

Just reaming – but quickly !

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The perfect instruction to get machine operators temporarily frightened.

Significant time saving particularly with reaming only sounds logical when still working with early technologies like HSS tools. However, at M & A Dieterle also the step from customary carbide reamers to the new CircoTec RX by URMA showed a considerable saving in time and many more advantages.

By: Karl-Heinz Gies, Stuttgart

“Time is money,” says Andreas Herrmann, head of the manufacturing department at M & A Dieterle, a versatile machinery and apparatus engineering company in the Swabian town of Ottenbach, manufacturing middle- to large-sized parts and components, machine bases, bridges and other things with about 100 staff members. “In my capacity as head of the manufacturing department I am continuously searching for new tools in order to shorten lead times, save money, and enhance productivity“. This sounds like a never ending story in consideration of constantly changing workpieces and time and again, different materials



Small diameters machined on big machines and in big workpieces, too.

that have to be machined with the highest possible precision and surface quality.

When looking at the individual manufacturing steps, time and again reaming turned out to be a real impediment requiring much time and effort. Although M & A Dieterle changed over from HSS reamers to cemented carbide, machining times still were quite long. Moreover, customary reamers show a handling problems



Long distances make tight tolerances difficult

requiring highly qualified personnel for adjusting and running-in of a reamer. After all, it is no good producing scrap at large individual parts due to test borings. The more, as reaming often is one of the last work steps after long machining time at a workpiece. A real problem for a company that works multi-shift, partly 2-shift, partly even 3-shift. Moreover, adjustment of a reamer takes valuable machine runtime, decreases productivity, and costs money.

So, it is not surprising that Andreas Herrmann, continuously searching for new tools and technologies, early came across the new reaming tool system CircoTec RX by URMA having been introduced to the public for the first time at the EMO 2005 in Hanover. It is about a completely novel reaming tool system based on a large cemented-carbide insert of a fixed diameter, many cutting edges and a cylindrical holder with a centring adaptor for the insert. The inserts are available either made of cermets or coated cemented carbide with a thickness of only 4.3mm. Examinations of used reaming edges of different systems have shown that, in most cases, wear could only be detected at the first 2.5 to 3mm, thus resulting in lack of dimensional stability of the reaming edge, which then has to be exchanged. This is why URMA refrains from using cemented carbide discs of higher thickness.



Not a side milling cutter but a reamer !

The exchangeable insert of the URMA CircoTec RX reaming tool shows many cutting edges forming the circumference of the insert and corresponding with the reamed diameter, normally in tolerance H7. Other tolerances are available on request. The insert can be exchanged by loosening few screws on the holder head. The new insert grabs into an alignment pin and is placed centred onto a hollow-shaft conical fitting on the holder. The hollow-shaft conical fitting takes care for centring of the insert and ensures change accuracy within 3 μ only. For this purpose and in order to ensure safe seat, the screws are tightened by means of a torque wrench. This changing procedure only takes a few seconds and can also be executed in the machine, if required. High change accuracy makes readjustment completely superfluous.



Easily interchangeable within 3 μ

Only the concentricity of the tool should be once adjusted upon first installation. Therefore it is recommended to take in the small, cylindrical tool holders in compensating chucks allowing for concentricity adjustment. With the CircoTec RX holders of larger diameters a concentricity adjustment possibility is built in the holder heads, thus also facilitating adjustment and shortening the time needed. Addressed with regard to this topic, Andreas Herrmann just smiles. For smaller diameters, he does without this concentricity

adjustment and basically uses hydro-expansion chucks having a very good concentricity.



Reamer 5 x diameter clamped in a hydraulic chuck

At that time, M & A Dieterle conducted tests with the tools very early and determined the time needed both for set-up and machining. Moreover, the tools were run in different materials. "Then we have quickly placed the order," Andreas Herrmann emphasizes his satisfaction from the very beginning. „In the past, I had to do the adjustment of reamers on my own or needed highly qualified personnel.

This is what we lack very often today, in particular in the shifts." he repeatedly explains his situation. Moreover, Dieterle not only instructs trainees in order to get a sufficient number of skilled workers. "With the URMA CircoTec RX this is no problem any more. The machines are equipped with a set of tools for recurrent bore diameters, which is inserted – and that's it," he describes his situation at present. "If an insert has to be exchanged, this is done and on with the show. No readjustment."

"Actually, this state-of-the-art reaming is an enormous progress, since

	1/6	F2	3000/1	1016/5	25mm	
06	Ø 16 H7	110	940	4000	2400	6
01005	Ø 16 H7	4	910	2480	3430	5
	Ø 20 H7	1	941	2550	2750	6
VA 14571						
1004	Ø 16 H7	50	910	1320	700	6
	Ø 16 H7	11	330	770		6
	Ø 20 H7	93	735	620		6
URMA CircoTec RX 6.1.1 1000 N/mm ²						

Ambitious but proved high feedrates

also the preparatory work for reaming takes much less time than in the past". Formerly, with HSS tools, the first step was centring, then drilling (initially also with HSS), then mostly broaching, boring, and finally reaming. So, there were five comparably slow tools. „Today, for example, a diameter of 15mm is bored by means of a

solid-carbide drill, reworked with a two-edged cutter made of solid carbide, and then reamed. These are three quick tools", Andreas Herrmann explains his procedure. "In the past, this took more than 300% of the time we need now. We have practically skipped spindling – it simply takes too much time."



Machine-servants get frightened with these fast feeds!

But not only set-up and tool adjustment, and change of cutting edges, respectively, can be done with the URMA CircoTec RX considerably quicker than ever before. Reaming is run with very high speed and feeds and really only takes next to no time. "Initially, machine operators get frightened by these

Pictures see separate picture index.

All pictures are factory-taken pictures by URMA AG, Rapperswil.

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