

## Iv-Consult

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### WINNER



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Iv-Bouw & Industrie is renamed into Iv-Consult per the 30th of March 2009 and is a division of Iv-Groep, a group of professional engineering companies with approximately 700 employees. Iv-Groep was founded in 1949 as a design and drawing office for steel structures. Through the years the company has developed itself into a sparring partner for clients that need independent advice or a constructive solution.

Iv-Consult has engineers for design and Engineering of Concrete and Mechanical Structures. Iv-Consult employs about 120 persons. The company is specialised in providing an independent advice for large heavy, complex and moving structures in different markets. A brief description of the Iv-Consult main markets are:

- Transport, storage and transfer systems and equipment;
- Heavy and special steel and mechanical structures;
- Special constructions such as attractions for amusement parks;
- Design of harbour and airport terminals, including logistic advice;
- All the offices, silos and store sheds etc. included in the projects.

The available manpower in the other divisions of Iv-Groep enables Iv-Consult to deploy extra capacity and, if required, other disciplines such as systems engineering, maintenance concepts and 3D measurement and 3D laser scanning.

The disciplines within Iv-Consult consist of steel engineering, mechanical engineering, civil engineering, logistic engineering, connection design and management/staff services.

Iv-Consult offers its services all over the world. Besides the home market in the Netherlands and Belgium, Iv-Consult serves clients in China, Malaysia, Middle East, Pakistan, Australia and India. For these international services Iv-Consult also runs a fully equipped office in Kuala Lumpur, Malaysia.

Iv-Consult's main objectives are:

- To be a reliable partner for its clients
- To be the innovating and creative consulting engineer for special and large steel, mechanical and concrete structures from feasibility studies up to preparation of shop drawings
- To be the logistic advisor for: Storage and Transfer, Internal logistics, People Logistics, Construction Logistics

Iv-Consult strives to be the constructive partner.

Iv-Consult wants to be the best in steel concrete and mechanical projects, from first draft up to realization.

### Clients

- Iv-Consult has a wide variety of clients:
- Contractors (national and international);
  - Operators of terminals and factories;
  - Suppliers of installations and equipment;
  - Project developers;
  - Port authorities;
  - Government.

## Hard-coal power station, Karlsruhe Rheinhafen

### Short Description

Iv-Consult is the engineering company for the structure of the boiler house of the Rheinhafen Dampfkraftwerke Unit 8 (RDK8) for Alstom Power Systems in Stuttgart - Germany. The RDK8 power plant will have a capacity of approx. 900 MW and will be constructed during 2008 up to 2011. The base of the RDK8 will be 68 by 68 meters and has a height of 120 meters. In total the structure will have more than fifty thousand calculated steel elements. Iv-Consult used Scia Engineer as the engineering program for both static and dynamic calculations and it proved to be a very useful tool for this large project.

### Project Information

Owner: EnBW  
 Architect: EnBW and fcg-architekten  
 Contractor: Alstom  
 Engineering Office: Alstom Stuttgart

Construction Start: 2008  
 Construction End: 2011  
 Location: Karlsruhe, Germany



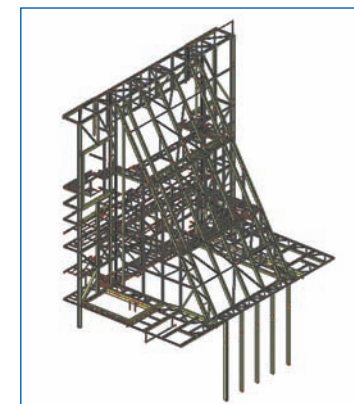
### Quote of the Jury

*"The high technical level of the structure, the updating of the 3D model including the pipelines and equipment make the project quite complex. The whole structure consists of in total 50.000 elements, 5000 loads, 70 combinations which have been calculated with different models. Also the utilization of Scia Engineer is quite impressive, especially the creative use of the output files obtain the appropriate data."*

This new generation of high-tech coal-fired power stations with a gross output of approx. 900 MW will be constructed from 2008 to 2011. Iv's Client "Alstom Power Systems GmbH" is the designer, who will have the construction executed for the German power supplier EnBW Energie Baden-Württemberg AG. The dimensions of the boiler house are relatively large, with a length x breadth x height of about 68x68x120 metres. The various installations, turbine

and generator housing, chimney and cooling tower will also be constructed by other suppliers.

The core of the power station consists in general of a square boiler suspended in a very heavy and rigid boiler stand. A boiler house is constructed with a partial suspension from this stand, which will support the flue gas duct, all the equipment, pipelines, landings, staircases, etc.



Used software: Scia Engineer

Iv-Consult will design and carry out the calculations for the RDK 8 boiler house, wherein details of the main steel, secondary steel, and the most important connection details will be worked out. The profile database used consists of around 250 Korean and assembled cross-sections. The RDK 8 boiler house comprises a total of 6 walls, 35 floors, 6 staircases and various special suspension and support structures. The boiler house consists of around 50,000 elements. Each floor is again split-up into 8 sections and a variable number of assembly partitions. In total, there are more than 5,000 different loads acting in the x, y and z directions and occurring in around 70 different combinations and 40 load instances.

At night, the 3D Design model is automatically updated and exchanged with the client's reference models of the pipelines and other equipment. The task is to match all the components to each other. In view of the large amount of information, many processes have been partially automated.

All the information that is received and administrated is put into separate Scia Engineer models. Due to the vast amount of members, the total size, the project approach and the schedule it is not possible to integrate all information into one model. For this purpose over 200 models have been built. The geometry from the 3D design model is used to make the models.

The Scia Engineer output data is filtered with the use of some programming in Visual Basic and transferred into the required output format and in various tables used for the connection design. Scia Engineer was also used to perform various earthquake analysis and Eigen frequency checks of structural parts and proved to be a useful tool.

Due to the vast amount of information within this project and a pre-described way of numbering the elements, combinations and load cases, the administrative flexibility within Scia Engineer was highly appreciated.

In general Scia Engineer proved to be a useful tool for designing power plant structures in a systematic way.

The work was commenced in July 2007 and taking into account all the additional improving revisions, it is expected to continue to around June 2009.

(Photo's © fcg-architekten and EnBw)

