

OUR ISLANDS

When the Rural Electrification networks reach the western coast there immediately arises the problem of extending the supply to the islands lying off this coast. Some of these islands are under a mile distant, and some are up to 10 miles from the nearest mainland.

Usually these islands are lacking in natural resources, and peat for fuel has, in some cases, to be transported from the mainland. Naturally, there is great interest in getting electricity, which would make such a great improvement in living conditions, and from some of the islands there is a very strong demand for the extension of the supply.

Where it has been possible to bring supply to an island by overhead line this has been done, usually where the island is joined to the mainland by a causeway, or where the distance has been under 200 yards. The possibilities of overhead lines are, however, very limited by the necessity of providing clearance for shipping. This means that very high masts are required, which rules out the use of wood poles. Lattice steel masts of the required height are prohibitive in cost, and would require very special treatment to prevent rusting.

For most of the islands there are two alternatives, either a local generating station or a submarine cable. At first sight the local generating station would appear an attractive solution for islands lying some miles from the coast. However, the capital and maintenance charges on the island generating station and network must be loaded on the price per unit of electricity, so that if there are only a small number of units sold the capital charges per unit will be high. Another factor which will make for a high unit charge is that generation will be from oil, so that it will not be possible to sell any "cheap units." The result would be that the islanders could only afford to use the supply for lighting. This would hardly satisfy them, as they naturally expect to participate in the benefits of cheap electricity from the national scheme. If a local station were installed the sale of the supply would probably have to be subsidised. Hence this solution is hardly acceptable. Thus it appears that if electricity is to be of benefit to the islanders it must come from the national networks and this means submarine cables.

The problem is somewhat simplified because the load required in most cases is well under 100kVA, and because single-phase is adequate. With single-phase supply at 10kV this means that the cable has only to carry 10 amps., so that mechanical rather than electrical requirements will determine the size of cable. If three-phase supply is provided on three single-core cables, the failure of one cable would reduce the island to single-phase supply, which would still be adequate. Furthermore, if use is made of a ground return circuit through land and sea this could be used instead of the defective cable, and three-phase supply could be maintained. There are several other ways in which the ground return can be used. A single cable could be used with ground return to give single-phase supply, or two cables can be laid and used with a ground return permanently to give three-phase supply, or initially three cables can be laid to give three-phase supply, and later a fourth can be laid and the four cables can be used with ground return to form two three-phase circuits, thereby doubling the supply. If a ground return line is to be used on the Board's system it must be tapped through an isolating transformer. If such a transformer is not readily available a substitute can be provided by connecting together the L.T. terminals of two 10kV/L.T. transformers.

Single-core cables have the further advantage that the length which can be shipped in one piece is three times that of a three-core cable, or conversely for a given length its weight is a third of the weight of a three-core cable.

This reduction in weight is very important, as the facilities for loading and unloading at the small harbours likely to be used are very primitive. Similarly, the shipping available for charter, and capable of working round these islands would not be able to carry a heavy drum of cable.

The most attractive type of single-phase submarine cable available for supplying

the islands is that where the cable is insulated and sheathed with plastic. The cable having no metal sheath is light and easy to handle. Jointing does not present any difficulties, and the insulant cannot be damaged by water should the cable be injured. Although this is a new type of cable there are a number of these submarine cables in service.

It will be appreciated that even with proposed plastic insulated single-core cables the cost of bringing supply to the islands will be higher than supplying consumers on the mainland. It is hoped that this will not prevent this interesting work from being undertaken. Although the costs of extending supply to the islanders will be greater than to dwellers on the mainland, the benefits to them will be correspondingly greater.

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