

TENSA EQUIPMENT

ABSOLUTE RELIABILITY
BUILT TOUGH FOR THE OFFSHORE ENVIRONMENT

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TENSA Equipment is a Western Australian company providing state of the art solutions for offshore lifting, drilling, construction and operations. Our focus is in the following areas:

ROBORIGGER

TENSA Roborigger range of products allow crane operations onshore and offshore to be undertaken more safely since personnel do not need to be near the load.

MOTION MONITORING

TENSA Dynamic Motion System (DMS) delivers vessel heave velocity, heave, pitch, roll and GPS position via wired and wireless links. It allows an accurate prediction of crane dynamic loads and allows vessel and rig motions to be monitored.

DRILLING MODULES & EQUIPMENT

TENSA weight optimised innovative lightweight drilling modules are specifically designed for helilift operations.

HEAVE COMPENSATED GANGWAYS

TENSA offers passive and active heave compensated gangways on a rental or purchase basis. We also have an active heave compensated pedestal system that can be used for gangways, winches, coring rigs or any item needing heave compensation.

DYNAMIC LOAD REDUCTION (DLR)

TENSA Dynamic Load Reducers dramatically improve the load capacity of offshore cranes for boat lifts and are also used to reduce impact loads during piling.

GRIPPING AND LIFTING PRODUCTS

TENSA gripper type conductor clamps are used to support jackup rig or fixed platform conductors during tensioning operations. We also provide our SLAM DECK to reduce impact on a ship's deck when backloading cargo.

HEAVE COMPENSATION

TENSA can supply a range of proven Active Heave Compensated (AHC) winches through its partner ntd Offshore. We also supply passive systems and have a rental high pressure accumulator system.

JACKUP RIG CONDUCTOR TENSIONING

TENSA supplies recessed conductor tensioning systems and BOP top tensioning systems up to 350t capacity for jackup rigs.

CONCRETE SUBSEA STORAGE TANK

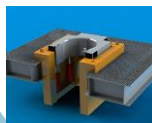
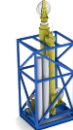
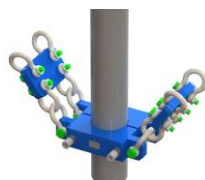
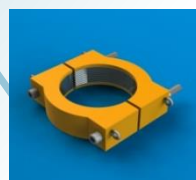
TENSA sub-sea concrete oil storage system is easily installed, needs no ballast and can be relocated to alternate field locations at minimal cost.

We are Western Australia based with agents and partners in Norway, UK, New Zealand, Singapore, China and Denmark.

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MAKING LIFTING OPERATIONS SAFER FOR PERSONNEL

The Tensa **ROBORIGGER** is an automated lifting device which uses gyroscopic and inertial forces to accurately rotate and orient loads. No taglines are needed. **ROBORIGGER** was conceptualized for applications in construction tower cranes and onshore cranes, where there is an average of three fatalities every year in Australia and many more injuries and near misses due to people being in the vicinity of crane loads.

ROBORIGGER includes a camera, load cell, and internet connectivity so all loads are immediately recorded and logged on the internet. **ROBORIGGER** is ideal for shore base loadout operations, as it improves safety, reduces the number of personnel required and logs all logistics movements.



ROBORIGGER PRODUCTS

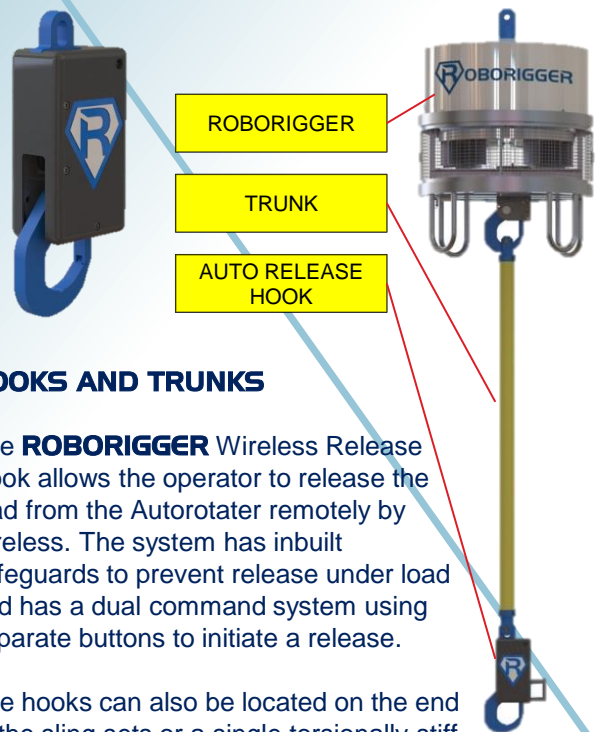


ROBORIGGER AUTOROTATING UNITS

The **ROBORIGGER** Autorotater AR rotating system uses inertial and gyroscopic forces to rotate the load. It is controlled wirelessly using a handheld remote and can automatically rotate the load to a desired heading using its control system that has an inbuilt compass and gyroscopes.

We have tested and commissioned 5 tonnes (AR5) and 10 tonnes (AR10) units. We have designs developed up to 20 tonnes and concepts for container lifting frames and long object spreader.

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HOOKS AND TRUNKS

The **ROBORIGGER** Wireless Release Hook allows the operator to release the load from the Autorotater remotely by wireless. The system has inbuilt safeguards to prevent release under load and has a dual command system using separate buttons to initiate a release.

The hooks can also be located on the end of the sling sets or a single torsionally stiff sling.

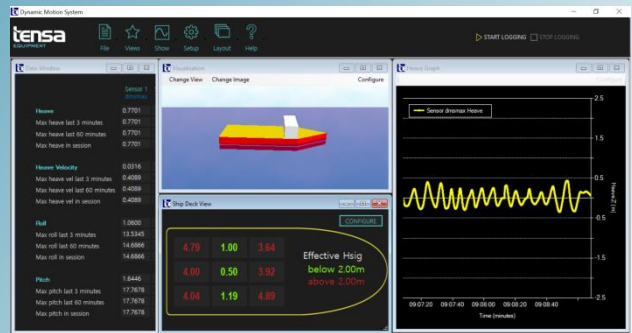
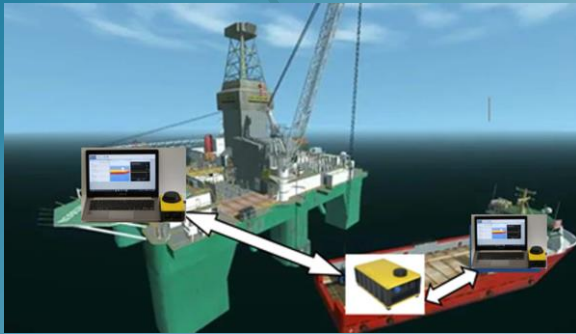


DYNAMIC MOTION SYSTEM (DMS)

A NEW PARADIGM FOR DETERMINING WHEN IT IS SAFE TO LIFT AND CHOOSING THE CORRECT CRANE CHART TO USE FOR OFFSHORE LIFTING

Dynamics are caused by the load velocity not the wave height (Hsig). Using Hsig to determine the dynamic factor ignores wave period, load position on boat, boat size and orientation. Hsig is usually guessed, predicted or provided by a sensor that is remote to the location.

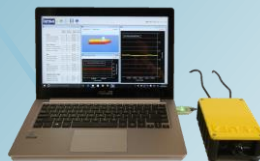
Estimating Hsig to determine the crane capacity can underestimate it or overestimate it by 50%. Using the DMS will increase safety and can increase capacity. It tells the crane operator what loads the crane will experience. The DMS allows you to measure the velocity directly. You then use the appropriate crane chart for this velocity.



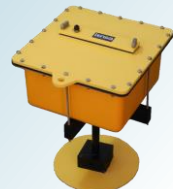
DMS MODELS



DMSMAX



DMSMINI

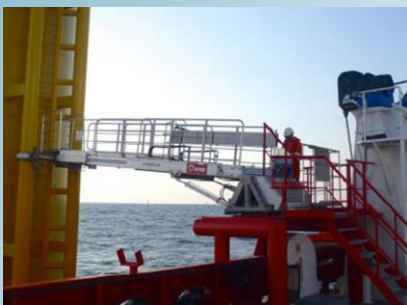


DMSBUOY

KEY FEATURES

- Wireless and wired connections using 900 MHz or 2.4 GHz plus USB and RS485
- 3 axis accelerometers, gyros, magnetometers and GPS provide a complete GPS aided inertial, attitude and positioning system
- Displays heave acceleration, velocity & heave, pitch, roll, heading, XYZ acceleration, position, velocity, course
- Delivers real time vessel heave to the crane operator - allows the operator to time the lift on a rising wave and between sets
- Visualisation window displaying moving vessel
- Powerful logging capability
- Minimum 12 hr battery life (DMSMAX and DMSBUOY). Charges battery and operates from USB (5V) supply.
- No setup time other than to turn it on and start the application

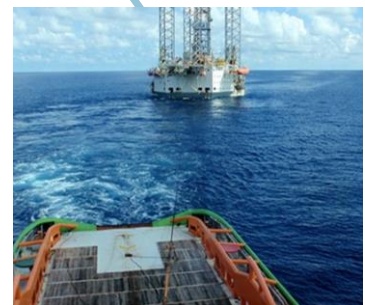
APPLICATIONS FOR DMS



Determine when safe to access.
Quantify working/standby conditions.



Monitor towed cargo.
Track vessels.
Log transits.



Quantify seastate is acceptable for moving or jacking.

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DRILLING MODULES AND EQUIPMENT

LIGHTWEIGHT MODULES DESIGNED FOR HELILIFT OPERATIONS

TENSA offers weight optimised lightweight drilling modules specifically designed for rapid mobilisations and easy set up. This significantly reduces the number of module lifts. In addition, the use of stainless steel and fibreglass increases the longevity and reduces the maintenance costs.

The modules are built in China to international standards at an affordable price.



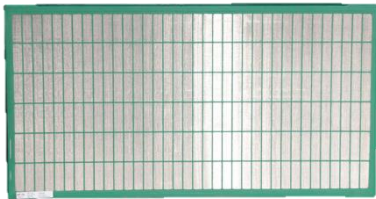
Drilling modules system designed for use with a ZJ50DB drill rig

KEY FEATURES

- **Transport** – Single skid system with fold over walkways to minimise transport and set up costs. Collapsible guardrails and roof means the system is road transportable.
- **Equipment** – Bridge gate valves in all suction lines. Designed to accommodate your preferred choice of equipment and built to international codes of practice with TENSA's fabrication and quality control partners. System includes shaker, trip tank, degasser, and mixing modules.
- **Built tough** – Steel tank for containment of high density mud up to 2.4 SG. Corrosion resistant fiberglass grating and ultra-heavy duty PVC rain cover. Corrosion proof 316 stainless steel piping and winch positioned tank skimmers.



TENSA is the agent for GN Solids Control equipment in Australia. We offer the following products:



SHAKER SCREENS

Moulded replacement screens for all major oilfield shakers. Identical functionality at a fraction of the price.



CENTRIFUGAL PUMPS

Component compatible with Mission Magnum pumps.



SHALE SHAKERS

GN's own design that matches or exceeds performance and longevity of US brands.

OTHER PRODUCTS AVAILABLE: HDD & CBM Mud Recycling System, Decanter Centrifuges, Agitators

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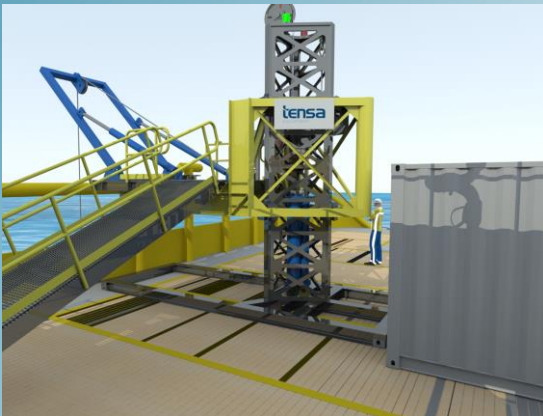
ACTIVE HEAVE COMPENSATED PEDESTAL

A VERSATILE MULTI-FUNCTION HEAVE COMPENSATED PLATFORM

The Tensa active heave compensated pedestal (AHCP) is designed to be used in conjunction with the Uptime 12m and 15m aluminium gangways for offshore crew transfer. The AHCP transforms the passive compensated gangway into a fully active heave compensated system.



AHCP SUPPORTING UPTIME 12M GANGWAY



KEY FEATURES

- Attaches to deck using standard container twistlocks for quick installation
- Compact and easy to mobilize.
- Lower weight, size and cost compared to other active heave compensated solutions.
- System can be operated by the onboard crew without the need for dedicated personnel.

SPECIFICATIONS:

- Design vertical load: 6000kg
- Operating Stroke: 3000 mm standard 5000 max
- Footprint: 2440mm (W) x 6060mm(L) + 10ft ISO container for AHC system
- Weight: 5t approx. (excluding gangway or A frame)



OTHER APPLICATIONS OF THE AHCP

The active heave compensated platform can be used to support a wide range of other equipment:

- A frame
- winch
- crane up to 3t SWL
- small coring rig
- static transfers at wharves with high tidal range

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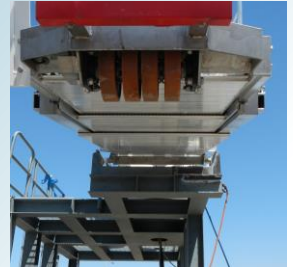
HEAVE COMPENSATED GANGWAYS

TENSA offers passive compensated gangways up to 12m long and AHC gangways up to 50m through our partner Uptime International AS from Norway.



PASSIVE HEAVE COMPENSATED GANGWAYS

12m gangway (currently available as a rental unit)



Gangway and HPU mounted on frame which can be installed as a single unit for fast installation and removal.

Can be supplied with gripper end or roller end.

Active telescoping maintains roller in the same position when vessel moves.

PHC supports gangway when connected in gripper mode.

ACTIVE HEAVE COMPENSATED GANGWAYS



24m gangway can be supplied with push type end or cone type end.

Length is 19.4m +/-4m. Other lengths are available.

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DYNAMIC LOAD REDUCER (DLR)

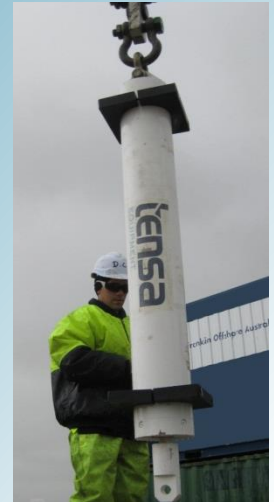


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INCREASE OFFSHORE CRANE CAPACITY BY UP TO 40% FOR BOAT LIFTS BY REDUCING THE DYNAMIC LOADING ON YOUR CRANE

The Tensa Dynamic Load Reducer (DLR) is designed to be used with offshore cranes to reduce the dynamic loads associated with lifts from moving vessels. The DLR can also be used in applications such as pile driving where unexpected large loads can be applied to the crane if the pile self penetrates whilst driving. The following standard models are available:

MODEL	SWL tonnes (Cv=1.4)
DLR10 *	10
DLR30	30
DLR60	60
DLR60L *	60
DLR70	70
DLR100	100
DLR100L *	100
DLR150	150
DLR150L	150
DLR250 *	250
DLR400	400



Standard Models* in rental fleet

DLR250
DLR100L

DLR10

TENSA DYNAMIC LOAD REDUCER WILL INCREASE THE CRANE'S BOAT LIFT CAPACITY BY 30% TO 80% DEPENDING ON MODEL AND SEASTATE

The DLR is a damped gas spring with spring rate, energy absorption and damping tailored to absorb the energy from a moving load and bring it gracefully to rest with minimal recoil.

The Tensa DLR series are modular and can be adapted quickly to different strokes and operating conditions.

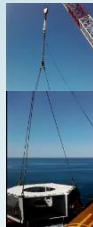
KEY FEATURES

- Nickel chrome or stainless steel rod to give long life in a marine environment.
- Efficient damping to prevent excessive load oscillation after lift off.
- Optional Dynamic Lift System which allows the DLR to lift the load from the vessel quickly in order to avoid recontact. This system is ideal for cranes that do not have adequate lift speed for the proposed lifting seastate.

APPLICATIONS FOR DLR



Lift of 36te Xmas tree to the Transocean Legend - November 2010



Lift of 220 te desalination intake structures in Bass Strait



Replacement of 6.3t ball valve on unmanned gas platform

Piling applications The Tensa DLR is highly effective in preventing shock loads on cranes during piling applications when the crane is unable to follow a dropping piling hammer.

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GRIPPING & LIFTING PRODUCTS



The Tensa Gripper type conductor clamps are the perfect solution for supporting the jackup rig drilling conductor when using a conductor tensioning system. Standard sizes of 13 3/8", 20", 30" and 36" can be delivered at short notice.

The clamps grip due to the tension applied by the clamp bolt. The bolt is accurately tensioned using an hydraulic bolt tensioner included in the kit. The clamps are based on a proven design and have been rigorously designed and analysed to ensure that they do not compromise the strength of the conductor whilst offering a significant factor of safety against slippage.

KEY FEATURES:

- Single clamp bolt ensures tension can be accurately set.
- Long bolt ensures tension is maintained as clamp teeth grip conductor.
- Extremely robust tested and proven design.
- Minimal maintenance required.
- Compatible with the complete range of Tensa conductor tensioners.
- Dual hand pump bolt tensioners are supplied to allow extremely quick installation.



CLAMP	SIZE inches	Capacity (te)
GC 1338	13 3/8"	150
GC 20	20"	230
GC 30	30"	250
GC 36	36"	250

PIPE IN PIPE CLAMPS

The Tensa Pipe-in-Pipe Clamps are the solution for gripping the inner and outer pipes when undertaking pipe in pipe installation. The clamps allow welding and other operations by clamping the inner pipe rigidly to the outer pipe. The inner or outer pipe can then be held in the standard tensioning system.

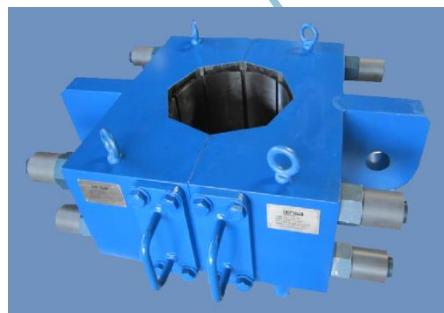
- pipe size range 150mm – 760mm diameter
- minimum difference in pipe sizes 100mm
- load capacity up to 200 tonnes



POLY GRIP CLAMPS

Tensa Poly Grip Clamps are the solution for clamping HDPE or FBE coated pipe without damaging the protective coating. The Poly Grip is suitable for a range of applications in offshore pipelay or drilling applications.

These clamps have been carefully designed to minimize damage to the coated surface thereby ensuring the corrosion integrity is maintained. Typical surface indentation of less than 0.3 mm achieved after loading to full capacity.



TENSA SLAM DECK

REDUCING IMPACT FORCE IN HARSH ENVIRONMENTS

The TENSA **SLAM DECK** is used on offshore supply vessels or barges to reduce the impact force on the vessel deck during loading and unloading operations in harsh environments.

The **SLAM DECK** is designed to absorb the kinetic energy of a 10t load dropping at a maximum speed of 1.5 m/sec. This is equivalent to the minimum required speed for the drop test specified in DnV Standard For Certification No. 2.7.1 - Offshore Containers. It is also significantly faster than typical crane auxiliary line speeds.

KEY FEATURES:

- Rubber and steel SLAM DECK structure provides energy absorption in case of gross overload to protect vessel deck. The slam deck is designed for vessels with a 5 t/m² deck strength.
- SLAM DECK is made in panels which can be individually repaired or replaced. It can be supplied with checker plate plus non skid finish or with timber deck.
- Deck panels include attachment points to secure to containers and vessels with chains.
- Deck panels are stored, transported in open top 20ft container.



ntd
offshore

Active Heave Compensated Winches

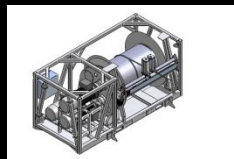
TENSA offers the range of NTD Active Heave Compensated offshore winches.

ntd design and build a range of AHC (active heave compensation) winches capable of reaching depths of 3000 meters with 60mm umbilical and are able to operate in sea state 6 with line speeds up to 2.5m/sec.

The winches can be driven hydraulically or electrically and ntd can build the power pack to suit customer requirements.

Standard ntd winches are capable of handling in excess of 3500mtr of 60mm diameter umbilical with a Safe Working Load of 30tonnes.

ELECTRIC ACTIVE HEAVE COMPENSATED WINCHES



HYDRAULIC ACTIVE HEAVE COMPENSATED WINCHES



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HEAVE COMPENSATION

Surface Passive Heave Compensation

TENSA provides a range of surface heave compensators for the following applications:

- Used as the primary compensator for drilling rigs with Active Heave Compensation when conducting operations connected to the seabed. 350t x 4.5m stroke compensating capacity is standard.
- Reducing dynamic loads on cranes when lowering items through the splash zone. Capacity up to 1000t available.
- Tensioning of guide wires.

The TENSA PHCs can be fitted with composite accumulators making them the lightest in the class and allowing all accumulators to be on board the compensator module. This eliminates high pressure hoses to remote accumulators.

Tensa has an inline deck mounted system that can be located between the winch and overboarding sheave.



Subsea Passive Heave Compensation

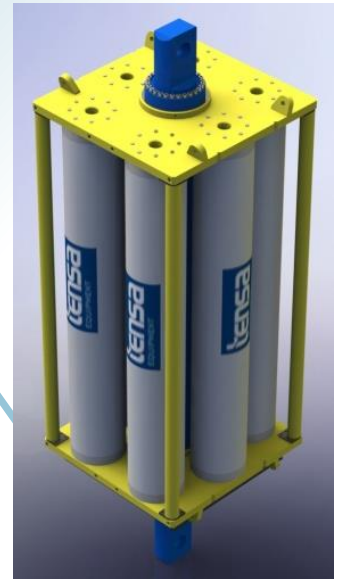
TENSA subsea PHCs are used when lowering heavy subsea equipment to the seabed. If the load has sufficient mass and drag, the motions can be reduced by up to 75%. Particularly in deeper water, the PHC delivers best performance when located just above the load as it will also compensate the elastic oscillation from the lowering wire.

The subsea PHC can also be used when supporting an object that will be connected to the seabed. Having the PHC subsea eliminates the need for deck mounted compensation equipment.

Key features include modular construction allowing use with 2, 4 or 6 accumulators and transport in standard shipping containers.

Capacities to 700t with 4.5m stroke available as standard.

Units can be used in parallel to give capacity in excess of 1000t and in series to give stroke up to 9 m.



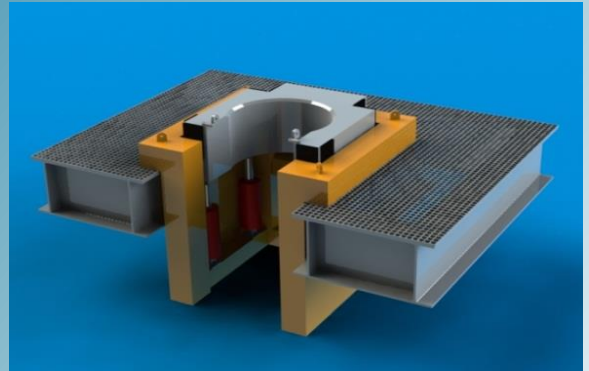
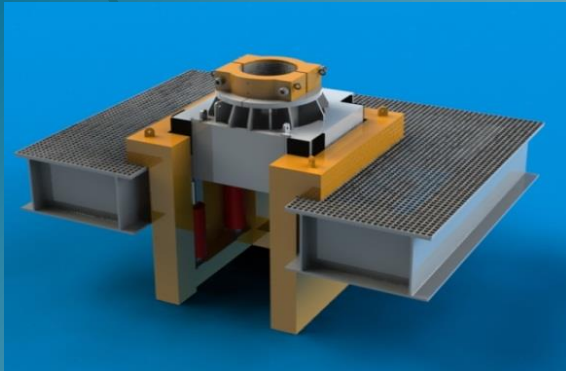
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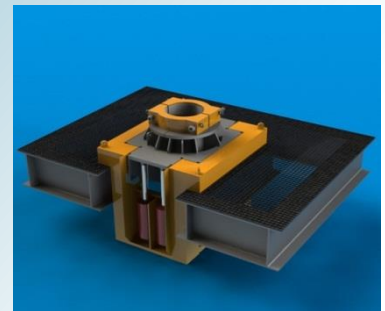
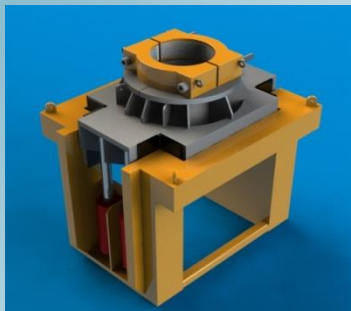
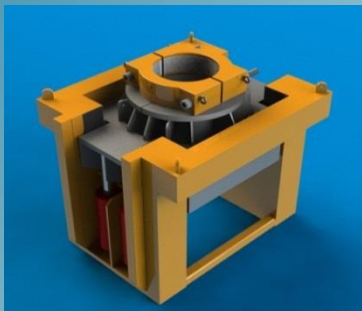
CONDUCTOR TENSIONING UNITS (CTU)

OPEN TYPE CONDUCTOR TENSIONERS – THE ULTIMATE FOR SUBSEA TREE INSTALLATION



The Tensa recessed open type (RO series) conductor tensioners when matched with a slot type conductor deck allow for easy installation of subsea guide bases and trees with a jackup rig.

STANDARD PUSH TYPE RECESSED CONDUCTOR TENSIONERS – COMPATIBLE WITH MOST STANDARD CONDUCTOR DECKS



The Tensa push type conductor tensioner is designed to be compatible with most existing conductor decks designed with a 1200mm opening for recessed tensioners. Load capacities from 200 tonnes (RS200) to 400 tonnes (RS400).

PULL TYPE TENSIONERS AND TOP TENSIONER SYSTEMS

The pull type (PT) top tensioner system is generally used to support the weight of the BOP by attaching to support padeyes or a support clamp on top of the BOP. PT systems are typically specified to have a capacity of 100-160t when designed to support the BOP weight and up to 400t when designed as a conductor tensioner



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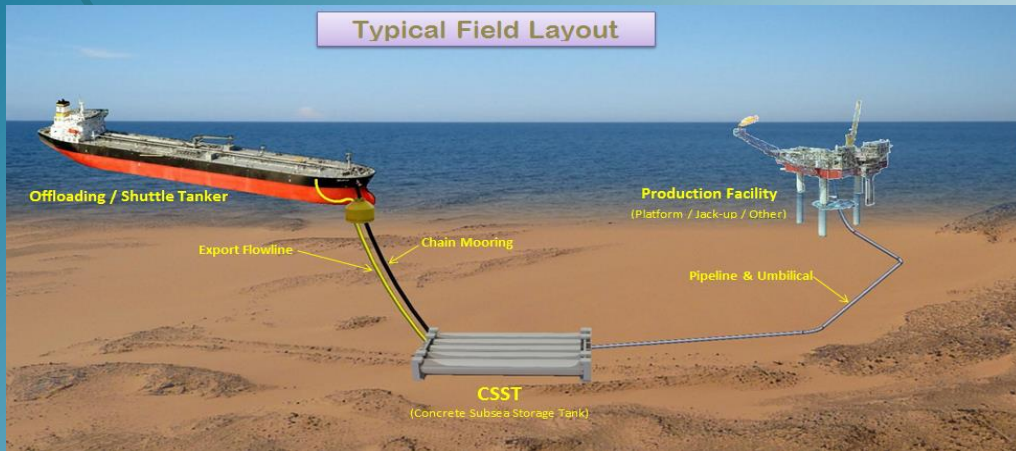


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CONCRETE SUBSEA STORAGE TANK (CSST)

THE CSST HAS THE FOLLOWING ADVANTAGES OVER OTHER SUBSEA STORAGE OPTIONS:

- Easily relocatable - install and readily relocate your storage unit to alternate field locations at minimal cost
- Moor your offtake tanker to the storage tank
- Membrane to separate the oil and ballast water
- No additional ballast needed for cyclonic environments
- Tank floats when empty and can be towed to site



KEY FEATURES:

- Uses standard prestressed concrete technology – low capex
- Minimal installation spread needed – low cost installation
- Designed for easy construction in low technology yards
- No FSO to demobilize - allows field to stay online
- Much lower risk of spills or pollution
- Heating and/or Insulation possible
- No or minimal dropped object / anchor drag protection needed
- No or minimal scour protection needed
- Expandable capacity by daisy chaining or parallel units

ROBOTS FOR EXPLOSIVE GAS ENVIRONMENTS

Tensa is the agent for IPS – *rugged reliable robots for explosive gas environments*



Operator / driver in safe, comfortable location



Robot & charging kennel in hazardous, harsh location



FEATURES:

- Driver can be hundreds of km away from robot
- IECEx or ATEX Zone 1 certified
- Designed for extreme environments & corrosive atmospheres
- Runs for months without human intervention
- The first project in Kazakhstan is ready for deployment!

NEW MODELS PLANNED FOR 2018:



Observation robot for single level sights:
Cost of ownership \$20,000/yr

Manipulation robot for modules with stairs:
Cost of ownership \$100,000/yr



IPS Robotics is a consortium of the following companies:



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