New clamping system allows individual equipping of the machine table with position-determining clamping units on cutting machine tools, thus allows use of the entire work area and offers major advantages in reduction of tooling times and flexibility enhancement owing to substitution of preset workpieces. The Swiss company Büchler Werkzeugbau AG is using Delphin in the production.

Clamping elements, devices, reference pallet systems and many other systems are used in every production plant in order to be able to efficiently clamp the workpieces used. In order to clearly reduce the time required through to the first cut, Messrs. Mecatool have developed a new clamping system which opens up entirely new approaches to manual and automated changing of workpieces. The prominent components of Delphin, the new datum-point clamping system, are clamping units which can be freely positioned on the machine table and the clamping journal acting as a connecting element between interchangeable pallet and clamping unit. The rugged and extremely low-vibration design of the clamping system allows both conventional and also high-speed milling and is designed for finishing and roughing.

System design ensures flexibility

Workpieces, devices and clamping elements of various types can be palletised if the machine can be equipped with the appropriate fixtures. Simple substitution of the parts either directly prepared or palletised with clamping journal allows a substantial reduction in setting times. In a next step towards automation, the pallets can then be substituted in with the aid of a robot or a manipulator, thus fully realising the advantages of a palletisation system: downtimes are virtually eliminated and productivity is substantially increased. The new development of Messrs. Mecatool is eminently suited to such production workflow and levels of automation, both when retrofitting existing machines and for equipping new machines.

The number and arrangement of clamping units of the Delphin system can be freely selected when equipping a machine table.

Factors which are crucial to practical suitability of a clamping system and its clamping and connecting elements include space requirement, attachment of the connecting elements and their centring accuracy and functionality of these elements in rough workshop operation. These diverse and, in some cases, contradictory tasks are performed by the highly accurate clamping units in combination with the compact clamping journals on the new Mecatool system. As the "coupling element", they perform two important functions: highly precise positioning and transfer of the clamping force. The patented, conical and spring-loaded centring facility between clamping journal and clamping unit means that positioning is free of play. Thanks to this design, it is possible to ensure a repeat accuracy of ± 0.005 mm, which is entirely adequate for production. Unlike cylindrically centring clamping systems which must always be manufactured with a specific level of play, the conical design eliminates the possibility of deflection of the centring bore.
**Capable of automation – this cannot be said of every system**

The suitability for automation can be ensured with the Z-workrest cleaning facility since, besides cleaning, it also performs the presence check. This function is a standard function of every DELPHIN™ pallet fixture so that an automation solution can also be attached at a later point.

**Ready for palletisation with two bores**

The clamping journals are positioned in a 5 mm-deep recess in the pallet, devices or workpiece and secured with a through-bolt. Thus, this allows easy alignment of the compensating clamping journal which is centred in one direction. The conical shape of the clamping journals allows the journals to be inserted easily into the fixture of the clamping unit. The required surface area in the pallet, workpiece, devices is only 28 mm per clamping journal. This means that the space required is extremely small by comparison with conventional clamping systems.

**Just enough clamping force but not too much**

The clamping force of 15,000 N is applied mechanically by a constantly cocked spring assembly. The "ball on inclined draw-in surface" force transfer between clamping unit and clamping journal produces a holding force of approx. 60,000 N. This holding force is released hydraulically. The required pressure of 30-70 bar is supplied either by the machine hydraulic system or by a separate hydraulic power pack. On release, the workpiece is raised approx. 2 mm from the centring facility. The Z-workrest is then free and is protected during the change of devices.

**Simple installation with built-on solutions**

A centring mandrel suffices for aligning the clamping units on the machine table. Instead of the machine spindle in Z direction causes the clamping units which are pre-positioned loosely in the T-slots to approach and to be positioned and bolted in position. A dial gauge is used for subsequent inspection. After fixing all clamping units in position, all that needs to be done is to make the hydraulic and pneumatic connections. In order to avoid damage to the supply lines, it is advisable to protect the machine table with the clamping units by means of a sheet-metal cover.

**Compatible with other clamping systems**

The GPS palletisation system of Messrs. Mecatool which has become readily accepted on the market can be combined easily with the new system. However, other clamping elements and clamping systems can also be connected to the new Delphin system simply by fitting the clamping journals. Since the Mecatool system is open to other methods, this achieves entirely new possible combination options, both in production and in the sector of toolmaking and mould construction. On the basis of the GPS system or makes of other manufacturers, it is possible to easily cover broad chucking capacities and thus fully utilise the traverse paths of even large machine tools. If necessary, the Mecatool specialists can provide you with competent advice.