

## Feature - DEEP HOLE DRILLING

# Tool shanks with interior cooling - a challenging drilling task

TBT develops a special device for standard deep hole drilling machine with four degrees of freedom

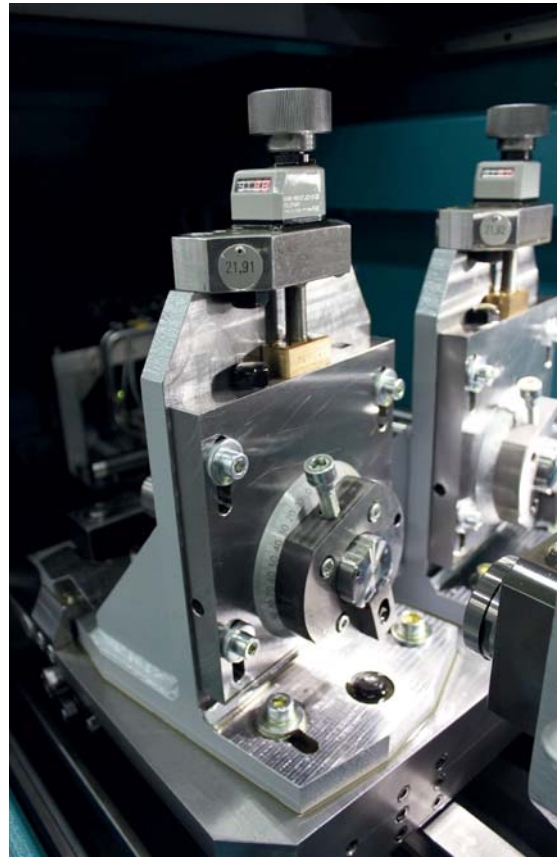
Cutting tools increasingly work with an interior cooling system. Manufacturing of such tool shanks becomes a challenge because cooling channels with a high length-to-diameter ratio have to be drilled. For some variants, the tool designers even intend drilling of inclined holes. For such drilling tasks, TBT Tiefbohrtechnik, located at Dettingen/Erms, has developed a special device to drill with single lip drills.

If the task was only to drill centric cooling channels, this would be a simple, hardly appreciable task, but tool shanks have become complex workpieces, since the cooling lubricant must be optimally fed to the edges of the drilling or milling tool. Therefore, a centric cooling hole is not sufficient. As a result, one manufacturer of such shanks was confronted with increasing requirements. This manufacturer had to produce several variants of shanks, with different shank lengths and diameters, as well as versions with eccentric holes, sometimes running inclined to the workpiece middle axis and in various distances to the middle axis. The diameters of the coolant holes vary with each tool for which they are intended, ranging mostly from 1.5 to 6 mm. This results in rather large length-to-diameter ratios. The technology of deep hole drilling with single-lip drills is

best suitable for this task, as single-lip drills are much better than conventional spiral drills regarding deviation and straightness and hence mostly the better tools with regards to process reliability.

Since the manufacturer of the tool shanks was already using several type ML200 deep hole drilling machines from TBT Tiefbohrtechnik in Dettingen/Erms, he wanted to produce the new workpiece variants again on this machine type. The machine is perfectly suited for tool shank applications. It is provided by TBT with one or several spindles, corresponding to drilling diameters of 0.8 to 12 mm. In this way, flexibility in both directions is given, if the diameter range from 1.5 to 6 mm is not sufficient.

TBT Tiefbohrtechnik not only manufactures machines but is also a contact partner for all questions around deep drilling. This also applies for devices. As a consequence, this tool shank manufacturer requested a suitable solution from TBT which could be adjusted to the new,



different workpiece versions and fit exactly with the intended ML200 in a two-spindle variant.

For the specialists at TBT, designing devices is a daily business. However, providing a highly flexible solution in this instance was a challenging task. The drilling device had to provide four degrees of freedom: 360° rotation of the workpiece around the middle axis, height adjustment, cross adjustment and angle adjustment for the inclined holes in a horizontal direction. Cross and angle adjustment could be synchronous for both spindles. However, the rotation and height adjustment for both workpieces had to be adjustable separately for each spindle.

Andreas Schlegel, sales manager at TBT, says: "Our claim is, to supply complete and 100 percent functioning solutions, consisting of deep hole drilling machines, drilling tools and all other machinery components. Beside this device, that may