



# RailMeasurement

## Rail Corrugation Measurement Products



### The Product Range

RailMeasurement has three standard products for rail corrugation measurement, with the ability to provide variants on these products for specialised applications.

#### CAT – Corrugation Analysis Trolley

The CAT is a portable instrument (weighing less than 15kg in total) for the accurate measurement of railhead irregularities, and is typically used to measure rail for acoustics purposes and for quality assurance of rail grinding.

Operating at walking speed, irregularities of less than one micron can be reliably measured by this instrument.

#### RCA – Rail Corrugation Analyser

The RCA is a train-mounted instrument, designed to measure rail profile to accuracies sufficient to approve grinding work, and to determine the requirement for grinding on worn rail.

Working at typical grinding speeds - up to 20km/h - the RCA provides measurements with accuracy typically better than 10 microns.

#### HSRCA – High Speed Rail Corrugation Analyser

The HSRCA is a train-mounted instrument like the RCA, but has been designed to carry out surveys of rail corrugation over extended lengths of track at high speed (60-100km/h).

The HSRCA can survey to accuracies better than 15 microns.

### Quality, Traceability, Accuracy

With a pedigree of over 25 years of continuing product development, RailMeasurement's products for rail corrugation measurement are rapidly gaining a solid reputation for quality, traceability and accuracy.

Our measurement equipment is in use in Sweden, Britain, Italy, Germany, USA, Korea, Australia, and Saudi Arabia. It is used routinely for high speed surveys of rail condition, for approval of grinding work and to measure rail profiles for acoustic purposes. Our clients include **Banverket**, **Schweerbau GmbH**, **Loram Maintenance of Way Inc.**, **Lucchini CRS** and **John Holland Pty Ltd**.

### Setting Standards

Measurement comparisons performed by our equipment are the basis of procedures that are incorporated in Appendices of the provisional Euronorm for rail reprofiling (**prEN 13231-3**) to demonstrate that equipment can measure the rail's longitudinal profile sufficiently accurately to show that grinding is satisfactory. There are few, if any, other examples of objective procedures that enable the "accuracy" of measuring equipment to be assessed.

Availability of the CAT, with which long sections of rail can be measured extremely accurately, has enabled the specification for measurement of rail roughness contained in **prEN ISO 3095** ("Measurement of noise emitted by railbound vehicles") to be broadened significantly. This provides at least the possibility of making a continuous measurement at a test site, rather than a number of short measurements that may give a misleading indication of rail roughness.

<b>Feature Comparison</b>	<b>CAT</b>	<b>RCA</b>	<b>HSRCA</b>
<b>Weight &amp; portability</b>	Portable, 7kg instrument, 11kg when in case Operated by one person	Not portable: train mounted	Not portable: train mounted
<b>Measuring speed</b>	Walking speed: 2-5km/h	Up to 20km/h	60-100km/h
<b>Measuring principle</b>	Contacting transducer	Contacting transducer	Axlebox accelerometers
<b>Measurement of</b>	Single rail	Both rails simultaneously	Both rails simultaneously
<b>Requirements regarding train or vehicle</b>	None: portable system	Minimal wheel irregularities	Minimal wheel irregularities  Electronic tachometer  Good primary suspension: minimal friction elements
<b>Typical accuracy in 30-100mm range</b>	Better than 0.001mm RMS	Better than 0.010mm RMS	Better than 0.015mm RMS
<b>Computing requirements</b>	Laptop, 200MHz Pentium or better	Laptop or desktop, 200MHz Pentium or better	Desktop, 500MHz Pentium or better
<b>Software</b>	Proprietary, Windows based	Proprietary, Windows based	Proprietary, Windows based
<b>Data collection, signal processing &amp; display</b>	<ul style="list-style-type: none"> <li>• Profile of one rail at 1mm or 2mm interval and 0.01 micron resolution</li> <li>• Filtered profiles</li> <li>• RMS amplitudes in "block" or moving window</li> <li>• Peak-to-peak amplitudes in block or moving window</li> <li>• Percentage exceedence</li> <li>• One-third octave band spectra</li> </ul>	<ul style="list-style-type: none"> <li>• Profile of both rails at 2mm interval and 1 micron resolution</li> <li>• Filtered profiles</li> <li>• RMS amplitudes in "block" or moving window</li> <li>• Peak-to-peak amplitudes in block or moving window</li> <li>• Percentage exceedence</li> </ul>	<ul style="list-style-type: none"> <li>• RMS amplitudes in "block"</li> <li>• Percentage exceedence</li> </ul>
<b>Automatic detection of discrete irregularities (e.g. welds)</b>	No	No	Yes, ranked into up to 7 ranges of severity
<b>Annotation of records with features of line (bridges, etc.)</b>	No	Yes	Yes
<b>Typical uses</b>	<ul style="list-style-type: none"> <li>• Corrugation surveys and troubleshooting</li> <li>• Quality Assurance for grinding</li> <li>• Accurate measurement of short lengths of track (2-5km/h)</li> <li>• Measurements for acoustics work</li> <li>• Verification and calibration of other equipment, e.g. RCA and HSRCA</li> </ul>	<ul style="list-style-type: none"> <li>• Corrugation surveys for metros or other relatively small railway systems</li> <li>• Quality assurance for grinding</li> <li>• Accurate measurement of moderate lengths of track</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of complete rail systems to assess grinding requirements</li> </ul>