A.1.4.

Utility experience in establishing technical standards specification for powers cable projects: *A case study from Gulf area*

Dr. EL-HOSSEINY TAHA EL-SHIRBEENY, Abu Dhabi Water and Electricity Authority, U.A.E.

ABSTRACT

This paper presents a project presently conducted in one of electric power utilities for establishing technical standards specification for the power cables. The utility is Abu Dhabi Water and Electricity Authority, ADWEA, situated in a region that is characterized by its harsh environmental conditions requiring certain general design requirements for execution of cable projects. The newly prepared cable specifications are prepared to provide safety, reliability, and optimum cost. The experience of ADWEA engineers gained in previous projects is utilized and modern cable technologies are considered. The paper identifies main components of typical cable projects for setting up optimum standard specifications. The preparation, review, and approval process is elaborated and specification management software is presented. The implications of applying the new cable specifications in new ADWEA projects are studied and the expected benefits are enumerated. It is hoped that this paper will serve as a model to help other utilities in optimizing cable assets in electric power projects.

INTRODUCTION

In electric power transmission and distribution projects, the underground cables are far more expensive to install and maintain than overhead lines [1]. The higher cost of power cables reflects the high cost of the cables, labor time, excavation and backfill of routes, and the installation work. As most of the cables are installed in congested urban areas, specifying type and size of cables requires careful consideration. The power cable must be able to carry the rated current without overheating, and must maintain acceptable voltage profile [2]. The cable life and performance depends on its specified construction and method of installation. A mistake in selecting a cable design or cable component can be catastrophic. Improper cable specification can cause utility to incur excessive and unnecessary operational and/or capital expenses.

Abu Dhabi Water and Electricity Authority, ADWEA, supplies electric power to more than one million customers in Abu Dhabi Emirate over an area of 67,340 km^2. ADWEA power transmission and distribution networks operate on different voltage levels ranging between 400 kV to 400V and employing overhead lines and power cables. At present, ADWEA networks have about 200 km of extra high voltage and high voltage cables, 13,000 km of medium voltage cables. The annual load growth in Abu Dhabi is relatively high reaching about 12% and ADWEA is continually expanding its networks to meet the load demand in Abu Dhabi by building new power transmission and distribution projects with underground power cables as a part of main project components. For this purpose, different international consultants have been hired to design and prepare technical standards tender specification for these projects. For similar network projects, it has been observed that different consultants present different or repeated old technical specifications. In 2001, ADWEA decided to launch a project