Structural Engineering

We are a group of consultants specialized in structural engineering, for each challenge we define ‘best’ as the right combination of quality, economy, innovation and efficiency to meet our client’s individual business needs.
C-SPIN’s services include: calculations and measurements of existing buildings, safety and seismic vulnerability, linear and nonlinear FEM modeling, diagnosis and structural monitoring.

Structural Investigation testing and monitoring

C-SPIN offers the complete range of structural investigation, analysis and advisory services to the construction and engineering industries. The range of services delivered by our Structures Division prove invaluable to a vast client base ranging from architects and structural engineers to civil engineering firms and other specialist contractors, significantly those based around existing buildings and railway infrastructure

C-SPIN's services

Structural Engineering design
- Structures in concrete, steel, masonry and timber
- Foundations, piling and rafts
- Basements, new and retro-fit
- Temporary works for construction projects

Civil Engineering design
- Culverts and earth retaining works
- Tanks and swimming pools
- Roads, car parks and hardstanding
- Underground shafts and inspection chambers
- Bridges, jetties and river works

Repair and Refurbishment
- Strengthening and repairing old structures
- Modifying and refurbishing structures for new uses
- Underpinning and improving foundations
- Repairing brickwork, masonry and claddings
- Giving technical advice for insurance claims

Investigation And Assessment
- Examining and reporting the condition of existing structures
- Investigating building defects and failures
- Monitoring movement
- Providing forensic and expert witness services
The Qutb Minar is the highest monument of India and one of the tallest stone masonry towers in the world. As a reference to the importance of the monument the Qutb Minar has been inscribed in the world heritage monument list since 1993. The construction began during the reign of Qutb-ud-din around 1202, but the erection stopped at the first storey. The next ruler, Iltutmish, added the next three storeys. The tower was damaged by lightning in 1326 and again in 1368. In 1503 Sikandar Lodi carried out some restoration and enlargement of the upper storeys. In the framework of the Eu-India Economic Cross Cultural Programme “Improving the Seismic Resistance of Cultural Heritage Buildings”, aimed at the preservation of ancient masonry structures with regard to the seismic risk, different NDT (Ambient Vibration and Pulse Sonic Velocity Tests) were applied to the Qutb Minar, New Delhi, India, in September 2005, intended to define the dynamic response of the tower and to qualitatively define the masonry conditions.
During the latest strongest earthquake in the north of Italy on November 2004 many damages were occurred to buildings and monuments. C-SPIN was involved in an investigation carried out to characterize the seismic response and structural vulnerability of St. Giovanni Battista church, typical of Italian structures built around the XVII century in Italy in Lombardy region. The applied methodology combines a set of integrated activities, including the dynamic numerical analysis of the church by means of detailed FEM modelling, with experimental tests aimed to evaluate mechanical properties of materials. Minor destructive techniques was carried out. Starting from surveys addressed to the description of geometrical and morphological features, the investigation process allowed vulnerability identification with comparison for both before and after strengthening interventions.
The need to insert new tendons often occurs in strengthening of ancient buildings. Mainly it happens that they are installed where no original elements have been designed during the construction phase or, they can be used as support elements to existing tendons who have lost their functionality with the passing of time and the consequent loss of the properties of materials. This is exactly what has been done in the “Galleria dei Re” placed in the Egyptian Museum in Turin where new tendons and the application of the “strain gauges measurement method” will be useful to know the exact value of tensioning over a long period of time.
Velasca Tower is one of the Milan skyscraper located south of Milan Cathedral. It was built in the 50s and is definitely one of the most representative monuments of that period. The tower stands in the landscape of the city, which has become one of the best-known symbols of Italy. For its historic and artistic interest, in 2011 the Superintendence for the Italian Cultural Heritage has undergone cultural constraint. It was designed by Studio BBPR, with the collaboration of engineer Arturo Danusso, in an area of central Milan destroyed by Anglo-American bombing of 1943. During the restoration works of the facades conducted from 2009 C-SPIN has conducted several load tests on the decks of the square below to verify the bearing capacity in order to sustain the 26 stories of scaffolding provided.
The length of the bridge is equal to mt. 63.00 while the width varies from mt. 2.50 in the supports up to mt. 5.00 in the middle section. It is a suspension bridge, with double rope upper suspension anchored to a metal structure having a "X" shape consists of tapered pipes with a diameter of 60 cm. The point of suspension of the cables is positioned at about mt.18 from the ground, with a deflection of the catenary equal to mt. 9. For the purpose of stabilization of the bridge in respect of the lateral forces due to wind or to asymmetries of the accidental load, the project provides for their absorption by means of two steel cables harmonic placed laterally the deck, having the function to apply a preload to the suspension system with beneficial effects as regards the deformed both longitudinal and transverse of the walkway.
The gravity dam forms the reservoir place on the slopes of the French Alps on the left bank of Vésubie (in the land of the legendary Montecarlo rally). The basin of St. Martin de Vésubie is about 300 meters long and 60 meters wide with a maximum height of 12 meters and the slopes angle is 1:1. The EDF (French company for energy) asked whether it was possible to use the Bossong injected anchors on the walls of the dam to replace the existing waterproof membranes. Therefore, pull out tests were conducted cooperating with professional climbers for fixing measurement instrumentation.
The main characteristics of the project are the two-lane road (one in each direction) is 4,600 meters long and has cost a total of approximately 14 million euro. Presents three major interchanges, two underpasses for cars and three pedestrian underpasses as well as a pedestrian footbridge glued laminated timber and a series of minor works necessary to give continuity to the irrigation network and connects the town of Clusone with Rovetta located near Bergamo. The road was finished in advance even a year than expected. It is a fact of importance in public works. The work was funded by the Province of Bergamo.
Security evaluation under static loading conditions and the seismic vulnerability of structures and existing buildings is a major theme in the activities of C-SPIN. Numerical analysis and structural verification are always supported by in situ tests using mainly non-destructive techniques especially of historical monuments and buildings. The safety assessment is carried out by means of numerical analysis linear and nonlinear (i.e. pushover and nonlinear dynamic analysis).
Design of industrial structures and control vibrations from machinery to evaluate the noise to the structures and foundations or people using high-performance accelerometers. Experimental modal analysis by means of a shaker able to induce vibrations with frequency and amplitude note, variables in a suitable range, to a structure or part of it.