

## Recommendations for Mechanical Tests on Submarine Cables

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### ABSTRACT

*“Recommendations for mechanical tests on submarine cables” is the title of the document published in the Electra No. 171 article in April 1997. Experience with submarine cable installation has since increased significantly with respect to the number of installations, depth, length and complexity. For this reason CIGRE SC B1 decided to start a new working group, B1.43, with the purpose of updating the Electra No. 171 article. This has resulted in a new Technical Brochure - Recommendations for Mechanical Tests on Submarine Cables - that will be published in 2015. This paper gives an overview of this new brochure.*

### INTRODUCTION

#### Background

Several documents concerning recommendations for tests on submarine cables have been issued over the years under the responsibility of the CIGRE Study Committee (SC) B1. In 1980 the document titled “Recommendations for mechanical tests on sub-marine cables” was published in Electra No. 68. The field of application was defined with a rated voltage  $U_0$  higher than 36 kV AC or 100 kV DC. It was also stated that the recommendations were primarily meant for single or 3-core paper-insulated cables for AC voltages. For DC cables it was mentioned that the reader should refer to the CIGRE document published in Electra No. 32, 1974, which described the test procedures for DC cables. Reference to mechanical tests was very briefly confined in a note: “Note: in the case of submarine cables, special mechanical tests may be agreed upon.”

After 1980, several deep and long submarine cable links were installed and, as a consequence, the experience with cable installations increased. At that time it was

recognised that in some cases the computed test forces according to the Electra No. 68 document differed in some cases from the actual measured tension during laying and recovery. For these reasons SC 21 (as SC B1 was named at that time) decided in the Sydney meeting in 1993 to revise the recommendations. The work done by Working Group (WG) 21.02 resulted in the document published in the Electra No. 171 article in April 1997, titled “Recommendations for mechanical tests on sub-marine cables”. The field of applications in terms of voltages remained the same, although the limitation to paper-insulated cables was removed in this version. The primary use of the recommendations for both AC and DC cables was also explicitly stated.

The number and scope of submarine cable installations has increased ever since and it is expected to increase even more in the future. It was also judged that the application areas are diversifying (offshore wind farms, floating platforms, etc.) and that the maximum installation depth is also increasing. These facts were recognised by SC B1 during the late 2000’s, subsequently initiating preparation of terms of reference for a new WG to update the Electra No. 171 document. Preparation of the terms of reference for the new WG was carried out by a Task Force within WG B1.27 and resulted in WG B1.43 being set up.

#### Terms of reference for WG B1.43

The terms of reference for Working Group B1.43 to produce the new technical brochure (TB) were as listed below.

#### Terms of Reference:

- Cover both impregnated paper cables and extruded cables (AC and DC) including a review of cable