

**James Fisher and Sons plc**  
Marine Services Worldwide


**James Fisher**  
Straininstall



# Monitoring solutions for the offshore industry







## Protect the integrity of your offshore assets with James Fisher Straininstall

**James Fisher Straininstall (JF Straininstall) is an innovative manufacturer of cutting-edge monitoring and control systems for the global offshore oil and gas industry, as well as the world's leading manufacturer of bespoke load monitoring systems for offshore environments.**

Supporting customers operating in hostile offshore environments, B> Straininstall delivers simple solutions to complex requirements for monitoring the demands placed on structures in the offshore environment. Our systems help maintain asset integrity and provide operators with confidence during challenging operations.

All sensors and monitoring systems have been designed to ensure safe operation when it matters, on the most high-profile structures in the world, operating in the harshest of environments. We design and manufacture equipment to operate in hazardous area environments up to Zone 0 (ATEX and IECEx), and our systems have approvals from all major world class societies including ABS, DNV GL, LRS and BV.

B> Straininstall operates a quality management system compliant with the requirements of ISO 9001: 2015.

At JF Straininstall, we are committed to minimising our environmental impact. In the world's current state of climate emergency, we believe that this is critical, as it enables future generations to thrive in a clean, safe, and sustainable environment. As part of this goal, our team works to reduce carbon emissions by prioritising lower/zero emission technologies, while actively sourcing from environmentally-conscious suppliers.





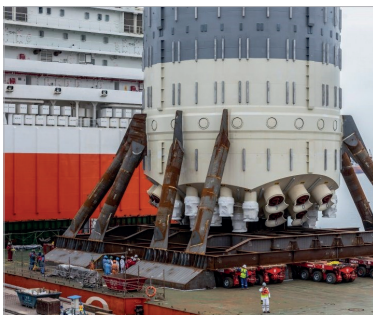
# Case studies

## Kaombo



Bluewater Energy Services contracted JF Strainstall to supply its **unique subsea strain ring technology** to provide mooring load monitoring for two turret-moored FPSOs installed in the Kaombo field, offshore Angola. The subsea strain ring is a device providing **unparalleled precision** in a rugged, bolt-on measurement sensor, enabling conventional mooring equipment to be upgraded into a reliable, instrumented system.

## Johan Castberg



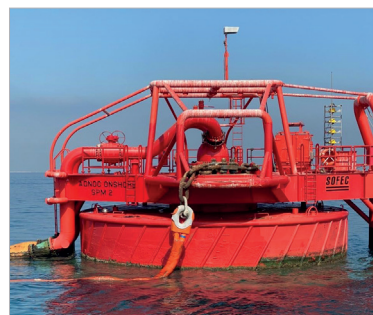
JF Strainstall provided a compression load cell based chain tension monitoring system for SBMs turret which is destined for the Barents Sea offshore of Norway. A special two piece load cell design which included redundant monitoring channels was provided including all topside instrumentation and connection into the vessel control and safety system.

## Terra Nova



In 1999, Suncor Energy's Terra Nova FPSO broke new ground in technology when it was installed offshore Newfoundland, with JF Strainstall's **StressAlert™** system selected to monitor the **hull stress condition of this crucial vessel**. JF Strainstall has provided ongoing service and support to Suncor and provided a mid-life improvement to capitalise on advancements in computer and instrumentation technology.

## Jebel Dhanna



JF Strainstall was contracted by Orwell Offshore to provide a CALM buoy monitoring package to be retrofitted to three existing buoys. These systems will improve operational efficiency, monitoring environmental and mooring loads from the tanker and local area, this information is shared wireless to shore-side and with the tanker.

## Moho Nord

JF Strainstall supplied Total with a Integrated Marine Monitoring System installed onto the Moho Nord Tension Leg Platform offshore of the Congo. This system integrates a number of sub systems onboard to provide a single user interface. JF Strainstall also supplied the Tendon Tension Monitoring System for measuring mooring loads and the platform environmental and oceanographic sensors for maintaining safety and operational efficiency.



# Expertise and global reach

With over 50 years’ expertise, JF Straininstall is a partner you can trust.

Our core values of delivering excellence and continuous innovation have been the key contributors to our success. By leveraging our global reach, deep operational understanding, breadth of capability and the enthusiasm and commitment of our staff, JF Straininstall has become a trusted partner to all its clients.

## Global locations:



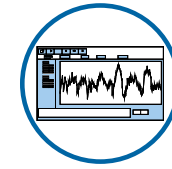
- United Kingdom
- UAE
- Malaysia
- Singapore

## A selection of offshore structures JF Straininstall has supplied systems to:

- Akpo (Nigeria)
- Al Morjan (UAE)
- Almirante Barroso (Buzios Field, Brazil)
- Anita Garibaldi (Marlim Field, Brazil)
- Belida (South China Sea)
- Bideford Dolphin (Norwegian North Sea)
- Ca Rong Do (South China Sea)
- Carioca (Sepia Field, Brazil)
- C7 (Offshore India, Arabian Sea)
- Dalia (Angola)
- Guanabara (Mero Field, Brazil)
- Jebel Dhanna (United Arab Emirates)
- Johan Castberg (Barents Sea, Norway)
- Jubilee (Ghana)
- Kizomba A & B (Angola)
- Kikeh (Sabah)
- Mero 2 (Santos Basin)
- Moho Nord (Congo)
- Prelude (NW Australia)
- Ocean Vanguard (Marmara Sea)
- Okume (Equatorial Guinea)
- Oveng (Equatorial Guinea)
- Papa Terra (Campos Basin)
- Pazflor (Angola)
- PFLNG 2 (Malaysia)
- PSVM (Angola)
- Salema (Campos Basin)
- Shenzi (Gulf of Mexico)
- Stampede (Gulf of Mexico)
- TEN (Ghana)
- TO Rather (Malaysia)
- West Seno (Makassar Strait, Indonesia)
- Shell Stones (Gulf of Mexico)
- Terra Nova (Newfoundland)







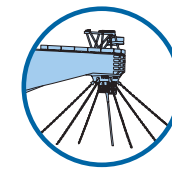
## Integrated marine monitoring system

**JF Straininstall's Integrated Marine Monitoring System (IMMS) consolidates information into a single user interface. This consolidation simplifies control rooms, and plays an integral part in operational safety and the formulation of effective platform management, inspection and maintenance plans.**

IMMS is an integrated monitoring and control system for fixed and floating offshore structures, providing operators with data and reporting on a number of key parameters, enabling remedial action to be taken before safe limits are exceeded.

### IMMS benefits:

- Reduces risk
- Enhances safety and performance of offshore structures
- Permits consolidation of purchasing and project management efforts
- Enables a common multi-system approach to redundancy
- Facilitates platform installation
- Simplifies remedial action if the system reports safety parameters out-of-range
- Provides key parameters in real-time and post-processing



## Chain tension monitoring system

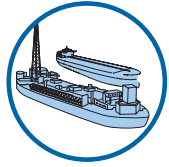
**JF Straininstall's Chain Tension Monitoring Systems (CTMS) provide real-time data on mooring load tensions for all types of offshore structures.**

From stand-alone mooring load monitoring sensors to comprehensive, integrated systems which monitor vessel position, draft, ballast status, metocean conditions and structural stress, JF Straininstall offers customers bespoke mooring monitoring solutions to suit their needs.

### Chain tension monitoring system benefits:

- Maintains effective mooring line tension feedback in real-time and post processing of data to manage change out of mooring lines
- Ensures safety of personnel whilst carrying out transfer of product to a tanker
- Protects equipment and infrastructure
- Offers a variety of sensor options to suit the installation, including in-line, bolt-on and angle monitoring in either single or redundant configurations





## StressAlert™

**JF Strainstall's StressAlert™ hull stress monitoring system enables hull structural integrity to be continuously monitored and displayed.**

With 10 FPSO systems supplied and over 300 systems delivered to merchant vessels, StressAlert™ is proven to enhance vessel safety by providing real-time feedback on hull stress conditions.

The system provides instant access to the vessel's hull stress status, whether derived from dynamic wave action or induced stresses or from cargo operations. Long baseline strain gauges measure global structural bending, short baseline strain gauges measure local hot spots and bow accelerometers measure the impact of bow slamming with optional bow pressure gauges measuring dynamic bow draft. Position, heading and metocean information can also be integrated, providing an increase in safety and operational efficiency.

### StressAlert™ benefits:

- Demonstrates risk management
- From-launch record of hull stress enables damage rate and fatigue life to be determined
- Detects early signs of hull damage or degradation, cutting repair costs
- Simple installation
- Reduces survey requirements from class



## Buoy monitoring system

**JF Strainstall's buoy monitoring system provides vessel masters and control room operators with the real-time operational and environmental data required to manage buoy integrity and to make calculated decisions.**

The integrated buoy monitoring system protects the hawser mooring by ensuring it is not overloaded. This allows for safe transfer of hydrocarbons and reduces the risk of accidents, resulting in reduced down-time.

### Buoy monitoring system benefits:

- Enables operators to take evasive action should loading exceed safe limits
- Environmental data required to manage buoy integrity
- Allows for safe transfer of product
- Low power requirements
- Solar-powered systems available
- Wireless communications systems from shore to buoy and carry on equipment available for the pilot
- Fail-safe ATEX and IECEx-compliant wireless comms available







**Al Marjan**  
Andarko, Arabian Gulf  
Client: Mojan Petroleum

2003: James Fisher Strainstall implements a jacking load monitoring system onto a jack up rig in the Arabian Gulf.

#### FPSO Okha

Sakhalin, Sea of Okhotsk

2003: James Fisher Strainstall equips the floating production storage and offloading (FPSO) unit, Okha, with a hull stress monitoring system.

#### Kizomba A and B

Exxon, Angola

2002(A)/2003(B): James Fisher Strainstall wins a landmark contract to provide a TTMS and riser tension monitoring system for the ABB Vetco TLP, situated on the Kizomba oil field.

#### West Seno 'A'

Chevron, Indonesia

2002: James Fisher Strainstall equips a Chevron tension leg platform (TLP) with a tendon tension monitoring system (TTMS) on the West Seno 'A' deep water oil field.

## 2000s

#### Zafiro

Exxon, Equatorial Guinea

1998: James Fisher Strainstall equips a catenary anchor leg mooring (CALM) buoy on the Zafiro oil field with the supervisory control and data acquisition (SCADA) telemetry and power system.

#### Scott Platform

BP Exploration, North Sea

1996: James Fisher Strainstall implements a jacket weight monitoring system on the Scott Platform.

## 1990s

## 1980s

#### Morecambe Bay Platforms

British Gas, Irish Sea

1984: James Fisher Strainstall installs jacket structural monitoring systems on the Morecambe Bay offshore oil platforms.

#### Shenzi

Bi-P, Gulf of Mexico  
Client: Modco

2007: James Fisher Strainstall provides an integrated marine monitoring system (IMMS) and TTMS for use on a TLP, deployed approximately 120 miles off the Louisiana Coast.



#### AKPO

Total, Nigeria  
Client: Inodoco

2008: James Fisher Strainstall installs both a strain ring and inclinometer based chain tension monitoring system (CTMS), for use on an FPSO in the AKPO oil field.

## 2010s

#### Prelude

Shell, Australia  
Client: SHI

2012: James Fisher Strainstall delivers its quick release mooring hooks and mooring load monitoring systems for Shell Prelude, the world's first floating liquefied natural gas project.

#### Papa Terra

Petrobras, Brazil  
Client: PloaTEC

2012: James Fisher Strainstall delivers a TTMS for use on a TLP in the Papa Terra oil field.

#### Utoe

Petrobras, Brazil  
Client: Sofec

2012: James Fisher Strainstall provides a CTMS with an inclinometer for use on an FPSO in the Utoe oil field.

#### Moho Nord

Total, Congo  
Client: Modco

2013: James Fisher Strainstall provides Total with a riser monitoring system, TTMS, and IMMS for the Moho Nord TLP.



#### Johan Castberg

Stratco, Norway  
Client: SBM

2020: Working closely with SBM Offshore, James Fisher Strainstall has implemented a sophisticated solution designed to keep the FPSO, Johan Castberg, permanently fixed to the seabed, while still allowing it to freely weathervane around its moored position.

#### Jebel Dhanna

ADOC, Abu Dhabi  
Client: Orwell

2020: James Fisher Strainstall provides environmental monitoring systems and telemetry packages to monitor three CALM buoys at the Jebel Dhanna oil terminal.

## 2020s

#### Jubilee

Tullow Oil, Ghana  
Client: Modco

2015: In collaboration with Modco, James Fisher Strainstall develops a custom-built turret bearing monitoring solution for a compromised FPSO in the Jubilee oil field.

#### Kaombo

Total, Angola  
Client: Bluewater

2015: James Fisher Strainstall is selected to provide an innovative CTMS, ensuring the integrity of the turret mooring systems on two FPSOs in the Kaombo deep water oil field.

#### Stampede

HESS, Gulf of Mexico  
Client: H-HI

2014: James Fisher Strainstall delivers a TTMS for use on the Stampede TLP.

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#### Mero 2

Petrobras, Brazil  
Client: SBM

2020: James Fisher Strainstall design and deliver a load monitoring solution for SBM's latest project, the installation of a complex mooring arrangement for a newly-built FPSO in the Mero oil field.

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