The Azipod Concept

- The Azipod Principle
- Diesel-Electric Propulsion
- Design Benefits
- Constructional Benefits
- Operational Benefits
- Scope of Supply
- Experience
The Azipod Principle

- COOLING SYSTEM
- STEERING GEAR
- AZIPOD HULL
- SLIPRING UNIT
- CONNECTION OF MAIN CABLES
- STEERING MOTOR
- PROPELLER
Diesel-Electric Propulsion

The Power Plant Concept

ABB supply

Low voltage side

Diesel-Generator
Transformer
Frequency converter

ABB
Diesel-Electric Propulsion

- Safety Aspects
  - Prime mover redundancy
  - Excellent dynamic response (e.g. short crash stop)

- Ship Concepts
  - Variable operating profile
  - Large auxiliary power demand
Diesel-Electric Propulsion

Design Aspects

- High modularisation capability of machinery
- Flexible arrangement and location of machinery
- Reduced number of engines
- Reduced installed power
- Single type of engines
Diesel-Electric Propulsion

Operational Aspects

- Flexible operation over the entire propeller speed range
- Power fluctuations are distributed evenly to the prime movers
- Optimum load on engines resulting in reduced:
  - Fuel consumption
  - Maintenance
  - Spare parts
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Design Benefits

- Smaller casing
- Added cargo volume
- Smaller vessel
- Low weight
- One-lift installation of Azipod
  - Shorter building time of the vessel
  - Late delivery  → less capital tied up
Azipod Concept

- Azipod units replace:
  - Propeller motors
  - Shaft lines and related equipment
  - Stern thrusters
  - Bossings, struts and rudders
- Smaller engine rooms
- Simplified casing
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Azipod propulsion

Conventional propulsion
Azipod Concept

Constructional Benefits

One unit eliminates the need for separate:

- Gearbox
- Thrust bearing
- Shaftline
- Sterntube with sealing
- Lube-oil system for bearings and sealings
- Rudder and steering gear
- Stern thrusters
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Constructional Benefits

• Simplified steel structure
• No aligning of shafts and bearings
• One-lift installation of the Azipod unit
• Building time in dry-dock is reduced
Operational Benefits

Hydrodynamics

Excellent wake field leads to:

- Improved hydrodynamic efficiency (an 8% improvement was recorded on Elation)
- Less cavitation
- Reduced propeller induced vibrations
- Reduced noise levels
Azipod Concept

Operational Benefits

Manoeuvring

• Good coursekeeping stability
• Short crash stop distance
• Small turning circle
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Operational Benefits

Manoeuvring

- Excellent for dp- and joystick operation
- Safer and faster harbour operations
- Reduced power demand for manoeuvring

Total transverse thrust with 3 MW
Azipod Concept

Operational Benefits

Environmental Aspects

- Reduced exhaust emissions
- Improved safety of navigation through redundancy and excellent steerability
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Operational Benefits

Operating economy

- Reduced fuel cost
- Optimum maintenance schedule and reduced hours
- Reduced manoeuvring time in port
Scope of Delivery

Standard:

• Complete Azipod unit
• Propeller
• Steering gear and hydraulic system
• Steering control system
• Cast ring for slewing bearing
• Machining of cast ring
Scope of Delivery

An Azipod unit includes:

- Pod steel structure
- Electric motor
- Shaftline incl. seals
- Bearings and lubrication systems
- Bilge system
- Cooling system
- Slipring unit
Scope of Delivery

Propeller

- FPP, monoblock or bolted blades, Cu-Ni-Al or stainless steel

Steering hydraulics and control system

- Electro-hydraulic power packs and hydraulic steering motors
- Control levers on the bridge and in the ECR
- Emergency back-up control system

Mounting block

- Built directly into the hull by the shipyard or supplied separately
- Machining can be done by ABB or shipyard in case the mounting block is built directly into the hull
Scope of Delivery

Steering control system:

- Bridge control stations
  - follow-up type helm wheels and rpm levers
  - azimuthing main control levers
  - steering place selection panels, analogue type angle indicators, rpm indicators and, start/stop/alarm panels
- Back-up control station
  - non-follow-up type overriding helm tillers
  - analogue type rpm controllers
Interfaces with the Yard

The following are normally Yard delivery:

- Power (incl. auxiliary power) cabling to the slipring unit
- Intrumentation cabling from the slipring unit to automation and control stations
- Power supply for hydraulic power packs and cooling fans
- Hydraulic piping
- Lubricating oil gravity tank
- Lubrication and bilge system piping up to the swivel joint
- Foundations for auxiliaries in the Azipod room (e.g. hydraulic power packs)
Materials and Components

The Azipod Unit is:

- A new configuration of standard components

Azipod units are made of:

- Reliable components
- Standard products
- Materials of well known suppliers
Operating Hours

132 000 HOURS
SEPT. 1999

Operating hours

Years 1991-2004