Technical Document Management for Power Plants

German grid operator Netzgesellschaft Düsseldorf

implements DMS[tec] for its new power station

- **Structured management of ten of thousands of power plant related documents and data points**
- **Links between all documents and the power station identification code of each part**
- **Automatic transfer of ECAD data to the DMS[tec] system**

The German city of Düsseldorf aims to be CO_2 neutral by 2050. The commissioning of the new gas and steam turbine power plant Fortuna (GuD-F) in 2016 marked a significant milestone in achieving this vision. At the time of its commissioning, "GuD-F" was more than just the most efficient and most powerful power plant in the world. Its operator, Netzgesellschaft Düsseldorf mbH, also took a cutting-edge approach to digitally managing the tens of thousands of plant related documents and data points by implementing PROCAD's technical document management system (DMS[tec]), which uses item classes and metadata to mirror the entire plant by attaching documents to the identification codes of every single part. This creates a structure that is independent of the individual documents.

In mid-2018, the City Utilities of Düsseldorf outsourced technical services such as power plant operation, city lighting, and high-voltage cables to the Netzgesellschaft Düsseldorf mbH. The company uses the Identification System for Power Stations (KKS), which is the industry standard. It serves to identify each part of a power plant in a uniform and systematic manner. The KKS is developed and maintained by VGB PowerTech e.V., an international technical association for companies specializing in the generation and storage of power and heat that is based in Essen, Germany.

The new power station incorporated KKS guidelines. Siemens, the company that built the plant, supplied the grid company with all the documents marked in accordance with the KKS nomenclature and the entire structure of the power plant not only on paper but also in electronic form. These digital documents were to be incorporated into a new technical document management system. The goal: To give the plant manager (or any authorized user) immediate access to all related documents upon entering a KKS into the system.

With this requirement in mind, the grid company started to evaluate various solutions. One initial consideration was to use the existing SAP system and to add a PLM solution component. Another alternative was to use the general purpose DMS system that was already in place. "Except for PRO.FILE, no other solution was able to directly assign documents to the corresponding part and simultaneously keeping with the structure in the KKS," said Thomas Burg, DMS Administrator and ECAD designer at Netzgesellschaft Düsseldorf. "During the RFP stage, PROCAD demonstrated its software's capability to deliver concrete solutions for very specific requirements in a fast and flexible manner and without requiring extensive programming."

Unique assignment of the documents within the plant's structure

PROCAD GmbH & Co. KG
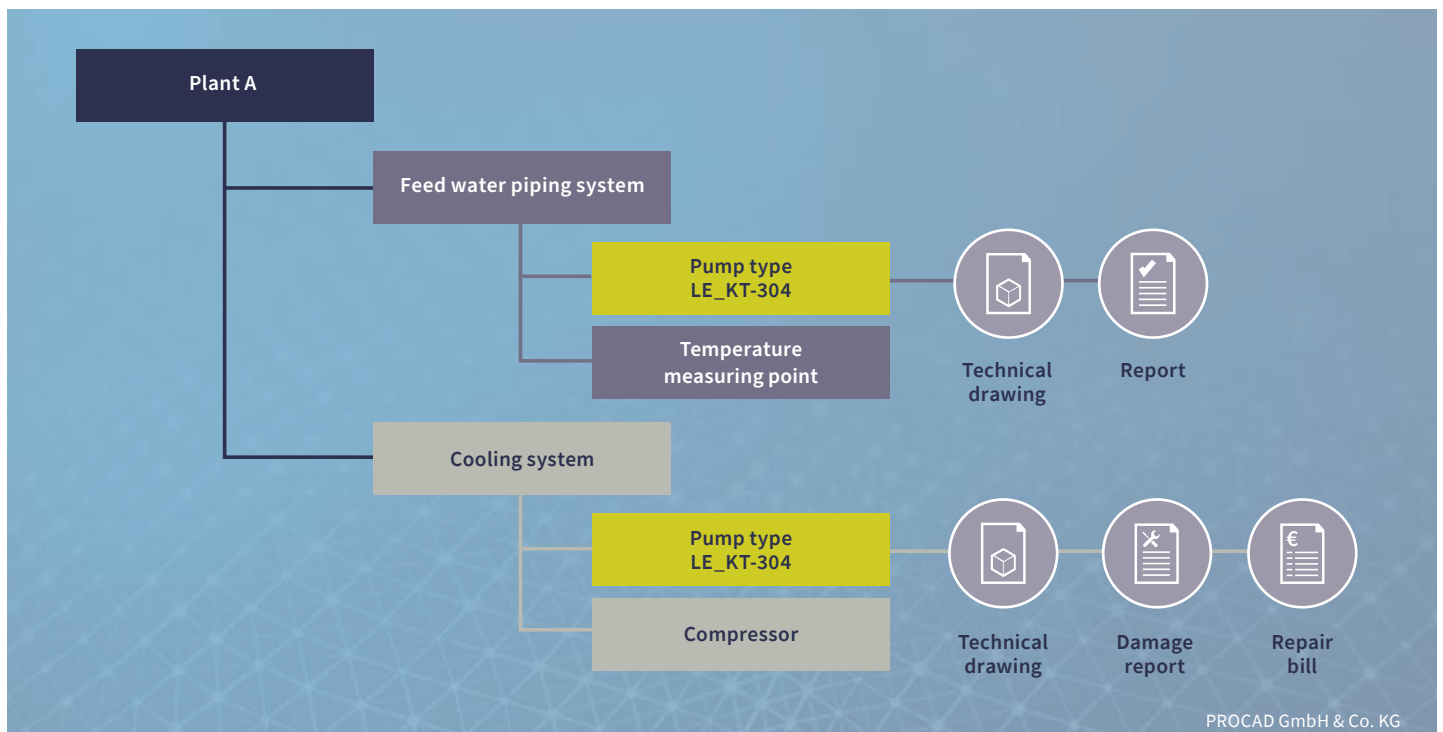
Another deciding factor was the availability of a PRO.FILE interface with EPLAN that allows for the direct import of files from the ECAD system into the DMS^{tec} system. Even though the power station unit was designed by Siemens, the grid company still needs to regularly make ECAD related changes – for example when circuit diagrams are updated, new piping is installed, or a part in a pump has to be exchanged. In these and other cases, the ECAD designers create a new drawing that is then automatically fed into the DMS^{tec} system right away.

Each motor, each pump throughout the power station is uniquely identified within the KKS structure. This ID code is a combination of letters and numbers to indicate the location ("61" for GuD-F), system code ("LAB" for feedwater piping system), and other subcategories. PRO.FILE now gives the company the ability to link the KKS code of every single part to its corresponding digital documents, which in turn gives the different users a specific structural view of the document master. After all, a circuit diagram, though likely to exist only once, usually refers to multiple motors and is displayed every time there is a connection to the part that someone is looking for.

Entering the KKS will display any related documents

This means that once a user enters the KKS code into the DMS^{tec} system, they will first see in the part master which motor they are exactly dealing with. They will find a short text with performance specifications; in a list of documents they can click on the technical data sheet, the circuit diagram, the P and I diagram, they can see how the pipes are routed or how the motor is supplied with power and from where it is controlled, and so on. "Having to piece together all of this information from almost 30,000 documents using Windows Explorer is pretty much impossible," points out Thomas Burg.

Documents within the context of the power plant's structure

This is exactly why being able to display these documents within the context of the power plant's structure, in day-to-day operation, is extremely helpful. It used to be and still is the case in the other power station units that the shift supervisor stood in front of a motor without immediate access to further information about the part in question. When in doubt, their only remedy was to check the cabinet right next to it for the paper based circuit diagram but in order to view all pertaining documents, they had to painstakingly search through the archive first which contained 900 square feet filled with countless binders in fireproof cabinets.

Faced with the choice between expanding the paper archive for the new power station or switching to a digital document management system, Thomas Burg and his team didn't have to think twice. It was not just the nuisance of having to re-plot and re-file complete circuit diagrams in DIN A0 format for every change, no matter how small. The cataloging of the document archive simply did not offer the same level of convenience, transparency and hierarchical organization that digital document management delivers. What's more, there was no structured and part-centric storage system in place. With DMS^{tec} and the built-in check-in/check-out mechanisms, there is also the added benefit of eliminating the risk of working with outdated versions.

Thomas Burg,
DMS Administrator and ECAD designer at
Netzgesellschaft Düsseldorf

"Having PRO.FILE display these documents within the context of the power plant's structure in day-to-day operation is extremely helpful.
We never had anything like this structured and part-centric storage system in any of our previous power station units. With DMS^{tec} and the built-in check-in/check-out mechanisms, we are also eliminating the risk of working with outdated versions."

The challenge

The construction of a new power station unit prompted its operator to look for a solution that would digitally store any documents related to the plant and establish a technical document management system. The goal was to give any authorized employee immediate access to all related documents upon entering a KKS into the document management system.

The solution

As a technical document management system (DMS^{tec}), PRO.FILE uses item classes and metadata to mirror the entire plant by attaching documents to the ID codes of every single part. This creates a structure that is independent of the individual documents.

The result

Simply by entering a KKS, users can pull up a list of documents and retrieve any related information: technical data sheets, circuit diagrams, flow diagrams and much more, saving them valuable time. Repair and maintenance teams and any affected departments can immediately access relevant documents in a structured and part-centric manner.

Powerstation Fortuna, operated by Netzgesellschaft Düsseldorf

The customer

Governed by the principle of economic efficiency and regulatory frameworks, Netzgesellschaft Düsseldorf mbH plans, operates, and builds power, gas, water and district heating grids. It is responsible for the smooth transmission of electric power, gas, water and district heating for its customers and controls and manages its grids and plants by pooling its commercial, technical, legal and regulatory competencies. The company was founded in 2007 as a spin-off of Stadtwerke Düsseldorf.

Support services for the import of documents into the DMS^{tec} system

PROCAD assisted the grid company in importing the documents, supplied by Siemens in XML format, into the DMS software and linking them to the KKS codes. The main challenge here was the fact that the power plant builder does not automatically supply the correct links between the KKS codes and the documents as they use a different classification and tagging system.

Currently, 20 DMS^{tec} users with write licenses are working with PRO.FILE in the company's documentation department and another approximately 200 workstation licenses were added to give read-only access to the company's maintenance and repair, operations, new construction and project management teams. At this point, all of the almost 30,000 documents pertaining to the newly built power station are stored in the PRO.FILE DMS^{tec} system along with approximately 149,000 KKS codes. Over the medium term, the company plans to also digitalize the paper-based documents for its existing power station units and to store them accordingly.

Next steps

Using an existing SAP interface, ERP users will be able to store hazardous materials protocols, inspection documents, quality assurance records, and other technical documents in PRO.FILE and, conversely, search for them, all without having to leave their familiar working environment. Another goal is to integrate PRO.FILE with RC Plant, a drawing system for the creation of piping and instrumentation diagrams, which will make these documents automatically available in the DMS^{tec} system as soon as they are created or updated.

Why did they choose PRO.FILE?

During the RFP stage, PROCAD was able to demonstrate how its PLM/DMS^{tec} software, PRO.FILE, delivers concrete solutions for very specific requirements in a fast and flexible manner and without requiring extensive programming. No other solution that was evaluated by Netzgesellschaft Düsseldorf had the capability to directly assign documents to the corresponding part and to do so in keeping with the structure in the Identification System for Power Stations (KKS).