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osmos NEWS

Editorial

Old buildings in general and historic monuments in particular present a real challenge for any monitoring system.

Building owners and contractors expect surveillance systems to provide the same levels of performance as those used on civil engineering structures, while imposing esthetic restrictions and a total absence of fire risks.

In just 10 years OSMOS technology has set a veritable standard in the preventive maintenance of historic buildings, thanks to its precision, solidity and versatility.

In this issue we take a look at some of the successes of OSMOS affiliates around the world using our equipment and know-how to monitor ancient monuments.

Page 4 presents the five fundamental principles of the OSMOS concept applied to such structures.

Bernard Hodac,
CEO of the OSMOS Group

St. John the Divine Cathedral, New York

Built in several phases from 1892 and still unfinished, St John the Divine in New York now has many pronounced cracks.

Moreover, work in progress on adjacent land is likely to submit this monument to additional stresses.

This why Urbitran, an OSMOS affiliate in New York, has fitted the building with optical strands and accelerometers to determine whether or not these new loads are affecting the Cathedral.

Front page news

Notre-Dame de Louviers Church

Preventive monitoring during restoration work

Thanks to the combined efforts of the State, Departmental and Municipal authorities, the classified Notre Dame de Louviers church is undergoing extensive restoration

Dating from the 13th century, the monument is showing many signs of weakness, notably serious cracking in arches and outwards movements of pillars.

Bruno Decaris, Chief Architect of Historic Monuments, who is also managing restoration work on the Vézelay Basilica in Burgundy, decided to check the tie-rods just before they were placed under load.

This enables real-time monitoring of strain variations in the rods. The work in progress can then be adapted taking account of objective criteria.
The precision and reliability of the OSMOS measuring system ensures that the managers receive very early warning of any unexpected phenomena.

Absence of movement over the whole length of the nave is verified by a battery of 21 X-Triggers operating as absolute distancemeters. Discreet and sturdy, the OSMOS system has been in place for 6 months monitoring the effects of the ongoing work, but without hindering the restoration team. To date, no movements beyond the acceptable limits have been observed.

The LANFRY Company in charge of the restoration work has reinforced the nave using numerous tie-rods and wall-holding brackets that constitute a kind of corset to consolidate the edifice during the work

21 X-Triggers operating as distancemeters are mounted inside the nave and the ambulatories. 3 optical extensometers are used to verify the strains in the tie-rods

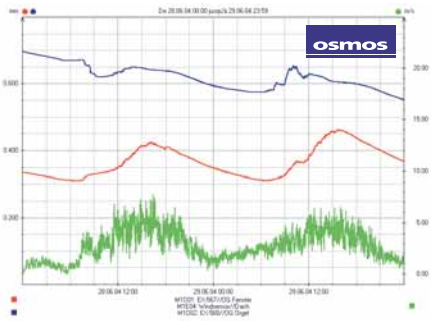
Saint Laurent Church, Lübeck

Old or recent damage? TÜV-OSMOS investigates

The neo-gothic Saint Laurent Church built at the end of the 19th century displays many areas of cracking, most of them old, possibly due to a process of progressive differential subsidence.

With building work planned on an adjacent site, Lübeck City Hall decided to place the church under permanent surveillance. TÜV-OSMOS was contracted to install extensometers inside and outside the building before the start of the work.

In addition, internal and external thermal probes have been installed, along with an anemometer and a triaxial accelerometer on the eastern side of the foundations. «Before-and-after» monitoring makes good sense for all ancient monuments. OSMOS has now made this much easier thanks to its simple, efficient systems that are increasingly becoming an industry standard (see page 4).



Daily behavior of two cracked areas, with associated wind measurements (in green)

Anemometer

Extensometers and optical feelers are installed inside and outside the edifice before the start of the works

LÜBECK

Meissen Cathedral

Optical strands: witnesses for the defense or the prosecution?

Meissen Cathedral is in a situation similar to that of Saint Laurent in Lübeck, except that it displays no visible existing damage.

However, since a tunnel is to be cut through the basement rock underlying the building, it is essential to verify continuously that the work is not causing any cracking or subsidence.

TÜV-OSMOS won this monitoring contract by proposing a judicious combination of optical extensometers and accelerometers. Everyone is hoping that the Cathedral will not suffer and that TÜV-OSMOS will become a witness for the defense.

La Roche-Guyon Château

A fiber-optic shield for a tired fortress

The chateau of La Roche-Guyon was built in the 13th century to resist the attacks of Richard the Lionheart's army. The long and turbulent history of this old bastion even includes the residence of the German Commander of Greater Paris during the occupation in World War II.

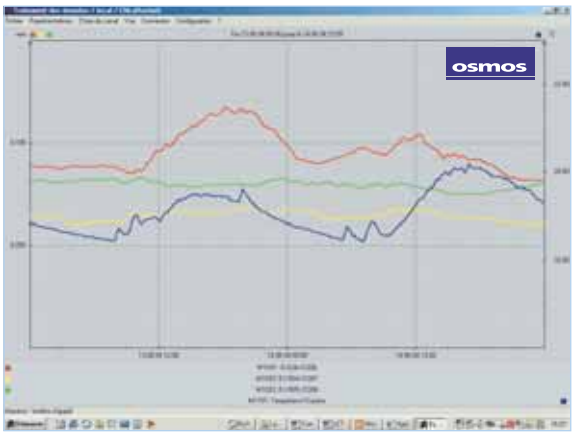
Built at a strategic location against a cliff overhanging the river Seine, the fortress has undergone many modifications over the centuries. New window penetrations and water infiltration due to drainage problems are probably the causes of the damage apparent today: deep cracks and deteriorated masonry.

Today the chateau is classified as a national monument and is open to the public. Pierre-André Lablaude, Chief Architect of Historic Monuments, and the Val de Oise Departmental Council decided to validate ongoing restoration work by placing the site under OSMOS monitoring.

Rain gage

Optical strand

Inclinometer and temperature sensor



Daily measurements combining deformation and inclination of the building

X-Trigger as a crack width sensor

Extensometer as a feeler

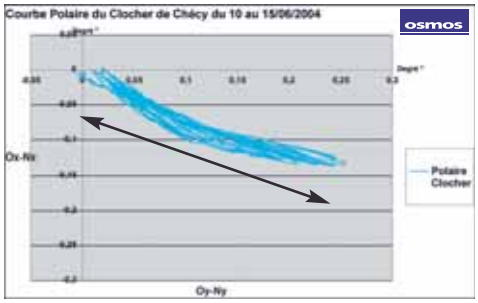
Saint Pierre Church, Chécy

A vigilant guardian in the tower

It's not certain - though more than possible - that Joan of Arc knelt in prayer in the Saint Pierre Church before crossing the river Loire at Chécy with her army in 1429.

What is certain is that IPC, an OSMOS affiliate, is now watching over this edifice whose 12th tower is showing signs of both cracking and marked inclination.

With the approval of Régis Martin, Chief Architect of Historic Monuments, four optical extensometers have been installed on the vertical fissures, plus two biaxial inclinometers on two faces of the tower, in order to quantify the movements of the building and thereby orient future restoration work.



Characteristic movement of the tower over several days

Northern view of the church tower and optical extensometer under protection

Close-up view of an optical extensometer on vertical cracks

Installation in one day using an aerial basket

The 5 main OSMOS principles for monitoring historic monuments:

1. Three-year monitoring cycle

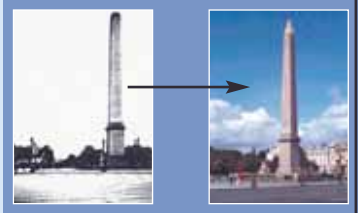
> Year 1: observation and preliminary hypotheses,

> Year 2: correlation of the hypotheses,

> Year 3: confirmation of the hypotheses and first conclusions.

2. Before-and-after approach

OSMOS first defines a protection baseline.
This reference will be more pertinent and realistic if it is determined well in advance of any work to be carried out near or on the structure.



3. Esthetic

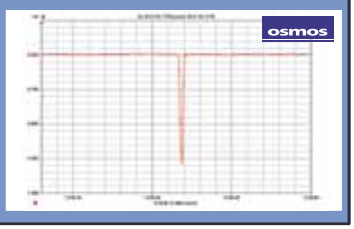
The monitoring installations must remain discreet in monuments open to the public.

4. Fire

The electromagnetic neutrality of the OSMOS detection lines totally eliminates fire risks.

5. Dynamics

The absence of "dead time" in the response of OSMOS sensors enables recording of dynamic phenomena, even of small amplitude and short duration. Despite what one might think, this proves to be a major advantage in the monitoring of structures subject to slow stresses.



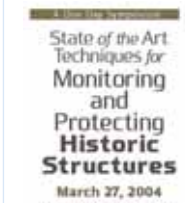
OSMOS invited to the University of Columbia Symposium in New York

Following its structural surveillance of the Federal Hall National Monument (see Osmos News no.5), OSMOS was invited to participate in the renowned Symposium on «Monitoring and Protecting Historical Structures» at Columbia University, New York.

Jürgen Braunstein explained the OSMOS approach to monitoring historic monuments. This contribution to the conference was accompanied by a presentation by Marie Ennis of EYP, New York. Fruma Narov of Urbitran, an OSMOS affiliate in New York, was also present.

The many attendees included representatives of the Institute for Conservation in Ottawa, Canada, who spoke about the long-term monitoring of the «Peace Tower» national monument.

In the field of corrosion, Peter A. J. Gibbs of Newark, England, described work on corrosion prevention in the restoration of old metal structures, while Stephen J. Kelley of Wiss, Janney, Elstner Ass., Inc., Chicago, presented corrosion protection applications in North-American edifices.



Stop press...

OSMOS has just won a contract for continuous monitoring of the Apollo Gallery at the **Louvre Museum** in Paris.
Our equipment, which will be in service by November this year, will provide support for studies and work in progress under the supervision of Michel Goutal, Chief Architect of Historic Monuments.

Welcome

Claude Poussin joins OSMOS as Deputy General Manager.

Claude started his career in the International Division of Paribas. Later he moved into the building and public works sector, managing many international projects at Spie Batignolles where he became Managing Director for Civil Engineering in Europe.
His experience of major engineering projects earned him the post of Executive Vice President of Vinci Park until 2003. Claude has assumed his new functions at OSMOS with great enthusiasm.
His responsibilities include the extension of the Group's network of affiliates, development strategy and financial operations.

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