مشروع
تخفيف مخاطر الزلازل في فلسطين

Support Action for Strengthening Palestinian- administrated Areas capabilities for seismic Risk Mitigation
(SASPARM)

Jalal Al Dabbeek, An Najah National University, Palestine

The Role of SASPARM Project on Building the Resilience of the Palestinian Community to Disasters

بناء قدرات المجتمع الفلسطيني لمواجهة الكوارث – مشروع تخفيف مخاطر الزلازل في فلسطين

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General Introduction
مقدمة عامة

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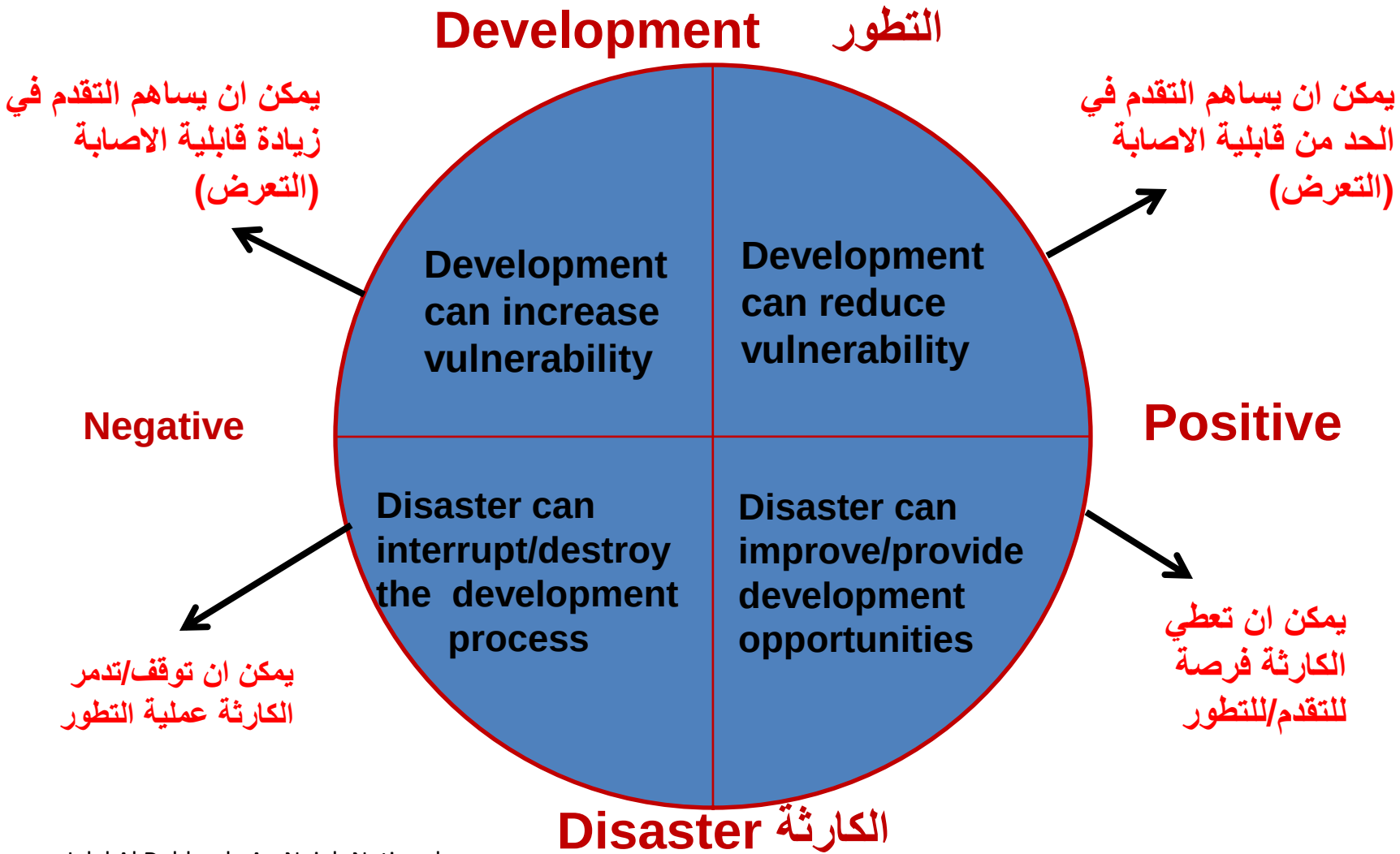
Disaster and Development

العلاقة بين التقدم/التطور والكوارث



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Elements of Risk عناصر المخاطر

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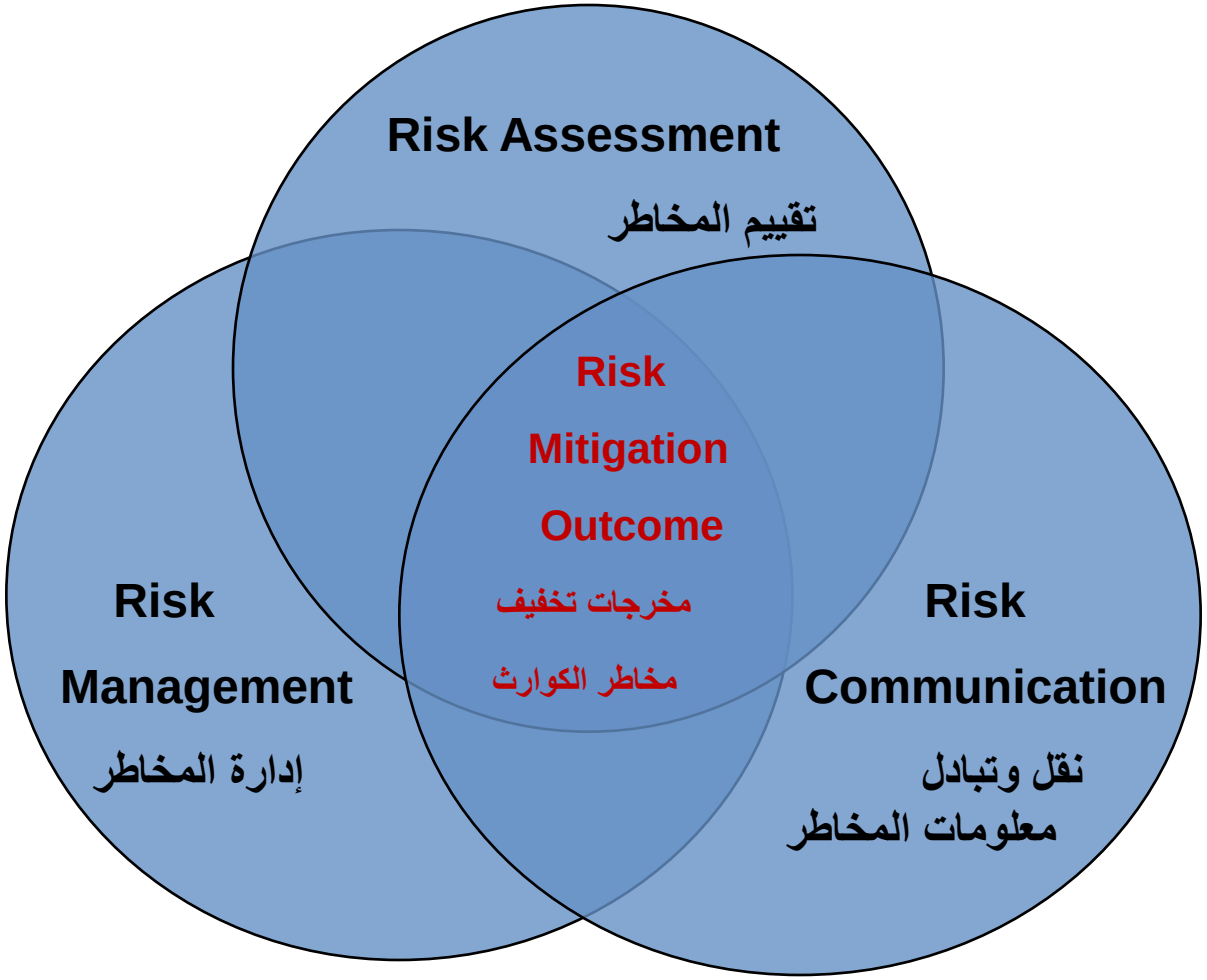

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The implementation strategies of risk reduction programs

استراتيجيات تنفيذ برامج الحد من المخاطر

Examples from ME and ….

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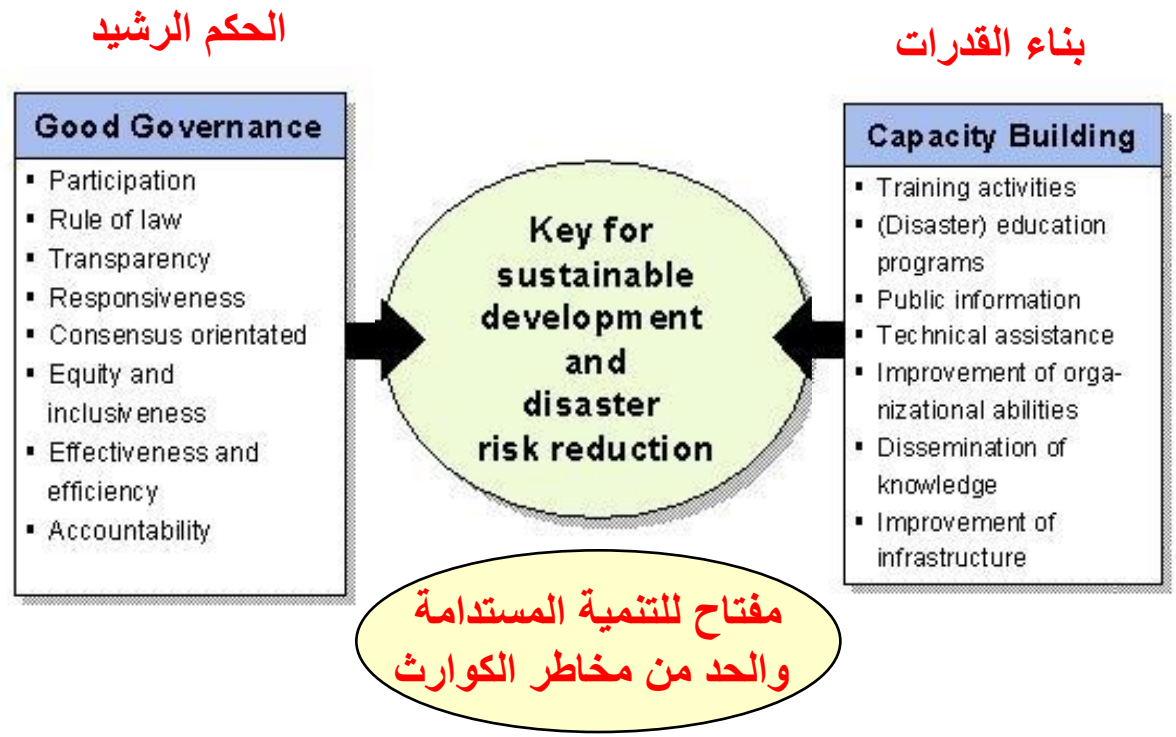

Examples from ME and .

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Risk Assessment
and
Seismic Risk Mitigation…

What …and How…..??

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Risk Assessment تقييم المخاطر

A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard

$$\text{Risk} = \frac{\text{Hazard} * \text{Vulnerability}}{\text{Capacity}}$$

The combination of the probability of an event and its negative consequences

The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals

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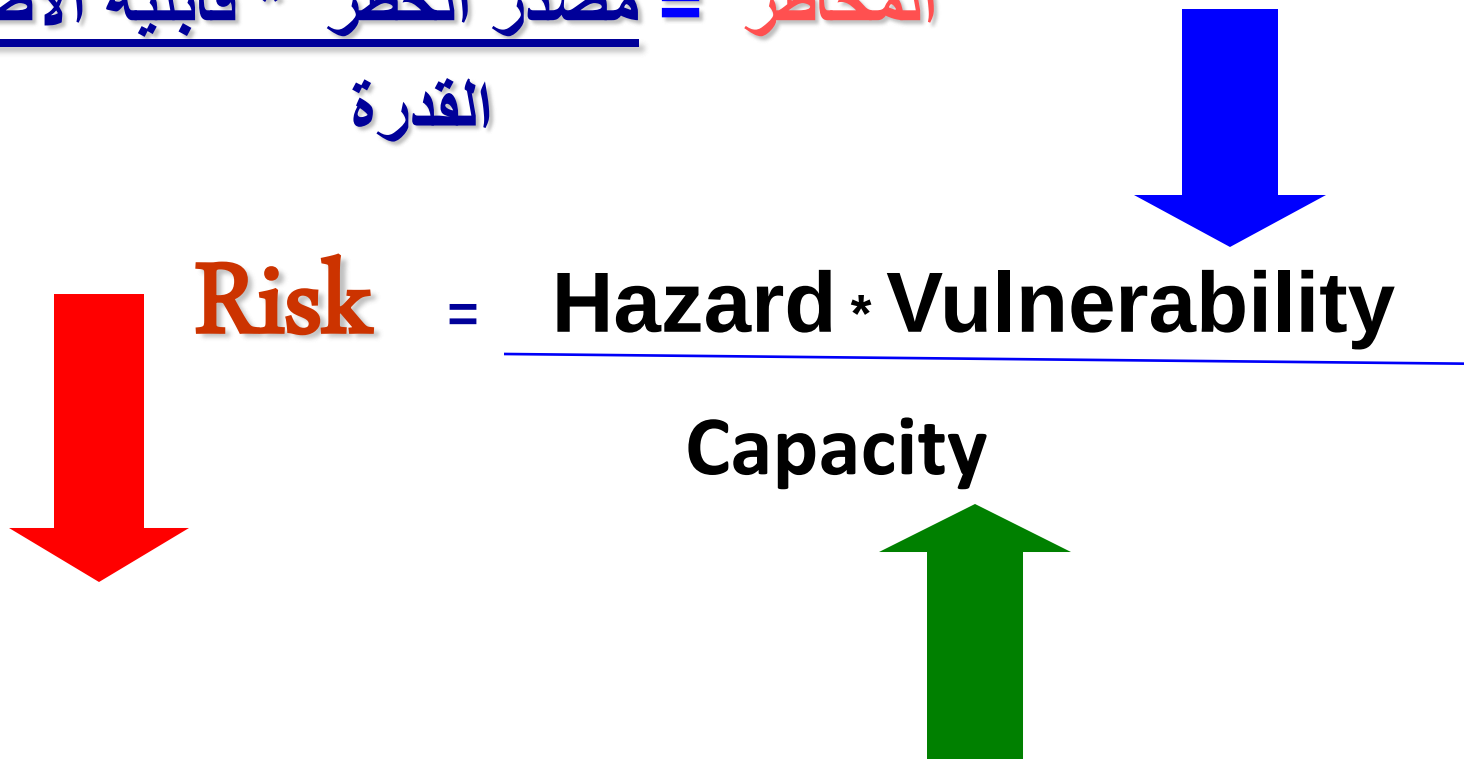
Risk Assessment تقييم المخاطر

المخاطر = مصدر الخطر * قابليّة الاصابة / القدرة



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$$[R] = [H] * [VUL]$$

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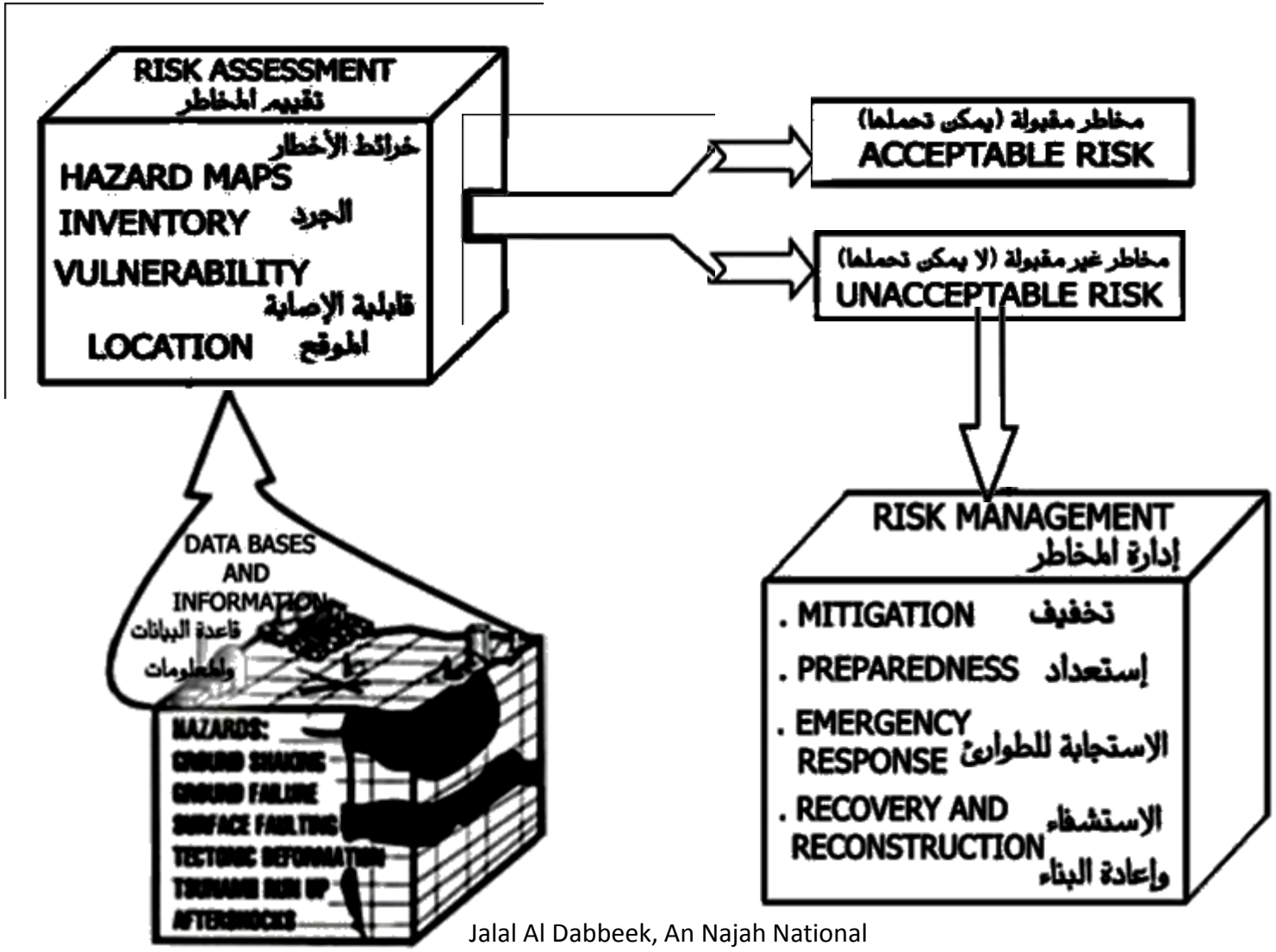
Risk Assessment and Risk Management



What is Disaster Management?

Preparedness -- activities prior to a disaster.
Examples: preparedness plans; emergency exercises/training; warning systems.

Response -- activities during a disaster.
Examples: public warning systems; emergency operations; search and rescue.

Recovery -- activities following a disaster.
Examples: temporary housing; claims processing and grants; long-term medical care and counseling.

Mitigation - activities that reduce the effects of disasters.
Examples: building codes and zoning; vulnerability analyses; public education.

Source: Information and Communication Technology in Disaster Risk Management - presentation prepared by Sujit Mohanty, Manager-Disaster Information Systems, GOI-UNDP Programme, Ministry of Home Affairs, GOI, 2005

Risk Analysis and Ranking

$$[R] = [H] * [VUL]$$

Risk = probability *X* magnitude

Risk = Likelihood x Severity

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Risk Analysis and Ranking

[R] = [H] * [VUL]

Risk = probability *X* magnitude

Probability

Probability	Descriptor	Description
3	Almost Certain	Expected to occur (within the time period)
2	Likely	Likely to occur (within the time period) under current conditions
1	Unlikely	Could occur (within the time period) if conditions changed moderately

Magnitude

Magnitude	Descriptor	Description
3	Catastrophic	Massive humanitarian consequences, substantial loss of life expected; humanitarian assistance urgently needed for large population segments; large amounts of commodities needed; additional personnel, administrative, and technical expertise urgently needed
2	Major	Humanitarian situation threatened for large population segments; some loss of life expected; humanitarian assistance likely needed to handle emergency; substantial commodities and additional staff and technical expertise likely to be needed
1	Moderate	Humanitarian situation is threatened for potential target groups; intervention may be needed, particularly for traditionally vulnerable groups; Local entities can likely respond with existing staff and personnel structures

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Risk Ranking

Probability = 3
Magnitude = 3
Risk = probability *X* magnitude = 9 = High Risk

Each hazard is assigned a risk according to the matrix:

Probability x Magnitude	Catastrophic	Major	Moderate
Almost certain	9	6	3
Likely	6	4	2
Unlikely	3	2	1

Interpretation of the Results

High Risk ***Score = 9 – 6***

Expected losses warrant attention by senior management at all levels and detailed inclusion in the Plan. In order to ensure adequate preparedness, coordination with the other pertinent government entities, key stakeholders, and other UN and NGO/IO response agencies in contingency planning processes is highly encouraged.

Interpretation of the Results

Moderate Risk ***Score = 4 – 3***

Hazard merits attention, scenario developed, and included in the Plan. Response may be of a magnitude that is well within the capacity of existing staff and personnel. Coordination with the other pertinent government entities, key stakeholders, and other UN and NGO/IO response agencies in-country may be warranted.

Low Risk ***Score = 2 – 1***

Hazard severity	Definition	Points rating
Very high	Causing multiple deaths and widespread destruction eg. fire, building collapse.	5
High	Causing death, serious injury or permanent disability to an individual.	4
Moderate	Temporary disability causing injury or disease capable of keeping an individual off work for three days or more and reportable under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995).	3
Slight	Minor injury, which would allow the individual to continue work after first aid treatment on site or at a local surgery. The duration of the stoppage or treatment is such that the normal flow of work is not seriously interrupted.	2
Nil	Very minor injury, bruise, graze, no risk of disease.	1

Hazard likelihood	Definition	Points rating
Inevitable	If the work continues as it is, there is almost 100% certainty that an accident will happen, for example: • A broken stair or broken rung on a ladder • Bare, exposed electrical conductors • Unstable stacks of heavy boxes	**5**
Highly likely	Will happen more often than not. Additional factors could precipitate an incident but it is still likely to happen without this additional factor.	**4**
Possible	The accident may occur if additional factors precipitate it, but it is unlikely to happen without them.	**3**
Unlikely	This incident or illness might occur but the probability is low and the risk minimal.	**2**
Remote possibility	There is really no risk present. Only under freak conditions could there be any possibility of an accident or illness. All reasonable precautions have been taken - This should be the normal state of the workplace.	**1**

Risk Rating Score	Action
1-4	Broadly acceptable - No action required
5-9	Moderate - reduce risks if reasonably practicable
10-15	High Risk - priority action to be undertaken
16-25	Unacceptable -action must be taken IMMEDIATELY

Risk Rating Matrix

	Likelihood				
Impact	Rare	Unlikely	Possible	Likely	Almost certain
Catastrophic	moderate	moderate	high	critical	critical
Major	Low	moderate	moderate	high	critical
Moderate	Low	moderate	moderate	moderate	high
Minor	very low	low	moderate	moderate	moderate
Insignificant	very low	very low	low	low	moderate

Reporting/Review Arrangements

Risk Rating 1-4	Very low risks: Risk subject to aggregate review, to be monitored by Directorate.
Risk Rating 5-10	Low risks: are acceptable to the Trust, any actions required to reduce risk will be responsibility of Directorate to fund.
Risk Rating 15-30	Moderate risks: copies of risk assessment forms, along with timetable and action plans will be agreed and monitored by the Executive Team
Risk Rating 40-60	Significant risks: will be reported to the Finance, Corporate and Commissioning Group along with proposed treatment plans, for action. Actions to be implemented as per the remedial plan and within 3 months where possible.
Risk Rating 75	High risks: will be reported to the Audit Committee, with proposed risk remedial plans to mitigate the risk. Actions to be implemented as per the remedial plan and within 1 month where possible.

- **Disaster Risk Mitigation / Seismic Risk Mitigation is a National responsibility….,**
- **Holistic Approach…**

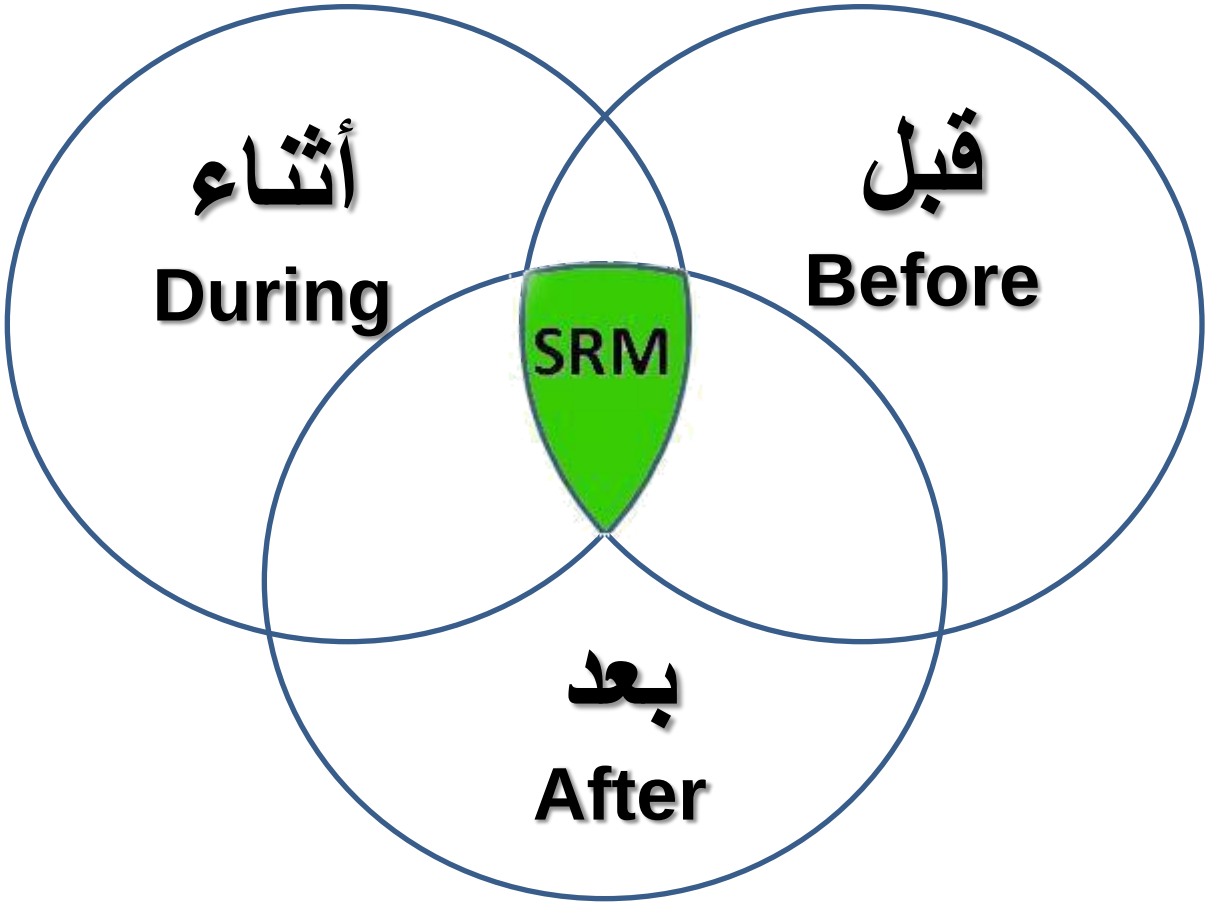
- تخفيف مخاطر الكوارث / تخفيف مخاطر الزلازل .... يعتبر مسئولية وطنية...

- نهج شامل....

Holistic Approach

Holistic Planning/ Stages

شمولية التخطيط/ المراحل



SRM :Seismic Risk Mitigation

تخفيف مخاطر الزلازل

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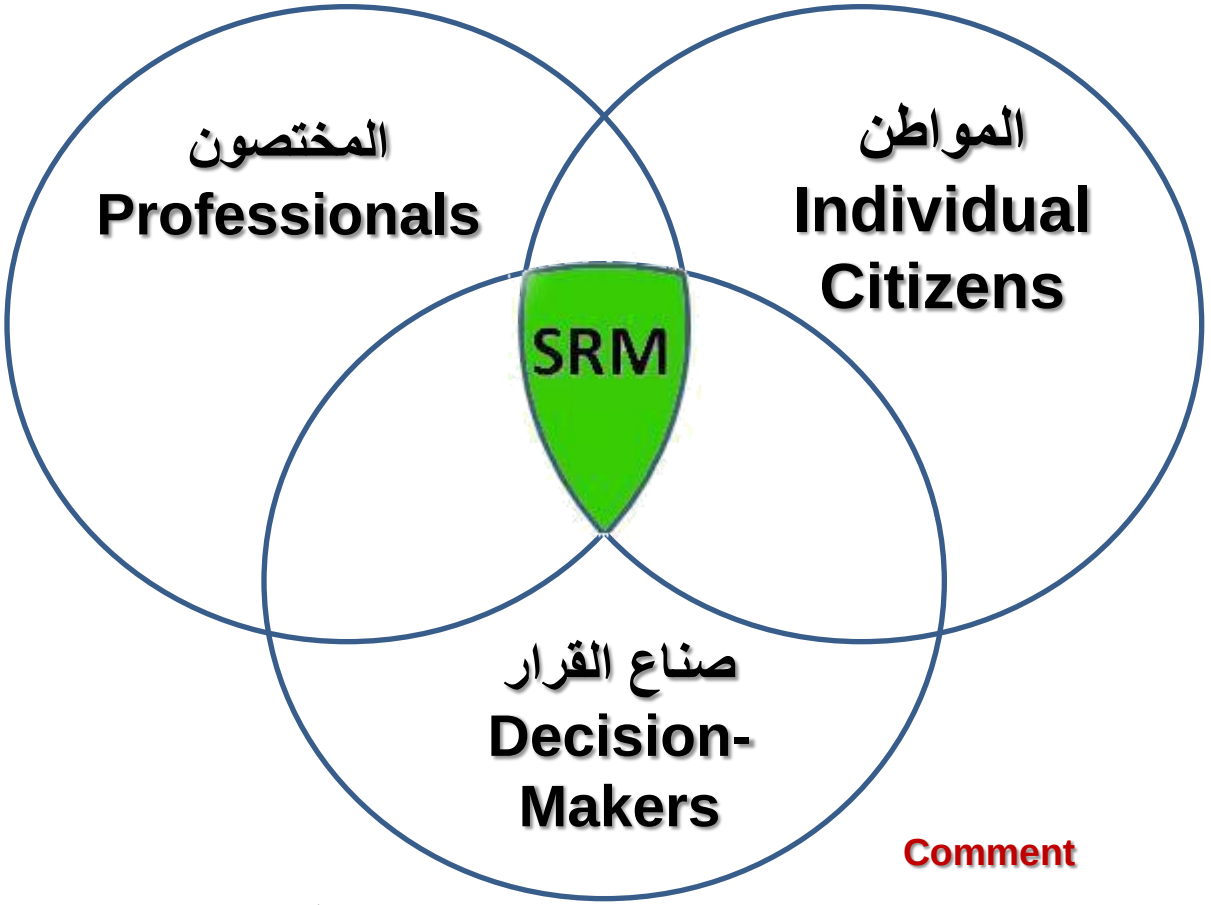
Holistic Approach

Comprehensiveness of target audiences/ Groups

شمولية الجهات المستهدفة



Comment مذكرة التفاهم

SRM :Seismic Risk Mitigation تخفيف مخاطر الزلازل

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Our Vision

Improved competitiveness of NNU, creation of networks of research centres, promote initiatives of general public awareness are some of the expected results of SASPARM.

Objectives

This project aims to reinforce the cooperation with Europe's neighbours in the context of the European Research Area. The An-Najah National University (NNU) in the Palestinian-administered Areas (PS) will coordinate the project, supported by the European Centre for Training and Research in Earthquake Engineering (EUCENTRE) and the Institute for Advanced Study of Pavia (IUSS) in Italy.

Activities

The project activities are identified with the goal to create a research infrastructure and to develop and enhance international cooperation with PS in the field of scientific technology and capacity building, i.e. human resources, research policy, networks of researchers and research institutes. In an international framework the proposed activities will lead NNU to a fruitful cooperation with EU.

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اجزاء المشروع: (Work Packages)

- تنسيق وادارة المشروع **Wp1: Project coordination and management**

- جمع وتوثيق الابحاث والدراسات التي تم تنفيذها في فلسطين في مجال تخفيف مخاطر الزلازل، وعمل بنك معلومات. **Wp2: Collection of existing research data**

- تبادل التدريب والمعرفة **Wp3 :Training and knowledge exchange**

- تعزيز قدرات مختبرات وحدة علوم الأرض وهندسة الزلازل في جامعة النجاح بالاجهزة والمعدات.

Wp4: Enhancement of NNU's laboratory capability for experimental-based training.

- الشبكات والنشر **- Wp5: Networking and dissemination**

- استغلال (تسخير واعلان) نتائج المشروع

-Wp6: Exploitation of the project results

Events, Activities, and Issues Contained in the Project
فعاليات ونشاطات وإصدارات يتضمنها المشروع

- Meetings
- Mini Workshops
- National Workshops
- International Workshops
- Lectures
- Training Courses
- Training Workshops
- Brochures, Posters, Newsletters and Films
- Public Awareness Programs through available Media: TVs, Radios and Newspapers.

- لقاءات
- ورشات عمل قطاعية
- ورشات عمل وطنية
- ورشات عمل دولية
- محاضرات
- دورات تدريبية
- ورشات عمل تدريبية
- إصدار نشرات وبوسترات وصحف الكترونية وأفلام صغيرة
- برامج توعية عامة من خلال وسائل الاعلام المتوفرة من تلفاز وراديو وصحف.

An-Najah University Launches Disaster Risk Mitigation Project (SASPARM Project) funded by European Union

26/02/2013

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An-Najah University Launches Disaster Risk Mitigation Project (SASPARM Project) funded by European Union

26/02/2013

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Workshops

The National Agency for Disaster Risk Reduction and An-Najah University organized a workshop on Disaster Risk Reduction in Rmallah-Palestine
26/03/2013

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A workshop on Disaster Risk Mitigation in Bethlehem- Palestine
30/04/2013

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Training workshop on Disaster Disk Mitigation in Al Bireh city-Palestine
4/05/2013

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Lectures

Birzeit University students visit the Earth Sciences and Seismic Engineering Unit

7/04/2013

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Lecture on Disaster Risk Mitigation at Haja Rashdah School in Nablus city

11/04/2013

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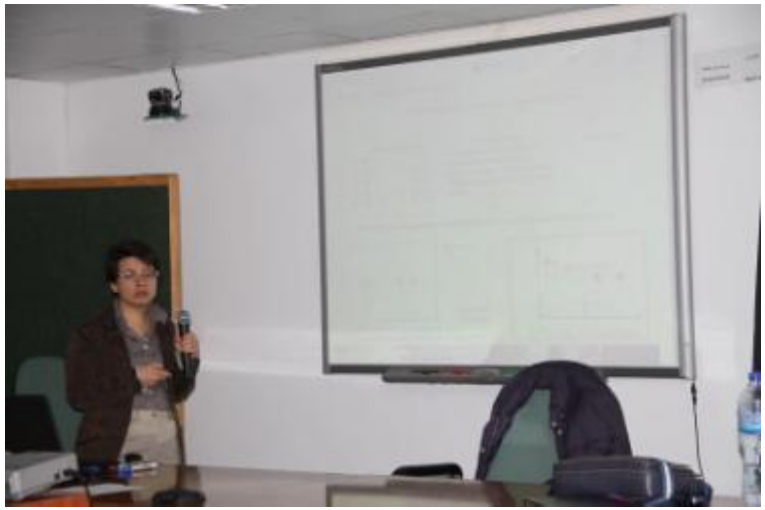
Training Courses

Training Course No. 1 27/02/2013

Fundamentals of seismic vulnerability and seismic risk

Lecturers: Dr. Barbara Borzi and Dr. Jalal Al Dabbeek



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Training Course No. 2 **19/04/2013**

Fundamentals of Structural dynamics

Lecturer: Dr. Alessandro Dazio

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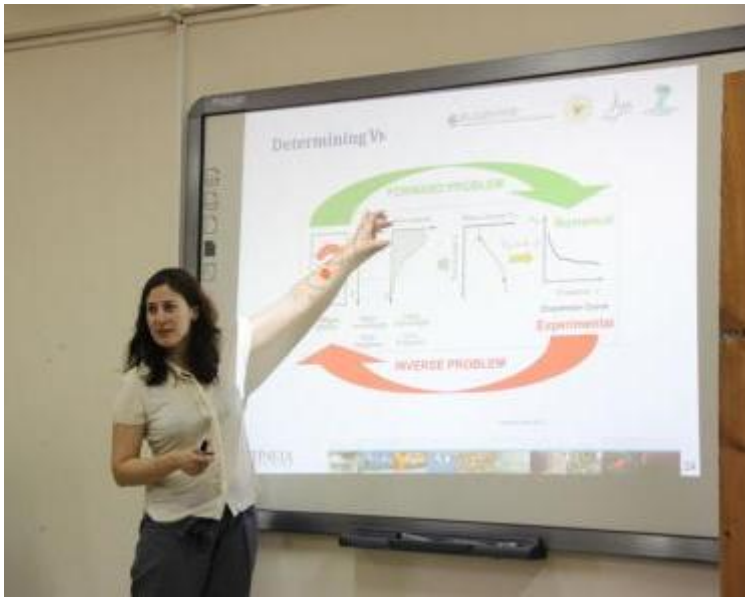
Training Course No. 3 **2-4/05/2013**

Ground response analyses and near-surface site characterization

Lecturers: Prof.Carlo G. Lai and Dr. Maria- Daphne Mangriotis



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Training Course No. 4 **7-9/05/2013**

Basic of signal processing, design of a specimens system acquisition

Lecturer: Dr.Simone Peloso

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28 – 05 - 2013

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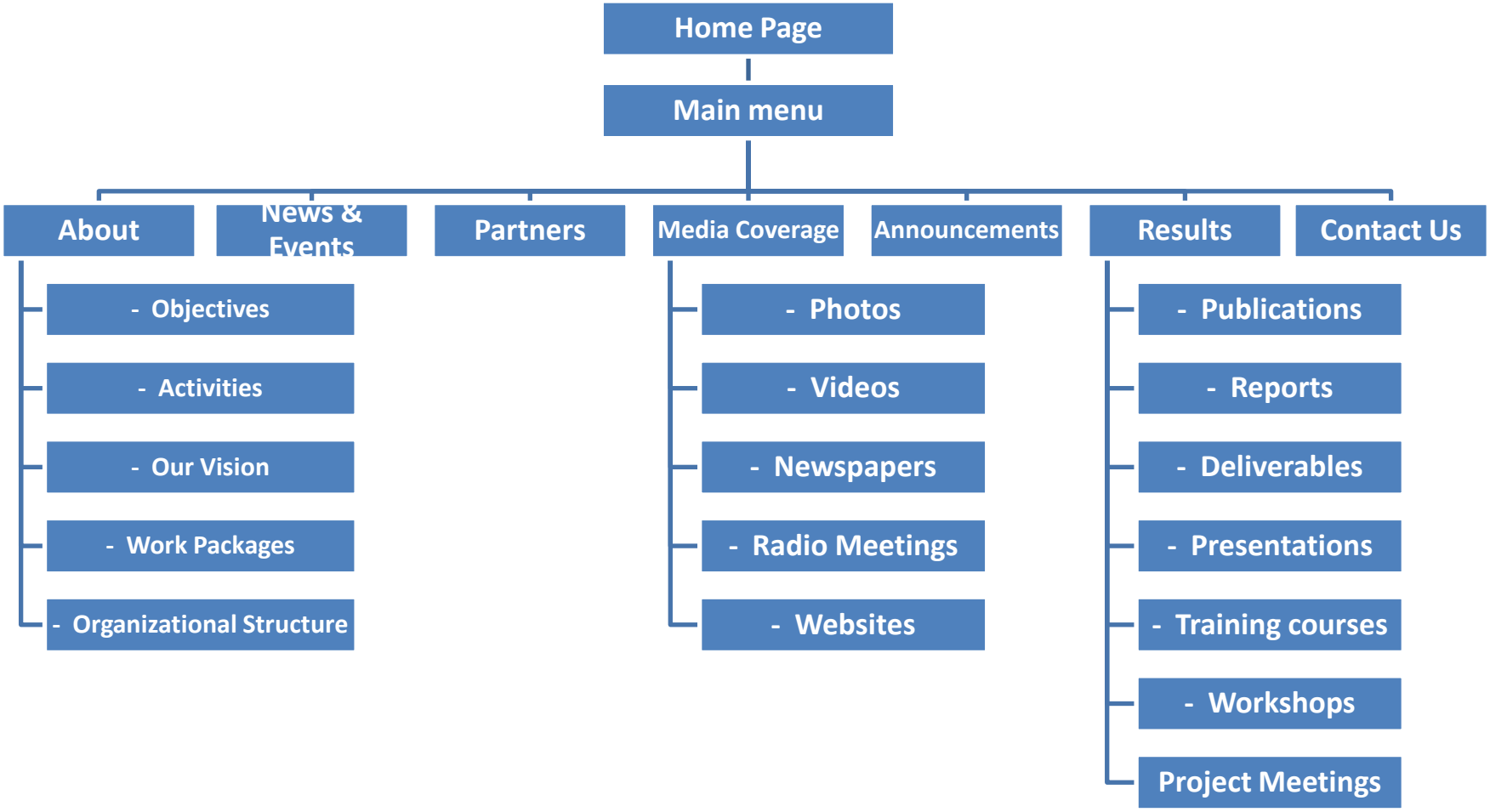
Website main menu



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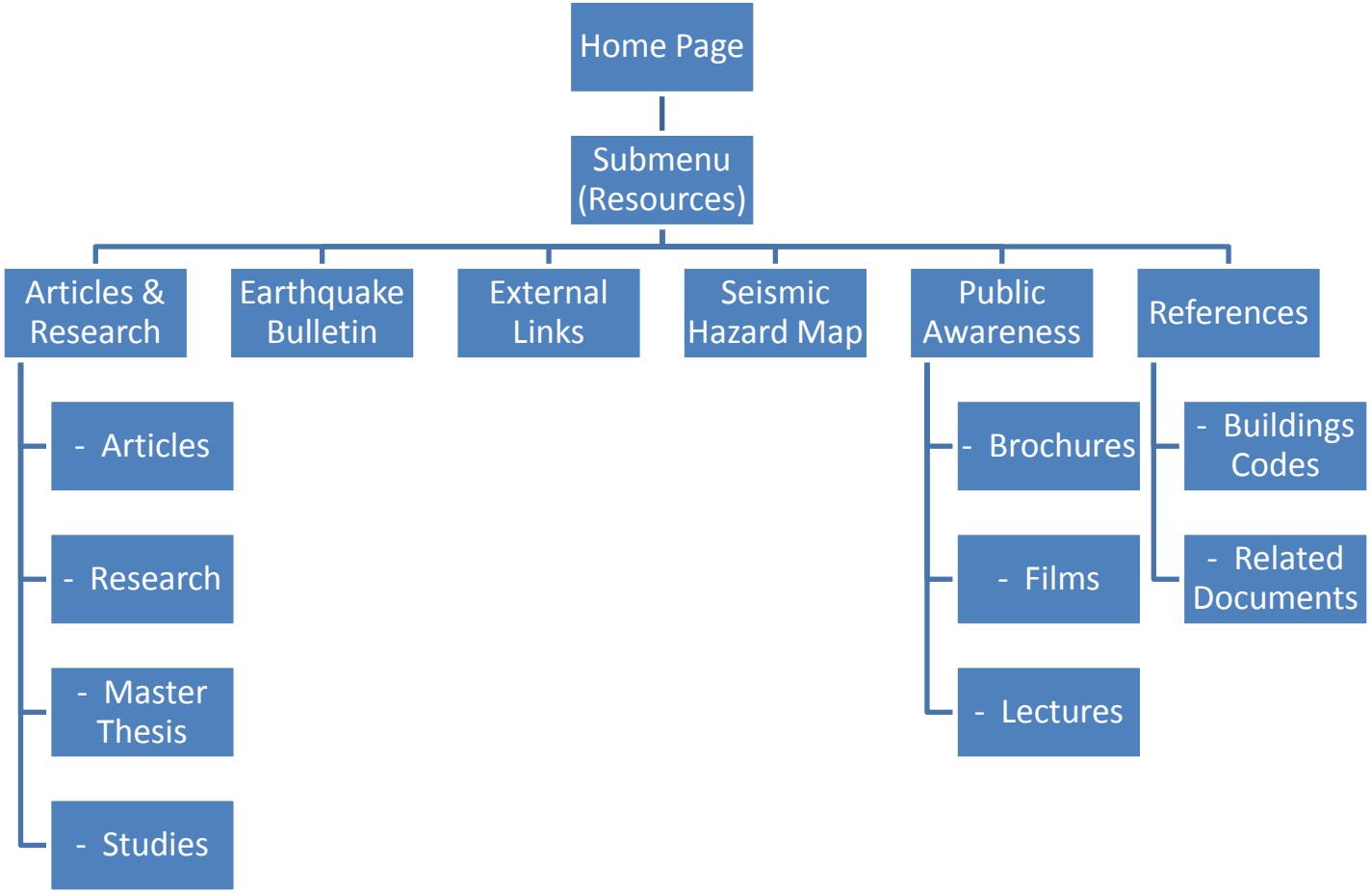
Awareness Resources



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11/04/2013
Members login
SASPARM
Support Action for Strengthening Palestinian-administrated Areas capabilities for seismic Risk Mitigation
An-Najah National University
Project Coordinator
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News & Events
Partners
Media Coverage
Announcements
Results
Project Meetings
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European Commission
EUCENTRE
European Center for Training and Research in Earthquake Engineering
Istituto Universitario di Studi Superiori di Pavia (IUSS)
An-Najah University Launches Disaster Risk Mitigation Project (SASPARM Project) funded by European Union
In the presence of Ms. Margareta Wahlstrom, the
What's New
Fundamentals of seismic vulnerability and seismic risk
27/02/2013 14:33:00
United Nations Special Representative of the Secretary-General for Disaster Risk Reduction
Project Overview
This project aims to reinforce the cooperation with Europe's neighbours in the context of the European Research Area. An-Najah National University (NNU) in the Palestinian-administered Areas (PS) will coordinate the project, supported by the European Centre for Training and Research in Earthquake Engineering (EUCENTRE) and the Institute for Advanced Study of Pavia (IUSS) in Italy.
Project Calendar
<< April 2013 >>
Sat Sun Mon Tue Wed Thu Fri
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
Context & Objectives
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Improved competitiveness of NNU, creation of networks of research centres, promote initiatives of general public awareness are some of the expected results of SASPARM.
Resources
References
Articles & Research
Public Awareness
Seismic Hazard Map
Earthquake Bulletin
External Links
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Website

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Risk Assessment
تقييم المخاطر

المخاطر = مصدر الخطر * قابليّة الاصابة / القدرة

$$\text{Risk} = \frac{\text{Hazard} * \text{Vulnerability}}{\text{Capacity}}$$

Examples / Applications

Hazard Mapping

(Visualizing the Hazard)

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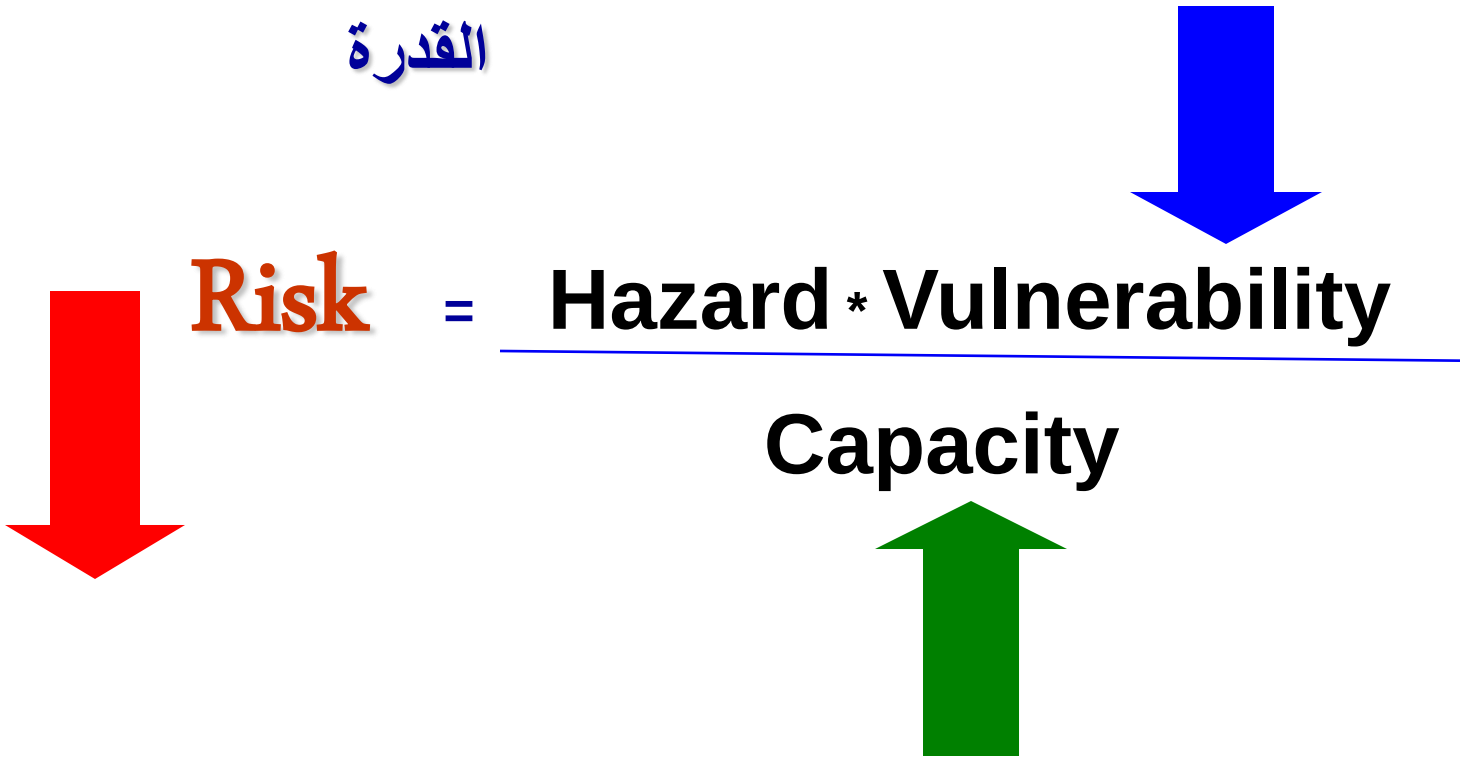
Risk Assessment

المخاطر = مصدر الخطر * قابليّة الاصابة / القدرة



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Seismic Waves Radiate from the Focus of an Earthquake

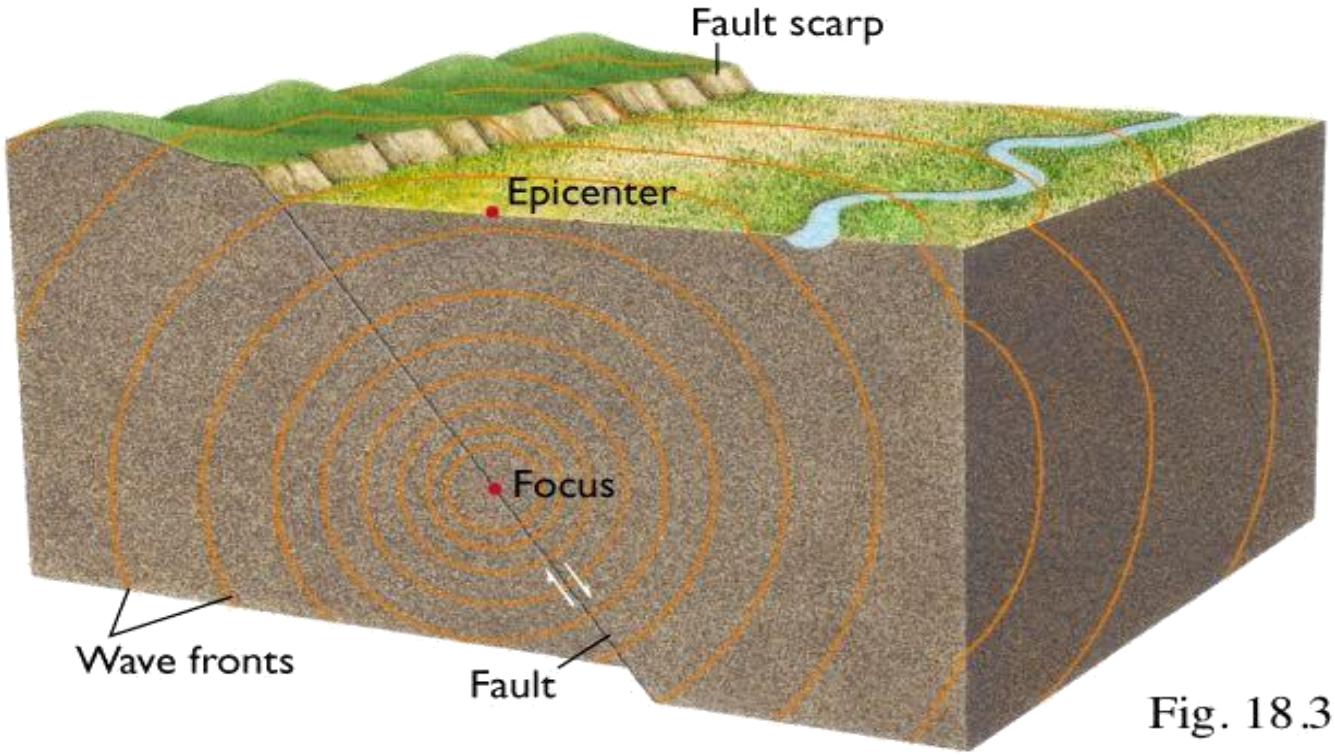

Fig. 18.3

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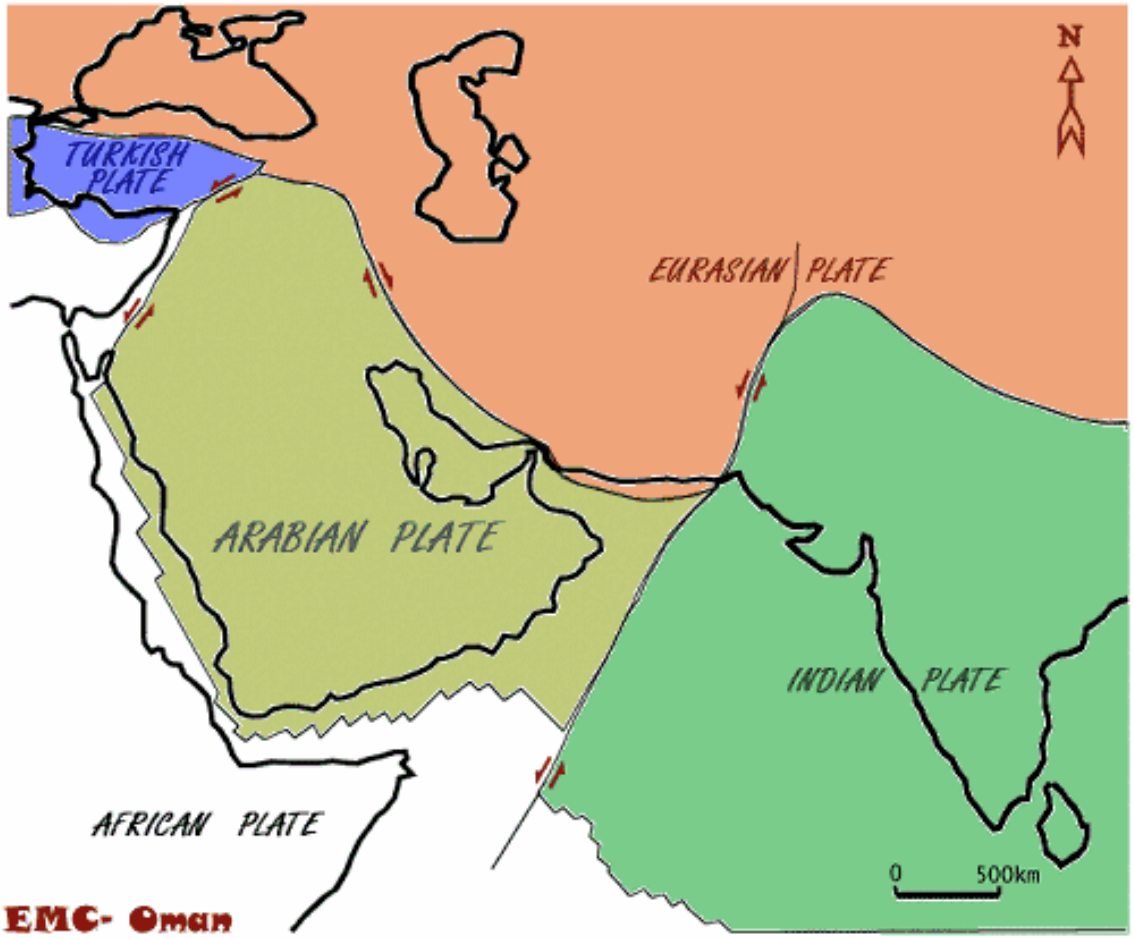

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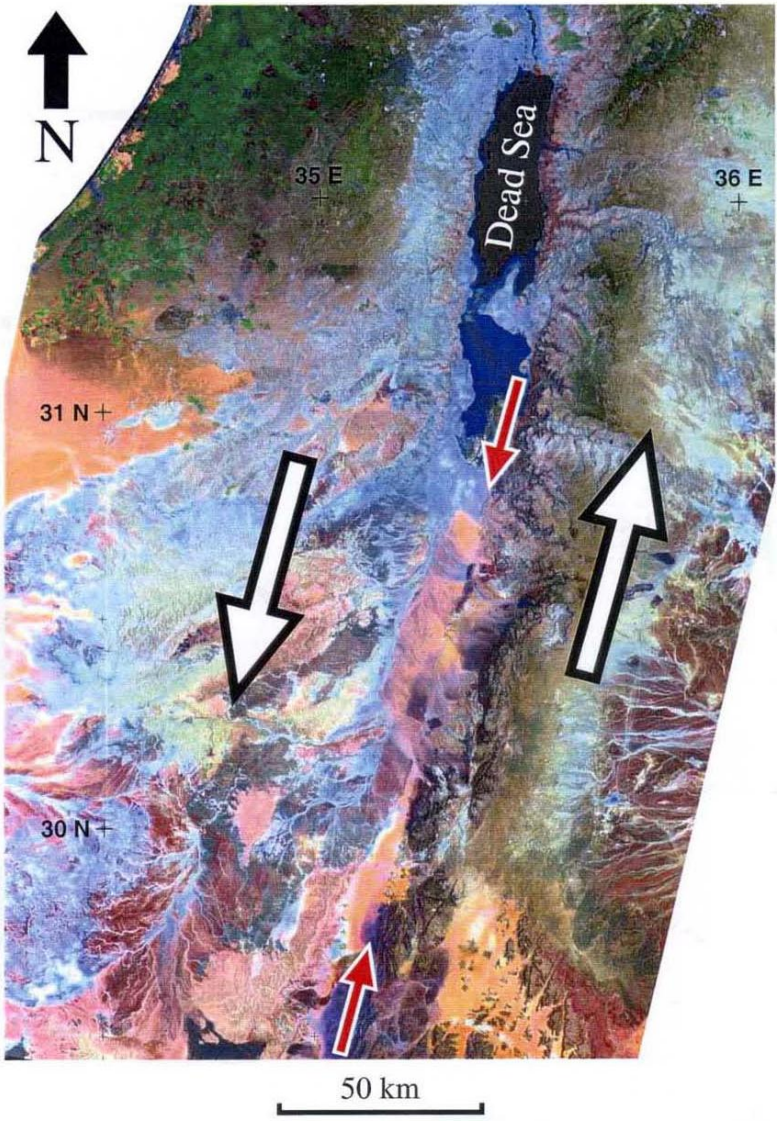

Transform Fault –
Relative movement between Jordan and Palestine.

اتجاه الحركة النسبية بين فلسطي والأردن

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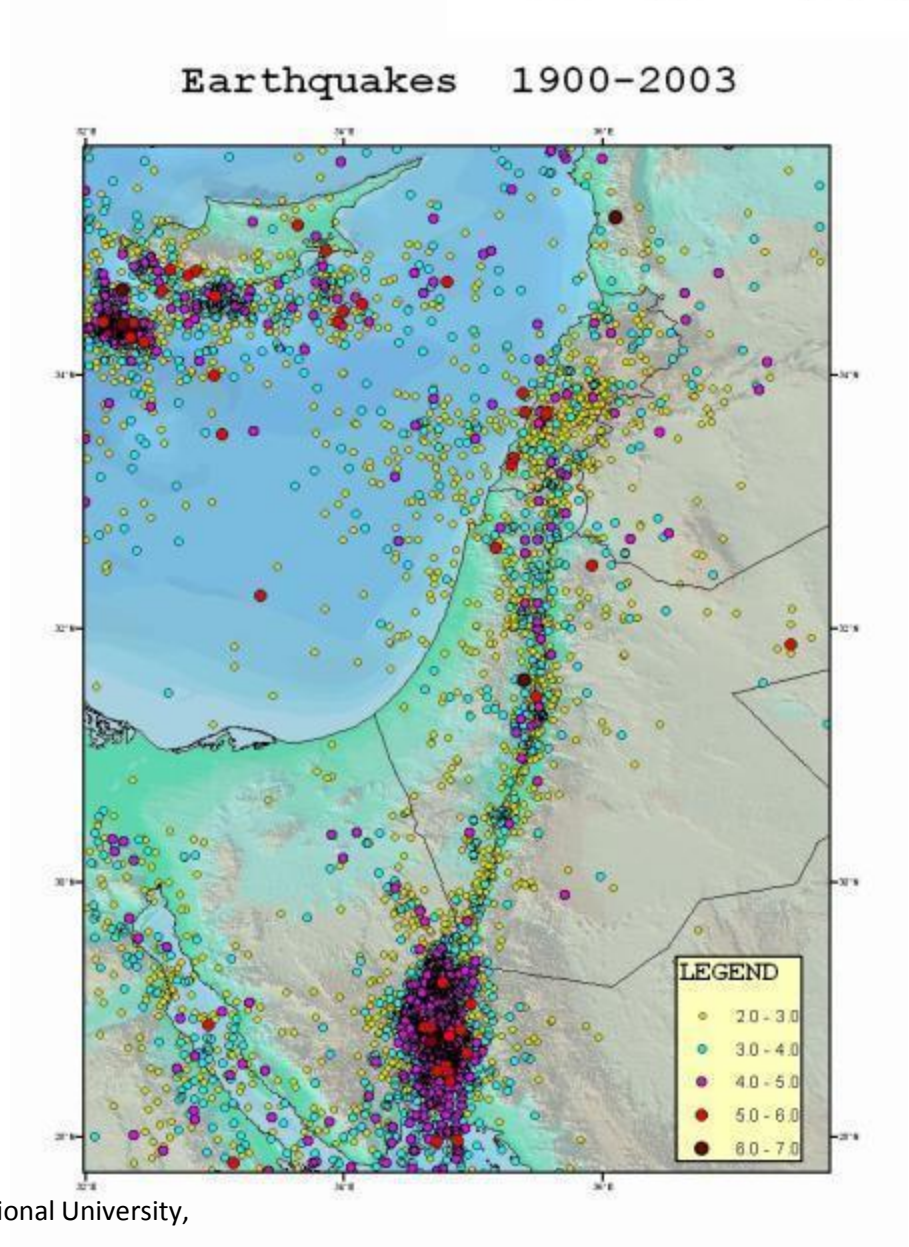

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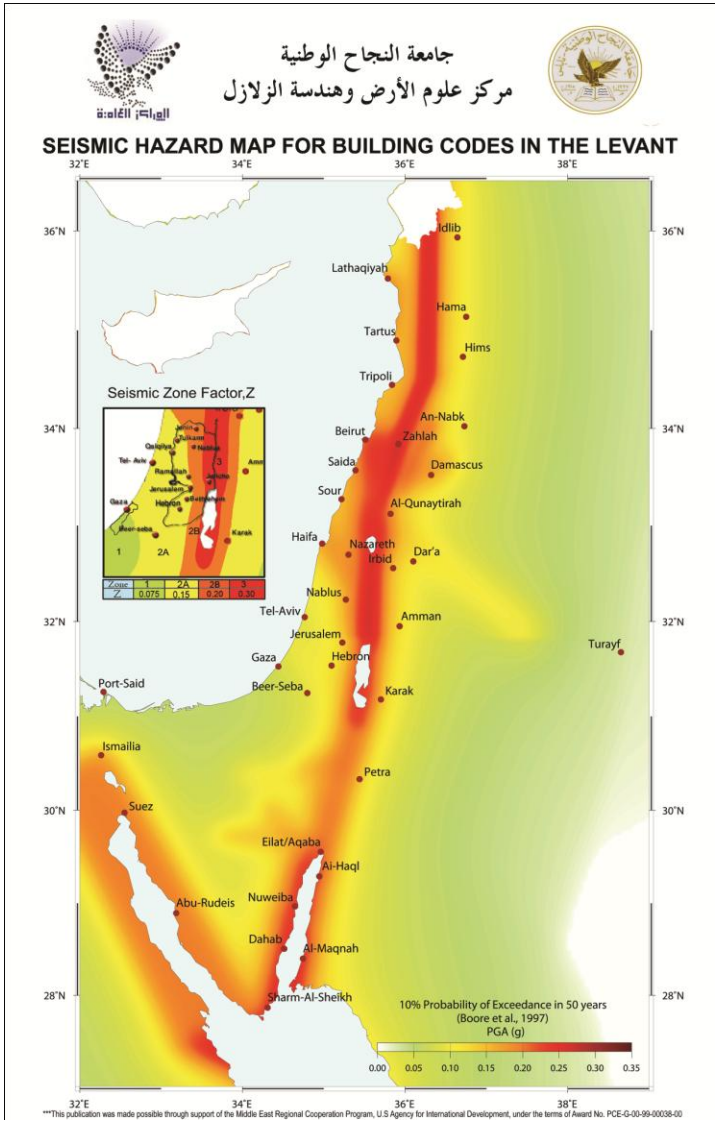
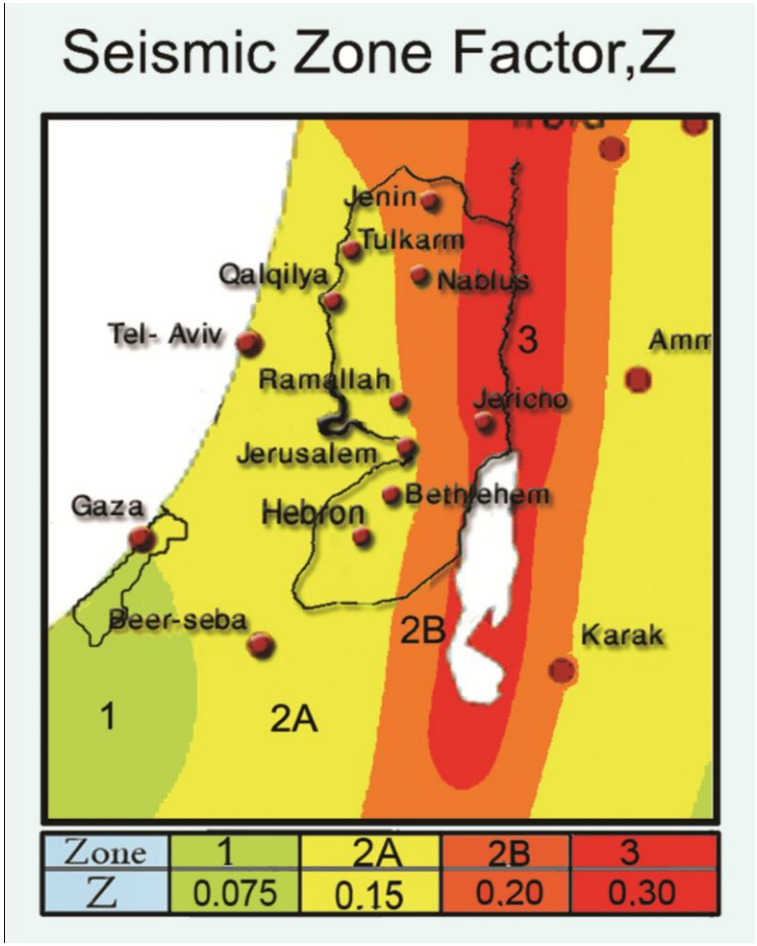
الخارطة الزلزالية





***This publication was made possible through support of the Middle East Regional Cooperation Program, U.S Agency for International Development, under the terms of Award No. PCE-G-00-99-00038-00

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Expected Earthquakes احتمال حصول زلازل في المستقبل

$$M_{max} = 6.5$$

$$7 > M > 6$$

Where is the problem: المشكلة الحقيقية

- ✓ **The Earthquake Magnitude ??** قوة الزلزال المتوقع ... ؟ !
- ✓ **The Readiness / Preparedness** ام الجاهزية .. !! ؟

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Seismic Vulnerability of Palestinian Common Buildings

قابلية الاصابة الزلزالية لانماط المباني الدارجة محليّا

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Jalal Al Dabbeek, An Najah National University, Palestine

العوامل التي تؤثر على قابلية الإصابة الزلزالية للمباني

Factors Affecting the seismic Vulnerability of Buildings

Structural Systems – النظام الإنشائي

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Old Masonry Buildings:
Cross Volts and Barrel Systems

Non Reinforced Concrete Bearing Walls

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النظام الانشائي وقابلية الاصابة

Structural Systems and Seismic Vulnerability

يعتبر النظام الانشائي للمباني من اهم العوامل التي تؤثر على قابليتها للإصابة الزلزالية وبالتالي على السلوك الزلزالي المتوقع لهذه المباني ويمكن تصنيف المباني من حيث قابليتها للإصابة كما هو موّضح في الجدول التالي :

أنواع المباني وفئات قابلية الإصابة [مصدر (Es)].

نوع المبنى	النظام الإنشائي	فئات قابلية الإصابة Vulnerability Class A	B	C	D	E	F
مبني من الطوب (masonry)	مباني من الحجارة (دبش قطع غير مصقولة) Rubble stone, Fieldstone	○					
	مباني طينية (من اللبن) adobe (earth brick)	○					
	مباني من الحجارة البسيطة (أشكالها غير معقدة) simple stone	○					
	مباني من الحجارة الكبيرة قوية متماسكة massive stone		○				
	مباني غير مسلحة (حجارة مصنعة) unreinforced, with manufactured stone units.	○					
	مباني غير مسلحة (لكن البلاطات مسلحة) unreinforced, with RC floors		○				
	مباني من الطوب المسلح reinforced or confined			○			
مبني من الخرسانة المسلحة (Reinforced Concrete RC)	إطارات غير مصممة لمقاومة الزلازل frame without ERD			○			
	إطارات مصممة تصميم متوسط لمقاومة الزلازل frame with moderate level of ERD				○		
	إطارات مصممة تصميم جيد لمقاومة الزلازل frame with high level of ERD					○	
	حدران مسلحة غير مصممة لمقاومة الزلازل walls without ERD		○				
	حدران مسلحة مصممة تصميم متوسط لمقاومة الزلازل walls with moderate level of ERD				○		
	حدران مسلحة مصممة تصميم جيد لمقاومة الزلازل walls with high level of ERD					○	
Steel	منشآت معدنية steel structures					○	
Wood	منشآت خشبية timber structures		○				

○ تشير إلى فئة قابلية الإصابة التي يقع فيها المبنى

—— احتمالية أقل لانتقال المبنى إلى الفئة الأخرى

—— احتمالية انتقال المبنى إلى الفئة الأخرى

ERD : التصميم المقاوم للزلازل (Earthquake Resistant Design)

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عامل تأثير الموقع
Local Site Effect

- أنظمة الصدوع الأرضية

Faulting Systems

- أثر التربة (تربة الموقع):

- التضخيم الزلزالي Amplification
- الانزلاقات الأرضية Landslides
- تميؤ التربة Liquefaction

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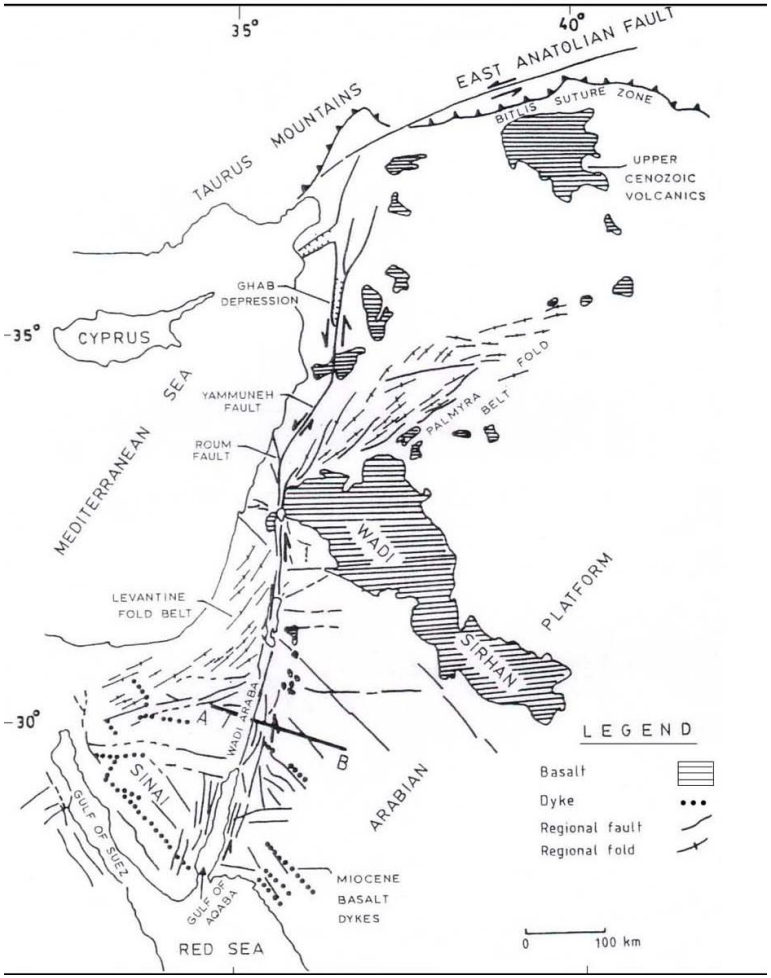
Tectonic Map Faulting Systems



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موقع فلسطين وتكتونية المنطقة

Faults

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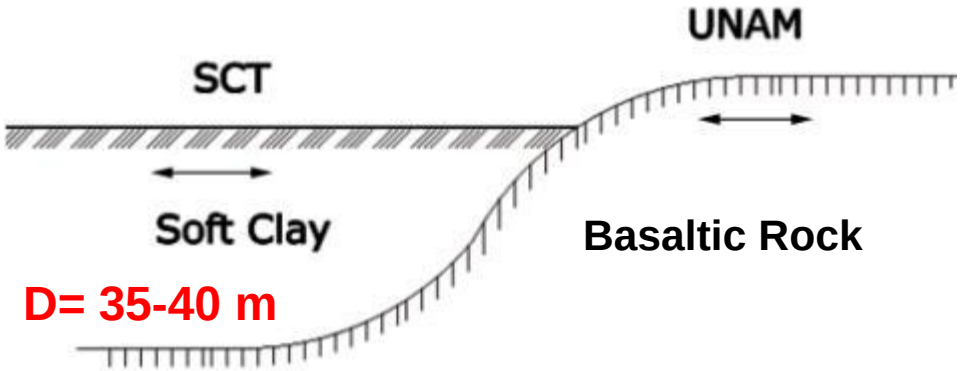
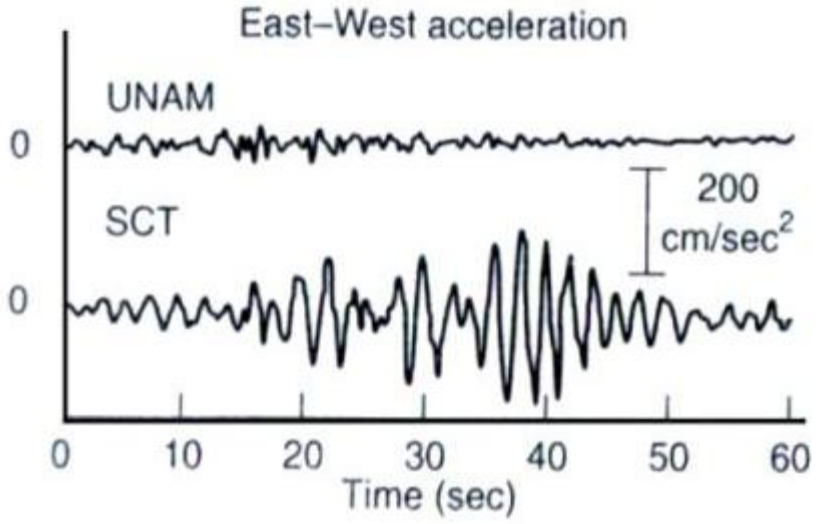
M=8.1كانت درجته 1985زلزال المكسيك،

Mexico City Earthquake, 1985

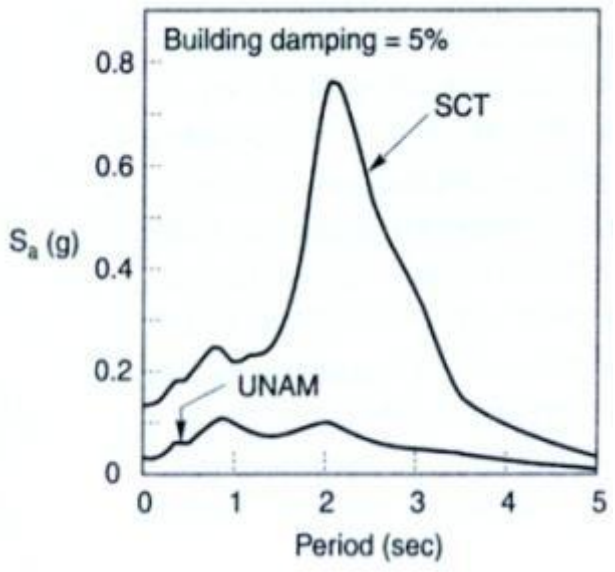


- **الموقعUNAM** تتكون تربته من : **Basaltic Rock**الصخر

- **الموقعSCT** تتكون تربتة من طبقة : **Soft Clay** يترواح من الطين الرخو (35-44 m عمقها بين ، ومعدل سرعة الموجات القاصة في هذه الطبقة75m/sec. تقريباً)



(a) Time Histories

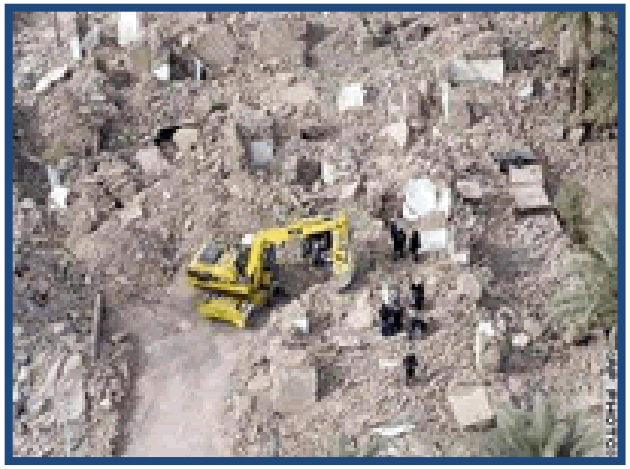


(b) Response Spectra

شكل (6.2): الحركات الأرضية السطحية

Time histories of acceleration recorded by strong motion instruments at UNAM and SCT sites

General Views of Bam after Earthquake



No collapse, Partial collapse, Total collapse

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IZMIT, TURKEY, 1999

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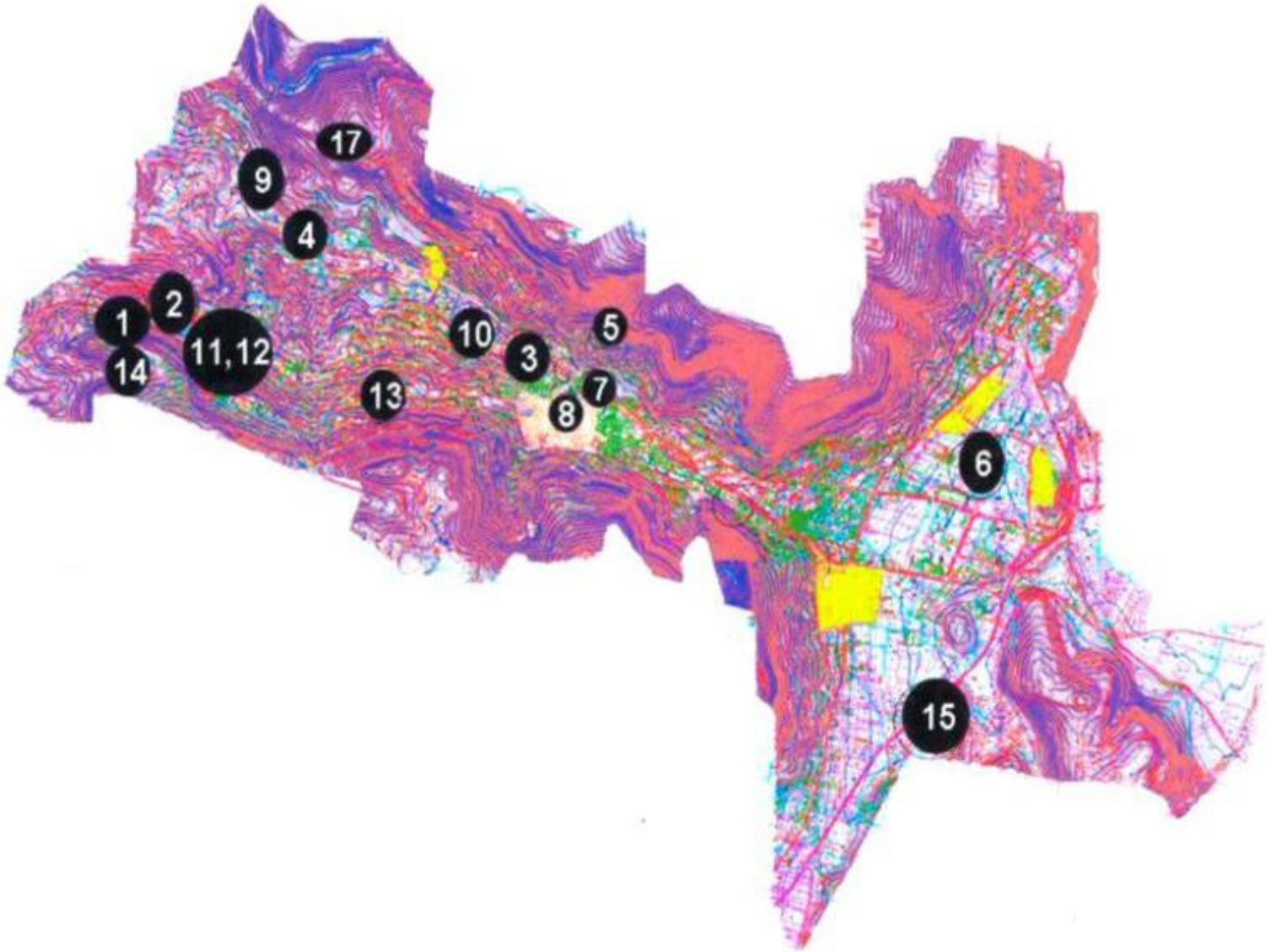

locations of measured sites in Nablus City.

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Liquefaction

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Liquefaction

Landslides - Palestine

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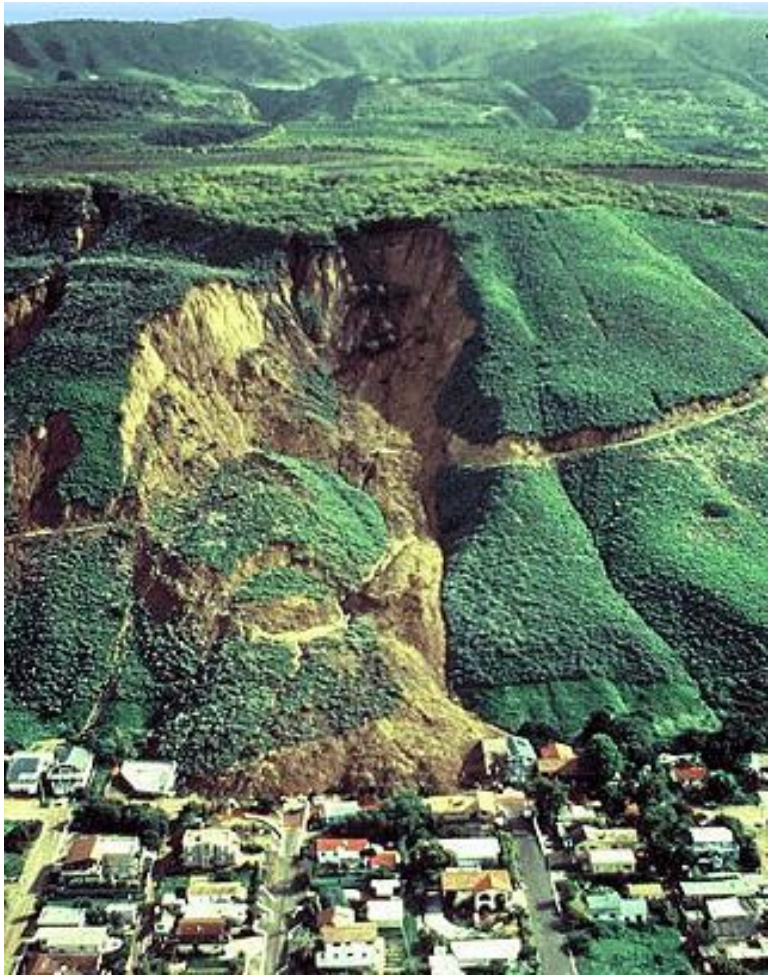

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الكشف الزلزالي او الاهتزازي

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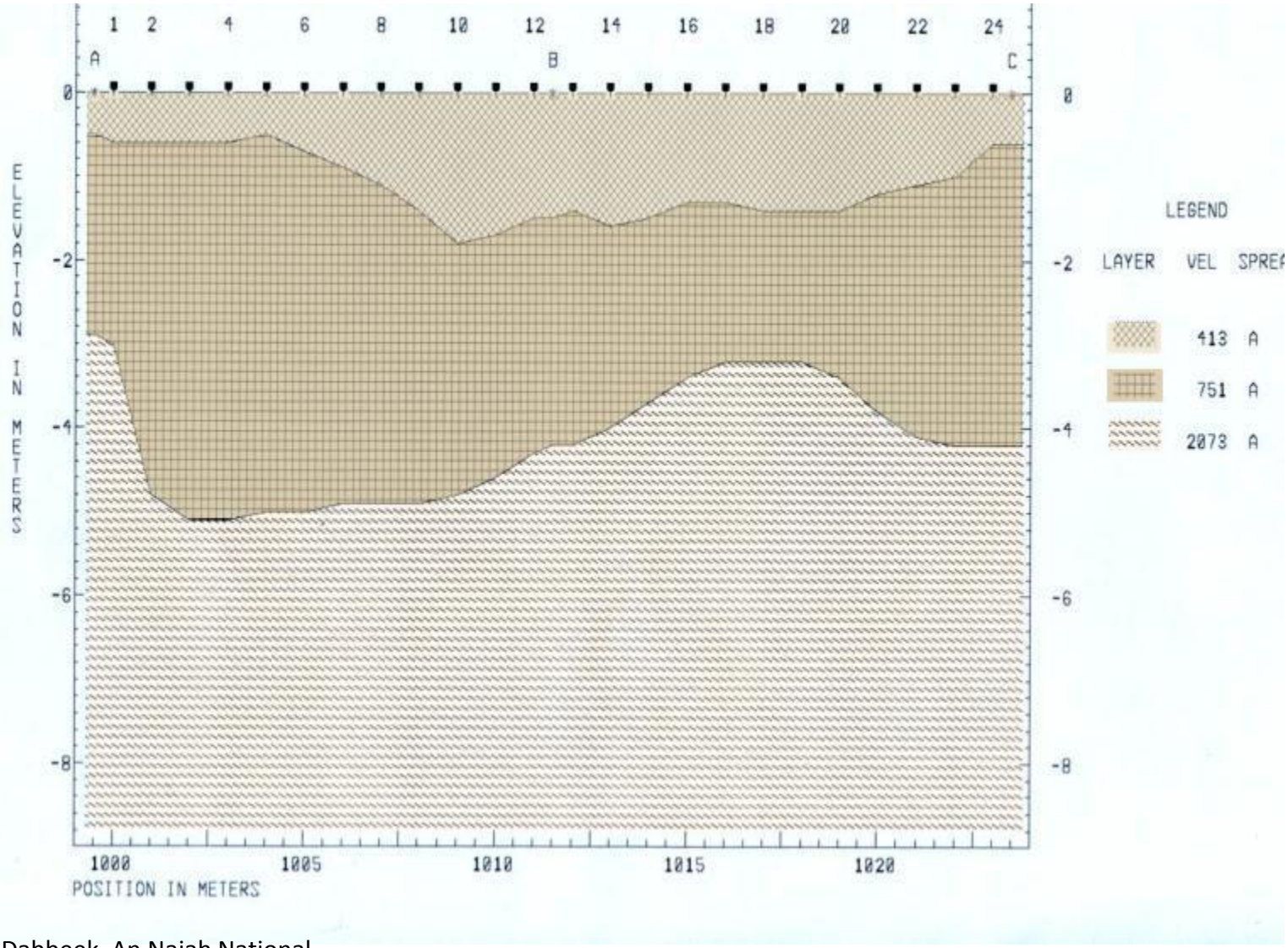

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To avoid the site effect….??

الحلّ ... !!!

سياسة استخدام الأراضي

Land Use

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تقييم المخاطر

المخاطر = مصدر الخطر * قابليّة الاصابة

الجاهزيّة او القدرة

$$\text{Risk} = \frac{\text{Hazard} * \text{Vulnerability}}{\text{Capacity}}$$

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Seismic Vulnerability of Palestinian Common Buildings

قابلية الاصابة الزلزالية لانماط المباني الدارجة محليّا

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Irregularity انعدام الانتظام والتماثل

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Irregularity انعدام الانتظام والتماثل

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انعدام الانتظام والتماثل
Irregularity

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Irregularity انعدام الانتظام والتماثل

Jalal Al Dabbeek, An Najah National University, Palestine

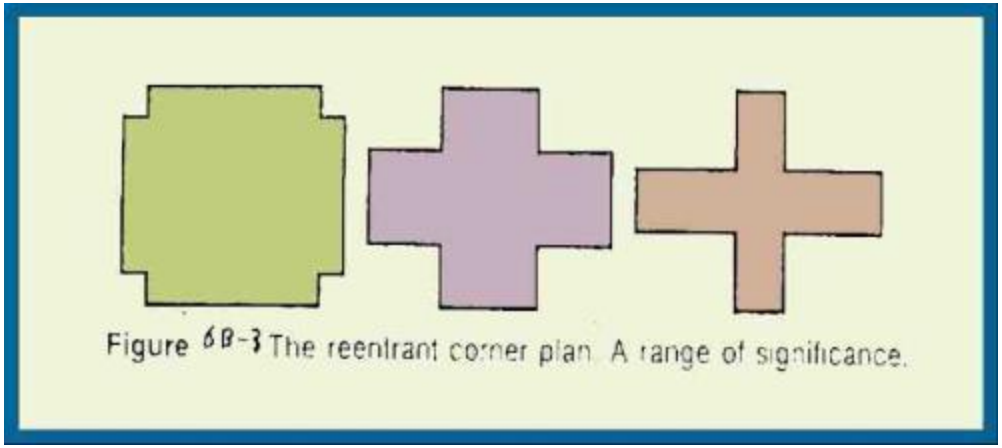
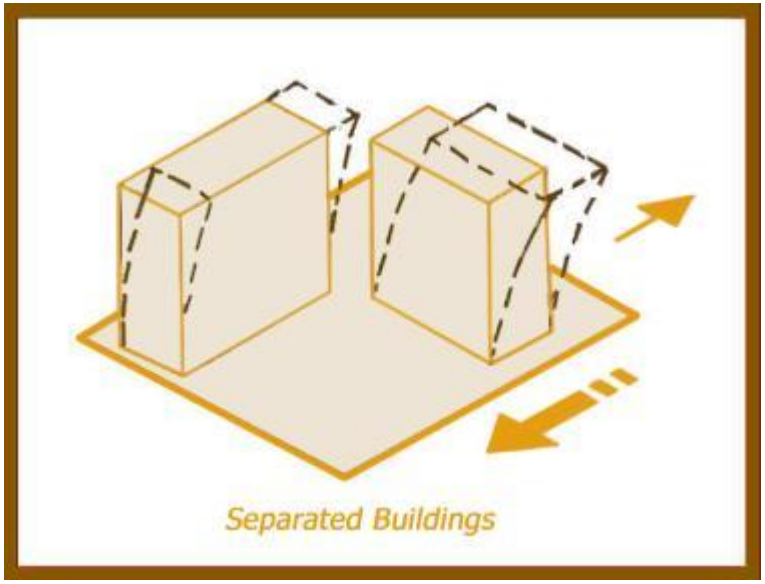
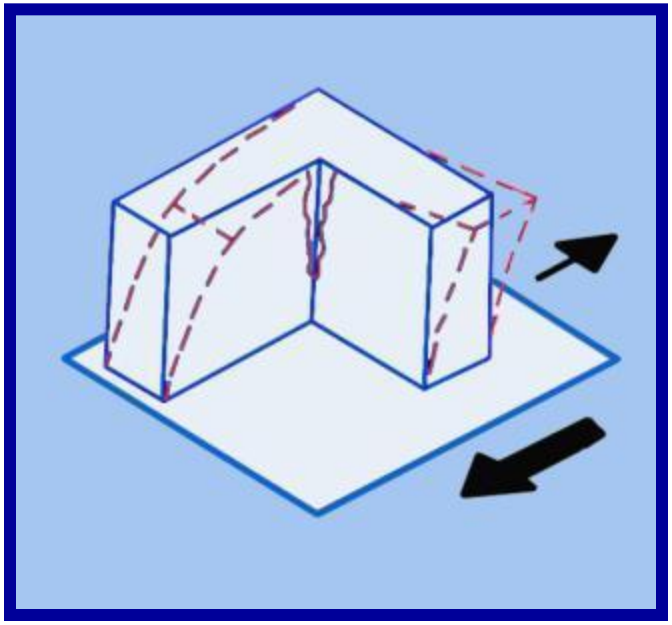


Figure 6B-3 The reentrant corner plan. A range of significance.





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Irregularity انعدام الانتظام والتماثل

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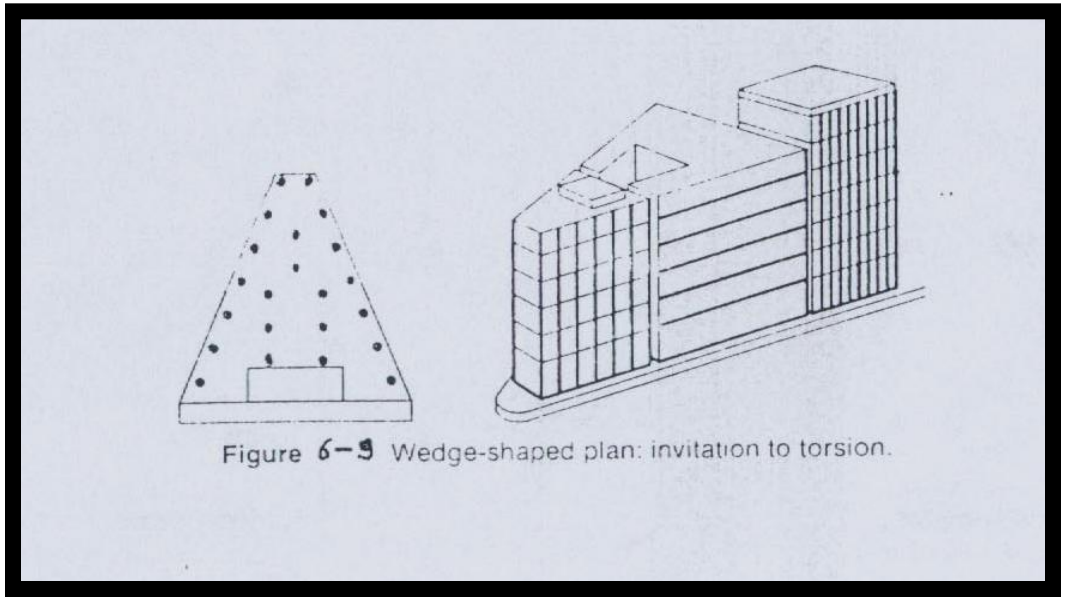
Irregularity انعدام الانتظام والتماثل



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Cantilever systems

الطيرانات

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Cantilever systems

الطيرانات

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Soft Story at the first floor

الطابق الرخو

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Soft Story

الطابق الرخو او الضعيف وانماط المباني الدارجة محلياً

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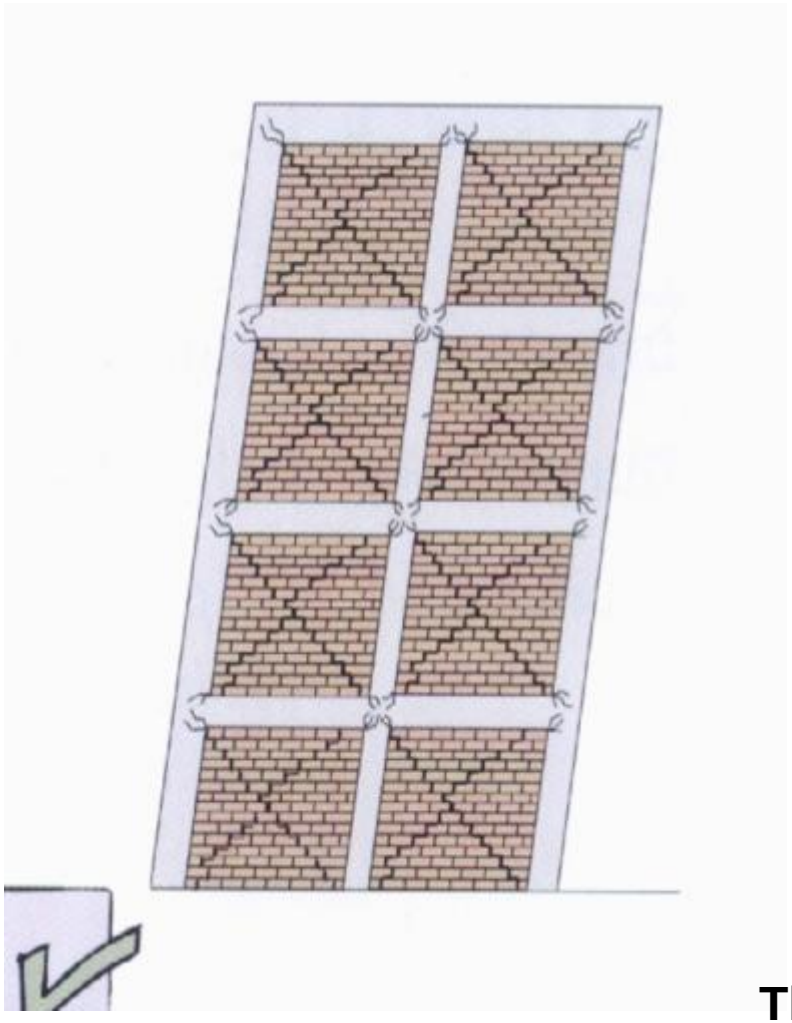

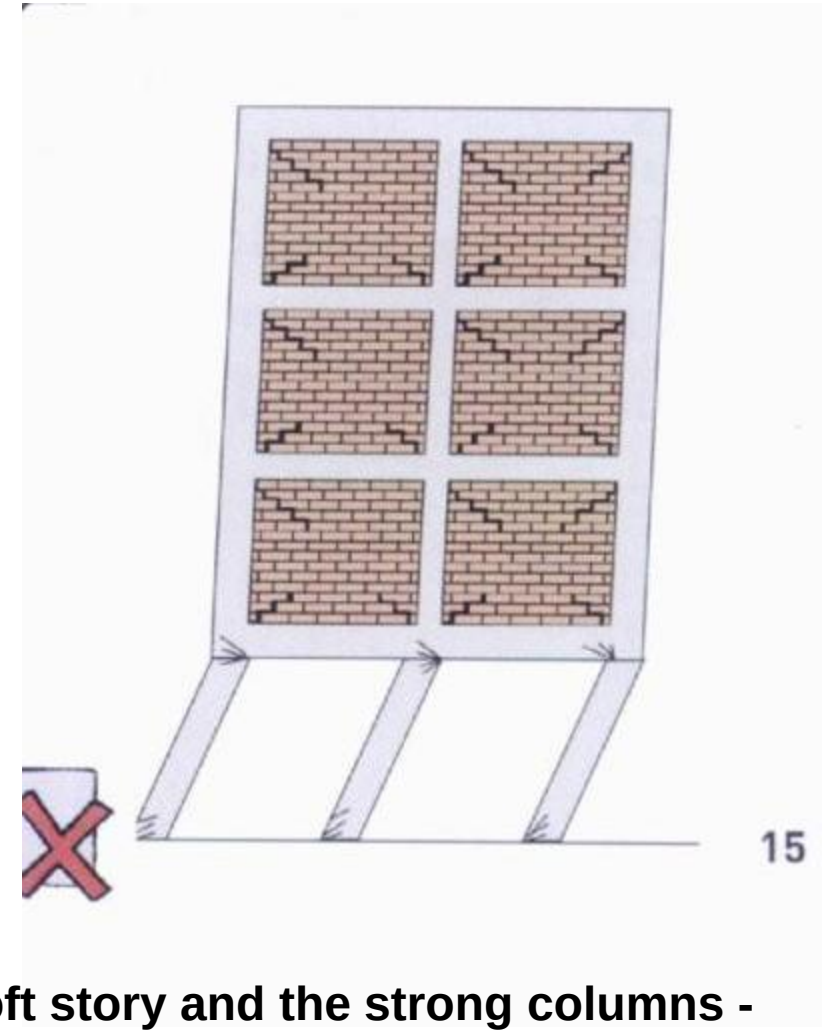

The soft story and the strong columns - weak beams concept.

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Soft Story

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Soft Story

Jalal Al Dabbeek, An Najah National University, Palestine

Soft Story

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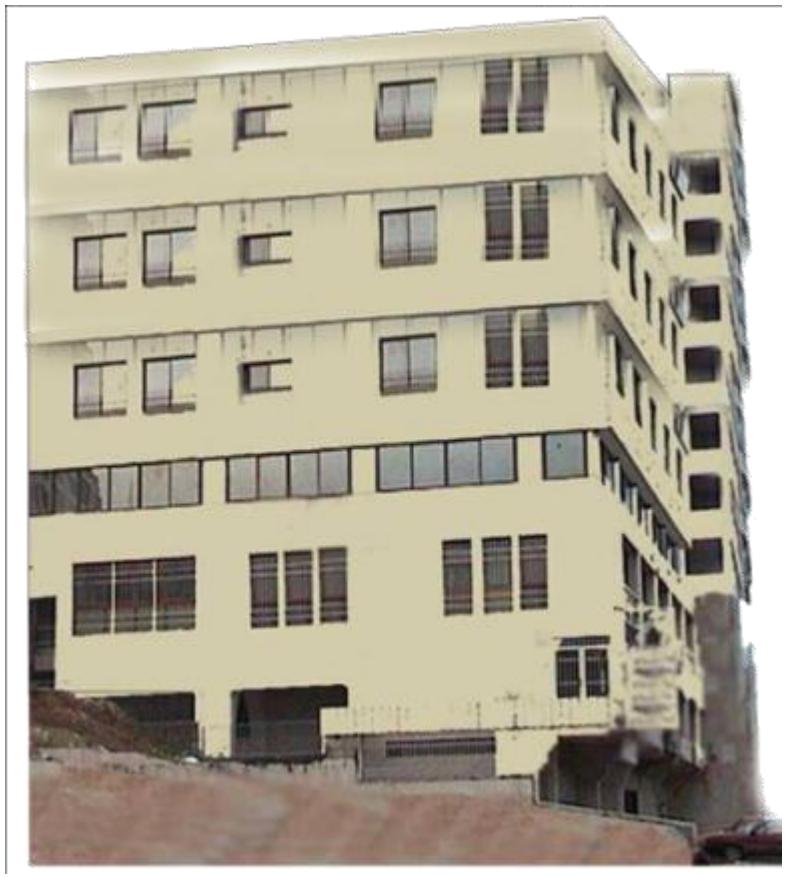

بعض أنماط المباني الدارجة محلياً ووجود طابق/ أو طوابق رخوة في الطوابق الوسطية أو المتكررة.

Soft Story

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Soft Story

زلزال تركيا 1999

تشكيل الطابق الرخو في الطوابق الوسطية

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زلزال الهند 2001

تشكيل الطابق الرخو في الطوابق الوسطية

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Jalal Al Dabbeek, An Najah National University, Palestine

Slenderness ratio نسبة النحافـة

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انقلاب مبنى نحيف زلزال كوبي، اليابان 1995

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الفواصل الزلزالية-

الفواصل الانشائيّة

Seismic Joints

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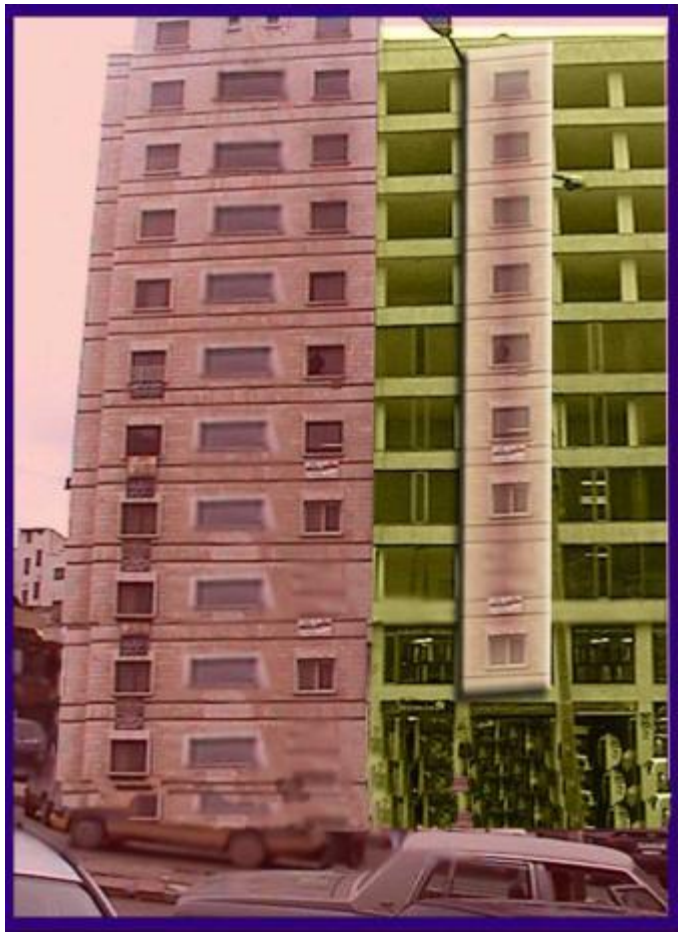
- Adjacent to other building.



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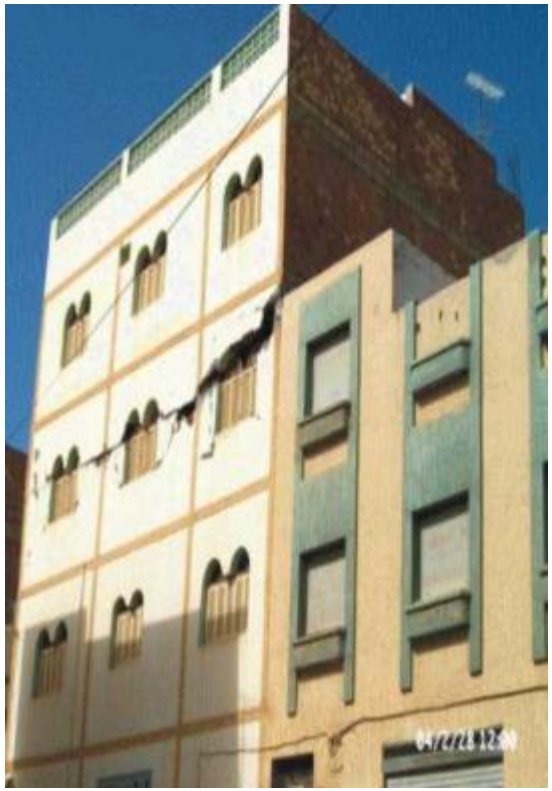
- Adjacent to other building.



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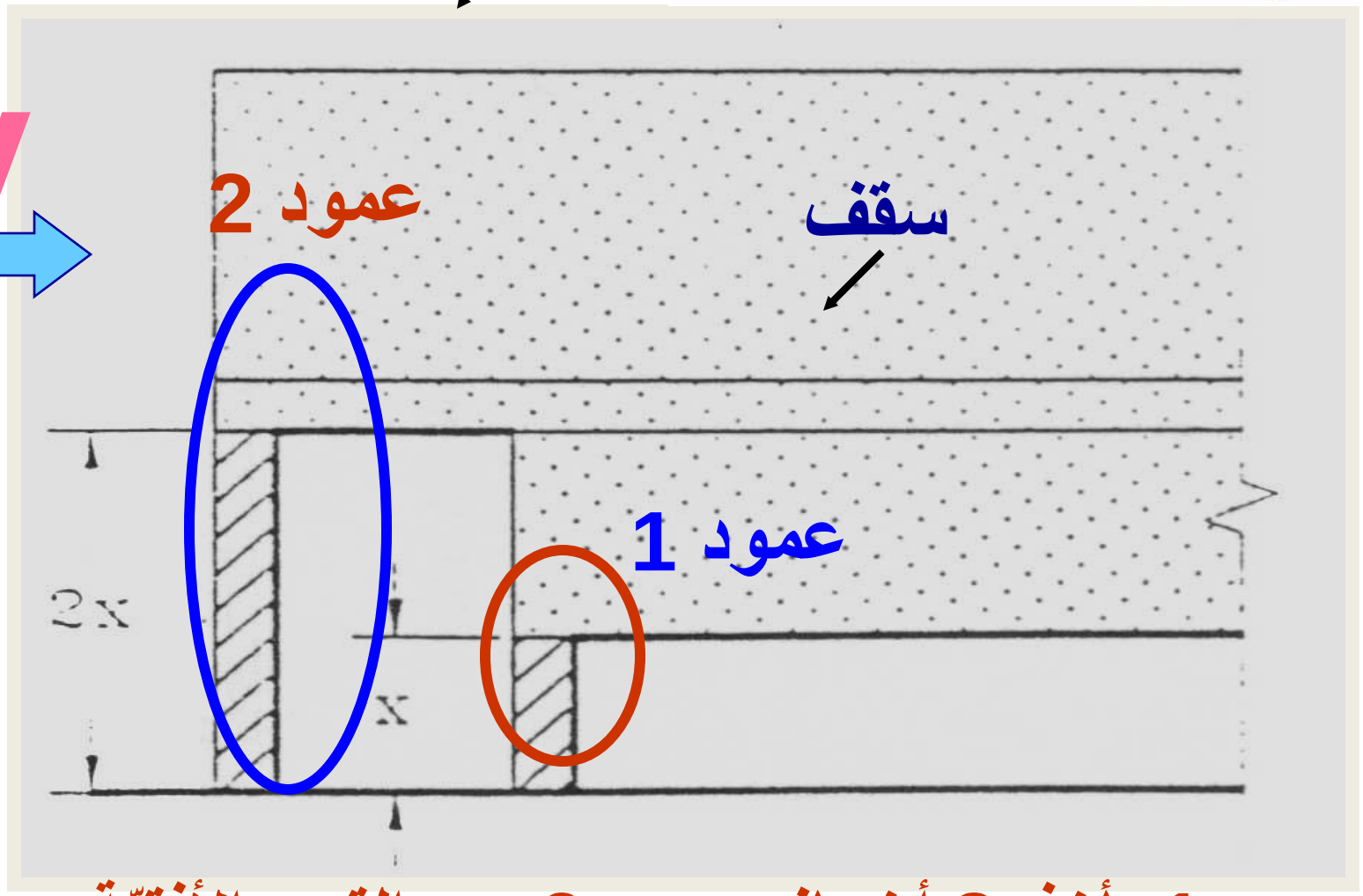

عمود1 يأخذ 8 أضعاف عمود 2 من القوى الأفقيّة

$$K = nEI / L^3$$

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Formation of short column.

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Quality and Workmanship

النوعية (المواد والتنفيذ)

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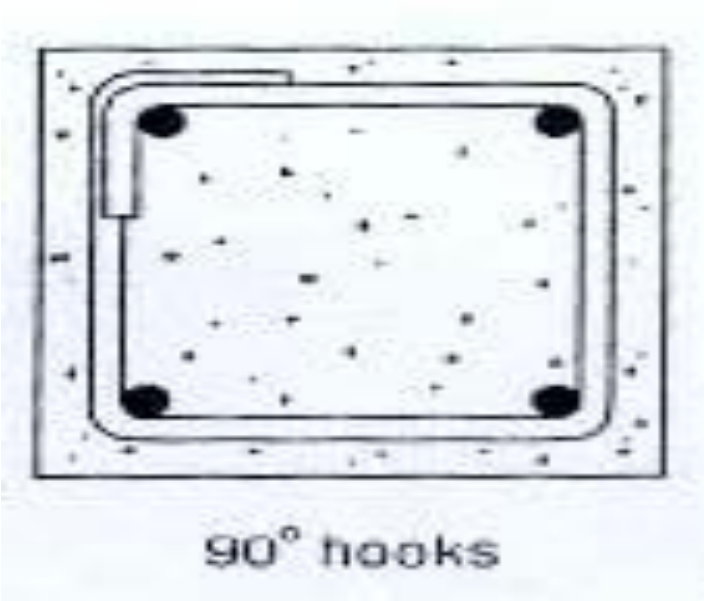
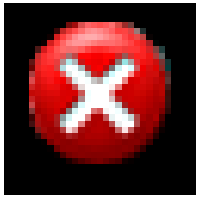
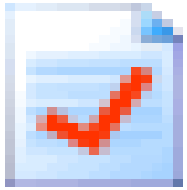
تفاصيل تسليح العناصر الانشائيّة







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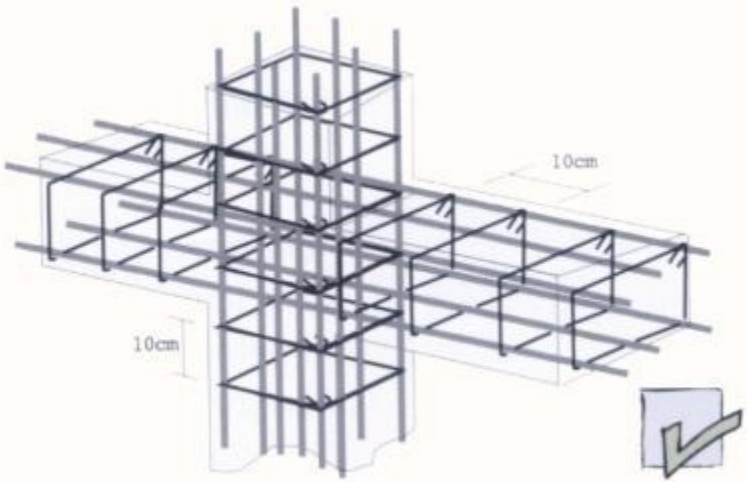

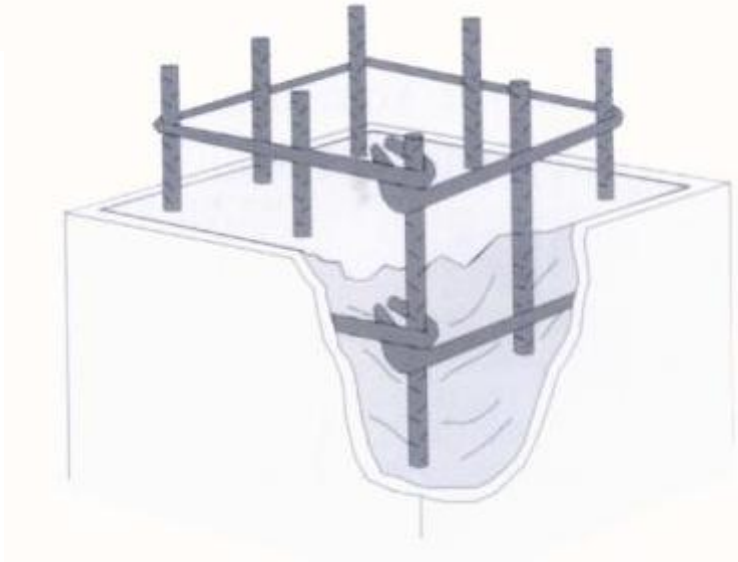

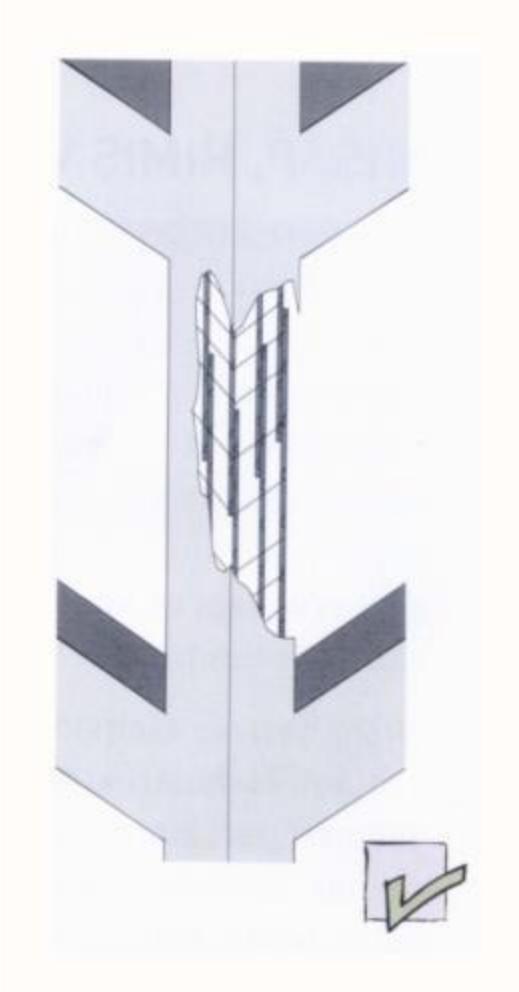

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أهمية المفاصل / العقد في الأعمدة الخارجية

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Figure 7: Formation of plastic hinge in the column near the beam-column joint in a hospital building in Mansehra

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ب. تشريك حديد التسليح واللحام

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Jalal Al Dabbeek, An Najah National University, Palestine

٣. صدأ وتآكل حديد التسليح:

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البناء القديم...
بناء فوق قائم قديم؟!

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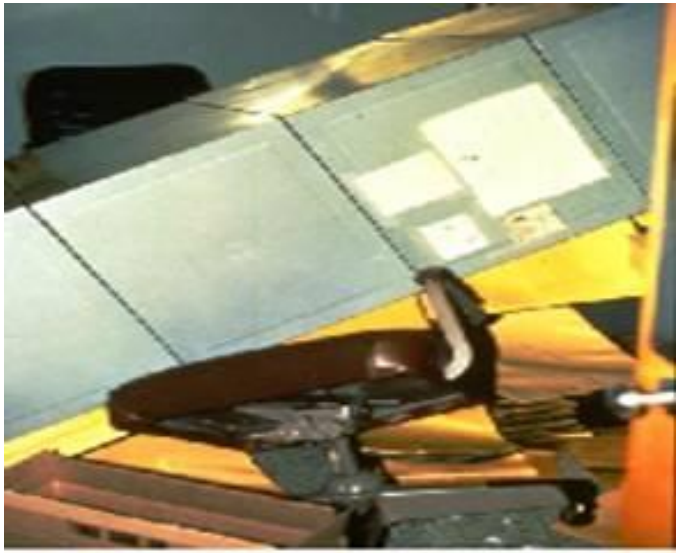
Jalal Al Dabbeek, An Najah National University, Palestine



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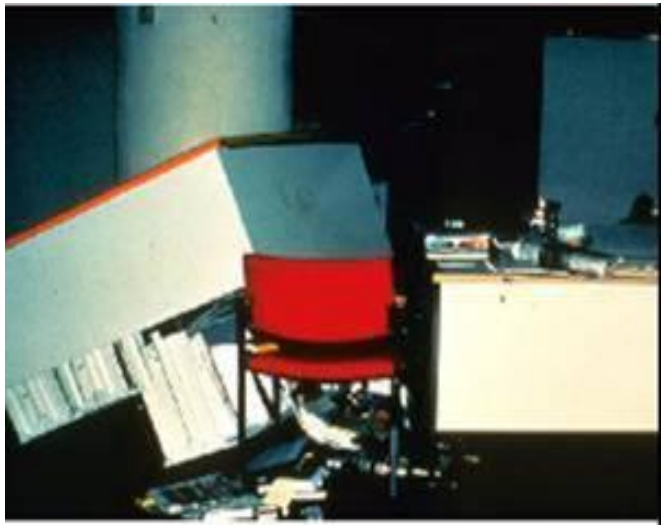

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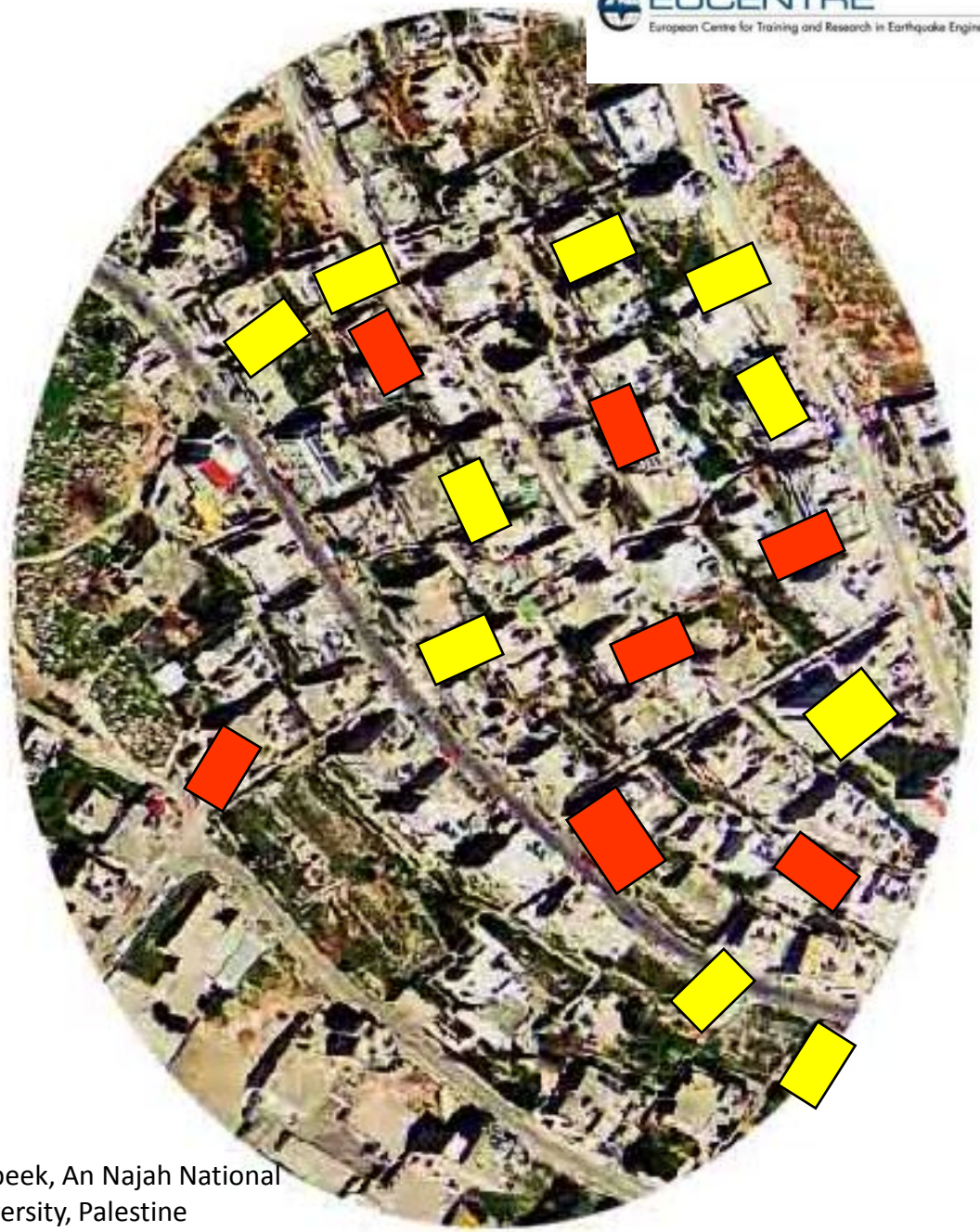

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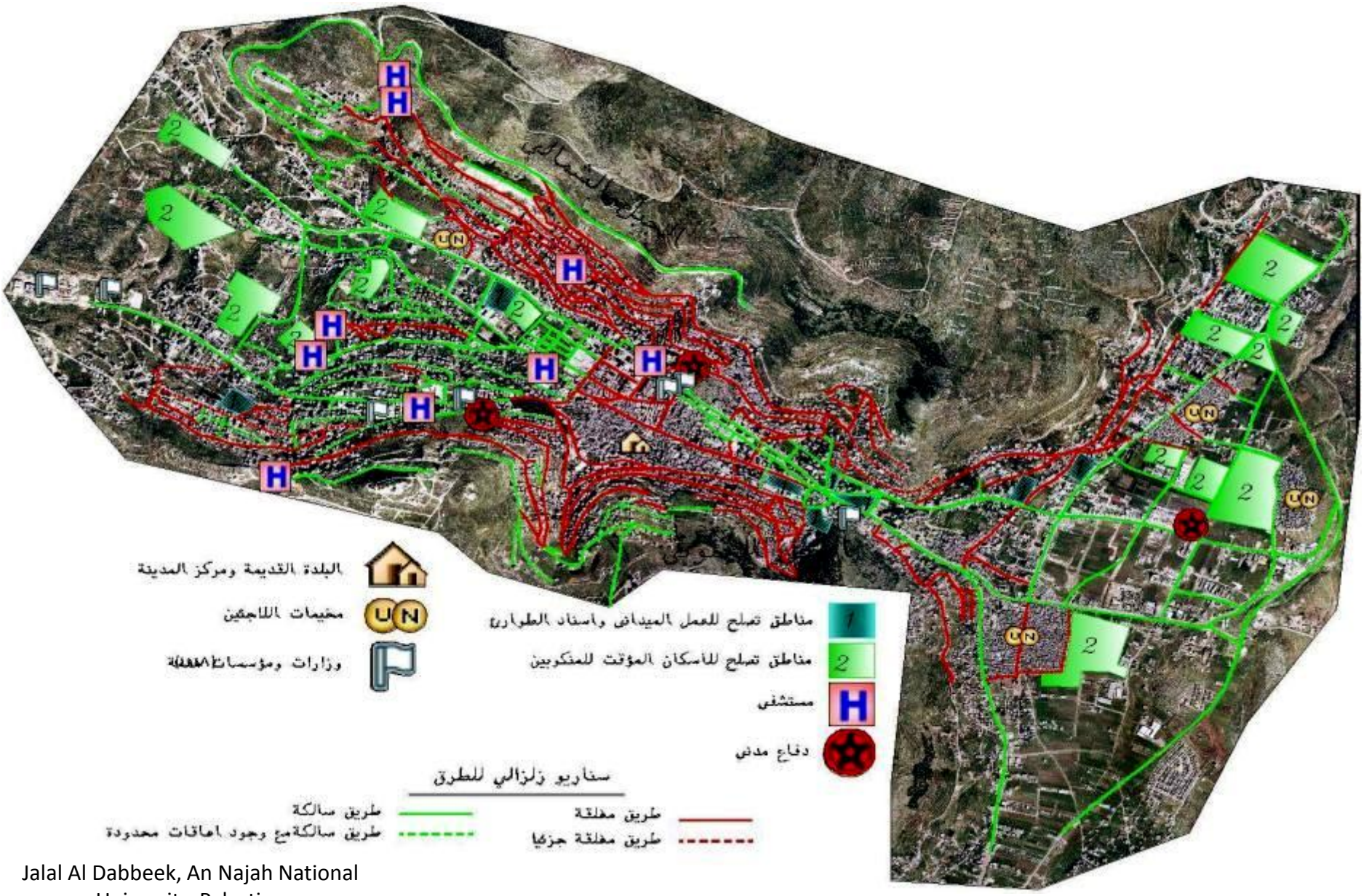

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The Integration Between SASPARM Project and International Activities and Programs on Disaster Risk Mitigations

التكامل بين مشروع تخفيف مخاطر الزلازل في قلسطين والفعاليات والبرامج الدولية في مجال تخفيف مخاطر الكوارث

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Hyogo Framework for Action 2005 – 2015

إطار عمل هيوغو في الفترة ما بين (٢٠٠٥-٢٠١٥)

Buildings the resilience of Nations and Communities to disasters

بناء قدرة الأمم والمجتمعات على مواجهة الكوارث

Priorities Action أولويات العمل

- **Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.**
- **Identify, assess and monitor disaster risks and enhance early warning.**
- **Use knowledge, innovation and education to build a culture of safety and resilience at all levels.**
- **Reduce the underlying risk factors**
- **Strengthen disaster preparedness for effective response at all levels.**

- ضمان إعتبار الحد من مخاطر الكوارث أولوية وطنية ومحلية قائمة على قاعدة مؤسسية صلبة التنفيذ
- تحديد مخاطر الكوارث وتقييمها ورصدها وتعزيز الإنذار المبكر
- الاستفادة من المعرفة والإبتكارات والتعليم لبناء ثقافة للسلامة والقدرة على مواجهة الكوارث على جميع المستويات
- الحد من عوامل المخاطر الأساسية
- تعزيز التأهب للكوارث بغية التصدي لها بفاعلية على جميع المستويات.

تمكين المدن من مجابهة الكوارث:
مدينتي تستعد!

Making Cities Resilient:
My City is Getting Ready

الحملة العالمية للحد من الكوارث

World Disaster Reduction Campaign

هل مدينتك مستعدة؟

Is your city ready?

www.unisdr.org/campaign

Jalal Al Dabbeek, An Najah National University, Palestine

Building the resilience of nations and communities to disasters

بناء قدرات الامم والمجتمعات لمواجهة الكوارث

ايجاد البنية الفعّالة و السّياسة الحكيمة و الجهاز القادر

Examples from ME and ..

Jalal Al Dabbeek, An Najah National University, Palestine

THANKS

زوروا:
موقع تخفيف مخاطر الزلازل في فلسطين

www.sasparm.ps

موقع المركز:
جامعة النجاح الوطنية
مركز التخطيط الحضري والحد من مخاطر الكوارث

www.najah.edu

seiscen@najah.edu

شكراً لحسن اصغائكم