

## DETECTING FAULTY ELECTRIC INSTALLATIONS IN RAILWAY SYSTEMS AND ENGINES, USING COMPUTER LOGGING OF GPS POSITIONS AND CURRENTS IN THE RAILWAY CARS.

Damage of a wheel bearing of a railway car can show up at a current density of 10 mA per square mm. One single spark-induced damage on a bearing-roll will cause damages all around the circumference of the bearing, because of the rotating movements. Therefore it is important to avoid extreme currents through the wheel-bearings by detecting damages in the engines and in the electric installations along the railway. In this study the GPS position of the train is logged every second, together with the rms-values of currents in different positions of a car. The currents have been measured in the front coupling, the rear coupling and in wire connections to isolated axes. Along the railway the following types of failures have been detected: faulty ground connections between the rail and a pole, connections between poles and the return cable, connections between two parts of the ground rail, where the ground rail is switching sides. Faulty engines can be indicated. The method has been tested on all parts of the railways of northern Sweden, from Stockholm up to Kiruna, and across the Norwegian border to Narvik. Both passenger trains and ore-trains have been investigated. A continuous logging following an ore train in both directions in a 300 km loop Kiruna – Luleå has been performed. On this occasion 4 different very heavy ore-engines were used, of the DM3- and the IORE types. The power supply voltage is 16 kV and the frequency is 16.7 Hz. Both BT and AT supply systems are included. A magnetic antenna has been used in an effort to find alternative ways of detecting missing installations.