

VIBRATION ISOLATION FOR TENERIFE'S TRAMWAY SYSTEM

CASE STUDY

Tram in Tenerife (ES)

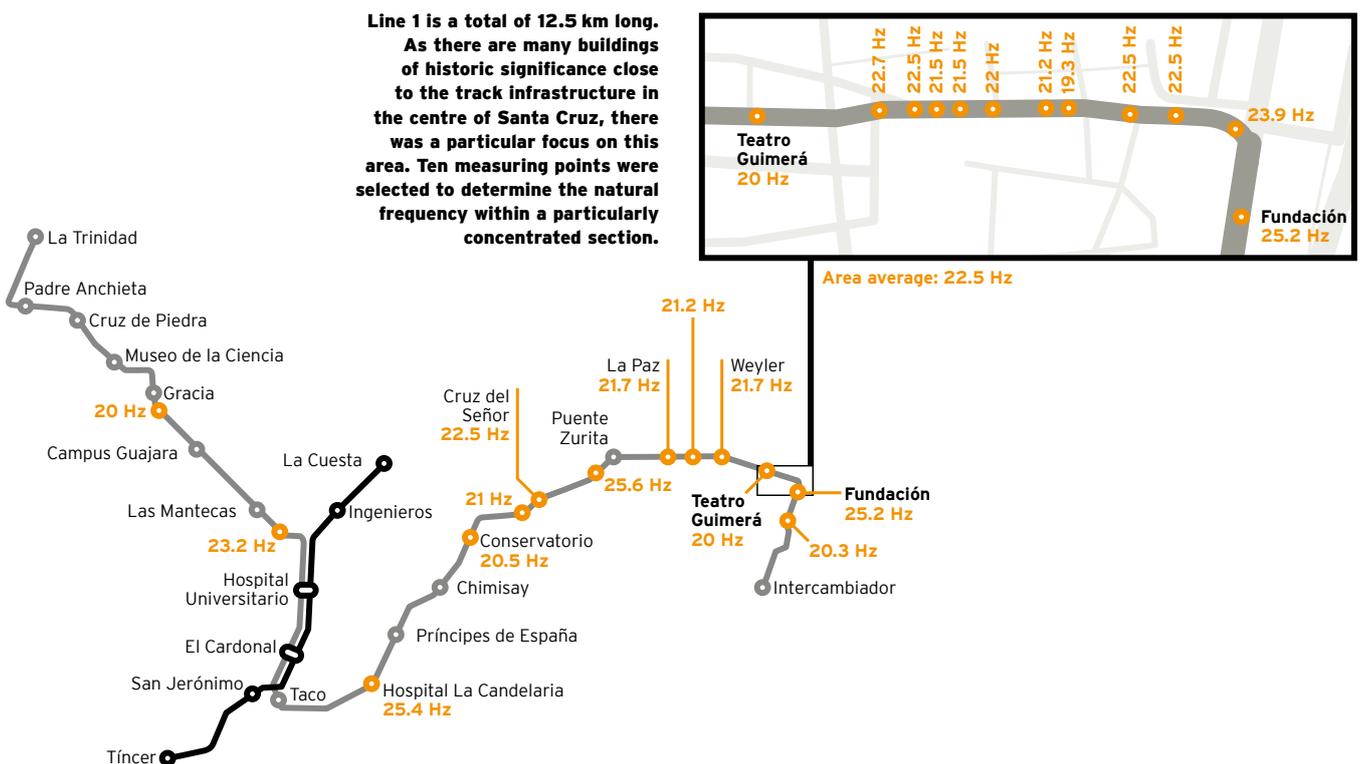
EFFECTIVE VIBRATION
ISOLATION.



ENHANCED ENVIRONMENT AND LONG-TERM PROTECTION FOR BUILDINGS

THE PROJECT

The Tranvía de Tenerife is the only rail transport system in the Canary Islands. The tramway line has connected Santa Cruz de Tenerife and San Cristóbal de la Laguna since 2007, with Line 1 carrying an average of more than 30,000 people per day. Minimising the transmission of structure-borne noise along the 12.5-kilometre route was a critical requirement for the customer, which led to Getzner installing mass-spring systems utilising Sylomer® S210. After nearly two decades in operation, tests were carried out to establish whether the surrounding urban environment continues to be effectively protected.





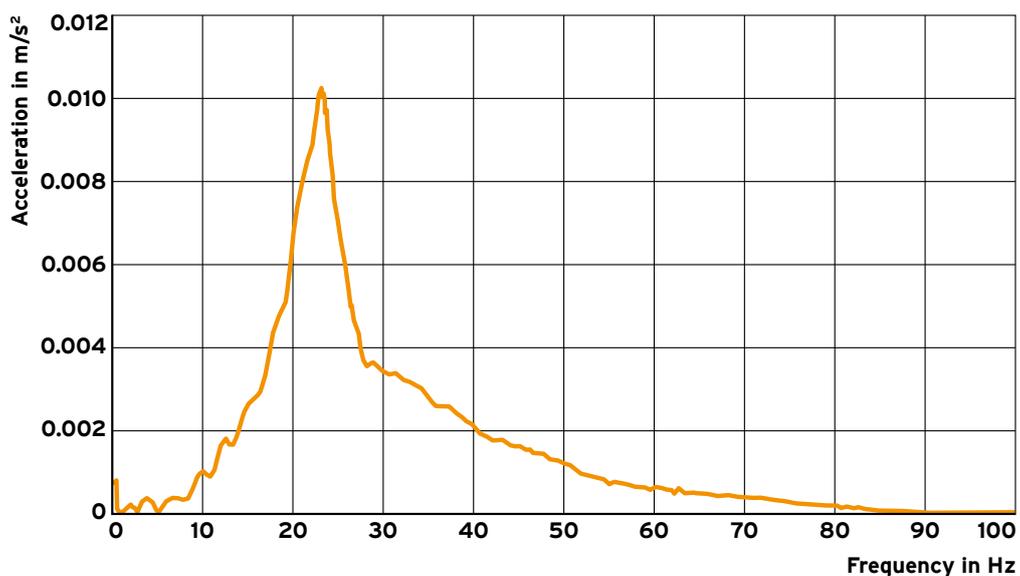
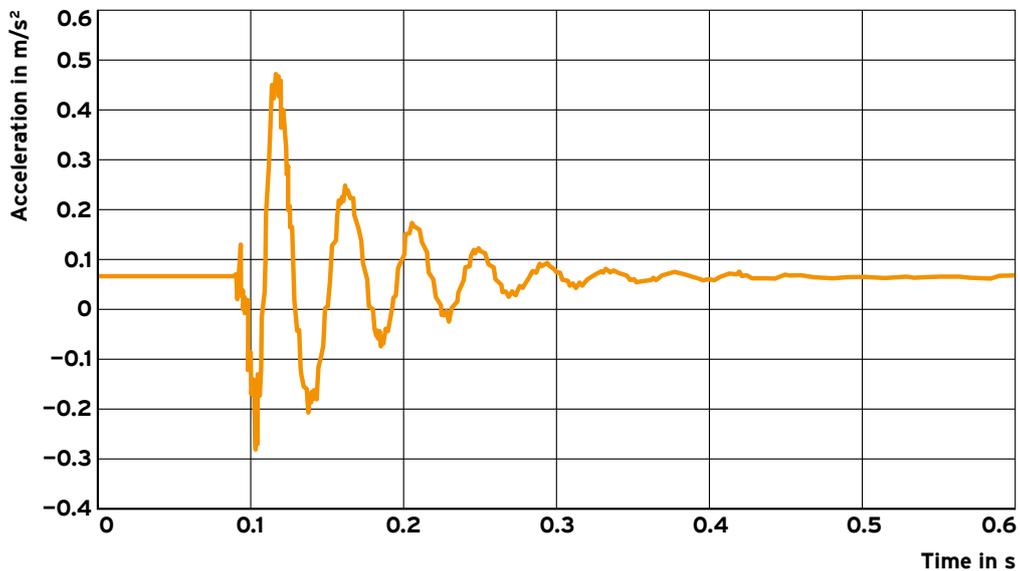
BENEFITS

- Proven long-term behaviour: The stiffness of the elastic elements remains constant after 18 years continuous operation
- Effective protection from structure-borne noise: Maximum vibration levels in the surrounding buildings are well below international and local standards

Long-term performance put to the test

After 18 years of operation, Metrotenerife, together with Getzner, reviewed the performance of the elastic polyurethane mass-spring system. The objective was to determine whether the system still exhibits its originally intended dynamic behaviour. In addition, the aim was to assess whether the

prescribed vibration reduction is still being achieved. Measurements were carried out at several characteristic locations in Santa Cruz and San Cristóbal de La Laguna. International standards as well as local regulations on maximum permissible vibration levels were taken into account.



Natural frequency measurements were taken at 23 points over the entirety of the line. Thanks to the mass-spring system from Getzner, the resulting time signal readings were normal and the frequency spectra showed a clear resonance.

Comprehensive analysis

To assess the condition of the mass-spring system, the natural frequency was measured without a train passing. It reflects the interaction between the track slab mass and the stiffness of the elastic elements. This shows whether the system is still properly tuned and continues to provide effective vibration isolation.

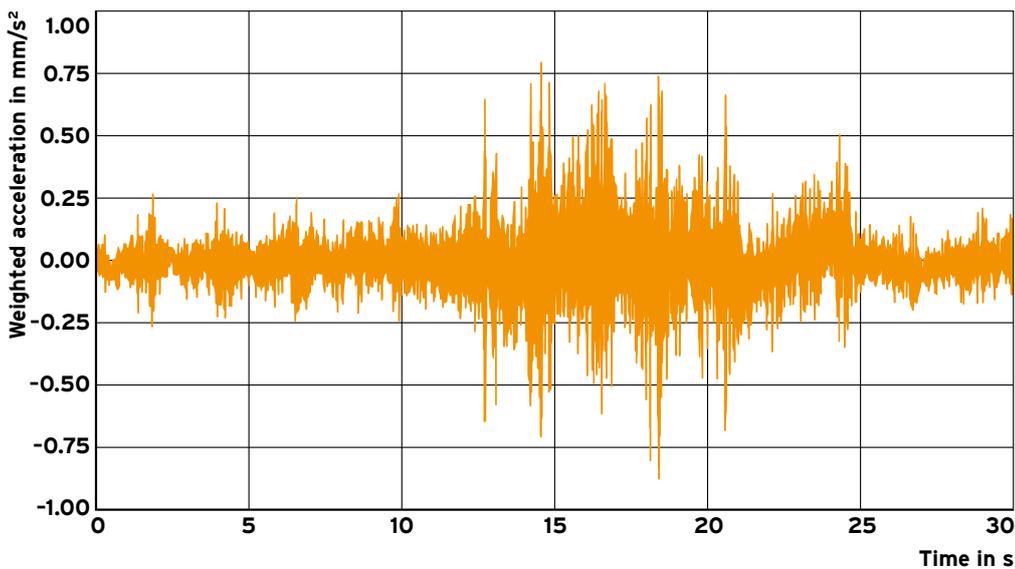
The natural frequency was experimentally determined at 23 measurement points in accordance with ISO 7626-5:2019-12. A defined impact generated by jumping onto the elastic plate served as the excitation. The system response was recorded using an acceleration sensor. Ten of the 23 measurement points were concentrated along the short section of track on Calle Imeldo Serís in the centre of Santa Cruz, located between the Teatro Guimerá and Calle de Bravo Murillo.

In addition, Getzner's experts checked the vibration levels at the buildings in front of the Teatro Guimerá and at Calle Imeldo Serís 54. These locations are particularly close to the tracks. The results were compared with the limit values defined in various vibration standards, including the ISO 2631 series and the Spanish regulation 'Real Decreto 1367/2007'.



The natural frequency of elastically mounted track slabs was determined in accordance with ISO 7626-5:2019-12. The excitation was done by jumping onto the slab and the response was recorded with an acceleration sensor.

Getzner installed three sensors at intervals of 8 to 10 metres to determine the vibration limit values at the culturally significant Teatro Guimerá. One measurement was taken at the wall, and a second at the foot of the steps on the pavement.



Land use category	Limit
Very sensitive areas (hospitals, schools, cultural institutions)	4.0 mm/s ²
Residential buildings	5.6 mm/s ²

The average vibration level next to the wall of the Teatro Guimerá was 0.210 ± 0.052 mm/s². On the pavement closer to the tracks, readings of 0.325 ± 0.115 mm/s² were taken. This means the values are well below the limits defined in the Spanish Real Decreto 1367/2007 for vibration-sensitive environments such as cultural institutions (see table).



THE GETZNER SOLUTION

Consistent long-term performance

Even after 18 years in operation, the natural-frequency measurements of the elastically supported track slabs align remarkably well with the original design assumptions. Across all 23 measurement points, values remained below the calculated 25.5 Hz, with an average of 23.2 Hz. These results clearly demonstrate that the mass-spring system continues to move freely and reliably maintains its dynamic performance – almost two decades after installation.

The vibration levels measured at Teatro Guimerá and at Calle Imeldo Serís 54 also lie well below the legal limits defined in Real Decreto 1367/2007 of 4 mm/s² or 5.6 mm/s².

At Teatro Guimerá, an average vibration level of 0.210 ± 0.052 mm/s² was recorded next to the building wall, while 0.325 ± 0.115 mm/s² was measured closer to the track on the sidewalk (see table). At Calle Imeldo Serís 54, the measured vibration level was 0.484 ± 0.103 mm/s².

These results clearly demonstrate that vibration transmission into the surrounding environment remains effectively and reliably controlled.

» ***“The mass-spring system made of Sylomer® from Getzner has proven itself to be a reliable, durable solution for tram applications. After 18 years continuous operation, the natural frequency is stable and the vibration levels are well below the relevant limit values. The ongoing durability and effectiveness of the system are beyond impressive.”***

Pablo Oromí Fragoso, Civil Engineer, Metropolitano de Tenerife, S.A



BENEFITS

Getzner's mass-spring system delivers long-lasting reduction of vibrations and structure-borne noise along the tramway line in Tenerife. It provides reliable protection for nearby buildings and ensures a pleasantly quiet environment. The combination of outstanding vibration isolation, high elasticity, and maintenance-free performance guarantees long-term comfort in urban areas.

Operator	Metrotenerife
Completed	2007
Solution	Sylomer® S210 (28mm) on a 12.5 km section of track

Additional references can be found on our website:



[getzner.com/
references](https://www.getzner.com/references)

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