

# Wire Wear Monitoring

## Determining residual thickness

*A camera combined with special LED lighting enables overhead rail lines to be measured.*

**Fast, precise, robust and non-contact**

Worn-out contact wires pose severe hazards for railroad safety. The Wire Wear Monitoring System WWS provides valuable information for condition-based maintenance of overhead contact wires. The optical system determines the residual thickness of the wires by non-contact measurement.

### Inspection runs at up to 250 km/h

The WWS has been designed for velocities of up to 250 km/h and can therefore run on high-speed lines without hindering regular traffic. Raw data is taken every millimeter and typically processed in real time to one value every 14 mm at 100 km/h.

### Eight contact wires simultaneously

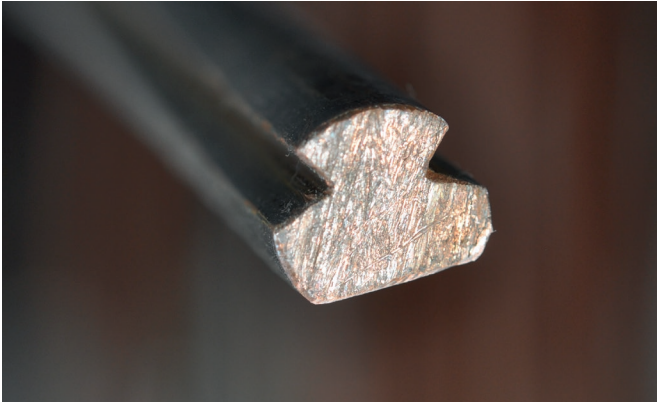
The degree of wear of contact wires with a round profile can be deduced from the width of the sliding surface. The WWS uses two cameras to detect these sliding surfaces. The system is capable of determining the residual thickness of up to eight contact wires simultaneously. Height and stagger are used to control cameras' focus.

### Active illumination

The WWS is enclosed in a double-cased housing. The interior housing is sealed hermetically (IP67) and climatized. Desiccator cartridges keep the humidity level in the housing at a minimum. The system works at ambient temperatures of  $-20^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ . The outer casing protects the sensor unit from mechanical impacts as well as from rain, snow or foliage. A cleaning unit controlled from inside the inspection car cleans the entrance window semi-automatically. This way, the system can be operated without maintenance over a long period. The WWS works practically independent from ambient light conditions. The illumination unit with high power LEDs is integrated into the interior sensor housing. The laser based Contact Wire Recording System CRS as part of WWS is eye-safe according to IEC60825.

### Railroad measurement systems by Fraunhofer IPM

Fraunhofer IPM develops optical measuring systems for monitoring the condition of rail infrastructure. Experts in measuring techniques and optics, designers, electrical and software engineers work together on supplying turn-key solutions for the special requirements of infrastructure operators and providers of surveying services. The robust measuring systems are deployed throughout the world and are characterized by their speed, precision and reliability.



*Worn-out contact wires entail the risk of rupture – with severe consequences for rail traffic.*

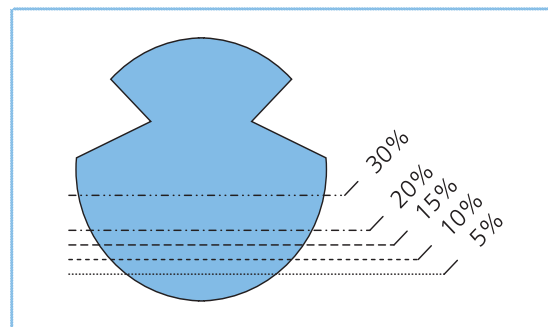


*WWS mounted on an inspection train.*

## Operation

The WWS is delivered with the Contact Wire Ranging System CRS or can be combined with a CRS already in operation.

The WWS is also available as part of the Contact Wire Inspection System (CIS). This multi-sensor system combines measurement technology for wire wear, wire position and, optionally, pole detection.



*The degree of wear of a round contact wire can be deduced from the sliding mirror's width.*

## Technical specifications

Height range	750 mm – 2,600 mm above mounting plane
Uncertainty	from $\pm 0.3$ mm to $\pm 0.5$ mm (mainly determined by the degree of wear)
Sampling frequency	25 kHz (1 mm distance at 100 km/h)
Measurement density	typically processed to 14 mm at 100 km/h
Velocity of inspection car	up to 250 km/h
Max. number of detectable contact wires	8 (maximum height distance of 40 mm)
Active illumination	high power LEDs
Ambient temperature	–20 to +55 °C (in operation) –20 to +60 °C (in storage)
Humidity	up to 100 percent (IP67)

*All specifications and features are subject to modification without notice.*

**CLASS 1  
LASER PRODUCT**

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