

**Execução de Tomada de Água**  
**Central de Ciclo Combinado de Lares (Figueira da Foz)**  
**Water Intake and Discharge Pipping**  
**Combined Cycle Central Power (Lares - Figueira da Foz, Portugal)**

### Work Description

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

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

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

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



### Main jobs:

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



### Resumo da Obra

#### Work Summary

|                    |                                       |                            |
|--------------------|---------------------------------------|----------------------------|
| Cliente            | <b>EDP – Energias de Portugal, SA</b> | <i>Client</i>              |
| Tipo de contrato   | <b>Valor Global</b>                   | <i>Contract type</i>       |
|                    | <b>Lump Sum</b>                       |                            |
| Data de construção | <b>2008-2009</b>                      | <i>Construction period</i> |
| Custo              | <b>EUR 2.990.000,00</b>               | <i>Cost</i>                |

## Construção do Reforço de Potência de Salomonde II

Bacia do Cávado-Rabagão (Vieira do Minho), Portugal

### **Improvement Salomonde Dam**

**Bacia do Cávado-Rabagão (Vieira do Minho), Portugal**

#### Work Description

Execution of all construction works of the new Hydroelectric Power Salomonde II which is intended to strengthen power installed in hydroelectric Salomonde, situated in Vieira do Minho, Braga district.

#### Scope of work

Independent and underground hydraulic circuit with 2.2 km total length, composed of the following elements:

- Water intake in the Albufeira Salomonde;
- Section of underground adduction;
- Section of restitution between the Central and the connection to the balancing chimney;
- Balancing chimney;
- Tunnel Return;
- Restitution in Albufeira Caniçada;
- Downstream channel dug in the bed of the River Cávado;
- Underground Central;
- Building support and substation;
- Access tunnels and attack;
- Heap and diversion of Rio Mau;
- Cofferdams Water Outlet, restitution and complementary flood spillway;
- Complementary Flood spillway with supply and assembly of equipment.

#### Main quantities:

Earth moving: 765 000 m<sup>3</sup>

Concrete: 130,000 m<sup>3</sup>

Steel: 9,100,000 kg

Construction of cofferdams

- Water intake in the Albufeira Salomonde
- Complementary Flood spillway, Albufeira Salomonde
- Restitution in Albufeira Caniçada



#### Resumo da Obra

##### Work Summary

|                    |                                                |
|--------------------|------------------------------------------------|
| Cliente            | <b>EDP – Gestão da Produção de Energia, SA</b> |
| Tipo de contracto  | <b>Valor Global / Lump-sum</b>                 |
| Construtores       | <b>Seth, SA (em consórcio)</b>                 |
| Data de construção | <b>2011-2015</b>                               |
| Custo              | <b>€ 125.000.000,00</b>                        |

|                            |
|----------------------------|
| <i>Client</i>              |
| <i>Contract type</i>       |
| <i>Contractor</i>          |
| <i>Construction period</i> |
| <i>Cost</i>                |

## 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<sup>3</sup>

**Rubble concrete:** 45 m<sup>3</sup>

**Shuttering:** 974 m<sup>2</sup>

**Steel:** 272.000 Kg

**Accesses:** 800 m<sup>3</sup>

**Excavation:** 2.300 m<sup>3</sup>

**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**

|                           |                                    |
|---------------------------|------------------------------------|
| <b>Cliente</b>            | <b>Câmara Municipal de Coruche</b> |
| <b>Tipo de contrato</b>   | <b>Turn-key</b>                    |
| <b>Data de construção</b> | <b>2011-2012</b>                   |
| <b>Custo</b>              | <b>EUR 2.291.885,00</b>            |

|                            |
|----------------------------|
| <b>Client</b>              |
| <b>Contract type</b>       |
| <b>Construction period</b> |
| <b>Cost</b>                |

## 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 m<sup>3</sup>

**Rubble concrete:** 5 000 m<sup>3</sup>

**Shuttering:** 9 500 m<sup>2</sup>

**Steel:** 1 500 tonnes

**Accesses:** 8 800 m<sup>2</sup>

**Excavation:** 16 000 m<sup>3</sup>

**Excavation in rock:** 8 500 m<sup>3</sup>

#### 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

Projectista

Tipo de contrato

Data de construção

Custo

**Câmara Municipal de Abrantes**

**CENOR – Projectos de Engenharia, Lda**

**Concepção/Construção**

**2004-2007 (670 days)**

**EUR 9.450.290,00**

*Client*

*Architect & Engineer*

*Contract type*

*Construction period*

*Cost*

## Rehabilitation of the dams at Arrabalde and Salgadas

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### 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.

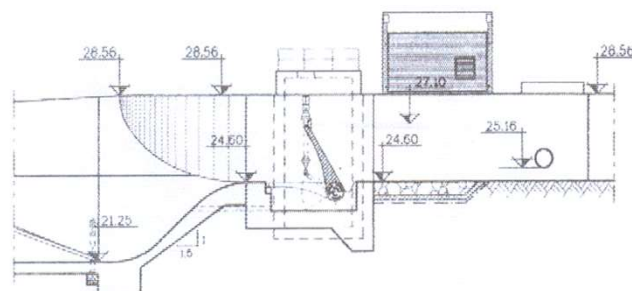
The rehabilitation of the dam Arrabalde's main goal was to allow the automatic triggering of the two gates, inserted in the body of the dam, and water intakes in order to allow, in accordance with the needs of water and streams and tributaries downstream requested, optimization of their operation.

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 vãos 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                                           |

## Rehabilitation of the dams at Arrabalde and Salgadas

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### 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.

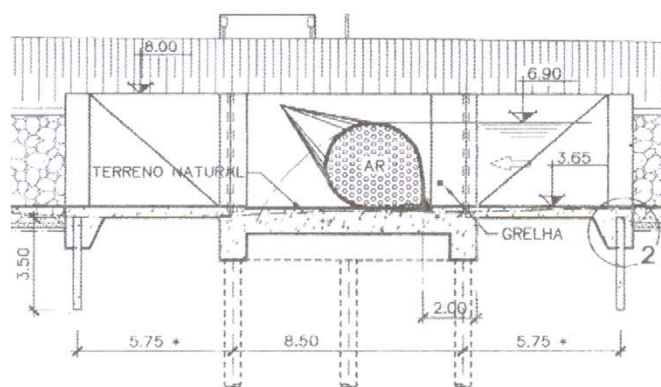
The rehabilitation of the dam's main goal was to replace the existing structure that was obsolete (about 50 years), creating a plan to allow sufficient water supply to the needs of water and flow downstream requested by making water in the left margin.

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  
Projectista  
Tipo de contrato  
Data de construção  
Custo

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