



EXPERIMENTAL ENGINEERING



COMPANY PROFILE

SGM Experimental Engineering operates since 1985 as a leading company in the field of innovative services for experimental engineering, providing laboratory and site testing of construction materials and soils, inspections and surveys, structural assessment and diagnosis, long-term monitoring and control of structures and infrastructures.

SGM is an Independent Laboratory accredited by:

- Italian Ministry of Infrastructures
- Italian Ministry of Economic Development

SGM is accredited laboratory according to the Italian art.59 of D.P.R. 380/2001 in the following sectors:

- Construction Materials - (Law n. 1081/76) with Decree n.38194 (14/01/1994) and followings;
- Soils - with Decree n. 54349 (16/02/2006) and followings.

SGM is also Inspection, Testing and Certification Body for the construction products and assemblies industry - (European Notification N. 1676) according to the law 156/2003 and D.P.R. n. 246 (21/04/1993).

SGM is therefore capable of providing an advanced experimental support to its clients (main contractors, consulting firms, owners, public authorities, etc.) in the construction quality control, testing and validation of new structures and infrastructures, structural analysis and diagnosis of existing buildings, also finalized to a proper design of structural retrofit and/or seismic upgrade interventions.

Up to date, **SGM** has completed more than 5,000 experimental campaigns throughout Italy and in several foreign countries. For over 25 years, therefore, **SGM** represents a landmark in the field of site quality control and laboratory testing of materials and soils, diagnostics and full scale testing of structures and infrastructure and in the research and development of technological solutions in the field of protection, enhancement, maintenance and control of the architectural and infrastructural heritage.

The company structure adheres to the modern corporate organizations based on a business process management and comprises the following divisions: Management, Administration, Commercial, Technical, Laboratories, Site Testing, Research & Development, Quality. The company operates since 1998 with a Quality Management System compliant with UNI EN ISO 9001:2008.

Our professional testing services are operated under national and international relevant standards, guidelines and accreditations as:



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VERONA (Italy)

MILANO (Italy)

L'AQUILA (Italy)

DUBAI (UAE)

TRIPOLI (Libya)



TESTING LABORATORY

SGM Testing Laboratory Division offers specialized testing services in the field of construction materials, soils, roads, and various assemblies. The laboratory operates since 1990 and has obtained various authorizations and recognitions over the years by public departments and private organizations of primary importance.

SGM Experimental Engineering laboratory division is equipped with latest generation testing machines and instrumentation allowing to operate in strict compliance with the most relevant standards and codes in their latest version. The modern organizational structure of the Laboratory allows **SGM** to respond quickly to a wide range of requests and customers, whether they are public authorities, private companies, project managers, engineers, inspectors or owners.

SGM offers a variety of personalized services including: design of suitable test methodologies, recommendations about applicable standard procedures and codes, design and development of special tests for the solution of specific problems, collection on site with own personnel of samples, execution of tests and certification under urgent procedures, organization of demo tests, technical meetings, workshops.

CONSTRUCTION MATERIALS

Concrete

- Aggregates
- Cement
- Water
- Fresh and hardened concrete
- Cementitious or non-cementitious mortars

Steel

- Structural steel for RC and PC
- Steel for extruded profiles and pipes
- Fasteners (bolts, nuts, screws, etc.)

Masonry

- Masonry blocks for slabs
- Structural masonry, concrete blocks, etc.

FRP Composite Materials

- Structural fiber sheets (Carbon, Steel, Glass, etc.)
- Natural fiber sheets (Basalt, Hemp, Flax, etc.)
- Pultruded profiles, bars and plates

Other materials

- Geotextiles
- Waterproofing membranes
- Timber

SOILS

- Identification and classification
- Laboratory compaction and strength
- Chemical tests
- Geomechanical characterization
- Permeability tests
- On site compaction and strength

ROADS & PRODUCTS

- Aggregates for bituminous mixtures
- Bitumen and bituminous emulsions
- Bituminous conglomerates
- Paints and coatings
- Drainage channels
- Concrete, stone or masonry curbs and plates
- Ceilings

DOORS & WINDOWS

- Doors and windows
- Curtain walls and facades
- Louvers
- Cladding systems
- Industrial doors and gates
- Door components



STRUCTURAL DIAGNOSTICS

Structural diagnostics with advanced NDT technologies has a fundamental importance in the assessment, maintenance, and renovation of the structural and infrastructural built heritage as well as in the design, quality control and validation of new constructions.

This sector involves the use of a variety of NDT (Non Destructive Testing) advanced technologies to characterize material properties, carry out detailed structural diagnosis, identify and simulate structural behavior, determine causes of deterioration and as-built load carrying capacities, and address serviceability challenges for a wide range of structural configurations.

As these techniques are non-invasive, their application is considered of crucial importance in the evaluation and restoration of the historic-artistic patrimony. The use of non-destructive methods enables also a proper quality control and validation of new constructions as well as the resolution of complex forensic engineering challenges.

RC STRUCTURES

- Structural survey
- Pachometric survey
- Videoendoscopic survey
- Thermographic survey
- Ground Penetrating Radar (GPR) survey
- Static\Dynamic load testing of structural elements
- Ultrasonic testing
- Rebound hammer survey
- Core sampling for laboratory testing
- Pull-out test
- Carbonation test
- Corrosion potential test on steel rebars
- Steel sampling for laboratory mechanical testing
- Concrete surface resistivity mapping

TIMBER STRUCTURES

- Structural survey
- Videoendoscopic survey
- Thermographic survey
- Static\Dynamic load testing of structural elements
- Low frequency ultrasonic testing
- Material sampling for laboratory testing
- Identification and classification of timber
- On-site moisture content measurement
- Resistographic survey to determine wood density and strength

MASONRY STRUCTURES

- Structural survey
- Videoendoscopic survey
- Thermographic survey
- Ground Penetrating Radar (GPR) survey
- 3D Tomographic survey
- Ultrasonic testing
- Single and Double flat jack test
- Material sampling for laboratory testing
- Windsor probe test
- Pull-out test
- Shear test on masonry blocks
- Diagonal/compression test on masonry panels

STEEL STRUCTURES

- Structural survey
- Videoendoscopic survey
- Static\Dynamic load testing of structural elements
- Material sampling for laboratory testing
- On-site and laboratory hardness test (Brinell, Vickers, etc.)
- Leeb sclerometric test
- Visual inspections
- Thickness evaluation
- Bolted connection tightening torque verification
- X-ray analysis
- Magnetic particle test
- Liquid penetrant test
- Ultrasonic testing



STRUCTURAL HEALTH MONITORING

Structural Health Monitoring (SHM) allows the real time structural assessment of an instrumented structure by means of continuously measuring and controlling parameters having relevant significance for the characterization of the structural behavior and its interaction with the environmental actions.

SHM is to improve safety and reliability of infrastructure systems by detecting damage before it reaches a critical state and allow rapid post-event assessment.

SHM not only allows detecting structural anomalies but it also provides data useful to identify the primary causes of the degenerative processes, thus allowing wiser and more durable conservation interventions done by removing the causes of the anomalies rather than by retrofitting the damaged members.

SHM is also to provide a more detailed knowledge of the structural behavior of the building under investigation, thus adding reliability to the estimations regarding its residual life and resistance to calamities and allowing a wiser optimization of the maintenance schedule.

TRADITIONAL WIRED SHM SYSTEM

Traditional monitoring system made of a variety of sensors applied or embedded at selected members over the structure and connected through cables to a data acquisition hardware system.

SMARTBRICK® WIRELESS MONITORING SYSTEM

Wireless and self-sufficient monitoring solution equipped with embedded sensors and 3G internet connection to make the collected data immediately available on a remote web server.

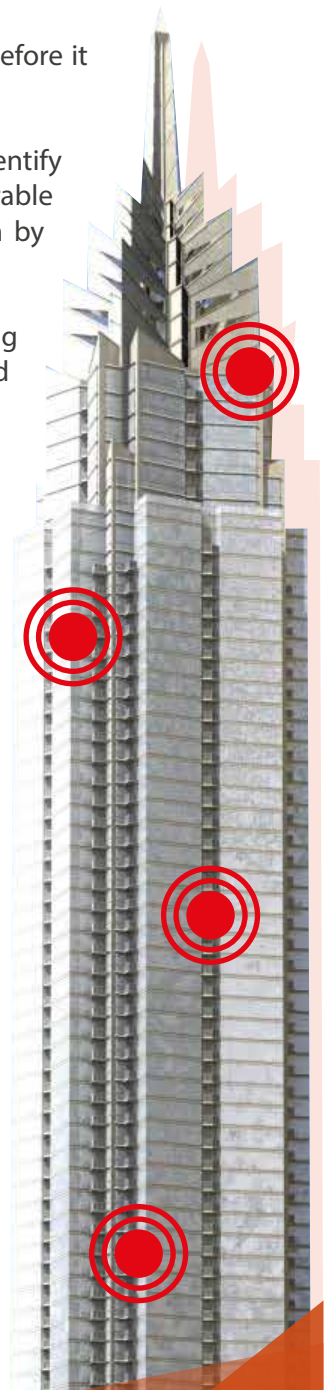
FIBRE-OPTIC BRAG GRATING TECHNOLOGY

The most advanced solution for demanding sensing applications. Made out of glass and not having any electrically powered part, FBG sensors are intrinsically safe in high voltage applications, lightning risk areas and flammable or explosion proof environments.

INTERFEROMETRIC RADAR

A specific SHM systems for civil infrastructures where the dimensional scale has to be taken into account. The ground-based Interferometric Radar allows the remote monitoring of movements of large portions of territory (landslides, slopes, volcanoes, glaciers etc.) and of structures (dams, bridges, towers, tunnels, buildings etc.) with sub-millimeter accuracy.

DAMAGE EVALUATION, EARLY WARNING, PREVENTIVE MAINTENANCE.





SOIL INVESTIGATION

SGM Soil Investigation Division provides specialized geotechnical and geophysical soil testing and engineering services. Thanks to its qualified team of geotechnical engineers and geologists, SGM is capable of providing a comprehensive technical support to a wide range of clients.

Geotechnical investigation services aim to identify the nature and the stratigraphy of underground soils and rocks, determine underground water regime, identify physical, mechanical and chemical properties of soils specimens through the execution of laboratory testing. Additionally, or alternatively to conventional borehole drilling, geophysical investigations are used to study the subsurface environment and indirectly determine its main properties and parameters.

SGM Experimental Engineering provides the following soil investigation services:

GEOGNOSTICS

- Continuous borehole drilling with power coring units
- Subsurface soil stratigraphy reconstruction
- Sampling of undisturbed or weakly disturbed soil specimens
- Geotechnical laboratory testing for mechanical characterization of soils
- Groundwater measurements and analysis
- Installation of various monitoring instruments (inclinometers, piezometers, accelerometers, etc.)
- Standard Penetration Test (SPT) or Dynamic Cone Penetration Test (DCPT)

GEOPHYSICS

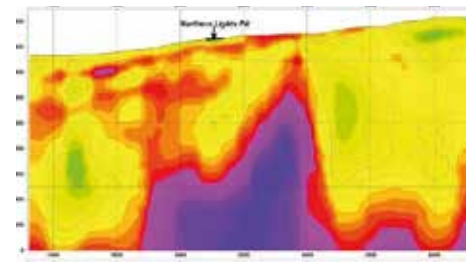
- Ground Penetrating Radar surveys (GPR)
- Surface seismic prospecting with MASW (Multichannel Analysis of Surface Waves)
- Downhole and Crosshole seismic prospecting to determine speed of P and S waves
- Seismic refraction prospecting to determine geometry and elastomechanical characteristics of the surveyed soils
- Electric tomography to assess stratigraphy of soils, look for hidden underground structures, artificial and natural caves/voids and to reveal water resources
- Gravimetric and Magnetometric ground surveys



Field testing



Laboratory testing



Geophysics



LARGE INFRASTRUCTURES SERVICES

SGM, thanks to its qualified team of engineers and technicians, provides to its clients a wide range of specialized testing and engineering field services for large infrastructures projects as highways, tunnels, railways, bridges.

SGM Experimental Engineering, thanks to the experience gained by its technicians over the years in the field of site testing, offers a variety of engineering services for large infrastructural projects and specifically it is specialized in the quick arrangement of temporary laboratories on every kind of construction site, everywhere located. The company is also equipped with a large fleet of mobile laboratories installed on vehicles of various sizes with fixed and variable configuration, always available for quick field interventions.

At same time, the Laboratory provides to contractors and producers of raw materials technical support, by means of studies and experimental tests, to research and develop innovative products and solutions for the installation, at competitive costs, of road pavements according to the UNI EN 13108 and complying to the performances required by international technical specifications.

SGM is therefore capable of performing all testing activities related to the construction of large infrastructures and specifically:

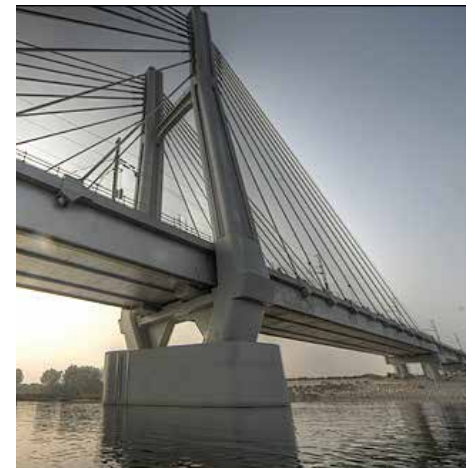
- Field and laboratory testing of construction materials (cement, concrete, chemicals, mortar, steel, etc.)
- Road pavement testing (aggregates, bitumen, conglomerates, load test, etc.)
- Product testing and certification (geotextiles, water proofing membranes, drainage channels, etc.)
- Embankment quality supervision and testing
- Soil investigation
- Load testing and structural validation of bridges and viaducts
- Structural and topographic monitoring of large infrastructures



Roads & Highways



Tunnels



Bridges & Viaducts



CE PRODUCT MARKING

SGM is Testing, Certification and Inspection Body for the CE marking of construction materials and products, according to the European Standard n. 89/106/CEE.

Since 2006, **SGM Experimental Engineering** owns the authorization released by the Italian Ministries of Economic Development and Infrastructures to issue certifications stating initial test results and production control activities of selected groups of construction materials. The CE marking is a mandatory conformity marking for products sold in the European Economic Area (EEA) since 1993. It represents the manufacturer's declaration that the product meets the requirements of the applicable EC directives, allowing its free circulation within the European Community and not only.

The list of products that **SGM** is authorized to test and certify as a Notified Body, with related reference standards, is listed hereafter:

- **Aggregates for concrete**
(UNI EN 12620)
- **Aggregates for mortar**
(UNI EN 13139)
- **Aggregates for bituminous mixtures and superficial treatments for roads, airports and areas subjected to heavy traffic**
(UNI EN 13043)
- **Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction**
(UNI EN 13242)
- **Aggregates for railway embankments**
(UNI EN 13450)
- **Aggregates for protection works - armourstone**
(UNI EN 13383-1)
- **Light aggregates for concrete, mortar and injection mortar**
(UNI EN 13055-1)
- **Light Aggregates for bituminous mixtures, superficial treatments and applications on bound and unbound layers**
- **Doors and windows**
(UNI EN 14351-1)
- **Curtain walling**
(UNI EN 13830)
- **Industrial, commercial and garage Doors and Gates**
(UNI EN 13241-1)
- **Building hardware**
(UNI EN 12209)
- **Ceilings**
(UNI EN 13964)
- **Drainage channels**
(UNI EN 1433)





CLIENTS & PARTNERS

PRINCIPAL CLIENTS



SCIENTIFIC PARTNERS

SGM owns an advanced R&D division dedicated to the identification, testing and development of new solutions in the field of testing, protection, enhancement, maintenance and control of the architectural and infrastructural heritage.

SGM Experimental Engineering, thanks to the expertise of its technicians, the modernity of its facilities and the fruitful collaborations with national and international research institutions, carries out also significant training, research and scientific activities in the civil engineering field. The company works closely and in partnership with many scientific partners as:

- UNI Italian National Unification Agency
- AIPND Italian Association of Non-Destructive Testing
- CICPND Italian Certification Center for Non-Destructive Testing and Industrial Processes
- CIRIAF Interuniversity Research Center on Pollution from Physical Agents
- AICAP Italian Association of Reinforced and Prestressed Concrete
- Faculty of Civil Engineering - University of Perugia
- Faculty of Civil Engineering- University of L'Aquila
- Faculty of Civil Engineering - University of Rome "La Sapienza"
- Faculty of Civil Engineering - University of Miami (USA)
- S.S. Lootah International - Dubai (UAE)
- Material Lab Dubai
- Network "The First Brick"



EXPERIMENTAL ENGINEERING

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