

# The Relations between Earthquake and Planning for Istanbul

Hulya DEMİR, Fatmagul BATUK

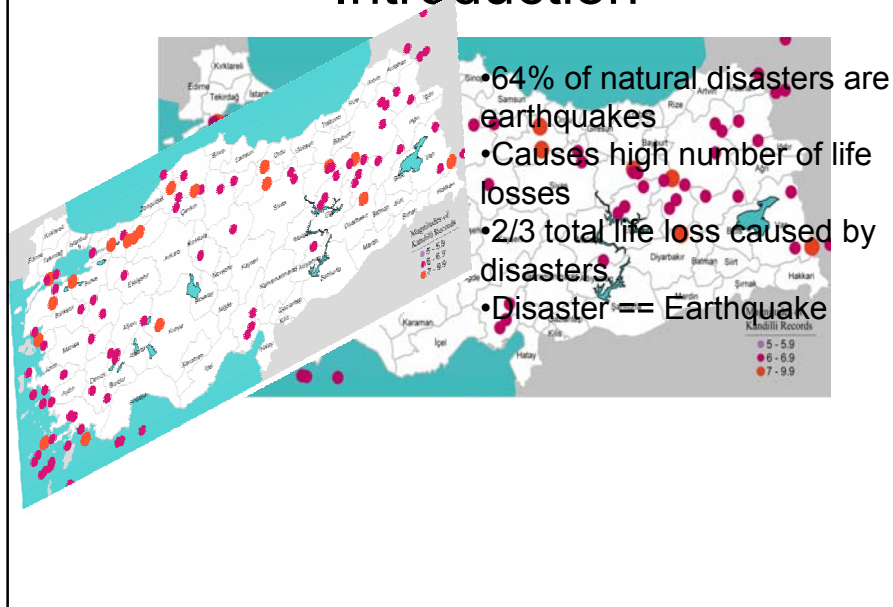
**Ozan EMEM**, Betül SENGEZER

Yildiz Technical University

## Outline

- Earthquake risk in Turkey
- Problems of Istanbul Metropolitan City
- Studies for mitigation
- Istanbul Earthquake Master Plan (IEMP)
- Conclusions

## Introduction



## Population and Risk in Turkey

- Annual population growth (18.28%) has reached to the highest values in big cities
  - (41.79% in Antalya, 33.09% in Istanbul, 28.62% in Bursa, 27.04% in Kocaeli)
- insufficient technical and social infrastructures in cities cause dramatical risk increase
- 70% of the total population lives on the first and the second degree earthquake zones which cover the 66% of the total area

## Statistics of dead/damage

Date	Location	Magnitude	Dead/Damaged Building
10.07.1894	Istanbul	7.0	474/387
08.11.1901	Erzurum	6.1	500/10.000
28.04.1903	Malazgirt	6.7	2.626/4500
28.04.1903	Patnos	6.3	3.560/12.000
04.12.1905	Malatya	6.8	500/5.000
09.02.1909	Menderes	6.3	500/5.000
03.10.1914	Burdur	7.1	4.000/17.000
24.01.1916	Tokat	7.1	500/5.000
18.11.1919	Soma	6.9	3.000/16.000
06.05.1930	Hakkâri	7.2	2.514/3.000
26.12.1939	Erzincan	7.9	32.962/116720
20.12.1942	Niksar	7.0	3.000/32.000
26.11.1943	Tosya	7.2	2824/25.000
01.02.1944	Gerede	7.2	3.959/20.865
17.08.1949	Karlıova	7.0	450/3.000
19.08.1966	Varto	6.9	2.394/20.007
28.03.1970	Gediz	7.2	1.086/9452
22.05.1971	Bingöl	6.7	878/5.617
06.09.1975	Lice	6.9	2.398/8.149
24.11.1976	Çaldıran	7.2	3840/9552
30.10.1983	Horasan	6.8	1.155/3.241
13.03.1992	Erzincan	6.8	653/6.702
17.08.1999	İzmit-Gölcük	7.4	16986+/-500000
12.11.1999	Düzce	7.2	845/-18000

in the last 109 years, approximately 100.000 dead and 550.000 collapsed or heavily damaged buildings (between 1894 and 2003)

## Building Problems

- in 1999 earthquake in Istanbul: 5% heavily damages, 20% medium damages and 16% slightly damages.
- 3073 heavily damaged, 13.339 medium damaged and 12.455 slightly damaged buildings
- Totally 454 person died mainly (274 body) of whom are from Avcılar District and 1.880 persons were injured

## Building Problems

- There are 724609 buildings according to the year 2000 data, and 80% of the buildings -that has actually been in use- have **no building usage permissions**.
- There are high risks for some social house instances due to the location decisions based on the land formation deformations.
- **The weak technical quality** is a very common problem for building cooperatives.

## Building Problems

- **Historical Business Center Area** is in the high risk group.
- Some of the industrial structures are located in the dense **settlement areas** or close to the **natural sources**.
- Some of the unplanned areas are located in the **natural environment** or in the **most valuable** areas

## **National Earthquake Damage Reduction Strategy**

- The strategy was constituted in accordance with the Prime Ministry Circular
- published as “National Earthquake Damage Reduction Strategy Report” of National Earthquake Council
- includes long and short term earthquake damage reduction studies

## **National Earthquake Damage Reduction Strategy**

- the precautions were defined as principles
- it did not include the studies about the earthquake damage reduction
- human factor was neglected
- it did not define any strategy for settlements
- it neglects the importance of Istanbul City

## **The Study on A Disaster Prevention/ Mitigation Basic Plan**

- Istanbul Metropolitan Municipality (IMM) and Japan International Cooperation Agency (JICA)
- Aimed to examine the buildings and the possible damage possibilities of infrastructures **in macro level**

## **World Disaster Report**

- World Disaster Report of Federation of the Red Cross and the Red Crescent Associations
- focused on the general situation of the buildings in Turkey
- It suggested to strengthen the critical buildings and to establish the own rescue teams for every region

## **The Earthquake Risk Analyses**

- Carried out by Bogazici University and supported by American the Red Cross
- the earthquake risk was defined in a macro level
- building count, ground condition, some properties in the sub-areas etc. Data used for the definition of earthquake scenarios

## **Istanbul Earthquake Master Plan (IEMP)**

- Started in 2002 and completed at the end of 2003
- Carried out by coordination of 4 universities (YTU, BU, METU, ITU) for İstanbul Metropolitan Municipality
- Main scope is to reduce the damage effect of a possible earthquake in Istanbul
- Secondary scope is improving the quality of natural and urban environment

## IEMP Strategies

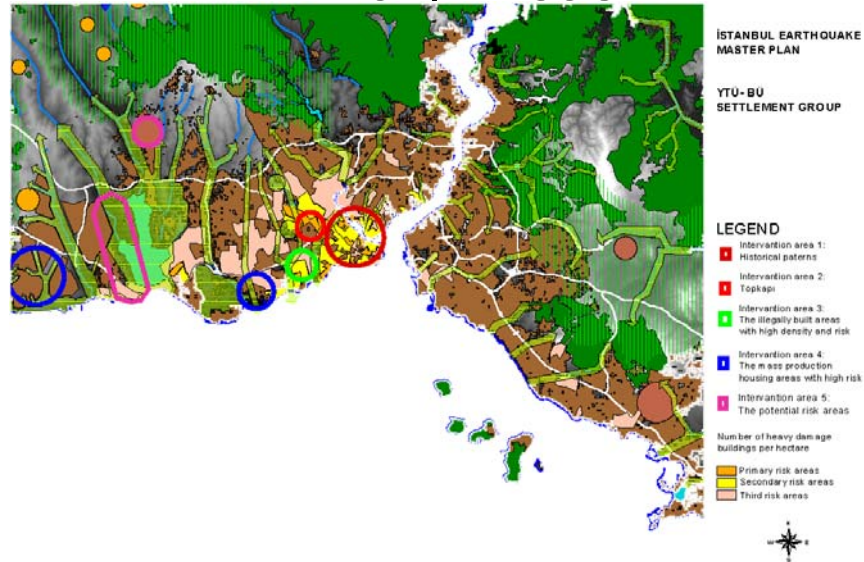
- Defining the new planning level as “National Spatial Strategy Plan” for Turkey’s planning system in order to define the spatial basis of the developments of social and economical.
- It is necessary to make a specific region plan for Istanbul Metropolitan Area. In this context, developing a complete model around all existing local plans for Istanbul.
- Preparing Istanbul Metropolitan Area Master Plan and IDERSP using the maps showing the physical, cultural and natural thresholds which are prepared by specialist organizations.

## Contribution of Other Studies

- JICA, BU-Red Cross and IMM GIS primary databases examined
- Primary areas are defined respect to the risk indicators and the other city planning parameters



## Primary Areas



## Suggested Typologies

- The Urban Regeneration Trigger Zones
- The Local regeneration zones
- The Regeneration Zones

## Legislative Suggestions

The project also includes some suggestions for the constitutional, developmental, urbanization and local administration laws

- Organization and responsibilities
- Planning
- Building

## Suggestions

- In order to collect the plans under an umbrella, an additional law is offered for the Constitution.
- The horizontal and vertical connections between integrity of the development and planning system of the institutions are defined.
- Determination of the criterion of risk defining, auditing and constitution of programs and strategy plans for the risk reduction responsibilities are given to the committees which are suggested to be founded.

## Suggestions

- Applications of establishment of the plans by participation and transparent system are developed.
- Responsible institutions for auditing and preparing the maps and are defined.
- The public auditing system and preparation of the plans with participatory process are offered
- Institutional proposals are taken place in the lawful arrangement which creates the financial possibilities for applying the plans for the risk reduction, prevention and sustainability.
- It is emphasized that the abrogation of the Development Exemption Law and the Amendment Development Plans is one of the most important points for the risk reduction.
- The building auditing system draft law is offered.

## Conclusions

- Necessity of revision of the approaches for urbanization is revealed
- A reform process has been started about the Development Laws by Turkish Republic Govern
- results of the studies which are applied for the earthquake safety are considered in the prepared draft laws ment by 2003

## Conclusions

- Building auditing, urban regeneration applications, development application methods, region planning, spatial strategy planning, wholeness of plans, disaster preventions and earthquake safety studies are considered and new sentences are being offered
- IEMP strategies are in action in a pilot area