

# Case Study

## Successful Tests on the Fengsha Heavy Haul Line, China



» First application of Under Sleeper Pads in China

» No wear of the Under Sleeper Pad

» Longer service life for superstructure components



# Effective solution despite extreme loads

## Description of the project

**On heavy haul lines in particular, every element of the superstructure is subjected to considerably higher loads and thus increased wear. Frequent maintenance repairs are inevitable. For important routes, such as the Fengsha Line in China, these interruptions quickly become a problem. Getzner offers solutions for increased track availability.**

The 206 km line, which connects the Fengtai region in western Beijing with the city of Shacheng in the Hebei province, is one of the most important railway connections in northern China. The double-track route has been electrified since 1984 and is operated and maintained by the railway authority in Beijing. Carrying coal, freight and passenger trains, the availability of this line is critical.

### Future-proof planning

"With the electrification of the line and clearance limit of the existing tunnel, the ballast height is very low (100 mm) and therefore insufficient. The lack of elasticity in the superstructure leads to damage to the sleepers and other components as well as to accelerated ballast wear - the consequence are frequent closures. We want to avoid this in the

future," Guanghai Wang says, head of the maintenance department at the railway authority in Beijing. "Getzner came to us with an interesting suggestion. The numerous reference projects featuring Getzner products and solutions all over the world made us curious."

### Test track to deliver results

To demonstrate the effectiveness of Getzner solutions in the superstructure, part of the Fengsha Line was converted into a test section with Getzner Under Sleeper Pads. This special application of Under Sleeper Pads is not only new for this line, but it is also the first of its kind in China. The installation was carried out as part of maintenance work on the Fengsha Line in April 2013.

## The Getzner solution

### Confirmed performance

The sleepers with Under Sleeper Pads were installed in the transition area from open track to a tunnel - 200 padded sleepers in the tunnel itself and 100 in the approaching section. In addition, the ballast underneath around 60 sleepers was cleaned, while the rest remained uncleaned. During the test period of one year, the test section of the superstructure was subjected to a load of approximately 120 million metric tons.

### Hardly any wear after one year

After the test phase, various padded sleepers were removed from the ballast bed and thoroughly examined. "The results were impressive in every respect," Kevin Dong says,





Excellent result: no damages on the Under Sleeper Pad



Under Sleeper Pads ensure high ballast quality.

**>>** *This was the first ever test of Under Sleeper Pads in China. The results impressed everyone involved.*

the responsible project manager at Getzner. "The Under Sleeper Pads did not exhibit any perforations, cracks, holes or other damage. The overall condition of all the Under Sleeper Pads examined was excellent."

**Cleaning of the ballast plays an important role**

Inspection of the ballast also provided new insights. Its condition was checked both in the sections with and without Under Sleeper Pads, and in the sections with cleaned and uncleaned ballast. "Without Under Sleeper Pads and cleaning of the ballast, there were no longer any larger ballast stones present under the sleepers. The ballast had been completely destroyed," Kevin Dong reports. "The best ballast quality was

found in the section with Under Sleeper Pads and cleaned ballast. In the section with padded sleepers but uncleaned ballast the deterioration of the ballast quality in comparison with the unpadded reference section was considerably reduced." This leads to the conclusion that Under Sleeper Pads significantly extend the service life of the ballast - and thus the track even if the initial state of the superstructure is suboptimal.

**No track settlement in the test area**

Getzner Under Sleeper Pads ensure improved load distribution and increase the contact surface between sleeper and ballast. The load from the train is distributed over a larger number of sleepers and therefore over a larger area. The ideal embedding of the ballast in the Under Sleeper Pad stabilises the top level of the ballast and reduces the direct dynamic load on the ballast. This was also the case in the test section of the Fengsha Line. Furthermore, the lateral resistance was checked in collaboration with the renowned Jiao Tong University in Beijing. "We were delighted with the positive findings," Kevin Dong explains. The conclusion was unequivocal: In line with the regulations of the CWR railway, the test results met all requirements.

Feedback

**What does the customer state about the project?**

"These tests proved that Under Sleeper Pads represent a way to significantly increase track availability," Guanghui Wang concludes, head of the maintenance department at the railway authority in Beijing.

**Advantages for the customer**

- Significantly reduced destruction of the ballast
- Increased availability and profitability
- Less maintenance work and lower costs
- Significantly improved track geometry quality





## Facts and figures at a glance

Operator:	Beijing Railway Bureau
Range of use:	Tunnel section no. 23 of the Fengsha Line
Material used:	300 elasto-plastic Under Sleeper Pads SLB 1510 G
Load during the test phase:	120 MGT

### Getzner Werkstoffe GmbH

Founded:	1969 (as a subsidiary of Getzner, Mutter & Cie)
Chief Executive Officer:	Ing. Jürgen Rainalter
Employees:	490 (360 in Bürs)
Turnover in 2018:	EUR 100.3 million
Business areas:	Railway, construction, industry
Headquarters:	Bürs (AT)
Locations:	Berlin (DE), Munich (DE), Stuttgart (DE), Lyon (FR), Amman (JO), Tokyo (JP), Pune (IN), Beijing (CN), Kunshan (CN), Charlotte (US), Decatur (US)
Ratio of exports:	93 %