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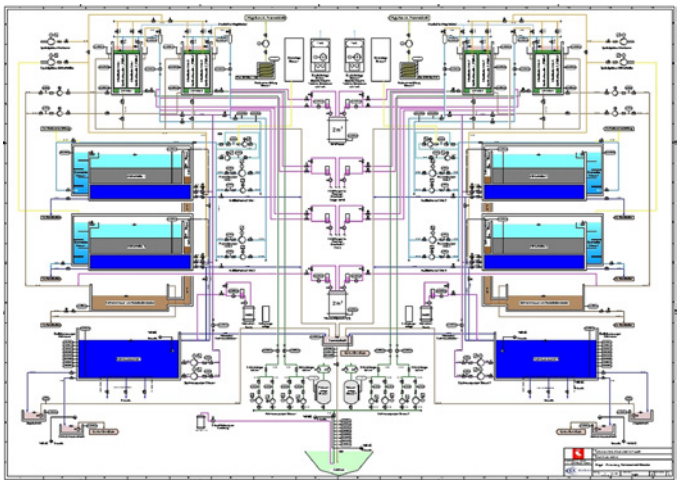
"BIM becomes a 'must have' in Plant Engineering"

WABAG Wassertechnik AG has sound knowledge and state-of-the-art technologies for the construction, capacity expansion and modernisation of wastewater treatment plants. The company covers the entire spectrum of process engineering: pre-cleaning, biological cleaning, tertiary cleaning, removal of trace substances and sludge treatment.

In water management, a new investment cycle is imminent to bring pipe networks, water treatment and waste water treatment plants up to date. Planners should be cautious when choosing the engineering tool to be used for this purpose. It is a decision that usually binds the company for years to come. Building Information Modelling (BIM) enables transparent and precise project management, because this method enables intensive communication between all the trades. WABAG Wassertechnik AG in Winterthur, the largest supplier of drinking water and waste water treatment plants in Switzerland, decided in favour of Cadison several years ago after thorough testing and is therefore equipped for BIM.

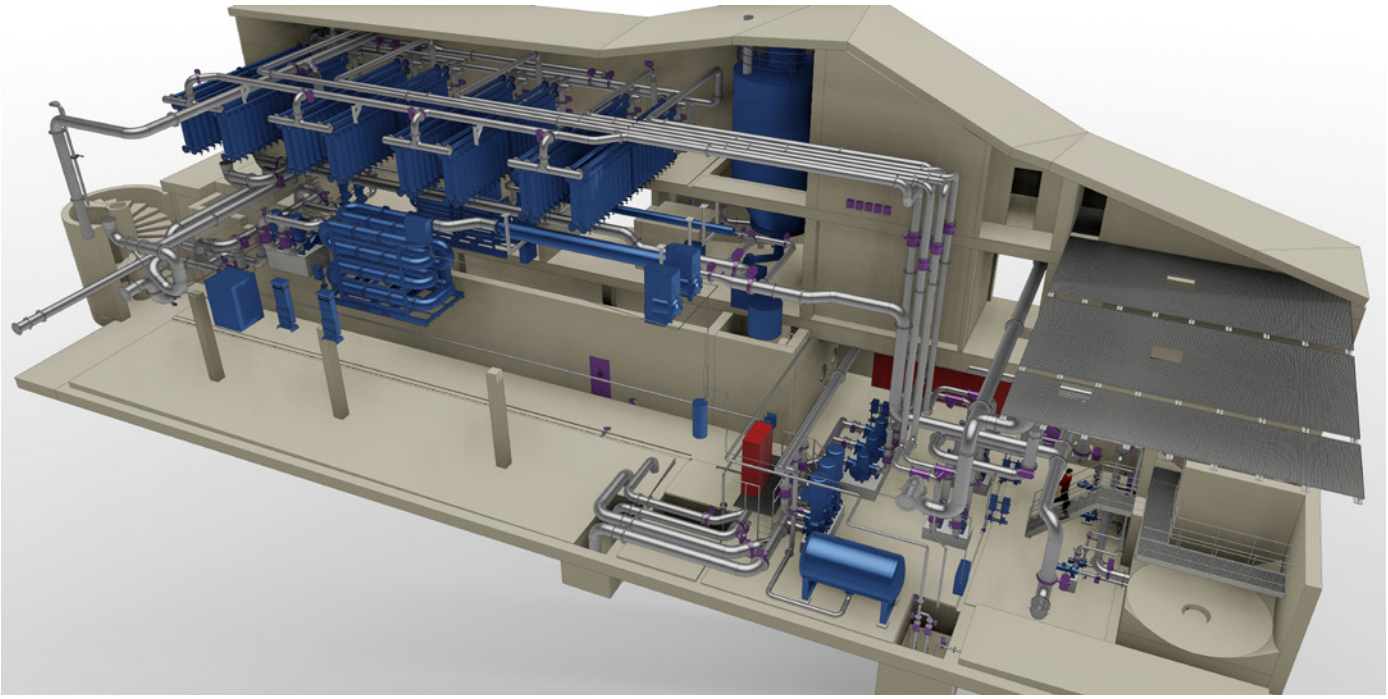


WABAG project example: Planning of the Horgen seawater works. The treatment of seawater is of great importance in Switzerland: around 17% of drinking water is obtained from seawater, and for water suppliers supplying more than 50,000 inhabitants, the figure is even higher at over 50%.

The municipal and industrial use of water always incurs costs: it usually has to be treated (conditioning costs), it has to be distributed (pumps consume energy) and, after use, it usually goes into post-treatment – either with the aim of recycling (cleaning costs) or for disposal in the receiving water (costs of the sewage treatment plant). For economic reasons, it is therefore important to move the water as less as possible, so as to heat it less and also to pollute it less.
In water-rich regions, this does not require the same technological effort as in water-poor areas - the costs of further closed-loop production through to zero-liquid discharge (ZLD) are more likely to be accepted there than, for example, in Switzerland or Germany. Everywhere else, on the other hand: the usually close integration of industrial production with water technology makes integrative technologies and comprehensive management systems desirable.
Water management facilities and infrastructures must be calculated, offered, planned, built and operated. In the course of this, a multitude of data (process data, drawings, pictures, specification sheets of the manufacturers or the plant documentation) is created, which ideally can be digitally processed and collected. There is a great potential in the digital image of all infrastructures - the 'digital twin' what is often quoted today.

From 'Digital Twin' to Building Information Modeling

Linking the digital image with the commercial and technical project management has always been the task of a cost- and quality-conscious planner. Today it has a name: Building Information Modeling (BIM).
The important advantage: The 3D model created in the planning process is also used in the production phase (expansion and maintenance of the plant) up to plant shutdown, i.e. over



Example of a 3D Cadison model (this is a drinking water treatment plant planned by WABAG).

the entire life cycle of the plant. BIM is an attractive instrument for this - not new software, but rather a new method of approaching projects. In concrete terms: a tool to improve cooperation between all those involved in the planning process. BIM of course uses software for this, for architectural planning as well as for the planning of building services. This is why the loss-free exchange of data between the specialist planners and operators involved in the project and its various phases of life is so eminently important.

In Switzerland, the topic of BIM has gained considerable momentum - the background is the strong competition among planners who want to differentiate themselves with this topic. "BIM becomes a 'must have' in plant engineering," says Marcel Frank, CFO of WABAG Wassertechnik AG and a Member of the Management Board.

In Dechema's position paper 'Industrial Water 4.0', the benefits of digital tools are described as follows: "The consistent use of the optimisation and cost reduction potential offered by digitalisation in industrial water management leads to smaller and more flexible plants with shorter construction times, which are characterised by increased operational safety, more reliable operation and a longer service life... The challenge of the future is to anchor this digitalization in industrial water management in such a way that water and wastewater treatment plants become adaptive systems that interact with their environment."

Digitization and Integration of Engineering

However, the path from idea to action is usually accompanied by challenges. To what extent can integrated systems contribute to simplifying the previous working method and workflow, reducing pain points, increasing quality, generating time savings and ensuring plant safety? How can the collection and modification of process data, data transfer to higher-level systems and document creation be automated?

ITandFactory (a solution provider in plant engineering who develops and sells engineering software) has developed the planning tool 'Cadison' to answer these questions: A consistent data management system that increases flexibility throughout the process workflow and enables multiple workgroups to collaborate in parallel. This also improves the division of labour between remote teams, the accuracy, speed and success of the project.

As an engineering solution for plant construction, Cadison is based on object-oriented technology with modular architecture. The tool offers the user a very flexible option to integrate 3D apparatus models created by other planners in different formats. Over the entire life cycle of a plant, all data is collected in a single database - from the initial design concept to assembly, through maintenance to dismantling.

Cadison has always been BIM-enabled

Is BIM something completely new? Marcel Frank has a different opinion: "Cadison has always been BIM capable!" He describes the difference to 'normal' engineering as follows:

IFC

- The format IFC or Industry Foundation Classes is a standard - technically not a file format, but a Schema or Data Structure. IFC models could be edited, but this is not the intended purpose, as this is an isolated activity and has no impact on the original model.

"With Building Information Modeling, you don't just model a 3D graphic, but also store more detailed information, for example on deadlines and costs. BIM is a graphic model with additional intelligence and information."
One has to differentiate between the variants 'Closed BIM' (which works very well in many cases within a tool family due to missing interfaces) and the variant 'Open BIM'. While many planning tools have a problem communicating with external tools, Cadison with its IFC interface can do so easily and effectively. IFC refers to a standardized data exchange, originally coming from building services engineering planning, in order to incorporate the planning of the various trades into a common model - this is already working quite well in Cadison, as Marcel Frank reports.
If you think BIM through, the customer has a very powerful 3D model with all the important information about the technical equipment after completion of the planning work and commissioning of his plant, which can be very helpful, for example, with all maintenance and servicing work," says Marcel Frank. BIM is thus ultimately a very efficient support for the customer throughout the entire life cycle of his plant. And: instead of having to deal with a mountain of paper documents, the operator has all these documents available on his tablet in the best case.
What does the plant and equipment manufacturer or planner of BIM have? The main advantage of BIM is the completely new way of communication and collaboration, explains Marcel Frank: "The traditional form of collaboration is characterized by many different media breaks (interfaces); BIM avoids a large number of these media breaks. The quality of communication will be much better". And you approach a project differently with BIM - quite simply because every trade up to the bricklayer of a sewage basin has a better idea of what the goal of this project is at all, with the help of visualisation via the 3D model. "The whole team simply knows much better what is being built! In short: BIM improves communication and increases transparency. This changed form of communication, however, must first be learned by all parties before it can fully unfold its potential."

Bottomline

The management of water supply systems and the associated operating and maintenance processes are becoming increasingly important and directly affect the sustainability, supply security and cost efficiency of water supply, wastewater treatment and wastewater disposal. Together with supporting or accompanying processes (e.g. the recording of condition and consumption data), this is summarised under the term 'technical plant management' - and because all this should take place in as digital a form as possible, the generic term BIM (Building Information Modeling) has prevailed.
BIM is therefore important not just for the engineering, i.e. the planning, manufacturing and assembly of the technical equipment; the industrial and municipal operators of the plants, in order to implement BIM as a comprehensive life cycle concept, must also continuously update the 3D model. It's not trivial, but it pays off.

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