Ωale Marine

37 years of experience in the creation of
Specialised and Customised Barge & Vessel Systems
and general Marine Engineering Solutions and Equipment

Designed & Supplied by

Wale Marine cc

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www.walemarine.com

Contacts: Anton Wale; Danie van der Merwe - see below

anton@walemarine.com Mobile +27-82-775-4040
danie@walemarine.com Mobile +27-82-325-3119

2 Avenue Beaumont
Constantia, 7806
Cape Town, South Africa
Office - +27-21-7948612

Cover Picture showing the 25,000 tonne Derrick Lay-barge "Seaway Polaris" supported on the 144 four metre high precast concrete blocking line in the Sturrock Dry Dock in Cape Town Harbour. This blocking line was designed, constructed and installed by Wale Marine cc in 2002 and subsequently re-installed in 2008 and finally in 2012. See project description on page 11.

Introduction

In 1952 Steinbeck wrote “the free, exploring mind of the individual human is the most valuable thing in the world. …. (It is) the one thing that separates us from the uncreative beasts. ” This was written by Steinbeck in “East of Eden” in the same year that Anton Wale, the founder of Wale Marine, was born.

In 1986, after resigning as a director of Underwater Construction (a leading Cape Town based Civil Engineering Contracting Company specialising in the design and construction of marine, harbour and piling works), Anton established an engineering fabrication and management practice. Nearly forty years later Wale Marine continues to create innovative engineering solutions for marine and other clients.

In line with Steinbeck’s thinking, Wale Marine remains a small group of individuals who focus on creative thinking, but over the decades we have formed close associations with larger specialised companies so that we can maintain the potential of speed and flexibility associated with a dynamic and non bureaucratic core, whilst also being able to offer the larger potential of complex turnkey systems which we co-create together with our established partners and sub-contractors.

We are a registered Professional Engineering corporation carrying a blanket 25 million Rand professional indemnity insurance covering the design of these services and equipment.

Wale Marine specialises both in the engineering of marine solutions and methodology as well as the design and supply of customised equipment. Our leading fabrication partners and sub-contractors are:

- Swift Engineering for mechanical and steelwork fabrication including cranes and winches;
- Hydac Hydraulics/ Hydro Armor for hydraulics and Hydraulic Thruster installations;
- Concrete Units and their associated company LB Pipes for the construction of reinforced and pre-cast concrete works and steel fabrication, including fabrications incorporating large diameter spirally wound steel pipework; and
- Rhino Marine Products - with whom Wale Marine share fabrication premises in Airport Industria Cape Town. Rhino Marine are the manufacturers of the HDPE “Rhino Craft” boats that Wale Marine initially developed for use primarily on offshore oil and gas installations.

In 2008 Wale Marine appointed Danie van der Merwe to act as a co-owner and as our contracts director. Danie not only has a wealth of experience and creative skills in Civil, Structural and Mechanical engineering, but also has exceptional computer skills enabling us to rapidly represent, design and communicate the creations that we develop in three dimensional model forms using Autodesk Inventor.

Our mission statement is simple – Assist our clients in engineering the most elegant and cost effective solutions for their needs. Past and current clients for whom we have successfully created marine and subsea engineering solutions and equipment include:

- Acergy (previously Stolt Offshore and Stolt Comex Seaway or SCS)
- Slumberger
- SMIT Subsea
- Petro SA (previously Mossgas and Soekor)
- Murray and Roberts Marine
- Cape Diving
- Leighton India
- Franki Pile
- SAIPEM
- Bourbon
- OIS (Oil Integrated Services) Gabon and DRC

This brochure is intended to give an overview of the typical services and solutions that we can and have supplied to the industry over the last couple of decades by showing pictures together with brief descriptions of selected projects or categories. For ease of reference an index of contents is given overleaf. This index gives the specific page numbers of the material that follows.

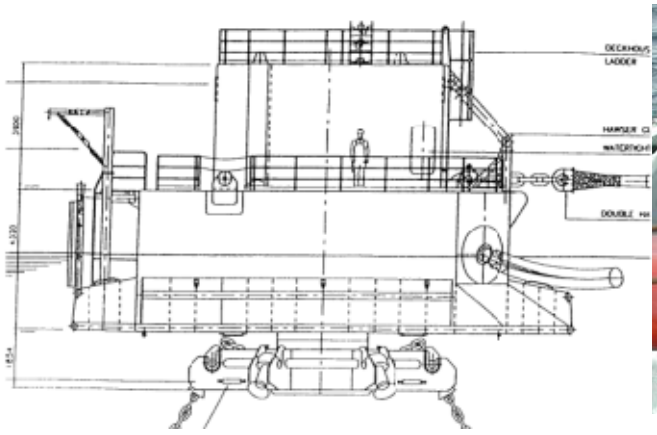
Index

Installation of ORCA EBT CALM Buoy 1997 and Anchor Chain Replacement 2005

In 1996-1997 Wale Marine were commissioned by Stolt Comex Seaway to act as their local representative for the sub-sea subcontract for the Soekor EB-T ("Oribi") Oil Field offshore floating platform (Orca FPSO) and CALM buoy loading terminal installation. Our works included the design and fabrication management of the ROV launch and recovery handling frame, concrete filling of the Linklok stability mattresses, design and construction of the reinforced concrete dead weight anchors for the production risers and umbilicals and for the temporary installation works, and the local sourcing of the tools, rigging slings and equipment required for the installation works. Wale Marine were also commissioned by Slumberger to design the rigging and pad-eyes used for the towing of the CALM buoy from Cape Town harbour to the EBT Field.

The Orca FPSO is a semi-submersible drilling rig that is anchored via heavy stud-link chains to the sea bed in about 120 metres of water depth about 100 km south of the African continent on the Agulhas Bank which is subjected to fairly extreme sea conditions.

The FPSO pumps oil from the fields below and then offloads the oil onto a tanker via the CALM Buoy. The oil travels to the CALM Buoy by flexible hose via a lazy S curve that employs concrete clump weights and a mid-water flotation buoy. The CALM Buoy name is an acronym for Catenary Anchor Leg Mooring given that it employs 6 equally spaced (at 60 degrees) heavy stud-link chain catenary legs from the buoy to large anchors on the sea bed. This is further described with the pictures shown below:

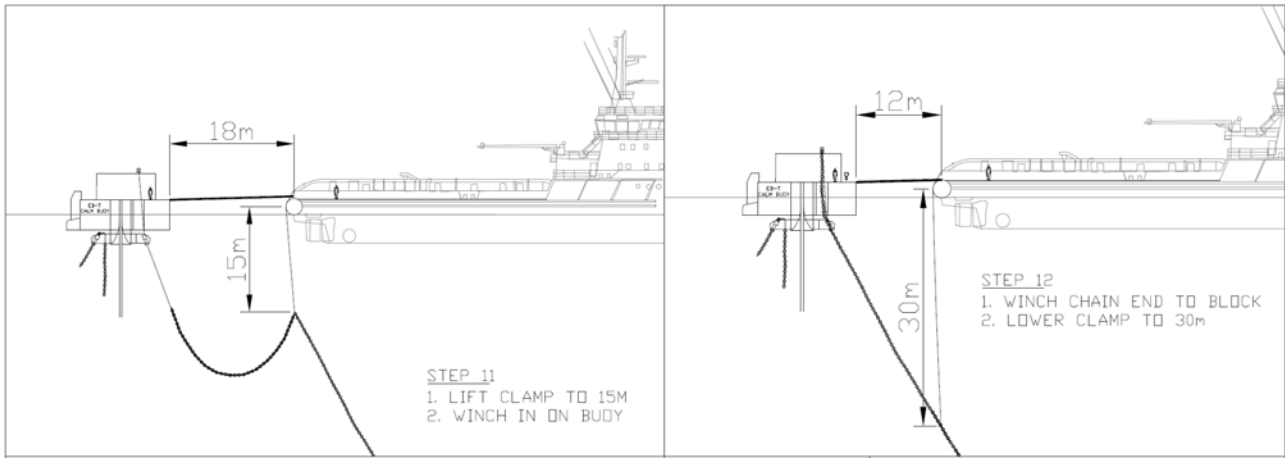


Top left picture shows the CALM Buoy in the foreground with the Orca FPSO in the background. **Top right** picture shows one of the three caisson legs of the Orca with its mooring anchor chains in the foreground and the CALM Buoy in the background with the Tanker connected via a floating hose and tethered to it via two large floating tanker hawsers of polyester construction. **Bottom left** diagram shows the arrangement of the rotating CALM Buoy above suspending (via a slew ring) the lower stationary 6 legged “spider” structure with each leg housing the upper termination of each of the anchor chains. **Bottom right** picture shows the aft deck of the Anchor Handler Tug (AHT) “Swire Buccaneer” with one of the six 15 Tonne Stevshark Anchors plus the approximately 600 metre length of 3.25” stud-link anchor chain that weighs 129 kg per metre.

In 2005 Wale Marine were commissioned by SMIT Subsea to engineer and offshore manage the replacement of the six anchor chains that were holding the Orca CALM buoy in position, given that the two weather anchors facing to the south west had both snapped and the CALM buoy was being largely tethered by the flexible flow lines from the Orca. The works for replacing each of the anchor legs essentially involved the following activities:

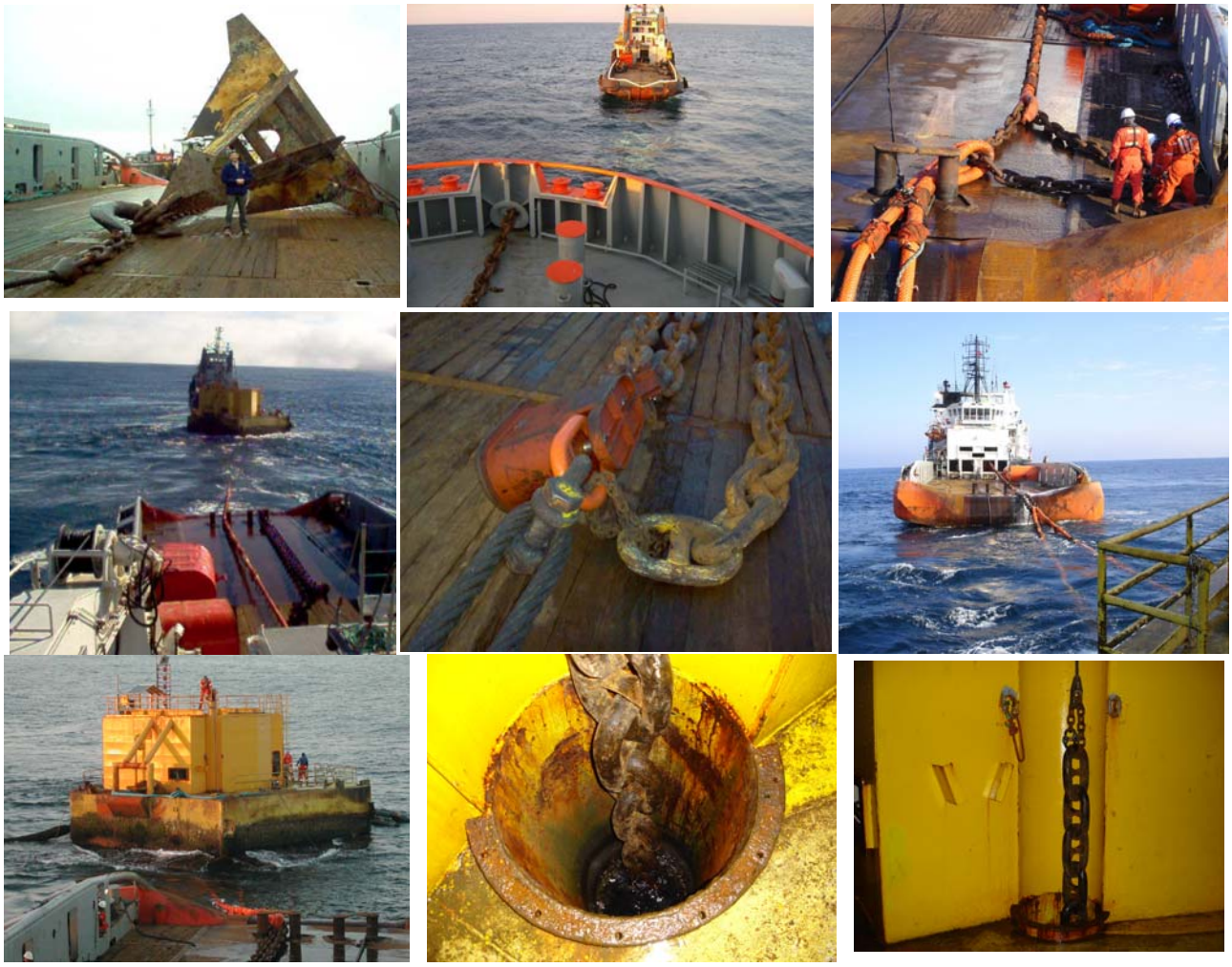
- Using the Anchor Handler Tug (AHT) "Swire Buccaneer" run a J hook down the chain so that the anchor and old chain can be recovered onto the aft deck of the AHT;
- Demobilise AHT from the field and return with the anchor and old chain back to Mossel Bay where a new length of chain can be added to the anchor in preparation for deployment;
- Return to the field and deploy the anchor onto the sea bed in its correct position and pay out the chain to its full length;
- Set the anchor (bury it into the seabed) by tensioning the chain to 160 Tonnes (using a tandem pull with two AHT in line);
- Survey with ROV to confirm the set position of the anchor and then calculate the correct catenary length to give the necessary 20 tonnes tension at the buoy and cut the chain end accordingly;
- Using a customised hydraulic shackle and chain clamp (Wale Marine design and supply) rig the chain up in a bight from the port main winch of the AHT so that a SWR can subsequently be installed from the CALM Buoy to the AHT;
- Using a 3.25" chain grommet connect a large polyester floating rope from the starboard AHT main winch onto a diver installed floating tanker hawser grommet installed just above the spider;
- Simultaneously pull the buoy toward the AHT and the chain clamp up towards the AHT stern roller so that the chain end can be pulled up into the spider by the CALM Buoy winch.

Steps 11 and 12 of the procedure relating to the final pulling of the chain end into the CALM Buoy spider with the assistance of the AHT are shown schematically below:



Essential to the whole operation was the lift clamp which was linked to a double hydraulic shackle that can be deployed under tension over the AHT stern roller and can be operated by a diver with a small hand HPU and umbilical from the surface. See hydraulic shackle top view below left and associated chain clamp right.

Further pictures and descriptions of the operations are shown in the collage below:



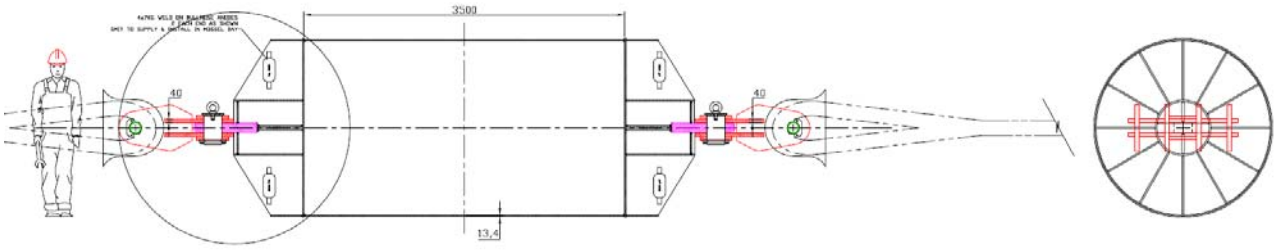
Top Left picture shows Anton Wale on the Buccaneer aft deck standing in front of one of the 15 Te Stevshark Anchor that has been recovered onto deck using the J Hook (to the left of Anton). The J hook has under-run the chain from the buoy to the anchor to be able to lift the anchor aboard over the stern roller.
Top Centre after deploying the new anchor and its chain the photo shows the AHT Smit Lloyd 33 linked up ahead of the AHT Buccaneer through the Panama fairleader ready for doing the tandem pull to 160 tonnes.
Top Right picture shows the Buccaneer's deck riggers next to the starboard Karm fork connecting the 3.25" chain grommet between the floating polyester tanker hawser line on the starboard winch and the floating hawser grommet installed round the top of the spider – at this stage the port winch line that is connected to the anchor chain via the hydraulic shackle and chain clamp is paid well out so there is no tension.
Middle Left shows the system being tensioned up through the starboard Karm fork so that the chain bight can be pulled up via the chain clamp over the stern roller and through the port Karm fork.
Middle Centre shows close up of the double hydraulic shackle connected to the port winch line one side (bow end) and onto the chain bight clamp other (stern) side. At this stage the chain end is connected to the master link with a temporary smaller chain grommet awaiting the passing over of the CALM buoy winch line.
Middle Right Once the winch line from the CALM buoy is connected to the anchor chain end, the bight system is lowered over the stern roller to hang loose off the bight via the hydraulic shackle and the system (buoy to vessel) is pulled tight till the buoy is once again close to the stern so that the CALM buoy winch is able to pull the chain end into the spider completing the operation.
Bottom Left CALM Buoy winch line dropping directly down from diver standing on roof into a moon-pool below him then down to the appropriate spider leg through its chain stopper.
Bottom Centre Chain emerging from the moon-pool at the end of the pull (Step 12 on page 5 above).
Bottom Right Pull completion showing the "slim rigging" used for passing through chain stopper (small chain grommet between 3.25" chain end and wire rope spelter). The spider leg chain-stopper has a ratchet and pawl system such that once the stud link chain links are pulled up and through they cannot slip back down.

EBT Tanker Hawser Extension 2006

As has been mentioned before the EBT site on the Agulhas bank is subject to extreme seas and swells generally from the south west being primarily associated with the cold fronts that past south of the continent.

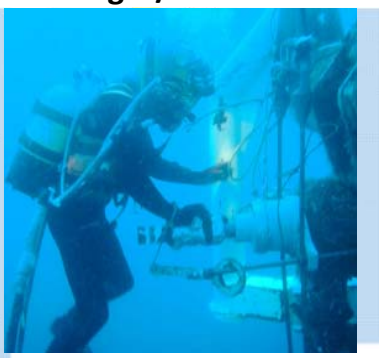
Because this was hindering operations of the tanker connected to the CALM Buoy, Wale Marine were commissioned by SMIT to design and effect a solution which would allow the tether hawser system to be doubled in length to reduce the movements of the tanker and enable it to resist larger sea conditions.

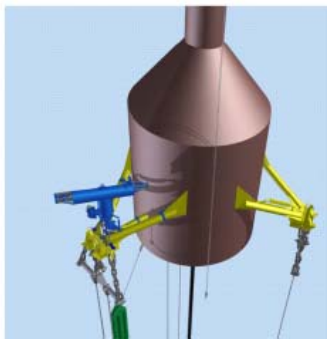
Wale Marine designed a 350 Tonne safe working load (SWL) articulated floating connector that could be installed between two pairs of polyester tanker hawsers. The float was called the "Christmas Cracker" because of its shape (see picture below). The body of the "Christmas Cracker" pipe was a 3.5 metre length of spirally wound X65 pipe of 13.4 mm wall thickness and 1.92 metres in diameter (see details below):



Not only was the tether length doubled but the inclusion of the "Christmas Cracker" float, which weighs about five tonnes, creates a motion damper as it would tend to be lifted out the water with the surge movements of the tanker. The system was installed by the SMIT Subsea divers and worked very effectively.

Repair of Tether System for the Mossgas/Petro SA EM Control Buoy (2010).




Having been extensively involved in the conceptual and detailed designs and the installation of the Mossgas Pipeline beach crossing and other offshore installations since 1987 and the later installation of the EM control buoy in 2000 (see pages 5 and 6), in 2010 Wale Marine were commissioned by Petro SA to engineer an emergency remedial solution when it was identified that two of the three EM tether systems was fatiguing and in imminent danger of one of the tethers failing, with major consequences including the shut down of the EM field. This installation is situated in a water depth of 90 metres about 70 miles south of the exposed Southern Coast of Africa.

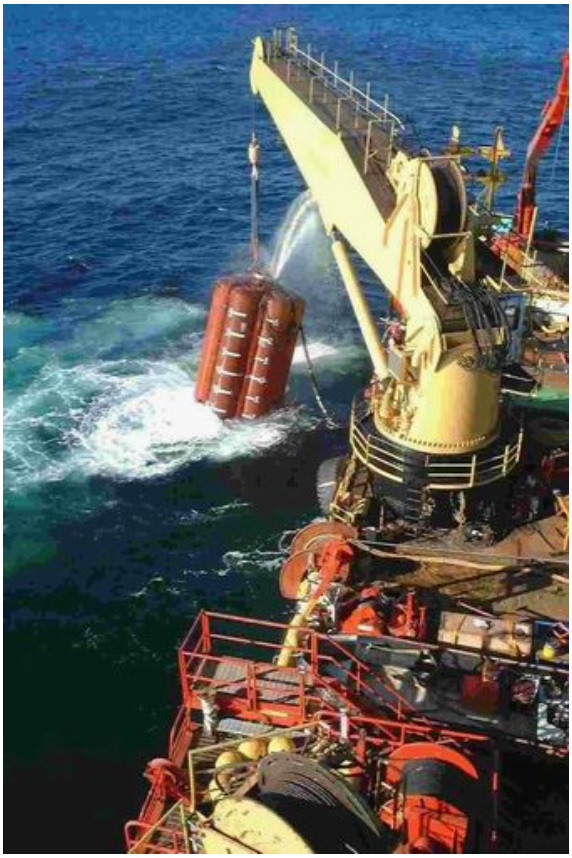
After investigation it was established that the head of the 300Te SWL shackle pin on one of the tethers had sheared off with the pin migrating into the shackle jaw; on a second tether the universal hanger had significant fatigue cracking. These items needed to be removed and replaced. Initial contemplations were that a construction vessel would need to be mobilised, but after review it was decided to engineer an innovative solution that could be executed from the Seacor Achiever. This small SOV (sub-sea operations vessel) is a converted supply vessel which Petro SA has on charter. The Achiever had a small air diving and saturation diving spread that was supplied and operated by Cape Diving. This had significant beneficial implications to Petro SA with respect to both time and cost.

Using the original hard copy fabrication drawings of the EM installation, Danie vd Merwe transposed the EM buoy system into a three dimensional "Inventor" computer model, and in co-operation with Cape Diving engineered a viable "diver friendly" solution conceived along the following lines:

- Design and fabrication of new shackle pins for the permanent tether system which would not be fatigue prone and could be fitted with installation aids for easy diver installation;
- Design and fabrication of a hydraulically operated 200 Te SWL temporary parallel tether system incorporating a 4 m stroke hydraulic puller which could relieve the load on the adjacent main tether;
- Separation of this "temporary tether" into a saturation diving lower installation (deeper than 35 metres) and an upper air diving system – each separated by a ballast-able tension buoy;
- Incorporation of 200 Te SWL eye and jaw swivels into the tethers to allow easy diver connections;
- Engineering of a sub-sea davit system with hydraulic winch to be installed on the control buoy outrigger for executing the installations and replacement works. This winch was operated from the same hydraulic power unit and umbilical system that was used on the hydraulic puller; and
- Development of a new HDPE workboat to be suitable for these works.

Anton Wale was the Offshore Manager for the operations. The equipment was all launched and recovered over the Achievers stern roller, and the full works from conception to completion of installation was effected in a period of two months. Equipment fabrication was executed in parallel with the design evolution. The 3D inventor model proved invaluable for the diver instruction and works procedure needed for the repair works.

Installation aids for EM Buoy installation Stolt Comex Seaway (SCS) - 1999-2000



In order to give a better perspective of scale of the control buoy a picture taken in the UAE during its fabrication is shown above top left, with the 6 m Rhino work boat shown next to the bow catcher boat landing in the picture below it. The right hand picture above shows the 100 cubic metre stabilising buoy, which had just been used for the controlled lowering of the 3,000 Te caisson gravity base, being recovered onto the DSV Discovery after successful deployment of the caisson. This buoy, that Wale Marine engineered and fabricated for SCS, employed spirally wound steel pipe modules designed to withstand a pressure of 110 Tonnes per square metre.

The stabilizing buoy was multi-compartmented to allow for controlled flooding and evacuation of the 11 compartments, with each compartment and its separating bulkhead being designed as a pressure vessel capable of resisting 110 m of submergence pressure (110 tonnes per square metre). Wale Marine also supplied and installed all of the piping for the flooding umbilical. Fabrication of the structure was sub-contracted to Concrete Units in Meyerton. The time between award and delivery was ten weeks. The structure was fabricated in 4 modules in Meyerton (3 x double pontoon units and 1 x central unit) and truck transported down to Cape Town for final assembly, in situ welding and installation of the flooding umbilical. Further

pictures of the associated rigging and ancillaries relating to the stabilising buoy and the gravity base and control buoy installation that were designed and supplied by Wale Marine are included below.

The above pictures show the floating caisson being towed from Simonstown to the EM field. These show the temporary tripod structure we designed and supplied together with the deployment pendant for the lowering of the caisson. The Wale Marine supply included the removable steel works platform atop the caisson gravity base. The tripod connections were designed to be compatible with the tether clevises used for anchoring the control buoy, and ten years later we used the same anchorage points for installing the temporary hydraulically operated retractable tether used in the repair works discussed on page 8.

Other equipment supplied by Wale Marine for the project included 100 tonne swivel (top left), the subsea hydraulic shackles for quick release (bottom left), a friction drum tensioning system that we used for spooling of the steel wire rope onto the 50 tonne deployment winch, 50Te SWL deflector sheaves for over-boarding winch cable from the DSV Discovery, the over-boarding chutes for umbilicals, chain forks and flooding manifolds, as well as the riser installation winch and 25 tonne SWL deflector sheaves used to install the EM risers onto the FA platform.

The picture above right shows the 120 Tonne SWL emergency replacement snatch block that was used for the installation of the EM Control Buoy onto the gravity base. This snatch block was an emergency replacement block to be used in the pull-down rigging because the initial block had failed. The order for the works was given to Wale Marine at noon on a Friday and the completed item was designed, built and dispatched by 08h00 the next day (Saturday), having been tested to 150 tonnes on a test bench. The reported comment from the DSV superintendent on receiving it in Mossel Bay was “This is almost as quick as ordering pizza”.

Dry-dock Blocking Line for Stolt Offshore's 25,000Te "Seaway Polaris" (2002 - 2008).

This blocking line including the reinforced concrete cruciform blocks themselves was engineered, supplied and installed by Wale Marine as a turnkey solution for Stolt Offshore and installed in Cape Town's Sturrock dry-dock. The fabrication of the 144 No cruciform shaped 200 Te SWL precast concrete units was sub-contracted to Concrete Units. This contract received the Fulton Commendation for excellence in Design in the use of concrete by The Concrete Society of Southern Africa. See also front cover picture.

In 2008 the converted Polaris incorporating a new J lay tower and weighing 30,000 Te was re-docked for maintenance in Cape Town by Acergy. Once again the new blocking line was engineered and installed by Wale Marine (in JV with Concrete Units). The new blocking line design incorporated the original blocks, but required further blocks and extra modifications to allow for a quicker installation time.

Pre-commissioning of Stolt Offshore Bonga Pipelines Nigeria (2004 - 2005).

In 2004 Wale Marine were engaged by Stolt Offshore as their resident pre-commissioning engineer for the 16" Gas Export Pipeline between the Bonga FPSO and the OGGS RPA platform. Top left is the FPSO in 1000m depth with the Seaway Polaris (for which we engineered the dry dock blocking line) alongside. The Polaris was used for the pipe-lay and sub-sea operations. Above right is the RPA platform (about 90 km away in 25m) during the dewatering of the 16" gas export pipeline. Ancillary works by Wale Marine included the re-design and fabrication in Port Harcourt of the bow-catcher boat landing for the Surfer 140 for easy deployment and recovery from the side of the Seaworker, as well as all pipe and valve work for the dewatering dump-line, plus significant removal and blinding of pipework and valving on the RPA top-sides owing to a 10" ball valve casing leak on the top-sides identified during the pressure testing of the pipeline.

On completion of the gas line pre-commissioning, Wale Marine were engaged as the offshore manager on the Bonga to further pre-commission the flow lines and water injection lines for the FPSO itself. BJPPS were subcontracted for the pumping and pressurising operations. The work essentially comprised the pressure strength-testing of the individual flowlines (400 bar for the PFL's and 310 bar for the WFL's), the cleaning of the PFL loops using bi-directional brushing pigs, and hydrotesting of the PFL loops (including manifolds, well jumpers and boarding valves) all to 330 bar.

Knuckle-boom ships crane for SCS DSV American Pride (1999-2000).

This crane was designed, fabricated, supplied and installed on the Stolt Comex Seaway DSV "American Pride" based in Lagos Nigeria. The crane has a 19 metre reach and a 75 tonne metre moment capacity, with a maximum lift capacity of 12 T (single line pull of 6T). The crane has a detachable fly-jib for long reach operation. **Above right** - Function testing of the crane in Cape Town Harbour before final painting & despatch. **Below right** - Load testing of the crane on the American Pride at Nigerdock in Lagos.

Modular Jack-up Barge for Geotechnical Sampling – Franki Pile (2005).

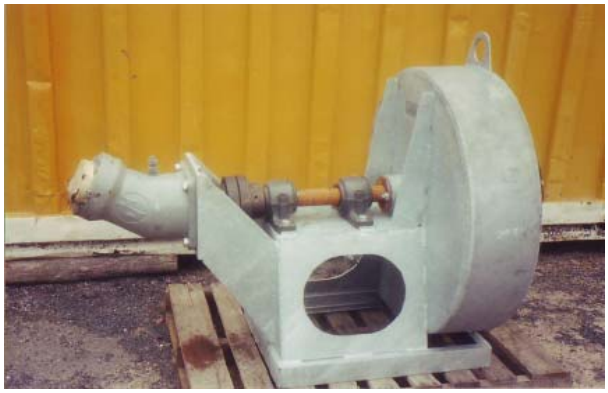
Wale Marine were commissioned by Frankipile (Africa) to design and manage the fabrication of a 20 Tonne lifting capacity modular jack-up barge from which to undertake a geotechnical investigation drilling project in 15 metres water depth off Lobito in Angola. The structure was fabricated by Concrete Units in their Meyerton factory (picture on right). The 35 tonne basic barge is modular with a maximum module mass of 6 tonnes. It comprises two 12 m long by 1.9 m diameter steel pipe pontoons flange connected in a T configuration and fitted out with modular decking, leg-guides and ancillary components such that the full system could be transported in three 12 metre open top containers.

Transport barge for Calshot harbour Tristan du Chuna – Apple Projects 2009.

For the upgrading of the Calshot harbour Wale Marine were commissioned to design a light-weight, low draught self propelled transport barge for transporting dollosse and construction equipment from a supply vessel anchored offshore into the harbour. The barge was fabricated from HDPE pontoons with a steel space frame superstructure.

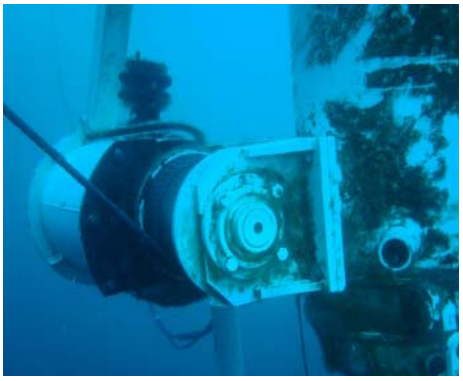
The steel superstructure and timber decking was fabricated in Cape Town (under our management) and the HDPE pontoons were supplied by Wale Marine using Customised Plastic Products in Pretoria as our fabrication sub-contractor.

Hydraulic/Electric Dredge Pumps – Murray and Roberts 1999/ Seychelles 1998



In 1999 Wale Marine was commissioned by LAMA/Murray and Roberts to assist them in the engineering related to the SAPREF replacement beach-crossing pipeline installation to their CALM Buoy SBM. One major problem encountered was the dredging of sand before pipe pull. For this we designed a system for a submersible electric motor as well as a hydraulically driven unit for use with the 100kW 10" gravel pumps that have been developed for the West Coast alluvial diamond pumping. Bottom right picture shows a simple modular dredger using spirally wound pipe and a submersible dredge pump that we engineered for the dredging of the Fregate Island harbour in the Seychelles which was designed by Wale Marine.

Drum Winches



Above Left – 10 Tonne Subsea winch installed on davit for the EM tether repair (2010 - see page 8).
Centre - 2,5 Tonne SWL Air Diving Man Rider Winch (2002). Winch designed and supplied to Hydro Dive (Nigeria) - designed to DNV & IMCA rules.
Above Right - Riser Pull-in Winch 15 tonne SWL (2000) for Stolt installation of the flexible riser from the EM field to the FA Platform.

Set of 4 mooring winches (2002) for the Hydro Dive DSV "HD Commander" in Nigeria. Each winch carries 1,500m of 28mm SWR and has a bare drum pull capacity of 30 tonnes. The winches are driven via a 110 kNm final drive planetary gearbox mounted inside the winch drum to minimise the space requirements. Winches are horse-power controlled for power efficiency. The two bow winches are fitted with automatic spooling.



Above Left - 12 Tonne High Speed Tool Deployment Winch Stolt Offshore(2000 – 2001) Winch with 140 kW power-pack– Designed for 1,500 meters of 26mm SWR and used by Stolt Offshore in deep water oil field installation (Girasol Field) activities off Angola.
Centre - 10 Tonne Sub-sea Winches – Murray and Roberts Marine (2010). Compact 10 te sub-sea pull down winches for water inlet system installation at Trejkoppie in Namibia.
Above Right – HRC deployment winch SMIT SAT3 System (2006). This winch was part of the HRC Launch and Recovery system – see page 19.

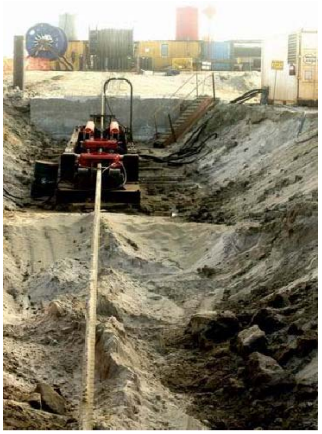
Powered Reels

Above Left. Hydraulically Powered Reel (1998 - 2001). This powered reel was initially supplied by Wale Marine to American International Divers which was subsequently taken over by Stolt. This reel is used for the installation of sub-sea flexible flowlines and control umbilicals, accommodating up to 3,000m of 150mm ϕ flexible pipeline weighing up to 120 tonnes. In 2001 the reel was upgraded for Stolt for the installation of the 6" flexible flow-line for the Mossgas E-M satellite field development (see page 9 and 10). The upgrade entailed incorporation of a 2nd pinion drive unit in order to double the drum torque.
Above Right. Two of three hydraulically powered reeler systems supplied to Leighton India 2008. These chain drive reelers were designed to accept the supply drums for 1000 metres of 86mm SWR to be used on a pipeline pull with a 300 Te linear Winch that we supplied to them (see next page).

Above Left. Two pneumatically powered umbilical reels fabricated in Cape Town and supplied via Wale Marine Australia (no longer operating) for Well Ops in Australia.
Above Left. Two pneumatically powered umbilical reels supplied via Wale Marine Australia to Well Ops UK. These reels have fail safe calliper brakes which engage onto a stainless steel liner.

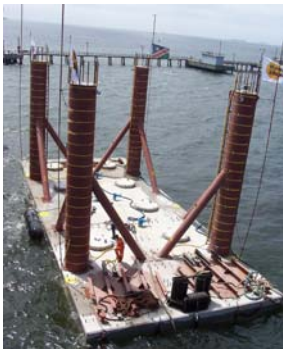
Above Left: Hydraulically powered reel for sub sea hydraulic hose umbilicals. **Centre:** Hydraulically powered reel with rim drive pneumatic wheel. **Right:** Hydraulically powered reeling system for varying drum sizes.

Linear and Traction Winches and Ancillaries

Above 300 Te Pipe-pulling Linear Winch for Murray and Roberts (M&R) 2007 Hydraulic power unit, cylinders and controls by Hyflo. The winch operates with Amclyde Lucker grippers and is designed to allow the pulling through of spelter connections. An identical winch was supplied to Leighton India in 2008.





Above 300 Te sheaves and fairleaders designed to allow spelters to pass through for pipe-pulling in Namibia for Murray and Roberts Marine. This pull used our 300 Te linear winch in upper photographs (2010).

Above 100 Te traction winch and hydraulic power unit for steel wire ropes of up to 127 mm diameter that we engineered and supplied to Endenburg Holland (2010).

General Hydraulic Cranes and Equipment

Above Left Self-propelled rail mounted crane for placing precast units on Allan Gray building in the Cape Town waterfront for Concrete Units (2013). **Above Right** Hydraulically operated lifting bridge for Port St Francis (1997). Wale Marine managed the Port St Francis harbour construction and designed the structures.

Above 21 Te Modular Scotch Derrick Cranes for offshore oil and gas platforms and FPSO's for Oil Integrated Services (OIS) in Gabon and the DRC (2013 & 2015).

Above. Overboarding Hose Chute with associated hydraulic clamp used for deploying and recovering flexible tanker hoses for FPSO SBM's for SMIT Subsea deployed on the Bourbon Peridot (2006).

Self-Propelled Hydraulically Operated Crane and General Bogeys

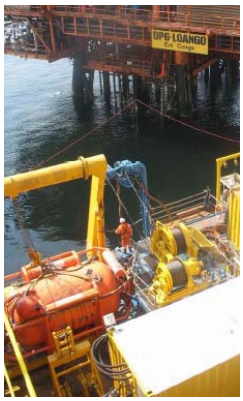

Above In 2008 Murray and Roberts Marine commenced with a contract to install an inlet pipeline for a desalination plant in Namibia just north of Swakopmund. This project used a linear winch supplied by Wale Marine (see page 16) but also required building a construction jetty to execute drilling, blasting and excavation works alongside. This jetty had rails either side and required self-propelled bogeys for mounting two 100 tonne crawler cranes as well as a cantilever drilling rig. Above left is the shoreward crane bogey with the drilling bogey in the background and above right is the drilling bogey with the seaward crane in the back ground. Wale Marine designed and supplied the hydraulic and mechanical powering system for these bogeys.


Above left 20 Te Payload jetty construction bogey for Franki Pile during trials at Concrete Units yard 2012. A second similar bogey was supplied to Franki in 2015.
Above right Self-propelled crane bogey for Concrete Units 2013.


Above 40 Te pay-load self-propelled transport bogeys for Franki Pile jetty and groyne constructions Ghana 2013 – 2014. Open bogey left and rock-body bogey right.

Launch and Recovery Systems





Above Left: Modular "A" Frame for Swire Pacific (2005). This 10 Te SWL luffing "A" frame was fabricated for the Swire AHT "Pacific Warrior" for use with one of its main winches.

Above Centre and Above Right: Modular LARS for 15 Te SWL SMIT SAT 3 HRC (2006) designed to fit into a standard 40' container. Test loading, and installed system on the Bourbon Peridot at the Hess Okume Field Development in Equatorial Guinea.


Above Launch and recovery system for survey boat daughter craft - Fugro 2009 Wale Marine were commissioned to engineer a launch and recovery system for Fugro such that they could launch their aluminium daughter craft from the mother vessel at sea in order to perform shallow water surveys. The LARS is articulated and telescopic, with a floating lower section such that the daughter craft can ride onto the ramp without swamping herself. Once the craft is on the lower ramp, the ramp is luffed down so the daughter craft can be winched up and the ramp can be brought in-board.


Above Launch and recovery system for Sakawe Surveyor LLNP Luderitz - 2015 Wale Marine were commissioned to engineer and supply a sampling grab and associated launch and recovery system for LLNP such that they could sample sea bed deposits of phosphate of the Namibian coast. The system has a high speed deployment winch fitted with dyneema rope.

Rhino Craft HDPE (High Density PolyEthylene) Workboats

In 2003 Wale Marine (WM) was commissioned by Hydro Dive Nigeria to engineer and supply three 6 metre HDPE workboats suitable for use in the Offshore Oil and Gas Industry and compatible with conventional bow-catcher landings. These and subsequent HDPE workboats ("Rhino Craft") have an excellent track record in the harsh operating environments off West Africa. These Rhino Craft were initially developed, fabricated and sold by Wale Marine, until in 2005 a sister company Rhino Marine Products (RMP) was formed to fabricate and distribute these "proven" boats under license to Wale Marine. Wale Marine continue to work closely with RMP who exclusively design and build mono-hull craft whilst WM exclusively design and build multi-hull craft and barges.

Above left Wale Marine Rhino Craft 590 workboat being used on EM tether repair - 2010 (see page 8). **Top right** WM Rhino Craft 850 workboat (2006), an evolution of the original 5.9 m workboat into an 8.5 metre workboat powered here by twin 200 hp outboards. **Bottom right** WM 9.5 metre Ultra Jet 305 drive Rhino Craft SCUBA Replacement (SRP) craft for SMIT Subsea with 295 hp Steyr inboard diesel - 2011.

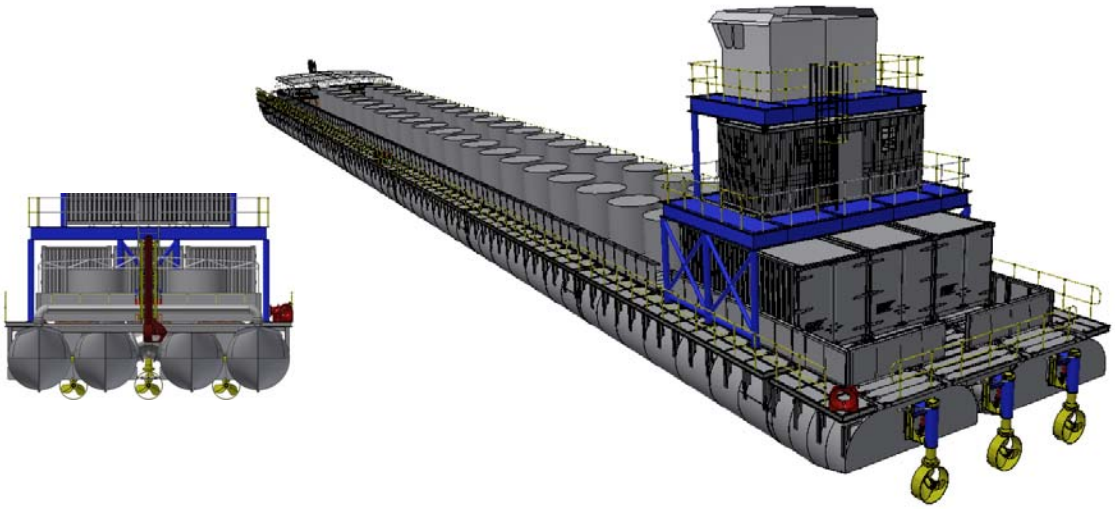
Above Wale Marine Rhino 9.5 m with 280 hp inboard diesel Volvo Penta Z drive for Perenco on sea trials in Cape Town (left) and in use being lifted onto jack up rig near Douala Cameroon - 2008.

Modular Steel Pipe Barges

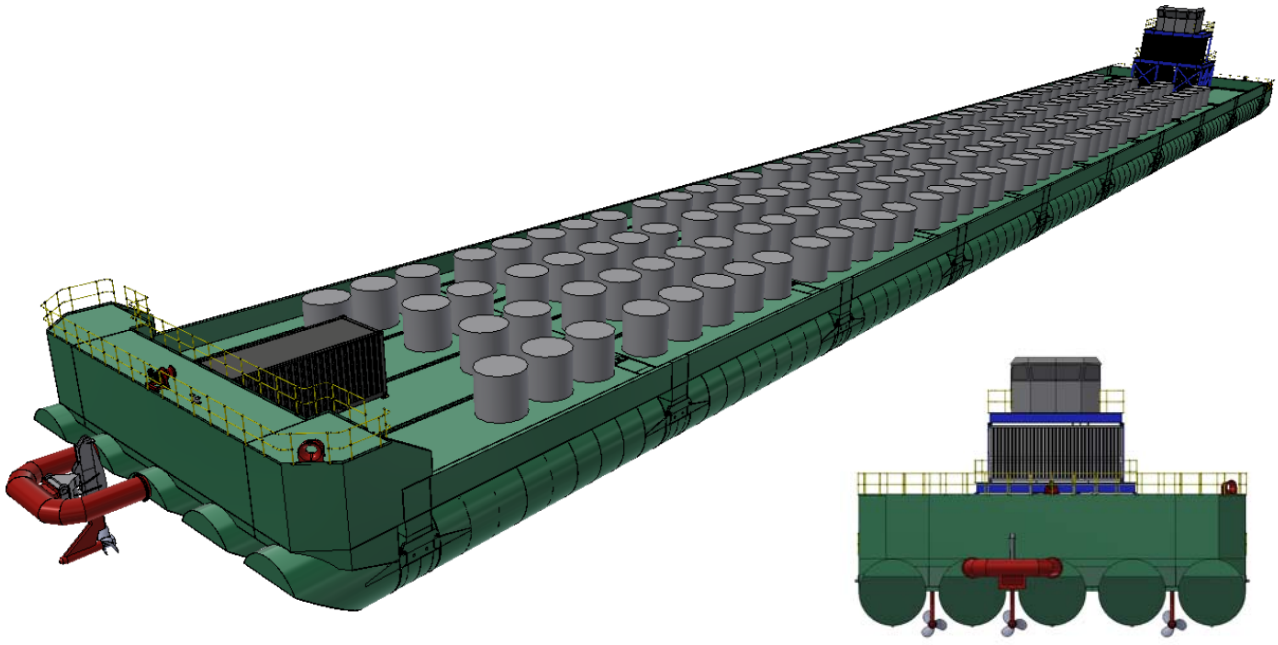
Wale Marine have had significant experience with building modular barges, dredgers and large flotation buoys using steel pipe structures (especially spirally wound steel pipes) as flotation units and working in close co-operation with Concrete Units and LB Pipes (see pages 7, 9 and 12 above).

As the demand for environmentally friendly transportation of goods increases the virtue of waterborne transport over road transport increases too – for this reason we are developing cost effective modular barges that can be established in countries with suitable river and lake systems.

We have recently developed designs for multi-hull modular riverine barges of a 400 Te payload capacity and lake barges of 1500 Te capacity. Bow and Isometric views of these two designs are shown below:



Above 400 Te Payload Riverine Barge with 3 WM Stern Thrusters and one WM Lateral Bow Thruster.
Below 1500 Te Payload Lake Barge with 2 Hydro Armor Stern Thrusters and one Hydro Armor Bow Thruster.



These barges are extremely strong and manoeuvrable low draught vessels and are designed to maximise ease and speed of assembly in the water.