

## HVDC & HVAC Cable Systems delivered on long length drums

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### ABSTRACT

Projects of connections and interconnections in the HVAC and HVDC transmission networks are growing. They have resulted in the selection of long links using underground cable systems.

After the identification of the need, the authors address the interest of the delivery of insulated cables with long length drums. This evolution, which is not straightforward, makes compulsory the study of the prerequisite to get a success.

The paper relates the innovations by manufacturers and installation engineers.

To complete the review, examples of recent projects are described.

### INTRODUCTION

The need for connections and interconnections in the transmission network, HVAC and HVDC, has resulted in the selection of long links using underground cable systems, and sometimes fully underground.

Developments of these links between and inside countries ensure the reliability of the global network for the next years. Transmission lines are subjected to environmental, economic and political pressure as well as public acceptance issues. New alternatives as the long underground cable links to transmit the electrical power represent a way to mitigate the different constraints.

In parallel, new and renewable energy generation systems such as wind farms induce the need to deliver the power from the coast to the nodes of the heart of the network. Long links (more than 50 km...), are here again required, and long underground cable links may be necessary.

The manufacturing of long lengths of HV cables with large cross-section conductors is intended to make these long links feasible.

This contributes to the economical and social development of the connected countries or areas, whilst generating new type of installation, civil works, and manufacturing activities.

### IDENTIFICATION OF THE NEED

During the survey of the needed new connection links, the following characteristics of the delivery lengths have been pointed out.

#### Target length

When the link uses existing infrastructures such as highways, the delivery length should be a multiple of the

safety areas, which are separated by 2 km.

The maximum weight that can be transported to the installation site is strongly depending on the road infrastructure and local access. For instance, a total weight of 100t can be accepted close to highways, whereas a weight of 50t can be considered as a limit when no road is available. The maximum weight per axle (axle load) has to be taken into account, but in steeply slopes, the total weight is the prevailing constraint. Transportation actors have been innovative to design the means of heavy load transportation [1].

The dimension of the trailer with the drum is another limiting factor. This has to be mitigated by exceptional haulage and a careful preparation of the site access (track strength, slope, size, turning radius).

The target length was set at 2000m or more.

Fig 1 shows an example of the delivery of 2200m of a 320kV DC cable, 2500mm<sup>2</sup> copper with a drum of total weight 80t (diameter 4,5 m and width between flanges 5,7m), on a 140t trailer.



Fig 1: Example of an 80t drum on a 140t trailer