Cable ships overview
The Gutta-Percha

Pallaquium Gutta

Tjipertir Plantation in Java

Compagnie du Gutta-Percha
Cable ships a long history

**Goliath**: lays 1st international cable, UK-France, 1850-1  
*Source: Illustrated London News*

**Great Eastern**: laying cable off Newfoundland, 1866  
*Source: Canadian Government*

**John Pender**, named after pioneer cable maker, 1900  
*Source: Cable & Wireless*

**Monarch**: laid 1st transatlantic telephone cable, 1955/6  
*Source: www.atlantic-cable.com*
Cable ships: key elements

- Working deck
- ROV Hangar
- Bridge
- ROV control room
- Cable linear machine
- Measurement room
- Cable tanks
- Jointing position
- Engine room
# Cable ships: size and performances

<table>
<thead>
<tr>
<th>Volume</th>
<th>25x15m</th>
<th>50x10m</th>
<th>75x12.5m</th>
<th>100x20m</th>
<th>125x22.5m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable load</strong></td>
<td>80T</td>
<td>400T</td>
<td>600T</td>
<td>2500T</td>
<td>4000T</td>
</tr>
<tr>
<td><strong>Autonomy at sea</strong></td>
<td>15j</td>
<td>20j</td>
<td>25j</td>
<td>35j-45j</td>
<td>45j-60j</td>
</tr>
<tr>
<td><strong>Transit Speed (Sea State 4)</strong></td>
<td>08nds</td>
<td>09nds</td>
<td>10nds</td>
<td>12nds</td>
<td>12.5nds</td>
</tr>
<tr>
<td><strong>Wave height at working area</strong></td>
<td>0.8m</td>
<td>1.0m</td>
<td>1.25m</td>
<td>2.0m</td>
<td>3.0m</td>
</tr>
<tr>
<td><strong>Working depth</strong></td>
<td>50m</td>
<td>1000m</td>
<td>2000m</td>
<td>5500m</td>
<td>10000m</td>
</tr>
</tbody>
</table>
Cable ships : engines

- Performances : engines should be able
  - To sustain a transit speed of 12 knots
  - To keep the working position with a sea state
  - To pull a plough (bollard pull)

- Number of engines :
  - Usually 4 engines
  - The optimum of fuel consumption could be to use only 3 or even 2 engines in parallel. The 4 engines are used for transit
Cable ships: engines room
Cable ships: Stability

- Different devices for the propulsion:
  - Azimuthal propellers with 360° movement
  - Transverse tunnel propellers
  - The optimum of fuel consumption could be to use only 3 or even 2 engines in parallel. The 4 engines are used for transit

- The design of the bow is now optimizing the behaviour in the waves

- Dynamic Positioning: to keep an accurate position a cable ship use satellite information acquisition to command the different propellers
  - DP 2: There is a double, independent system from data acquisition to propellers command
Sheaves and working D Deck
Buoys
Repeater and Branching Unit handling
Repeater and Branching Unit handling
Cable machines & cable drums
Jointing
Jointing room
The ROV has four functions

- Finding the cable
- Cutting the cable if necessary
- Gripping the cable with a rope
- Once the repair done, burial of the cable using high pressure tools
ROV: immersion
ROV Detection tool

Front burial tool

Umbilical protection

rear burial tool

Front burial tool
ROV: control room

- Importance of coordinating the ROV progression with the ship navigation
- The ROV can be floating or progressing on the sea bottom using its tracks
Bridge
Grapnels: cutting
Grapnels : retrieving
Food and beverage
On board:

- The Captain also called Master is in charge of the vessel and of the people on board, including customer representatives.

- The vessel is organized in 3 services:
  - Bridge, navigation, and deck operations
  - Engines and all electrical devices on board
  - General services: administrative, accommodation and food

- The crew organization is different in each company, but there are 50 persons per ship: officers, petty officers and seamen (AB for the deck Able Seamen, with a unique experience).

- There is also a dedicated team for the cable operation:
  - Telecom technician for measurement and relation with onshore stations
  - Jointers
  - ROV pilots and maintenance
  - Reporting

- This team is about 10 to 12 people, it exists synergies between this team and the crew.
Route and Slack control

- The key point of a good lay (installation or repair) is a good slack management tool and an accurate navigation on the planned route.
- Prior to an installation, a survey has provided among others a Route Position List (RPL) that has to be final position of the cable on the seabed.
- In order to lay, or relay in case of maintenance operation, the points to be controlled are:
  - The route followed by the vessel, according to the route that has been decided in the survey prior to installation.
  - The speed of the vessel.
  - The speed of the cable engine and the cable drums.
- These points are referred to as Slack control. This allows the cable to be laid as flat as possible on the seabed and to avoid any kink due to wrong slack management.
- There are several software that are dedicated to the slack management.

Slack management: spaghetti and Chopsticks.
The most important: the mascot

- The troll of Pierre de Fermat
- Forever the Pierre de Fermat will remember being born in Norway