

**B.1.4. Développement du réseau souterrain HTA : environnement du câble et nouveaux appareillages pour réseaux ruraux**

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**B.1.4. Development of underground MV network : cable environment and new electrical equipment for rural networks**

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**RÉSUMÉ**

ELECTRICITE DE FRANCE est engagé depuis 1990 dans un important programme de développement de réseaux souterrains HTA en zones rurales. En effet, l'intérêt du câble souterrain HTA pour la qualité de la fourniture, la préservation de l'environnement et la diminution des dépenses d'exploitation, a conduit à favoriser ce développement du souterrain, en cherchant à limiter le surcoût par rapport aux réseaux construits en aérien. Dans cette optique, EDF fournit un effort important en matière d'études et de développement pour améliorer les conditions et les techniques d'installation des ouvrages enterrés.

**ABSTRACT**

Since 1990, Electricité de France (EDF) has been engaged in a large programme of development of MV underground networks in rural areas. In fact the advantages of MV underground cable for installation quality, preservation of the environment, and reduction of operating costs has led to increased development of underground networks and to limitation of expenditure devoted to networks using aerial networks. In this context, EDF is devoting a considerable effort to research and development aimed at improving the installation conditions and techniques concerning underground works.

**INTRODUCTION**

At the present time, the environment occupies a very prominent position in the public mind, and so EDF has recognised this development by the signature with the state on 25 August 1992 of a protocol relating to the insertion of electricity networks into the environment.

Subsequently, the burying of MV networks increased considerably. This increase was accompanied by a large growth in the use of mechanised cable laying machines.

The proportion of new works using underground techniques rose from 47% in 1991 to 63% in 1994.

Several research areas were developed, in order to improve and encourage the use of underground networks :

- In order to assist all those working in the field, an MV cable laying guide was prepared. This document specifies the conditions required in order to conduct high-quality field work. It is intended to be used as a set of site conditions and to be attached to cable laying works orders. The guide particularly emphasises the importance of well-conducted surveys and well-prepared sites.

- A standard for the cable laying area was prepared. This gives all of the necessary conditions of the environment in the immediate vicinity of the cable to ensure long life. In addition, geo-synthetic protection for cables are being researched currently, and this may lead to the replacement of sand, which is now causing some supply and cost problems.
- To check the state of a cable after laying, very small and simple instruments now enable all external sheathing to be checked on site, measuring the insulation resistance between earth and the metal screens. This will provide a guarantee of cable life expectancy by detecting any sheath faults which may have been caused during laying, before introduction of the cable into service.
- From the start of development of underground cables for rural areas, the equipment available for the creation of switchgear led to very costly works. It was for this reason that new equipment, having only those functions strictly necessary for the purpose, were designed. These took the form of integrated sectioning cubicles, and could be switched rapidly to isolate faulty sections or to provide an alternative supply in the case of faults. Some of them are remotely controlled and have an independent LV power supply.