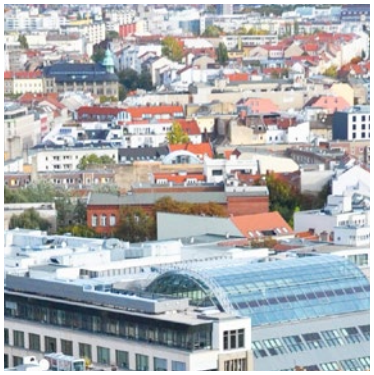
OSMOS | STRUCTURAL HEALTH MONITORING



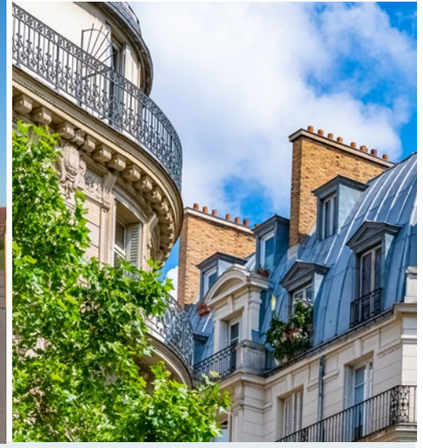



STANDARD BUILDINGS, HIGH-RISES AND ESTABLISHMENTS OPEN TO THE PUBLIC



OSMOS helps you preserve your buildings, over and above their appearance

Safe Works



osmos

STRUCTURAL HEALTH MONITORING

A subsidiary of EREN Group and 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.

STRUCTURAL RISK MANAGEMENT FOR YOUR BUILDINGS

At a time when standard buildings are becoming a concern for local populations, the private and public players responsible for their upkeep must be extremely vigilant as to the stability of their structures. To assist those property managers with the preservation of their buildings, **OSMOS offers continuous, real-time monitoring solutions to determine their exact state of health, detect any emerging issues and track changes to existing problems**. This way, our analyses help our clients to take control of their structural risks, launch appropriate upkeep and maintenance work on their buildings, if necessary, and guarantee the safety of their occupants.

OSMOS MONITORS BUILDING HEALTH

OSMOS specializes in the continuous, real-time study of the mechanical behavior of different structures. No matter the materials used or challenges faced by a project, we can **help our clients manage their structural risks in the short, medium and long terms**. Our services go beyond appearance criteria alone and do not cover short-term tests carried out over several hours or days. Nevertheless, they can be an effective complement to such 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 building** and **monitor changes in its mechanical behavior** over time. Thanks to our expertise, the technical departments of management companies and/or property owners, regional authorities, co-owned building administrators, construction experts and private companies are able **to guarantee the safety of their buildings' occupants**, **avoid needless, costly repairs** and **preserve their structural assets over time**.

CRITICAL INFORMATION ABOUT YOUR STRUCTURES

ESTABLISHMENTS OPEN TO THE PUBLIC

- Academic institutions
- Public and private healthcare facilities
- Train and bus stations
- Airports
- Shopping malls
- Museums
- Hotels
- Etc.

STADIUMS

PRIVATE AND PUBLIC HOUSING

COMMERCIAL PROPERTIES

UNUSUAL STRUCTURES

RECEIVE REAL-TIME BUILDING HEALTH ASSESSMENTS

Our monitoring systems make it possible to quantify and track the behavior of your structure, without interruption. This gives you accurate information about its state of health and allows you to adapt its 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 monitor the most critical parts of the structure and verify the effectiveness of your protective measures.

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 performed nearby or on the building is monitored in real time.

QUICKLY ACCESS YOUR METRICS VIA OUR COLLABORATIVE INTERFACE, SAFE WORKS

SAFE Works, our dedicated interface, provides an overview of your building's general state of health, allowing you to prioritize the necessary actions and informing your decisions.

MONITORING OF CHANGES, OVERALL STABILITY AND SUB-ASSEMBLY STABILITY

TRACKING DEFECTS AND EMERGING ISSUES

By monitoring the physical parameters of the most critical parts of structures, OSMOS analyzes building behavior, in order to **assess their stability** and **detect any potential deviations**. Our solutions allow us to identify all structural problems, whether or not they are visible, and monitor all changes in defects over time.

Quick to install, without damaging, closing or interrupting operations

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

Static (cyclical) analysis

■ CONTINUOUSLY OVERSEEING CRITICAL POINTS

OSMOS provides precise, conclusive information about the **severity of known damage and its source**. We perform verifications to give managers insight that can inform their decisions. By continuously monitoring the structure's critical points, we can **assess all immediate and long-term structural risks, as well as the mechanical behavior of the building.**

■ MONITORING OVERALL STABILITY

OSMOS's expertise gives us the ability to assess the **strength of the building under different stresses**, both internal and external, that can affect its stability. By implementing a suitable monitoring system over a long enough period of time, the recorded readings help **determine whether the building's behavior is stable** and **detect any emerging issues.**

PREVENTION	ASSESSMENT
Detection of structural defects	Fissures, cracks and crevices
Prevention of disputes	Creep, spillage, angle of inclination and bursting force
	Load-bearing capacity, differential settlement and discharging arch
	External strains

BUILDING WORK	CRISIS MANAGEMENT
Maintenance, renovation, restoration and reinforcement work	Disasters and protective measures
Monitoring of neighboring structures	Weather phenomena
Preventive referrals and legal risks	Extraordinary events
Underpinning, pumping and tieback work	Earthquakes

ENVIRONMENTAL IMPACT ASSESSMENT

MONITORING THE IMPACT OF EXTERNAL STRAIN

Thanks to continuous, real-time measurements, OSMOS can not only analyze the structure's long-term behavioral trends, but also the **impact of occasional "dynamic" stresses**. These can include nearby work, neighboring constructions and weather phenomena like strong winds, which can **cause or exacerbate structural faults** in buildings.

Information communicated via reports and the SAFE Works Dashboard

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

Dynamic (instant) analysis

■ MONITORING THE IMPACT OF WEATHER PHENOMENA

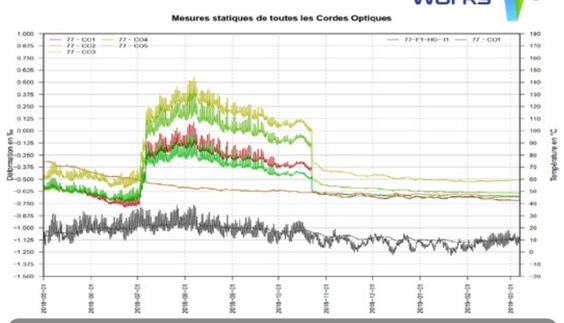
The natural environment and the weather can be sources of external strain on a structure. **OSMOS monitors the effects of weather phenomena on buildings in real time**, so we can notify our clients of any **abnormal behavior** and help them **take control of their structural risks**.

■ MONITORING THE IMPACT OF NEARBY WORK AND NEIGHBORING CONSTRUCTIONS

Changes to the soil bedding, vibrations and shocks caused by **nearby work and neighboring constructions** can have lasting consequences, well beyond the building site itself. These strains can engender **major structural changes that then need to be monitored**.

THE SOLUTION TO YOUR CHALLENGES: THE RESULTS OF OUR ANALYSES

Stability control

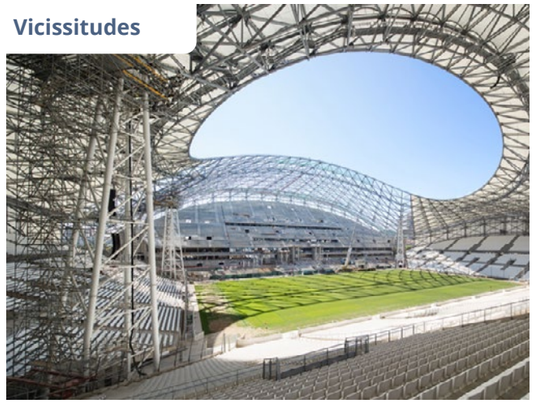


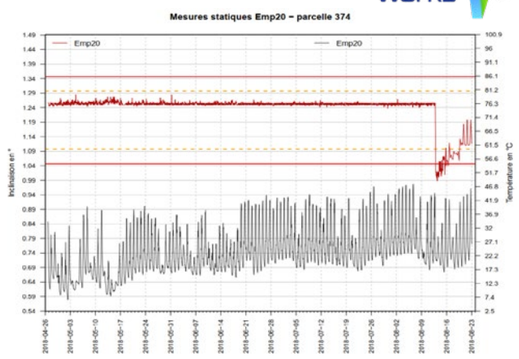
When a pipe bursts, tensioning is observed in a load-bearing wall. That tensioning is proportional to the distance of each Optical Strand from the fault. Later, after reinforcements have been applied, we can see the return to normal operations.

SLOW-MOVING CHANGES (BLOCK SEPARATION, DIFFERENTIAL SETTLEMENT, ETC.)

OSMOS tracks various parameters over the long term, in order to detect any structural defects early on and verify the stability of the buildings and any changes that have occurred over time. As a result, our teams are in a position to recognize and anticipate a structure's mechanical behavior, so as to identify and prevent any structural risks.

Vicissitudes





During a storm, a building façade becomes imbalanced, and then a lack of drift continues.

VIBRATIONS, NATURAL AND WEATHER PHENOMENA, AND UNDERPINNING WORK

Temperature fluctuations, weather events, nearby work and neighboring constructions can all cause damage to buildings. OSMOS's methodology leverages the continuous, real-time measurements recorded and analyzes long-term behavioral trends in structures, as well as the impact of dynamic events on their state of health. Our solutions allow us to measure and assess the effects of the environment and human activity on structures.

SIX REASONS TO CHOOSE OSMOS

OSMOS
helps with your decisions, so you can:

1 PROTECT YOURSELF FROM IRREVERSIBLE DAMAGE

A lack of regular upkeep can lead to major deterioration, which in turn will eventually require substantial renovation work. Check your building's state of health at any time and anticipate structural risks.

2 CONTROL PERSONAL AND PROPERTY SAFETY

Our monitoring systems function in real time and immediately detect any abnormal behavior, for optimal control over the safety of your property and its occupants.

3 EXTEND THE LIVES OF YOUR BUILDINGS

Verify the actual impact of strain on your structure, in order to define appropriate upkeep actions to preserve your structure and extend its life.

4 PRESERVE YOUR BUILDING'S INTEGRITY AND VALUE

Protect your structure from the vicissitudes to which it is exposed. By placing it under continuous monitoring and carrying out targeted maintenance actions, you can guarantee its integrity and its preservation over time.

5 AVOID THE COST OF DOWNTIME

Put an end to urgent responses and opt for proactive management of your structure: avoid critical situations that could force the closure of your building and the substantial expenses associated with protective measures.

6 SCHEDULE AND PRIORITIZE MAINTENANCE AND RENOVATION WORK

Perform appropriate maintenance work and manage your priorities to significantly reduce the cost of your structure's upkeep.

OUR SIGNATURE PROJECTS

Tour Europe and Tour Blanche, La Défense, Puteaux, France
10 years tracking internal constraints
Preventive monitoring of the tower block during neighboring construction projects

Immeuble Window, La Défense, Puteaux, France
Monitoring of work and verifications over the course of five years, on a building located above Les 4 Temps shopping mall

Résidence Gaston Pinot, Paris, France
Verifications after swaying was noted in one of the buildings, describing the ground-related issues and identifying at-risk zones

ZAC Batignolles, Paris, France
Monitoring of construction of a building on a cover slab over railroad tracks, followed by monitoring of fissures that appeared during the work

Apartment building on Rue Berger, Paris, France
Structural monitoring set up after the appearance of fissures up and down the entire building, in order to identify its evolution (opening with or without inclination) and quantify the opening

Apartment building on Boulevard Magenta, Paris, France
Verification of the stability of vertical load-bearers by monitoring loads carried down to the ground

Apartment building on Rue Ordener, Paris, France
Continuous monitoring of changes in fissures and structural deformations, in localized parts of the building, to determine the root cause of their appearance and spread

Stade de France, Saint-Denis, France
Monitoring of the stadium's suspended roof since its construction more than 20 years ago

La Samaritaine, Paris, France
Monitoring of the structure's behavior during construction

La Pierrerie School, Roissy-en-Brie, France
Structural monitoring of the buildings in a school complex after the appearance of defects

Carnavalet Museum, Paris, France
Monitoring and technical support provided during demolition work

Above-ground parking lot at Rouen Teaching Hospital, Rouen, France
Continuous monitoring with an alert system for any deformations or displacement of load-bearing structures on two parking levels

Caen Normandy Teaching Hospital, Caen, France
Monitoring of logistics flooring to determine the behavior of load-bearing structures when in operation and depending on seasonal temperature fluctuations

New AEK Stadium, Athens, Greece
real time strain measurements via optical fiber sensors of the four prestressed pylons during the tensioning phases and the erection works of the steel canopy

OUR SATISFIED CUSTOMERS

La Défense

Eiffage CGPT
Groupama

Paris Habitat

Bouygues Bâtiment Construction Privée

Marchal Syngest
Building Administrator

Building administrator, represented by Cabinet Debayle

Stade de France

Vinci Construction

City of Roissy-en-Brie

Bouygues Bâtiments et Ouvrages Publics

Rouen Park

Caen Normandy Teaching Hospital

DIKEFALOS 1924 SA, Ermonassa SA, Dimand SA

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OSMOS Group SA, a limited company with capital of €8,040,816 – RCS Paris 438 288 458
All OSMOS products are designed, developed and made in France.

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