Istanbul Seismic Risk Mitigation and Emergency Preparedness Project

Kazım Gökhan ELGİN
Director of ISMEP
TURKEY is prone to mainly three types of natural disasters:

- **Earthquakes:**
  - 70% of the population living in seismically active areas.
  - 66% of the country is located on active fault zones.
  - 75% of damaged buildings and %64 of total disaster losses in the last century are due to earthquakes.

- **Floods:**
  - Mostly in coastal plains and exacerbated by deforestation, erosion and ignorant development.
  - 15% of total disaster losses are due to floods.

- **Landslides:**
  - 25% of country area is exposed to landslide hazard.
  - 11% of total population is located in landslide areas.
  - 16% of total disaster losses are due to landslides.
Disaster management is a problem of sustainable development, not just that search and rescue ...

**GROWTH IN GDP**

- * DISASTER
- **GREEN** UNDER-DEVELOPED COUNTRIES
- **PURPLE** DEVELOPED COUNTRIES

**TIME**

**Effect of disasters**
### Summary Data on Disasters Caused by Natural Hazards (1980 - 2014)

<table>
<thead>
<tr>
<th>TYPE of DISASTER</th>
<th>Frequency</th>
<th>Loss of Lives</th>
<th>Injuries</th>
<th>Affected</th>
<th>Homeless</th>
<th>Total Affected</th>
<th>Total Loss('000$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EARTHQUAKE (Seismic Activity)</strong></td>
<td>38</td>
<td>21.193</td>
<td>63.684</td>
<td>4.880.751</td>
<td>1.027.490</td>
<td>5.971.925</td>
<td>24.534.800</td>
</tr>
<tr>
<td><strong>FLOOD</strong></td>
<td>32</td>
<td>593</td>
<td>214</td>
<td>1.678.270</td>
<td>97.036</td>
<td>1.775.520</td>
<td>2.195.500</td>
</tr>
<tr>
<td><strong>LANDSLIDE</strong></td>
<td>11</td>
<td>633</td>
<td>260</td>
<td>11.911</td>
<td>2.385</td>
<td>14.551</td>
<td>26.000</td>
</tr>
<tr>
<td>Storm</td>
<td>7</td>
<td>70</td>
<td>139</td>
<td>1.500</td>
<td>--</td>
<td>1.639</td>
<td>--</td>
</tr>
<tr>
<td>Fire</td>
<td>5</td>
<td>15</td>
<td>--</td>
<td>500</td>
<td>650</td>
<td>1.150</td>
<td>--</td>
</tr>
<tr>
<td><strong>Low/High temperature</strong></td>
<td>7</td>
<td>100</td>
<td>450</td>
<td>8.000</td>
<td>--</td>
<td>8.450</td>
<td>1.000</td>
</tr>
<tr>
<td>Epidemic</td>
<td>3</td>
<td>35</td>
<td>--</td>
<td>380</td>
<td>--</td>
<td>380</td>
<td>--</td>
</tr>
<tr>
<td><strong>Industrial Accident</strong></td>
<td>22</td>
<td>860</td>
<td>454</td>
<td>175</td>
<td>--</td>
<td>629</td>
<td>--</td>
</tr>
<tr>
<td><strong>Transportational Accident</strong></td>
<td>91</td>
<td>2.244</td>
<td>1.348</td>
<td>56</td>
<td>--</td>
<td>1.404</td>
<td>--</td>
</tr>
<tr>
<td>Unspecified</td>
<td>11</td>
<td>235</td>
<td>527</td>
<td>--</td>
<td>--</td>
<td>527</td>
<td>--</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Loss of Lives</th>
<th>Injuries</th>
<th>Affected</th>
<th>Homeless</th>
<th>TOTAL AFFECTED</th>
<th>TOTAL LOSS('000$)</th>
</tr>
</thead>
</table>
1999 Marmara Earthquake, 7.4 Richter

18000 lives lost

113,000 housing units and business premises were completely destroyed, 264,000 damaged to varying degrees

Up to 675,000 people were forced to leave their homes

10-15 billion US$ direct cost
Lessons learned from Marmara Earthquake

**Communication**
- Communication failed
- Telephone lines were out of order in first 48 hours
- Mobiles did not function

**First Aid & Rescue**
- Lack of organization and coordination in search & rescue activities
- Caotic situation
- Bureaucracy inhibiting efficiency and effectiveness
- Insufficient logistical support
- Voluntary efforts were not trained and organised

**Losses / Problems**
- Public buildings and infrastructure seriously damaged
- Sub-standard buildings and infrastructure
- Hazard ignorant development
- Lack of code enforcement
- Improper inspection during construction
- Corrupted permitting and licensing

**Serious Resource Gap**
- 10-15 billion $ as direct cost
- %5-7 of Turkey’s GNP
In the past

- Fate
- Reactive
- Recovery
- Wait and see
- Ex-post
- Crisis management
- Ad-hoc efforts
- Development at risk

New Strategic Approach

- Choice
- Proactive
- Mitigation
- Anticipate and prevent
- Ex-ante
- Risk management
- Comprehensive approach
- Sustainable development

Prepared by M.S. Bursa and K.G. Elgin
13-14 million people, 20% of Turkey’s population, live in İstanbul.

More than 40% of Turkish GNP is generated in the region.
- Comparable seismic risk degree with San Francisco, Los Angeles and Tokyo cities
  - Probability of occurrence of a large earthquake in next 30 years is greater than %62
  - Probability of occurrence of a large earthquake in next 10 years is greater than %20

- Impacts after a probable 7.5 Richter scale earthquake in Istanbul;
  - Approximately 70,000 dead people, 120,000 heavily injured people, 400,000 lightly injured people
  - Direct economic loss ~50 billion US $
**Country / Region**: Turkey / Istanbul

**Project Duration**: 2006 +

**Implementation**: Istanbul Governorship
Istanbul Project Coordination Unit (IPCU)

**Finance**: World Bank
European Investment Bank
Council of Europe Development Bank
Islamic Development Bank

**Loan Amount**: EURO 1.5 Billion (WB-EIB-CEB-IDB)
ISMEP Project Phases

Phase I
2000-2005
- ISMEP Project Preperations
- Ownership
- Prioritization
- Budget allocation
- Comprehensive approach
- Risk reduction strategy

Phase II
2006
- Project Organization
  - Local Administration
  - Establishment of IPCU
  - Development of project team
  - Steering Comittee

Phase III
2006 +
- Implementation
  - Socially acceptable and human oriented
  - Technical feasibility and harmony with international standarts
  - Appropriate financial and economic solutions
  - Working with multistakeholders

Phase IV
- EXPERIENCE AND KNOWLEDGE SHARING
  - Establishment of a centre of excellence in İSTANBUL
Phase III Implementation

**A. Strengthening Emergency Management Capacity**
- Emergency Communication Systems
- Emergency Management Information System
- Strengthening the Institutional Capacity of DED
- Upgrading the Emergency Response Capacity
- Public Awareness and Training

**B. Seismic Risk Mitigation for Priority Public Buildings**
- Retrofitting
- Reconstruction
- National Disaster Studies

**C. Enforcement of Building Codes**
- Public Awareness
- Development of Regulatory Framework
- Voluntary Accreditation and Training of Engineers
- Streamlining of Building Permits Issuance Procedures

**ISMEP Components**
Communication Infrastructure

- To enhance uninterrupted communication system;
  - Analog FM Radio Infrastructure strengthened and extended to cover provincial city limits.

- Peripheral hardware investments done to have effective communication between agencies;
  - Istanbul Disaster and Emergency Directorate
  - Provincial Health Directorate
  - Istanbul Search and Rescue Unit
  - Provincial Police Department

Investments:

- Mobile Relays
- Regional Relays
- Analog Radio
- Radio exchange and management platform
- Other peripheral investments
Strengthening the Institutional Capacity of AFAD

Component A
Enhancing Emergency Preparedness

HASDAL Command and Control Center
(European Side)
Component A
Enhancing Emergency Preparedness

Strengthening the Institutional Capacity of DED

Hasdal Command and Control Center
European Side

Akfirat Command and Control Center
Anatolian Side
## Component A

### Enhancing Emergency Preparedness

#### Equipments:
- Emergency service vehicles
- Emergency operation vehicles
- Communication vehicles
- Ambulances
- Rescue equipments
- Medical Equipments
- Containers
- Cold depots
- Mobile lighting towers
- Others

#### Agencies/Institutions:
- Istanbul Disaster and Emergency Directorate
- Provincial Health Directorate - UMKE
- Search and Rescue Unit
- Provincial Police Department
- Red Crescent
Feasibility study of 1969 building has been completed in 1218 campuses. 383 buildings in 236 campuses are being studied.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Campus</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools</td>
<td>1189</td>
<td>1710</td>
</tr>
<tr>
<td>Hospitals</td>
<td>33</td>
<td>324</td>
</tr>
<tr>
<td>Outpatient clinics-health centers</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Administrative buildings</td>
<td>95</td>
<td>131</td>
</tr>
<tr>
<td>Dormitories</td>
<td>17</td>
<td>49</td>
</tr>
<tr>
<td>Social service buildings</td>
<td>14</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1454</strong></td>
<td><strong>2352</strong></td>
</tr>
</tbody>
</table>
EDUCATION SECTOR

- Retrofitting and Reconstruction Works:
  - 944 schools
  - 3 million m² construction area,
  - 1.5 million students, teachers
Bayrampaşa Yahya Kemal Primary School
Component B
Seismic Risk Mitigation for Priority Public Buildings
Component B

Seismic Risk Mitigation for Priority Public Buildings

Education Areas
Seismic Risk Mitigation for Priority Public Buildings

Education Areas
Component B
Seismic Risk Mitigation for Priority Public Buildings

Education Areas
Component B

Seismic Risk Mitigation for Priority Public Buildings

Old View

Gaziosmanpaşa Alparslan Primary School

New View
Component B
Seismic Risk Mitigation for Priority Public Buildings

Old View

Sancaktepe Turgut Aydınlı Primary School

New View

2015.6.1
HEALTH SECTOR

Seismic Retrofitting / Reconstruction Works

- 17 hospitals
- 61 polyclinics
ISMEP Health Investment Program

- **Umraniye** Pediatrics and Maternity Hospital
- **Kartal** Training and Research Hospital
- **Okmeydani** Training and Research Hospital
- **Goztepe** Training and Research Hospital
- **Marmara University** Training and Research Hospital

4,466 beds

1,000,000 m²
**ISMEP Health Investment Program**

**İSMEP HEALTH INVESTMENTS**

**Ümraniye PH**
- Construction Area: 100,000 m²
- Bed capacity: 465
- Budget: 41,000,000 EUR

**Okmeydanı TRH**
- Construction Area: 250,000 m²
- Bed capacity: 1099
- Budget: 135,000,000 EUR

**Göztepe TRH**
- Construction Area: 290,000 m²
- Bed capacity: 1003
- Budget: 159,000,000 EUR

**Marmara University TRH**
- Construction Area: 250,000 m²
- Bed capacity: 1149
- Budget: 145,000,000 EUR

**İSMEP**

**Construction Area:** 1,000,000 m²
**Bed capacity:** 4,466
**Total Budget:** 510 Million EUR
Ümraniye Pediatric and Maternity Hospital
Ümraniye Pediatric and Maternity Hospital
Ümraniye Pediatric and Maternity Hospital
Okmeydanı Training and Research Hospital
Contractor Company
✓ Taşıyapı İnşaat Taahhüt San. Ve Tic. A.Ş.

Contract Date
✓ 31.10.2013

Notice to Commence
✓ 14.11.2013

Contract Value
✓ 391.530.574,49 TL

Targeted Project Finishing Dates
• 1st Phase: 14.11.2013 (34 Months)
  • Transfer period: 6 Months

• 2nd Phase: 26.02.2017 (14 Months)
  • Transfer Period: 3 Months
<table>
<thead>
<tr>
<th></th>
<th>Existing Hospital</th>
<th>New Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Bed number</td>
<td>753</td>
<td>979</td>
</tr>
<tr>
<td>Total Intensive Care Unit Bed Number</td>
<td>54</td>
<td>120</td>
</tr>
<tr>
<td>Total Qualified Bed Number</td>
<td>0</td>
<td>1099</td>
</tr>
<tr>
<td>Polyclinic Number</td>
<td>160</td>
<td>210</td>
</tr>
<tr>
<td>Operating Room Number</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Total Emergency Area</td>
<td>1.300 m²</td>
<td>10.000 m²</td>
</tr>
<tr>
<td>Total Indoor Medical Area</td>
<td>55.000 m²</td>
<td>205.000 m²</td>
</tr>
<tr>
<td>Total Parking Area</td>
<td>0</td>
<td>45.000 m²</td>
</tr>
<tr>
<td><strong>Total Area</strong></td>
<td><strong>55.000 m²</strong></td>
<td><strong>250.000 m²</strong></td>
</tr>
</tbody>
</table>
Annual Data (Patient Number)
Polyclinic 1,236,853
Inpatient 43,226
Surgery 37,000
Emergency 700,000
General View
Okmeydanı Training and Research Hospital
Okmeydanı Training and Research Hospital
Double-bed Room

Single-bed Room
Okmeydanı Training and Research Hospital
Okmeydanı Training and Research Hospital
Contractor
✓ Kalyon İnşaat Sanayi ve Ticaret A.Ş.

Contract Date
✓ 24.07.2014

Targeted Project Finishing Date
✓ 36 months

Notice to Commence
✓ 07.08.2014

Contract Value
✓ 464.460.085,48 TL
<table>
<thead>
<tr>
<th></th>
<th>Existing Hospital</th>
<th>New Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Bed number</td>
<td>643</td>
<td>883</td>
</tr>
<tr>
<td>Total Intensive Care Unit Bed Number</td>
<td>50</td>
<td>120</td>
</tr>
<tr>
<td>Total Qualified Bed Number</td>
<td>0</td>
<td>1003</td>
</tr>
<tr>
<td>Polyclinic Number</td>
<td>155</td>
<td>200</td>
</tr>
<tr>
<td>Operating Room Number</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td>Total Emergency Area</td>
<td>5.100 m2</td>
<td>14.000 m2</td>
</tr>
<tr>
<td>Total Indoor Medical Area</td>
<td>45.000 m2</td>
<td>235.000 m2</td>
</tr>
<tr>
<td>Total Parking Area</td>
<td>0</td>
<td>55.000 m2</td>
</tr>
<tr>
<td><strong>Total Area</strong></td>
<td><strong>45.000 m2</strong></td>
<td><strong>290.000 m2</strong></td>
</tr>
</tbody>
</table>
Kartal Training and Research Hospital
Kartal Training and Research Hospital
Göztepe Training and Research Hospital
Contract Date: 05.05.2014

Targeted Project Finishing Date:
- 1st Phase: 28.02.2017 (34 Months)
- Transfer Period: 6 Months
- 2nd Phase: 21.10.2018 (14 Months)

Notice to Commence: 15.05.2014

Contractor: Taşyapı İnşaat Taahhüt San. Ve Tic. A.Ş.

Contract Value: 417.059.125,46 TL
<table>
<thead>
<tr>
<th></th>
<th>Existing Hospital</th>
<th>New Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Bed number</td>
<td>640</td>
<td>1022</td>
</tr>
<tr>
<td>Total Intensive Care Unit Bed Number</td>
<td>50</td>
<td>127</td>
</tr>
<tr>
<td>Total Qualified Bed Number</td>
<td>0</td>
<td>1149</td>
</tr>
<tr>
<td>Polyclinic Number</td>
<td>163</td>
<td>240</td>
</tr>
<tr>
<td>Operating Room Number</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Total Emergency Area</td>
<td>500 m²</td>
<td>10.000 m²</td>
</tr>
<tr>
<td>Total Indoor Medical Area</td>
<td>85.000 m²</td>
<td>205.000 m²</td>
</tr>
<tr>
<td>Total Parking Area</td>
<td>0</td>
<td>45.000 m²</td>
</tr>
<tr>
<td><strong>Total Area</strong></td>
<td><strong>85.000 m²</strong></td>
<td><strong>250.000 m²</strong></td>
</tr>
</tbody>
</table>
Göztepe Training and Research Hospital
Göztepe Training and Research Hospital
Göztepe Training and Research Hospital
Göztepe Training and Research Hospital
Göztepe Training and Research Hospital
Project Name: Marmara University Training and Research Hospital Retrofitting Project

Start and End Dates: 2012-2014

Total Area: 113,000 m²

Contract Value: 67,800,000-TL
Retrofitting Method: Base Isolation
Ataturk Dormitory Campus Social Buildings
Ataturk Dormitory Campus Social Buildings
Social Guidance and Awareness Study for Retrofitting Schools

- Teachers
- Students
- Parents
- Reached app. 250,000 people..
Public Awareness and Training

Training Programs for Disaster Preparedness

• Individual/Family Disaster Preparedness Training Program
• Disaster Preparedness Training Program for Neighborhood Disaster Volunteers
• Disaster Preparedness Training Program
• School Disaster Preparedness Training Program
• Hospital Disaster Preparedness Training Program
• Business Community Disaster Preparedness
• Survival under Extraordinary Conditions Training Program Psychological First-Aid Program Structural Awareness Training Program
• Non-Structural Risk Awareness Training Program
• Retrofitting of Public Buildings
• Awareness of Compulsory Earthquake Insurance.
• Urban Planning and Construction for Disaster Mitigation
  – Local decision makers
  – Technical staff
  – Community representatives
Public Awareness and Training

What is ISMEP
Learn more about the world's biggest seismic risk mitigation project

Safe Life Volunteer
What is safe life, who is a safe life volunteer? Content of safe life volunteer trainings

Publications
Download the training modules on disaster preparedness

We are retrofitting our schools

Istanbul is one of the biggest cities in the world and our country which is located on a seismic belt. Our city's being located on such an earthquake-prone region increases the risk possibility related to earthquake and possible major accidents.

Within the scope of ISMEP Project "Informing, Awareness Raising, Social Guidance Study" is started in schools which are retrofitted against an earthquake. School management, teachers, students and parents are informed with this study and seminars, which are conducted together with the cooperation of Governorship of Istanbul and Province National Education Directorates.

Web Site: www.guvenliyasam.org
### Public Awareness and Training

**2009 - 2014**
- **245,000 Safe Life Volunteer**

**2015 Target**
- **300,000 Safe Life Volunteer**

<table>
<thead>
<tr>
<th>Before and During a Disaster &amp; Emergency</th>
<th>Community Preparedness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Preparedness</strong></td>
<td><strong>SAFE LIFE 1</strong></td>
</tr>
<tr>
<td><strong>Community Preparedness</strong></td>
<td><strong>LOCAL DISASTER VOLUNTEER</strong></td>
</tr>
<tr>
<td><strong>After a Disaster &amp; Emergency</strong></td>
<td><strong>SAFE LIFE 2</strong></td>
</tr>
</tbody>
</table>
Component B
Seismic Risk Mitigation for Priority Public Buildings

**Project**: Inventorization and Multi-Hazard and Earthquake Performance of the Cultural Heritage Buildings in İstanbul

**Client**: Republic of Turkey, Ministry of Culture and Tourism, Governorship of Istanbul, Special Provincial Administration, İstanbul Project Coordination Unit

Archeology Museum
Main Objectives:

- Mitigating the seismic risks associated with the cultural and historical property (heritage) in İstanbul

- Strengthen the capacity for proactive measures in order to mitigate the damaging and devastating effects of future earthquakes on cultural and historical heritage buildings and other historical and cultural structures and assets in Turkey, such as museums and museum displays
Project Stages

- Literature Survey
- Field Surveys
- Vulnerability Assessment
- GIS Database
- Final Risk Assessment and The Mitigation Measures

Hagia Irene Monument existing material decays, weak zones technical drawings
Training of Civil Engineers on Retrofitting Code (dated 06.03.2007 (no:26454) Official Gazette) is being implemented under the protocol signed with the Ministry of Public Works and Resettlement.

**In this scope:**

- Training materials were prepared.
- Training of trainers was completed.
- Training of civil engineers in selected provinces throughout Turkey has been started. By the end of April 2012, 3631 engineers were trained.
Projects in the pilot municipalities:

- Streamlining and monitoring of building and occupation permit issuance procedures in the pilot municipalities (Bağcılar and Pendik)

- Undertaking practical and restructuring measures by re-engineering activities (Capacity building activities, software/hardware provision and integrated data management services and call center for better building code enforcement)
**Component C**

**Building Code Enforcement**

**MAIN STAGES of IMPLEMENTATION PERIOD**

**IT STRUCTURE**

**Stage 1**
(2007-2008)

- Strengthening IT Infrastructure and Information Security
  - Software
  - System Room
  - Hardware
  - Network and Disaster Recovery
  - Information Security

**DATA MANAGEMENT**

**Stage 2**
(2008-2010)

- Spatial data revision-collection-digitalization and integration and digital archive system
  - Field works
  - MIS-GIS integration
  - Digital Archive System

**IMPROVEMENT**

**Stage 3**
(2010-2012)

- Improving work flows of development and permit procedures and transferring them into electronic document system and Call Center
  - E-document management system
  - Work flows improvement
  - Call Center
  - Web implementation and e-form
- Work flows (all related applications) are now in digital environment and integrated with web site, service desk and call center (e-municipality services)

- Electronic document system are operating in both municipalities

- Citizen satisfaction (according to records of the municipalities) increased and the approval time for building permit decreased.

- Digital archive system is fully used in both municipalities. (documents can be loaded from the computer and produced documents can be uploaded automatically to archive)

- Building permits are given in digital form in both municipalities via web site as well.
INTERNATIONAL REPRESENTATIONS

29 Countries - 50 Events
THANK YOU VERY MUCH...