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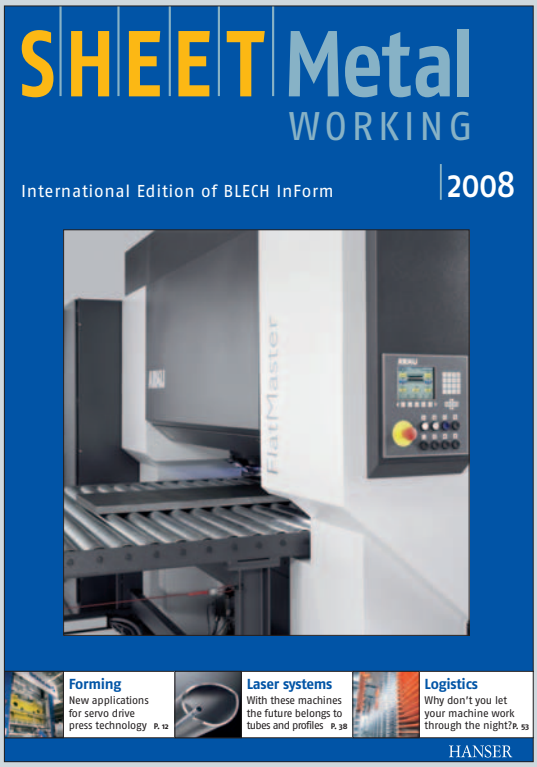
The economic way of getting flat parts



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The **economic** way of getting **flat parts**

Precision levelers provide better results in subsequent welding, bending or chamfering processes. With precision levelers, even difficult flame-cut parts, which can take hours to straighten manually, can be flat in just a few minutes.

A closer look at a **leveling unit** where the parts are deformed by alternate bends to get them flat and stress-free

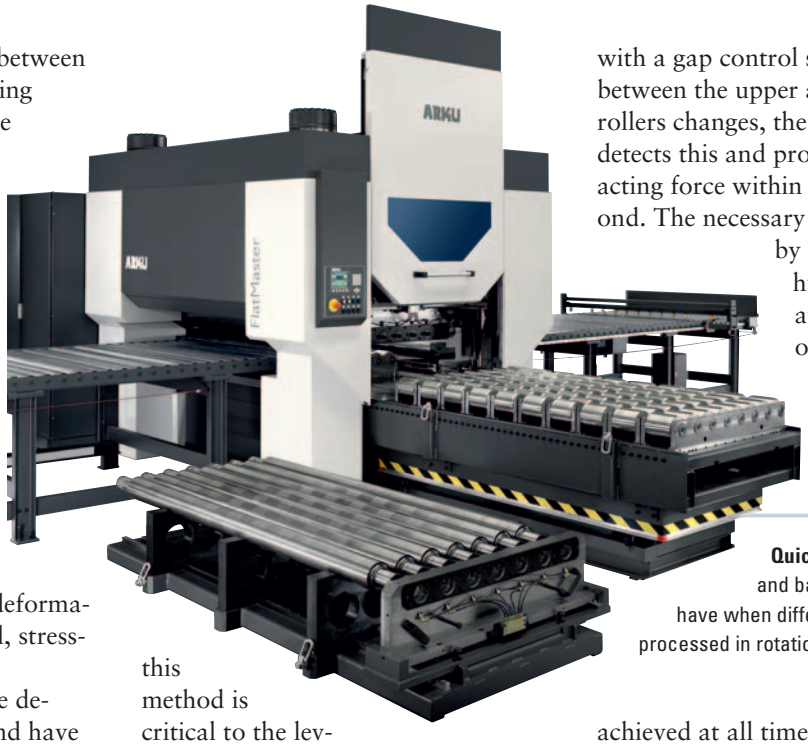
WHY DOES PRECISION leveling of sheet metal parts makes sense? Flatness errors can occur with sheet metal parts processed using mechanical or thermal cutting methods. This applies to all parts from thin laser-cut parts in the aircraft industries to thick flame-cut parts for construction machines. Flatness errors in sheet metal are usually caused by different residual stresses in the material. Even the smallest differences in residual stress become clearly noticeable, particularly with wide sheets. The residual stress gets released when stamping or laser-cutting the parts. At the same time, new stresses are brought into the material. The result is twisted and skewed sheet metal parts. Flatness errors can have a negative effect on the whole sheet metal processing. If uneven parts get bent, chamfered or welded, then quality defects can occur. The trend toward tighter tolerances in sheet metal manufacturing means roller levelers are becoming standard equipment for more sheet metal companies. That trend is increased with more automated production processes. More automation means more emphasis on precision sheet metal parts with continuous repeatable accuracy. Precision leveling of laser-cut and flame-cut parts provides consistent quality and reliable manufacturing processes.

Roller leveling with Precision levelers

Roller leveling is a bending process. The unleveled sheet metal part is deformed with a series of alternate bends. In the end, it is flat and nearly stress-free. These alternate bends are

Precision levelers like the **Arku FlatMaster** provide better leveling results in just a few minutes – even for thick flame-cut parts

created by passing the sheet between upper and lower sets of leveling rollers.The leveling rollers are offset by half the roller spacing in the direction of travel. As a result, the sheet metal takes a wave-like path through the parts leveler. The depth of the wave should be greatest at the entry of the machine and smallest at the exit. The alternate bending characteristic is comparable to a decaying sinusoidal curve. The elastic-plastic alternate bends and the steady reduction in deformation give a flat and, above all, stress-free sheet metal part.
Modern precision levelers are designed in bank adjustment and have excellent support for the leveling rollers.The lower leveling bank is fixed, while the upper leveling bank is set by means of only two parameters (entry and exit value). The gap between the leveling rolls produced by this method is critical to the leveling result. If the gap changes during the leveling process, poor quality leveling can result. Therefore, hydraulic parts levelers, like the FlatMaster range of Arku, play a major role. They are equipped with a gap control system. If the gap between the upper and lower leveling rollers changes, the precision leveler detects this and produces a counteracting force within fractions of a second. The necessary pressure is applied by means of powerful hydraulic cylinders at the four corners of the machine tool. The result is that an absolutely constant leveling gap is achieved at all times – even when the cross-sections change.
Consequently, the leveling results are consistently good. This is a major advantage, especially in the case of parts with recesses or round parts. For thick flame-cut parts modern

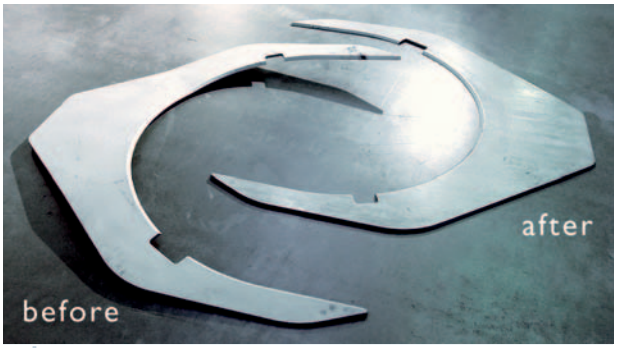


Quick change of leveling and back-up rollers – A must-have when different materials are processed in rotation

Modern precision levelers are equipped with **leveling gap control**, overload protection and user-friendly operator instructions with setting-memory

Typical parts, leveled by precision levelers – buzz saw blades, stamped parts, laser- and flame-cut parts

hydraulic precision levelers offer an additional advantage. Compared to mechanic levelers, hydraulic adjustments allow an effective overload protection. When leveling thick plates, high forces can occur on both the leveler and the sheet metal. A wrong adjustment of the machine can cause several components of the leveler to be overloaded. Modern precision levelers have overload protection to eliminate the risk. If the forces are getting too high, the precision leveler stops; the straightening unit opens, and the sheet metal part is then easily backed out.



Precision levelers provide flat **laser- and flame-cut parts**

Good maintenance and cleaning procedures must be considered when choosing a parts leveler. Dirt in the leveler or material residues on the leveling rollers will reduce the leveling quality during the production process. Scratches and blemishes due to material residues can appear on the material surface when sheet metal parts made from different materials are leveled alternately. If steel and stainless steel are leveled alternately, for example, this can cause a considerable loss of quality. If thorough cleaning is not possible, then residues accumulate in the leveling unit. In the worst case, this can damage the leveler. Because of this, modern parts levelers are equipped with a quick-change system. This allows quick change of the roller and thorough cleaning of the leveling unit.

Compared to manual leveling with hammer or flame, leveling with precision levelers is a quick and easy process. This is particularly noticeable with heavy flame-cut parts. What can take experienced workers up to an hour per part to achieve using hammer and flame can be achieved in just a few minutes with a precision leveler. With smaller laser-cut and stamped parts, through-puts of several thousand can be achieved.

Roller levelers save time and eliminate costly rework

Along with time savings compared to manual leveling methods, economic considerations must include additional expenses incurred. Roller levelers can eliminate costly rework. Additional costs, for example, from flatness and angularity errors when bending sheet metal parts and faults when welding sheet metal parts. The losses incurred by sheet metal processors due to complaints from dissatisfied customers must also be added to the cost of rework.

Despite the efforts to limit unevenness and distortion to a minimum during production, there is a clear trend toward processing sheet metal parts with precision levelers. This development matches the worldwide trend toward higher precision in sheet metal processing and the use of cost-efficient manufacturing methods. ■

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