

Leadership in energy transition



Due to the energy transition, cases of close proximity of high voltage systems with metallic pipelines become more and more frequent. With this trend, a growing concern about the safety of people and damaging of pipelines can be found.

Electromagnetic Interference

Energy Transition in relation with Electromagnetic Interference

Why?

The trend towards a more sustainable society affects the power distribution systems. With this trend, new technologies and grid expansions are needed to cope with the increasing energy demand. Grid expansions will lead to an increasing amount of high voltage (HV) cables and lines. The existing and new HV assets are often in de proximity of metallic pipelines used to transport fluids. This proximity may lead to interference on pipelines. Especially under fault conditions, voltages on influenced pipelines can reach up to several kilovolts, causing safety risks or damages to the metal or coating of pipelines. These problems can be related to one or more of the relevant coupling mechanisms, namely: inductive coupling, capacitive coupling and conductive coupling.

Safety and damage

Safety to people

People, in contact with pipelines influenced by HV cables or lines, can experience an electric shock. Regarding the impedance, the voltage will result in a current flowing through the body. This current can be harmful (or fatal) for vital organs. To ensure safety, limits in terms of voltage are expressed. These limits depend on particular situations. For instance, during short circuit currents, the fault clearance time is taken into account. The safety issues can result from all three coupling mechanisms.

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Safety and damage

Damage to pipelines

Coating damages may result from inductive or conductive coupling between HV system and pipeline. The conductive coupling is a rare occurrence, only applicable when the HV system generates a short circuit current. Part of the short circuit current is dissipated in the ground, which may reach the pipeline and cause damages to the coating.

On the other hand, corrosion may occur due to inductive coupling. The HV system, located close to the pipeline will generate a magnetic field, depending on the current intensity. This magnetic field will, when in the proximity of a conducting material, induce a voltage. Due to the induced voltage, corrosion may occur. The corrosion rate depends on the current intensity of the HV system.

In most situations, distribution or transmission operators may be hold responsible for both economic damage and injuries of peoples.

Calculation of interference

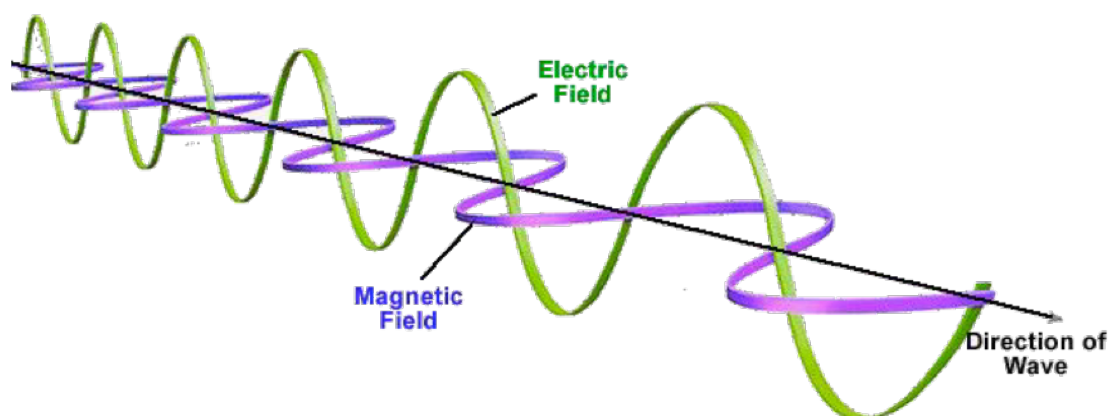
Petersburg Consultants

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Petersburg Consultants is a firm, located in the Netherlands, specialized in high- voltage engineering and calculations. We have been providing engineering, consultancy and advisory services to the energy sector since 1998. Our field of experience varies from structural and electrical engineering of HV substations and connections to the specific calculation of EMC phenomena under complex circumstances.

Get in touch with us for:

- Design of overhead lines, underground power cables and substations;
- Advice in the field of overhead lines, underground power cables and substations;
- Specific calculations of inductive, capacitive and conductive coupling;
- Protection and automation of distribution systems;
- Design, advice and implementation of telecommunication networks for Smart Grids.



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