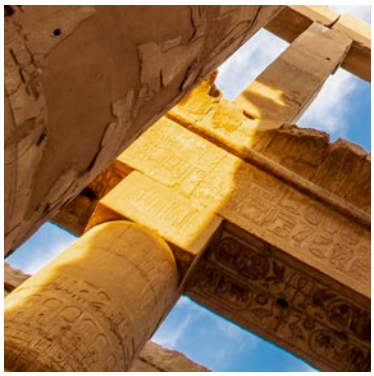



ANCIENT HERITAGE



OSMOS helps you to protect ancient heritage for future generations

Safe Works

*Figures taken from the website data.culture.gouv.fr, a platform which centralises public data from the Ministry of Culture and Communication.

OSMOS
STRUCTURAL HEALTH MONITORING

A subsidiary of EREN Group, an expert in natural resource efficiency, OSMOS aims to extend the lives of structures and to optimize their upkeep in order to save energy and economize on the materials needed for new builds. With recognized expertise in France and abroad, the company has made a name for itself as a major player on the structural health monitoring (SHM) market. Thanks to its innovative technology and its expertise, OSMOS gives managers of structures and engineering and construction companies the possibility of continuously monitoring changes to their structures, in real time.

Since its creation, OSMOS Group has been working to continuously improve its processes and services, in the interest of customer satisfaction.

ISO 9001 BUREAU VERITAS Certification

OSMOS Group is ISO 9001-2015 certified.

ASSISTANCE WITH HERITAGE PRESERVATION AND CONTROL OF STRUCTURAL RISKS

As a reflection of our history, our ancient heritage brings cultural, economic and historical value which we need to protect to pass on to future generations. However, these ancient structures do not always have a record of their construction or any changes that were made throughout their existence. Owners of these structures therefore keep a close eye on their state, particularly when they are open to the public. In order to assist them with the management and preservation of these structures, OSMOS offers bespoke solutions to control structural risks.

OSMOS IN SHM*

OSMOS is a specialist in the study of continuous, real-time mechanical behavior of ancient structures. No matter the materials used or challenges faced by a project, we can help our clients to control structural risk over the short, medium or long term. Our services go beyond appearance criteria alone and do not cover short-term tests carried out over several hours or days. Nonetheless, they can be an effective addition to short-term inspections and tests as our devices are neither intrusive nor destructive to the studied structures.

OUR SUPPORT

Our primary mission at OSMOS is to provide conclusive insights on the actual state of a structure and monitor any mechanical behavior changes over time. Thanks to the expertise provided, public contracting authorities, Chief Architects for Historical Monuments, architects from Architectes du Patrimoine and Bâtiments de France, building experts and private companies are well placed to ensure the conservation of our ancient heritage.

*Structural Health Monitoring

CONCLUSIVE INSIGHTS FOR EVERY SCENARIO

PREVENTION	VERIFICATION	WORKS	CRISIS MANAGEMENT
■ Detection of structural defects	■ Fissures, cracks, crevices	■ Maintenance / Rehabilitation, restoration, improvement	■ Disasters, protective measures
■ Prevention of disputes	■ Creep, spillage, inclination, bursting force	■ Monitoring of surrounding structures	■ Climate phenomena
	■ Load-bearing capacity, differential settlement, discharging arch	■ Preventive referral and legal risk	■ Extraordinary events
	■ External loads	■ Ground-works load-spreading, injections, drafts	■ Earthquakes

■ RECEIVE REAL-TIME HEALTH ASSESSMENTS OF YOUR STRUCTURE

Our monitoring systems make it possible to quantify and track the behavior of your structure, without interruption. You will have accurate information on its state of health and you will be able to adapt your structure's use accordingly to ensure the safety of all property and people.

■ CONTROL STRUCTURAL RISKS

Thanks to continuous, real-time monitoring, OSMOS offers early detection of signs of structural anomalies that could have an irreversible impact on your structure and on your users' safety. In cases of emergency or disaster, we will help you to monitor the most critical parts of the structure and check whether protective measures are working correctly.

■ ENJOY A LONG-TERM VISION AND AVOID THE NEED FOR URGENT ACTION

Thanks to OSMOS's analyses and the comprehensive expertise we offer, you can be proactive, maximizing the targeting and scheduling of your maintenance and upkeep operations, as well as the associated budgets. The impact of heavy work nearby or on the structure is monitored in real-time.

■ QUICKLY ACCESS POSSIBLE MEASURES WITH OUR COLLABORATIVE INTERFACE, SAFE WORKS

SAFE Works, our dedicated interface, provides an overview of your structure's general state of health, allowing you to prioritize the necessary actions and help you in your decision-making.

MONITORING OF CHANGES, OVERALL STABILITY AND SUBSECTION STABILITY

MONITORING OF DEFECTS AND POTENTIAL DEFECTS

By monitoring the physical parameters of the most critical structure areas, OSMOS can provide a structural behavior analysis to assess stability and detect any possible drift. Our solutions allow us to detect all structural problems whether they are visible or not, and to monitor all defect changes over time.

Easy to install, causing no damage or interruptions in service

See the presentations of OSMOS LIRIS and OSMOS EDAS on **osmos-group.com**

Static (cyclical) analysis

CONTINUOUS MONITORING OF CRITICAL POINTS

OSMOS provides you with accurate and conclusive information on the criticality of visible damage, how it originated and carries out important checks to help managers make decisions. By continuously monitoring critical points of the structure, we can assess all immediate or long-term structural risk, as well as the structural behavior of the building.

MONITORING OF THE OVERALL STABILITY

Our expertise gives us the ability to assess the strength of the building when faced with various strains, whether internal or external, which can impact its stability. By deploying an appropriate monitoring system over a sufficient time period, the readings will help determine if the building remains stable or if there are any potential defects.

ASSESSING THE IMPACT OF EXTERNAL STRESSES (SURROUNDING STRUCTURES, CLIMATE PHENOMENA, EARTHQUAKES, ETC.).

CONTROLLING ENVIRONMENTAL RISKS

Benefiting from continuous, real-time measurements, OSMOS can not only analyze the structure's long-term behavioral trends, but also the impact of occasional stresses, also known as dynamic stresses. These can include nearby works or surrounding structures, climate phenomena and earthquakes which can lead to or escalate structural deficiencies on the ancient building.

Information communicated via reports and the SAFE Works collaborative platform

See the presentation of SAFE Works on **osmos-group.com**

Dynamic (instant) analysis

MONITORING OF THE IMPACT OF VIBRATIONS ON THE STRUCTURE

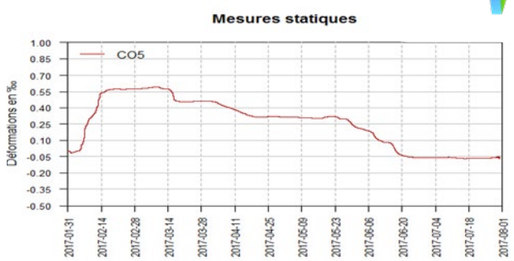
Vibrations (bells, subway stations, repetitive impact of winds, etc.). can create local defects to stonework or an imbalance in the structure. A strong, dynamic monitoring process will detect and quantify all vibrations and their impact.

MONITORING OF THE IMPACT OF WORKS AND SURROUNDING STRUCTURES

Changes to the foundation soil, vibrations or load transfers generated by works can have lasting consequences, even well beyond the site itself. These loads can create large structural changes which need to be monitored.

THE SOLUTION TO YOUR ISSUES: THE RESULTS OF OUR ANALYSES

Stability control

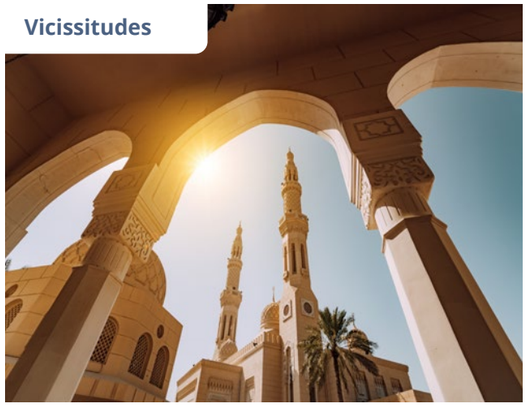


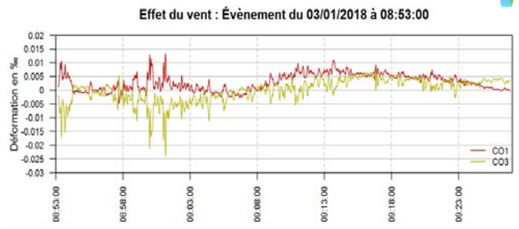
Over the course of several months, we have observed separation of stone blocks on each pillar. The progressive return to its initial balanced state was observed over this time period.

SLOW-MOVING CHANGES (BLOCK SEPARATION, DIFFERENTIAL SETTLEMENT)

OSMOS follows various parameters in the long term in order to detect any structural defects early on and to assess the stability of the buildings and any changes that have occurred over time. Our teams are therefore equipped to recognize and anticipate the building's mechanical behavior in order to identify and prevent any structural risks.

Vicissitudes





During bouts of strong wind, we have observed a tightening and flexion of the church buttresses. By running a dynamic analysis, we can assess the impact on the structure and confirm if it has returned to its balanced state.

VIBRATIONS, NATURAL AND CLIMATE PHENOMENA, GROUND-WORKS LOAD-SPREADING

Temperature variations, climate phenomena, works or surrounding structures can all damage ancient heritage. OSMOS applies methodology that leverages the continuous, real-time measurements recorded. We also analyze long-term structural behavioral trends, as well as the impact of dynamic events on the structure's state of health. Our solutions allow us to measure and assess environmental and human activity effects on structures.

SIX REASONS TO CHOOSE OSMOS

OSMOS helps you to make decisions:

1 PROTECT YOURSELF AGAINST IRREVERSIBLE DAMAGE

A lack of regular upkeep can create major defects, which in turn will eventually require heavy restoration works. Verify your structure's state of health at any time and anticipate heavy works.

2 PROTECT YOUR ASSET TO PASS ON TO FUTURE GENERATIONS

Protect and promote ancient structures to preserve the cultural & historic interest of monuments and target key actions to be taken to retain this interest for future generations.

3 CONTROL PERSONAL AND PROPERTY SAFETY

Our monitoring systems function in real time and immediately detect any abnormal behavior, for optimal safety control.

4 CHOOSE A MONITORING SYSTEM THAT IS BOTH DISCRETE AND ADAPTED TO YOUR CONSTRAINTS

Protect your structure's esthetic appeal and integrity by using our discrete systems which are designed with your structure in mind. Our systems can also be built directly into the stonework. We regularly work with member companies of the Association of Restoration Companies of Historical Monuments (Groupement des entreprises de restauration des Monuments Historiques (GMH)).

5 KEEP YOUR STRUCTURE OPEN TO THE PUBLIC

Ensure your structure's availability, thanks to preventive management, by taking action in the right place, at the right time, so you can prevent urgent situations where closures to the public are necessary.

6 SCHEDULE AND RANK RESTORATION MAINTENANCE AND REPAIRS

By undertaking adequate maintenance work and managing priorities, upkeep costs can be significantly reduced.

OUR SIGNATURE PROJECTS

Cathedral of Saint Peter of Beauvais, Picardie, France
Verification of the monument's structural behavior, in particular that of the pillars

La Sagrada Familia, Barcelona, Spain
Monitoring of the impact of a tunneling machine passage under the monument

Dôme des Invalides,Paris, France
Monitoring of the church, dome, crypt and the courtyard

Versailles Cathedral, Yvelines, France
Structural behavior survey to safeguard the building

The Louvre – Galerie d'Apollon, Paris, France
Verification of the load-bearing capacities of the ceiling

Carnavalet Museum, Paris, France
Monitoring and technical assistance provided during demolition works

Saint-Léger Church, Saint-Chamas, France
Monitoring of defect changes to the bell tower and assistance with renovation decision-making.

Palais Bourbon – Assemblée Nationale, Paris, France
Verification of parts of the building from different time periods

Propylaea of the Acropolis of Athens, Athens, Greece
Monitoring of changes to fissures and survey of general structural behavior to rain and earthquakes.

Notre-Dame de Paris Cathedral, France

Assistance in the stabilization and conservation of Notre-Dame de Paris following the fire of 15 April 2019.

OSMOS currently provides continuous and real-time monitoring of the critical areas of the structure to ensure the site is stabilized.

OUR SATISFIED CUSTOMERS

DRAC Hauts de France

Unesco

Service national des travaux
ACMH

Service territorial de l'architecture et du patrimoine des Yvelines

Direction architecture, muséographie et technique du Musée du Louvre

Bouygues construction and public works

Saint Chamas

Service des affaires immobilières et du patrimoine de l'Assemblée Nationale

Committee for the Conservation of the Acropolis Monuments

Établissement public Notre-Dame de Paris
DRAC Île-de-France

osmos
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OSMOS Group, a limited company with a capital of €8,040,816/RCS Paris 438 288 458
All of our products are designed, developed and manufactured in France.

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