OERLIKON

Reference

Satisfied customers: Our primary objective
Max Bögl

www.oerlikon-welding.com

AIR LIQUIDE WELDING

A good connection

Max Bögl Stahl- und
Anlagenbau GmbH & Co. KG
Max-Bögl-Straße 1
D-92369 Sengenthal
Tel. +49 (0) 91 81 / 909-402
Fax +49 (0) 91 81 / 909-439
info@max-boegl.de · www.max-boegl.de

Interview-Partner:
Willibald Scherer
Steel Construction
Tel. +49 (0) 91 81 / 909-402
Fax +49 (0) 91 81 / 909-439
wscherer@max-boegl.de

Company profile

The Max Bögl group has more than 75 years of success behind it. Over the years Max Bögl has steadily developed from a supplier of straightforward building services to become a leading provider of technology and all-round services. The range of services offered today means that the group can meet all requirements for even the most complex of building projects.

The Max Bögl group is the largest privately owned construction company in Germany and currently employs a workforce of 4,400. Its turnover in 2006 was around 990 million EUR.

The Steel and Plant Construction division is now an independent operation within the Max Bögl group, acquiring and processing projects independently. Its services are of course also offered throughout the group, which increases customer benefits by eliminating interface questions relating to deadlines, quality and price.

Interview

What is the role of welding within your projects?

Steel manufacturing developed from the company's tool making shop, which itself grew out of the need for operating materials, fixings and casings. The division became independent in 1991. Welding is at the very centre of the manufacture of steel parts. Here we prepare the parts so that the work on site is reduced to a minimum. Max Bögl Stahl- und Anlagenbau GmbH & Co. KG has evolved in recent years into a highly renowned welding operation. Particularly through the bridge building industry, we have many contacts with external testing institutes such as LGA, TÜV, GL, DB, all of whom accredit the company's very high quality welding work.

How do you see the future of the steel industry in Germany?

Max Bögl is investing in the steel industry. Only last year we built a new production shop. Strategically, we want to focus on even larger projects. The company is therefore undergoing enormous capacity expansion and modernisation. In the sheet fabrication sector for bridge components, intensive automation has greatly simplified the handling of the parts required for bridge building, which are heavy, wide and tall. Investment in this kind of production plant represents a positive signal for the German economy. Even more positive is the fact that investment expectations have already been exceeded – and we haven't yet exhausted all opportunities.

Photo credit/source: R. Legrand, on behalf of DEGES and the Max Bögl group.

Pictorial evidence/source: R. Legrand, on behalf of DEGES and the Max Bögl group.

The current investment is in welding equipment. Within this sector there is a constant need to keep up with the latest production technology. Welding technology must always be state-of-the-art.

How many are employed in the Steel Construction division?

The Steel Construction division employs a workforce of approximately 150, of which 50 are welders. The assembly sector comprises around 30 people.

How did the Strela Sound project go?

The Strela Sound Bridge involved the largest tonnage of construction steel of any project in Germany that we have ever handled. One of the first planning jobs was to decide on the production process, i.e. which parts would be produced at the plant and how could they be transported to the site. The optimum solution is generally to prefabricate parts, transport them to the site, place them into position and weld them together there, so that the assembly and welding effort on site can be kept within limits. This involves paying particular attention to intelligent positioning of all joints and the welds. Joints should not be in areas where the material is at its thickest. The aim is to minimise stress on the final joint. The majority of the forces at work in this bridge are located at the base of the pylon. This is therefore the largest part: it weighs 140 tons and is 5.20 m high, 22 m long and 5 m wide. It was possible to transport it to the Strela Sound by boat, which enabled very large sections to be handled. Eight sections, prefabricated at the workshop and welded together on site, formed a single huge part that was lifted into position by a ship crane.

What were the particular welding challenges presented by this project?

The road surface for the bridge was a cantilevered structure, which means that the bridge was attached piece by piece from the pillars and welded in place. The pylon cross-section was a teardrop shape and tapered as it rose upwards. The assembly of the six sections to an overall height of 80 m posed a particular challenge for the geometry of the prefabricated parts. The same applied to the welding work that took place at the site, which required millimetre precision for the circumferential welding of the sections. It was a constant battle to counter welding distortion and welding had to be carried out using as little heat input as possible. In-house welding processes included submerged arc welding, MAG tractor welding and MAG manual welding. Absolutely even heat application was the key factor in preventing any unwanted distortion. The longitudinal and transverse seams were of extreme importance for the superstructure of the Strela Sound Bridge. Hollow trapezoidal stiffeners were butt welded in one single operation. These were 7 millimetres thick, angled sheets which were welded without any seam preparation in a single submerged arc pass. The pylons involved butt welding, 30 to 50 mm thick, curved sheets that had been welded in-house into a tubular section.



We used FLUXOFIL M10 1.6 mm for this purpose. Of course, some sections have inner components which have to be welded to the outer skin with a minimum of distortion. Only a small amount of heat can be applied, so FLUXOFIL filler wire is ideal.

Which OERLIKON auxiliary materials were used?
Submerged arc welding has been used for quite a long time in bridge building, both for butt joints and for welding longitudinal ribs. Max Bögl employs OERLIKON OP 181 welding flux for butt welding. In process tests conducted with OERLIKON, the best results were achieved with this flux. For productivity reasons, a lot of flux cored wire is used. We favour FLUXOFIL M8 1.2 mm and FLUXOFIL M10 1.6 mm. They are pretty much essential for this kind of work these days because of their superior application. Although there are also many arguments for choosing solid wire, when it comes to productivity there is no alternative to flux cored wire. FLUXOFIL 14 HD is primarily used for vertical and overhead seams.

What is it like working with OERLIKON?
Max Bögl's collaboration with OERLIKON has developed alongside our evolution in steel construction. Our welding engineers and supervisors are in constant contact with OERLIKON. We solve problems together, for example minimising corner shrinkage or increasing the use of filler wires for submerged arc welding. We have joined forces to identify the benefits for production with the result that there is less realigning work, less distortion, less part shrinkage and therefore higher quality at a lower cost. The Max Bögl group is continually on the lookout for improvements and has found a sound and fair partner in OERLIKON. We receive the best possible support for problem solving. It is often the small changes that offer the greatest potential and effects. Ceramic weld pool backings, for instance, are increasingly used to save time as compared to conventional processes. The OERLIKON Innovation Day is another example of a highly successful means of exchanging new technologies and processes and learning about them directly.

Max Bögl obtains auxiliary materials, ceramic weld backing strips, flux and welding wires for the submerged arc process from OERLIKON. The quality of its products and customer support are still the key factors in OERLIKON's favour. All stakeholders are satisfied and confident that things will remain this way.

AIR LIQUIDE WELDING
www.airliquide.com

OERLIKON

AIR LIQUIDE WELDING FRANCE
13, rue d'Épluches
BP 70024 Saint-Ouen l'Aumône
95315 Cergy Pontoise Cedex
Tel.: +33 1 34 21 33 33
Fax: +33 1 34 21 31 30
www.oerlikon-welding.com

W 000 269 974 - 11 2007 - S 01 Ed. 1 - QB: 2367 - Photos: ALW