ICPC Recommendation

Recommendation No. 14

Basic Power Safety Procedures that are to be followed by Marine Repair Operators and Terminal Station Personnel during Subsea Cable Repair Activities

Note: The presence of a Suffix letter after the Issue number indicates inclusion of updated peripheral information that does not change the wording of this Recommendation.

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1. INTRODUCTION

This document has been produced to confirm the basic Power Safety Procedures that are to be followed by Marine Repair Operators and Terminal Station personnel during Subsea Cable Repair Activities. It is understood that each organisation and operator will have their own procedures and documentation but the overall guidelines given in this document must be followed by everyone to ensure the safety of all personnel.

Remember Power Safety applies not only to DC (Direct Current) Power on the cable but also to Optical Power. Many modern systems are using High Power Optical levels (Class 3B & Class 4) as well as very high voltages (up to 14,000 volts).

1.1. Definition of Power on a Submarine Cable

Power is the application of:-

1.1.1. Any Voltage

- From the PFE (Power Feeding Equipment).
- From a HV (High Voltage) Insulation Tester.
- From a Test-set (Tinsley, L2G, etc).
- From an External Electroding Generator (Tinsley).

1.1.2. Optical Power

- SLTE (Submarine Line Terminal Equipment) Line Output.
- High Power Pump Amplifier Output.
- RAMAN Amplifier Output.
- OTDR (Optical Time Domain Reflectometer) Testing Laser Pulses.
- COTDR (Coherent Optical Time Domain Reflectometer) Testing Laser Pulses.
- Laser Light Source.

1.2. When are Power Safety Messages (PSMs) Required

PSMs should be either a request for work to be completed, a statement that work has been completed to make a situation safe, or that it is unsafe as power will be applied.

It may be that you have completed a task to make it safe for the distant end to work or it may be a request for them to confirm that they have completed their work so it is safe for you to re-apply power. Either way they are statements relating to Power.

2. GENERAL PRINCIPLES OF POWER SAFETY

The following are the guidelines for working on Subsea Cable Systems:

- **The safety of personnel is the highest priority.**

Remember there is always a distant end. This may be a Cable Repair Ship or may be a Terminal Station. What you do may directly affect personnel at that distant location.

- Safety of personnel is a priority followed by the safety of the system and the equipment.
- Subsea Cable Plant is expensive. Replacing damaged submerged units is difficult and time consuming and consequently very costly.
- All personnel shall be **trained and competent** to undertake their allocated tasks.

It is essential that all persons working on a Submarine Cable System are trained and competent to perform the tasks that are required of them. This includes awareness of the cable equipment set up and power paths within their facility. If trained personnel are not available within the organisation a request can be made to the Marine Repair Operator for a trained resource or resources to provide support during the operation.

It should be noted that Marine Repair Operators have a duty of care to their employees and therefore have to have full confidence in the staff competence levels of the Maintenance Authorities' deployed personnel. This is to ensure that their own personnel will not be placed at undue operational risk. If the required level of competence cannot be demonstrated then consideration should be given to suspending or delaying the repair operation pending availability of suitably qualified in house, Marine Repair Operator or third party staff.

Initial Power Safety Training for all applicable stakeholders is highly recommended (NB: This is mandatory within some organisations) followed by regular refresher training as follows:

- **For SPSOs (Ships' Power Safety Officers) and Deputy SPSOs -** If a period exceeding 3 years (or as per individual company recommendations) passes without supervised and assessed operations or off line assessment, formal refresher training is required.
- **For Terminal Station Personnel -** Formal 3 yearly (or as per individual company recommendations) refresher training is highly recommended (NB: This is mandatory within some organisations).

All work on a submarine cable system that involves access to the Power Feeding Equipment, Cable Head or Cable itself:

- Must be controlled by one designated individual at any given time.
- In Terminal Stations a second trained person must be present.

The name of this individual must be logged whilst they are on duty. This person will normally be the TPSO (Terminal Power Safety Officer) or the SPSO.

Any Power operation involving more than one location:

- Must be controlled by **one agreed location and individual** (Power Control) at any given time. Again, this must be documented.
- **Make safe** before any direct access to a potentially hazardous area is permitted.

This will be done by co-operating with the other party or parties that could be feeding power into the system. All changes in Powering conditions must be confirmed in writing.

When working on the system:

- Always assume that the equipment or cable is **powered and unsafe** until it has been confirmed to be safe.
- No individual shall do anything before **first ensuring that it is safe to proceed**.
- Ensure that the system **will remain in a safe condition while work is in progress** and access permitted.
- When work is completed the system shall be **made safe to power and people moved clear of the hazardous areas**. This must be **confirmed in writing** before power is applied or the system energised. Be aware it is not only your location but also all distant connected locations that are affected by your actions.
- A written record must be maintained of all agreements and actions. These messages will normally take the form of PSM's (Power Safety Messages).

3. POWER SAFETY MESSAGES

PSMs must be considered as legal documents – or a document evidencing what has been requested or agreed during a cable operation. If a serious accident occurs they will be required in a Court of Law.

Fax must always be used as the primary method for the transmission of PSMs. Where Fax is not available, e-mail is an acceptable method for the transmission of PSMs, provided the PSM is in the form of an attachment in PDF file format.

All PSMs must be dated, timed (Preferably in GMT or UTC) and include the identity of person who issued them.

PSMs are essential to ensure that the application of power to a Submarine Cable System is undertaken in a manner that ensures the safety of all personnel working on the cable. Confirming contact details prior to a repair operation requires written communication via E-mail or Fax, but does not require a PSM to be sent.

3.1. Key Rules for PSMs

- **Never proceed** with any operation without **written confirmation** that it is safe to do so.
- Always confirm power is off before accessing a potentially dangerous area.
- Always confirm it is safe to apply power before doing so.

When generating PSM's, always:

- Keep them short.
- Keep them simple.
- Keep them clear.
- Keep them unambiguous.
- Keep numbering unique (numbering system to be agreed prior to commencing the operation).

- Use a template (Appendix 1 shows an example).
- Must have Date, Time, your Name, Role and Signature.

NB: If a received PSM is not clear, always request clarification from the sender or request a resubmission of the intended message.

4. TRANSMISSION OF POWER SAFETY MESSAGES

There are two possible methods for the transmission of PSMs between terminal stations and repair ships, Fax and E-Mail. The method of transmission between each party should be agreed prior to commencement of the repair operation. Each party should also clearly define the contact details of the dedicated recipient including Phone, Fax number and E-mail address prior to the transmission of any PSMs.

There are two methods of preparing the PSM prior to transmission, these are to print and physically sign, or to prepare using a scanned image of a signature and save in PDF file format.

4.1. Physical Signature

- Write PSM and print hard copy.
- Sign and date PSM.
- Fax to recipient or scan to PDF (Portable Document Format) and attach to email for transmission.
- Both sender and recipient print and file in accordance with Sections 5 and 6 respectively.

4.2. Electronic Signature

- Write PSM.
- Insert scanned image of signature. Date and time accordingly.
- Save PSM in PDF file format.
- Print and fax to recipient or attach to email for transmission.
- Both sender and recipient print and file in accordance with Sections 5 and 6 respectively.

NB: Although not applicable on all occasions due to language difficulties, it is acknowledged that a follow up phone call after the sending of a PSM can reduce delays and ensure that there are no communication system failures.

5. POWER SAFETY LOG BOOKS

Log books are also legal documents, if an accident occurs they will be required in the Law Courts.

All actions, events and issues related to work on Submarine Cable Systems must be logged in either the common log book or the specific system log book as detailed below. All entries must be signed and have the date and time recorded in GMT (Greenwich Mean Time) also known as UTC (Co-ordinated Universal Time) and Z (Zulu Time).

Log books should:

- Have a substantial hard cover.
- Have numbered pages.
- Be clearly marked on the front cover with the log book title.
- Never have pages removed.
- Be retained for at least 2 years after the last entry or for the life of the system whichever is longer.
- No blank lines should be left between entries
- Be completed at the time of the activity.

Two Types of Logbooks are used in Terminal Stations:

- **Common Logbook:**
  - TPSO Signs On and Off Duty in this logbook.
  - Keep information clear and uncluttered so any TPSO coming on duty can quickly see what activities are in progress.
  - All active PSM's & PTWs (Permits to Work) should be held in this logbook until the operation is completed.
- **System Logbook:**
  - Ensure full details of all faults and actions are recorded in this logbook.
  - PSMs and PTW's should be pasted into this Logbook when the operation is completed. It is acceptable to store these documents elsewhere but if this is done a note confirming their location must be recorded in this logbook.

6. FILING AND TRACKING OF POWER SAFETY MESSAGES

All sent and received PSMs must be printed and filed in an appropriate location in a system that enables quick reference to a received or sent PSM and therefore system status.

7. REFERENCES

Document Number **Title**

8. DEFINITIONS

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

Term	Definition
COTDR	Coherent Optical Time Domain Reflectometer
DC	Direct Current
GMT	Greenwich Mean Time
HV	High Voltage
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PFE	Power Feeding Equipment
PSM	Power Safety Message
PTW	Permit to Work
SLTE	Submarine Line Terminal Equipment
SPSO	Ships Power Safety Officer
TPSO	Terminal Power Safety Officer
UTC	Co-ordinated Universal Time
Z	Zulu Time

9. ATTACHMENTS

Document Number	Title
Appendix 1	Power Safety Message Template Example

APPENDIX 1

POWER SAFETY MESSAGE TEMPLATE EXAMPLE

Power Safety Message			**No:**	
Subject (if applicable):				
To:				
Name:		**Role:**		
Telephone No:		**E-mail:**		
System Name:		**Segment No:**		
Message				
From:				
Name:		**Role:**		
Telephone No:		**E-mail:**		
Date:		**Time:**		
Signature:				
If this message is not received correctly or if there is any uncertainty regarding its contents please contact the person above.				