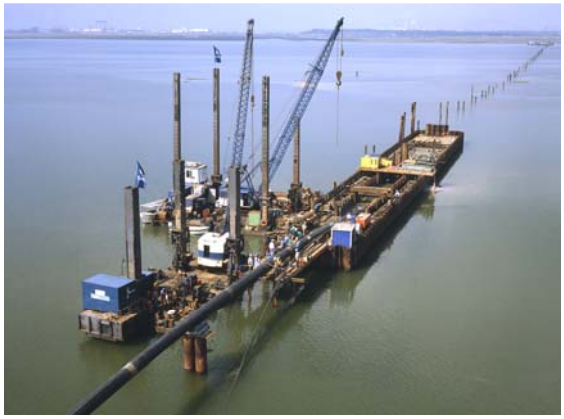
Company Profile

www.seth.pt



Corporate Headquarters

Avenida Tomás Ribeiro, No. 145
2790-467 QUEIJAS
Portugal

Phone + (351) 219 43 14 79
Fax + (351) 219 43 15 18

URL www.seth.pt
E-mail seth@seth.pt

Mailing Address

SETH, SA
Avenida Tomás Ribeiro, 145
2790-467 QUEIJAS
Portugal

Maintenance Facilities and Main Warehouse

Rua da Ponte, 2
2950-422 PALMELA
Portugal

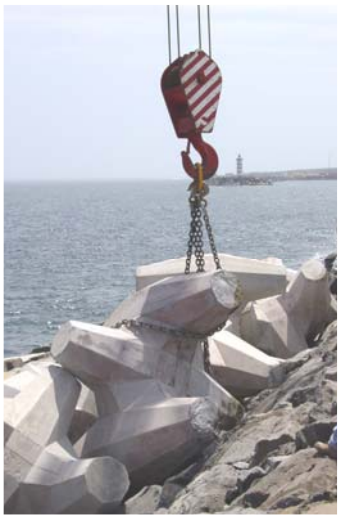
Main Warehouse
Sandblasting and Paint Shop
Carpentry Shop
Mechanic and Welding Shop
General Archives

Portuguese License Construction No. 5

SETH in brief

- **Founded 1933**
- **Subsidiary company of MT Højgaard a/s (Denmark)**
- **Turnover (2012): € 25,7 million**

Seth



Quality Management System

apcer

Certificado
Certificate

NÚMERO **2012/CEP.4165**
Number

O Sistema de Gestão da Qualidade da
The Quality Management System of

SETH – Sociedade de Empreitadas e Trabalhos Hidráulicos, S.A.

Sede
Avenida Tomás Ribeiro, 145
2790-467 QUEIJAS

Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL

implementado em obras de construção civil, engenharia portuária e costeira, cravação de estacas, trabalhos de hidráulica fluvial e marítima, estações de tratamento de águas e de águas residuais, cumpre os requisitos da norma
implemented in the civil construction, Marine, Harbour and Shore protection works, Pile–driving, Hydraulic works, Water and SewageTreatment Plant, meets the requirements of the standard

NP EN ISO 9001:2008

IQNet IPAC IAF

José Leitão
CEO

APCER – Associação Portuguesa de Certificação
Edifício de Serviços da Exposor, 2º Andar, Av. Dr. António Macedo
4450-617 Leça da Palmeira
www.apcer.pt

Emitido em 2014-02-18
Date of issue
Válido até 2015-05-17
Valid until

IQNet®

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and

APCER

hereby certify that the organization

SETH – Sociedade de Empreitadas e Trabalhos Hidráulicos, S.A.

Sede
Avenida Tomás Ribeiro, 145
2790-467 QUEIJAS

Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL

for the following field of activities

Civil construction, marine, harbour and shore protection works, pile–driving, hydraulic works, water and sewagetreatment plants

has implemented and maintains a

Quality Management System

Which fulfils the requirements of the following standard

ISO 9001:2008

Issued on: 2014-02-18
Validity date: 2015-05-17

Registration Number: PT- 2012/CEP.4165

IQNet apcer

Michael Drechsel
President of IQNet

José Leitão
APCER CEO

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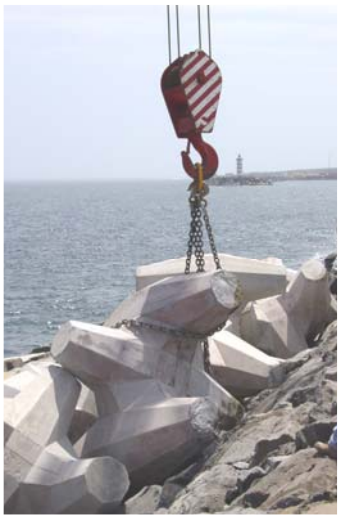

Environmental Management System

apcer

Certificado
Certificate

NÚMERO **2009/AMB.0420**
Number

O Sistema de Gestão Ambiental da
The Environmental Management System of

SETH – Sociedade de Empreitadas e Trabalhos Hidráulicos, S.A.

Sede
Avenida Tomás Ribeiro, 145
2790-467 QUEIJAS

Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL

implementado na coordenação e execução de obras de construção civil e públicas, designadamente para obras de protecção costeira, portuárias, hidráulicas, gasodutos, estruturas de betão e metálicas e cravação de estacas em Portugal e Ilhas, cumpre os requisitos da norma
implemented in the coordination and execution of civil construction and public works, namely coastal and shore protection works, harbour works, hydraulic works, gas pipelines, reinforced concrete and steel structures and pile-driving in Portugal and Islands, meets the requirements of the standard

NP EN ISO 14001:2012

IQNet IPAC IAF

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CEO

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4450-617 Leça da Palmeira
www.apcer.pt

Emitido em 2014-02-18
Date of issue
Válido até 2015-03-16
Valid until

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and

APCER

hereby certify that the organization

SETH – SOCIEDADE DE EMPREITADAS E TRABALHOS HIDRÁULICOS, S.A.

Sede
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2790-467 Queijas - PORTUGAL

Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL - PORTUGAL

for the following field of activities

Coordination and execution of civil construction and public works, namely coastal and shore protection works, harbour works, hydraulic works, gas pipelines, reinforced concrete and steel structures and pile-driving in Portugal and Islands

has implemented and maintains a

Environmental Management System

Which fulfils the requirements of the following standard

ISO 14001:2004

Issued on: 2012-03-17
Validity date: 2015-03-16

Registration Number: PT- 2009/AMB.0420

IQNet apcer

Michael Drechsel
President of IQNet

José Leitão
APCER CEO

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Occupational Health and Safety Management System

apcer
Associação Portuguesa de Certificação

Certificado de Conformidade
Certificate of Registration

NÚMERO 2008/SST.0177

APCER – Associação Portuguesa de Certificação certifica que o Sistema de Gestão da Segurança e Saúde do Trabalho da

SETH – SOCIEDADE DE EMPREITADAS E TRABALHOS HIDRÁULICOS, S.A.

Sede
Avenida Tomás Ribeiro, 145
2790-467 Queijas
PORTUGAL

Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL
PORTUGAL

implementado na coordenação e execução de obras de construção civil e públicas, designadamente para obras de protecção costeira, portuárias, hidráulicas, gasodutos, estruturas de betão e metálicas e cravação de estacas em Portugal e Ilhas, cumpre os requisitos da norma

OHSAS 18001:2007 / NP 4397:2008

Occupational Health and Safety Management Systems – Requirements / Sistemas de Gestão da Segurança e Saúde do Trabalho – Requisitos

Data de emissão 2012-09-11 — Válido até 2015-09-10

José Leitão
CEO

Qualquer esclarecimento adicional sobre este certificado pode obter-se consultando a APCER

APCER – Associação Portuguesa de Certificação
Edifício de Serviços da Exponor, 2º Andar, Av. Dr. António Macedo
4450-617 Leça da Palmeira
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APCER parceiro da IQNet

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and

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hereby certify that the organization

SETH – SOCIEDADE DE EMPREITADAS E TRABALHOS HIDRÁULICOS, S.A.

Sede
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Estaleiro Central de Palmela
Rua da Ponte 2 Orvidais, Palmela
2950-422 SETÚBAL - PORTUGAL

for the following field of activities

Coordination and execution of civil construction and public works, namely coastal and shore protection works, harbour works, hydraulic works, gas pipelines, reinforced concrete and steel structures and pile-driving in Portugal and Islands

has implemented and maintains a

Occupational Health and Safety Management System

Which fulfils the requirements of the following standard

OHSAS 18001:2007

Issued on: 2012-09-11
Validity date: 2015-09-10

Registration Number: PT- 2008/SST.0177

IQNet — apcer

Michael Drechsel
President of IQNet

José Leitão
APCER CEO

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Seth

MTH Headquarters

Offshore Wind Turbines Denmark

Linpro a/s
From HV lines
to LAN networks

Farøbroen Bridge
Denmark

Group Headquarters

MT Højgaard a/s
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Tel: +45 3954 4000
Fax: +45 3954 4900
E-mail: info@mthojgaard.dk
URL: www.mthojgaard.dk

On May, 2nd, 2001, Højgaard & Schultz a/s (founded 1918) and Monberg & Thorson a/s (founded 1919) have merged. The new company, designated MT Højgaard a/s, ranks among the top 30 European construction firms. For more information, please visit MTH's corporate website at http://www.mthojgaard.com.

Our reference shareholder, MT Højgaard a/s, in brief

- **Leading construction company in Denmark**
- **Turnover: 986 EUR million (2013)**
- **Assets: 539 EUR million (2013)**

The Öresund Link (between Denmark and Sweden) built by Sundlink Contractors, in which MT Højgaard a/s participated with a 37% share

Ferry Terminal Copenhagen Harbour

Temporary buildings made by Scandi Byg a/s

Overview of the Group Diagram

2014

MT Højgaard a/s

Enermærke & Petersen a/s
(carries out refurbishment and new building)

Lindpro a/s
(carries out electrical installations and services work)

Ajos a/s
(leases mechanical equipment)

Scandi Byg a/s
(produces and builds industrial modular buildings)

Greenland Contractors I/S
(is responsible for operation at the Thule Air Base)

SETH, SA
(carries out civil works in the area of marine works in Portugal and Africa)

The "Vala Nova" Bridge
The first pre-stressed concrete bridge in Portugal
Built by SETH in 1954

Pego do Altar Dam
Built by SETH in 1949

Vale do Gaio Dam
Built by SETH in 1949

Marechal Carmona Bridge
Built by SETH in 1951

SETH's Milestones

1933 Foundation of SETH

1934 Construction of Setúbal Harbour

1938 Construction of Funchal Harbour

1951 Construction of Marechal Carmona bridge (Vila Franca de Xira)

1960 Activity started in Angola

1963 Activity started at Lajes Air Base (Azores)

1984 Secil - Setúbal - Forno IX

1987 Activity started in the Caribbean (U.S. Navy / U.S. Air Force) (until 1991)

1991 Start of activity of the Pile Driving Department

1996 Ownership opened to Portuguese stockholders

2000 Activity started in Mozambique

2003 Legal regime conversion to "public company"

2005 GMP – *Groupe Maritime Portugais* was formed

2006 Activity started in Spain

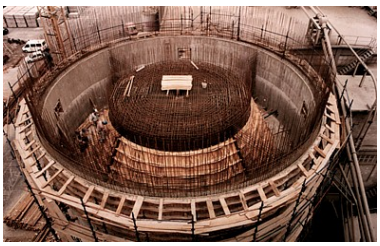
2007 Start activity in Guinea (Conakry) and Algerie

2009 Foundation of SethAngola, SA (Angola)

2010 Start activity in Cape Verde

2012 Foundation of SethMoz, SA (Mozambique)

2013 80th Anniversary



Complex concrete structures
and special formwork
(sliding and climbing):
two of our main specialties.

Coferdam (sheet piling)
HDD Works for Sines-Setúbal Pipeline

Elevated water tank
Alpiarça

Marine works
Water intake, Valorsul

Seth's Specialties

- Transmission and Distribution Lines
- Coastal and Harbour Engineering
- Contract Management
- Concrete Structures
  (Conventional and Special Formwork)
- Tube and Sheetpile Driving
- Hydraulic Engineering
- Water and Wastewater Treatment Plants
- Industrial Facilities
- Military Facilities

Sheet-pile curtain wall

Petrogal - Aveiro
Marine pile driving

Special foundations: marine pile driving (tubular and sheet). SETH is the undisputed leader of this sector in Portugal

Pedestrian Bridge, Alcácer do Sal, Portugal
Pylons: tubular driven piles
(Ø 708 and 508 mm)

Piledriving and Special Foundations

Tubular Steel Piles
Sheet Piles
Rock Drilling
Shoring

- Driving of tubular steel piles, up to ∅ 2 m
- Sheet piling, including design and construction of complete containment structures and cofferdams
- Auger drilling for stress relief of soil, prior to the installation of sheet piles (pre-drilling)
- Large diameter rock drilling, up to ∅ 912 mm

Jack-up platform“Valeira”
Marine pile driving

Core-Loc® - 32 Ton
Praia da Vitória Military Harbor

Helicopter Landing Pad
Massarelos, Porto

Sines-Setúbal Gas Pipeline
HDD Works (Sado River)

Viana do Castelo
Arrifana
Porto
Peniche
Lisboa
Doca de Sto. Amaro
Doca do Bom Sucesso
Piscina do Tamariz
Marina de Cascais
Cais do Sodré

Barreiro
Alcácer do Sal
Setúbal
Sines
Pomarão
Tavira
Faro
Lagos

Madeira
Azores

Harbour, Coastal and River Engineering

Setúbal Harbour

Funchal Harbour

Praia da Vitória Military Harbour

Lagos Fishing Harbour

Riverside Marinas

Tamariz Ocean Pool

Fuel Jetty (EDP - Carregado)

Shore Protection Structures

HDD Works (Sado River)

Seth

“Denmark” Office Building
R. Alexandre Herculano
Lisbon
26,000 sq.m

CODAN
Medical Instrumentation Factory
Loures

U.S. Navy
Lajes Field, Azores
Wastewater Treatment Plant

Portuguese Parliament
New Addition Building
Lisbon

Panoramic Elevator
Boca do Vento - Almada

Commercial and Industrial Construction

“Denmark” Office Building (Lisboa)

Administrative Complex (SECIL Cement Plant - Setúbal)

Main Warehouse (Dyrup)

Wastewater and Water Treatment Plants

Office Park (Sintra)

Panoramic Elevator (Almada)

Parliament Building (Lisbon) (addition building)

Seth

Diesel engine for prime generator
Lajes Air Base - Azores

EDA - Diesel Power Plant Addition
Belo Jardim, Terceira - Azores

EDA - Geothermal Plant
at Ribeira Grande
S. Miguel - Azores

Power Engineering

Civil Works

Mechanical and Electrical Installation

Supply, Installation and Testing of large-capacity Diesel generator sets

Power Plant Addition
U.S. Navy - Lajes Field
(Terceira, Açores)
Turn-key project (including engines and generators refurbishment)

Ribeira Grande Geothermal Plant
(S. Miguel, Açores)
Civil works, metal structures and off-site works
1st and 2nd Phases

Belo Jardim Diesel Power Plant
(Terceira, Açores)
Civil works, fuel storage tanks and ancillary works

Seth

U.S. Navy
Control Tower / RAPCON
Lajes Field, Azores

Portuguese Air Force
Aircraft Engines
Test Facility

U.S. Navy
Repair of POL tanks
Lajes Field, Azores

NATO POL Pier
Lisbon, Portugal
Loading arms replacement

Seth

Military Facilities

Portuguese Defense Ministry
Portuguese Navy
Portuguese Air Force
NATO Infrastructures Directorate (Portugal)
United States Navy (Naval Facilities Engineering Command)
United States Air Force
United States Army

Power Plants and HV Distribution Lines
Lajes Field, Azores

Crew Readiness Facility
Lajes Field, Azores

Comissary
Lajes Field, Azores

Avionics Repair Shop
Naval Air Station Bermuda

Control Tower / RAPCON
Lajes Field, Azores

Water and Fuel Storage Tanks
Naval Air Station Bermuda and Lajes Field, Azores

Water Lines and Waste Water Treatment Plants
Naval Air Station Bermuda and Lajes Field, Azores

Lodging and Administrative Buildings
Naval Air Station Bermuda and Lajes Field, Azores

Aircraft Engines Test Facility
Monte Real Air Base, Portugal

EXPO ‘98
Aerial Ropeway

EXPO ‘98
Olivais Dock
Lock cofferdam

EXPO ‘98
Swatch Pavilion

EXPO ‘98
Olivais Dock Amphitheater
Pile driving

From May 22 to September 30, 1998, Lisbon hosted the last World Exposition of the 20th century.

SETH was a proud member of the construction community that set the stage for the 150 official participants and renovated a large area of eastern Lisbon.

Olivais Dock - Closure Dike and Lock (*)
Olivais Dock Amphitheater (*)
Marina Quay (*)
Cable Car Foundations and Stations
Vasco da Gama Tower - Foundations
Pilings and Pedestrian Promenade
AquaMatrix Support Structures
Swatch Pavilion
Denmark Pavilion

Turn-key project - Joint Venture (*)

Job Management

- Job management and turn-key jobs
- Feasibility studies
- Legal counseling
- Licensing
- Scheduling and resource management
- National and international procurement

Engineering

- Designers Selection
- Detail Engineering
- Drawings and Specifications Approval
- Technical Consulting Services
- Value Engineering

Labor

- Labor Management
- Labor Selection and Recruitment
- Subcontractors Selection and Management
- Labor Operation Control

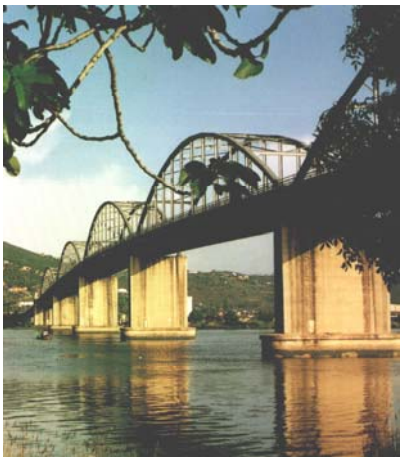
Equipment

- Operator Recruiting
- Supply
- Local and International Leasing
- Operational Management

Seth

32 T Core-Loc®
Praia da Vitória Harbour Breakwater
Largest in the world

Sines-Setúbal Gas Pipeline
HDD Works at Sado River Crossing
Pull-Back Operations



Marechal Carmona Bridge
Vila Franca de Xira, Portugal
Built by SETH in 1951

Seth

WORK PORTFOLIO

Enlargement of the open-air storage yard and construction of a new access road in the northeast region of the great port of São Vicente

City of Mindelo, Island of São Vicente, Cape Verde

Work Description

This job 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 the result of 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 fabric known as geotextile with a mass of 300g/m2.

Inside the embankment sand was placed dredged from another part of the bay of Mindelo, transported by the dredger then pumped ashore using 60cm diameter steel pipes.
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 spur 130 m in length.

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

Laginha Beach / *Zone completion of the work*

General view of the port area after intervention of this work

Resumo da Obra
Work Summary

Cliente	**Ministério das Infraestruturas, Transportes e Telecomunicações de Cabo Verde**	*Client*
Tipo de contracto	**Valor Global / *Lump-sum***	*Contract type*
Construtores	**Seth, SA (in Consortium)**	*Contractor*
Data de construção	**2013-2014**	*Construction period*
Custo	**€ 14.309.000,00**	*Cost*

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Dragagens nos Estaleiros Navais de Porto Amboim

Porto Amboim, Angola

Works of dredging in the basin of PAENAL shipyards

Porto Amboim, Angola

Descrição dos trabalhos

O âmbito dos trabalhos incluiu:

Dragagem de 650.000 m^3 de areia da bacia do cais com draga de sucção “GEFION R” da Rhode Nielsen

Remoção de 1.300 m de *pipelines* e diversas estruturas (maciços de betão, âncoras, cabos de aço, destroços diversos) enterradas no leito da bacia com embarcação alugada tipo Multicat auxiliado por bomba de dragagem de areia "DOP" e equipa de mergulhadores.

Números mais significativos:
650.000,00 m^3 de dragagens

Meios especiais utilizados:
Draga de sucção “GEFION R” da Rhode Nielsen
Bomba de dragagem de areia DOP
Embarcação multical “JIFWORKER” da Jifmar

Zona das dragagens durante os trabalhos
Zone of dredging during the works

Work Description

The scope of work included:

Dredging of one basin with a Rhode Nielsen suction dredger (650,000.00 m^3).

Removal of sundry equipment buried in the sea bed (as pipelines (1.300 m long) concrete blocks, anchors, steel cables).
This work was make with a rented vessel type Multical aided pump dredging "DOP" and divers team.

Most significant figures:
650,000.00 m^3 of dredging

Special Means:
Suction dredge Rhode Nielsen
Pump dredging type DOP
Vessel type Multical

Draga de sucção na bacia do cais dos estaleiros navais de Porto Amboim
Suction dredger in the dock of shipyards of Porto Amboim

Resumo da Obra
Work Summary

Cliente	**PAENAL** **Porto Amboim Estaleiros Navais, Lda**	*Client*
Tipo de contrato	**Preço global** ***Lump sum***	*Contract type*
Data de construção	**2013**	*Construction period*
Custo	**1.000.000,00 EUR**	*Cost*

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Reabilitação do Cais 22 no Terminal dos Granéis Líquidos

Porto de Aveiro

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

Porto de Aveiro, Portugal

Description of work

Removing a portion of the quay with 40 ml in the its structure collapsed following the deepening of sandy bottom causing a transfer of the founding of existing pilings . The aim of the work summarized into replacement of the section that was affected.

Work performed :

- Demolition and removal to dump the board and foundations affected by the collapse of the structure;
- Implementation of new foundations in reinforced-concrete piles jacketed metallic tube;
- Installation of prefabricated reinforced concrete beams;
- Concreting of massive header (link beams prefabricated/top of the piles of concrete);
- Installation of prefabricated slabs;
- Concreting board and curbs.

In addition to the above referenced activities was performed the protection of sandy bottoms with rockfill 80 to 100 Kg and placement of two new fenders on the pier docking replacing existing.

Main Quantities:

Piling: 12 piles (diameter 600 x 8mm w/ 20 ml long, spiked 10 ml at the bottom of the estuary)
Armour: 34,288 Kg
Concrete in rebar: 64m3
Concrete on deck slab and pile caps: 57m3
Precast beams: 20 units
Precast slabs: 22 units
Armor stone volume: 800 ton
Fenders: 2 pcs

Antes dos trabalhos de reabilitação
Before rehabilitation works

Depois de concluídos os trabalhos de reabilitação
After concluded the rehabilitation works

Resumo da Obra
Work Summary

Cliente	**SGPAMAG** **Sociedade de Granéis do Parque de Aveiro, Movimentação e Armazenagem de Graneis, S.A**	*Client*
Tipo de contrato	**Preço global** ***Lump sum***	*Contract type*
Data de construção	**2013-2014**	*Construction period*
Custo	**426.000,00 EUR**	*Cost*

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Construção da Expansão do Porto de Porto Novo – 1.ª Fase

Ilha de Santo Antão, Cabo Verde

Porto Novo Harbour – 1st. Phase

Santo Antão Island, Cape Verde

Work description

Seth executed (in consortium) the following structures: quay block wall 40 m long with service depth of -3.0 m (ZH); multipurpose block wall quay 115 m long with a service depth of -6.0 m (ZH), equipped with a RO-RO ramp; extension of a second multipurpose block wall quay by 45 m totalling 135 m of length and a service depth of -7.0 m (ZH), also equipped with a RO-RO ramp, for cargo and passengers use.

A storage area with 1,7 HA of area was also executed for cargo and container storage purposes. This storage area is protected by 500 m long breakwater and sea wall.

A boat slip was also executed to assist the fishing activity.

The project also included the construction of ground facilities, including a maritime station of 2,000 m2.

Zone of berths after completion of the work

General view of the port area after project conclusion

Main quantities

Dredging and blasting rock: 11,000 m^3

Concrete blocks, caissons: 7,200 m^3

Concrete in curtain wall: 10,000 m^3

Rockfill TOT: 320,000 m^3

Rockfill underwater: 66,000 m^3

Work Summary

Client	**Ministério das Infraestruturas, Transportes e Telecomunicações de Cabo Verde**
Contract type	***Lump-sum***
Contractor	**Seth, SA (lead company, in consortium)**
Construction period	**2009-2012**
Cost	**€ 26.319.577,00**

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Terminal de Contentores de Kamsar e Terminal de Descarga de Barcaças

Porto de Kamsar, República da Guiné

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 port 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.

Resumo da Obra
Work Summary

Cliente	**GAC** **Guinea Alumina Corporation**	*Client*
Tipo de contrato	**Lump Sum**	*Contract type*
Data de construção	**2011-2012**	*Construction period*
Custo	**EUR 18.000.000,00**	*Cost*

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Reabilitação do Cais Francês no Porto de Kamsar
República da Guiné

Rehabilitation of the French Quay - Port of Kamsar
Republic of Guinea

Work Carried Out

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.

Description of the Work
- 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.

Resumo da Obra
Work Summary

Cliente	**CBG** **Compagnie des Bauxites de Guinée**	*Client*
Tipo de contrato	**Lump Sum**	*Contract type*
Data de construção	**2006-2007**	*Construction period*
Custo	**USD 3.000.000,00**	*Cost*
Projectistas	**Haskoning UK, Ltd**.	*Engineering*

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Trabalhos de reforço do molhe exterior do Porto de Oran

Argélia

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

Oran, Algerie

Descrição dos Trabalhos

Esta foi a primeira obra em que a Seth participou na Argélia, cujos trabalhos feitos em consórcio compreenderam o reforço do troço intermédio do molhe do Porto de Oran, numa extenção de 1287 m.
Foi construída uma banqueta em TOT até à cota -20.00 (ZH) sobre a qual se construiu uma outra de secção trapezoidal em enrocamento de 3 a 6 toneladas atè à cota -12.50 (ZH).
Procedeu-se ainda à regularização do talude exterior do molhe com enrocamento de 1 a 3 toneladas, sobre a qual se colocaram os Antifers de 40 toneladas cada.
Sobre o paredão existente, a todo o comprimento, foi construído um muro em betão simples com aproximadamente 1 m x 1 m, que ficou a limitar a camada de Antifers.

Quantidade dos trabalhos

Enrocamento TOT – 254.074 ton
Enrocamento de 1 a 3 ton – 173 092 ton
Enrocamento de 3 a 6 ton – 216 355 ton
Betão em blocos Antifer de 40 ton – 91 928 m3
Fabrico e colocação
de blocos Antifer de 40 ton – 5 505 unidades
Betão em muro-cortina – 2 844 m3
Aço no muro cais – 22 000 Kg

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 - 254,073 tons
Foundation stones from 1 to 3 ton - 173 092 ton
Foundation stones 3 to 6 tons - 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 ton

Resumo da Obra
Work Summary

Cliente	**Direction des Travaux Publics de la Wilaya d'Oran** Argélia / **Algerie**	*Client*
Tipo de contrato	**Preço global / *Lump sum***	*Contract type*
Data de construção	**2007-2010 (27 mois)**	*Construction period*
Custo	**EUR 35.176.600,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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Reconstrução de um cais na Base Naval de Mers-El-Kébir

Mers-El-Kébir, Argélia

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

Mers-El-Kébir, Algerie

Descrição dos trabalhos

• Reparação do caminho de rolamento das gruas, com a construção de vigas de fundação e o fornecimento e aplicação de carris, numa extensão de 520 ml.
• Reabilitação do cais Sul, com a construção da viga de coroamento sobre o cais de blocos existente, numa extensão de 375 m.
• Reabilitação do cais Norte, com a execução de 21 estacas de molde metálico perdido, de 813 mm de diâmetro, na frente do cais.
• Execução de novo cais com infra-estrutura composta por 54 blocos de betão e superstrutura de betão *in-situ*.

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 1000 m3 / Concrete: 3590 m3 / Steel: 325 t
Supply and installation of rail: 874 ml / Terminals: 43 units
Fenders: 43 units / Rockfill: 2,000 t.

Resumo da Obra
Work Summary

Cliente	**Ministère de la Défense National de la République Algérienne Démocratique et Populaire**	
Tipo de contrato	**Preço global / Lump sum**	*Contract Type*
Data de construção	**2009**	*Construction period*
Custo	**EUR 6.405.061,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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Plataforma de aterro e taludes de protecção em Koudiet Eddraouch

Annaba, Argélia

Platform landfill and protective embankments at Koudiet Eddraouch

Annaba, Algerie

Descrição dos Trabalhos

Dique com 350 m de extensão, para protecção da plataforma marítima destinada à construção da estação de bombagem do circuito de refrigeração da central de ciclo combinado.
O dique é composto por núcleo de enrocamento TOT, sub-mantos de enrocamento seleccionado e manto de protecção de enrocamento de 5 a 7 t.

Quantidades de Trabalho

Dragagem: 8.850 m^3
Núcleo de enrocamento seleccionado: 13.775 m^3
Tela geotêxtil: 8.024 m^2
Filtro de enrocamento 3-5 kg: 1.881 m^3
Filtro de enrocamento 500-700 kg: 11.252 m^3
Manto de enrocamento 5-7 ton: 20.742 m^3

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: 8850 m^3
Selected core rockfill: 13,775 m^3
Geotextile fabric: 8,024 m^2
Filter rockfill 3-5 Kg: 1,881 m^3
Filter rockfill 500-700 Kg: 11,252 m^3
Cloak rockfill 5-7 ton: 20,742 m^3

Resumo da Obra
Work Summary

Cliente	**Iberdrola**	*Client*
Tipo de contrato	**Preço global / Lump sum**	*Contract type*
Data de construção	**2009**	*Construction period*
Custo	**EUR 6.500.000,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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Reabilitação do Molhe Leste do Porto Petrolífero de Béjaia

Béjaia, Argélia

Rehabilitation of East Breakwater of the Oil Port of Béjaia

Béjaia, Algerie

Descrição dos Trabalhos

Reabilitação do molhe leste do porto petrolífero de Bejaia com submantos de enrocamento seleccionado e mantos de protecção de cubos tipo Antifer de 13 e 24 toneladas.

Quantidade dos trabalhos

Enrocamentos seleccionados: 59.387 m³

Betão em blocos: 20.434 m³

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

Resumo da Obra
Work Summary

Cliente	**Ministère des Travaux Publics de l'Republique Algérienne**	*Client*
Tipo de contrato	**Preço global / Lump sum**	*Contract type*
Data de construção	**2006-2008 (23 mois)**	*Construction period*
Custo	**EUR 7.320.000,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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Construção de um Cais no Porto Petrolífero de Béjaia

Béjaia, Argélia

Construction of a Quay in the Oil Port of Béjaia

Béjaia, Algerie

Descrição dos Trabalhos

Construção de cais em estacas prancha, com cota de serviço (-12,00 m)ZH e frente acostável de 78 m de comprimento. O cais é rematado lateralmente por duas estruturas de contenção de 20m de extensão e ligado ao molhe existente por terrapleno com cerca de 35m de largura, em TVC, com camada de desgaste de betão betuminoso. A bacia é dragada à cota -12,00m.

Quantidade dos trabalhos

Dragagem: 450.000 m³
Estacas-prancha AZ 50: 950 t
Betão: 1.490 m3 / Aço: 170 t
Betão betuminoso: 480 t
Enrocamento 50-200kg: 350 t
Enrocamento 200-1000kg: 600 t
Brita 0/40: 1.700 t / TVC 0-200kg: 65.000 t
Cabeços de amarração de 100t: 12un / Defensas: 4 un

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 ton
Concrete: 1.490 m3 / Acier: 170 ton
Bituminous concrete: 480 ton
Rockfill 50-200 kg: 350 ton
Rockfill 200-1000 kg: 600 ton
Broken stone 0/40: 1.700 ton
TVC 0-200 kg: 65.000 ton
Bollards type 100 ton: 12 units / Fenders: 4 units

Resumo da Obra
Work Summary

Cliente	**SOGEPORTS** **Entreprise Portuaire de Béjaia, EPE**	*Client*
Tipo de contrato	**Preço global / Lump sum**	*Contract type*
Data de construção	**2008-2009 (11 mois)**	*Construction period*
Custo	**EUR 11.146.000,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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Aterro e Ensecadeira Circular para Tomada de Água de uma Central de Ciclo Combinado

Terga, Argélia

Circular cofferdam embankment and outlet for water of a Combined Cycle

Terga, Algerie

Descrição dos Trabalhos

Execução de aterro e de uma ensecadeira de forma circular com 70 m de diâmetro, composta por estacas prancha AZ50 com 25 m de comprimento, reforçadas com vigas em anel de betão armado, como trabalho provisório de contenção para a construção de uma tomada de água.

Obra de defesa frontal aderente, com núcleo de enrocamento TVC 50-500 kg e enrocamento de protecção seleccionado com gamas de 0,5-1 ton, 0,5-2 ton, 1-3 ton e 3-5 ton.

Quantidade dos trabalhos

Escavação e dragagens: 44.680 m³
Enrocamentos: 54.760 m³
Estacas prancha AZ50: 1.430 ton

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

Resumo da Obra
Work Summary

Cliente	**ORASCOM**	*Client*
Tipo de contrato	**Prix Forfaitaire**	*Contract type*
Data de construção	**2009-2010 (15 mois)**	*Construction period*
Custo	**EUR 14.450.000,00**	*Cost*
Observações	***Job in Consortium***	*Notes*

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GNL - 3Z Project – Construção do Cais de Serviço
Porto de Arzew, Argélia

GNL – 3Z Project – Service Quays Construction
Arzew Port, Algeria

Trabalhos Efectuados

Os trabalhos de construção dos cais de serviço do projecto GNL–3Z, em Arzew, Argélia, foram executados por um consórcio de que a Seth fez parte.
Esta obra consistiu na construção de 2 cais constituídos por colunas de aduelas de betão armado, encabeçadas por uma viga de coroamento, também em betão armado.
Estes dois novos cais acostáveis, com fundos de serviços à cota -9.50 m (Z.H.), têm 85 m e 35 m de comprimento, respectivamente e serão usados pelas embarcações de dragagem, rebocadores e outras embarcações de apoio no desenvolvimento dos trabalhos do projecto GNL–3Z no Porto de Arzew.

Principais quantidades

Aduelas em betão armado – 160 un
Betão armado em aduelas – 1.200 m³
Betão armado em superestrutura - 450 m³
Dragagens - aprox 9 628 m³
Enrocamentos diversos – 5.000 m³

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 I 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 units
Reinforced concrete staves - 1,200 m³
Reinforced concrete superstructure - 450 m³
Dredging - + - 9628 m³
Armourstone - 5,000 m³

Resumo da Obra
Work Summary

Cliente	**Snamprogetti Chyoda s.a.s. di SAIPEM S.p.A.**	*Client*
Tipo de contrato	**Valor Global**	*Contract type*
Data de construção	**2009**	*Construction period*
Custo	**EUR 2.600.000,00**	*Cost*

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Defensas Nova Cimangola

Luanda, Angola

Rebuilding of Fender System – Nova Cimangola Export Jetty

Luanda, Angola

Descrição dos trabalhos

O âmbito dos trabalhos incluiu:
•Cravação de 36 estacas com 813 mm de diâmetro
•Betonagem das estacas até ao nível do fundo do mar
•Execução de 4 maciços em betão e instalação das defensas.

Números mais significativos:
1300 m3 de betão
8 defensas elásticas Fentek SCN 1400

Meios especiais utilizados:
Grua automóvel Liebherr LTM 1100, colocada no local da obra por um navio, devido a esta ser inacessível por terra.

Work Description

Work included:
• 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) (hauled to site work by boat)

Resumo da Obra
Work Summary

Cliente	**NovaCimangola**	*Client*
Tipo de contrato	**Preço global** ***Lump sum***	*Contract type*
Data de construção	**2003-2004**	*Construction period*
Custo	**USD 2.200.000,00**	*Cost*
Projectista	**Eng. Luís Colen**	*Designer*

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Projecto de Cassinga - Terminal Mineralífero

Moçâmedes, Angola

Cassinga Project - Ore Terminal

Moçâmedes, Angola

Construção de um molhe acostável em betão pré-esforçado com 600 m de comprimento. Capacidade de acostagem de navios até 300 000 tdw.

Fundação do molhe sobre estacas metálicas cravadas de 43 m de comprimento.

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).

Diversos aspectos dos trabalhos
Several views of the works

Resumo da Obra
Work Summary

Cliente	**Companhia Mineira do Lobito**	*Client*
Tipo de contrato	***Concepção-Construção Design-Build***	*Contract type*
Data de construção	**1968 - 1972**	*Construction period*
Estacas cravadas	**43 m comp.*llenght***	*Driven piles*
Cais de acostagem	**600 m**	*Berthing pier*
Navios servidos	**300 000 tdw**	*Ships served*

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Terminal de Exportação de Clinquer e Cimento

Luanda, Angola

Clinker and Cement Export Terminal

Luanda, Angola

Construção de um molhe acostável em betão armado com 1000 m de comprimento e molhe-testa com 120 m, sobre estacas de 30 m.

Cais de carga, 4 silos de 5000 ton para cimento e clínquer, instalações de ensacagem de cimento, transportadores de correia e diversas estruturas metálicas.

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 klinker silos (5000 ton), cement bagging facility, conveyor belts and miscellaneous steel structures.

Vista de terra do cais de acostagem
Berthing pier viewed from land

Vista dos silos de cimento e clínquer e transportadores de correia.
2º plano: os cais de acesso e acostagem.
Cement and klinker silos and conveyor belt. Background: the acess and berthing piers.

Resumo da Obra
Work Summary

Cliente	**CIMANGOLA U.E.M.**	*Client*
Fiscalização	**Dar Al-Handasa Consultants (Beirute)**	*Inspection agency*
Tipo de contrato	***Concepção-Construção Design-Build***	*Contract type*
Data de construção	**1982 - 1984**	*Construction period*
Estacas cravadas	**30 m comp.*llenght***	*Driven piles*
Cais (acesso/acostagem)	**1000 + 120 m**	*Access + berthing pier*

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Reparação da Loca do Farol do Bugio
Foz do Rio Tejo – Zona de Oeiras (Lisboa)

Repair of the Void at Bugio Lighthouse
Mouth of the Tagus River – Zone of Oeiras, Lisbon

Work description

Seth has fulfilled the contract for the repair of the Void at the Bugio Lighthouse under Directorate of Lighthouses management.
This job called for the repair and filling of the void to prevent deterioration of the entire berthing and access area.
The Bugio Lighthouse is a work of military architecture situate at the mouth of the Tagus, specifically on the Cabeça Seca sandbank in front of Oeiras and São Julião da Barra.
The construction of this listed building dates from the nineteenth century and it consists of a two-storey circular tower, each floor separated by a moulding, with few openings.
In the central area of the fort, in the middle of the parade ground, stands the Bugio Lighthouse.

Fort "São Lourenço do Bugio/Bugio Lighthouse
(Photo by Daniel Feliciano / pt.wikipedia.org)

Repair of the void at the Bugio Lighthouse
(Photo by Manuel Garcia)

View of the works
(Photo by Manuel Garcia)

Equipment employed

• 1 30m x 9m pontoon with a draught of 2.3 m, equipped with winches and piles
• 2 x 365 HP tugs, 16.5m x 4m, with a draught of 1.68m
• 1 x 6m launch, with a 40HP engine
• 1 Crawler crane of 60T capacity, installed on the pontoon
• 3 fixed concrete kibbles with pump
• 1 crawler excavator equipped with a hydraulic hammer
• Concrete mixers and ready-mix concrete pump
• Formwork Panels
• Concrete Vibrator
• 1 Pick-up Truck
• 1 x 3-axle truck equipped with HIAB crane
• 2 light vehicles

Main quantities

400m3 of C30/37.S4XC2(P).D22.C10.4(CPF) concrete
25m3 Calibrated Rockfill
1 roll of geotextile

Resumo da Obra
Work Summary

Cliente	**Ministério da Defesa Nacional** **MARINHA - Direcção de Infraestruturas**	*Client*
Tipo de contrato	**Preço Global**	*Contract type*
Data de construção	**2013**	*Construction period*
Custo	**EUR 134.000,00**	*Cost*

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Avanço de Margem e Nova Avenida Ribeira das Naus
Cais do Sodré – Terreiro do Paço, Lisboa

Widening the River Bank and New Ribeira das Naus Avenue
Cais do Sodré – Terreiro do Paço, Lisbon

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 / 1.20 m diameter)
Rebar cages - 700,000 kg
Concrete – 7,000 m3
Dredging/ Excavation – 20,000 m3
Prefabricated slabs (on the Agencies pontoon) - 45 units. (rebar cages 22,000 kg / concrete 180 m3)
Dolerite basalt paving cubes – 8,000 m2
Trees planted – 48

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal de Lisboa**	*Client*
Tipo de contrato	**Série de preços**	*Contract type*
Data de construção	**Fev 2012 – Mar 2013**	*Construction period*
Custo	**EUR 3.750.000,00**	*Cost*

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U.S. Navy - Cais de Combustíveis e Lubrificantes

Terceira, Açores

U.S. Navy - POL Pier

Terceira Island, Azores

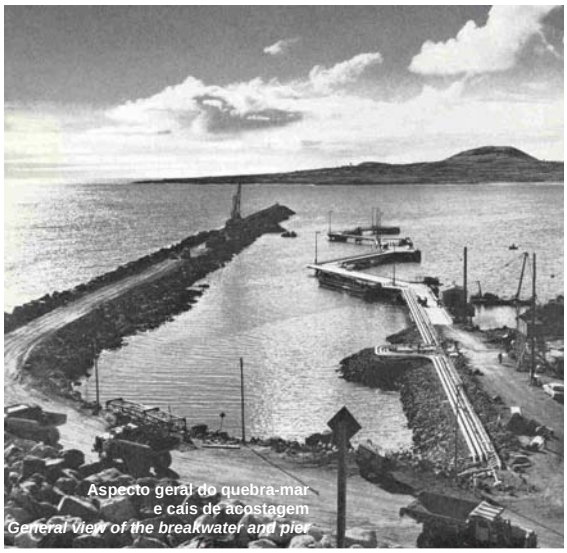
A construção do cais de combustíveis e lubrificantes da Praia da Vitória, para apoio às actividades das Forças Armadas Americanas estacionadas nas Lajes, Açores, envolveu a execução das seguintes infraestruturas:

- cais acostável de betão com 260 m de comprimento (incluindo 1 duque d'alba), com fundações em estacas de aço com 40 m de comprimento. Profundidade no topo do cais: 14 m, utilizável por navios com calado até 12 m

- quebra-mar de protecção de secção transversal trapezoidal com 650 m de comprimento, envolvendo um volume de enrocamento de 500.000 m^3

- construção de um pipeline multi-duto para produtos petrolíferos refinados com 2500 m de comprimento.

Mais recentemente, em 1982, a SETH executou ainda diversas obras de reforço do quebra-mar e em 1989 instalou um novo sistema de protecção catódica por corrente imposta.



Aspecto geral do quebra-mar e cais de acostagem
General view of the breakwater and pier

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Fiscalização	**Naval Facilities Engineering Command**	*Inspection agency*
Tipo de contrato	**Construção *Construction Only***	*Contract type*
Data de construção	**1962-1963**	*Construction period*
Volume de betão	**75 000 m^3**	*Total concrete volume*
Estacas cravadas	**40 m comp./lenght**	*Driven piles*
Quebra-mar	**650 m / 500 000 m^3**	*Breakwater*
Cais de acostagem	**260 m**	*Pier*
Calado útil	**12 m**	*Draught*

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Ampliação do Cais de Descarga de Combustível

Central Termoeléctrica do Carregado

Fuel Pier Extension

Carregado Power Plant

Description of work:

- Demolition of existing piles mooring (dolphins)
- Crimping of tubular piles Ø 500 and Ø 700.

- Prefabrication of structural elements (reinforced concrete).

- Construction and installation of steel structures (gangways connecting and fenders).

- Supply and installation of fenders.

- Design-build of spill prevention system, comprising:
  - Floating barriers;
  - Motor pump racking;
  - Flexible tanks;
  - Recovery discs.

Estacas, encabeçamentos e passadiços metálicos (em cima)
Cais acostável durante a fase da sua construção (em baixo)
Piles and capping structures and steel structures (top view)
Berthing Quay during construction phase (bottom view)

Resumo da Obra
Work Summary

Cliente	**EDP** **Electricidade de Portugal, SA**	*Client*
Projecto	**Proman / SETH**	*Engineering design*
Projecto do sistema de prevenção de derrames	**Slickbar, Inc.**	*Oil spill prevention design*
Fiscalização	**EDP**	*Inspection agency*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1993**	*Construction period*
Custo	**PTE: 290.000.000**	*Cost*
Estacas tubulares	**Ø 500 / Ø 700**	*Tubular piles*

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Projecto Fénix - Ampliação do Cais 3

Lisnave Internacional, SA

Phoenix Project - Pier 3 Extension

Lisnave Internacional, SA

The Extension of Pier # 3 of Shipyards at Lisnave (Setúbal) was performed in 2 phases:
• 53 x 18 m (Phase 1) and
• 15 x 14 m (Phase 2).

The new pier was supported on bored piles on the ground, in the following quantities and dimensions:
• 36 cuttings with Ø 1,000 mm
• 69 stakes Ø 800 mm

The dredging made were intended to improve navigation in the turning basin and deployment of the foundations of the structure of the pier.

The work also included the protection of buildings with prisms rockfill, several gutters fluid, construction of 1 dolphin and several works for recovery of Pier # 1.

The dolphin was erected on a shoe with 8 m x 15 m and joined a slab top with 14 m x 7 m.
The volume of sand for core filling totaled 900 m^3.

Aspecto dos trabalhos de ampliação do Cais 3
General view of the Pier 3 Extension works

Resumo da Obra
Work Summary

Cliente	**Lisnave Int'l, SA**	*Client*
Projecto	**Imoconsult**	*Engineering design*
Fiscalização	**Proman**	*Inspection agency*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1995 - 1996**	*Construction period*
Custo	**PTE: 526.000.000**	*Cost*
Volume de dragagens	**120 000 m3**	*Total dredging volume*
Volume de betão	**6200 m3**	*Total concrete volume*
Estacas moldadas	**36 + 69 (1000 mm - 800 mm)**	*Bored cast-in-place piles*
Prismas de enrocamento	**18 000 m3 (3-5 ton)**	*Armour stone*
Duque d'alba	**14 x 7 x 10 m**	*Dolphin*

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Porto de Recreio de Oeiras

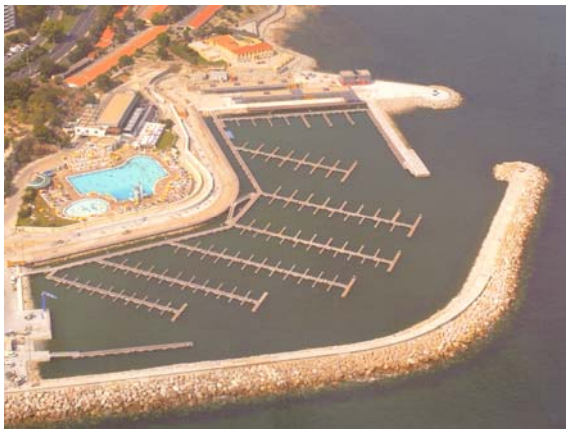
Oeiras

Oeiras Pleasure Harbour

Oeiras, Portugal

Trabalhos efectuados

Obra estruturante para o concelho de Oeiras, não só requalifica a orla ribeirinha como se assume um espaço de lazer, de desporto e de apoio às actividades náuticas, com uma áera envolvente com cerca de 250 lugares de estacionamento automóvel, um lote de lojas e um restaurante, instalações para a PSP e para o SEF, sanitários públicos e um posto de abastecimento de combustíveis para barcos.
A marina inserida no Porto de Recreio de Oeiras disponibiliza assim 275 lugares para embarcações de 6 a 25 m de comprimento.



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.

Principais volumes de trabalho
Main work volumes

Betão / Concrete, 4 000 m^3
Estrutura metálica / Steel Structure, 165 000 Kg
Estacas em betão Ø300mm / Foundation piling, 48 units
Estacas metálicas Ø580 mm / Steel piles, 49 units
Passadiços flutuantes / Steel gangways w/ wood, 1400 m^2
Pavimentos / Concrete pav. vessel parking area, 4269 m^2
Rev. betuminoso / Bituminous concrete pavement, 2142 m^2

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal de Oeiras**	*Client*
Tipo de contracto	**Concepção / Construção** ***Design-build***	*Contract type*
Construtores	**Seth, SA (em consórcio)**	*Construction consortium*
Data de construção	**2004-2005**	*Construction period*
Custo	**€ 7.000.000,00**	*Cost*

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Terminal Multiusos de Leixões
Porto de Leixões
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**
Dreading 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 tones**
NOREF type quay mass concrete blocks - **1,546 units**

Work Summary

Client	**APDL** **Administração dos Portos do Douro e Leixões**
Type of contract	**Lump Sum**
Contractor:	**Seth, SA (in consortium)**
Construction period	**2006-2009**
Cost	**EUR 13.000.000,00**

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Terminal de Cruzeiros de Lisboa – 1.ª fase
Santa Apolónia, Lisboa

Lisbon Cruise Liner Terminal - 1st Stage
Santa Apolónia, Lisboa

Work perfomed

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 6,600 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)

Resumo da Obra
Work Summary

Cliente	**APL** **Administração do Porto de Lisboa**	*Client*
Tipo de contrato	**Valor Global**	*Contract type*
Data de construção	**2007-2009**	*Construction period*
Custo	**EUR 14.000.000,00**	*Cost*

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Terminal de Cruzeiros de Lisboa – 2.ª fase
Santa Apolónia, Lisboa

Lisbon Cruise Liner Terminal – 2nd Stage
Santa Apolónia, Lisboa

Work perfomed

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 - +- 65,000 m3
Precast beams – 513 units (556,000 kg of rebar cages and 2,405 m3 of concrete)
Precast slabs – 1,327 units (438,000 kg of rebar cages and 2,587 m3 of concrete)

Resumo da Obra
Work Summary

Cliente	**APL** **Administração do Porto de Lisboa**	*Client*
Tipo de contrato	**Valor Global**	*Contract type*
Data de construção	**2009-2011**	*Construction period*
Custo	**EUR 38.200.000,00**	*Cost*

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Grande Reparação do Molhe Principal do Porto de Porto Santo

Porto Santo (Arquipélago da Madeira)

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

Porto Santo (Madeira, Portugal)

Works Performed

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 34º and their replacement by 30-tonne antifers, laid with an inclination of about 26º. 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: 4,000 units
10-tonne tetrapods (new): 350 units
10-tonne tetrapods (existing, dismantled and reapplied): 5,000 units
C35/45 concrete: 52,000 m3
Rockfill 2/3 ton: 85,000 ton
Dredging sand: 25,000 m3

Resumo da Obra
Work Summary

Cliente	**APRAM - Administração do Portos da Região Autónoma da Madeira, S.A.**	
Tipo de contrato	**Valor Global**	*Contract type*
Data de construção	**2007-2009**	*Construction period*
Custo	**EUR 19.000.000,00**	*Cost*

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Terminal de Granéis Sólidos do Porto de Aveiro

Gafanha da Nazaré, Aveiro

Bulk Terminal, Aveiro Harbour

Gafanha da Nazaré, Aveiro

Descrição dos trabalhos

Este é o primeiro cais de acostagem em Portugal, construido em cortinas de estacas-prancha ancoradas.
A parede que suporta o cais do Terminal de Granéis Sólidos de Aveiro foi construida numa combinação de estacas-prancha tipo Arcelor HZ 975 B –14 / AZ18. Os elementos-chave desta estrutura são perfis "HZ" com 25.9 m de comprimento, em aço da classe S 430 GP. Os elementos intermédios da cortina são estacas-prancha AZ18 com 20.9 m de altura, em aço da classe S 355 GP.

O âmbito dos trabalhos incluiu

• Construção de 750 metros de cais industrial;
• Construção de um terrapleno com 22 000m² de superfície e um caminho de rolamento, fundado em 642 estacas, cada uma com 1000 mm de diâmetro.
• 4 500 toneladas de estacas-prancha.

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 lenght 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.

Resumo da Obra
Work Summary

Cliente	**APA – Administração do Porto de Aveiro, SA**	*Client*
Tipo de contrato	**Série de Preços** ***Unit Prices***	*Contract type*
Data de construção	**2001-2004**	*Construction period*
Custo	**EUR 21.038.183,00**	*Cost*
Observações	**Obra feita em Consórcio** ***Job in Consortium***	*Notes*

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Reparação de Emergência do Quebra-Mar – Fase 1

Puerto Militar – Praia da Vitória, Açores

Breakwater Emergency Repair – Stage 1

POL Pier – Praia da Vitória, Azores

Trabalhos realizados

Cota do coroamento: (+7:00 ZH)
Cota do pé do talude: (- 8:00 ZH)
Fabrico e colocação de antiferes de 20 tons: 415 unid.
Fabrico e colocação de CORE-LOC® de 33 tons: 380 unid.
Enrocamento de 2 a 9 tons: 5.500 tons

NOTA:
Os maiores CORE-LOCS ® do mundo à data desta obra.

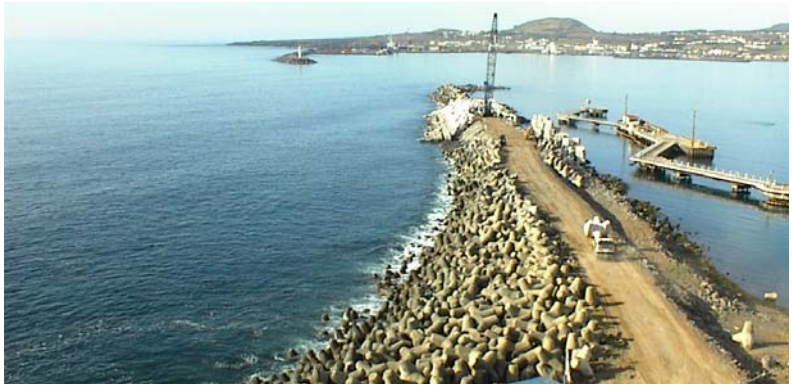
Maquinaria utilizada
1 Grua de rastos de 350 tons
1 Grua de rastos de 250 tons
1 escavadora giratória de 60 tons
3 trailers de 40 tons

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.*
Armour rock (2 - 9 ton): 5500 tons

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



Topo: aspecto da zona dos trabalhos
Top: site, general view

Imagens inferiores: CORE-LOC e antifers
Lower images: CORE-LOC unit and antifers

Resumo da Obra
Work Summary

Cliente	**Brown & Root Services Corp. (US Navy)**	*Client*
Consórcio com	**Ediçor/Somague**	*In consortium with*
Projectista	**Transystems Corporation**	*Engineering*
Data de construção	**2002 - 2003**	*Construction period*
Custo	**€ 12,6 million (Phase I)**	*Cost*

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Reparação de Emergência do Quebra-Mar, Fase 2

Puerto Militar – Praia da Vitória, Açores

Breakwater Emergency Repair, Stage 2

POL Pier – Praia da Vitória, Azores

Trabalhos realizados

Cota do coroamento: (+7:00 ZH)
Cota do pé do talude: (- 10:00 ZH)
Fabrico e colocação de CORE-LOC® de 33 tons: 670 unid
Enrocamento de 2,5 a 20 tons: 175.500 tons

NOTA: *Os maiores CORE-LOCS ® do mundo à data desta obra.*

Maquinaria utilizada
1 Grua de rastos de 350 tons
1 Grua de rastos de 250 tons
1 escavadora giratória de 60 tons
3 trailers de 40 tons
1 pá carregadora Komatsu WA600 (60T)

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)

Topo: aspecto da zona da obra
Top: site, general view

Resumo da Obra
Work Summary

Cliente	**Brown & Root Services Corp. (US Navy)**	*Client*
Projectista	**Transystems Corporation**	*Engineering*
Data de construção	**2004 - 2006**	*Construction period*
Custo	**€ 24,6 million (Phase 2)**	*Cost*

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Reparação de Emergência do Quebra-Mar – Fase 3

Porto Militar – Praia da Vitória, Açores

Emergency Repair of the Breakwater – Stage 3

Military Port, POL Pier – Praia da Vitória, Azores

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;
- Reprofiling 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 (60 ton)

Resumo da Obra
Work Summary

Cliente	**US Navy** **United States Navy**	*Client*
Projectista	**Baird & Associates (USA)**	*Engineering*
Data de construção	**2007 - 2009**	*Construction period*
Custo	**€ 8,5 million (Phase 3)**	*Cost*

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Porto de Abrigo da Costa Norte no Porto Moniz

Porto Moniz, Madeira

Porto Moniz Harbour

Porto Moniz. Madeira

Trabalhos efectuados

• Construção de cais acostável

• Caixotões fundados à cota – 8,00m ZH

• Viaduto em betão armado para acesso ao porto.

Volumes de trabalho
Fabrico e colocação de 2100 antifers com 50 toneladas cada
• 5 caixotões com 25m x 15m x 13m cada
• 200.000 m^3 de enrocamentos

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: 200.00m^3*

Vista geral da obra (topo). Vista durante a construção (em baixo).
General view of the finished work (top). Construction in progress (below).

Resumo da Obra
Work Summary

Cliente	**APRAM (Madeira)**	*Client*
Fiscalização	**APRAM**	*Inspection agency*
Tipo de contrato	**Série de Preços** ***Unit Price***	*Contract type*
Data de construção	**2002-2003**	*Construction period*
Custo	**EUR 18.352.751**	*Cost*
Projectista	**WW – Consultores de Hidráulica**	*Architect/Engineer*
Observações	**Consórcio com Etermar e Somague**	*Notes*

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Porto de Fuah Mulaku

República das Maldivas

Fuah Mulaku Harbour

Republic of Maldives

Trabalhos efectuados

Construção de um porto de pesca com uma área total de 15 000 m^2, incluindo 500 m de parede quebra-mar, 700 m de estacas-prancha e dragagem de aproximadamente 80 000 m^3 de fundos de coral de elevada dureza.
A cravação das estacas-prancha e a execução dos trabalhos de dragagem exigiu o desmonte a fogo dos terrenos subjacentes através de 85 toneladas de explosivos. As paredes quebra-mar foram construídas com pedra de granito importada (cerca de 50 000 toneladas).

Work description

Construction of a fishing harbour covering an area of 15 000 m^2 including 500 m of breakwaters, 700 m sheet piling and dredging of approx 80 000 m^3 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.

Topo: aspecto, após a conclusão
Top: view, after completion

Imagens inferiores: durante a construção
Lower images: work in progress

Resumo da Obra
Work Summary

Cliente	**Ministry of Construction and Public Works**	*Client*
Construtores	**Højgaard & Schultz a/s** **SETH, Lda.**	*Construction consortium*
Data de construção	**2000-2002**	*Construction period*
Custo	**€ 9,7 million**	*Cost*

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Estacas de Guiamento dos Pontões

Plataforma Avançada e de uma Retenção Marginal
Interface do Cais do Sodré, Lisboa

Guiding Piles for Floating Pontoons

Dettached Platform and Bank Retention
Cais do Sodré Transit Interface, Lisbon

Fornecimento de estacas para guiamento dos pontões, criação de uma plataforma avançada e de uma retenção marginal no Interface do Cais do Sodré, na cidade de Lisboa.

O âmbito dos trabalhos incluiu:

- Dragagem e demolição
- Enrocamentos e assentamentos de pedras para reforço e revestimento do perret
- Execução de estacas moldadas no terreno
- Cravação de estacas metálicas
- Betão armado

Vista geral das estacas de guiamento.
General view of piling to guide floating pontoons for the Cais do Sodré Interface in Lisbon.

Work Description

- Guiding piles for floating pontoons
- Dredging and demolition works
- Supply and placing of armour stones
- Concrete piles (casting in-situ)
- Reinforced concrete works

Resumo da Obra
Work Summary

Cliente	**Metropolitano de Lisboa**	*Client*
Tipo de contrato	**Concepção-Construção** ***Design-Build***	*Contract type*
Data de construção	**2002-2003**	*Construction period*
Custo	**EUR: 2.424.619,00**	*Cost*
Classificação	**RINAVE**	*Classification*

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Pontões de Acostagem Flutuantes e Pontes de Acesso

Interface do Cais do Sodré, Lisboa

Floating Berthing Pontoons and Access Gangways

Cais do Sodré Interface, Lisbon

Fornecimento completo de 3 pontões flutuantes para embarque e desembarque dos passageiros da carreira fluvial Lisboa-Cacilhas, integrados no Interface do Cais do Sodré.

O âmbito dos trabalhos incluiu:

- Construção de 3 pontões flutuantes
- Construção de 6 passadiços de acesso cobertos
- Lastragem e aprestamento dos pontões
- Licenciamento da construção junto da Autoridade Marítima

O lançamento à água teve lugar no cais dos estaleiros da Mitrena, em Setúbal, tendo sido utilizado o pórtico rolante. Os pontões foram depois rebocados até ao local de montagem definitivo, onde se procedeu ao seu posicionamento e ancoragem.

Vista geral de um dos postos de acostagem.
General view of one of the berthing pontoons for the Lisbon-Cacilhas ferry line.

Work Description

Complete furnishing of 3 floating pontoons for ferry boat line passengers (Lisbon-Cacilhas line).

Work included:
- Construction of 3 floating pontoons
- Construction and erection of 6 covered gangways
- Ballasting and rigging of pontoons
- Licencing/classification of the pontoons

Launching of the pontoons took place at the Mitrena, Setubal shipyard and were then towed to their final destination location and moored.

Resumo da Obra
Work Summary

Cliente	**Metropolitano de Lisboa**	*Client*
Tipo de contrato	**Concepção-Construção**	*Contract type*
	Design-Build	
Data de construção	**2003**	*Construction period*
Custo	**EUR 2.490.303,00**	*Cost*
Classificação	**RINAVE**	*Classification*
Pontões:	**3 unid. / *units***	*Pontoons:*
Comprimento	**38,5 m**	*Length overall*
Boca	**10,0 m**	*Beam*
Pontal	**2,5 m**	*Moulded depth*

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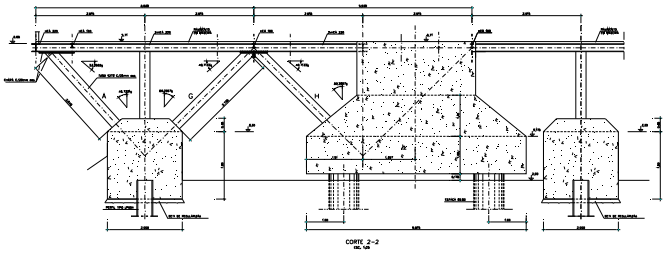
EXPO'98 - Dique de Fecho e Eclusa
EXPO'98 - Closure Dyke and Lock

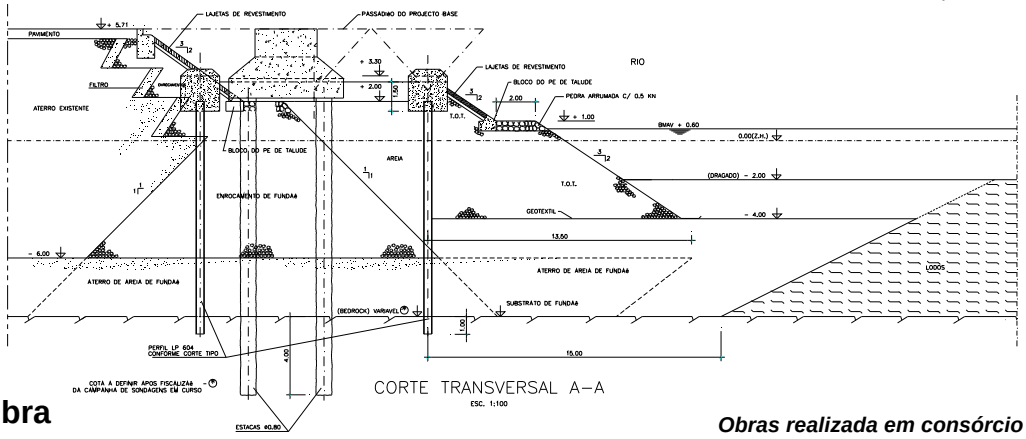
Ensecadeira da eclusa
Lock cofferdam

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 m^3 (including transport and discharge on the sea
- Enrocamento - 150 000 m^3



Plataforma pedonal
Pedestrian platform



Resumo da Obra
Work Summary

Obras realizada em consórcio
Joint-venture works

Cliente	**Parque EXPO, SA**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**1998**	*Construction period*
Custo	**PTE 3.200.000.000**	*Cost*

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Quebra-mar Destacado, Castelo do Neiva
Outlaying Breakwater, Castelo do Neiva

Topo: aspecto, após a conclusão
Top: view, after completion

Imagens inferiores: diversos aspectos, durante a construção
Lower images: views during construction

Trabalhos efectuados

Construção de um quebra-mar destacado em betão simples, para protecção da entrada e saída de embarcações de pesca. Assentamento do paredão sobre formações rochosas, após quebramento e regularização por explosivos. Protecção do manto exterior com enrocamento.

Comprimento: 250 m
Cota do coroamento: +6.00 ZH
Volume de betão: 6430 m^3
Volume de enrocamento: 25 000 ton.
Desmonte e dragagem de rocha: 5850 m^3

Work description

Construction of a non-reinforced concrete outlaying breakwater for protection of the fishing boats entering and leaving the shore facilities.
Foundation: rock bottom, after underwater rock blasting/breaking preparation and dredging.
Exterior face protected with armor rock.

Length: 250 m
Height: +6.00 m datum
Concrete volume: 6430 m^3
Armor stone volume: 25 000 ton
Blasting and dredging: 5850 m^3

Resumo da Obra
Work Summary

Cliente	**Instituto Marítimo- Portuário**	*Client*
Projectista	**Instituto Marítimo- Portuário**	*Designer / Engineer*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**Aug1999/Sep2000**	*Construction period*
Custo	**PTE 346.000.000**	*Cost*

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Construção das Infraestruturas da 2.ª fase do Porto de Peniche – 1.ª etapa

Peniche

Construction of the infrastructures of the 2nd Phase of the Port of Peniche – 1st Stage

Peniche (Portugal)

Work Perfomed

The construction of the infrastructures of the 2nd Phase of the Port of Peniche – 1st Stage, provided this new sector of the port with highway, sewage, water supply (fresh and sea water), electricity, communications and CCTV infrastructures. Besides these networks, there was also the buildings complex required for this sector of the port to come into operation, involving the construction of the new Guard House, the Mareograph Building and the the Provisional Fish Reception and Transfer Building.

The Provisional Fish Reception and Transfer Building comprises a steel hangar 125 m long with a current-construction (concrete and brickwork) services building at each end.

Work was also carried out on the Port's Pumping Station, involving replacement of the pumping equipment, pipework and accessories, and the internal and external painting of 5 hydro-pneumatic pressure vessels.

Attention is also drawn to the installation of a 16 m weighbridge and to the drilling of two water-abstraction boreholes and to three hydrocarbon separators for the water supply and drainage networks respectively.

Main Quantities:

Excavation – 34,600 3 m3
Concrete – 1,400 m3
Rebar cages – 72,000 kg
Pipework – 9,000 m
Concrete sett paving –16,000 m2
Bituminous paving – 23,500 m2
Fencing – 1,300 m

Resumo da Obra
Work Summary

Cliente	**IPTM – Instituto Portuário e dos Transportes Marítimos**	*Customer*
Tipo de contrato	**Indefinite-Quantities**	*Type of Contract*
Data de construção	**2007-2008**	*Construction period*
Custo	**EUR 3.505.294,30**	*Cost*

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Portinho de Pesca da Arrifana

Obras de Conservação e Valorização

Arrifana Fishing Harbor

Maintenance and Upgrading Works

Trabalhos efectuados

Dragagem da bacia interior
Prolongamento e alteamento do quebra-mar
Melhoramento da estabilidade das arribas
Construção de muros de suporte da envolvente da bacia
Reparação da rampa varadoura

Volume de betão: 2500 m^3
Volume de enrocamento: 6000 m^3

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

Concrete volume: 2500 m^3
Armor stone volume: 6000 m^3

Topo: aspecto, após a conclusão
Top: view, after completion

Imagem inferior:
durante a construção
Lower image:
work in progress

Resumo da Obra
Work Summary

Cliente	**Instituto de Conservação da Natureza**	*Client*
Projectista	**Consulmar**	*Designer / Engineer*
Inspecção	**Instituto Marítimo e Portuário**	*Inspection Agency*
Tipo de contrato	**Série de Preços** ***Unit Prices***	*Contract type*
Data de construção	**1999/2000**	*Construction period*
Custo	**€ 545.000**	*Cost*

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Remodelação da Doca - Carregal do Sul
Dock Remodeling - Carregal do Sul

Trabalhos efectuados

Fornecimento e instalação de um quebra-mar flutuante com um comprimento total de 140 m e largura mínima de 3 m.
Dragagens para obtenção de fundos à cota de -1,50 m ZH.
Reformulação do perímetro envolvente da doca com elevação do coroamento.
Construção de maciços de enraizamento do passadiço de acesso às embarcações.
Cravação de estacas de apoio e fornecimento e instalação dos passadiços flutuantes (cerca de 140 m) para amarração das embarcações.
Fornecimento e instalação de equipamento urbano diverso (candeeiros, bancos e canteiros).
Reconstrução dos pavimentos.

Work description

General dock remodeling, including dredging to -1,50 m, fabrication and installation of a floating breakwater (140 x 3 m) and floating walkways (total of 140 m) for 335 boats of various sizes. Refurbishing of the surrounding area, including the installation of urban equipment (lighting fixtures, benches and planters).

Após a remodelação efectuada, a doca pode agora receber 335 embarcações.
After this remodelation, the dock has now the capacity to lodge 335 boats.

Resumo da Obra
Work Summary

Cliente	**Instituto Marítimo- Portuário**	*Client*
Projectista	**Instituto Marítimo- Portuário**	*Designer / Engineer*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**Jan/Dez2000**	*Construction period*
Custo	**PTE 455.000.000**	*Cost*

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Construção de Rampa e Cais de Apoio

Clube Náutico de Tavira

Construction of Ramp and Ancillary Quay

Tavira Nautical Club

Trabalhos efectuados

Construção de rampa varadoura e cais de apoio

Estacas cravadas: ∅ 508 mm, 22 unidades

Work description

Construction of a boats ramp and ancillary quay

Driven steel piles: ∅ 508 mm, 22 ea.

Topo: aspecto, após a conclusão
Top: view, after completion

Imagem inferior: durante a construção
Lower image: work in progress

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal de Tavira**	*Client*
Inspecção	**Câmara Municipal de Tavira**	*Inspection Agency*
Tipo de contrato	**Série de Preços** ***Unit Prices***	*Contract type*
Data de construção	**1999**	*Construction period*
Custo	**€ 361.000**	*Cost*

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Açude Insuflável de Coruche
Inflatable Weir at Coruche

Seth completed the work of the Inflatable Weir (river Sorraia) in Coruche.

The work of Dam Coruche, launched by the Municipality of Coruche, is part of the Recovery Plan Marginal Sorraia River allowing residents to enjoy a new social facilities, unique features.

The water mirror thus created upstream of the dam enhances the practice of fishing contests and events, recreational motorboats, and other footpaths.

The dam consists of a main body, reinforced concrete, crossing the entire river, and a metal catwalk, a pedestrian extension of 62 meters, which allows the passage from one to the other side.

The indirect foundations of the complex consist of a set of 62 reinforced concrete piles, cast on the ground, with 800 mm diameter and 16 m deep.

The inflatable weir is still complex consists of:
- A house of Control
- A house of Command
- An observation room for fish
- A fish ladder.

Main quantities of work
Concrete: 3.970 m^3
Rubble concrete: 45 m^3
Shuttering: 974 m^2
Steel: 272.000 Kg
Acesses: 800 m^3
Excavation: 2.300 m^3
Inflatable sluice gates:
Span 1: c/ 30 meters
Span 2: c/ 30 meters
Diameter: 2,5 meters
Material: semi-synthetic rubber reinforced with polyester mesh
Architect and Engineer: Hidroprojecto

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal de Coruche**	*Client*
Tipo de contrato	**Turn-key**	*Contract type*
Data de construção	**2011-2012**	*Construction period*
Custo	EUR **2.291.885,00**	*Cost*

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Açude Insuflável de Abrantes
Inflatable Weir at Abrantes

As part of a consortium **Seth** concluded the River Tagus Inflatable Weir job at Abrantes. The job, awarded by the Abrantes City Council, was finalised in 670 working days and it included the design of the project and the construction of what is, to date, the Iberian Peninsula's biggest weir of its type.

One of the goals of this job was to create a reflecting pool upstream of the weir at a predetermined level, allowing the reservoir created between the city of Abrantes and Rossio ao Sul do Tejo to be used for leisure and entertainment purposes.

Fundamentally, the weir comprises a reinforced concrete body with a portico-shaped cross section about 15 metres wide and 200 metres long, with a variable depth of about 6 metres. The superstructure comprises 4 piers 5.5 metres tall that form four spans that can be blocked by means of cylindrical rubber bodies, the first having a perimeter of 1.20 m and the others 3.2 m. The 5th span comprises a reinforced concrete sluice.

Of the complementary organs, attention is drawn to the reinforced fish house (a zigzag labyrinth) located on the left bank surrounding the respective abutment, and to the control room where the equipment required to operate the weir is located (insufflators, valves, electrical installation, automation, emergency generators, plc-automated control, etc.).
The access roads to the weir are also part of the project.

Main quantities of work:
Concrete: 25 000 m³
Rubble concrete: 5 000 m³
Shuttering: 9 500 m²
Steel: 1 500 tonnes
Accesses: 8 800 m²
Excavation: 16 000 m³
Excavation in rock: 8 500 m³
Inflatable sluice gates:
Span 1 (weight 2.1 tonnes – thickness 10.8 mm)
Spans 2, 3 & 4 (weight 3 x 4.7 tonnes – thickness – 13.5 mm)

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal de Abrantes**	*Client*
Projectista	**CENOR – Projectos de Engenharia, Lda**	*Architect & Engineer*
Tipo de contrato	**Concepção/Construção**	*Contract type*
Data de construção	**2004-2007 (670 days)**	*Construction period*
Custo	EUR **9.450.290,00**	*Cost*

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Rehabilitation of the dams at Arrabalde and Salgadas

Inflatable Weir at Arrabalde

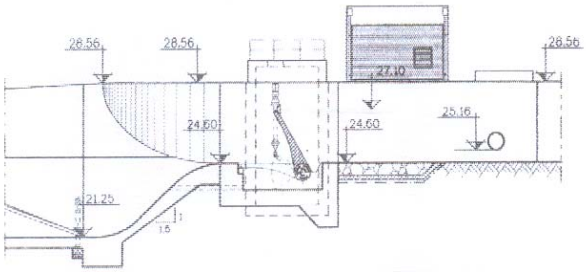
This dam is located approximately 14.3 kilometers to the river Lis, a section located to the west of the city of Leiria next "field of the fair." This hydraulic structure is fundamental part of the irrigation system of the fields of the Valley of Lis. It is through this that creates the reservoir water level necessary to enable the abstraction of water for irrigation.

The rehabilitation of the dam Arrabalde's main goal was to allow the automatic triggering of the two gates, inserted in the body of the dam, and water intakes in order to allow, in accordance with the needs of water and streams and tributaries downstream requested, optimization of their operation.

From the structural point of view, the solution rehabilitation forced the demolition of the old central area of the dam wall and sill, for placement of new gates. This intervention took place, on both sides, with the curtains crimping sheet pile walls in masonry of the dam, to ensure the stability of the work and the surrounding land during the demolition of existing walls and the sill.

The implementation of the new dam, comprised the construction of two side meetings, a central pillar and from two wells, one on each bank, which host the servo motors driving the floodgates. The work also included the automation of the two water intakes for irrigation.

Inflatable at Arrabalde: view downstream of the two spans, cofferdam and house to electrical controls



Inflatable weir at Arrabalde: river to flow only in the lower tubes, during the execution of work

Tipo de comportas	Charneira
Largura dos vãos obturados	7,75m
Altura dos vão obturados	2,50m
Número de comportas	2
Cota de soleira	24,60m
Cota do NPA	27,10m
Cota da plataforma	28,56m
Carga máxima	2,5 m.c.a.
Manobra da comporta	Em plena carga
Manobra da ensecadeira	Em águas equilibradas

Resumo da Obra
Work Summary

Client	**IHERA - Instituto de Hidráulica, Engenharia Rural e Ambiente**
Project	**HIDROPROJECTO – Engenharia e Gestão, SA**
Tipo de contrato	**Turnkey**
Data de construção	**November 2000 to April 2001**
Cost	**1.920.371,91 Euros**

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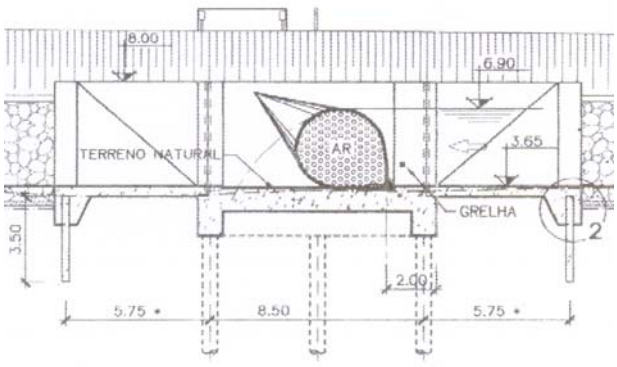
Rehabilitation of the dams at Arrabalde and Salgadas

AÇUDE DAS SALGADAS

The dam of Salted located approximately 30 kilometers to the river Lys, near Mount Royal, a section of the bed and settled contributes more as a fundamental part of the irrigation system of the fields of the Valley of Lis.
The rehabilitation of the dam's main goal was to replace the existing structure that was obsolete (about 50 years), creating a plan to allow sufficient water supply to the needs of water and flow downstream requested by making water in the left margin.
The work consisted of a "inflatable dam" which broadly comprises a threshold based on eight concrete piles with 60 cm diameter and depth between 18 and 24 meters, in which a chamber is recessed synthetic rubber reinforced. The rehabilitation also included the automation of irrigation water outlet.

Açude das Salgadas em plena carga (pormenor do insuflável)



Açude das Salgadas: vista de jusante da margem direita (açude a descarregar com o insuflável a esvaziar)

Tipo de comporta	Insuflável
Largura do vão obturado	7,00m
Altura do vão obturado	3,25m
Inclinação das paredes laterais	1 (V) : 1 (H)
Número de comportas	1
Cota da soleira	3,65m
Cota do NPA	6,90m
Cota da plataforma	8,00m

Resumo da Obra
Work Summary

Cliente	**IHERA - Instituto de Hidráulica, Engenharia Rural e Ambiente**
Projectista	**HIDROPROJECTO – Engenharia e Gestão, SA**
Tipo de contrato	**Chave-na-Mão**
Data de construção	**Novembro de 2000 a Abril de 2001**
Custo	**1.920.371,91 euros** (PTE 385.000.000) os dois açudes

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Electricity III / Package 1 and Package 2

Gaza, Inhambane, Nampula - Moçambique

Electricity III – Package 1 & 2

Gaza, Inhambane, Nampula - Mozambique

Work Description

Electricity III - Package 1 and 2, Supply and erection Medium and Low Electricity Networks in Mozambique is the name of the contract that EDM - Electricity of Mozambique awarded to Seth, with funding guaranteed by the African Development Bank and the Fund for International Development.
That contract had a deadline of 18 months and included the implementation of about 700 kilometers of distribution power lines, medium and low voltage in several districts in the provinces of Inhambane and Nampula, and in its final link up to about 8000 consumers.

Package 1 - Power to the provinces of Gaza and Inhambane:
- Supply and installation of approximately 228 km of overhead lines, 33 kV
- Supply and installation of approximately 154 km of overhead lines, 0.4/0.23 kV
- Supply and installation of approximately 67 transformer stations air, 33/0.4 kV
- Connect the end about 4,500 consumers

Package 2: Power to the province of Nampula, including:
- Supply and installation of approximately 247 km of overhead lines, 33 kV
- Supply and installation of approximately 63 km of overhead lines, 0.4/0.23 kV
- Supply and installation of approximately 22 transformer stations air, 33/0.4 kV
- Connect the end about 3,400 consumers

Main quantities:

Connect 8000 final consumers
- 89 transformers 33/0.4 kV
- 575 Kms of medium voltage lines
- 217 Kms of low voltage lines

Resumo da Obra
Work Summary

Cliente	**EDM** **Electricidade de Moçambique**	*Client*
Tipo de contrato	**Série de Preços** ***Unit Price***	*Contract type*
Data de construção	**2010-2012**	*Construction period*
Custo	**EUR 17.410.358,00**	*Cost*
Observações	**Consórcio**	*Notes*

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Grid Intensification Component – ERAP, Package III

Maputo - Moçambique

ERAP – Package III

Maputo - Mozambique

Work Description

ERAP (Energy Reform and Access Program), Package III is the name of the contract that EDM – Electricidade de Moçambique has awarded to Seth under a loan from the NDF (Nordic Development Fund).

The contract has a completion deadline of 21 months and involves the installation of about 295 km of low-and medium-voltage electricity-distribution lines in several districts in the suburbs of Maputo, as well as their connection to approximately thirty thousand end customers.

The project naturally includes an initial survey of the districts and preparation of the distribution plans of the lines to be installed, in addition to the supply and installation of all materials and equipment, such as posts, lines, transformers and electricity meters.

The contract comprises 3 sections: Section 3 comprising large farms to the south of Maputo, in the locality of Catuane, near the border with South Africa; Section 2 located in the suburbs of Maputo; and Section 1 in the surroundings of Maputo, in which the greater part of this contract is located and involves the larger quantity of work adjudicated.

Principal quantities:

- Connecting 30,000 end customers
- 114 x 25 to 315 kVA transformers
- 137 km of medium-voltage lines
- 158 km of low-voltage lines

Resumo da Obra
Work Summary

Cliente	**EDM** **Electricidade de Moçambique**	*Client*
Tipo de contrato	**Série de Preços** ***Unit Price***	*Contract type*
Data de construção	**2007-2009**	*Construction period*
Custo	**EUR 9.439.006,00**	*Cost*
Observações	**Consórcio**	*Notes*

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Iluminação de segurança da placa de estacionamento de aeronaves

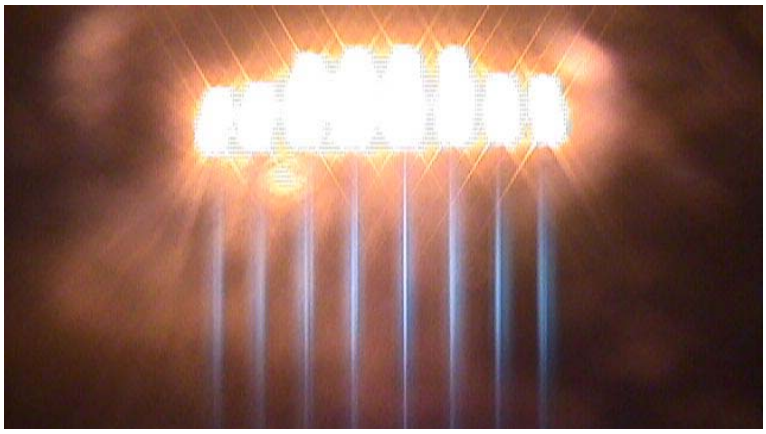
US Navy - Base Aérea das Lajes, Açores

Apron Security Lighting

US Navy - Lajes Field, Azores

Âmbito dos trabalhos
Scope of Work

- Abertura de valas e instalação de cablagem.
  Trenching and cabling installation.
- Instalação de 26 postes (20 m) multi-projector (20).
  Installation of 26 multi-fixture (20) lighting posts (20 m).
- Cablagem AT (15 kV) enterrada para alimentação dos postes.
  Buried HV cable (15 kV) for post feeding.
- Instalação de transformadores (26) na base de cada poste.
  Installation of step-down transformers at each post location.
- Testes operacionais e commissionamento da instalação.
  Operational testing and commissioning of the installation.



26 postes (multi-projector) para iluminação da placa de estacionamento de aeronaves da Base Aérea das Lajes, Açores.
26 multi-fixture lighting posts for the security lighting of the apron at Lajes Field, Azores.

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**2000-2001**	*Construction period*
Custo	**USD 1,44 million**	*Cost*
Projectista	**Vansant & Gusler, Inc.**	*Architect & Engineer*

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Dyrup - Armazém de Produtos Acabados

Sacavém - Portugal

Dyrup - Warehouse for Finished Products

Sacavém - Portugal

Construção de um edifício em estrutura metálica.
Construction of a prefabricated metal building

Dimensões / *Dimensions*: 70 x 51 m
Vão livre / *Free span*: 51 m
Betão / *Concrete:* 4100 m^3
Pavimentos exteriores
Exterior pavements: 4500 m^2
Aterro / *Earth fill:* 17 500 m^3
Laje do armazém dimensionada para 100 kN de carga concentrada
Warehouse ground slab sized for 100 kN concentrated live load

Principais características / *Main features*

Piso elevado para escritórios (70 x 10 m).
Mezzanine for office space (70 x 10 m).

10 cais de carga/descarga com plataforma hidráulica e sistema eléctrico
10 loading/unloading docks with hydraulic platforms and electrical system

Isolamento térmico total
Full thermal insulation

Arranjos exteriores
Landscaping

Resumo da Obra
Work Summary

Cliente	**Tintas Dyrup, SA**	*Client*
Fiscalização	**Proman**	*Inspection Agency*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**1997 - 1998**	*Construction period*
Custo	**PTE: 446.400.000**	*Cost*
Arquitectura	**Arquipedra**	*Architect*
Projecto de estabilidade	**Planege**	*Structural design*
Instalações especiais	**Planege**	*Mechanical/Electrical*

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Estação de Enchimento de Garrafas de Gás

Galp Gás, SA – Refinaria de Sines

Sines - Portugal

Sines LPG Bottle Filing Plant

Sines Refinery of Galp, SA

Sines - Portugal

Work Description

Seth, SA, carried out all the civil construction work for the Gas Bottle Filling Plant undertaken at the Sines Refinery of Galp, SA, where its customer was Galp Gás, SA.

Of the work undertaken, we would underscore the filling building, the office building (including electricity, water and drains networks), the porters buildings (including the electricity network), the fork-lift truck garage, the steel pipe-rack to support the pipework over the railway line, the compressed-air and pumping equipment foundations, the entire water and drains networks, as well as connecting up with the existing networks, the electrical and instrumentation networks, 10,000 m2 of concrete flooring for the full and empty bottle store, as well as full support to all the civil construction work in respect of the installation of the booster pumps using to supply the gas to the new facility.

Main quantities:

- 10,000 m2 reinforced concrete paving;
- 170 tonnes of steel structures;
- 1,000 m3 of concrete for foundations and sundry structures.

Resumo da Obra
Work Summary

Cliente	**TECHNIP PORTUGAL, SA**	*Client*
Tipo de contrato	**Valor Global** ***Lump Sum***	*Contract type*
Data de construção	**2004**	*Construction period*
Custo	**EUR 2.000.000,00**	*Cost*

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Ampliação da Assembeia da República

2ª Fase - Acabamentos

Parliament Building Addition

2nd Phase - Finishes

Descrição dos trabalhos
Work description

Número indicativos / Main figures:
9 pisos / *9 levels*
170 gabinetes e salas de reunião
170 offices and meeting rooms
Auditório e restaurante
Auditorium and restaurant
14000 m^2 de mármore
155,000 sq.ft of marble cladding
Instalação de AVAC / *HVAC installation*
6 elevadores / *6 elevators*

- Empreitada de Acabamentos Gerais (piso -3 a piso 6)
  General Finishing Work Contract (level -3 until level 6)
- Revestimento de fachadas a mármore de lioz
  Marble cladding on the exterior walls
- Interiores revestidos a mármore lioz e madeira de carvalho
  Interior wall finishes with marble cladding; solid oak door frames and doors
- Janelas de vidro duplo com caixilharia de latão
  Double-glazing windows with solid brass frames







Resumo da Obra
Work Summary

Cliente	**Assembleia da República** ***Portuguese Parliament***	*Client*
Fiscalização	**Cinclus, SA**	*Inspection agency*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**1998 - 1999**	*Construction period*
Custo	**PTE: 2.300.000.000**	*Cost*
Arquitectura	**Arq. Fernando Távora**	*Arquitect*
Proj. de Instalações Especiais	**Engº Rodrigues Gomes & Associados**	*Mechanical & Electrical*

Obra realizada em consórcio
Joint-venture works

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Novo edifício-sede da Seth

Queijas (Oeiras)

Corporate Headquarters

Queijas (Oeiras), Portugal

Work description

The main goal in the design of the new headquarters underwent achieve harmonize three fundamental aspects: aesthetics, functionality and energy efficiency.

The main dimensions of the building are the following:
Deployment area - 1334m2
Construction area above ground - 1583m2
Building area buried - 1289m2
Sealed area - 1725m2
Cércea maximum - 10.93 m

The building consists of 4 floors. The floor -2 intended to parking with 30 places, has 4 rooms and equipment storage pumping rainwater and sewage.
At floor -1 are given various types of usage: Living surveillance, parking for 20 cars, storage, gym, locker rooms, cafeteria, kitchen, boiler room, and the Medical Centre.

On the floors above ground and the offices are situated on the top floor are located the air handling equipment, air conditioning and building solar panels and photovoltaic.

The interior areas of the floors are:
Floor -2 - 1289m2
Floor -1 - 1289m2
Level 0 - 858m2
1st Floor - 642m2

Think about a high efficiency over the life of the building, installed the following materials and equipment: automatic climate control and lighting inside the building; lights low power, installation of shade visors; glazing solar in south facades and exterior walls consist of two panels of masonry, air-box and "Wallmate", thus enabling to obtain low heat transfer coefficients.

In order to reduce the consumption of mains water, installed a system of rainwater harvesting, which after treatment are used in the discharges of toilets, taps of service garages (washing floors) and outside building, for watering the gardens.

Resumo da Obra
Work Summary

Cliente	**Seth, SA**	*Client*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**2008-2009**	*Construction period*

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Modernização da Escola Secundária Braamcamp Freire
Pontinha

Secondary School Modernisation Programme at Pontinha
Portugal

Description of works

Seth (in consortium with two other companies) carried out the modernization work of Freire Bramcamp Secondary School, located at Rua Dr. Gama Barros, Pontinha, Amadora.

These works, integrated into the process of "modernization for phase 3A of the Schools Modernisation program with Secondary Education - Lot 3 L1 EI" were awarded to the consortium by the value of 12,476,478.86 euros.

The works comprised the refurbishment, modernization and expansion of that school, in order to rehabilitate and modernize the buildings, restoring the physical and functional effectiveness, with a view to creating conditions for the practice of a modern education, adapted to the syllabus, to teaching and new technologies of information and communication.

Partial view of the schoolyard

Overview of the school buildings

Resumo da Obra
Work Summary

Cliente	**Parque Escolar, EPE** (Entidade Pública Empresarial)	*Client*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**2011-2012**	*Construction period*
Custo final	**EUR 12.476.478,00**	*Cost*
Observações	*Obra feita em consórcio*	*Notes*

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Escola Secundária Emídio Garcia

Bragança

Secondary School Modernisation Programme at Bragança

Portugal

Description of works

Seth (in consortium with two other companies) carried out the modernization work Emídio Garcia Middle School, located at Rua Eng Adelino Amaro da Costa, the city of Bragança.

These works, integrated into the process of "modernization for phase 3A of the Schools Modernisation program with Secondary Education - Lot 3EN10" awarded to the consortium by the value of 12,950,871.18 euros.

The works comprised the refurbishment, modernization and expansion of these schools, in order to rehabilitate and modernize the buildings, restoring the physical and functional effectiveness, with a view to creating conditions for the practice of a modern education, adapted to the syllabus, to teaching and new technologies of information and communication.

General view of the schoolyard

General view of the schoolyard

Resumo da Obra
Work Summary

Cliente	**Parque Escolar, EPE** (Entidade Pública Empresarial)	*Client*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**2011-2012**	*Construction period*
Custo final	**EUR 12.950.871,18**	*Cost*
Observações	*Obra feita em consórcio*	*Notes*

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Escola Secundária de Rainha Sta. Isabel
Escola Secundária de Severim de Faria

Estremoz / Évora

Rainha Sta. Isabel Secondary School
Severim de Faria Secondary School

Estremoz / Évora, Portugal

Job Description

Seth (in consortium with two other companies) has carried out rehabilitation work at the Rainha Sta. Isabel Secondary School (in Estremoz) and at the Severim de Faria Secondary School (in Évora).

These jobs, included in "Stage 2A of the Secondary Schools Modernisation Programme - Let 2AS3" in respect of the schools of Évora and Estremoz, were awarded to the consortium for the sum of 22,680,401.33 euros.

The works included remodelling, modernisation and (in some cases) enlargement of the schools, the idea being to rehabilitate and modernise the buildings and to re-establish their physical and functional efficacy, from a standpoint of creating conditions to provide modern education suited to the programme contents, the didactic contents and the new information and communication technologies.

Rainha Sta. Isabel Secondary School - ESTREMOZ

Rainha Sta. Isabel Secondary School

Location: Estremoz
Planned capacity: 39 classes
Architecture / Project Co-ordination: José Laranjeira
Completion deadline: 15 months
Cost: EUR 12,207,000.00

Severim de Faria Secondary School
Location: Évora
Planned capacity: 36 classes
Architecture / Project Co-ordination:
FSSMGN Arquitectos, Lda (Fernando Sanches Salvador and Margarida Grácio Nunes)
Completion deadline: 15 months
Cost: EUR 10,980,000.00

Severim de Faria Secondary School - ÉVORA

Resumo da Obra
Work Summary

Cliente	**Parque Escolar, EPE** (Entidade Pública Empresarial)	*Client*
Tipo de contrato	**Preço Global** ***Lump Sum***	*Contract type*
Data de construção	**2009-2010**	*Construction period*
Custo final	**EUR 23.187.000,00**	*Cost*
Observações	*Job in consortium*	*Notes*

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Elevador Panorâmico da Boca do Vento

Almada

Panoramic Elevator at Boca do Vento

Almada

Concepção-construção de um elevador panorâmico com cabina exterior.

Altura da torre: 50 m

Fundações:
Em estacas moldadas no terreno
(bored cast-in-place piles)
Quantidade: 15
Comprimento/diâmetro das estacas: 15 m / 800 mm

Tipo de cofragem: Trepante *(climbing formwork)*

Estruturas metálicas: 42 ton

Elevador:
Curso: 42 m
Capacidade: 1600 kg / 21 pessoas
Cabina exterior em aço inoxidável

Aspecto da cofragem trepante para a betonagem da torre.

Climbing formwork used for the tower pouring.

Resumo da Obra
Work Summary

Cliente	**C.M. Almada**	*Client*
Tipo de contrato	**Concepção-Construção** ***Design-Build***	*Contract type*
Data de construção	**1998 - 1999**	*Construction period*
Custo	**PTE 152.000.000**	*Cost*
Concepção	**Esc. José Aurélio**	*Conceptual design*
Estabilidade	**Engs. Alfredo e Luís Morgado**	*Structural design*
Elevador	**OTIS**	*Elevator*

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Desmantelamento das Instalações da Portucel Recicla

Mourão (Alentejo)

Dismantling of Facilities Portucel Recycler

Mourão, Portugal

Trabalhos executados

Desmantelamento e demolição da globalidade do património edificado que constituía a antiga unidade fabril da Portucel Recicla (pavimentos, fundações, estruturas de betão e metálicas, edifícios, tanques de armazenagem, depósitos, equipamentos, tubagens, diques, muretes e paredes, postes de iluminação e vedações).

Na zona a Sul da antiga fábrica foram retiradas as lamas, as terras misturadas com lamas e outros resíduos aí encontrados e foi terminada a respectiva modelação do terreno.

Na zona da fábrica e a norte desta, para além do património edificado, e na sequência da remoção dos resíduos aí existentes, foram removidas as terras do interface.

Topo: A ponte acabada.
Top: The finished bridge.

Cable-stayed bridge

Dimensional features
Length: 121 m
Deck width: 3,5 m
Maximum span between pylons: 27 m
Maximum height above water: 6 m
Pylons: driven tubular piles
(Ø 708 and 508 mm)

Construction features
Steel piles: 110 t
Steel deck and abutments: 169 t
Reinforced concrete: 62 m^3
Exotic wood on deck: 1300 m^2

Resumo da Obra
Work Summary

Cliente	**C.M. Alcácer do Sal**	*Client*
Tipo de contrato	**Concepção-Construção** ***Design-Build***	*Contract type*
Data de construção	**2001**	*Construction period*
Custo	EUR **1.855.000,00**	*Cost*
Projectista	**Engº Luís Colen**	*Architect & Engineer*

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Seth

Concepção-Construção
Design-Build

Ponte Pedonal
Alcácer do Sal, Portugal
Pedestrian Bridge
Alcácer do Sal, Portugal

Ponte atirantada

Características dimensionais
Comprimento: 121 m
Largura: 3,5 m
Vão máximo entre pilares: 27 m
Altura livre máxima: 6 m
Pilares: estacas metálicas
(Ø 708 e 508 mm)

Características construtivas
Aço em estacas metálicas: 110 t
Aço no tabuleiro e plataformas
dos encontros: 169 t
Betão armado: 62 m^3
Madeira exótica no tabuleiro: 1300 m^2

Cable-stayed bridge

Dimensional features
Length: 121 m
Deck width: 3,5 m
Maximum span between pylons: 27 m
Maximum height above water: 6 m
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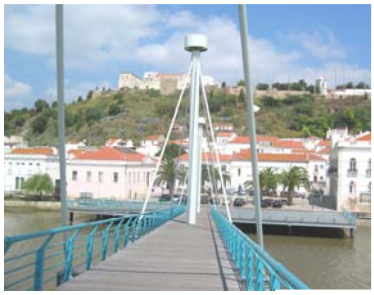

Topo: A ponte acabada.
Top: The finished bridge.

Resumo da Obra
Work Summary

Cliente	**C.M. Alcácer do Sal**	*Client*
Tipo de contrato	**Concepção-Construção** ***Design-Build***	*Contract type*
Data de construção	**2001**	*Construction period*
Custo	EUR **1.855.000,00**	*Cost*
Projectista	**Engº Luís Colen**	*Architect & Engineer*

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Central de Dessalinização de Beni Saf

Beni Saf, *Argélia*

Desalination Plant

Beni Saf, Algerie

Works description

Driving of sheet piling cofferdam to perform release pipe 2.400mm and 1.800 mm, and implementation of outfall, including dredging, in 1,200 m long pipe of 2,400 mm and 800 m to 1800 mm pipe diameter. Running water intake tower and sinking the same.

Description of the work:

Crimping and unbolt of curtain sheet piles: ± 1041 ml

Dredging sand: 33,589.16 m2

Underwater rock blasting and its dredging: 6316.05 m3

Excavations: 87541.38 m3

Release and sinking tubing Ø 2400mm, 1200m

Release and sinking tubing Ø 1800mm: 800

Running rings for pipes: 286 units

Implementation of knights to pipes: 86 units

Resumo da Obra
Work Summary

Cliente	**Befesa, Cobra, Codesa, Sadyt**	*Customer*
Tipo de contrato	***Contract price***	*Type of Contract*
Data de construção	**2007**	*Construction date*
Custo	**EUR 9.733.604,23**	*Cost*
Observações	**Job in Consortium**	*Notes*

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Emissário Submarino de Albufeira

Albufeira, Algarve

Marine Outfall

Albufeira (Algarve, Portugal)

The contract for the "Design and Construction of the Reinforcement of the Disinfection Stage of the Vale de Faro Wastewater Treatment Plant, in Albufeira, and the Corresponding Treated Effluent Disposal at Sea Infrastructures" was awarded to the consortium that included **Seth**, in 2004, and it was completed within 210 days.

Trabalhos efectuados

• Instalação de um sistema de desinfecção ultra-violeta na ETAR de Vale de Faro;
• Execução de um emissário terrestre PEAD Ø1000 mm entre a ETAR de Vale de Faro e a Câmara de Carga do Emissário Submarino;
•Execução e afundamento de um emissário submarino em PEAD Ø1000 mm com 1020m de comprimento e um difusor na extremidade com 160 m de comprimento, à cota –11 ZH;
• Os trabalhos foram realizados entre a cota -11 ZH e -13 ZH.
• Caudal descarregado: 4.232 m^3 / h
• População servida: 130.000 habitantes

Main features

• Construction of one marine outfall pipe (HDPE Ø 1000 mm) w/ 1020 m long
• Construction of one earthy outfall pipe (HDPE Ø1000 mm) w/ 926 m long
• Work done at depths between -11 and -13 m datum level
• Unloading flow in WWTP: 4.232 m^3 / h
• Population: 130.000 inhabitants





Lançamento da tubagem e vista durante a construção.
Pipe launching and Construction in progress.

Resumo da Obra
Work Summary

Cliente	**Águas do Algarve**	*Client*
Fiscalização	**Águas do Algarve**	*Inspection agency*
Tipo de contrato	**Preço Global**	*Contract type*
	Lump Sum	
Data de construção	**2004-2005**	*Construction period*
Custo	**EUR 3.512.305,00**	*Cost*
Projectista	**WW – Consultores de Hidráulica**	*Architect/Engineer*

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Reparação do Emissário do Martinhal

Sagres, Vila do Bispo

Repairs to the Martinhal Outfall Pipe

Sagres, Vila do Bispo

Trabalhos efectuados

- Reparação de um troço do emissário em tubagem de PEAD ∅ 450 mm)
- Os trabalhos foram realizados entre a cota -14 ZH e -18 ZH

Work description

- *Repair of a section of the outfall pipe (HDPE* ∅ 450 mm)
- *Work done at depths between* -14 *and* -18 *m datum level*

Lançamento da tubagem (topo). Vista durante a construção (em baixo).
Pipe launching (top). Construction in progress (below).

Resumo da Obra
Work Summary

Cliente	**C.M. Vila do Bispo**	*Client*
Fiscalização	**C.M. Vila do Bispo**	*Inspection agency*
Tipo de contrato	**Série de Preços** ***Unit Price***	*Contract type*
Data de construção	**2001**	*Construction period*
Custo	**PTE 24.695.000**	*Cost*
Projectista	**WW - Consultores de Hidráulica**	*Architect/Engineer*

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Remodelação e Ampliação da ETAR Faro Noroeste

Loulé e Faro

Faro Northwest WWTP – Remodeling and Enlargement

Loulé - Faro, Portugal

The new plant was designed for a treatment capacity of 44,530 inhabitants equivalent and for new quality goals for the final effluent, particularly with regard to microbiological parameters.
The area served covers part of the parishes of Almancil and São Clemente, of the municipality of Loulé and part of the parishes of Santa Bárbara de Nexe, Conceição and São Pedro, and the whole of the parish of Montenegro in the municipality of Faro.

Presentation of the Infrastructure
The recommended treatment scheme involves two lines and, in hydraulic and procedural terms, it was dimensioned for a design horizon year of 2033. It is based on a system of biological treatment using activated sludge, involving long aeration in two biological reactors configured as two oxidation ditches with surface aerators.
The solution adopted comprises a three-stage treatment scheme:

1 – Liquid Stage
• Intake system: equipped with rotating-drum screens to remove bigger solids / • Grit/grease removal, to remove sand, oils and fats / • Reception of sludge from septic tanks / • Contact tanks and receivers (selectors) and biological reactors of the oxidation ditch type, where the biological treatment takes places / • Secondary decanters to remove the biomass from the effluent, a part being recycled to the process / • Microfiltration in rotating-drum micro-atomisers / • Disinfection of the final effluent from the Plant by ultraviolet radiation / • Additional disinfection of part of the effluent with a view to its use as service water within the area of the Wastewater Treatment Plant.
The receiving environment for the final effluent from the Faro Northwest Wastewater Treatment Plant is the Ramalhete Creek of the Formosa Ria.

2 – Solid Stage
• Conditioning with polyelectrolyte / • Thickening (in a thickening drum and mechanical dehydration (in centrifuge) of the excess biological sludge / • Elevation of the dehydrated sludge and its storage in silos.

3 –Odour Control
Extraction and treatment, at a chemical odour-control unity, of the foul air from the sludge entering and treatment stages.
This treatment design is considered the most advantageous in both economic and operational terms, taking into account the size of the plant and the regulations governing the discharge of residual waters from the Plant fixed by the Algarve Hydrographic Region Administration (ARH):
CBO5 - 25 mg/l;
COD - 125 mg/l;
TSS - 35 mg/l;
and Fecal Coliforms < 300 MPN/ 100 mL.

Resumo da Obra
Work Summary

Cliente	**Águas do Algarve, SA**	*Customer*
Tipo de contrato	***Concepção-construção***	*Type of Contract*
Data de construção	**2008-2010**	*Construction date*
Custo	**EUR 9.700.000,00**	*Cost*
Observações	**Job in Consortium**	*Notes*

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Concepção-construção da ETAR da Lagoinha

Palmela (Setúbal)

WWTP at Lagoinha (Design-build)

Palmela (Setúbal), Portugal

Work Undertaken

The purpose of the Lagoinha wastewater treatment plant is to process the urban wasters of about 18,000 inhabitant-equivalents (i.e., about 60% of nominal capacity. It was dimensioned to respond to a population of 30,600 inhabitant-equivalents. The average flow to be treated in the project-horizon year is 7,650m3/day, with a peak flow of 670m3/hour. It comprises a treatment line that includes the following main stages.

Initial Pumping and Preliminary Treatment
The initial raw wastewater pumping station is designed for a water-column height of 11.4m. Following reception of the raw wastewater it is mechanically pre-treated in 2 compact-equipment lines in which the fine-sieving and sand-, oil- and fat-removal operations are combined in a single, completely-enclosed unit installed at the surface.

Secondary and tertiary treatment
The biological treatment involves prolonged aeration using Carrousel Biological Reactors. Comprising two symmetrical units, they have a capacity to handle 6,500m3 of effluent. They are 9.20m high and 6 metres are below ground level. The Secondary Decantation is undertaken in 2 identical circular tanks having a conical bottom slab equipped with bottom-scraper pontoons. Each tank is 22m in internal diameter, 3m high, 2 m being below ground level.

Effluent treatment
Part of the final effluent from the Treatment Plant is disinfected for the purpose of reuse as Service Water, both for washing and for irrigation of the green spaces.

Sludge treatment and storage
Mechanical dehydration of the digested sludge is undertaken in two centrifuges located in the operations building. The storage and treatment of the excess biological sludge is undertaken in two identical cylindrical reinforced-concrete tanks of a diameter of 10.5m and a height of 4.5m. The sludge thickening tank is equipped with a bottom scraper.

Deodorisation
Extraction and treatment of the foul air involves a BIOFILTER. The recommended Biofilter has an area of 80m2 and a biomass filtering height of 1.5m.

Resumo da Obra
Work Summary

Cliente	**Simarsul, SA**	*Customer*
Tipo de contrato	***Design-build***	*Type of Contract*
Data de construção	**2006-2008**	*Construction date*
Custo	**EUR 3.634.000,00**	*Cost*
Observações	**Job in Consortium**	*Notes*

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ETAR Ribeira Brava

Sítio da Praia (Freguesia de Tabua, concelho da Ribeira Brava) Madeira

WWTP Ribeira Brava

Praia, Tabua (Ribeira Brava) Madeira Island

Trabalhos efectuados

A ETAR faz parte da empreitada de Destino Final de Águas Residuais do Concelho da Ribeira Brava, dimensionado para servir a actual população de aproximadamente 7000 pessoas e preparado para no ano de 2025 servir uma população estimada em 13200 habitantes.
Caudal médio diário de 3164 m^3 / dia
Caudal de ponta horária de 260 m^3 / hora.
Etapas de Tratamento:
Pré-tratamento – tamisação vertical; desarenação; equalização do efluente bruto; medição de caudal.
Tratamento secundário – reactores biológicos sequenciais (SBR).
Tratamento terciário – equalização do efluente decantado; filtração em filtros fechados em pressão; desinfecção por ultra-violeta (pressão); armazenamento do efluente tratado.
Tratamento de Lamas – espessamento gravítico; desidratação centrífuga; estabilização com cal viva.
Tratamento de odores – para reduzir os cheiros na área envolvente à ETAR, foi instalado equipamento para tratamento de odores através de um sistema de carvão activado.

Scope of work

Turn-key construction of a waste water treatment plant for the local government at Madeira Island, in Tabua (Ribeira Brava), to 13200 inhabitants served, with a treatment flow of 3164 m^3 per day. Works included civil construction, procurement and installation of all specific, mechanical, electrical and control equipment and pre-engineered systems, as well as all commissioning tests.

Vista geral da ETAR
General view of WWTP

Resumo da Obra
Work Summary

Cliente	**SRARN - Direcção Regional de Saneamento Básico**	*Client*
Tipo de contrato	**Chave-na-mão** ***Turn-key***	*Contract type*
Data de construção	**2004-2005**	*Construction period*
Custo	**EUR 6,8 million**	*Cost*
Projectista	**Cenor / Consulgal**	*Architect & Engineer*
Observações	**Consórcio / Consortium**	*Notes*

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ETAR de Redondo e Montoito

Alentejo (Portugal)

WWTP at Redondo and Montoito

Alentejo (Portugal)

Trabalhos realizados

A ETAR do Redondo, e as respectivas infra-estruturas complementares, têm por finalidade tratar as águas residuais urbanas de cerca de 7000 habitantes-equivalentes. O caudal médio a tratar, no ano horizonte de projecto(2034), é de 1265 m3/dia, e o caudal de ponta horária de 145 m3/h.

É constituída por uma linha de tratamento que inclui as seguintes etapas principais :

Pré-tratamento

(gradagem grosseira, tamização, desarenação, medição e elevação dos caudais afluentes) ;

Tratamento secundário e terciário

(tratamento biológico, pelo processo de lamas em arejamento prolongado, e decantação secundária assistida para remoção de fósforo solúvel) ;

Tratamento de afinação do efluente

(microtamisação do efluente clarificado e desinfecção por meio de radiação ultravioleta) ;

Tratamento de lamas

(espessamento gravítico de lamas biológicas em excesso e desidratação centrifugada).

Work Description

The Redondo Wastewater Treatment Plant and its ancillary infrastructures are designed to treat the urban wastewater of about 7000 inhabitant-equivalents. The average faily flow to be treated over the project horizon is 1265 m^3/day, with a peak flow of 145 m^3/hour.

It consists of a treatment line that includes the following main stages:

Pre-treatment

(course screening, fine screening, sand and grit removal, measurement and pumping the sewage to a higher level);

Secondary and Tertiary Treatment

(biological treatment using the prolonged sludge aeration process, and asssited secondary decantation to remove soluble phosporus);

Final Processing of the Efluent

(micro-screening of the clarified effluent and desinfection by ultraviolet radiation);

Sludge Treatment

(gravity thickening of excess biological sludge and centrifuge dehydration).

Resumo da Obra
Work Summary

Cliente	**Águas do Centro Alentejano, SA**	*Customer*
Tipo de contrato	***Chave-na-mão***	*Type of Contract*
Data de construção	**2005-2006**	*Construction date*
Custo	**EUR 5.255.480,00**	*Cost*
Observações	**Obra feita em Consórcio**	*Notes*

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Estação de Tratamento de Águas Residuais

Grupo PORTUCEL SOPORCEL (antiga Fábrica de Papel INAPA), Setúbal

Wastewater Treatment Plant

PORTUCEL SOPORCEL Group (old INAPA Pulp and Paper Mill), Setúbal

Construção de uma Estação de Tratamento de Esgotos Industriais (ETARI)
Construction of an Industrial WWTP for the INAPA Paper Mill Plant

Características principais
Main features

População servida (equivalência)	**180 000 hab**	*Population*
Caudal tratado	**800 m³/h**	*Treatment flow*
Grau de tratamento	**Secondary**	*Treatment level*
Sistema de tratamento	**Biological reaction**	*Treatment system*

2 Tanques de reacção biológica (50x 25x8 m) / *Biological reaction tanks (50x 25x8 m)*
1 Tanque de equalização (50x10x8 m) / *Equalizer tank (50x10x8 m)*
1 Caleira Parshall (caudal de saída) / *Parshall flume (outlet flow)*
1 Tanque espesssador com ponte raspadora (Ø12 m, 5,5 m H) / *Thickener tank with scraping bridge (Ø12 m, 5,5 m H)*

Excavação	**39 000 m³**	*Excavation*
Aterro	**6900 m³**	*Backfilling*
Betão	**3300 m³**	*Concrete*
Cofragem	**16 400 m²**	*Formwork*
Armadura e obras metálicas	**243 ton**	*Rebar and steel works*

Resumo da Obra
Work Summary

Cliente	**Papéis INAPA, SA**	*Client*
Tipo de contrato	**Chave-na-Mão** *Turn-Key*	*Contract type*
Data de construção	**1999-2000**	*Construction period*
Custo	**EUR 3.831.243,32**	*Cost*
Projectista	**Hidrocontrato, SA**	*Architect & Engineer*
Observações	**Consórcio c/ Hidrocontrato**	*Notes*

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Estação de Tratamento de Águas Residuais

SISTEMA II - Colares, Sintra

Wastewater Treatment Plant

SYSTEM II - Colares, Sintra

Construção de uma Estação de Tratamento de Esgotos (ETAR)
Construction of an WWTP for the Municipality of Sintra (Colares)

Características principais
Main features

Habitantes servidos	**35 000**	*Inhabitants served*
Caudal tratado	**7900 m³/h**	*Treatment flow*
Grau de tratamento	**Secondary**	*Treatment level*
Sistema de tratamento	**Activated sludge**	*Treatment system*

2 Decantadores primários / *Primary decanters*
2 Tanque de arejamento / *Aeration tanks*
2 Decantadores secundários / *Secondary decanters*
2 Digestores / *Digesters*
1 Desidratração de lamas / *Sludge drying plant*
3 Estações elevatórias / *Pumping stations*

Excavação	**45 000 m³**	*Excavation*
Aterro	**33 400 m³**	*Backfilling*
Betão	**2200 m³**	*Concrete*
Cofragem	**12 000 m²**	*Formwork*
Armadura e obras metálicas	**125 ton**	*Rebar and steel works*

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal Sintra**	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1996 - 1997**	*Construction period*
Custo	**€ 1,7 million**	*Cost*
Projectista	**CESL, SA**	*Architect & Engineer*

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Estação de Tratamento de Águas Residuais

Magoito, Sintra

Wastewater Treatment Plant

Magoito, Sintra

Construção de uma Estação de Tratamento de Esgotos (ETAR)
Construction of an WWTP for the Municipality of Sintra (Magoito)

Características principais
Main features

Habitantes servidos	**6000**	*Inhabitants served*
Caudal tratado	**1200 m³/h**	*Treatment flow*
Grau de tratamento	**Tertiary**	*Treatment level*
Sistema de tratamento	**Activated sludge, aeration and UV**	*Treatment system*

2 Tanque de arejamento / *Aeration tanks*
2 Decantadores secundários / *Secondary decanters*
2 Leitos de secagem / *Drying beds*
1 Sistema Draimad / *Draimad system*
1 Poço de bombagem de escorrências / *Runoff pumping chamber*
1 Sistema de ultravioletas / *UV system*

Excavação	**15 000 m³**	*Excavation*
Aterro	**6500 m³**	*Backfilling*
Betão	**700 m³**	*Concrete*
Cofragem	**3500 m²**	*Formwork*
Armadura e obras metálicas	**42 ton**	*Rebar and steel works*

Resumo da Obra
Work Summary

Cliente	**Câmara Municipal Sintra**	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1997 - 1998**	*Construction period*
Custo	**€ 1,5 million**	*Cost*
Projectista	**Hidroprojecto, SA**	*Architect & Engineer*

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Estação de Tratamento de Águas Residuais

U.S. Navy - Base Aérea das Lajes, Açores

Wastewater Treatment Plant

U.S. Navy - Lajes Field, Azores

Construção para a Marinha de Guerra dos E.U.A. de uma Estação de Tratamento de Águas Residuais na base Aérea das Lajes, Açores. Toda a instalação foi construída e equipada com base em projecto realizado nos E.U.A.. O projecto foi executado em regime chave-na-mão e incluiu a construção civil, procura e montagem de todo o equipamento electro-mecânico, dispositivos de instrumentação e controlo remoto, assim como todos os testes de arranque. O contrato integrou ainda a construção e equipamento total do laboratório de análises físico-químicas dos fluidos tratados e dos efluentes gerados pelo tratamento. Ainda parte do projecto, salienta-se a construção de uma rede de tubagens de transporte das águas residuais (com cerca de 6 km de extensão), tubagens de intercepção, câmaras de visita e 3 estações de bombagem.

Vista geral da ETAR. Em segundo plano, os tanques de clarificação
General view of the WWTP. Background: the clarifier tanks

Vista geral do edifício de comando e laboratório
General view of the control and laboratory building

Construction of a WWTP for the US Navy at Lajes Field, Azores (Portugal). Design was made by a US engineering firm. Construction was done on a turn-key basis and included all works: civil works, procurement and expediting of all electrical, mechanical and control equipment, as well as all commissioning and start up operational tests. Also included in the contract was the construction and furnishing of the laboratory building. Scope also included the construction of a piping network about 6 km long, manholes and 3 pumping stations.

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**1995 - 1997**	*Construction period*
Custo	**USD 4,8 milhões**	*Cost*
Projectista	**Allen & Hoshall (EUA)**	*Architect & Engineer*

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Estação de Tratamento de Águas

U.S. Navy - Base Aérea das Lajes, Açores

Water Treatment Facility

U.S. Navy - Lajes Field, Azores

Construção para a Marinha de Guerra dos E.U.A. de uma Central de Tratamento de Águas (osmose inversa) na base Aérea das Lajes, Açores.

Toda a instalação foi construída e equipada com base em projecto realizado nos E.U.A..

O projecto foi executado em regime chave-na-mão e incluiu a construção civil, procura e montagem de todo o equipamento específico, electro-mecânico, dispositivos de instrumentação e controlo remoto, assim como todos os testes de arranque. Após a construção, a empresa assegurou ainda a exploração e condução técnica da instalação.

Baterias de membranas
Membrane stacks

Scope of work

Turn-key construction of a water treatment facility for the US Navy in Lajes Air Field (Terceira, Azores). Works included all civil construction, procurement and installation of all specific, mechanical, electrical and control equipment and pre-engineered systems, as well as all commissioning tests. After construction, under a separate contract, SETH has also been responsible for the operation of this facility.

Diversas vistas do equipamento instalado na central.
Several views of the equipment installed in the facility.

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**2001**	*Construction period*
Custo	**USD 3,31 million**	*Cost*
Projectista	**Glenn & Sadler (EUA)**	*Architect & Engineer*
Capacidade	**750 000 gal/dia (gal/day)**	*Capacity*

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Dessulfurização da Central Termoeléctrica de Sines
EDP – Refinaria de Sines, Portugal

Civil Works for Desulphurization Plant, at the Thermoelectric Power Plant, Sines
EDP Sines – Portugal

Work Carried Out

The desulphurisation project for the Sines Thermoelectric Power Station consists of implementation of four limestone/gypsum wet flue gas desulphurisation (wet FGD) units, one for each of the respective electricity generators. The desulphurisation process basically consists of removal of the SO2 from the combustion gases through reaction with an alkaline absorbent, obtaining gypsum as a sub-product.
The main components of the desulphurisation system are indicated hereunder, complete with the associated civils:

Combustion Gas System: construction of ventilator foundations and reinforced-concrete pipeline supports.

SO2 Absorption System: foundations of the absorbers, pumping wells, sundry foundations for equipment.

Limestone Storage System: very large foundation for two steel limestone tanks, three foundations for ball mills, well to house the limestone unloading system and conveyor belt for transport to the tanks, all the surrounding building and foundations for various items of equipment.

Gypsum Storage System: construction of a reinforced-concrete silo, diameter Ø24 m, height 40 m, capacity 9,000 m3.

Desulphurisation Liquid Effluent Treatment System: construction of 2 decantation tanks, 10 square tanks, sludge building, electrical building and sundry retention basins.

Ancillary Energy Systems: building for an ancillary boiler and sundry basins. Electrical and Central Command Building: construction of a building with basement to house the electrical switchboards, laboratory, command and control room, etc.

Compressed Air Systems: construction to four buildings next to the generators to provide compressed air to the desulphurisation system. To support the sundry pipework a Pipe Rack was build from the 4 units to what is known as the common zone.

Ancillary work included sundry drainage, landscaping and paving.

Major Quantities:

Excavation: 160,000 m3 / **Landfill:** 95,000 m3
Structural concrete C35/45: 25,000 m3
Lean concrete C12/15: 8,500 m3 / **Formwork:** 48.000m2
Construction rebar: 2,600,000 kg / **Sundry steel elements:** 400,000 kg

Resumo da Obra
Work Summary

Cliente	**Consórcio Hitachi - Coba**	*Client*
Tipo de contrato	**Valor Global** ***Lump Sum***	*Contract type*
Data de construção	**2005-2008**	*Construction period*
Custo	**EUR 14.000.000,00**	*Cost*

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Ampliação da Central Eléctrica de Belo Jardim

Terceira, Açores

Belo Jardim Power Plant Addition

Terceira Island, Azores

With a view to increasing the electric power available on Terceira Island in the Azores, EDA - Electricidade dos Açores, signed a contract with BWSC - Burmeister & Wain Scandinavian Contractor a/s, for the design and construction of the enlargement of the Belo Jardim Power Station.

This enlargement included the erection of two 4-stroke diesel generator sets with a combined mechanical power of 12.6 MW and 6.1 MW of useful electric power.

All the civil construction works (power station building, workshops, office buildings and ancillary structures), fuel tanks, gas exhaust chimney, accesses and exterior works and landscaping were awarded to **Seth**.

The civil construction works also include construction of the engine foundation pads – each involving 120 m^3 of concrete.

Vista aérea da central termoeléctrica de Bejo Jardim
À esquerda o edifício da nova ampliação.
Em primeiro plano, o novo parque de combustíveis.

Aerial View of the Belo Jardim Power Station.
Background, left: the new addition.

Intervenção SETH / *SETH's work share*

Edifício da Central / *Station building*:	1350 m^2
Ponte rolante / *Overhead crane*:	35 ton
Chaminé de escape / *Exhaust stack height*:	30 m
Parque de tancagem / *Tank farm*:	8 *tanks* / 890 m^3 total

Resumo da Obra
Work Summary

Cliente	**B.W.S.C. a/s - EDA**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**1995 - 1997**	*Construction period*
Custo	**PTE 700.000.000**	*Cost*
	USD 3,700,000	
Projectista	**B.W.S.C.**	*Architect & Engineer*

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Central Geotérmica da Ribeira Grande

S. Miguel, Açores

Ribeira Grande Geothermal Plant

S. Miguel Island, Azores

The geological characteristics of the Azores (located in one of the world's regions of greatest seismic activity) have allowed the construction of a power station in which the working fluid is the steam produced within the earth's crust, captured at a depth of 600 metres.

The Ribeira Grande geothermal power station is one of the few in the world. Since its construction it has constituted the benchmark for this type of facility.

The project was developed in two stages, leading to a total electric power production of 14 MW (13 MW in the grid), accounting for some 20% of the total electricity consumption of the island of São Miguel.

The 1st stage (6 MW) was completed in 1993 and the 2nd stage (8 MW) in 1999.

Vista geral da central geotérmica da Ribeira Grande
Em primeiro plano, a bateria de condensadores

General view of the Ribeira Grande Geothermal Plant
Foreground: the condenser yard

Intervenção SETH / *SETH's work share*

Edifício de Comando / *Control building*
Fundações da tubagem / *Pipework foundations*
Suportes de tubagems / *Pipe bridges*
Edifício da bomba S.I. / *Fire pump building*
Edifício do gerador / *Emergency generator building*

Resumo da Obra
Work Summary

Cliente	**Ormat Atlantic / EDA**	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1992 - 1993 (1ª Fase)** **1998 (2ª Fase)**	*Construction period*
Custo	**PTE 160.000.000 (1ª F)** **PTE 140.000.000 (2ª F)**	*Cost*
Projectista	**Ormat Atlantic, Inc.**	*Architect & Engineer*

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Gasoduto de Transporte de Gás Natural Sines - Setúbal

Sines - Setúbal

Sines – Setúbal Natural Gas Pipeline

Sines - Setúbal

Trabalhos Efectuados

O Gasoduto de Transporte de Gás Natural entre Sines e Setúbal efectua a ligação entre o futuro terminal de GNL em Sines e a Rede Nacional de Transporte de Gás Natural.

Os trabalhos efectuados incluíram a construção de um Gasoduto de Gás Natural com 87 km de extensão, entre Sines e Setúbal, incluindo a maior travessia da Europa por perfuração dirigida, a do Estuário do Rio Sado (4500 m).

Foi utilizada tubagem com as seguintes características: tubo de aço API 5L Cl. Gr. X-70 (∅ 800 mm), espessura de 17,50 mm, com revestimento exterior a polietileno, pressão máxima de serviço de 84 bar e caudal máximo de 675 000 Nm^3/h.

Work Description

Natural Gas Pipeline (87 km) between Sines and Setúbal including the longest Horizontal Direction Drilling (HDD) in Europe, 4500 m across the Sado River Estuary.

Pipework: steel pipe, API 5L CL. Gr. X-70 (∅ 800 mm) with polyethylene exterior coating.

HDD installation of 800 mm / 17,5 mm pipeline at the following crossings: Santo Andre, Salinas do Sado, Sado Estuary (4 HDD), Várzea do Sado, and Rio do Sado (8 HDD altogether).








Resumo da Obra
Work Summary

Cliente	**TRANSGÁS Sociedade Portuguesa de Gás Natural, SA**	*Client*
Tipo de contrato	**Série de Preços** ***Unit Price***	*Contract type*
Data de construção	**2003**	*Construction period*
Custo	**EUR 21.667.182,00**	*Cost*
Projectistas	**Eng. Luís Colen Seth, SA**	*Engineering*
Observações	**Consórcio com CME e GHIZZONI**	*Notes*

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Terminal Marítimo da CLCM
Companhia Logística de Combustíveis da Madeira
Caniçal - Madeira

Complete Conventional Buoy Mooring (CBM) system for the CLCM Caniçal Marine Terminal
Caniçal - Madeira

Trabalhos Efectuados

A **Seth, SA** concluiu a empreitada que lhe foi adjudicada pela CLCM – Companhia Logística de Combustíveis da Madeira para a concepção e instalação de um sistema de abastecimento de combustíveis para armazenamento no Terminal Logístico de Combustíveis instalado no arquipélago.
Caracterizou a empreitada, um quadro de 4 bóias com ganchos de desengate rápido, ligados a um troço de três tubagens submarinas (cada uma com 450 m de comprimento) que terminam num sistema de PLEM (Pipeline End Manifold) colocado à cota –23.00 (Z.H.).
A estes PLEMs estão ligadas mangueiras flexíveis que fazem a ligação aos navios abastecedores.
A coordenação de toda a empreitada foi assegurada pela **Seth, SA** e a tecnologia ali empregue foi subempreitada à companhia holandesa Bluewater Energy Services B.V..

Work Description

Seth has completed a contract for the design and supply of a complete Conventional Buoy Mooring (CBM) system for the CLCM.
The CLCM terminal is a Joint Venture including GALP Energia (Petrogal) providing the main import facility for LPG, black and white products (gasoline, diesel, fuel oil and kerosene) for the energy and power consumption for the island.
Scope of supply consists of four CBM buoys, complete with mooring system and quick release hooks, three combined pipeline end manifolds (PLEMs) and hoses, and the complete control and instrumentation via umbilical towards the shore terminal control room.
Seth used as technological partner the Dutch company Bluewater Energy Services B.V..







Resumo da Obra
Work Summary

Cliente	**CLCM** **Companhia Logística de Combustíveis da Madeira, Lda.**	*Client*
Tipo de contrato	**Chave-na-mão** ***Turn-Key***	*Contract type*
Data de construção	**2003-2004**	*Construction period*
Custo	**EUR 6.500.000,00**	*Cost*
Projectistas	**Bluewater Energy Services, B.V. (Holanda)**	*Engineering*

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Terminal Multifuncional dos Socorridos

Câmara de Lobos - Madeira

Socorridos Multipurpose Terminal

Câmara de Lobos – Madeira Island (Portugal)

Work Description

Seth, SA, carried out the remodelling of the Socorridos Multipurpose Terminal on the island of Madeira, in front of the Socorridos Stream at Câmara de Lobos.
This job involved the construction of a marine terminal to supply fuel to the Vitória Power Station on the island of Madeira.
This infrastructure, which supplies fuel from tankers moored about 560 m from the shore, comprises three buoys used to moor the ship, about 75 m of Ø10" fuel hose and 560 m of Ø12" steel pipeline.
The following work was carried out in accordance with the initial contract.
Removal of 4 buoys and respective chains and accessories, concrete blocks and anchors.
The steel buoys weigh about 5 tonnes each and have a diameter of 4 m at the water line and a total height of 4 m.
(These four sets of buoys were removed from the sea in front of the Formosa breach, where the Shell discharging facility used to be).
Laying just three of these sets (buoys + accessories + plus blocks and anchors) in front of the Cimentos Madeira Marine Terminal near the mouth of the Socorridos Stream.
Construction of a 560 m sea-line of Ø12", 12 mm wall, steel pipes welded together. The pipe ends at a PLEM (Pipe-Line End Manifold) built of reinforced concrete. On shore, the pipe is connected to another pipeline *(the construction of which was not a part of our contract)* that delivers the fuel to the storage tanks.
The PLEM includes steel piping and a set of seven Ø10" hoses totalling about 75 m. A shut-off valve was installed between the two pipelines.
A Breakaway Coupling valve was fitted between the 1st and 2nd hoses.
The steel piping of the sea-line is protected with Reno mattresses (wire-mesh baskets 4.0 x 2.0 x 0.3 m filled with 5-10 cm crushed stone).
As an addendum to the initial contract, **Seth** was awarded the overhaul of the 4 buoys (shot-blasting, sundry repairs, painting and fitting of lanterns fed by solar panels).
The 4th buoy is located at the Vitória Power Station and will act as a spare buoy.

A Sea Mark Plan was prepared by the Portuguese Hydrographic Institute.

The Employer in this contract was EDM – Electricidade da Madeira, which acted in close co-operation with CLCM – Central Logística de Combustíveis da Madeira.

Resumo da Obra
Work Summary

Cliente	**EDM - Electricidade da Madeira**	*Client*
Tipo de contrato	**Chave-na-mão** ***Turn-Key***	*Contract type*
Data de construção	**2006**	*Construction period*
Custo	**EUR 1.800.000,00**	*Cost*
Projectistas	**Seth, SA**	*Engineering*

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Remodelação do Sistema de Abastecimento e Armazenamento de Combustível Militar

Porto Santo, Madeira

Jet Fuel Pipeline from Off-base Depot and Additional On-Base Storage

Porto Santo Island, Madeira

This work involved remodelling the Military Fuel Supply and Storage System at the Porto Santo Island Aerodrome.
The contract included work in several areas: civil construction, foundations and structures, mechanical works, electricity, roadways, waters and drains.

Work carried out

- Distribution manifold building
- Two underground steel tanks (500 m^3 each), covered with reinforced concrete
- Waste Tank and Fuel Tank, complete with ladders and walkways providing access to respective covers
- Two fuel pits at the Fuelling Bay and another two at the Apron
- Construction of earth retaining embankments and walls
- 3200 metres of 6” diameter carbon steel connecting pipeline
- Related DWV, landscape and electrical works

Projecto NATO 99/7PL40601

Resumo da Obra
Work Summary

Cliente	**Ministério da Defesa Nacional** ***Portuguese Ministry of Defense***	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**2003-2004**	*Construction period*
Custo	**EUR 4.982.652,00**	*Cost*
Projectista	**Triar**	*Architect & Engineer*
Observações	**Consórcio com Crismetal**	*Notes*

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Quartel de Bombeiros

Base Aérea das Lajes – Ilha Terceira, Açores

Fire/Crash Rescue Station

United States Navy – Lajes Field, Terceira Island, Azores

Trabalhos efectuados

O Quartel de Bombeiros, foi uma obra adjudicada pela Marinha dos Estados Unidos em Maio de 2006 através de um contracto tipo "chave-na-mão", e concluída em Junho de 2008.
A empreitada consistiu essencialmente na construção de um edifício de 2.300 m² constituído por um corpo de 2 pisos em betão armado e uma zona de garagens em estrutura metálica, com paredes exteriores em betão armado, sendo o interior em paredes de gesso cartonado. O edifício é composto por áreas técnicas (sala de comando, sala de comunicações, sala eléctrica, sala de mecânica, sala de gerador), quartos, refeitórios, cozinha, balneários, lavandaria, e escritórios.
Para além das "tradicionais" especialidades como águas, esgotos, electricidade e comunicações, também fez parte da empreitada o fornecimento e instalação de um elevador, de todo o sistema de ar condicionado, detecção de incêndios, monitorização de todos os alarmes da base, sistema áudio e visual de alerta de incêndios, sistema de extracção de gases de escape dos camiões dos bombeiros.

Scope of Work

The Fire Crash Rescue Station was awarded in May, 2006 by the U.S. Navy and it was completed on June, 2008.
The project consists of one 2.300 sm building composed by a two story reinforced concrete building and a 10 fire trucks bay area built in structural steel, with reinforced concrete exterior walls and gypsum wall board interior walls. As part of the building we have the control room, communications room, electrical room, mechanical room, generator room, resting rooms, dining room, kitchen, lockers, laundry and offices.
Beside the "normal" specialties as water, drain, electrical e communications, was included in our scope of work the supply and installation of a hydraulic elevator, all the systems as: air conditioning, fire alarm, monitoring of all base alarms, mass notification system, fire/crash rescue vehicle exhaust removal system.

Resumo da Obra
Work Summary

Cliente	**United States Navy**	*Client*
Tipo de contrato	**Chave-na-mão** ***Turn-Key***	*Contract type*
Data de construção	**2006 - 2008**	*Construction period*
Custo	**EUR 7.490.000,00**	*Cost*
Projectista	**Benham** ***(Saint Louis, Missouri, USA)***	*Design*
Fiscalização	**United States Navy**	

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Ginásio – Fase II

Base Aérea das Lajes – Ilha Terceira, Açores

Fitness Center – Phase II

United States Navy – Lajes Field, Terceira Island, Azores

Trabalhos efectuados

O Ginásio, Fase II foi uma obra adjudicada pela Marinha dos Estados Unidos em Dezembro de 2004 e concluída em Setembro de 2006.
A Empreitada consistiu essencialmente na construção de um edifício de 2 pisos em estrutura de metálica de aproximadamente 910 m² com paredes exteriores em betão armado, sendo o interior em paredes de gesso cartonado. O edifício é composto por áreas técnicas (sala de comunicações, sala eléctrica, sala de mecânica), escritórios, sala de aeróbica, ginásio e balneários.
Para além das "tradicionais" especialidades como águas, esgotos, electricidade e comunicações, também fez parte da empreitada o fornecimento e instalação de um elevador, de todo o sistema de ar condicionado, som, CCTV e detecção de incêndios.

Aspecto do exterior do edifício
Outside view of the Fitness Center

Scope of Work

The Fitness Center, Phase II was awarded in December, 2004 by the U.S. Navy.
The project was the construction of a two floor building with approximately 9.800 SF structural steel, reinforced concrete exterior walls and gypsum wall board interior wall. As part of the building we have the communication room, electrical room, mechanical room, offices, aerobics room, open gym and lockers room.
Beside the "normal" specialties as water, drain, electrical e communications, was included in our scope of work the supply and installation of a hydraulic elevator, all the systems as: air conditioning, music, commercial intrusion detection system and fire alarm system.

Aspecto do interior do ginásio
Inside view of the gimnasium

Resumo da Obra
Work Summary

Cliente	**United States Navy**	*Client*
Tipo de contrato	**Chave-na-mão**	*Contract type*
	Turn-Key	
Data de construção	**2004 - 2006**	*Construction period*
Custo	**EUR 4.592.500,00**	*Cost*
Projectista	**Clark Nexsen*, USA***	*Design*
Fiscalização	**United States Navy**	

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Clínica Dentária

Base Aérea das Lajes – Ilha Terceira, Açores

Dental Clinic

United States Navy – Lajes Field, Terceira Island, Azores

Trabalhos efectuados

A clínica dentária foi uma obra adjudicada pela Marinha dos Estados Unidos em Setembro de 2003 e concluída em Maio de 2005. O contracto foi tipo "chave na mão" pelo valor aproximado $3,123,00.00 USD.

A clínica dentária consiste essencialmente de um edifício em estrutura metálica com paredes exteriores em blocos de betão, sendo o interior em paredes de gesso cartonado. Pode-se dividir o edifício em 5 grandes áreas: pública, administrativa e arquivos, serviços, consultórios e área técnica.

Fez também parte da empreitada o fornecimento e instalação de todo o sistema de ar condicionado, ar comprimido, vacum, oxigénio, esterilizador, som e detecção de incêndios, bem como todo o mobiliário dos consultórios, laboratório e sala de raio X.

Aspecto do exterior do edifício
Outside view of the Dental Clinic

Aspecto do interior da clínica
Inside view of the Dental Clinic

Scope of Work

The dental clinic was awarded in September, 2003 by the U.S. Navy. The contract amount was approximately $3,123,000.00 USD and it was completed on May, 2005.

The dental clinic is a structural steel building with concrete masonry exterior wall and gypsum wall board interior wall. The facility can be divided in five main areas: public, administration and records, services, doctor rooms and equipment rooms.

It was scope of work the supply and installation of all the systems as: air conditioning, dental air, oral evacuation, oxygen, sterilizer, music and fire alarm system as well as all the cabinets for the doctor rooms, lab and X-ray room.

Resumo da Obra
Work Summary

Cliente	**United States Navy**	*Client*
Tipo de contrato	**Chave-na-mão**	*Contract type*
	Turn-Key	
Data de construção	**2003 - 2005**	*Construction period*
Custo	**USD 3,123,000.00**	*Cost*
Projectista	**RLF, *Florida, USA***	*Design*
Fiscalização	**United States Navy**	

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Edifício de Ensaio de Motores de Avião - F16 e A7

Força Aérea Portuguesa - Base Aérea de Monte Real

Hush House for F16 and A7 Aircraft

Portuguese Air Force - Monte Real Air Base

Design and construction for the Portuguese Air Force of a sound-proofed building to be used to test the engines of the F16 Falcon and A7 Corsair aircraft.
The engines are tested when fitted to the aircraft, which allows very precise engine test and working conditions.

The building and the specific systems were designed by I.A.C. - International Acoustic Company, a British firm specialised in facilities of this kind.

All the civil construction, erection of the building's modules, and the fluid networks, electrical and telecommunications installations and fire detection and fighting systems were undertaken by **Seth**.

As a result, the Portuguese Air Force is now provided with a technologically very advanced facility to be used to service its most advanced aircraft.

Aspecto do interior do edifício com um aparelho F16 em preparação (pré-ensaio)

Inside view of the hush house with an F16 aircraft being readied for test

Resumo da Obra
Work Summary

Cliente	**F.A.P.**	*Client*
Tipo de contrato	**Concepção-Construção**	*Contract type*
	Design-Build	
Data de construção	**1995 - 1996**	*Construction period*
Custo	**PTE 470.000.000**	*Cost*
Projectista	**I.A.C. plc**	*Design*

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Controlo de Corrosão em Tanques POL

US Navy - Base Aérea das Lajes, Açores

POL Tank Corrosion Control

US Navy - Lajes Field, Azores

Trabalhos Efectuados
Scope of Work

- Reparação de superfícies
  Surface repairs
- Decapagem e grenalhagem de superfícies
  Sand and shot blasting
- Limpeza e reparação dos interiores
  Inside cleaning and repair
- Substituição de suportes de tubagem
  Replacement of pipe supports
- Fabricação e montagem de estruturas metálicas
  Fabrication and erection of steel structures
- Repintura geral
  Overall repainting

Vista aérea do Parque de Tancagem Sul na Base Aérea das Lajes.
Em 2º plano, a cidade da Praia da Vitória, com
o Porto Militar (esquerda) e o Porto Comercial (em cima, ao centro)
The South Tank Farm at Lajes Field, Azores.
In the backgound, the city of Praia da Vitória,the
Military Harbor (left) and the Commercial Harbor (top center).

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**1999 - 2000**	*Construction period*
Custo	**USD 2,96 milhões**	*Cost*
Projectista	**Austin Brockenbrough & Ass.**	*Architect & Engineer*

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Substituição da Estação de Bombagem e Tanques de Combustível

US Navy - Base Aérea das Lajes, Açores

Replace Pumphouse and Tanks

US Navy - Lajes Field, Azores

Trabalhos Efectuados
Scope of Work

- Construção de 2 tanques de combustível para aeronaves com 160 m³ cada e respectivas bacias de retenção
  Construction and erection of 2 jet fuel tanks with 160 cu.m each and associated containment dikes
- Construção da estação de bombagem e comando
  Construction of the pumphouse and control building
- Fornecimento e montagem dos seguintes equipamentos:
  Supply and installation of the following equipment:

  5 bombas (1368 m³/h cada)
  5 fueling pumps (38 liters/s)

  Instalação de carga de camiões
  Truck loading island

  6 hidrantes de rampa
  6 ramp hydrants

  Tubagem de aço inoxidável e aço carbono e respectivas válvulas de passagem e controlo
  SS and CS piping and associated valves and control valves

  Sistema de controlo por autómato programável
  PLC control system

  Sistema de protecção catódica
  Cathodic protection system

Resumo da Obra
Work Summary

Cliente	**U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**2001 - 2002**	*Construction period*
Custo	**USD 6,54 milhões**	*Cost*
Projectista	**Robert International**	*Architect & Engineer*

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Substituição dos Braços de Carga

Ministério da Defesa Nacional - Depósito POL NATO de Lisboa

Replace Loading Arms

Portuguese Ministry of Defense - POL NATO Depot, Lisbon

Trabalhos Efectuados
Scope of Work

Fornecimento e montagem de 2 braços de carga (8") para jet fuel e 2 braços de carga (10") para gasóleo e respectiva cabina e sistema de controlo.
Supply and erection of 2 loading arms (8") for jet fuel and 2 loading arms (10") for diesel fuel and associated control system and cabin.

Fornecimento e montagem de tubagem de aço carbono, válvulas, bombas, filtros e contadores para as linhas de jet fuel, gasóleo e águas de lastro.
Supply and erection of carbon steel piping and valves, pumps, filters, flow meters for the jet fuel, diesel fuel and ballast water.

Execução da instalação eléctrica e rede de telefones e som com aparelhagem antideflagrante.
Installation of electrical, phone and PA systems with explosion-proof equipment.

Em cima: Vista dos braços de carga, após a montagem
Top: The loading arms after assembly and errection.
Em baixo: Montagem de um dos braços de carga.
Bottom: Erection of one the loading arms.

Resumo da Obra
Work Summary

Cliente	**Ministério da Defesa Nacional** ***Portuguese Ministry of Defense***	*Client*
Tipo de contrato	**Chave-na-Mão** ***Turn-Key***	*Contract type*
Data de construção	**1998-2000**	*Construction period*
Custo	**€ 1,7 milhões**	*Cost*
Projectista	**Techint Portugal**	*Architect & Engineer*
Fiscalização	**Techint Portugal**	*Inspection agency*

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Substituição de Moradias Unifamiliares, Fases I, II e III

US Navy - Base Aérea das Lajes, Açores

Replace Military Family Housing, Phases I, II and III

US Navy - Lajes Field, Azores

Descrição do projecto
Project description

- Construção de 154 moradias unifamiliares
  Construction of 154 family housing units
- Remoção de amianto e demolição de 28 moradias
  Asbestos abatement and demolition of 28 existing housing units
- Redes de águas e esgotos
  DWV networks
- Instalação eléctrica
  Electrical installation
- Arruamentos e arranjos exteriores
  Sidewalks, driveways and landscaping

Diversos aspectos da construção.
Various images of the new neighborhood.

Resumo da Obra
Work Summary

Cliente	**U.S. Air Force /U.S. Navy**	*Client*
Tipo de contrato	**Chave-na-Mão**	*Contract type*
	Turn-Key	
Data de construção	**2001-2005**	*Construction period*
Custo	**USD 43 million**	*Cost*
Projectista	**Baker and Associates**	*Architect & Engineer*

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Barragem do Pego do Altar

Rio Santa Catarina, Setúbal

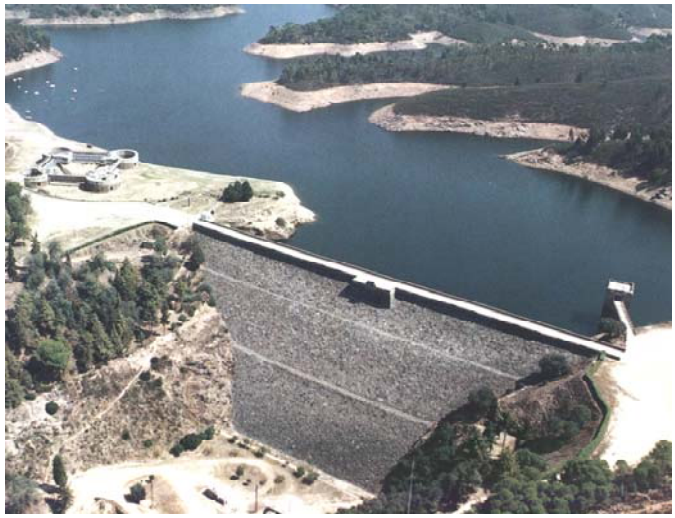
Pego do Altar Dam

Santa Catarina River, Setúbal

Barragem de enrocamento, com o paramento de montante revestido com cortina de chapas de aço inoxidável e juntas elásticas. Uma solução inovadora, mas que tem demonstrado um excelente desempenho.

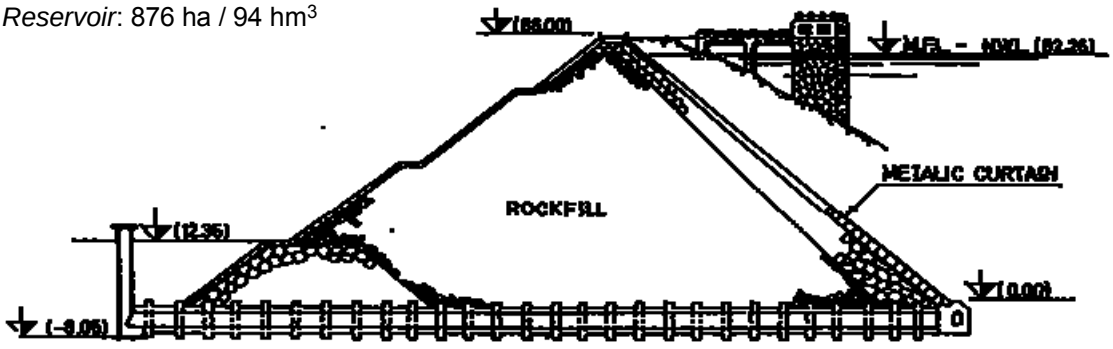
Rockfill dam with an upstream watertight face made of welded stainless steel plates with elastic joints. This technical solution is quite uncommom but has shown an excellent behaviour along the years.

The stored water is used for irrigation of the downstream hydroagricultural development and in hydroelectric production.



Obra incluída na selecção "100 Obras de Engenharia Civil no século XX" da Ordem dos Engenheiros.

Altura / *Height*: 63 m
Desenvolvimento do coroamento / *Crest length*: 192 m
Descarregador / *Spillway*: Controlado / *Controlled*
Volume / *Dam volume*: 371 000 m^3
Albufeira / *Reservoir*: 876 ha / 94 hm^3



Secção Transversal / Cross Section

Resumo das Obras
Works Summary

Cliente	**Associação Regantes do Vale do Sado**	*Client*
Projectista	**JAOHA**	*Engineering*
Data de construção	**1949**	*Construction period*

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Barragem do Vale do Gaio

Rio Xarrama, Alcácer do Sal

Vale do Gaio Dam

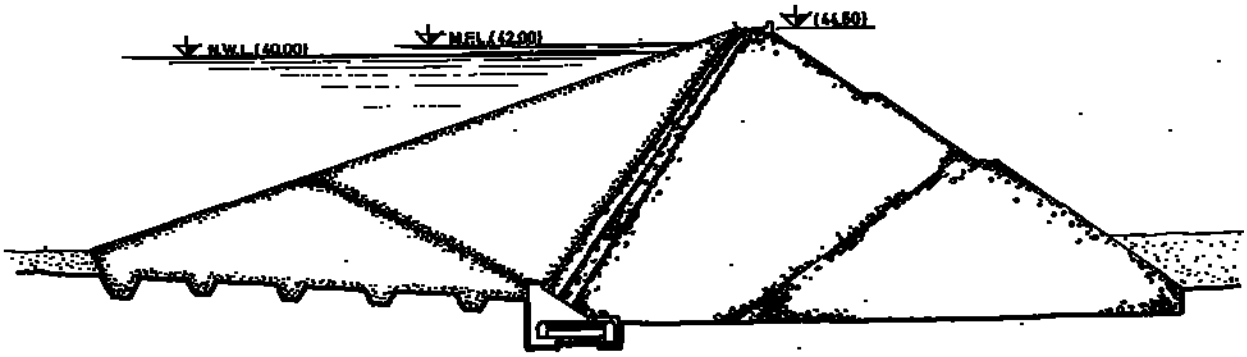
Xarrama River, Alcácer do Sal

Barragem de terra, com cortina interior em material betuminoso entre o maciço terroso e o maciço de enrocamento.

Dam with an earthfill part, on the upstream side, and a rockfill part on the downstream shoulder. An asphalt sealing curtain was built between them.

Altura / *Height*: 51 m
Desenvolvimento do coroamento / *Crest length*: 368 m
Descarregador / *Spillway*: Controlado / *Controlled*
Volume / *Dam volume*: 636 000 m^3
Albufeira / *Reservoir*: 550 ha / 63 hm^3

Obra incluída na selecção "100 Obras de Engenharia Civil no século XX" da Ordem dos Engenheiros.



Secção Transversal / Cross Section

Resumo das Obras
Works Summary

Cliente	**Associação Regantes do Vale do Sado**	*Client*
Projectista	**Engº Augusto Poppe**	*Engineering*
Data de construção	**1949**	*Construction period*

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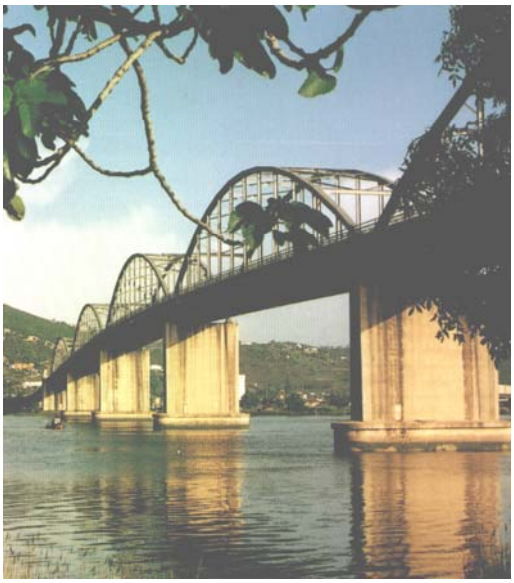
Ponte Marechal Carmona

Rio Tejo, Vila Franca de Xira

Marechal Carmona Bridge

Tagus River, Vila Franca de Xira

Ponte metálica com 5 tramos metálicos apoiados em pilares de betão armado. Os tramos metálicos são constituídos por vigas *Lang,* com o banzo inferior recto e o banzo superior em arco parabólico. A infraestrutura é composta por 37 pilares, dos quais 4 se situam no leito do rio e 2 são pilares de transição da estrutura metálica para a de betão. As fundações foram construídas em estacas de betão cravadas com 60 e 50 cm de diâmetro e 25 m de comprimento.



5-span steel deck bridge, supported by reinforced concrete pylons. The steel deck is formed by Lang beams, with straight lower flanges and a parabolic arch in the upper flange. The foundations are composed by 37 pylons, 4 of which are located in the river and 2 as transition elements between the steel and concrete sections of the bridge.

Características geométricas
Geometric data

Comprimento total, incluindo encontros / *Total length, including abutments*: 1224 m
Comprimento do tabuleiro metálico / *Steel deck*: 524 m
Vãos / *Spans*: 5 x 104 m
Largura do tabuleiro entre guardas / *Deck width between railings*: 12 m

Resumo da Obra
Works Summary

Cliente	**JAE / Dir. Serviço de Pontes**	*Client*
Tipo de contrato	**Concepção-construção**	*Contract type*
Fiscalização	**JAE / DSP**	*Inspection agency*
Construtores	**SETH, Lda.** **Dorman, Long & Co. Ltd**	*Construction consortium*
Data de construção	**1948-1951**	*Construction period*
Custo	**PTE 42.000.000**	*Cost*

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Ponte da Vala Nova
Benavente

Vala Nova Bridge
Benavente

Primeira ponte
Construída em Portugal
com betão pré-esforçado

No seguimento da construção da Ponte Marechal Carmona e respondendo aos anseios das populações de Benavente e Salvaterra de Magos, decidiu a Direcção do Serviço de Pontes da Junta Autónoma das Estradas contruir uma nova ponte sobre a Vala Nova.

O projecto foi confiado à SETH, tendo o projectista, Engº Francisco Bélard de Vasconcelos Mello, optado pela construção do tabuleiro com pré-esforço, uma solução então já utilizada em alguns elementos de estruturas, mas totalmente inédita em pontes de quaisquer dimensões. Para tal, deslocou-se o projectista à casa Freyssinet, em Paris, com vista à aquisição dos necessários conhecimentos para a aplicação do sistema. As fundações foram constituídas por estacas de betão cravadas com 60 cm de diâmetro e uma profundidade aproximada de 25 m.

First pre-stressed concrete bridge built in Portugal

Concrete bridge with a pre-stressed concrete deck. Designed and built by SETH, whose designing engineer, Mr. Francisco Bélard de Vasconcelos Mello, decided to build the deck with pre-stressed concrete. In the 50s, the pre-stressing of concrete elements was already being used in Portugal for other concrete elements, but never on bridges of any size. The pylons are supported by driven concrete piles with a diameter of 60 cm and an approximate length of 25 m. The pre-stressing was done by the Freyssinet method.

Características geométricas
Geometric data

Comprimento total / *Total length*: 108 m aprox.
Vãos / *Spans*: 3 x 33,8 (aprox.)
Largura entre guardas / *Width between railings*: 11,4 m

Resumo da Obra
Works Summary

Cliente	**JAE / Dir. Serviço de Pontes**	*Client*
Tipo de contrato	**Concepção-construção**	*Contract type*
Fiscalização	**JAE / DSP**	*Inspection agency*
Pré-esforço	**Método Freyssinet**	*Pre-stressing method*
Data de construção	**1953-1954**	*Construction period*
Custo	**PTE 8.000.000**	*Cost*

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