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Tool Management (June 2004)

Less is often more – much more

EADS Space Transportation puts its trust in TDM Systems' tool management and Kelch's setting systems.

100,000 euros saved at a stroke: that was how much the team at EADS Space Transportation in Ottobrun saved by simply not ordering seldom-used, redundant tools. However, this is only one of the many benefits offered by the new tool management system rolled out at the European Space Travel Organization in cooperation with TDM Systems and Kelch.

When the mechanical production department at the production centre for launch vehicle power modules at the EADS Space Transportation Organization in Ottobrun was formed from the union of two separate departments, the EADS team also had to reconcile the two completely different tool worlds. "The programmers used to have to write a new program for each part from scratch – and even plan for new tools, which then had to be procured" explained Wolfgang Simon, the manager of the mechanical production department.

Ottobrun supplies the European space agency with its thrust engines. Most of the orders are for the Vulcain main power module that drives the workhorse of European space travel – the Ariane 5. But the site also produces the power module for three different variants of top sections as well as the small positioning drive unit for satellites. In addition, it makes satellite tanks, parts for aviation engines as well as highly sophisticated components such as transmitting aerials for communications satellites.

Production focuses mainly on the Ariane power modules. "We make power modules in batches of six to seven per year," said Simon. "These items are all made to exacting tolerances in terms of dimensional and surface accuracy."

As time passed, the jumble of tools grew umanageable. Some of these special tools were stored together with the matching mechanisms. "Some people knew their way around," recalled Simon, "but we were in serious trouble when they were not there. Then, we had no choice but to spend a long time searching – even if it was just on the vertical – horizontal lift system."
The move to unify production threatened to plunge the tool stocks into major chaos. One of the many complications was that not even the designations of the tools in the tool lists had been standardized. "We spent several days poring over the

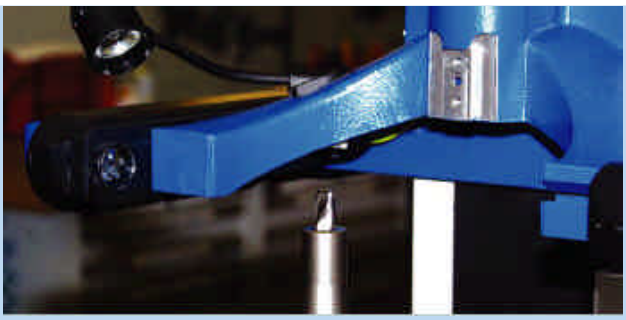
At arm's length: All tools and retainers are listed in the TDM system and can be accessed by any authorized worker.

Discards: Just launching the system saved more than 100,000 euros in tool costs.

Wolfgang Simon: "We make Vulcaine power modules in batches of six to seven per year. These items are all made to exacting tolerances in terms of dimensional and surface accuracy."

Lathe tools with an overhang of up to 800 mm are required for the large cones of the rocket power modules. The Kelch equipment can handle these sizes as standard.

Kivran Kenan: "The theoretical data and setting-up plans for the tools are provided by the TDM system. The complete tool definition is established during NC programming. And finally the tools are sent to the CNC machines with accurate actual data."



The tools can be set automatically. This frees up the operators to concentrate on their real job.

tool lists," said Simon. "There were over 20 different NC spot drills! Things had obviously gotten out of hand. We wanted to reduce this burgeoning multiplicity of items by standardizing the tools with an efficient, easy-to-operate tool management system that the design engineers could also access."
The hunt was on for a suitable solution. EADS in Augsburg had already installed the TDM (Tool Data Management) system from TDM Systems – which back then was still called Walter Information Systems. "Certainly, we're nowhere near the size of the Augsburg site, but with so many different components, we do need a large assortment of tools," explained Simon.

The initial software specification called for an SAP interface. However, SAP does not support the administration of the tool circulating stock. In other words, tool stocks can only be booked in when they enter the factory. Once they are used in production, they have to be booked out again. "So SAP deletes these tools, which are in use, from the stocks, despite the fact that they are still in the factory and can be reused," said Uwe Sauer, the sales manager of TDM Systems. This issue convinced EADS to implement a TDM-only solution. In the end, it opted for the TDM tool crib module with stock and storage place administration.
The experts from TDM Systems and the team in Ottobrun began to systematize tool handling.

"The discards alone represented a six-figure sum in euros. They were available in the factory, but would probably never be used again," explained the production manager. "Deliberately standardizing quickly reduced the number of our tools. In the future, we will only be producing the tools we really need."

To streamline operations, the system needed to record not only the storage site and technical data, but also graphical representations of the tools. Even the various storage locations had to be combined centrally – now there is just one tool issuing point in the middle of the workshop.

No need to reinvent the tool technology for each machining job.

Why use expensive and complicated special tools when standard tools will do? You will save time and money if your programmers know that new designs can be machined with existing tools. Why have 20 different NC spot drills when one is sufficient? You only need to know which tool is available and where it is stored. That is why EADS in Ottobrun implemented the TDM Systems tool data management system – with setting devices from Kelch, which are easy to handle and cover the larger tool dimensions needed to build rocket components.

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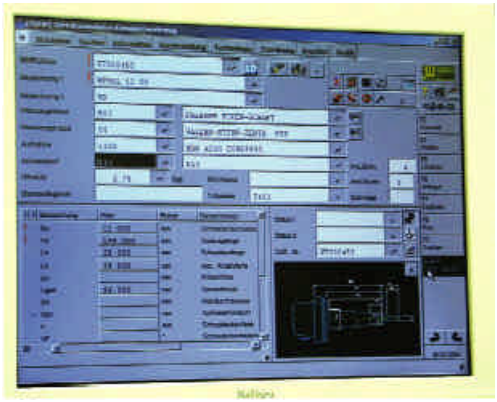

Accurate data and graphical representation: In TDM the construction plans for the tool assemblies are unambiguous and clearly structured. No risk of confusion.

Another important step was to automatically set the tools by transferring data to TDM. "The Kelch equipment was at the very top of our list," said toolsetter Kivran Kenan, who had been especially impressed by the simple, safe operation of the equipment using a teach-in procedure.

Lathe tools with overhangs of up to 800 mm are needed for the large cone on the power module. This criterion alone was too much for the competitor's equipment – but not for Kelch's Sirius A horizontal setting unit. Together with the software Easy-Webset, the Sirius unit accurately sets the lathe tools in the central tool issuing station, while the Kalimat vertical setting unit sets the tools for cubic production. The entire process is automated to eliminate human error. TDM supplies the theoretical data and the setting plans. The NC programming contains the complete definition of the tools. Once everything is ready, the tools are sent to the CNC machines with accurate actual data.

Initially, the new system means more work for the operators. "So we involved the operators in the planning right from the start. They now know how efficient tool administration helps them and regularly update the tool data," added the production manager. Several of the people had some concerns of their own: "The worst worry was that they would be barred from directly accessing the tools," explained Simon. "But they, too, saw reason in the end." Everyone understood that in an industry as time-critical as astronautics, you simply cannot have urgently-needed tools listed as in-stock in the tool management system when in reality they have been used up long ago. Simon explained, "We sometimes use special tools with delivery times of several months. And we can't miss a delivery date because of one missing tool. But now that we're covering all our entire tool handling with the TDM system, that won't ever happen."

The design engineers also have access to the TDM system. This ensures that the designers use existing tools as much as possible.

The user's assessment

The user
EADS Space Transportation GmbH
The technology
TDM and the Sirius A and Kalimat setting units from Kelch.

- Advantages

- Standardization of the tool stock
- Drastic reduction in tool crib stocks
- Used right through from design to machine. Tools are defined in the NC program
- Current status can be seen at any time
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- Clean, easy-to-understand system
- Maintains minimum storage quantities
- You can immediately check whether an order can be filled with existing tools, increasing scheduling reliability
- Standardized tool setting no matter who the operator is
- Universal data system between setting devices and the TDM system

⁻ Disadvantages

- Requires discipline in the consistent tracking of removed and fully worn tools

In Profile

EADS Space Transportation GmbH

EADS Space Transportation is a wholly-owned subsidiary of EADS Space, which itself is part of EADS (European Aeronautic, Defence and Space Company). EADS Space Transportation bundles all the EADS Group's activities and competencies in space transport and space travel infrastructure. The company is heavily involved in all the European space programmes and maintains competencies in space travel and strategic defence programmes. The Ottobrun factory primarily produces the main power module that drives the workhorse of European space travel – the Ariane 5 – as well as the power module for the upper stage. But the astronautics specialists also produce such delicate parts as the aerials for communications satellites or workpieces for sensitive aeronautics components. Around 900 highly-qualified employees work at EADS Space in Ottobrun. In 2002, turnover levels reached 152 million euros.