

VSL France

Frictional damping for cable-stayed bridges

VSL has developed an original damper to dampen the vibrations of cable-stayed bridges. In order to improve its operation and its durability, the most suitable high performance materials have been selected.



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OUR CUSTOMER

Corporate name
VSL France

Business activity
Development of pre-stressing systems for civil engineering structures and buildings, guying of bridges, implementation of reinforced earth techniques.

Turnover
17 million euros

Context
Within Bouygues Construction, the VSL group took part in prestigious and complex projects, such as the West Rail project in Hong Kong, the pre-stressing of the largest concrete barge in the world (N'Kossaen France) or the lifting of the roof of the Airbus A 320 assembly hangar in Toulouse (France); more recently, the cable-stay Puente de la Unidad in Monterrey (Mexico).

A few years ago, a new vibration phenomenon appeared on cable-stayed bridges, related to the increased lightness and flexibility of the structures. Structure builders have found a solution with the installation of dampers, most of the time hydraulic ones.

Making maintenance simpler

In order to ensure reliability and durability, VSL preferred to use a frictional damping technique, for which all maintenance operations can be carried out on site. "Contrary to hydraulic

dampers, the frictional damper developed by VSL only works when necessary", explained Yves Bournand, development manager for the company, "when the guy wire begins to really enter a critical vibration period".

Reducing wear and adherence

In order to increase the durability of the frictional material over a period of more than 20 years, VSL looked for high performance materials adapted to the operating conditions of the damper and the aggressive conditions of the cable-stay bridge environment. Cetim

performed laboratory tests of several materials. Three composite materials with very similar performance data were selected. Tests in simulation, carried out on tribometers with metallic frictional materials, had revealed wear and adherence phenomena due to the formation of a transfer layer on the plate. This does not appear with the new materials proposed.

Fit for service !

"In addition, we were able to complement this work by carrying out real-size tests on a 216 m long cable in Shanghai. These tests were carried out with a damper fitted with frictional materials advised and tested by Cetim and they demonstrated the correct operation of the damper", said Yves Bournand. "Our objective is to use these new dampers on very long bridges fitted with cables more than 500 m long".

Cetim's asset

Cetim has long-lasting experience with wear mechanisms, which allows it to understand the phenomena and identify their origins.



It can also carry out tests on its tribometers.