

De-burring is usually a typical finishing technique applied in a manufacturing process.

In order to carry out this procedure like all other processes before this, proper workholding is critical to ensure quality. This point is particularly pertinent in high-tech aircraft-companies where manufacturing processes should be of top standard right down the line. One example involves deburring large aluminium-fuselage parts on special machines.

In aircraft manufacturing, parts with large surface areas up to 1,2 x 7 m are mostly made of aluminium and milled out of solid material. Before they are sprayed, sharp edges have to be removed to ensure sufficient spray adhesion.

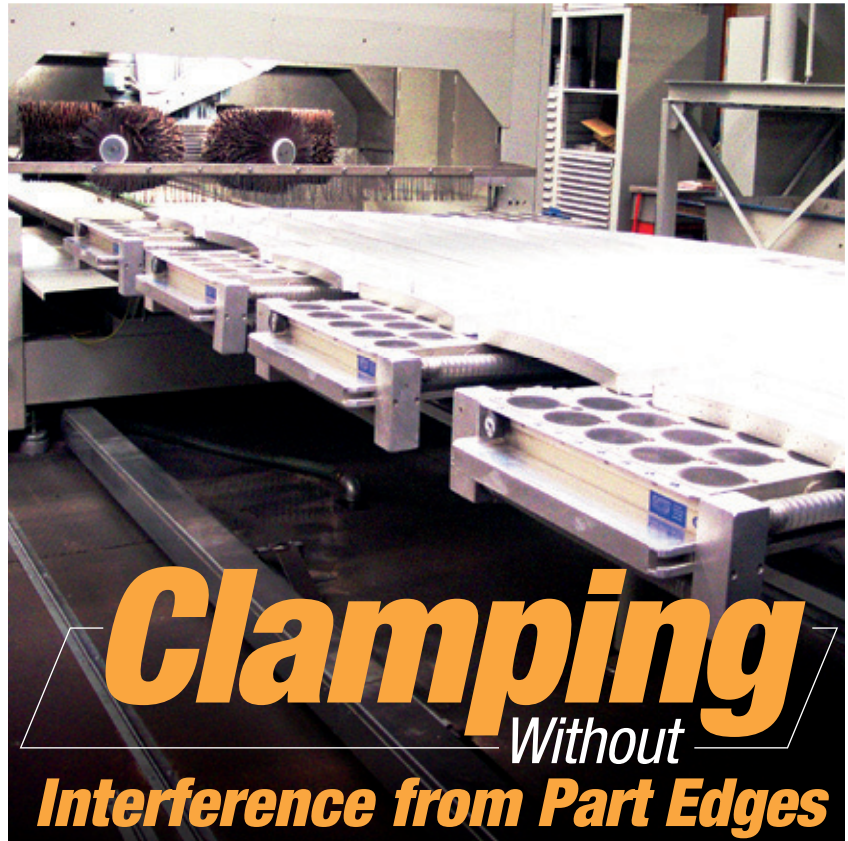
In addition to slide-grinding methods, parts up to 150 mm high and 2,000 mm wide can be machined on an automatic deburring machine to achieve the necessary curves of 0.15 to 0.2 mm. Workpiece lengths can be varied. It is especially profitable all for workpieces with large outer dimensions, which have sufficient flat surface area underneath to be able to be held with vacuum.

Clamp Down On Burr

The 'heart' of the deburring machine is a grinding tip with six spindles, on which grinding cylinders are clamped. These comprise of flexible grinding tools like for instance double sided grinding rings which turn in pairs in opposite directions. While workpieces run through the machine, the grinding head rotates and oscillates, so the tool machines the parts from different angles during deburring process.

Parameters can be adjusted, but are coordinated by the machine manufacturer. A change in spindle-turning speed also changes the rotation and a change in feed causes a change in oscillation.

However before parts can go into the machine on a guiderail



Clamping Without Interference from Part Edges

Holding parts with vacuum provide a welcomed alternative to the traditional way of workholding. By **Maren Roeding**, Witte Far East

transport system, it has to be cleanly clamped. Because of different workpiece geometries as well as possible interfering edges due to conventional clamps, mechanical clamping solutions for the aircraft-technicians were rejected right from the start.

Let Nature Do Its Job

High tech companies are on the lookout for optimal clamping equipment. Vacuum clamping system provides one option. This technology involves a vacuum pump sucking out air between workpiece and chuck, so that the force created by atmospheric pressure effectively presses down on the surface.

This hold-down force increases in proportion to the workpiece surface area. Especially when milling large thin aluminium parts, vacuum clamping offers advantages – workpieces are

clamped on an even surface over a large area corresponding to their geometry.

For deburring machines, a clean fast clamping solution is involved, for which relatively low clamping forces are required. Vacuum system, the Flip-Pod by Witte for instance, comprises of a vacuum chuck with a universal grid in which so-called pods lie.

When turned upwards and activated, these pods are the contact points to the workpiece, onto which it is sucked and thereby clamped. Pods not required are flipped over and stored in hollows in the pod plate and are available for other configurations at any time for using with other shaped parts.

The workpieces do not always have a flat base surface over their whole area. Aircraft parts especially must have high rigidity and minimum weight, which is why

they are specifically ribbed and have irregular surfaces and steps. Standard pods therefore do not cover all applications.

For this reason, half and three-quarter pods were developed. They are excentric and even retractable or height-adjustable pods. A special locking device avoids unintended movement. In the event where no suitable pod is available, the aircraft specialists can help themselves and change an existing solution to fit.

Time Savings

Finish machining processes are fairly simple. When a workpiece is on the deburring machine for the first time, the first test to be run must be to establish the optimal position of the pods. The experience of the staff plays a large role in this. Once the positions are set, the clamping plan is entered into a computer. Special software has been developed in

which the various clamping layouts can be entered.

Generally clamping with vacuum system is a time saving matter. Since the clamping procedure takes place at the press of a button, clamping and releasing of the workpiece is possible in a second. With this

system, deformation or damage of workpieces, which for example always occurs when using vises or clamps, is as good as eliminated. **MEN**

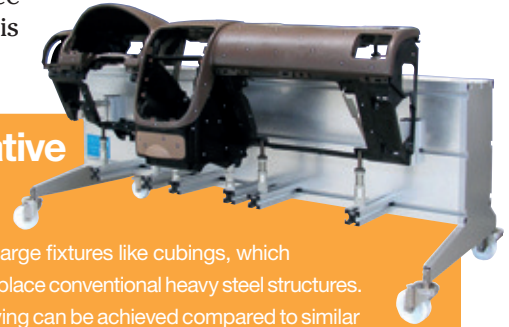
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Witte: Economical Alternative To Large Fixtures

Aluquick Solid by Witte is suitable for large fixtures like cubings, which require high stability. The system can replace conventional heavy steel structures. With the system, 50 percent weight saving can be achieved compared to similar structures in steel, which means it facilitates handling and transport.

The system comprises of extruded profiles with slots and is provided with a grid. This combination allows components to be positioned either repeatably using the grid or offset using the slot. Contrary to conventional slot profiles, the maker claims it can achieve high repeatability of measuring fixtures as well as further use of the individual profiles for other fixtures. **MEN**

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