Enhanced value chain

Resource efficiency and digitalization are dominating topics not only in the wire industry. Manipulated software in diesel-fuelled vehicles and decisions of the Leipzig Administrative Court have resulted in the fact that also e-mobility will change value chains.

By using augmented reality technology, a real-time picture can be transmitted, and information can be transferred to the operator. © Kieselstein

Even machine producers in the wire industry experience this trend. On the one hand, the focus of the materials to be processed shifts, and on the other hand the demands to the surface quality for applications in electric vehicles increase. This shows clearly that technologies like shaving are important, for example for the processing of copper and copper alloys and for removing undesirable surface defects – oxide layers, inclusions, mechanical damages amongst others. Due to the chip removal a homogenous wire is created that is free of surface defects and meets the superior requirements of the automotive industry.

Practical benefit of "K.connect"

Besides electric vehicles another focus is on the electrification of railways. The mega markets of the past years – China amongst others, where a considerable high-speed railway network has been constructed – become clearly perceptible around the world. This is also reflected by the increased number of enquiries for trolley wire drawing plants. As a producer of trolley wire drawing plants that can be supplemented with the technology of wire shaving, the number of projects realized by the company Kieselstein has grown in the past four years.

By integrating shaving into drawing plants there is the possibility to remove the surface defects described that occur during casting or milling processes, and to produce the profiled wire, the trolley wire, on the same plant. Further on, new fields of application, e.g. for the production of cables can be tapped into. The company exhibited a part of such a plant at its booth at this year's "wire 2018" including the described process of shaving that can be integrated easily in other plants. Besides the electrification another trend determines the activities of many companies. Under the term "digitalization" and the keyword "industry 4.0" digital services and techniques are entering the manufacturing industries. Of the one part, these changes are a challenge to a machine producer offering individual customer-specific solutions, of the other part they are also a chance. Consequently, in a first step an app to support the assembly process has been developed and was implemented in the shop floor in 2017.

Under the logo "K.connect" – an android-based tablet version – the employees in the receiving department, the quality assurance and in the shop floor are supported in their everyday work. But also the company's management uses K.connect in order to access information about certain part components as required. For this purpose each part is labelled with a QR-code. This can be scanned using the camera of the tablet and makes the required information from a database and the ERP-system available appropriate to what the user requires.

The following information can be retrieved directly at the part:

- Article number and project reference
- Technical specifications
- Technical drawing
- Supplier
- Status of the incoming goods' inspection
- Inspection protocols
- Delivery note and commercial information

By implementing the app, many processes have simplified. In the long run, the assembly process becomes more effective and the employees are disburdened from organizational tasks. By using the app and becoming more familiar with these techniques new ideas arise on how the app can be developed further. Currently, efforts are being expanded to integrate time recording in the shop floor in order to automatize time consuming administrative tasks.

CONTENT

WIRE | SPRINGS | CABLE | DRAWING / SHAVING

With "K.connect" the company makes its assembly process more efficient and relieves its employees from administrative tasks. © Kieselstein

Already today the plants made by Kieselstein are connected to the company through Virtual Private Network (VPN). This functionality is free of charge to the customer and allows accessing the control of the plant whenever it becomes necessary. Interruptions of single components or program errors can be solved quickly and easily. Until now this functionality in the area of security technology or during the adjustment of the control behaviour represented a certain risk. The fact that the service engineer relies on the feedback of the operator is strongly affected by the communication skills on both sides and the comprehension of the machine's functionalities. By using the virtual reality technology (VR) and the data glasses in a "Zim-Koop" project funded by the German Federal Ministry of Economics and Technology in cooperation with the Technical University in Chemnitz/Germany, the West Saxon University of Applied Sciences of Zwickau and ARC Solutions GmbH, Kieselstein pushes the development of this benefit. Target is, to create a real-time picture by using the data glasses in order to enable a service engineer of Kieselstein to provide advice to the operator of the plant which is displayed by using AR-technology.

Based on the positive experience when using the app K.connect internally, at Kieselstein the idea matured to put certain functionalities at the customer's disposal, for example for service and maintenance. In this case different types of information are relevant. The version for maintenance shows besides the technical data of the machine, of the components including assembly drawings, functional descriptions, article numbers and source of supply perspectively also settings and positioning parameters. In addition to the support during maintenance of the plant, the app also assists the operator during the usage of the plant. This contributes to the stabilization of the processes at constant quality.

When checking the data on components and parts a spare parts or wear parts enquiry can be generated directly from the app, which accelerates the process, reduces the processing efforts for all partners and avoids mistakes in communication. The term "Augmented Reality" means a computer based presentation that extends reality by virtual aspects: a technique that allows for example for projecting a virtual piece of furniture into the real space. It enables operators of plants and machines to fade-in recent machine data either on a tablet or smartphone or in a next step also on so called data glasses.

Plant for the production of trolley wire with integrated shaving technology © Kieselstein

Conclusion

The changes described pose great challenges to the companies. However, they also offer them the opportunity for a closer interlinking of plant producer and plant operator. The information made available in this way by using digital techniques offers advantages for both parties. Travel costs for maintenance by the service engineers of the machine producer are omitted. Down times are reduced. For small companies it provides for the possibility to render good and prompt services at favourable conditions to their customers. Later on, an enhanced version offers the opportunity to carry out trainings and to support the customer actively with technological know-how, for example regarding settings of the plant.

Besides the explained reduction of times and costs another advantage is that the plant producer can study the conduct of the plants during operation which are often produced as single special productions. The findings obtained during the operation of the plant lead to an improvement of the machine technology, which is adapted to the requirements of the customer more detailed and more efficient.

Kieselstein's intense research and development efforts at in-house science centre draw-shaving continously broadens the know-ho in the area of draw-shaving wire. The company's plants are suitable for peeling of steel wire, as well as valve spring wire, stainless steel, bearing steel, cold heading wire and many other materials. In addition, high-tensile materials such as copper and copper alloys, aluminium and its alloys, nickel and nickel-based alloys, titanium and titanium alloys as well as noble metals and special alloys can be draw-peeled.

wire China 2018, hall W1 booth F52

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