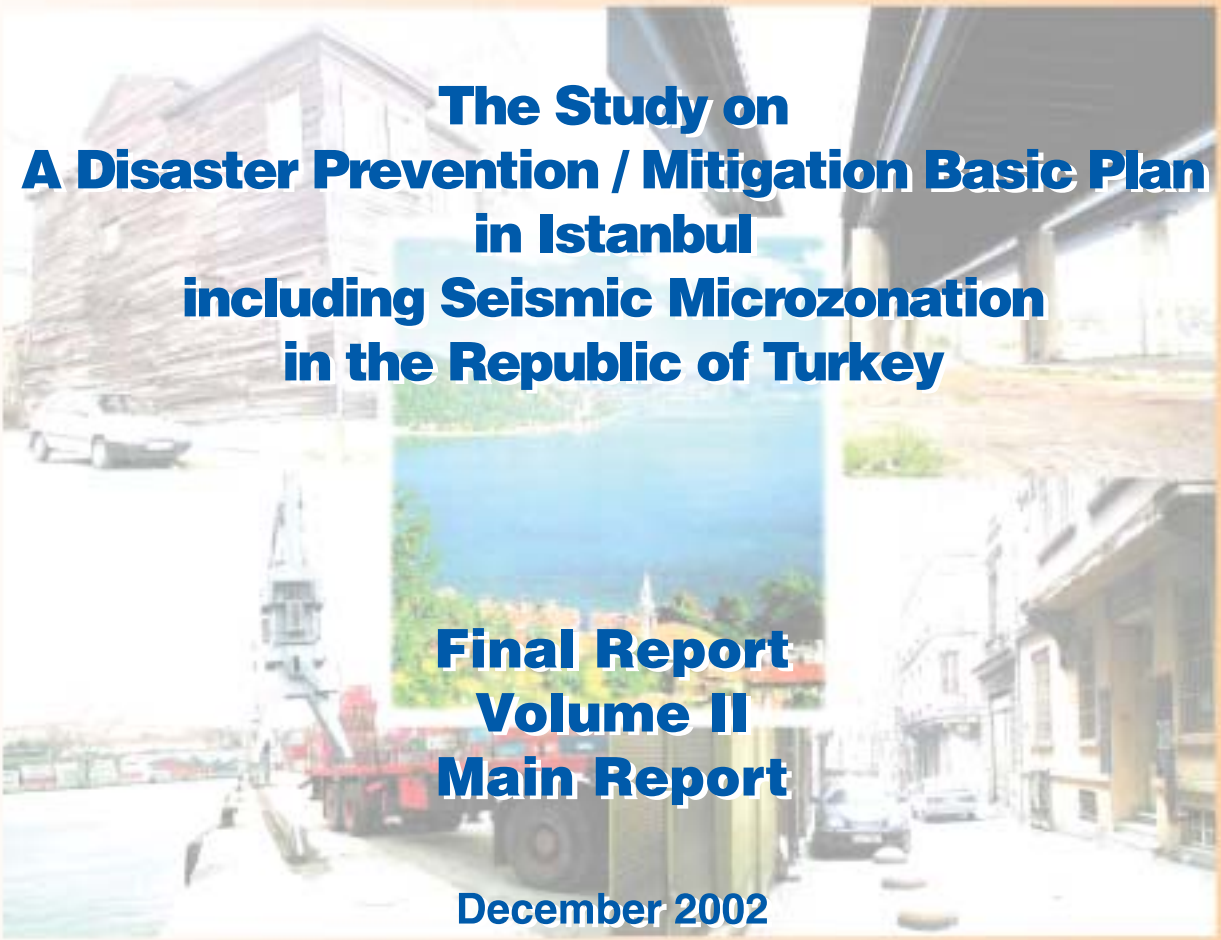
No.

The Istanbul Metropolitan Municipality
Directorate of Soil and Earthquake Research

Japan International Cooperation Agency



The Study on A Disaster Prevention / Mitigation Basic Plan in Istanbul including Seismic Microzonation in the Republic of Turkey

Final Report
Volume II
Main Report

December 2002

Pacific Consultants International

OYO Corporation

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Japan International Cooperation Agency (JICA)
Istanbul Metropolitan Municipality (IMM)

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A Disaster Prevention / Mitigation Basic Plan
in Istanbul
including Seismic Microzonation
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COMPOSITION OF THE FINAL REPORT

Volume I	**Summary**
Volume II	**Main Report**
Volume III	**GIS Maps**
Volume IV	**Summary in Turkish**
Volume V	**Main Report in Turkish**
Volume VI	**Summary in Japanese**
CD I	**PDF Files of Summary and Main Report, Supporting Report and Data**
CD II	**GIS Data**

The following foreign exchange rate is applied on this study report;

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(September 2002)

PREFACE

In response to a request from the Government of the Republic of Turkey, the Government of Japan decided to conduct The Study on A Disaster Prevention / Mitigation Basic Plan in Istanbul including Seismic Microzonation in the Republic of Turkey and entrusted to study to the Japan International Cooperation Agency (JICA).

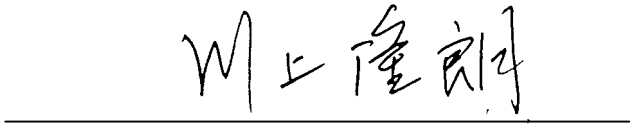
JICA selected and dispatched a study team headed by Mr. Noboru Ikenishi of Pacific Consultants International, and consisted of Pacific Consultants International and Oyo Corporation to the Republic of Turkey, four times between March 2001 and September 2002. In addition, JICA set up an advisory committee headed by Dr. Ken Sudo, Professor of University of Tokyo between April 2001 and March 2002 and by Dr. Yoshimori Honkura, Professor of Tokyo Institute of Technology between March 2002 and September 2002, which examined the study from specialist and technical point of view.

The team held discussions with the officials concerned of the Government of the Republic of Turkey and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

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

December 2002



Takao KAWAKAMI
President
Japan International Cooperation Agency

Mr. Takao KAWAKAMI

President
Japan International Cooperation Agency
Tokyo, Japan

December 2002

Letter of Transmittal

Dear Mr. KAWAKAMI,

We are pleased to formally submit herewith the final report of "The Study on A Disaster Prevention / Mitigation Basic Plan in Istanbul including Seismic Microzonation in the Republic of Turkey".

This report compiles the result of the study which was undertaken in the Republic of Turkey from March 2001 through November 2002 by the Study Team organized jointly by Pacific Consultants International and OYO Corporation under the contract with the JICA.

The Final Report is composed of the three volumes, "Main Report", "Summary" and "GIS Maps for Disaster Prevention and Mitigation".

In the main report, existing social and physical conditions of the study area are described and seismic damage analysis was carried out based on the potential big earthquakes. Necessary recommendations for the seismic disaster prevention and mitigation were also made. The Study Team developed a comprehensive geographic database (GIS) to support data analysis and presentation of the study results. "Microzoning Maps" were compiled out of this GIS data base in such a way that those who are interested in urban analyses, detailed disaster management, studies and planning for Istanbul area may easily make use of the data base.

Finally, we would like to express our sincere gratitude and appreciation to all the officials of your agency, the JICA advisory Committee, the Embassy of Japan in Republic of Turkey, JICA Ankara Office and Ministry of Foreign Affairs. We also would like to send our great appreciation to all those extended their kind assistance and cooperation to the Study Team, in particular, relevant officials of Istanbul Metropolitan Municipality, Directorate of Soil and Earthquake, the Turkish counterpart agency.

Very truly yours,

Noboru IKENISHI
Team Leader,
The Study on A Disaster Prevention / Mitigation Basic Plan in Istanbul including Seismic Microzonation in the Republic of Turkey

EXECUTIVE SUMMARY

1. Background and Objectives of the Study

Because the phenomena of strong earthquake epicenters migrating from east to west along the North Anatolian Fault (NAF) continue to be observed, it is likely that sometime in the future another large earthquake will strike Istanbul, located on the western edge of the NAF. Moreover, since Istanbul is one of the largest cities in the Middle East, it is speculated that a large earthquake in or around Istanbul will cause a national catastrophe in Turkey.

Because of this possibility and in response to the request from the government of The Republic of Turkey, the government of Japan conducted the Study on Disaster Prevention / Basic Mitigation Planning in Istanbul, which has the following objectives: 1) to integrate and develop seismic microzonation studies in Istanbul as the scientific and technical basis for disaster prevention/mitigation planning; 2) to recommend a citywide prevention/mitigation program against building and infrastructure damages ; 3) to recommend disaster prevention considerations in the urban planning of Istanbul City; and 4) to pursue the transfer of technology and planning techniques to Turkish personnel counterparts.

2. Assessment of the Present Status

As a starting point, the Study team collected data on natural and social conditions in the Study Area necessary to conduct an earthquake damage analysis, and it constructed a database using a Geographic Information System. The following data were obtained:

Natural conditions: earthquake history, list of earthquake and waveforms, geology map, fault distribution map, topography map, slope distribution map, and existing boring data.

Social conditions: census for the year 2000, cadastral data for buildings, public facilities, land use, hazardous facilities, lifelines, road networks, mahalle (sub district) boundaries, laws and organizations, and plans for disaster prevention.

3. Geological Study and Definition of Scenario Earthquake

A numerical ground model using 500m grids was developed for the whole Study Area. The model was developed using a combination of 1,076 existing borings and 48 drillings, which the Study Team conducted to study dynamic properties of the ground.

Four scenario earthquakes (models A, B, C, and D) were determined based on discussions with researchers from the scientific community serving on the project's scientific committee and researchers from relevant institutes, as well as on recent research on the NAF. These models were used to make appropriate damage estimations for disaster prevention planning. These scenario earthquakes are modeled along the NAF in the Marmara Sea, and the difference between each earthquake is the length of its respective fault segment.

4. Earthquake Hazard Analysis

Ground motion at the seismic bedrock was calculated based on the fault model with a selected empirical attenuation formula that explains the data observed during the 1999 Izmit earthquake. The amplification factor of seismic motion due to subsurface soil was classified by the average shear wave velocity of surface soil.

Ground motion at the ground surface was calculated by multiplying by the amplification factor. Model A is regarded as the most probable case, and model C is regarded as the worst case. Scenario earthquake of model A and model C are used for further analysis because these two scenarios represent the most general picture of the hazard conditions. In addition, liquefaction potential and the slope stability were evaluated.

5. Building Damage and Casualties Estimation

Buildings were classified according to structure, number of stories, and their construction year in order to estimate building damage due to the scenario earthquake. The number of buildings of each type per mahalle were then counted using building Census 2000.

The theoretical relationship between seismic motion and the damage state of buildings was constructed using a capacity spectrum model and adjusted to fit real damages observed in recent earthquakes in Turkey. The number of damaged buildings according to the three damage states was then calculated for all building types.

The number of deaths was estimated using the number of heavily damaged housing units, through examination of empirical relationships between building damage and casualties based on the damages observed in recent earthquakes in Turkey. The number of severely injured was also estimated using number of deaths observed in recent earthquake events in Turkey.

6. Evaluation of Urban Vulnerability

After carrying out building surveys, the seismic index of structures was evaluated for two schools designed by the school building standard. It was found that that these buildings may collapse or be heavily damaged under conditions similar to those of the 1992 Erzincan Earthquake. It is presumed that almost all school buildings may have similar earthquake resistance shortcomings.

Damage estimations for public facilities were conducted, and it was observed that the estimated damage rate of major public facilities is similar to that of all buildings.

The study also found that the possibility of large fires is small because the wooden building coverage area ratio of all mahalles stands at less than 10%. Nonetheless, many fires occur immediately after an earthquake, and it can take a fire-fighting team a long time to reach a fire because of roadblocks caused by debris.

Damage to lifelines such as water pipelines, sewage pipelines, gas pipelines, gas service boxes, and electricity cables were also estimated.

The possibility of bridge collapse was evaluated for 480 bridges using a Japanese method commonly used for preliminary screening purposes. Based on these evaluations, a prioritized list of necessary detailed bridge inspections was developed.

The prioritization of the road network was also evaluated, based on the review of road network and on the effect of damaged bridges. Road blockages due to collapsed buildings were estimated using the results of the study's building damage estimation.

7. Preparedness Measures to Strengthen Vulnerable Buildings and Urban Structures

Executing an earthquake damage assessment served to assess urban vulnerability against earthquake disaster and improvement issues were then identified. Land availability per mahalle was assessed by considering the mahalle's built-up area ratio and its average building coverage ratio.

8. Recommended Measures for Earthquake Disaster Mitigation

Necessary earthquake disaster mitigation measures are presented as short- and medium- to long-term perspectives. Short-term measures basically include retrofitting important facilities and infrastructure to secure their operational function. Medium- to long-term measures involve non-structural recommendations.

Basic concepts of urban structure improvements are the redevelopment of high population density areas, the widening of narrow roads, and the review of existing land-use to have more open space areas. Finally, the coordination and/or development of appropriate legal, institutional, and operational systems are also recommended.

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ABBREVIATION

General Word

İLÇE	District
Mahalle	Sub-distirct

Organization

AKOM	Disaster Coordination Center, Istanbul Metropolitan Municipality
AKTAŞ	Anatolia Electric
AKUT	Search and Rescue Society
ASK	Civil Coordination against Disasters
AASHTO	American Association of State Highway and Transportation Officials
AYM	Disaster Management Center, Governership of Istanbul Province
BEDAŞ	Boğaziçi Electric
BIMTAŞ	The Bosphorus Landscape, Construction, Consultancy, Technical Services and Tree Company
BSSC	Building Seismic Safety Council (USA)
CBO	Community Based Organization
CNRS	National Science Research Center (France)
DASK	Natural Disasters Insurance Council
DMC	Disaster Management Centre
EC	European Community
EOO	Emergency Operations Organizations
ERD	Earthquake Research Department of General Directorate of Disaster Affairs, the Ministry of Public Works and Settlement
FEMA	Federal Emergency Management Agency
GDDA	General Directorate of Disaster Affairs
HUD	Department of Housing and Urban Development
IGDAŞ	Istanbul Gas Distribution Corporation
IETT	Istanbul Bus Transportation Company
IMM	Istanbul Metropolitan Municipality
INSU	National Institute of Universal Science (France)
ISKI	Istanbul Water and Sewage Management
ISSMFE	International Society of Soil Mechanics and Foundation Engineering
ITU	Istanbul Technical University
JICA	Japan International Cooperation Agency
KIPTAŞ	The Istanbul Homes Construction and Projecting Corporation
KOERI	Kandilli Observatory and Earthquake Research Institute, Boğaziçi University
LPG	Liquefied Petroleum Gas
MTA	General Directorate of Mineral Research and Exploration, the Ministry of Energy and Natural Resources
MPWS	Ministry of Public Works and Settlements
NATO	North Atlantic Treaty Organization
NEHRP	National Earthquake Hazard Reduction Program
NGO	Non Governmental Organization
NMT	Northern Majority System
SAR	Search And Rescue
SCADA	Super user Control and Data Acquisition
SIS	State Institute of Statistics, The Prime Ministry
SPO	State Planning Office
TBAG	The Scientific and Technical Research Council of Turkey
TCDD	The National Railway, Republic of Turkey
TCIP	Turkish Catastrophe Insurance Pool

TEAŞ	Turkish Electric Production and Transmission Corporation
TEM	Trans European Motorway
TGNA	Turkish National Grand Assembly
The Counterpart Agency	Department of Soil and Earthquake Research, Istanbul Metropolitan Municipality
The Study	The Study on a Disaster Prevention/Mitigation Basic Plan in Istanbul including Seismic Microzonation
TL	Turkish Lira
TÜBİTAK	The Scientific and Technical Research Council of Turkey
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USAID	United States Agency for International Development
USGS	United States Geological Survey

Scientific / Technical Term

CAD	Computer Aided Design
CI	Buried Iron Cast
DTM	Digital Terrain Models
EMS	European Macroseismic Scale
ES	Basic Index of Earthquake Resistance
GIS	Geographic Information System
HAZUS	Hazards U.S.
Is	Seismic Index
Iso	Required Seismic Index
JMAI	Japan Meteorological Agency Intensity
LNG	Liquid Natural Gas
MDOFM	Multi Degree of Freedom Model
MDPE	Middle Density Poly Ethylene
PVC	Poly Vinyl Chloride
SDOFM	Single Degree of Freedom Model
Mw	Moment Magnitude
NAF	North Anatolian Fault
PGA	Peak Ground Acceleration
PGV	Peak Ground Velocity
RC	Reinforced Concrete
SPT	Standard Penetration Test
UTM	Universal Transverse Mercator

Chapter 1.
General

Chapter 1. General

1.1. Introduction

In response to the request of the Government of the Republic of Turkey (hereinafter referred to as "GOT"), the Government of Japan (hereinafter referred to as "GOJ") has decided to conduct "The Study on A Disaster Prevention / Mitigation Basic Plan in Istanbul including Seismic Microzonation" (hereinafter referred to as "the Study") in the Republic of Turkey.

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the technical assistance programs of GOJ, undertakes the Study in accordance with the relevant laws and regulations in force in Japan. Also, the Study is undertaken in accordance with the Scope of Work agreed upon between the Istanbul Metropolitan Municipality (hereinafter referred to as "IMM") and JICA.

As the acting Counterpart Agency representing IMM, the Directorate of Soil and Earthquake Research (hereinafter referred to as "Counterpart Agency"), under the Directorate of Planning and Construction, will coordinate with the organizations of IMM and other relevant agencies and organizations.

The Study Team organized by JICA arrived in Istanbul on March 13, 2001 to conduct the Study in the following steps. The Study took approximately 19 months up to the official submission of the Final Report in December 2002.

Step 1: Existing data collection, analysis and evaluation to identify the study issue

Step 2: Site investigation on ground condition, population, building conditions, and others

Step 3: GIS database development and analysis of data

Step 4: Analysis of earthquake motion

Step 5: Estimation of seismic hazard and damage

Step 6: Compilation of hazard maps, seismic microzoning maps

Step 7: Detail examination on urban disaster prevention and mitigation plan

This Final Report covers all of the steps mentioned above.

1.2. Background of the Study

Istanbul city, which is located in the western part of Turkey, has been developed as the capital city of the East Roman Empire and the Ottoman Turkey for more than ten centuries. After the cease of the Ottoman Emperor, Istanbul has continued to grow as one of the biggest cities in the Middle East, representing a center of economic, industrial and tourist destination of the modern Turkey. The city has ten million of population today.

Geologically, Turkey is located at the boundary area where the Arabian Plate and African Plate are moving north towards the Eurasian Plate. A large scale fault line called North Anatolian Fault (NAF) is formed more than 1,000 km long from east to west in the northern territory of Turkey and historically, many strong earthquakes have occurred along this fault line. In recent years (1939 and 1992), very strong earthquakes occurred in Erzincan City, which is situated in the eastern part of Turkey. More than 30 thousand died in the earthquake of 1939 while 700 people perished in 1992. There was heavy damage to property, including the collapse of a number of buildings and infrastructures.

On August 17, 1999, an earthquake disaster called Izmit Earthquake occurred around Izmit and Adapazari, which are located 110 km east from Istanbul. Recorded at a magnitude of 7.4, this earthquake caused tremendous damage to human lives and properties in the area. Another strong earthquake with M 7.2 occurred on November 12, 1999 along the NAF again. More than 1000 people died or suffered from serious injuries.

Seismologists are paying much attention to the phenomena that the epicenters of these strong earthquakes are migrating from east to west along the NAF and they are pointing out the possibility of another big earthquake hitting Istanbul where the western edge of the NAF is.

In order to manage the potential earthquake disaster in Istanbul, it is necessary to prepare a seismic disaster prevention/mitigation plan, emergency rescue plan and restoration plan of the earthquake stricken area from middle to long-term points of view. However, the IMM does not have an integrated seismic disaster prevention/mitigation plan.

Therefore, GOT requested GOJ to conduct this Study as a technical cooperation program. JICA as the official implementation agency of this Study sent a Project Formation Study Team twice to Turkey in late 1999 to discuss and formulate the project. After the necessary discussions, S/W was signed in October 2000.

1.3. Agreement on the Scope of the Study

Prior to the mobilization to Istanbul on March 8, 2001, the Study Team prepared a Draft Inception Report in Tokyo, which contains the basic approach and methodology for the Study. Upon arrival in Istanbul, the Draft Inception Report was presented and explained to the Counterpart Agency. Based on the Draft Inception Report, following three issues were discussed:

1) Scope and basic approach of the Study;
   - Clarification of final output
   - Effective use of seismic microzoning results for disaster prevention/mitigation planning
2) Technical Transfer
   - Main technical transfer field such as seismic microzoning methodology, disaster prevention/mitigation planning and application of GIS
   - Training method for technical transfer
3) Organize a Steering Committee and a Technical Committee

During the first stay of the Study Team from March 13 to April 8, 2001, a total of 38 administrative and technical issues have been discussed. Finally, the scope, procedure and schedule of the Study are mutually agreed and summarized in the Final Inception Report.

1.4. Scope of the Study

1.4.1. Study Objective

The objectives of the Study are to compile the seismic microzonation maps which can serve as the basis of seismic disaster prevention/mitigation plan for Istanbul city and prefecture, to make recommendations for construction of earthquake resistant urbanization and to conduct effective technical transfer on relevant planning technique.

Specifically, the Study intends to:

1) Integrate and develop seismic microzonation studies being carried out in Istanbul as scientific and technical basis for disaster prevention/mitigation planning;
2) Recommend a citywide prevention/mitigation program against damage of buildings and infrastructures based on the detailed seismic microzonation study and building-vulnerability evaluation of areas;

3) Recommend disaster prevention considerations to be incorporated in urban planning of Istanbul City including land use plan and earthquake-resistant design regulation, etc; and

4) Pursue technology transfer of planning techniques to Turkish counterpart personnel in the course of the Study.

1.4.2. Study Area

The study area consists of 27 districts of IMM and the built-up area of additional 3 districts (Büyükçekmece, Silivri and Çatalca). The study area is shown in Figure 1.4.1

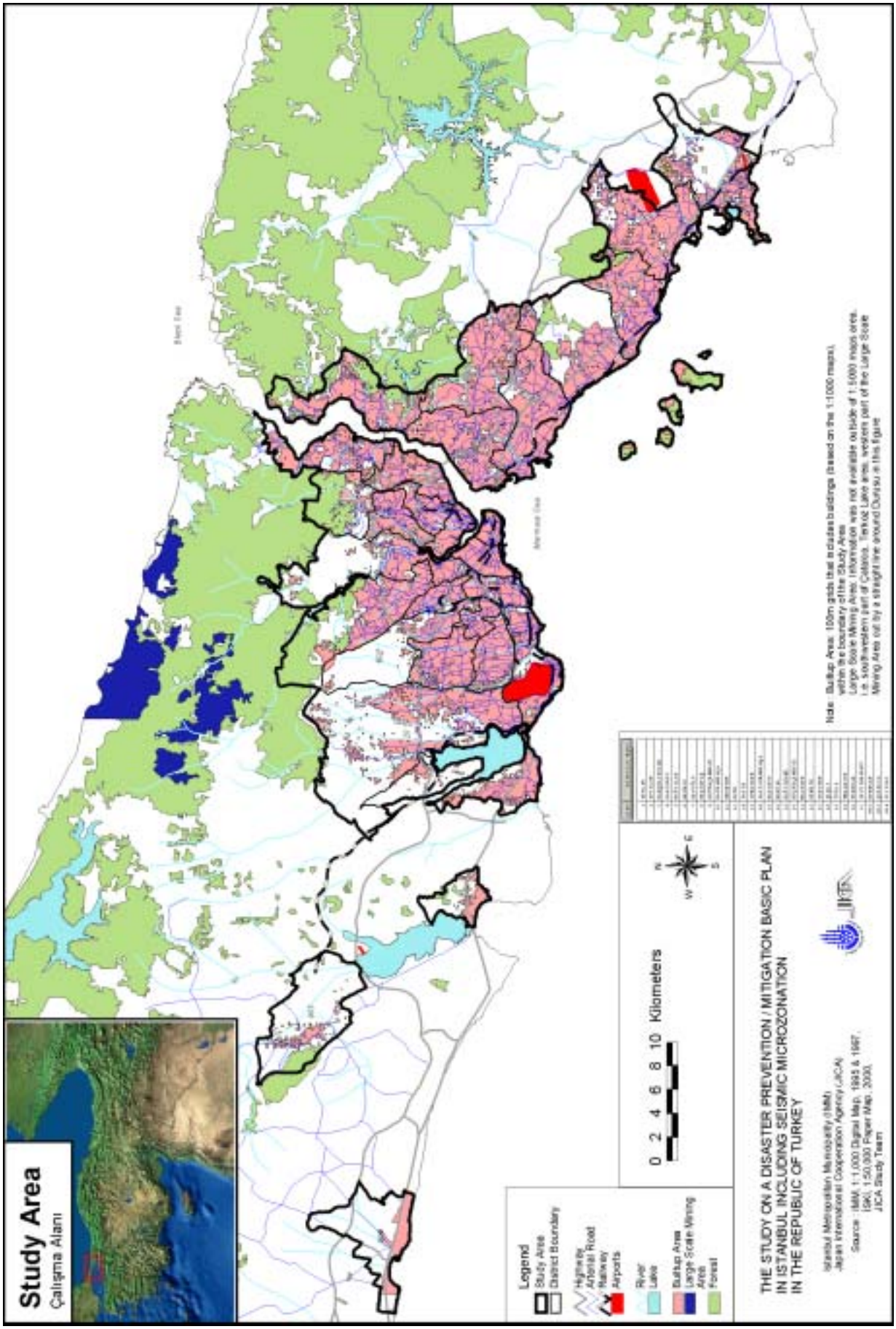

Figure 1.4.1 Study Area

1.4.3. Schedule of the Study

The Study consists of a variety of tasks. Figure 1.4.2 shows the work schedule of, and interrelations among, the tasks and shows the logical flow of the Study.

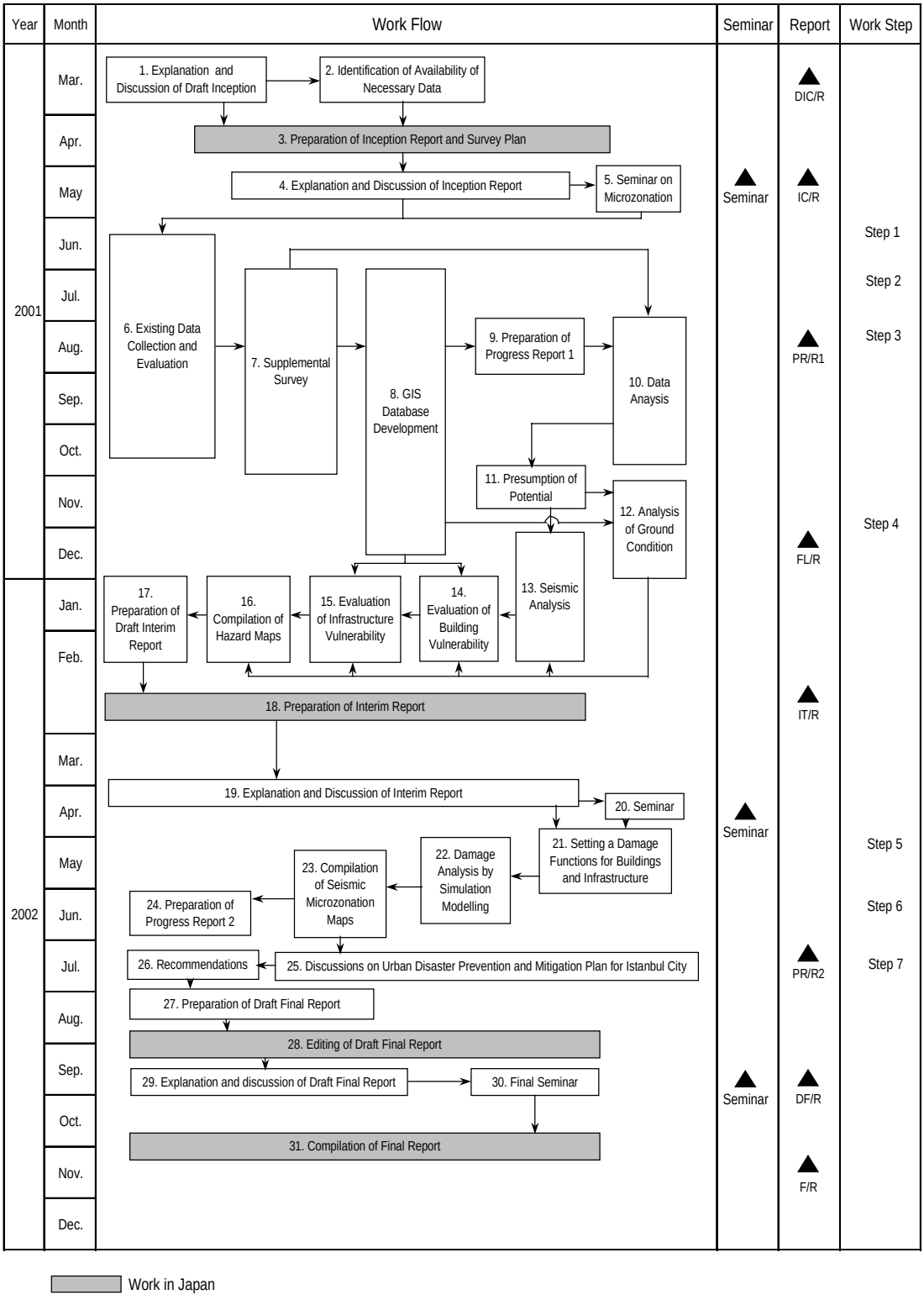

Figure 1.4.2 Work Flow of the Study

In the course of the Study, unfortunately an earthquake disaster occurred in Afyon, 250km southwest from Ankara, on 3rd of February 2002. This earthquake caused a limited number of building collapse and totally 54 human casualties. People's awareness on a potential big earthquake in Istanbul was reminded by this earthquake disaster. The final result of JICA Study was required to be submitted as soon as possible to discuss necessary measures for seismic disaster mitigation planning. Therefore, JICA decided to finalize the whole Study three month earlier than the original plan. According to this plan, original work flow chart was modified.

1.4.4. Implementation Organizations

(1) Establishment of Committees of Turkish Side

For the purpose of smooth and successful implementation of the Study, the Turkish side had established two committees, the Administrative Consulting Committee and the Scientific Consulting Committee, as shown in Figure 1.4.3.

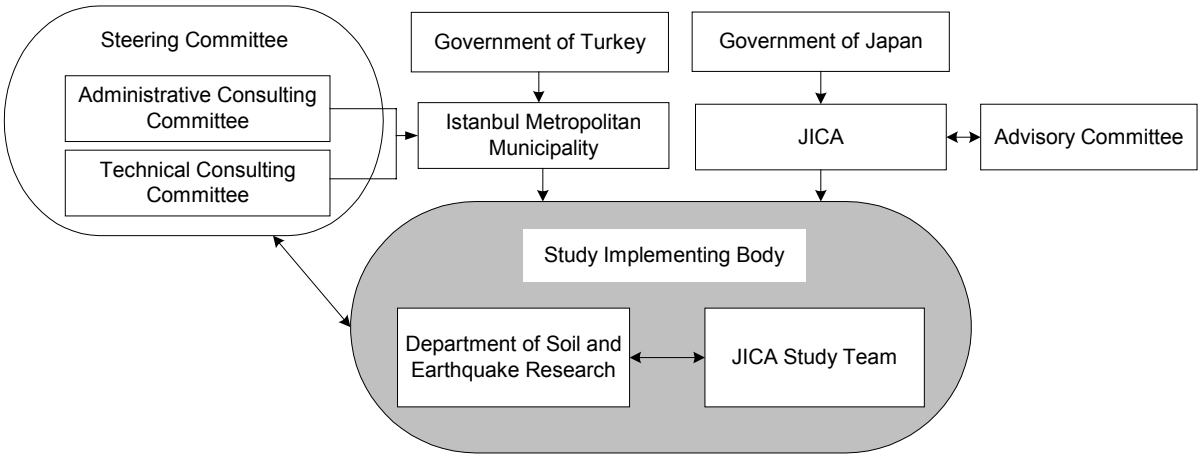

Figure 1.4.3 Study Organization

The Administrative Consulting Committee consists of both representatives from the IMM and Istanbul Governorship, more specifically, for the purpose of better coordination of two relevant organizations in Istanbul. The members are shown in Table 1.4.1.

To cover the various areas of the Study's scope, the Scientific Consulting Committee had been established as shown in Table 1.4.2.

Table 1.4.1 Members of Administrative Consulting Committee

Name	Organization	Position
Alicafer AKYÜZ	Governorship of Istanbul	Deputy Governor
İrfan UZUN	IMM	Head, Department of Planning and Reconstruction

Table 1.4.2 Members of Scientific Consulting Committee

Name	Organization	Specialty
Prof. Dr.Nafi TOKSÖZ	Massachusetts Institute of Technology, USA	Risk Analizes and Microzonation
Prof. Dr. O. Metin İLKIŞIK	Istanbul University (Retired)	Geophysics
Prof. Dr. Aykut BARKA	Istanbul Technical University	Geology
Prof. Dr. Fazlı Y. OKTAY	Istanbul Technical University (Retired)	Geology
Prof. Dr. M. Hasan BODUROĞLU	Istanbul Technical University	Structure
Prof. Dr. Ömer ALPTEKİN	Istanbul University	Seismology
Prof. Dr. Mustafa ERDİK	Boğaziçi University	Earthquake Engineering
Prof. Dr. Kutay ÖZAYDIN	Yıldız Technical University	Geotechnique
Prof. Dr. Cengiz ERUZUN	Mimar Sinan University	Urban planning/Architect
Prof. Dr. Nuray AYDINOĞLU	Boğaziçi University	Structural
Mr. Ekrem DEMİRBAŞ	General Directorate of Disaster Affairs, Ministry of Public Works and Settlement	Engineering Geology
Mr. Hüseyin IŞIK	Construction and Real Estate Department	Civil Engineer
Mr. Gökmen ÇÖLOĞLU	İGDAŞ	Seismology

On 1st of February 2002, Prof. Dr. Aykut Barka was suddenly passed away by fatal accident. JICA Study Team describes this fact here to memorize and show deep appreciation to his contribution to the Study.

(2) Counterparts assigned

A total of 8 persons had been assigned as counterpart personnel in accordance with their special subjects as tabulated in Table 1.4.3.

Table 1.4.3 Members of Counterparts

Name	Specialty
Mr. Mahmut BAŞ	Disaster Management
Dr.Ali İSKENDEROĞLU	GIS Development
Mr. Hikmet KARAOĞLU	Geophysics
Mr. Mehmet AKTAŞ	Geology
Mr. İskender AKMEŞE	Geology
Mr. Öner TAYMAZ	Geophysics
Ms. Mine Nilay ÖZEYRANLI	Urban Planning
Mr. Mustafa Özhan YAĞCI	Building and Infrastructure

(3) Member of Japanese Side

Table 1.4.4 Member of Administrative Body of JICA

Name	Position
Mr. Toshio HIRAI	Director, First Development Study Division, Social Development Study Department (March 2001- September 2002)
Mr. Takeshi NARUSE	Director, First Development Study Division, Social Development Study Department (October 2002 - November 2002)
Mr. Yodo KAKUZEN	Deputy Director, First Development Study Division, Social Development Study Department
Mr. Susumu YUZURIO	Staff, First Development Study Division, Social Development Study Department
Mr. Kenshiro TANAKA	Staff, First Development Study Division, Social Development Study Department
Mr. Shinichi TANAKA	Staff, First Development Study Division, Social Development Study Department

Table 1.4.5 Member of Advisory Committee

Name	Organization
Prof. Dr. Yoshimori HONKURA	Professor, Department of Earth and Planetary Sciences, Tokyo Institute of Technology
Prof. Dr. Ken SUDO	Professor, Institute of Industrial Science, Tokyo University
Prof. Dr. Itsuki NAKABAYASHI	Professor, Center for Urban Studies, Graduate Schol of Urban Science, Tokyo Metropolitan University
Dr. Hiroshi FUKUYAMA	Senior Researcher, Building Research Institute
Mr. Akio MIZUTANI	Chubu Regional Bureau, Ministry of Land, Infrastructure and Transport
Mr. Masayuki TANAKA	Deputy Director, Earthquake and Volcano Division, Disaster Prevention Bureau, Cabinet Office

Table 1.4.6 Member of JICA Study Team

Name	Assignment
Noboru IKENISHI	Team Leader / Database
Takashi KADOTA	Deputy Team Leader / Urban Disaster Prevention
Yutaka KOIKE	Geotechnical Engineer / Soil Dynamics
Shukyo SEGAWA	Earthquake Engineer
Osamu NISHII	Geophysical Engineer
Akio HAYASHI	Structural / Seismic Behavior Engineer
Yasuhito MORIMOTO	Structural Engineer
Osamu IDE	Infrastructure (Road, Bridge, etc.)
Ryoji TAKAHASHI	Infrastructure (Lifeline) / Building and Land Use Survey
Kanao ITO	Urban Planning
Hiroyuki MAEDA	GIS Development (1)
Hitoshi SUZUKI	GIS Development (2)
Yoshitaka YAMAZAKI	Disaster Prevention Management
Tomoko SHAW	Coordinator (1)
Miho NAKANO	Coordinator (2)

Chapter 2.
Lessons from Past Experience

Chapter 2. Lessons from Past Experience

In this section, situations and lessons during the Izmit Earthquake is described, based on interviews with numerous authorities that worked during the emergency period.

2.1. Lessons from 1999 Izmit Earthquake

(1) The large earthquake hit an industrial and populated area.

The earthquake with Magnitude 7.4 hit industrial and population heartland in Turkey. As a result, the 1999 Izmit Earthquake caused the second worst human casualties in 20th century in Turkey.

The earthquake affected seven provinces, and caused death of more than 15,000, heavily damaged household of more than 77,000.

(2) The public buildings and infrastructures were not strong against earthquake.

In the affected area, 43 schools collapsed while 377 of them were damaged.

Since the municipality building was not considered safe, municipality staffs moved to drivers' building and worked for relief activities.

Local hospitals collapsed, so foreign aid team set up tent hospitals.

(3) Governmental offices are also damaged, and responsible staffs were also victims

The earthquake fault ran through the naval base at Golcuk, thus the naval headquarter was directly affected and many flag officials were killed.

(4) Initial communication was not possible

Main fibre optical cable for telecommunication was disrupted that connect Izmit to Ankara, because of fault dislocation.

The president and prime minister could not communicate from Istanbul up to four hours.

No telephone was usable for first 48 hours.

Thus, telephone and mobile phone were not usable, only radio was useful. In case radio communication lacked backup battery, it was not very usable.

It took two days to understand the situation.

(5) Initial few days were chaotic; rescue activity was done by local residents.

In Izmit, at 5pm of the second day, first Turkish rescue team arrived from outside Izmit.

In Avcilar, citizens voluntarily started rescue work on the first day morning. Construction companies offered heavy machines on the morning of the first day.

Urgent rescue and relief team formed in each province consisting of 50 to 150 personnel could only seen on the paper, as most of them lacked training, plans for their mobilization, and allocation of equipment for those who reached to the affected area.

(6) Search and rescue was not organized and not effective

In resort place where residents did not know neighbors, it was difficult to know that if possible victims are buried or not.

Without guide in the area, rescue work was difficult for non-residents members.

Searched buildings were not marked, thus several rescue team worked on same building repeatedly.

There was friction between those who tried to hear sounds from possible survivors buried under the debris, and those who wanted to bulldoze, load and remove the damaged buildings.

Amateur rescuer who lacks building's structural knowledge was dangerous.

Logistic support was lacking such as gasoline, or provision of heavy machine.

Rescue work during night was difficult due to the lack of electricity and light.

Wiring a protocol letter for asking help delayed response activities.

(7) Rescue work from collapsed building was difficult

Light rescue works up to four-storied buildings.

Fire brigade did not have enough tools for heavy rescue, and were not accustomed to heavy rescue.

It takes ten persons for two days to remove a collapsed building without buried victims, without legal problems. If there are possible buried victims, or necessary legal procedures, the work delayed much more.

Heavily machines could not cut columns of collapsed buildings.

(8) Building damage assessment not organized

Initially, municipality did rapid inspection of building safety to meet the demand of residents with the help of architects and professors within a few days. Chamber of engineers and architects provided assessment form.

Engineers from ministry of public works and settlement came after 12 days to do official building damage assessment. The result of rapid inspection were not utilised for official assessment. Nor the results of official damage assessment were given officially to the municipality.

(9) Relief activities was not organized

Municipalities tried to open bank account for donation, but could only dealt donated goods. Only governorship could deal with donated money.

Volunteers coming without preparation of won food and shelter were problematic.

Donated clothes contained food inside, and they were rotten.

(10) First Aid

During past disasters, unskilled amateur treatment of victims rather caused problems.

Medical stocks need to last for first three days. After that period, necessary medicines will be available by donation.

(11) Psychological problems

Residents afraid of earthquake still go back to sleep in prefabricated house.

Rescue workers who worked without knowing family safety had mental problems.

(12) International aid acceptance

Working with foreign rescue members was difficult because there were not translator in emergency management centre.

Some of the medicines donated from abroad were not used, because they lacked readable instructions.

(13) Relocation problem

Permanent housing areas are selected in good ground, but in distant place from the city centre. New area lacks sufficient public transportation and social facilities such as school and clinic. As a result, people still prefers to live in temporally housing near the city centre.

Tent area that lacked infrastructure was problematic.

2.2. Lessons from 1995 Kobe Earthquake

Followings are major problems during the earthquake that hit Kobe, Japan, in 1995 to show some similarity in major earthquake damages in metropolitan area.

(1) Damage

The earthquake caused damage was the worst in post war era in Japan. Kobe city had experienced maximum seismic intensity of Japanese scale. The total numbers of death exceeds 6,000, with injuries over 14,000. The maximum number of refugee was 230,000.

The major cause of death was collapse of housing or trapping under house furniture. Necropsy study shows most of them dies within 15 minutes.

Existing buildings built with old building code suffered higher degree of damage.

(2) Communication

Due to the saturation of telephone communication or functional problems in radio communication, information collection on damage status was difficult.

Satellite communication system did not work because of generator's overheat due to the breakage of cooling water pipes.

Polices were asked to help rescue on the way, and could not collect initial damage information.

(3) Information

Mass media collected damage information quicker than government, and it was the major means to know the situation for government. However, their information mostly focused on the severest damage, and insufficient to know the situation in general.

Radio was initially the most effective ways to inform situation to public.

Local government staffs that worked on site did not know the general damage situation. Newspapers by local government for citizen were also useful to them.

(4) Initial response

Gathering of local government staffs were not sufficient because they were also victims, and because of traffic problems.

Local government staffs were also victims, and heavy traffic caused delayed arrival to office.

Municipality offices were damaged structurally or non-structurally, and were not useful.

(5) Traffic control

Insufficient traffic control caused traffic jams that delayed response activities.

Narrow road had higher percentage of road closure due to collapsed buildings.

Abandoned vehicles also caused traffic jams.

Helicopters were used as emergency transport means, but assurance of airways, air traffic control during emergency period, and use of helipad were problem.

Ocean transport means were also used, but damage to port facilities was problem.

(6) Debris removal

Large heavy machine was unable to enter into pile of debris, so that small heavy machine was useful in initial stage.

Machines become useless because they are broken, or run out of fuels after the hours of operation.

Dust produced by demolition work of buildings caused health problems. Also massive garbage from damaged buildings caused environmental problems.

(7) Search and rescue activities

Major difficulty was to cut the steel bar in concrete building.

Jack or bar was useful to jack up the collapsed building.

In a village where residents know each other well, the rescue operation terminated in the first day.

Estimation shows that to rescue a person from reinforced concrete building, it took 188 man-minutes for fire brigade. Another estimate by Tokyo fire department shows it took 21 man-hours to rescue a person from fireproof collective housing.

When a dead body is found, the necropsy procedure that requires attendance of police hindered the rescue worker to move to next site.

Noise from hovering helicopters obstructed activities to detect buried victims.

(8) Emergency medical aid

Triage, initial screening of victims, was not made on site. Thus, patients of every degree of injury flooded in hospitals. Doctors also lacked experience in triage, but they had to do it first.

Information on medical needs and treatment capacity, structural and non-structural damages to hospitals, logistics of medical goods and victims was lacking. As a result, hospital in severest damaged area was flooded with many patients. Fire station, evacuation areas were also flooded with patients.

Treatment of rescued person trapped under debris for a long time had a risk of "crushed syndrome". Though they looked fine at first, they needed an early treatment such as dialysis to be alive after rescue.

Though building was not damaged, lack of water and electricity services caused functional problem of hospitals. Lack of water caused problem for dialysis. In addition, cooling water for boiler and generators was also lacking.

(9) Evacuation shelter

Operation manual for evacuation shelter was necessary, such as maintaining sanitation, distribution of limited food, and keeping of dead bodies.

Making a list of evacuated people was necessary to respond the inquiries of safety.

Treatment of human waste was also a big problem. One temporally toilet per 100 persons was mostly sufficient, and one toilet per 75 persons caused little trouble.

Volunteers were helpful to transportation and distribution of goods and foods.

Heating could not be used in shelters for fire safety, and it caused health problems.

Mental cares to refugees and families who lost relatives were problem.

(10) Lifelines

Lasting blackout and saturated calls exhausted backup battery of exchange.

Restoration of electricity to damaged area caused fire due to switched apparatus, damaged cables, or gas leakage.

For the recovery of lifeline, parking, housing, and material stockyard for external recovery assistance team was lacking. Information provision on recovery status of lifeline was lacking.

Evacuation was recommended due to the gas leakage from LNG tank in high-pressure gas facilities.

(11) External help

Acceptance of official external help was difficult, due to lack of working space, experience, and organization in local government.

Many volunteers came from outside, but local government lacked experience to work with them.

Chapter 3.
Administrative Conditions for Earthquake Disaster Management

Chapter 3. Administrative Conditions for Earthquake Disaster Management

3.1. Introduction

Natural anomalous phenomena, such as earthquake, flood, landslide, heavy snows etc., can happen from time to time. These events may be mere natural phenomena if they occur in an unpopulated area. However, if such phenomena were to occur in a populated area, it could cause serious impacts on human life as well as on many other social aspects and the event becomes a natural disaster. In this section, disaster management is defined as various forms of organised human efforts to prepare for, to reduce, and to respond to a natural disaster. Disaster management is necessary because:

- Occurrence of anomalous natural phenomena cannot be stopped by human efforts.
- A natural disaster causes the loss of many lives and propertyand hinders national development.
- The impact of the disaster will expand, if it is not managed properly.

Scope of this Study

The object of this study is two-fold. One objective is to examine the current national and local government disaster management system in Turkey to learn its characteristics. Another is to suggest possible organisational and planning changes within current legal frameworks of the local governments in Istanbul.

The first section reviews the status of natural disasters in Turkey and existing cooperation efforts. The second through fourth sections examine the status of disaster management in Turkey from legal, institutional, and operational viewpoints, respectively. Bibliographic studies, interviews with key persons, critical readings of key legal documents and operation plans currently used in Turkey were carried out as key methods of this study. In the fifth section, disaster management systems in Japan and USA are described for a comparison. In the sixth section, some recommendations regarding local government law, organisation, and planning are presented.

Natural Disasters in Turkey

Table 3.1.1 shows the percentage of dwelling units destroyed by natural disasters during the last 70 years in Turkey. Earthquakes prove to be the most damaging natural disasters in the country.

Table 3.1.1 Dwelling Units Destroyed by Natural Disasters in Turkey

Natural Disaster Type	% of Total
Earthquake	61
Flood	14
Landslide	15
Rockfalls	5
Fire	4
Avalanche, storm, rain	1

Source: Oktay Ergunay, (1999)

Figure 3.1.1 shows the number of casualties and heavily damaged buildings due to earthquakes in Turkey during the last century. In total, 130 events are recorded. Total deaths exceed 80,000, with total injuries numbering more than 54,000, though some records are without injuries in older times. The total number of heavily damaged houses exceeds 440,000. Among them, the worst event was the 1939 Erzincan Earthquake that killed more than 32,000. The 1999 Izmit Earthquake that killed more than 15,000 was the second worst.

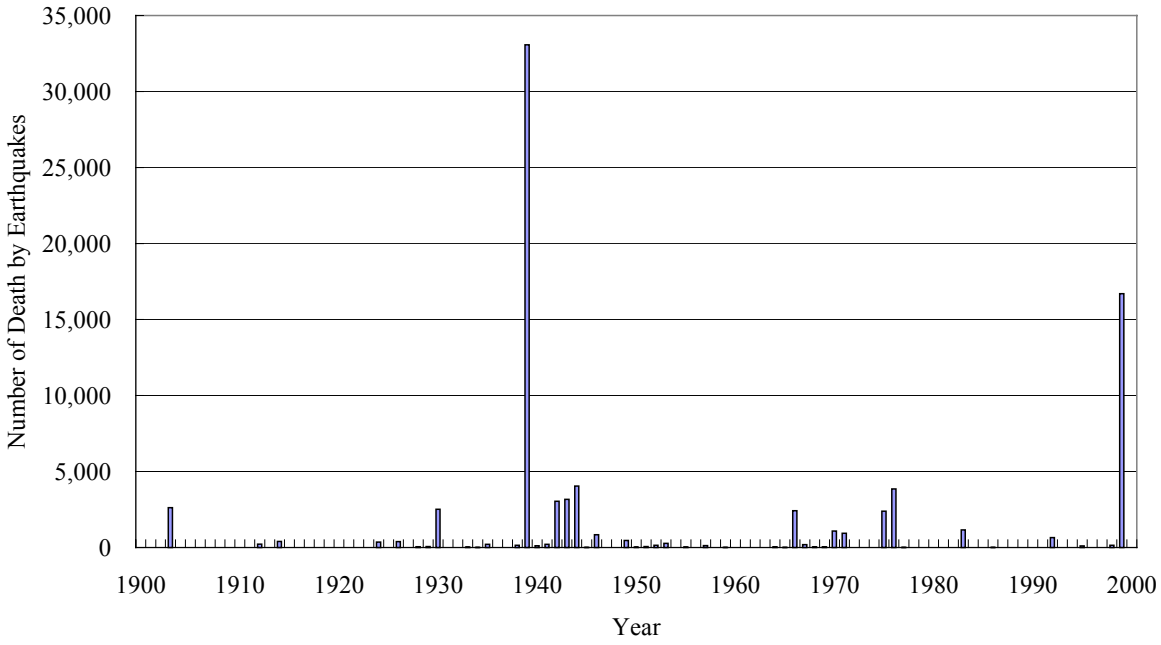

Figure 3.1.1 Number of Deaths by Earthquakes in Turkey

Source: Ministry of Public Works and Settlements (www.deprem.gov.tr). 1999 figure is according to the Prime Ministry Crisis Management Center

Existing Cooperation on Disaster Management

In Istanbul, there are two other international cooperation projects focusing on disaster management, as shown in Table 3.1.2. The "Community Impact Project" with Boazici University mainly works with local communities, in developing emergency response volunteers, with emphasis on non-structural mitigation. The project "A Cooperative

Hazard Impact Reduction Effort Via Education" focus on training of disaster prevention volunteers. Though the project terminated in 2001, training and research are underway at the newly established "Center of Excellence in Disaster Management."

Table 3.1.2 Existing Cooperation on Disaster Management in Istanbul

Project name	Community Impact Project	A Cooperative Hazard Impact Reduction Effort Via Education Project
Counterpart organization	Boazici University	Istanbul Technical University
Donor	17 organisations including USAID, UNDP, Swiss Agency for Development and Cooperation, etc.	Federal Emergency Management Agency, USA
Target	Local communities	Mostly at the national level
Period	Ongoing	2000-2001
Features	Community emergency response volunteers. Non structural mitigation. Model area in Kadikoy Municipality.	Training of disaster prevention volunteers. Focused mainly at the national level. "Centers of Excellence in Disaster Management" offers courses and projects on disaster management.
Reference	www.iahep.org	atlas.cc.itu.edu.tr/~achieve www.cedm.itu.edu.tr/

Reference for Section 3.1

Oktay Ergunay, 1999, a Perspective of Disaster in Turkey: Issues and Prospects, Urban Settlements and Natural Disasters, Proceedings of UIA Region II Workshop, Chamber of Architects of Turkey

3.2. Legal Systems Related to Disaster Management in Turkey

3.2.1. Laws Related to Administration

(1) 1982 Constitution

The government of the Republic Turkey functions in accordance with its constitution. Since the establishment of the Republic in 1923, the constitution has been revised two times, both after the period of military rule following a coup. The constitution in effect today was adopted in 1982, replacing the constitution of 1961.

The fundamental change in the legislature by the 1982 Constitution was the abolition of the Senate of the Republic; thus, the Turkish Grand National Assembly became a single chamber. While the President of the Republic and the Council of Ministers carry out executive functions, independent courts exercise judicial power. The 1982 Constitution expands the authority of the president and circumscribes the exercise of individual and association rights. The 1982 Constitution has not only strengthened the powers of the president, but those of the prime minister as well.

The 1982 Constitution stipulates the fundamental duties and rights, fundamental organzation of the Republic, and financial and economic provisions. The table of contents of the 1982 Constitution related to organzation of the Republic is shown in Table 3.2.1. The 1982 Constitution defines central government as follows:

ARTICLE 1 stipulates the form of the state as “The Turkish State is a Republic.”

ARTICLE 2 states the “Characteristics of the Republic.”

“The Republic of Turkey is a democratic, secular and social state governed by the rule of law; bearing in mind the concepts of public peace, national solidarity and justice; respecting human rights; loyal to the nationalism of Atatürk, and based on the fundamental tenets set forth in the Preamble.”

ARTICLE 123 defines the “Integral Unity and Public Legal Personality of the Administration” as follows:

“The administration forms a whole with regard to its structure and functions, and shall be regulated by law. The organisation and functions of the administration are based on the principles of centralization and local administration. Public corporate bodies shall be established only by law, or by the authority expressly granted by law.”

ARTICLE 124 speaks to the issuance of "By-laws" as follows:

"The Prime Ministry, the ministries, and public corporate bodies may issue by-laws in order to ensure the application of laws and regulations relating to their particular fields of operation, provided that they are not contrary to these laws and regulations. The law shall designate which by-laws are to be published in the Official Gazette."

Table 3.2.1 Contents of the 1982 Constitution

PREAMBLE
PART ONE GENERAL PRINCIPLES
PART TWO FUNDAMENTAL RIGHTS AND DUTIES
PART THREE FUNDAMENTAL ORGANS OF THE REPUBLIC
- CHAPTER ONE LEGISLATIVE POWER
  - I. The Turkish Grand National Assembly
  - II. Functions and Powers of the Turkish Grand National Assembly
  - III. Provisions Relating to the Activities of the Turkish Grand National Assembly
  - IV. Ways of Collecting Information and Supervision by the Turkish Grand National Assembly
- CHAPTER TWO THE EXECUTIVE
  - I. President of the Republic
    - A. Qualifications and Impartiality
    - B. Election
    - C. Taking the Oath
    - D. Duties and Powers
      - a) Those relating to legislation:
      - b) Those relating to executive functions:
      - c) Those relating to the judiciary:
    - E. Presidential Accountability and Non-accountability
    - F. Acting for the President of the Republic
    - G. General Secretariat of the President of the Republic
    - H. State Supervisory Council
  - II. Council of Ministers
    - A. Formation
    - B. Taking Office and Vote of Confidence
    - C. Vote of Confidence While in Office
    - D. Functions and Political Responsibilities
    - E. Ministers, and the Formation of Ministries
    - F. Provisional Council of Ministers During Elections
    - G. Regulations
    - H. Calling for Elections for the Turkish Grand National Assembly by the President of the Republic
    - I. National Defence
      - A. Offices of Commander-in-Chief and Chief of the General Staff
      - B. National Security Council
  - III. Procedure Governing Emergency Rule
    - A. States of Emergency
      - 1. Declaration of State of Emergency on Account of Natural Disaster or Serious Economic Crisis
      - 2. Declaration of State of Emergency on Account of Widespread Acts of Violence and Serious Deterioration of Public Order
      - 3. Rules Relating to the State of Emergency
    - B. Martial Law, Mobilization and State of War
  - IV. Administration
    - A. Fundamentals of the Administration
      - 1. Integral Unity and Public Legal Personality of the Administration
      - 2. By-laws
    - B. Recourse to Judicial Review
    - C. Organisation of the Administration
      - 1. Central Administration
      - 2. Local Administrations
    - D. Provisions Relating to Public Servants
      - 1. General Principles
      - 2. Duties and Responsibilities, and Guarantees During Disciplinary Proceedings
    - E. Institutions of Higher Education and Their Higher Bodies
      - 1. Institutions of Higher Education
      - 2. Superior Bodies of Higher Education
      - 3. Institutions of Higher Education Subject to Special Provisions
    - F. Radio and Television Administrations and State-Financed News Agencies
    - G. The Atatürk High Institution of Culture, Language and History
    - H. Public Professional Organisations
    - I. Department of Religious Affairs
    - J. Unlawful Orders
- CHAPTER THREE JDICIAL POWER

PART FOUR FNANCIAL AND ECONOMIC PROVISIONS
PART FIVE MISCELLANEOUS PROVISIONS
PART SIX PROVISIONAL ARTICLES
PART SEVEN FINAL PROVISIONS

Source: Grand National Assembly website (www.tbmm.gov.tr/anayasa/constitution.htm)

Central and Local Administration

The 1982 Constitution defines central and local administration as follows:

ARTICLE 126 stipulates the meaning of "Central Administration" as follows:

"In terms of central administrative structure, Turkey is divided into provinces on the basis of geographical situation and economic conditions, and public service requirements; provinces are further divided into lower levels of administrative districts. The administration of the provinces is based on the principle of devolution of wider powers. Central administrative organisations comprising several provinces may be established to ensure efficiency and coordination of public services. The functions and powers of these organisations shall be regulated by law."

ARTICLE 127 stipulates the meaning of "Local Administrations" as follows:

"Local administrative bodies are public corporate entities established to meet the common local needs of the inhabitants of provinces, municipal districts and villages, whose decision-making organs are elected by the electorate as described in law, and whose principles of structure are also determined by law.

The formation, duties, and powers of the local administration shall be regulated by law in accordance with the principle of local administration.

The elections for local administrations shall be held every five years in accordance with the principles set forth in Article 67. However, general or by-elections for local administrative bodies or for members thereof, which are to be held within a year before or after the general or by-elections for deputies, shall be held simultaneously with the general or by-elections for deputies. Special administrative arrangements may be introduced by law for larger urban centres.

The procedures dealing with objections to the acquisition by elected organs of local government or their status as an organ, and their loss of such status, shall be resolved by the judiciary. However, as a provisional measure, the Minister of Internal Affairs may remove from office those organs of local administration or their members against whom investigation or prosecution has been initiated on grounds of offences related to their duties, pending judgement.

The central administration has the power of administrative trusteeship over the local governments in the framework of principles and procedures set forth by law with the

objective of ensuring the functioning of local services in conformity with the principle of the integral unity of the administration, securing uniform public service, safeguarding the public interest and meeting local needs, in an appropriate manner.

The formation of local administrative bodies into a union with the permission of the Council of Ministers for the purpose of performing specific public services; and the functions, powers, financial and security arrangements of these unions, and their reciprocal ties and relations with the central administration, shall be regulated by law. These administrative bodies shall be allocated financial resources in proportion to their functions."

(2) Municipality Act (No.1580)

The first municipal organisation was established in Istanbul in 1854. Municipalities in other cities followed with the municipal laws of 1868 and 1876. Local administrations gained their contemporary features after the establishment of the Republic in 1923.

The main legislation that gives powers and responsibilities to municipalities is the Municipality Act (No. 1580) of 1930, which is still valid to date. The law is based on the French system, prescribing the organisation and functions of the municipalities in detail.

According to this law, a municipal administration can be established in localities of more than 2,000 inhabitants with a referendum. As to provinces and districts, municipal administration has to be instituted irrespective of their population. The number of municipalities in Turkey has increased in parallel with the increase in population.

Article 15 states that “the principal duty of the municipality is to meet the local needs of the inhabitants and the citizens.”

Article 19 states that “having fulfilled the duties and services given by this law, the municipalities can execute every sort of activity concerning the common necessities of their inhabitants.”

There have been significant changes in local-level public needs and expectations and in the structure of urban settlements since the 1930’s because of major socio-economic and technological developments in Turkey. Certain municipal functions have become obsolete over time. In general, however, there has been a significant re-evaluation and expansion in the scope of municipal activities to meet the rapidly changing needs of urban life.

The most fundamental change took place in the post-second World War period, when the rapidly accelerating pace of urbanisation of the 1950’s was reflected in municipal functions. In the 1960’s the scope of authority of municipalities in regulating urban economic

activities and consumption was expanded. In the 1970's, certain duties in the field of environmental protection were added.

(3) Metropolitan Municipalities Act (No. 3030)

In 1984, a different type of municipal administration, namely a "metropolitan municipality" defined as "a city that comprises more than one district within its own boundaries," was introduced by the Metropolitan Municipalities Act (No. 3030). This type of administration was first set up in Istanbul, Ankara and Izmir, and later extended to 15 metropolitan municipalities.

The 1984 Metropolitan Municipalities Act requires that all intra-city services be carried out in accordance with plans and programmes prepared by the metropolitan municipalities within the framework of the objectives of the National Development Plans.

Table 3.2.2 Contents of the Metropolitan Municipalities Act

Part	Title	Article	Contents
1	Object, contents, definition	1-3	Object, contents, definition of the law
2	Establishment and boundary	4-5	Establishment and boundary of the greater municipality
3	Duties, rights	6-8	Duties and rights of greater municipality
4	Organs in greater municipality	9-15	Organs, council, committee, lord mayor
5	Organs in greater municipality	16-17	Secretary general and sub secretary general
6	Finance in greater municipality	18-20	Revenue, expense, plan, budget
7	Decisions	21-26	Settlement of dispute, transition to greater municipality

3.2.2. Development Laws

(1) The 1982 Constitution

Article 57 of the 1982 Constitution states the "Right to Housing." "The state shall take measures to meet the need for housing within the framework of a plan which takes into account the characteristics of cities and environmental conditions and supports community housing projects."

(2) National Development Plan

In the 1930's, the Republic of Turkey introduced the first of its five-year plans. The State Planning Organisation (SPO) was established in 1961 to regain stability in the economy after social turmoil. The SPO developed its first five-year national development plan in 1962. Currently the eighth national development plan for the years 2001 to 2005 is in effect, with reference to the long-term development for 2001 to 2023. Major objectives of each five-year plans are summarised in Table 3.2.3.

Table 3.2.4 shows the table of contents of the 8th National Development Plan. In the plan, section seven "Urban and Rural Infrastructure" in chapter eight "Development Objectives and Policies Related to Social and Economic Sectors" refers to urbanization and housing. In addition, section seven in chapter nine "Enhancement of Efficiency in Public Services" refers to natural disasters.

Table 3.2.3 Major Objectives of the Republic's Five-Year Plans

Plan	Term	Objectives
	1930's	Firstly introduced five-year plans as part of the etatist industrialization drive, provided guidance for the development of infrastructure, mining, and manufacturing.
	1940's	Plans was drafted but only partially implemented because of World War II.
	1950's	The Democrat Party (DP) eliminated central economic planning.
	1961	The 1961 constitution made social and economic planning a state duty.
1st	1963-1967	What should be accomplished by the mid-1970s
2nd	1968-1972	What should be accomplished by the mid-1970s
3rd	1973-1977	Goals for 1995, including a customs union with the EC
	Late 1970's	The economic and political disorder made it impossible to achieve plan targets.
4th	1979-1983	Modified to favor the private sector, labor-intensive and export-oriented projects, and investments that would pay for themselves relatively quickly.
5th	1984-1989	Called for a smaller state sector. The state would take more of a general supervisory role than it had in the past, concentrating on encouraging private economic actors. Nevertheless, the state was to continue an aggressive program of infrastructure investments to clear bottlenecks in energy, transport, and other sectors.
6th	1990-1995	Called for overall economic growth of 7 % per year. The growth of private-sector investment was targeted at an average of 11 % per year, whereas the aim was to increase exports 15 % per year. The inflation rate was targeted at 10 % per year.
7th	1996-2000	development and physical planning studies is emphasized to reduce interregional development disparities.
8th	2001-2005	Called for improvement of life quality of the society, start of a continuous and stable growth process, realization of basic transformations within the process of European Union membership, integration with the world.

Table 3.2.4 Contents of the 8th National Development Plan

CHAPTER ONE DEVELOPMENTS PRIOR TO THE 8TH FIVE YEAR DEVELOPMENT PLAN
CHAPTER TWO BASIC TARGETS AND STRATEGY FOR LONG-TERM DEVELOPMENT (2001-2023)
CHAPTER THREE BASIC TARGETS, PRINCIPLES AND POLICIES OF THE 8TH FIVE YEAR DEVELOPMENT PLAN (2001-2005)
CHAPTER FOUR MACROECONOMIC POLICIES, OBJECTIVES AND PROJECTIONS OF 8TH FIVE YEAR DEVELOPMENT PLAN
CHAPTER FIVE RELATIONS WITH THE EUROPEAN UNION
CHAPTER SIX TURKEY'S ECONOMIC RELATIONS WITH COUNTRIES IN THE REGION AND WITH OTHER COUNTRIES
CHAPTER SEVEN REGIONAL DEVELOPMENT OBJECTIVES AND POLICIES
CHAPTER EIGHT DEVELOPMENT OBJECTIVES AND POLICIES RELATED TO SOCIAL AND ECONOMIC SECTORS
- I. INTRODUCTION
- II. THE DEVELOPMENT OF HUMAN RESOURCES
- III. CULTURE
- IV. ENHANCEMENT OF WELFARE
- V. INDUSTRIALISATION
- VI. IMPROVEMENT OF THE SCIENTIFIC AND TECHNOLOGICAL CAPACITY
- VII. INFORMATION AND COMMUNICATION TECHNOLOGIES
- VIII. AGRICULTURAL DEVELOPMENT
- IX. ENERGY
- X. TRANSPORTATION
- XI. TOURISM AND PROMOTION
- **XII. URBAN AND RURAL INFRASTRUCTURE**
  - **1. SETTLEMENT AND URBANISATION**
  - **2. HOUSING**
  - **3. MUNICIPAL WATER, SEWERAGE, WASTE WATER TREATMENT AND WASTE MANAGEMENT**
  - **4. URBAN TRANSPORTATION**
  - **5. CONSTRUCTION, ENGINEERING, ARCHITECTURE, TECHNICAL CONSULTANCY AND CONTRACTING SERVICES**
  - **6. MAP, LAND REGISTRATION AND CADASTRAL SURVEY, GEOGRAPHICAL INFORMATION SYSTEMS AND GLOBAL POSITIONING SYSTEMS**
  - 7. RURAL INFRASTRUCTURE
- XIII. ENVIRONMENT

CHAPTER NINE ENHANCEMENT OF EFFICIENCY IN PUBLIC SERVICES
- I. IMPROVEMENT AND RESTRUCTURING OF THE PUBLIC ADMINISTRATION
- II. EFFICIENCY IN JUDICIAL SERVICES
- III. EFFICIENCY IN SECURITY SERVICES
- **IV. LOCAL ADMINISTRATIONS**
- **V. EFFICIENCY IN PLANNING AND IN IMPLEMENTATION OF PUBLIC INVESTMENTS**
- **VI. NON-GOVERNMENTAL ORGANISATIONS (NGOs**
- **VII. NATURAL DISASTERS**
- VIII. TRAFFIC AND LIFE SAFETY

CHAPTER TEN ENHANCEMENT OF EFFICIENCY IN ECONOMY
BASIC TARGETS AND STRATEGY OF TURKEY'S
LONG TERM DEVELOPMENT (2001-2023) AND 8th FIVE YEAR DEVELOPMENT PLAN (2001-2005)
- I. DEVELOPMENTS IN THE WORLD
- II. TURKEY'S EXPERIENCE AND MAIN PROBLEM AREAS
- III. BASIC TARGETS AND STRATEGY OF LONG TERM DEVELOPMENT(2001-2023)
- **IV. BASIC TARGETS, PRINCIPLES AND POLICIES OF THE 8th FIVE YEAR DEVELOPMENT PLAN (2001-2005)**
  - 1. THE PROCESS OF ACCESSION TO THE EUROPEAN UNION AND FOREIGN ECONOMIC RELATIONS
  - 2. MACRO-ECONOMIC TARGET FORECASTS AND POLICIES
  - 3. DEVELOPMENT OF HUMAN RESOURCES
  - 4. CULTURE AND ARTS
  - 5. ENHANCEMENT OF SOCIAL WELFARE
  - 6. INDUSTRIALISATION
  - 7. DEVELOPMENT OF SCIENCE AND TECHNOLOGICAL CAPACITY
  - 8. INFORMATION AND COMMUNICATION TECHNOLOGIES
  - 9. AGRICULTURAL DEVELOPMENTS
  - 10. ENERGY
  - 11. TRANSPORTATION
  - 12. TOURISM AND PROMOTION
  - 13. REGIONAL DEVELOPMENT
  - **14. SETTLEMENT, URBANISATION PROVINCIAL AND RURAL INFRASTRUCTURE**
  - 15. ENVIRONMENT
  - **16. NATURAL DISASTERS**
  - 17. ENHANCEMENT OF EFFICIENCY IN PUBLIC SERVICES
  - 18. ENHANCEMENT OF EFFICIENCY IN ECONOMY

GLOSSARY

Source: State Planning Office website (www.dpt.gov.tr/dptweb/ingin.html)

(3) Development Law (No. 3194)

The Ministry of Reconstruction and Settlement, the predecessor organisation of the current Ministry of Public Works and Settlements, was established in 1958 to reduce the risk of death and injury to the population, and to reduce the scale of the economic risks involved from earthquake and other natural disasters. The single and most important mandate was to implement two laws, the so-called "Development Law" and "Disaster Law," which were created by the Ministry of Reconstruction and Settlement in 1959.

The current Development Law (No.3194, termed the "Reconstruction Act" as literally translated from Turkish) was enacted in 1985, and it is the fourth generation in a tradition of such legislation in Turkey. The contents are shown in Table 3.2.5.

The Development Law is the principal legal instrument governing how buildings are constructed. This law was devised to ensure the establishment of settlement areas and structures in compliance with planning, health and environmental conditions.

The construction process in Turkey is illustrated by a schematic diagram in Figure 3.2.1. This law has a few articles in Part 4 that regulate the supervision of building construction. The law holds municipalities (or governorates for buildings outside of urban areas) responsible for design supervision. Construction supervision is entrusted to the inspector, so-called "engineers of record." For certain classes of buildings to be built in non-municipality areas, non-engineering degree holders have also been enabled to serve in this capacity. There are other exceptions granted for rural settlements. Plans for areas remaining inside or located outside of municipal and residential areas, and all structures to be constructed are subject to provisions of this law.

In Turkey, the legal system functions by chartering by-laws, regulations, or statutes that regulate how a given law is enforced. Numerous regulations complement the Development Law as follows:

- Standard building regulations for non-metropolitan municipalities

- Land and property sharing with renewed alignments according to Article 18

- Standards and procedures for preparing and revising plans

- Building regulations for areas without a plan

Table 3.2.5 Contents of the Development Law

Chapter	Article	Contents
CHAPTER ONE General Provision	1-5	Purpose
		Scope
		General Principle
		Exceptions
		Definitions
CHAPTER TWO Principles Pertaining to Zoning Plans	6-14	Planning Stages
		Current Maps and Zoning Plans
		Preparation and Putting in Effect of Plans
		Authority of the Ministry for Zoning Plans
		Reconstruction Programs, Expropriation and Restriction
		Public Owned Real Estate
		Front Line
		Places Reserved for General Services in the Zoning Plans
		Servitude Rights
CHAPTER THREE Separation and Unification Matters	15-19	Separation and Unification
		Registration and Division
		Parts Remaining after Expropriation
		Regulation of Fields and Lands
		Preparation and Registration of Parceling Plans
CHAPTER FOUR The Structure and Principles Relevant to the Structure	20-37	Structure
		Structure License
		Conditions of License
		Structure License in Redevelopment Areas
		Classification of Independent Sworn-In Architecture and Engineering Bureaus
		License for Public Structure and Buildings and Industrial Plants
		Structures Not Subject to Licensing and Principles They Should Abide By
		Technically Responsible Persons, Responsibilities Thereof and Contractor Records
		License Term
		Structure Habitation License
		Structures Without Utilisation Permit
		Structures Started Without License or in Contradiction to the License and Appendices
		Temporary Structures on Areas Reserved for General Services
		Measures and Liabilities Pertaining to Construction, Repair and Landscaping
		Dig of Natural Ground Between the Building Frontline and Road
		Apartments of the Doormen and Shelters
		Parking Lots
CHAPTER FIVE Miscellaneous Provision	38-45	Preparation and Application of Current Maps, Zoning Plans and Structure Designs
		Structures Dangerous to the Degree of Collapse
		Measures For the Safety of the Public
		Lands Facing the Road
		Punitive Sanctions
		Repealed Provision
		Regulation
		Settlement Area
CHAPTER SIX Provision Regarding the Bosphorus Act 2960	46-48	
CHAPTER SEVEN Temporary Provisions, Effectiveness and Enforcement	49-50	Utilisation of Structures for their Purposes
		Parking Lots Utilised for Other Purposes
		Licenses and Permits Granted Previously
		Joint Entrance
		"Tenures" and Land Holds
		Period for Promulgation of Regulations
		Effectiveness
		Enforcement

BUILDING TYPE → / BUREAUCRATIC STEP ↓	PRIVATE PROPERTY			INSTITUTIONAL BUILDING
	Single Detached Building (Business or Rental Facility)	Collective Housing through Cooperatives	Land-in-Exchange for Share of Property (Build-Sell)	
1. Establish land ownership	The Deeds Bureau or Assignment/Lease Bureau: Acquisition of the deed or assignment paper			Deed and/or expropriation
2. Financial arrangements	Individual	Collect money from members	Private agreement between parcel owner/ contractor	Budget and funds
3. Conformance with development plan	Municipality or Provincial Office of Ministry of Public Works and Settlements			
	Deed holder Applies	Deed holder (or Coop. Board) applies	Deed holder applies	End user applies w/ deed + petition
	For lands with no plans, new plans must be attached			
4. Design: architectural, structural, installations	Design Offices (Engineer-Architects)			Subcontracted, with in-house check or design in-house
	Municipality or Provincial Office of Ministry of Public Works and Settlements			
5. Building permit	An engineer of record must be designated			
6. Preparation for construction/ contracting	Private award to contractor, Invite for tender, or turnkey Arrangement		Private agreement	Follow Contracts Law procedures
7. Construction	Contractor + (subcontractor) + engineer of record (Municipality checks only foundation, subbasement and story elevations)			Contractor + sub-Contractor + site engineer
8. Supervision, progress payment, quantity surveys, workplan, conformance check	Private Supervisors		As per Agreement between parties	Agency units, supervisory units, engineer of record
	Engineer of record			True responsibility
9. Engineering responsibility	The engineer of record designated during the taking out of the permit is on paper only. Law holds contractor responsible, even for design errors. He often is able to pass it on to the site engineer.			does not exist: civil employees cannot be held liable
10. Occupation permit: delivery of works to owner	Check with Social Security Agency for workers' compensations; check for completion of project (municipality, public health, fire bureau, architectural and engineers chambers, utility connections)			Supervisory unit within agency grants certificate of completion

Figure 3.2.1 A Simplified Description of the Construction Process in Turkey

Source: Polat Gulkan (2000)

(4) Illegal Housing Construction Laws

In Turkey, the informal settlement sector plays an important role in housing construction. Illegal housing, or so-called "gecekondou", a Turkish word meaning "overnight construction", began to appear in the 1940's. At first, the government tried to remove gecekondou. However, rapid increase of gecekondou and massive political power of its inhabitants forced the governmental policy to take more feasible measures (Hirayama,2001;Kobayashi et al.,2001).

In 1953, a law was issued to prohibit new gecekondou but permit existing illegal housing. In the late 1950's, construction of illegal housing became industrialised. Planned but illegal housing development, and its selling and renting were established as a commercialized system.

In 1963, the Republic's five-year national development plan was institutionalized, and housing provision was included under the plan.

In 1966, a major shift in the housing policy was made when a gecekondou law was issued. The law designated gecekondou areas that satisfied certain conditions as "improvement areas," and their improvement and infrastructure were promoted. Gecekondou areas that did not satisfy certain conditions were designated as "prohibited areas," and the removal of housing from these areas along with provisions of alternative housing were promoted. Illegal occupants in public areas were requested to buy the land in short period of time as sub-division, and then they become subject to property taxation. Gained revenue was to be used for the improvement of the gecekondou areas.

In Istanbul in the 1950's, the informal sector consisted of 45% of its housing construction. In the 1970's, the informal sector accounted for over two thirds of housing construction. Gecekondou law was revised later in 1976 and in 1983, maintaining basic principles from its first version.

In 1985, financial assistance systems for acquisition of housing such as the Mass Housing Law, and the Mass Housing Fund were outlined under the 5th National Development Plan. In the same year, a new reconstruction law penalized illegal development covering areas over 1000 m^2, but small illegal housing developments covering areas less than 1000 m^2 were legalized.

(5) Recent Decrees related to Safe Construction

Following two earthquakes in 1999, new decrees were developed to ensure safe construction (Polat Gulkan, 2001).

a. Building Construction Supervision (Decree No. 595, April 10, 2000)

Decree No. 595 was issued to ensure that nominal quality standards are abided within the building construction continuum. Institutional buildings are excluded. The individuals deemed responsible for a given building are the design engineer, contractor, site engineer and building supervision firm. Design engineers are required to have the title of "expert engineer," similar to a professional engineer. In essence, the building supervision firm exercises the duties of the municipal or governor offices in ensuring both the correctness of the designs and conformance of the actual construction to the design.

In each provincial capital and town with populations numbering more than 50,000 inhabitants, a building supervision oversight commission is established under the general coordination of the field office of the Ministry of Public Works and Settlements. Ankara's "Building Supervision Supreme Council" is embedded in the same ministry and manages this hierarchical structure.

Fees for design and construction supervision range from 4 to 8 percent of the estimated cost of the building and are disbursed by the owner through the municipality. Unless there exists a confirmation that the building has been completed in conformance with the actual design, municipalities are not able to grant occupation permits for people to move into the premises.

The building construction supervision firm is the party primarily responsible for offsetting any losses incurred by the owner that may arise during the first ten years after the occupation permit is issued, including those caused by natural disasters. To ensure this compensatory liability, firms must purchase insurance for each job they supervise. All firms engaged in this type of activity have this coverage.

The enforcement of this decree was initiated in 27 pilot provinces, including all that were impacted by the 1999 earthquakes. An omission in the text of the decree is the detailed construction inspection procedures that are required for effective quality assurance. Architects have been left out of the inspection procedures, with the civil engineering profession having received prime responsibility there. A number of regulations have also been issued to facilitate the implementation of the decree.

b. Regulation for Implementation of Construction Supervision (May 26, 2000)

Construction supervision firms are classified into three groups in order of reduced responsibility and manpower requirements. These firms must be owned by a majority of engineers or architects. Their chief mission is to ensure that the designs conform to the appropriate building code as well as the seismic code. Local site evaluations are specifically mentioned because of past experiences with liquefaction and loss of soil strength. This regulation also contains clarifications regarding the manner in which different-level supervision councils are to function, and how their records are to be kept.

c. Revision of the Law on Engineering and Architecture No. 3458 and Law on the Union of Chambers of Turkish Engineers and Architects No. 6235 (Decree No. 601, June 28, 2000)

The practice of engineering and architecture, and the empowerment of engineers and architects to organise themselves into chambers and a union comprising the different chambers are regulated by these two laws.

With the introduction of "expert" engineers or architects in the process of construction supervision, corresponding amendments to the parent laws were required. This decree achieves that objective. The chambers are enabled to set the guidelines for conferral of the expert title, but generous transition (grandfather) clauses have also been admitted.

d. General Conditions for Mandatory Financial Liability Insurance for Construction Supervision Firms (July 10, 2000)

This directive issued by the Undersecretariat of the Treasury sets the rules and procedures for the purchase of the mandatory financial liability insurance all supervision firms must have for each construction they undertake to oversee. Coverage articles refer to "unreasonable" damages caused by the disaster as being excluded from the intent of the underwriting, but no specific guidelines are mentioned.

In successive articles, the obligations of the insurer and the insured are spelled out when events leading to physical damages have occurred because causes of damage are often not easily ascribed to only one party in the building delivery process. The insurance premium is 1.3 percent of the insured value.

e. Testing Laboratory Requirements for Decree No. 595 (July 30, 2000)

Independent testing laboratories must certify that minimum requirements are met for building materials used in construction. This directive and a companion set out the requirements for these laboratories.

3.2.3. Disaster Laws

(1) The 1982 Constitution

The 1982 Constitution outlines the rules and procedures for the declaration of a state of emergency and the suspension of fundamental rights.

Article 15 describes the suspension of the "Exercise of Fundamental Rights and Freedoms" as follows:

"In times of war, mobilization, martial law, or state of emergency, the exercise of fundamental rights and freedoms can be partially or entirely suspended, or measures may be taken, to the extent required by the exigencies of the situation, which derogate the guarantees embodied in the Constitution, provided that obligations under international law are not violated."

Article 119, "Declaration of a State of Emergency on Account of Natural Disaster or Serious Economic Crisis," in the constitution defines the activation of a state of emergency. The article states that "in the event of natural disaster, dangerous epidemic diseases or a serious economic crisis, the Council of Ministers, meeting under the chairmanship of the President of the Republic may declare a state of emergency in one or more regions or throughout the country for a period not exceeding six months."

Article 121 states the "Rules Relating to the State of Emergency" as follows:

"In the event of a declaration of a state of emergency under the provisions of Articles 119 and 120 of the Constitution, this decision shall be published in the Official Gazette and shall be submitted immediately to the Turkish Grand National Assembly for approval. If the Turkish Grand National Assembly is in recess, it shall be assembled immediately. The assembly may alter the duration of the state of emergency, extend the period, for a maximum of four months only, each time at the request of the Council of Ministers, or may lift the state of emergency.

The financial, material and labour obligations which are to be imposed on citizens in the event of the declaration of state of emergency under Article 119 and, applicable according to the nature of each kind of state of emergency, the procedure as to how fundamental rights and freedoms shall be restricted or suspended in line with the principles of Article 15, how and by what means the measures necessitated by the situation shall be taken, what sort of powers shall be conferred on public servants, what kind of changes shall be made in the

status of officials, and the procedure governing emergency rule, shall be regulated by the Law on State of Emergency.

During the state of emergency, the Council of Ministers meeting under the chairmanship of the President of the Republic may issue decrees having the force of law on matters necessitated by the state of emergency. These decrees shall be published in the Official Gazette, and shall be submitted to the Turkish Grand National Assembly on the same day for approval; the time limit and procedure for their approval by the assembly shall be indicated in the Rules of Procedure."

(2) National Development Plan

Unlike former plans, the 8th National Development Plan fully addresses natural disasters in section seven, "Natural Disasters," and in chapter nine, "Enhancement of Efficiency in Public Services."

The plan describes objectives and principles as follows:

"The main objective is to establish the social, legal, institutional and technical structure for reducing the damages of disaster to the minimum through measures to be taken. Central coordination in the establishment of this structure is the main principle.

Through continuous and systematic training efforts, measures shall be taken against earthquakes and other disasters, and it shall be ensured that these disasters shall be perceived as common natural events. Training efforts for people shall be continued to include the social ethical rules.

Necessary efforts shall be made to guarantee sufficient security for all the existing or future infra and superstructures.

A small part of the large resources, which were utilised after the disasters but proved not to be efficient, shall be utilised under a plan before the disaster to take measures for reducing the damages of a possible disaster.

Since design of the disaster-proof buildings requires specialization, emphasis shall be given to earthquakes and other issues on disasters in engineering graduate programs. Furthermore, programs improving the sense of responsibility of the engineers and laying down a professional ethic shall be emphasized. Postgraduate programs of earthquake engineering shall be introduced in the technically eligible universities and existing programs shall be improved. Efforts shall be made to reduce deficiencies of engineering in practice.

Since most of the building stock is not secure against earthquakes, these buildings shall be examined and strengthened systematically against earthquakes, starting, first of all, from the places where earthquake occurrence possibility is high.

Establishment of Building Assessment Centres where competent engineers shall work for assessment and strengthening of the existing buildings against earthquakes shall be supported.

With a view to making the principles and methods of the field use and construction plans sensitive against disasters, related legislation shall be reviewed and effective mechanisms shall be introduced for strict implementation. Liabilities and relevant sanctions of those who will act against the rules shall be revised.

A disaster management system, in harmony with the existing legal and institutional structure and including the studies for National Extraordinary Situation Plan shall be made. This system shall cover a fast, effective and comprehensive rescue and first aid operation in order to reduce the damages of the disasters before and during the disaster and accomplish the functions towards eliminating the economic, social and psychological damages of the disaster."

The plan describes legal and institutional arrangements as follows:

"Necessary arrangements shall be made in the legislation to make the Turkish Emergency Management Institution operative.

The Law on Engineers and Architectures laying down the duties, authorities and responsibilities of the engineers and the Law concerning the Turkish Engineers and Architectures Chamber Union setting out the duties and authorities of the professional chambers shall be revised to introduce a concept of Competent Engineering.

Construction Law shall be amended to introduce a sound construction control system and revised to include the liabilities of those acting against the rules and the sanctions to be applied to them.

The Law on Municipalities and the Metropolitan Municipalities Law shall be amended to bring about a sound construction control system and revised to arrange the duties, authorities and responsibilities of the local administrations on the determination of natural disaster threats and risks and reduction of their likely damages.

Full and accurate implementation of the provisions of the Natural Disaster Regulation is considered adequate for ensuring earthquake-proof building design in the future. Legislation for other disasters needs to be updated and accurately implemented.

Related provisions of the Civil Code, Law of Obligations and Trade Law shall be reviewed as regards construction controls, responsibilities and insurances, and necessary legal arrangements shall be made to this end.

The Law on the Measures and Assistance in Natural Disasters Affecting Life which considers the state as a natural insurer covering all damages incurred shall be amended to cover only the cases which are impossible to be insured, thus public liability shall be limited.

A national disaster information system shall be established through which cooperation with institutions in the other countries and international bodies shall be possible.

A national disaster communication system that would provide continuous service during the disaster shall be established."

(3) Disaster Law (Law No. 7269)

A "law on the measures to be taken and assistance to be directed due to disaster having influence on social life," or so-called "Disaster Law," was issued in 1959 as a fundamental law in dealing with disasters, and was later amended in 1968. The contents and relevant articles are shown in Table 3.2.6.

The main scope of this law is to provide public intervention capacity and to improve the efficiency of relief operations after disasters such as earthquakes, fires, floods, erosions, rockslides, avalanches, etc.

For this purpose, the law entitles extraordinary powers for provincial and district governors, making them the sole authority with powers commanding all public, private, and even military resources to manage response activities.

Each governor is responsible for drawing a relief operation plan to become effective immediately after a disaster. The relevant ministries, provincial administrations, and sub-districts are required to draw up their own emergency preparedness plans.

A disaster fund is allocated annually from the national budget for all recovery expenses.

Table 3.2.6 Contents of the Disaster Law (No. 7269)

Articles	Titles
1-5	General Principles
6	Extraordinary Powers Granted to Civil Servants
7-11	Liabilities
12	Compensation, Bonus and Advance Payments
13-15	Technical Operations at the Disaster Areas
16	Moving a Community Present at Disaster Areas to Other Places
17-32	Valuation, Division and Distribution
33-46	Fund Creation and Assistance through Fund and Forms of Spendin
47-49	Penal Provisions
50-53	Miscellaneous Provisions

Following are seven by-laws prepared in association with the Disaster Law:

- Regulations concerning the fundamentals of emergency aid organisation and planning associated with disasters
- Regulations concerning the basic principles of determining the degree by which the general public is affected by disasters
- Regulations concerning the identification of disaster affected individuals
- Regulations concerning the remissions of loaned sums for expenditure in connection with buildings to be built as a consequence of disasters
- Regulations concerning the valuation of leftover buildings, lots, and lands appropriated after disasters
- Regulations concerning the expenditures from the disasters fund established in accordance with Law No. 7269-1051
- Regulations for structures to be built in disaster areas

(4) Regulations Concerning the Fundamentals of Emergency Aid Organisation and Planning Associated with Disasters (Decree No. 88-12777)

As one of the by-laws pursuant to Article 4 of the Disaster Law, this regulation was established in 1988 by the Ministry of Public Works and Settlements. The contents of the regulations are shown in Table 3.2.7.

The object of these regulations is to define the formation and duties of emergency aid organisations by effectively planning the facilities and resources of the State before natural disasters occur to ensure that, in case of a natural disaster, the State gets fastest access to natural disaster areas and survivors get efficient first aid.

Provincial and district governors are entitled with the most responsibility and given extraordinary power to seize men, vehicles, land, and properties in the event of a disaster.

These regulations stipulate that the Provincial Emergency Aid Committee be formed under the governor and that the Permanent Provincial Disaster Office be established under the Provincial Directorates of the Ministry of Public Works and Settlements.

The Provincial Disaster Office is composed of nine service groups and associated sub-service groups, formed by various public organisations. The service groups will work for the victims from the beginning of the disaster up to 15 days, though the termination date of the services may be extended.

The regulation also stipulates that district governments set up district emergency aid committees including the district mayor and formed under the district governor, and to form district emergency aid service groups and provide services, which are similar to or reduced in scale to the provincial ones.

Table 3.2.7 Contents of the Regulations Concerning the Fundamentals of Emergency Aid Organisation and Planning Associated with Disasters

Part	Contents		Article
1	GENERAL PRINCIPLES		1-5
2	EXTRAORDINARY POWERS AND OBLIGATIONS		7-9
3	GENERAL PRINCIPLES OF PLANNING PROMPT ASSISTANCE		10-13
4	PROVINCIAL AND DISTRICT PROMPT ASSISTANCE ORGANISATION AND DUTIES		
	1	PROVINCIAL PROMPT ASSISTANCE ORGANISATION AND DUTIES	14-45
	2	ORGANISATION AND DUTIES OF DISTRICT PROMPT ASSISTANCE	46-48
5	ASKING FOR HELP		49-50
6	CENTRAL PLANNING AND COORDINATION		51-53
7	DUTIES OF PRIME-MINISTRY, DEPARTMENT OF GENERAL STAFF, MEMBER MINISTRIES OF THE CENTRAL COORDINATION BOARD OF DISASTERS AND THE RED CRESCENT		54-69
8	MISCELLANEOUS		70-76

(5) Regulations for Structures to Be Built in Disaster Areas

Seismic regulations in Turkey are developed in conjunction with a nation-wide zone map and associated codes. The first seismic regulation in Turkey was developed in 1944 with two zones, motivated by severe damage due to the 1939 Erzincan earthquake, which killed more than 30,000 people. The national zone map has been revised three times since then. Changes are associated with increment of zones, increment in fundamental base shear

coefficient, and inclusion of more coefficients such as structural type, ground type, spectral, and importance, as shown in Table 3.2.8.

The current seismic building code, "Regulations for Structures to Be Built in Disaster Areas," was established by the Ministry of Public Works and Settlements as another by-law in pursuant to the Disaster Law.

The latest revision of the seismic zone map was made in 1996. In the previous 1972 map, the boundary of each zone was made based on observed ground motions. However, in the new map, the boundary of each zone is based on calculations of the maximum effective acceleration for a return period of 475 years.

Figure 3.2.2 shows the latest 1996 revision of the national seismic zone map. Because of the existence of NAF, the highest risk area (zone I) extends in the east-west direction in Turkey. According to the map, the southeastern part of the Istanbul Province on the Asian side is located in zone I, while most of the European side of the province is located from zone II to zone IV.

Table 3.2.8 Development of Seismic Regulation in Turkey

Year	Event	Fundamental base shear coefficient	Structural coefficient	Ground type coefficient	Spectral coefficient	Importance coefficient
1939	Erzincan earthquake					
1944	First seismic regulation Zone I-II	Zone I 0.02-0.04 Zone II 0.01-0.03				
1949	Code revision	Editorial change in zone division				
1953	Code revision	Editorial change in zone division				
1961	Code revision	Story shear coefficient and regional coefficient	Coefficient by ground and structural type introduced			
1963	**Zone map revision Zone I-IV**					
1968	Code revision	Zone I 0.06, Zone II 0.04, Zone III 0.02, Zone IV 0		Introduced	Introduced	Introduced
1972	**Zone map revision Zone I-V**					
1975	Code revision		Introduced	Ground type and spectral coefficient introduced		Same
1996	**Zone map revision**					
1998	Code revision	Zone I 0.4, Zone II 0.3, Zone III 0.2, Zone IV 0.1, Zone V 0	Revised	Ground type and spectral coefficient revised		Revised

Source: Kobayashi, K. et al. (2001)

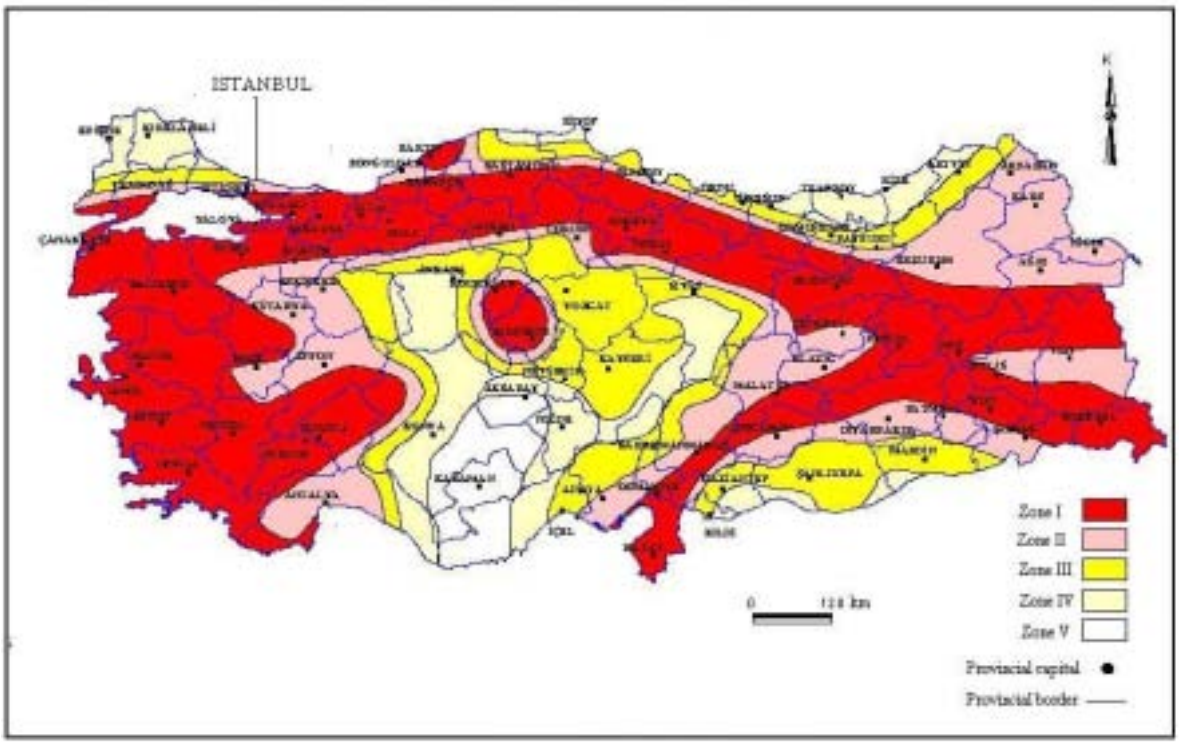

Figure 3.2.2 National Seismic Zone Map as Revised in 1996

Source: Ministry of Public Works and Settlements (www.deprem.gov.tr)

(6) Civil Defence Act (No. 7126)

Civil Defence Act (No. 7126) was issued in 1959 and serves as a legal basis of present civil defence. This act entitles civil defence with rescue work authority. Organisations that operate rescue activities must have a protocol with civil defence.

(7) Laws Related to Fire Brigade

Services of the fire department and control of hazardous facilities are defined as duties of municipality, as defined in the Municipality Act, and in Metropolitan Municipality Act. In addition, there are 30 laws, rules and regulations in total that are concerned with fire, though special fire laws do not exist.

(8) Laws Related to Compulsory Earthquake Insurance

Following are a set of decrees related to earthquake insurance that were issued after the 1999 Izmit Earthquake (Polat Gulkan, 2001):

a. Compulsory Earthquake Insurance (Decree No. 587)

Compulsory earthquake insurance was issued as an act on December 27, 1999. All existing and future privately owned property is required to contribute to the Turkish Catastrophe

Insurance Pool (TCIP). Non-engineered rural housing and fully commercial buildings are excluded. The intention of this decree is to create a fund contributed to by homeowners' annual payments for use in disasters so that no one will be left homeless, with a nominal sum, currently capped at US$28,000, being disbursed immediately to homeowners who are left homeless.

An important feature of this decree is its denial of assistance in accordance with the Disasters Law No. 7269 when homeowners have not participated in the TCIP. This article became operational in March 2001. A number of penalty clauses, missing from the original text, have been added when the draft law was forwarded by the Undersecretariat of the Treasury to parliament.

b. General Conditions for Compulsory Earthquake Insurance (September 8, 2000)

Issued by the Undersecretariat of the Treasury, this directive regulates the manner in which insured parties shall make claims for losses against the Natural Disasters Insurance Council ("DASK" is the Turkish abbreviation). The amount payable by DASK essentially covers the minimum amount required for a modest new accommodation. Homeowners can, of course, purchase additional voluntary insurance if their property is worth more. However, for additional coverage to be purchased, the compulsory insurance policy must be presented to the insurer. TCIP coverage is for property only and does not extend to contents or life.

TCIP is insurance, not compensation. This means that payments will be proportional to actual losses, i.e. an indemnification will occur. TCIP is a policy that specifically covers the earthquake peril. Damage due to fires, explosions, and/or landslides triggered by an earthquake is also automatically covered. Homeowners may purchase additional voluntary insurance for their property if they so wish.

c. Tariff and Instructions for Compulsory Earthquake Insurance (September 8, 2000)

While, for 2000, the limiting compensation equals 20 billion TL (approximately US$28,000), premiums are differentiated based on location with respect to the earthquake zone map and on type of construction. The premium for the highest risk buildings such as non-reinforced masonry is rated at 0.5 percent of the assessed value, which cannot exceed 20 billion TL. For a reinforced concrete building, the premiums are set at 0.2 percent. On this basis, the premium for a regular, reinforced concrete building in the highest hazard zone will be about US$50 per year. While this sum is not unaffordable, annual property tax for many homes is less than this amount. This is because no property value assessment is made, but homeowners declare what they believe is the taxable value of their property.

While sale prices for homes substantially exceed their declared value for taxation purposes, this discrepancy is not noted. DASK will utilise the existing sales network of the insurance companies doing business in Turkey. The commission to be paid to these companies is 12.5 percent of the premiums. Even so many insurance agencies are reluctant to collect premiums for DASK because it is incumbent upon them to notify homeowners when renewal is due. They claim that the expenses for notification that must be forwarded through a public notary are exorbitant. DASK is currently considering a differentiated commissions structure for less seismically hazardous areas in order to achieve higher rates of penetration there. Table 3.2.9 shows the basic TCIP premium structure.

Table 3.2.9 Tariff for TCIP Premiums (Percent of Insured value)

Type of Construction	Unit Cost (US$/m2)	I	II	III	IV	V
Steel or Reinforced. Concrete	220	0.20	0.14	0.08	0.05	0.04
Masonry	150	0.35	0.25	0.13	0.05	0.04
Other	75	0.50	0.32	0.16	0.07	0.05

Source: Polat Gulkan (2001)

Reference for Section 3.2

Hirayama, Y., 2001, Housing and Urban Reconstruction, Report on the Damage Investigation of the 1999 Kocaeli Earthquake in Turkey, Architectural Institute of Japan, Japan Society of Civil Engineers, The Japanese Geotechnical Society, pp. 410-419

Kobayashi, K., Nagano, T., and Kobayashi, J., 2001, Earthquake Resistant Design Code of Turkey, Report on the Damage Investigation of the 1999 Kocaeli Earthquake in Turkey, Architectural Institute of Japan, Japan Society of Civil Engineers, The Japanese Geotehnical Society, pp. 439-451

Law on the Measures to be Taken and Assistance to be Directed due to Disaster Having Influence on Social Life, 1959, Law No. 7269, Published in the Official Gazette of: 25/5/1959 No. 10213

Polat Gulkan, 2000, Code Enforcement at Municipal Level in Turkey: Failure of Public Policy for Effective Building Hazard Mitigation, Proceedings of the 6th International Conference on Seismic Zoning, Earthquake Engineering Research Institute, No. 21

Polat Gulkan, 2001, Rebuilding the Sea of Marmara Region: Recent Structural Revisions in Turkey to Mitigate Disasters, Issues Paper for a Wharton-World Bank Conference on Challenges in Managing Catastrophic Risks: Lessons for the the US and Emerging Economies

Reconstruction Act, 1985, Act No. 3194, Published in the Official Gazette of 9/5/1985, No. 18749

Regulations Concerning the Fundamentals of Emergency Aid Organization and Planning Associated with Disasters, 1988, Decree No 88/12777, Published in the Official Gazette of 8/5/1988, No. 19808

Regulations for Structures to be Built in Disaster Areas, 1997, Published in the Official Gazette No.23098

State Planning Office, 2001, Long-Term strategy and Eight Five-Year Development Plan 2001-2005, Decision No. 697

Istanbul Fire Department, 2001, Fire and Fire Brigade Legislation

The Constitution of the Republic of Turkey, 1982, Turkish National Grand Assembly, Published in the Official Gazette of 9/11/1982, No. 17863

3.3. Institutional System Related to Disaster Management in Turkey

3.3.1. Administrative Structure

(1) Organisation in Central Government

The Government of the Republic of Turkey functions according to the provisions of the 1982 Constitution. The government is divided into legislative, executive, and judicial establishments as illustrated in Figure 3.3.1.

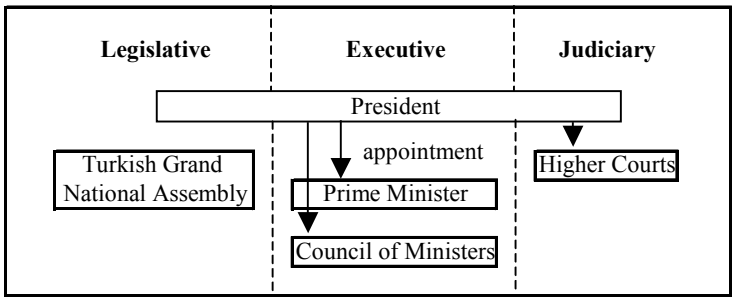

Figure 3.3.1 Central Administration Establishment in Turkey

a. Legislature

Legislative authority is vested in the Turkish Grand National Assembly (TGNA). The TGNA is composed of 550 deputies. Parliamentary elections are held every five years. Deputies represent the entire nation and, before assuming office, take an oath, the text of which is included in the Constitution.

The duties and authority of the TGNA are outlined as follows:

- To adopt, amend and abrogate laws
- To supervise the Council of Ministers and ministers
- To give authority to the Council of Ministers to pass decrees with the power of law
- To adopt the budget and final account draft laws
- To ratify the printing or minting of currency
- To make decisions for declaring war, martial law or emergency rule, to approve the signing of international agreements
- To make decisions for declaring general or special amnesties

b. Executive

The executive branch in Turkey has a dual structure. It is composed of the President of the Republic and the Council of Ministers.

President

The president, who is the head of state, represents the Republic of Turkey and the unity of the Turkish Nation. The president oversees the workings of the constitution and ensures that the organs of the state function in an orderly and harmonious manner. He is elected for a one-time term of seven years either from among the members of the TGNA or from among those who are Turkish citizens of over 40 years of age and eligible to be elected to the TGNA, from among persons who have completed standard education.

The duties and authority of the president with respect to legislation are:

- In the event that he deems it necessary, to deliver the opening speech on the first day of the legislative year
- To summon the Turkish Grand National Assembly to session
- To publish laws
- To return laws to the assembly for reconsideration
- If he deems it necessary, to present laws related to changes in the Constitution to public referendums
- Should the whole or some of the provisions of laws, decrees with the power of law or Grand National Assembly internal regulations be considered to be in violation of the terms of the Constitution in term or in content, to file a suit with the Constitutional Court for the repeal of such laws, decrees or regulations,
- To decide upon renewal of parliamentary elections

The duties and authorities of the president in the exercise of executive power are:

- To appoint the prime minister or to accept his resignation
- Upon the recommendation of the prime minister, to appoint or remove ministers to and from office
- In the event that he deems this necessary, to chair the meeting of the Council of Ministers, or to summon the council to meet under his chairmanship
- To appoint accredited envoys to represent the Turkish State in foreign countries and to receive the representatives of foreign states to the Republic of Turkey
- To ratify and publish international agreements
- To represent the Commander-in-chief of the Turkish Armed Forces on behalf of the Turkish Grand National Assembly
- To decide upon the use of the Turkish Armed Forces
- To appoint the chief of general staff
- To summon the National Security Council to convene and to chair the meetings of the council
- To proclaim martial law or impose state of emergency by decree to be decided by the Council of Ministers meeting under his Chairmanship, and to issue decrees with the Power of Law
- To approve decrees as signatory

- To commute or pardon the sentences of certain convicts on the grounds of old age, chronic illness or infirmity
- To appoint the members and president of the State Auditory Council
- To conduct investigations, inquiries and research through the State Auditory Council
- To select the members of the Higher Education Council
- To appoint university chancellors

Duties and authority of the president related to the Judiciary are:

- Appointing the members of the Constitutional Court, one fourth of the members of the Council of State, the Chief and Deputy Chief Public Prosecutor of the Supreme Court of Appeals, the members of the Supreme Military Tribunal of Appeals, the members of the Supreme Military Administrative Tribunal and the members of the Supreme Council of Judges and Public Prosecutors.

All decrees, with the exception of those with which the president is specifically empowered by the constitution or by other laws to sign singly without need for the co-signature of the prime minister and the related minister. The prime minister and the related minister shall be held accountable for these decrees.

No appeal may be made to any legal body, including the Constitutional Court, against the decrees and presidential orders signed directly by the President of the Republic.

Prime Minister and the Council of Ministers

The prime minister is responsible for ensuring the Council of Ministers functions in a harmonious manner. He/she supervises implementation of government policy. The prime minister is the de facto head of the executive branch. Each minister is accountable to the prime minister, who in turn ensures that ministers fulfil their functions in accordance with the constitution and its laws.

The Council of Ministers consists of the prime minister, designated by the President of the Republic from members of the TGNA, and various ministers nominated by the prime minister and appointed by the President of the Republic. Ministers can be dismissed from their duties by the president or upon the proposal of the prime minister when deemed necessary.

When the Council of Ministers is formed, the government's program is read at the TGNA and a vote of confidence is taken. Members of the Council of Ministers are responsible for the execution of general policies. The ministers assume two kinds of political responsibilities. First is responsibility for the general policy of the government, shared

equally by all ministers. Second, each minister is individually responsible for matters within the jurisdiction of his/her own ministry and for the acts of his/her subordinates.

The fundamental duty of the Council of Ministers is to formulate and to implement the internal and foreign policies of the state. The council is accountable to parliament in execution of this duty.

The constitution also includes national defence in the section related to the Council of Ministers. The Office of the Commander in Chief, the Office of the Chief of the General Staff and the National Security Council form the authoritative organisations for national defence.

Figure 3.3.2 shows the structure of the Prime Ministry Central Organisation. Providing general directorship of emergency management in Turkey is one of the main services assigned to the deputy undersecretary.

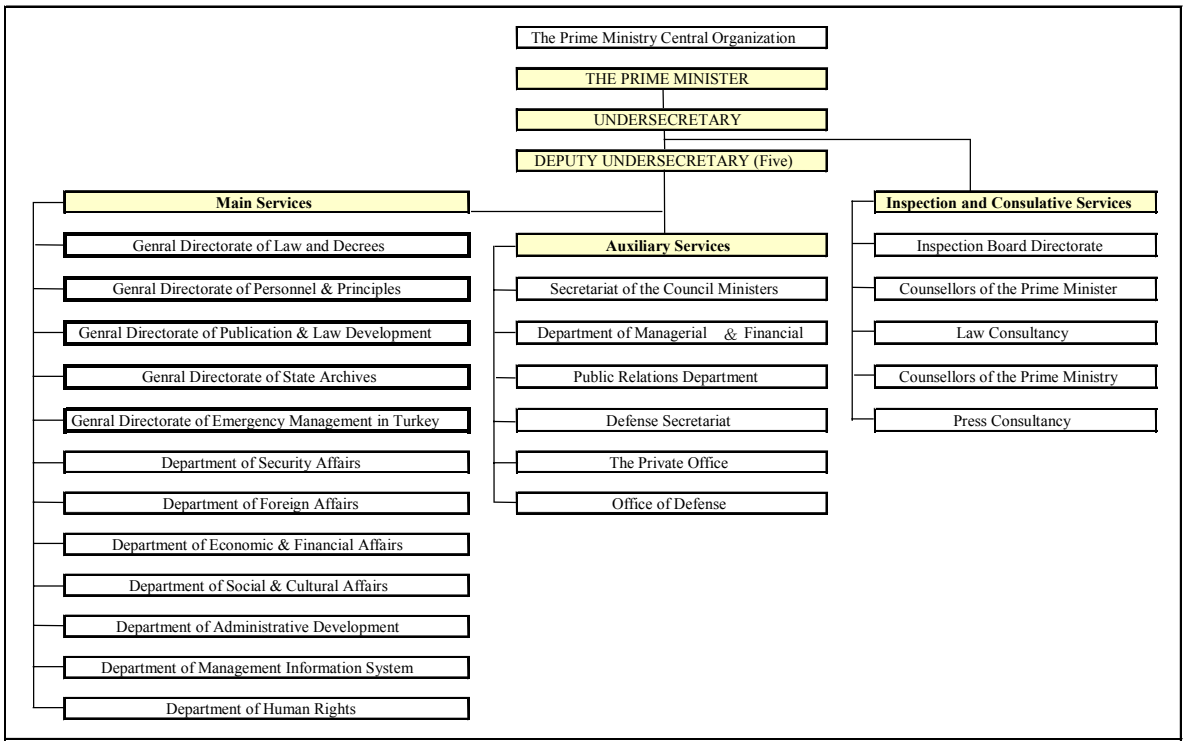

Figure 3.3.2 Organisation of the Prime Ministry Central Organisation

Source: Prime Ministry website (www.basbakanlik.gov.tr)

c. Judiciary

The judicial system in Turkey is independent of other state organizations. Its autonomy is protected by the High Council of Judges and Public Prosecutors. Higher courts include the

Constitutional Court, Council of State, Court of Jurisdictional Dispute, Court of Cassation, and the Military Court of Cassation. For the purpose of civil and criminal justice, the Court of Cassation serves as a supreme court.

The judicial section of the Constitution, with the principle of a legal state as its basis, is founded on the independence of the courts and the judges, and the guarantee of judges' rights. Judges rule on the basis of constitutional provisions, law, and jurisprudence.

The legislative and executive organs must comply with the rulings of the courts and may not change or delay the application of these rulings. Judges also assume the duties of monitoring elections.

Functionally, a tripartite judicial system has been adopted by the Constitution and, accordingly, it has been divided into an administrative judiciary, a legal judiciary and a special judiciary.

The Constitutional Court, the Supreme Court of Appeals, the Council of State, the Supreme Military Court of Appeals, the Supreme Military Administrative Court and the Court of Jurisdictional Conflicts are the supreme courts mentioned in the judicial section of the Constitution. The Supreme Council of Judges and Public Prosecutors and the Supreme Council of Public Accounts are two organisations that also have special functions in the judicial section of the Constitution.

(2) Organisation of the Provincial Government

Currently, the Republic of Turkey is divided into 81 provinces. Each province is further subdivided into districts, and each district is segmented into sub-districts.

The 1982 Constitution retains Turkey's centralised administrative system. Each province is administered by a governor appointed by the Council of Ministers with the approval of the President. The governors function as the principal agents of the central government and report to the Ministry of Interior. The structure of the local government in relation to the central government is illustrated in Figure 3.3.3.

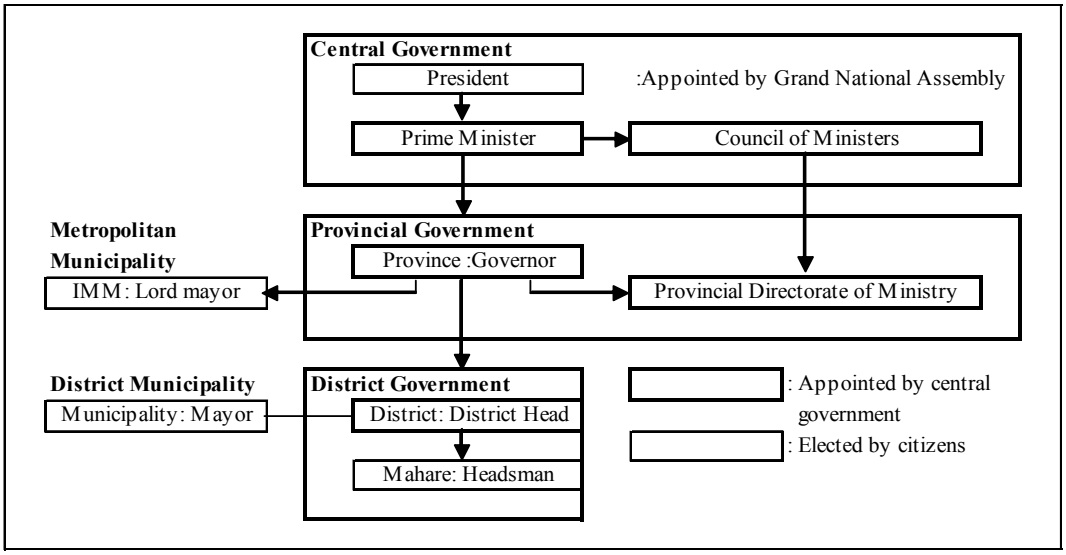

Figure 3.3.3 Structure of Central and Provincial Governments

Provincial Governor

The provincial governor, the representative of the central administration, is also the head of the provincial local administration and its chief executive. The governor usually acts in line with the decisions made by the Provincial General Assembly.

The Provincial General Assembly, the most authoritative body of the organisation, consists of members elected for a term of four years. Meeting every year for forty days under the governor, it approves the provincial budget and makes decisions regarding the institutional services of the province.

As chief executive of the province and principal agent of the central government, each governor supervises other government officials assigned to carry out ministerial functions in his or her province. Civil servants head offices of the national government that deal with education, finance, health, and agriculture at the provincial level. In each province, these directors form the Provincial Administrative Council, which, with the governor as chair, makes key administrative decisions and, when necessary, initiates disciplinary actions against errant provincial employees.

The governor also heads the Provincial Assembly, several service departments concerned mainly with local trade, and industrial matters.

Provincial General Assembly

The Provincial General Assembly, which advises and works closely with the Provincial Administrative Council, is elected every five years. The Provincial Assembly, with the

governor chairing, meets annually to approve the provincial budget and to select one person from each district to serve on the province's administrative commission. With the governor presiding, the administrative commission meets weekly for mutual consultation. Provincial budgets derive their income from rents, payments for services, fines, state aid, and 1 percent share of national tax revenues.

Members of the Provincial General Assembly are elected by the proportional representation system, if their parties receive at least 10 percent of the votes. Each district forms an electoral zone for elections to the Provincial General Assembly.

Provincial Council

The provincial council, composed of four members elected for a term of one year by the Provincial General Assembly from among its own members, reviews and approves fiscal matters, informs the Provincial General Assembly of the state of affairs of the organization and submits to the mayor, upon his request, its views related to local administration operations.

Functions

The provincial government is responsible for implementing national programs for health and social assistance, public works, culture and education, agriculture and animal husbandry, and economic and commercial matters.

The constitution stipulates that the central administration oversee elected local councils in order to ensure the effective provision of local services and to safeguard the public interest. The minister of the interior is empowered to remove from office local administrators who are being investigated or prosecuted for offences related to their duties.

(3) Organisation of the District Government

District Head

Each district in a province has its own administration based in the district seat. The district administration consists of a district head, central government representatives, and a district administrative board. More than 500 district heads are appointed by the president upon nomination by the minister of the interior.

Each district head is reports to the governor, serving essentially as his or her agent in supervising and inspecting the activities of government officials in the district. The district in which a provincial capital is located may not have a district head but instead be headed directly by the governor.

(4) Organisation of the Mahalle

The smallest unit of local government in Turkey is the Mahalle. The principal authority of the Mahalle is the headman chosen by an assembly of all the village's adults. This informal assembly also makes decisions pertaining to village affairs and elects a council of elders that includes the village schoolteacher and the imam.

The headman supervises the planning and operation of communal projects and services and administers directives from higher authorities. The headman receives government officials, maintains order, collects taxes, and presides at civil ceremonies.

The Village Assembly supervises village finances, purchases or expropriates land for schools and other communal buildings, and decides on the contributions in labour and money to be made by villagers for road maintenance and other community improvements. The Village Assembly also arbitrates disputes between villagers and imposes fines on those who fail to perform the services allotted to them.

(5) Organisation of theDistrict Municipality

Each provincial capital, district centre, and town with more than 2,000 populations is organised as a municipality headed by an elected mayor. All municipalities are public corporate entities. Municipalities are required to meet the common regional and civic needs of the region and the regional populace.

Mayor

The mayor is the chief executive and representative of the municipality. The mayor is elected for a term of five years. Deputy mayors, department heads and branch directors assist the mayor in the performance of municipal duties.

In big cities, where there is more than one district within municipal borders, the electoral zone for the election of the mayor of the metropolitan municipality is restricted by the municipal borders of the metropolis. Each district elects its own mayor and municipal assembly members.

Municipal Assembly

The municipal administration comprises an assembly and a mayor. The Municipal Assembly, elected by popular vote by simple majority, varies in size with the population. Municipal elections are held every five years. Holding three regular meetings every year, the assembly approves the annual budget of the municipality, plans, projects related to

public works and city planning and determines taxes, rates of duties, fees and tariffs of various sorts.

A variety of municipal standing committees appointed by the mayor and municipal department directors, or selected by municipal assembly members from among them, deal with financial issues and decide on the appointment and promotion of municipal personnel.

Municipal Assemblies, also elected for five years by the proportional representation system, vary in size according to each town's population. Municipal Aassemblies meet three times a year to decide on such issues as the budget, housing plans, reconstruction programs, tax rates, and fees for municipal services.

The Municipal Assembly consists of the mayor, the heads of the municipal departments and members elected by the Municipal Assembly from among its own members. It prepares transport tariffs and fees, sets commodity prices, determines municipal fines, checks budgets and decides on the hiring, firing and promotion of city employees.

Function

Municipalities and villages located near big cities and with populations greater than 300,000 according to the the last census may be attached to the metropolitan municipality so that basic municipal services can be carried out in an adequate and efficient manner and under complementary plans. The distance between the metropolitan municipality and the municipality or village to be attached, as well as the feasibility of combining the services, should be taken into consideration during the course of the attachment process.

Municipal governments are responsible for implementing national programs for health and social assistance, public works, education, and transportation and are authorised to carry out the following:

- To impose and enforce rules and municipal prohibitions prescribed by law
- To punish those who violate the prohibitions
- To collect municipal taxes, duties, and fees
- To set up drinking water, gas, electricity and transport facilities and networks or transfer their operational rights
- To run transport vehicles within municipal borders
- Urban planning and implementation, mapping, regulating construction, and the issuing of construction permits
- Land development and the opening up of new settlement areas
- Urban renewal
- Planning and construction of social housing

- Organisation and management of mass transportation systems, passenger and freight terminals and parking lots
- Construction and maintenance of parks and the other green areas
- Construction and maintenance of urban roadways, public squares and bridges
- Provision of water, sewerage and public utility gas services
- Garbage collection and disposal, cleansing of public spaces
- Provision of fire-prevention and fire-fighting services
- Establishment and operation of slaughterhouses and wholesale facilities
- Establishment and management of recreational, sports, and cultural facilities
- Provision of veterinary services
- Establishment and management of health and social welfare facilities such as hospitals, nurseries, dormitories, orphanages, and convalescent homes, etc.
- Municipal policing
- Regulation of industrial waste with regard to environmental pollution
- Protection and conservation of areas of natural and historical value and of coastlines
- Nuptial services
- Vocational training
- Helping and supporting the poor, handicapped, etc.

(6) Organisation of the Metropolitan Municipality

Lord Mayor

Figure 3.3.4 shows the organisational structure of the Istanbul Metropolitan Municipality. The lord mayor is popularly elected every five years. He is the chief executive and coordinator for the metropolitan area and represents the metropolitan government. He has the power of veto over all decisions made either by the Metropolitan Assembly or by the District Municipal Assemblies, which may override this veto with a two-thirds majority vote.

Metropolitan Assembly

The assembly is the ultimate decision-making organization of this body. It is composed of one-fifth of the members of district and lower-tier municipalities within the metropolitan boundaries who have had the most number of votes, as well as the mayors of these municipalities. The assembly is chaired by the lord mayor. The term of office for assembly members is five years.

In addition to carrying out its own duties, the Metropolitan Assembly has the power to discuss and approve some of the decisions of district municipalities. For example, the district budgets accepted by the district municipalities are discussed and may be amended by the Metropolitan Assembly in order to ensure integrity between investments and

services. It may also make executive and regulatory decisions that provide solidarity, unity and conformity amongst the overall integrity of the metropolis in services carried out by district municipalities.

Important functions of the Municipal Assembly are:

- Reviewing and controlling the award of contracts
- Approving the use of reserves to cover un expected expenses
- Setting of fare prices for municipality transport

Metropolitan Executive Board

The Metropolitan Executive Board is both an organ of decision making and execution and an advisory body of the municipality. There is no elected member on the board other than the mayor. The board, headed either by the mayor or by someone to be assigned by the mayor, is made up of the secretary general and the heads of the units of construction, public works, legal affairs and accounting, and personnel.

Because there no specific regulations in Law No. 3030 exist concerning the meeting,working principles, and duties of the board, the principles determined by Law No. 1580 for other municipal executive committees prevail.

Services

The total number of officers and workers serving the Municipality of Metropolitan Istanbul is 13,235 (as of 20/1/2000), with workers representing 60% of the total personnel and officers representing 40% of the total. There are four units where the number of personnel exceeds 1,000. These are the Central Fire Brigade 2000, Directorate of Road Repair and Maintenance 1269, Municipal Police 1166, and Social Administrative Affairs 1134.

Municipal services other than those, which are given exclusively to the metropolitan municipalities, are rendered by district municipalities, or both metropolitan municipalities and district municipalities.

In this context, the responsibilities of metropolitan municipalities can be summarized as follows:

- Drawing up city master plans
- Approving the applications of master plans drawn up by district municipalities and to supervise their implementation
- Building and operating major infrastructure installations such as water and sewage systems, waste water and solid waste treatment plants, and gas and central heating systems
- Selection of solid waste disposal sites

- Construction and maintenance of major roads, bridges, squares, etc.
- Completion of city-scale projects
- Development of major parks
- Building and operation of passenger and freight terminals
- Location, construction and operation of cemeteries
- Naming and numbering of all public thoroughfares
- Construction and operation of wholesale markets and slaughterhouses
- Operation and coordination of municipal police and fire services
- Implementation and coordination of city-scale joint ventures
- Dealing with other services beyond the capacity of district municipalities
- Coordinating and controlling the activities of municipalities within its boundaries
- Settling the conflicts among municipalities within their own boundaries

Municipality Companies

IMM has 23 companies, the majority of which are listed in Table 3.3.1, to provide essential public services to its citizens. The Municipal Companies Department is responsible for the daily administration and financial coordination of 21 companies. The IMM has a majority shareholding in 18 companies, all of whom provide essential services to the municipality, and it has a minority stake in three companies.

These companies cover a wide range of services such as supplying water, gas, bread, transportation, construction, etc. The total number of employees of these companies is more than 26,000. During the 1999 Izmit Earthquake, many of these individuals provided voluntary help to the victims in the disaster area.

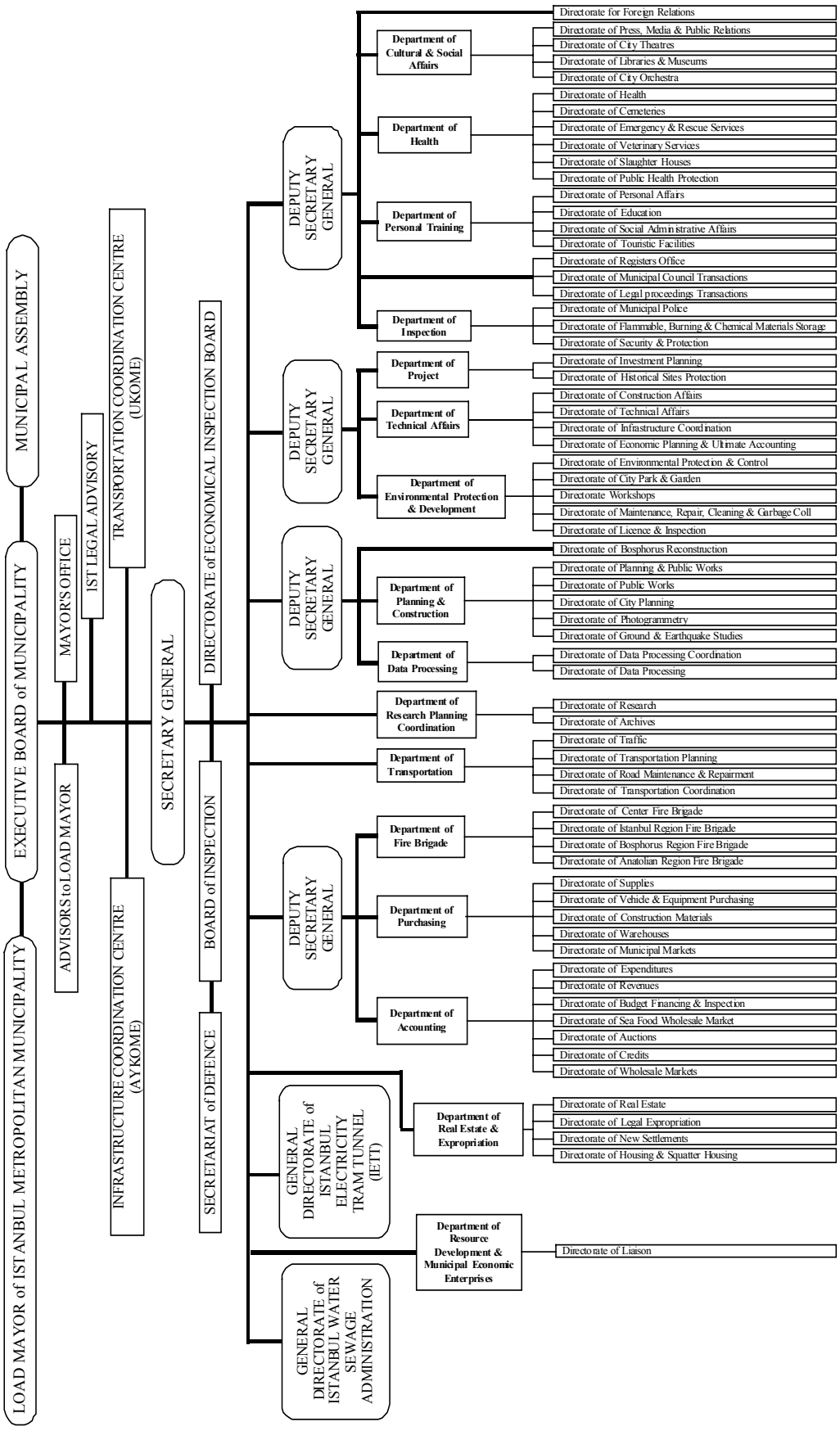

Figure 3.3.4 Organisational Structure of the Istanbul Metropolitan Municipality

Table 3.3.1 List of Public Service Companies in the IMM

Name of Company	Establish-ment	No. of Employees	Capital (Million USD)
Istanbul Bus Transportation Company (IETT)	N/A	8,068	N/A
Istanbul Water and Sewage Operation (ISKI)	N/A	7,306	N/A
Istanbul Transport Corporation (ULASIM)	1988	3,050	20.0
Istanbul Gas Distribution Corporation (IGDAS)	1986	2,677	340.0
The Istanbul "People's Bread" Flour and Flour Products Corporation	1978	564	20.0
The Municipal Data Processing Corporation of Istanbul (BELBIM)	1987	552	2.0
Istanbul Sea Buses Corporation (IDO)	1987	550	40.0
Istanbul Cultural and Artistic Products Corporation (KULTUR)	1989	455	2.6
The Istanbul Environmental Protection and Waste Processing Corporation (ISTAC)	1994	432	8.7
Istanbul Asphalt Factories Corporation (ISFALT)	1986	366	1.2
The Istanbul Concrete Elements and Ready Made Concrete Mix Production Corporation (ISTON)	1986	358	6.0
Municipal Maintenance Corporation of Istanbul (ISBAK)	1986	352	4.0
Hamidiye Spring Water Corporation (HAMIDIYE)	1979	346	3.0
The Bosphorus Landscape, Construction, Consultancy, Technical Services and Tree Company (BIMTAS)	1997	276	1.4
Istanbul Sports Activities Company (SPOR)	1989	252	2.0
The Istanbul Homes Construction and Projecting Corporation (KIPTAS)	1995	210	22.0
Grand Istanbul Tourism and Health (BELTUR)	1996	190	3.0
The Istanbul Tree and Landscape Corporation (AGAC)	1998	111	3.0
Petroleum and Petroleum Products Company (BELPET)	1962	30	0.6
The Istanbul Health Enterprises Corporation (SAGLIK)	1998	22	18.0

Source: IMM website (www.ibb.gov.tr)

3.3.2. Disaster Management Organization

With the experience of two earthquakes in Turkey in 1999, many disaster management organisations were established at various levels, from prime ministry to municipality. The following describes the foundation, organisation and function of these organisations:

(1) Central Government

a. Prime Ministry Disaster Crisis Management Centre

The Prime Ministry Crisis Management Centre was established at the time of the 1999 Izmit Earthquake to integrate the disaster response of the government. Later, the General Directorate of Emergency Management under the Prime Ministry was established as a permanent organisation to ensure efficiency in emergency management.

The activities of the general directorate are as follows:

- To establish emergency management centres within local governments, determine their principles and carry out inter-institutional coordination
- To carry out preliminary actions, make short- and long-term plans, monitor and evaluate databases in order to prevent and mitigate disasters
- To coordinate the utilisation of public and civilian vehicles and facilities in case of emergencies
- To promote volunteer efforts by organisations and individuals in emergencies
- To coordinate the procurement, warehousing and distribution of relief materials

b. Ministry of Public Works and Settlements

Motivated by frequent earthquakes in Turkey, the Ministry of Reconstruction and Resettlement was established in 1958. Its aims were to reduce the risk of death and injury to the population, and to reduce the scale of the economic risks. The name of the ministry has been changed to the current name through organisational restructuring.

General Directorate of Disaster Affairs

In the ministry, the General Directorate of Disaster Affairs is the organisation responsible isfor disaster management. In the directorate, the Earthquake Research Department has three sub-departments focusing on earthquake research.

- The Earthquake Engineering Department is responsible for providing the necessary measures for constructing earthquake-resistant structures and for providing and developing basic principles for the rehabilitation of structures damaged by earthquakes.
- The Seismology Division is responsible for the establishment, operation and development of the National Seismological Observation Network and for the monitoring of micro seismic activity to aid in earthquake prediction and to study aftershock activities.
- The Laboratory Division is in charge of carrying out international joint projects and is responsible for building and updating a GIS, which covers earthquakes and other data for the whole country. It also sets up and operates the strong motion recording stations covering the whole country.

Central Disaster Coordination Council

The Central Disaster Coordination Council is formed in case of a disaster as shown in Figure 3.3.5. However, since the prime ministry has established a crisis management centre that deals with administrative aspects, this ministry now mainly deals with technical aspects.

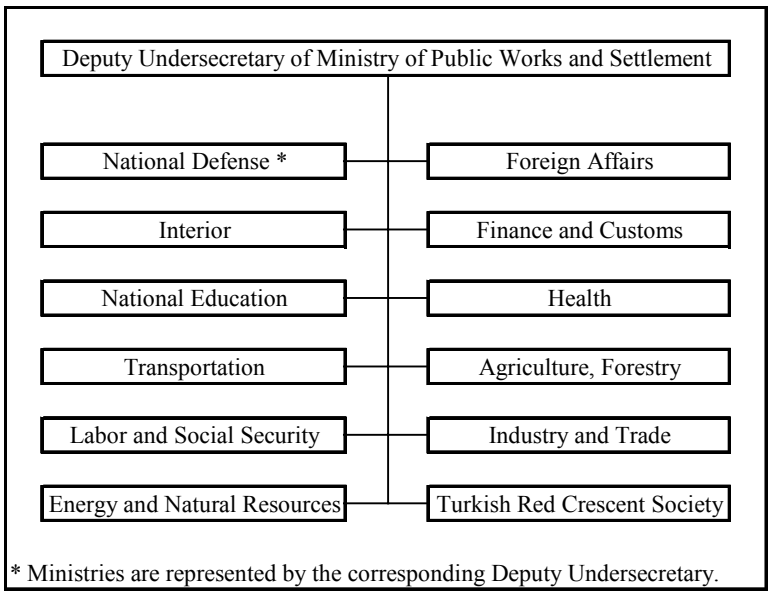

Figure 3.3.5 Organisation of the Central Disasters Coordination Council

Source: Oktay (1999)

c. Civil Defence

The Civil Defence was organised as apart of military in 1928. The current Civil Defence became an independent organisation with the "Civil Defence Act" of 1959. With the experience of major earthquakes, the Civil Defence has reinforced its rescue teams. The brief history of the National Civil Defence is summarised as in Table 3.3.2.

The Civil Defence is unarmed, protective, and involved in the development of rescue measures and activities. The General Directorate of Civil Defence has been carrying out these services under the auspices of the Ministry of Interior.

The organisation consists of both central and provincial bodies. The central organisation includes the General Directorate, Civil Defence College, and the Warning and Alarm Centres. Provincial organisations have been set up as Province and Town Civil Defence Directorates, Civil Defence Local Forces, and Civil Defence Search and Rescue Units Directorates.

In addition, every governmental organisation must have a civil defence section, for firefighting, rescue, first aid, and the security of each organisation. The head of the civil defence section in each organisation is appointed by the central government. The duties of the Civil Defence Directorate are as follows:

- To set up civil defence services nationwide and to ensure the planning application, coordination and supervision of measures taken by the public and private establishments

- To plan and execute all activities for unarmed, protective, and , emergency rescue and first aid
- To set the standards for fire departments, educate their staff, and supervise and coordinate their fire protection and prevention efforts
- To train civil defence staff and inform the public about the Civil Defence
- To manage civil defence funds
- To fulfill the Ministry's Defence Secretariat duty
- To perform other duties required by special laws

The goal and purpose of the Civil Defence Organisation is to minimise life loss and other types of losses during warfare or any natural disaster. The main purposes of the organisation are as follows:

- Securing the lives and assets of civilians during warfare
- Saving lives and assets of people during natural disasters
- Reducing the damage to the lives and the assets of victims in a fire
- In case of damage, renewing, repairing and protecting public and private institutes of vital importance
- Supporting every defence effort during time of warfare
- Raising the morale of civilians during time of warfare

Table 3.3.2 Development of the Civil Defence

Year	Event
1928	Organised under the supervision of the Turkish Armed Forces
1938	Passive Protection Law
1952	Turkey's entry into NATO, Civil Defence role re-examined
1959	Civil Defence Act
1983	**Erzurum earthquake**
1986	First civil defence unit was established in Ankara
1992	**Erzincan earthquake**
1993	Surplus soldiers and officers from civil defence oOrganisations were replaced byprofessionals in Ankara
1996	Two new civil defence units formed by professionals were also established in 1996 in Istanbul and Erzurum
1999	61 civil defence personnel in Ankara, 24 personnel in Istanbul, and 30 personnel in Erzurum
1999	**Izmit and Düzce Earthquake**
1999	Eight civil defence search and rescue units deployed in provinces (Adana, Afyon,Bursa, Diyarbakır, İzmir, Sakarya, Samsun and Van). Civil defence teams have also been established in all provinces where civil defence units were not established.

Source: Civil Defence General Directorate website (www.ssgm.gov.tr)

d. Turkish Red Crescent

The International Federation of Red Cross and Red Crescent Societies was founded in 1919, and it comprises 176 members (making up the world's largest humanitarian organisation). The international federation provides assistance without discrimination as to nationality, race, religious beliefs, class or political opinions. The federation's secretariat is located in Geneva and more than 60 delegations are strategically located worldwide to support activities around the world.

The federation's mission is to improve the lives of vulnerable people by mobilising the power of humanity. Vulnerable people are those who are at greatest risk from situations that threaten their survival, or their capacity to live with an acceptable level of social and economic security and human dignity.

The federation carries out relief operations to assist victims of disasters, and combines this with development work to strengthen the capacities of its member National Societies. The federation's work focuses on four core areas: promoting humanitarian values, disaster response, disaster preparedness, and health and community care.

The Turkish Red Crescent Society is a member society of the international federation. The Turkish Red Crescent Society was founded on the 11th of June 1868, under the name "Society for Helping Sick and Wounded Ottoman Soldiers. "It was rebaptised as the "Ottoman Red Crescent Society" on the 14 of June 1877, the "Turkish Red Crescent Union" in 1923, the "Turkish Red Crescent Association" in 1935, and the "Turkish Red Crescent Society" in 1947.

The Turkish Red Crescent has a fund source independent of the government. Planning of the Turkish Red Crescent is centralised under the Ankara Planning Directorate, which plans the distribution of food and tents. There are 600 branches in Turkey covering every province. The Turkish Red Crescent Society's services are relief services, youth services, blood services and health services.

e. Natural Disasters Insurance Council

As earthquake insurance became obligatory for building owners in urban areas on March 27, 2001, management of the insurance pool is entrusted to a new entity called the "Natural Disasters Insurance Council" (DASK), under the General Directorate of Insurance in the Ministry of the Treasury. The model of the pool management was patterned after exhaustive examinations of New Zealand's Earthquake Commission (EQC) and the California Earthquake Authority (CEA).

In effect, DASK is different from both these public institutions. A seven-man board, whose members are of mixed public and private background, governs DASK. It has no staff of its own and outsources all of its requirements. Milli Re, the largest private reinsurer in Turkey, has been retained as the "operational manager" for five years. Of the 40 non-life insurance companies in Turkey, 34 have agreed to sell Turkish Catastrophe Insurance Pool policies.

(2) Provincial Government

Provincial Rescue and Relief Committee

On February 1999, before the Izmit Earthquake, the Istanbul Governorship had established a provincial disaster relief committee and execution groups, according to regulation, as shown in Figure 3.3.6.

The committee is the decision-making body chaired by the governor. Nine provincial emergency service groups were formed for the execution of emergency response efforts in different categories of service.

Governorship Disaster Management Centre (AYM)

The Istanbul provincial governorship established the Disaster Management Centre (AYM in Turkish abbreviation) as the organisation for integrated disaster management, by the order of president just after the 1999 Izmit Earthquake.

The Disaster Management Centre consists of the council, the scientific consultancy committee, the administrative board, and the management office as shown in Figure 3.3.7. Under normal conditions, it aims to promote and coordinate disaster preparedness of concerned organisations, and it will be shifted to the Provincial Disaster Management Centre in case of crises.

In addition, in case of a major disaster that affecting several provinces, a Regional Disaster Management Centre is established under the MPWH.

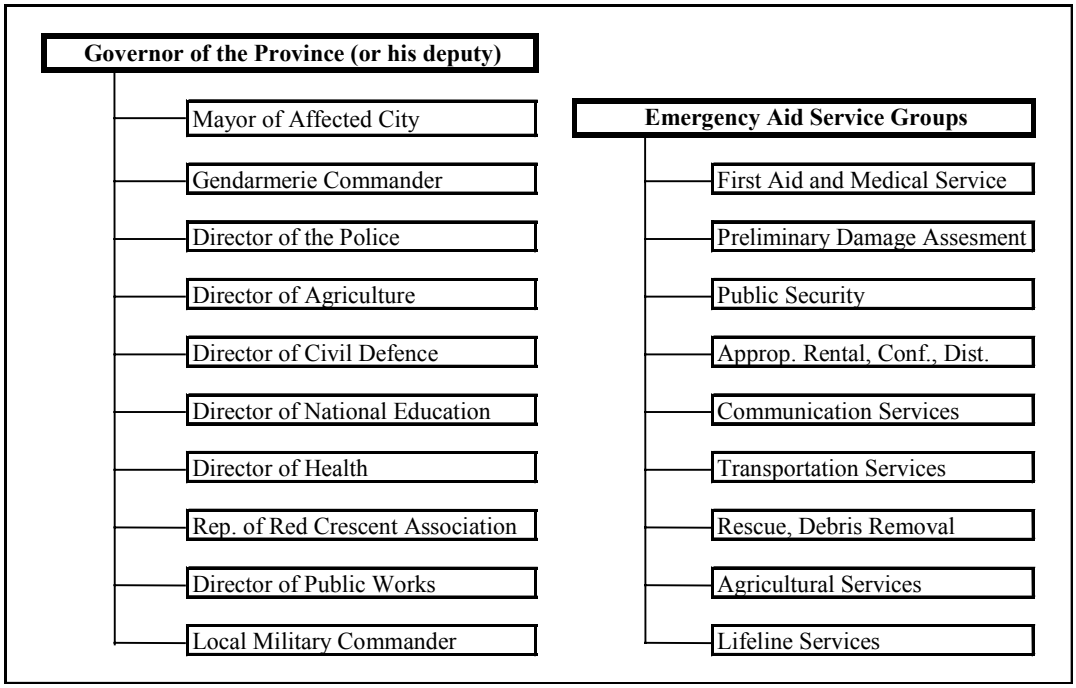

Figure 3.3.6 Organisation of the Provincial Rescue and Relief Committee

Source: Oktay (1999)

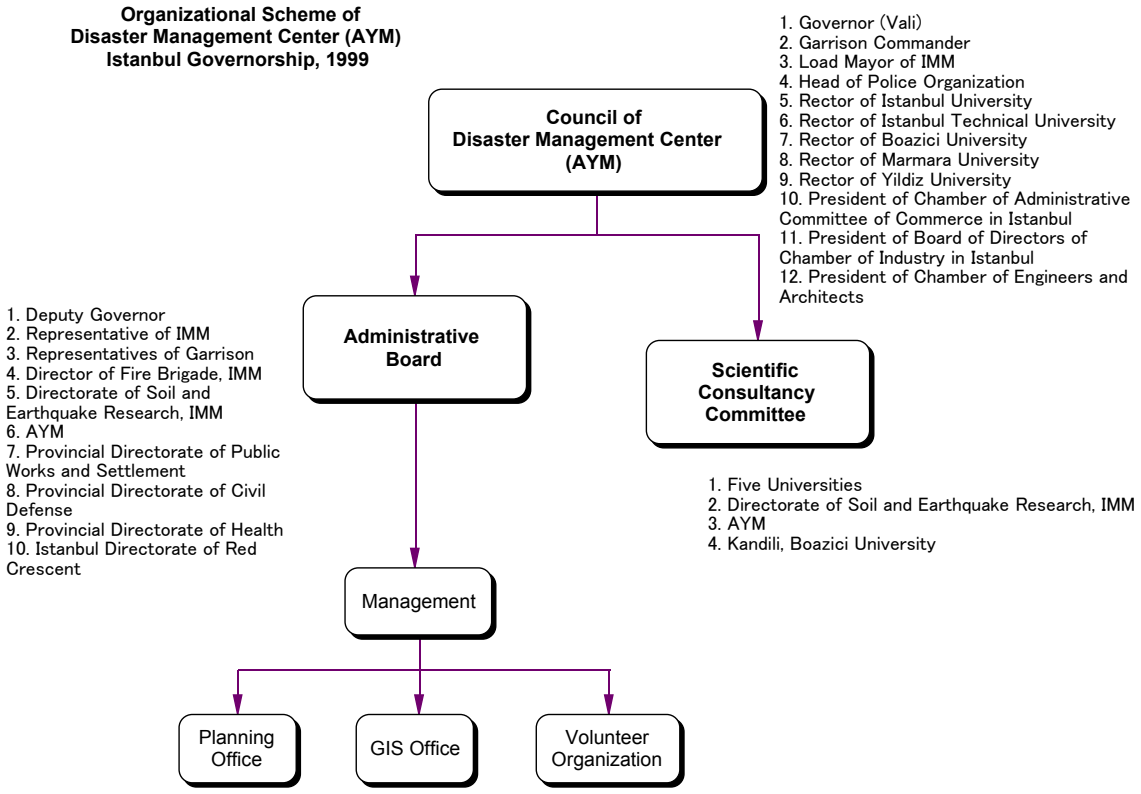

Figure 3.3.7 Organisation of Governorship Disaster Management Centre

(3) Metropolitan Municipality Government

Istanbul Metropolitan Municipality Disaster Coordination Centre (AKOM in Turkish abbreviation) was established in 2000 due to the necessity to establish a communication channel within IMM, by the order from mayor and authorisation by the Municipal Assembly. The initial members of the centre were the fire department, health department, ISKI and IGDAS. Planning, mapping, and other departments joined later on to form the current organisation.

The object of AKOM is to coordinate tasks among organisations within Istanbul Metropolitan Municipality.

The organisation structure of AKOM is shown in Figure 3.3.8. In AKOM, organisations are included by importance, unlike the service groups of the Governorship Disaster Management Centre. The president of AKOM is the vice general secretary of IMM. The vice president of AKOM is the department head of the fire brigade.

IMM's related companies are included via the shareholders department. Some key organisations in AKOM, such as ISKI or IGDAS, are also designated in AYM. AKOM does not have direct relations with municipalities within the IMM.

AKOM has its own new building constructed by IMM's budget in ISKI's area. Currently AKOM's operational budget comes from the fire brigade, but AKOM will eventually have its own budget.

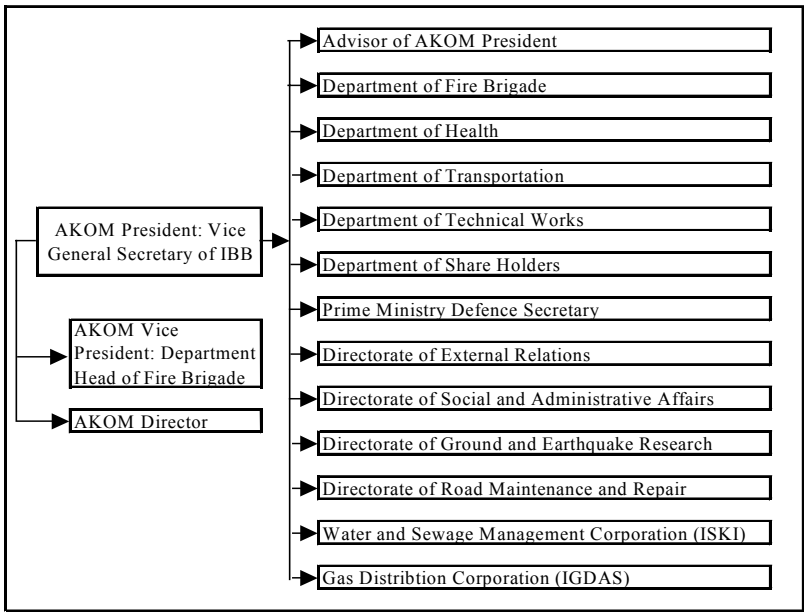

Figure 3.3.8 Organisation of Disaster Coordination Centre in IMM

(4) District Disaster Management Centre

The district disaster regulation requires establishing a permanent district disaster management centre in every district, with the district head serving as the head of the centre. Mayors in each municipality will work with district heads under the governorship.

Each disaster management centre is connected to AYM, but it does not have a direct relationship with AKOM. ISKI and IGDAS have subsidiary offices in each district, and they are designated to work with each district management centre.

The real situations of the district disaster management centres vary from district to district. In some municipalities, the municipalities have built their own disaster management centre, and it provides office space for a district head. In this way, the municipality disaster management centre practically works as a district disaster management centre.

In other municipalities, existing buildings are used as a district disaster management centre, and district head and related service group organisation are included.

Reference for Section 3.3

Oktay Ergunay, 1999, A Perspective of Disaster in Turkey: Issues and Prospects, Urban Settlements and Natural Disasters, Proceedings of UIA Region II Workshop, Chamber of Architects of Turkey

3.4. Disaster Management Plan and Activities in Turkey

3.4.1. Central Government

(1) Ministry of Public Works and Settlements

a. Earthquake Observation

The Ministry of Public Works and Settlement's Laboratory Division operates a nation wide strong motion network as a national project. During the 1999 Izmit Earthquake, 24 stations recorded strong motions.

The Seismology Division established and operates a national seismological observation network, and it carries out microseismic activity monitoring for a Turkish-German project on earthquake prediction.

An earthquake disaster prevention research project was also carried out with JICA, Japan in 1993 and has concluded. As part of three sub-centres within the project, the earthquake data collection and vulnerability evaluation sub-centre in Ankara has ten stations around Ankara, and data collected are used for rapid damage estimation.

b. Earthquake Damage Inspection

The Ministry of Public Works and Settlements is the single authorised body to conduct building damage inspections after a damaging earthquake. In case engineers from the Ministry of Public Works and Settlements are not enough, help from the chamber of architects and civil engineering is requested. Muhtar in the area, who know the area well, guide engineers.

Damage assessment is conducted in two stages. The format for assessment was developed with the help of universities. The preliminary assessment is done by visual inspection for all buildings. Secondary assessment is carried out to classify the degree of damage. The result is shown to the owners to ask for their approval. The result will be used as a basis for financial aid for reconstruction. Heavily damaged building will be demolished under the district head's orders.

The state of ownership and financial aid from government is summarised in Table 3.4.1. Only owners of legal houses can receive financial aid from government. However, shelter is provided to all victims who lose houses, regardless of the ownership or legal condition.

After the Izmit Earthquake, 2,000 engineers were dispatched to aid in building damage inspections in response to owners' request. It took four months to study 20 districts in Gorcuk. The overall result was that 96,000 buildings were severely damaged, 58,000

buildings were moderately damaged, 122,000 buildings were slightly damaged, and 33,000 buildings were undamaged.

Table 3.4.1 State of Ownership and Financial Aid from Government

Ownership	Financial aid from government
Owner of a slightly damaged house	600 million TL.is given
Owner of a slightly damaged tenants for more than two years	100 million TL is given or rent fee
Owner of a moderately damaged house	10% of credit (2 to 4 billion TL) to repair the building is given
Owner of a heavily damaged house	Credit to rebuild the building is given
Owner of an apartment	Safe house is provided or government shall construct new house
Residents of irregular house	Shelter is given if house is heavily damaged
Residents of gecekondou	Help is not mentioned in law
All victims who lost houses	Everyone is entitled to obtain shelter

(2) Ministry of Health

a. Operation Centre

In case of emergency, the Ministry of Health will work under the Prime Ministry Crisis Centre. Information will be provided by the Prime Ministry or Provincial Directorate of Health. In the Ministry of Health in Ankara, four departments are standing by on alert for a possible disaster 24 hours a day. These include the Information Flow Gathering and Coordination, Administration and Financia, the Secretary for Communication and Documentation, and the Computing Departments.

b. Resource Inventory

In the ministry, a resource inventory that includes staff, medicines, trucks, and ambulances for each province was prepared in the year 2000, and it is updated every six months. The number of beds includes beds available in hotels and lodgings. Inventory is sent to neighbor provinces for mutual aid.

c. Emergency Response Planning

The ministry plans access routes to dispatch aid to damaged areas. Provincial hospitals are listed, but emergency medical operation will not be performed inside the hospitals. Tent hospitals in open spaces are considered as possible locations. Open spaces are also considered to accommodate the efforts of foreign medical aid organisations.

d. Mutual Help System among Province

The Ministry of Health has a mutual help system set up among neighbor provinces, where each regional crisis center is programmed to help a neighbor province. A copy of this information is sent to the Ministry of Public Works and Settlements.

Three stages for mutual help according to the degree of damage, location, and population are planned. For Istanbul Province, seven neighbor provinces are designated to help in first stage, and another five provinces are designated for second stage help.

(3) Civil Defence

a. Civil Defence College

Civil Defence College was established in Ankara in 1960 for education and training, focused on search and rescue and first aid issues. The trainees are teachers of local civil defence centres, governmental officials, fire brigade members, and NGOs. Between 1960 and 2002, 18,266 personnel have been trained. Since 1982, 1,374 trainees from the fire department haveparticipated.

b. Rescue Activities

Duties of civil defence related to disaster management are as follows:

- To fulfil search and rescue, first aid, and social relief services during warfare, natural disasters, and big fires
- To coordinate search and rescue activities of both foreign and local search and rescue teams during a disaster
- To provide social relief and temporary lodging services for refugees
- To prepare weekly, monthly, and yearly education and training programs and carry them out in order to improve physical capabilities of the personnel with knowledge of practical and theoretical issues
- To train search and rescue teams assigned by public and private institutions and search and rescue teams of NGO's
- To plan and carry out day and night exercises
- To participate in training and exercises to be organised both in the country and abroad, and to participate in search and rescue activities abroad when necessary or requested
- To assist the Civil Defence College and governorships with rescue, first aid, and social relief courses
- To perform communication, information gathering, and mobilization exercises in order to reach a disaster area rapidly when necessary
- To fulfill other duties given by the Ministry of the Interior and the governorships

Before the 1999 Izmit Earthquake, only three provinces had search and rescue units. After the event, the Civil Defence has added search and rescue teams in another eight provinces. In addition, Civil Defence teams have been established in all provinces where civil defence units are not established.

The results of recent rescue works are tabulated in Table 3.4.2. The number of rescue personnel from different provinces engaged in recent rescue works is shown in Table 3.4.3.

Table 3.4.2 Activities of the Civil Defence Units during 1992-2001

			Rescued		
Date of Disaster	**Place and Type of Disaster**	**Rescue personnel**	**Rescued Dead**	**Rescued Alive**	**Total Rescued**
1992/3/13	Erzincan - Earthquake		34	4	38
1993/4/24	İstanbul / Hekimbaşı - Explosion of Dust Heap		12	0	12
1995/7/13	Isparta / Senirkent- Flood		37	1	38
1995/10/1	Afyon / Dinar - Earthquake		23	9	32
1995/11/4	İzmir - Flood		2	0	2
1995/11/27	Alanya - Flood		1	0	1
1998/3/22	Bingöl and Tunceli - Avalanche		4	0	4
1998/5/21	West Black Sea- Flood		1	101	102
1998/6/27	Ceyhan - Earthquake		62	2	64
1998/8/11	Trabzon / Köprübaşı - Flood		1	0	1
1999/1/14	K.Maraş/ Ekinözü - Avalanche		0	3	3
1999/2/7	Denizli / Honaz - Avalanche		1	1	2
1999/4/1	Niğde / Çamardı - Avalanche		0	1	1
1999/7/7	Erzurum Aşkale - Flood		2	0	2
1999/8/8	Antalya / Elmalı - Flood		1	0	1
1999/8/17	Marmara earthquake	110	349	194	543
1999/11/11	Bolu-Duce earthquake	108	56	30	86
2000/6/6	Çankırı / Orta - Earthquake		1	-	1
2001/5/8	Hatay and Samandağ - Flood		0	3	3
2001/6/10	Sivas / Kangal - Landslide		4	0	4
2002/2/3	Afyon earthquake	197	14	0	14
	Total		**605**	**349**	**954**

Source: Civil Defence General Directorate website (www.ssgm.gov.tr)

Table 3.4.3 Number of Civil Defence Rescue Workers in Recent Earthquakes

	Earthquake		
Name of the Unit	1999 Marmara	1999 Duzce	2002 Afyon
Afyon			72
Ankara	60	59	40
Bursa			13
Sakarya			36
İzmir			36
Istanbul	24	24	
Erzurum	26	25	
Total	110	108	197

Source: Civil Defence General Directorate website (www.ssgm.gov.tr)

(4) Turkish Red Crescent

The Turkish Red Crescent Society is the largest non-governmental organisation in Turkey. The society plays a significant role in relief activities from disasters, and it is embedded in the governmental emergency management system. In 1999, the total amount of internal assistance for relief was 541,630,369,000 TL, among which, 6,165,000,000 TL was used for disaster relief.

In case of an emergency, an aid assessment team is sent to the affected areas by the decision of the Red Crescent headquarters in Ankara. In addition, one representative is sent to the prime minister's crisis centre. Another representative is sent to the emergency management centre of the provincial governorship. The Prime Ministry, General Directorate of Red Crescent in Ankara, and governorship form a triangle of corporation. An emergency response plan is developed that includes shelter provisions. This plan includes the number of necessary tents and total tent area.

(5) Natural Disasters Insurance Council

Being that the Natural Disasters Insurance Council is a new organization, management of the fund and its risk will be the major challenges. Istanbul Province has the largest number of policyholders in Turkey, 931,554 holders that make up 39 % of the total holders as of March 2002. The distribution of holders according to seismic zone (I to V) is shown in Table 3.4.4, which shows zone I have the largest share. Government deed offices require submission of proof of TCIP coverage during property-related transactions such as sale or succession, but this currently affects only a small part of all property.

Table 3.4.4 Distribution of Earthquake Insurance Holders According to Seismic Zone

Seismic Zone					
I	II	III	IV	V	Total (%)
67	11	4	18	0	100

Source: Natural Disasters Insurance Council website (www.dask.gov.tr)

Table 3.4.5 shows the history of refunds by earthquake insurance for recent earthquakes, with an average refund amount per file. The Afyon Earthquake of February 3, 2002 has had the largest number of files so far, and the average refund for the total 1,450 files is 961,880,350 TL.

Table 3.4.5 Refunds by Earthquake Insurance

Date	Location of earthquake	Magni-tude	File number	Total amount of refund (TL)	Rrefund (TL) /file
2000/12/15	Afyon / Bolvadin	5.8	7	23,022,000,000	3,288,857,143
2001/1/17	Osmaniye / Merkez	4.9	1	960,000,000	960,000,000
2001/5/29	Erzurum / Pasinler	4.6	2	815,000,000	407,500,000
2001/6/22	Balıkesir / Savaştepe	5.0	3	537,500,000	179,166,667
2001/6/25	Osmaniye / Merkez	5.5	132	43,546,400,000	329,896,970
2001/6/26	İzmir / Merkez	3.9	6	5,724,200,000	954,033,333
2001/7/11	Erzurum / Pasinler	5.4	10	8,206,250,000	820,625,000
2001/7/30	Yalova/Merkez	3.8	3	372,000,000	124,000,000
2001/8/9	Osmaniye/Merkez	4.0	4	1,275,000,000	318,750,000
2001/8/26	Düzce/Yığılca	5.4	7	820,000,000	117,142,857
2001/9/12	Siirt/ Pervari	4.5	1	1,421,000,000	1,421,000,000
2001/10/13	Osmaniye/Merkez	5.2	136	29,215,000,000	214,816,176
2001/10/18	Adana/Merkez	4.9	45	14,540,250,000	323,116,667
2001/12/2	Van / Merkez	4.5	3	3,920,000,000	1,306,666,667
2002/2/3	Afyon	6.2	1,090	1,260,351,907,522	1,156,286,154
Total			1,450	1,394,726,507,522	961,880,350
					(Average)

Source: Natural Disasters Insurance Council website (www.dask.gov.tr)

3.4.2. Provincial Government

(1) Governorship Disaster Management Centre

In the year 2000, the Scientific Consultancy Committee proposed an action plan for improving the disaster preparedness and mitigation in Istanbul. The plan proposes:

- To stimulate the damage/risk assessment based on seismic microzonation
- To prepare the seismic risk maps
- To review the city master plans
- To protect cultural heritage
- To improve/strengthen buildings
- To improve the current building permission procedure

Accordingly, current tasks at the Disaster Management Centre of the Governorship are:

- Collection and compilation of resource inventory using GIS for disaster response
- Provision of resource maps to district disaster management centres
- Planning of temporary housing areas
- Revision of disaster preparedness plan by emergency response service groups
- Preparation of infrastructures in temporary housing areas
- Coordination of disaster drills
- Operation of FM radio station for disaster prevention
- Information provision via internet
- Construction of helipads
- The construction of new disaster management centre near international airport

Two types of regular meeting are held at AYM, and agendas and orders made in these meeting are given to AKOM. These include executive meetings with the governor on first Tuesday of every month, and decision-making meetings with the vice governor on every Tuesday.

Currently, AYM is located in the centre of Istanbul, in a two-storied pre fabricated building. The location of the new centre was chosen because of its access to transportation channels via air, sea, and road. The new centre area will consist of a main building serving as the disaster management centre, housing, training, warehouse for civil defence, and temporary housing area.

At AYM, police and military staff are standing by 24 hours a day in the centre, which is equipped with satellite communication to the central government. Communication with the 32 district disaster management centres in the Istanbul Province will be made possible via satellite telephone, internet, and UHF band radio. In addition, volunteer amateur radio operators can assist with communication.

In case of an emergency, representatives in emergency service groups will gather the governorship without a direct order. Communication will be established with every district head to collect each district's damage status. A decision-making group and situation study group will gather in the same room. The decision-making group includes eleven members from various organisations. The situation study group consists of 22 staff persons and contact organisations and works a 24 hour shift. The ministry from central government will come to the governorship centre at the time of emergency, as it did in the Izmit Earthquake.

Mayors of each district municipality will work with the governorship via the district head. IMM and AKOM will work under the governorship, but they are not linked with mayors in municipality.

Within 15 days after the occurrence of the emergency, the governor is given extraordinary power and has the authority to coordinate and mobilise organisations in the province for execution of emergency services. The governor's authority includes the following abilitities:

- To charge duties to all males aged between from 18 to 65
- To impound or lease without restriction all means of transport whether public or private, including construction machinery
- To execute all procurements or rentals required for first aid, relief, feeding and sheltering
- To occupy temporarily all property regardless of ownership

However, the governor has no operational role and no financial funds to impound or lease necessary lands, buildings, machinery and cars. The governor has to request assistances from the central government and armed forces, and assistance from other provinces.

(2) Turktelekom

Turktelekom is a nationwide government-owned company, with its office located on the European side, and it is the head organisation of a communication service group that includes 12 companies.

Turktelekom has 12 offices on the European side, and it has eight offices on the Asian side. The European staff is comprised of 6,000 people. In case of an emergency, 570 engineers are assigned to go to designated or nearby locations, where they will work under AYM. The Asian side office staff is comprised of 522 people, and 179 vehicles are available. Each member has first to third priority responsible locations, with alternative staff.

Each company has a civil defence group that works on a voluntary basis, and members are trained regularly for light rescue. Within Turktelekom, civil defence staff numbers 249. Though they have tents, civil defence members do not have vehicles or equipment. The communication service group has 176 staff members trained for search and rescue in total among the 12 companies on the European side.

The Provincial Civil Defence Directorate offers search and rescue training at four levels. Training for the first level is given to the civil defence section in Turktelekom, for five days and 35 hours in total. IMM civil defence also offers a three-day training course.

Turktelekom has frequent meetings among its communication service group members, and an emergency plan established independently in each organization is now joined within the service group, and an emergency communication facility can be shared by these organizations.

Turktelekom had provided the NMT (Northern Majority System) as an emergency system for use byamong governmental organnizizations. NMT is an analog system using with a 400MHz bandwidth, capable of servicing 90,000 users. It was put to usehas been in place since 1987, when it was used as a first- generation mobile phone system (used withing a car battery). Since the current number of NMT users is 23,000, no communication traffic congestion is expected during an emergency. Emergency public telephones areis are planned to be made available at planned tent locations. Normally, 20 lines will be installed in an area for 500 tents, and 10 lines for 250 tents.

Turktelekom's buildings are inspected visually inspected by their own engineers. Five buildings have been made diagnosed by ITU. Projects to strengthen works to buildings to comply with the 1998 building seismic code is now tendered have begun.

Turktelekom has eight architects, but not sufficientthis is not sufficient personnel to check all the buildings. Damage to buildings will be assesschecked by the Mministry of Ppublic Wworks. Damage to telephone lines will be assesschecked by Turktelekom. Upper ranking staffs are to report damages to governorship.

(3) Highway 17th Rregional Ddirectorate

The Highway 17th Regional Directorate is the head organisation in the transportation service group. The directorate is in charge of Turkey's highways in European side, while the Highway 1st Regional Directorate is in charge of highways in Asian side. The transportation service group has seven subgroups. Each sub-group has head organisations as follows.

- Highway and express way group, headed by Highway 17th Regional Directorate
- State and provincial road group, headed by Highway 1st Regional Directorate
- Inner city road group, headed by IMM
- Village road group, headed by Rural Affairs
- Seaway group, headed by the Maritime
- Railroad group, headed by the Turkish Railroad
- Airway group, headed by Turkish Airways

In case of an emergency, one person from each of the seven subgroups will come to the governorship. Other members will gather at the Highway 17th Regional Directorate. The highway directorate and rural affairs office will exchange their staff for the cooperation of debris removal. Emergency damage assessment shall be performed by highway patrol members and teams dispatched from the governorship. For cooperation with other taskforces, information will be exchanged via the governorship.

Damage information will be provided to the public by radio or TV. Use of helicopters is planned by the governorship, but this directorate is not informed of their use.

The Highway 17th Reginal Directorate has established a response and prevention plan. The plan specifies each member organisation's responsibilities with respect to emergency response for road systems. The plan lists allocations of heavy machines and personnel. If allocated resources are insufficient, additional machinery can be procured from military or private companies by law. The plan also includes a list and map of possible detours.

(4) Provincial Directorate of Rural Affairs Services

The Provincial Directorate of Rural Affairs is the head organisation of rescue and debris removal service groups. There are 13 organisations under the taskforce classified into three sub-taskforces. This directorate is responsible for debris removal for rescue. Principal organisations and their duties (by sub-group) are the following:

- IMM Road Maintenance is in charge of debris removal for road opening
- Civil Defence is in charge of search and rescue
- IMM Fire Department is in charge of fire fighting

In Istanbul, 7,000 heavy machines are registered for emergency response use under the governorship; 20% of these belong to the government. Existing heavy machinery is only for debris removal. Heavy machinery for cutting through building columns is lacking, and purchase of such machines is planned. Civil defence does not have heavy machinery for debris removal. Though civil defence has cutting tools, these are not sufficient for cutting through building columns.

There are 34 gathering points, such as stadiums and large parking lots, designated in Istanbul. The European and Asian sides are to work independently in case of emergency. Debris deposit areas are planned.

The surrounding 19 provinces have protocols with Istanbul to help Istanbul in case of an emergency. Each surrounding province has designated which municipality will help. However, resources in neighbouring provinces on the European side may be insufficient. Sea transport from the Asian side has also been considered for efforts to provide help to the European side.

(5) Provincial Directorate of Civil Defence

The Provincial Directorate of Civil Defence is the head organisation of the rescue and debris removal service groups.

Istanbul's provincial civil defence has a warehouse and training centre in Avcilar, and administration offices in Fatih. Since administrative offices have been moved to the city centre, the former building is used as the District Disaster Management Centre of the Avcilar District.

Under normal conditions, the fire department handles rescue work dealing with car accidents or collapsed buildings. However, if the work is difficult, civil defence is requested to help. If a state of emergency is declared by the central government, then, the rescue responsibility is shifted primarily to civil defence.

During the two earthquakes in 1999, 24 civil defence personnel from Istanbul Province responded and rescued 50 people in total.

(6) Provincial Directorate of Health

The Provincial Directorate of Health is the chief organiznization of thein First Aid and Health Service Group. The organization sends a list of hospitals and respective pertinent information (such as address, name of hospital head, number of beds, and hospital type) to the governorship. A seismic strength assessment was performed for hospitals by order of the Ministry of Health.

There are 12 organisations in five sub-groups. The service group had four sub-groups defined in the plan before the 1999 Izmit Earthquake; however, the fifth sub-group for burial of the dead was added afterwards. Sub-groups and their tasks are as follows:

First Aid and Emergency Relief

This group aids in the triage and transportation of victims to hospital. During the 1999 earthquake, this sub-group worked for the first 48 hours.

Hospitalisation

This sub-task group is responsible for the selection, treatment, and hospitalisation of victims. In two districts, local capacity was insufficient, so they sent victims to other district and university hospitals. By way of helicopter or by highway, they also sent victims to Istanbul. This group mainly worked for a few months after earthquake.

Supply and Logistic Support

The duties of this sub-task group include the collection of medicine from abroad, distribution and delivery of this medicine to hospitals. The group also helps to assess and fill hospital personnel needs.

Rehabilitation and Primary Care

This sub-task group studies environmental health andepidemic diseases, and it works long-term.

Dead Body Burial

The main task of this group was to assist with burial services for the victims. The Population Census Directorate and religious organisation worked as part of this group.

(7) Red Crescent

The Red Crescent works within the Health, Purchase, and Preliminary Assessment service group. The Provincial Directorate of the Red Crescent in Istanbul has a staff of 58. In

addition, in Istanbulthere are two blood donation centresand two regional warehousing centres. These groups work directly under Ankara's general directorate, and they work independently in each province. No regular contacts are made with other sections.

In case of an emergency, a representative is sent to the emergency management centre of the provincial governorship. The Red Crescent works within a triangle cooperation of the Prime Ministry, General Directorate of Red Crescent in Ankara, and the provincial governorship. The Red Crescent also has education programs.

(8) Provincial Directorate of Public Works and Settlements

The Provincial Directorate of Public Works and Settlements is the chief organiznisation of the in Preliminary Damage Assessment and Temporarlly Housing service group. The service group has two sub-groups, Preliminary Damage Assessment and Temporary Housing.

According to the Disaster Law, the Provincial Directorate of Public Works and Settlements should function as a disaster management centre. Currently, a section in charge of information collection only remains within Provincial Directorate of Public Works and Settlements. Communication within service sub-groups is managed within the office of this directorate.

In the Istanbul Province, there are 450 staff members in the Directorate for Preliminary Damage Assessment. Two engineers per each team will form 120 teams and will conduct secondary assessments. Type of temporary house, tent or pre fabricated house, is decided according to the climate. The number of necessary temporary homes is estimated using results from a scenario carried out by Boazici University and the Ministry of Public Works and Settlements. The ministry gives owners a lot for reconstruction. The Ministry of Public Works and Settlements will consult the IMM and decides reconstruction and planning.

Seismic retrofitting is overseen by various ministries. The Ministry of Education is responsible for retrofitting schools. The Ministry of Religious Affairs is responsible for retrofitting of religious facilities.

(9) Provincial Directorate of Police

The Provincial Directorate of Police is the head organisation of the security service group. Istanbul Province is divided into 10 regions. The police force is in charge of urban areas. The gendarme and military are in charge of rural areas. IMM cooperates with 15 assistants from the Transport Planning Directorate.

The police force's responsibilities include preventing the blocking of traffic ways and escorting the deliveries of goods, and rescue teams. They have a disaster plan consisting of 900 pages. The main information contained in this plan is the list police forces in each district, their traffic plans, logistic centres for civil defence, their district vehicle gathering centres, location information of major traffic, list of tea houses, mosques, and flammable materials storage sites as priority locations for search and rescue.

The police department has two helicopters and plans to buy two more. Helicopters will be used only for monitoring purposes in case of an emergency. The police department has a protocol established with surrounding provinces. Schools, dormitories, and locations of flammable tanks are checked. Police department buildings are partially inspected as part of a seismic diagnosis effort.

In case of an emergency, damage observation will be carried out by foot, bike, or helicopter. Damage status is reported to the district head but not to the municipality. Walkie-talkie or mobile phones are to be used as the mode of communication. Radio communication channels differ between the police, military, and gendarme, but all radio communication is transferred to the AYM. To prevent looting, police will be sent to shopping centres and historical places. Police forces also take precautions against possible sabotage during a disaster.

(10) Provincial Directorate of Agriculture

The Provincial Directorate of Agriculture is the head organisation of the Agriculture service group. There are 370 staff members in the provincial office's department. The main activity is to make a list of food-related major facilities, such as food production plants, warehouses, and supply facilities. The list includes location, address, and possible supply, most of which is from private companies. The list is updated every year. In case of a disaster, the same list will be sent to the central government. In Istanbul, about 80% of food production comes from outside of the province, though the supply's origin is not well known at the provincial directorate.

The Disaster Law and the tasks outlined therein are not known by the Directorate of Agriculture. No information for disaster coordination has been provided by the governorship, nor has any coordination between the agriculture taskforce members and the provincial directorate been outlined. No drills are held.

Technical matters for disaster response are handled within the Agriculture Department. The responsibility of damage assessment for the farmers is not clearly defined. The Ziraat

Bank will give credit to farmers. In the Agriculture Directorate, there are 66 members assigned to the civil defence section. They receive training from the fire department and civil defence.

3.4.3. Istanbul Metropolitan Municipality

(1) Disaster Coordination Centre (AKOM)

AKOM was established on August 14, 2000 by order from the mayor in February 2000. The IMM Assembly authorised AKOM on December 2000. The object of AKOM is to coordinate tasks among organisations within IMM. Including member privatized companies, IMM has 30,000 staff members, 70 directorates, and 30 department heads. AKOM is funded by the IMM through the Metropolitan Municipality Act.

In AKOM, organisations are grouped by importance. IMM's related smaller companies are also included via the Enterprise Department. The chief of AKOM is the deputy general secretary of IMM. The assistant of chief is the department head of the fire department.

AKOM's building was constructed under IMM's budget. Currently AKOM's operational budget comes from the fire brigade, but it will eventually have its own budget. Traffic monitoring by real time video from the IMM Transport Directorate is transmitted to AKOM. All organisations, such as the Kandili observatory group, civil defence, governorship representatives, the fire brigade,etc., are provided work space within AKOM's building. Communication is done by walkie-talkie, equipped in each room.

In normal times, there are 15 staff members working in AKOM. They collect information on inventory and report to the governorship every month. Every Tuesday, one representative attends the meeting with the governorship. Every Wednesday, the meeting is held in AKOM to inform the member on the agenda covered during the preceding day's meeting with the governorship.

In case of an emergency, 120 people from organisations are to report to AKOM, where they will be awaiting decisions and any order from the governorship. Their main responsibility is to execute orders rather than make decisions. They will work in AKOM around the clock in shifts. Within AKOM, only the IMM, fire department, ISKI, and IGDAS have rescue units. These units may be asked to assist in rescue efforts by the governorship.

Some important organisations in AKOM, such as ISKI or IGDAS are also part of the AYM. In case of an emergency, each director of such doubly assigned organisation will report to the governorship, and the deputy head will be in AKOM. ISKI and IGDAS also have

subsidaries in each district, and they work with each respective district management center. Mayors in each municipality will work with the district head under governorship. District disaster management centers are connected to the governorship. IMM does not have a mutual help protocol established with other metropolitan municipalities. The governorship does have a protocol of mutual help with other provinces.

During past earthquakes, each organisation made announcements independently and caused confusion. In the AKOM building, a press room is provided, but any broadcast announcement is uniquely authorised by the governor, or mayor if permitted. The facility's web server is not mirrored, and updating is done by a private company.

IMM planned and constructed helipads according to a request from the governor. The IMM has one helicopter for agriculture use and two helicopters from the transportation company. However, the total number of helicopters and their use in an emergency is only known in governorship.

Disaster prevention education is done by the Directorate of Emergency Relief, fire department, and civil defence. These groups held a conference last November and will have another this August. They have a pilot study in Zeytinburunu that includes the seismic retrofitting of buildings. Table 3.4.6 shows a list of activities undertaken in AKOM, classified by area of activities and by status of progress.

Table 3.4.6 Activities undertaken in AKOM

Area	Contents of Work	Status
Study	The geological and geotechnical reports of the Zeytinburnu District, which was chosen as a pilot area, have been prepared by the Zeytinburnu Municipality.	Done
Study	A meeting was held in November 2001 entitled, "Istanbul Earthquake and Safe Structures." The notes of the participating academicians and experts were later compiled as a book and distributed to related organisations.	Done
Study	GIS activities are mostly completed. The input of data is continuing.	Done
Study	The 1/5000 scale construction/improvement geology map of Istanbul are completed.	Done
Study	The JICA Project, which is being carried out with IMM, will be completed in 2002.	Done
Study	Studies related to the Olympics are completed, and the necessary controls have been taken. Coordinating units are the Directorate of External Affairs, ISKI, IGDAŞ, Dir. of Transportation Planning, Dir. of Road Maintenance and Repair.	Done
Study	According to the decision made at the executive board meeting held at the Provincial Disaster Management Centre, the studies and work requested by and given to the IMM are completed and submitted to the Provincial Disaster Management Centre via a file.	Done
Study	Crisis Centre functional system.	Future plan
Structural reinforcement	After the Izmit Earthquake, a tender was held for the construction work and retrofitting activities together with project and consultancy services of the 15 IMM building properties with prices of 18.719.440.000.000 TL (according to the year 2001 unit construction prices of the Structural Works Directorate) and 30.887.074.500.000 TL (according to the year 2002 unit construction prices of the Structural Works Directorate).	Done
Structural reinforcement	The statistical projects and calculations of the Kartal and Cebeci Public Bread Factories are reconsidered and checked with respect to seismic considerations and the General Directorate of Public Bread is informed of the results.	Done

Structural reinforcement	Emergency exit doors will be constructed in the Main building of the IMM, and a fire exit (ladder) and emergency exits will be included as part of the retrofit project.	Done
Structural reinforcement	The seismic inspection of the Edirnepkapı General Directorate of Public Bread building is completed.	Done
Structural reinforcement	Based on the concrete inspection report to be received from BIMTAŞ, the studies are continuing to aid in the development of a proposal to ISTON A. Ş. For the retrofitting of the Kartal Public Bread Factory.	Ongoing
Structural reinforcement	To assess Istanbul's building inventory, to inspect buildings to understand their seismic resistivity, and to classify buildings in terms of earthquake safety (Zeytinburnu can be pilot area).	Future plan
Structural reinforcement	All units must make detailed studies to give ideas and recommendations regarding what can be done to improve the seismic resistance of buildings and houses in which important rescue unit members and individual's responsible for disaster management are living.	Future plan
Structural reinforcement	The number of abandoned houses, especially within the historical settlement areas of Istanbul, must be counted accurately, and precautions must be taken against potential collapses.	Future plan
Training	The training of the security staff at the Istanbul metro is completed, emergency rescue units are formed, other safety systems are checked and their deficiencies are addressed.	Done
Training	The drill named "Disaster 2001, Crisis Management," which was held between Nov. 13-15, 2001 under the coordination of the General Secretariat of National Security Board, the Istanbul Governorship, and AKOM, has completed the drill.	Done
Training	On April 12, 2001 a fire and rescue drill was held by the Department of the Fire Brigade.	Done
Training	The activities and preparations for before and after a disaster are discussed and talked over with the EUCOM mission from USA and the mission from China.	Done
Training	At the "S.O.S 2001, Preparation Before Disaster Fair," held August 17-21 2001, at the CNR International Fair Center, AKOM set up a stand to exhibit the tools, materials, vehicles and the disaster preparation studies of IMM.	Done
Information system	A disaster recovery system was successfully established on May 16, 2002, the project is considered, the test has been done and currently is on-going. After the completion of the data processing system of AKOM, the system, including back-up systems, will work fully.	Done
Information system	To determine addresses for "specialty offices/businesses", to inspect these places by with respect to transportation, fire hazard, activity field, number of people, working style, etc. All sections will work from a common data gathering form and the information will be input to into a computer system which will aid in the development of location maps.	Ongoing
Information system	Within the scope of taking air photos and land photos for activities related to disasters, every section should inform AKOM about the locations and studies that they want to photograph.	Future plan
Disaster management	The determination of suitable locations for storage buildings,considered within the framework of disaster preparedness activities. The ground studies of these locations are complete and the construction of the storage buildings is ready to start.	Done
Disaster management	In time of a possible disaster, the cities, which will provide support and help, are already contacted. Information is received on the activities that will be done.	Done
Disaster management	Providing GIS information to aid in disaster preparedness efforts.	Ongoing
Disaster management	Pertinent parties are examining and deciding on sites for "Emergency Response Stations," which will be newly established.	Ongoing
Disaster management	To discuss with the district municipalities the opening of the information in each district municipality to common use (without making any changes) and to give access to IMM and other units to view these information.	Future plan
Disaster management	On an appropriate date, a meeting shall be held with Civil Society Organisations (NGOs), and information will be taken from these organisations relating to their activities on disasters. Also, cooperation possibilities will be sought.	Future plan
Communication	An introductory seminar and a demonstration was given to related organisations of IMM by the SETKOM Company on the Motorola Dimetra Wireless (Walkie-Talkie) Communication Solution.	Done
Transport	By May 22, 2002, 50 helipads have been constructed in important locations of Istanbul.	Done
Transport	The junction images that are transferred to the Transportation Coordination Center are also transferred to AKOM as a demo.	Done
Transport	In case of heavy snow and rainfall, the "Alternative Transportation Road" plans are completed, and, in the framework of a certain plan, the implementation test is done in Eminönü District.	Done

Transport	The widening and maintenance of 39 critical roads that have priority for road accessare completed, and the results are shown on a map.	Done
Transport	The inventory of the streets and narrow streets of Istanbul is completed and marked on the map.	Done
Transport	To designate areas and routes to be used for burial sites, and the input study of the records into a computerized system to find the cemeteries easily.	Done
Transport	Making a street and wide street inventory, to determine appropriate evacuation routes. Gather information on number of people in the area, materials, equipments to be used, etc. (Zeytinburnu can be a pilot area).	Ongoing
Transport	The information which will be received from districts will be marked on map for the already prepared "Alternative Transportation Roads" plan to be applied in case of heavy snow and rain.	Ongoing
Fire fighting	The number of water hydrants which ISKI and fire brigade plans to install around 5,000 by the end of 2002 has reached 3,113 by May 22, 2002.	Done
Fire fighting	The Directorate of flammables and explosive chemical storage has made an inventory of the hazardous facilities and working offices within the city, and these have been included in the records.	Done
Fire fighting	Using CPS systems to develop physical controls for existing hydrants, to determine their coordinates accurately. Also, there is a need to take into consideration the narrow roads and streets, when determining the locations of new hydrants, and these points should be marked on the map and digitalised.	Ongoing
Fire fighting	To work together with Universities to prepare a Fire Risk Map of Istanbul, to prepare projects and have a bigger range of studies, to prepare fire hazard information and an analysis of the last 10 years, and to develop the software.	Ongoing
Fire fighting	ISKI and the fire brigade are continuing to work water tanks with 60-100 ton capacities and hydrants.	Ongoing
Fire fighting	The work on the fire outbreak risk map is continuing by preparing the information and fire analysis of the last 10 years.	Ongoing
Fire fighting	To determine the locations of explosive, hazardous, and flammable material-producing facilities and storage locations within Istanbul, to clarify the legal responsibility and authority of the municipality, and to study on the present data.	Future plan
Fire fighting	Research whether ground-level water storage in the fire brigade facilitiesbe used as cold storage. Research whether ice rings be constructed in certain locations of Istanbul.	Future plan
Fire fighting	To gather the rain water in artificial ponds, etc., and to utilise this water in future.	Future plan
Fire fighting	The Dir. of Flammable Chemical Storages should work on activating the storage facilitiess within the Municipality, a study should start to facilitate the use of private company storage locations.	Future plan
Rescue	As entrust method, a tender was held in 3 regions (Anatolia, Istanbul and Bakırköy) for renting heavy work machinery to be utilized in times of a possible earthquake. Also the request is made for the purchase of heavy work machinery, which will be used by the Directorate of Road Maintenance and Repair.	Done
Emergency Medical	In order to use medical equipment and materials more efficiently and effectively, the Directorate of Emergency Relief Lifeguard has prepared two storage sites with materials and equipment: one on the Asian side (in the garden of Zeynep Kamil Hospital) in Uskudar, and the other on the European side (at a fire brigade station) in Gaziosmanpaşa.	Done
Emergency Medical	Health materials and equipment are placed in the sea ferries of IDO, and arrangements are made to give immediate response to injured citizens.	Done
Emergency Medical	Simple but effective Emergency Health Sets (2,500) were prepared to be used in the first steps of a possible crisis.	Done
Burials	The purchase of 6 collective funeral cars, 10 cars for mobile dead cleansing, 5 emergency ambulances, and 3 closed cooler cars has been completed.	Done
Burials	In order to be used after a possible earthquake, 3 large locations in Istanbul are designated to be used as cemeteries.	Done
Burials	In time of a possible earthquake, the purchase of a greater number of body bags and ID cards has been made (up to 50,000).	Done
Burials	The location on maps of existing cemeteries for the general area of Istanbul. (Also information on ratio of capacity, availability of empty graves, place to wash the dead, how many burials can be done at the same time, etc.)	Done
Burials	Additional to the studies of increasing the number of ice rings and cold storages, the determination and finding of the facilities that have cold storages, ice factories, slaughterhouses and producing carbon ice.	Future plan
Food	A mobile kitchen which can serve up to 20,000 people a day, is provided by the Directorate of Social and Administrative Affairs and it is waiting in preparedness.	Done

Food	In times of disaster, the production of bread which will contain high nutrition and calories and to which vitamins are added is attractive.Studies concerning the production, storage and distribution of the bread is completed. It is possible to make any amount of production in times of necessity.	Done
Food	25,000,000 food packages are purchased to be given in times of disaster to rescue units and citizens.	Done
Food	In case the natural gas for the 3 big bread production facilities is cut during a natural disaster, a study on a system, which will work on LPG for at least a week, is completed.	Done
Food	In times of crisis the locations for bread distribution (Public Bread Buffets, I.E.T.T Stops, Muhtars, Police Stations, Hamidiye Water sale points, etc.) are fixed and marked on map in digital format.	Done
Food	To take into consideration the tent areas for mobile food houses, to consider the cooking activities in every area, to increase the number of places for serving and eating meals.	Ongoing
Food	To have cooperation between TUBITAK-MAM and the General Directorate of Public Bread for long lasting consumption goods (food).	Future plan

Source: AKOM (2002)

(2) Istanbul Fire Department

The legal foundation of the Istanbul Fire Department came about through the Municipality Act. The Istanbul Fire Department belongs to the municipality, and it is a key organisation in the AKOM. The department is also the head organisation of the Rescue and Debris Removal Service sub-group of the governorship disaster management centre.

The fire department has been under the Istanbul Municipality, not under the central government. When the IMM was established in 1985, 16 fire departments in each municipality were united, and the Istanbul fire department then became the central fire department of the IMM. Currently, the IMM fire department has 38 stations in total within Istanbul. The IMM fire department helps fire departments of other municipalities within the IMM.

The fire department has 38 stations, 307 vehicles, and 2180 staff members in total in Istanbul. They have rescue teams, which consist of 4 to 7 people, equipped with audio-visual search detectors, cutting tools, and breaking devices, and these teams work in all fire stations in 3 shifts, 24 hours a day. In addition, new rescue teams are formed which will work under the responsibility of the disaster intervention centre, equipped with 20 fully equipped vehicles.

In theory, one fire brigade is necessary for every 1000 citizens. In this sense, 9,000 brigades would be necessary to meet the real demand in Istanbul. The fire fighting force in IMM is divided into three sectors. The Boazici area has a staff of 543, the Istanbul area has a staff of 650, and the Asian side has a staff of 709. In addition, there are 119 logistics staffmembers. In both the European and Asian side, the fire departments have disaster centres with 50 staff members.

A quarter of the budget is from project licenses, project settlements, insurance companies, and routine service. The rest of the budget comes from the municipality. In the year 2000, the group's annual budget was 20.1 trillion TL. 1.5 trillion TL was spent on the salary of staff members. In the year 2001, 4.5 trillion TL was spent for new vehicles. In five years, new vehicles will be purchased for 30 million Deutsch Mark.

Combating forest fires are the responsibility of the civil defense. Fire on roads is officially the responsibility of the Ministry of Public Works and Settlements, but the fire department actually attends these fires. In Turkey, not like other countries, civil defence conducts all aid. Training, checking, and standardisation is the fire department's responsibility. Public training focuses on self-survival rather than helping others.

According to the Disaster Law, the fire department must have apreparedness plan for all kinds of disasters, though no specific scenario is considered. The responsibility of the fire department during an emergency is primarily fire extinction. Debris removal is the responsibility of the Road Maintenance Department and the Provincial Directorate of Rural Affairs. It is the fire department's secondary responsibility. Rescue from fire zones is their primary responsibility. The fire department staff has the advantage of daily experience in rescue efforts. The fire brigade can work independently, that is, without external assistance. NGO's lack experience in rescue, and it is desirable that this effort be under control of the fire department. In case of an emergency, the fire department can work voluntarily based on information collected at each fire station.

The governorship, civil defence, and fire department are connected via a wireless communication system. Earthquake information from the Kandili observatory is directly reported to the fire department. Calls to the fire department from citizens are directed to the nearest fire department. Recently, all calls are channeled to a single call centre. During the Izmit Earthquake, since earthquake damage information was not available initially, the fire department dispatched staff based on their working knowledge of the areas.

(3) Istanbul Water and Sewage Operation (ISKI)

ISKI is the head organisation of the Electricity, Water, and Sewage service group. ISKI is responsible for the IMM's urban area and for small water reservoirs. Rural and state water agencies are responsible for areas outside IMM and for dams.

In the 1999 Izmit Earthquake, the Istanbul Water and Sewage Management repaired damage to the water supply system in the gulf region and secured clean and drinkable water for survivors.

Only telephone service is excluded from the lifeline service group because it belongs to the communication taskforce. The lifeline taskforce includes five subgroups: water, electricity, gas, sewage, and support. In an emergency, a member from the civil defence section in each organisation is assigned to the governorship to receive orders, while the rest of member will report to AKOM. Seven members from the civil defence team for search and rescue and appointed by the central office of the province are also present.

In case of an emergency, nine assigned authorities, six department heads, the Director General of IGDAS, and an operator will report to AKOM.

95% of the pipeline has been moveed; the remaining 5% is located in its historical site. The SCADA (Superuser Control and Data Acquisition) system has been in operation for two years in ISKI. ISKI and IGDAS developed a map of the distribution of the area's geology and their pipeline networks. An emergency response drill is planned for the future. Retrofitting work of the reservoir is not clearly understood.

Regional help from neighbourhood provinces times of emergencies is coordinated under the governorship. ISKI has prioritized sites for water service restoration with respect to their functions, for example, governmental organisation, hospital, or community centre. ISKI prepares repair materials for a case that 30% of pipelines are damaged by warfare.

(4) Soil and Earthquake Research Directorate

The Soil and Earthquake research directorate was established in 1997. The current staff numbers 70 in this department, and the reconstruction department has 90 staff members. This department is in same directorate as the reconstruction directorate, which works for urban development. IMM's major disaster-related tasks deal with preventive measures, not response measures.

This directorate has prepared a 1/5,000 scale geological map of the IMM area, based on a compilation of existing boring results secured by the IMM and other organisations. Municipalities prepare 1/1,000 scale geological maps and present their maps to this directorate.

These maps are disclosed to public and help planners of new construction to see the vulnerability of the site they may be interested in. IMM's task is to check if the presented geological map from each municipality matches the IMM's map. Resulting maps are sent to the General Directorate of Disaster Affairs for approval. The classification is the same as the one used in the building code of the Ministry of Public Works and Settlements. In each geological map, the geology of the land is classified according to four types:

1) Area suitable for settlement

2) Area suitable for settlement under some measures

3) Area suitable for settlement but needs detailed geological study

4) Area not suitable for settlement

This department checks plans for new construction, and it has the authority to require a new study or prohibit construction according to geological conditions of the proposed site. The Reconstruction Department permits new construction plans, in accordance with reconstruction laws.

Other studies undertaken in this department are deep tectonic studies via seismic refraction and pilot studies for urban rehabilitation.

IMM has formed a committee of 12 members that meet once a week to establish an earthquake master plan. The members are from different disciplines, such as geology, geophysics, mapping, architecture, civil engineering, city planning, and law. IMM Soil and Earthquake Research Directorate works as head of the committee. The committee is trying to establish a protocol that asks for consultancy from major universities.

Prior to 1999, this department also had eight stations for monitoring micro-earthquake, via dial-up connection to the IMM. Six more stations will be added by JICA. Data analyses are conducted within this department, and, if necessary, are sent to TUBITAK for consultancy. TUBITAK has online monitoring stations for hydraulic, radon, and geo-chemical around the Marmara area. The observed acceleration and epicentre location will be reported to governorship, police, and IMM's disaster coordination centre within three minutes of the event to aid in the initial damage estimation.

Since this department mostly deals with research, education is currently not considered. The Department of Education issued a brochure for disaster prevention. The brochure was originally intended to be distributed in schools, but plans to do so were later.

(5) Istanbul Gas Distribution Corporation (IGDAS)

IGDAS has its own crisis management centres in three district centres in Beyoglu, Istanbul, and Anatolia. These centres are coordinated by IGDAS headquarters, and they are connected to AKOM. IGDAS has its own emergency action plan. Its damage extent shall be expressed using three degrees of measurements and will be reported to AKOM. IGDAS uses common frequency bandwidths for radio communications with the fire brigade.

IGDAS uses European design standards for its pipelines. Daily repair of lifelines for various companies are coordinated by the IMM Infrastructure Coordination Department. Since fiscal years differ from company to company, coordination is difficult. The gas network in Istanbul is under surveillance 24 hours a day, with a night watch shift of 250 technical personnel. Mobile teams are on continuous patrol along the network.

IGDAS has an "Emergency Action Plan", under which all personnel will be immediately called to their places of duty. After the Izmit Earthquake, the plan was revisited with new additional earthquake scenarios. The Action Plan also requires the personnel and equipment of gas companies also be involved in search and rescue operations under the corporation's supervision.

If an emergency occurs, mobile team from its own 30 substations can shut down pipelines faster than the fire brigade. For emergency support, IGDAS has 280 personnel that reside in close proximity to their duty points. They are prepared to go on site within two hours. Under the plan, a meeting with gas companies in Bursa and Ankara is to be held to agree on mutual help efforts. The provincial civil defence provides them with training on rescue operations, first aid, and fire fighting.

Three control centres will shut down at once, then their operation will be restored gradually according toorders from AYM. AYM is responsible for ordering gas restoration. Restoration work for lifelines will be done independently by each company.

At the time of the 1999 Izmit Earthquake, the corporation formed a search and rescue team of 50 personnel in cooperation with the Civil Defence Directorate of the Provincial Government and the Metropolitan Municipality's Fire Brigade.

IGDAS does not have a representative in AYM, and it is directly connected to AKOM. Only via AKOM is IGDAS is linked with the governorship. In the past, a new gas and petroleum taskforce within AYM was planned, but the plan failed due to legal difficulties.

(6) Department of Health

Before 1985, ambulance service was provided by individual hospitals. In 1985, the Health Department was established in Istanbul to provide ambulance service. The department had an emergency call number, 112, the first of this kind in Turkey. In 1994, the Provincial Health Directorate established its own ambulance service, and it and took over the emergency call number. The location of Provincial Health Centre was selected not to overlap with existing health centres.

The IMM Health Directorate has 21 ambulances in total at 13 different locations, mostly housed within fire stations. The fire brigade carries out rescue efforts and ambulance staff provides medical care.

The Provincial Health Directorate has 40 ambulances at 40 independent stations. IMM Health Directorate now focus on training rather than daily ambulance work. IMM Health Directorate and the Provincial Health Directorate have a good working relationship towards a common goal.

Under normal situations, patients are sent to the appropriate types of hospitals according to the insurance of the patient. Patients with workers' insurance are sent to social insurance hospitals under the Ministry of Labor. Patients with governmental insurance are sent to state hospitals under the Ministry of Health. Patients with private insurance are sent to the university or private hospitals under the Ministry of Health. In case of a state of emergency, however, such distinction will not be applied.

By law, each hospital should have an emergency section. The municipality, as a tax collecting body, can call for the construction of a hospital building. However, the municipality cannot operate the hospital according to the law that prohibits the recycling of funds. Doctors in the municipality work in ambulances or in treatment centres. The capacity of one university hospital is approximately equal to that of five state hospitals. State and insurance hospitals have major capacity in terms of total capacity.

Only the Health Department is responsible for the preparation of equipment among AKOM. The IMM Health Department has emergency relief plan. They built two medical equipment centres, one on the Asian side and one on the European side. Equipment is mainly stored as medicines that have an expiration date are not stored. Medicines will be sent to the centres through arranged protocols with private companies. These centres also have a protocol with the sea transport company to aid in the transportation of victims. Seats of these sea ferries can be used as a bed in case of emergency.

The centres recognize that the first three days after the earthquake event are the most critical. After that period, they know by experience that necessary medicines will be donated from external sources.

Emergency hospital services will be provided out of one-storied hospital buildings. They do not count on existing hospital buildings after the earthquake. They count on tents or ships as hospitals. The IMM Health Directorate will work from ambulances. Operations at hospitals and preparation for water or electricity are the responsibility of each hospital.

The IMM Health Directorate attend AKOM and works with the AKOM in case of an emergency. They do not work directly with the AYM, but the Deputy Director from IMM Health Directorate report to the governorship in case of an emergency.

The IMM Health Directorate does not have the right to sign protocols. It took a year to achieve a protocol with the sea transport company. Some seismic retrofitting of the building has been completetd. Many organisations work independently on this effort, and the results have not been made known.

Even in normal situations, the number of exisiting hospitals is insufficient to meet patient needs. In a disaster, many officers or drivers may not report to work because of injury to them or their families, or because of traffic problems. External help will be needed. Staff living on the Asian side may not be able to report to the European side. Capacity of Istanbul Province is larger than the sum of five of its neighbouring provinces, though Istanbul has a protocol established with them.

From their experiences in past disasters, they recognised that unskilled amateur first aid caused problems to victims rather than help; thus, they focus on providing first aid training to the public, so as to reduce the potential to worsen patients' condition due to unskilled first aid. Trainees are mostly limited to professionals such as traffic police, fire fighters, etc. There are 20 trainees in a class, and two classes are held at a time. The training program lasts seven hours a day for three days using an "American first aid standard." They limit the program offering because there are only six trainers. Training is provided on a voluntary basis free of charge, since volunteerism is the most important factor in first aid. They managed to gather a 20,000 member audience on a voluntary basis for a seminar, and they trained 3,750 applicants. Their goal is to have one trained person in each building, then one person in each family. Red Crescent or international hospitals also offer first aid training on acommercial basis.

(7) IMM Civil Defence Directorate

In Istanbul, there are two rescue organisations. The Provincial Directorate of Civil Defence works under the governorship of Istanbul and belongs to Ministry of Interior. The director is appointed by the Ministry of Interior. The Provincial Civil Defence has 44 highly skilled rescue workers and 7 vehicles.

The IMM Civil Defence has 41 highly skilled rescue workers and six vehicles. They work under the governorship via the Provincial Civil Defence. The number of workers in civil

defence including less trained rescue workers amounts to 7000. Three rescue dogs are trained everyday at the police department dog training facility.

IMM civil defence has radio communication with three different channels. The first channel is between the governorship and the Provincial Civil Defence, the second one is for use among the civil defence in IMM, and the third one is with the police department. Communication is establsishedwithin five minutes and it takes three minutes to leave office. The IMM civil defence does not have a direct access phone number for the public to use. They are called on duty by the Provincial Directorate of Civil Defence.

Both civil defence organisations are located on the European side, and there is no civil defence office on the Asian side. In case of an emergency, the IMM Civil Defence is designated to work in the two districts, Eminonu and Fatih. Other districts are within the responsibility of the Provincial Civil Defence. The fire brigade also executes rescue operations, but they may have little knowledge of heavy rescue. Military rescue would also be a major force.

In the past, the governor or vice governor had to be present on site to command rescue operations. However, this precedent has been changed recently. The district chief must be present on site to command efforts, and the fire brigade is in charge of the rescue operation. Civil defence in the IMM is called only in case of a serious situation. In the year 2002 so far, there were eight rescue operations regarding building collapse cases. Due to insufficient cooperation on the part of the fire brigades, some operations were not successful. The major role of the fire brigade is extinguishing fires and light rescue.

IMM civil defence has three staff members fully assigned to rescue training. Training is given to students and staff in high schools and universities. In addition, training is given to district municipality, sports club, or NGO members. Training is done at the AKOM site. One training course takes a week, four hours a day, for a total of 20 to 25 hours. In a class, the maximum number of students is 15. 25 hours are necessary to teach the basic rescue operation. Upon completion, a certificate is issued to the participants. Provincial Civil Defence gives continuous rescue training to civil defence sections in each governmental organisation. The total number of trainees amounts to over 10,000.

(8) Department of Transportation Planning

In this directorate, there exist three departments that are related to disaster management. The Coordination Department is in charge of coordination with external organisations. The

IMM Road Maintenance section is included in the governorship taskforce via the Highway 17th Regional Ddirectorate.

The Planning Directorate is in charge of transport planning and attends the AKOM meeting regularly. This directorate planned helipad construction according to the request from AKOM and AYM, but it is not responsible for emergency response. Their task is uniquely limited to the planning of helipads. Helipads will be used for emergency purpose only. Up to now, 50 out of 76 planned helipads are completed. However, information on the total number of helicopters and their operation could not be obtained from the governorship.

In the traffic monitoring room, 21 points along the highways and main roads with heavy traffic have been monitored since 1997. Realtime traffic monitoring results are aired on 22 radio stations and five TV stations, two to three times a day. The realtime traffic information is also seen on internet. The information is communicated via digital form from ten stations and via analog fromeleven stations. No batteries are installed in the cameras, though a uninterruptible power system lasting for few hours is to be installed. Five electric boards are installed to indicate detour routes to drivers.

For disaster management issues, the Transportation Planning Directorate only develops plans. The Traffic Control Directorate appoints 15 staff persons to help police with traffic control, without police authority.

The transportation directorate does not have a direct tie to the governorship. No cooperation regarding emergency management exists between the Highway 17th Regional Directorate. No meetings is held among transportation taskforce organisations.

To promote communication during normal circumstances, the Transportation Coordination Centre meets once a month. The centre includes the 1st and Highway 17th Regional Directorates, IMM transportation companies, IETT, the mayor, the Transportation Department head, the Traffic Coordination Directorate, and traffic police.

3.4.4. District and Municipal Government

Avcilar District has a population of more than 230,000. In the Istanbul Province, this district suffered the heaviest damage during the 1999 Izmit Earthquake, with 281 deaths, 40 collapsed buildings, 86 heavily damaged buildings, and 488 moderately damaged buildings.

(1) Avcilar District

District Disaster Management Centre

The Avcilar District has a disaster management centre within the site of the Provincial Directorate of Civil Defence, in a two-storied old building formerly used as an administration building by civil defence. Two other buildings are planned as alternative sites in case the current building suffers damage. Currently telephone, fax and radio are installed.

Two staff members from Avcilar Municipality work in the centre. In case of an emergency, 11 members will meet as a decision group; nine members meet as an execution group. The execution group includes the fire department, police, and gas company, etc. The first story of the building serves as the working room for the execution group. The second story serves as the meeting room for the decision-making group, and a separate room is provided for a secretary.

A resource map for the district was provided by the governorship. The map will be updated with disaster scenarios based on experience. The extent of damage in the scenario is not known.

Municipality

There are two rescue teams in the civil defence section of the municipality. Only a list of the staff and their tasks exist in the municipality now. Damage or experience reports have not been completed by the municipality. The emergency centre established by municipality during the Izmit Earthquake was moved to the District Disaster Management Centre. The municipality only receives an agenda or memo from the governorship once every three months, and most of the topics have to do withrescue efforts.

The Municipality has amended a plan note to conduct a geology study if needed after the Izmit Earthquake. The geology maps divide areas into four categories according to ground conditions. Before the Izmit Earthquake, the number of construction permits was 200 per year on average. After the earthquake, only 18 buildings have been permitted. This sharp drop is mostly due to the economic recession.

(2) Kadikyo District

Municipality

Kadikoy District has a population of over 660,000, which is the largest within the IMM. The district has 28 Mahalles, which are grouped into ten areas according to the population. The municipality executes various disaster prevention activities, with the active participation of many volunteers.

In the municipality, the Project Coordination Directorate developed a disaster prevention plan, based on their principle "to solve the problem with, and, by local people," by consultancy with civil society. Their planning includes an organizational plan, the location of a disaster management centre, the locations of pertinent facilities on maps and GIS, citizen's participation planning, and concrete and ground testing.

The municipality coordination group includes the mayor, vice mayor, planning and the directorate. The consultancy group includes the Boazici University and chambers. The executive group has a meeting every 15 days. There are ten service groups, which are parallel to the ones in AYM, including 28 neighbouring volunteer groups. Each service group has a director and trainer, and aims to form a bottom-up organization. In addition, there are a study group, financial group, and executive group.

In the municipality, the location of useful facilities for disaster management, such as hospitals, pharmacies, fire stations, doctor and nurse offices, fuel stations, military posts, district health centres, cemeteries, and storage buildings, are contained in an urban information database using GIS, which also contains information on the facilities' attributes, and such information will be posted on the internet.. Such GIS data are passed to the AYM. In the next 2.5 years, building identification and street-based community information will be completed.

Though the building code is issued by the central government, the municipality can specify the number of stories or the structure of a planned building. The municipality's building safety inspection is now mandatory. If the inspected new building does not meet specified requirements, they can stop construction.

Kadikoy Municipality Disaster Management Centre

The Kadikoy Municipality built a disaster management centre covering 90,000 m^2, including training rooms. The municipality provided a working office for the district head and all related organisation representatives, including those of ten NGOs. Thus, the centre will also work as a district disaster management centre. Communication between the

governorship will be made via the district head. The municipality does not have an official relationship with the IMM or the AKOM.

The DMC has a power generator and an emergency water tank. The DMC will have satellite telephone communication to the AYM, a Local Area Network is ready in the centre, and a web server will be installed – all for disaster information management. Tents and lamps are stored from past rescue work experiences during the Izmit Earthquake. Six flat buildings plus office are provided for AKUT and major rescue NGOs.

DMC has a dining hall for emergency use; the hall is currently used as kitchen for another project. Cooks for the kitchen are trained for eight months as vocational training. The centre is used as a training and seminar room on weekend.

(3) Building Quality Study in Laboratory

The municipality disaster management centre has a concrete quality and soil laboratory, run by municipality with municipal staff. It was built in 2001, motivated by the Izmit Earthquake. Before, private companies inspected building quality as of 1994. Experts from the centre make observations on site, take concrete samples, and inspect iron bars with X-rays on a non-profit basis. They mostly work in this municipality, but some also work in other municipalities.

They have only one team for concrete testing, so that their services are usually reserved for two months ahead. Owners or residents of an existing building can apply for a safety inspection, and they are informed the results. 6,000 samples of concrete cores have been tested so far. A total of 40,000 buildings in the municipality are inputted in GIS. However, the municipality cannot enforce retrofit work or the budget to do so. The result of the evaluation will be used to classify buildings in a new project currently being proposed.

Another corporation in the IMM also works on building quality inspections on a profit basis with five staff members. However, their test is based on comparison of plans and the actual building, and the report is not a detailed one.

The municipality has drilled at 93 sites, 1500 m in depth in total. In addition, 84 existing boring data were collected from public services in the IMM. Geology base maps, geotechnical maps, and settlement maps are made using the collected data, and they will be disclosed on Internet.

Though the municipality understands the needs for retrofitting, retrofitting faces difficulties in two aspects. The first problem is that the municipality does not have the legal authority

to enforce retrofitting. Also, if reconstruction is done, the height of the new building will be lower than the original one if it follows MPWS's request to limit the height of new buildings. The second problem is that the cost of retrofitting is estimated to be about 70% of the cost of construction. The municipality cannot afford assistance under the present economic situation. Nor can the municipality provide credit, though it can pay monthly for the work.

References for Section 3.4:

Oktay, E. "A Perspective of Disaster in Turkey: Issues and Prospects, Urban Settlements and Natural Disasters." Proceedings of UIA Region II Workshop. Chamber of Architects of Turkey, 1999.

AKOM. Activity Report, 2002.

3.5. Disaster Management Systems in Japan and USA

3.5.1. Disaster Management System in Japan

(1) National Disaster Management System in Japan

Due to its geological setting and its location in a monsoon area, Japan has repeatedly suffered from various types of natural disasters: typhoons, heavy rains, earthquakes, volcanoes, etc. Figure 3.5.1 shows the number of deaths by natural disaster in Japan since 1946, the year which marked the end of the Second World War.

In the post-war period, Japan's national land was deteriorated and was susceptible to natural disasters. Motivated by the major typhoon disaster that killed more than 5,000 people in 1959, the "Basic Law for Disaster Prevention" was issued in 1963. This law aimed to implement a major shift in Japan's national disaster management policy from being post-disaster focused to placing more emphasis on pre-disaster mitigation.

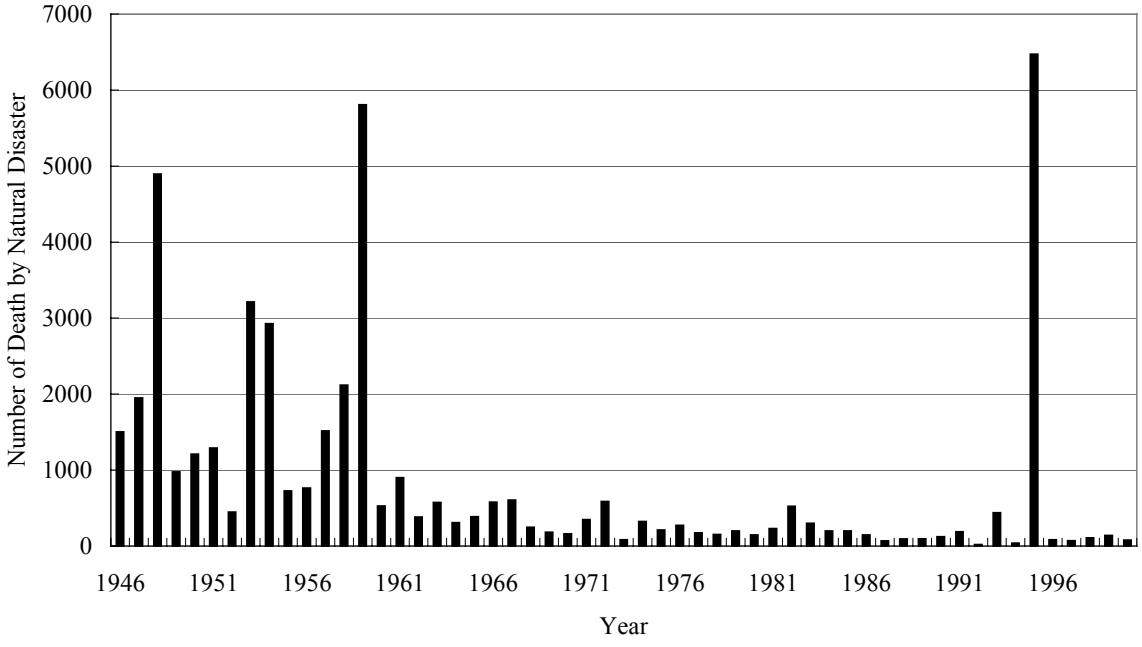

Figure 3.5.1 Number of Deaths by Natural Disaster in Japan

Source: Cabinet Office (2002)

The table of contents in the Basic Law is shown in Table 3.5.1, and Japan's disaster management organisations, as specified by the law, are illustrated in Figure 3.5.2. The main features of the Law are the following:

- Responsibility for disaster prevention is defined at every level and stage.

Responsibilities are defined for the national government, prefecture government, municipality, designated public services at national and local levels, and citizens. Responsibility for prevention, emergency response, and recovery stage efforts is defined for the national and local governments.

- Council is established at national, prefecture and municipality level.

A central council for disaster prevention with the prime minister as its head is established in the national government as a comprehensive coordination organisation. A prefectural council is also established with the governor as its head, including local ministry offices and designated public services. The municipality also establishes a similar council.

- A disaster prevention plan is made at every level based on the national basic plan.

The central council for disaster prevention establishes a basic plan for disaster prevention, a comprehensive and long-term plan. Designated administrative organisations and public services make operational plans for disaster prevention, based on the national basic plan. Prefectural and municipal councils for disaster prevention also make their plan according to the national basic plan.

- Establishment of disaster prevention research organisation in government.

The need for scientific research to mitigate damages due to natural disasters was recognised at a national governmental level.

- Reconstruction from disaster should aim to improve facilities.

Reconstruction after a disaster should not only restoredamaged infrastructure, but also strengthen it against future disasters.

Japan's "Basic Plan for Disaster Prevention," whose contents are shown in Table 3.5.2, was issued in 1963 according to the Basic Law. The plan deals with different natural and industrial disasters, but the earthquake case is given primary attention. In each chapter, measures for prevention, emergency response, restoration, and reconstruction are described.

A notable feature in the law's section for prevention is that it includes urban planning and states that national development should be taken into consideration in disaster prevention. Section three describes the duty of the central and local governments to let the public know their potential risk using the result of damage estimation and so on, as well as their duty to urge citizens to prepare for the disaster with active participation. Section four mentions the government promotes scientific, engineering, and social studies for disaster prevention. It obligates responsible personnel of damaged facilities to collect damage information, to

analyse the cause of damage, and to report findings to the government, if necessary, for further study and clarification of responsibility and for the future improvement of standards.

A gradual decrease in the number of deaths after the enactment of the Basic Law in 1963 indicates that major policy change combined with comprehensive long-term mitigation efforts have been successful in reducing human casualties to some extent.

However, the 1995 Kobe earthquake that killed more than 6,000 --many of them killed due to the collapse of old buildings-- demonstrates urban areas still remain in Japan. With the experience of the Kobe earthquake, the following items were amended:

- Prohibition of regular traffic to assure emergency transportation
- Establishment of an emergency response centre, regardless of the declaration of the state of emergency
- Empowerment of the mayor to request to the governor that self defence forces be dispatched for disaster response

Table 3.5.1 Table of Contents of Japan's "Basic Law for Disaster Prevention"

Table of contents		Contents	Articles
Chapter 1 General rules		Object of the law, definition of terms, responsibilities of national, provincial, municipal governments, designated public services, and citizens. Mutual cooperation among local governments.	1-10
Chapter 2 Organizations related to disaster prevention			
	Section 1 Central disaster prevention committee	Establishment and responsibilities of central council.	11-13
	Section 2 Local disaster prevention committee	Establishment and responsibilities of prefecture and municipal council.	14-23
	Section 3 Emergency operation center	Establishment and responsibilities of emergency operation center.	24-28
	Section 4 Dispatch of staffs during emergency	Request of staffs' dispatch.	29-33
Chapter 3 Planning of disaster prevention		Planning and accouchement of disaster prevention plan at national, prefecture, and municipal government and designated public services.	34-45
Chapter 4 Prevention of disaster		Responsibilities of preventive measures. Disaster drills.	46-49
Chapter 5 Emergency response measures		Responsibilities of emergency response, notification of warning, mayor's authority in order of evacuation and precaution area, request of help to governor, traffic during emergency, priority of communication, compensation of losses.	
	Section 1 General rule		50-53
	Section 2 Notification of warning etc.		54-57
	Section 3 Preventive measures and evacuation		58-61
	Section 4 Emergency response		62-86
Chapter 6 Recovery from disaster		Responsibilities of recovery, cost estimation for recovery works, report to council, financial assistance from national government.	87-90
Chapter 7 Financial assistance measures		Prefecture and national assistance for recovery works executed by municipality.	91--104
Chapter 8 Activation of state of emergency		Declaration and termination of state of emergency, acceptance of national diet.	105-109
Chapter 9 Miscellaneous rules			110-112
Chapter 10 Penalty rules			113-117

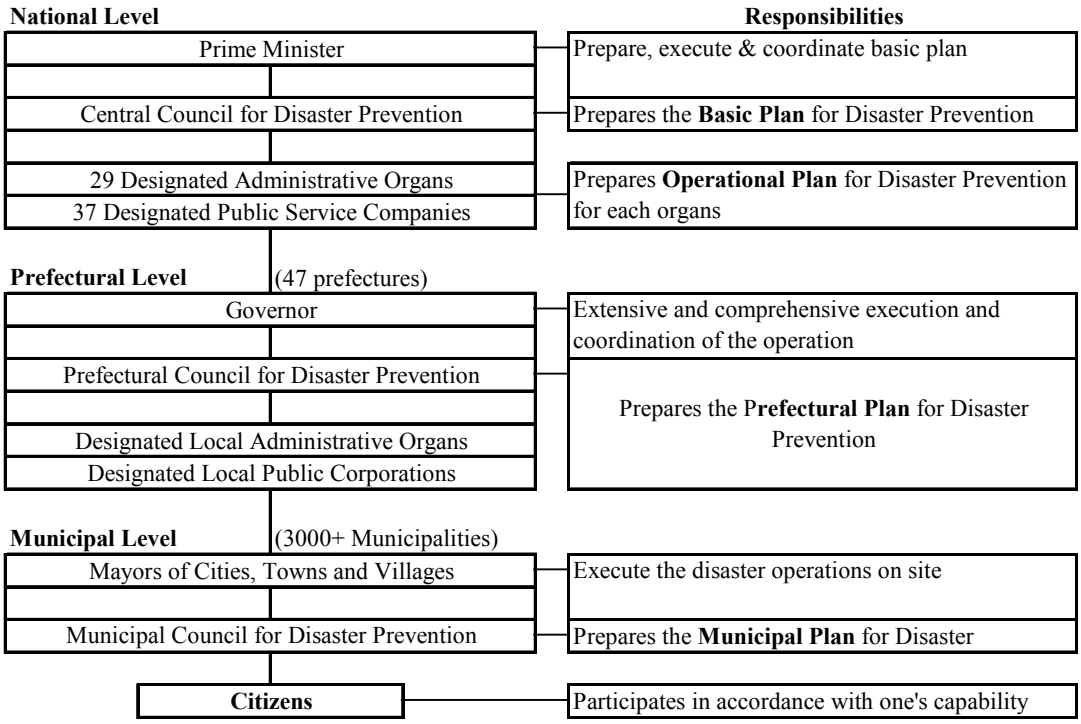

Figure 3.5.2 Japanese Disaster Prevention Organizations and their Responsibilities

Table 3.5.2 Contents of The Basic Plan for Disaster Prevention

Part	Contents	
1	General	
2	Earthquake disaster prevention	
	Chapter 1Disaster prevention	
		Section 1 Building seismic resistant country and cities
		Section 2 Rapid and smooth emergency response, preparation for restoration and reconstruction
		Section 3 Promotion of citizens' disaster prevention activities
		Section 4 Promotion of research and observation for disaster and disaster prevention
	Chapter 2 Emergency response	
		Section 1 Collection of information and assurance of communication and command
		Section 2 Establishment of emergency response system
		Section 3 Rescue, first aid, medical treatment, and fire fighting
		Section 4 Assurance of emergency traffic, emergency transportation
		Section 5 Evacuation and its acceptance
		Section 6 Procurement of food and water and its distribution
		Section 7 Hygiene, prevention of disease, body treatment
		Section 8 Maintenance of social order and stability of prices
		Section 9 Emergency restoration of facilities
		Section 10 Precise public relation to victims
		Section 11 Prevention of secondary disasters
		Section 12 Acceptance of voluntary help
	Chapter 3 Restoration and reconstruction	
		Section 1 Decision of basic orientation for restoration and reconstruction
		Section 2 Method of rapid restoration
		Section 3 Methods for planned reconstruction
		Section 4 Support for victims' daily life reconstruction
		Section 5 Support for restoration of small-medium business and other economic recoveries
	Chapter 4 Measures for tidal waves	
		Section 1 Prevention of disaster
		Section 2 Emergency response
3	Storm and Flood disaster prevention	
4	Volcanic disaster prevention	
5	Snow disaster prevention	
6	Maritime disaster prevention	
7	Air traffic disaster prevention	
8	Railway disaster prevention	
9	Road disaster prevention	
10	Nuclear disaster prevention	
11	Hazardous material disaster prevention	
12	Large scale fire disaster prevention	
13	Forest fire disaster prevention	
14	Other types of disaster prevention	

(2) Disaster Management in Tokyo Metropolitan Municipality

Tokyo has been the capital of Japan since the 17th century, and it has suffered major earthquakes repeatedly. The last major earthquake Tokyo suffered occurred on September 1st in 1923; the eventkilled more than 140,000 people in a great fire after the earthquake. On the memorial day of this event, disaster drills are held by many governmental organisations in Japan.

Based on the "Basic Law on Disaster Prevention" of 1961, the Tokyo Metropolitan Government formed the Metropolitan Disaster Prevention Council and established a disaster prevention plan in 1963.

In 1971, Tokyo's metropolitan government issued the "Earthquake Disaster Prevention Act." The contents of the act are shown in Table 3.5.3. The act stresses seismic reinforcement of structures. In addition, the act requests the cooperation of citizens to create disaster prevention organisations, to be educated, and to practice drills.

In 1973, based on the act, the first "Five-year Plan for Earthquake Disaster Prevention for Tokyo" was established to realise items mentioned in the act and to integrate disaster prevention-related projects executed in various sections of the metropolitan government independently.

In 1978, the study on seismic damage estimation in Tokyo, the first one among local governments in Japan, was completed for 23 central districts. The result of estimation has been made public to form realistic disaster prevention initiatives, and to promote public awareness.

Table 3.5.3 Contents of Earthquake Disaster Prevention Act

Chapter 1 General		Article
	Section 1Definition	1
	Section 2 Responsibilities of governor	2-8
	Section 3 Responsibilities of district, cities, and villages	9-10
	Section 4 Responsibilities of metropolitan citizens	11-12
	Section 5 Responsibilities of private sectors	13-15
Chapter 2 Urban planning for disaster prevention		16-19
Chapter 3 Prevention of destruction		
	Section 1 Strengthening of seismic resistance	20-26
	Section 2 Prevention of earthquake disaster in made land	27-28
	Section 3 Prevention of subsidence	29
Chapter 4 Prevention of fire		
	Section 1 Prevention of fire breakout	30-32
	Section 2 Prevention of fire spreading	33-36
Chapter 5 Evacuation		37-42
Chapter 6 Systems for information and communication		43-44
Chapter 7 Cooperation by citizens		
	Section 1 Disaster prevention organization	45-47
	Section 2 Disaster prevention education	48
	Section 3 Disaster prevention drill	49-50
	Section 4 Opinion of metropolitan citizens	51-52
Chapter 8 Authorization		53

The plan has been updated regularly since then every three to six years. The 7th Earthquake Disaster Prevention Plan for Tokyo Metropolitan Government, established in 1999, has contents as shown in Table 3.5.4.

Table 3.5.4 Contents of 7th Earthquake Disaster Prevention Plan for Tokyo Metropolitan Government

I. General
- 1 Basic characteristics of earthquake disaster prevention
- 2 Background of establishment for seventh plan
- 3 Basic principles of plan establishment
- 4 Period of plan
- 5 System of plan
- 6 Outline of plan
- 7 Size of projects

II. Sectorial Plans

Part 1 Building seismic resistant city
- Chapter 1 Urban structure redevelopment
  - Section 1 Promotion of disaster prevention urban plan
  - Section 2 Redevelopment of dense wooden housing areas
  - Section 3 Strengthening of Road, bridges, rivers, coast, and ports
  - Section 4 Strengthening of lifeline facilities
  - Section 5 Assurance of open space inn urban area
  - Section 6 Strengthening of buildings
  - Section 7 Strengthening against liquefaction
- Chapter 2 Mitigation of earthquake damage
  - Section 1 Prevention of earthquake fire
  - Section 2 Prevention of slope and wall failure, and fallen objects
  - Section 3 Prevention hazardous materials risk

Part 2 Building seismic resistant societies
- Chapter 1 Diffusion and education
  - Section 1 Awareness promotion of disaster prevention
- Chapter 2 Cooperation among citizens
  - Section 1 Establishing mutual help network
  - Section 2 Strengthening of civic organization for disaster prevention
  - Section 3 Strengthening of disaster prevention system in corporation
  - Section 4 Development and assistance of volunteers
- Chapter 3 Helping weak people
  - Section 1 Security assurance for weak people
  - Section 2 Assistance for foreigners
  - Section 3 Promotion of measures for difficulties to home coming

Part 3 Building seismic resistant systems
- Chapter 1 Strengthening of initial response system
  - Section 1 Preparation for allocation
  - Section 2 Preparation of activity centers
  - Section 3 Strengthening of communication
- Chapter 2 Strengthening of rescue and support system
  - Section 1 Preparation of evacuation area and evacuation route
  - Section 2 Strengthening of function in evacuation area
  - Section 3 Assurance of water and food
  - Section 4 Preparation of fire fighting and rescue
  - Section 5 Preparation of ambulance and medicals
  - Section 6 Preparation of transport and logistics
- Chapter 3 Recovery from earthquake disaster
  - Section 1 Recovery from earthquake disaster
- Chapter 4 Strengthening of cooperation
  - Section 1 Strengthening of mutual help
  - Section 2 Strengthening of disaster drill
- Chapter 5 Research and study
  - Section 1 Research and study for damage estimation and local risk
  - Section 2 Information collections for disaster prevention measures

3.5.2. Disaster Management System in the USA

(1) National Disaster Management System in USA

History of Disaster Management in USA

In the United States, the first piece of disaster legislation can be traced back to the Congressional Act of 1803, which provided assistance to a New Hampshire town following an extensive fire. In the following century, legislation was passed in an ad hoc manner more than 100 times in response to hurricanes, earthquakes, floods, and other natural disasters.

By the 1930s, the Reconstruction Finance Corporation was given authority to make disaster loans for repair and reconstruction of certain public facilities following an earthquake, and later, other types of disasters.

In 1934, the Bureau of Public Roads was given authority to provide funding for highways and bridges damaged by natural disasters. The Flood Control Act, which gave the U.S. Army Corps of Engineers greater authority to implement flood control projects, was also passed. This piecemeal approach to disaster assistance was problematic and it prompted legislation that required greater cooperation between federal agencies and authorised the President to coordinate these activities.

The 1960s and early 1970s brought massive disasters requiring major federal response and recovery operations by the Federal Disaster Assistance Administration, established within the Department of Housing and Urban Development (HUD). These events served to focus attention on the issue of natural disasters and brought about increased legislation. In 1968, the National Flood Insurance Act offered new flood protection to homeowners, and in 1974 the Disaster Relief Act firmly established the process of presidential disaster declarations.

However, emergency and disaster activities were still fragmented. When hazards associated with nuclear power plants and the transportation of hazardous substances were added to natural disasters, more than 100 federal agencies were involved in some aspect of disasters, hazards and emergencies. Many parallel programs and policies existed at the state and local level, compounding the complexity of federal disaster relief efforts. The National Governor's Association sought to decrease the many agencies with which state and local governments were forced work. They asked President Jimmy Carter to centralise federal emergency functions.

Establishment and Development of FEMA

President Carter's 1979 executive order No. 12127 merged many of the separate disaster-related responsibilities into a new Federal Emergency Management Agency (FEMA).

- To reduce the expense of the federal government due to duplicated emergency response activities
- To establish an effective partnership between central and local government, by establishing unified coordination organisation in central government

FEMA absorbed the Federal Insurance Administration, the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, the Federal Preparedness Agency of the General Services Administration and the Federal Disaster Assistance Administration activities from HUD. Civil defense responsibilities were also transferred to the new agency from the Defense Department's Civil Defense Preparedness Agency.

FEMA is an independent agency reporting to the President and with responsibilities of responding to, planning for, recovering from and mitigating against disasters. Today, FEMA has more than 2,600 full time employees. FEMA also has nearly 4,000 standby disaster assistance employees who are available to help out after disasters. Often FEMA works in partnership with other organisations that are part of the nation's emergency management system. These partners include state and local emergency management agencies, 27 federal agencies and the American Red Cross. The organisation of FEMA is illustrated in Figure 3.5.3.

John Macy was named as FEMA's first director. Macy emphasized the similarities between natural hazards preparedness and civil defense activities. FEMA began development of an Integrated Emergency Management System with an all-hazards approach that included direction, control and warning systems, which are common to the full range of emergencies from small isolated events to war.

The new agency was faced with many unusual challenges in its first few years that emphasized how complex emergency management can be. The Loma Prieta Earthquake in 1989 and Hurricane Andrew in 1992 focused major national attention on FEMA.

In 1993, President Clinton nominated James L. Witt as the new FEMA director, the first director with experience as a state emergency manager. He initiated reforms that streamlined disaster relief and recovery operations, giving a new emphasis regarding preparedness and mitigation, and focused agency employees on customer service. The end

of the Cold War also allowed Witt to redirect more of FEMA's limited resources from civil defense into disaster relief, recovery, and mitigation programs.

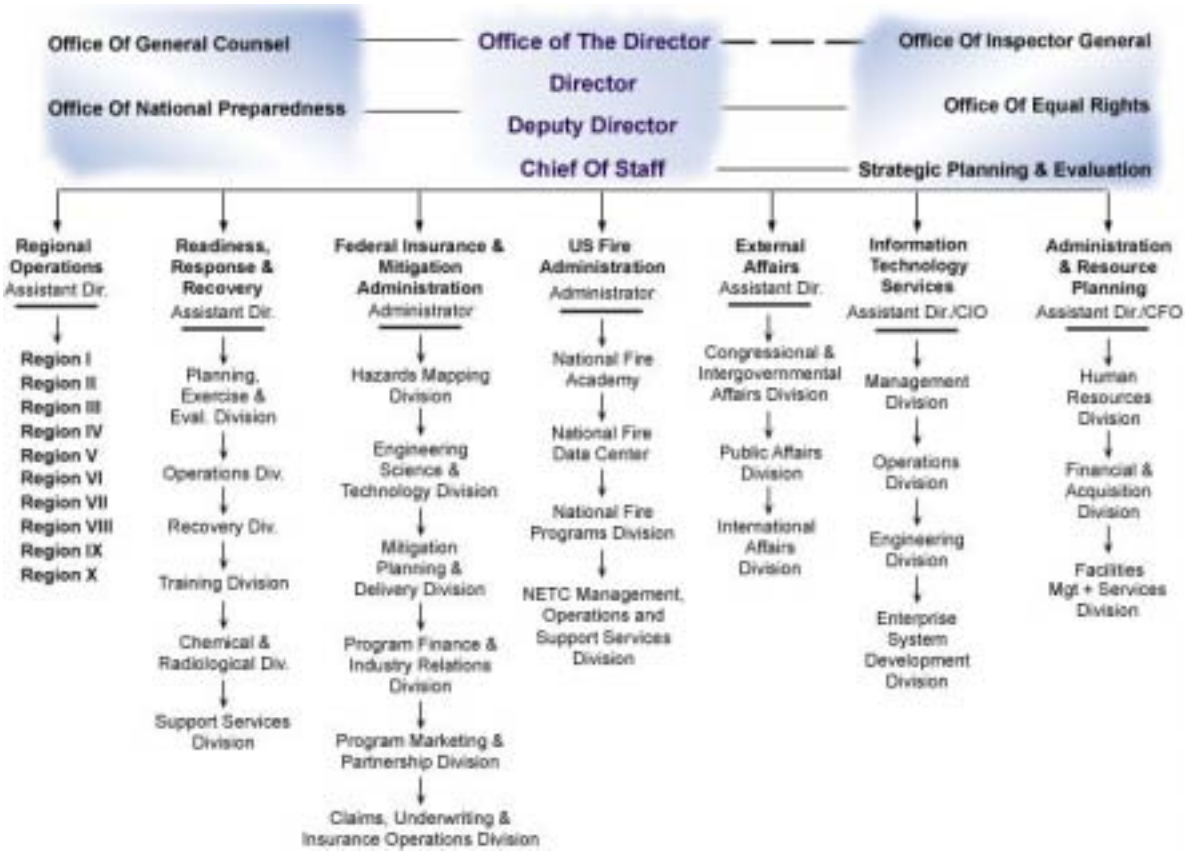

Figure 3.5.3 Organisation of FEMA

Source: Federal Emergency Management Agency website (www.fema.gov)

FEMA's Earthquake Program

FEMA's earthquake program was established in 1977, under the authority of the Earthquake Hazards Reduction Act of 1977, enacted as Public Law 101-614. The purpose of the National Earthquake Hazards Reduction Program (NEHRP) is to reduce the risks of life and property from future earthquakes.

FEMA serves as lead agency among the four primary NEHRP federal partners, Research Centers at the National Science Foundation, and National Institute of Standards and Technology, and the US Geological Survey, Engineering, and is responsible for planning and coordinating the Program.

FEMA's Earthquake Program has four basic goals directly related to the mitigation of hazards caused by earthquake as follows.

- To promote understanding of earthquakes and their effects
- To work to better identify earthquake risk
- To improve earthquake-resistant design and construction techniques
- To encourage the use of earthquake-safe policies and planning practices

As a part of the earthquake program, FEMA publishes guidelines and a safety checklist to prepare against various natural disasters.

The Southern California Earthquake Preparedness Project, an experimental project funded by the federal government and State of California started in 1980 and lasted for three years. The object of the project was to establish an earthquake preparedness plan, and to promote earthquake prevention measures against a potential major earthquake.

In the project, a procedure to establish earthquake disaster prevention measures for high earthquake risk areas was developed. Also, an earthquake disaster prevention plan was established including governmental and private sectors, and considering the case of earthquake prediction as both possible and impossible.

The results of the project were published as part of the "Comprehensive Earthquake Preparedness Planning Guidelines" for corporations, counties, and citities in 1985; namely FEMA 71, 72, and 73, respectively. Table 3.5.5 shows the contents of FEMA 72, a guideline for counties.

The guidelines include long-term and short-term preparation, assuming that earthquake prediction is possible, emergency response within a few weeks after the occurrence of an earthquake, and short-term recovery within a few months. A matrix to define the division of roles among related organisations, and to specify the primary responsible organisations and supportive ones is given for each stage.

Table 3.5.5 Contents of FEMA's Comprehensive Earthquake Preparedness Planning Guidelines: County

Part One User's Guide
- A. Introduction
- B. Phase one: About planning
- C Phase two: Plan Establishment
- D Phase three: Plan Implementation

Part Two Planning Guide
- A Elements of plan
- B Activities and division of roles for earthquake response
- C Preparation in long term (Activities to be done in few years to several ten years before earthquake)
  - 1 Safety measures against earthquake
  - 2 Incentives for damage mitigation
  - 3 Mutual help and mutual aid protocol
  - 4 Disaster assistance
  - 5 Earthquake preparation
  - 6 Mitigation of structural damage
  - 7 Seismic resistant measures for non structural elements and facilities
  - 8 Public relations and education
  - 9 Emergency shelters and large scale aid
  - 10 Disaster management
  - 11 Safety of schools
  - Duties and division of role matrix for long term preparation
- D Preparation in short term
  - (Activities to be done in few days to few weeks before earthquake, if earthquake is predicted)
  - 1 Preparation for emergency response
  - 2 Traffic and transportation
  - 3 Communication
  - 4 Public relations and warning
  - 5 Human and material resource management
  - 6 Support for logistics
  - 7 Hazardous and toxic material management and fire protection
  - 8 Safety of
  - 9 Evacuation
  - 10 Emergency shelters and large scale aid
  - 11 Emergency medicals
  - 12 Maintenance of law order
  - Duties and division of role matrix for preparation in short term
- E Emergency response (Activities to be done within 72 hours to few weeks after earthquake)
  - 1 Traffic and transportation
  - 2 Communication
  - 3 Removal of debris
  - 4 Fire fighting and management of hazardous or toxic materials
  - 5 Repair of road and bridges
  - 6 Damage inspection, prohibition, and demolition
  - 7 Support for human and material resources and logistics
  - 8 Emergency medicals and public health
  - 9 Search and rescue for victims
  - 10 Necropsy
  - 11 Public relations
  - 12 Emergency shelters and large scale aids
  - 13 Investigation of damage status
  - 14 Recovery of lifelines and public service
  - 15 Disaster management
  - 16 Maintenance of law order
  - Duties and division of role matrix for emergency response
- F Recovery in short term (Activities to be done in one to two months after earthquake)
  - 1 Recovery of traffic network
  - 2 Disaster assistance
  - 3 Public relations, information transmission
  - 4 Reopening of governmental activities
  - 5 Resume of public service
  - 6 Demolition of dangerous structures
  - 7 Damage cost calculation and refund
  - 8 Redevelopment and reconstruction
  - Duties and division of role matrix for recovery in short term
- G Glossary

(2) Emergency Operations, City of Los Angeles

In the City of Los Angeles, California, the Emergency Operations Organization (EOO) was created by the Emergency Operations Ordinance in 1980, as the only local government organisation of its kind in the United States at that time.

The EOO is an operational department of Los Angeles, which centralises command and information coordination to enable its unified chain-of-command for planning, coordination, and management of disaster preparedness, mitigation, response, and recovery.

The City's emergency preparedness goal is to effectively bring every available resource to bear against the problem in times of crisis. Accomplishing this task requires multifaceted interdepartmental and inter-agency cooperation and the resolution of complex operational, legal, legislative and administrative issues. The operational priorities of the EOO are the followings:

- To save lives and protect property
- To repair and restore essential systems and services
- To provide a basis for direction and control of emergency operations
- To provide for the protection, use and distribution of remaining resources
- To provides for continuity of government
- To coordinate operations with other jurisdictions' emergency service organisations

The Los Angeles Emergency Operations Master Plan was established in accordance with Division 8, Chapter 3, Article 1 of the Los Angeles Administrative Code of 1980, and Emergency Operations Ordinance amending Chapter 3, of Division 8 of the code. The Emergency Operations Master Plan is consistent and compatible with the State Emergency Plan. The contents of the Emergency Operations Master Plan in 1996, as shown Table 3.5.6, include the following novel features:

- Plan maintenance and distribution in Part 1
- The organisation and duties of emergency operation centres are defined in Chapter 4
- Multi-agency coordination is stressed in Chapter 5
- Importance of emergency public information is stressed in Chapter 6
- Plans for each division in the city are defined in Chapter 7
- Response plans to various kind of disasters are described in the Annexes

Reference for Section 3.5:

United States Cabinet Office. White Paper on Disaster Prevention, 2002.

Table 3.5.6 Contents of Emergency Operation Master Plan of the City of Los Angeles

Part 1 Introduction
- 1 Basis for planning
- 2 Purposes of the plan
- 3 Objectives
- 4 Planning assumptions
- 5 Plan activation
- 6 Authorities and references
- 7 Plan maintenance and distribution
- 8 Organization of the plan

Part 2 Authorities related to emergencies
- 1Emergency laws and regulations
- 2 Definitions of emergency
- 3 Authorities and actions under local emergencies
- 4 Continuity of government

Part 3 Emergency operations
- 1 Introduction
- 2 Emergency operations organization
- 3 Emergency operations organization coordinator
- 4 EOO authority and powers
- 5 Activation of the emergency operations organization

Part 4 Emergency operation centers
- 1 Primary emergency operations center
- 2 Organizations of the EOC
- 3 Duties and responsibilities of EOC sections
- 4 Activation of the EOC
- 5 Overview of EOC operations
- 6 Action planning in the EOC
- 7 EOC equipment and support systems
- 8 EOC information management system
- 9 Information flow within the EOC
- 10 Multi agency coordination within EOC
- 11 Mobile emergency operations center

Part 5 Multi agency coordination
- 1 Mutual aid
- 2 City county joint emergency operations procedures
- 3 Multi agency or inter agency coordination
- 4 State and federal coordination
- 5 America red cross assistance
- 6 Volunteer and private sector coordination
- 7 Payment for emergency services

Part 6 Emergency public information
- 1 Background
- 2 Development of public information
- 3 Coordination with other agencies
- 4 Means of dissemination

Part 7 Emergency operations organization -functions and resources summary
- 1 Table of function and resources

Part 8 Division plans

Annexes to the emergency operations master plan
- Civil disturbance
- Earthquake prediction
- Storm
- Earthquake
- Major fire
- Hazardous materials
- Aircraft accident
- Recovery and reconstructions

Source: Los Angeles City website (www.lacity.org/epd/epdep.htm)

3.6. Recommendations for Improved Disaster Management in Turkey

Recommendations for the improvement of the current disaster management system in Turkey, categorised by legal measures, organisational structure, and planning, are based on an examination of current conditions, interviews, and comparisons with other management systems. These recommendations are discussed in this section.

3.6.1. Recommendations on Legal Measures

Many researchers have pointed out weaknesses of the disaster management system in Turkey (Ergunay, 1999; Gulkan, 2000; Balamir, 1999). Problems with basic laws are discussed respectively.

(1) Development Law

The Development Law should cover the entire construction process:

The law should control not only the construction phase, but also investments and entrepreneurial organisations, provision of land and infrastructures, and technical means of control during the construction.

The Development Law should include concerns for disaster mitigation:

The law should have direct reference to the precautions needed for disaster mitigation. Land-use and zoning, transportation and infrastructure, land-use and density changes, and planning of open spaces should be taken into account by the law. Thus, the multi-disciplinary basis of disaster management should be established.

The Development Law should take integrated approaches for property management:

The Low should control land-use in an integrated manner for areas currently treated as special cases (such as metropolitan areas, national parks and reserves, areas of historical and natural significance, tourism centres, areas of ecological significance, and shores).

Planning control should be unified to avoid diffusion of authority:

Within Istanbul Province, there are four heads of land control, that is, the provincial government, IMM, districts within IMM, and districts outside IMM. IMM can develop city plans only after build-up areas are submitted to IMM. As such, IMM cannot control new development areas. To pursue the uniform control of the contents and procedures of plan development, particularly for disaster mitigation purposes, there should be a unified authority.

(2) Building Code Enforcement

a. Project Supervision

Engineers in public service companies in IMM should be utilised to assist with structural design checks.

Higher authorities should provide oversight for designated supervisory bodies.

Legal arrangement should be made for consumers to be able to sue the design engineer, inspection engineer of record, or approving agency for design errors in case of losses.

Legal measures should require the presence of a site engineer for construction projects exceeding certain limits.

A simplified check method should be developed for simple, ordinary designs.

Distinction should be made between ordinary and unusual engineering projects.

b. Construction Supervision

Professional qualification of the inspection engineer should be made.

The Development Law does not specify qualifications of inspectors who control designs. Supervising inspectors (called "engineers of record" in the law) only need to have valid diplomas. Experiences or professional qualifications do not count. In fact, some municipalities have transferred this duty to the local branches of the Chambers of Civil Engineers or Architects through informal agreements.

The inspectors should be empowered, and they should have liability insurance.

Inspectors have obligations but no real power. Even if they are required by the court to pay compensation, they cannot do so. There is no liability insurance.

The inspector should be separated from the contractor, and their minimum fees should be set:

The law requires inspectors to report any violation by the contractor he supervises to the municipality or governorate. The law also defines corrective actions and penalties if such violation occurs. However, the inspectors are usually hired by a contractor, not by the property owner. It is very difficult for inspectors to report because contractors are their employers in most cases. In addition, there are no minimum fees for supervising engineers.

Qualification requirement of the contractors should be made:

Currently, no particular requirements exist for people to pursue careers as contractors. The only guidelines are those in the Trade Law.

A building inspection process should be privatised to service companies:

Building plans are submitted to the municipal authorities with the signature of a design engineer who is responsible for code compliance. However, municipality engineers cannot adequately check all of the design calculations because of their heavy load. In addition, municipalities have no mechanisms other than citizen informants to become aware of illegal construction violating some legal article.

Seismic regulations should include other design aspects and building layouts:

Current regulation only includes structural aspects. The regulation should be broad, including other aspects such as fire and roofing materials.

Legal procedures should be simplified to ensure effective corrective action by authorities:

The legal procedures leading to the eventual tearing down of unpermitted construction take at least one year. Even if the court orders the tearing down, municipalities do not have necessary equipment or personnel to do it. In any case, it would be expensive to demolish buildings, and violators are frequently able to wait until some form of amnesty is declared. Compensatory awards against contractors take a long time to collect and, because of inflation, are meaningless when finally collected. Contractor errors or negligence can be addressed only through obsolete articles of the Law of Indebtedness. These do not constitute sufficient disincentives against fraud.

(3) Laws Related to Illegal Housing Construction

Disaster funds or catastrophe insurance pool funds should be allocated for improvement or relocation of illegal housing in advance of a disaster.

Currently, the fund for the “improvement area” designated by the law is lacking. In Istanbul, only 10% of illegal housing ownership has been transferred until 1980. In addition, alternative housing for the residents of “prohibited areas” is lacking.

Small-scale development would be necessary to regulate new development.

The Gecekondou Law of 1985 does not require construction permission for housing developments smaller than 1000 m2 and less than three stories. This would encourage new illegal developments.

(4) Disaster Law

Pre-disaster efforts should be stressed in the law:

The law primarily focuses on post-disaster intervention. Only a few mention preparations and responsibilities before disasters. The decrease of casualties due to natural disasters in Japan after a major shift of policies toward pre-disaster efforts indicates that pre-disaster efforts did pay off in the long-term. Efforts to mitigate possible damage should be included in the law as a national strategy.

The law should be standardised to learn from disasters:

The law stresses extra-ordinary power of authority for emergency response. This allows production of special decisions with every occurrence of disasters by political authority, and tends to forget the past experience, which should be the lessons for the future. Standardised emergency management is necessary to discourage special decisions and to encourage learning from past disasters.

The law should differentiate between those who do not comply with development regulations and those who do:

Providing equal help for everyone after every disaster should not be the standard response to promote efficient and just allocation of resources, to promote respect for the entire technical process, and to encourage responsible development in the long-term.

Specialised funds should be created for reconstruction:

It is necessary to avoid the extended and translocated use of pecialised funds by political bodies to gain popularity. The use of a fund should be decided by a lower echelon technical committee to be more efficient and precise in the allocation of financial resources.

(5) Emergency Aid Organisation and Planning Regulations

These regulations mostly describe the planning and duties for efficient activities after the disaster. Actions to reduce the damages or reconstruction in the long-term should be mentioned. The need for education and disaster drills should also be included.

Regulations should deal with different types of disasters separately:

These regulations deal with disasters in general. However, disaster situations and necessary responses will be different between earthquakes and other types of disasters. Thus, measures for different types of disasters should be described in different chapters.

Recent topics in disaster response should be included in the regulations:

Topics such as industrial, environmental, or psychological aspects not mentioned at the time of the issuing of the regulations should be included.

Special legislation for urban earthquake disasters should be made:

Regulations implicitly assume the disaster situation will occur in general in a province. However, the population in some districts in Istanbul nearly equal the population of an entire province, and the possible impact of a major earthquake in Istanbul will most likelu be much larger compared to the case in another province. Therefore, special legislation for an anticipated earthquake, such as the "Earthquake Disaster Prevention Act" by the Tokyo metropolitan government, should be made.

(6) Laws Related to Fire

A specific fire law should be integrated into the legal system.

A special fire law, one that specifies a central regulation of all existing redundant rules and regulations issued by municipalities, should be made. The law should include scientific studies such as calculations of fire prevention, fire resistance, and fire strength. Additionally, the legislation should include volunteering.

(7) Earthquake Insurance

Retrofitting efforts should be reflected in insurance premiums:

Currently, only structural type is considered in the calculation of insurance premiums. In order to promote seismic retrofitting, retrofitted buildings should be given lower premiums.

More provinces should join the insurance:

To gain more popularity, not only should the pilot province, but also more provinces join the insurance in the future.

3.6.2. Recommendations Related to Organisation

(1) The disaster management should be distributed in a bottom-up system.

In case of a disaster, the initial gathering of officials at the management centre would be slow due to their own safety or traffic problems, as observed in past experiences. Communication and traffic between central and local offices during disaster would be very limited. Under such a situation, local offices should manage to work independently for the

first few days, with little external help. Thus, local offices should be empowered with resources, information, and authority.

In addition, the hierarchical, top-down nature of the system tends to discourage local initiative, and it undermines the role of local authorities that must face the affected people.

(2) Linkage between central and local government should be made clear.

Adequate coordination between provincial governors, provincial directorates of ministries, and respective ministries in the central government should be made. The role of regional disaster management centres, which will be established to cover several provinces in case of large disaster, should be well defined.

(3) Command system should be well defined.

The command system between the Prime Ministry Crisis Management Centre and GDDA in MPWS in the central government, as well as between AYM and the provincial directorate of MPWH in the local government should be well defined. Command system to public service companies between AYM and AKOM should be made simple, since a few companies belong to both, while the rest are under AKOM.

(4) Weak links between organisations should be strengthened.

Linkages between AYM and AKOM, as well as between district heads and mayors, are not necessarily strong. In general, provincial officials charged with disaster management are not themselves from the province where they work, and may be unfamiliar with the local situation. The rapid turnover of government officials may make plans obsolete. These officials have to deal with other more pressing priorities than reviving the province plan. However, such linkages are very important because disaster response should essentially be done locally, especially during the initial period when sufficient external help cannot be expected. In addition, linkages between IMM and each district municipality, which are currently made via AYM, are important for disaster management in public services.

(5) Citizens and volunteers should be fully involved in the management system.

Citizens, if trained and organized properly, could be major players in disaster response, because they are the ones who are the closest to the disaster area, and they best know the local situations. However, they are a hidden resource in the current disaster management system. The total number of official rescue members may not be sufficient in case of a large-scale earthquake, because some of them may be also victims, and because they will have difficulties reaching the disaster area due to communication and traffic problems.

3.6.3. Recommendations Related to Disaster Management Plan

(1) Each member organisation should make its own plans and be checked on its conformity to these plans.

Each organisation responsible for emergency service should make its own plans. Moreover, the chief organisation of the corresponding service group and/or AYM should check the conformity to the plan within service groups and emergency services as a whole, as Turktelekom does with its communication service groups. Making a responsibility matrix showing the relationship between each task and responsible organisation should help this process. This is necessary to clarify the responsibility of each member and to improve the coordination among member organisations.

(2) Communication within service groups should be made.

Communication among service groups, between head organisations of service groups and the head organisations of sub-groups, and between sub-group organisations and member organisations, should be made. If regular meetings areheld among members for daily matters, as done in the transportation service groups, disaster management should also be included in the topics of discussion. An additional advantage for implementing these communication channels is that having a personal contact before the disaster will help groups to work more efficiently in case of a disaster.

(3) Inter-organisational cooperation should be considered.

Inter-organisational cooperation should be considered to avoid sectionalism created by the division of members into service groups. Examples of tasks that need cooperation from several service groups are listed below.

Communication service group will have to collect and distribute damage status information on roads, ports, public facilities, stockyards, etc. for rescue and recovery work.

Transportation service group will have inter-organisation tasks such as the provision of information on detour routes, debris transportation, hospitalisation of victims, donation goods transport, traffic control, and repairs of roads.

In most cases, debris removal from roads will be necessary before starting debris removal from buildings.

First aid groups will need assurance of lifeline services, and the distribution of donated medicines for purchasing service groups.

Damage assessment and temporary housing group will need to obtain damage information from the debris removal group and purchasing group. Cooperation with lifeline services will be necessary to set up temporary housing.

Security groups will need to work with transportation groups for traffic control, with rescue groups to control security in the rescue area, and with purchasing groups to secure goods against looting.

Agriculture groups could help purchasing groups by providing their list of food stocks.

Purchasing groups will need information of victims from rescue or damage assessment groups to estimate the amount of goods to be distributed.

Public services such as telephone, electricity, water, gas are mostly underground. The telephone companies belong to the communication service group, while other services belong to the lifeline service group. This would make cooperative repair work difficult. Even in normal times, the repair work coordination among public services does not work well.

(4) Methods of provision of information to the public should be studied.

There are many possible means to provide information -- from cellular phone messages, to telephone, fax, radio, TV, newspapers and the internet. Provided information will be warnings of aftershocks or secondary disasters, status of damage and response operations, coordination of external help, and the extinction of rumours. Information provision to service members as well as to the public should play an important role in disaster management. For this purpose, use of existing means for public relations should be considered. The FM radio station in AYM should be more well known. Internet web sites should have links to other governmental sites, to pages that inform on the damage situation, to pages in English for an international audience. Websites should be maintained within the disaster management centre.

(5) Training of trainees and simplified courses should be considered.

Much effort has been made by various organisations to offers rescue and first aid training for officials and the public. However, common problems observed in such efforts are the limitation in number of trainers. With more trainers, such training could be more widely exercised. Therefore, training of trainees should be considered first. Moreover, current training takes more than 20 hours, which is sufficient but may be too long for ordinary people, so that a more simplified course may be necessary to gain additional trainees.

(6) Use of helicopter should be well planned.

One of the major efforts in the AYM and AKOM is to build new heliports to prepare against the possible interruption of road traffic. The total number of helicopters in many organisations, and their purpose, their capacities, their logistics support should be planned, and this information should be relayed to each owner. In addition, air traffic control and cooperation with rescue teams to maintain for the silence that is sometimes needed in the search for survivors, (which was a major problem during rescue operations in Kobe) should also be considered.

(7) Resource inventories should be organised and checked.

To construct a useful resource inventory for disaster management using GIS, various attributes of said resources, such as types or capacity, in addition to their location should be noted. Also, collected data from various organisations should be cross-checked on a uniform basis, their locations to start with.

(8) Joint disaster drills including citizens should be exercised.

Full-scaled disaster drills should be executed in a realistic manner. For this purpose, drills should include AYM and AKOM members, volunteers, and citizens. Drills should be made simultaneously in various places. Inter-operation between different service groups should be tested. Use of key equipment such as helicopters or radio should be tested. Disaster drills should not necessarily be successful. Instead, finding many problems during the drill should be the objects for the improvement of current system.

(9) Building damage inspections should be completed in a shorter time.

The object of building damage inspections by MPWS is to evaluate the damage extent for the owner's compensation. Since the number of official engineers for the inspection is limited, it took four months to complete inspections after the Izmit Earthquake. To conduct inspections more rapidly, professional engineers from chambers of engineering should be involved. Also, results of inspections done by professionals on a voluntary basis to meet the urgent demand of residents could be used as a reference, and the official results should be provided to the municipality as information for reconstruction.

(10) Evaluation of ground study results and its use is unjust.

After the Izmit Earthquake, ground studies before construction become obligatory when deemed necessary. However, much ambiguity remains in the interpretation of the study results. Communication between civil engineers, geophysicists, and geologists working on ground studies should be enhanced to make a balanced engineering decision.

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