TECHNICAL ARTICLE

ELECTRODING SUBMARINE CABLES WITH THE TINSLEY 5916G ELECTRODING DETECTOR

Accurate location of submarine cables is critical for installation, maintenance and route verification. The Tinsley 5916G Electroding Detector is the industry standard for precise, reliable cable location in all marine environments.

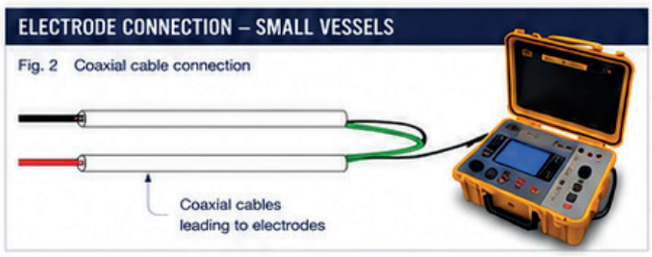
ELECTRODING

When an Electroding tone is applied to a submarine cable two fields are produced around the cable. The first is a potential field in the water local to the cable and the second is a magnetic field produced by the current flowing in the cable. Traditional Electroding uses the potential, or voltage, field that is present in the area near to the cable. This field can be detected using a pair of trailed electrodes, or antennas, that are towed in the water behind a cableship and connected to a high gain frequency selective receiver such as the Tinsley 5916R Electroding Detector.

THE ELECTRODES

Suitable electrodes can easily be constructed. A typical method would be to use a length of copper tube of approximately 50mm diameter and 1 metre in length. This should be flattened at one end and then a hole drilled through the flat to enable a cable to be connected. The tube should then be filled with a heavy material such as lead to give the electrode some weight and thus encourage it to remain submerged and not “skip” on the surface when being towed behind the cable ship.

Alternatively, solid material such as brass or copper could be used. The cables connecting the electrodes to the detector are not critical but should be of sufficient strength to avoid breaking whilst towing the electrodes. Whilst a single conductor cable can be used, using coaxial cables can give a significant improvement in signal to noise ratio. Typical cable length would be not less than 200 metres.



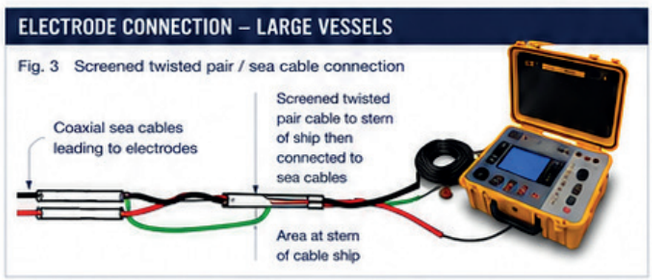
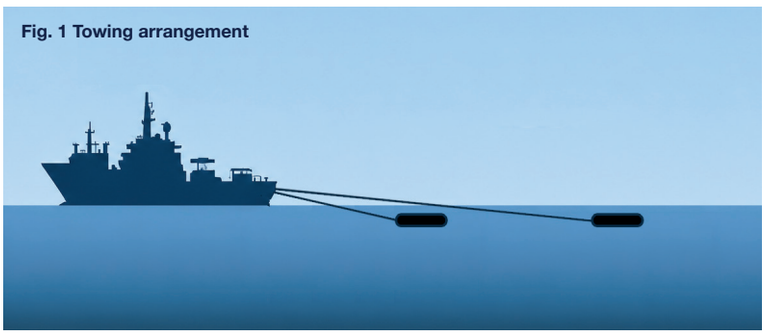


Fig. 2 The above sketch illustrates using a pair of cables connected direct to an Electroding Detector such as the Tinsley 5916 shown in the photograph. In this case coaxial cables are used but if single conductor cable is used the green ground lead is be omitted. This is a typical setup used from a small boat or RIB.

Fig. 3 This is a setup often used on larger cable ships where the Electroding Detector needs to be observed from the bridge of the ship. A single twisted pair or screened twisted pair cable is permanently wired from the bridge to the stern of the ship. At this point provision is made to be able to connect and remove the sea cables that lead to the electrodes. This setup makes for easy adjustment of the distance between the electrodes in the water. If screened cables are not used then the green ground connection is omitted.

THE TECHNIQUE

In use the two electrodes are towed at different distances behind the cableship (see Fig. 1). The distance between the two electrodes is adjusted to give the strongest signal level or the required performance. Typically the distance between the electrodes would be similar to the depth of water above the cable being electroded. However, by increasing the interelectrode spacing the sensitivity of the system can be increased at the expense of resolution. Therefore it would be normal to start with a greater inter-electrode spacing until the submarine cable has been located and then reduce the distance between the electrodes whilst tracking the cable along its length.



FAQs

The most frequently asked question is “how far is it possible to electrode along the length of a cable?”. Unfortunately there is no direct answer to this question as there are too many variables. The next most popular question is “from what distance is it possible to detect a submarine cable when using electroding?”. Once again there is no definitive answer but tests have shown that cables can be detected at several hundred metres depth and at more than a kilometre distance under ideal conditions.