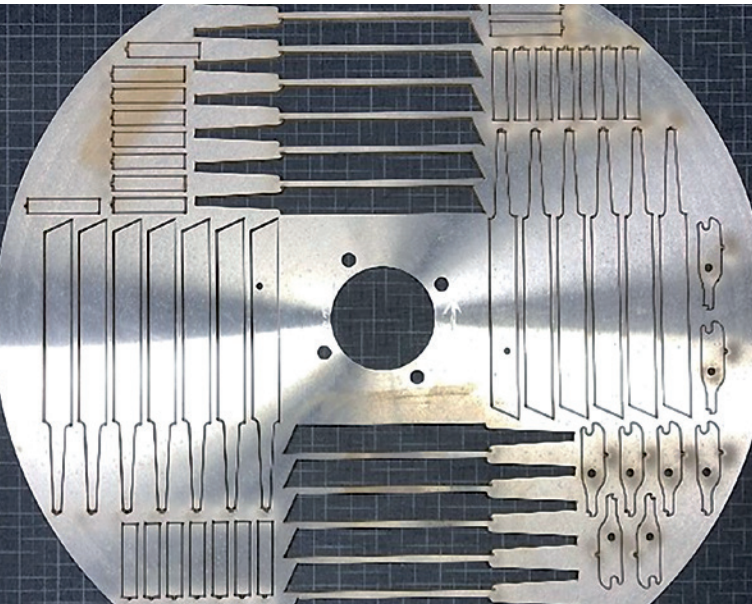


CoT – CIRCLE OF TOOLS

Development Steel Tools and testing of Demonstrators designed for a Circular Economy



Resource-efficient Circular Economy – Innovative Product Cycles (ReziProK)

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The sustainable use of natural resources is currently one of the greatest challenges facing society. According to a circular economy, raw materials should be kept in the economic cycle as long as possible, waste should be avoided. The central concern of the CoT project is to close regional material cycles in the metalworking industry by means of re-manufacturing and re-purposing of worn metallic products.



Material cycle of the metal industry

In general, the Circular Economy (CE) is seen as an essential strategy to effectively reduce the consumption of raw materials and resources. One well-known possibility is recycling. Upstream of this are concepts such as re-manufacturing and re-purposing, through which materials can be used longer in the economic cycle. In the CoT project, the cooperating research institutions and companies from Wuppertal, Solingen and Remscheid want to close a material cycle of the local metal processing industry in this way.

The aim is to reduce resource and energy consumption and to demonstrate economic advantages for the companies. The challenges are manifold: A process has to be developed that is based on the use of purely returned and qualitatively high-alloyed tool steel either in the original manufacturing process or to integrate it into other manufacturing processes across companies.

The main progress here takes place in avoiding remelting as part of the dominant recycling process in the steel industry. Although this is desirable and part of a circular economy, it goes hand in hand with high energy and resource consumption. A key aspect here is the recycling of scrap that is not sorted by type.



Diskussion der Einsatz- und Anwendungsmöglichkeiten innerhalb des Projektteams.

First results

At the beginning of the project, the project team determined suitable target products on the basis of material characteristics and the suitability of the geometry. This was followed by essential metallurgical investigations to derive findings for the manufacturing process. Finally, it was possible for the first time to manufacture blades from machining knives with the help of separating manufacturing processes (re-purposing).

In the case of re-manufacturing, the existing challenge is to analyse and adapt the manufacturing process accordingly. The concept for producing a smaller machining knife from a worn one is currently being researched.

The first ecological investigations show possible saving potentials, but also decisive hotspots of the process. In addition, the essential structures of the existing and the envisaged business models could be captured.



Erste Klingenrohlinge, entnommen aus einem Kreismesser.

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Interdisciplinary competence

The CoT project unites a total of six project partners in its inter- and transdisciplinary team. Companies from the Wuppertal, Solingen and Remscheid, this region is known for its cutlery and tools, are working closely with two research institutions. Using the products of the companies TKM GmbH, Kirschen Werkzeuge and Freund & CIE, it will be demonstrated, with the support of PlanConsult GmbH, how a return and further use of the material can be designed via re-manufacturing and re-purposing. Furthermore, demonstrators will be produced by the respective companies through re-manufacturing and re-purposing.

Scientific researcher from the University of Wuppertal and the Wuppertal Institute are responsible for the scientific investigations. The focus is on the metallurgical analyses of the tools and cutting products as well as the ecological and economic potential.

Funding measure

Resource-efficient Circular Economy – Innovative Product Cycles (ReziProK)

As part of the FONA Field of action 6:
The circular economy – efficient use of raw materials, avoiding waste.

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CoT – CIRCLE OF TOOLS
Re-manufacturing of worn circular knives

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P. 1: TKM 2019

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P. 2: TKM 2019

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Cover-Picture: Circular knife with exemplary arrangement of blades.

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