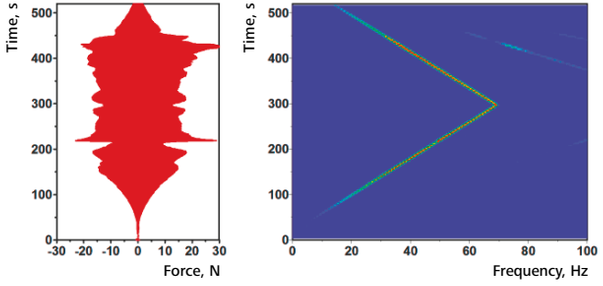
Technical specification

Frequency range	5 Hz to 110 Hz	
Force direction	vertical, horizontal	
Force/frequency curve for operation up to 50 Hz	**frequency [Hz]**	**force [kN]**
	5	1,0
	10	4,2
	20	16,8
	30	37,6
	50	105,0
Force/frequency curve for operation up to 110 Hz	**frequency [Hz]**	**force [kN]**
	5	0,2
	10	0,8
	20	3,2
	50	19,8
	70	38,8
	110	105,0
SPS-control	Force/frequency curves and time course programmable	
Fixing to the substructure	screwed with 4 bolts on gravity foundation	
Force measurement	vertically, load cells	
	Mass [kg]	
Imbalance exciter	ca. 850	
Control cabinet	ca. 300	
Gravity foundation	ca. 3.200	
Mounted parts	ca. 400	

Force measurement

Force excitation with the imbalance exciter DYNAQ® can be done both in vertical and horizontal directions. For vertical direction, the dynamic forces induced into the underground can be measured and recorded through four load cells.



Force vs. time (left), Campbell diagram of the measured force (right)

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Contacts

Dr.-Ing. Andreas Gömmel

Phone +49 711 136757-16
Andreas.Goemmel@mbbm.com

Dipl.-Ing. (FH) Markus Löffler M. Eng.

Phone +49 711 136757-19
Markus.Loeffler@mbbm.com

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Müller-BBM GmbH
Branch Office BFB Stuttgart
Schwieberdinger Strasse 62
70435 Stuttgart
Germany
Phone +49 711 136757-0

www.MuellerBBM.com

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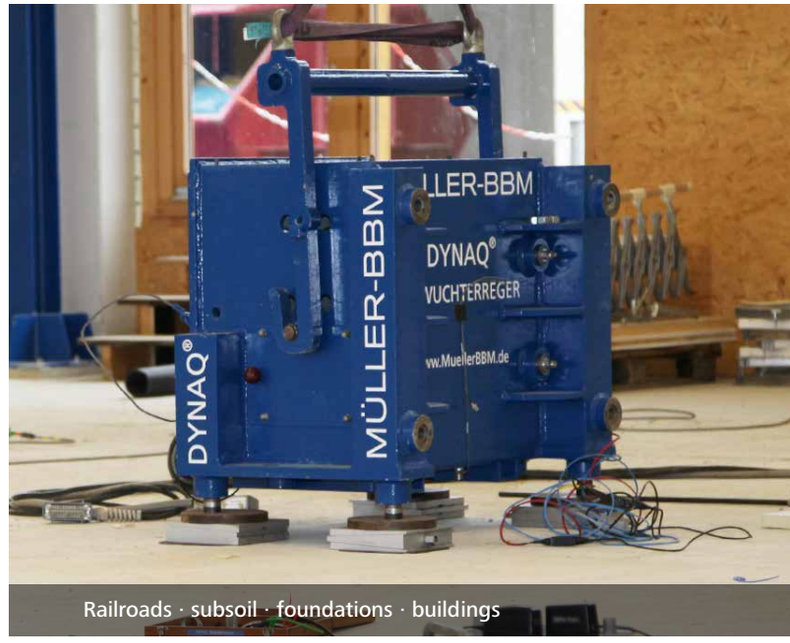


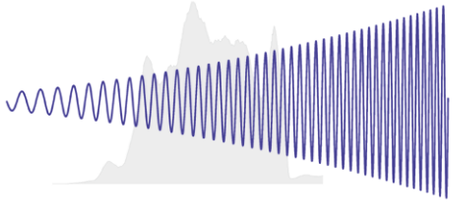
Railroads · subsoil · foundations · buildings

Imbalance exciter DYNAQ®

Dynamic analyses of subsoil, baseplates and buildings by application of defined dynamic forces

Imbalance exciter DYNAQ®

Controlled and direct transmission of reproducible dynamic forces with frequencies up to 110 Hz into structural components, such as bridges, high-rise buildings, piles, machine foundations, road infrastructure, and track systems as well as into the subsoil – facilitated by Müller-BBM's imbalance exciter DYNAQ®.



Foundations and buildings

With dynamic measurements the vibrational behaviour of buildings and foundations can be better evaluated. The excitation of DYNAQ® is controlled by both force and vibration – thus it is possible to have a detailed examination of the dynamic stiffness of constructions and, in addition, to analyze the transfer functions of two dynamic systems.

Dynamic excitation of the base frame of a paper machine

Resonance effects with the constructions' eigenfrequencies will show up in the course of the dynamic force excitation. Thus, conclusions can be drawn not only regarding the soil-building-interaction but also for the impact on individual machines or machine foundations. With the measurement results, numerical models can be calibrated and mitigation measures can be effectively dimensioned to reduce distortions or vibrational transfer.

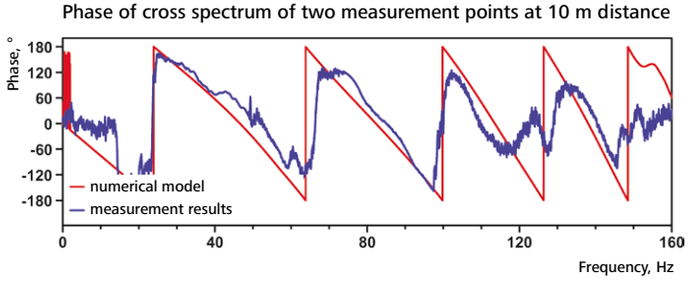
Soil dynamics

Adequate knowledge of the dynamic soil parameters is crucial for predicting vibration emissions and the nuisance from vibrations. Parameters such as the dynamic shear modulus and the Poisson's ratio can be determined e.g. in in-situ measurements by recording the velocities of wave propagation.

Dynamic excitation of a concrete foundation slab to determine the wave propagation in the soil

With Müller-BBM's imbalance exciter DYNAQ® frequency-dependent wave fields can be generated in soils.

Through seismic measurements it is possible to allocate depth-dependent dynamic parameters, which provide a good understanding of the soil stratification.



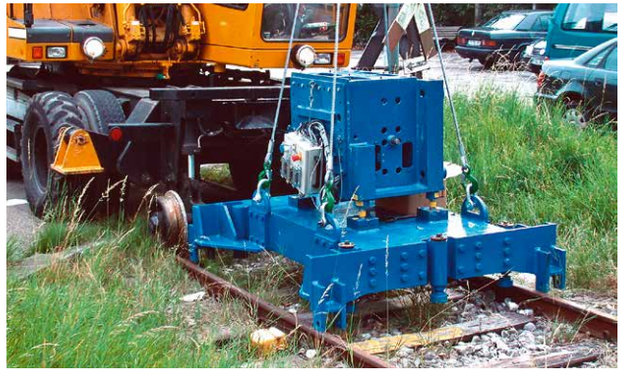
Railroad traffic

DYNAQ®, Müller-BBM's imbalance exciter, can be used in both tunnel carcasses and in ready-made railway track systems. The dynamic forces that are induced into the superstructure or the substructure with DYNAQ® are in a frequency range between 5 Hz and 110 Hz. Thus, the most relevant frequency range of railway-bound vibration emission is covered.

Installation of DYNAQ® on a railway plate

Recorded response functions of the track system, the tunnel construction or the subsoil can help to make statements not only on stiffness levels, damping properties or impedance values, but also on the characteristic qualities of track insulation measures, such as mass-spring-systems or installed sub-ballast mats.

Vibration measurements with our DYNAQ® imbalance exciter deliver precious data – data that allows predictions regarding track stability at an early stage, before new or retrofitted railway lines are put into operation; this data can even be specified to give insight into the expected shock propagation.



Installation of DYNAQ® on a rail track