Industrial maintenance is becoming knowledge work

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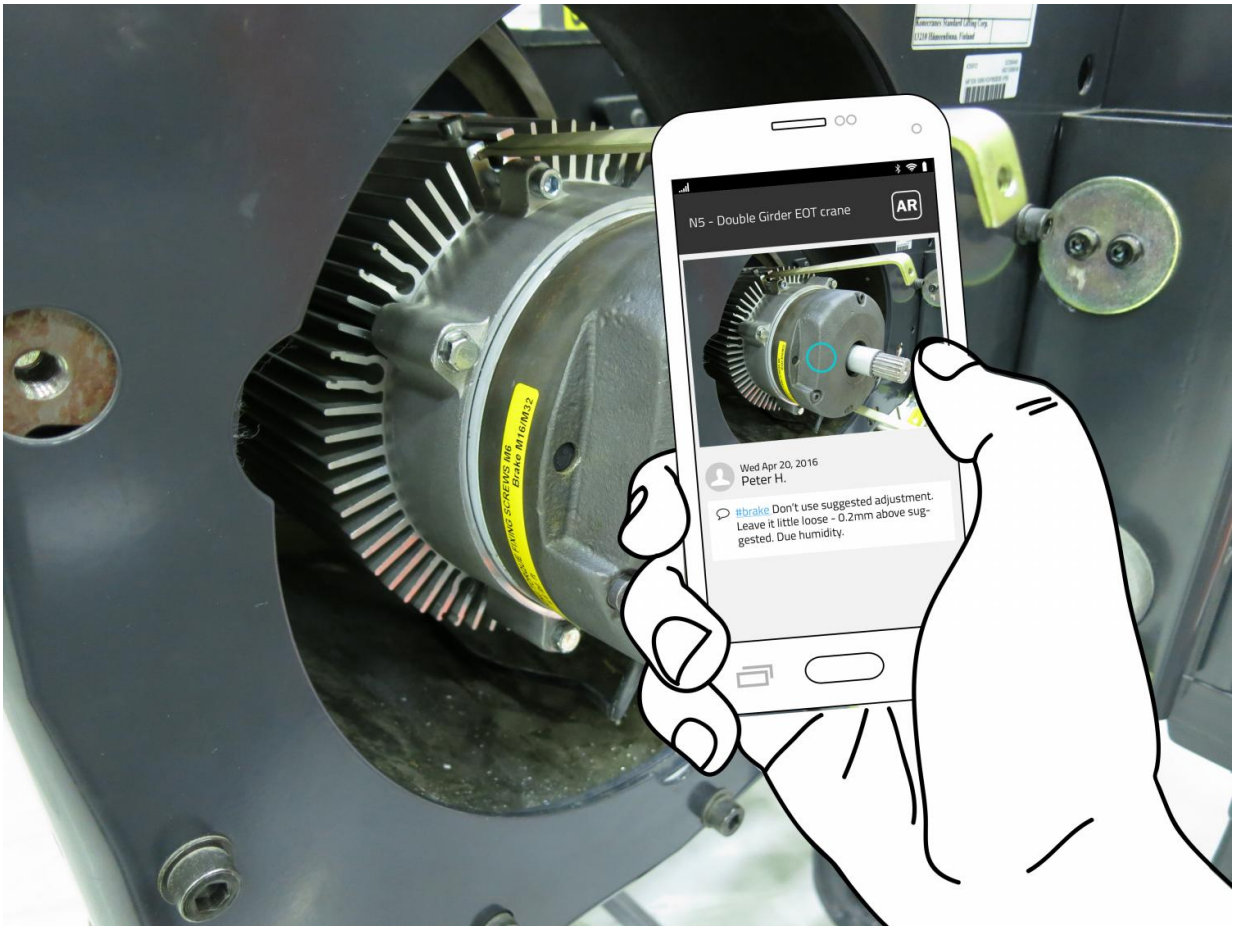

Service technician receives to his phone tips created by other service technicians, about the maintenance target. Credit: Konecranes

Virtual reality (VR), augmented reality (AR), and mobile social media will soon be part of everyday work for service technicians. VTT Technical Research Centre of Finland coordinated a sub-project forming part of the DIMECC S-STEP (Smart technologies for lifecycle performance) program. In the sub-project researchers and industry jointly developed new digital solutions and tools for industrial maintenance. The aim is to improve both productivity and work satisfaction.

Much R&D has been done on the digitalisation of industry from the ICT perspective, but very little from the point of view of work efficiency and job satisfaction.

"The digitalisation of industry is changing maintenance tasks and tools - an increasing number of employees now do knowledge work. The best productivity and work satisfaction can be achieved by developing work practices - and tools based on new technology - holistically, together with employees," comments Project Manager Eija Kaasinen from VTT.

The key areas selected for development were: better preparation for maintenance visits, support for fault identification, personal and context-aware "hands-on" guidance, and effortless reporting already during the maintenance visit. VTT, the other research partners and the participating companies have jointly developed several pilot applications.

Mobile service technician and digital tools

Before heading to the maintenance site, the service technician can check the service environment virtually with VR glasses.

Using augmented reality (AR) applications, a remote expert can display hands-on instructions to the technician. Colleagues can share tips on the maintenance site and good practices with social media and AR.

AR and VR tools are maturing to the point where their price and functionality allow their use widely in industry. AR and VR applications will rapidly proliferate in a number of industrial maintenance tasks over the next few years.

The project's results can be applied in a range of industrial tasks in addition to maintenance. The solutions have been developed for the needs of international companies with extensive and global maintenance operations. That is why the programme is having a huge impact on those companies, who are now adopting the best solutions.

"Augmented reality in the industrial context is not a fad. Very likely, it will be a common instrument for service technicians in the coming years. However, making the most out of it requires strong collaboration with technology vendors, but more importantly, an understanding of how the internal processes need to support the AR solution. S-STEP program has accelerated our entry to augmented reality." Riitta Partanen-Jokela, Director, Maintenance Development, KONE"Today's machines are a complex combination of different kinds of technologies, and the need for information among service technicians is increasing every day. For the same reason, reporting from the field is more and more time-consuming. In this project, we developed a new way to collect and share context-sensitive information using a single device. S-STEP program has been a real success story, and we will continue the development in the future." Jouni Törnqvist, R&D Manager, Bronto Skylift

"Already from the early S-STEP results we have circulated internally in our company it has become clear that contextual guidance, remote support and 360 degree VR visualisations have a high potential of impacting the way we educate, prepare and perform maintenance tasks. Excitement has been high, and concrete cases for piloting these technologies are being actively considered." Mikael Leppä, Lead User Experience Designer Wärtsilä

"The S-STEP results show that there is a need for an advanced service tool. A hands-free information feed and context-sensitive guidance or content share are areas of great potential in Konecranes service, and should be studied more. By concentrating on the user experience, we are able to deliver such tools that really revolutionize the technician's work." Johannes Tarkiainen, Industrial Design Manager, Konecranes

The project began in June 2014 and ended in late 2016, as one of the four projects under DIMECC's S-STEP (Smart technologies for lifecycle performance) programme. The following organisations participated in the programme: DIMECC Ltd, 3D Studio Blomberg Ltd, Bronto Skylift Oy Ab, KONE Corporation, Konecranes Plc, Mevea Ltd, Wärtsilä Corporation, Aalto University, Lapland University of Applied Sciences, Lappeenranta University of Technology, Tampere University of Technology, the Tampere Unit for Computer-Human Interaction (TAUCHI) at the University of Tampere and VTT Technical Research Centre of Finland Ltd. Tekes funded the project alongside the participants.

The project won the DIMECC Prize for the best result of 2016. A number of continuation projects are under way and new companies have joined to the work.

Provided by VTT Technical Research Centre of Finland