



---

# Competence in Bogie Testing



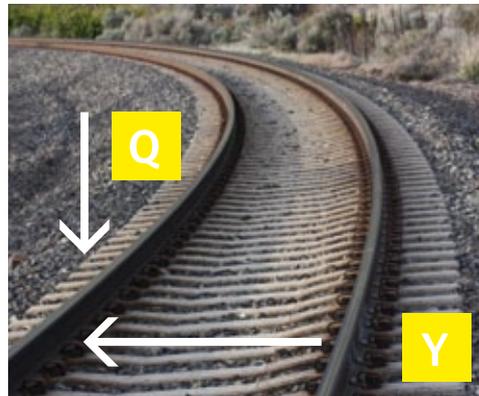


## « Nencki bogie test stand NBT

# Increased requirements and new standards ask for better checks

### IMPROVED TRAVEL COMFORT AND SAFETY, LESS WEAR

An accurate test and adjustment of the wheel loads and the bogie geometry optimize the travel comfort and minimize the wear and operating costs of rail and rolling stock. An exact check is also imperative for avoiding derailling accidents. Two factors have to be considered for that: The lateral force  $Y$  becomes increased especially in curves or under strong side winds. Now it becomes very important for the wheel load  $Q$  to be adjusted correctly, in order to withstand this and to avoid derailling.



### DIN 25043-7

This standard has been in force since 2012 and requires extensive measuring on bogies. Nencki Railway Technology has these challenges and developed the new machine NBT *Evolution*<sup>®</sup>, which handles those requirements extremely well.

### FUNCTION OF THE BOGIE TEST STAND

The Nencki bogie test stand was designed for the final check and quality control of new, overhauled and repaired bogies. The load cylinders simulate different vehicle weights and forces for the fully automatic test of wheel loads, axle distances and parallelism, wheel concentricity and diameter, deflection and other parameters. This guarantees also a high stability for an accurate geometry measuring. The data are logged and are permanently traceable and can be transferred to a higher ranking system.

Nencki Railway Technology is the leading manufacturer of bogie test stands. Following the first delivery in 1996, more than 100 units have been sold in the meantime. Nencki offers a suitable solution with latest technology for every purpose, thanks to a continuous progression for new types, components, test functions, control and software. Shown on pages 6 and 7 are a few of the numerous available test functions.



LOCOMOTIVE MANUFACTURERS (NBT LOCO)



ROLLING STOCK MANUFACTURER



HIGH SPEED TRAINS IN CHINA, TURKEY, RUSSIA AND SOUTH COREA



WORKSHOPS OF NUMEROUS STATE AND PRIVATE RAILWAYS

THEY ALL HAVE SOMETHING IN COMMON, THE NENCKI BOGIE TEST STANDS



// Metros (NBT Coach)



// Trams

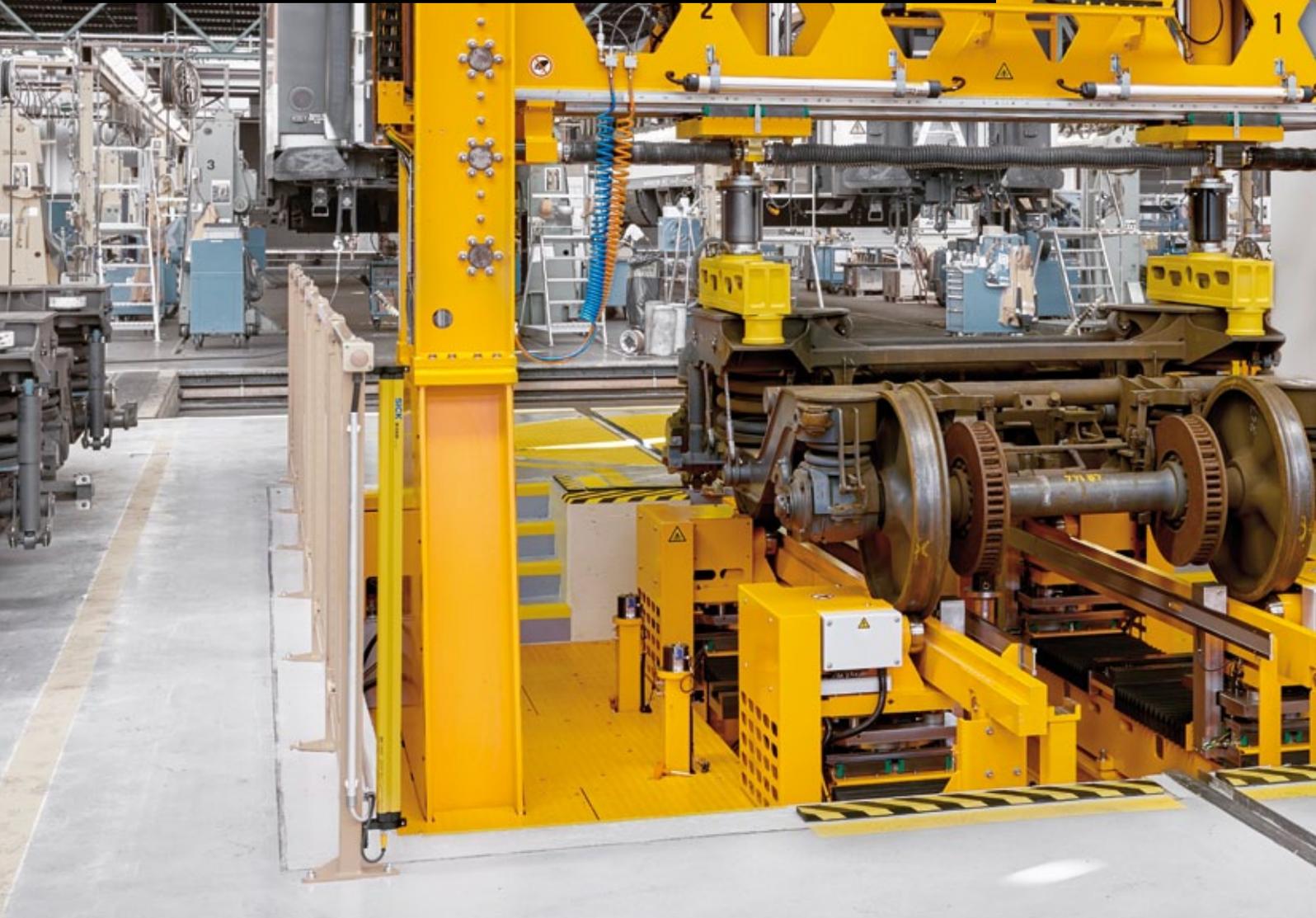


// NBT no.100 (NBT Light)

# « NBT *Evolution*®

## The next generation of bogie testing

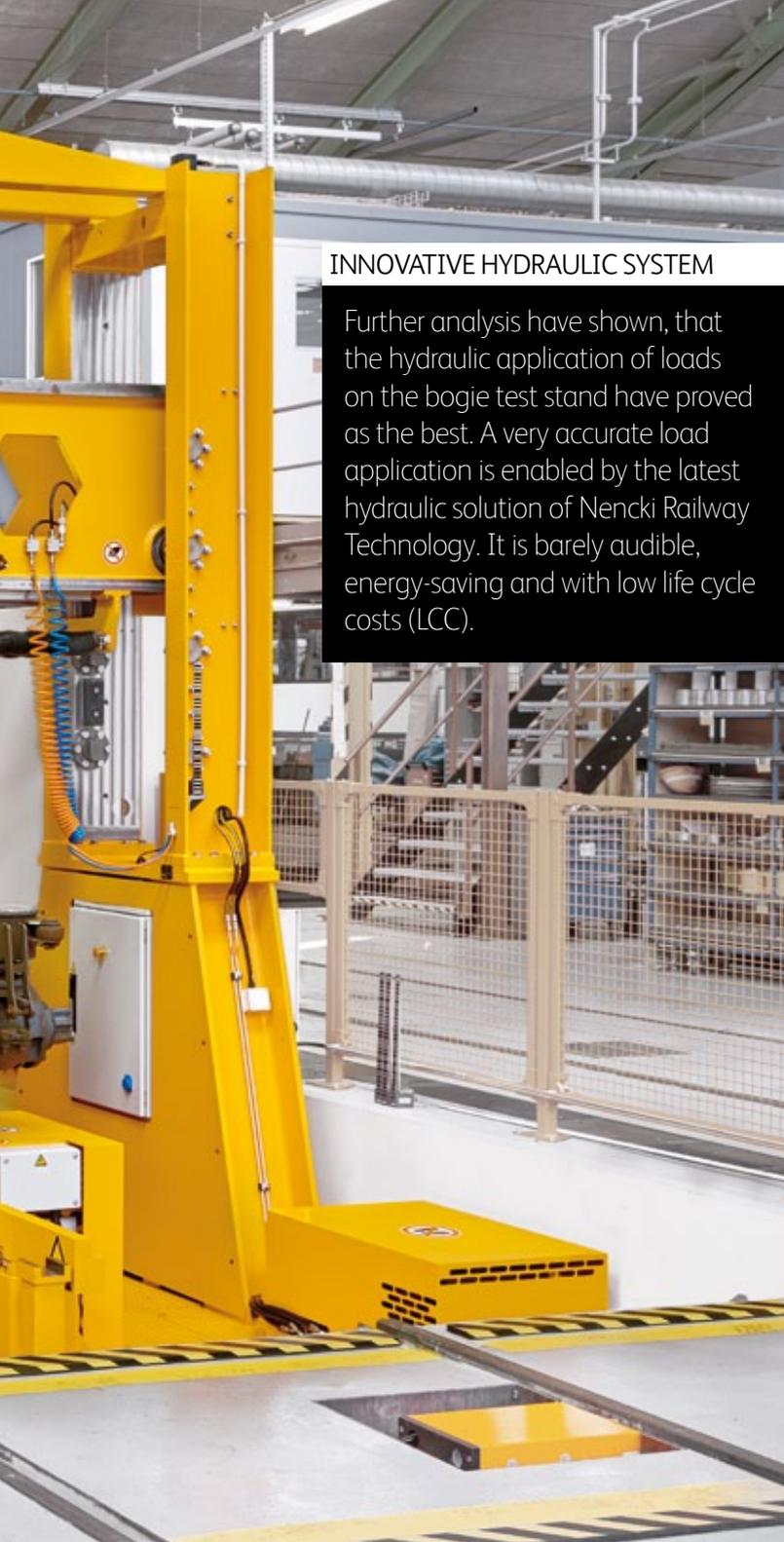
The Nencki bogie test stand *Evolution*® is based on the long-standing experience, which we developed together with our customers for 100 machines in accordance to DIN standards 250437.



EASY ACCESS BELOW AND AROUND THE BOGIE

INTEGRATION OF A MEASURING ARM FOR A FAST AND USER-FRIENDLY MEASURING OF MANY DIFFERENT LENGTHS ACCORDING TO DIN 250437





## INNOVATIVE HYDRAULIC SYSTEM

Further analysis have shown, that the hydraulic application of loads on the bogie test stand have proved as the best. A very accurate load application is enabled by the latest hydraulic solution of Nencki Railway Technology. It is barely audible, energy-saving and with low life cycle costs (LCC).

## HIGH STABILITY

- « Reinforced frame and components, optimized by the FEM method.
- « Optimized guide of the load application cylinders, without additional yoke.
- « Very minor deflection, under high load application.

## ACCURATE AND RELIABLE LENGTH MEASURING, HIGH REPEATABILITY

- « Compensation of the thermal expansion during temperature fluctuations on the location
- « Compensation of the deflection during alternating loads
- « Fully automatic and accurate centring of the bogie in X and Y direction, without changing the wheel gauge.

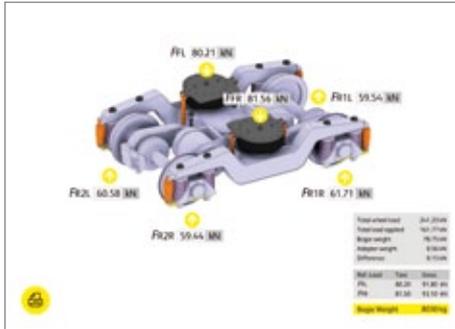
## BASED ON DIN 250437 ARE:

- « Dimensions with basis of the coordinates X,Y and Z
- « Software and nomination
- « Accurate measuring out and adjustment of the system during commissioning
- « Calibration by a certified company
- « Process proof
- « Proof of the measuring accuracy

## MODULAR SYSTEM WITH VARIOUS FUNCTIONS AND OPTIONS

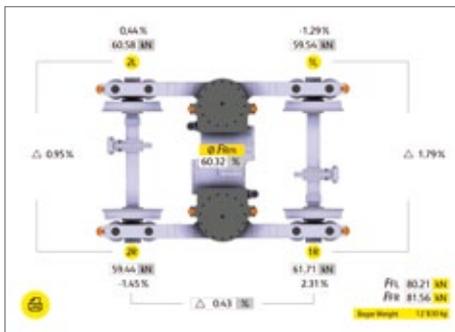
- « Fully automatic height adjustment
- « Fully automatic wheel gauge adjustment, each side individual adjustable.
- « Many new test functions such as brake force measuring, axle resistance etc.
- « Inclusion of divers test instruments for height and other length measurements
- « Improved operator guidance for the manual measuring with measuring arm or other measuring equipment

# « Nencki bogie test functions



## LOADS

- « Applied load (Tare, Gross etc)
- « Distribution onto every wheel represents a measuring
- « Bogie weight



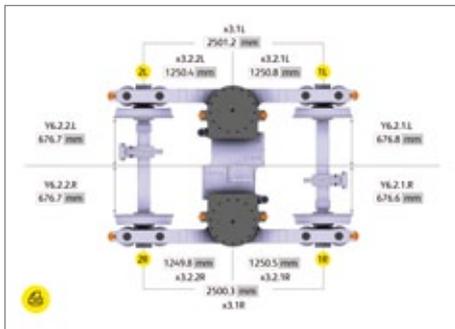
## WHEEL LOADS AS BASIS FOR THE BOGIE TEST

- « Automatic calculation of the deviation between wheels or the axles.
- The correct load distribution onto each wheel is important for the derailing safety and the wear of a bogie



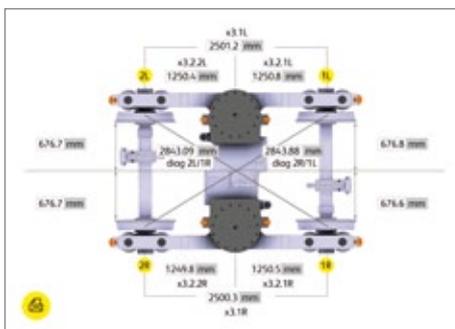
## AUTOMATIC CALCULATION OF THE SHIM PLATES

- « For the correction of different wheel loads
- « For the correction of the secondary spring height above T.O.R.



## AXLE DISTANCES L.H. AND R.H.

- « Axle parallelism and angle
- Parallel axles show less wear on wheel and rail, are safer and produce less noise and vibrations.



## DIAGONAL AXLE DISTANCE

- « For measuring the bogie in the diagonal direction



BOGIE TEST STAND TYPES AND FUNCTIONS				
Light	Loco	Coach	Evolution	Test functions
2	2/3	2	2	number of axles
■	■	■	■	Test load, synchronous or individual
■	■	■	■	Wheel load, load distribution
■	■	■	■	Wheel load - comparison: wheel /axle/average
▲	▲	▲	▲	Z-height – bogie above T.O.R. (top of rail)
▲	▲	▲	▲	Z-height – spring above T.O.R. (top of rail)
▲	▲	▲	▲	Measuring of the wheel diameter (manually)
	▲	▲	▲	Measuring of the wheel diameter (automatically)
	▲	▲	▲	Stiffness of the individual primary springs (Wheel load, travel of the spring under different loads)
▲	▲	▲	▲	Calculation of the shims (primary springs)
▲	▲	▲	▲	Calculation of the shims (secondary springs)
▲	▲	▲	▲	Leakage – pneumatic spring
	▲	▲	▲	Leakage – air brake system
		▲	▲	Axle impedance measuring
▲	■	■	■	Wheel shoulder – distance measuring
	■	■	■	Axle distance (l.h. and r.h.)
	■	■	■	Axle parallelism (calculated)
	▲	▲	▲	Axle angle
	▲	▲	▲	Axle distance diagonal
		▲	▲	Test load lateral
		▲	▲	Movement of the wheels under load in Y- direction
		▲	▲	Wheel eccentricity (X)
		▲	▲	Wheel eccentricity (Y)
		▲	▲	Wheel profile
		▲	▲	Axle rotation sensor
			▲	Wheel load dQ/Q
		▲	▲	Tilting angle
		▲	▲	Wheel set steering, navigator system
	▲	▲	▲	Customer specific functions on request

■ Included in the standard

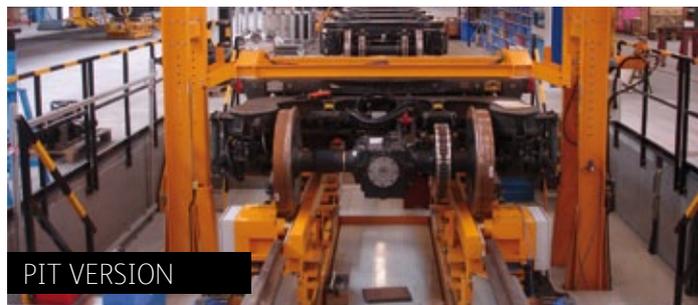
▲ Option

# the right bogie test stand solution for every requirement

## « Possible location alternatives

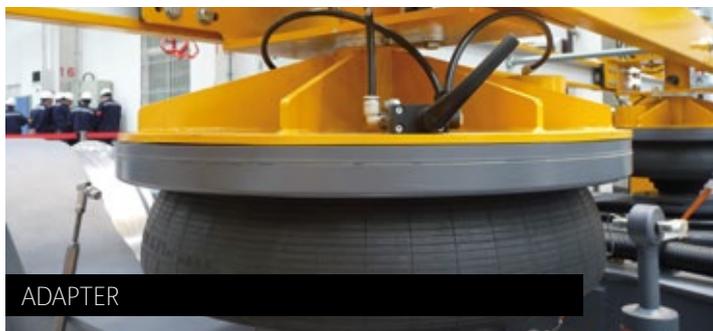


Bogies must be placed onto the test stand by crane for loading and the later unloading. The integration into a client's assembly line is possible.



The most productive way of operation.

## « Accessories



This is the mechanical interface between load application and the bogie. A very important bogie-specific component for an accurate load application.



For height measuring and calibration of the system.



For the efficient measuring underneath the bogie by the measuring arm etc. Industrial type with additional emergency stop.



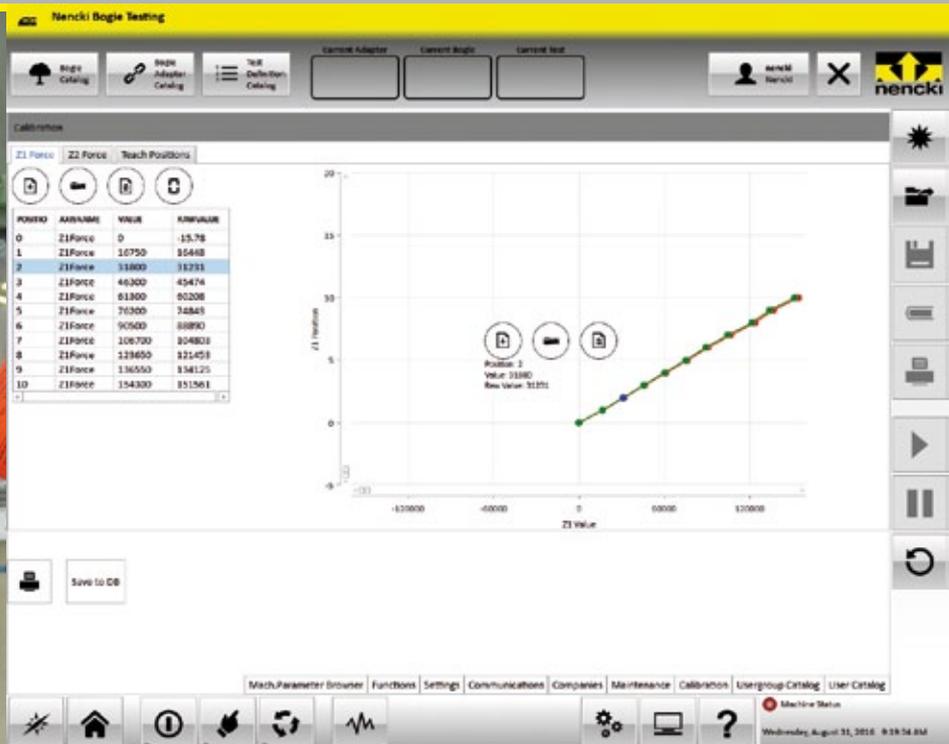
For length dimensions, wheel diameter, wheel profile etc. With direct interface to the control.

# « Calibration and certification

The bogie test stand represents a measuring machine, which has to be calibrated annually or after repairs according to ISO directions.

Nencki test stands are equipped with a standard software module for calibration, and the relevant calibration tools including the training are available as an option.

The load calibration is based on the ISO standard 7500-1.  
If desired, authorized third parties can be engaged for the calibration.



## CALIBRATION METHODS:

- « Load
- « Axle distance
- « Wheel shoulder
- « Heights
- « Leakage test
- « Measuring the system by laser



## « Nencki support

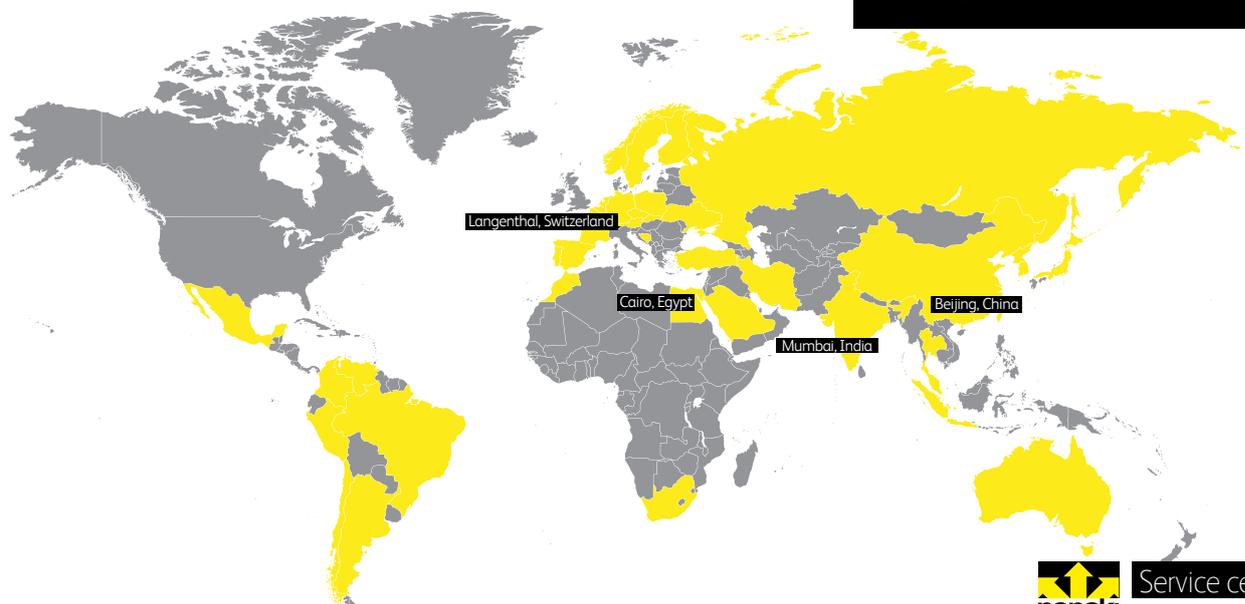
BEFORE AND AFTER THE SALE

In collaboration with local partners in the most important markets, Nencki Railway Technology is able to offer full support already in the evaluation phase.

The international service department with worldwide agencies of Nencki Railway Technology guarantees maximum machine availability.

Very well educated and multilingual service engineers carry out an optimum support during the entire lifetime of a machine. Our services include:

- « Installation and commissioning
- « Training
- « Calibration
- « Tele-maintenance
- « Service contracts
- « Spare parts
- « Upgrades





Integrated  
Bogie Workshop



Competence in  
Spring Testing



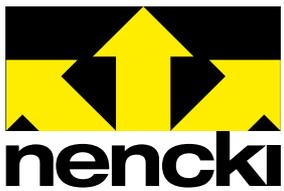
Competence in  
Damper Testing



Bogie  
Handling



Machines for  
Railwelding Plants



Nencki Ltd.  
Railway Technology  
Aarwangenstrasse 90  
4900 Langenthal  
Switzerland

+41 (0)62 919 93 93  
+41 (0)62 919 93 90  
railway@nencki.ch  
www.nencki-railway.ch