

CADdy⁺⁺ assures railway operation

In the ongoing extension of the safety installation at Østerport Station in Copenhagen more than 1,500 drawings are needed. CADdy⁺⁺ keeps track of them all.

When the railway part of the Great Belt Fixed Link was going to be built, Atkins Denmark (then called DSB Railway Advice) was responsible for the project work. When the commuter train connection from Ballerup to Frederikssund was going to be expanded to double track, it was Atkins Denmark who did the projecting and provided the technical supervision. In the ongoing LOKO project, which is an expansion of the railway connection from Copenhagen Central Station to Østerport Station, Atkins Denmark provides the technical consulting within railway engineering.

- We participate in all phases from idea to delivery, says project manager Ulrik Nielsen.



Atkins Denmark is a consulting engineering company specializing in railway engineering, but they also have activities within other areas such as road transport, industry, and environment. It is subsidiary company of the British Atkins, which is one of Europe's largest companies within technical consultancy. Atkins Denmark is part of the rail division, called Atkins Rail. The foundation consists of the employees and the know-how from DSB from the time when this Government service was spilt up into a part operating the trains (DSB) and a part managing the railroad network ('Banestyrelsen', Rail Net Denmark). Atkins Denmark was established in 2001 when the consultancy division of Rail Net Denmark was privatised.

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The company employs 300 people who are specialists in railway engineering, etc. The principal customer is Rail Net Denmark, but Atkins Denmark also works for other customers, both in Denmark and abroad.

Development of Special CADdy⁺⁺ Version for Atkins

There are four main subject areas within railway engineering: track device, propulsion power device, safety installation, and information system. The ongoing LOKO project, which is going to finish by mid June 2004, involves all four areas. Ulrik Nielsen is responsible for the safety technology handling the control of track shifters and signals. The employees within this area are typically electrical engineers, electricians and safety installation workers who all have gone through special training at the 'former' DSB.

- The history of safety technology goes a long way back. It is a conservative area where relay technology that was developed in the fifties and sixties is mainly used just because safety has been a first priority. The essential thing about the relay technology is that the constructions are robust and easy to understand so the maintenance staff can carry out repair work by using simple tools. Computer technology is only used in few safety installations, Ulrik Nielsen explains. At the same time he underlines that computer technology, of course, is used in the overall control.

Projecting safety technology demands high-quality drawing documentation, and simultaneously it should be easy to handle the many drawings. Therefore it is important that the design engineers use the right and the best tools. One of these is the electrical drawing program CADdy⁺⁺ from IGE+XAO Denmark A/S.

The development department at IGE+XAO has developed a special version of the program (connected to an earlier version of CADdy⁺⁺) for Atkins Denmark. The special version is very comprehensive because of the high and very demanding documentation standard used within safety technology.

Electrical Diagrams and Form Drawings

Ulrik Nielsen points out that the functions in an ordinary electrical diagram are denoted by names, whereas they in the drawings of Rail Net Denmark are given a graphical representation by means of symbols. It must be quick and easy to get an overview of and troubleshoot the installation. For safety reasons it is also required that the wiring direction of each wire is shown on the electrical diagram. Apart from this the diagrams should show the normal position of the circuitry, that is, show the installation when power is turned on. An arrow, for example, indicates whether a relay is energized or de-energized.

- One thing is the electrical diagram, but we also want to show what the components look like physically. For this purpose we use the so-called



form drawing, which is a drawing illustrating what the components look like when they are placed in the rack. It is front pictures of the relays with numbers referring to the pages, where the relay appears in the electrical diagrams. The pictures also indicate how many wires have been connected up. They are "live" symbols being

updated dynamically as the drawings are being prepared.

- The developers at IGE+XAO have – in co-operation with us – developed a special program module handling form drawings and automatically updating form symbols on the basis of the electrical diagrams.

CADdy⁺⁺ is delivered with several libraries of symbols, but because of the special documentation standard of Rail Net Denmark this was not enough for the technicians. They have – in close co-operation with IGE+XAO – developed their own library of symbols comprising about 1,200 symbols of which some 700 are "active". All symbols are recognized as electrical components by the program so lists of connections and components can be produced.

The last facility is – according to Michael Mahler from IGE+XAO - a basic function in CADdy⁺⁺.

"CADdy-Atkins"

Ulrik Nielsen has many years of experience working with CAD and CAE systems and took part in introducing them at the Brüel & Kjær company in the first half of the eighties. He first became acquainted with CADdy when he joined Atkins seven years ago. At that time an early version of CADdy was already being developed and Ulrik Nielsen was given the task of finishing and spreading the use of the system among the design engineers. The task has been solved and all design engineers now use CAE.

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- Today we have a vast number of installations placed with our design engineers. The old CADdy has been replaced with CADdy⁺⁺ and simultaneously a new development module with the same additional functions that were included in the old CADdy - plus many more - has been developed. A continuous development is taking place in order for us to make the work more effective.

- We have actually got a "CADdy-Atkins", which we call ReCs (meaning "Consulting Electrical CAE system"). We use the program here in Copenhagen and at our office in Aarhus. You can install it on a laptop computer; some of our employees have even installed the system on their home PC so they can work from home.

Furthermore Ulrik Nielsen tells us that with ReCs it is also possible to make working drawings with colour markings of changes. This is used a lot when lists of new wires to be mounted at existing installations are going to be printed out.

Despite the fact that CADdy⁺⁺ has been deeply integrated in the daily work of the Atkins technicians, Ulrik Nielsen closely monitors what happens in the area of CAD/CAE and any new programs being introduced.

- So far we have not seen any reason why we should change over to another CAD program. CADdy⁺⁺ is easy to work with; it has a lot of advanced functions, and it is based on the Microsoft Access database, which we have benefited a lot from. We have been given access to the structure of the system and have been able to develop support tools ourselves. This, among other things, has given us the opportunity to update drawings that share pieces of information in drawing frames, change names of components, and copy drawings between projects.

Safety is also about 100 per cent control of the drawings; that is why special demands are put on the design engineers, among other things for version control.



In the CADdy⁺⁺ system all drawings are handled in one single database file, and in this way they cohere. It is a quality that is important to us, and which we value a lot, Ulrik Nielsen concludes.

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