



Harbour and Coastal Engineering



Running path of a new 180-ton travel of a new 180-ton travel lift

Lagos, Algarve (Portugal)

Work description

The contract awarded to Seth aimed at the construction of a new infrastructure that will allow the lifting and transport of recreational/fishing vessels up to 30 m in length for repair and restoration in a shipyard, promoting the economic and tourist activity of the region.

The solution studied comprised the execution of 10 driven metal piles with a diameter of Ø1016mm x 16mm, made of S355J0 steel, and lengths between 24.10 and 28.76 ml. To enable the driving of the piles, it was necessary to temporarily remove the riprap protecting the existing slope, with its partial replacement planned after the driving of the metal piles, as well as the execution of a temporary embankment. Before driving each pile, a driving guide was installed, supported by auxiliary piles. Driving tests were carried out on three of the most distal piles by the company Geoproviders.

The piles were driven using a PTC 65HD vibratory hammer and a CX85 impact hammer, both powered by a CO650 hydraulic power plant. Permanent sheet pile walls were driven in three of the spans between tubular piles, with Larssen ZZ-36 and ZZ-20 sections, to contain the existing slope.

Two reinforced concrete C50/60 bearing beams, measuring 31.5x2.25x1.75 m3, were constructed and supported on driven piles, along with a tie beam measuring 16.5x1.15x1.75 m3, with a corbel, on which the transition slab will be supported, using a special Carldora-type formwork solution.

A C40/50 concrete transition slab measuring 16.5 x 8m2 was constructed, supported on the transition beam and over controlled slab stone.

The marina bottom was dredged with buckets to a depth of -3.0m ZH throughout the surrounding area.

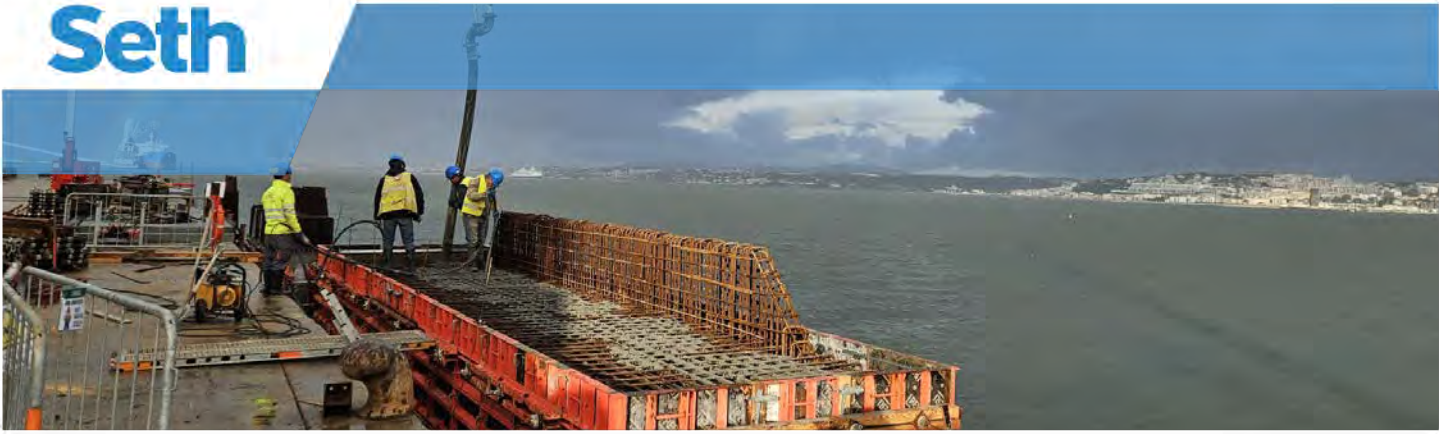
For pedestrian access, a 32ml FRP walkway solution was installed on both bearing beams by the company STEP. Foundation piles were also driven for a floating pontoon, and a metal support structure was built, founded on driven HEB 500 profiles, with a spacing of 18 ml.



Work Summary

Client	Sopromar, Lda
Contract Type	Lump Sum
Construction Period	2025 - 2026
Cost	€ 1 008 147,40





Harbour and Coastal Engineering



Restoration of docking conditions at the Portinho da Costa pier

NATO POL Ammunition Depot Station, Lisbon (Portugal)

Work description

The project to restore berthing conditions at the POL NATO Ammunition Quay in Portinho da Costa aimed to restore 4 berthing posts (new flexible Duques d'Alba berths with quay stops), rehabilitate the lower part of the existing quay platform where some anomalies were visible, and redesign the mooring devices supporting the quay.

In addition to the concreting of the section between elevations +4.55 ZH and +5.95 ZH at berth no. 2, the installation of the "Yokohama" pneumatic floating fender, measuring 2500 mm x 5500 mm, was carried out at Berthing Post No. 1.



Work Summary

Client	Sopromar, Lda
Contract Type	Lump Sum
Construction Period	2025 - 2026
Cost	€ 1 008 147,40



Harbour and Coastal Engineering

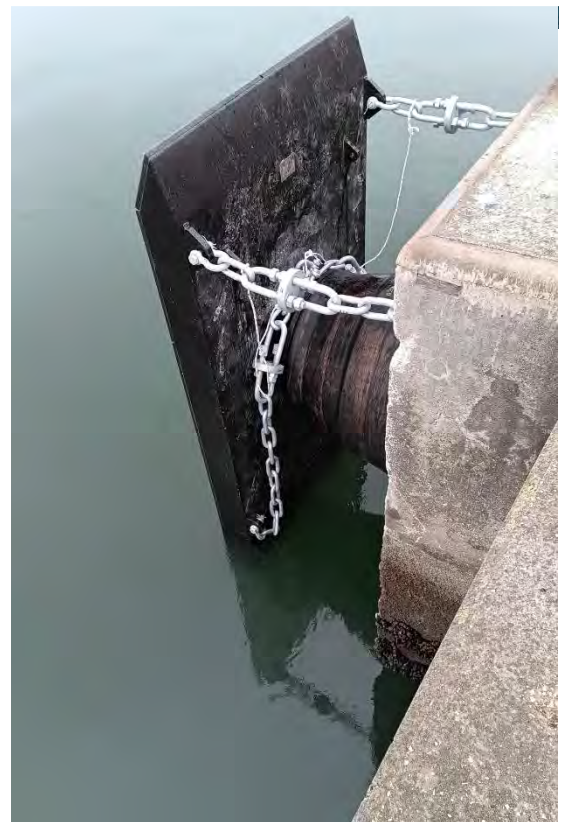


Reinforcement of Fenders and Mooring Boreholes

Port of Aveiro – Aveiro (Portugal)

Work description

Seth has completed the first phase of the project with the installation of 21 mooring bollards of 80 tons each and 44 ship berthing fenders at the North Container and Ro-Ro Terminal. 126 bollard fixings, 416 fender fixings, and 32 structural reinforcements of the quay's front panels (shields) were carried out. Next, Seth has completed the installation of 12 mooring bollards of 80 tons each and 35 mooring bollards of 50 tons each at the North General Cargo Terminal.



Work Summary

Client	Administração do Porto de Aveiro, SA
Contract Type	Lump Sum
Construction Period	2025 em Progresso
Cost	€ 2 251 802,60





Harbour and Coastal Engineering



Works of dredging in the basin of CREVRON Port

Malongo, Cabinda (Angola)

Work Description

The contract, executed in Consortium, consisted of dredging 170,000.00 m³ in the berthing area of docks 1 and 2 of Porto da Chevron in Malongo, Cabinda (Angola).

The defined dredging quota was -6.5m (LAT). Dredging was carried out using a Cutter Suction Dredger (CSD 450), which discharged the material into a temporary retention basin, whose function was to decant the dredged mixture, ensuring the retention of the sand, to be transported and unloaded at a specific location.

In order to ensure the speed of material removal tasks, one of the work fronts was dedicated to extracting sand using earthmoving machinery. At a more advanced stage, a new front appeared, consisting of a DOP Pump and a crawler crane, to fill in the area to be dredged next to the dock walls.

The works awarded also included the placement of all the dredged material on land, using a "dry" area of approximately 8,000.00 m² located 3 km from the pier for this purpose.

Main work volumes

Dredging: 170.000,00 m³

Equipment used

Cutter Suction Dredger (CSD 450)

Work Summary

Client	Ministério das Finanças e do Fomento Empresarial
Contract Type	Lump Sum
Construction Period	2025 em Progresso
Cost	€ 8 998 930,60





Harbour and Coastal Engineering



Rehabilitation of the wall, removal, supply and driving of piles

Trafaria River Station – Trafaria Parish, Almada (Portugal)

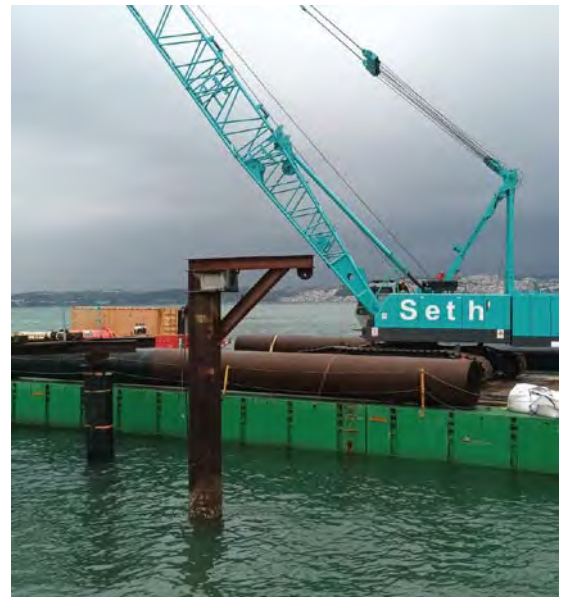
Work description

Seth has completed the requalification of the Trafaria River Station, specifically the design/construction contract for the rehabilitation of the wall, removal, supply and driving of piles at the aforementioned river station.

This project was awarded by TTSL – Transtejo Soflusa, in which SETH's intervention had two distinct aspects, namely:

- **Installation of 4 new piles** (1220 mm diameter) **for guiding the Rio Coia pontoon** (removal of seven existing damaged piles, and installation of 4 new piles, 1220 mm diameter x 22 mm, with a length of 22 ml);
- **Execution of the rehabilitation of the wall structure**, with the execution of a riprap prism adherent to the current wall, consisting of a TOT core protected by a riprap layer totaling 9900 tons.

The current infrastructure represents a real improvement in public service conditions on the Trafaria – Porto Brandão – Belém river link, allowing it to resume its original route and vehicle transport service.



Work Summary

Client	TTSL – Transtejo Soflusa, SA
Contract Type	Lump Sum
Construction Period	2024
Cost	€ 1 298 372,06



Harbour and Coastal Engineering



Reconversion of Pier 4, Cryogenic Liquefied Gas Terminal

Sines Multipurpose Terminal – Sines, Setúbal (Portugal)

Work description

APS – Administração dos Portos de Sines e do Algarve, S.A., awarded to Seth the contract for the conversion of Pier 4 of the Sines Multipurpose Terminal (Pier 4 TMS), in order to create the necessary conditions to operate cryogenic liquefied gases.

The main interventions to be carried out include

- Relocation of the docking station by 150 m to the SW;
- Construction of 3 new Dolphins Mooring for docking and mooring ships;
- Construction of 4 Berthing Dolphins on land, for mooring ship cables;
- Construction of a 40x20 meter platform (Dolphins Mooring) for the installation of loading arms and/or hoses for tankers and for the installation of hoses for the movement of cryogenic products, including a bridge to support the pipeline mat connecting to this platform.

With this project, the pier's intervention area will increase from 1.83 ha to 2.09 ha and the bottom level will remain the same (-15 ZH).



Work Summary

Client	APS, SA (Administração do Porto de Sines e do Algarve)
Contract Type	Lump Sum
Construction Period	2023 – 2024
Cost	€ 11 831 295,34



Harbour and Coastal Engineering



Reinforcement of Fences and Mooring Bollard

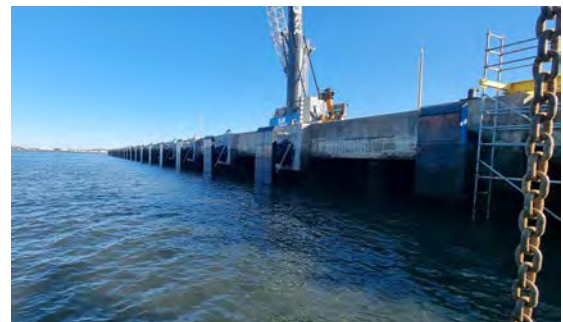
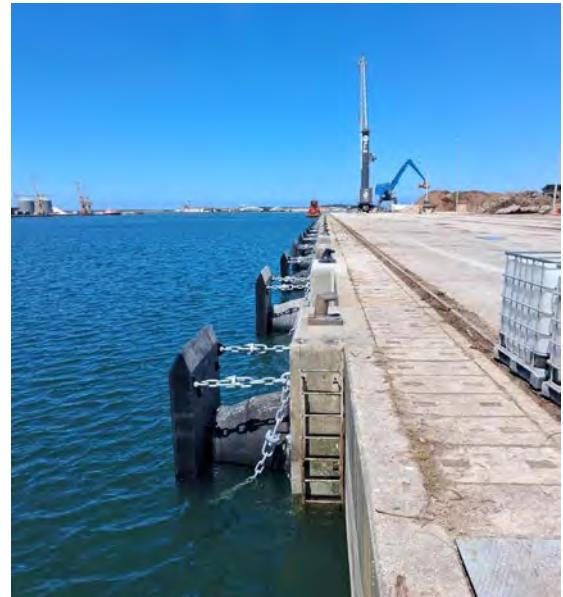
Sines Multipurpose Terminal – Sines, Setúbal (Portugal)

Work description

Seth has completed the first phase of the project with the installation of:

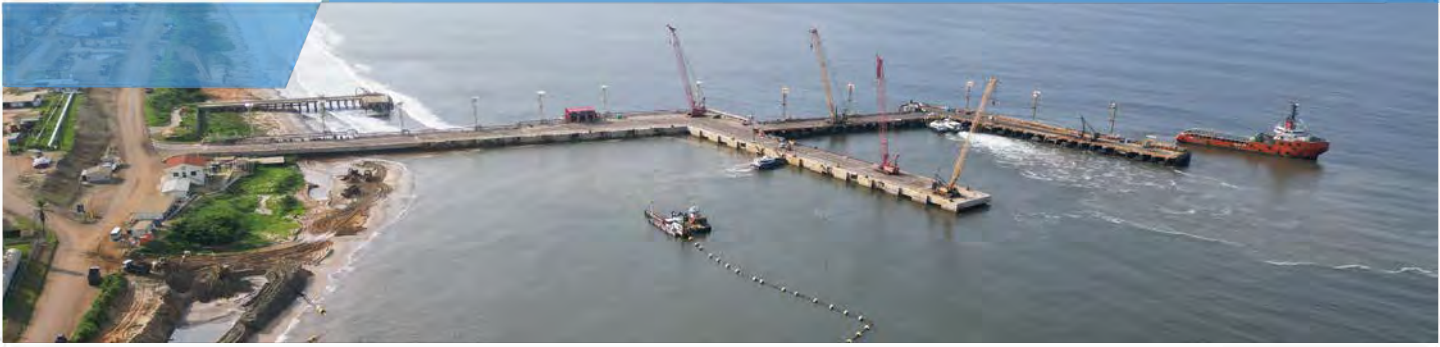
- 21 mooring bollards of 80 tons each
- 44 ship berthing fenders at the North Container and Ro-Ro Terminal.
- 126 bollard fixings, 416 fender fixings and 32 structural reinforcements of the quay's front panels (shields) were carried out.

Next, Seth has completed the installation of 12 mooring bollards of 80 tons each and 35 mooring bollards of 50 tons each at the North General Cargo Terminal.



Work Summary

Client	Administração do Porto de Aveiro
Contract Type	Lump Sum
Construction Period	2025 - 2026
Cost	€ 2 251 802,60



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Works of dredging in the basin of CREVRON Port

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Work Description

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The defined dredging quota was -6.5m (LAT). Dredging was carried out using a Cutter Suction Dredger (CSD 450), which discharged the material into a temporary retention basin, whose function was to decant the dredged mixture, ensuring the retention of the sand, to be transported and unloaded at a specific location.

In order to ensure the speed of material removal tasks, one of the work fronts was dedicated to extracting sand using earthmoving machinery. At a more advanced stage, a new front appeared, consisting of a DOP Pump and a crawler crane, to fill in the area to be dredged next to the dock walls. The works awarded also included the placement of all the dredged material on land, using a "dry" area of approximately 8,000.00 m² located 3 km from the pier for this purpose.

Main work volumes

Dredging: 170.000,00 m³

Equipment used

Cutter Suction Dredger (CSD 450)



Work Summary

Client	Cabinda Gulf Oil Company Limited
Contract Type	Lump Sum
Construction Period	2022 - 2023
Cost	€ 4 604 440,28





Harbour and Coastal Engineering



Extension and improvement of Commercial Quay at Ponta Delgada Island of S. Miguel, Azores (Portugal)

Work description

Reprofilation of the Quay-10 (ZH), Repaving the Port Embankment and Improvement of the Technical Networks integrated therein and Dredging of the harbour basin of Ponta Delgada, Island of São Miguel, Azores.

Maritime Work

- Advancement of the pier to the north, parallel to the existing, caisson structural solution;
- Dredging for setting up the pier and obtaining service levels, -10.00 and -12.00ZH;
- General dredging of the maneuvering area of the port basin;
- Execution of Ro-Ro ramp.

Infrastructures

- Elevation of the pier front from the current elevation between +2.80 and +3.00ZH to +3.50ZH elevation;
- Total repaving and painting of the road access road and stowage park;
- Full replacement of the potable water supply network for ships and repair of water tanks;
- Total replacement of the fire network powered by a portable high-flow pump;
- Complete replacement of all electrical networks, including supply of a new Transformer Station and supply and installation of new lighting columns for the quay and embankment;
- Full replacement of all communication networks;
- Execution of new gutters adapted to the new quay and embankment dimensions with renovation of all existing networks.

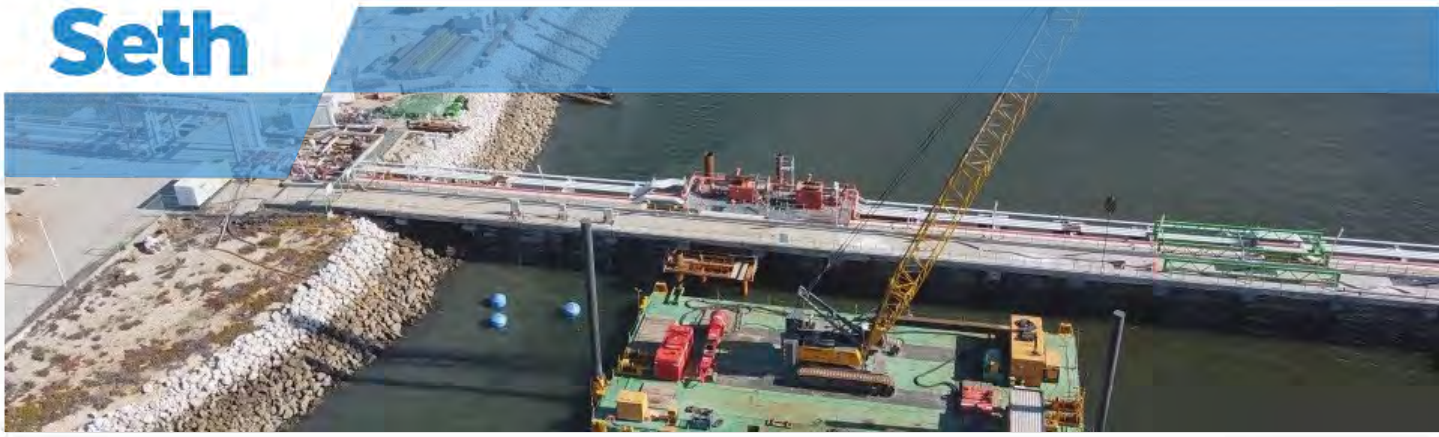
Buildings

- Construction of the New Port Operations and Exploration Building;
- Construction of the New Weighing Control including the supply of 2 weighbridges;
- Construction of the New Entrance;
- Construction of the New PT Building.

Work Summary

Client	Portos dos Açores, SA
Contract Type	Lump Sum
Construction Period	2020 - 2023
Cost	€ 42 650 000,00 (Valor Final Acumulado: Autos + Revisão de Preços)





Harbour and Coastal Engineering



Rehabilitation and Improvement of Quay at Tanquisado

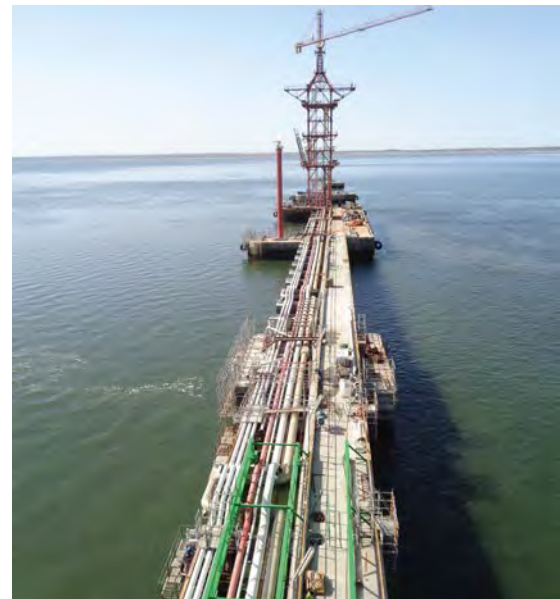
Mitrena – Setúbal (Portugal)

Work description

Seth took on the execution of the contract for the Rehabilitation and Reinforcement of the jetty at the Tanquisado/Eco-Oil Maritime Terminal, located in the Sado riverbed, at Mitrena, Setúbal (Portugal) with a deadline of 300 days.

This terminal is under concession to Tanquisado - Terminais Marítimos, SA and Eco Oil - Tratamento de Águas Contaminadas, SA, and is intended for handling bulk liquids (fuels), and has a ship cleaning and degassing station. It is equipped with:

- A quay and berthing dolphins;
- A west berth (Tanquisado) for tankers carrying fuel, allowing the berthing of ships up to 200 meters long and with a draught of up to 9.5 meters.
- An east berth (Eco-Oil) for ships destined for the ship cleaning and degassing station, allows the berthing of VLCC ships with drafts up to 7.5 meters.



Work Summary

Client	Tanquisado – Terminais Marítimos, SA
Contract Type	Lump Sum
Construction Period	2021 - 2023
Cost	€ 4 551 432,55





Harbour and Coastal Engineering



Extension and improvement of English Quay

Island of Maio, Cape Verde

Description of Works

The contract under the responsibility of the Ministry of Infrastructure, Territorial Planning and Housing of the Republic of Cape Verde, was financed by the African Development Bank in 82.13% and by the Republic of Cape Verde in 17.87 %.

The works lasted 35 months (12 months suspended pandemic period) and included the execution of the following works:

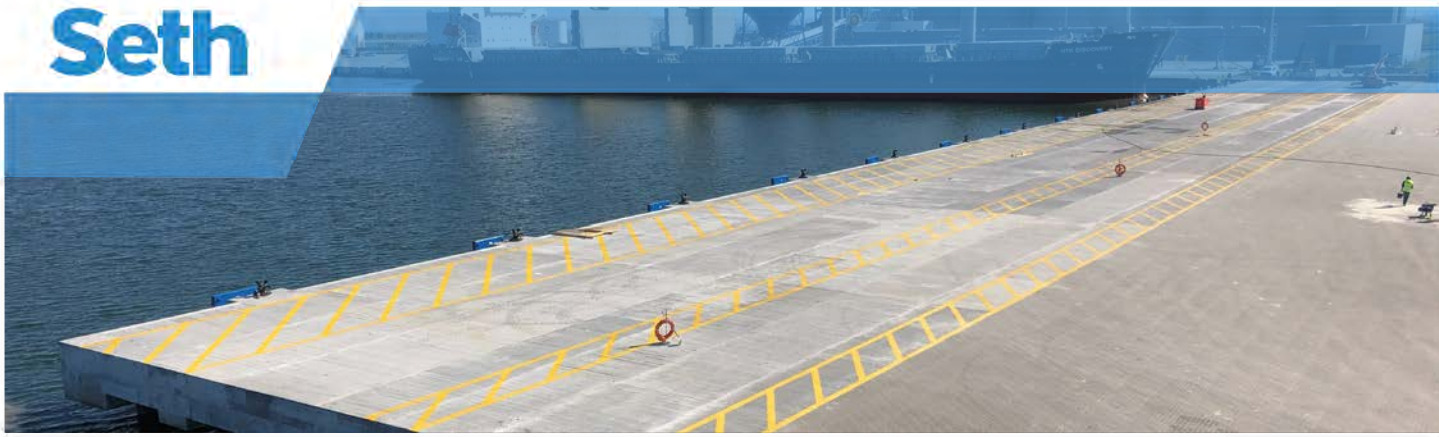
- 1– Rehabilitation and repair of the existing quay which is 340m long and 14m wide:
 - a) General repair of the structure (existing pile caps, transversal and longitudinal beams and slabs);
 - b) Replacement of mooring fittings (fenders and mooring bollards);
- 2– Construction of a "Roll-on/Roll-off" quay 120m long and 40m wide, founded on 112 reinforced concrete piles Ø970 mm and equipped with two ramps;
- 3– Construction of a detached breakwater 145m long, with depths located between -7.00 and -12.00 ZH. The breakwater heads were reinforced with 656 concrete blocks of "Accropode TM II" type, with an average weight of 16 tons;
- 4– Rehabilitation and extension of the port embankment, doubling its initial area of 7000 m²;
- 5– Reconstruction and reinforcement of the Logistic Platform's embankment protection, consisting of a rockfill prism 260m long;
- 6– Upgrading of the 900m access road leading to the port.



Work Summary

Client	Ministério das Infra-Estruturas, do Ordenamento do Território e da Habitação da República de Cabo Verde
Contract Type	Lump Sum
Construction Period	2019 - 2022
Cost	€ 20 805 758,63 (valor final acumulado Autos + revisão de preços)





Harbour and Coastal Engineering



Jetty Berth at Port of Aveiro

Port of Aveiro, Gafanha da Nazaré, Ílhavo (Portugal)

Works Description

The Administration of the Port of Aveiro (APA) awarded to Seth the contract for the construction of a new berth for ships for around seven million euros in Gafanha da Nazaré, Ílhavo (Portugal).

This berth was designed to support the productivity of companies that install production units in the Port of Aveiro, and was assumed to be strategic to allow the appropriate transport operation for the dimensions and weight of the elements in question, reducing logistical costs that would be associated with the transfer between the manufacturing site and the shipping point.



The works of this contract, with a duration of 340 days, consisted of the execution of a berth within the Port of Aveiro, to be used by a company producing large-scale structures for the construction of offshore wind towers. Due to the high loads, the executed pier was the first to consider overloads of this dimension and to be dimensioned for this purpose.

In terms of quantities of materials and works, the aforementioned contract comprised:

- Execution of 120 driven metal piles of Ø1016 mm and 18 mm thick for the foundations of the deck.
- 200 ml x 25 ml reinforced concrete tray, including all dock accessories, namely, 14 fenders and 14 bollards. The water network was also installed on the pier.
- Construction of pavement with base and sub-base, for the execution of a concrete pavement slab and pave layer with a thickness of 10 cm.
- Within the scope of the contract, 2 dolphins mooring were also built in metal piles and two concrete blocks for bollards.

Work Summary

Client	Administração do Porto de Aveiro
Contract Type	Lump Sum
Construction Period	2020 - 2021
Cost	€ 6 848 532,32





Harbour and Coastal Engineering



Jetty Berth and Dolphins

CLC Port, Republic of Guinea-Bissau

Description of Works

EPC Contract for construction of two mooring dolphins, 2 berthing dolphins and a new platform (for manifolds) on existing jetty at Bandin Oil Terminal, in Guinea Bissau. This project also includes the demolition of the existing structures (to be replaced) and the installation of temporary berthing and mooring structures to allow the use of the Terminal during the construction phase.

The new (permanent) structures are composed by:

- Dolphins mooring– 4 driven steel piles of 1220mm // 21.6mm, connected by a rigid prefabricated metal frame in which a double quick release hook (QRH) of 60 ton will be installed;
- Berthing dolphins- 9 driven steel piles of 1220mm // 21.6mm, connected by a rigid prefabricated metal frame in which a double quick release hook (QRH) of 60 ton and a fender system (composed by two conical fenders and a steel panel 10m high by 3m wide) will be installed;
- New platform: 4 driven steel piles 1220mm // 21.6mm, connected by a prefabricated steel structure in which the prefabricated slabs will be installed.

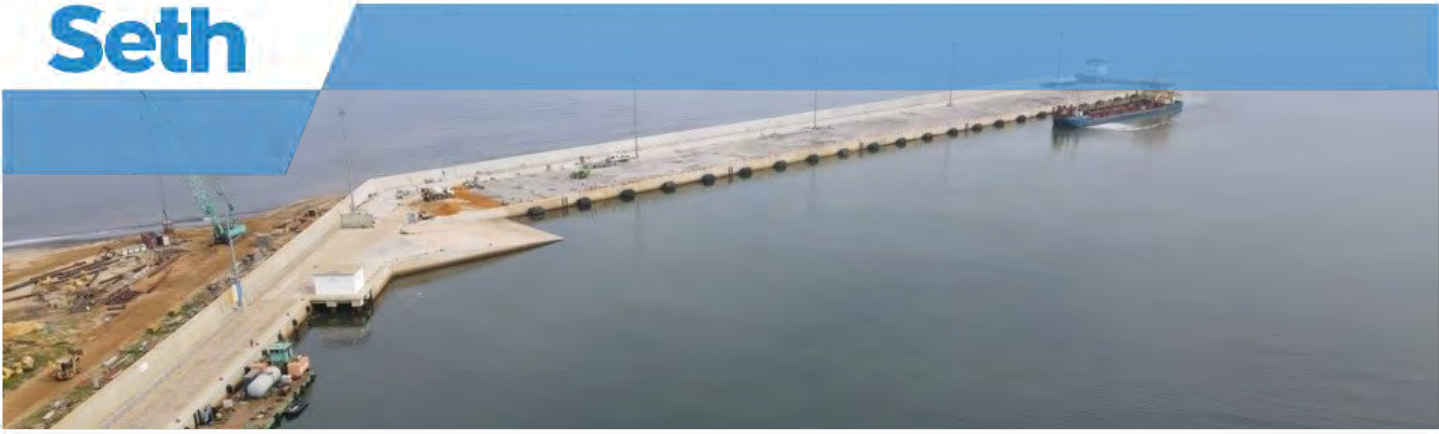
At the end of September 2019, the installation of the temporary berthing and mooring structures (ETA of the first vessel on 6 October) and the piling works on the upstream mooring dolphin were complete. The piling works performed during September were subjected to the performance of dynamic load tests to determine the load capacity of the piles.



Work Summary

Client	CLC GALP, Guiné-Bissau
Contract Type	Lump Sum
Construction Period	2019 - 2020
Cost	€ 7 546 886,26





Harbour and Coastal Engineering



New Breakwater and Quay of Cabinda Port

Cabinda, Republic of Angola

Description of works

In 2017, Seth started the consortium work on the subcontract for the construction of the new dockable breakwater at the Port of Cabinda in Angola. This work is part of a port and passenger port infrastructures project, awarded by the Maritime and Port Institute of Angola to the company China Gezhouba Group Company, Ltd.

The contract includes the construction of a breakwater of approximately 660m in length (divided between an access road with 295m long and 12.5m wide) and a liable area of 365m long by 39.8m wide and one ramp RO-RO.

As infrastructures to support the quay, a concierge building, a saltwater catchment and pumping building, a water reservoir, and a VTS tower were built.

The structural solution used involves the creation of a vibro compacted landfill, using sands from dredging, contained by two combined wall curtains (HZ800 + AZ18-800 planks) with variable lengths between 8m and 24.5m, each other.

The superstructure consists of crown beams and deflector wall in reinforced concrete.

Due to the length of the profiles / piles and to the geotechnical profile of the terrain, the water-jetting technique was successfully used and used to aid the drilling with the vibrating hammer.

Given the specificity of the site and the work to be done, Seth used its own machinery (sea and land) to carry out all the drilling, namely:

- Vibratory hammer ICE 55NF and ICE 815;
- Impact hammer IHC S-90 and PVE 9NL;
- Crane Liebherr LR1160 and Kobelco CKE1100;
- Self-elevating platform;
- Self-propelled modular barge.
- DOP 2320 pump



Work Summary

Client	Porto de Cabinda
Contract Type	Lump Sum
Construction Period	2018 - 2022
Cost	€ 42 700 000,00





Harbour and Coastal Engineering



Subsea Cable Installation to connect a Waveroller

Peniche (Portugal)

Description of Works

The scope had included the subsea cable installation works that interconnects an underwater power generation unit to a system control cabin located about 150 m from the shoreline, to convert the sea waves energy to electricity.

This system is called "Waveroller" and was installed next to Praia da Almagreira, Ferrel parish, Peniche municipality, at an average depth of 15 m and approximately 850 m from the coast.

Main quantities

- Cable reel weight: 13 tons
- Subsea Cable Installed: 1000 meters
- Earthmoving: 1600 m³
- Number of buoys used: 130 units
- Number of rollers used: 34 units

This work did not include the connection and installation work of the generator and its shovel (these works were performed directly by the Owner).



Work Summary

Client	AW - Energy OY
Contract Type	Lump Sum
Construction Period	2019
Cost	€ 54 918,89



Harbour and Coastal Engineering



Bauxite Export Jetty

Port Taresa (Kamsar), Republic of Guinea

Work Description

Compagnie de Bauxite et d'Alumine de Dian-Dian, SA (COBAD, SA) has awarded to Seth the construction works of the 116 meters-long Bauxite Export Jetty for barges with capacity up to 6,000 DWT at Port Taresa (Kamsar) at Republic of Guinea.

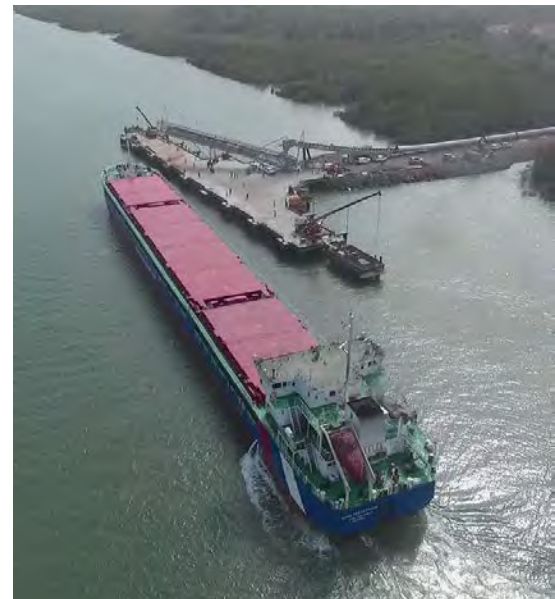
The Contract Price is in the amount of 6 million euros (all materials provided by COBAD) and had a scheduled duration of 10 months.

The Scope of Seth's works under this contract include:

Execution of Jetty foundations:

- The 73no. concrete socketed piles (Ø980mm//33mm with 22.00 meters);
- The 53no. driven piles (Ø970mm//29.5mm with 17.50meters);
- 53 piles (Ø970mm//29.5mm with 17.50 meters) driven into the ground;
- Installation of the steel beams and welding of those beams to the piles;
- Installation of prefabricated concrete slabs.

The completion of the concrete slab, the installation of the fender system, bollards, cathodic protection system or the other works associated with the extension of the causeway are not included in Seth's scope of (those works being carried out directly by COBAD).



Work Summary

Client	COBAD, SA (Compagnie de Bauxite et d'Alumine de Dian-Dian)
Contract Type	Lump Sum
Construction Period	2017 - 2018
Cost	€ 6 999 789,10





Harbour and Coastal Engineering



Kamsar Container Terminal, Phase III

Port of Kamsar, Republic of Guinea

Work Description

Three years after having completed the second phase of the Kamsar Container Terminal, Seth has returned to the Republic of Guinea (Conakry) to start a new contract.

This job began in July 2015 and involved the third phase of enlargement of the Container Quay that Global Alumina Corporation, SA, awarded to Seth for a sum of 12,401,909.85 euros.

The contract (for 12 months) was comprised by various maritime and port construction works, including the extension and enlargement of the existing quay with a berthing length of 170.00 m and a breadth of 17.50 m, duly equipped. Was applied a reinforced concrete solution in situ (beams and compression slab) involving the use of prefabricated concrete slabs acting as shuttering. This superstructure was supported on 103 tubular piles (914 mm diameter each) driven into the natural ground, with an average length of 51 m, the upper part (7.2 m) concreted.

Taking into account the specifics of the site, all the work was carried out directly by the company, namely:

1. Concrete production;
2. Prefabrication of the elements (some pre-stressed);
3. Preparation of the pile tubes;
4. Driving the tubular piles;
5. Casting the piles and support beams in situ;
6. Placement of pre-slabs;
7. Concreting of the deck (compression layer) and installation of all accessories.



Work Summary

Client	GAC Guinea Alumina Corporation
Contract Type	Lump Sum
Construction Period	2015 - 2016
Cost	€ 12 401 909,85





Harbour and Coastal Engineering



Fishing Harbour

Montijo (Portugal)

Work description

Seth has concluded a professional fishing quay owned by Cooperative Society Union in Montijo.

The project included:

- A berthing space 12 to 13 vessels simultaneously (with a maximum tonnage of 8.35 Ton);
- A beaching ramp for access of vessels and its maintenance / repair;
- A scaled pier platform to allow the placement of boats in a dry local;
- An area for the individual support facilities for storing fishing gear.

At the same time, SCUPA aimed for the environmental and landscape requalification of the area, the rehabilitation of the space around the old Salt Pan and Fish Nursery, and the preservation of the ruins of the old tidal mill existing on the site.

This project was inaugurated on January 23, 2016.



Work Summary

Client	SCUPA – Sociedade Cooperativa União Piscatória Aldegalense, CRL
Contract Type	Lump Sum
Construction Period	2015 - 2016
Cost	€ 548 523,00





Harbour and Coastal Engineering



Widening of the embankment and construction of a new access road in the Northeast area of the large port of São Vicente

Mindelo, S. Vicente Island, Cape Verde

Work Description

This project undertaken by Seth (in consortium) in Mindelo, São Vicente Island (Cape Verde), provides the city with two major, significant improvements: increase of the area of the port and alterations to its road accesses, and a significant increase of the dry area of the Laginha beach.



The better to understand the benefit of this job, it should be explained that the climate in São Vicente allows the beach to be used year round.

The enlargement of the open-air storage yard covers an area of about 24,000m², built entirely on an area that was previously sea. This enlargement was made possible by the construction of a prism embankment 580m in length using rip-rap. Having been built to a height of 1.80m above the average sea level, the embankment was externally lined with stones weighing between 500 and 1,500 kg and lined on the inside with geotextile with a mass of 300g/m².

The area contained by the embankment was reclaimed by sand pumped in by a trailing hopper suction dredger trough a 600 mm pipeline.

About 90,000m³ were dredged and pumped ashore until the correct level was reached, allowing crusher-run aggregate/ C 8/10 concrete to be laid.

As far as Laginha is concerned, it was a beach about 300m long by 20m wide on average at the start of the job, its entire width sloping down to the sea.

Upon completion of the work the beach is now as follows: a level area 400m long by 70m wide, which then slopes gently till reaching sea level.

This beach is now bounded to the south by the embankment and to the north by a stone groine 130 m long.

The increase of the beach to its final dimensions involved the use of 170,000m³ of sand that was dredged and pumped ashore.

Work Summary

Client	MITT de Cabo Verde
Contract Type	Lump Sum
Construction Period	2013 - 2014
Cost	€ 14 309 000,00





Harbour and Coastal Engineering



North Mole Extension

Gibraltar (British Overseas Territory)

Work Description

The contract of the "North Mole Extension" is the extension of Quay/Breakwater located in the northwestern part of Gibraltar (a small peninsula on the southern Iberian coast near the entrance of the Mediterranean Sea).

The extension of the existing Quay, 270 m, consists in the installation of 9 concrete caissons based on rockfill foundation and aims to increase the area of land available with the propose of building a new "Power Station" in this area.

This structure will be finished at elevation +4.00 m OD and the foundation to -8.00 m OD. From level -10.50 m OD to level -8.00 m OD runs a foundation formed by selected rockfill.

The 9 reinforced concrete caissons, approximately 2.300 ton/caisson, will be prefabricated inside the Port of Gibraltar using a slipform system.

The construction of each caisson starts on the Floating Dock "Ignatios" and ends with the caisson in floatation.

After conclusion, caissons will be towed to the North Mole where they will be sunk on the rockfill foundation previously executed using floating equipment, namely a dredger with backhoe and a pontoon.

The works will end with the execution of a top slab of in-situ.



Main quantities

- Caissons: 9 units;
- Concrete: 9,000 m³;
- Steel rebars: 850 tons;
- Sliding formwork area: 34,650 m²;
- Dredging: 20,250 m³;
- Rockfill: 15,000 m³.

Major equipment involved

- Floating Dock "Ignatios" 4.000 ton of capacity;
- Sliding formwork system;
- Tower crane 6 tons capacity, 50 m distance;
- Dredge w / backhoe;
- 2 Tugs;
- 1 Floating Pontoon (50 m x 15 m) w/ 1 crawler crane 100 ton;
- 1 Rough Terrain Crane, 70 ton capacity.

Work Summary

Client	Government of Gibraltar (através da Casais, SA)
Contract Type	Lump Sum
Construction Period	2014 - 2015
Cost	€ 11 750 000,00





Harbour and Coastal Engineering



Improvement and Rehabilitation of the Quay of ENACOL

Mindelo, Cape Verde

Work description

As part of a consortium, Seth has concluded the work of expansion and improvement of a pier to ENACOL (Oil Company of Cape Verde) in Mindelo, Sao Vicente Island.

The contract have included the following jobs:

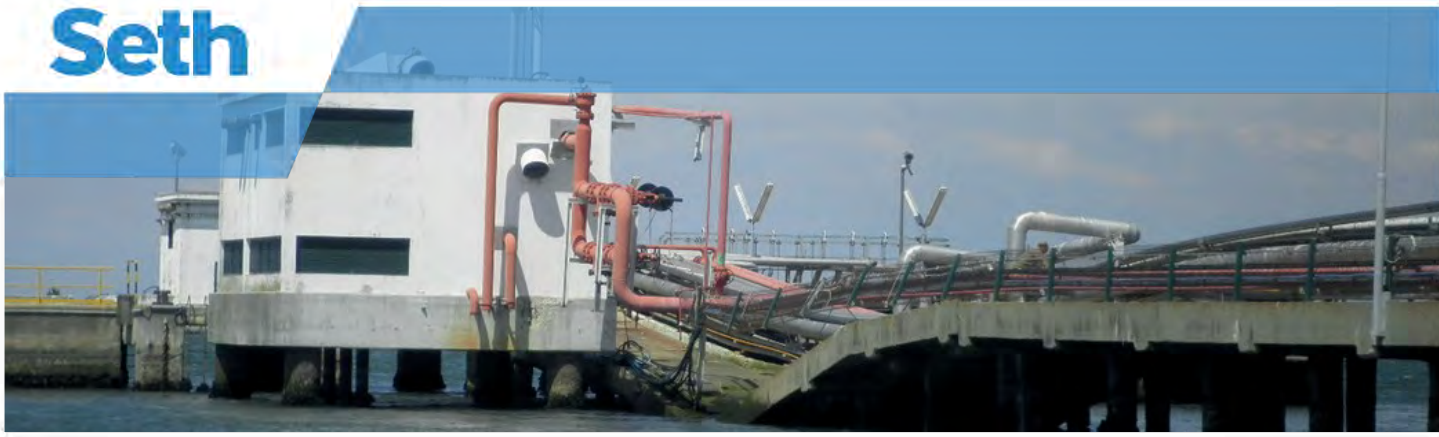
- Construction of an embankment for movement of vehicles and mobile equipment, built on existing wet area with about 1600m²;
- Enlargement of the existing quay to 10/12 m wide, with a total increase of this area with 1100 m².
- Construction of a quay with 40m length, replacing the existing one.
- Improvement of the existing pier jetty on the opposite face to the expansion.
- Construction of a fuel lines covered duct.
- Pavement of the new areas with a reinforced concrete slab.



Work Summary

Client	ENACOL, SA
Contract Type	Lump Sum
Construction Period	2014
Cost	€ 1 600 000,00





Harbour and Coastal Engineering



Rehabilitation of Pier 22 in the Liquid Bulk Terminal at the Port of Aveiro

Porto de Aveiro (Portugal)

Description of work

A 40 m long section of the quay collapsed as a result of erosion of the sandy bottom causing a loss of bearing capacity of the existing piling. The work performed was the replacement of the collapsed section.



Work performed

- Demolition and removal of superstructure and piles in the affected zone in reinforced concrete;
- Installation of reinforced concrete piles in steel pipe casings;
- Installation of prefabricated reinforced-concrete pile caps and beams;
- Installation of prefabricated slabs;
- Concreting top slab curbs.

In addition to the above referenced activities the sandy bottom was protected against further erosion with rockfill 80 to 100 Kg and the installation of two new fenders on the pier.

Main Quantities

- Piling: 12 piles (diameter 600 x 8mm w/ 20 ml long, driven 10 ml into the bottom of the estuary)
- Reinforcement: 34.288 Kg
- Prefabricated concrete: 64m3
- In situ concrete on deck slab and pile caps: 57m3
- Precast beams: 20 units
- Precast slabs: 22 units
- Armor stone: 800 ton
- Fenders: 2 units

Work Summary

Client	SGPAMAG
Contract Type	Lump Sum
Construction Period	2013 - 2014
Cost	€ 426 000,00





Harbour and Coastal Engineering

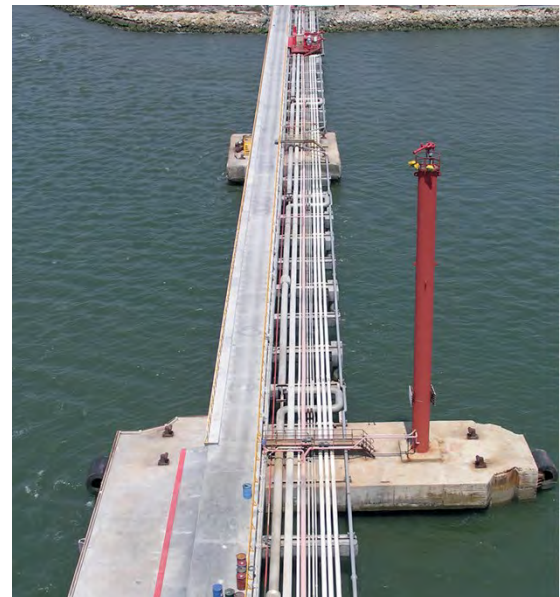


Rehabilitation of the existing Jetty

Mitrena, Setúbal (Portugal)

Description of the Works

The purpose of the contract was the rehabilitation of the existing jetty and the reinforcement of the "Mitrena Park" jetty with the construction of 34 new piles in the access tray.



Work Summary

Client	Tanquisado - Terminais Marítimos, SA
Contract Type	Lump Sum
Construction Period	2003 - 2004
Cost	€ 1 161 175,00





Harbour and Coastal Engineering



Works of dredging in the basin of PAENAL shipyards

Porto Amboim, Angola

Work Description

The scope of work included:

- Dredging of one basin with a Rhode Nielsen suction dredger (650,000.00 m3).
- Removal of sundry equipment buried in the seabed (as pipelines (1.300 m long) concrete blocks, anchors, steel cables).

This work was made with a rented vessel type Multical aided pump dredging "DOP" and divers team.



Most significant figures

- 650.000,00 m3 of dredging

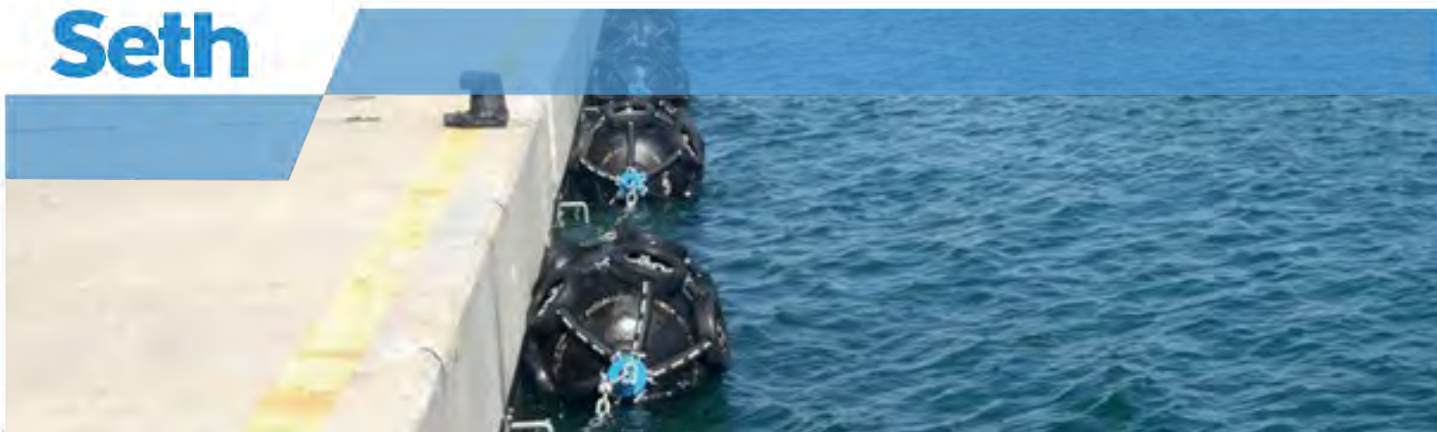
Special Means

- Suction dredge Rhode Nielsen
- Pump dredging type DOP
- Vessel type Multical

Work Summary

Client	PAENAL Porto Amboim Estaleiros Navais, Lda
Contract Type	Lump Sum
Construction Period	2013
Cost	USD 9 228 265,19





Harbour and Coastal Engineering



Fender System – Doca dos Pescadores

Setúbal (Portugal)

Work Description

Quay #1

Supply and assembly, including the mobilization of all necessary equipment and means, of 12 cylindrical rubber fenders with 400 mm outside diameter and 200 mm internal diameter, with lengths of 3500 mm.

Quay #2

Supply and assembly, including the mobilization of all necessary equipment and means, of 38 cylindrical rubber fenders with 400 mm outside diameter and 200 mm internal diameter, with lengths of 3500 mm.

Equipment used

1 wheel crane (Liebherr LTM 1100) (hailed to site work by boat).



Work Summary

Client	APSS – Administração dos Portos de Setúbal e Sesimbra, SA
Contract Type	Lump Sum
Construction Period	2017 - 2018
Cost	€ 187 500,00





Harbour and Coastal Engineering



Rebuilding of Fender System Nova Cimangola Export Jetty

Luanda, Angola

Work Description

- Installation of 36 piles with 813 mm of diameter
- Concrete piles at bottom of sea level.
- Installation of 4 concrete foundations and fender system.

Work volume

- 1300 m3 of concrete
- 8 elastic fenders (Fentek SCN 1400).

Equipment used

1 wheel crane (Liebherr LTM 1100) (hailed to site work by boat).

Designer: Eng. Luís Colen



Work Summary

Client	NovaCimangola
Contract Type	Lump Sum
Construction Period	2003 - 2004
Cost	USD 2 200 000,00





Harbour and Coastal Engineering



Cassinga Project – Ore Terminal

Moçâmedes, Angola

Work carried out

Construction of a 600 m long berthing pier (pre-stressed concrete deck) for ships until 300 000 tdw.

Foundations: driven steel piles (*length: 43 m*).



Work Summary

Client	Companhia Mineira do Lobito
Contract Type	Lump Sum
Construction Period	1968 - 1972
Cost	N/D





Harbour and Coastal Engineering



Construction of River Side Steps

MAAT – Belém, Lisbon (Portugal)

Description of Works

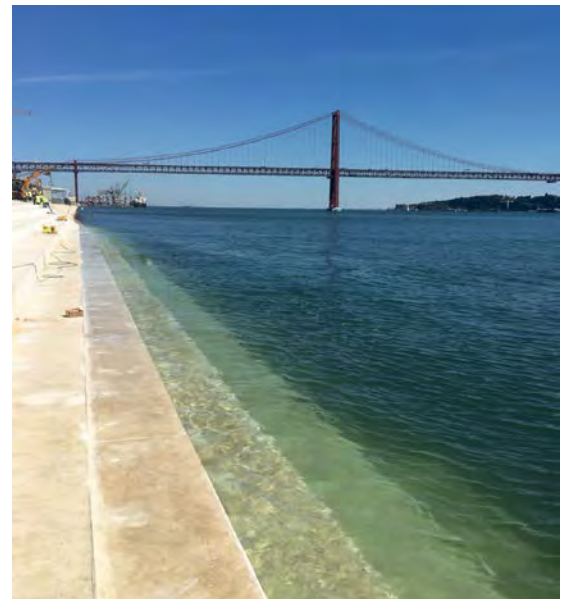
The aim of the project was the implementation of a new marginal structure on the riverside front of the new Museum of Art, Architecture and Technology (MAAT) of the EDP Foundation.

Main quantities

- 88 prefabricated elements installed in about 150 ml with the heaviest elements being 19 ton;
- 1600 m3 of excavation and dredging;
- Placement of 360 m3 of concrete in inclined slope;
- Demolition of 200 tons of reinforced concrete;
- Removal of 1300 m2 of equipped stone.

Means used

- 110 ton Track Crane (Kobelco CKE 1100)
- 24 ton Rotary Excavator w/ arm 17 m long (Case CX 240)
- Dredging bucket
- Maritime buoy of works



Work Summary

Client	Alves Ribeiro, SA
Contract Type	Lump sum
Construction Period	2016
Cost	€ 485 000,00



Harbour and Coastal Engineering



Riverbank Extension and New Ribeira das Naus Avenue

Cais do Sodré – Terreiro do Paço, Lisbon (Portugal)

Work description

Seth carried out the first stage of the job involving the refurbishment of the Avenida Ribeira das Naus area in Lisbon, thus contributing to the recovery of the history of this place, while also allowing a more contemporary use through the creation of gardens, a reflecting pool and a ramp providing access to the river, in addition to the opening to the public of a part of the Navy's central facilities.

This contract for the redevelopment of the public space and infrastructure involving the Widening of the Bank and the new Ribeira das Naus Avenue included the extension the river bank, an adjustment of the traffic lanes, an access ramp to the river, the pontoon near the Agencies Building and recuperation of the docks and pontoons that had long been buried.

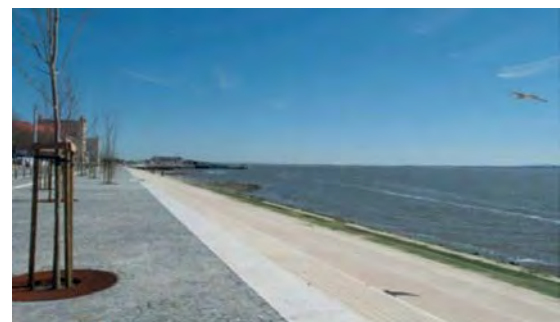
In this first stage the investment amounted to around 4 million euros, a percentage of which was provided by the Community Support Framework and the rest by the local authority itself.

Main quantities

- Piles – 78 units (length 22 m / diameter 1.20 m)
- Rebar cages – 700.000 Kg
- Concrete – 7.000 m³
- Dredging/Excavations– 20.000 m³
- Prefabricated slabs (on the Agencies pontoon) – 45 uni (rebar cages 22,000 kg / concrete 180 m³)
- Dolerite basalt paving cubes – 8.000 m²
- Tree planting– 48 units

Work Summary

Client	Câmara Municipal de Lisboa
Contract Type	Price Series
Construction Period	Fev 2012 – Mar 2013
Cost	€ 3 750 000,00





Harbour and Coastal Engineering



Clinker and Cement Export Terminal

Luanda, Angola

Work carried out

Construction of a 1000 m long access pier (reinforced concrete deck) and berthing pier founded over 30 m long piles.

Berthing/loading pier (120 m), 4 cement and clinker silos (5000 ton), cement bagging facility, conveyor belts and miscellaneous steel structures.

Inspection agency: Dar Al-Handasa Consultants (Beirute)



Work Summary

Client	CIMANGOLA U.E.M.
Contract Type	Design-Build
Construction Period	1982 - 1984
Cost	N/D





Harbour and Coastal Engineering



Kamsar Container Terminal and Barge Unloading Facility

Port of Kamsar Republic of Guinea

Works description

Seth has completed the design/construction of the Container Terminal at the port of Kamsar in the Republic of Guinea. The contract awarded for the sum of 18 million euro with a duration of 18 months. The construction of the quay is part of the project for the construction of an alumina refinery at Sangarédi, located in the interior of this West African country, the employer being the multinational enterprise Guinea Alumina Corporation. The Republic of Guinea has one of the worlds biggest reserves of bauxite (the raw material for the manufacture of aluminium), and the refinery will have a production capacity of 3.3 million tonnes per annum (Mtpa) manufactured from 9.4 Mtpa of bauxite extracted from the site.

The quay comprises a berthing facility for cargo vessels and barges bringing the building materials required for the construction of the alumina export terminal infrastructures at Kamsar and for the refinery at Sangarédi. It is a precast reinforced concrete structure supported on circular steel piles of a diameter of 914 mm.

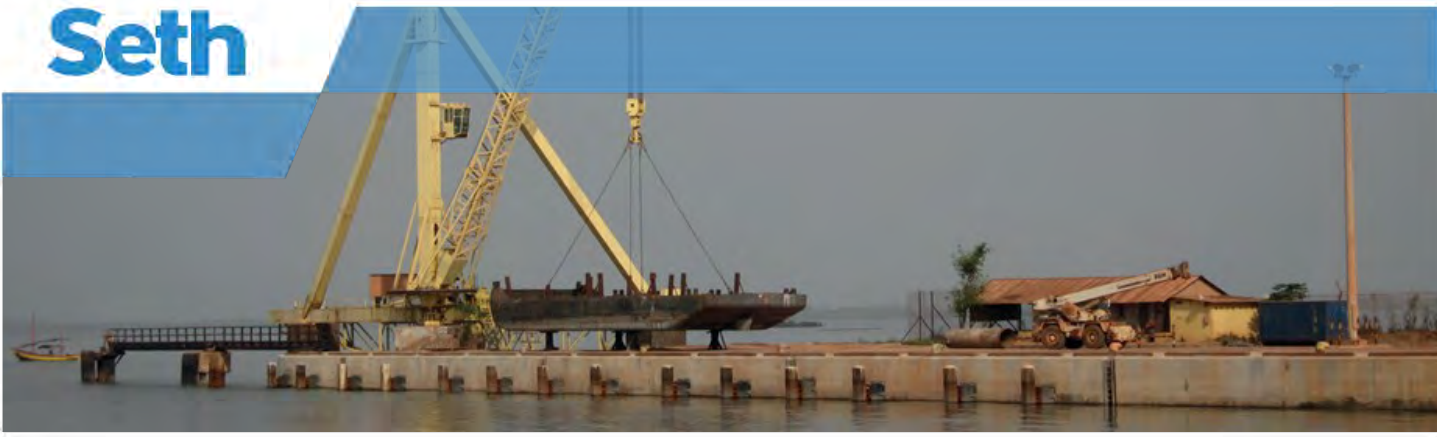
The quay is 230m metres long and can berth ships of up to 10,000 tons dwt. Its construction is essential to the project as there is no other quay in the region able to receive equipment of the dimension and weight of the equipment to be installed at the refinery.



Work Summary

Client	GAC Guinea Alumina Corporation
Contract Type	Lump Sum
Construction Period	2011 - 2012
Cost	€ 18 000 000,00





Harbour and Coastal Engineering



Rehabilitation of the French Quay

Port of Kamsar, Republic of Guinea

Description of Works

Seth, has concluded a job awarded by Compagnie des Bauxites de Guinée.

The job was located at the mining town of Kamsar, about 300 km north of the capital, Conakry.

The work was designed to rehabilitate the existing French Quay, a port structure dating from the 1950s, which was in bad condition.

During the rehabilitation work, the quay was operation at all times and continued to receive the two ships scheduled each month. These are the ships that supply Kamsar with the materials required for the mining operation and for the subsistence of the population.

The job consisted of driving a main curtain of sheet piling, driving an anchoring curtain of sheet-piling, and horizontal drilling under the existing quay to introduce the anchorage tie-rods linking both curtains.

Subsequently, a reinforced-concrete crown beam and pavement slabs were built. The work was concluded with the installation of a new fender system and erection of sundry quay furniture.

Designer: Haskoning UK, LTD



Main features

- Rehabilitation of a quay in operation;
- Driving two sheet-pile curtains, main and anchorage;
- Horizontal driving of steel pipes for subsequent installation of tie-rods;
- Installation of anchorage tie-rods;
- Excavation and landfill;
- Construction of the reinforced-concrete crown beam;
- Construction of reinforced-concrete pavement slabs;
- Installation of a new fender system;
- Installation of new quay furniture.

Work Summary

Client	CBG Compagnie des Bauxites de Guinée
Contract Type	Lump Sum
Construction Period	2006 - 2007
Cost	USD 3 000 000,00





Harbour and Coastal Engineering



Reinforcement of Intermediate Section of the Pier of the Port of Oran

Oran, Algeria

Description of works

Reinforcement of the intermediate section of the pier of the Port of Oran, in an extension of 1287m, with foundation stones placed in sub layers and toe footing, and cubic blocks like Antifer on the protection layer.

Main features and quantities

- Foundation stones TOT 254.074ton
- Foundation stones from 1 to 3 ton – 173 092 ton
- Foundation stones 3 to 6 ton – 216 355 ton
- Concrete in Antifer blocks of 40 ton – 91 928 m3
- Concrete in pier wall – 2 844 m3
- Steel in pier wall – 22 000 Kg



Work Summary

Client	Direction des Travaux Publics de la Wilaya d'Oran
Contract Type	Lump Sum
Construction Period	2007 - 2010
Cost	€ 35 176 600,00





Harbour and Coastal Engineering



Reconstruction of a Pier at Naval Base of Mers-El-Kébir

Mers-El-Kébir, Algeria

Description of works

Repair of the track, with the construction of the foundation beams and the provision and application of rails, a distance of 520 ml.

Rehabilitation of the South Jetty, with the construction of the capping beam on existing blocks quay with a length of 375 m.

Rehabilitation of the North Pier, the execution of 21 entries lost metal mold 813 mm in diameter, in front of the pier.

The implementation of the new infrastructure with dock included 54 concrete blocks and concrete superstructure in situ.

Main Features and Quantities

- Excavated: 1.000 m3
- Concrete: 3.590 m3
- Steel: 325 t
- Supply and installation of rail: 874 ml
- Terminals: 43 un
- Fenders: 43 un
- Rockfill: 2.000 t.



Work Summary

Client	Ministère de la Défense National de la République Algérienne Démocratique et Populaire
Contract Type	Lump Sum
Construction Period	2009
Cost	€ 6 405 061,00





Harbour and Coastal Engineering



Platform landfill and protective embankments at Koudiet Eddraouch

Annaba, Algerie

Description of works

This contract in Annaba (Algerian East coast) near the border with Tunisia, was the implementation of a platform next to the sea, for the installation of the pumping station water sea to the combined cycle.

The work itself consists of an execution platform approximately 400 m x 200 m, protected by dikes artificial concrete blocks 8 tons each.

Also included are the establishment of five tubes each 4 meters in diameter, in the root zone emissaries slopes.

Main features and quantities

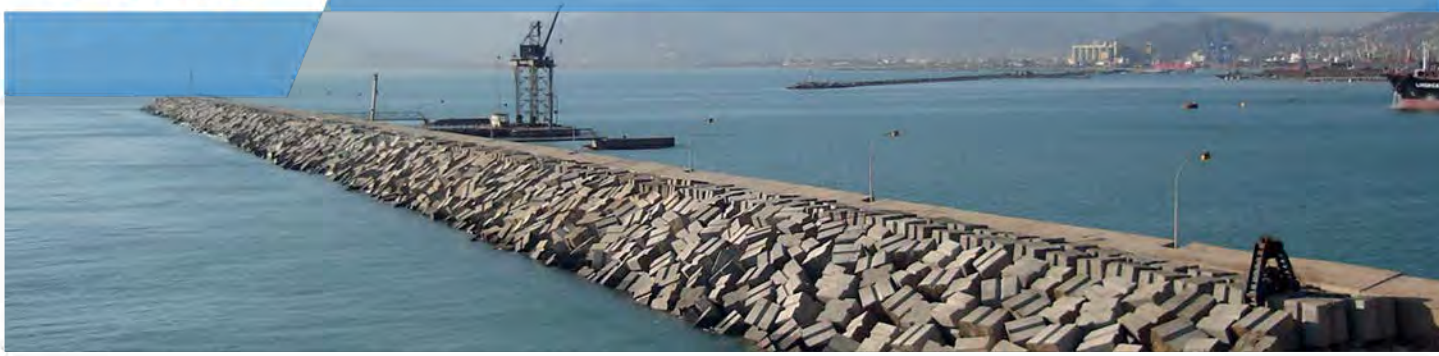
- Dredging: 8.850 m³
- Selected core rockfill: 13.775 m³
- Geotextile fabric: 8.024 m²
- Filter rockfill 3-5 kg: 1.881 m³
- Filter rockfill 500-700 kg: 11.252 m³
- Cloak rockfill 5-7 ton: 20.742 m³



Work Summary

Client	Iberdrola
Contract Type	Lump Sum
Construction Period	2009
Cost	€ 6 500 000,00





Harbour and Coastal Engineering



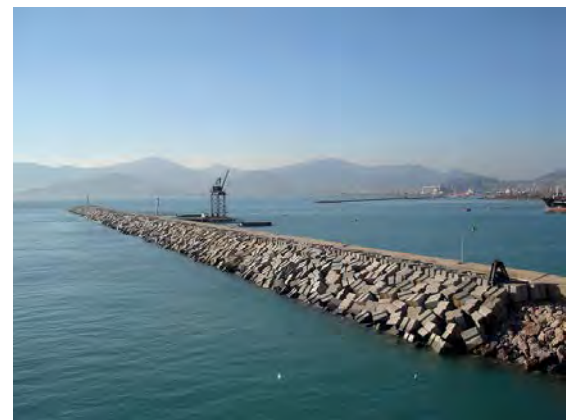
Rehabilitation of East Breakwater of the Oil Port of Béjaia

Béjaia, Algeria

Description of works

Rehabilitation of east breakwater of the oil port of Béjaia with sub-mantles of selected rockfill and protective mantles of cube type Antifer of 13 and 24 tons.

Construction of a pier on piles board at elevation -12.00 m of berth length of 78m and two 20m side walls. For connecting the pier to the existing jetty was built in TOT with about 35m wide with asphalt concrete pavement.



Main features and quantities

- Selected rock fillings: 59.387 m³
- Concrete blocks: 20.434 m³

Work Summary

Client	Ministère des Travaux Publics de l'République Algérienne
Contract Type	Lump Sum
Construction Period	2006 - 2008
Cost	€ 7 320 000,00



Harbour and Coastal Engineering



Construction of a Quay in the Oil Port of Béjaia

Béjaia, Algeria

Description of works

Construction of a quay on sheet piles, with a quota of service (-12.00 m) ZH and forward berth of 78 m in length. The pier is topped by two lateral containment structures of 20 m in length and attached to the existing breakwater embankment by approximately 35 m wide, in TVC with wear layer of bituminous concrete. The basin is dredging at elevation -12.00 m.

Main features and quantities

- Dredging: 450.000 m³
- Sheet-piles AZ 50: 950 t
- Concrete: 1.490 m³ / Aço: 170 t
- Bituminous concrete: 480 t
- Rockfill 50-200 kg: 350 t
- Rockfill 200-1000 kg: 600 t
- Broken stone 0/40: 1.700 ton
- TVC 0-200 kg: 65.000 ton
- Bollards type 100 ton: 12 units / Fenders: 4 units



Work Summary

Client	SOGEPORIS Entreprise Portuaire de Béjaia, EPE
Contract Type	Lump Sum
Construction Period	2008 - 2009
Cost	€ 11 146 000,00





Harbour and Coastal Engineering



Circular cofferdam embankment and outlet for water of a Combined Cycle

Terga, Algeria

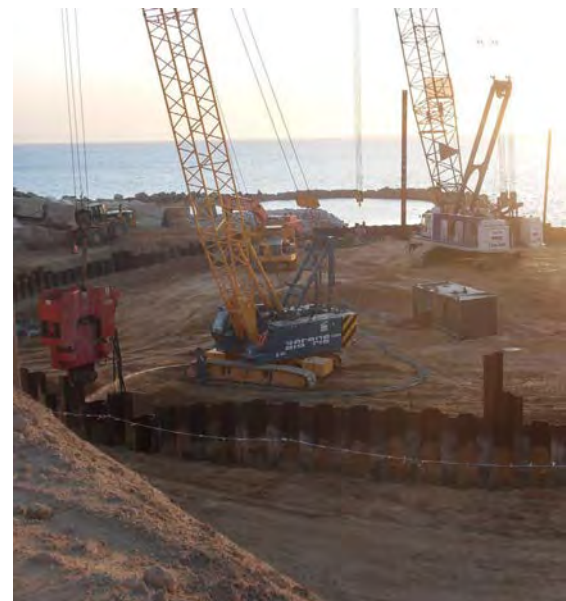
Description of works

Execution of landfill and a circular cofferdam shape with a diameter of 70 m, consisting of AZ50 with cuttings board 25 m long, reinforced with beams ring of reinforced concrete containment as temporary work for the construction of an outlet of water.

Work defensive front stick with core rockfill TVC 50-500 kg and riprap protection with selected ranges of 0.5-1 ton, 0.5 to 2 ton, 3.1 ton and 5.3 ton.

Main features and quantities

- Excavation and dredging: 44.680 m³
- Rockfill: 54.760 m³
- Sheet piles AZ50: 1.430 ton



Work Summary

Client	ORASCOM
Contract Type	Lump Sum
Construction Period	2009 - 2010
Cost	€ 14 450 000,00



Harbour and Coastal Engineering



GNL – 3Z Project – Service Quays Construction

Arzew Port, Algeria

Work description

Construction work on the docks of service-3Z LNG project in Arzew, Algeria. This work involved the construction of two quays consisting of staves columns of reinforced concrete, headed by a capping beam, also in reinforced concrete.

These two new docks, with funds services at elevation -9.50 m (ZH), have 85 l 35 m long, respectively, and will be used for dredging vessels, tugboats and other vessels to support the development of work-LNG project 3Z at the Port of Arzew.



Main features and quantities

- Staves – 160 un
- Reinforced concrete staves – 1.200 m3 Reinforced concrete superstructure – 450 m3 Dredging - aprox. 9 628 m3
- Armourstone– 5.000 m3



Work Summary

Client	Snamprogetti Chyoda s.a.s. di SAIPEM S.p.A.
Contract Type	Lump Sum
Construction Period	2009
Cost	€ 2 600 000,00





Harbour and Coastal Engineering



Oeiras Pleasure Harbour

Oeiras (Portugal)

Work description

Oeiras Pleasure Harbour located about 15 Km's west of Lisbon, is one of the most modern pleasure harbours of the "Sunny coast of Portugal" between Estoril coast and Sintra.

Scope included dredging, a breakwater and berths for 275 boats of various sizes, refurbishing of the surrounding area, including the installation of urban equipment (lighting fixtures, benches and planters) and shops, restaurant, police station, and parking to 250 automobiles.

Main work volumes

- Concrete: 4 000 m³
- Steel Structure: 165 000 Kg
- Foundation piling Ø300mm: 48 units
- Steel piles Ø580 mm: 49 units
- Steel gangways w/ wood: 1400 m²
- Concrete pav. vessel parking area: 4269 m²
- Bituminous concrete pavement: 2142 m²



Work Summary

Client	Câmara Municipal de Oeiras
Contract Type	Design-build
Construction Period	2004 - 2005
Cost	€ 7 000 000,00





Harbour and Coastal Engineering



Leixões Multipurpose Terminal Port of Leixões (Portugal)

Work description

The contract for the Construction of the New Multipurpose Terminal at the port of Leixões was awarded by the APDL (Douro and Leixões Ports Authority) to the consortium of which Seth is a member, with a duration of 22 months and included the following jobs:

- Dredging two basins, one with a service depth of -8.50m (CD) and another of -5.00 m (CD);
- Construction of an Advance Structure of the South Mole Quay;
- Construction of a Fixed Roll-On/Roll-Off Platform;
- Construction of the New Block Wall Quays to depths of -8.50 m (CD) and -5.00 m (CD);
- Construction of two Rock-fill Bank Retaining Walls;
- Construction of a Slipway and an Open-air Storage Area at a level of +6.00 m (CD).

Restructuring the area in various areas:

- Repair of the vertical parameter of the present quay-wall of the South Mole;
- Removal of sundry equipment;
- Restructuring the technical networks;
- Restructuring the stormwater run-off networks;
- Repaving the port's existing open-air storage area.

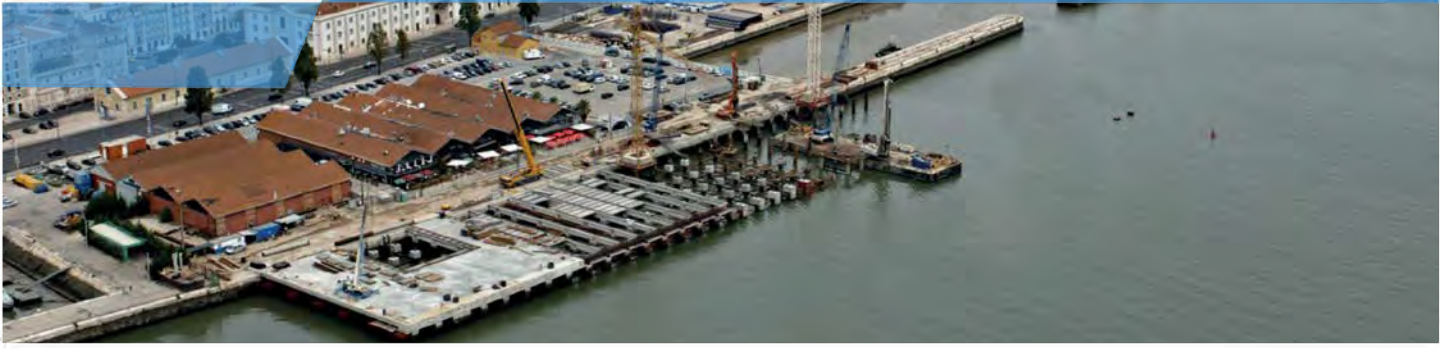


Main quantities

- Dredging of soft materials to design level - 106.000 m3
- Dredging of rock - 99.000 m3
- Rock blasting - 73.000 m3
- Earthmoving - 100.000 m3
- Ungraded rock-fill - 95.500 m3
- Graded rock-fill - 16.700 m3
- Concrete - 40.000 m3
- Paving - 37.000 m2
- Rebars - 328 ton
- NOREF type quay mass concrete blocks- 1.546 units

Work Summary

Client	APDL Administração dos Portos do Douro e Leixões
Contract Type	Lump Sum
Construction Period	2007 - 2009
Cost	€ 13 000 000,00



Harbour and Coastal Engineering



Lisbon Cruise Liner Terminal - 1st Stage

Santa Apolónia, Lisbon (Portugal)

Work description

The first stage of the job involving the Rehabilitation and Reinforcement of the Quay between Santa Apolónia and Jardim do Tabaco, at a cost of €14 million, has been concluded by a consortium that includes Seth.

Construction of the Santa Apolónia liner terminal is divided into three stages. The first stage involves rehabilitation of the present quay between the Santa Apolónia liner terminal and the Navy Dock, as well as the construction of a new advanced structure, ensuring greater water depth to allow the berthing of present-day liners.

The river-front crown of the new berth now stands at a level of +5.70 m (chart datum), which means that continuity will be given to the present Santa Apolónia Quay with which it is now connected following the conclusion of the job.

The works also involved general dredging of the manoeuvring basin and berthing basin, improvement of the foundation soils involving the construction of aggregate columns, and the reconstruction of the rock-fill prisms and of the landfills behind the existing quay. Besides these, other works were carried out, such as reinforcement of the massif of the superstructure of the existing quay including soil-nailing and sealing fissures, as well as the construction of pile caps, placement of pre-beams, erection of pre-slabs and complementary concrete-pouring work.

The contract also includes construction of a new quay 200 metres long and a variable width of between 33 m and 45 meters, using reinforced concrete piles.

The technical infrastructure works and the fitting out of the quays include the water, electricity and storm-water networks, as well as connecting up with the existing water mains.



Main quantities

- Piles - 204 units (1,000 mm internal diameter piles of an average depth of 36 m)
- Rebar cages - 791,000 kg (piles) 101 000 Kg (pile caps) 223,000 kg (deck slab)
- Concrete - 3400 m3 (deck slab) and 6600 m3 (for the piles)
- Dredging - +- 30 000 m3
- Precast beams - 202 units (283,000 kg of rebar cages and 950 m3 of concrete)
- Precast slabs - 660 units (230,000 kg of rebar cages and 1,300 m3 of concrete)

Work Summary

Client	APL - Administração do Porto de Lisboa
Contract Type	Lump Sum
Construction Period	2007 - 2009
Cost	€ 14 000 000,00





Harbour and Coastal Engineering



New Cruise Liner Terminal – 2nd Stage

Santa Apolónia, Lisbon (Portugal)

Work description

The 2nd stage of the job involving the Rehabilitation and Reinforcement of the Quay between Santa Apolónia and Jardim do Tabaco, at a cost of € 38 million, has been concluded by a consortium that includes Seth.

This stage concluded the rehabilitation of the present quay between the Santa Apolónia liner terminal and the Navy Dock, as well as the construction of a new advanced structure, ensuring greater water depth to allow the berthing of present-day liners.

The river-front crown of the new berth now stands at a level of +5.70 m (chart datum), which means that continuity will be given to the present Santa Apolónia Quay with which it is now connected following the conclusion of the job.

The works also involved general dredging of the manoeuvring basin and berthing basin, improvement of the foundation soils behind the existing quay. Besides these, other works were carried out, such as reinforcement of the massif of the superstructure of the existing quay including soil-nailing and sealing fissures, as well as the construction of pile caps, placement of pre-beams, erection of pre-slabs and complementary concrete-pouring work.

The contract also includes construction of a new quay 475 metres long and a variable width of between 20 m and 55 meters, using reinforced concrete piles.

The technical infrastructure works and the fitting out of the quays include the water, electricity and storm-water networks, as well as connecting up with the existing water mains.

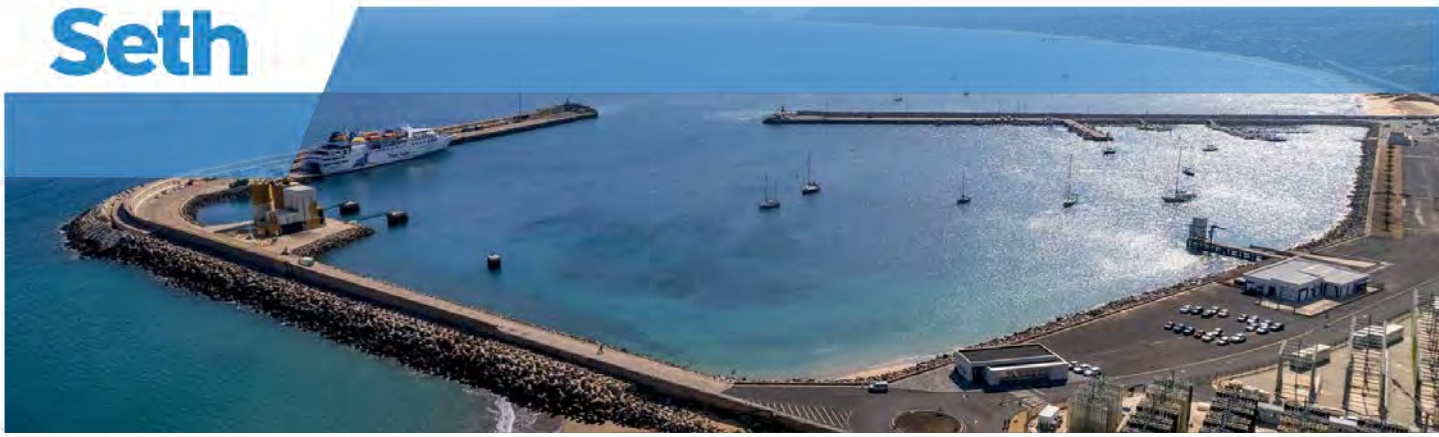


Main quantities

- Piles – 435 units (1,000 mm internal diameter piles of an average depth of 38 m)
- Rebar cages – 1,673,766 kg (piles) 238,937 Kg (pile caps) 629,318 kg (deck slab)
- Concrete – 7,705 m3 deck slab) and 13,062 m3 (for the piles)
- Dredging - 65000 m3
- Precast beams – 513 units (556,000 kg of reinforcement and 2,405 m3 of concrete)
- Precast slabs – 1327 units (438,000 kg rebar cages and 2,587 m3 of concrete).

Work Summary

Client	APL - Administração do Porto de Lisboa
Contract Type	Lump Sum
Construction Period	2009 - 2011
Cost	€ 38 200 000,00



Harbour and Coastal Engineering



Major Repair of the Main Breakwater of the Port of Porto Santo

Porto Santo, Archipelago of Madeira (Portugal)

Work description

This contract was awarded to Seth (in consortium) to carry out the work involved in the Major Repair of the Main Breakwater of the Port of Porto Santo, over a period of two years.

The job involved two distinct parts, marine work and onshore work.

The aim of the onshore work was to improve the quality, safety and working of the container park and of the entire commercial area, involving several roadways along the eastern part of the Quay

The marine work accounted for 90% of the contract and comprised reprofiling the external protection of the breakwater, (East section) consisting of rockfill of up to 0.15 tones and 10-tonne tetrapods, over a distance of 260 m, as well as the reconstruction of the external protection of the breakwater, (South section) consisting of 2-3 tonne rockfill and 30-tonne antifers, over a distance of 460 m.

The placement of the 4,000 30-tonne antifers involved the use of a heavy-lift crane (Manitowock 4100 erected on a "ringer"), sent for the purpose from Mainland Portugal, having the following main characteristics:- Safe working load: placement of 3 tonnes at 50 metres- Total weight of the crane, counterweights and jib: 400 tonnes- Jib with a section of 3 x 2 metres, 61 m long- Crane travel: on rails Fundamentally, the repair consisted of removing the breakwater's protection mantle comprising 10-tonne tetrapods laid with slope of 34° and their replacement by 30 tonne antifers, laid with an inclination of about 26°. The alteration made to the inclination means that the protection of the breakwater extends into the sea by a further 12 to 15 metres, ensuring a greater area for the waves to break.



Main Quantities

- 30-tonne antifers: 4000 units
- 10-tonne tetrapods (new): 350 units
- 10-tonne tetrapods (existing, dismantled and reapplied): 5000 units
- C35/45 concrete: 52,000 m³
- Rockfill 2/3 ton: 85,000 ton
- Dredging sand: 25,000 m³

Work Summary

Client	APRAM Administração do Portos da Região Autónoma da Madeira, S.A.
Contract Type	Lump Sum
Construction Period	2007 - 2009
Cost	€ 19 000 000,00



Harbour and Coastal Engineering



Bulk Terminal, Aveiro Harbour

Gafanha da Nazaré, Aveiro (Portugal)

Work Description

This is the first Portuguese quay-wall employing the combined wall system with sheet-piles and HZ beams.

The quay wall of the bulk terminal consists of a HZ 975 B-14/AZ18 combined wall system from Arcelor anchored with tie-rods to a secondary sheet pile wall.

The key elements are HZ beams with a length of 25.9 m in steel grade S 430 GP. The intermediate sheet pile elements are 20.9 m long AZ 18 sheet piles in steel grade S 355 GP.

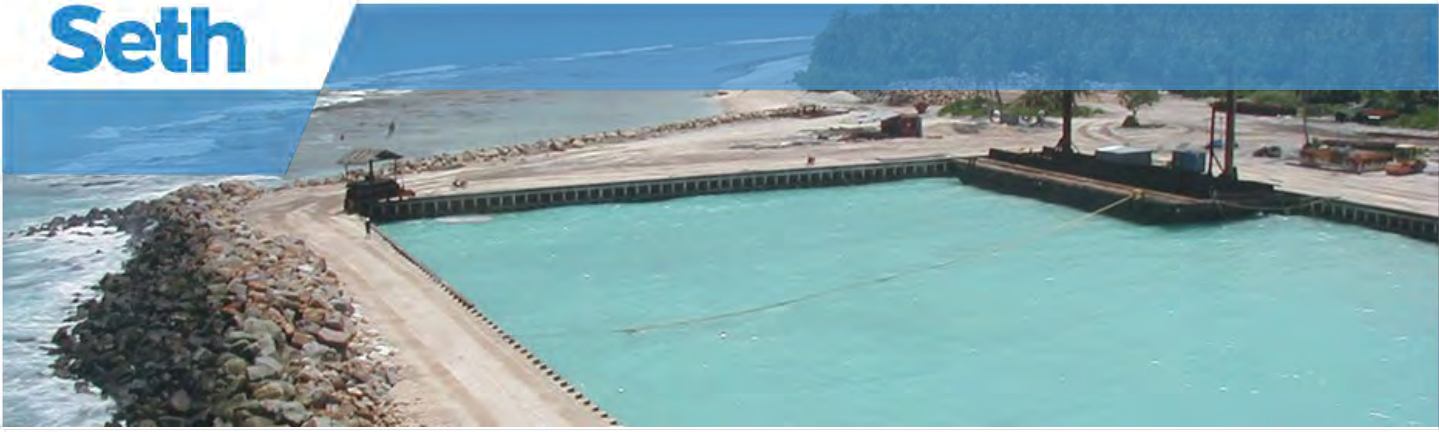
Work included

- Construction of a 750 m long quay;
- Construction of a quay area of 22 000 m² and a gantry rail supported by 642 concrete piles (Ø 1000 mm).
- 4 500 ton of sheet-piles.



Work Summary

Client	APA Administração do Porto de Aveiro, SA
Contract Type	Unit Prices
Construction Period	2001 - 2004
Cost	€ 21 038 183,00



Harbour and Coastal Engineering



Fuah Mulaku Harbour

Republic of Maldives

Work description

Construction of a fishing harbour covering an area of 15 000 m² including 500 m of breakwaters, 700 m sheet piling and dredging of approx 80 000 m³ hard coral.

To perform the piling and dredging works, 85 000 kg of explosives were detonated by surface blasting. All in all imported granite stone for the breakwaters, approx. 50 000 tons.

Construction consortium: Hojgaard & Schultz a/s + Seth



Work Summary

Client	Ministry of Construction and Public Works
Contract Type	Lump Sum
Construction Period	2000 - 2002
Cost	€ 9 700 000,00





Harbour and Coastal Engineering



Breakwater Emergency Repair – Stage 1

POL Pier – Praia da Vitória, Azores (Portugal)

Work description

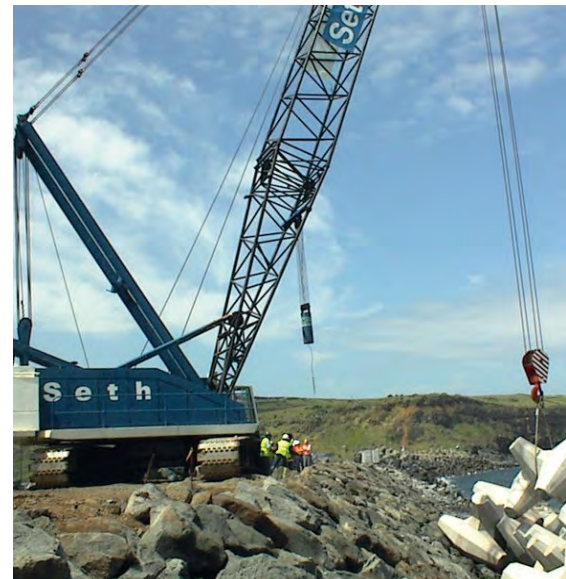
- Crest height: +7.00 Datum
- Bottom depth: – 8.00 Datum
- Pre-fabrication and placement of 20-ton antifer armour blocks: 415 ea.
- Pre-fabrication and placement of 32-ton CORE-LOC® armour blocks: 380 ea
- Armour rock (2 - 9 ton): 5500 tons

NOTE: The world's largest CORE-LOCS ® at the time of this work.

Equipment used

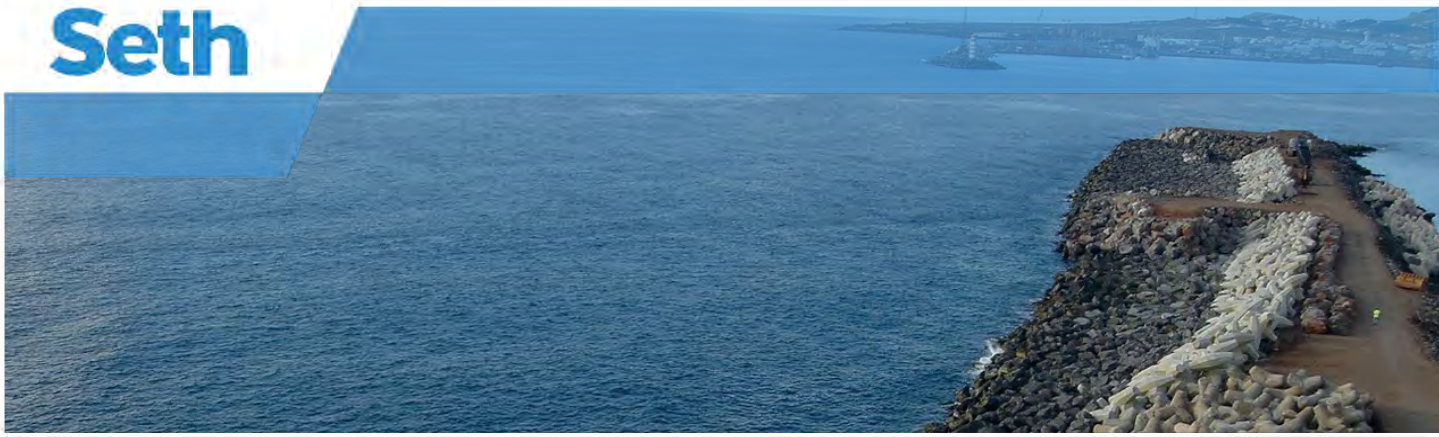
- 1 Crawler crane, 350 tons
- 1 Crawler crane, 250 tons
- 1 Hydraulic excavator, 60 tons
- 3 trailers, 40 tons

Engineering: Transystems Corporation, USA



Work Summary

Client	Brown & Root Services Corp.(US Navy)
Contract Type	Série de Preços
Construction Period	2002 - 2003
Cost	€ 12 600 000,00



Harbour and Coastal Engineering



Breakwater Emergency Repair, Stage 2

POL Pier – Praia da Vitória, Azores (Portugal)

Work description

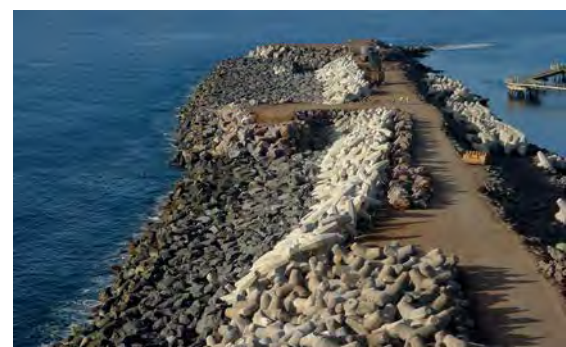
- Crest height: +7.00 Datum
- Bottom depth: – 10.00 Datum
- Pre-fabrication and placement of 33-ton CORE-LOC® armour blocks: 670 ea.
- Armour rock (2,5-20 ton): 175.500 tons

NOTE: The world's largest CORE-LOCS® at the time of this work.

Equipment used

- 1 Crawler crane, 350 tons
- 1 Crawler crane, 250 tons
- 1 Hydraulic excavator, 60 tons
- 3 trailers, 40 tons
- 1 Komatsu WA600 (60T)

Engineering: Transystems Corporation, USA



Work Summary

Client	Brown & Root Services Corp.(US Navy)
Contract Type	Price Series
Construction Period	2004 – 2006
Cost	€ 24 600 000,00



Harbour and Coastal Engineering



Breakwater Emergency Repair – Stage 3

Military Port, POL Pier – Praia da Vitória, Azores (Portugal)

Work Description

The third and final stage of the reconstruction of the North Breakwater of Praia da Vitória Bay, a contract that the US Navy had awarded to Seth, on November 1, 2007, was concluded in March 26, 2009.

The job in question, budgeted at about € 8.5 million, took 15 months (3 months ahead of the date scheduled by the customer) and it involved the following tasks and quantities:

- Conclusion of the protection crown (30 metres wide) around the head, involving application of 19,300 tonnes of rock-fill of between 8 and 22 tonnes;
- Reprofilling the body of the breakwater over a distance of 540 m and application of 66,300 tonnes of rock-fill of between 2,5 and 8 tonnes used in the construction of the protection mantle along the inner side of the breakwater;
- Pre-fabrication of 392 C60/75 concrete Core-locs reinforced with 50mm synthetic-fibre;
- Placement of 516 new 33-tonne Core-locs;
- Shifting and replacing 100 existing Core-locs;
- Shifting and replacing 120 Antifers each of 20 tonnes;
- Concreting the superstructure of the head and placement of the Port of Praia da Vitória approach light having a visual range of 10 nautical miles.

NOTE: The world's largest CORE-LOCS ® at the time of this work.

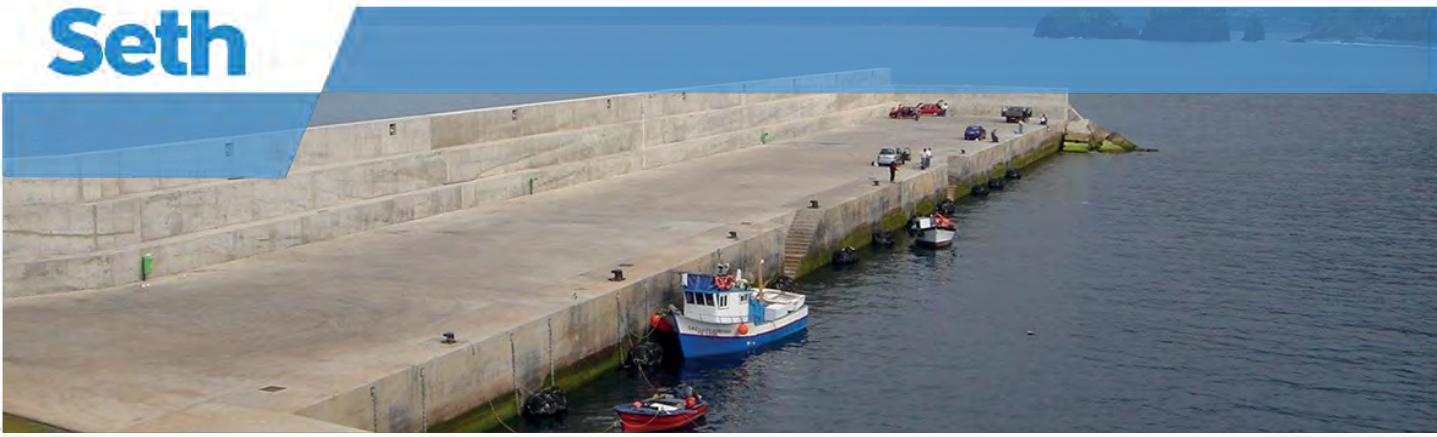
Equipment used

- 1 Crawler crane, 350 tons
- 1 Crawler crane, 250 tons
- 1 Hydraulic Excavator, 60 tons
- 3 trailers, 40 tons
- 1 Wheel Loader Komatsu WA600 (t0 ton)

Work Summary

Client	US Navy United States Navy
Contract Type	Lump Sum
Construction Period	2007 - 2009
Cost	€ 8 500 000,00





Harbour and Coastal Engineering



Porto Moniz Harbour

Porto Moniz, Archipelago of Madeira (Portugal)

Work description

- Construction of berthing quay
- Caissons laid at -8,0 m below datum level
- Concrete access viaduct

Work volume

- Pre-fabrication and placement of 50 ton antifer armour blocks: 2100ea
- Pre-fabrication and placement of 5 concrete caissons (25m x 15m x 13m each one)
- Stone volume: 200.00m³



Work Summary

Client	APRAM (Madeira)
Contract Type	Unit Price
Construction Period	2002 - 2003
Cost	€ 18 352 751,00





Harbour and Coastal Engineering



U.S. Navy - POL Pier

Terceira Island, Azores (Portugal)

Work description

The construction of the dock of fuels and lubricants of Praia da Vitória, to support the activities of the US Armed Forces stationed at Lajes, Azores, involved the implementation of the following infrastructure:

- Concrete wharf with 260 m in length (including 1 Duke d'Alba), with foundations on steel piles 40 m long. Depth at the top of the pier: 14 m, usable by ships with a draft up to 12 m.
- Breakwater protection trapezoidal cross section with 650 m length, involving 500,000 m³ rockfill.
- Construction of a multi-product pipeline to refined petroleum products 2500 m long. More recently, in 1982, SETH also performed several works by enhancing the breakwater and in 1989 installed a new cathodic protection system imposed current.

Work volume

- Total concrete volume: 75 000 m³
- Driven piles: 40 m comp./length
- Breakwater: 650 m / 500 000 m³
- Pier: 260 m
- Draught: 12 m

Inspection agency: Naval Facilities Engineering Command/ USA



Work Summary

Client	U.S. Navy
Contract Type	N/D
Construction Period	1962 - 1963
Cost	N/D





Harbour and Coastal Engineering

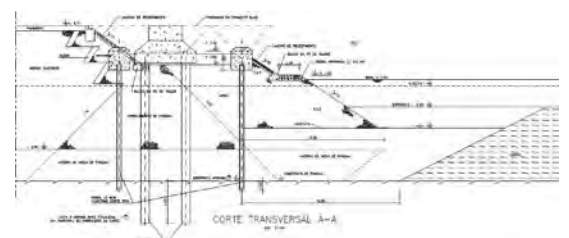
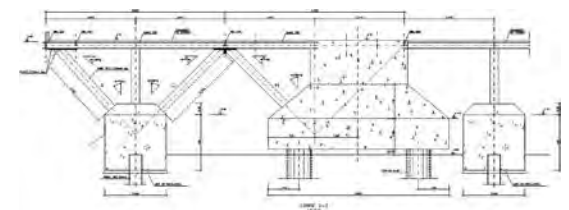


EXPO'98 -Closure Dyke and Lock

Lisbon (Portugal)

Description of works

- Sheet-piles -1000 ton
- Construction of a cofferdam for canal dock
- Construction of steel structures and installation of mechanical equipment - 200 ton
- Dredging - 1 000 000 m³ (including transport and discharge on the sea)
- Enrocamento - 150 000 m³



Work Summary

Client	Parque EXPO, SA
Contract Type	Turn-Key
Construction Period	1998
Cost	PTE 3 200 000 000





Harbour and Coastal Engineering



Arrifana Fishing Harbor

Maintenance and Upgrading Works

Arrifana, Aljezur (Portugal)

Work description

- Dredging of the inner basin
- Length and height increase of the breakwater
- Stability improvement of the surrounding cliffs
- Construction of retaining walls around the inner basin
- Repairs to the boats ramp
- Volume de enrocamento: 6000 m³
- Armor stone volume: 6000 m³

Designer / Engineer: Consulmar

Inspection Agency: Instituto Marítimo e Portuário



Resumo da Obra

Client	Instituto de Conservação da Natureza
Contract Type	Unit Prices
Construction Period	1999 - 2000
Cost	€ 545 000,00



Harbour and Coastal Engineering

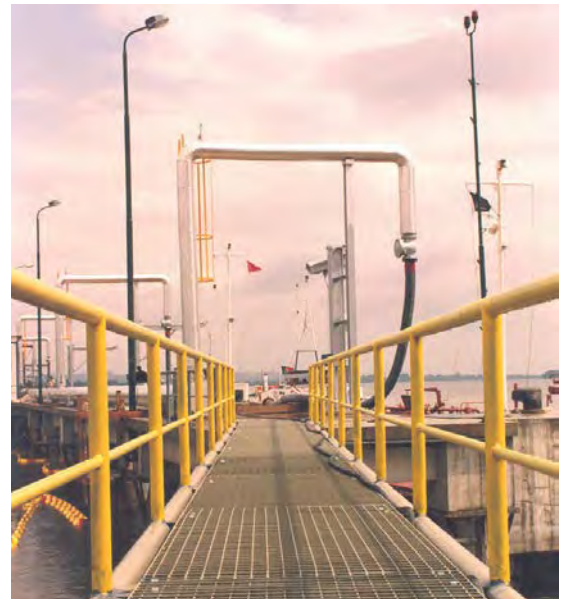


Fuel Pier Extension

Carregado Power Plant (Portugal)

Description of Works

- Demolition of the existing dolphins.
- Driving of Ø 500 and Ø 700 tubular steel piles.
- Prefabrication of structural elements of reinforced concrete.
- Construction and assembly of the steel structures (walkways connecting to the dolphins and fender attachment belts).
- Supply and assembly of fenders.
- Study, supply and assembly of the spill prevention system, comprising:
 - floating barriers;
 - racking motor pump;
 - flexible tanks;
 - disc recovery.



Work Summary

Client	EDP Electricidade de Portugal, SA
Contract Type	Turn-Key
Construction Period	1993
Cost	PTE: 290 000 000,00





Harbour and Coastal Engineering



Phoenix Project - Pier 3 Extension

Lisnave Internacional, SA, Setúbal (Portugal)

Description of Works

The extension of Pier No. 3 of the Lisnave Setúbal Shipyards was carried out in 2 phases: 53 x 18 m (1st Phase) and 15 x 14 m (2nd Phase).

The new quay was supported by ground-shaped piles in the following quantities and dimensions:

- 36 piles with Ø 1000 mm
- 69 piles of Ø 800 mm
- The dredging carried out was intended to improve navigation in the maneuvering basin and to lay the foundations of the quay structure.
- The work also included the protection of buildings with rockfill prisms, several fluid gutters, the construction of a Dolphin and several works for the recovery of Pier #1.
- Dolphin was founded on a 15 x 8 m shoe and integrated into a 14 x 7 m top slab.
- The volume of core filling sands totaled 900 m3.



Work Summary

Client	Lisnave Int'l, SA
Contract Type	Turn-Key
Construction Period	1995 - 1996
Cost	PTE: 526 000 000



Harbour and Coastal Engineering



Construction of Ramp and Ancillary Quay

Tavira Nautical Club (Portugal)

Work description

Construction of a boats ramp and ancillary quay

Driven steel piles: Ø 508 mm, 22 ea



Work Summary

Client	Câmara Municipal de Tavira
Contract Type	Unit Prices
Construction Period	1999
Cost	€ 361 000,00





Harbour and Coastal Engineering



Water Intake and Discharge Pipping

**Combined Cycle Central Power
Lares - Figueira da Foz (Portugal)**

Work Description

Seth, S.A. executed, in consortium, the contract for the execution of the Water Intake and Discharge Pipping for the EDP Combined Cycle Central Power, at Lares (Figueira da Foz).

The work consisted in implementing the aforementioned water outlet at the Mondego River and the work realized basically water intake and pumping wells, in reinforced concrete structures, executed by the method of molded walls and the micro tunnelling execution water intake and discharge pipping.

During the contract it was also need to implement some cofferdams in "Larsen" sheet piles.

Around the water intake box was performed a slab in "Reno mattresses", over a rock fill foundation with about 1.0 m thick, for protection of this slab were performed "wing" walls in gabions.

Main jobs

- Micro tunnelling
- Horizontal drilling
- Shapped walls
- Cofferdams
- Dredging
- Gabions and mattresses underwater
- Submerged concrete



Work Summary

Client	EDP – Energias de Portugal, SA
Contract Type	Lump Sum
Construction Period	2008 - 2009
Cost	€ 2 990 000,00