

Date: 01.01.2020

## Partnerships, customer portals and artificial intelligence

Step-by-step networking for in-house manufacturing, involving suppliers and customers and efficiently using data together – the digital services provided by c-Com, a member of MAPAL Group, make it all possible. However, the start-up isn't just developing its own applications. It's also generating added value for customers by working closely with cooperation partners.

## Cooperation with MARPOSS: reduced setup times and maximum tool service life

The optimal and longest-possible use of tools represents a vital cost factor for machining companies. But compromises are often necessary – particularly in series production and as part of automated processes. Tools with a defined tool life are replaced as soon as the specified tool life has come to an end. In many cases, though, the tool has not truly reached the end of its tool life and replacement is not yet necessary. However, companies play it safe to avoid quality issues and the risk of producing items that later need to be rejected.

This is one of the elements addressed by the ARTIS GENIOR MODULAR module by MARPOSS. The fully automatic tool- and process-monitoring system has been an established feature of the market for many years. It works by recording various measurements and assessing them on the basis of several criteria. For example, the module can measure the force that needs to be generated during the machining process. This enables the system to identify tool wear and potential tool fractures. The current status is shown on the machine control operating display or via a connected computer. By taking the measurements into account, tools can be used up to the true end of their tool life. The entire system is protected by the measurements taken by the module.

MARPOSS recently launched a collaboration with c-Com GmbH and its c-Com open cloud platform to provide module users with additional value: the ARTIS GENIOR MODULAR module and c-Com are set to exchange data. Once the defined tool limits have been reached, the staff member responsible receives a notification on their

MAPAL Präzisionswerkzeuge  
Dr. Kress KG  
Postfach 1520 | D-73405 Aalen

Contact:  
Andreas Enzenbach

Phone: +49 7361 585-3683  
Fax: +49 7361 585-1019  
E-mail: [presse@mapal.com](mailto:presse@mapal.com)

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mobile terminal – which is made possible by the cooperation with c-Com. As a result, operators can react more quickly and boost the efficiency of their manufacturing processes.

The exchange of data also helps to forecast for upcoming tool changes. Depending on the user's preference, c-Com creates an overview showing a time limit or the number of workpieces remaining. With this information, it becomes possible to stock up on new tools at production facilities in good time. This reduces setup time and machine downtime caused by unavailable or unprepared tools. The number of spare sister tools can be minimised and fewer tool mounts are required.

At EMO 2019, MARPOSS and c-Com showcased the results of this promising collaboration – which is set to be intensified – for the very first time.

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E-mail: [presse@mapal.com](mailto:presse@mapal.com)

## **Cooperation with Oerlikon Balzers: transparency and sustainability thanks to digital processing for coating**

Many tools are re-sharpened and re-coated to make production as cost-efficient as possible and to use raw materials sustainably. During this reconditioning process, the tool passes through several stages, which are usually carried out by different companies. Tools are recorded several times to allow the processing of orders and to enable them to be assigned accordingly. This procedure is very complex for everyone involved – from the machine operators to the staff members carrying out the re-sharpening and coating. Physical product cards accompany the orders throughout the entire process chain. If a staff member responsible for re-sharpening sends a tool for coating, this staff member is often not aware of corresponding order status. This results in frequent queries. Neither tool users nor the coating and re-sharpening staff have an oversight of how many times the tool has been re-sharpened or coated in the past. In some cases, the number of re-sharpening processes is simply marked on the tool shank. Overall, the total benefit is reduced by the very high investment of time and effort required.

In cooperation with Oerlikon Balzers, c-Com has developed an application that enables significantly more effective and transparent order processing. The prototype

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was showcased at EMO Hannover. The only prerequisite to benefitting from the advantages of digital processing for coating is identifying all tools with a unique ID. The c-Com application exchanges data with the myBalzers customer portal run by Oerlikon Balzers. This way, the entire order process is digitalised, and all receipts are available online. It is easy to share documents such as delivery slips, invoices or order confirmations, and the status of each coating order can be viewed in real time. There is no longer a need to ask for order updates – a quick glance at the application provides the user with all the information they need.

The speed of the overall order process is also increased as the recorded data is made available for all successive steps. Tools are returned from reconditioning after a shorter period of time. As a result of significantly reducing the manual data input, the process is no longer as susceptible to errors.

On top of that, machine operators have access to all the important information about their tool at all times. Thanks to the collaborative approach by c-Com, they can access all data via the cloud. They know how many times their tool has been re-sharpened and are provided with comprehensive information on the coating. This data is extremely useful for the optimisation of processes. If the tool's performance drops, the cause of any issues can be established and resolved much more quickly. Involving coating staff significantly enhances the networking of the entire supply chain and serves transparency. This is one of c-Com's key objectives for the open cloud platform.

### **The c-Com wear detection app: a technical advisor in your pocket**

In order for machining to run smoothly, reliably and with optimum results, many cogs have to interact optimally. If poor results or even scrap are produced, there may be several causes. If worn-out cutting is the reason, the following questions arise: What is wear and tear? Why does this wear and tear occur and how can it be avoided in the future?

c-Com has developed a wear detection application to provide answers to these questions. The prototype for the application was presented at EMO Hannover. The

MAPAL Präzisionswerkzeuge  
Dr. Kress KG  
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Contact:  
Andreas Enzenbach

Phone: +49 7361 585-3683  
Fax: +49 7361 585-1019  
E-mail: [presse@mapal.com](mailto:presse@mapal.com)



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application is very simple to use: first, the worn blade is documented using a smartphone and a conventional auxiliary lens for zooming in. The app then identifies the type of wear and suggests corresponding recommended actions. This allows users to prevent this type of wear in future.

The application is based on machine learning, a sub-category of artificial intelligence. This means that the application uses datasets to learn. Together with tool specialists at MAPAL, c-Com has compiled and categorized hundreds of images. Effectively, the algorithm was trained by being shown what different types of wear look like, allowing it to assess whether or not a blade is in good order.

As a result, the application can identify different types of wear, including clearance surface wear, crater wear or a built-up edge. Based on this, the app then provides appropriate suggestions – such as reducing the feed, increasing the spindle speed or using a different kind of coating. At present, the advice and suggestions for how to proceed are still static. However, the c-Com team is working hard on the beta version of the app to enable it to use the application data for each tool to provide specific individual suggestions on what action to take. Put simply, it's a technical advisor you can keep in your pocket – with numerous potential extensions aimed at making users' lives easier.

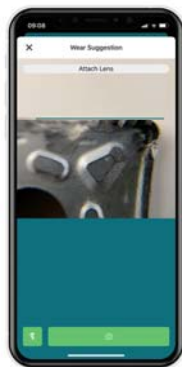
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Captions:



The worn cutting edge is photographed with the smartphone. The app identifies what kind of wear and tear is involved.

If published, please send a voucher copy  
by mail to Patricia Müller  
or by e-mail to [patricia.mueller@mapal.com](mailto:patricia.mueller@mapal.com).

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