# Successful installation and commissioning of a MES system for the revision of wheelsets at the Dutch national railway company NS

ICT Group has installed a Manufacturing Execution System (MES), for the department of the Dutch National Railway company NS that executes overhauls and repairs of railway wheelsets. They not only overhaul the wheelsets of their own trains, but also those of other Dutch railway companies, such as Arriva, Synthus and Veolia.

Digital transformation through a MES system

In 2017 NS moved to a new factory building in the city of Haarlem, simultaneously renewing all its machinery. The relocation was accompanied by a digital transformation, which automated almost the entire overhaul process. In order to actuate the machines digitally and collect measuring and processing data, a MES system was called for. MES stands for Manufacturing Execution System

and is the link between the customers question from the Enterprise Resource Planning (ERP) system and the machines who have to deliver the product. NS chose ICT Group as its partner to install the MES system, mainly because of the extensive experience in configuring MES software packages according to the needs and requirements of our clients.

ICT+ smarter solutions
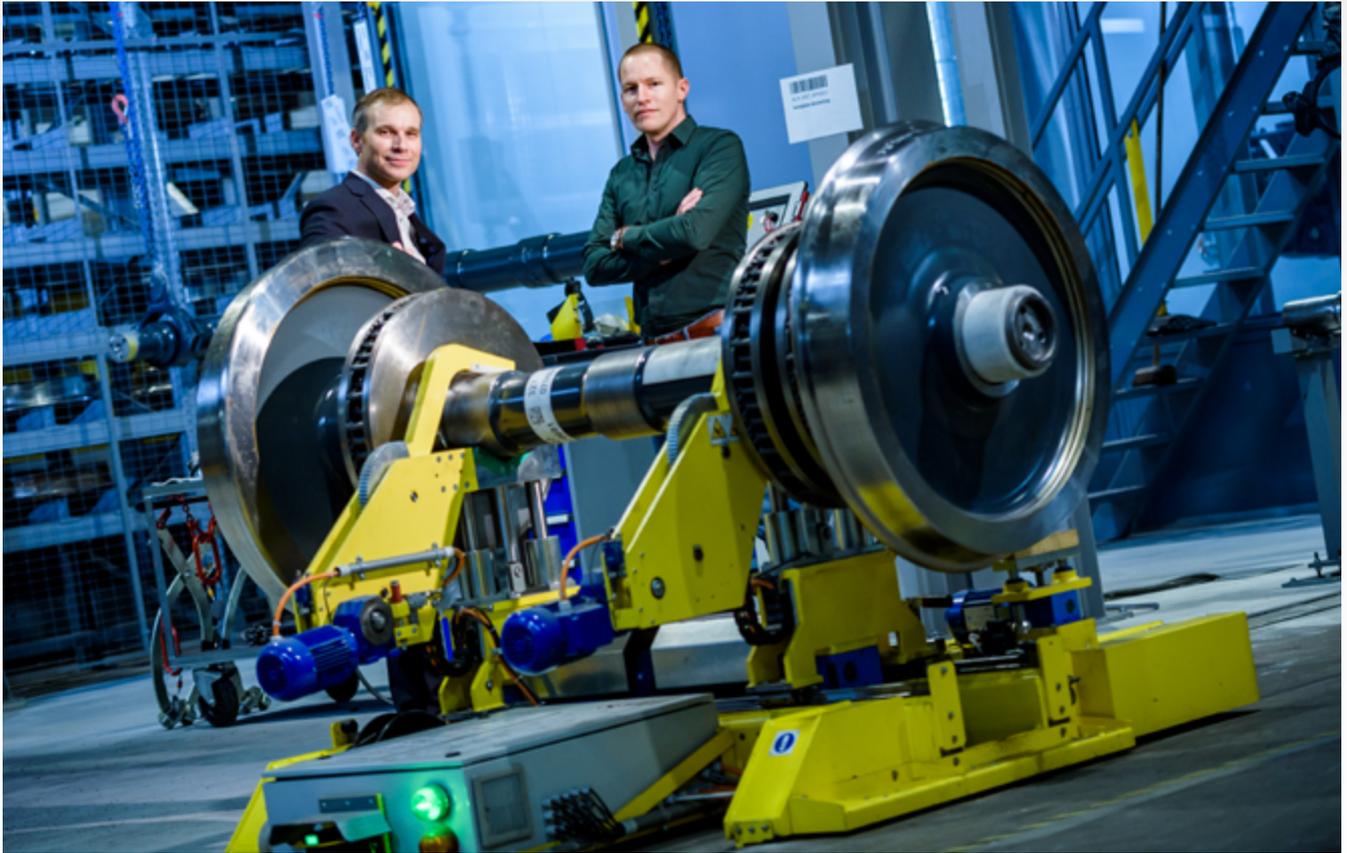
MES: digital link between machines, operators and ERP

On average, railway wheelsets are overhauled once every five years. As soon as a wheelset enters the NS factory, it is subjected to a thorough inspection to see which components are in need of replacement or repair. Next, the routing (workflow) of the separate components through the overhaul process is determined. In the overhaul process the MES system serves as a digital director.

It actuates production machines and logs each operation. Through the use of barcode labels MES can track each separate component during the entire overhaul and logs and stores the more than one hundred measurements conducted on each wheelset. During the overhaul process MES guards all process parameters, such as pressure forces and buffer times, and sends a signal as soon as an intervention is required. The system also keeps track of each wheelset's component consumption ('consumption traceability') so that new components can be ordered in time. To reserve the needed components MES communicates with the ERP.

Mobile scanners

Human factory operators are equipped with a mobile device enabling them to communicate with MES and to scan component barcodes. This is done through a mobile application developed by OrangeNXT, an ICT Group company. The mobile scanners support the operators through work instructions and they can also use the mobile scanners to log measurement data, scan objects for checks, start and stop tasks and confirm activities. ICT Group's technical specialists and consultants have provided training sessions for the staff of different departments within NS about how to use the new systems.

Data analysis

Since MES is designed for centralized data collection of all measurements and processing, it provides the opportunity for smart data analysis with the aim of optimizing the overhaul process. One example is 'downtime registration' in which MES tracks the availability of production machines, expressed by an Operational Equipment Efficiency (OEE) figure. NS has fully automated its OEE and the status of each and

ICT smarter solutions

every machine is logged. In the case of downtime, the machine automatically forwards the cause to MES. Through data analysis MES can also signal useful trends in throughput time.

Results

Before the digitization and automation of the overhaul process, many operations were executed manually. Decisions were made based on human assessments. Since MES directs the process through exact standards, more impact and certainty about the final quality is achieved ('First Time Right').
In the past data collection depended on the annotations of human operators. At present all the measuring data and features of each component are flawlessly stored in MES. MES' out-of-the-box analysis opportunities enables further optimization of the production process.
MES also increases NS' compliance with the requirements of the Dutch Railways Act, which demands a fifty year storage of wheelset overhaul data. MES ensures that the NS maintenance system Maximo is automatically provided with the right data.

Satisfied customer

NS is satisfied with the MES system. "In the beginning NS had some concerns because IT projects tend to overpromise, underdeliver and suffer from delays," says Marco Kerstens, who was involved with the project as client manager for ICT Group. "NS was pleasantly surprised that our project was completed both in time and with the right quality."

Core functionalities of MES in the overhaul process

· *Order management* - creating and managing work orders using workflows for directing the different phases of the overhaul process.
· *Standard operating processes* - creating work instructions for human operators on mobile devices using Standard Operating Procedures (eSOP's).
· *Tracking & Tracing* - collection and long-term storage of all measuring and overhaul data from each component.
· *Traceability* - logging of all operations by human operators, when they took place and what the results were.
· *Genealogy* - noting which components end up on which axis and vice versa.
· *Data analysis* - signaling trends in the overhaul process to discover smart solutions and continually optimize the process.

Contact:

Marco Kerstens
Senior Operations Manager

E: marco.kerstens@ict.nl
T: +31 (0)6 27 087 497

Visiting address

Kopenhagen 9, 2993 LL Barendrecht, Nederland

W: www.ict.eu

ICT
smarter solutions

Kopenhagen 9   T +31 (0)88 908 2000   info@ict.nl
2993 LL Barendrecht   F +31 (0)88 908 2500   www.ict.nl
The Netherlands