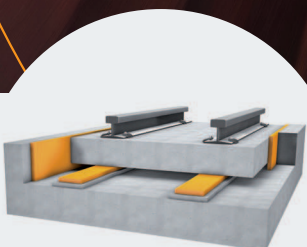


# Extended Mass-Spring System for use in Standing Water



# Mass-Spring System XT – Solid and Efficient



## Efficient vibration protection in standing water

The presence of standing water in a system can impair the effectiveness of mass-spring systems. With its mass-spring system XT, Getzner has developed a vibration solution that works in the long term in standing water – even if a drainage system becomes blocked or is totally lacking.

In the rail sector, vibrations can be reduced in a variety of ways depending on the requirements. Mass-spring systems are employed wherever the highest levels of protection from structure-borne noise and vibrations are required. Getzner's full surface elastic bearings for mass-spring systems are highly efficient in helping to protect buildings and residents living in the vicinity of railway lines from the effects of noise and vibrations. However, in situations where a mass-spring system has to function under the effects of water, the elastic materials are playing an even more important role in determining the success of the vibration solution.

Systems that are full surface mounted on Sylomer® exhibit little change in their natural frequency when exposed to water. However, if elastomers whose elasticity is dictated by shape are used, the natural frequency can change significantly. In extreme cases, this can result in system failure.

## Elastic bearing during normal construction process

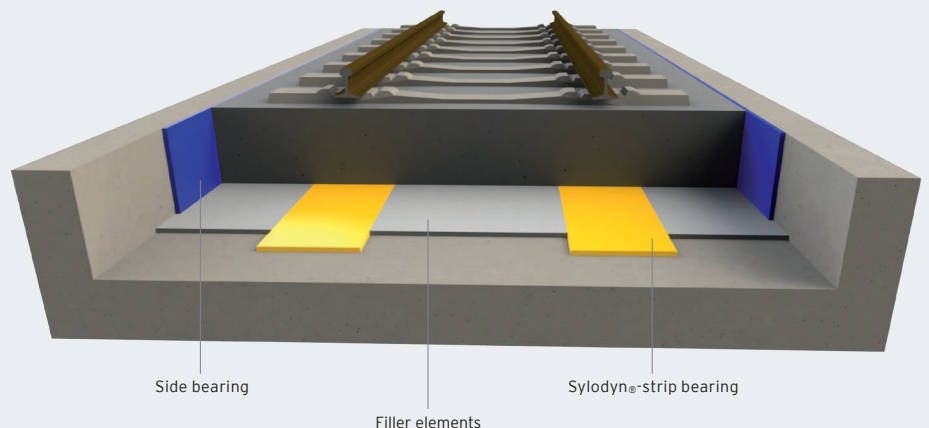
If there is any standing water in the vicinity of the bearing surface, the mass-spring system XT provides the necessary level of vibration protection. As an alternative to full surface bearing – a combination of Sylodyn® strip bearings and fillers – Getzner has developed a vibration solution that guarantees the highest level of effectiveness in the long term, even in standing water. No deviations whatsoever from the normal construction process are necessary. The vibration protection is implemented in the usual "pour-in-situ" manner by direct concreting, in other words without

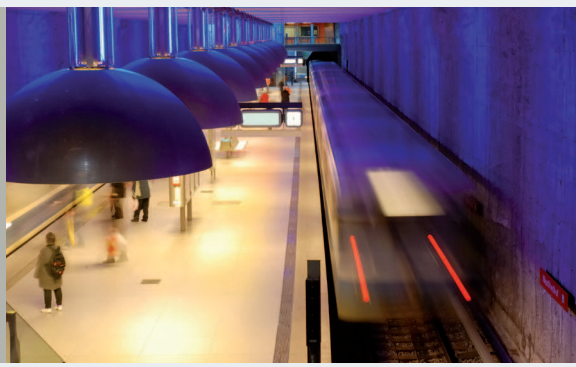
the use of precast concrete elements or filigree slabs. This particular solution not only effectively counteracts the hardening effect of water ingress, the "pumping effect", it decouples the superstructure from its environment and dramatically reduces the transmission of structure-borne noise and vibrations.

## A system that is unique on the market

In the case of the full surface mass-spring system XT, the combination of materials achieves the desired effect: the strip bearings are made of the proven Getzner material Sylodyn®, with special filler elements fitted in

## Execution of the mass-spring system XT





Munich underground line

the spaces in between. The effectiveness of the solution is essentially due to the high-tech Sylodyn® material. During the installation of the mass-spring system XT, the track slab is completely decoupled from its surroundings by additional side mats. The specialised knowledge required for this task has been acquired over decades. We are unaware of any other solution on the market that achieves comparable results under the same conditions.

### **Sustainable economic and effective system**

The materials developed by Getzner are highly effective. The mass-spring systems in particular have already proven to be a sustainable economic system worldwide. In terms of cost-effectiveness, the mass-spring system XT can be compared with a full surface Sylomer® bearing. The effectiveness of this system is maintained even if a drainage system is blocked or is totally lacking. The pumping effect, in other words the stiffening of the system in standing water that cannot drain away, does not occur with this solution - or only to a very limited extent. The effectiveness of the system thus remains reliable and predictable, even in standing water.

### **Getzner's know-how offers security**

One of the most striking features of this vibration solution from Getzner is



its simplicity: no special requirements or changes to the construction process are necessary. Getzner will also provide professional support during the installation of the system. With their extensive background in this area, the Getzner specialists become vital partners: whether providing advice in the planning phase, developing the best customised solution or as project engineers or coordinators during the installation work. The vibration specialist owns state-of-the-art equipped laboratories and special testing rigs, and also works closely with a number of scientific institutions. The vibration solutions are both technically and commercially mature.

### **Construction benefits of the full surface mass-spring system XT from Getzner**

- No deviation from the normal construction process
- Quick and easy to install
- The system continues to function even in standing water - e.g. when a drainage system is blocked or is totally lacking
- High-tech materials
- Effective in the vicinity of a full surface Sylomer® bearing
- A sustainable and economical complete system for the long term
- Minimal maintenance required



Nottingham tram line



### Getzner projects speak for themselves

Reference projects from all over the world using elastic bearings made from Sylomer® and Sylodyn® testify to the extensive experience of Getzner. The vibration specialist has been providing professional support to its international customers for decades in reducing levels of structure-borne noise and providing protection against vibration.

### International references relating to mass-spring systems for trams

- Stuttgart
- Barcelona
- Berlin
- Krakow
- Le Mans
- Madrid
- Milan
- Marseille
- Nice
- Nottingham
- Paris
- Rome
- Vienna