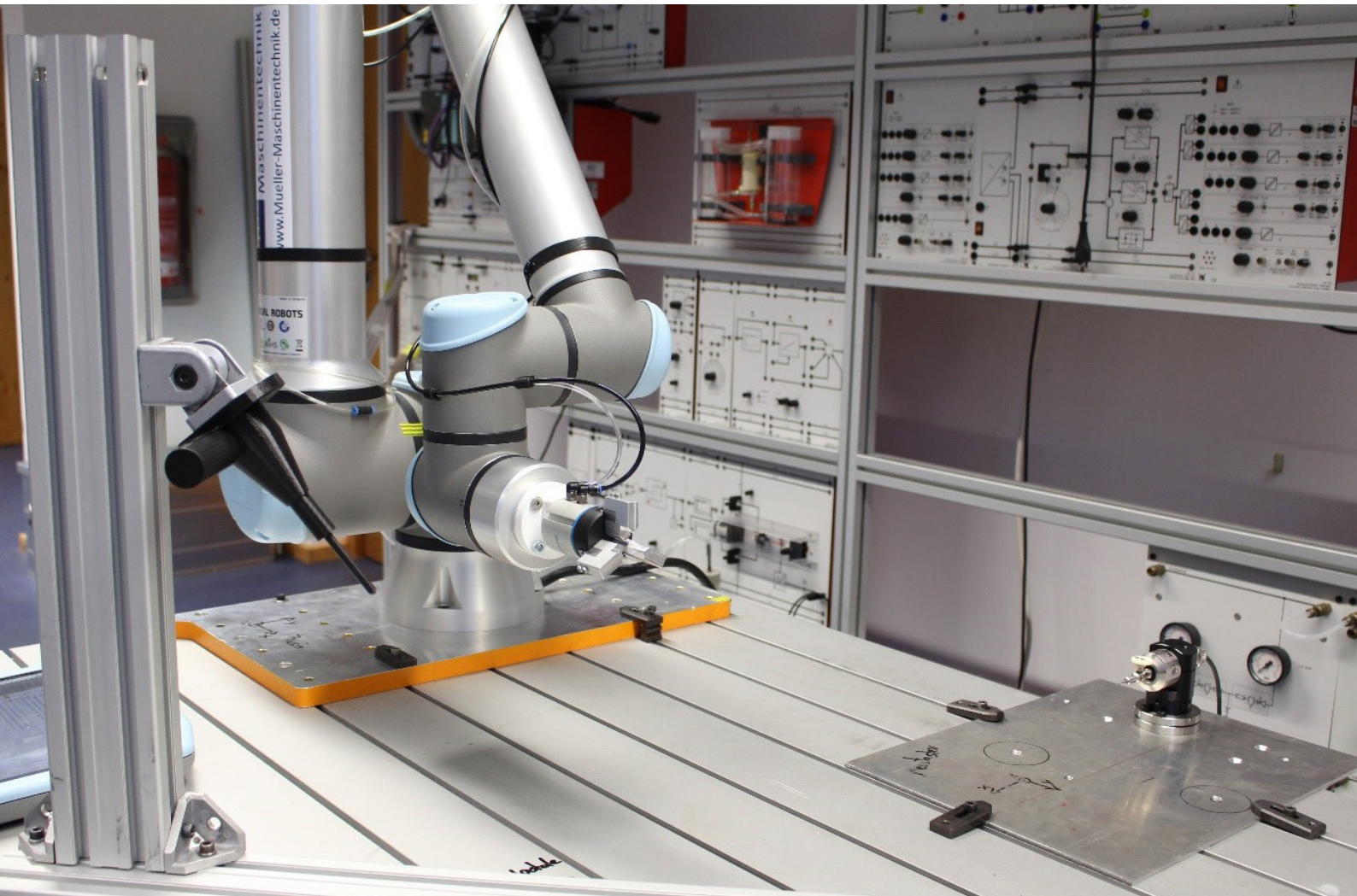
Interreg
EUROPEAN UNION
North-West Europe
COTEMACO
European Regional Development Fund

Success Story

Automated blasting test for K.-H. Müller Präzisionswerkzeuge GmbH

Feasibility study of a surface treatment method with a UR robot



Automated blasting test

Figure 1: first test of different handling principles (Photographer: Lisa Kopp, Umwelt-Campus Birkenfeld)

Company description

Müller Präzisionswerkzeuge is engaged in the development, design, production and reconditioning of innovative high-performance tools made of solid carbide. In close cooperation with universities and research institutes, ever better tools and reconditioning processes are developed in order to continuously maximize the cutting forces, cutting speed and tool life.

Motivation/Starting Point

The company has a very innovative surface treatment step for cutting tools, which is currently carried out manually in a blasting booth. The aim is now to investigate whether this step cannot also be automated with the help of an industrial robot. Due to the environment, the variety of variants and the quality requirements, this is a challenging task.

Analysis

The analysis of the product range under consideration showed that, from an economic point of view, it makes sense to focus on the tools that are most requested by customers. However, the resulting product spectrum is still very extensive, especially since such features as diameter and tool length are not discrete but continuously pronounced. The swirl angles present on the tools, which also play a major role in machining, are not necessarily known before machining, so these must also be measured before machining. For technical reasons, the blasting material used in this process is used in a blasting cabin under negative pressure. Therefore, the corresponding robot must also be equipped with a hood and a transfer station.

Technical realization

In a first step, a detailed process analysis was carried out. Due to the large number of variants and the partly complex process, it quickly became clear that only a first prototype could be created within the scope of this COTEMACO project. After the analysis, different robots, gripping concepts and measuring methods were evaluated and a sealing of the robot was tested in order to find suitable modules for the implementation. After this concept phase, combinations for different budgets were created, one of which was then procured after close coordination.

Result

Through the analysis and evaluation within the framework of this COTEMACO project, it was possible to find an initial solution for the individual functional components of an automated blasting system and thus to prove its feasibility in principle.
In the project it also became clear how important a good as-is analysis is and the understanding of the background of the partners, so that all participants have the same basis and can work together on the goals.
In the next steps, the solutions found are now to be further improved and combined into an overall solution, which can then also be used at the Müller company in the future.

View from the employee perspective

When there are many similar parts to be handled, the manual processing of the parts is a physically and mentally very monotonous and exhausting task. Therefore, the employees at this point are glad to be relieved of this work. Special parts that are not included in the automated spectrum are still processed manually in the blast cabinet. However, these are now only diversified individual parts and small batches.

Interview

How could COTEMACO support you?

COTEMACO helped us to assess the current shot blasting process from the outside and to identify and leverage potential for improvement. Therefore, we have carried out a detailed as-is analysis together in order to obtain as comprehensive an overview as possible in the individual sub-areas of the process. Subsequently, an improved or automated solution was found for many sub-problems and evaluated as a prototype in a first step.

What was implemented and what are the benefits?

Following the analysis of the current situation, various scenarios were examined to determine what an automated solution might look like. Of particular interest were the sub-problems of automatic workpiece guidance within the blast cabinet and the measurement of the geometries and parameters required for this. These initial prototypical approaches to these problems already significantly reduce the consumption of the very cost-intensive blasting medium and ensure improved quality through uniform application. Furthermore, it can be assumed that a later implementation within a plant through the use of robots can also significantly reduce the series dispersion induced by the previously manual activities.

Were your expectations fulfilled - technical implementation?

Our expectations were fully met. The automated approach now opens up completely new possibilities for influencing the process and quality can at least be maintained at the current high level, if not increased further. The time that follows will show how the results can be turned into a plant for productive operation and what additional advantages this will then bring.

Were your expectations fulfilled - Support through COTEMACO?

The support from the COTEMACO partner was very good at all times. The employees are able to empathize well with the customer's problems and, after a process analysis and definition of partial problems and goals, work very focused on an objective overall solution.

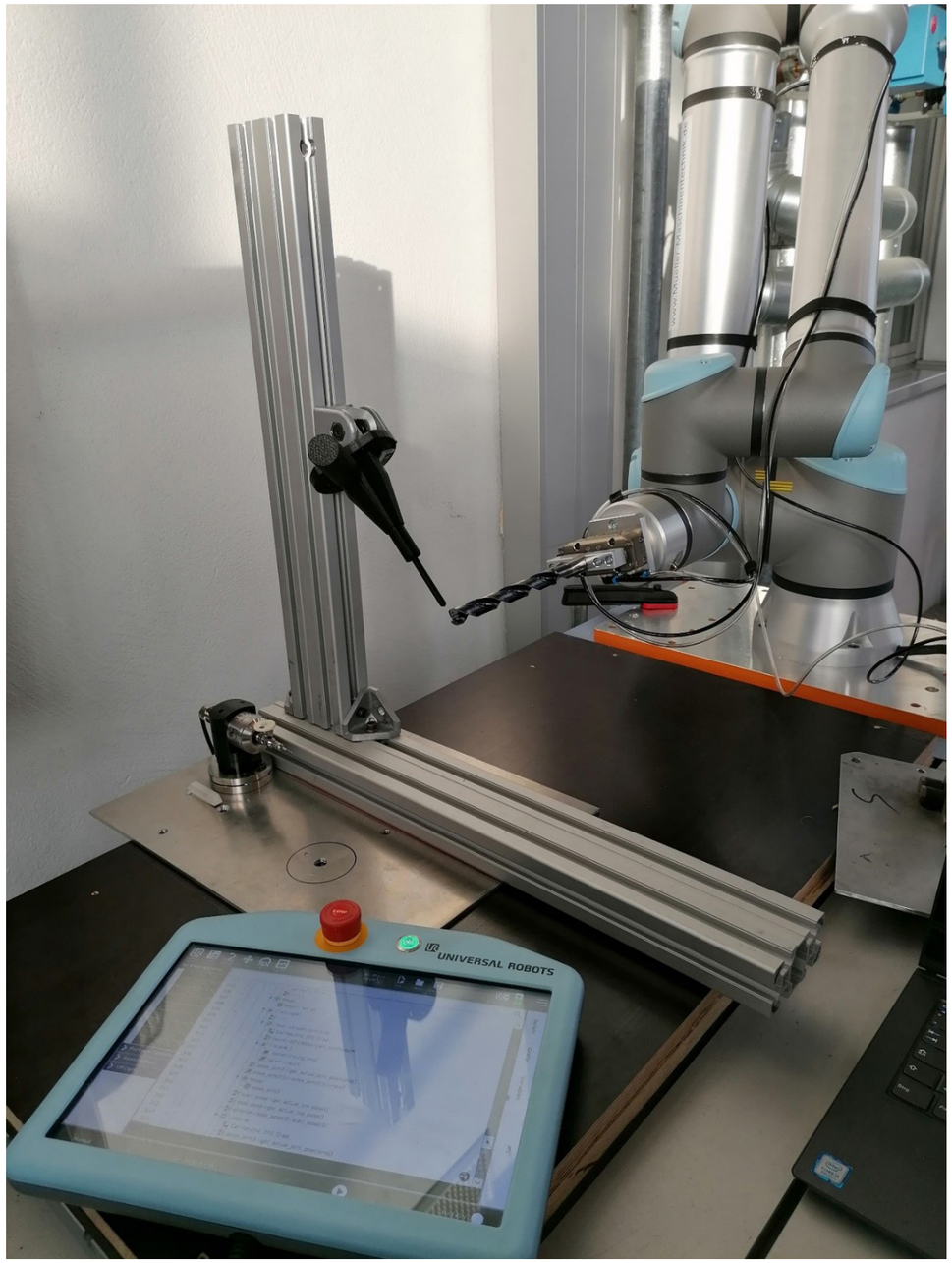


Figure 2: Test the suitability of a particular robot system (Photographer: Lisa Kopp, Umwelt-Campus Birkenfeld)

What is COTEMACO?

The project, which is an initiative of Interreg North-West Europe, aims to support around 60 SMEs in the automotive and food manufacturing industries with so-called „test environments“ and to encourage them to integrate collaborative robotic systems and digital technologies into their business. Accordingly, in addition to increasing production flexibility, the relocation of production abroad will be curbed and the number of jobs in manufacturing increased, which will generally lead to an improvement in the competitiveness of the companies involved.
In the project new technologies are implemented in application examples - the aim is to move from the prototype in the laboratory environment to the transfer to production, taking into account the legal situation and certifications.

You want to become part of COTEMACO too?

You are interested in further Best Practice implementations?

Then visit our website at:
www.robot-hub.org/cotemaco

Implementation partner:
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und Automatisierungstechnik

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