

## Silo Multi-Produto - 6000 ton

SECIL, SA - Outão

### *Multi-Product Silo - 6000 ton*

*Secil, SA - Outão*

Design-build of a multi-product silo for 6,000 tons w/ five interior compartments enable the storage of products secreted.

#### Foundation type:

- In molded stakes in the ground (bored cast-in-place piles)

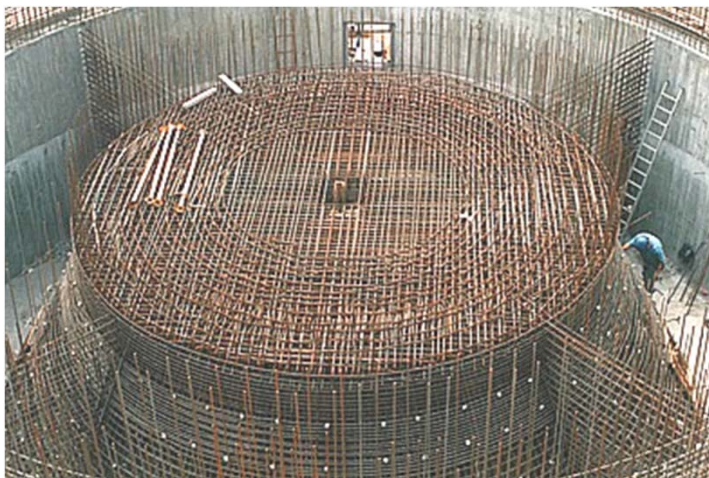
#### Quantity: 44

Length of the stakes: 30 m

#### Type of formwork: Stepper

Concrete volume: 3200 m<sup>3</sup>

Reinforcement steel: 450 ton



Aspecto da armadura do  
cone de descarga.  
Densidade de aço: 190 kg/m<sup>3</sup>

Rebar for the discharge cone.  
Steel density: 190 kg/m<sup>3</sup>

## Resumo da Obra

### *Work Summary*

Cliente	SECIL, SA	Client
Tipo de contrato	<b>Concepção-Construção</b> <b>Design-Build</b>	Contract type
Data de construção	1995 - 1996	Construction period
Custo	PTE 470.000.000	Cost
Projectista	Engs. Alfredo e Luís Morgado	Structural design

**Depósito de Água Elevado**  
Centro de Distribuição do Melão, Palmela  
**Elevated Water Reservoir**  
**Melão Distribution Center, Palmela**

Construction of a large water tank with the following features:

**Capacity:** 600 m<sup>3</sup>

**Height:** 26 m

**Concrete Volume:** 450 m<sup>3</sup> (including foundation shoe with 230 m<sup>3</sup>)

Pumping stations with 4 electro-pump groups and post processing.  
Deposit power with Ø 400 mm pipe.

**Construction details:**

Fuste run with slipform.  
Cuba performed with conventional formwork anchored to the shoe with towers type PAL.



Aspecto das torres de escoramento.

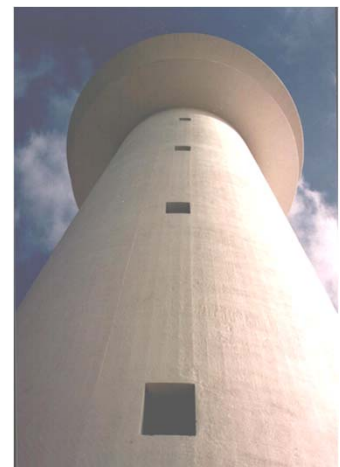
*View of the support towers.*



Aspecto do fuste.  
Note-se a perfeita verticalidade da cofragem.

*Note the plumbness of the formwork.*

*View of the tower.  
Note the plumbness of the formwork.*



**Resumo da Obra**  
**Work Summary**

Cliente	<b>C.M. Sesimbra</b>	<i>Client</i>
Tipo de contrato	<b>Construção Civil</b> <b>Civil Works</b>	<i>Contract type</i>
Fiscalização	<b>C.M. Sesimbra</b>	<i>Inspection Agency</i>
Data de construção	<b>1998</b>	<i>Construction period</i>
Custo	<b>PTE 70.000.000</b>	<i>Cost</i>
Estabilidade	<b>Ortsan - Gesplan</b>	<i>Structural design</i>

## Forno de Clinquer e Torre de Ciclones CIMPOR, Souselas

### *Modification of the Clinker Cooler and the Cyclone Tower CIMPOR, Souselas*

#### Descrição dos trabalhos

Obra industrial em que as tarefas foram na sua generalidade estruturas de betão armado, salientando a execução da torre dos ciclones em sistema de cofragem trepante da Peri e execução de duas lajes de betão armado desta mesma torre sobre o forno com este funcionamento.

#### Quantidades totais da obra:

**Escavação:** 3.500 m<sup>3</sup>

**Betão** em estruturas de betão armado: 7.000 m<sup>3</sup>

**Cofragem** em estruturas de betão armado: 30.000 m<sup>2</sup>

**Armaduras** em aço de construção: 1.250 ton

**Aço** em estruturas metálicas: 250 ton

#### *Work description*

Industrial work generally consisting of reinforced concrete structures, including the cyclone tower formed with climbing formwork system type "Peri" and execution of two concrete slabs in the same tower above the kiln in operation.

#### *Total quantities of work:*

**Excavation:** 3,500 m<sup>3</sup>

**Concrete** in reinforced concrete structures: 7,000 m<sup>3</sup>

**Formwork** in reinforced concrete structures: 30,000 m<sup>2</sup>

**Reinforcement steel:** 1,250 ton

**Reinforcement steel structures:** 250 ton



#### Resumo da Obra

##### *Work Summary*

Cliente	<b>F. L. SMIDTH &amp; Co, AS</b>	<i>Client</i>
Tipo de contrato	<b>Valor Global Lump-sum</b>	<i>Contract type</i>
Data de construção	<b>2000-2001</b>	<i>Construction period</i>
Custo	<b>EUR 2.865.010,00</b>	<i>Cost</i>

Dessulfurização da Central Termoelétrica 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 SO<sub>2</sub> 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.

**SO<sub>2</sub> 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 m<sup>3</sup>.

**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 m<sup>3</sup> / **Landfill:** 95,000 m<sup>3</sup>

**Structural concrete C35/45:** 25,000 m<sup>3</sup>

**Lean concrete C12/15:** 8,500 m<sup>3</sup> / **Formwork:** 48.000m<sup>2</sup>

**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