

MINISTRY OF HABITAT, OF URBAN PLANNING
AND THE TOWN



**NATIONAL EARTHQUAKE
ENGINEERING CENTER
C.G.S**

PRESENTATION OF THE CENTER



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Laboratories of C G S, Sebala El Achour

THE REASONS FOR SETTING UP C.G.S

If, based on the present knowledge, it is impossible to predict seismic events in terms of date, location and magnitude, it is nevertheless possible to reduce considerably the seismic risk by taking adequate countermeasures to bring it down to an acceptable level.

In Algeria, different geological and seismological investigations have shown that 70% of the northern part of the country is prone to seismic activity. At least 90% of the social, economical and political infrastructures of our country are concentrated in this part of the national territory.

Within the Arab region, Algeria is the country that has most suffered from the earthquake destructive effects.

Alger 1716 (M=7)	Mascara	1994 (M= 5,6)
Oran 1790 (M=7)	Ain Temouchent	1999 (M=5.5)
Blida 1825 (M=7)	Beni Ourtilane	2000 (M=5.4)
Jijel 1856 (M=7)	Boumerdes	2003 (M=6.8)
Chlef 1954 (M=6,7)	Ham. Melouane	2003(M=5.0)
Chlef 1980 (M=7,	Alger	2004 (M=5.3)
Tipaza 1989 (M=5,6)	Mihoub	2016 (M=4.9)



Boumerdes 2003

In this context, and following the CHLEF (formerly EL ASNAM) earthquake of October 10th 1980, the Algerian government got aware of the risk induced by such similar future disasters in other regions of the country.

Consequently, he decided to take a series of preventive measures, the main one being the creation of this Center which should constitute the pole of reference and the focal point around which should be organized the multiform activities of seismic risk reduction at the national level with a certain influence or radiation on Arab region and mediterranean. Set up by decree in April 1985, the CGS is operational since January 1987.

MISSIONS OF C.G.S.

The approach aiming at reducing the seismic risk integrates the following actions:

Research to understand much better the seismic movement, the structure behavior and the soil-structure interaction, in order to formulate and improve the technical building regulations.

Training of the technical staff and dissemination of information in order to implement the research findings.

Strict **Application** of the technical building regulations.

Appropriate land use and development **Planning**.

Preparation of civil defense services (emergency plan, intervention means) and special units for intervention and rehabilitation.

The center deals with the first four types of actions. The global mission consists in contributing to an appreciable reduction of seismic risk in Algeria through research activities, specialized investigations, training and dissemination of information.

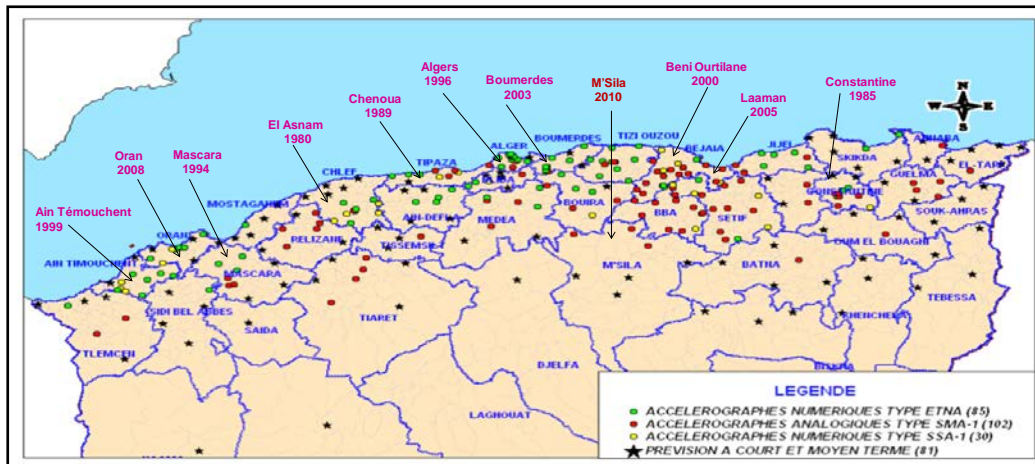


Earthquake recording instruments



Technical regulation and scientific popularization documents

NATIONAL ACCELEROGRAPH NETWORK



STAFF

Category	1987	1990	2016	2020
Researchers	13	23	52	48
Tech staff	/	02	28	22
Tech mastery	02	02	03	06
Adm staff	02	04	16	16
Adm mastery	04	10	15	12
Execution personnel	04	08	26	40
Total	25	49	140	144

ORGANIZATION OF C.G.S

In order to accomplish its statutory missions, the C.G.S is organized in four (4) scientific divisions, two (2) technical departments and administrative and financial services

Seismic Hazard Division (S.H.D)

- Engineering sismology,
- Sismotectonics,
- Neotectonics and quaternary geology,
- Paleosismicity.
- Seismology and Earthquake hazard modeling.

Seismic Micro-zoning Division (S.M.D)

- Geophysics,
- Soil dynamics (analytical and experimental),
- Site effects,
- Soil-structure interaction.

Earthquake Engineering Division (E.E.D)

- Vulnerability and static and dynamic behavior of building structures,
- Bridge vulnerability,
- Water works vulnerability,
- Steel structures,
- Materials and Construction technologies.

Regulations and Seismic Risk Reduction Division (S.R.D).

- Technical regulations,
- Construction standardisation,
- Lifelines and Equipments,
- Urban vulnerability and Seismic risk,
- Seismic risk reduction and Land user planning in seismic zones.

Technical Departements

Number of two (2):

Department of Scientific Equipements and Tests and Measurements (D.Sc.E.T.M)

It deals with:

- Maintenance and operation of scientific equipments.
- Design and realization of technological processes for the needs of the divisions
- Management, programming and execution of tests and measurement of experimental research projects

Department of Scientific Information, external Relations and Valorization of Research results (D.S.I):

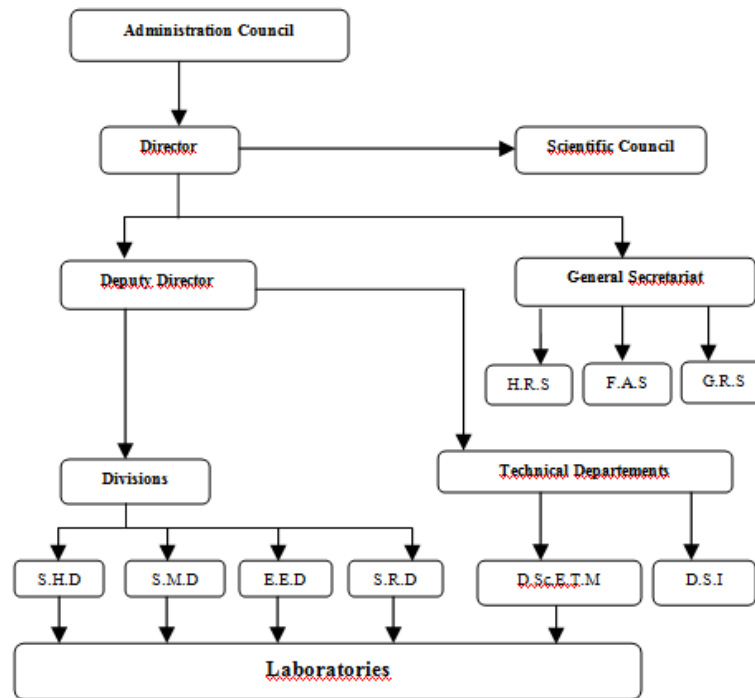
It is organized in three (3) services:

- Data processing
- Training, documentation and valorization
- External relations and communication

General Secretariat

- Accountancy and Finance service
- Human resources service
- General resources service

ORGANIGRAM OF C.G.S



THE LABORATORIES OF C.G.S

In addition to the appreciable means **the centre** already possessed (qualified staff, offices, computer means, networks of 495 accelerographs, geophysics and geotechnic equipments, mobile equipment for vibration of structures etc ...), the center has four (4) laboratories:

- A laboratory for the dynamic tests of structures
- A laboratory of soil mechanics and soil dynamics
- A geophysics laboratory
- A laboratory of engineering seismology



The laboratory of Dynamic Tests of Structures:

It's intended to study behavior:

- Of works in reduced models, under the action of real earthquakes, thanks to the shaking table (6mx6m) and supporting up 60tons-forces
- Of models of real scale structures subjected to so-called «pseudo-dynamics» loads through its test slab (32mx13m) and its reaction wall (15mx13m)



The Geophysics laboratory

Allows the use of various prospecting methods such as seismic, electrical, microgravimetric and georadar prospecting to provide elements of response to seismic hazard and seismic microzonation studies such as:

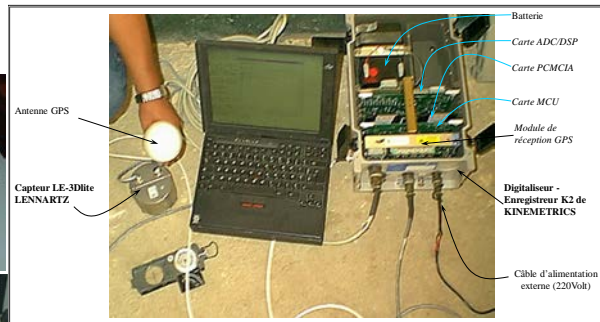
- The determination of dynamic parameters of in-situ soils
- The classification of site according to the Algerian code RPA
- The amplification functions.....
- The determination of the lithologie of formations



The laboratory of Seismology



Station sismologique
 large-bande
 (STS2+Q330+Baler)



Station sismologique courte-période

Capteur LE-3Dlite

- sismomètre 3 composantes
- fréquence propre 1Hz

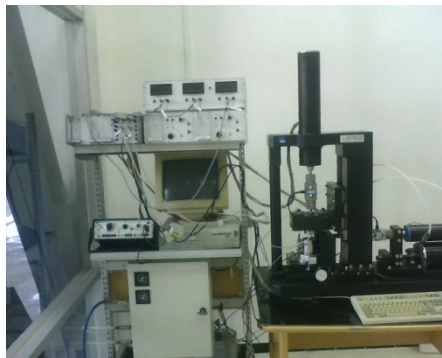
Enregistreur-digitaliseur K2

- fréquence d'échantillonnage variable
- enregistrement à déclenchement ou en continu

The soil mechanics and dynamics laboratory



CYCLIC TRIAXIAL



SINGLE CYCLIC SHEAR

SOME ACHIEVEMENTS OF C.G.S

Technical regulations and scientific popularization documents

- Seismic building code (RPA 88/99/03/17),
- Reinforced concrete regulations (design & execution),
- Steel structures regulations (design & execution),
- Foundations regulations (design & execution),
- Recommendations and methods for repair and strengthening,
- Seismic risk in Algeria (hazard, vulnerability and mitigation),
- Proceedings of conferences and seminars,
- Other popularization and information books.

Technical Studies on Seismic Risk Reduction and Assistance

- Seismic micro-zoning studies of Ténès, Alger,
Mascara, Boumerdes, Blida, Tipaza...
- Seismic hazards assessment of Algiers, Aïn Defla,
Mascara, Constantine, Oran, Annaba, Skikda...
- Specific seismic studies on industrial or critical sites,
- Post seismic investigations on the Tipaza, Oued Djer,
Mascara, Aïn Bénian, Ain Temouchent, Beni-Ourtilane, Boumerdes,
Hammam Melouane, Algiers and Mihoub earthquakes,
- Seismic vulnerability studies of some strategic buildings and other specific buildings,
- Seismic risk study of urban areas.
- Expertise and assistance for the design of complex structures,
- Peer review of soil investigation studies.

Structural dynamics laboratory tests

Tests of the Great Mosque of Algiers

On the stone façade covering (cladding) (Shaking table)

On steel couplers of reinforced capitals (Testing slab and reaction wall)

Tests on the bleachers of 5 July stadium of Algiers and Tizi-Ouzou (Testing slab and reaction wall)

Tests on panels of cold-formed steel profiles (Testing slab and reaction wall)

Tests of RC frames carried out in the framework of technical cooperation CGS/JICA (JAPAN) (Testing slab and reaction wall)

Seminars

The center organizes regularly each year six to ten seminars on topics related to the earthquake engineering field. The center also participates in the animation of other scientific or technical meetings organized by other institutions.

FUTURE PROSPECTS

- Realization of teaching and research facilities (substructures)
- Acquisition of new equipments
- Densification of accelerograph network in such way that the distance of 30km between stations is not exceeded
- Development of national and foreign partnerships

TEXTS GOVERNING THE CENTRE

- Decree N° 83.521 of September 10th 1983 fixing the research centres statutes (RC)
- Decree N° 85.71 of April 13th 1985 related to the creation of CGS
- Decree N° 86.212 of August 19th 1986 modifying the previous decree
- Decree N° 99.256 of November 16th 1999 fixing the statutes of scientific and technological public establishments (EPST)
- Decree N° 03.504 of December 30th 2003 modifying and completing the decree N° 85.71 of April 13th 1985 (to conform with the new statutes of EPST)

