3 Solutions Found for Irish Research Vessels

A CTD Davit design

A Vibration Damping Solution

Managing mooring chain on a small vessel

Bill Dwyer, P&O Maritime Services
Celtic Voyager & Celtic Explorer
Marine Institute, Ireland. 1991

RV Lough Beltra 1978 – 1997
Marine Technology Ltd
1983 - 1997
Marine Technical & Development Services 1998

P&O Maritime Services, 2006

Celtic Voyager, 1997

Celtic Explorer, 2003
Provider of Specialist Maritime Services

HQ Melbourne, Australia
600 worldwide
P&O Maritime Services Ireland

Located in Galway on the west coast of Ireland

50 Employees
14 shore based
33 Ships crew

220 Million Acres of Irish Ocean Territory
Celtic Voyager

- 31.4m long
- 8.5m beam
- Draft 3.8m
- 340 Tonnes
- 15 Berths
- 15 Days endurance

Equipment:

- EM1002 Multibeam
- Sub Bottom Profiler
- SBE 911 CTD Rosette
- Hull mounted RDI ADCP
- Automated Weather System
- Fugro Starfix position
- Ixsea GAPS
- EA400 Single Beam
- SBE 21 Thermosalinograph
- Turner Model 10 Fluorometer
- MDM400 Data logger
- Seapath Motion reference System
- Furuno Fishing Sonar
- EchoPlus Ground Discriminator
Celtic Explorer

ICES 209
65m Long
15m Beam
2500 Tonnes
Diesel Electric
Drop Keel
DP System
31 Berths
45 days endurance

EM1002 Multibeam
Sub Bottom Profiler
SBE 911 CTD Rosette
Fugro Starfix position
Moving Vessel Profiler
IT Network

EA600 Single Beam
SBE 21 Thermosalinograph
Turner Model 10 Fluorometer
SP70 Fishing Sonar
Automated Weather System
Seapath Motion reference System

EK60 Scientific Sounder
Hull mounted ADC
MDM400 Data logger
Ixsea GAPS
Gravity Meter
Octans III
CTD Deployments

Problems on Celtic Voyager
- CTD Derrick
  - High pivot Point
  - Big Pendulum Effect
- Smashed Bottles
- Damaged Rosette frame
- Damaged Instrumentation

Problems addressed on Celtic Explorer
Celtic Explorer Davit Design

Reduce Pendulum Effect

Overhead telescopic Davit
Requires a hanger - Expensive

Simple Watts Linkage design chosen

In house design in consultation with crane supplier

No Hangar - less space
Less cost
Minimum of movement required for deployment

Telescopic arm can reach down towards sea surface

Seabird 911 CTD
24 x 10ltr bottle Rosette
Heave compensation system added

Needed for deep water deployments

Influence of heave on CTD data is reduced. Can deploy in much heavier seas.
Celtic Explorer Davit Design

Pendulum effect greatly reduced

No impacts on side of vessel

No damaged bottles or instrumentation

Have deployed to 4800m depth

Deployed in 6m swells

Heave influence removed from data

Working on Davit for Celtic Voyager
Vibration damping

- Vortex Shedding - well known phenomenon.
- Occurs in the wake of towed bodies, cables and suspended poles.
- As speed increases these Vortex induced vibrations increase.
- Potential issue with a retraction unit on Celtic Voyager
• Retraction unit pole
  – In-house design
  – Size constrained by space
  – Pole length 2500mm
  – Diameter 150mm
  – Stroke 1780mm
• Potential for vibration very high

• Helix form used to disrupt vortices
  - Spiral Wrap
  • Cheap option to use rope
    • slackens when retracted
    • Potential to foul
    – Used bungee cord – works very well!
Bungee Cord works very well!

Sliding Ring on the pole allows much shorter cord lengths

Works well up to 10 knots
Shorter length of bungee cord needed

Cord attached to a nylon Ring that slides on the pole

Cord easily replace by a diver
Irish DataBuoy Network

Shallow water deployments 90m-190m

Small Vessel deployment

Small vessel more cost effective
Buoy Moorings

Limited deck space for chain and wire

Buoy towed to station

Work space reduced
Higher risk of injury
Net Drum makes the job much easier!

Chain taken off the deck and onto a net drum.
Same method used on larger vessel
K Series Buoy Deployment

4500m mooring

Wire spooled one drum. Chain spooled on another

Deployed from Celtic Explorer

Woods Hole designed Mooring
Mooring Recovery

Cable ties snap off once rope is pulled

Easy reach to mooring rope

Hook to grab mooring rope