Preparing Istanbul for Future Disasters: İstanbul Seismic Risk Mitigation and Preparedness Project (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.
Earthquakes occurred in Turkey causing substantial loss of life and property since 1990

<table>
<thead>
<tr>
<th>Earthquake</th>
<th>Date</th>
<th>Loss of Life</th>
<th>Injured</th>
<th>Homeless</th>
<th>Affected Population</th>
<th>Financial Loss (US$ one million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erzincan</td>
<td>13.03.1992</td>
<td>653</td>
<td>3,850</td>
<td>95,000</td>
<td>250,000</td>
<td>750</td>
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<tr>
<td>Dinar</td>
<td>01.10.1995</td>
<td>94</td>
<td>240</td>
<td>40,000</td>
<td>120,000</td>
<td>100</td>
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<tr>
<td>Çorum-Amasya</td>
<td>14.08.1996</td>
<td>0</td>
<td>6</td>
<td>9,000</td>
<td>17,000</td>
<td>30</td>
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<td>Ceyhan-Adana</td>
<td>27.06.1998</td>
<td>145</td>
<td>1,600</td>
<td>88,000</td>
<td>1,500,000</td>
<td>500</td>
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<tr>
<td>İzmit Körfezi</td>
<td>17.08.1999</td>
<td>17,480</td>
<td>43,953</td>
<td>675,000</td>
<td>15,000,000</td>
<td>13,000</td>
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<tr>
<td>Düzce</td>
<td>12.11.1999</td>
<td>763</td>
<td>4,948</td>
<td>35,000</td>
<td>600,000</td>
<td>750</td>
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<tr>
<td>Afyon-Sultandağı</td>
<td>03.02.2002</td>
<td>42</td>
<td>327</td>
<td>30,000</td>
<td>222,000</td>
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<td>Bingöl</td>
<td>01.05.2003</td>
<td>177</td>
<td>520</td>
<td>520</td>
<td>245,000</td>
<td>135</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>19,354</strong></td>
<td><strong>55,444</strong></td>
<td><strong>972,520</strong></td>
<td><strong>17,954,000</strong></td>
<td><strong>15,361</strong></td>
</tr>
</tbody>
</table>
1999 Marmara Earthquake, 7.4 Richter

- 17480 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.
- 10-13 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
  - Chaotic 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
Paradigm Shift in TURKEY;

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.
İstanbul

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 %50.
- 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 injured-heavily injured people, 400,000 lightly injured people
- Direct economic loss ~30 billion US$
**İstanbul Seismic Risk Mitigation and Emergency Preparedness Project: ISMEP**

- **Country / Region**: Turkey / Istanbul
- **Project Duration**: 2006-2015
- **Implementation**: Istanbul Special Provincial Administration
  Istanbul Project Coordination Unit (IPCU)
- **Finance**: World Bank,
  European Investment Bank
  Council of Europe Development Bank
- **Loan Amount**: (Joint WB-EIB-CEB) EURO 860 Million
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
Component A
Enhancing Emergency Preparedness

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;

- İstanbul Disaster and Emergency Directorate
- Provincial Health Directorate
- İstanbul Search and Rescue Unit
- Provincial Police Department

Investments:
- Mobile Relays
- Regional Relays
- Analog Radio
- Radio exchange ve management platform
- Other peripheral investments

Communication Infrastructure
Component A
Enhancing Emergency Preparedness

Communication Infrastructure Before ISMEP

After ISMEP
Component A
Enhancing Emergency Preparedness
Establishment Of Emergency Management Information System

Procurement of Computers, Network Devices and Active Devices for Istanbul Disaster and Emergency Directorate was completed.

Software Development for İstanbul Disaster Management Information System has been started to ensure;
- efficient resource management
- staff assignment for crisis management
- organize search and rescue activities
- etc.
Component A
Enhancing Emergency Preparedness

Strengthening the Institutional Capacity of DMC
Component A
Enhancing Emergency Preparedness

Istanbul Disaster Management Center
Command Control Centers

European Side – The construction has been started in April 2010.
- 7500 m² construction area
- accessibility by highway and air transport
Component A
Hasdal Provincial DMC Building
Component A
AKFIRAT DMC and RED CRESCENT REGIONAL LOGISTIC CENTER

- **MAFOM BUILDING**
  - 50,000 m² depot
  - 8 entrance-exit
  - 20 long truck
  - accessibility by highway and air transport
Component A
DISASTER MANAGEMENT CENTERS
## Component A
Upgrading the Emergency Response Capacity

<table>
<thead>
<tr>
<th>Equipments:</th>
<th>Agencies/Institutions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency service vehicles</td>
<td>İstanbul Disaster and Emergency Directorate</td>
</tr>
<tr>
<td>Emergency operation vehicles</td>
<td>Provincial Health Directorate - UMKE</td>
</tr>
<tr>
<td>Communication vehicles</td>
<td>Search and Rescue Unit</td>
</tr>
<tr>
<td>Ambulances</td>
<td>Provincial Police Department</td>
</tr>
<tr>
<td>Rescue equipments</td>
<td>Red Crescent</td>
</tr>
<tr>
<td>Medical Equipments</td>
<td></td>
</tr>
<tr>
<td>Containers</td>
<td></td>
</tr>
<tr>
<td>Cold depots</td>
<td></td>
</tr>
<tr>
<td>Mobile lighting towers</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>
Emergency Communication Vehicles
Lighting Towers
Emergency Operation Vehicles
This component covers retrofitting/reconstruction works for priority public buildings such as hospitals, dormitories, schools and also historical and cultural buildings.
Vali Yardımcısı Aydınoğlu, Çeltikçay YİBO'dan şu ana kadar 117 öğrencinin depremden sağ olarak Kurtarıldığını, 46 öğrenci ve 1 öğretmenin öldüğünü belirterek, şu anda ise enkaz altında 35 ila 40 arasında öğrencinin bulunduğu bildirdi.
全面贯彻教育方针
全面提高教育质量

China
China
Retrofitting/Reconstruction Works

To minimize probable life and economic losses due to earthquakes, it is very significant not only to construct our new buildings in accordance with building codes and regulations, but also to retrofit or reconstruct vulnerable existing buildings.
## SEISMIC RISK MITIGATION FOR PRIORITY PUBLIC BUILDINGS

<table>
<thead>
<tr>
<th>BUILDING TYPE</th>
<th>COMPLETED</th>
<th></th>
<th></th>
<th>TENDER STAGE</th>
<th></th>
<th></th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus</td>
<td>Building</td>
<td>Campus</td>
<td>Building</td>
<td>Campus</td>
<td>Building</td>
<td>Campus</td>
</tr>
<tr>
<td>SCHOOLS</td>
<td>653</td>
<td>969</td>
<td>141</td>
<td>197</td>
<td>90</td>
<td>108</td>
<td>884</td>
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<tr>
<td>HOSPITALS</td>
<td>29</td>
<td>282</td>
<td>2</td>
<td>28</td>
<td>14</td>
<td>18</td>
<td>45</td>
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<tr>
<td>POLYCLINICS-HEALTHPOST</td>
<td>18</td>
<td>19</td>
<td>84</td>
<td>84</td>
<td>1</td>
<td>8</td>
<td>103</td>
</tr>
<tr>
<td>ADMINISTRATIVE BUILDINGS</td>
<td>28</td>
<td>63</td>
<td>5</td>
<td>5</td>
<td>56</td>
<td>56</td>
<td>89</td>
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<tr>
<td>DORMITORIES</td>
<td>8</td>
<td>37</td>
<td></td>
<td></td>
<td>5</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>SOCIAL SERVICE BUILDINGS</td>
<td>10</td>
<td>24</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>746</strong></td>
<td><strong>1394</strong></td>
<td><strong>233</strong></td>
<td><strong>320</strong></td>
<td><strong>167</strong></td>
<td><strong>198</strong></td>
<td><strong>1146</strong></td>
</tr>
</tbody>
</table>

- **SEISMIC RISK MITIGATION FOR PRIORITY PUBLIC BUILDINGS**

- **SCHOOLS**
  - Completed: 653, Building: 969
  - On going: 141, Building: 197
  - Tender stage: 90, Building: 108
  - Total: 884, Building: 1274

- **HOSPITALS**
  - Completed: 29, Building: 282
  - On going: 2, Building: 28
  - Tender stage: 14, Building: 18
  - Total: 45, Building: 328

- **POLYCLINICS-HEALTHPOST**
  - Completed: 18, Building: 19
  - On going: 84, Building: 84
  - Tender stage: 1, Building: 8
  - Total: 103, Building: 111

- **ADMINISTRATIVE BUILDINGS**
  - Completed: 28, Building: 63
  - On going: 5, Building: 5
  - Tender stage: 56, Building: 56
  - Total: 89, Building: 124

- **DORMITORIES**
  - Completed: 8, Building: 37
  - On going: 5
  - Tender stage: 7
  - Total: 13, Building: 44

- **SOCIAL SERVICE BUILDINGS**
  - Completed: 10, Building: 24
  - On going: 1, Building: 6
  - Tender stage: 1
  - Total: 12, Building: 31

- **TOTAL**
  - Completed: 746, Building: 1394
  - On going: 233, Building: 320
  - Tender stage: 167, Building: 198
  - Total: 1146, Building: 1912
## SEISMIC RISK MITIGATION FOR PRIORITY PUBLIC BUILDINGS

### RETROFITTING WORKS

<table>
<thead>
<tr>
<th>BUILDING TYPE</th>
<th>COMPLETED</th>
<th>Ongoing</th>
<th>Tender Stage</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Campus</td>
<td>Building</td>
<td>Campus</td>
<td>Building</td>
</tr>
<tr>
<td>SCHOOLS</td>
<td>413</td>
<td>514</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HOSPITALS</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>POLYCLINICS-HEALTH CENTERS</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>ADMINISTRATIVE BUILDINGS</td>
<td>13</td>
<td>27</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>DORMITORIES</td>
<td>6</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SOCIAL SERVICE BUILDINGS</td>
<td>7</td>
<td>12</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>450</td>
<td>590</td>
<td>12</td>
<td>24</td>
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</table>

### RECONSTRUCTION WORKS

<table>
<thead>
<tr>
<th>BUILDING TYPE</th>
<th>COMPLETED</th>
<th>Ongoing</th>
<th>Tender Stage</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Campus</td>
<td>Building</td>
<td>Campus</td>
<td>Building</td>
</tr>
<tr>
<td>SCHOOLS</td>
<td>45</td>
<td>45</td>
<td>51</td>
<td>53</td>
</tr>
<tr>
<td>HOSPITALS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>POLYCLINICS-HEALTH CENTERS</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ADMINISTRATIVE BUILDINGS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DORMITORIES</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>SOCIAL SERVICE BUILDINGS</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>46</td>
<td>46</td>
<td>53</td>
<td>59</td>
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<tr>
<td><strong>GRAND TOTAL</strong></td>
<td>496</td>
<td>636</td>
<td>65</td>
<td>83</td>
</tr>
</tbody>
</table>
Component B
Seismic Risk Mitigation for Priority Public Buildings

EDUCATION SECTOR

Retrofitting and Reconstruction Works:

- 496 schools,
- 1,873,769 m² construction area,
- 748,806 students, teachers
Component B
Seismic Risk Mitigation for Priority Public Buildings

EDUCATION SECTOR

Retrofitting Works (completed):

- 413 schools,
  - 1,457,480 m² construction area,
  - 616,362 students, teachers
Component B
Seismic Risk Mitigation for Priority Public Buildings

EDUCATION SECTOR

Reconstruction Works (completed):

- 45 schools,
  - Demolished 128,496 m², Recons. 246,000 m²
  - Demolished 902 classrooms, Recons. 1,479 classrooms
  - 90,351 students, teachers

Reconstruction Works (ongoing):

- 53 schools
  - Demolished 120,000 m², Recons. 330,000 m²
  - Demolished 1,030 classrooms, Recons. 1,945 classrooms
  - 110,763 students, teachers
Component B
Seismic Risk Mitigation for Priority Public Buildings

HEALTH SECTOR

Seismic Retrofitting / Reconstruction Works

- 10 (26 building) hospitals
- 13 polyclinics
Component B
Seismic Risk Mitigation for Priority Public Buildings
DORMITORIES/SOCIAL SERVICE BUILDINGS

Seismic Retrofitting Works:
- 14 buildings
- 50,000 m² construction area
- 4000 students
Retrofitting Works

Before retrofitting

After retrofitting

ISMEP takes into consideration that Retrofitting Works should be

- technically feasible
- financially affordable
- economically justifiable
- socially acceptable
Actors in Retrofitting Process

- Consultant
- Contractor
- Engineer
- Craftsmen
- Worker
- Teacher
- Parents
- Student
- Province National Education
- District National Education
- Municipalities
- Citizens
- Press

Direct relations: solid lines
Indirect (irregular/out of control) relations: dashed lines
Social Guidance and Awareness Study for Retrofitting Schools

Teachers
Students
Parents
Reached app.
250,000 people
Social Guidance and Awareness Study for Retrofitting Schools

Social Guidance and Awareness Study for the beneficiaries of retrofitting schools
April-May 2009
Social Guidance and Awareness Study for Retrofitting Schools

Distributed Materials:
• Retrofitting Brochure
• First 72 hours after Earthquake
• Cartoon
Public Awareness and Training

- 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

**Training Programs for Disaster Preparedness**
Public Awareness and Training

August 16-17, 2009
A step forward for a safe life: Get a training

Distribution of
• 500,000 brochures, information cards,
• 3000 t-shirts,
• 3000 caps,
• 50,000 magnets
• 100,000 bags

Taksim, Mecidiyeköy, Beşiktaş, Bakırköy, Kadıköy
Eğitimlerimiz Kasım 2009'da başladı.
Public Awareness and Training

Web Site: www.guvenliyasam.org
Component B
Seismic Risk Mitigation for Priority Public Buildings

“Consultancy Services for Inventorization and Multi-Hazard and Earthquake Retrofit Evaluation of the Cultural Heritage Buildings in Istanbul under the Responsibility of the Ministry of Culture and Tourism (Ref: CB 4.1)” are completed.
Component B
Seismic Risk Mitigation for Priority Public Buildings

• The Contract for “Consultancy Services for Earthquake Performance Assessment and Preparation of Structural Seismic Retrofitting Designs for Cultural Heritage Buildings under the Responsibility of the Ministry of Culture and Tourism (CB 4.2)” is signed.

• The consultant firm continues to implement the project activities.
Component C
Building Code Enforcement

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 2010, 3000 engineers will be trained.
Component C
Building Code Enforcement

Projects in the pilot municipalities:

• Streamlining and monitoring of building and occupation permit issuance procedures in the pilot municipalities (Bağcılar ve 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

Project Activities for Streamlining and Enforcement of Building Permit Procedures

- Data collection, updating and integration services-Digital Archive System for Documents of Development Plans
ISMEP PROJECT

Contributions:

✓ Prevention of potential loss of life.

✓ Mitigation of social, economic and financial effects of a possible earthquake.

✓ A model for the design and implementation of other projects and activities within the field of disaster management.
“We are strengthening our Future”

Thank you

Istanbul Governorship Special Provincial Administration
İstanbul Project Coordination Unit (IPCU)
www.ipkb.gov.tr