to disaster management: Article 29 of Welfare Rights and Article 31 of Housing.

(b) The Law of Foundation of National Committee for Mitigation of Natural Disaster Effects (NCNDR) in 1991

The law is the first regulations in Iran in the field of disaster management system. This law and together with the Council of Minister Decree of 2003 governed the basic foundation of Iran's disaster management system.

- The Ministry of the Interior (MOI) is to act as the supervisory body of disaster management-related entities and activities
- The law on natural disaster is laid out by type of disaster
- It identifies 14 line ministries, government entities and NGOs as the principal entities in disaster management.
- It transfers the authority to establish the required sub-committees to the National Committee empowering the Committee to announce any emergency situation
- It delegates the authority to the National Committee to approve the budget (funding) needed by the above entities for the realization of their responsibilities.
- It charges the MOI to issue the necessary instructions for the establishment of provincial level committees to be placed under the supervision of the governor of each province
- It directs the MOI to inform all Islamic Consultative Assembly Commissions of the results of the activities of involved entities every six months.

(c) Council of Minister Decree of 2003

In order to execute the Law, the Council of Ministers Decree of 2003 regulates individual duties of sub-committees in disaster management.

- Article 1 of the Council of Ministers' Decree identifies the core-function(s) for nine specialized Sub-committee established by the Decree.
- Article 2 to Article 14 regulate general meeting schedules, administrative matters and some procedural issues. Article 4 and 10 are summarized below.
- Article 4 defines the decision mechanism of the Sub-Committees, i.e. a quorum is established through the attendance of two-thirds of sub-committee members. Once a quorum is present, a majority vote is needed to pass a motion.
- Article 10 defines duties of nine Sub-Committees. The overall and general duties of subcommittees are the implementation of studies and research on the prevention of natural disasters and/or mitigation of their effects. The details of duties of subcommittees will be prepared by the members of the relevant committee and will be approved by the National Committee for Mitigation of Natural Disaster Effects.
- With regard to the nine sub-committees, risk assessment for earthquake and landslide as well as relief and rescue operation are directly related to earthquake disaster management. The Sub-Committee is responsible for studies, research and education plans in risk estimation, creation of an alarm and early warning system and the preparation of relevant laws and regulations, criteria and standards. They are also to coordinate with the provincial sub-committee, plan education and training program, hold the seminars and propose annual planning and budget.

(d) Rescue and Relief Comprehensive Plan (RRCP) of 2003

RRCP is a comprehensive document composed of 57 individual articles regarding the disaster management in Iran. It contains the national, provincial and township level disaster management system. The following gives a summary of the important articles that are related to the Project.

- The objectives of the plan are defined in RRCP: (1) To realize scientific study and research transfer of the modern and advanced disaster management methods, (2) To implement national and district level plans and investments with priority areas of prevention and mitigation, (3) To provide a unified management and delineate duties and responsibilities of all executive branch organization, (4) To mobilize people's participation and organize and train volunteer forces of a disaster management network, and (5) To ensure efficient utilization of government and non-government resources and ensure the required support of line ministries, other organizations and the Armed Forces, particularly the " Resistance Mobilization Force".
- Article 2 to Article 4 regulate three levels of disaster management organization in Iran: national, provincial and township levels.
- Article 53 mentioned "Tehran Comprehensive Emergency Management Plan (TCEMP)". It was approved only in the 8th session of the National Committee for Natural Disaster Reduction.

- Article 54 defines the establishment of a Disaster Management Group (DMG) in both urban and rural areas. Any location and/or entity that has over 25 residents or employees receives over 25 visitors daily, exceeds six floors and any structure that has been damaged and/or poses danger for the vicinity must form a DMG. The responsibility for compliance with the conditions set forth in this article falls on the respective municipalities for urban areas and the Secretariat of the Provincial Office for rural area.

2.1.2 Regulatory Framework for Tehran Municipality

In Tehran Municipality level, there are two sources of the regulation, which formulate Tehran's disaster management system: Tehran Mayor's Decree of May 2003 that formally established Tehran Disaster Mitigation and Management Centre (TDMMC) and Tehran Mayor's Decree of May 2004 regarding disaster management system in Tehran. In Article 17 of this decree, it is stated that TDMMC is to change its name to Teheran Disaster Mitigation and Management Organization (TDMMO) in 2006. The Decree covers whole subjects of the disaster management in Tehran and consists of six chapters, namely: (1) General issues, (2) Disaster management task force in Tehran and relevant task forces, (3) Tehran disaster mitigation and management organization (TDMMO), (4) Organization in charge of disaster management in Tehran, (5) Disaster management groups in important buildings in Tehran and (6) Other regulations.

The Decree regulated whole aspects of the disaster management organization, role and responsibility, and others related to disaster management. TDMMO gained statutory functions, positions and responsibilities.

2.2 Roles and Responsibilities of Disaster Management Organizations

2.2.1 Organizational Responsibility

The national level organization has been defined by the RRCP of 2003, in which delineated three levels of government agencies: national, provincial and township levels of organization. The disaster management, mitigation, preparedness, emergency response and rehabilitation and reconstruction are main responsibilities of the Ministry of Interior and the Governors of respective provinces. The Tehran Municipality was the only exception; the mayor of Tehran is the one responsible for disaster management within the municipality.

City and community levels are not mentioned in the RRCP. The decision has not yet been finalized for community levels organization.

2.2.2 Tehran Municipality Level

The 18 Articles of the Empowering Disaster Management System in Tehran of May 2004 defines TDMMO's responsibilities. According to the 2004 decree, the Tehran Municipality's disaster management system is formed as shown below.

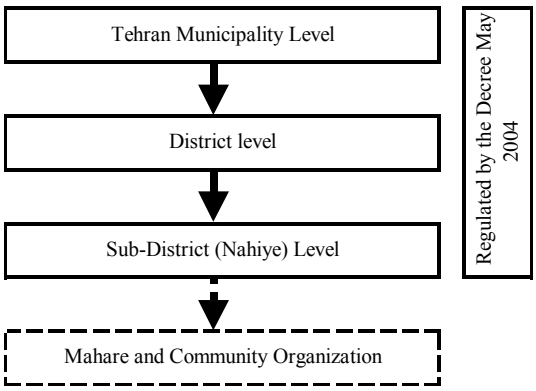

Figure 2.2.1 Hierarchy of Tehran Municipality's Disaster Management System

TDMMO deals with disaster management of the Tehran municipality under the Tehran mayor. In order to formulate disaster management policy and programs and supervises the implementation of disaster management in Tehran, it established "Disaster Management Task Force in Tehran". The detailed roles and responsibilities of the task force are contained in Chapter 2 of Article 6 of the Mayor's Decree of May 2004. In the same manner, a district level of the task force has been established with members now membering 20 emergency response organizations. Sub-district (Nahiye) level task forces for disaster management are also formed.

TDMMO is responsible for four areas of disaster management, namely mitigation, preparedness, emergency response, and rehabilitation and reconstruction, covering both natural and man-made disasters.

Chapter 4, Article 24 of the Decree of Mayor May 2004 governs the emergency response phase of TDMMO in the emergency response phase. It states that the all related organizations in charge of emergency response in Tehran should work closely with TDMMO in accordance with the policy and decisions set force by the task force at the national level.

2.3 Disaster Management Plans and Implementation Systems

2.3.1 Tehran Comprehensive Emergency Management Plan (TCEMP)

TCEMP is an emergency response plan that governs 24 organizations under the 22 committees that have been formed to address emergency situations. The Mayor's Decree of

May 2003 defined the legal and institutional requirements of TDMMO to enable it to take charge of disaster management in Tehran. TCEMP defines the mandates and functions of TDMMO.

The objectives of TCEMP are defined as relief and rescue, settlement and logistics managements. TDMMO continues to implement the requirements of the "Emergency Response Plan" (ERP) by establishing the definition and introduction of "Standard Operation Plans" (SOPs) and Incident Command System (ICS) in all relevant participating organizations a unified management structure.

The organizational set-up of TCEMP is illustrated in Figure2.3.1.

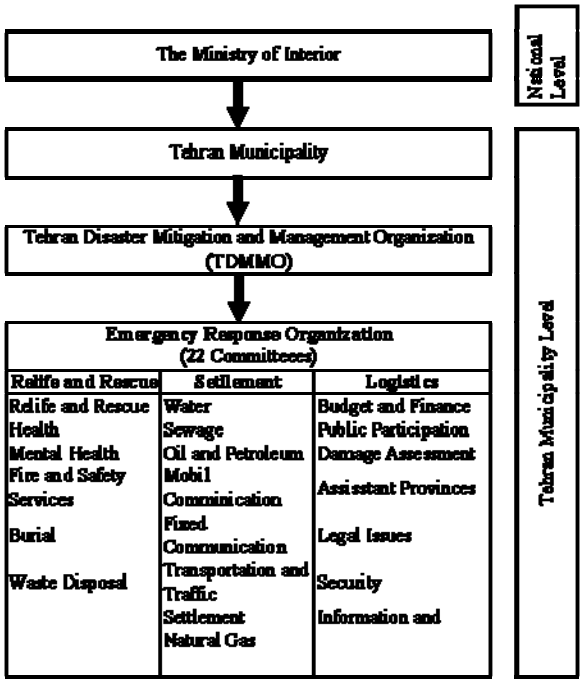

Figure 2.3.1 Organizational Set-up of TCEMP

All 22 SOPs have been finalized and distributed to the participating organizations for application. The SOPs are quite general in nature covering the following typical headlines and explanations: (i) introduction; (ii) objectives of the plan; (iii) purpose of preparing the plan; (iv) policy-making; (v) hypothesis; (vi) disaster levels; (vii) chart of main activities; (viii) action plan for different disaster levels; (ix) organizations in-charge, partners and backup; (x) diagram of activities related to disaster resolution, and (xi) table of level of participation among organizations.

Table 2.3.1 SOP Example – Organizations Responsible for Debris Removal

Organization	Production of Waste Material					Temporary Storage					Collection					Transfer Station					Recycling & processing					Disposal				
	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5
Recycling Organization	p					ic	ic					p				ic	p	p	p	p	ic	ic	ic	ic	ic	ic	ic	ic	ic	ic
Tehran Disaster Management Center	b	b			b			b																						
Private companies active in management of solid waste material					p	p	p	p	p			p	p		p					p										
Environment Protection Organization	b	b	b	b	b																b	b	b	b	b					
Ministry of Industries and Mines	b	b	b	b	b																	b	b	b	b					
Min. of Health, Tratment & Medical Education	b	b	b	b	b																	b	b	b	b					
Min. of Sciences, Research & Technoligy	b	b	b	b	b																									
NGOs (*Basij* and NGOs)	b		b	b	b																									
Deputy for Urban Services/Tehran Municipality and affiliated organizations						b	b	b	p	p	ic	p	ic	ic	p	b	b	b	b	b	b	b	b	b	b	b	p		p
Deputy for District Affairs of Tehran Municipality						b																								
Mass Media					b	b	b	b	b	b						b														
Basij Forces						b	b	b								b														
Disciplinary (police) forces						p	p	p	p																					
Workers in construction sites						p	p	p	p	p																				
Deputy for Training & Research and Public Relation in Recycling Org.	ic	ic	ic	ic	p																									
Service sector of major centers and units producing solid waste material (factories, hospitals, hotels , …)						p	p	p	p	p																				
Other urban producers						ic	p	p	p	p																				
Deputies for Urban Services in District Municipalities						ic	p	p	p	p	p	p	p	p	p			p	b	b										p
Motorized Services Org. in Tehran Municipality							p					ic				p	p	p	p	p										
Deputies for Social & Cultural Affairs in district municipalities		p	b	p	p																									
Private suppliers of machineries											b	b	b	b	b			b	b	b	b									
Relevant organizations and agencies											p																			
Relevant governmental and privatesorganizations and agencies																					p	p	p	p	p					
Contractors (transportation, storage, etc.)											p	p	p	p	p	p	p	p	p	p			p		p	p	p	p	p	p
Producers of solid waste material											p	p	p	p	p															
Tehran Emergency Center																b	b	b	b	b										
Fire Brigade and Safety Services																b	b	b	b	b										
Transportation & traffic Org.																b														
Relevant Governmental Organizations for site selection and land cession including Natural Resources Gen. Office, Environment Org., Army																										b	b	b	b	b
Min. of Education & training		b	b	b	b																									
IRIB (Radio-TV Org.)		b																			p									
Temporary daily paid workers through urban services contractors												p			p			p	p	p										
Companies and organizations that have necessary facilities and equipments												b	b	p	b			b	b									b	b	b
Traffic Police General Office												b	b	b	b							b	b	b	b					
Min. of Commerce																						b	b	b	b					

Notes: 1) ic = in charge; b = back up; p = participating.
Source: Debris Removal SOP, TDMMC.

In line with the requirements of the Tehran Comprehensive Disaster Management Plan (TCDMP), the emergency response (ER) employs an Incident Command System (ICS).

The rationale for using an ICS is to introduce among the various participating entities a common language that uses standardized terms, and also to realize within the participating organizations a uniform command structure in terms of functional assignments and responsibilities that should facilitate inter-agency communications. It must be stressed that this is a functional hierarchy that should not be confused with an organizational structure.

The staffing level of some 29 professionals in 2004 should be interpreted, at this point in time, keeping in mind the following circumstances:

Table 2.3.2 TDMMO Actual Manning Situation By Area of Expertise (March 2004)

Category/ Parameter	Calendar Year	2000	2001	2002	2003	2004 (March)
Professional Staff	Level					
Architecture	n.a.	n.a.	n.a.	n.a.	1	0
Civil Engineering	B.S.	n.a.	n.a.	n.a.	1	4
Computer Science	B.S.	n.a.	n.a.	n.a.	1	1
Earthquake Engin.	Dr.	n.a.	n.a.	n.a.	n.a.	2
Environmental Health	B.S.	n.a.	n.a.	n.a.	n.a.	1
Geophysics	n.a.	n.a.	n.a.	n.a.	n.a.	1
GIS Experts	B.S.	n.a.	n.a.	n.a.	n.a.	2
Medical Doctors	M.D.	n.a.	n.a.	n.a.	2	4
Public Relations	M.S.	n.a.	n.a.	n.a.	1	1
Search & Rescue Mgmt.	B.S.	n.a.	n.a.	n.a.	n.a.	4
Structural Engin.	B.S.	n.a.	n.a.	n.a.	n.a.	3
Transportation	PhD	n.a.	n.a.	n.a.	1	1
Urban Planning	M.S./B.S.	n.a.	n.a.	n.a.	2	2
Languages	B.S.	n.a.	n.a.	n.a.	1	1
Sub-Total		n.a.	n.a.	n.a.	10	27
Supporting Staff	n.a.	n.a.	n.a.	n.a.	2	2
Other Staff	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL		6	9	12	12	29

Notes: 1.) The number are only indicative, since not all personnel shown in 2004 is on the permanent payroll of TDMMC yet.

2.) The manning table has not yet been approved by the relevant authorities.

3.) The term other staff refers to drivers, cleaners, gardeners, and cafeteria staff.

Source: JICA Study Team compilation based on information provided by TDMMC.

It is likewise not clear, at this point in time, how the existing expertise structure actually relates to the individual types of disasters that fall, at least in theory, under the jurisdiction of TDMMO. For example, much of the activities are geared toward addressing earthquake-related disasters, but what about floods and/or industrial accidents?

2.3.2 Experience of Past Earthquakes

As mentioned in the Inception Report, the JICA Team tries to investigate past earthquake experience, especially, the emergency response phase. Attention should be given to the activities of each government organization and draw lessons from the past experience. The limited paper and resources make it difficult to investigate in detail. The experience gained in the Bam earthquake is the most suitable for Tehran Municipality, because it is in urban area, although Bam's population size is only 120 thousand in the earthquake happened at the end of 2003.

Paper review of the past earthquakes in Iran provides some of the lessons learned. Hassani Movahedi (2005)[1] reviewed the Bam earthquake regarding search and rescue and treatment of injured patients.

He pointed out: *"It is bellied that for hours Iranian officials were unaware of the depth of the disaster. This is evident by the fact that the central government did not convene for an emergency session until the afternoon of the earthquake…. It appears that despite previous experience with natural disaster, Iranian officials were not prepared to mount an effective response during the early days after the disaster."* He described the response of the early days of the Bam thus: *"To begin with, various organizations assumed the leadership role, competing rather than cooperating with each other in reaching out to people. From the Ministry of Interior to the Iranian Red Crescent Society (IRCS), the Committee of Relief and the Revolutionary Guards, various representative formed crisis centre in Kerman and Bam, issuing orders without coordinating their efforts. As a result, chaos ruled during the first days of activity"*. Mr. Movahedi reviewed the university associated hospitals of Afzalipour and mentioned that the Kerman city hospital was able to cope with the disaster because of its staff's experience treating the many injured soldiers during the eight-year war between Iran and Iraq.

The article suggested the following points:

- There is no flow of appropriate information among the responsible organizations. Information on the magnitude and epicentres of earthquake is not shared by the responsible organization.
- The initial action by the government is not sufficient. Coordination and commanding system has not been established.
- The mobilization of the rescue and relief team is late, resulting in confusion about the early damage distribution.

The other paper from the World Health Organization (WHO)[2](2006) mentioned the lessons learned from humanitarian response, as a result of a workshop held on June 27-28, 2006. The important points mentioned are quoted as follows:

- Coordination and the response were chaotic during the first hours of the response; due to unclear roles and responsibilities of different authorities.
- Individuals and community-based organizations (CBOs) rushed to provide support during the early hours of the response (e.g. in search and rescue, evacuation etc) lack appropriate basic training.

[1] Search, Rescue, and Care of the Injured Following the 2003 Bam, Iran Earthquake, Earthquake Spectra, Volume 21, No. 51, Pages, S475-S485, December 2005; Earthquake Engineering Research Institute
[2] The WHO Support for the Earthquake-affected area of Lorestan, WHO Representative Office, I.R. Iran June 2006

- Controversial decision and contradicting view of provincial, districts and central authorities on the need for international support hampered timeless and adequacy of UN and INGOs response.
- Response teams from other provinces contributed to the relief operations need training on standardized and comprehensive national guidelines, procedures and protocols for different aspects of disaster management within an agreed and advertised contingency plan.

In both cases, the situation of the early phase of the emergency response in Iran is similar. In conclusion, the following points should take into account for formulating the project.

- Initial action by the government is very weak in the early phase of emergency response. The roles and responsibilities of province (Tehran municipality in case of Tehran) are not well defined and well known by the disaster management-related organization.
- Mobilization of rescue team to the site is haphazard and unstable in the early stage. These organizations are competing rather than coordinating activities.
- The role of community organizations should be defined. They should be trained properly so that they can act independently without instruction from the authority.

These lessons learned should be considered in formulating a more realistic and operational emergency response system in Tehran.

It should be pointed out that the emergency response in general in Iran is very effective and efficient and this is carried out by Red Crescent Society of Iran, which has accumulated experience and information from every incident that happened in Iran. The skill level of the organization is high and its aid workers are used to emergency situations, yet response during the early hours of disaster is the part that is somewhat lacking.

2.4 Quick Damage and Loss Estimation System (QD&LE)

Quick Damage and Loss Estimation System is not available in TDMMO at the present time. In the current response system, TDMMO collect damage and loss information manually from related organization.

2.5 Community-Level Emergency Response

2.5.1 Roles and responsibilities of related organizations

The Empowering Disaster Management System in Tehran May 2004 defines the mandate of TDMMO. In this document, there are three articles defining roles and responsibilities of TDMMO with regard to community-level disaster management.

- Attract community and volunteer rescue and relief force through public training, desirable direction of community aids and fair distribution among disaster victims, organization and retraining the volunteer force in disaster management network (Part 4, Article 4).
- Organization and planning towards taking advantage of public participation concerning in Tehran metropolitan area (Part 5, Article 6).
- Organization, coordination and guidance of community establishment, NGOs and volunteer rescue & relief forces towards cooperation and participation in search, rescue and relief operation as the need arises (Part 7, Article 18).

Accordingly, TDMMO is responsible for promoting community disaster management and coordinating with community-level organizations.

The roles and responsibilities of municipalities at the district level and the sub-district level in terms of community disaster management are not clearly defined in laws and regulations, except the roles of the disaster management centers at the district level on follow-up of ICS establishment at housing complexes and public buildings (see below section).

In these last few years, disaster management centers had been established in all district municipalities and staff were assigned to the centers, while sub-district municipalities do not have any functions related to disaster management at present. TDMMO is now preparing a document to clarify the roles and responsibilities of the district and the sub-district levels.

2.5.2 Organizational structure of TDMMO with regard to community-level disaster management

Following the name change of TDMMC to TDMMO in 2006, a new organizational structure was established in TDMMO recently. There are two offices in TDMMO that are playing roles in community-level activities/public participation. Those offices are:

- Office for Community Based Coordination under Deputy for Preparedness and Response Coordination
- Public Training Office under Deputy for Prevention and Risk Reduction

Existing staff members including newly hired personnel were assigned to the two offices, therefore, at present, the demarcation of roles between the two offices is not clearly defined in

the actual situation. Both offices are involved in community-level activities; the Office for Community Based Coordination for ICS establishment at housing complexes, while the Public Training Office for carrying out the Swiss Development Corporation (SDC) project that aims at establishing volunteer groups at the Mahalle level.

Considering the fundamental functions of each office, the Office for Community Based Coordination is supposed to take the main role for establishing the community disaster management system and coordinating with related organizations in the disaster management network, while Public Training Office is supposed to develop and provide training programs for community disaster management organizations.

2.5.3 Major Activities of TDMMO

After the JICA Master Planning Study was implemented, TDMMO has been actively expanding the activities related to community-level disaster management and/or public participation. The major activities carried out by TDMMO are mentioned below:

(a) Pilot Project for Establishment of ICS at housing complexes

Legal framework

Article 33 of the 70th Official Session Approval of the Islamic Tehran City Council (Second Round) in 2004 provides the specifications of housing complexes and public buildings where ICS has to be established. The specifications are:

- Inhabited by at least 25 residents or employee
- Receiving at least 25 persons at a certain time each day
- Having at least 6 floors
- Provided that any incident happening to the building and its function does not pose danger to neighbouring residents.

According to the article, disaster management centres at the district level are responsible for following up the ICS establishment in coordination with TDMMO.

The same specifications are also provided by the national level "Rescue & Relief Comprehensive Plan" established in 2003.

Implementation of Pilot Project

TDMMO has implemented a one-year pilot project since 2005. Seven districts (District 1 to District 7) were selected as target areas. TDMMO recruited around 20 graduates and district municipalities hired them as advisors. The advisors were trained to support residents at selected buildings to establish ICS according to the guideline prepared by TDMMO (The Guideline for Establishment of Disaster Management Structure in Public Buildings of Tehran).

The activities at each building include the following:

- To explain the process of activities and obtain approval of the building or housing board of directors
- To obtain approval of residents
- To establish ICS according to the standard (Establishment of a task force)
- To provide training (Fire fighting and first aid)
- To prepare one-year disaster management action plan

Organizational chart of disaster management task force at district level and buildings are shown in the guideline.

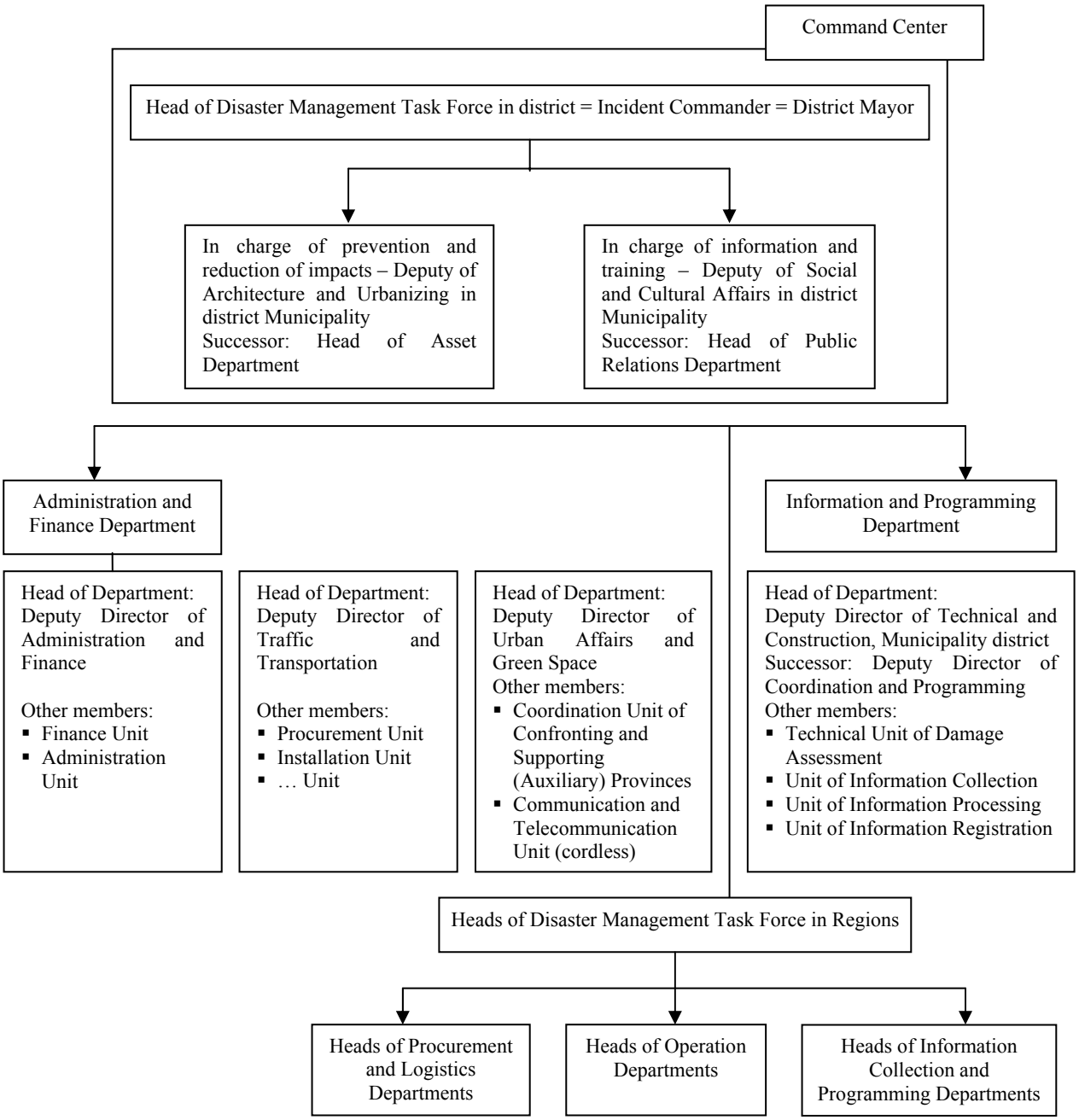

Figure 2.5.1 Structure of Disaster Management Task Force in Tehran Districts (in Times of Disaster)

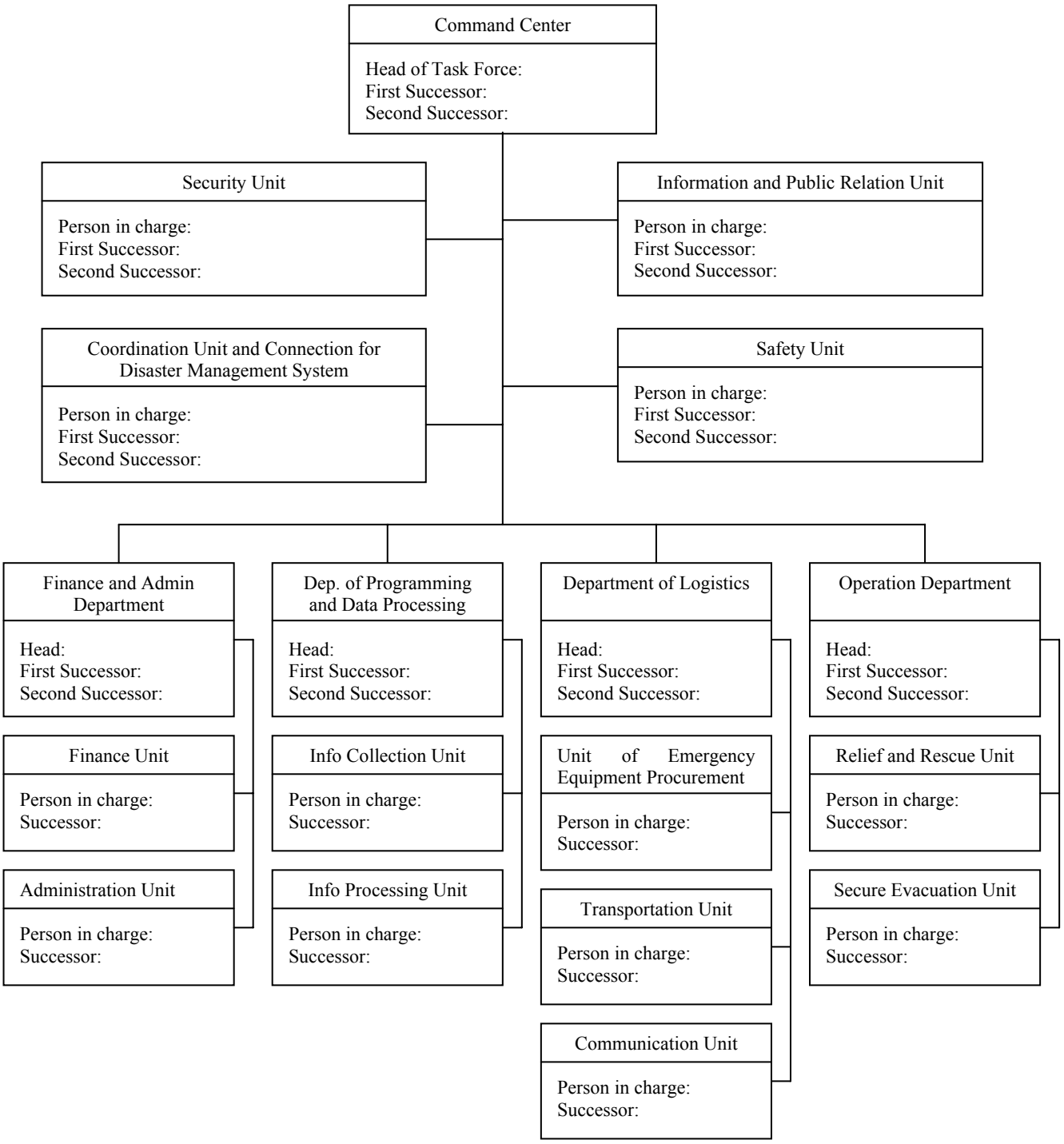

Figure 2.5.2 Structure of the Disaster Management Task Force in Public Buildings

Evaluation of the Pilot Project

At present, TDMMO is evaluating the pilot project in order to improve the guideline and the strategies for further promotion of ICS establishment at housing complexes. The lessons learned from the pilot project are useful for the establishment of community-level disaster management system. The preliminary evaluation result is as the follows:

- Only a few housing complexes completed the planned process of activities. The process which the guideline mentioned took a long time.
- Awareness of people was very low, making it difficult to motivate members of the board of directors and residents. Measures should be taken to improve the awareness level of people to make them understand the importance of the project; e.g. providing information through media and posters.
- Participants did not clearly understand the purposes and process of the project. Methods of training should be improved.
- Training programs (fire fighting and first aid) were not practical and did not attract residents.
- In many housing complexes, there are no board of directors, or if they exist, they are not actively working.
- After the establishment of ICS, members of the task force did not keep their interests to participate in the activities. In order to sustain the system, it is necessary to follow up and provide continuous support
- Advisors were not trained enough that they did not understand the purpose and the process of the project clearly.
- The salary of the advisors was small. They were not motivated enough to complete the process, while some of them were interested in the activities, having willingness to continue the work in future.
- Some distinct municipalities did not understand the purpose of the project properly. Advisors could not get necessary and sufficient support from them.

(b) Establishment of ICS at large-scale housing complexes and public buildings

In addition to the pilot project mentioned above, TDMMO has been supporting the establishment of ICS at large-scale housing complexes and public buildings including Sepah Bank, Tehran University, high schools, shopping centers and housing complexes such as Shahrak Omid housing complex and Shahgoli housing complex.


Survey and Workshop


Established Task Forces


Drills participated by Residents

Figure 2.5.3 Activities of ICS Establishment and Training at Housing Complexes

(c) Pilot project for establishment of the community disaster management system

TDMMO prepared a draft guideline of community-level disaster management in 2006, which include the organization of the community-level disaster management task force, task description of each department to be set under the task force and implementation instruction to the task force including risk assessment, resource assessment, preparation of data base, identification of evacuation places and routes, etc.

TDMMO identified one community unit in Mahalle Estakhr, District 4, having a mosque as a base of people's network, and implemented a pilot project for 6 months based on the guideline. The task force was established and some activities were carried out. Through the process of the project, some participants gradually became aware of the importance of the disaster management, and they showed a willingness to continue the activity. However, they still need support and guidance from TDMMO to operate the activity.

Figure 2.5.4 shows the organization of the community-level disaster management task force indicated in the guideline.

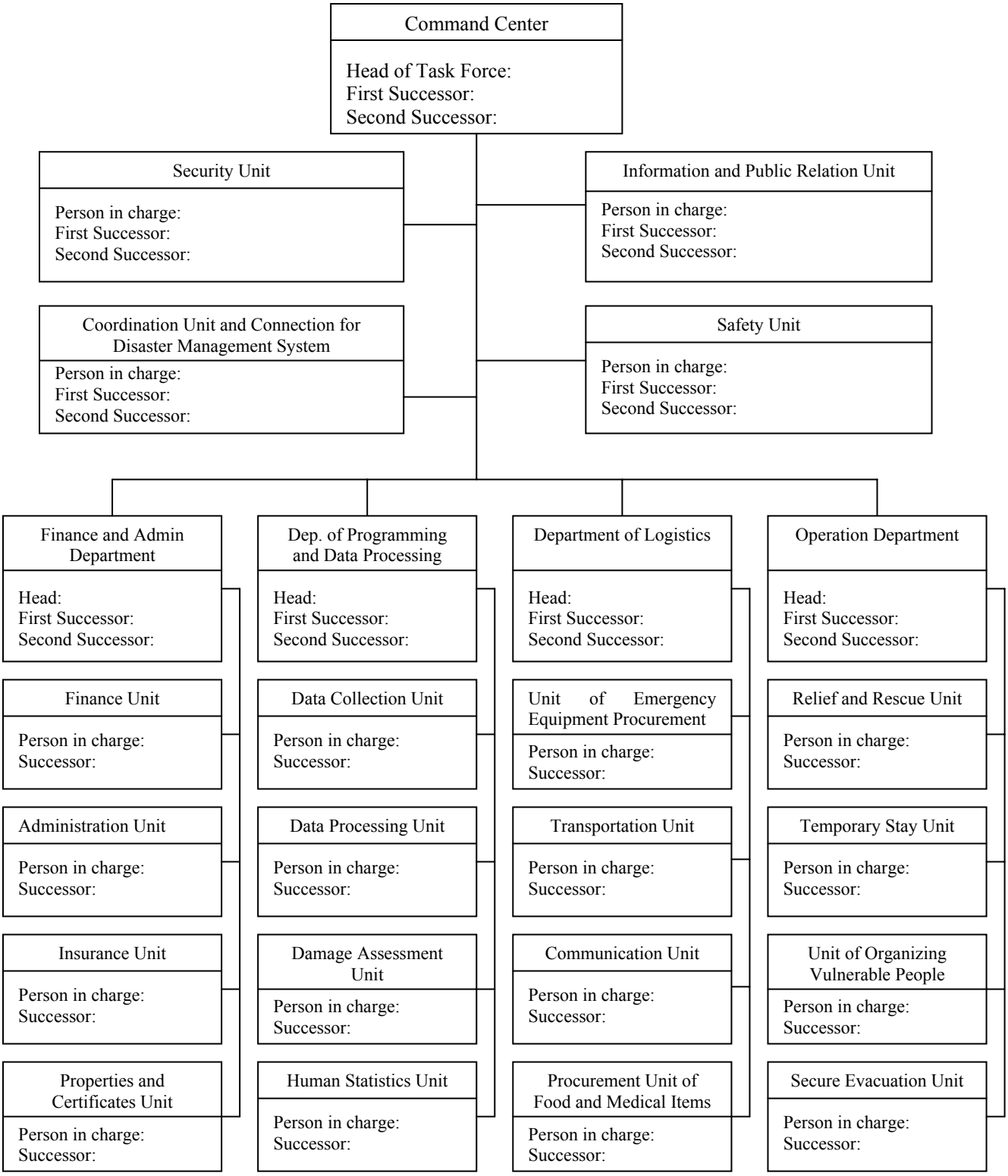

Figure 2.5.4 Commanding System at Community Level

(d) SDC Project for Establishment of Volunteer Groups at Mahalle

The project for establishment of volunteer groups at the mahalle level has been carried out with the assistance of SDC.

The goals of the project were set as follows:

- To reduce the casualties and damages of the citizens in Tehran
- To increase disaster awareness
- To promote community based activities for disaster preparedness
- To strengthen the capacities of civil societies for disaster management, emergency response at the time of disaster occurrence, search and rescue operations after the occurrence of the disaster
- To initiate connections and collaborations among the civil societies and government
- To establish a network among local, national and international organizations

Five districts (district 4, 6, 8, 10 and 17) were selected and one mahalle from each district was selected as a project implementation area.

60 volunteers ranging from ages 18 to 55 years old were selected in each mahalle according to the selection criteria, and they organized as a mahalle rescue group. Training programs were provided for them which covered:

- Earthquake preparation
- Basic search and rescue
- Basic first aid class
- Disaster psychology
- Basic fire prevention and fire fighting techniques

The project team of TDMMO designed the training programs and developed the training materials in collaboration with the fire fighting department and the Red Crescent Society, and prepared a list of equipment necessary for the activity of the mahalle rescue groups.

The project team worked and coordinated closely with district municipalities and Shorayaris (mahalle councils). The awareness level of Shorayari members was high, and they showed a readiness to implement the project activities.

(e) Establishment of school-based emergency response system

Ministry of Education (MOE) had been planning to establish the emergency response system by organizing “School Safely Council” at each school, while TDMMO had been developing the School ICS. There were similarities found in the plans of both organizations, and TDMMO and MOE (Office for Preventing Natural and Social Disaster, Deputy of Sports and Religious Activities) started coordinating with each other in

December 2005 to develop the integrated system, in consideration of existing conditions of schools. Through the series of coordination meetings between TDMMO and MOE, the organization chart of School Safety Council and the task description have been prepared. (See Figure 2.5.5)

It was decided between two organizations that MOE will take responsibility for establishing the School Safety Council while TDMMO will support MOE. At present, the process of signing on an agreement on School Safety Council system between the two organizations is on-going.

MOE want to implement a pilot project to examine the system. MOE is planning to include the pilot project for establishment of School Safety Councils in UNDP project in Kerman.

In addition, the Office for Preventing Natural and Social Disaster of MOE have the strong willingness to develop disaster education materials and education programs, as there are no such programs except the drills implemented once a year in all schools in Iran and training of teachers on disaster management. At present, the disaster education in schools is highly dependent on teachers' capacity and interest. However most of the teachers do not have enough knowledge on disaster management and disaster education.

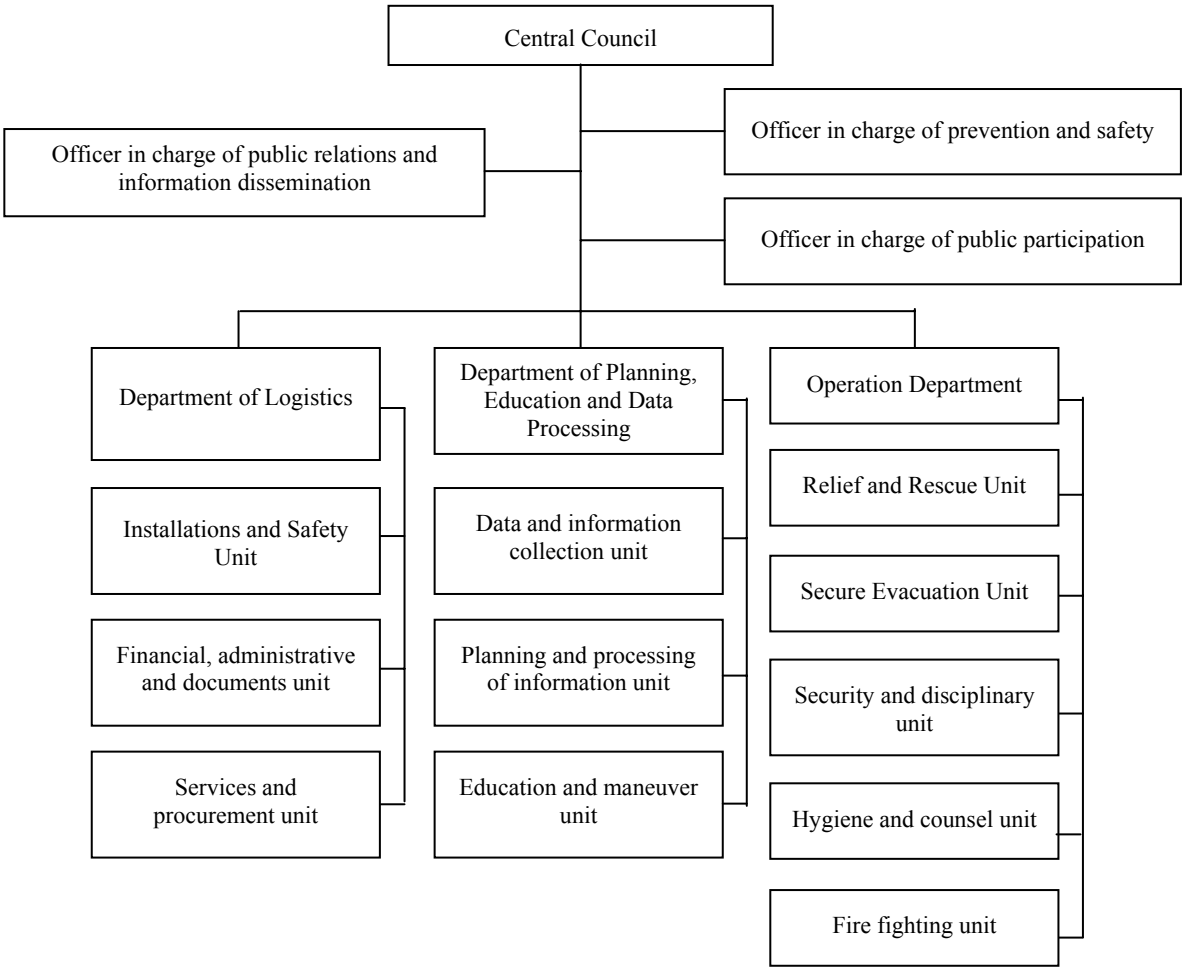

Figure 2.5.5 Organization of School Safety Council

(f) Materials development for improvement of public awareness

TDMMO developed some educational materials targeting children including booklets and CD (See Figure 2.5.6). Those materials were distributed to households, children hospitals, etc. After distribution of the materials, TDMMO conducted a telephone survey to evaluate the impact of the activity. The evaluation report was under preparation.

Figure 2.5.6 Educational Materials Developed by TDMMO

(g) Other activities

TDMMO has been organizing various seminars and workshops to improve the awareness of people on disaster management in collaboration with district municipalities. The training contents include the mechanism of earthquakes, earthquake potential in Tehran, disaster preparedness, strengthening of building structure, and ICS.

In 2006, TDMMO has organized 4-day disaster preparedness workshop for children in Health Exhibition, which was organized by Tehran Municipality. Participants drew pictures and wrote poems related to earthquakes. It was discovered that the children had some knowledge on earthquakes and on what to do when an earthquake occurs. According to the TDMMO staff, the awareness level of people was improved after the Bam earthquake, with the opportunity to obtain knowledge through different forms of media.

Figure 2.5.7 Children's Drawings and Poems

2.5.4 Findings in the Stage I regarding to be considered in establishment of community disaster management

(a) Shorayari (Mahalle councils)

In the Master Planning Study, it was pointed out that the formal link between district municipalities and local residents is lacking and the necessity of a bridge between district offices and individual local residents is indispensable.

In the past year, shorayari (mahale councils) were established in all mahalles in Tehran.

In the plan of shorayari establishment, it was recommended to establish a sub-group for disaster management. The tasks of the group are mentioned in the plan as follows:

- Detecting weak points and vulnerabilities during an occurrence of an unexpected disaster
- Providing local ideas and innovations in respect to prevention and struggle against unexpected disasters
- Training the community in order to increase their strength and awareness in preparedness and mitigation in an unexpected disaster
- Practical cooperation during an occurrence of a disaster and rescue of the victims
- Establishing rescue training, fire brigade, first aids etc. and holding workshops in order to increase the community's awareness during an occurrence of a disaster

At present, there are still no groups for disaster management established in shorayari. Though it is necessary to confirm the future potential of shorayari with the Tehran city council and to evaluate the shorayari's capacity and acceptance by the community members, there is a high potential for the shorayari to function as bridge between the district and sub-district municipalities and local residents, as they are working closely with those municipalities, and the community disaster management system should rely on the existing resources in Tehran as much as possible.

(b) Disaster Management Network

The disaster management network for promoting and supporting the community disaster management organizations in normal conditions, and for information gathering and commanding in emergency cases should be identified. The preliminary idea was shown in Figure 2.5.8. It should be finalized by implementing the pilot project, and incorporated with the future plan of TDMMO with regards to the roles and responsibilities of district and sub-district municipalities in the disaster management network.

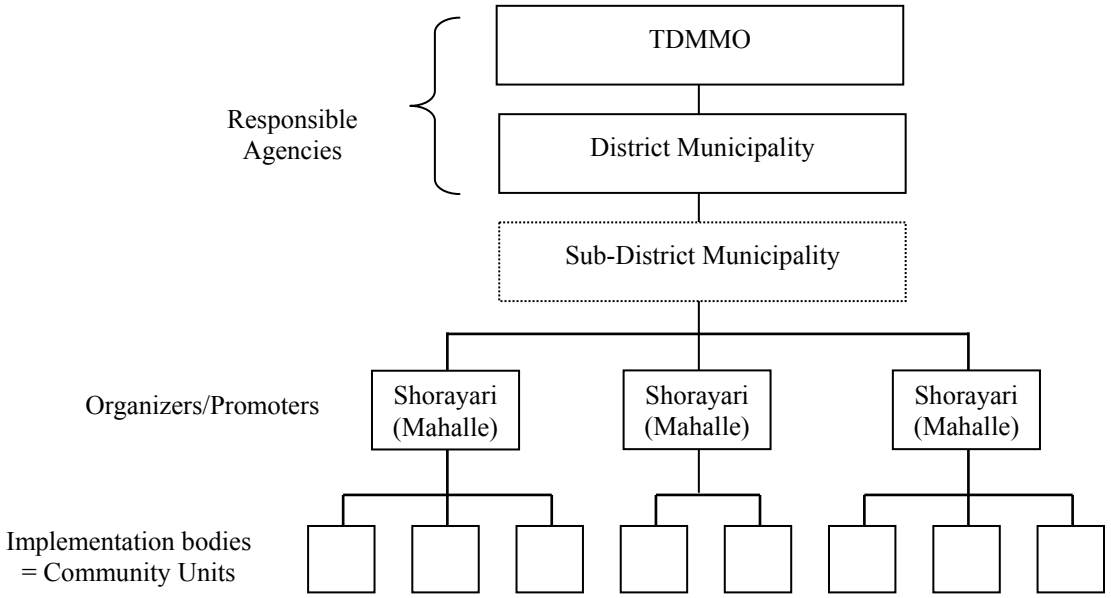

Figure 2.5.8 Network for Community-Level Disaster Management

(c) Potential neighborhood units

The potential community units were identified in the Master Planning Study as follows:

- A board of directors of a housing complex
- A sub-group of a homeowners association of a housing development area
- Households covered by one health communicator (50-130 HH)
- Women's religious gathering: Rosekhani (20-80 HH)
- Houses along one alley (10-30 HH)
- Parents and Teachers Association (200HH)
- Small Mahale

In the Stage I of the project, the case study to identify the community units in actual situation was carried out. Some maps were collected indicating the mahalle boundaries in districts covered by Shorayaris: however, it was discovered that maps and basic data including population at the mahalle level were not available in many districts.

Shorayari members of Mahalle 18 in Sub-District 4, District 14, identified the community units on a map (See Figure 2.5.9). For the members of Mahalle, it was easy to identify the community units because they have a strong network among local people through attendance in religious activities such as in mosques and other religious facilities. Six

community units were identified, some of which cover the areas with manholes adjacent to Mahalle 18.

Figure 2.5.9 Community Units Identified by the Shorayari of Mahalle 18 in District 14

2.6 Other Systems

2.6.1 Evacuation System

TDMMC formulated Phase I plan on Emergency Evacuation and Temporary Housing Plan for Tehran citizens in 2002. Following are the description, results and comments on the plan.

(a) General Description of Emergency Evacuation and Temporary Housing Plan for Districts of Tehran

The main objective of the whole plan is to predict and design the possible methods for evacuation, transfer, and settlement of the citizens in safe places during the disaster. Planning items are defined as follows:

- Identification and evaluation of existing facilities and capabilities to materialize the main objective of evacuation plan: transfer and settlement of citizens during disaster
- Formulation of criteria for designating temporary location in urban and suburban areas
- Designation of safe places for probable temporary housing of Tehran citizens
- Study on the method of equipping the location designated for temporary settlement of the victims
- Designation of locations for depot of facilities and equipment for relief operations during disaster
- Study and introduction of strategies for evacuation of endangered citizens to safe and pre-designated places
- Designation of main entrance and exit roads from damaged areas to safe places
- Study on the role of In-Charge, Back-up, and Partner organizations through formulation of managerial structure for evacuation and temporary housing during disaster

The Phase I Plan includes up to item 2 in the above planning items.

In addition, in order to formulate and integrate the major policies of the plan and its executive approaches, a specialized group was selected from TDMMC and Training and Research Institute of RCS. The group prepared the primary scope of work for emergency evacuation and temporary housing master plan based on presumptions as follows:

- Formulation of theoretic principles and framework of required activities for executing the plan
- Determination of the limitations and prerequisites (resources, managerial, structural)
- Designation of locations for temporary housing

- Designation of locations for settlement of required facilities, equipment and tools for temporary housing points
- Managerial structure of evacuation and temporary housing during disaster and of In-Charge, Back-up and Partner organizations
- Determination of executive approaches for evacuation and temporary housing master plan

(b) Result of Phase I Plan

In order to coordinate and collect necessary information, it was requested from Deputies for Technical & Civil Affairs of District Municipalities to send their latest information about urban spaces such as vacant, cultural, sporting grounds, service area, commercial area, green spaces (forest park, parks and recreational centers), fairs, terminals and other open spaces with more than 2,000 m^2 existing in their districts, as primary data to TDMMO.

In January 2003, the completion of the Phase I of the Plan was announced based on the following acquired outcomes:

- About 1,030 locations introduced by municipality were evaluated, and selected points were identified and their data registered.
- Particular software was designed and developed for establishing a database of collected data.
- All temporary housing locations were marked on map of different districts.
- Main access roads to these locations were preliminarily marked on districts maps.
- Software called "Tehran Temporary Housing Software" was developed to contain all the above information and other requirements of not only each district but also the whole of Tehran, with enough flexibility to suit users.

(c) Review of the Phase I Plan

The phase I plan is briefly reviewed and following points can be singled out for consideration:

- The plan is quite preliminary and no basic policy of evacuation system is presented.
- The selection of evacuation place was performed only from among those spaces with an area of more than 2,000m^2.
- No other criteria such as required area for unit population and allowable maximum distance of evacuation route are taken into account.

- Evacuation zoning that shows who should evacuate and where they should go is not prepared.

2.6.2 Debris Removal System

(a) Current Situation

Standard Operation Plan (SOP) for Waste and Debris Removal was prepared by Tehran Comprehensive Emergency Management Secretariat (CEMS, now in TDMMO) in 2001.

(b) Nature of Standard Operation Plan

The Standard Operation Plan specifies the expectations of entities in charge of such operation for facing the disaster, without going through technical aspects or type of disaster. This plan provides a procedure for improving legal and administrative connections, organizational policy-makings and strategic programs for organizations in-charge and their back-up organizations. A set of standard operations is defined in this plan that is expected to be implemented by the organizations during disaster. Standard Operation Plan does not provide any technical or expertise knowledge for implementation of the job. Usually required knowledge and skills for a particular function will be transferred through technical protocols. In this plan, the considerations related to a function is described. For example, commandership hierarchy, coordination with other organizations and reporting will be specified according to the regulations and standards of each organization.

The advantages of Standard Operation Plan are mentioned in the Plan as follows:

- Improvement and evolution of organizational missions and standardization of activities
- Specifying legal and formal requirements and type of organizational and inter-organizational connection
- Increasing flexibility in methods and response possibilities
- Increasing coordination and notification to other groups and responding organizations, managers and planners, partner organizations, board of ministers, etc. during disaster
- Increasing safety, efficiency and observing organizational and personal rights
- Decreasing instability and increasing reliability in the system
- System analysis, feedback and providing better operational solutions
- Making the strategies and organizational plan operational
- Specifying organizational and inter-organizational connections

(c) Activities and Organizations In-charge

The purpose of this plan is to describe activities and responsibilities of main and partner organizations removing waste material and debris during disaster. A Recycling Organization is in charge of this operation operating under a broad and controlled plan, and deputy for Urban Service of Isfahan Municipality will act as the substitute of the Recycling Organization.

Activities of waste and debris removal during disaster are defined in five phases, namely:

- Production
- Temporary storage
- Collection
- Transfer
- Disposal

A total of 32 activities are introduced in these five phases. Also, a total of 35 organizations are assigned to these activities in accordance with the disaster level of E1 to L5. Table 2.6.1 shows a chart describing the activities and responsible organizations for waste and debris removal.

Table 2.6.1 Participation Level of Organizations in Waste and Debris Removal

Organization	Production of Waste Material					Temporary Storage					Collection					Transfer Station					Recycling & processing					Disposal				
	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E1	E2	E3	E4	E5
Recycling Organization	p					ic	ic					p				ic	p	p	p	p	ic	ic	ic	ic	ic	ic	ic	ic	ic	ic
Tehran Disaster Management Center	b	b			b			b																						
Private companies active in management of solid waste material					p	p	p	p	p			p	p		p					p										
Environment Protection Organization	b	b	b	b	b																b	b	b	b	b					
Ministry of Industries and Mines	b	b	b	b	b																	b	b	b	b					
Min. of Health, Tratment & Medical Education	b	b	b	b	b																	b	b	b	b					
Min. of Sciences, Research & Technoligy	b	b	b	b	b																									
NGOs (*Basij* and NGOs)	b		b	b	b																									
Deputy for Urban Services/Tehran Municipality and affiliated organizations						b	b	b	p	p	ic	p	ic	ic	p	b	b	b	b	b	b	b	b	b	b	b	p		p
Deputy for District Affairs of Tehran Municipality						b																								
Mass Media					b	b	b	b	b	b						b														
Basij Forces						b	b	b								b														
Disciplinary (police) forces						p	p	p	p																					
Workers in construction sites						p	p	p	p	p																				
Deputy for Training & Research and Public Relation in Recycling Org.	ic	ic	ic	ic	p																									
Service sector of major centers and units producing solid waste material (factories, hospitals, hotels , …)						p	p	p	p	p																				
Other urban producers						ic	p	p	p	p																				
Deputies for Urban Services in District Municipalities						ic	p	p	p	p	p	p	p	p	p			p	b	b										p
Motorized Services Org. in Tehran Municipality							p					ic				p	p	p	p	p										
Deputies for Social & Cultural Affairs in district municipalities		p	b	p	p																									
Private suppliers of machineries											b	b	b	b	b			b	b	b	b									
Relevant organizations and agencies											p																			
Relevant governmental and privatesorganizations and agencies																					p	p	p	p	p					
Contractors (transportation, storage, etc.)											p	p	p	p	p	p	p	p	p	p			p		p	p	p	p	p	p
Producers of solid waste material											p	p	p	p	p															
Tehran Emergency Center																b	b	b	b	b										
Fire Brigade and Safety Services																b	b	b	b	b										
Transportation & traffic Org.																b														
Relevant Governmental Organizations for site selection and land cession including Natural Resources Gen. Office, Environment Org., Army																										b	b	b	b	b
Min. of Education & training		b	b	b	b																									
IRIB (Radio-TV Org.)		b																			p									
Temporary daily paid workers through urban services contractors												p			p			p	p	p										
Companies and organizations that have necessary facilities and equipments												b	b	p	b			b	b									b	b	b
Traffic Police General Office												b	b	b	b							b	b	b	b					
Min. of Commerce																						b	b	b	b					

Notes: 1) ic = in charge; b = back up; p = participating.
Source: Debris Removal SOP, TDMMC.

(d) Review of the Standard Operation Plan

The emergency waste and debris removal plan is under implementation using the prepared "Standard Operation Plan" (SOP) and "Incident Command System" (ICS). It is clear from the above nature of the plan that the emergency plan is not yet at an operational level. There are also many areas that need clarification and re-definition. The SOP issued by TDMMO are very general in nature and the actual formulation of the emergency response plan is left to the participating organizations themselves. The ICS involves many hierarchical layers of personnel in participating organizations. While the whole approach looks well structured on paper, it is not unreasonable to assume that there will be numerous communication and control problems in an actual event.

It is, therefore, recommended to review to plan, based on the requirements of a final fundamental mandate and functions for debris removal at the Recycling Organization. A

core issue in this discussion is the question whether the Recycling Organization should function as the emergency operation organization in case of an actual event.

3. COMMENTS AND EVALUATIONS BASED ON THE REVIEW

3.1 Emergency Response System

The Tehran Comprehensive Emergency management Plan (TCEMP), that is approved 8th session of the National Committee for Natural Disaster Reduction in June 2001, is the only emergency response plan in Tehran Municipality. The plan regulates the emergency management organizational set-up and role and responsibility. It formed 22 committees to cope with an emergency situation. The Plan regulates three broad areas of the emergency response: relief and rescue, settlement and logistic managements. JICA Team reviewed the TCEMP during the Stage I and come to conclusion of the following points:

- TCEMP has established seven years ago and the organizational set-up is outdated. The plan itself is not fit existing organizational structure and regulations.
- Initial action of the Tehran municipality, which is the most important action by the TDMMO, is not included in the Plan. The government response to the disaster situation may delay because of the unclear early actions.
- The idea of the Standard Operation Plan (SOP) is acceptable, yet the details of the activities are very complicated and would not be a function after the incident. Moreover, some of the organizations in charge do not even know about their responsibility after the disaster.
- TCEMP regulates framework of the emergency response, yet the whole disaster management organization has not covered.

3.2 Quick Damage and Loss Estimation System

Quick Damage and Loss Estimation System is not available in TDMMO now. In the current response system, TDMMO collect damage and loss information manually from related organization.

However, in order to organize quick response, damage volume and distribution is very important. Information from related organization is late. A system, which estimates damage and loss estimation without any information from any other responsible organization, is necessary for initial action.

3.2.1 Requirement

Damage degree and its distribution is calculated automatically in case of earthquake disaster.

(a) Items

Estimation of building damage and number of casualty is indispensable for any kind of quick response.

Moreover, number of refugee is necessary for evacuation. Debris volume on emergency road network is necessary for debris removal.

(b) Schedule

Damage Estimation must be finished before initial decision and instruction from TDMMO. There is no time to collect detailed information from responsible organizations.

3.2.2 Comparison of Potential Methodologies

Existing QD&LE system are classified as 3 major groups. Their characteristics are shown in Table 3.2.1. Because of damage estimation schedule and uncertainty, graphical images from air or high-resolution satellite don't meet with the requirement. Only "Using ground motion monitoring result" method meets with the requirement.

Table 3.2.1 Comparison among Potential Methodologies

Potential Methodologies	Using ground motion monitoring result	Using graphical images from air	Using graphical images from high resolution satellite
Method Outline	1. Ground motion distribution is estimated by ground motion monitoring 2. Building damage distribution is estimated by ground motion, building database and building damage function	1. Graphical image will be taken from air, by helicopter or air plane 2. Graphical image will be analyzed by human eye and/or computer program	1. Images will be taken from satellite 2. Images will be analyzed by human eyes and/or by computer programs
Schedule	Output is available generally in 10 minutes	Several hours for taking aerial photos. It will be longer in case of bad weather. More hours are necessary for graphic image analysis.	A few days are necessary to take satellite images.[3]. It will be longer in case of bad weather. More hours are necessary for graphic image analysis.
Staffing	Damage estimation can be calculated without any staff.	Trained staffs are necessary both for taking aerial photos and graphic image analysis	Trained staffs are necessary for graphic image analysis
Uncertainty	1. Failure of ground motion monitoring and data transportation system	1. Availability of air plane and helicopter 2. Weather 3. Staffing	1. Satellite schedule 2. Data transfer of a few GBs from satellite control center abroad 3. Staffing
Sample	1. "PHOENIX" of Hyogo Prefecture 2. "READY" of Yokohama City 3. "DIS" of Cabinet Office, Government of Japan 4. Nagoya City 5. Tokyo Prefecture	1. Secondary system of Yokohama, Hyogo and Tokyo	1. International Disaster Charter

[3] Commercial satellites have less than one shooting chance per day of taking a photo of any places because they orbit the Earth. 2 or more shooting chances are necessary to cover whole Tehran Municipality because the width of Tehran Municipality is twice as wide as shooting width of satellites. Consequently, a few days are necessary to cover whole of Tehran.

3.2.3 Outline of Proposed Method

As discussed above, "using ground motion monitoring result" is the only method applicable in Tehran now. Outline of the proposed method is shown in Figure 3.2.1. Ground motion is monitored at stations and telemetered to one central station. Once a strong motion is detected, ground motion distribution is estimated. Then, building damage distribution is calculated using building distribution database with building damage function. Other damage and loss estimation, such as number of casualties, is calculated based on the distribution of the building damages.

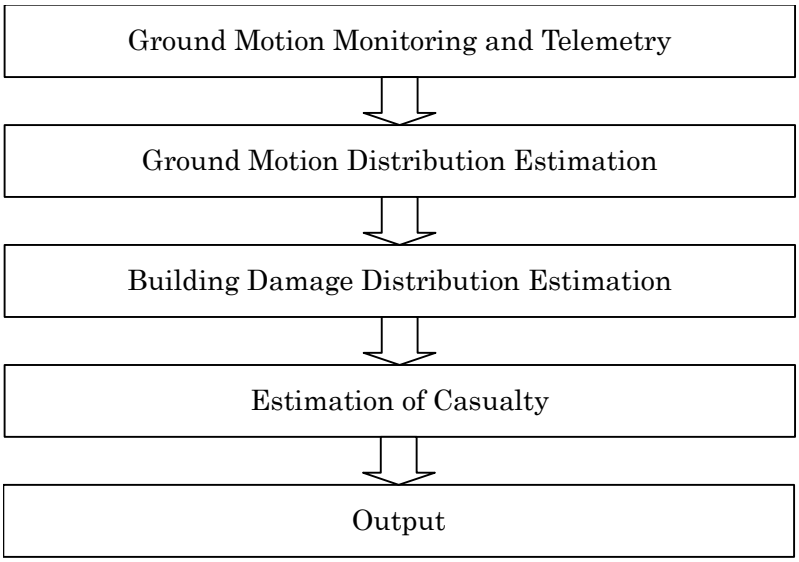

Figure 3.2.1 Outline of the Proposed Method

(a) Ground Motion Monitoring and Telemetry

There are 3 ground motion monitoring networks for Tehran.

One network is operated by Building and Housing Research Centre (BHRC). Among 84 strong-motion stations in Tehran Province, 28 stations are located in and near from Tehran Municipality. Installing a telemetry system will be difficult and will cost much because of its original design.

The other network is Tehran Seismic Network, by International Institute of Earthquake Engineering and Seismology (IIEES) and Geophysical Institute. There are only 2 weak-motion velocity meter is located in Tehran City. There is no strong-motion station in Tehran City.

The last network is operated by TDMMO itself. This is also a weak-motion monitoring system. There is no strong-motion station.

Since all of these 3 networks are not telemetry, or weak-motion monitoring, new strong-motion monitoring and telemetry network is necessary to be newly installed.

(b) Ground Motion Distribution Estimation

3 levels of ground motion distribution estimation methods are used in the world.

The most simple and quick calculation method is the simple interpolation of ground motion monitoring result. Since ground model is prepared by JICA (2000) and ground survey results are available in TDMMO, amplification of subsurface ground can be taken into account, as the second level method. Also the distance and direction to the source fault can be taken into the estimation method as the third level method. In this case, estimation of the location and dimension of the fault is necessary and the calculation time will be longer.

Detailed methodology should be examined based on required accuracy, calculation time and data availability.

(c) Building Damage Distribution Estimation

Since both of building distribution database and building damage function were developed in JICA studies, building damage distribution can be calculated. Number and floor area estimation of damaged buildings are necessary for general purpose.

JICA studies were based on 1996's building census by Statistics Center of Iran (SCI). It can be replaced by newer building census by SCI, which is carried out every 10 years, or by building tax database maintained by Tehran Municipality Computer Service Organization (TMCSO), which is updated periodically. Building database of Tehran Land use Manager is not appropriate because building structure information is not available and there is no database-updating schedule.

Table 3.2.2 Building Database Available in Tehran

Available Database	Building Census	Building Tax Database	Tehran Land Use Manager
Managed by	SCI	TMCSO	Tehran Geographic Information System Center (TGIC)
Updating Schedule	1996, 2006	Periodically	Only 2002 data is available and no updating plans
Location information	Census zone code and building block code are attached. However, map compiling and digitizing might be necessary for 2006	GIS data (polygon) for each "COD NOSAZI", which is unique for each building, would have been digitized.	GIS data (polygon) for each building is available.
Building Structure	Available	Available	Not available

Also building damage function developed by Microzoning Study, may be able to be updated by recent earthquake experiences in Iran.

(d) Estimation of Casualties

Estimation of casualty distribution would be the second basic information to understand the damage distribution.

Population data should be updated by last population census in 2006. Although all of functions and parameters were prepared in JICA studies, some may be able to be updated by recent earthquake experiences in Iran.

3.2.4 Tasks for QD&LE System Development

Following are the tasks for QD&LE System Development:

- General design
- Staffing
- Design of ground motion monitoring network and telemetry system
- Installation of ground motion monitoring network and telemetry system
- Development of condition on which QD&LE calculation will be started
- Development of ground motion interpolation model
- Evaluation of recent earthquake damage study, and updating functions and parameters if updating is important
- Evaluation of recent building databases (including location information) and substitution of building database
- Substitution of population database, including updating boundary data of population census
- Design of output
- Computer system development
- Maintenance and operation training

3.3 Community-Level Emergency Response System

(a) Capacity of TDMMO

For the last several years, TDMMO has been carrying out various activities related to community-level disaster management and public participation. Some staff of TDMMO has substantial experience of community activities and skills of communicating with local people and training them. TDMMO is aware of importance of improving public awareness. Taking into consideration that the community-level activities and/or public participation were totally new to the TDMMC when the Master Planning Study was carried out, it can be said that TDMMO's capacity have been considerably developed.

The next step is to expand the activities and bring about visible outputs. The organizational capacity building will be necessary in making the best use of human resource in TDMMO, and promoting team work. There are four areas of work related to public participation: 1) community-based disaster management, 2) school education, 3) disaster management education, and 4) public awareness. At present, the demarcation of the offices is not clearly defined.

(b) Development of Disaster Management Network

TDMMO is directly supporting community-level organizations. Considering that the community disaster management must be incorporated in the disaster management network and be developed as a system, it is important for district municipalities to play roles for promoting/supporting community-level activities. However, at present, the capacity of district municipalities is not developed sufficiently. To develop the network, the roles and responsibilities of each body in the network should be clarified and the necessary training should be provided.

(c) Social capacity

In order to expand the community disaster management system into whole Tehran, self-motivation of community people are essential. Public awareness on the importance of disaster management has been gradually improved after the Bam Earthquake. However, the level of awareness of people is still low as seen in the pilot projects carried out by TDMMO.

3.4 Other Systems

3.4.1 Evacuation

Based on the review of the existing evacuation plan (Phase I) of TDMMO, three categories of the evacuation plan shall be formulated in the Stage II of the Project:

- Evacuation System
- Method of Evacuation
- Operation and Maintenance of Evacuation Place

Following are brief explanations of each category of the plan.

(a) Evacuation System

At the time of an earthquake, it is anticipated that a lot of situation will arise requiring the evacuation of residents. It is necessary to designate, even in ordinary time, an evacuation system, a wide area evacuation place and evacuation roads. In addition, it is essential to

specify necessary items concerning the establishment and operation of evacuation places and to ensure that such items are fully understood by residents. Area of evacuation place is defined as follows:

a. Regional Evacuation Place

It is an open space such as a large-scale park or green place having a space that is necessary to protect the lives of evacuating persons from such danger as spreading of fire at the time of a large-scale earthquake.

b. Community (temporary) Evacuation Place

It is a place for neighboring evacuating persons to temporarily assemble and to watch the situation before evacuating to the Regional Evacuation Place. It is a place for evacuating persons to form a group temporarily to evacuate to the Regional Evacuation Place. It shall be such places as an urban park, a sports field, a school, or a religious facility, among other places, in which the safety of assembled persons can be secured.

c. Evacuation Route

It is a road that leads from the Community Evacuation Place to the Regional Evacuation Place. It is designated in advance to enable residents living in an evacuating zone to evacuate quickly and safely to the Regional Evacuation Place.

On the plan formulation process, TDMMO should coordinate with each District Municipality to establish the district evacuation plan, especially for regional evacuation zoning and place.

(b) Method of Evacuation

d. Recommendation and Instruction of Evacuation

It is necessary to let residents in the disaster area evacuate quickly to a safe place in the following cases:

- When it is estimated that danger to human lives has seriously increased;
- When it is estimated that human lives in a wide area will face the danger caused by flowing-out and diffusion of gas, etc.;
- When a lot of fires break out at the same time caused by an earthquake and fires spread and expand; and
- When it is deemed necessary to protect residents from disaster.

Recommendation and instruction of evacuation shall be properly announced through appropriate organizations.

e. Evacuation Guidance

The role and measures for the evacuation guidance in each organization shall be defined by respective agencies. When a recommendation or instruction is issued, TDMMO shall quickly disseminate the information by following means:

- Announcement using speaker at mosques or schools
- Oral communication to residents or community leaders directly
- Mass media
- Publicity activity by Police Department or Fire Brigade

At the community evacuation place, staff members of the District Municipality shall form groups of respective areas, communities or companies with the assistance of Police Department and Fire Brigade. After that, they shall organize a group leader of communities or persons in managerial position of companies and shall guide them to the regional evacuation place. In such an event, evacuation of vulnerable persons such as sick persons, senior citizens or disabled persons is a top priority.

District Municipality staff shall also make the effort to carry out evacuation and guidance for the safety of pupils and students, according to the situation of earthquake disaster, centering on each classroom teacher and headed by a school principal.

In addition, TDMMO and District Municipality shall consider in advance the method in cases of evacuation when there is no time to issue recommendation or instruction of evacuation that corresponds to the actual situation of the area or the situation in which disaster takes place.

At the time of evacuation guidance, they shall allocate guides at important points of evacuation roads and carry out ad hoc public announcement on the site

They shall allocate the necessary number of guides at the regional evacuation places. They shall collect information relating to damage and public relations activity and help locate missing persons. They shall also take measures of re-evacuation if necessary and shall make efforts to keep the order at the evacuation place.

(c) Operation and Maintenance of Evacuation Place

a. Operation of Evacuation Place

The operation of evacuation places shall be conducted, in principle, by RCS. However, the District Municipality shall cooperate with the RCS.

In order to maintain the safety of evacuating residents, the District Municipality shall take appropriate measures and quickly respond to the progress of situation and shall specify the operation in advance in respect of details and method.

The measures shall involve the following:

- To allocate staff necessary for the operation, taking into account the size of evacuation places and surrounding situation
- To secure means of information distribution, to provide accurate information in a timely manner and to issue appropriate instruction
- To secure first-aid station and first-aid trained staff for the purpose of providing emergency medical care for injured or sick persons
- To make efforts to maintain sanitary condition of evacuation places
- To arrange water, food and emergency goods with the cooperation of RCS to specify the distribution method and to execute fair and effective allocation
- To guide evacuated persons back to their homes safely and smoothly when evacuation is lifted

b. Maintenance of Communication Material and Equipment for Evacuation Guidance

TDMMO and District Municipality shall make efforts to maintain the wireless system that will be used for evacuation of disaster victims, rescue and aid activities. The wireless system shall also be used for the purpose of ensuring the direction, order and information distribution between the RCS, the Fire Brigade and the Police Department engaged in the on-site activity.

In addition, since it is necessary to obtain a lot of traffic information, they have to make the effort to maintain the wireless system so that proper and timely decision can be made in the regional and community evacuation places.

3.4.2 Debris Removal

As reviewed in Chapter 2, the SOP for the debris removal provides the related organizations and its duty. However, the SOP is not very practical and no actual site is defined. Therefore, the action plan of debris removal has to practically state the activities of each organization based on the guideline presented by JICA Study Team in 2004. Following is a brief outline of the guideline:

(a) Action Policy of Disposal of Debris

In order to undertake an emergency operation and strive for restoration and reconstruction without any trouble, debris generated due to destruction, collapse, fire and bulldozing of houses shall be treated appropriately. Debris generated in the districts shall be treated by a Recycling Organization in collaboration with the District Municipalities. In order to deal with the problem, other than the implementation of the items provided in the plan mentioned above, a District's own plan for the treatment of debris in their jurisdiction shall be developed.

(b) Estimated Volume of Discharged Garbage

The estimated volume of debris by building collapse in the case of Ray Fault Model is estimated to reach 124,000,000 tons (83,000,000 m^3) in the Tehran District area. The estimated volume of debris on the emergency road is 3 % of above volume, or 3,700,000 tons.

(c) Removal and Treatment Plan

Debris removal and treatment plan shall include following items:

a. Establishment of Temporary Organization for Removal and Treatment of Debris

After the occurrence of a disaster, the Tehran Municipality shall establish the Removal and Treatment of Debris Headquarters (tentative name) consisting of a Recycling Organization (and for example), Construction and Transportation, Department of Finance, Taxation and City Planning. At the same time, in collaboration with the relevant District Municipality, the Treatment of Debris Headquarters shall set up the Countermeasures Group of Debris Treatment (tentative name) of each District to carry out regional debris treatment work.

b. Removal of Debris from the Emergency Road Blockages

Tehran Municipality and TDMMO shall decide the emergency transportation roads/networks beforehand in which the priority to clear debris is given in case of earthquake disaster. Only two lanes, one going in and the other going out of disaster area, shall be cleared for emergency vehicles. Each organization of the Countermeasures Group of Debris Treatment shall decide their responsible roads to be cleared in advance, rather than dispatching parties in accordance with the actual situation of the road blockage informed time by time.

These organizations shall exchange protocols with private companies/associations of transportation/construction industries for renting and mobilizing equipment and manpower. TDMMO shall coordinate these protocols, arrangement and allocation of the resources to ensure the removal of the expected amount of debris.

Debris collected from emergency roads to smoothly carry out rescue operations shall be transported to debris-stock yard (1st temporary stock yard).

c. Removal of Debris and Dismantlement of Collapsed Buildings

The removal of debris of individual house and medium and small businesses building shall be conducted once the owners have filled up an application. Each District shall accept these applications for debris removal and instruct citizens on proper treatment of collapsed houses and buildings. Meanwhile, the Group also shall be engaged in contracting with private companies.

- Clerical work of acceptance of applications
- Contract with private companies
- Clerical work of instruction on proper treatment

d. Setting-up of Temporary Debris-Stock Yards

The Treatment of Debris Headquarters and the Countermeasures Groups shall set up, in collaborate on setting up temporary debris-stock yards to enhance transport efficiency by transshipment. The debris-stock yard, also the functions as the site for the debris separation so that the recycling facilities can operate without trouble.

e. Intermediate Treatment, Reuse and Final Disposal of Debris

The debris materials separated at the first and second temporary debris-stock yards shall be reused as much as possible. These materials are:

- Brick and concrete wreckage
- Waste lumber
- Steel and metal waste

Only non-recyclables shall be transported to the existing landfill, which is under the control of the Tehran Municipality, after being minimized in volume by incineration and other means.

4. PROPOSED PILOT PROJECT AREAS

Dr. Maziar Hosseini, President of TDMMO and Dr. Kambod Amini Hosseini, Advisor of TDMMO, participated in a training trip on the existing situation of Japanese emergency response system from the 5th to 16th of February 2007, in Kobe, Yokohama and Tokyo.

At the end of the training, they made a presentation on the evaluation process and results of pilot project areas for Stage II. The presentation considered priority selection criteria, scoring methods, priority based on scoring and categorization of selected pilot project areas, reflecting an understanding of the existing Japanese Emergency Response System and the existing Iranian Emergency Response System.

4.1 12 Priority Areas

Dr. Maziar Hosseini and Dr. Kambod Amini Hosseini evaluated the relevance of the following 20 SOP areas and Emergency Response Commanding Centre (ERCC) with emergency response activities of TDMMO. Although ERCC is not included in the 20 SOP areas, during the training, they found out that it is indispensable to TDMMO activities given that the initial action of Tehran Municipality have not been firmly established yet.

In the end, they selected most relevant 12 areas among the 21 areas listed as priority areas for emergency response in Tehran Municipality as indicated in Table 4.1.1. Coloured areas show the 12 priority areas.

Table 4.1.1 12 Priority Areas for Emergency Response in Tehran Municipality

1- Rescue and relief	2- Triage	3- Medical care
4- Fire Fighting	5- Debris removal	6- Distribution of aid
7- Logistics	8- Fuel supply	9- Dead bodies handling
10- Mental health	11- Damage estimation	12- Security
13- Legal affairs	14- Telecommunication	15- Supply for victims
16- Traffic	17- Evacuation	18- Information
19- Lifeline	20- Community activities	21- Emergency Response Commanding Centre (ERCC)

4.2 Priority Selection Criteria

The presentation considered the following 4 criteria and 12 items shown in Table 4.2.1 in order to select 5 pilot project areas from the 12 priority areas for emergency response in Teheran Municipality.

Table 4.2.1 Priority Selection Criteria of Pilot Project Areas

Criteria	Item
1. Importance	1-1. Effects on casualties reduction
	1-2. Effects on damage reduction
	1-3. Effects on facilitating reconstruction activities
2. Efficiency	2-1. Preparedness promotion
	2-2. Number of target group population
	2-3. Necessity for the citizens
3. Feasibility	3-1. Level of responsibility
	3-2. Capacity for implementation
	3-3. Relevance with master plan
4. Necessity of JICA co-operation	4-1. TDMMO's capacity
	4-2. Japanese experience and knowledge
	4-3. High technology required

4.3 Scoring Method

The 12 priority areas for emergency response in Tehran Municipality were scored by the evaluation based on the priority selection criteria. Scores range from 0, 1 and 2 corresponding with the evaluation of criteria item which is "low", "medium" or "high" as described in Table 4.3.1. The only exception here is item 4-1 TDMMO's capacity, in which the score of 0 means "high" and 2 means "low". Based on this scoring method, the 12 priority areas were scored as indicated in Table 4.3.2.

Table 4.3.1 Scoring Method of Criteria Item

Item	Evaluation	Score
1-1. Effects on casualties reduction	low	0
	medium	1
	high	2
1-2. Effects on damage reduction	low	0
	medium	1
	high	2
1-3. Effects on facilitating reconstruction activities	low	0
	medium	1
	high	2
2-1. Preparedness promotion	low	0
	medium	1
	high	2
2-2. Number of target group population	low	0
	medium	1
	high	2
2-3. Necessity for the citizens	low	0
	medium	1
	high	2
3-1. Level of responsibility	low	0
	medium	1
	high	2
3-2. Capacity for implementation	low	0
	medium	1
	high	2
3-3. Relevance with master plan	low	0
	medium	1
	high	2
4-1. TDMMO's capacity	low	2
	medium	1
	high	0
4-2. Japanese experience and knowledge	low	0
	medium	1
	high	2
4-3. High technology required	low	0
	medium	1
	high	2

Table 4.3.2 Score of the 12 Priority Areas

Priority Areas	1. Importance				2. Efficiency				3. Feasibility				4. Necessity of JICA Cooperation				Total
	1-1	1-2	1-3	S.T.	2-1	2-2	2-3	S.T.	3-1	3-2	3-3	S.T.	4-1	4-2	2-2	S.T.	
Debris removal	2	2	2	8	2	2	2	2	1	1	2	1	1	2	2	4	22
Logistics	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	5
Dead bodies	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	2
Legal affairs	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	0	4
Evacuation	2	1	2	4	2	2	2	2	2	2	2	2	2	2	1	4	24
Fire fighting	2	2	1	4	1	2	2	1	1	1	2	1	1	2	2	4	14
Emergency communication	2	2	1	4	2	1	2	2	1	1	2	1	1	2	2	4	14
Traffic	2	2	2	8	2	2	2	2	1	1	2	1	1	1	2	2	20
Information	2	2	1	4	2	2	2	2	2	1	2	2	1	2	2	4	20
QD&LE	2	2	1	4	2	2	2	2	2	2	2	2	2	2	2	8	28
Community	2	1	2	4	2	2	2	2	1	2	2	1	1	2	1	2	18
ERCC	2	2	2	8	2	2	2	2	2	2	2	2	2	2	2	8	32

Note: 1) S.T. stands for Subtotal
2) Subtotal score is multiplication of each item, whereas total score is sum of subtotals

4.4 Priority Based on the Score

Table 4.4.1 shows priority of the 12 priority areas based on Table 4.3.2. It indicates that ERCC, QD&LE, Evacuation, Debris Removal and Information are suitable for pilot projects areas for Stage II in terms of importance, efficiency, feasibility and necessity of JICA cooperation.

Table 4.4.1 Priority of the 12 Priority Areas Based on the Score

Priority Areas	Total Score
ERCC	32
QD&LE	28
Evacuation	24
Debris removal	22
Information	20
Traffic	20
Community	18
Fire fighting	14
Emergency communication	14
Logistics	5
Legal affairs	4
Dead bodies	2

4.5 Categorization of Proposed Pilot Project Areas

According to PDM0, Stage II aims at the improvement of emergency response plan and the implementation of 5 proposed pilot project areas. Dr. Maziar Hosseini and Dr. Kambod Amini Hosseini categorized them into 3 groups as shown in Table 4.5.1 in order to clarify their interaction. Group 1 aims at direct promotion of emergency response activities on the ground, whereas Group 2 focuses on capacity building of emergency response agencies. Group 3 supports public awareness on emergency response. Group 2 supports Group 1 activities from the viewpoint of “public-assistance” while Group 3 backs up Group 1 activities in terms of “self-assistance” and “mutual-assistance”.

Table 4.5.1 Categorization of Proposed Pilot Project Areas

Group 1: Promotion of Emergency Response Activities
1-1- Improvement of emergency response plan and initial actions
1-2- Evacuation
1-3- Debris removal
Group 2- Emergency Response Capacity Building
2-1- Emergency response command centre (ERCC)
2-2- Quick damage and loss estimation (QD&LE)
Group 3- Emergency Response Information and Education
3-1- Emergency response model schools

ANNEX1. OUTPUTS OF STAGE I

Output 0, output to be achieved in Stage I as scheduled in Figure 1.2.1, was achieved as shown in Minutes of Meetings on PDM1 and PO1 etc., agreed on the 7th of March, 2007. Review of the existing ERP and ERS, and transfer of skills have contributed to the achievement.

Figure 5.1.1 Minutes of Meetings on PDM1/PO1 etc.

ANNEX2. PROJECT IMPLEMENTATION SCHEDULE OF STAGE I

Figure 5.2.1 shows Activities implemented in Stage I. They started in November 2006 and ended in March 2007.

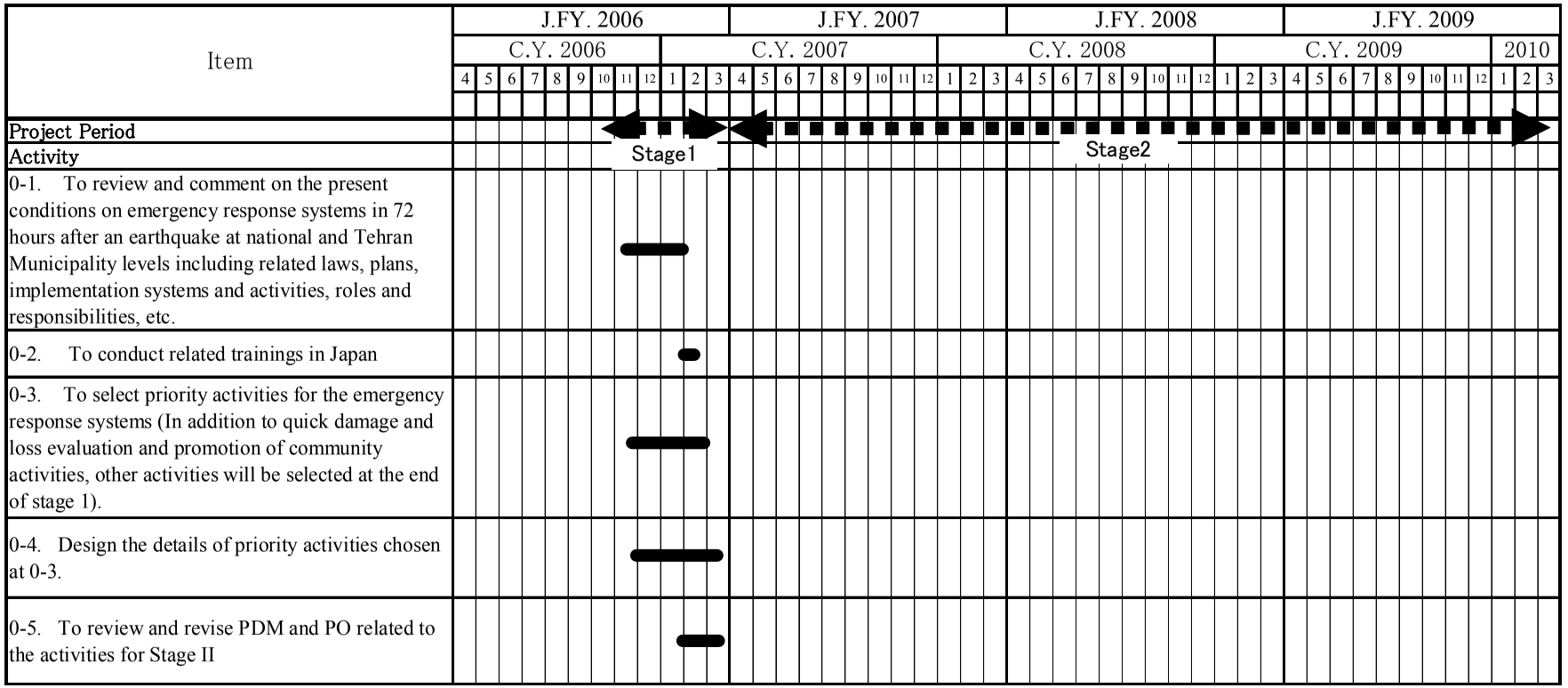

Figure 5.2.1 Project Implementation Schedule of Stage I

ANNEX3. INPUTS OF STAGE I

Table 5.3.1 Inputs of Stage I

	Iranian Side		Japanese Side	
Item	**Description**	**Quantity**	**Description**	**Quantity**
Personnel	➢ Project Director ➢ Project Manager ➢ Counterparts - Disaster Management - QD&LE - Emergency Response - Disaster Management Information System - Community Disaster Management Organization ➢ Administrative Official	1 person 1 person 2 persons 2 persons 2 persons 2 persons 2 persons	➢ Chief Advisor ➢ Sub Chief Advisor/ Disaster Management ➢ Emergency Response/ Quick Damage and Loss Estimation (QD&LE)2 ➢ Disaster Information System/ Quick Damage and Loss Estimation (QD&LE)1 ➢ Community Disaster Management Organizations ➢ Administrative Institutions/ Project Design	1 person 1 person 1 person 1 person 1 person 1 person
Facility and Equipment	➢ Project Office	1 Room	➢ Computer ➢ Printer	1 Set 1 Set
Project Implementation Budget	➢ Budget from TDMMO	N/A	➢ Budget from JICA	¥29,869,350
Others	➢ PJCC ➢ TDMMO's Coordinating Committee ➢ TDMMO's Steering Committee			

ANNEX4. DISPATCHED JICA EXPERTS

The JICA Expert Team provided necessary recommendations and advice to the Project Director, Project Manager and Iranian counterpart personnel on any matters pertaining to the implementation of the Project. JICA Expert Team was composed of the following 6 members as described in Table 5.4.1. The assignment schedule of each expert is shown in Figure 5.4.1.

Table 5.4.1 Roles and Responsibilities of Each JICA Expert in Stage I

Name	Expertise	Main Roles and Responsibilities
Mr. Shozo KAWASAKI	Chief Advisor	➢ Manage the whole Stage I activities ➢ Organize JICA Experts ➢ Prepare, explain and discuss the reports ➢ Determine Stage II activities
Mr. Ichiro KOBAYASHI	Sub Chief Advisor/ Disaster Management	➢ Assist in managing the whole Stage I activities and in organizing the JICA Expert Team as sub chief ➢ Assist in preparation, explanation and discussion of the reports ➢ Review disaster management plan, laws and implementation organization
Mr. Osamu NISHII	Emergency Response/ Quick Damage and Loss Estimation (QD&LE)2	➢ Review emergency response system in Tehran ➢ Assist in selection of pilot areas for Stage II ➢ Review community level disaster management system in Tehran ➢ Assist development of Quick Damage and Loss Evaluation system
Mr. Hiroyuki MAEDA	Disaster Information System/ Quick Damage and Loss Estimation (QD&LE)1	➢ Review existing data and Seismograph network for establishment of Quick Damage and Loss Estimation system ➢ Study and prepare realistic Quick Damage and Loss Estimation system
Ms. Junko OKAMOTO	Community Disaster Management Organizations	➢ Review existing community level disaster management system ➢ Prepare community level disaster management plan
Mr. Ryo HAMAGUCHI	Administrative Institutions/ Project Design	➢ Assist review of disaster management plan, laws and implementation organization ➢ Assist in selection of pilot areas for Stage II ➢ Review and prepare PDM and PO for Stage II

	Expertise	Name	Company	J.F.Y 2006 Nov	Dec	Jan	Feb	Mar	Total Iran	Total Japan
I R A N	※ Chief Advisor	Shozo KAWASAKI	PCI		10 (0.33)			10 (0.33)	0.67	
	Sub Chief Advisor/ Disaster Management	Ichiro KOBAYASHI	PACET		15 (0.5)	20 (0.67)		15 (0.5)	1.67	
	Emergency Response/ Quick Damage and Loss Estimation (QD&LE)2	Osamu NISHII	PCI			21 (0.7)	25 (0.83)		1.53	
	Disaster Information System/ Quick Damage and Loss Estimation (QD&LE)1	Hiroyuki MAEDA	PACET				15 (0.5)		0.50	
	Community Disaster Management Organizations	Junko OKAMOTO	PCI		45(1.5)				1.50	
	Administrative Institutions/ Project Design	Ryo HAMAGUCHI	PCI				15 (0.5)		0.50	
								Sub Total	6.37	
JAPAN	Chief Advisor	Shozo KAWASAKI	PCI	2 (0.07)				2 (0.07)		0.13
	Emergency Response/ Quick Damage and Loss Estimation (QD&LE)2	Osamu NISHII	PCI				14 (0.47)			0.47
								Sub Total		0.60
	Reporting			△ IC/R				△ F/R		
	Sub Total								6.37	0.60
	Total								6.97 (0.00)	

Figure 5.4.1 Assignment Schedule of JICA Expert Team in Stage I

ANNEX5. RECORD OF TRAININGS

As Activity 0-2 in Figure 5.2.1, TDMMO personnel had trainings in Japan in order to understand the existing emergency response system in Japan. Table 5.5.1 describes the details of the training.

Table 5.5.1 Outline of Trainings in Japan

Outline		
Title	Trainings in Japan for the Project on the Establishment of Emergency Response Plan For the First 72 Hours After an Earthquake in the Islamic Republic of Iran	
Overall Objectives	Study Existing Emergency Response System in Japan	
Period	February 3, 2007 ～ February 17, 2007 (15 Days)	
Trainees	Dr. Maziar Hoseeini, President of TDMMO Dr. Amini Hosseini, Advisor of TDMMO	
Date	**Venue**	**Objectives**
February 5	Hyogo Emergency Medical Centre	Study rescue and relief system in Hyogo Emergency Medical Centre, triage methods
	National Research Institute for Earth Science and Disaster Prevention (NIED)	Study a full size three-dimensional vibration destruction facility
	Miki Disaster Preparedness Park	Study roles and activities of the Park in Emergency Response
February 6	Disaster Management Section, Hyogo Prefecture	Study Prefectural Emergency Response Plan and PHOENIX in Hyogo Prefecture
	Earthquake Disaster Mitigation Centre (NIED-EDM)	Study QD&LE by satellite images
February 7	Fire Department, Kobe City	Study activities of a community disaster management organization in Kobe City
	Disaster Reduction and Human Renovation Institution (DRI)	Study formulation system for emergency response plan
February 8	Cabinet Office, Government of Japan	Study QD&LE in Cabinet Office
	Japan Metrological Agency	Study the distribution of seismometer network and how to utilise the collected data
February 9	Fire and Disaster Management Agency (FDMA)	Study the earthquake disaster management system in FDMA
	Meguro City, Tokyo	Study activities of a community disaster management organization in Meguro City in Tokyo
February 13	Emergency Management Office, City of Yokohama	Study REaltime Assessment of earthquake Disaster in Yokohama System (READY)
February 14	River Bureau, Ministry of Land, Infrastructure and Transport (MLIT)	Study Earthquake Disaster Management System in the MLIT
	Earthquake Research Institute, University of Tokyo	Study present situation and possibilities of earthquake prediction in Japan
February 15	Asia Air Survey Co., Ltd.	Study QD&LE by aerial images
	Japanese Red Cross Society	Study rescue and relief system in Japanese Red Cross Society, triage methods

ANNEX6. LIST OF EQUIPMENT

Stage I procured equipment shown in Table 5.6.1.

Table 5.6.1 List of Equipment

	Equipment	Specifications	Quantity	Installation Location	Date of Arrival	Condition	Use
1.	Computer	Assembly (Display, OS, Necessary Software, Standard Accessories etc.)	1	TDMMO JICA Expert Office	02/12/06	Good	Data Analysis
2.	Printer	Hp5200 (A3, Laser, Plotter etc.)	1	TDMMO JICA Expert Office	02/12/06	Good	Data Analysis

ANNEX7. IMPLEMENTATION COST OF STAGE I IN IRAN

Table 5.7.1 shows estimation for major cost of project implementation of Stage I in Iran by March 2007. This estimation excludes personnel cost and indirect cost.

Table 5.7.1 Breakdown of Implementation Cost of Stage I in Iran (Estimation)

Description	Unit Price (¥)	Quantity	Total (¥)	Note
Interpreter	182,000	3.5 Man/ Month	637,000	
A4 Paper	650	4 packs	2,600	
A3 Paper	1,300	1 pack	1,300	
Translation	1,950	80 pages	156,000	Data Collection and Handouts for Seminar
Handouts for Seminar	100	10 copies	1,000	English
	100	50 copies	5,000	Persian
Sedan Car with a Driver	104,000	4 Vehicles/ Month	416,000	
4WD Car with a Driver	17,540	12Vehicles/ Day	210,480	
Computer	130,000	1 Set	130,000	
Printer	195,000	1 Set	195,000	
		Total (¥)	1,754,380	

ANNEX8. LESSONS LEARNED FROM PROJECT IMPLEMENTATION

Table 5.8.1 Lessons Learned From Project Implementation

	Item	Experience	Lessons Learned
1	Procedures of Formulation of PDM/PO	Through the formulation activities of PDM1/PO1, the Project Team found an unexpected gap in the understanding of Stage II activities between Iranian side and Japanese side in the latter period of the Project. The project team needed to push themselves to go through intensive meetings at the end of the Project to bridge the gap.	・Draft PDM/PO should be drafted as early as possible to clarify the gap with parties concerned on written format ・Based on the draft PDM/PO, Coordination Committee should be held appropriate times in order to reach agreement on schedule.

ANNEX9. RECORD OF JOINT COORDINATION COMMITTEE

PJCC will be established and held at the beginning of Stage II.

ANNEX10. Organization of TDMMO

Figure5.10.1 shows the latest organization of TDMMO.

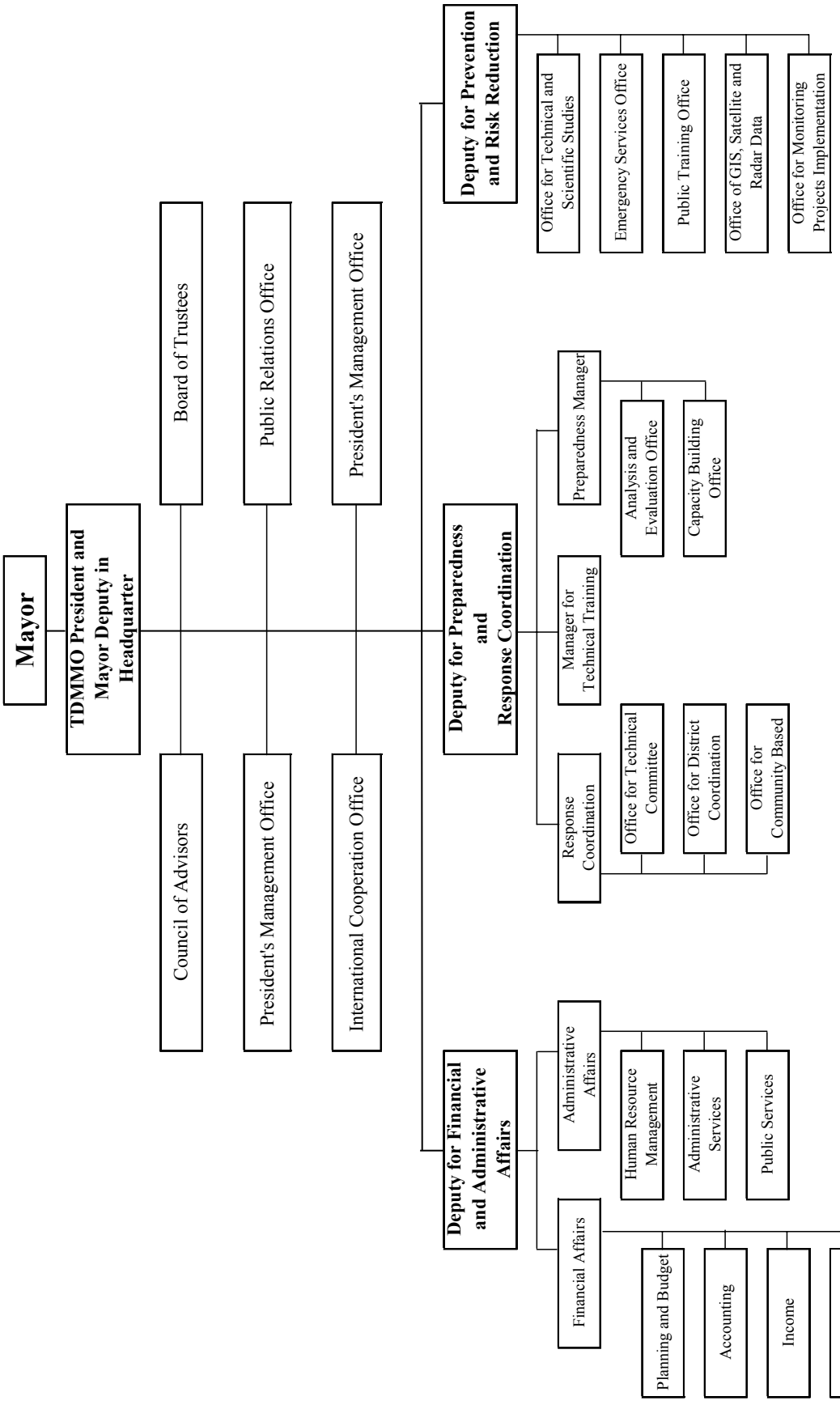

Figure 5.10.1 Organization of TDMMO