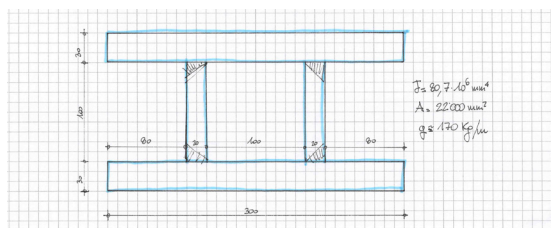


Special Beams for Medical Application



Profile:	<i>Special Beams</i>
Material grade:	<i>304L</i>
Execution:	<i>Laser fused</i>
Industry served:	<i>Petrochem, Chemical & Pharmaceutical</i>
Destination:	<i>Switzerland</i>



The challenge is to produce two special beams in 304L (1.4307) stainless steel. The input data are the following limits: the minimum moment of inertia ($80.7 \times 10^6 \text{ mm}^4$), as well as the maximum acceptable section height of 160mm. In addition, the request is for fully penetrated welds.

The solution designed by the engineering company is a tough welding challenge and is significantly heavy as far as weight is concerned. There is potential for improvements. With the support of Montanstahl's technical department, a weight-lighter section is designed (with 26kg/m weight savings), which is easier to laser weld, but satisfies the structural and dimensional requirements.

The section is a beam with three webs, with wider flanges but foresees strongly reduced material thickness.

The appointed engineering company does approve and sign off the suggested variant. Two of those special beams are needed with a length of approximately 6650mm.

The final length to which the beams will be precision cut, is defined by measures performed on site once the concrete works are ultimate.

The bars are installed in a private medical clinic (Ars Medica) in Lugano in the Tessin Region of Switzerland. They will be the structural support for the equipment of a magnetic resonance imaging (MRI). This is also the reason for the choice of an austenitic stainless steel, in order to keep the magnetism of the supporting structure extremely reduced. The use of the expensive non-magnetic stainless steels, such as 316LN or 1.4435 (a 316L with a min. 12.5% Ni content), is not necessary. At first the central web is laser fused. The heat input for welding the thin 10mm web with full penetration from two sides is limited. Thus distortion is minimal and only little straightening is needed prior to stitch the two external webs and then laser weld them with full penetration too. The agreement is to cut to measure and release the bars within two days, once the cutting length is established.

With the enlargement of the range of expertise, another private clinic (S. Anna) in Lugano, always belonging to the Group Genolier Swiss Medical Network, one of Switzerland's leading private clinic groups to which also Ars Medica belongs, will be furnished with a heavy magnetic resonance imaging equipment.

The requirements are similar and the proven concept is adapted in the same way. In this project the beams with three webs are significantly bigger, both higher and wider, as well as much heavier (245kg/m), forcing the production manager and his team to explore new limits thanks to this challenge.

Also for this job a 2 days lead-time for precision cutting of the 6.9 meter long bars and release is established and successfully accomplished.

