

The image features a dynamic, high-contrast photograph of a large ocean wave. The water is a deep, dark blue, while the crest of the wave is breaking into a bright, white foam. The sky above is a clear, vibrant blue. Centered over the wave is the 'SOFEC' logo in a white, bold, sans-serif typeface. The letter 'F' is stylized with a blue horizontal bar extending from its top, matching the color of the sky and the wave's crest.

SOFEC



Proven

Global

With a history of integrity and reliability, SOFEC is a global leader in the development and supply of complete single-point mooring solutions that meet the specific operational needs of its customers.

Innovative

Proprietary, state-of-the-art systems cater to a wide range of environments and water depths.

Turnkey

SOFEC offers turnkey development of mooring systems for FLNGs, FPSOs and FSOs by engineers who are among the most experienced professionals in the industry.

SOFEC designs, fabricates, delivers, installs and services a wide array of single-point mooring systems, tanker spread mooring systems and marine terminals. Founded in 1972, the company has produced some of the world's largest, most sophisticated external and internal turrets, tower yokes and spread moorings. Always innovative, its products have stood the test of time and anticipate the challenges of extreme locations and environments across the globe, in a wide range of water depths from less than 20 meters to more than 3,000 meters.

With aggressive growth initiatives and state-of-the-art technologies, SOFEC's proven successes include disconnectable turret mooring systems off northwest Australia, harsh environment systems in the South China Sea, deep water mooring systems in Brazil and West Africa, and a complex disconnectable turret system for the iceberg-prone North Atlantic Grand Banks.

Technology

Reliable



Unrivaled Uptime

For years, satisfied customers have depended on SOFEC mooring systems to operate without issues in extreme locations and harsh environments. A legacy of proven quality is built into every product.



A history of innovation embodies the concept and design of all SOFEC products, from state-of-the-art hydrodynamic analysis to model basin testing to the development of advanced swivels at its research facility in Houston, Texas.



Quality

CORE BUSINESS PRODUCT

Internal Turrets

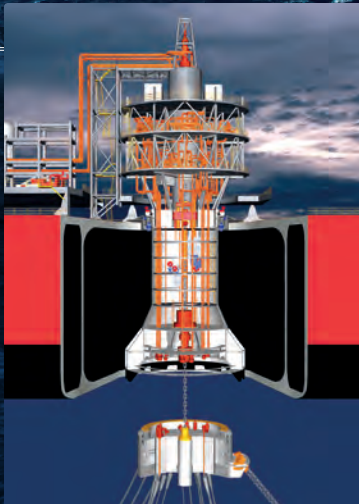


FSO and FPSO operations in deep water or remote areas must weather the world's most demanding climatic conditions.

SOFEC designs two types of internal turret systems – permanent and disconnectable – that enable vessels to respond to extreme conditions such as harsh seas, icebergs, hurricanes and typhoons.

Both types of systems feature enhanced mooring load capacities and allow vessels to weathervane 360° in normal to severe conditions. They can be installed in water depths from 40 meters to more than 3,000 meters.

INTERNAL TURRET CUTAWAY



Product Highlights

- SOFEC delivered Terra Nova in 2001, the first disconnectable turret for an iceberg-prone region.
- SOFEC's P-34 Turret Mooring System, installed in 1997 at a depth of 835 meters, claimed title to the world's largest and deepest internal permanent turret, with 34 risers and umbilicals.
- SOFEC has since produced the largest, most sophisticated and deepest internal disconnectable turret mooring systems in the world.

Permanent

Internal permanent turret mooring systems enable vessels to remain securely on location during extreme conditions.

Disconnectable

Half of the internal turrets SOFEC has designed, built and installed are disconnectable systems that allow vessels to leave the field and avoid typhoons, hurricanes and icebergs. The vessels return to normal production operations with an efficient, reliable reconnect sequence.

CORE BUSINESS PRODUCT

External Turrets



SOFEC is the industry leader in the turnkey production of innovative, high-tech external turret systems that satisfy a wide range of floating storage and production applications. Permitting vessels to weathervane 360°, external turret systems allow vessels to operate normally in moderate to extreme sea conditions.

Product Highlights

- Since 1988, SOFEC has designed, built and installed more than 20 external turret mooring systems – more than any other company in the industry.
- Milestone projects include the largest external turret system in the world. Installed in 2013 at 110 meters water depth on an FPSO in Brazil, this turret is based on a 9.5 meter segmented roller bearing and it accommodates 26 risers and umbilicals.
- SOFEC has also supplied an external turret mooring system offshore Vietnam, designed to withstand the extreme environmental challenge of 10 meter significant typhoon wave conditions in only 45 meters water depth.
- In 1988, the company built the external turret system for the world's largest FSO, which is still operating offshore Yemen.

Complexity

SOFEC's external turret structures have grown in size and complexity to meet the ever-increasing challenges of subsea resource development. At their core are some of the industry's most advanced components, including swivel stacks that accommodate risers for produced oil, gas and water injection, electricity, hydraulics and fiber optics from subsea to the vessel, or vessel to subsea.

Fast, Adaptable

More economical to produce and deliver in less time than internal turrets, external turret systems can be mounted at either the bow or stern of converted tankers or new-built vessels.

CORE BUSINESS PRODUCT

Tower Yoke Systems



SOPEC's highly specialized tower yoke systems are cost-effective, reliable solutions for permanently mooring FSOs and FPSOs in shallow water. The yoke system links the vessel to a fixed tower outfitted with a mechanical turntable that enables the vessels to weathervane. The yoke allows the vessel to pitch and roll without inducing unacceptable loads on the mooring links.



Setting Standards

SOPEC built the world's largest tower yoke mooring system, which operates on an FPSO in Bohai Bay, China.

Engineered to Last

SOPEC Tower Yoke Mooring Systems can be mounted on the bow or the stern of converted tankers or new-built vessels.

- A fixed tower with a mechanical turntable allows the vessel to freely weathervane.
- The yoke, connected to the turntable with specially designed joints, allows the vessel to pitch and roll.
- A large, water-filled ballast tank on the yoke minimizes vessel excursions.

CORE BUSINESS PRODUCT

Marine Terminals



From its inception, SOFEC has been an industry leader in the supply of Catenary Anchor Leg Mooring (CALM) and Single Anchor Leg Mooring (SALM) terminals. These Single-Point Moorings allow safe and reliable transfer of crude oil, LPG, jet fuel, heavy fuel oil and other products. Serving a complete range of import/export applications, these versatile systems minimize maintenance and maximize operational reliability in extreme environmental conditions.

Product Highlights

- SOFEC delivered its first ice-class buoy in 1997 for installation in the Baltic Sea offshore Lithuania.
- SOFEC's CALM Buoy Project for Sonatrach in the Mediterranean offshore Algeria was the single largest CALM Buoy order in the industry. SOFEC delivered and installed these five buoys at three port locations in 2005.
- Several SOFEC buoys have been directly impacted by 100-year storms and all have survived without significant damage.



History

SOFEC has designed and built more than 60 CALM and SALM offloading and loading buoys.

Fast Solutions

SOFEC provides single-source turnkey design and construction of marine terminals for a complete range of import/export applications. Anticipating projects requiring extremely quick turnaround, SOFEC often maintains an inventory of new, standard CALM components.

Core Business Products

At A Glance

Permanent Internal Turrets



Suitable for both existing and new-built vessels, the permanent internal turret offers far greater mooring and fluid transfer capabilities than external turrets. Engineered to allow an FLNG, FPSO or FSO to withstand extreme conditions such as cyclonic weather in remote, deep water and/or harsh sea environments, it can accommodate 100 or more risers and be adapted to a wide range of water depths, from 40 to 3,000 meters, or more.

Features

- Vessel remains on location in the most demanding design conditions
- Vessel can weathervane 360°
- Accommodates 100 or more risers
- Adapts to a wide range of water depths

Applications

Moderate to harsh environments such as the Gulf of Mexico, the North Sea, the North Atlantic, the South China Sea, and offshore Brazil, Australia and New Zealand.

Disconnectable Internal Turrets



The internal disconnectable turret enables vessels to disconnect to avoid typhoons, hurricanes and icebergs in remote, deep water and other challenging environments, returning to normal production operations with a quick, reliable reconnect sequence. The design is adaptable to a wide range of water depths.

Features

- Disconnects to avoid extreme climatic conditions
- Quick and easy reconnect sequence
- Vessel can weathervane 360°

Applications

Moderate to harsh environments such as the Gulf of Mexico, the North Sea, the North Atlantic, the South China Sea, and offshore Brazil, Australia and New Zealand.

External Turrets



More economical to produce and deliverable in less time than internal turret designs, SOFEC's innovative, high-tech external turret systems have grown in size and complexity to meet the needs of subsea resource developments. Mountable at either the bow or stern of a converted tanker or new-built vessel, SOFEC external turrets satisfy a wide range of floating storage and production applications in moderate to extreme sea conditions.

Features

- Industry-leading, proven technology
- Accommodates many risers in the full range of water depths
- Vessel can weathervane 360°
- Faster to produce than internal turret systems
- Frees up vessel processing and storage space

Applications

Moderate to extreme offshore environments such as offshore Southeast Asia, West Africa, the Middle East, Latin America, Brazil, Australia and New Zealand.

SOFEC consults with customers to determine and develop the best single-point mooring system for their needs.

Tower Yokes



A cost-effective, reliable solution for permanently mooring FLNGs, FPSOs and FSOs in shallow water, the tower yoke system links a vessel to a fixed tower. It can be mounted on the bow or the stern of a converted tanker or new-built vessel. A mechanical turntable enables the vessel to weathervane 360°. A yoke allows pitch and roll, while minimizing vessel excursions. Product travels between the tower and the vessel via flexible hoses.

Features

- Cost-effective, reliable
- Vessel can weathervane 360°
- Ample deck space for auxiliary equipment
- Easily accessible with walkways across yoke

Applications

Shallow water to 45 meters.

Spread Moorings



Suitable for sites where prevailing severe weather is highly directional, a SOFEC Spread Mooring System utilizes four groupings of anchor legs, normally arranged in a symmetrical pattern. Attached to the bow and stern, the anchor legs secure the vessel on location with a fixed heading.

Features

- Uses traditional shipboard mooring equipment
- Doesn't require turret structure, bearing or swivels
- Accepts all types of anchor leg configurations
- Easily accommodates large numbers of risers and umbilicals

Applications

Projects requiring long service life, in any water depth, on any size vessel. Shuttle tanker offloading facilities are typically located at the stern or the bow; other deep water applications may require a dedicated buoy terminal for cargo transfer.

Marine Terminals



SOFEC offers single-source, turnkey design and construction of Catenary Anchor Leg Mooring (CALM) and Single Anchor Leg Mooring (SALM) terminals that enable the safe, reliable transfer of crude oil, LPG, jet fuel, heavy fuel oil and other products. Serving a complete range of import/export needs, SOFEC marine terminals minimize maintenance and maximize operations in extreme environmental conditions.

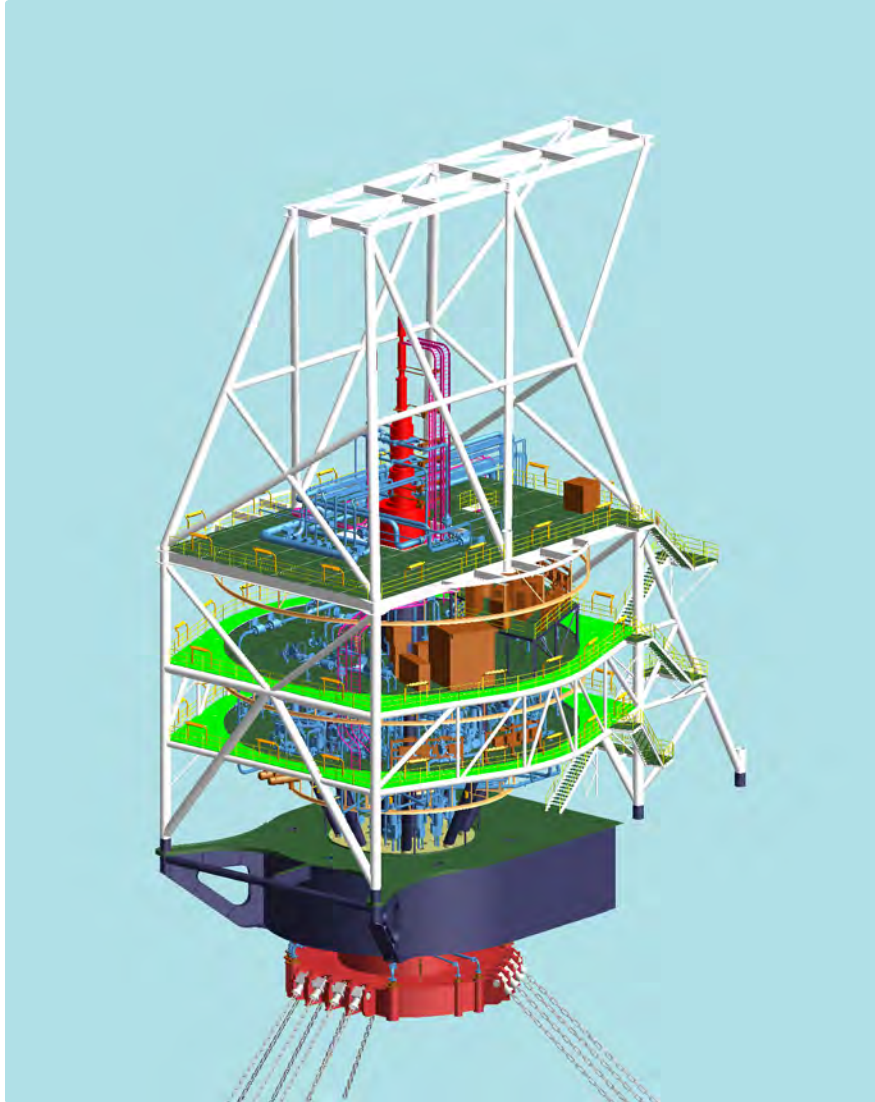
Features

- Safe, reliable transfer of many products
- Reduces mooring forces
- Vessel can weathervane while loading or discharging cargo

Applications

Storage facilities, floating production, refineries, petrochemical and power plants, transshipment facilities. Suitable for import and export of crude oil, fuel oil, condensate and other products in mild to severe environments.

Engineering



Engineered for long life and high reliability, SOFEC products have a well-deserved reputation for unrivaled uptime.

From icebergs in the North Atlantic to typhoons in the shallow seas offshore Vietnam to hurricanes in the deep water Gulf of Mexico, SOFEC has a solution. SOFEC engineers have solved floating production and storage challenges at all water depths, in all types of environments, all over the world.



SOFEC products are designed, fabricated and installed to exacting customer requirements by some of the most experienced engineers in the industry.

Our engineers are experts in the calculation of environmental forces, hydrodynamic analysis, structural dynamics, geotechnical analysis and the design of structural, mechanical and hydraulic systems. In addition to these classical engineering capabilities, SOFEC's staff is skilled in the practical requirements imposed by the fabrication and assembly of large structural components and heavy, precision-machined weldments; and the transportation, installation, testing and maintenance of these systems in the ocean environment.

No two projects are alike. Working with some of the world's most sophisticated customers, SOFEC engineers have produced some of the largest and most complex single-point mooring systems in existence. The company's broad expertise brings efficiency to the process and superior reliability of its products.



Research & Development

SOFEC assembles and tests complex devices and components at its own assembly and test facility in Houston, Texas, and at world-renowned model basin facilities.



Innovation has always driven business at SOFEC.

Through research and development at its in-house facilities, the company continues to introduce new, forward-looking methods for meeting evolving customer needs.

These efforts encompass complex systems development, as well as industry-leading research in hydrodynamic design and load analysis based on the physics of

both surface and subsea conditions. SOFEC's product development engineers routinely publish journal papers based on this research.

With a tremendous history of fully realized turnkey projects, SOFEC also applies its R&D expertise to concept and FEED studies, which are often required prior to the commencement of multi-billion dollar projects by its clients.





Innovation is a part of SOFEC's culture. This innovation is driven by a desire to improve existing products in order to provide better value for the firm's customers and to develop new solutions that meet the ever-changing demands of the industry.

Over the last 40 years, SOFEC has built an extensive patent portfolio that covers a wide range of technologies, including:

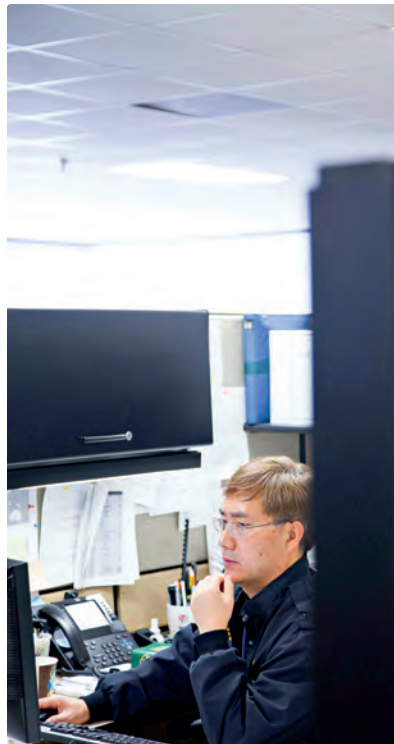
- Disconnectable turret mooring systems
- Bearing systems
- Fluid swivels
- LNG offloading
- Mooring hardware
- Yoke mooring systems

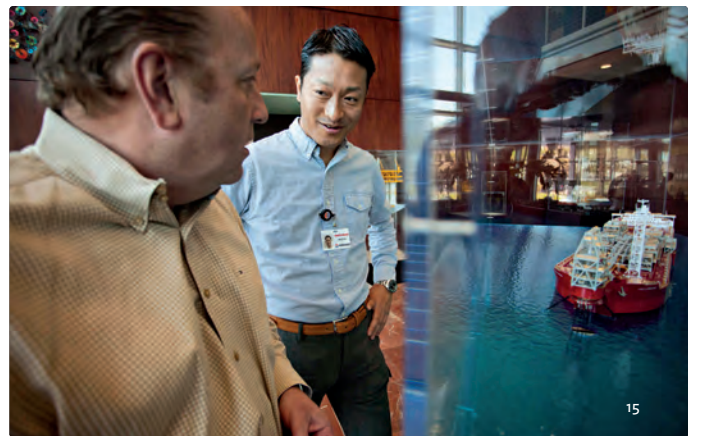
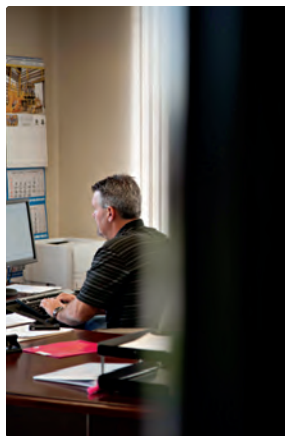
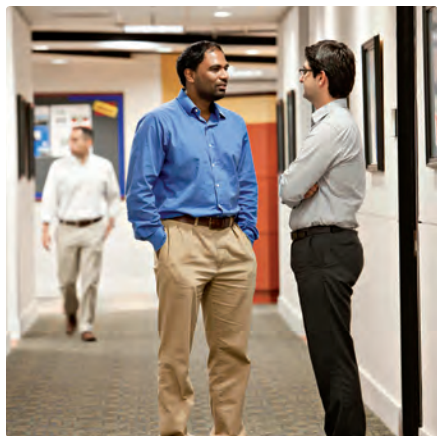
Innovative Culture

More than 40 years after it was founded, SOFEC retains a unique, engineering-focused culture built on a history of pride in the industry.

All of the company's managers are engineers by training, and a hands-on attitude prevails. This is seen in the makeup of project teams involving experts from across the engineering disciplines, including structural, piping, civil, mechanical, swivel, hydrodynamics, mooring, electrical and instrumentation specialists.

Diversity contributes to the positive work environment, with a multi-generational, multi-cultural staff focused on continual process improvement as the company adapts to the ever-evolving needs of a dynamic industry.





Protecting People and the Environment

Health, Safety and Security

SOFEC is committed to conducting all business activities in a responsible manner to assure the health, safety and security of people; preservation of the environment; and compliance with all applicable health, safety, environmental, security, legal and regulatory requirements in countries where it operates.

SOFEC strives to achieve the goal of “Zero Loss Incidents” through its HSE Management System and its HSE Management System Code of Conduct.

This means more than simply obeying safety rules. The company makes every effort to safeguard the security of its property, its employees and visitors to its premises. It also has procedures and resources in place to effectively respond to crisis, emergency and security situations.

Environmental Stewardship

SOFEC recognizes its responsibility to conduct business in a way that protects and, where possible, improves the state of the environment for future generations. Committed to working with its business partners and suppliers to strengthen environmental stewardship and responsibility, SOFEC also promotes environmentally safe designs and construction at all SOFEC locations and with subcontractors under its direct influence.

SOFEC strives to improve its environmental performance through continual design reviews, environment monitoring, pollution prevention and waste minimization, water and energy efficiency, the effective use of raw materials and paying maximum attention to the efficient use of resources.



Health



Safety



Environment



Quality

Our Goal is...



All Incidents are Preventable

By consistently delivering successful projects to its customers for more than 40 years, SOFEC has become a recognized leader for the design and supply of mooring systems for floating oil and gas production facilities and marine terminals. SOFEC is committed to continually improving product value by employing the best people and processes in the industry and by emphasizing safety, quality and on-time delivery.

SOFEC, Inc. is a MODEC Group company.

DESIGN: SAVAGE BRANDS, HOUSTON, TX



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