ICPC Recommendation

Recommendation No. 2

Recommended Routing and Reporting Criteria for Cables in Proximity to Others

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PREAMBLE

This recommendation has been compiled to assist cableowners whose planned system will cross, or closely approach, existing in-service cables, and owners of existing systems which may be crossed by a planned system, to reach agreement on the manner of the proposed crossing.

In order to do this the recommendation uses best practice/worst case scenarios and, given the proliferation of cables in recent years, it is unlikely that many proposed crossings will meet all, or even most of the criteria.

Nonetheless, the recommendation should be used to enable the two cables owners to reach a compromise over the planned crossing, that is acceptable to both of them.

1. INTRODUCTION

This Recommendation provides generalised cable routing and notification criteria that the ICPC recommends be used when undertaking cable route planning activities where the cable to be installed crosses, approaches close to or parallels an existing or planned system.

The criteria set out in the following paragraphs is designed to specifically apply to submarine telecommunication cables. For information on crossing power cables and pipelines, see ICPC Recommendation No. 3.

2. CABLE ROUTE SELECTION DATA

2.1 General

The minimum requirements for cable routing are embodied in the United Nations Convention on the Law of the Sea (UNCLOS) Articles 51, 58, 79, and 114. It is necessary to give due regard to cables or pipelines already in position. In particular, possibilities of repairing existing cables or pipelines shall not be prejudiced.

The routing of a cable depends on a number of factors, including the end points to be connected, seabed characteristics, risks of cable damage, water depths, the routes and characteristics of cables already in place. Cable routing guidelines to strive for under ideal conditions are suggested below. It must be noted that in practice, a number of factors particular to any given cable installation may prevent adherence to certain of these guidelines.

The routes of new cables should be selected so as to avoid crossings of other cables, in particular existing working cables, whenever feasible. Crossings of two or more cables, which would create a close spaced triangle or matrix, or other situation which prejudices the repair of existing cables should be avoided if possible. Where this is not possible, then consideration should be given to Section 2.12 of this recommendation.

Optimised cable crossing and parallel criteria would ideally consider such factors as water depth, cable maintenance and repair, accuracy of the navigational control methods used to identify the locations of existing cables, and local legal and permitting requirements. These factors, coupled with natural and cultural submarine obstructions,

will all influence crossing angles and spacing. It is recommended that each crossing and parallel situation be examined on its own particular merits, with consideration for the prevailing environment and conditions.

2.2 Planning

When new systems are conceived, it is important that potential cable crossings are looked at as early as possible in the planning process. Approaches should be made to other cable owners whose cables may be affected and information, including the positions of their submerged plant, sought from them.

NB: Failure to relate the positions of repeaters in other systems to the positions of repeaters in the system being planned may result in problems with recovery of repeaters during repairs later in the lives of either system.

2.3 Crossing Agreements

The early stages of the Route Engineering process will identify existing and planned cables that the new system will closely approach or cross. Early consultation should take place with the Maintenance Authorities of these other cables in order to reach an agreement on the position and manner of the crossing.

In most cases the cable owners should be able to come to an accord without a formal Crossing Agreement, this being effected by a simple exchange of letters, an 'agreement to cross'. For a simple 'agreement to cross', the Maintenance Authority for the crossing cable should forward to the Maintenance Authority for the crossed cable the following information:

i) An RPL showing the route of the cable for at least three times depth of water on both sides of the proposed crossing point

ii) Depth of water

iii) Angle of cross

iv) Cable type

v) Positions of any submarine plant

vi) Derivation of navigational data, including datums

vii) Type of seabed in area of crossing

viii) Burial information, if applicable, including the procedures to be followed by the Installer, when crossing the cable.

It may be helpful to include the above information in a chartlet of the crossing area, showing both cables and any other points of interest. Consideration should be given to supplying a copy of the RPL for the whole of the particular segment of the system involved as this may serve to highlight areas where the cables are in close proximity away from the crossing point.

The Maintenance Authority for the crossed cable should then review the information and respond on a timely basis to ensure that the crossing falls within the guidelines laid down by this procedure, or if that is not possible, that a compromise is reached which is acceptable to both parties.

NB: The need for both parties to provide the fullest possible information to each other, as early as possible in the project timetable cannot be overstressed. Delay in forwarding the initial request will have a knock on effect, as will the failure to supply sufficient information for the other party to make an informed decision. Project timescales are becoming foreshortened and the fullest possible information, sent as early as possible, will help to ensure that crossing agreements can be concluded well in advance of the cable installation.

2.4 Cable Crossings

When crossings are unavoidable, they shall be made as near to a right angle (90 degrees) as possible. If a 90-degree crossing is not technically feasible then angles down to 45 degrees may be considered depending on the particular circumstances. It is highly recommended that crossing angles shallower than 45 degrees not be implemented in order to ensure operational and maintenance activities related to either cable are not compromised.

2.5 Cable Types

Cable types shall be chosen to avoid armour/LW crossings due to the risk of abrasion.

Where it is proposed to install an armoured cable over an existing LW cable, special coverings shall be applied to armoured cables or special crossing methods implemented where this situation is deemed unavoidable.

Where it is proposed to install a LW cable over an existing armoured cable, a short length of armoured cable shall be inserted into the LW cable at the crossing point or special crossing methods implemented where this situation is deemed unavoidable.

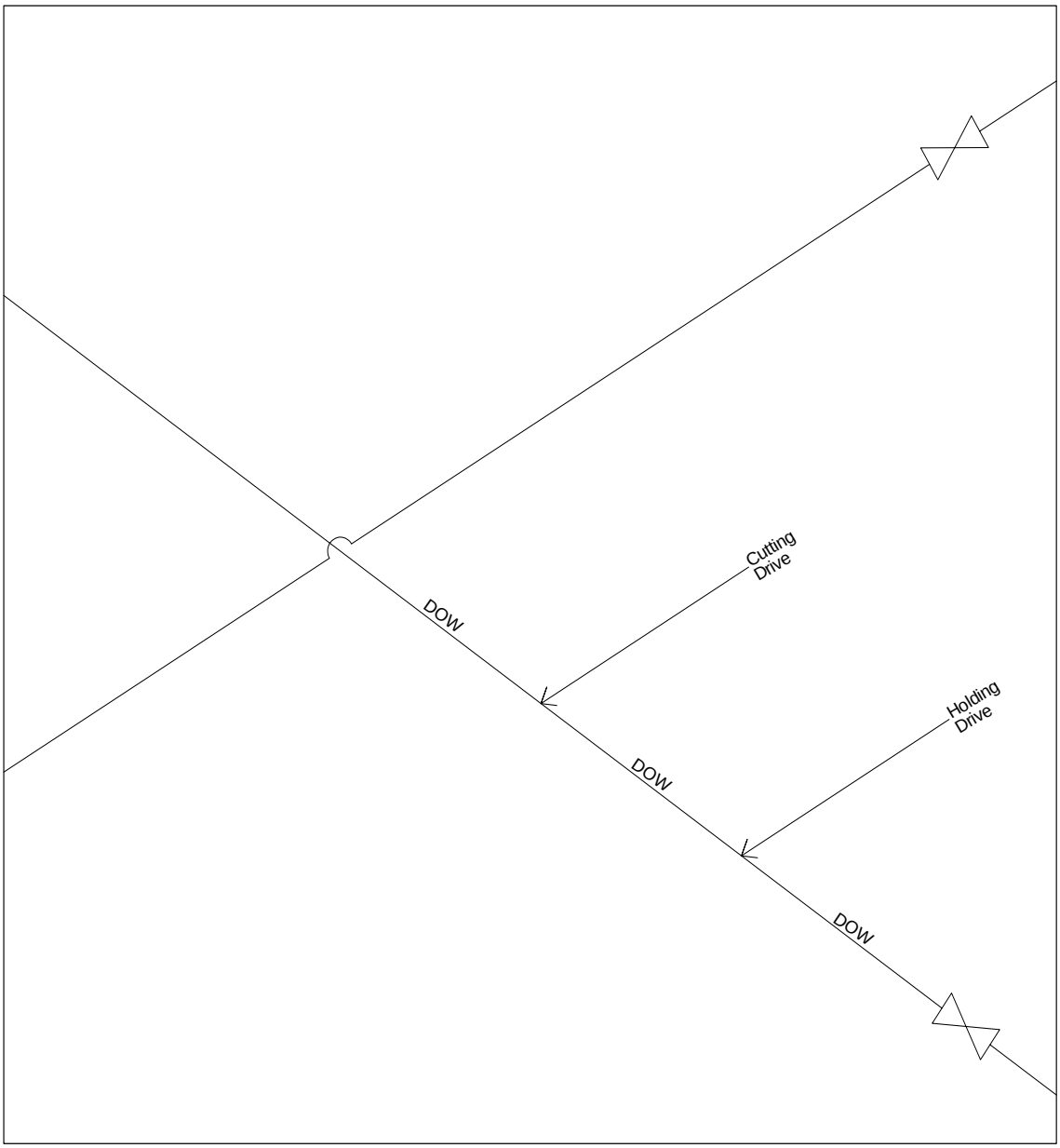
2.6 Repeaters

It is recommended that a clearance of three times the depth of water should be allowed between a crossing point and a repeater in the crossed system. This will ensure that the repeater can be recovered, without endangering the crossing cable, should the cable have been cut so close to the other end of the repeater that recovery from that end is not possible.

However, with the use of modern navigational equipment and lay/repair practices, these distances could be reduced to 2 times depth of water providing that two such crossings do not exist on either side of the repeater.

(See Diagram 1 on the following page)

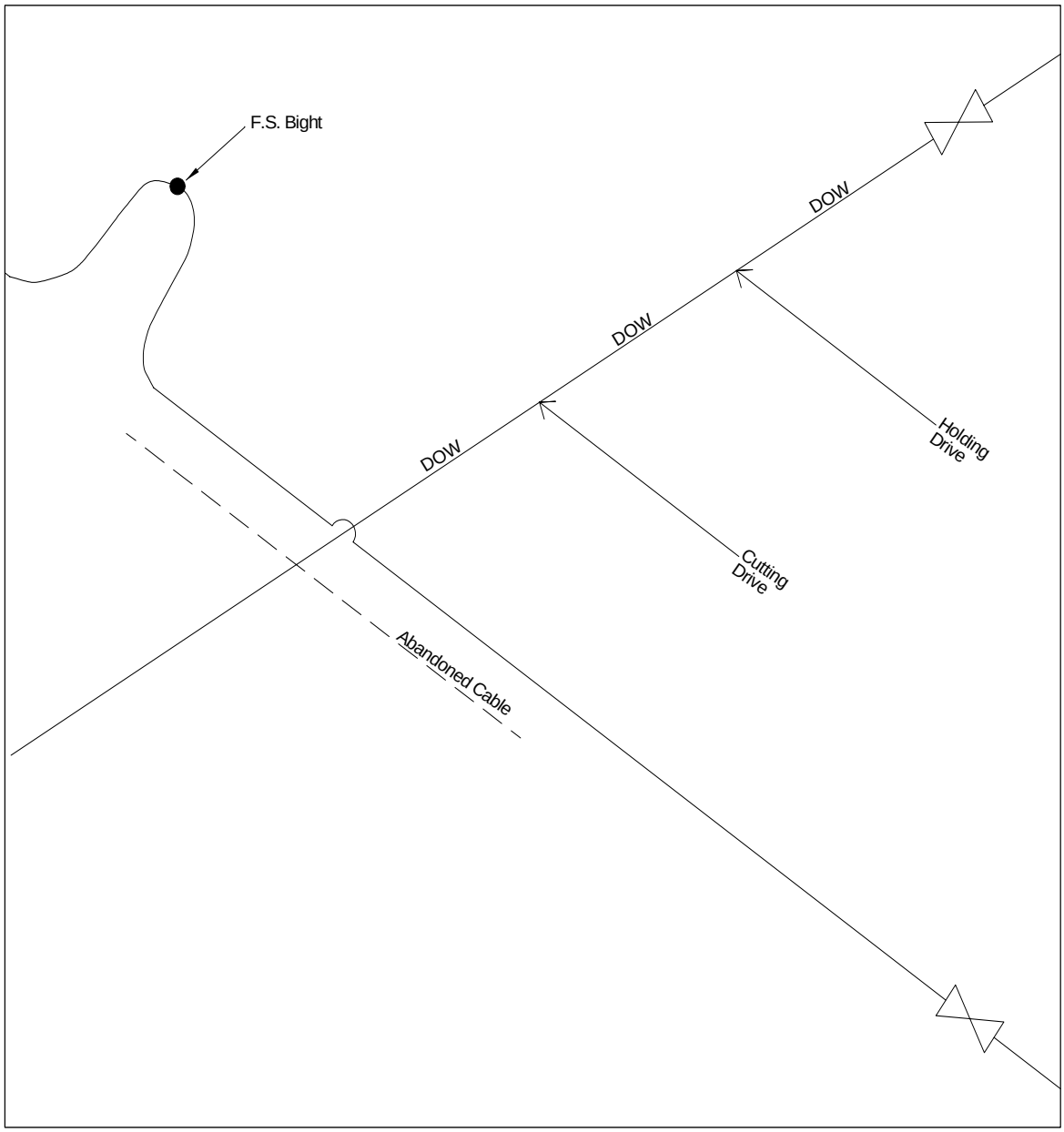
Diagram 1



Similarly, a clearance of three times depth of water should be allowed between the crossing point and a repeater in the crossing system. This will ensure that, in the event of a repair to the crossed cable which results in that cable becoming the crossing cable, the repeater can be recovered should the cable have been cut close to the other end.

(See diagram 2)

Diagram 2



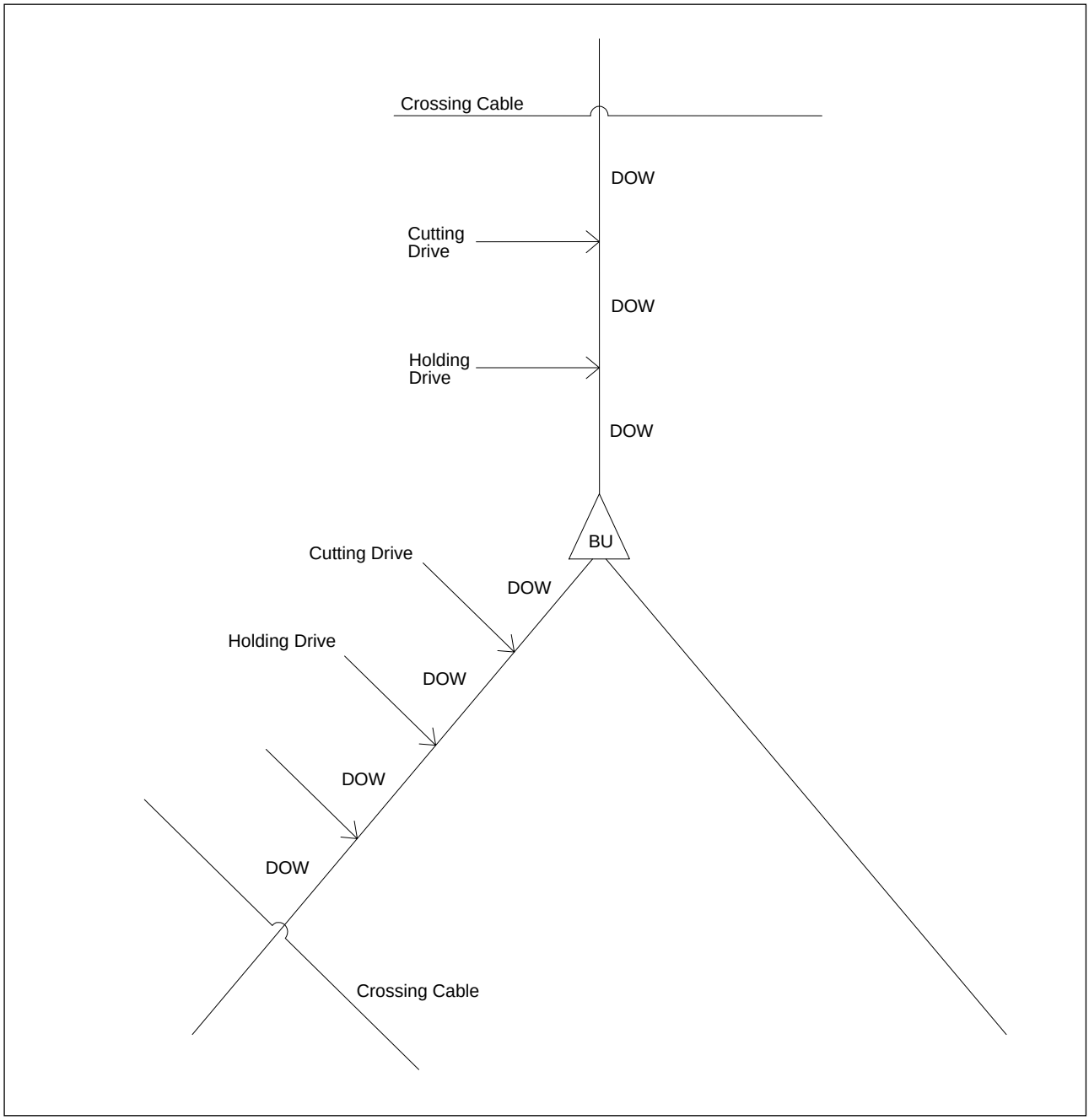
It should be noted that when repairs are carried out close to cable crossings, the planning process should ensure that the final splice is deployed well away from the crossing point, so that it does not compromise future repairs in the same area.

It should also be noted that, whilst the clearance criteria of at least three times depth of water should be adequate in most circumstances, in very shallow water this may not be sufficient. For example, in 20m water depth grappling for the crossed cable only 60m from the crossing cable could result in that cable being disturbed: in this situation a clearance of a least 100m should be allowed.

2.7 Branching Units

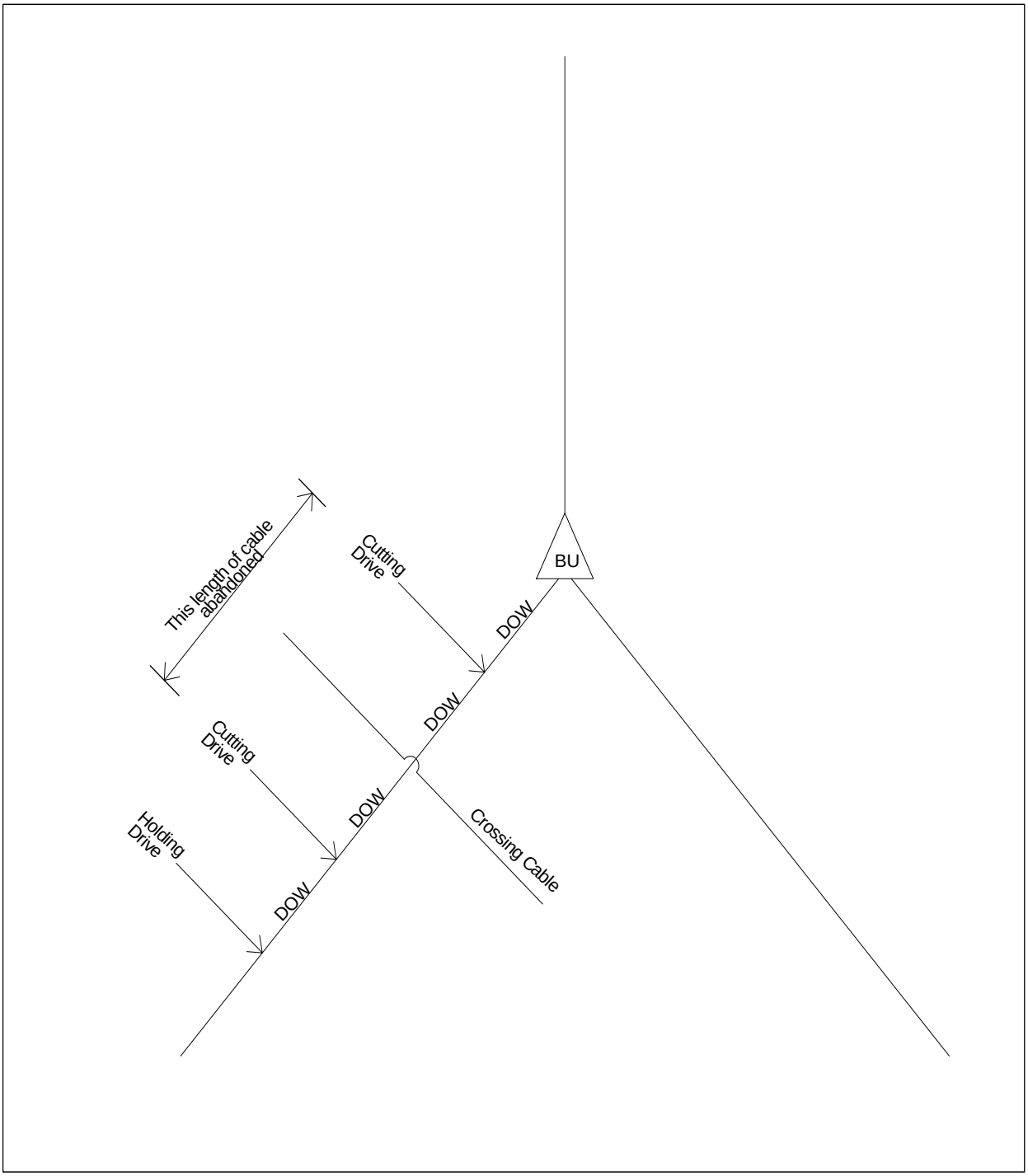
As with repeaters, a clearance of at least 3 times depth of water should be allowed along the main trunk of a branching unit to allow it to be recovered without endangering the crossing cable. On the legs of a branching unit, the clearance recommended is 4 times depth of water. This is to allow room for a cutting drive followed by a holding drive to enable the legs to be buoyed off, whilst still keeping operations well clear of the crossing cable. (See diagram 3)

Diagram 3



Where other considerations are paramount, it is possible to cut down the clearance along the legs to twice depth of water, but if this is done then the cutting and buoying operation has to be undertaken outside the crossing point and in that case a length of cable equal to twice depth of water would have to be abandoned on each leg that was crossed. (See diagram 4)

Diagram 4



2.8 Burial Procedures

Ideally crossings should occur in deep water. However when this cannot be achieved and it is necessary to cross a buried cable, then the following should apply.

The Maintenance Authority of the crossing cable should supply a copy of the procedures to be followed by its contractor during the crossing operation. This should include at least the following:

(i) Plough up/plough down positions.

These are conventionally 500m before and after the closest point of approach to the cable being crossed. In some circumstances it may be acceptable to reduce this clearance, following discussions with the Maintenance Authority of the crossed cable and the agreement of all parties involved in the installation process.

(ii) Plough position during the crossing.

T he plough will normally be flown between the plough up and down positions, though the Maintenance Authority of the crossed cable may ask that the plough be on the deck of the installation ship at this time.

(iii) Post Lay Inspection

An ROV should inspect the crossing point to verify the position and ensure that the cable has been properly laid prior to any burial operations.

(iv) Post Lay Burial.

The cable between the plough up and plough down position will be buried by an ROV, either tracked or free-swimming. The procedure should detail how this will be done and how close the ROV will approach the cable.

If the crossed cable is not buried, permission may be sought to bury a short section at the crossing point, prior to burying the crossing cable.

If the crossed cable is buried, permission may be sought to bury the crossing cable to a shallower depth, leaving an agreed safety margin between the two cables so that there is no risk of the ROV fouling the lower cable.

Should burial not be possible at the crossing point, then cable protection by other methods, such as mattressing or rock dumping may be required.

After completion of the crossing operations, as-laid data should be provided to the owner of the crossed cable in the format and time frame agreed.

2.9 Cable Parallels

Where cables parallel one another, the distance between them shall be maintained at 3 times depth of water where possible or 9 km, whichever is the lesser. However, with the use of modern navigational equipment and lay/repair practices, these distances could be reduced to 2 times depth of water and 6 km spacing, whichever is the lesser, after consultation and agreement by all affected parties.

In the case of multiple coastal or festoon type systems, the distance between parallel cables and the number of crossings shall not be ignored in order to reduce the system length. When close parallels are unavoidable because of routing constraints, the

minimum spacing between parallel cables shall be determined after consultation with and agreement by all affected parties.

2.10 Shore-end Cables

Every endeavour shall be made to avoid unnecessary alter courses in the routing of shore-end cables. This approach will allow:

a) The earliest possible launching of a cable plough, where the cable is to be buried into the seabed.

b) Easier subsequent cable installations to be achieved without unnecessary cable crossings close to shore.

c) Easier removal of the shore-end cable, should this be required for either permitting reasons or to allow a subsequent cable system to be installed, or for any other reason, after the cable system is withdrawn from service at the end of its service life.

2.11 Choke Points or Narrows

Where there is a feature, or series of features, which restricts the width of the corridor in which a cable must run, careful consideration shall be given to the positioning of the first and subsequent cables in order to maximise the utilisation of the available space.

The route chosen for the first and subsequent cables shall ensure that:

a) A minimum number of cable crossings occur in the approach to, and departure from, a chokepoint or narrows.

b) That the cables lie parallel to the maximum extent possible and the distance between cables is chosen with due regard to the installation of further cables through the same feature at some time in the future.

c) The number of altercourse points shall be kept to a minimum.

2.12 Multiple Crossings

In deep water, in Open Ocean, crossings should be planned so that they are well away from existing cable crossings. However, where it is not possible to provide a sufficiently large separation, then it may be preferable to install the new cable over the existing crossing.

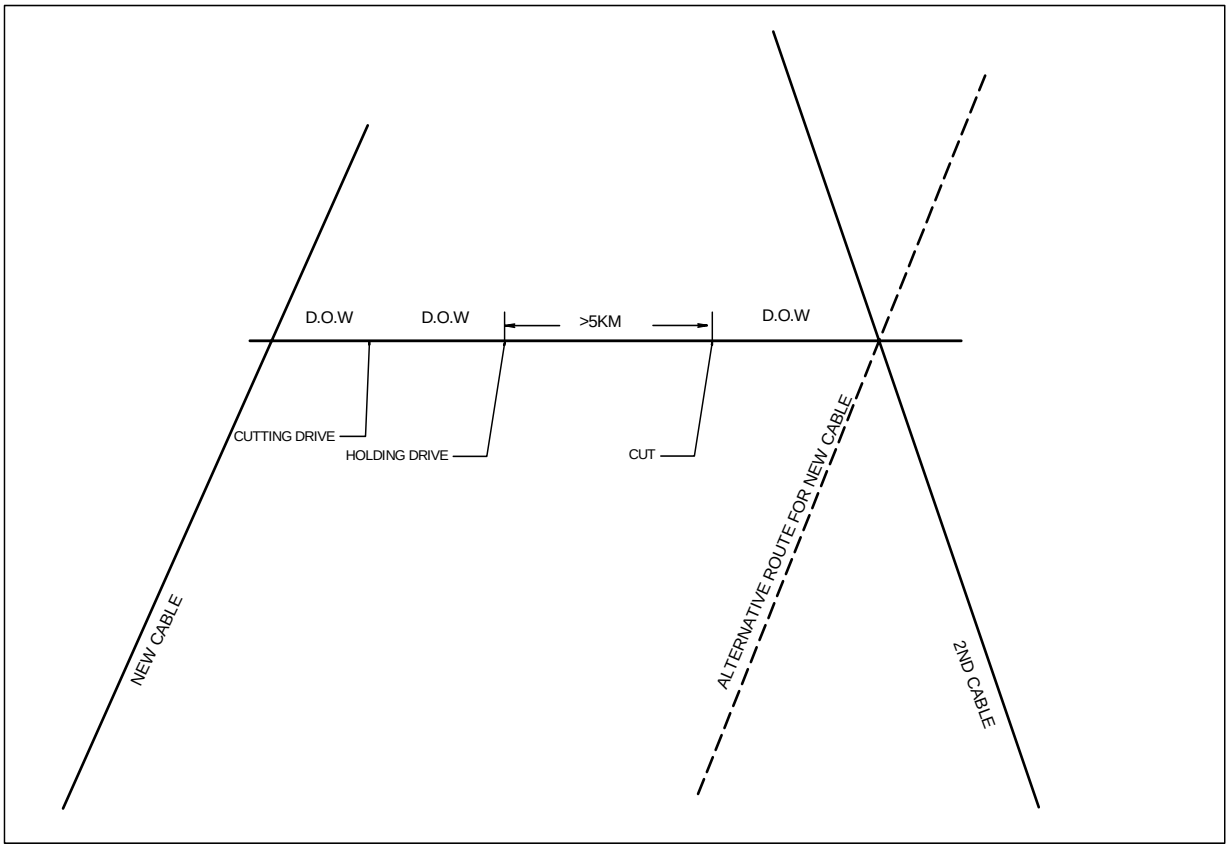
In the example below (see Diagram 5), a new cable is to be installed close to the crossing point of existing cables. If we assume 4,000m water depth throughout, and that generally in deep water the minimum cable length that can economically be recovered is 5 kms, it can be seen that the minimum clearance between the two cable-crossing points is 17kms. Anything less will effectively sterilise the cable between the two crossing points and render it unrecoverable.

In this case it would be preferable to install the new cable over the original crossing point.

Care should be taken when the original two cables cross at a relatively shallow angle as a third cable may make cable recovery close to the crossing point, during repairs,

difficult: however even in this case, the cable unrecoverable at a multiple crossing may be less than would be so if the two crossings were separated.

Diagram 5



3. NOTIFICATIONS IN CONNECTION WITH NEW CABLE CONSTRUCTION OR REPAIRS

3.1. General

Advance notification of planned new cable routes, or repair operations, which will result in close parallels and/or crossings of existing cable routes, shall be made to the responsible Maintenance Authority for the existing cable system.

3.2. Contact List

A list, identifying maintenance or engineering contacts for every working cable system in the same general area as the new cable system, shall be established by the Maintenance Authorities of each of the cable systems. This list shall be periodically updated to reflect current status and shall include telephone, facsimile and e-mail details of the nominated contacts. This list will be used to facilitate required notifications and to obtain existing cable positional data for use in new route planning.

3.3. Conflicts with Military and Government Cables

The organisation that has responsibility for planning the new cable system shall make all reasonable efforts to ensure the planned cable route does not conflict with military, government or any other submarine facilities. Additionally, consultation with other ICPC members that have cables in the area of planned installation could assist in locating appropriate military and government contacts.

3.4. Operational Notifications:

The cable owner or Maintenance Authority will ensure that it is a requirement of the cable installation vessel or company to inform all relevant parties of the intention to cross 48 and 24 hours before the crossing and again 24 hours after the crossing.

4. REFERENCES

Document Number	Title

5. DEFINITIONS

The following words acronyms and abbreviations are referred to in this document.

Term	Definition
DOW	Depth of Water
Maintenance Authority	The organisation responsible for the operation and maintenance of a particular submarine cable system

6. ATTACHMENTS

Document Number	Title