HARMONIZING MV CABLE: RESULTS OF THE EUROPEAN PROJECT EUROMVCABLE

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ABSTRACT

Extruded MV cables have now given more than twenty years of satisfying experience. Today, we can note a large variety of cable constructions in Europe (the Cenelec harmonising document HD 620 describes 84 models !). This paper presents the results of the EuroMVcable project ended in 2004. Electricity companies and cable manufacturers were seeking to rationalise the design of MV cables in Europe and to demonstrate the performances of optimally insulated cables. From a comparative analysis of models, tests, operating requirements and operating practices in Europe, four cable designs were proposed, allowing the majority of the European market to be covered. The paper focuses on the results of investigation tests.

KEYWORDS

MV cables, reduced insulation thickness, long-term test.

INTRODUCTION

Modern extruded insulation MV cables have now given more than 20 years of satisfactory experience as against the early products of the 1960s that gave poor performance.

The CENELEC Harmonised Document HD 620 contains all European MV cable Standards. There are 84 general categories of cables included (over 1000 pages). The variety of cable constructions is due to differences in the use of materials, construction of both of the cable cores and also the packaging (i.e. the many layers of materials and components external to the cores of single and three-core constructions) not to mention the variations due to the different tests called up, test methods and test requirements. The number of designs in European standards is countless.

This paper is related to the work done by the consortium of the European project EuroMVCable. This project funded by the European Community was launched in 2001 and concluded in April 2004 (Fifth Framework Program http://ec.europa.eu/research/fp5.html).

The main objective was to rationalise the design of MV distribution cables both in terms of cost reduction and European harmonisation. During this project, Electricity Utilities and Cable Manufacturers together investigated ways of optimising cables. These investigations focused on the reduction of insulation and oversheath thicknesses but also took into consideration the main technical criteria for a MV cable design:

1. Reliability (reduce failure rate in service).
2. Safety (reduce the number of incidents on distribution networks).
3. Life duration (a "normal life" of 30 years or an "extended life" of 60 years)
4. Operability (simple and cost-effective laying systems and interconnection systems)
5. Environmental aspects (including recycling)

The first part of the project concentrated on establishing the existing situation in Europe. From a comparative analysis of models, tests, operating requirements and operating practices in Europe, the consortium agreed on “preferred designs”, this means optimised designs that should be subjected to be suitable for the widest number of users in Europe. Investigation tests have been carried out on prototypes. As a final step, a draft of a three new specifications for new medium voltage cable designs have been produced on a consensus basis within the project consortium.

MAIN RESULTS OF THE EuroMVCable PROJECT

Comparison of the existing cable design, test requirements and distribution system

The consortium carried out a comprehensive analysis of current MV cable standards and practices in use in France, Germany, Italy, Spain, the UK and also Sweden and Denmark. The team then prepared an “analysis of similarities / differences and background to the differences in the test standards” [1].

This work issued in main lines for the preparation of a set of specifications for a new cable system to be developed in the second phase of the project.

The survey showed quite clearly that distribution system requirements are not identical, for instance, in terms of system voltage (insulation thickness is likely not be the same), fault current, rated maximum temperature (means that, for instance, the same insulating material may not be appropriate across the board).

The very major source of difference comes from **the large range of earth fault current** allowed by the utilities within each country and also differences between countries. The difference in i^2t among the UK utilities alone is more than a