



*Zuken's software solution
for electrical wiring,
control systems and
fluid engineering.*



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by adopting a modular methodology for
electrical design

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Jens Fricke,
Wiring Diagrams Group Manager,
Alstom

Alstom improves productivity and planning by adopting a modular methodology for electrical design

After acquiring various companies around the globe in the 1990s, Alstom needed to integrate these new elements into its international corporate structure in a meaningful way. This also meant creating a standardized software landscape that would cover all divisions of the group. In both the Power Systems and Transport divisions, Alstom's electrical engineering departments opted for Zuken's E³.series software, and is now widely used around the globe.

Today's locomotives are unrecognizable from the noisy steam or diesel beasts of our not-so-distant past. Challenges such as increased demand for in-carriage electronics, and global supply chains, have led to ever more complex design processes.



"Every traction vehicle in our new Coradia Continental vehicle platform uses around seven kilometers of cable. All these converge

in the control console, where they provide feedback on what is happening in the train and forward instructions to the relevant actuators," explains Jens Fricke, Group Manager for Wiring Diagrams.

"From the outside, the Coradia Continental is virtually no different from any other traction vehicle. But a lot of changes have taken place behind the scenes, to the design in particular. Using a configurator with E³.series means we can do our work not just much faster but with fewer mistakes too. Preparations are also underway for us to start using the E³.series various integration options," explains Fricke.

Using configurators for more effective engineering

In the past whenever a new order landed on the desks of staff in the electrical department, they would first hunt out previous similar projects and use the most suitable one as a basis for the new project. All parameters, including their follow-up parameters, then had to be modified by hand. Calculating the follow-up parameters was not just time-consuming, but also prone to error given the manual modifications needed.

Fricke explains how the configurator works: *"For the Coradia Continental vehicle platform, we started by producing a master plan, containing all possible options for the vehicle platform. The customer is now specifying which of these he wants to use. For example, he needs an electric traction vehicle with a total of seven carriages and a maximum speed of 120km/h. We then feed the configurator with only the main parameters we take from the customer's requirements. A set of rules stored in the configurator then automatically computes most of the follow-up parameters."*

Results

- Use of a configurator has meant faster work processes with improved quality
- 3D interface to CATIA V5 has boosted productivity in calculating the production lengths of cables.
- Alstom structured their design department more efficiently, greatly improving integration with process planning, procurement and production.

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Alstom Germany grew from a small company in the early 1990s, and now represents one of the major players on the infrastructure markets for power and transport. Alstom LHB belongs to the world-leading full-range providers of railway technology and services.

Alstom LHB products include trainsets, railroad cars and locomotives, as well as most modern control and safety technology.

The Salzgitter factory is one of the largest manufacturing plants for railway vehicles in Germany.

E³.series is Zuken's software solution for electrical wiring, control systems and fluid engineering.





E³.series from Zuken is a Windows-based, scalable, easy-to-learn system for the design of wiring and control systems, hydraulics and pneumatics. The out-of-the-box solution includes schematic (for circuit and fluid diagrams), cable (for advanced electrical and fluid design), panel (for cabinet and panel layout), and formboard (for 1:1 wiring harness manufacturing drawings). Integrated with MCAD, E³.series is a complete design engineering solution from concept through physical realization and manufacturing output.



Cable lengths from CATIA data

An interface to CATIA V5, for example, is about to be completed and should give a further boost to productivity.

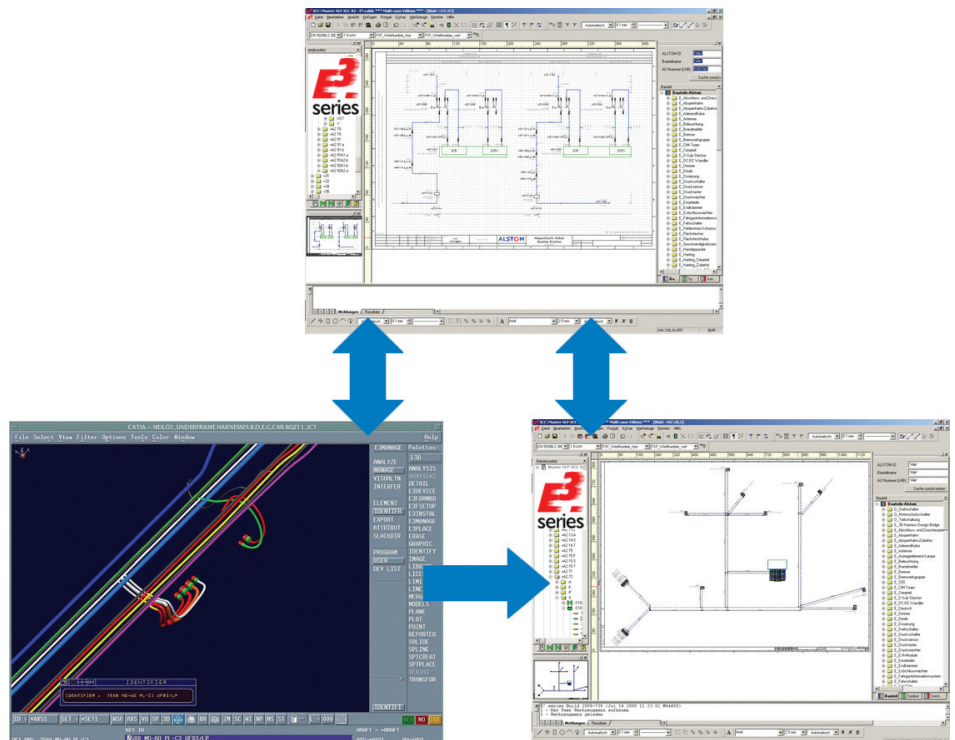
"Calculating the cable lengths currently takes up a lot of time even though we already have all the data we need for this in CATIA. In the future we want to use the E³.series 3D interface to CATIA V5 to exploit this data. The efficient 3D interface between E³.series and CATIA will greatly boost productivity in calculating the production lengths of cables," explains Dipl.-Ing. Klaus Heimke, Manager for New Technologies and E-Business at Alstom.

In order to achieve this, the wiring diagram data is first transferred from E³.series to the CATIA system. This data also includes all plugs and their ID numbers. The plug data is stored in both the E³.series component database and the CATIA database, the only difference being that E³.series contains definitions for the terminals via which the plug connections are linked, while CATIA contains definitions of the geometric location of the plugs and the layouts of how

they are connected via cable ducts. *"We can now use the plug ID numbers to automatically assign the data from both systems. This gives CATIA all the information it needs to perform autorouting, i.e. automatically filling all cable ducts or conduits,"* explains Heimke, who adds: *"This means that the production lengths of the cables are calculated automatically, which enables us to greatly minimize the number of mistakes made and time required for this work."*

The next step is to transfer this data to the E³.series module E³.formboard that is used to plan processes. This can be used to print out huge 1:1 plots which are used as a basis for producing the wiring harnesses required. *"E³.formboard uses the same component database as all other E³.series modules. Not only does this save us from having to set up and update another component database, it also offers the benefit of changes in E³.cable being automatically incorporated in the formboard module,"* explains Heimke.

Fricke is very positive about the future: *"E³.series has enabled us to structure our design department more efficiently and also to greatly improve integration with process planning, procurement and production in a short time."*



All data is transferred via the E³.series 3D interface to CATIA V5 and can be passed from there to the planning process once autorouting has been completed in the E³.formboard module.