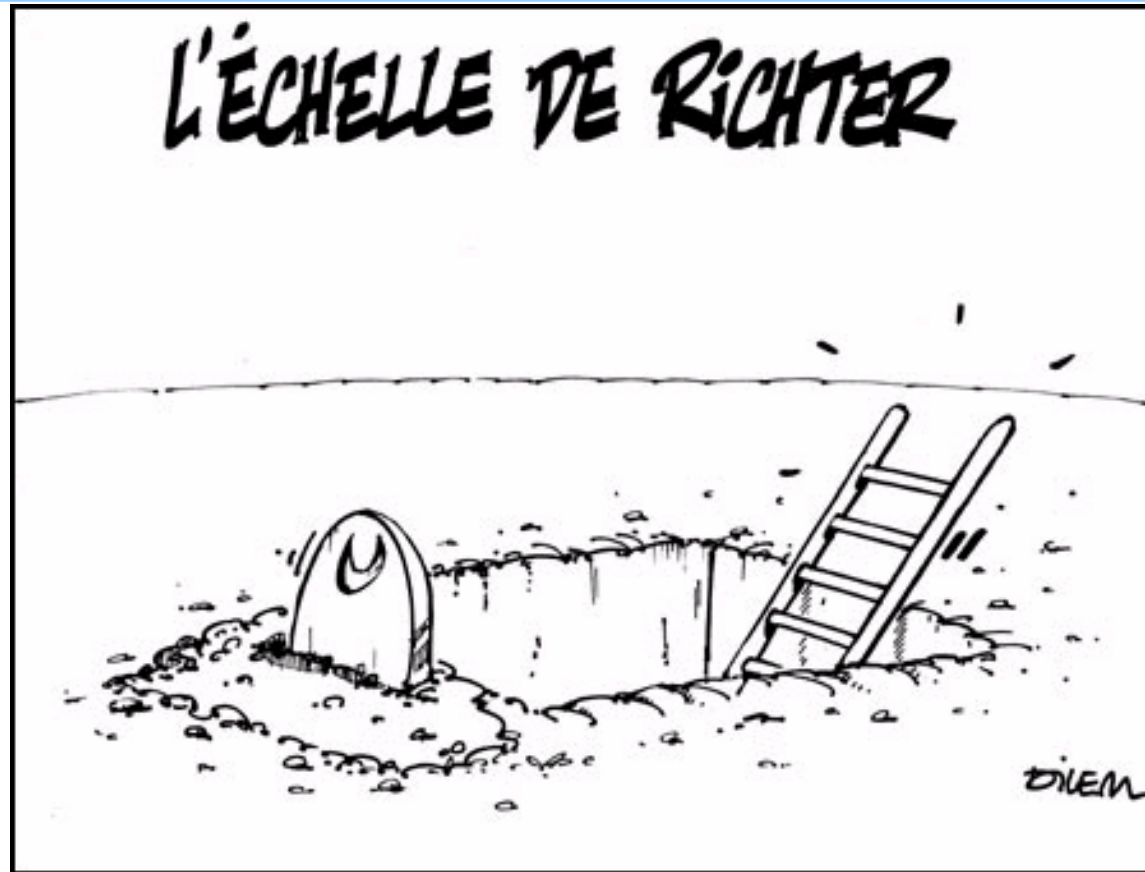


Zenzla or not zenzla.. that is the question



Omar Khemici

Algerian American Association of Northern California
January 26, 2006



Outline of Presentation

- What is the earthquake hazard in the Bay Area?
- How should we prepare for the Big One?
- Do we need to buy earthquake insurance?
- Why are there so many casualties from earthquakes in Algeria?
- What should people and government do to reduce the large loss of life from earthquakes in Algeria?
- Should we move back home or stay put here, what are the odds saying in terms of zenzla?



Let's Start with the Bay Area...



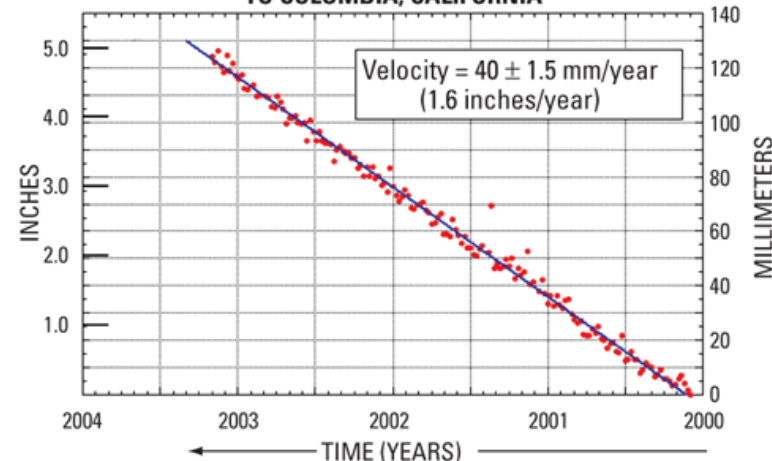
Tectonic Environment in the Bay Area

<http://pubs.usgs.gov/fs/2003/fs039-03/>

FAULTS AND PLATE MOTIONS IN THE SAN FRANCISCO BAY REGION



MOTION OF FARALLON ISLANDS IN N36°W DIRECTION RELATIVE TO COLUMBIA, CALIFORNIA

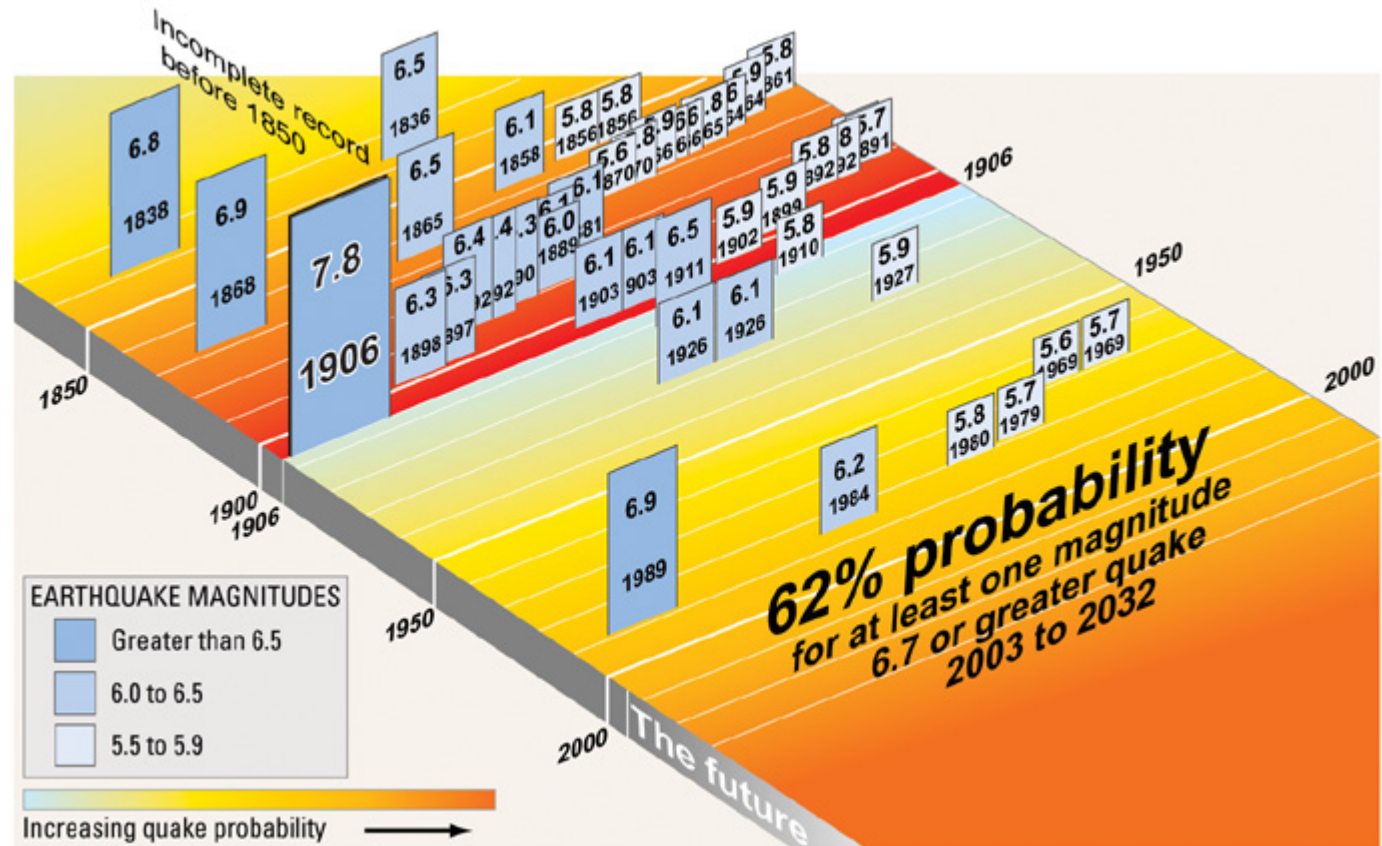


<http://pubs.usgs.gov/fs/2003/fs039-03/>



Historical Events in the Bay Area

<http://pubs.usgs.gov/fs/2003/fs039-03/balance.html>



Earthquake Insurance Coverage

- **You can check the premium rates at:**
www.earthquakeauthority.com

- **Rates vary according to:**
 - Location (proximity to faults/soil type)
 - Age of Property (building code in-force)
 - Type of Property (Single Family/Condo/Mobile Home)
 - Construction Type (Wood Frame/Masonry/etc.)



Example of Premiums

■ Assume that the replacement cost of your property is \$300,000 (say 2,000ft² @ \$150/ft²)

City	Year Built	\$300K/\$5K/\$1.5K & 15%Ded	\$300K/\$5K/\$1.5K & 10%Ded
Foster City Campbell Hayward	>1991	990	1,275
	1979-1990	1,125	1,455
	<1978	1,440	1,860
Napa	>1991	600	780
	1979-1990	690	885
	<1978	885	1,140
Los Gatos	>1991	585	750
	1979-1990	660	855
	<1978	840	1,080
Sacramento	>1991	240	315
	1979-1990	270	360
	<1978	345	450



Is the earthquake insurance worth it?

With a 10% deductible policy you need to pay out-of-pocket the first \$30,000 in damages before you get a check in the mail from your insurance. So, you need to understand your risk before you decide by asking these fundamental questions:

1. Is my property located near active faults?
2. Is my property built on soft soil?
3. Is my property built on a slope?
4. Is my property built over a garage?
5. Is my property bolted to the foundation?
6. Is my chimney braced?
7. Is my cripple walls braced?
8. Is my water heater securely fastened?

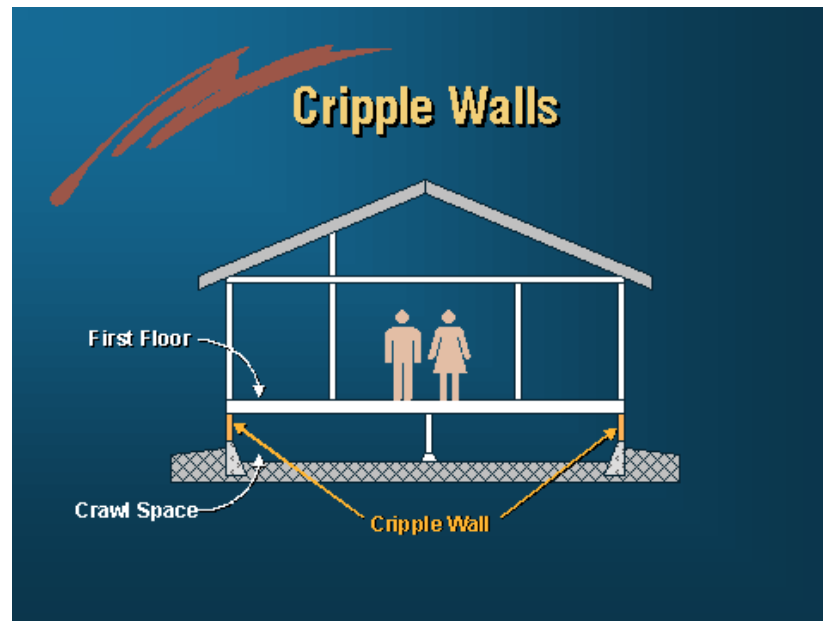
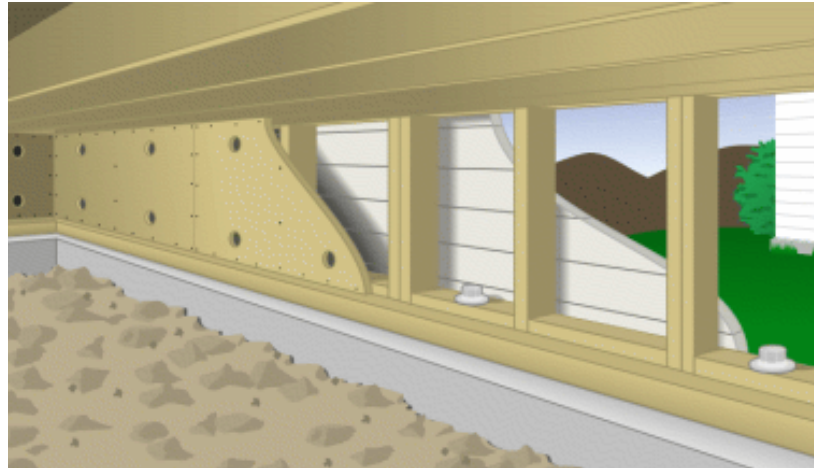
Any “Yes” to questions 1, 2, 3 and 4 and any “No” to 5, 6, 7 and 8 should raise the flag. The higher the flag the faster you need to act and fix the problem and/or purchase insurance coverage to protect your property!

Visit www.abag.ca.gov for excellent literature on how to get ready!!



What is a cripple wall?

<http://www.abag.ca.gov>



What if I do not bolt my home to the foundation?

<http://www.abag.ca.gov>



Any Alternative?

- If the problems are in your homes and not due to the hazards (proximity to fault, slope, soft soil) you can invest in fixing the vulnerabilities in your home. This could be a cost effective alternative if properly implemented.
- Although costs vary, the typical home retrofit that does not require an engineer costs about \$5,000. Add up to about \$5,000 if you consult an engineer.
- Download helpful booklets at http://www.seismic.ca.gov/pub/CSSC_2005-01_HOG.pdf



Does retrofitting pay off? You bet!

Northridge Retrofit Success

A family spent \$3,200 in 1993 retrofitting their home built in 1911.

None of their neighbors did any work. When the 1994 Northridge earthquake hit, this home was the **only one** on both sides of the street for two blocks that was **not damaged**.

*James Russell, Codes
Consultant*



Renter?

<http://www.earthquakecountry.info>

As a renter, you have less control over the structural integrity of your building, but you *do* control which building you rent.

- **Apartment buildings can have many of the same structural issues as houses.**
- **Structures made of unreinforced masonry (such as brick) and with soft first stories (such as parking space openings) have caused great loss of life in earthquakes.**
- **Foundation and cripple wall failures have led to expensive damage but less loss of life.**
- **Objects attached to the sides of buildings, such as staircases and balconies, have often broken off in earthquakes, injuring those below.**

Ask your landlord these questions:

- **What retrofitting has been done on this building?**
- **Have the water heaters been strapped to the wall studs?**
- **Can I secure furniture to the walls?**



Soft-story Apartment Buildings

<http://www.abag.ca.gov>

■ San Francisco's Building Department determined that the collapse of these apartments is likely to be responsible for about half of all of the damage to privately-owned buildings in that city in a magnitude 7.2 San Andreas earthquake. The Earthquake Engineering Research Institute's Northern California Chapter estimates that there are approximately 15,000 of these buildings in the nine-county Bay Area. Based on city and county data, there are 2,630 of these buildings in Santa Clara County housing about 90,000 people and 5,700 soft story buildings in San Francisco housing about 180,000 people.

Sidesway: 1994



Sidesway: 1971



Collapse: 1989

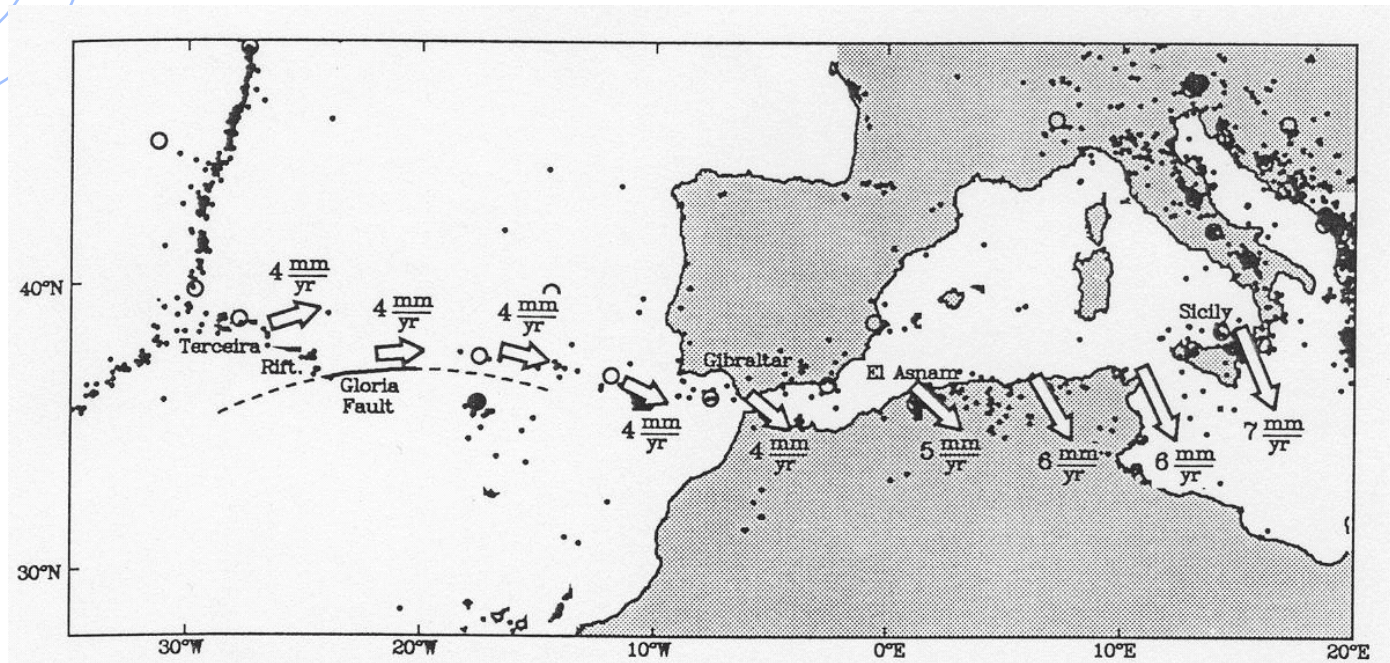


Let's take a look at what is going on in Algeria



Tectonics

Argus et al., 1991

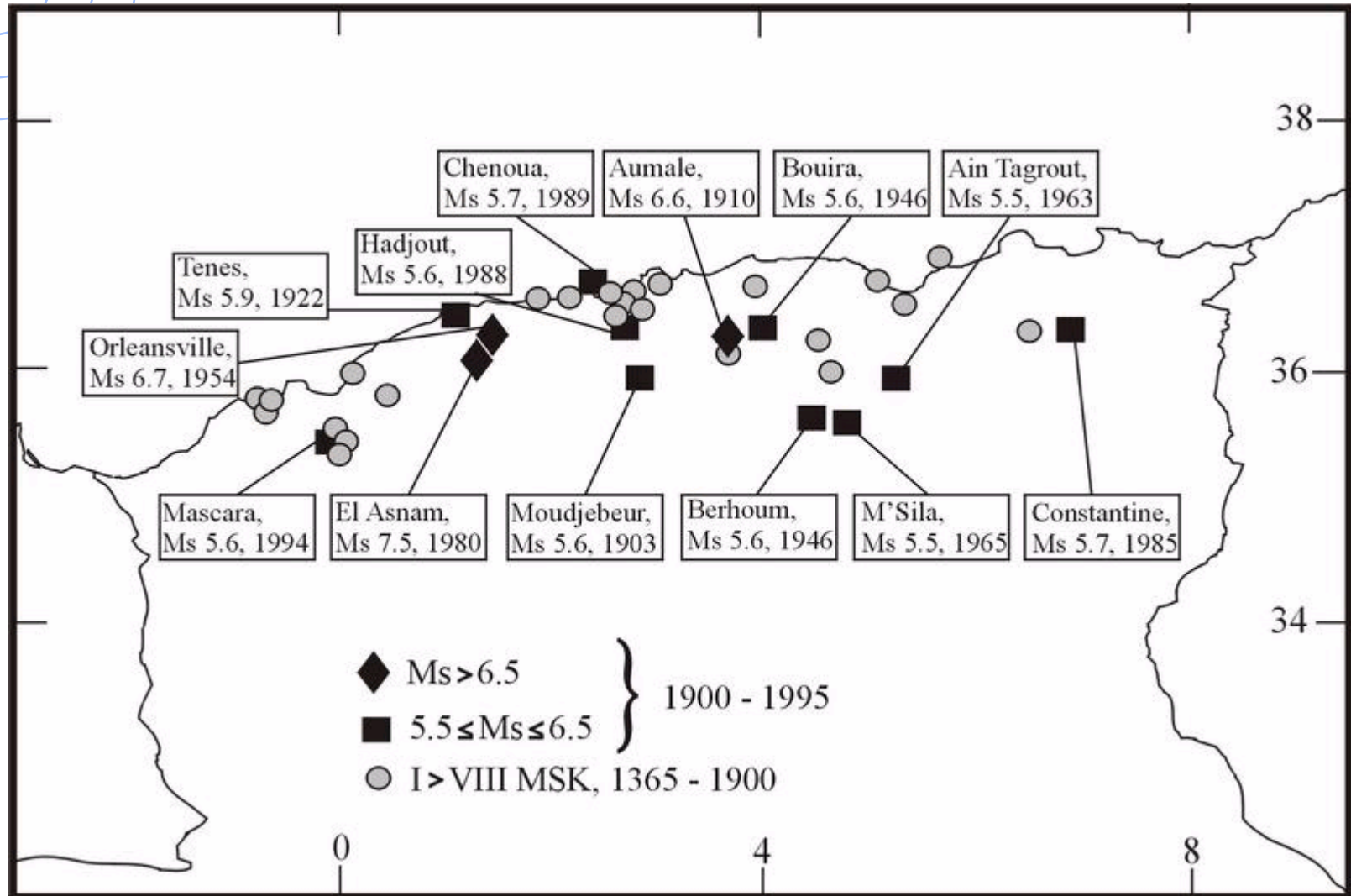


Map showing average early displacement between the African and Eurasian plates



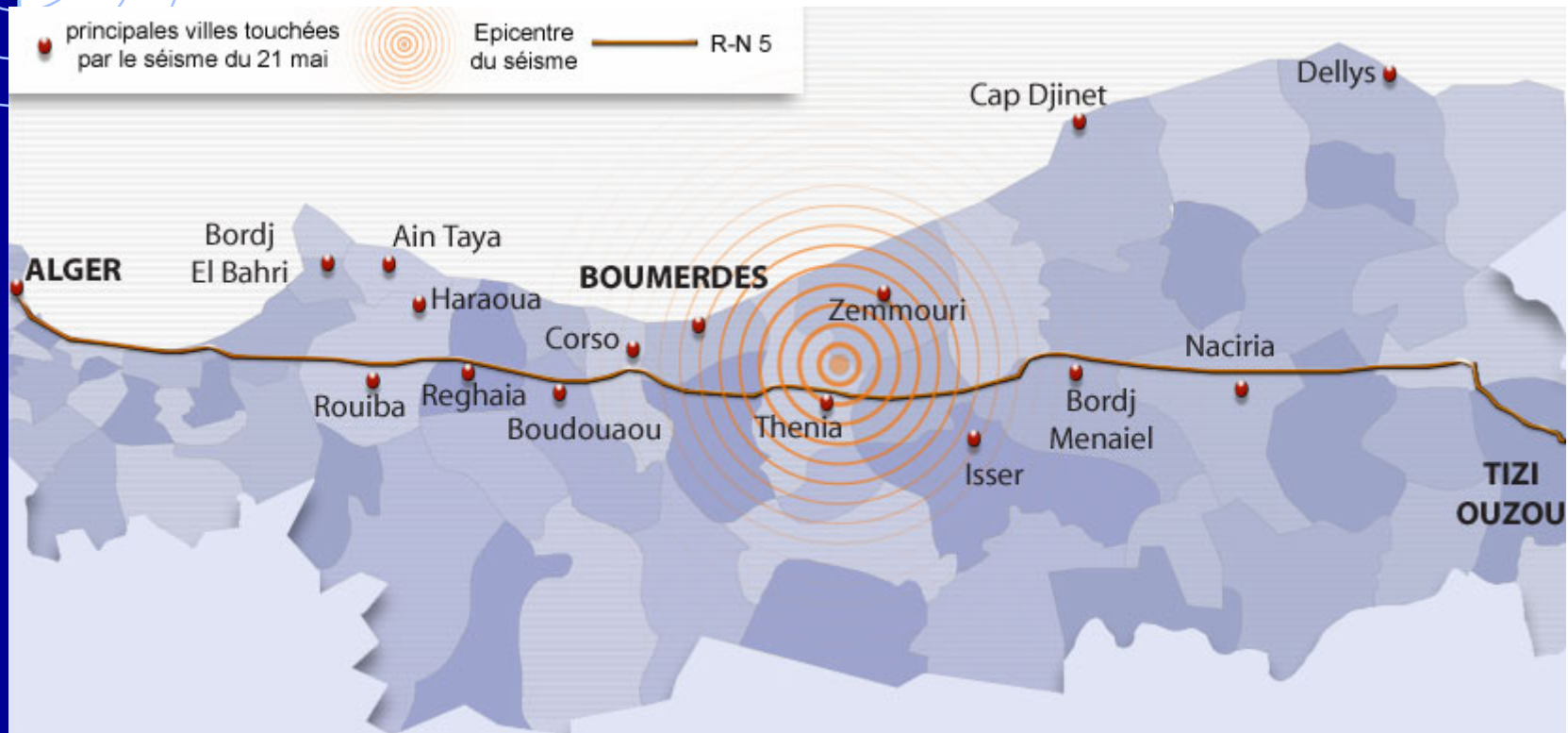
Historic Seismicity

Benouar



Map of Epicentral Region

Reference unknown



Apartment Building Damage



Apartment Building in Boumerdes



Apartment Building Damage



Apartment Building in Boumerdes



Apartment Building Damage



Old Masonry (1880-1930) Apartment Buildings in Algiers
Smaller Building is a School



Apartment Building Damage



Old Masonry (1880-1930) Apartment Buildings in Algiers



Apartment Building Damage



Old Masonry (1880-1930) Apartment Buildings in Algiers



Single Family Home Damage



Single Family Home Damage



Home Still Under Construction: P-D Effect



Typical New Construction of Apartment Buildings



Undamaged RC with Masonry Walls Apartment Building



What contributed to the large loss of life and property damage in the past earthquakes in Algeria?

Each damaged site may have had one or more of these reasons:

- Non-ductile concrete (inadequate steel reinforcing)
- Soft-story buildings (openings for high garages and stores at the ground level)
- Short column (“vide sanitaire”)
- Heavy beams/weak columns
- Poor concrete (inadequate ratios of cement/sand/gravel poorly mixed)
- High amplification due to soft soil (alluvium soil)
- Etc.



What should have been done to avoid the tragedies?

All of the reasons listed led to large scale building failure and loss of life that could have been avoided or mitigated had:

1. A competent structural engineer been consulted
2. A competent contractor hired, and
3. A proper on-site inspection performed during construction.

Important Note: In the case of Boumerdes the design code did not recognize the higher seismic hazard in the region.



Earthquake Engineering in Algeria

- At least up to 1975 no earthquake engineering taught at the university
- First Algerian seismic code introduced in 1981 (RPA 81) with the assistance of Stanford University.
- Several revisions followed several earthquakes
- Latest revision is RPA 99 version 2003 following the Boumerdes Earthquake



Enforcement of Earthquake Design

- Design code is more or less enforced for public and commercial buildings
- Private residential constructions did not require code enforcement till recently (2004-2005?)
- Since the Boumerdes Earthquake building officials require an earthquake design prior to issuing building permits



Remaining Weak Links in the Private Residential Sector

- **As of the summer of 2005, drawings and calc are not always submitted to city officials in order to get the building permit especially in remote locations**
- **On-site checking is not done**
- **Building contractors are still not required to prove qualifications, so anyone can start this lucrative but highly dangerous business**



Earthquake Insurance in Algeria

<http://www.cna.dz>

- Following the Boumerdes Earthquake a compulsory insurance called “CatNat” has been ordered through the August 26, 2003 ordinance which states requires that "tout propriétaire, personne physique ou morale, autre que l'État, d'un bien immobilier construit situé en Algérie de souscrire un contrat d'assurance de dommages garantissant ce bien contre les effets des catastrophes naturelles“
- À titre d'exemple, le coût annuel d'un logement collectif d'une superficie de 100 mètres carrés, situé à Alger (zone 3) varie entre 600 dinars et 3 600 dinars. Pour le même logement situé dans le sud, il varie de 80 dinars à 1 056 dinars.



Should we move back home or stay put here, what are the odds in terms of zenzla?

Wash t'miyaz
Cheikh?



Ya errayah t'rouh ta3ya
wa twali...



N'rouhou wala nekou3dou?

- Each location on earth has its weight of hazard from natural and man-made catastrophic events
- The responsibility of each one is to evaluate the risks where he/she lives and act to mitigate them the best way possible by seeking professional help
- So, debrouraskoum..



Questions or comments?

Feel free to send your questions, comments, corrections or any other relevant information on the topic to Omar Khemici at:

mouzaia@yahoo.com

