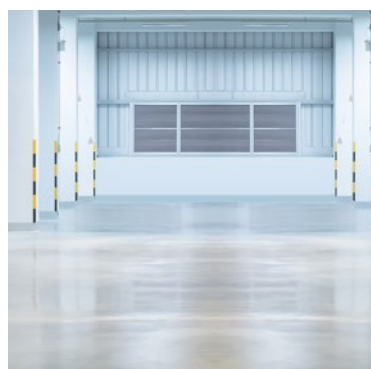


CIVIL ENGINEERING AND INDUSTRIAL EQUIPMENT



OSMOS monitors the structural integrity of industrial equipment and civil engineering works



Maintenance expenses in industry came to a total of

€22.1 billion in 2017*

* Source: AFIM (French Association of Maintenance Engineers and Managers) website



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.



MONITORING AND PRESERVATION OF INDUSTRIAL ASSETS

In recent years, the awareness of industrial site managers has been significantly enhanced, in terms of the assessment and management of their civil engineering structures. Faced with shrinking budgets and rising performance demands, keeping equipment in good working order while saving money on maintenance has become a major concern. This means reducing the amount of needless servicing by taking action in the right place, at the right time. Within this context, structural health monitoring tools have emerged as a solution capable of cutting control and maintenance costs for civil engineering works and industrial equipment. Whether the need relates to production line supports, intra- or inter-unit structures, storage facilities, or factories or other industrial buildings, OSMOS offers tailored monitoring services for those structures, which, in many cases, are aging yet still strategic.

OSMOS, STRUCTURAL DATA SUPPLIER

The classic approach to monitoring the stability of industrial structures consists, first and foremost, of performing visual inspections at regular frequencies (every one to five years) and, in the case of major or progressive problems, conducting a more in-depth assessment of the structure in question. Nevertheless, this type of approach is unable to anticipate events that may be detrimental to a construction's integrity and stability, or estimate its remaining life. OSMOS solutions provide real added value to structural monitoring policies. A combination of monitoring and behavioral engineering now allows you to:

- Determine the exact state of health of your structures and their evolution over time (in the event of any doubts or known weaknesses)
- Track the impact of regular operations on the behavior of equipment and/or civil engineering structures
- Detect and analyze early signs of structural defects and known defects
- Track long-term structural behavior, to optimize their operation and maintenance.

OUR METRICS GIVE YOU CONTROL OVER YOUR STRUCTURAL RISKS



CONTINUOUSLY COLLECT YOUR STRUCTURES' BEHAVIORAL DATA

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 level of service accordingly, to ensure the safety of all property and people.

DETECT SIGNS OF WEAKNESS EARLY

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.

RECEIVE NOTIFICATIONS FOR ANY ANOMALIES DETECTED

Our systems run continuously and in real time. This way, you are instantly alerted to any abnormal behavior detected in your equipment or your industrial structures.

MONITOR THE USE OF YOUR EQUIPMENT

OSMOS solutions let you monitor your equipment's behavior in real time, particularly during operation. The analyses performed by our solutions give you the keys you need to determine your equipment's optimal operating conditions and adapt its usage accordingly.

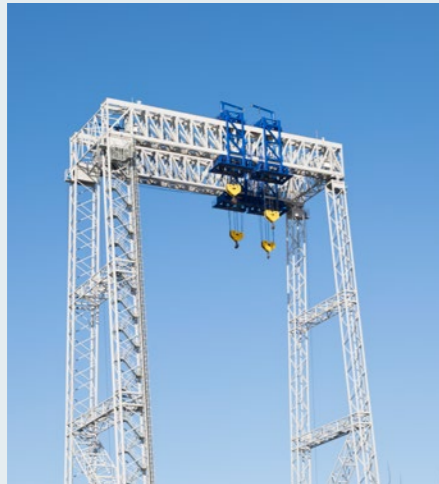
OVERSEE YOUR OPERATIONS IN REAL TIME, ON SITE

OSMOS can help you take control of your structural risks and improve the security of your industrial properties, thanks to data that can be integrated with security management systems (SMSs) and computerized maintenance management systems (CMMSs).

ACCESS YOUR BEHAVIORAL DATA USING OSMOS SAFE WORKS

The data for each of your equipment and/or civil engineering structures can be accessed 24/7 via a dedicated data viewing interface.

MONITOR THE USE OF YOUR EQUIPMENT IN REAL TIME



LIVE DYNAMIC SIGNATURES OF INDUSTRIAL EQUIPMENT

Industrial equipment is exposed to a large number of specific constraints associated with its operating conditions and the environment. 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. Of those stresses, vibrations, variable loads and maneuvers are major factors in accelerating the aging of machinery.

Adaptability of monitoring systems (in environments that are hostile or hard to access)
Suitable for use in explosive atmospheres

See the presentation of OSMOS EDAS on osmos-group.com



Dynamic (instant) analysis

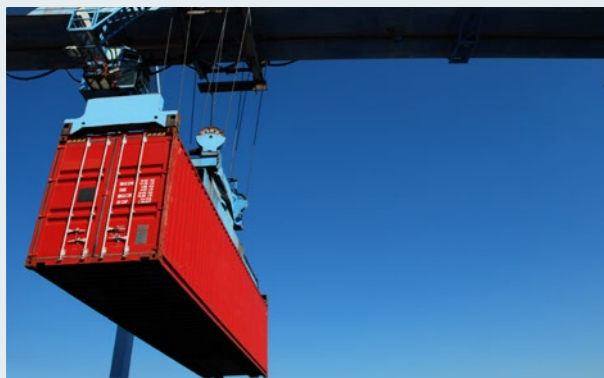
EVALUATE YOUR OPERATING LIMITS

OSMOS solutions measure the impact of the operation of your equipment on its structural health and determine its maximum use capacity. This allows industrial site managers to reassess the use of their equipment, in order to optimize output while preserving its state of health.



DETECT BEHAVIORAL CHANGES

Strains, both internal (operation, vibrations, etc.) and external (heat, cold, strong wind, etc.) can alter equipment's structural properties. Through continuous, real-time monitoring, you can instantly detect any abnormal behavior and take the necessary measures to prevent any shutdown of operations.



STUDY YOUR STRUCTURES' LONG-TERM BEHAVIOR TO OPTIMIZE THEIR USE



STRENGTH OF INDUSTRIAL EQUIPMENT AND CIVIL ENGINEERING WORKS

The measurements taken during monitoring periods allow us to track any structural anomalies we detect and obtain conclusive information about the health of your structure, whether it is a piece of equipment (overhead crane, production line, crane track, etc.) or a civil engineering works (framework, silo, chimney stack, etc.). In the long run, the quantity of data recorded will also enable forecasts about a structure's future mechanical behavior and its estimated remaining life.

Adaptability of monitoring systems (in environments that are hostile or hard to access)
Suitable for use in explosive atmospheres

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



Static (cyclical) analysis

MONITOR THERMAL EFFECTS ON YOUR STRUCTURES

Our temperature compensation algorithm can automatically correct structural deformation measurements to account for the effect of temperature fluctuations. This makes it possible to identify the structure's actual mechanical behavior and obtain exact knowledge of long-term changes caused by its natural aging process.



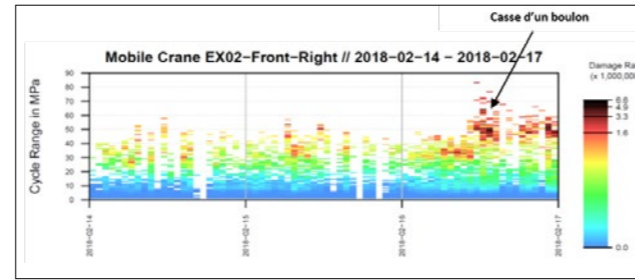
EXAMINE GROUND-STRUCTURE INTERACTIONS

Our devices are compatible with most of the analog sensors available on the market. The output data are synchronized in real time, allowing us to combine structural health monitoring with geotechnical and/or hydrogeological studies, for the precise monitoring of ground-structure interactions.



OUR ANALYSES SUPPORT YOUR DECISIONS

Fatigue analysis

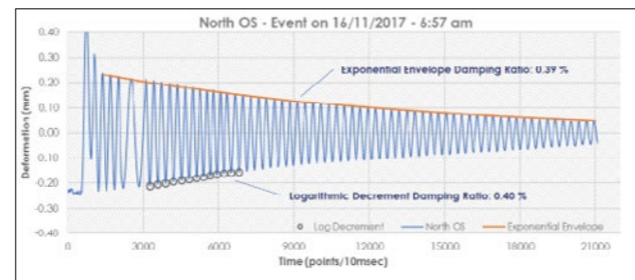
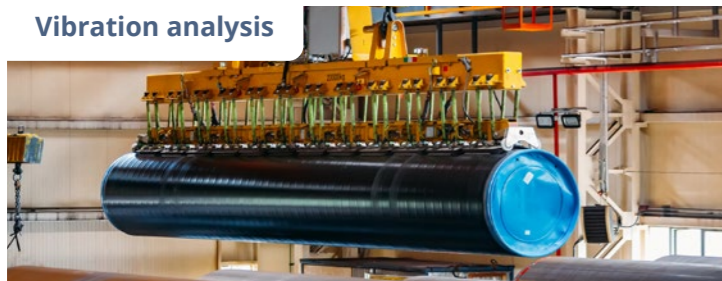


ESTIMATED EQUIPMENT LIFE

Amplitude of deformation and damage cycles

OSMOS tracks various parameters to evaluate wear and tear on a structure and its evolution over time. This allows us to anticipate the future mechanical behavior of industrial equipment and structures and to estimate their remaining life.

Vibration analysis

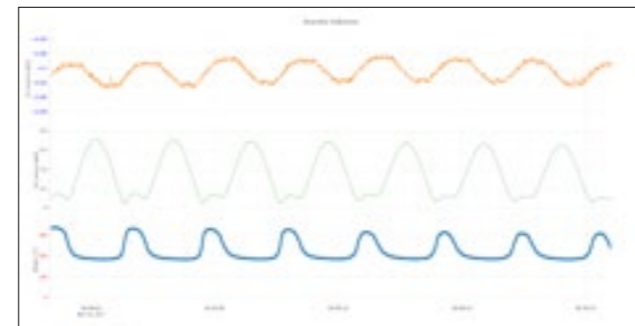


Calculation of damping coefficients

DETECTION OF ANOMALIES

OSMOS records a structure's dynamic characteristics – the frequency, damping ratio and modal deformation of each mode of vibration – in order to define its intrinsic signature. After experiencing stress, that signature indicates whether or not the building or equipment has suffered any damage, locates the damage and assesses its severity.

Cyclical analysis



Oscillations in daily cycles

LONG-TERM STATIC STUDIES

All equipment is subject to cycles that are linked to its operation. As for civil engineering structures in the industrial sector, they are likewise exposed to seasonal cycles and temperature fluctuations. OSMOS assesses the impact of those recurring strains on a structure's behavior. Our analyses also yield precise knowledge of the long-term changes caused by the natural aging of engineering works.

SIX REASONS TO CHOOSE OSMOS

OSMOS
helps you preserve your
industrial assets:



1 CONTROL PERSONAL AND PROPERTY SAFETY

Our monitoring systems function in real time and immediately detect any abnormal behavior, for optimal control over your industrial site's safety.

4 OPTIMIZE EQUIPMENT MAINTENANCE

Opt for the preventive management of your industrial assets, by redefining and planning ahead for your maintenance and upkeep, so you can take action in the right place, at the right time, and achieve substantial savings.

2 KEEP YOUR STRUCTURES IN WORKING ORDER

Put an end to urgent responses: avoid critical situations that could force a shutdown and reduce the output of your industrial facilities.

5 EXTEND THE LIVES OF YOUR INDUSTRIAL EQUIPMENT

Define appropriate maintenance actions for your equipment and adapt its level of service according to its structural properties, for a longer life.

3 OPTIMIZE THE USE OF YOUR EQUIPMENT

Adapt the usage made of your structure, to ensure its availability and maximum performance without undermining its structural health.

6 GET HELP WITH ASSESSMENTS AND LONG-TERM FORECASTS

Anticipate your structures' mechanical behavior and adapt their usage, so as to optimize the performance of your assets while preserving their health in the long run.

OUR SIGNATURE PROJECTS

ARCELORMITTAL, DUNKIRK, FRANCE
VERIFICATIONS AND BEHAVIORAL ANALYSIS OF AN OVERHEAD CRANE IN OPERATION

NEXANS, PAILLART, FRANCE
VERIFICATIONS AND STRUCTURAL MONITORING OF FLOORS WHILE IN OPERATION

TEREOS, CHEVRIÈRES, FRANCE
STRUCTURAL MONITORING OF A 30,000-METRIC-TON SILO'S FOUNDATIONS

TEREOS, ATTIN, FRANCE
VERIFICATIONS AND MONITORING OF A LIME KILN'S POSTS

TOTAL, DUNKIRK, FRANCE
BEHAVIORAL STUDY OF A LOADING DOCK AT THE OIL STORAGE FACILITY ON THE OPAL COAST

YARA, GONFREVILLE-L'ORCHER, FRANCE
LOAD TESTING AND MONITORING DURING WORK ON A GANGWAY TO THE BERTHS

LME, TRITH-SAINT-LÉGER, FRANCE
STRUCTURAL MONITORING OF A 155-METRIC-TON OVERHEAD CRANE

SCAEL, FRANCE
STRUCTURAL MONITORING OF A FERTILIZER STORAGE BUILDING AND A PORT SILO

ETMF, ROUEN, FRANCE
CONTINUOUS MONITORING OF THE STABILITY AND INTEGRITY OF A SILO DURING RENOVATION OF THE MRM DOCK

OUR SATISFIED CUSTOMERS

ARCELORMITTAL

NEXANS

TEREOS

TOTAL

YARA

LME

SCAEL

ETMF