Part III: Wheel/Rail Contact Inspection System

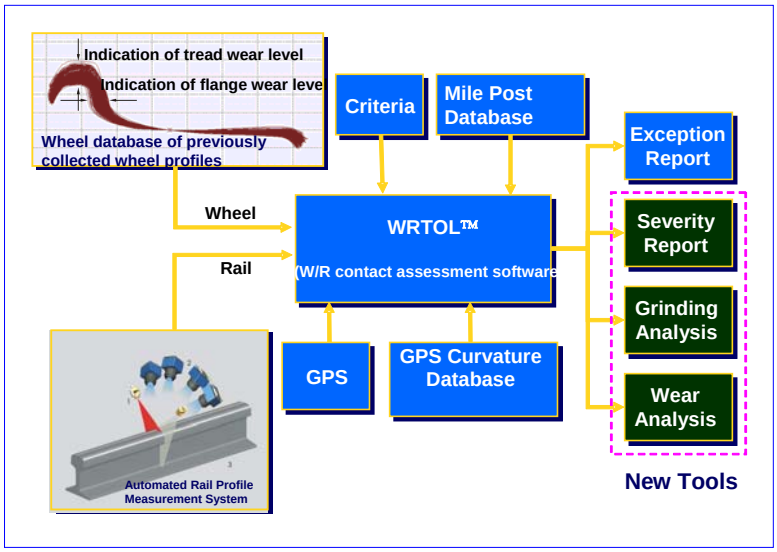
As part of the AAR's Strategic Research Initiatives Program, TTCI developed improved software, new wheel/rail profiles, friction control measures, and measurement tools to manage the wheel/rail interface to reduce the stress state between wheel and rail.

The WRCI system has been successfully used for several wheel/rail contact condition inspections on revenue service lines such as the Norfolk Southern route from Louisville, KY to Chattanooga, Tennessee, and the BNSF lines from Clovis, New Mexico to Mexico (approximately 500 miles).

These inspections identified rail sections that could induce poor wheel/rail interactions leading to increased fuel consumption. The rail grinding patterns for correcting the problems on the inspected lines were also suggested. TTCI engineers are currently working with the railroads to implement the WRCI technology on existing track geometry measurement cars. The TLV is also getting ready to test wheel/rail profile contact conditions on four US railroads starting in May 2009. The information gathered during these tests will be used to improve the life of wheel and rail assets and reduce fuel.

TTCI has developed an automated wheel/rail contact inspection (WRCI™) system using the Track Loading Vehicle or existing track geometry measurement cars.

A laser system installed in front of the leading truck of TTCI's Track Loading Vehicle is used to measure the dynamic rail profiles. The rail profiles are measured as the car moves along the track. TTCI's approach is to match measured rail pairs against wheels typical of the vehicles passing over, calculate the wheel/rail interaction, and assess against the preferred interaction. The data analysis software computes the contact parameters by placing each wheelset on the measured rail pair. The maximum operating speed for real-time data analysis can now reach up to 47 mph (75 km/h) with a processing interval of 10 feet (3 m) by using multiple data processors.



The rail/wheel contact measurement system determines (1) Contact angle–indication of flange climb risk, (2) Low rail contact position–indication of rail rollover, (3) High rail contact conformity–indication of bogie steering, (4) Conicity–indication of high speed lateral stability, (5) Rolling radius difference–indication of bogie steering, and (6) Contact stress–indication of rolling contact fatigue risk.