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Artikel: Structure of a coal-fired steam generator (Austria)
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2. Structure of a Coal-Fired Steam Generator (Austria)

Owner:	*VKG, Vienna* *NEWAG, Maria Enzersdorf, Austria*
Engineer:	*Siemens AG Österreich* *Vienna and Linz, Austria*
Manufacturer of Steam Generator:	*Simmering-Graz-Pauker AG,* *Vienna, Austria*
Contractor:	*Joint Venture "Dürnrohr Thermal Power Plant"* *Porr AG and Universale AG, Vienna, Austria*

The engineering task for the construction of the supporting structure for a modern steam generator comprehends the design and the erection of an approximately 100 m high tower on which the steam generator is suspended, allowing free downward extension.

The classical solution for this task is a steel structure which commonly is considered as a part of the boiler. Access facilities like fire protected stair cases and elevator shafts are located according to operational requirements and construction regulations. Normally these facilities are installed into free standing reinforced concrete towers, which are incorporated in or situated beside the boilerhouse.

For this task, a new reinforced concrete design was developed, integrating the stair cases and elevator shafts into the supporting structure of the boiler. This new design uses all the advantages of modern reinforced concrete technique like slipforming and lifting technique and proved very competitive compared with conventional steel structures. Therefore, the owners' decision was in favour of this reinforced concrete design for their new thermal power plant at Dürnrohr/Austria (405 MW + 320 MW). Civil work for the first boiler supporting structure was finished 1982, construction work for the second unit is in progress according to time schedule 1983.

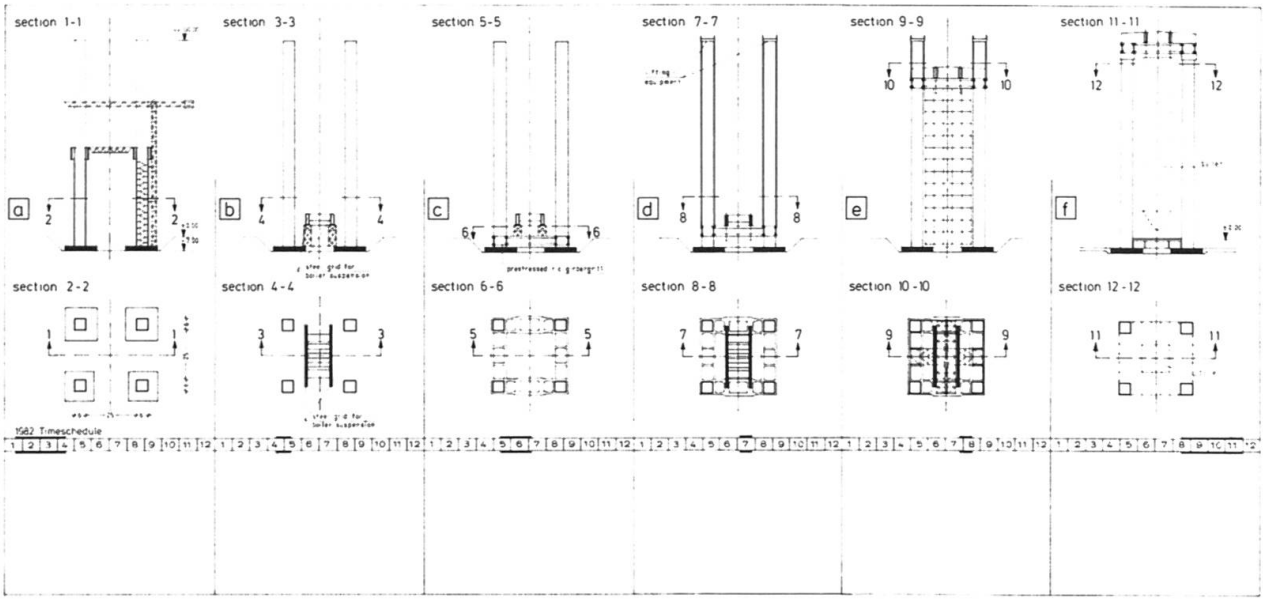

Fig. 1 Schematic overview of the most important construction phases.
The second unit will be realized during 1983 in the same way.

a) Construction of foundation, slipforming of pylons, installation of prefabricated reinforced concrete stairs-elements.

b) Mounting of the steel girder grill for suspension of the boiler. Weight: 400 t

c) Construction of prestressed reinforced concrete girder grill.
Concrete quality: B 400 1150 m³
Prestressing tendons: St 160/180 40 t
Reinforcement: Steel IV 175 t
Embedded parts: 21 t

d) Lifting of the prestressed reinforced concrete girder grill.
Take-over of the steel grill for boiler suspension.
Premounting of the steel structure for the roof (500 t).

e) Lifting of the prestressed reinforced concrete girder grill together with the steel grill and the premounted roof structure.
Mounting of the bearing structure for the cladding between the pylons during stops of lifting.
Total lifted weight: 4000 t approx.

f) Construction of the rigid connection of the lifted prestressed reinforced concrete girder grill with the pylons.
Installation of cladding, completion of roof and floor ± 0,0.

Both boiler supporting structures consist of 4 slip-formed box section pylons of 6 m by 6 m square dimension. The height of these pylons is about 100 m. Each pylon is founded separately by a reinforced concrete slab. The tops of the pylons are connected by a prestressed concrete girder grill. This grill is cast, prestressed and grouted on groundlevel and than lifted — together with the steel-grid for boiler suspension, elements of the roof-structure and the bearing structure for the side wall cladding between the pylons — by means of a hydraulic lifting equipment, installed at the top of the pylons, in its final position. There the reinforced concrete girder grill gets rigidly connected with the pylons, so creating a very stiff three-dimensional reinforced concrete frame structure. The total weight to be lifted is approximately 4000 t, the lifting height is approx. 100 m.

The pylons themselves are used for the installation of stairs, elevators, cable- and airducts and ancillary equipment of the steam generator.

The slipforming procedure for the pylons and the construction of a prestressed concrete girder grill on ground level are today routine activities of civil contractors involved in power-plant construction. Lifting technique is offered today by quite a number of experienced companies at very competitive prices. This work normally is subcontracted. The key-point of the project is — as well for the engineer as for the contractor — the realization of the rigid connection of the pylons and the lifted reinforced concrete girder grill. It has to be designed to meet correctly all static requirements and to allow a practicable realization by a reasonable amount of work and material. This task additionally becomes more complicated by restrictions caused by the boiler and its auxiliary components.

Besides the technical advantages of the reinforced concrete boiler supporting structure in reinforced concrete, a considerable cost reduction resulted compared with a conventional steel structure. Experience gained from this project showed the possibility for further reduction of cost and construction time.

(H. Nussbaumer, A. Unden)

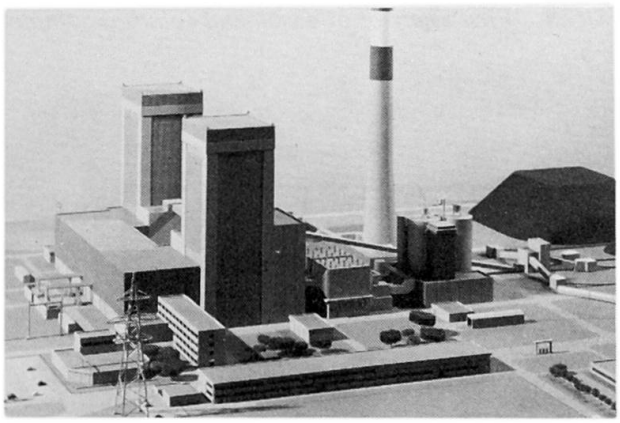

Fig. 2 Model of the total plant.

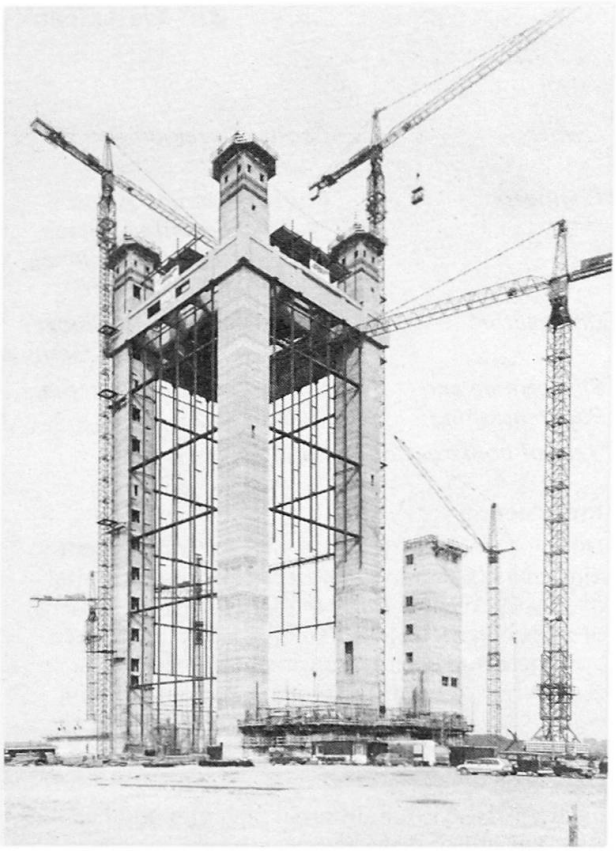

Fig. 3 Lifting procedure of prestressed reinforced concrete girder grill.
Lifted weight: approx. 4000 t
Lifting height: approx. 100 m

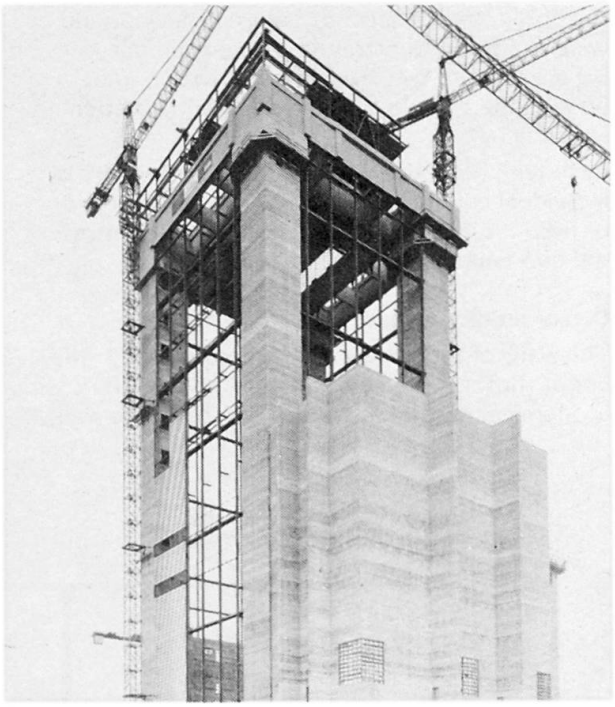

Fig. 4 Prestressed reinforced concrete girder grill in its final position. Construction of the rigid connection of the girder grill and the pylons. Installation of cladding between the pylons.