



JICABLE'07

Rapporteur's Session Report

B.8 SESSION : DESIGN (1)

Chairman : Walter ZENGER, PG&E (USA)

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This session was dedicated to cable system design and associated experimental methods. It included 5 papers, raising a lot of questions in the large audience.

B.8.1 : The use of very large conductor, up to 2500 mm², the design of high power transmission lines, and comparative results AC resistance measurement results.

B.8.2 : The specific optimised design of a 12 km umbilical feeding two subsea motors, facing temperatures close to the limits and mutual effects (cross talk).

B.8.4 : The results of investigations carried out to determine coefficients to calculate the rating of cables in plastic ducts, filled with water or not.

B.8.5 : The results of many experiments to evaluate the mechanical performance of a cable-supporting transition structure designed to accommodate bridge structure dilation, based on a full-size prototype.

B.8.6 : The experimental approach for testing the suitability of racking systems to fix cables and joints in duct & manhole structures, with the monitoring of thermo-mechanical forces and the tracking of eventual weak spots.

The panel of the different items shows the diversity of issues and stakes for large projects, it especially reminds the following points :

- Cable design involves major disciplinary fields beyond electrical considerations : the cable engineer requires strong thermal and mechanical skills, and sophisticated tools.
- The cable environment and interfaces during various types of operating conditions provide infinity of configuration studies, with complex issues (land or subsea, and combinations).
- Experimental validation with full-site prototypes brings very valuable and didactic information.
- Design methods are still improving : analytical calculation refinements are still in progress, many decades after the Neher McGrath publication...

The network operator wants to carry the maximum power, with overload capabilities, while limiting any risk of breakdown or safety problem. Design is not only used to basic optimisations and cost reduction. High technical challenges require innovative solutions for bulk energy transmission or severe environmental conditions. The use of a power line must be free of disturbances for other systems in the neighbourhood. The safety margin of the design and the operating conditions should decline gradually with a best control of most of risks and the emergence of adapted solutions. Adequate design (preventing mechanical fatigue for example) can extend equipment lifespan. All these considerations make cable design a high priority for the engineer.

The present B8 Session was of high interest. Every author was congratulated for the quality of his work and presentation.