

# NMFSS portable CTD winch & rope for metal free sampling

C. Day

National Marine facilities, Sea Systems,  
NOC

## PORTABLE METAL FREE WINCH SYSTEM

### Requirement:

Provide a clean, metal free CTD deployment winch & rope to support our science programmes.

### Proposal:

A portable deployment winch using a synthetic electro-mechanical rope designed to minimise metal contamination to the rope & CTD/sensor deployment frame.

## PORTABLE METAL FREE WINCH SYSTEM

### Portable – Direct pull – Easy to transport

- The system should support metal free sampling as best as possible.
- The system must be portable for installation on NERC and OFEG ships
- We specified a direct pull winch to operate in conjunction with a jacketed synthetic electro-mechanical cable.

*The decision to go for a direct pull winch was partly driven by a limited budget, and partly to make the system 'simple' and 'easy to maintain at sea'*

- The winch is to be fully enclosed to protect it from the elements, but with effective access for operation and maintenance.
- The system must be capable of being transported by road, rail or sea freight as a standard 20 foot ISO CSC plated load.

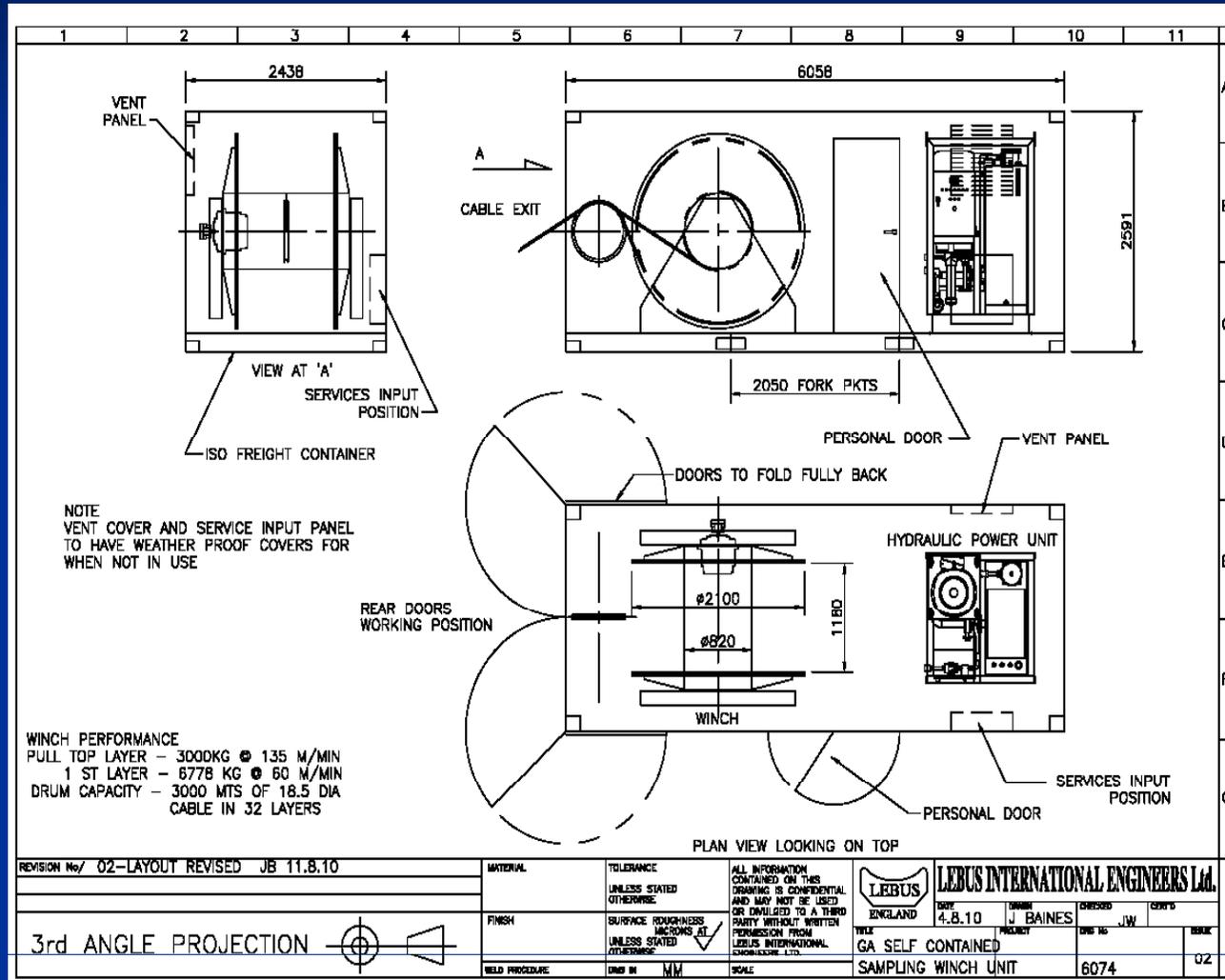
## PORTABLE METAL FREE WINCH SYSTEM

### Which rope?

- We specified electrical conductors only and not fibre optic.
- We identified 3 potential synthetic rope suppliers:  
Cortland (USA)   Cousin Trestec (France)   NEXANs (Norway)
- We have previous bad experience from Cortland which influenced our thinking
- The Cousin Trestec rope option was outside our budget
- The NEXANs option had some track record with IMR and NIOZ and was in budget!

*We consider the rope as the major risk factor in the project!*

# Lebus International Metal free winch system – Outline design



Direct pull winch

Electro-hydraulic drive

Simple, reliable scroll  
system

3T line pull with full  
drum

1.0 m s-1 line speed at  
drum

Grooved Lebus drum  
shells

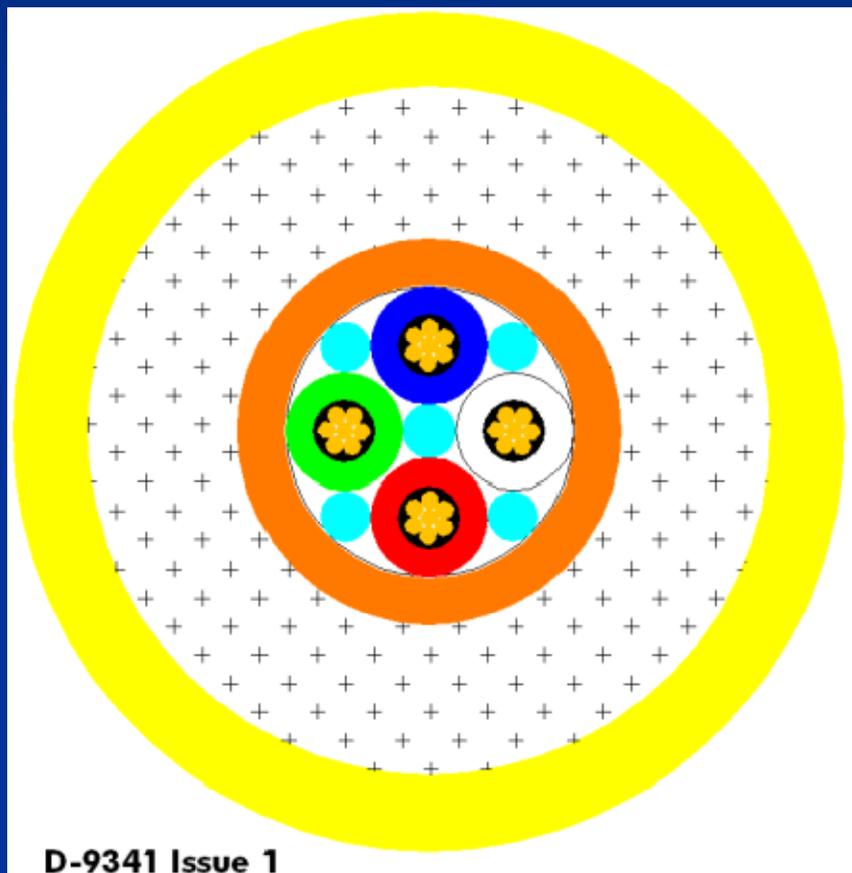
All surfaces in contact  
with the rope to be coated  
in  
non-metallic material

CCTV cameras for drum  
and wire run

20ft ISO box dimensions



## Aramid armoured CTD instrument cable.



Length = 8000m

4 off Cu Conductor, 0.82mm<sup>2</sup>,  
7x0.39mm, 3.3kV

Outer diameter = 18.5mm

Bend diameter = 750mm

Weight in air = 310kg/km

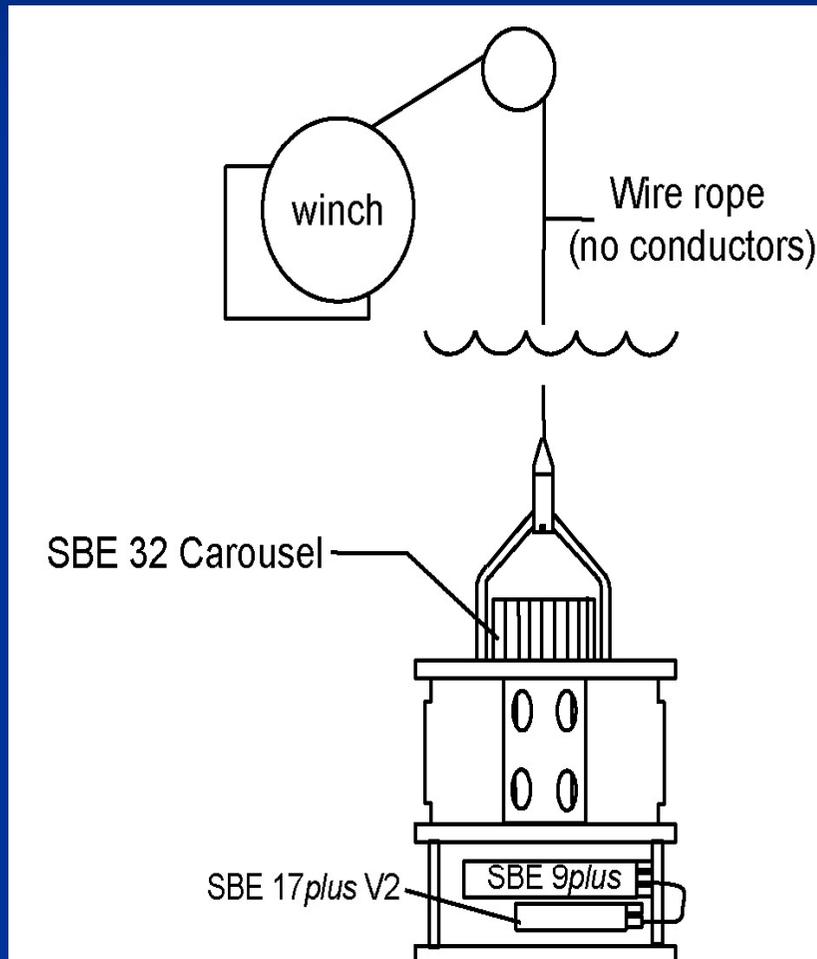
Weight in water = 40kg/km

Breaking strength = 130kN

Safe working load = 22kN

# Another approach!

The RRS Discovery completed a cruise in November carrying out clean/metal free CTD sampling using the ship fitted synthetic PLASMA coring rope to deploy the CTD system.



The PLASMA does not have an electrical or fibre optic core.....

The CTD frame was fitted with a SEABIRD SEARAM system which powered the full suite of instruments, acoustically fired the water bottles at pre-determined depths (pressures) and logged the instrument data.

We had a few technical problems with the system but it is a very viable alternative.



# Another possible future approach?

*Could we send data acoustically from CTD to ship via ship fitted USBL?*

We have a collaborative arrangement with SONARDYNE who supply our ship fitted USBL systems on the RRS James Cook and RRS Discovery

We have had exploratory discussions with SONARDYNE about using their USBL technology to send data via an acoustic modem from deployed CTD systems to the ship.

This has not gone beyond informal discussions.....

As acoustic technology advances it may become increasingly viable.....

Does anyone have any experience on this?