FACTS4WORKERS PROJECT PRESENTS HIGHTECH SOLUTIONS FOR SHOP FLOOR WORKERS

PROJECT PRESS RELEASE

FACTS4WORKERS is a 4-year project financed under the European Horizon 2020 Research and Innovation programme. The goal of the project is to provide State-of-the-art information and communication tools (ICT) to create work environments in present and future smart factories to make them are attractive to shop-floor workers. The project brings together 15 partners from 8 different countries and covers a variety of industry sectors: automotive, steel, tooling and plastics. Now we are entering the last project phase, rolling out the developed solutions to the shop floors.

Within FACTS4WORKERS we strongly believe that enhancing innovation skills and well-being are key to achieve major increase in workers satisfaction. Our state-of-the-art systems designed with a human centered approach to the specific needs of shop floor workers are enabling them to cope with their daily challenges. We demonstrate this in 8 solutions which are implemented in **Slovenia** (EMO Orodjarna, Hidria TC, Hidria Rotomatika), **Spain** (Thermolympic) and **Germany** (Schaeffler, ThyssenKrupp Steel Europe).

FACTS4WORKERS SOLUTIONS

The solutions developed in FACTS4WORKERS are based on advanced IT-solutions that are developed by technological partners and R&D centres represented in the consortium. The developed solutions include a personalised augmented operator, knowledge sharing/management database, self-learning machine module and in-situ mobile learning for the production post. In addition to presentation available in this press release you can find out more about FACTS4WORKERS solutions at our project webpage http://facts4workers.eu or on our solutions dedicated webpage http://i40cases.com/en/

EMO ORODJARNA use case:

EMO Orodjarna d.o.o. is a medium-sized enterprise which engineers and produces highly productive transfer tools and progressive tools. The smart-factory workplace solution, developed for EMO, covers three main scenarios that are defined by the company. It consists of an information tool for production, assembly and quality assurance and an application for preventive maintenance issues. The software prototype consists of several services which obtain by fully automated connectors all relevant data from the highly specific company´s ERP system.

The tool building process is a highly flexible team effort where the biggest challenge is that the workers are fully aware of the production status of all relevant parts. Awareness of upcoming work orders, detailed information about packages and parts as well as location tracking of parts are provided via mobile displays and smart glasses for the machine operators and assembly workers.

This enables the workers qualification to make decisions on his own has a huge impact on the personnel dimensions autonomy and relatedness. The system enables the worker to gain comprehensive knowledge by using the communication tool, which provides in-situ remote support at the machines. To be better supported with an additional knowledge database – maintenance guidelines and trainings - the worker can better coordinate and control the work process and hence is more efficient in doing his tasks. This relates to the raised dimension competence on an individual level. Because of these changes the employees are more satisfied with their work. The working day is accompanied by an innovative tool which is frequently used by all employees and this leads to the fact that the job on the shop floor is more attractive than in the past.

SCHAEFFLER use cases:

> *The FACTS4WORKERS solution at Schaeffler with the learning support and the digital shift book provides operators and workers with cross-layer access to all the information needed.*

Learning support for test rig operators

Schaeffler is a manufacturer of bearings and a renowned supplier to the automotive industry. Schweinfurt is home to the Schaeffler competence center for test rig measurements of rolling bearings. These complicated measurements are carried out all over the world and require high precision and

a lot of experience. With an innovative combination of mixed reality and web application, the FACTS4WORKERS solution will be used for training and education purposes to help workers better understand the complicated processes. A web application optimized for the use on mobile devices will provide all relevant information on-site and a mixed reality device will display 3D animations, text descriptions and instructions, videos and sounds directly on the test rig. An integrated chat component gives the operators the opportunity to communicate handsfree with colleagues all over the world and show exactly what the person sees who has the mixed reality device on. The mixed reality animations can improve the understanding of the processes and thus the quality of the training of the operators and the improvement of the information access and the communication lead to better problem solving and thus to higher reliability of the measurement data.

Paperless information management for assembly workers

Schaeffler produces in Ingolstadt various engine components in a value stream oriented production. The FACTS4WORKERS solution

aims to support paperless information management for assembly workers. The digital shiftbook is an ICT platform supporting task planning and documentation of the production. It is customized to the production processes and to the workers needs and provides them with cross-layer access to all the information needed and the ability to create own documents and entries, on mobile devices right at their workplace. It harmonizes information sources, provides easy access and management of information, and optimizes the shift handover of the assembly workers. This increases the quality of the documentation and improves knowledge sharing, leading to higher job satisfaction, innovation and worker productivity. The FACTS4WORKERS approach for paperless information management fits the digitalization strategy of Schaeffler and could subsequently be applied throughout the Group worldwide.

THYSSENKRUPP STEEL EUROPE use case:

The FACTS4WORKERS solution at ThyssenKrupp Steel Europe (TKSE) provides the workers with all relevant information for the fault repair and maintenance processes. Additionally, it encourages the workers to actively share knowledge and improves the teamwork by connecting them.

ThyssenKrupp Steel Europe is one of the world's leading producer of carbon steel products. Located in Duisburg, Germany, the plant covers an area of 9,5 square kilometers with over 3000 HVAC units deployed. Maintaining these units is a challanging tasks due to the rought environment, the high number of different models, the specific knowledge required, and the variety of data sources containing relevant inforamtion. Since summer of 2017, the FACTS4WORKERS solution support the maintenance workers in their daily tasks. Thereby, the solutions provides an easy to use interface for accessing all relevant data. To ensure a constant growth of the knowledge base, the workers can flexibly edit or extend the data. Further, the workers can use the so-called logbook to review information about their activities and actions. Furthermore, the worker is provided with an personal note storage, where she/he can store comments or anotations for herself/himself. Finally, the solutions provides a tool for storing informal information like hints that should facilitate future activities.

To enable a constant further development, only open-source software is used. This includes Angular for the front-end and Flask, Elasticsearch, Redis and PostgreSQL for the back-end building blocks. Currently, the company is renewing its complete IT infrastructure. During this process, the FACTS4WORKRES solution is going to be re-develop as part of a build in SAP solution. Therefore, the results of the evaluations are gathered, and instructions are authored that will enable the companies' developers to enhance the system even after the project has ended.

HIDRIA GROUP use cases:

The two USE cases within the Hidria Group have the objective to both improve the satisfaction of the workers and boost the productivity due to an easier and faster access to the required information. The first application of FACTS4WORKERS project is related to the implementation of a smart solution for the Knowledge management and sharing in the shop floor. The basic idea is to collect automatically the PLC errors of a complex assembly line and suggest to the operator the best solution to solve the issue on tablet that the operator could carry with him during the whole fixing operation. The proposal is based on the past experience of all the workforce, that could comment the adopted solution and explain it using multimedia data, like video, audio or picture taken directly using the tablet.
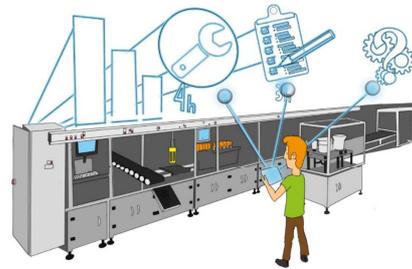
The application has been carried out on a smart plug assembly line, a complex manufacturing system constituted by different stations (nearly 12 meters long), sensors and actuators. The developed software is also able to provide an overview of the maintenance activities carried out on each machine, to provide a base for further analysis.

The second application of FACTS4WORKERS solution is related to the implementation of a smart cockpit to keep track of the geometrical deviations of the production process of a laminated shaft and rotor. The implemented solution is able to visualize the blueprint of the shaft under production, acquire automatically the data from an automatic measuring machine and suggest the correct offset to the operator. The solution enables the worker to keep track of the evolution of the process and take care of possible deviation with maintenance action.

THERMOLYMPIC use case:

Thermolympic is a small Spanish SME active in the automotive industry with strong presence in the automotive cluster in Leon, Zaragoza. Thermolympic produces plastics products in different batches. The solution developed for Thermolympic is based on a variant of the Knowledge management system developed for Hidria. In this case the errors are not fed into the system by the machine PLC but are inserted by the operator. In this case there is also the possibility to monitor more than one machine, hence the production manager could have a fast and reliable bird-eye view of the production machines status. In Thermolympic the
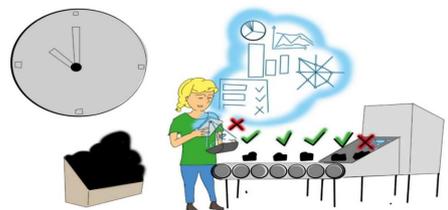
solution is enriched by an automatic analysis of the process parameters. Thanks to a connection to the IT infrastructure of the company, the system is able to acquire the production data and visualize them on a tablet to enable the workers to evaluate the occurrence of trends and other out-of-control behaviour.

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