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KUKA
Roboter GmbH

Adopting modular design with EPLAN

Brand name in industrial robotics

KUKA Roboter GmbH of Augsburg, Germany, known internationally as KUKA Robotics, has been a leader in industrial robotics for almost four decades. Its orange robots are welding, riveting, trimming, painting, gluing, taping, polishing, lifting and much more in an ever-growing list of industries, essentially doing what it would take many humans to accomplish with greater speed, precision and consistency. The company's product line covers all standard load types – from mini-robots to heavy-duty lifters like the "Titan" class with 1,000 kg load-bearing capacity. There are six axle robots, portal, clean room and stainless steel robots, heat-resistant ones, SCARA models (typically four axis robotic arms) and welding robots.

“KUKA uses the EPLAN Engineering Center (EEC) as part of its electrical design environment; it provides designers with function-based, constructional kits containing all the engineering data and administrative information to design equipment to the customer's requirements. The result is streamlined electrical engineering with an integrated database that has been optimized for the modular manufacturing philosophy employed throughout the KUKA product portfolio.”

efficient engineering.

OPTIMUM

design
automation



Standardization moves from content to design

All KUKA robots have a modular design so they can switch tasks quickly and simply, as well as a proven PC-based steering platform – which laid the foundation for KUKA Roboter's philosophy of modular manufacturing. When the electrical engineering group upgraded from EPLAN 5.70 design software to EPLAN Electric P8, which incorporates the EPLAN Platform database, the new system provided the opportunity to take this modular manufacturing approach and apply it to design methodology to simplify and accelerate projects.

Perfectly suited for uniformity

"Our entire robot product line is characterized by a uniform system philosophy, spanning all technologies and operator control systems as well as uniform maintenance and upgrade concepts," says Jürgen Albrecht, team leader of the electrical design department in Augsburg. "At the electrical engineering level, the product line had already been streamlined and standardized. So much standardization at the product level opens up opportunities for a large degree of modularization and automation in our design systems as well." The EPLAN Platform supports the full suite of EPLAN design products, including the EPLAN Engineering Center. The EEC, in turn, has made it possible for KUKA to adopt a functional design approach to accelerate project turnaround times by using pre-existing modules that represent machine functions to generate design data.

EEC generates complete interdisciplinary design package

With the EEC, the designer chooses one of these modular building kits representing, say, a linear axle or gripper or valve terminal and enters the desired performance data or sizes. He then selects a mechatronic module from the kit that already has the design data for all engineering disciplines involved, as well as the administrative data, like order numbers. These mechatronic modules are compiled into a customer-specific, total solution and parameterized. The EEC generates all drawings, diagrams, schematics and control software. As the functional modules are represented in cross-disciplinary fashion, all available information is transparent and universal, avoiding double entries and inconsistencies in data management. Tedious, time-consuming tasks, like the selection of individual components from catalogues, listing specifications, etc. are dispensed with. All the data needed by the purchasing and production departments are created with the design.



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FASTER

turnaround times
with EPLAN Engineering Center

Good planning: a best practice in adopting modular design

While the EEC accelerates the design process, some forethought about module content can maximize the overall benefit. Electrical engineer Udo Dettmering says, "The key question is how should each module be structured?" adding, "EPLAN has supported us extensively here." The module characteristics for KUKA's EEC rollout were determined beforehand in a workshop: "One of our main objectives was to retain flexibility and openness for the future," remarks Dettmering. "It would be too costly to change the system later on. Therefore we had to give some thought to future structures in the fields of electrical and steering engineering. We came to the conclusion the best choice would be building modular kits at the smallest level, because of the great speed at which innovation occurs in our industry. This would help us retain flexibility."

Abiding by this principle means that relatively few additional modules will be needed, says electrical engineer Gerhard Bauderer. "It is sufficient now to call up the functions, to select the available modules, and combine them into a plan." That's both user friendly and flexible, so much so the EEC could be used by his design colleagues in the project business unit designing individual system solutions incorporating KUKA robots.

SAP link promises high-level mechatronic design

KUKA is currently in the process of linking EPLAN to its SAP system. When this step has been completed, the various engineering disciplines can pursue true integration; they can begin designing collaboratively using standardized mechatronic function modules to develop innovative products – and do it even faster.

“Gerhard Bauderer: “Working with the EEC modular kits is real and true progress for me. We save time, use uniform modules across product lines, and the plans as well as the documentation are of considerably higher quality.” Even building variants has become much easier, “We define a schematic for the basic design containing as many options as possible, to limit the number of variants to only a few – this has been already done using the EEC.”

Many advantages
of function based engineering
SUMMARY

Having standardized and modularized a great deal of content in its entire product line of industrial robots, KUKA Roboter is building those advantages into the design process. Using specially created, pre-validated functional modules, or construction kits, that contain engineering data for all disciplines, electrical designers working with the EPLAN Engineering Center (EEC) are achieving huge time savings in generating complete design packages with very high quality results and documentation. It's an important step in switching from the traditional sequential design workflow to a true mechatronic approach where all engineering disciplines can work collaboratively to develop the product.

Find out more about KUKA Roboter on www.kuka-robotics.com

efficient engineering.



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Published in 2011

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