

Effects of the metallic structures from AC railway systems on the inductive influence of pipelines

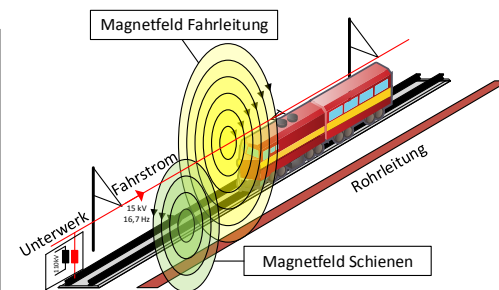
The current flow in AC railway systems generates a magnetic field, which can influence nearby metallic pipelines (e.g. gas pipelines) inductively. Normative limit values must be observed to ensure that there is no danger to persons as a result of touch voltages and no destruction of the piping system as a result of AC corrosion or overvoltage.

A calculation model as well as a calculation program were developed to estimate the induced voltages. The influences of metallic structures (e.g. rails) and their reduction effects on the pipe potentials were investigated. Reduction factors (e.g. rail reduction factor) could be calculated for different reduction effects.

The reduction factors allow a fast estimation of the inductive influence.

$$\underline{U}_{\text{ind},i} = \sum_{k \neq i} \underline{Z}_{ikE} \cdot \underline{I}_k \cdot r_{\text{sp},k}$$

$\underline{U}_{\text{ind},i}$	induced voltage in conductor i (V)
\underline{Z}_{ikE}'	Counterimpedance between conductor i und k (Ω/m)
\underline{I}_k	Current in the influencing conductor k (A)
$r_{\text{sp},k}$	Voltage reduction factor of the conductor k



- i: beeinflussende Leitung (Fahrdrabt)
- k: Reduktionsleitung (Schienen)
- t: beeinflusste Leitung (Rohrleitung)

