



ENOTRAC is known for its Electromagnetic Field studies on Railways all over the world. Field testing is a complementary core capability encompassing power, signalling and telecommunication installations, on both rolling stock and fixed infrastructure. Our clients benefit from highly developed measurement techniques, instrumentation hardware, analysis software, and organisational procedures.

During more than 30 years of practice, ENOTRAC has delivered a vast number of different EMC studies. A case study we are sharing was in Switzerland- the European nuclear particle research centre which is located to the north-west of Geneva in Switzerland on the Swiss-French border (CERN).

The main research facility was the Large Electron and Positron (LEP) accelerator ring, which allows scientists to raise the energy levels of nuclear particles.

The LEP ring is 27 km in circumference, situated between 60 m and 120 m underground, and is bounded to the south by the SNCF 1500 V DC railway line from Geneva to Lyons and on the east by the SBB 15 kV AC line from Geneva to Lausanne.

The accelerator ring has dipole electromagnets producing a vertical magnetic field. This field is moving in a circle rather than a straight line.

### Magnetic interference effects

At intervals, the filling process is calibrated as it affects the accuracy of the experiments and fluctuations in the dipole magnet field were seen to be taking place. This led to an increase in the bending magnetic field of about 10mT over the 12-hour fill period.

A period of quietness in magnetic field activity between 00:00 and 04:00 gave a clue that the effect might be due to the nearby railway. Further experiments involving the measurement of rail-earth voltage showed an almost perfect correlation between train movements and dipole magnetic field activity.

The control loop for the dipole magnets has now been modified to measure the magnetic field in the beam pipe.

### Conclusions

In this case, the interference was caused by the magnetic field from the actual stray current. This case is unusual because of the long, low impedance path for the stray current.

Most of ENOTRAC Electromagnetic Field studies involve analysing sensitive equipment interference with Railway infrastructure. Because of the close proximity to the railway, any equipment can be severely affected by the magnetic fields of rolling stock running nearby.

Would you like to discuss more Electromagnetic compatibility between specific equipment and systems and Railway Infrastructure? ENOTRAC is at AusRail Exhibition next week. Come and discuss how we can help you conduct an EMC study. You will find us at RIA's stand, booth 95.