

photovoltaic production

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TECHNOLOGY ALONG THE VALUE CHAIN

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The German-British company PV Crystalox Solar Silicon GmbH built a new poly-silicon plant in Bitterfeld-Wolfen (Germany)

ACCELERATED ASSEMBLY

PV Crystalox builds a factory using an advanced modular assembly system for secondary steelwork
 Nowadays, support structures for plant construction can be erected considerably faster and more cost-effectively than by using classic welding technology. During the construction of a new plant for Solar Silicon, the benefits of a modular assembly system were utilised for the installation of the secondary steelwork.

During the period from September 2007 to December 2008, the German-British company PV Crystalox Solar Silicon GmbH built a new plant in the Bitterfeld-Wolfen chemical park for the production of polycrystalline solar silicon. Representing a total investment of Euro 100 m, this plant will progressively attain a full production capacity of approx. 1,800 tons. PV Crystalox is one of the world's largest manufacturers of crystalline silicon ingots and silicon discs.

It is common for contractors and clients to underestimate issues regarding labour, site tolerances, and installation of secondary steelwork support structures, which very often leads to needless delays during the assembly process if these structures are constructed conventionally. To avoid any such problems, the en-

gineering companies installed the Sikla Simotec Assembly System. The consulting engineers EDL Pörner in Grimma and Ferkatsch GmbH (chemical plants) were appointed as specialists for the planning of the steel pipework.

The greatest part of the engineering project was designed with the Sikla product range in PDS using the Sucad software application. The remaining part was designed in traditional steelwork and then converted into a modular support design by the Sikla application engineering team. In this way, un-modifiable traditional welded structures, without any possibility of adaptation to existing structural tolerances, were replaced by a fully adjustable system, allowing schedules to be adhered to and subsequent operational targets to be met. This system is infinitely extendable, so even during production processes further connections, building alterations and maintenance services in Ex-zones can be carried out quickly and simply, hence minimising labour requirements and production

down-time. During this project Sikla as a supplier overcame challenges relating to delivery targets, flexibility, logistics handling and conversion of traditional welded systems into an adaptable modular system. One aspect which demonstrated the vendor's flexibility was the need for the steelwork system to be treated and supplied with a special non-standard chemically resistant coating because it was to be permanently exposed to a chemically laden atmosphere.

More than 2,000 steel sub-structures were assembled by the companies Weber Rohrleitungsbau Merseburg and MCE Industrietechnik Ost with a workforce of 200 experienced assembly operatives in only 4 months. The fast handling with only a minimum of components and special connection techniques greatly facilitated the assembly process. Thus even variations / additional supports outside the original design scope could be introduced quickly thanks to the modular assembly principle. Temporary supports are completely eliminated, and the use of lift-



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Use of the carrier 100 and height-adjustable seat for the high load range



For an economic solution the systems Framo 80 and the carrier 100 may be combined

ing gear is greatly reduced, according to Mr. Vandersee, Site Manager for the Company Weber Merseburg.

Tested and approved to meet safety regulations

In the area of supporting structures, plant construction is subject to strict basic rules. Proof of compliance must be supplied by the vendor of the supports. Dur-

ing the design stage, the planners could refer to simple and easy-to-understand load charts based on pre-calculated structures. The Framo System 80 is able to withstand very high loads. As a result, it was necessary to check actual static load calculations only in borderline cases. The systems comply with the requirements of static load proofing and are type-tested. Elaborate single proofs were not necess-

ary, said Mr. Ferkatsch, CEO of Ingenieurbüros Ferkatsch.

In the mid-load range, the closed modular framing system covers pipe size ranges up to DN 150. Lack of space and interfering edges from other subsections lead to the preferred assembly of cantilevers. The torsional forces, arising from the axial force of the pipeline, are properly transmitted from the hollow section into the building structure. Beyond this nominal size range, the Simotec girder system, based on 100/120 H beam sections, meets the requirements of the heavy-duty sector. Compatibility between the two systems means that an economic combination can be attained. The system has been utilised in pharmaceutical, chemical, refinery and energy applications for over 11 years.

Part of the vendor's service package behind the assembly system includes documentation, pre-fabrication, special products, planning software, coordination of the assembly, training for design and assembly, in-house workshops and accompanying application engineering. This reduces the number of interfaces involved during project development and installation. ■

CONTACT

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INTERVIEW WITH DR. HILMAR TIEFEL, CEO OF PV CRYSTALOX SOLAR SILICON GMBH

How did the use of Simotec products influence the construction of the plant?

Dr. Tiefel: All requirements for secondary steelwork could be fully covered by the service package from Sikla. The preliminary work was very satisfying, the response times and the provision of material were very short so that the concept, in retrospect, is absolutely convincing.

What is the potential of the mounting system with regard to maintenance?

Dr. Tiefel: Simotec is a fast-connection system and therefore easy to assemble also in Ex-protection areas. Moreover, the components are reusable. Should modifications, expansions or maintenance tasks become necessary, it's possible just to "bolt-on". Framo 80 even allows multiple connections on all 4 sides of the base profile for further components or pipe surrounding components. So I see further potential to save costs and time.

Did you have any reactions from the TÜV during the approval process?

Dr. Tiefel: The documentation of the supplier was gapless. The system offers the required static certificates. All supporting structures were designed in detail. "We didn't hear anything on



„I see further potential for future measures to reduce costs and save time“

Dr. Hilmar Tiefel is CEO of Silicon Solar PV Crystalox

the part of the TÜV", no signal could be better!

What is your conclusion with regard to the efficiency?

Dr. Tiefel: Ready corrosion protection on delivery, flexibility during adaptation to dimensional tolerances and a reduction in scrappage are important aspects when considering efficiency. Not only during construction of the plant, this mounting system provided us economical advantages. We could start up a factory with the security, that also in future short-term provision of material and fast assembly in EX-protected areas is possible.