

Stray currents in Spain

Author: Lluís Gomila GULDAGER ELECTROLISIS SA

Ljubljana, 2016

Introduction

High-speed trains (AVE) built in Spain during the last 25 years are powered by ac current, so their influence on metal buried pipes causing conduction or induction problems is not addressed in this document.

Except AVE, all Spanish railways are powered by DC current, so in many areas the problem of stray currents represents a significant risk of corrosion for buried metallic pipes.

The situation is completely different from some countries where most of the electrified railways are powered by ac current.

The DC stray current interference is aggravated by the important lengths of buried pipes without isolating joints. Unlike in other countries where many isolating joints are used for sectioning pipes, in Spain it is common that DC stray currents circulate over long distances over the pipelines, causing the effects of stray currents to act often at important distances from the railroads.

Solutions to stray currents

A classic solution used in other countries to solve the problems that stray currents represent for cathodic protection systems, is the installation of current drainage systems from the pipe to the railroad.

In Spain it is very difficult to obtain permission from the railway companies to install these drainage systems. This may be due to the lack of official regulations which force railway companies, to their little knowledge of the subject or to the fear that drainage systems can affect the rail traffic communications systems.

Sometimes, for the lack of authorization to install a drainage system or because of the excessive distance between the affected area of the pipeline and the railway, the alternative is to install automatic impressed current rectifiers in the areas where the current leaves the pipe to the ground. By doing this, the current does not create anodic areas in the pipeline and flows via the anodes connected with the installed rectifiers.

Effectiveness verification

To verify the effectiveness of the cathodic protection systems in presence of stray currents, EN 50162 requires to verify that the IR free potentials meet the criteria of Table 1 of EN 12954.

In Spain, external potential test probes are massively used due to the abundant presence of important stray currents.

After 20 years of potential measurements on test probes located in areas with significant stray currents, we can say that, making adequate ON OFF measurements and 24 hours data loggings, experience shows that it is perfectly possible that 100 % of the time test probes achieve the criteria of cathodic protection even in areas heavily influenced by stray currents.

EN 50162 Questionnaire

In the presentation we will show the answers of the most important gas and petrol companies in Spain to the EN 50162 questionnaire about stray current influence.

