

A global insight on the technology and business drivers

Tutorial 5

MV and LV distribution feeder design using probabilistic approaches to load and DG

The course will be presented at the Frankfurt / Main Congress Center (Messe Frankfurt) on **Monday, 6th June 2011** from 09.30 hrs to 15:00 including a lunch break at 12:30 hrs. The course will be given in English.

Background

Most practical methods of calculating voltage drop and selecting conductor sizes for LV feeders are based on empirical techniques developed between 1950 and 1975, using load measurements made before 1970. Since then three significant changes have occurred: quality of supply regulation has become more formal, probabilistic methods have been developed, and DG has changed the passive feeders to active ones. In MV networks the variability of loads and DG introduce conditions of voltage rise and infeed to the source networks. Designers need new tools to cope with these changes. The tutorial provides such tools and describes how they were prepared and are used, and how similar tools may develop in future.

Aim of the tutorial

To introduce the diversity of methods of feeder design used at present, identifying their strengths and weaknesses and, using examples, show how a probabilistic approach overcomes many of the problems facing designers and the managers responsible for the quality of supply to loads, including the effects of the load variability and DG, and give them a means to prepare such designs.

Content

1. Introduction: Historical development and alternative approaches.
2. Models: Load models, risk related to probability.
3. Passive feeders: Dimensioning feeders with loads only - MV and LV.
4. Active feeders: Introducing DG as a planning approach instead of a problem - MV and LV.
5. Quality of supply assessment: Linking QOS to LV feeder dimensions.
6. Further applications: In planning and operations.

Expected benefits

Participants will gain an improved understanding of how variability of load, with and without DG, can be modelled and applied to meet voltage drop performance standards in distribution feeders, and they will take away with them data, methods and tools to improve feeder design.

Who should attend

This tutorial is intended for engineers, managers and technical regulators involved in performance specification, design and monitoring of distribution feeders to achieve compliance with requirements.

Support material

Copies of presented slides will be handed out.

About the presenter(s)



[Prof Dr Trevor Gaunt](#), South Africa - has over 35 years of experience with an equipment manufacturer, electricity utility, consulting engineer and, since 2000, in teaching and research at the University of Cape Town. His interests in power delivery planning and design have led to over 150 publications.



[Dr Ron Herman](#), South Africa - worked with Eskom before he joined the staff of the University of Stellenbosch, where he completed his PhD degree in Electrical Engineering, specializing in load modelling and probabilistic methods. He is currently a part-time Senior Research Officer at the University of Cape Town.



[Dr Gianni Celli](#), Italy - is Assistant Professor of Power Systems at the University of Cagliari since 1997. His research interests are in the field of MV network planning and operation with distributed energy resources, optimization techniques, and power quality, with a production of more than 70 publications. He is an IEEE and AEIT member.



[Dr Susanna Mocci](#), Italy - graduated in Electrical Engineering at the University of Cagliari in 2001 and in 2005 received the Ph.D. in Industrial Engineering from the same University. Her current research activity is on distributed generation, renewable energy sources and distribution system planning and operation. She is an IEEE and AEIT member.
