

# NMFSS portable CTD winch & rope for metal free sampling

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## PORTABLE METAL FREE WINCH SYSTEM

### Requirement:

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

### Proposal:

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

## PORTABLE METAL FREE WINCH SYSTEM

### Portable – Direct pull – Easy to transport

- The system should support iron 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 environment, 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

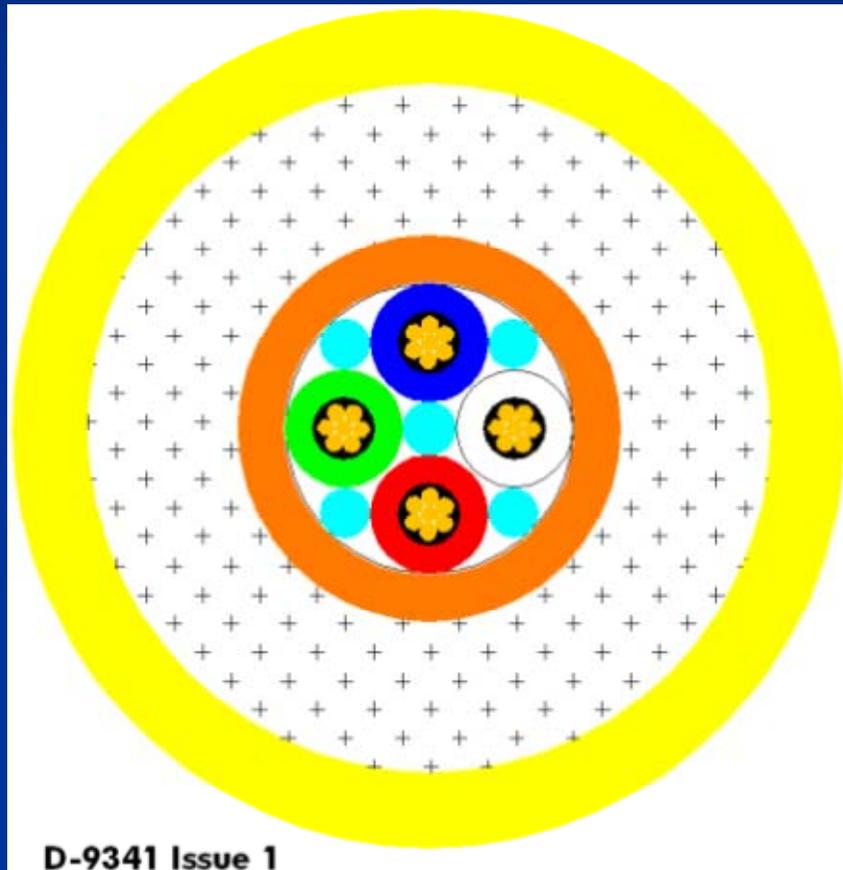
### Which rope?

- We specified electrical conductors only and not fibre optic.
- We identified 3 potential synthetic rope suppliers:  
Cortland (USA)   Cousin Trestec (France)   NEXANs (Norway)
- The Cousin Trestec rope option was outside our budget
- The NEXANs option had some track record with IMR and NIOZ and was in budget!
- A Cortland rope is to be fitted onto the new RRS Discovery replacement clean CTD winch, so this will provide a comparison with the NEXANs rope

*We considered the rope spooling as the major risk in the project!*



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

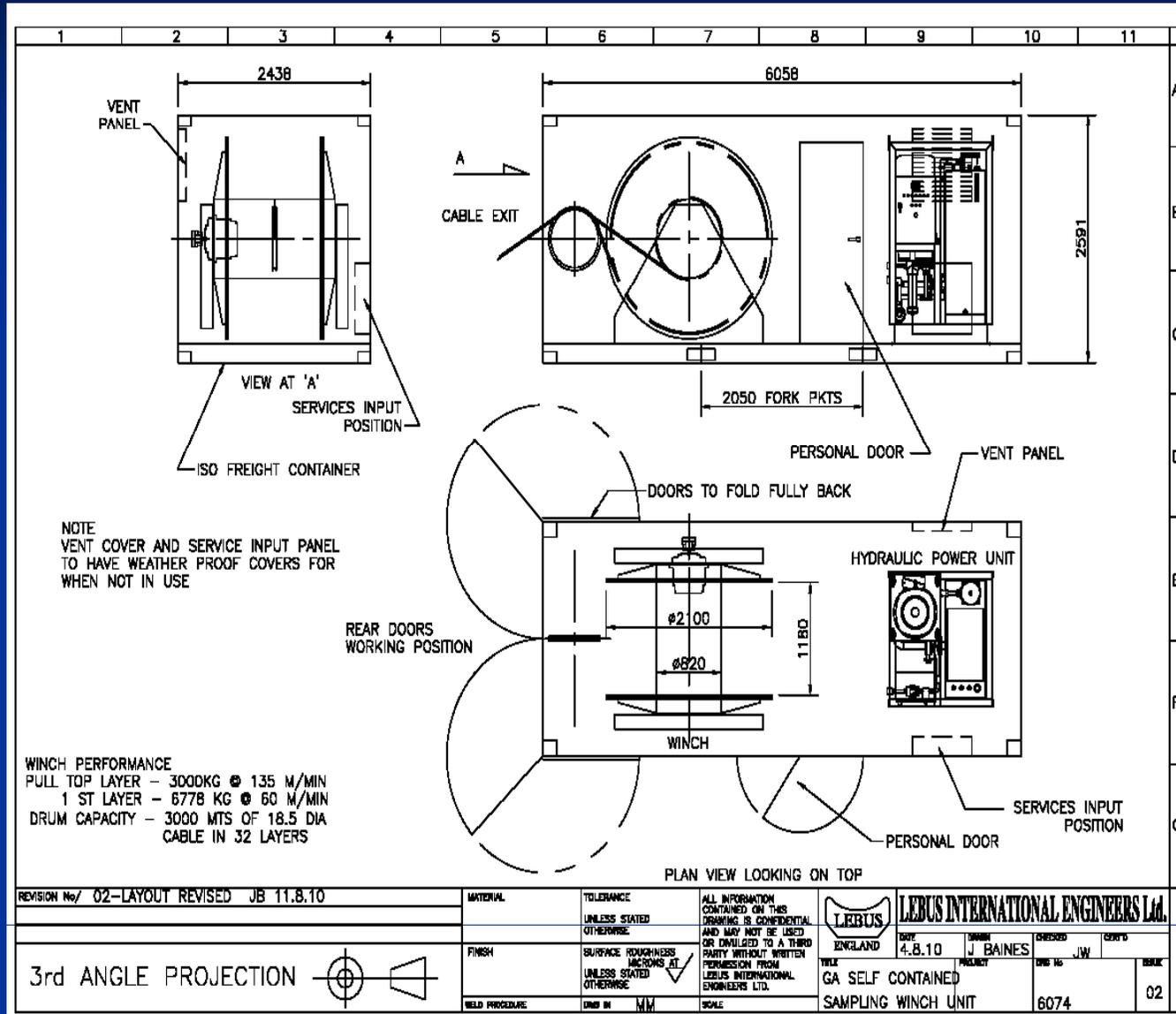
Weight in air = 310kg/km

Weight in water = 40kg/km

Breaking strength = 130kN

Safe working load = 22kN

# Lebus International metal free winch system



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

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  
for shipping

# Containerised clean CTD winch trials on JC75



**RRS James Cook: Containerised clean CTD winch & 8000m of NEXANs Aramid rope.**

Trials carried out to 1400m depth with successful tests carried out on the spooling system which was believed to be the highest risk area of the system.

During trials the winch developed a fault, which proved to be a seized brake (in the combined gear box/brake assembly). The winch is now under repair at the manufacturer



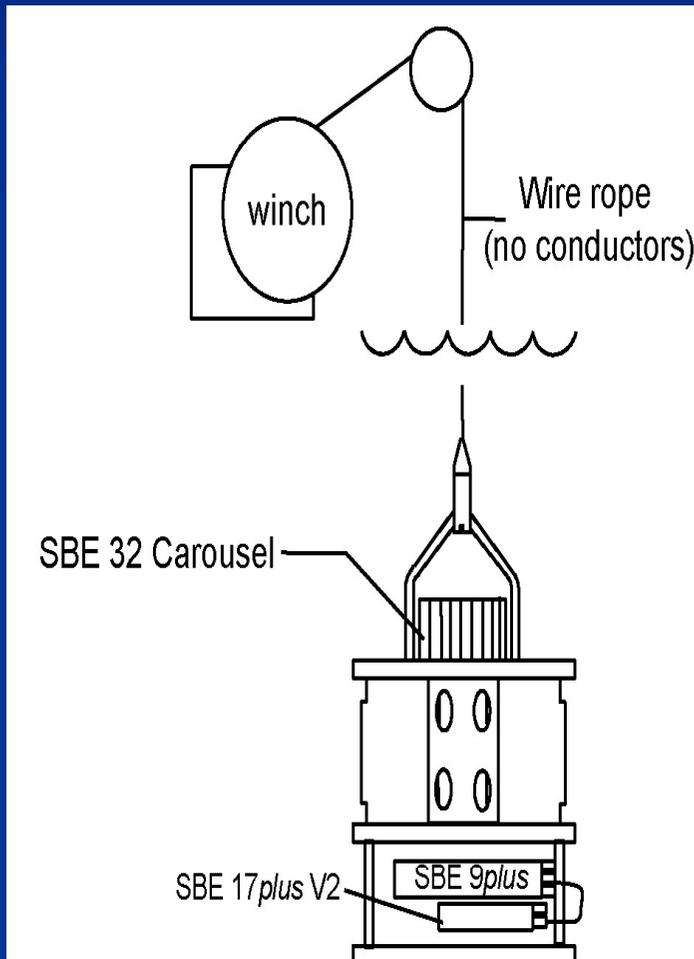
Non-metallic block fitted to stern A frame

Portable operating console



# Another approach to iron free CTD operations!

NERC also supports clean/iron free CTD sampling using the ship fitted synthetic PLASMA rope to deploy the CTD frame with the acoustic SEABIRD SEARAM 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 transmit data acoustically from the CTD using the ship fitted USBL system?*

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

This could allow us to routinely use non electrically conducting wires and ropes.

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

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

Does anyone have any experience on this?