

HIGH PROTECTION FOR HIGH VOLTAGE CABLES IN TRANSMISSION POWER PROJECTS

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Abstract : Dubai Electricity and Water Authority (DEWA) is the exclusive provider of electricity and water services in Dubai. Transmission lines are the backbone of electricity network which transmit power from generating stations to distribution system, for supplying power to the customer. Electrical High Voltage Cables (EHV) have unique properties of transmitting power from generation power plant to substations. Directly buried cables are at high risk of damages due to different site activities. EHV cables are designed to emit no electric and magnetic fields to minimize power losses, and for the purpose of supporting sustainability of power supply 132 kV cables which are laid inside concrete trough covered with concrete slab.

INTRODUCTION

Dubai Electricity and Water Authority (DEWA) is the exclusive provider of electricity and water services in Dubai. DEWA do their best to manage the generation, Transmission and Distribution of Electricity and Water across the emirate. DEWA serves a large customer base across the Emirate of Dubai. DEWA constructing substations are part of DEWA's efforts to increase the capacity, efficiency, and readiness of the power transmission network in the Dubai emirate and meet the future needs of customers, developers, and the business sector."



132 kV underground cables:

Transmission lines are the backbone of electricity network which transmit power from generating stations to distribution system, for supplying power to the customer. DEWA 132kV OHL & Cable lines are in open fields and passing through desert / hilly terrain, urban areas and crossing roads / bridge / underpass / canals & utility services etc.

The purpose of a substation is to 'step down' high voltage electricity from the transmission system to lower voltage electricity so it can be easily supplied to homes and businesses in the area through lower voltage distribution lines. To feed the substation to the proposed substation to existing transmission system 132kV High Voltage cables were laid within the approved corridor allocated by Dubai Electricity (DEWA) and by relevant authorities.

The risk of damages due to contractor's are very high, due to Possible unauthorized and unsafe construction activities in the vicinity of the lines. In the following consequences, it may lead to partial or full blackout in the Emirates of Dubai, if there are any damages with lines. Hence, the installation of 132kV underground cables were laid with mechanical protection of 2m wide reinforced concrete (RCC) structure called as Troughs.

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These concrete troughs were casted in the precast factories as per the approved issued drawings for construction with concrete Grade of C40N of 2.0m wide x 0.6m high and 6.0m length. A trough is a prefabricated U-shaped covered housing which is used to protect the installed High Volt power cables from mechanical damage. The troughs can be precast or cast in place as a single element composed of precast sections of approximately one to six-meter-long installed or by means of continuous concrete casting process at precast factories.



Troughs Installation:

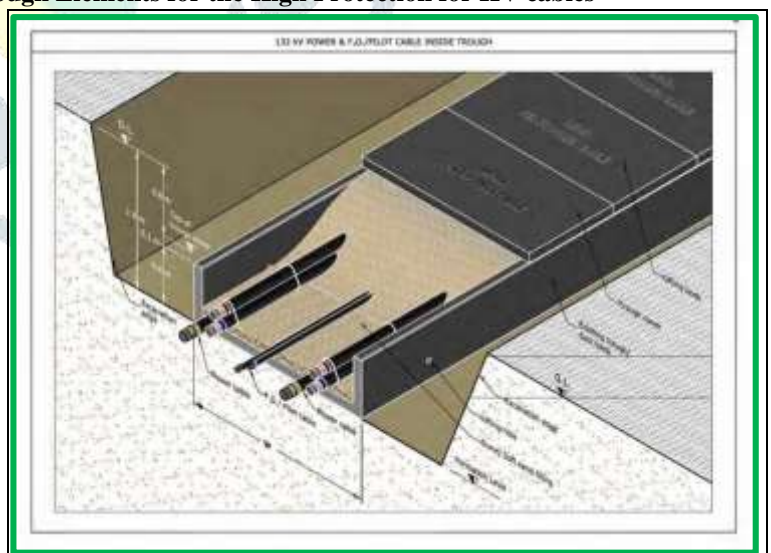
In general, for trough installation at site involves understanding of centre line and levels as issued in the construction drawings. Before the trough installation process can begin, Quality checks such as verifying/ recording ground level and marking of reference points should be done. Trough installation shall be in line with as per approved drawings which issued for construction and with the necessary specifications considering all the loads given by the client.



Installation of Precast reinforced trough Elements for the High Protection for HV cables

After completion of precast trough installation, necessary inspection has been carried out by the DEWA Engineer and all the clearance has been provided accordingly with coordinating with all other relevant internal departments for the High voltage cable installation.

The Cable contractors will lay the HV cables and necessary test has been performed in-line with approved specifications and requirements. Upon Completion of High Voltage cable testing for the proposed cable circuit the Power connection shall be established in the network and required As-built datas prepared for the records and for future reference.



CONCLUSION:

The concrete troughs and slabs are designed to withstand certain loads and protect the power cables from damages. Therefore, during construction activities DEWA existing assets to be protected as per specified standard for the high protection for high voltage cables in Transmission Power Projects in DEWA (Dubai Electricity and Water Authority) networks. Thus High Voltage cables in Transmission Power Network are protected with Higher priority inside the concrete structure of Precast elements of troughs.