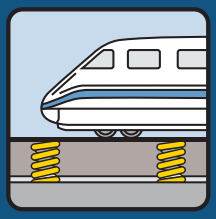
TRACKBEDS

Mass-Spring Systems for Vibration Isolation of Trackbeds & Alignment of Stiffness Transition Zones



Steel spring MSS, Expo Line, Los Angeles, USA

Mat MSS, subway, Chongqing, China

PREVENT VIBRATION AND GROUND-BORNE NOISE EFFECTIVELY - WITH GERB SOLUTIONS FOR ELASTICALLY SUPPORTED TRACKS

Transport systems running on rails are the best option for overcoming the traffic problems of the 21st century. Today, they belong to the most modern and comfortable forms of transporting human beings and goods. However, all train systems cause noise and vibrations. Hence, where tracks and buildings are close to each other, conflicts are often inevitable. Ground-borne noise and vibrations are perceived as disturbances.

MSS, TGV High Speed Train, Cheonan, South Korea

Elastic support systems from GERB reduce the transfer of ground-borne noise and vibrations of train traffic, regardless where they are deployed, inside buildings or in nearby areas. They are appreciated and recommended by experts throughout the world as being efficient and reliable systems for reducing vibrations.

GERB support systems - in the form of coil springs made from steel or technically high-quality polyurethanes - not only provide effective insertion loss in the audible or higher frequency range, but also reduce low-frequency vibrations successfully. In this way, resonance effects in surrounding areas or in neighboring buildings can be prevented. Attenuation systems from GERB are deployed in tunnels, at grade sections and elevated tracks. Thanks to the large variety of available systems, requirements of each installation can be met for all rail systems.

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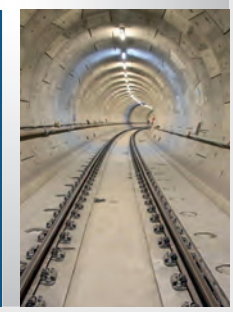
CROSSRAIL UK



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EXPO LINE USA

GERB

XIZHIMEN STATION - XIHUAN PLAZA CHINA

MSS with earthquake protection, subway, Tokyo, Japan

MSS, commuter train, Charlotte, USA

CUSTOMIZED SOLUTIONS

GERB systems are suitable for all types of rail traffic systems:

+ Heavy Haul
+ High Speed
+ Trams
+ Subways
+ Urban Mass Transit
+ Magnetic Levitation

+ STEEL SPRING SYSTEMS

+ Very high effectiveness/requirements
+ Sensitive surroundings (e.g., hospitals)
+ High attenuation capacity, natural frequency 4 - 8 Hz

+ ELASTOMER SYSTEMS

+ Moderate to high effectiveness/requirements
+ Heavy haul trains, high speed routes, etc.
+ Medium attenuation capacity, natural frequency 8 - 25 Hz

+ NOVODAMP® DISCRETE BEARINGS

+ High effectiveness/requirements
+ High attenuation capacity
+ System frequency: 8 - 14 Hz

+ NOVODAMP® MAT SYSTEMS

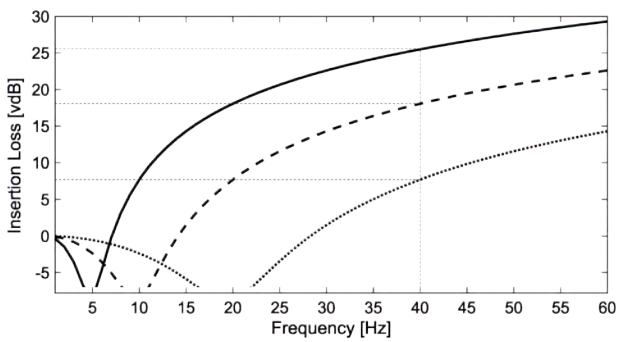
+ Medium vibration attenuation
+ System frequency: < 25 Hz
+ Stiffness transition zones

+ SUB-BALLAST MATS

+ For ballasted trackbeds
+ Special antiperforating system with protective fleece
+ Protection of ballast and bed

+ STIFFNESS TRANSITIONS

+ Protection of trackbed
+ Extension of maintenance intervals
+ Reduction in operational downtime



Floating Slab Track with Steel Spring Elements

Floating Slab Track with NOVODAMP® Discrete Bearings (Pads)

Floating Slab Track with NOVODAMP® Mats

Exemplary insertion loss of various floating slab tracks with system frequencies of 5 Hz, 10 Hz and 20 Hz leading to insertion loss of 26 dB, 18 dB and 8 dB at 40 Hz.

SOLUTIONS FOR YOUR APPLICATION

STEEL SPRING ELEMENTS IN SINGLE OR MULTI-SPRING DESIGN

Steel spring elements in single or multi-spring design offer a high level of load-bearing capacity and thus enable large distances between the individual elements. They are either placed below the slab track or in the gaps on each side in order to achieve low construction heights. For the installation of the spring elements the slab tracks are raised from the support structure. Side recesses or central openings for placing hydraulic jacks enable the lifting of the track. Elastic elements can be removed for inspections.

SPRING ELEMENTS WITH LIFTING FUNCTION

Spring elements with an integrated lifting function enable casting of the reinforced concrete slab track directly on the substructure (1st stage concrete or bridge deck). The slab tracks are raised and aligned both easily and quickly with the help of hydraulic equipment. Subsequent adjustment or inspection without any significant interruption of rail traffic is enabled by accessibility from above. This procedure is suitable for turnouts and crossing zones and combines an optimal isolation effect with a compact design. In comparison to classical mass-spring systems, the height of the slab track can be reduced significantly with this GERB system.

ELASTIC SYSTEMS BASED ON POLYURETHANE

Polyurethane in the form of mats, strips or pads has proven itself as highly elastic track support. The NOVODAMP® solutions from GERB are extremely resistant - against both mechanical (e.g., fatigue and compression set) and chemical wheatering (e.g., water, oil, lubricants and ozone). The systems can be easily installed and are available in different thicknesses. They can be dimensioned and installed for required attenuation ranges. Different materials are available and by varying the thickness it can be adapted to all design loads typical for railway systems.

Product	Application Trackbed Isolation	Support Frequency [Hz]
T150 T125 T100 T075 T060 T045 T035 T025 T018	FST / Discrete Bearings Strips Transition Zones	≥ 8
T010 T008	Under Ballast Mats FST / Full Surface Mats	≥ 10

Other materials are available on request. All data may become subject to change.

REFERENCES

+ + +

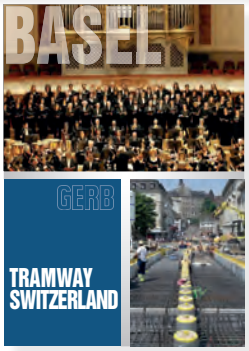
Worldwide, more than 250 projects and over 700 km plain track
– ranging from light rail tramways to high speed lines – isolated with

GERB Helical Steel Spring Elements
and/or
GERB NOVODAMP® Closed-cell Polyurethane

Argentina – Brazil – Canada – Germany – India – Japan – Korea – Mexico – Norway –
Russia – Singapore – Switzerland – Taiwan – Thailand – UK – USA

EXCERPT

Country	Project	In operation since	Max. axle load (kN)
Brazil	Suburban Railway, São Paulo	1999	210
	Subway, Brasilia	2000	175
China	Subway, Beijing	2002	140
	Subway, Shenzhen	2003	160
	Subway, Shanghai	2003	160
	Subway, Nanjing	2004	140
	Subway, Guanzhou	2005	150
	Subway, Chengdu	2010	140
	Railway, Tianjin	2010	170
	Subway, Chongqing	2018	150
Germany	Subway, Berlin	1994	90
	Tramway, Bielefeld	1995	100
	Tramway, Köln	1997	100
	Airport Transfer, Frankfurt a. M.	1997	70
	Tramway, Stuttgart	2000	100
	Tramway, Bochum	2005	100
	Tramway, Heidelberg	2007	100
India	Subway, Chennai	2020	160
Japan	Subway, Tokyo	2000	100
	Intercity Railway, Tokyo	2004	150
	Subway, Yokohama	2006	150
	Railway, Fukuoka	2009	170
Norway	Tramway, Oslo	2004	100
Russia	Subway/Metro, Moscow	2006	150
South Korea	Railway, Puchon	1997	220
	TGV High Speed Train, Cheonan	1999	220
Switzerland	Tramway, Basel	2006	100
Taiwan	Circular line, Taipei	2018	103
Thailand	Railway (State Railway of Thailand, SRT)	2018	200
	Subway (State Railway of Thailand, SRT)		
United Kingdom	Subway, London	1999	100
USA	Commuter train, Charlotte, NC	2002	125
	Brightline, Miami, FL	2018	177
	Expo Line, Los Angeles, CA	2016	110



GERB

worldwide

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Vibrations can be controlled wherever they occur

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Interested in detailed information or individual consulting service? Please contact us!

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