

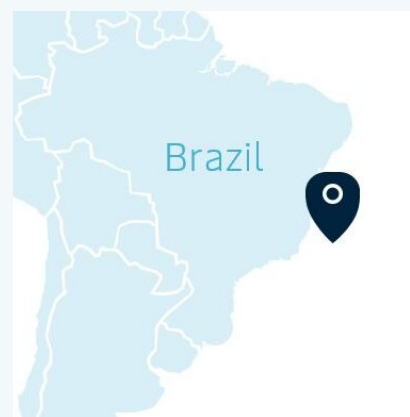
# Fluminense Mooring Lines Life Extension

## Project deliverables

- Project management
- Planning & engineering
- Heading control analysis
- Procurement
- Transportation of mooring equipment
- Temporary disconnection of mooring system
- Installation of new mooring components

In October 2019 Maersk Supply Service was awarded a contract by Shell to provide an integrated mooring lines life extension solution for FPSO Fluminense off the coast of Rio de Janeiro.

The project was to perform life extension work on an existing FPSO mooring system. Maersk Supply Service carried out work scopes on eight of the nine mooring lines, with a primary focus of remedial work on three mooring lines. The project included heading control of the FPSO, replacement of mooring lines, as well as installation and hook up of new mooring components. Maersk Achiever, along with two L-class anchor handling tug supply vessels performed the integrated scope.



## Key Facts

**Client:**  
Shell

**Project:**  
FPSO mooring lines life extension and remedial works

**Location:**  
Offshore Brazil

**Water Depth:**  
725m

**No of Vessels Used:**  
3 - Maersk Lancer, Maersk Laser and Maersk Achiever

**Offshore Project Timing:**  
December 2019 to January 2020

**Operations:**  
Top chain replacement  
Full mooring line replacement  
Mooring line remediation work  
Heading control



**One Stop Solution**  
Reducing interfaces for our customer

The turn-key solution provided by Maersk Supply Service included project management, engineering and offshore execution. It enabled us to optimise time and resources through a one-team approach and integrate our marine experience from the start. In addition, we provided personnel onboard the FPSO to coordinate operations. As a result, we achieved a smooth transition from onshore to offshore operations, completing the project within the estimated time.



**Time & Cost Savings**  
Optimising port calls and offshore operations

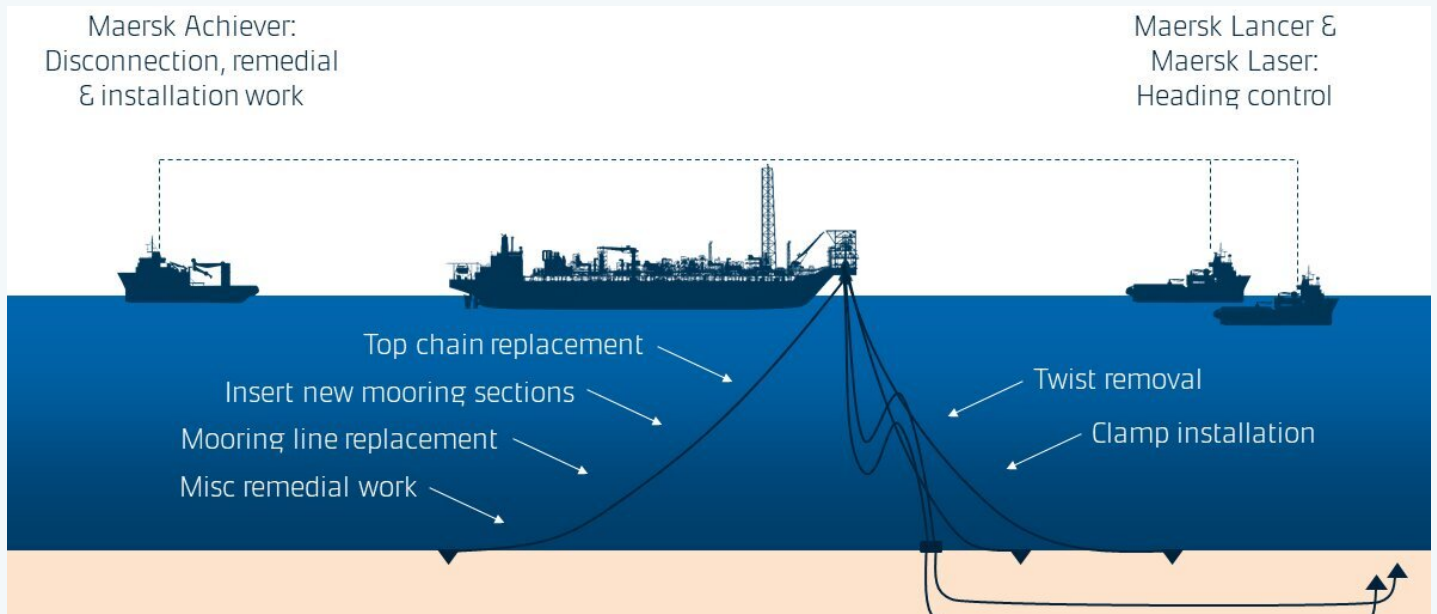
With all three vessels supplied by Maersk Supply Service, we were able to take all mooring equipment out in just one mobilisation. This eliminated the need for multiple trips to port, saving the time and cost of additional port calls. At the same time, this allowed the two L-class vessels to perform pre-stretching of the new polyester rope ahead of the arrival of Maersk Achiever in field, further optimising time offshore.



**Reliable Delivery**  
Adapting to challenges while offshore

During operations it was discovered that additional remediation work was required on some components. Through collaboration between Maersk Supply Service's engineering team and marine crew, a solution using spare equipment resolved the issue without the need to return to shore. In addition, while the two L-class vessels were maintaining heading control of the FPSO down to 1-3 degrees, they were able to deliver despite inclement weather and unpredictable high currents.

# Vessels and operations involved in the Fluminense mooring lines life extension project



## End-to-end project management of:

### Transportation of mooring equipment

- Transport of mooring equipment from customer nominated port to field location
- Performed by all three vessels: Maersk Lancer, Maersk Laser and Maersk Achiever
- Carried out in just one mobilisation

### Heading control

- FPSO heading maintained down to +/- 1-3 degrees through adverse weather
- FPSO offloading hose management
- Performed by two anchor handling tug supply vessels: Maersk Lancer, Maersk Laser

### Temporary disconnection of mooring system

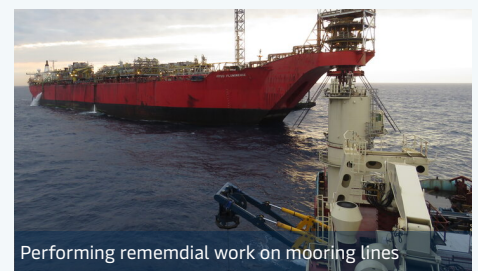
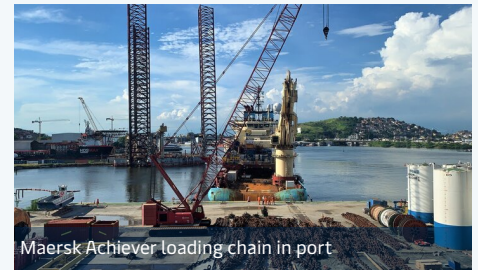
- Disconnection of existing mooring system one line at a time
- Performed by hybrid construction / anchor handling vessel Maersk Achiever

### Remedial work on mooring system

- Urgent clamp installation
- Mooring line twist removal
- Misc additional remediation work
- Additional remediation work required on a mooring component was discovered during operations and resolved without the need to return to shore
- Performed by Maersk Achiever

### Installation of new mooring components

- Full mooring line replacement down to anchor wire
- Top chain replacement
- Insert new mooring sections
- Performed by Maersk Achiever



## Maersk Supply Service - Provider of vessels and full service solutions to the energy sector

Maersk Supply Service is a leading provider of marine services and integrated solutions to the energy sector worldwide with a large fleet of anchor handling tug supply vessels and subsea support vessels. The company provides solutions to the oil and gas industry in areas such as towing and mooring installation, subsea construction, and light well intervention services, and supports other industries such as offshore wind, deep sea mineral recovery and ocean cleaning.

Maersk Supply Service employs an international staff of approximately 1100 offshore and 250 onshore people. Headquartered in Lyngby, Denmark, Maersk Supply Service is represented globally with offices in Aberdeen, Accra, Luanda, Manila, Mexico City, Perth, Rio de Janeiro, St. John's, and Singapore. Maersk Supply Service is a part of A.P. Møller – Mærsk A/S which employs roughly 70,000 employees across operations in 130 countries.

For more information visit [www.maersksupplyservice.com](http://www.maersksupplyservice.com)

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