

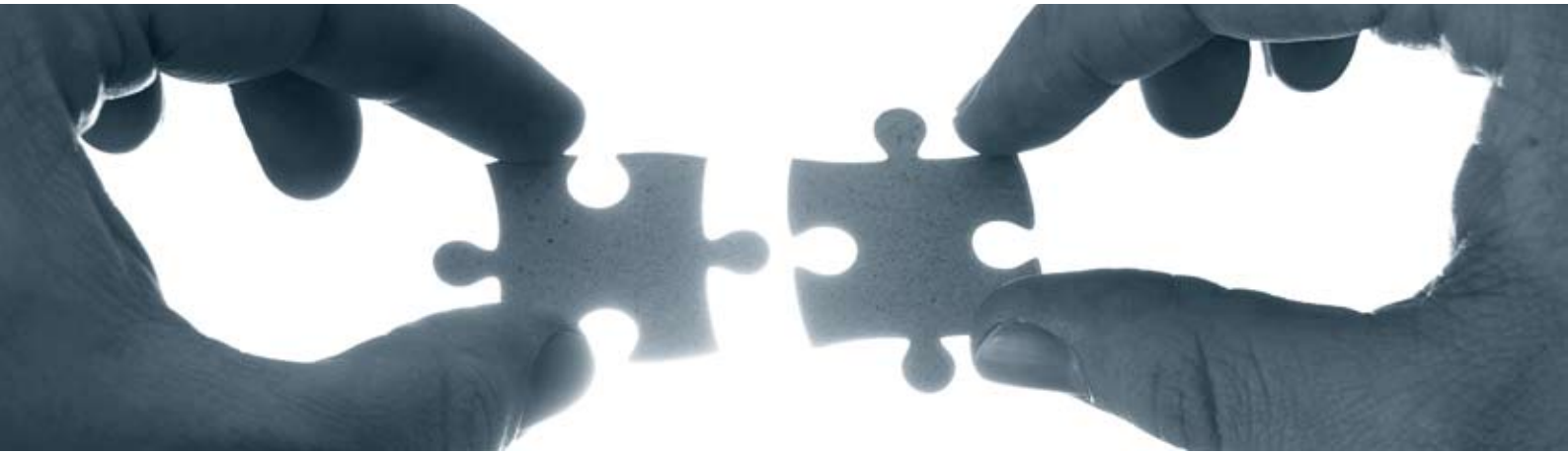


EVERYTHING YOU CONSTRUCT IS **BUILDING YOUR REPUTATION**

INTEGRATED SERVICES TO HELP MEET QUALITY, BUDGET AND SCHEDULE OBJECTIVES IN CONSTRUCTION PROJECTS

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SGS



GLOBAL EXPERIENCE AND LOCAL EXPERTS FOR ANY PROJECT

The construction industry for infrastructure and buildings is one of the world's largest contributors to global economy, and traditionally many parties are involved in the design, fabrication and construction process. As an operator in the construction or real estate business, you need to meet all quality, safety, cost and time related objectives. Design by different parties has to comply with each other, while both design and production are subject to many local regulations and sometimes insurance company guidelines. Many public or private investors, insurances, engineering and construction companies rely on SGS as an independent supervising company to help them control these crucial factors.

INTEGRATED SERVICES TO THE CONSTRUCTION INDUSTRY

SGS carries out independent and impartial examination, verification, validation and assessment on behalf of clients to ensure that systems and products are designed and constructed according to the specification requirements. In construction projects around the world we perform audits, site and production assessment visits, monitoring or witnessing of activities including safety and quality functions and reporting.

Our dedicated range of services to the construction industry includes

- Project Management and Technical Assistance for Civil Works, Buildings and Installations, e.g.
 - Contract Engineer
 - Owner's Engineer
 - Bank's Technical Advisor
 - Health, Safety and Environment (HSE) Coordination and Management
- Quality Control (Structures, Installations and Finishings)
- Certification and Inspection
 - Design Assessment/Verification
 - Statutory Inspections of scaffolding, lifts and construction site machinery, such as cranes, mobile elevating work platforms, forklifts

- Inspection of used machines and tools
- Product and Import Certification
- Energy Certification
- Fire Safety
- Electrical Inspections
- Construction Material Testing
 - Material laboratories in several locations worldwide
 - Provision of Mobile Site Laboratories
- Supply Chain Services
 - Expediting
 - Vendor Surveillance
 - Loading/Unloading Supervision
- Steel Structure Examination and Verification
 - Non-Destructive Testing and Examinations (NDT/NDE)
 - Technical inspection and supervision in the workshop or on-site
 - Welders certification and welding method qualification
 - Verification of the calculation/design
- In-Service Inspection and Maintenance Management
 - Facility Management
 - Technical Due Diligence
 - Periodical (Statutory & Voluntary) Inspections

EXPERIENCE AND CAPABILITIES AROUND THE WORLD

SGS services to the construction industry help clients to reduce technical risks, prevent construction errors, control budgets and effectively keep the construction project within planned schedule. With our extensive experience covering all aspects of construction, SGS has the skills needed to provide a comprehensive supervision, inspection and commissioning service for all types of projects – no matter of size or location.

With our wide ranging technical capacity we provide public institutions, private investors, real estate owners, insurance and construction companies with the necessary support required during construction projects.

SGS is the global leader and innovator in inspection, verification, testing and certification services. Founded in 1878, SGS is recognised as the global benchmark in quality and integrity. With a strong, wide ranging global network of more than 1,000 offices and laboratories SGS is able to respond quickly to our customers' needs for world-class service skills serving the increasingly globalising construction market.



DESIGN ASSESSMENT/VERIFICATION & GEOTECHNICAL SERVICES

DESIGN ASSESSMENT/VERIFICATION

Design Assessment/Verification services aim at ensuring design quality in terms of correctness of the solutions chosen by the designer referred to intended use and life time as well as compliance of the design to functional, performance and economical needs of the contracting body. The objective of this service is to check constructors' design, drawings, calculations and specifications with applicable codes, standards, legal requirements (legislation) and purchase specification to assure safety, functionality and comfort for the users.

As an independent Third Party, SGS provides verification of design and stress calculations, geotechnical criteria, working drawings, material specifications and control systems to operate in accordance with construction requirements. These requirements can be based on owners' expectations, insurance company demands, local law or (inter-)national standards.

Our Design Assessment/Verification services cover the preliminary design, final design and executive design. The assessment is performed based on the type, category, entity and importance of the intervention and aims at assessing the technical quality of the selected design solution.

In particular, the design is assessed in order to evaluate the risk in terms of

- Completeness, suitability and compliance of project documents
- Reliability of technical choices in time

The goals of assessment/verification services can be mainly summarised as follows

- Guarantee that the project can be awarded
- Minimise the risks of the introduction of variants due to non-exhaustive or incomplete design
- Avoid consequent delays and cost overruns in delivering the works
- Minimise the friendly suits with contractors
- Reliability of works in time
- Minimise management fees

The assessment activity will be documented with specific reports, in cross examination with the designer. SGS' final report will include results of activities performed and a declaration that the design assessment took place, for validation purposes.

GEOTECHNICAL ENGINEERING SERVICES

Geotechnical engineering requires a thorough understanding of ground conditions so that projects can be completed safely and cost effectively.

SGS specialises in providing comprehensive Geotechnical Soil Investigation for structures and buildings, to Site Classification Works for residential development including data interpretation and analysis of test results. Our geotechnical engineers provide a comprehensive Geotechnical Instrumentation Plan for the monitoring of any potential ground movement resulting from construction activities or potential failures of slopes.

Our Geotechnical Services include

- **Geotechnical Investigation** – to determine the engineering soil parameters for the design of foundations from residential pad footings to pile foundations for buildings and structures. It also includes environmental assessment, monitoring and reporting
- **Geophysics Applications** – use of Ground Penetrating Radar, Electrical Resistivity, Seismic Survey to solve engineering problems
- **Geotechnical Instrumentation Monitoring** – short and long term of natural slopes stability, advance warning for deep excavation works
- **Geotechnical Field Tests** – Nuclear Density, Compaction Control, Dynamic Cone Penetration Tests, Plate Bearing Tests, Soil Permeability Tests, Light Drop Weight Tester to determine soil properties



CONSTRUCTION SUPERVISION & HSE COORDINATION

Professional supervision of construction works is a prerequisite for the successful implementation of a project in terms of time, quality and cost. Owners/investors want to be sure that the investment realisation conforms to technical documentation, regulations and valid standards on time, agreed price and is in accordance to the construction permit. Moreover, they want to ensure that all documents, certificates and declarations are completed and issued correctly.

With the extensive experience gained in hundreds of construction projects around the world and a multidisciplinary team of experts, SGS is a reliable global provider of value added services during all phases of a project.

FULL SERVICES OFFER

Construction supervision by SGS includes all professional fields, such as civil and construction works, mechanical and pipe systems as well as installations, electricity and control systems.

During the critical implementation phase SGS supports customers by providing the following services

- Design Verification in accordance with legal requirements
- Safety procedures and coordination documents in accordance with legal requirements
- Safety coordination and site supervision
 - Site supervision in accordance with legal construction requirements
 - Independent supervision of safety measures and adherence to safety procedures

- Continuous contractor supervision
- Project, Execution and Material Control
- Technical Assistance
- Non-Destructive Testing Supervision
- Control, verification and filing of documents and documentation
- Technical and legal expertise
- As-built documentation
- Occupational Health and Safety Management
- Costs supervision
- Schedule supervision
- Reporting

SGS possesses specialised personnel and inspection procedures that enable us to cover the specific necessities in each project for controlling all details to assure compliance to quality requirements and established standards.

SAFETY FIRST

On the shop floor or construction site, many employees are working together, be they staff or sub-contractor personnel. All these people work and walk around each other, using various materials and equipment. Is it all safe? Are all danger zones indicated and is there sufficient protection against hazards like falling objects or people?

Realising safety requires experience, personnel and time, SGS is pleased to take safety coordination and monitoring off your hands. For infrastructure or public building work, SGS coordinates the preparation of the project as well as the coordination of all safety activities on site. SGS draws up health and safety plans and verifies any existing or

proposed plans. If necessary we advise on adaptations and implement them as the activities progress.

Our wide range of safety coordination services includes

- Advices in preventive measures
- Drawing up of coordination documents
- Safety risk analysis
- Verification/Development of health and safety plans
- Internal license controls
- Verification of access permits
- Access controls for designated areas (e.g. gas storage, confined spaces)
- Certificate control for cranes and operators
- Control of collective protection (safe scaffolding, lifelines, etc.)
- Control of personnel protection equipment (helmets, gloves, shoes, etc.)
- Safety signalling control
- Determination of transfer/clearing routes
- Supply of external HSE coordinators
- Advice/coordination concerning Occupational Health and Safety regulations
- Regular recordings and reporting with focus on non-conformities, corrective/preventative actions, statistical data
- Training for management, supervisory and execution personnel of subcontractors and visitors



TECHNICAL INSPECTION, MATERIAL AND PAVEMENT TESTING

TECHNICAL INSPECTION

Technical Inspection Service activities verify that works performed and in progress during a project are concluded in compliance with contractual requirements, standards, regulations, insurance specifications and expected quality.

Technical Inspection Services include

- Check and supervise construction works, verifying that these can be certified at perfect state-of-the-art, as compliant with the laws and specifications, in addition to contractual requirements
- Monitor and check the activities in progress and those being completed, in compliance with expectations in terms of materials and components used
- Support in technical, specialised subjects, and in any problem that may arise during technical inspections
- Support in checking the state of works progress during execution, assessing the coherence of the work with the executive design and contractual requirements

These technical inspection activities allow SGS to evaluate the suitability of design choices and construction works based on the fulfilment of the following requirements

- Stability and mechanical resistance of structural elements to prevent collapses and serious building defects
- Durability, preservation, useful life of building works (flooring, façade, proofing)
- Functionality of installations

With technical inspections from SGS, the risk for material damages or accidental building defects that may cause partial or total detachments, cracks, water and air leaks in technological elements can be significantly reduced. For insurance companies, we prepare special reports to determine risks which are covered in the Insurance Policy.

CONSTRUCTION MATERIAL TESTING

SGS has several Construction Material Laboratories around the world providing professional testing services and operating under relevant required accreditations. Our laboratories are the first choice when you require testing by an independent third party organisation, advice on quality of the materials and information about requirements for import and export of construction materials.

SGS Construction Material Testing Laboratories conduct a wide range of tests that focus on the classification, strength, durability and suitability of materials for projects. Materials tested include soils, rocks, aggregates, concrete, bricks-blocks, steel and polymers, and tests include

- Yield and tensile strength, elongation and bending strength of steel
- Design and mixture proportions of ordinary concrete and masonry mortar
- Compressive, flexure and impervious strength of concrete
- Compressive strength of mortar
- Compressive and flexure strength, setting time, fineness and soundness of cement
- Compressive strength of bricks

- Aggregate testing including checking of fineness modulus, density, lumpiness of clay, crushed stone value, flat and elongated particles in coarse aggregate
- Density of soil
- Testing of polymer (plastics, paint and rubber) materials
- Environmental testing: soil, ground water, indoor environmental quality testing

Apart from Material Testing in our worldwide laboratories, SGS can deploy Mobile Site Laboratories to support our clients directly on-site with their continuous or on-demand testing requirements to ensure the right material quality at any time.

PAVEMENT TESTING

SGS specifically supports road and airfield construction projects through the use of physical and NDT techniques. Testing covers skid and slip resistance, pavement structural adequacy through the use of Falling Weight Deflectometer and Ground Penetrating Radar. Pavement deflection using a Benkleman Beam Deflectometer and road roughness, surface rutting and texture using a Multi-laser Profilometer.

In response to our clients' needs, our standard range of pavement tests include

- Test pit
- Skid resistance
- Slip resistance
- Pavement structural adequacy
- Pavement deflection
- Road roughness, surface rutting and texture



CERTIFICATION SERVICES

ENERGY CERTIFICATION

Energy Certification of buildings was introduced as an European Directive to reduce energy consumptions and to consider alternative sources to save energy. SGS can help realise significant savings in the early stages of construction projects. We examine the energy efficiencies of every space, calculating the capacities to be installed and ensuring well-dimensioned and comfortable heating systems. We determine the minimum requirements for good basic ventilation and suggest other energy-saving measures.

Energy Certification to us means evaluating energy consumption compared to the current building legislation (energy requirements and indications established) considering

- Typological factors of the building (position and orientation)
- Climatic parameters of the site
- Energy balance of the façade (insulation, bearing structures, perimeter padding, doors and windows, thermal bridges and single materials used)
- Existing conditioning, illumination and water systems and their performances
- Passive solar systems and solar protections
- Natural ventilation
- Use of renewable energy sources

Purpose of the Energy Certificate is to assign an energy class to the building and determine possible improvement or maintenance activities needed to reach a higher energy class.

PRODUCT CERTIFICATION

International and regional directives and regulations worldwide set consistent standards for health and safety to those involved with the design, manufacture and supply of industrial products.

Compulsory Product Certification (CPD) assures that materials used in the civil/building sector comply with the European Directive 89/106/EEC (Building Products Directive) and thus can be circulated without any obstacles inside the European Community. The conformity of the various products to European standards and therefore to CPD is determined by activities of the product manufacturer, with the assistance of a Notified Body.

SGS is an accredited Notified Body for certification of the following building products

- Aggregates (natural, derived from crushing, from industrial process and recycled)
- Masonry and related products
- Concrete pre-fabricated products (For structural, semi-structural and non structural use)
- Products for the construction of roads, airports, and other traffic areas

In addition to the certification of building products, SGS performs conformity assessments as well as Statutory Inspections of scaffolding, electricity, fire detection or protection systems, lifts and construction site machinery, such as cranes, mobile elevating work platforms and forklifts. Under certain country regulations new constructed equipment

has to be assessed and approved by accredited bodies; in-service inspections are often in place to ascertain integrity of these potentially dangerous equipment.

SGS is accredited for conformity assessments in many countries, for new fabrication as well as for in-service inspections, e.g.

- Notified Body for EU Lifts Directive
- Notified Body for EU Machinery Directive
- Notified Body for EU Personal Protective Equipment Directive
- Notified Body for EU ATEX Directive
- Inspection Body according to EN ISO/IEC 17020 and 17025



IN-SERVICE INSPECTION AND MAINTENANCE MANAGEMENT

FACILITY MANAGEMENT

A good maintenance and inspection system is important for the safety of installations. Throughout the useful life of a building or infrastructure SGS can manage the administration and maintenance in case the owner decides to outsource some services.

By means of its worldwide experienced specialised laboratories, SGS is capable to supply comprehensively any service a company demands and follow each customer's specific needs. SGS traces visible and concealed damage to installations or systems and enhances the continuity and reliability accordingly. SGS has the professionals, expertise, experience, equipment and accreditations for carrying out expert controls, measurements and inspections.

Building Maintenance Management by SGS offers you all necessary activities throughout the building's useful life. SGS will manage maintenance activities by implementing computed solutions for your monitoring and can perform Building Condition Surveys at any time.

We help you to establish an appropriate maintenance programme including spares control and are at your disposal with independent expert opinions and recommendations to ensure efficient and optimised processes. Moreover, we will keep track of necessary periodical Statutory Inspections of any installed equipment or system.

Our Facility Management System will automatically monitor and take into consideration any new regulations related to Building Technical Inspection or any other Statutory Inspection, thus providing the owner with all necessary modifications to keep the building or factory in a perfect state for service and safe condition (HSE standards and regulations).

TECHNICAL DUE DILIGENCE

The Due Diligence Service aims at checking the state of buildings through a documented and physical analysis to evaluate the overall conformity status. The outcome of this service is a document which declares the building's conformity to current legislations, based

on the documental, technical and functional compliance compared to the actual status and which may be used for property transactions.

The service can be divided into two main activities

- **Document Inspection** – analysis of all documents provided by the client or competent bodies to verify compliance with current legislation and determine possible documental lacks, with regards to building permit documents, cadastral practises and all technical documents foreseen by law
- **Direct Inspection** – assessment of the building status with regards to maintenance level and conformity, in order to identify possible criticalities and non-conformities, considering
 - Technical documents
 - Building types, and structural conditions
 - Mechanical, electrical, and special systems
 - Fire-prevention and prevention systems
 - Environmental and sustainability conditions

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