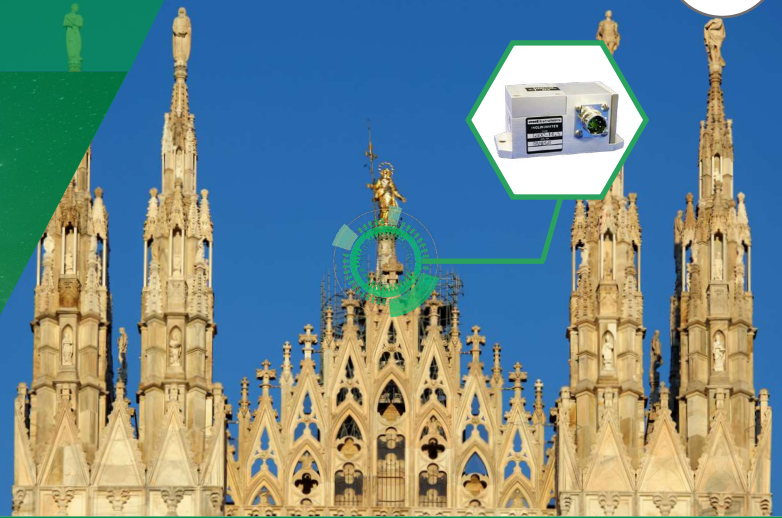




## Monitoring The Madonnina



- **Objectives:** Monitor the Madoninna for stability
- **Solution:** **Jewell Instruments LSOC**
- **Benefits:** Stable/accurate reading over broad spectrum
- **Results:** Measure vibration from tram and underground

### Overview

Standing as the centerpiece of Milan, the Duomo is one of Europe's greatest architectural and cultural landmarks. As Italy's largest church and one of the largest in the world, it took over 600 years to build. The Duomo now has a capacity of 40,000 people and is home to the world's second-largest organ.

With continuously ongoing restoration projects, the overseeing company wanted to first measure general stability using the C801, then some years later updated their configuration to include Jewell Instruments LSOC sensors for even greater sensitivity in order to measure the effects of tram and subway traffic nearby.



*Jewell Instruments LSOC Inclinometer*

### History

The Duomo of Milan tells a story of faith and art spanning over six centuries. Work for the construction of Milan cathedral began in 1386, when the style of Gothic cathedrals had reached its peak. It was decided that the new church should be built in the area of the ancient basilicas of Santa Maria Maggiore and Santa Tecla, the remains of which, together with those of the Baptistery of San Giovanni alle Fonti, are still visible in the Archaeological Area.

The twentieth century, which was marked by war and conflict, saw the start of major renovation works of the Duomo, the first archaeological excavations in Piazza del Duomo and the completion of the façade with the addition of the doors, which date back to a relatively recent period, between 1909 and 1965.

In the second half of the 20th century, structural and conservative restoration of some complex parts of the Duomo were started. The sixties and seventies saw works on the façade, with the second restoration carried out on the spire after another one that had been carried out in 1840.



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The Madonnina, perched on the highest spire of the Duomo di Milano Cathedral, represents the heart and soul of the city. The Madonnina “lantern” spire – or guglia del tiburio – is one of the main features of the cathedral and was erected in 1762 at the height of 108.5 m (356 ft). At the top of the spire is the Madonnina statue, designed and built by Giuseppe Perego in 1774. By tradition, no building in Milan is higher than the Madonnina.



## Results

Several years ago, the electrolytic tilt meters were changed to LSOC-3L sensors. Due to the dynamic conditions of the structure, including restoration and reinforcement works as well as the Cathedral being located in a highly populated area with significant vehicle traffic, a fluid-damped force-balance sensor like the LSOC provide a more stable output signal during measurements.

This new sensor was not only able to provide highly accurate and relevant vibration data, but was even able to detect the deflection that resulted from temperature variance. Having such crucial and precise information is key to the upkeep and maintenance of the structure and the Madonnina herself.

## About Jewell Instruments

Jewell Instruments is a world leader in the design, manufacture, and distribution of high-precision products. Our expertise includes acceleration and tilt sensors, electronic compasses, avionics components, solenoids, and panel meters. The extensive application knowledge we have obtained through decades of experience allows us to provide custom solutions for a diverse group of industries. In fact, customers from all over the globe contact us for solutions to aerospace, medical, industrial, and telecommunications applications - to name a few.

To find out more, visit our website!



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