Hot tip: flame cutting instead of milling

High ablation rates mean optimised parts costs, even for complex geometries

Especially when it comes to the production of large-scale components, time is money. That's why Jebens GmbH from Korntal-Münchingen, Germany, a leading specialist for large, heavy flame-cut parts, mechanical processing and complex welded components, is increasingly opting for flame-cutting instead of milling when high ablation rates are called for. With one single cut, they can remove massive amounts of material, saving up to 50% on the time required for the job. And that means significantly lower costs. They can do this because they not only have the necessary machines and equipment for processing plates and blocks with thicknesses up to 1,100 mm and unit weights up to 55 tons – they also have distinctive expertise in thermal cutting machine operation and temperature control.

In view of the increasing demand for smaller batch sizes and tighter delivery times, balancing efficiency, flexibility and quality is becoming more and more important. In this respect, Jebens sees a perfected flame-cutting technique as a viable competitive alternative to the complex mechanical processing of large-format parts. In many cases, it enables milling times to be considerably reduced – if not dispensed with completely – and thus offers significant rationalisation potential. One example from real life is a casing for minting presses that Jebens has produced for the Schuler Group from S355J2-grade structural steel with APZ 3.1. The job was to produce workpieces with the dimensions 400 x 710 x 840 mm from a 30-ton steel plate. This required ablation of large segments with tight radii on several levels. These notches had to be accomplished in a wide range of different cutting heights, widths and depths. Without resorting to milling, the thermal cutting specialists produced the complex geometries exactly to the

customer's specifications – exclusively by means of flame-cutting. This was possible thanks to the profound know-how of Jebens' staff with their decades of experience, and to the company's ultra-modern technical equipment. A Sato thermal cutting machine was used first to reduce the thickness, and then a chamfering robot took over the fine finishing of the complex geometries on the different levels. Before starting, the exact course of the cut was simulated by means of 3D-modelling to ensure that the cut really would be perfect first time round. A wise precaution, as – with this procedure - there's no second chance if too much is ablated by accident!

Precision work with 3D simulation

Often, design engineers on the client side are completely unaware of the possibility of producing tight radii or bevelled edges using a thermal cutting machine. And yet, this kind of gross ablation – even in the case of precise parameter specifications – is often the best approach. Partial re-milling ensures that even the tightest tolerances are fulfilled, but only after the large volumes of material have first been cost-effectively ablated by means of flame cutting. The potential of this option is evident in the example of a replacement part for a steel works made of S355 structural steel. The job required the implementation of 710-mm-long diagonal cuts. The specified dimensional accuracy called for the highest procedural skill in flame cutting, as a flame simply doesn't work with the precision of a laser beam. But Jebens mastered this challenge by means of special thermal control with an ingenious pre-heating strategy and some really virtuoso operation of the thermal cutting machine. From a steel block 450 mm thick and 1,000 mm high, four diagonals separated by a bar – in parallel pairs – were cut. Jebens removed the elements from the sides and the 45º diagonals by means of multi-layer flame cutting. They only deployed the milling machine for the fine finishing of the component. The contrast between the costs for mechanical processing and flame cutting was what primarily motivated the customer to decide on the procedure that Jebens was recommending.

Using 3D-modelling, the commercial and technical consultants from Jebens worked closely with the customer to optimise the construction in terms of cost and quality aspects. The result speaks for itself: 40% savings on processing costs and a 30% shorter processing time.

Economically interesting prospects

In the meantime, Jebens is enjoying a flood of enquiries about the alternative option of flame cutting instead of milling for cost-efficient accomplishment of large ablation volumes even in the case of complex geometries. Final mechanical finishing cannot always be dispensed with, but the main portion of the material to be ablated can be removed at considerably lower cost. The prospects of faster production time, reliable processes and lower parts costs in the processing of large components are very attractive. In numerous applications they are convincing arguments for this solution, and – thanks to Jebens' comprehensive know-how and high-performance machinery and equipment – the specialists from Korntal-Münchingen are predestined to be the ones to provide it.

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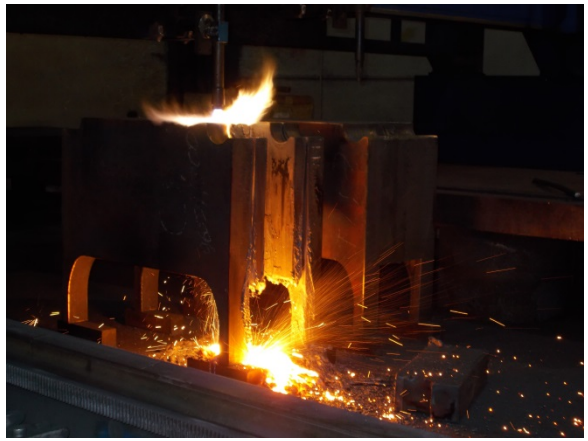
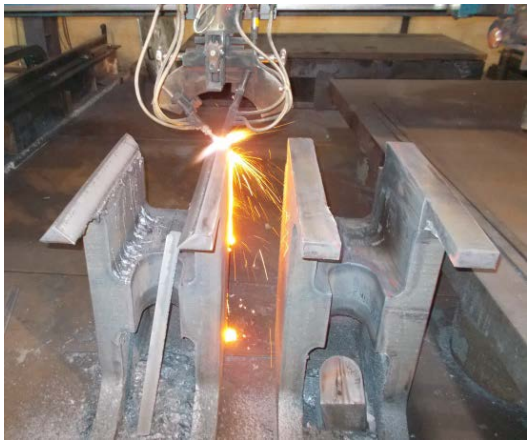


Picture 1: The job was to produce workpieces with the dimensions 400 x 710 x 840 mm from a 30-ton steel plate. This required ablation of large segments with tight radii.



Picture 2: These notches had to be accomplished in a wide range of different cutting heights, widths and depths.

Picture 3: Without resorting to milling, the thermal cutting specialists produced the complex geometries exactly to the costumer‘s specifications.

Picture 4: From a steel block 450 mm thick and 1,000 mm high, four diagonals seperated by a bar – in parallel pairs – were cut.

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