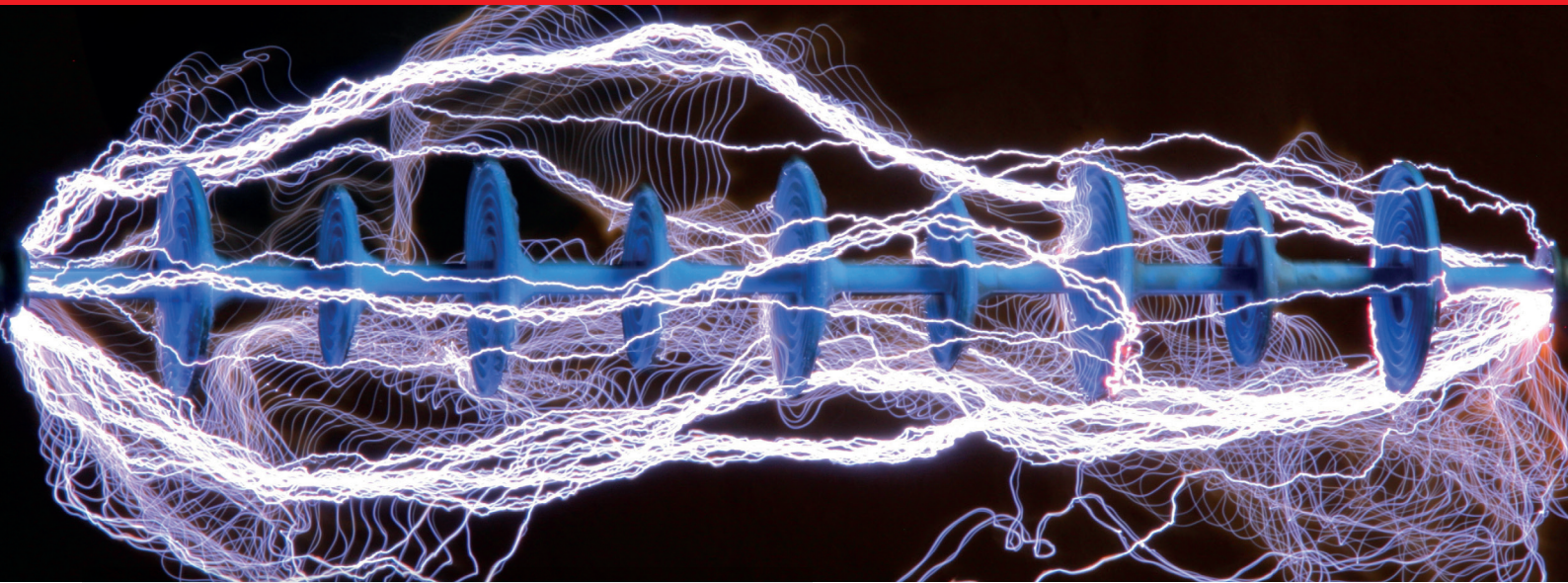


High Voltage and Power Plants Department



The work of the High Voltage and Power Plants Department entails various fields connected with high voltage devices, power plants and other electrical power facilities. Department experts conduct research in electric power industry, tests and measurements on HV devices, collaborate at the construction of electric power facilities, provide consultation services and educate.

They regularly collaborate at conference organisation and provide expert papers as well as transfer knowledge among science and research institutions, companies in electric power industry and the industry itself. Permanent contacts with similar research and education organisations abroad are constantly maintained. Experts are members of many international associations (IEEE, CIGRE, ISH, SIST, IAEA).

The High Voltage Laboratory and Laboratory for Machines operate within the High Voltage and Power Plants Department.

The department has acquired the EN ISO 17025 standard for measurement procedures.

Intensive IT support has been introduced in individual fields of work (e-measurements, e-assessments).

OVERVOLTAGE AND INSULATION COORDINATION

- ▶ Overvoltage analyses (temporary, switching and lightning) and insulation coordination tasks,
- ▶ computer simulations of electrical transients (EMTP, Sigma Slp) and numerical analyses,
- ▶ the determination of the insulation level and the calculation of the reliability of overhead lines (lightning overvoltage),
- ▶ the verification of suitability of the protection of facilities against direct lightning strikes (Strelec programme),
- ▶ the calculation of overvoltages and the dimensioning of overvoltage protection (position, number, technical characteristics of surge arresters).

THE TECHNOLOGY AND CHARACTERISTICS OF HIGH VOLTAGE DEVICES

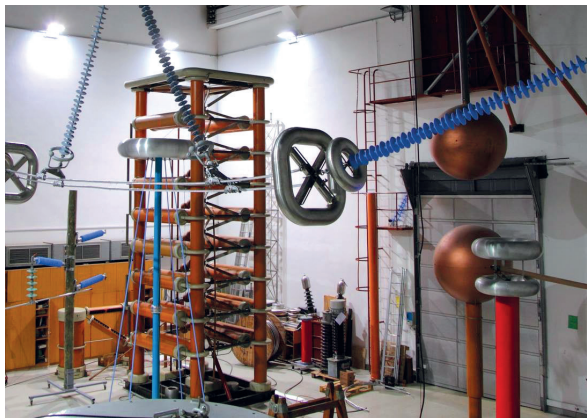
- ▶ Issuing expert opinions on the suitability of devices and technical solutions,
- ▶ numerical calculations of fields (electric, magnetic, temperature) with computer-assisted numerical calculations (FEM – Comsol Multiphysics),
- ▶ testing HV devices and measurements,
- ▶ determining the technical characteristics of devices,
- ▶ determining technical characteristics of cables and the calculations of heating for different cable arrangements,
- ▶ verifying the abilities of producers (production procedures, input material, QA, QC, testing, storing, documentation, transport),
- ▶ cooperation with investors and project engineers during tenders,
- ▶ supervising the tests and QA procedures during the takeovers of devices at producers.



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VERIFICATION OF HIGH-VOLTAGE DEVICES

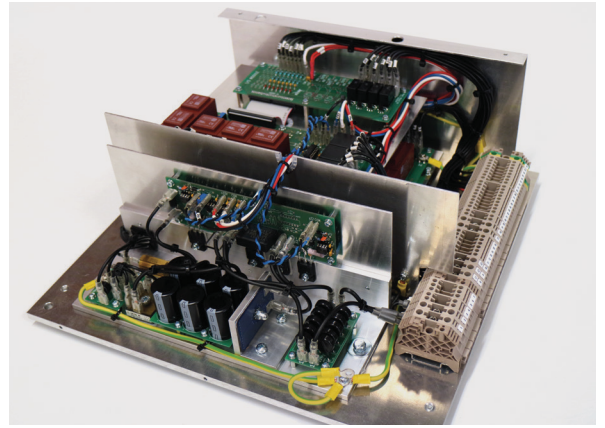
- ▶ Tests and measurements at the High Voltage Laboratory (measurements, HV tests, corona, temperature, partial discharges etc),
- ▶ insulation control of HV devices and voltage testing of cables in electric power facilities,
- ▶ numerical processing and systematic storage of data for subsequent analysis,
- ▶ situation diagnostics on the basis of measurements and operational data,
- ▶ cooperation in the discovery of defects,
- ▶ cooperation in the procedures of HV devices maintenance,
- ▶ study work in resolving operational issues of electrical power facilities.



High Voltage Laboratory

CONSTRUCTION OF ELECTRIC POWER FACILITIES

- ▶ Consulting in the introduction of new technologies and solutions in the electric power system,
- ▶ cooperation in the determination of technical specifications, the selection and ordering of HV devices,
- ▶ expert cooperation in procurement, production and installation of power transformers,
- ▶ help in planning, construction and restoration of electric power facilities,
- ▶ resolving technical issues during construction,
- ▶ ensuring the fulfilment of requirements of standards and legislation,
- ▶ supervising the implementation of functional tests,
- ▶ technical revisions and expert assessments upon the conclusion of works.



EIMV Excitation System

OPERATION OF POWER PLANTS

- ▶ Monitoring, measuring and establishing operational characteristics of individual electrical and mechanical devices, device assemblies and entire electrical power or industrial facilities,
- ▶ implementation of expert analyses of causes of defects on electrical and mechanical equipment in power plants, industrial facilities and the implementation of appropriate rehabilitation guidelines,
- ▶ establishing the remaining life period of critical components,
- ▶ expert cooperation in establishing system aspects of operation and the revitalisation of power plants,
- ▶ expert and technical revisions, measurements and analyses of power plant facilities in accordance with valid regulations and recommendations.

NUCLEAR AND RADIATION FACILITIES, RADIOACTIVE WASTE AND SPENT FUEL DISPOSAL SITES

- ▶ Managing activities and security culture,
- ▶ security report, procedures, technical specifications and other documents,
- ▶ electrical systems,
- ▶ regulation, protection and instrumentation,
- ▶ accident analyses (probability and deterministic) including internal and external events,
- ▶ protection against radiation,
- ▶ impacts on the environment, including monitoring,
- ▶ assessments in connection to radioactive waste disposal sites.



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