

Optimisation of Turnouts with Elastic Bearings



» Reduced impacts and vibrations

» Less wear of ballast and turnout components

» Decreased maintenance costs

Solutions for ballast protection



- 1 Damage to rails and the frog
- 2 Short pitch corrugation
- 3 Transfer of vibrations to adjacent buildings
- 4 Tilting of the turnout
- 5 Ballast wear

The inhomogeneous load distribution of passing trains causes high dynamic forces in turnouts. As a result, numerous factors increase maintenance costs: The ballast is subjected to heavy loads and wear. This produces cavities beneath the sleepers and the entire turnout can tilt. Additionally, damages to other components such as the frog and rails occur.



Inhomogeneous load distribution in the turnout causes ballast wear and “white spots”.



High dynamic forces frequently lead to broken rails.

Solutions for vibration isolation



When trains pass through, vibrations and noise are transferred to the surrounding area - both in slab track and ballasted track. Moreover, the vibrations affect the entire superstructure.



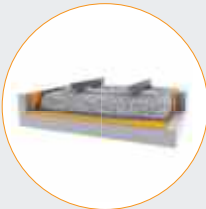
Damage to rails and the turnout frog



Reduced quality of life without vibration isolation

Solutions for ballast protection

2x
service life
of ballast



Under Ballast Mats
Optimum ballast bedding and load transfer. Effective vibration protection.



Under Sleeper Pads
Increased track quality, longer ballast service life and fast installation.



Rail Pads
Improved load distribution for reduced wear to the superstructure. High mechanical load capacity.



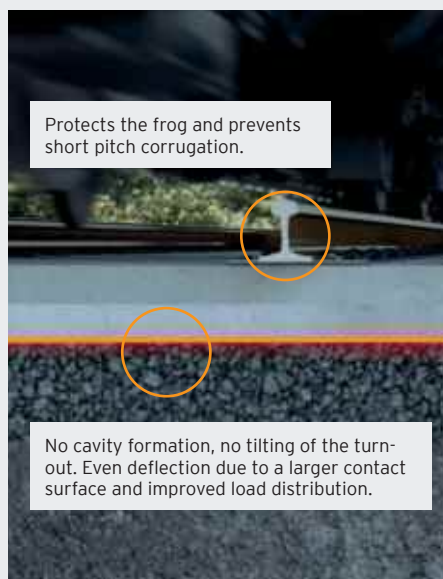
Baseplate Pads
Reduced vibrations and improved load distribution in the case of slab track systems.

Advantages of the solutions

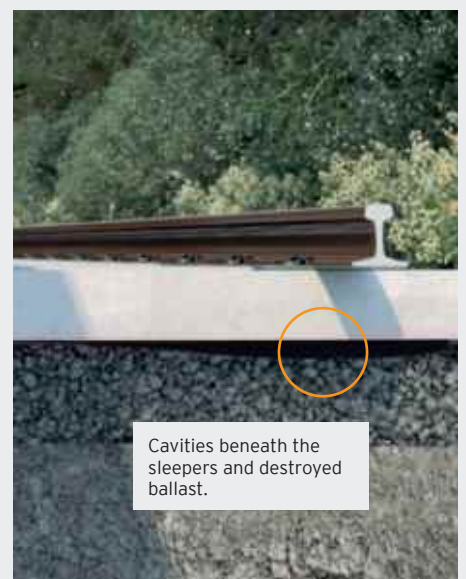
- Higher availability and longer service life of the railway line
- Less wear to turnout components such as frog or rails
- Longer ballast service life
- Reduced maintenance costs
- Lower life cycle costs

Less wear

The introduction of defined elasticity with Sylomer® and Sylodyn® evens out asymmetrical loads in the area of the turnout. This reduces wear and maintenance costs significantly. Tamping intervals can be extended by at least 100 %.



Optimised turnout with Under Sleeper Pads



Turnout without elastic bearing



**China | CRC China Railway Corporation
Rail Pads**

- Higher availability of heavy haul tracks
- Longer service life of rails
- Lower life cycle costs

**Austria | ÖBB
Under Sleeper Pads**

- Reduced ballast wear
- More homogenous load distribution
- Longer service life of the turnout

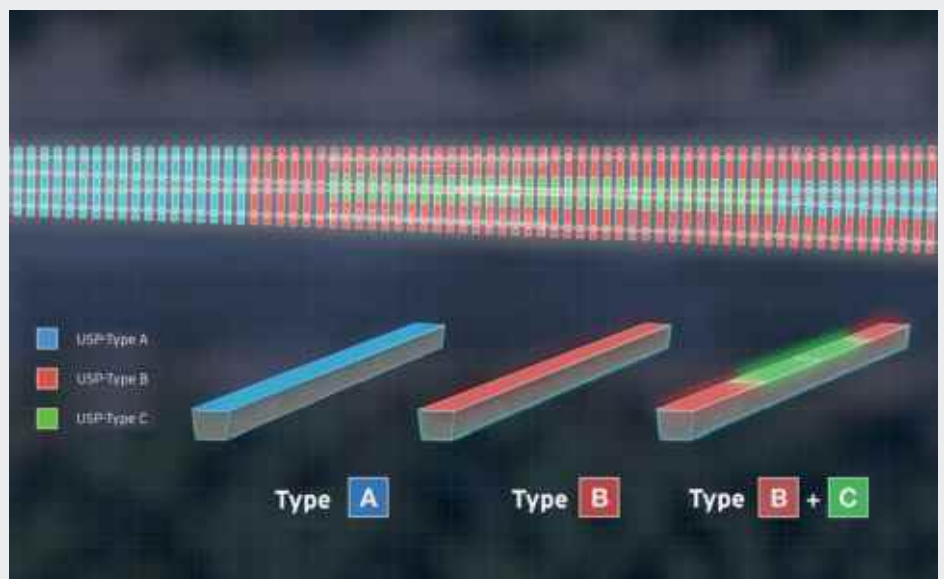
References (extract)

Solutions for ballast protection

- DB, DE, since 2004
- ÖBB, AT, since 2005
- ADIF, ES, since 2008
- SNCF, FR, since 2011
- RFI, IT, since 2014
- Trafikverket, SE, since 2015

The perfect mix of materials selected with the Finite Element Method

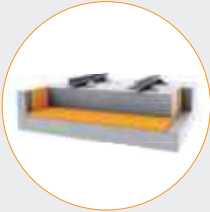
Using the Finite Element Method, the effects of a train passing over a turnout are simulated precisely, taking into account all geometric boundary conditions. This results in an optimum mix of various elastic elements such as different types of Under Sleeper Pads.



Getzner simulation tool for the turnout

Solutions for vibration isolation

> 2000
optimised
turnouts
worldwide



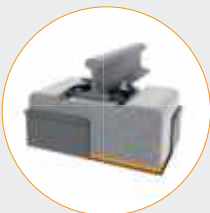
Mass-Spring Systems (full surface, strip- or point-bearing)

Highly effective vibration protection and greater elasticity for the superstructure.



Under Ballast Mats

Optimum ballast bedding and load transfer. Effective vibration protection.



Insertion Pads for Sleeper Boots

Reduced structure-borne noise, emission particularly in tunnels.



Baseplate Pads

Reduced vibrations and improved load distribution in the case of slab track systems.

Advantages of the solutions

- Better living conditions and acceptance among people living near railway lines
- Greater flexibility in track/ installation planning
- Higher availability of the railway line
- Less wear to the superstructure
- Greater comfort for passengers
- Vibrations reduced by up to 95 %

More elasticity for greater comfort

Flexible solutions from Getzner provide targeted elasticity and reduced changes in stiffness - for turnouts in both slab tracks and ballasted superstructures. Railway lines thereby create less vibration and noise.



Turnout mounted on a Mass-Spring System



Brazil | Salvador de Bahia, Line 1
Insertion Pads for Sleeper Boots and Mass-Spring System

- Maintenance-free Sylodyn® bearings
- Effective protection against vibrations and structure-borne noise
- Better living and working conditions for residents

China | Zhangjiawan Depot, Metro Beijing, Line 7
Under Ballast Mats

- Increased elasticity
- Vibration protection for noise-sensitive buildings
- Increased track quality

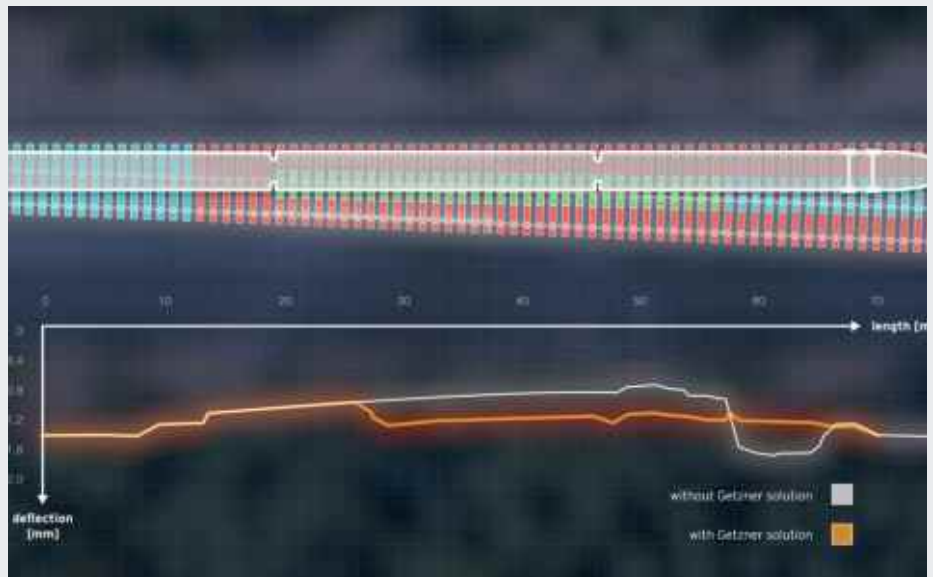
References (extract)

Solutions for vibration isolation

- London Underground, GB, 2011
- ÖBB, entrance to Brenner Base Tunnel, AT, 2012
- Metro Sao Paulo, BR, 2013
- Metro Madrid, ES, 2014
- SBB, Gotthard Base Tunnel, CH, 2016
- Metro Istanbul, TR, 2018

Precise simulation for reduced changes in stiffness

The optimum elasticity determined using the Finite Element Method reduces the changes in stiffness caused by the turnout geometry. The smooth passage of the train minimises vibrations and protects the superstructure.



Getzner simulation tool for the turnout



Large scale test rig



Installation of under ballast mats

Developed, tested and installed by experts

Products from Getzner are continually subjected to strict quality testing, even during the production process. Their reliability is rigorously tested, not only on the large scale test rig in-house, but also frequently by independent external institutes such as the Technical University of Munich (Chair and Institute of Road, Railway and Airfield Construction).

Comprehensive range of services

An excellent product can only reach its full potential when it is used correctly. Experts from Getzner support customers all the way from precise deflection calculations through the optimum material choice, to installation supervision and approval on site.



50 YEARS OF EXPERIENCE



LEADER IN INNOVATION



CERTIFIED SOLUTIONS



WORLDWIDE PROJECTS



Find more information on turnouts at www.getzner.com/turnouts

