

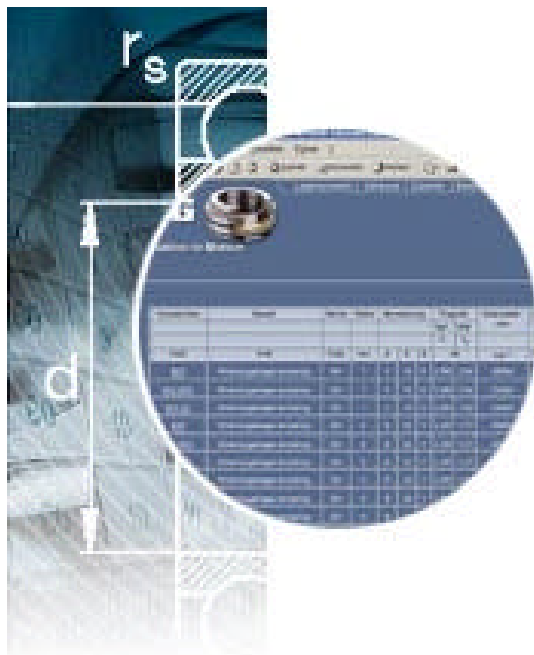
FAG Kugelfischer Schweinfurt

FAG integrates Unigraphics and SAP PLM

Faster Order Processing by Process Integration

Dr. Arne Gaiser, DSC Software AG

By combining SAP R/3 PLM and Unigraphics, rolling bearings manufacturer FAG seamlessly integrated engineering into business processes, and improved engineering productivity. The SAP R/3 system already in use in the commercial and logistic areas for several years also handles product data management, and provides the basis for collaboration.



FAG- a synonym for bearings

FAG Kugelfischer Georg Schäfer AG with its headquarters in Schweinfurt is one of the world's biggest makers of roller bearings for various application environments. In the business year of 2000, FAG with a staff of 18,000 had a global turnover of approx. 2.21 Billion €.

Objectives and tasks

The ability to react to customer request faster and more qualified is increasingly decisive in competition. "Our main objec-

tive was to reduce cycle times from customer request to quotation, while simultaneously increasing quotation quality. In addition, the ratio between quotations and orders is to be further increased," explains Dr. Claus Schmid, Program Manager SAP PLM at FAG.

Key to these intentions was to re-organize and substitute previously hardcopy-based processes by paperless, electronic processing, and the integration of these processes. All paper-based processes were changed to an optimized digital document management on the basis of SAP PLM. A further efficiency increase promised the integration of engineering data and processes into SAP PLM. Thus, FAG decided for the introduction of PLM Integration for Unigraphics to manage engineering data created by the CAD system Unigraphics.

"With SAP PLM we manage Unigraphics models and drawings, materials and bills of material (BOM). Moreover, using SAP R/3 for PLM tasks made a separate EDM/PDM system obsolete," states Dr. Claus Schmid.

For the introduction of PLM Integration FAG defined the following objectives:

- Efficient and qualitatively improved document generation with associative

data from quotation to the generation of production documents

- Management of all product-related data and documents in SAP R/3
- Introduction of a digital process-oriented operation method
- A departmental-spanning, integrated revision management to reduce editing efforts
- Reduction of cycle times of engineering orders from customer inquiry to the release of engineering documents
- Realization of a system environment considering requirements of modern software engineering (standardization, modular design, re-use, security, stability, integration, ...)

Those objectives were to be achieved by an integration of product development processes, product data, product documents, and product structures, as direct and deep as possible into SAP PLM.

The first department within the FAG group casing engineering was equipped with the PLM integration.

CAD Integration – Milestone in the PDM Master Plan

The integration of CAD into SAP was a sub-project within the PDM project at FAG. Following the classical project phases of specification analysis, design, pilot launching and implementation, in less than 3 months the solution went productive in casing engineering. In March of 2001, the CAD integration with full functionality went productive on 15 engineering workstations.

Document-oriented proceeding

PLM Integration for Unigraphics integrates Unigraphics data into global FAG processes, and provides for process and document-oriented work. For a fast and authorized access, and a control of spe-

cific processes separate document types were created:

3D assemblies, 3D single parts, 3D part families including derived quotation and production drawings, operating supplies, special instructions, and BOMs. In the workflow, engineering creates a material master record of material type ANFR (request), and links it with related documents. For each document and material object parameter classes exist. On input, the engineer evaluates the respective parameter. The classification system FAG built at the document and material level allows a quick retrieval of finished (FINI) and requested (ANFR) products. „This allows us to achieve one of our objectives, namely to increase the re-use rate in the company,“ asserts Dr. Claus Schmid.

Management of structures

Because the case production is completely outsourced, FAG creates a material master record only at the highest product level (assembly). For the single parts used in the assembly no material master records exist, and thus, the material BOM function in SAP is not used. For clear assigning the documents of the finished product, the material master record is linked with the quotation drawing and the assembly drawing for production. An object link for the active part in Unigraphics is automatically set for SAP PLM by using a menu item of the PLM Integration. Since material master records are created for sales-relevant products only, external service provider and customer get document BOMs. Basis for this structure is the 3D assembly structure created in Unigraphics.

The document BOM is automatically created and maintained in SAP via the Unigraphics-SAP interface. "Non-CAD user" are able to add further document positions to the document BOMs not created by CAD system Unigraphics, such as, operating supplies, and special instructions. This improves cooperation between engineering and logistic within the company. In

case an assembly is changed in Unigraphics, and consequently the related structure is updated, the manually added positions are transferred. The BOM display of the 3D assembly in SAP lists all referenced documents of the model. This elementary realization allows to display all required documents including version and quantity for a component at a glance.

Visualizing CAD drawings at each workstation

It was important to provide information on components throughout the whole company. Today, employees, customer, and supplier get prompt digital information where 'paper piles' prevailed before. However, because those workstations are not equipped with the generating application Unigraphics, it was necessary to provide a neutral format created by the standard functionality of the PLM Integration. On each save of an original Unigraphics drawing, automatically a file in format CGM is created, and converted to a TIFF file by a net-installed conversion server (see *Figure 1*). Then the TIFF file is filed to the same document info record as the original Unigraphics drawing. Here the basic advantages for FAG using the SAP Knowledge Providers (KPRO) became obvious: several original files are to be filed for an existing document info record.

Release process

In order to ensure a clear verification of 'release person' and 'release date' also in the context of product liability, this information had to be recorded on the document. The solution was as follows: all document types have a position in a status network. It is defined which positions the document cycles until release, and who has the authorization to issue a status change. Depending on the document type and document status the conversion server calls a conversion software. On a status change, e.g. from 'Done' to 'Released', the existing TIFF file for the document info record is called by the conversion software, and, in

turn, the existing TIFF-to-TIFF converter replaces the TIFF file. Since this status change is done by user at a specific date, this information can be read from SAP, and 'stamped' to the neutral TIFF document generated by the conversion program. This automated workflow requires that at FAG input fields on all drawing formats are identical designed to be automatically completed by stamp information. That means, stamp adjustment in the conversion software is a one-time task only. This process allows that at FAG on key-stroke all digitally provided documents are furnished with a 'digital signature' and other information (status change). This automation alone allows FAG to reduce cycle times in quotation and order processing by 20% while increasing data and document quality!

Automatic header completion

Today, SAP directly manages 3D models and derived drawings. Revisions are consistently and transparently handled company-wide. Via the PLM Integration meta data, such as description, document number, version, material, etc., are directly transferred to Unigraphics, and following, to the drawing header. Stresses Dr. Claus Schmid: "For the first time, FAG is able to centrally maintain and manage all engineering-related product data. This considerably reduces our maintenance efforts for a product".

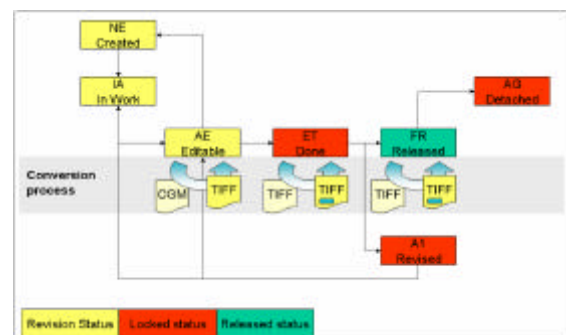


Figure 1: Status network showing points in time for TIFF generation (Source: FAG IB AG)

Outlook

The experiences with the PLM Integration are very promising: "We achieved our objective for uniform management of all product-relevant data in R/3. From engineering to sales, we now have continuous processes. In addition, we were successful in increasing productivity. This is demonstrated by the significant monthly increase in completed order construction for casings", sums up Dr. Claus Schmid.

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