Better planned maintenance with Digital Pen and Paper

FACTS

Customer: EMEF, the largest Portuguese maintenance company for rolling stock, such as electric and diesel locomotives and railcars.

Challenge: Better planned maintenance, to reduce train downtime and increase train availability.

Solution: A digital pen and paper solution developed by Fluxima, enabling Anoto functionality. The solution is based on XMS Penvision's platform. EMEF's innovation unit developed an embedded computer system that interfaces with the digital pen. Currently 210 pens are being used and up to 1,200 pens are expected to be installed altogether.

Benefits: Real time communication with the Portuguese Railways' back office and EMEF's workshops means better planned maintenance. As a result operational breakdown can be avoided and trains can keep their schedule. Train availability is also increased. Furthermore, EMEF's paper consumption has been reduced by 50%, corresponding to 1,500 trees in five years.

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Alberto Simões,
Chief Inspector of train drivers, CP

EMEF is the largest Portuguese maintenance company for rolling stock, such as electric and diesel locomotives and railcars. The company is fully owned by the public company CP – Portuguese Railways.

It is obligatory to document events that occur during the train trip. These events are reported in a logbook – this has been the case for more than 50 years.

For example, the train driver notes down disruptions in the electrical supply, or regarding climate control. The driver also has to report any events that occur in his compartment, for example a stone crashing against the windscreen. All events that are not unusual have to be reported. At planned or unplanned maintenance stops, service technicians will board the train and attend to the problems described in the logbook, for example the replacement of windows or fixing of doors that do not close properly. Their work is also documented in the logbook.

The new solution

When EMEF was introduced to Anoto Digital Pen and Paper technology by Fluxima, they immediately saw the possibilities to improve a very old, but crucial process. With this new solution, a proof of report can be kept of the drivers' and technicians' notes as well as of the technicians' signatures once they have solved a problem. The solution enables real time communication between the back-office and the workshops, and information can thus be shared.

"This partnership between Anoto, EMEF and CP made it possible to develop an advanced technological solution to help our costumer improve the quality of services that they offer to their train passengers", says Costa Franco, Director of Railway Technology and Innovation Unit, EMEF.

The main reason for choosing this digital pen and paper solution is that it was easy for the users to adopt. Previously, the drivers used ordinary pen and paper and the workflow has remained the same as before. No training has been needed. A pilot was made during 2008 and the drivers adapted very well to this new technology.

"I think that this is a system that we should quickly continue to extend to all the fleets due to the large acceptance by the drivers", says Alberto Simões, Chief Inspector of train

drivers, CP.

How it works

A pen is integrated in an aluminium case in the driver's dashboard. There are two pens per train set, i.e. one in each driver's compartment. When an event occurs during the trip, the driver opens the case, takes the pen and writes in a logbook with Anoto functionality. The driver then puts back the pen into the case. The pen connects to the embedded computer system developed by EMEF, and the request is sent to the EMEF Formidable server on the fly, and can be seen on EMEF's INFOTEC web portal.

The personnel at the workshops can directly order material and when needed, send service technicians, in order to quickly attend to problems, during the next stop. Before, the service personnel received the information first and only during train stops, which could delay the process, since regular maintenance stops are only performed at an interval of 10 - 30 days.

Take, for example, a broken windscreen that needs to be replaced. This was first discovered during regular checks and the train was taken out of operation. If spare parts were not available, it could take several days until the problem was solved. Now, as service personnel receive information in real time, they can work more proactively, and in this particular case, the necessary material and maintenance personnel can be arranged for in advance. Previously, unexpected things caused a higher level of unavailability of the trains.

When the maintenance problem is solved, the service technician takes the pen and fills out the information in the logbook and signs off. The maintenance event report is now closed and transmitted to the customer – Portuguese Railways.

Benefits with the solution

"With this system, the driver writes down the information the way he has always done, but now the information is sent in real time and in digital format to the operators and the workshops. This allows the information to reach all the parties of the maintenance process immediately. Since we started using this system we have been able to optimize the availability of rolling stock material. The workshop can also be better prepared in advance to minimize the time for a maintenance stop, resulting in increasing the availability of the trains", says Costa Franco, Director of Railway Technology and Innovation Unit, EMEF.

A benefit for the driver with the new solution is that since the information is transferred in real time to the back office, the driver receives direct response to what he has noted down and thus feels that his comments are taken more seriously than before.

"This is a very innovative solution that corresponds to our technical, organizational and environmental needs. Technical faults are now detected and transmitted on a real-time basis with information from all the main departments of EMEF and ourselves – CP. Nowadays we can get handwritten information directly to our SAP database, which saves us time and increases the reliability of the data. We have also reduced 50% of the actual paper consumption, which in the future means 7.500.000 sheets less, and this corresponds to 1,500 trees in five years", says Pontes Correia, CEO of Portugal Long Course trains, CP.

Future plans

Currently 210 pens are being used on 104 trains and up to 1,200 pens are expected to be installed altogether. There are plans to expand the new solution to include a computer system for the train drivers, where they can log in and follow the status of the issues that they have reported. EMEF is also working on convincing train manufacturers and train operators to integrate the pen in the driver's compartment already when the trains are built and sell the system worldwide.