

## Extruded 420 kV Cable System for Installation in a 4 km Long Blasted Tunnel.

Jos VAN ROSSUM, Corné VAN EEDEN, Romeo NIJHOVE; Prysmian Group, (Netherlands), [jos.vanrossum@prysmiangroup.com](mailto:jos.vanrossum@prysmiangroup.com), [corne.vaneeden@prysmiangroup.com](mailto:corne.vaneeden@prysmiangroup.com), [romeo.nijhove@prysmiangroup.com](mailto:romeo.nijhove@prysmiangroup.com)  
 Jon Ivar JUVIK; Statnett, (Norway), [jon.juvik@statnett.no](mailto:jon.juvik@statnett.no)  
 Giuseppe PATERNO; Prysmian Group, (Italy), [giuseppe.paterno@prysmiangroup.com](mailto:giuseppe.paterno@prysmiangroup.com)

### ABSTRACT

In 2016, Statnett launched the project “420 kV cable system Smestad - Sogn”. This project concerns the ready-for-service delivery of a 420 kV cable system consisting of 2 circuits of approximately 4,2 km each, installed in a tunnel which is purpose-built by using blasting technology. The scope of work consists of design, engineering, manufacturing, transportation, installation, assembly, testing and ready-for-service completion of the cable system, including monitoring systems (DTS, Sheath Current Measurement and PD detection at accessories). The 420 kV cable system is successfully commissioned and put into operation. This paper highlights the design of the system and points of attention.

### KEYWORDS

EHV, cable tunnel, corrosion, monitoring systems, steel support structures, DTS, SCM, PD, FAT, SAT, LS0H

### INTRODUCTION

Installing cables in dedicated tunnels is normally used if one of the following conditions are encountered [1]:

- Significant number of cables required within a confined area;
- High cable rating cannot be achieved with cables in proximity;
- Congestion of the projected cable route.

Various cable tunnel constructions are known, such as ‘open cut’ (cut and cover type), ‘pipe jacking’ and ‘tunnel boring machine (TBM)’. All these tunnel constructions have in common that the tunnel dimensions are defined at the pre-engineering stage by designing pre-cut concrete elements which form the tunnel wall during the execution phase. In such tunnel with pre-cut elements, the fixation points for the cable system support structures and other auxiliary equipment are well defined. For this 420 kV project in Oslo, a different installation technique was adopted because of the adaptability to local conditions allowed by the method adopted, lack of area for TBM and its high initial cost.



Fig. 1: View on the drill-and-blast tunnel with the two 420 kV circuits. On the left: cable phase transposition, on the right: joint support frame.