

Fault Detection Reduces Maintenance Costs

All rolling stock belonging to a train company is subject to stringent checks as part of a periodic maintenance plan. While this in part constitutes a safety requirement, it is also a matter of getting the maximum mileage out of the carriage during its service life. Even if the maintenance plan is carefully followed, damage to carriages may have time to develop in-between these checks. In order to allow simple and continuous checking of the wheel quality, the German company Innotec Europe has developed a measuring system called LASCA® which allows this information even when the train passes the measurement point at full speed.



The system is easily mounted with clamps directly to the side of the rail track and measures, except from wheel quality, the load on each wheel, boogie, wagon and train set as well as the speed. In addition, you can also record the traffic flow at the spot in question. In fact, over 60 parameters can be controlled while a train passes by.

Measures the force on the rail

The measurement unit consists of a housing containing a laser in one end pointing at a PSD in the other. When a train passes the force on the rail will cause a vertical deflection of the laser beam. This deflection is measured by the PSD and can, by thorough signal analysis, be converted to information about wheel loads and wheel defects.

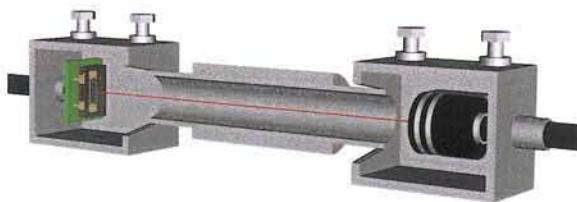


Figure 1. Principle sketch of the LASCA® measurement unit.

“The choice of the PSD as the sensing device was crucial to achieve the performance needed”, says the measuring system’s inventor, Mr. Siegfried Pieper of Innotec Europe and continues: “By utilizing the high speed and high reso-

lution possibilities the PSD enables, we have developed a system which measures a wheel load of over 20 tons with a resolution of one kilogram, and this on a train passing at 350 km/h”.

This performance makes the LASCA® superior to competing systems based on other techniques, e.g. strain gauge sensors or acoustic measurement methods.

“The main reason for choosing SiTek’s PSD is that they offer the best resolution on the market. Moreover, the device has proved itself resistant to both moisture and damp, which is obviously extremely important to us,” says Mr. Pieper.

Early warning of wheel defects

The wheel defect analysis is made possible since each defect has a characteristic footprint, different from a perfectly round wheel. By signal processing wheel flats, out-of-roundness and built-ups can all be measured and categorized. This, in essence, provides an early warning system if there is anything wrong, so that a carriage can be taken out of service and thoroughly inspected even between scheduled maintenance checks.

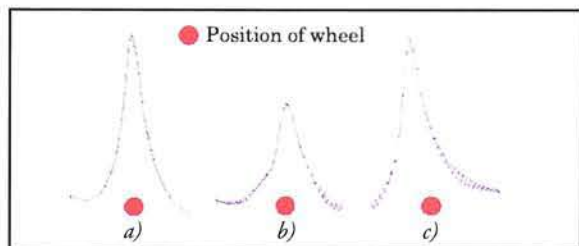


Figure 2. Typical footprints for a) a perfect wheel, b) a polygon shaped wheel and c) an out-of-round wheel.

Multiple areas of application

Due to the unique design and performance of the system its use isn’t limited only to train control.

“The sensor can also be used to control bridges and high buildings like skyscrapers or wind power stations and we see a great potential in these kind of applications as well”, concludes Mr. Pieper.

