

Contents

03 **Breaking a green record at sea**
Running on biodiesel, Trimaran Earthrace breaks the world record for the fastest round-the-world boat trip.

06 **Focus: Comfort & Shelter**
We continue the *Life's Essentials* series. The third part focuses on applications that shelter and bring comfort.

10 **Rough and tough**
Bombarded, blasted and shook from all directions, a mock-up curtain wall goes through harsh quality tests.

12 **An oil spill response kit**
Oil out at sea is collected in a gigantic rubber bladder, a Dracone barge, for later disposal on land.

In each issue

Editorial p.2 **Technology p.16**
People & Trends p.18 **News/Update p.22, 23**

Future comfort is our mission

SOME SUPPLIERS to the automotive industry feel threatened by the constant endeavors of customers to simplify and reduce weight. They fear this could result in certain automotive components actually being eliminated in future designs. For Trelleborg, this trend is an advantage, since our technology allows the replacement of metals with polymers. Moreover, the need for anti-vibration systems, which is one of our core competencies, is rising continuously rather than declining, as people demand greater comfort from their vehicles.

Naturally, we cannot rest on our laurels. Our contribution to human comfort and shelter must be achieved through the continuous development of new and innovative solutions. Some examples of these are provided in this issue of *T-Time*. One aspect in this area is that a building's windows provide adequate insulation from cold or heat and do not let in moisture. Polymer solutions from Trelleborg help ensure that homes, offices and public buildings stay warm and watertight. Read more in this issue's *Life's Essentials* series, with the theme Comfort & Shelter.



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Enjoy your reading!



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A quiet high-level ride

Amidst a mountain wilderness a new highway system rises, featuring Spain's highest viaduct.

TEXT and PHOTO: Richard Surman

FOR YEARS, motorists and truck drivers have had to endure the slow and tortuous climb from Molledo on the Cantabrian northern lowlands, up the N611, climbing through the Cantabrian mountains to Palencia, on the Meseta – Spain's high central plateau. It is a dangerous road liable to traffic hold-ups, delays and accidents, and frequently impassable in the depths of winter. Now the N611 is all but deserted, used mostly by local traffic. In its place is the new Molledo-Pesquero section of the Autovia de la Meseta, a welcome addition to Spain's highway system.

When completed, the A67 – the Autovia de la Meseta – will provide a high-speed link between Spain's capital Madrid, located at the geographical center of the country, and Santander, the



Installing the joints

Antonio Nogueira, Head of Production of the expansion joints division at Trelleborg Izarra, is responsible of supervising the installation of the Transflex expansion joints.

"We got three weeks at the end to get our job done," Antonio reflects. "The only things left after that are the road markings and the opening ceremony! The panic to get everything ready was incredible. There were so many people on the site at times, it was more like working in the center of London."

Antonio pauses and grins. "Except much colder, and my traffic plan worked better."



Juan Carlos Minaya

capital of Cantabria, on Spain's northern coast.

The highway is being designed and constructed by Ferrovial Agroman, one of Spain's leading infrastructure companies, and the first section, linking Molledo at 250 meters and Pesquero at 750 meters, was officially opened on the January 31, 2008. It is a triumph of engineering and construction in a rugged and beautiful mountainous terrain, built to cope with high traffic volumes, extreme wind and temperatures, and sensitive environmental concerns, such as noise, visual impact and disturbance to the natural surroundings.

Two particular challenges for Ferrovial Agroman were the design and construction of the Montabliz

and Pujayo viaducts. The Montabliz viaduct was the greater challenge: 805 meters long and 150 meters high, it spans an area of outstanding natural beauty in rough terrain. The River Bisueña runs underneath the viaduct, through a deep valley, a place of mountain wilderness, cloaked in ancient oak forest, and home to rare birds and mammals. In order to minimize disturbance to the valley floor and natural surroundings (and to minimize visual impact) the viaduct was constructed on four single tapering piers, supporting five deck spans. The central pier, at 140 meters high, is Spain's tallest, and the viaduct is the sixth highest in Europe.

ferrovial agroman used self-climbing formwork to construct the piers.

This was a first in construction techniques in Spain. The roadway is a continuous pre-stressed concrete deck, with the piers embedded in the concrete deck, creating an integrated structure of flexible strength. The deck segments are the largest and heaviest built in Spain – constructed at the site, and among the largest in the world. The viaduct at Pujayo, 420 meters long, also posed similar environmental challenges, although in this case in relation to the human environment. The same method of design and construction as at Montabliz allowed for a reduction of road noise and the least possible visual impact on the adjacent village. "Metal-style plate joints tend to be really noisy, and gave an uncomfortable ride", says Juan Carlos Minaya,

Marketing and Sales Manager for engineered products at Trelleborg Izarra

With a predicted average daily flow of some 11,500 vehicles, 16 percent of which is heavy freight trucks, any further reduction in noise over and above that achieved by the basic design of the structure would be environmentally significant. At the initial stages of the project in 2005, Ferrovial Agroman approached Trelleborg IESA, asking them to supply data from their Transflex high movement seismic joints for bridges range. Juan Carlos Minaya comments: "With a history of some 30 years of collaboration with Ferrovial, we were well-placed to supply these components. They provide a 'mobile' section joining the

abutments and the bridge decking. The surface design of the Transflex expansion joints plays a vital part in road noise reduction. These joints are the final piece in a series of measures designed to ensure bridge safety and to minimize environmental impact."

"The end result is an impressive section of high-grade mountain highway: driving over the two viaducts, the driver is barely aware of passing over our expansion joints, while at the base of the piers there is hardly any sound from traffic passing some 150 meters above," says Antonio Nogueira, who is Head of Production of the expansion joints division at Trelleborg Izarra. "Mostly you hear only the wind rustling through the oak forest, and the occasional cry of the Iberian eagle." «»

A tough joint

The Transflex expansion joints span the space between the decking and the abutments, absorbing movement caused by high traffic volumes, high winds and contraction and expansion from temperature variations, from -5 degrees C in the winter, to + 30 degrees C in the summer.

"Each expansion joint has two sections," explains Juan Carlos Minaya. Marketing and Sales Manager for engineered products at Trelleborg Izarra. "The first is the bridging module, a strong rubber plate that spans the structural opening between the abutment and the bridge deck. The second part is the movement module, which absorbs movements of the bridge deck. Horizontal safety anchor bars strengthen the whole unit to prevent sagging. We have developed a form of surface patterning that creates very little noise as traffic passes over. We used Transflex 3200 on Montabliz, which is a large expansion joint, allowing for movement of up to 800 mm. There were 12 for each section, each weighing a massive 500 kg. On the Pujayo viaduct, which is half the length, we used Transflex 1600, which accommodates movements of up to 400 mm."