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2019

eXperience **No 03**

Process & Industry



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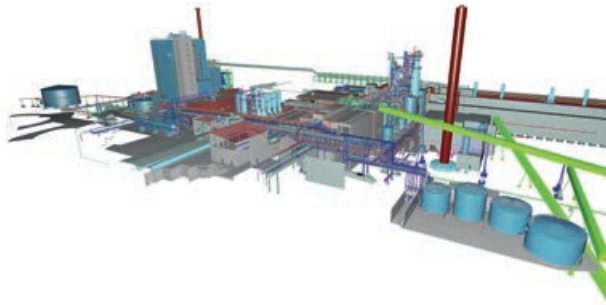
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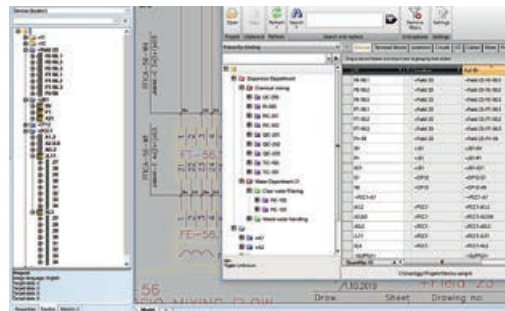
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The CADMATIC eXperience Magazine is published twice a year by CADMATIC Oy.
Cover picture: Alrar separation and boosting plant constructed by Bonatti in Algeria,
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eShare making its mark

The second and third quarters of 2019 have been particularly busy at CADMATIC. We have welcomed many new customers while CADMATIC's information management solutions have received a strong response from the market. At the same time, our strategic investment in Kymdata's CADS software has bolstered our capacity to serve our customers more comprehensively.



Photo © Timo Mäkipää

The theme of this Plant eXperience magazine is *information management*, with a focus on eShare and how data visualization can bring efficiencies throughout plant design, construction, and operation.

2019 has, in many ways, been a breakthrough year for CADMATIC's flagship eShare information management solution. An increasing number of EPC companies and owner-operators are taking note of the efficiencies that eShare can bring to their operations. eShare's ability to integrate, visualize and share information seamlessly is an attractive proposition. The fact that eShare is independent of design software packages is a further reason for EPC companies to invest in the solution.

In this edition, we present how Bonatti, the Italian oil & gas EPC, uses eShare to increase efficiencies in constructability and construction project phases. It is pleasing to hear how much they appreciate the visualization of information and how this enables their site

managers to make more effective operational decisions.

We have an article about paper plant owner-operator SCA Obbola, where eShare is used as the platform for the digital twin of their plant, combining information that is spread across different systems and databases. All the information they require can be found easily and quickly, and in one place, via eShare.

We also have an in-depth look at an eShare use case: the visualization of constructability data via the integration of construction analysis system software with eShare.

In August this year, we acquired the Finnish software company Kymdata and its CADS software. CADS Electric, or *CADMATIC Electrical* as it will be known in future, is the market leader in electrical and automation design in Finland and Estonia, while the CADS product family also includes software modules, e.g. for HVAC calculation and modeling as well as struc-

tural design. The CADS products are an excellent complement to CADMATIC's product portfolio.

Automation levels are increasing rapidly in different process industries. Now, CADMATIC can provide fully integrated software functionality for all plant design needs in the global market (one-stop-shop). The integration of CADS into CADMATIC is ongoing, and we will keep customers informed in this regard. With the acquisition of CADS, we now have over 200 professionals serving our 7,000 customer organizations in 60 countries. On page 24, we present an overview of CADMATIC Electrical software.

I trust that you will enjoy the information management-themed magazine.

I wish you all happy reading and welcome your feedback.


Jukka Rantala, CEO

Italian giant Bonatti bets on eShare

*Gaining efficiencies in constructability
and construction project phases*

In early 2018, international oil & gas general contractor Bonatti acquired CADMATIC's eShare information management system to boost the efficiency of its constructability and construction project phases. It has started the gradual implementation of eShare on its projects in view of eventually integrating it completely with the company's corporate systems.



Construction Methodologies and Systems Manager Massimiliano Del Rio and Construction Methodologies and Systems Senior Engineer Giovanni Silluzio have been key persons in the implementation of eShare at Bonatti. They are part of the Plant Construction Business Unit and are responsible for developing and implementing construction management methodologies to optimize construction phase execution and support construction management decisions. Giovanni oversees eShare configuration and implementation on projects while continuously investigating possible new applications.

According to Massimiliano, a key reason eShare was selected at Bonatti was its ability to visualize the current status of the construction phase in the 3D model.

"We use color-coding to present the progress of installations as well as quality control activities such as erection certification, piping pressure testing, plant mechanical completion and handover," says Massimiliano.

Another important goal with eShare at Bonatti is to provide support to the construction site in managing and tracking specific activities. One such activity is work-face planning, a process aimed at

"It's non-negotiable that the information management solution we use is independent from the design packages used by our contractors."



improving the productivity of the construction workforce by removing execution constraints. It ensures that the required installation inputs such as drawings, materials, procedures, permits, equipment, etc. have been previously monitored and are promptly available to the crew assigned to the work package.

"We also wanted the possibility to highlight construction priorities

associated with the relevant material availability (feasibility). In addition, our goal is to track electrical and instrumentation installations, to display welding joint data in real time in terms of execution and inspection, and to allow direct access to engineering data and deliverables related to a selected model object," Massimiliano explains.

Bonatti's corporate construction system is the source of all the

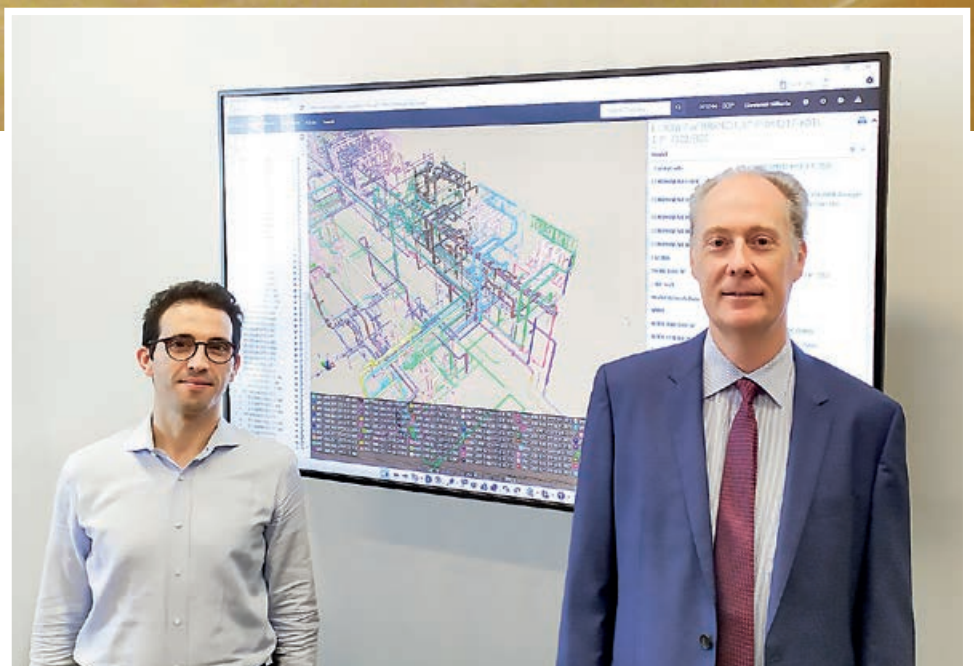
information that is linked to and visualized in the eShare 3D model.

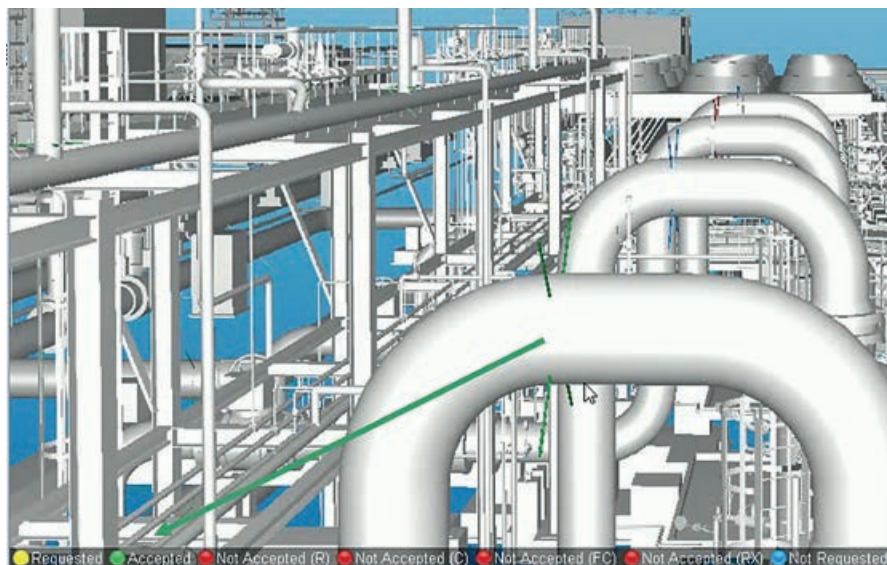
Constructability is key factor in project success

Ensuring constructability is a core element in the successful implementation of Bonatti's projects. It allows the company to analyze all project processes with the aim of optimizing construction sequences and practices. Interferences and

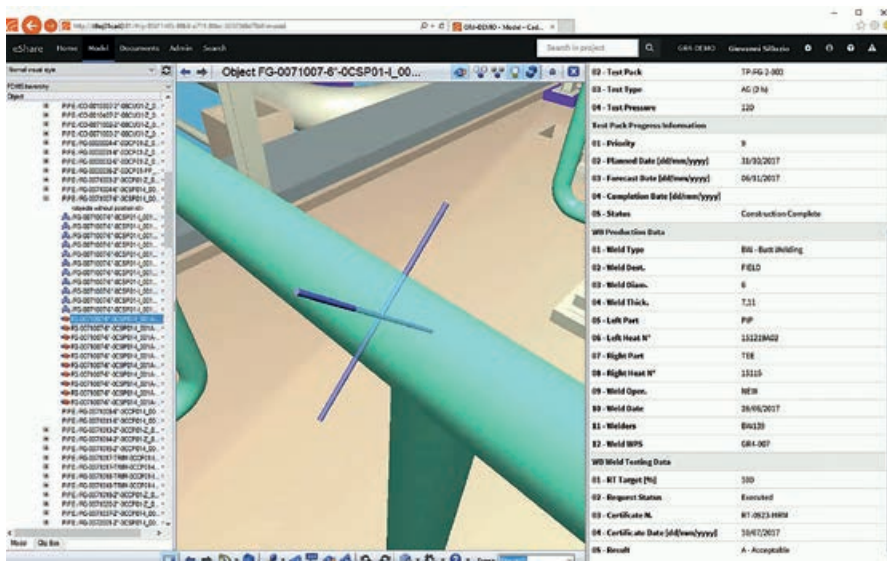


Massimiliano Del Rio (right) and Giovanni Silluzio (left) have been instrumental in implementing eShare at Bonatti.





Weld examination status in CADMATIC eShare.



Weld execution data in CADMATIC eShare.

possible schedule impacts are identified before starting construction, thereby preventing errors, delays or cost overruns. Project processes are reviewed from the pre-construction phase.

The effective integration of construction knowledge with planning activities, design and field operations allow Bonatti to achieve their overall project objectives in compliance with time, accuracy and HS&E requirements.

CADMATIC eShare is set to become an integral part in supporting this process.

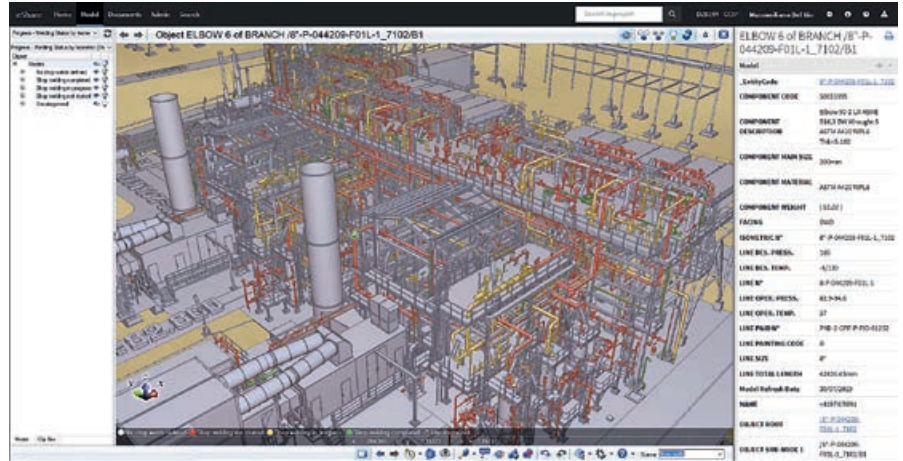
Massimiliano stresses the value of data visualization. *"When you visualize data in a realistic digital image of the plant, it dramatically improves the quality of information conveyed to the user. It gives the site management a much greater amount of information in a single screenshot than can be achieved with traditional forms of reporting*

such as reports, tables, and graphs. This assists the site management to take more effective operational decisions."

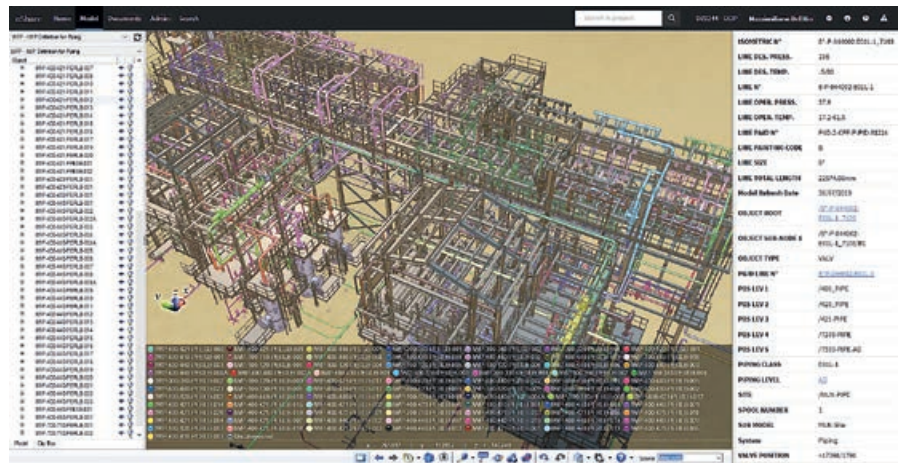
eShare activated once 3D model is sufficiently detailed

At Bonatti, eShare is implemented on projects once they are sufficiently detailed, usually when the model is about 30% defined. At this stage, the first conversion from the native 3D model to eShare is

Piping fabrication feasibility in CADMATIC eShare.



Installation Work Package (IWP) definition for piping in CADMATIC eShare.



Bonatti at a glance

done. As more detail is added to the model from engineering disciplines, the link to engineering data from different corporate systems is established. This allows the site to take advantage of the system according to the discipline under construction at the time.

For its EPC projects, the Bonatti Engineering Center does not use CADMATIC plant design software. It is nevertheless a straightforward process to convert the native

Bonatti is an oil & gas international general contractor with 70 years' experience of providing services to the oil & gas and power industry. As a general contractor, Bonatti operates as a loop cycle service company providing engineering & procurement, construction, construction, and operation & maintenance services.

Over its more than 70 years of operation, the company has created a worldwide reputation for completing challenging projects under the most critical environmental and logistical conditions in remote locations. In 2018, the company posted revenues of about 800 million euros. It relies on over 10,000 employees on four continents worldwide.



A Bonatti 3D plant model of a gas compression station and related construction site in the Libyan desert.

modeler review file into an eShare model once the engineering department has done the necessary work to properly set up the data and properties to be transferred to eShare through the conversion files.

On some projects, Bonatti also operates solely as a construction contractor. In such cases, the 3D model is inherited from the client's engineering contractors. *"For this reason, it is absolutely non-negotiable for us that the information management solution we use is independent from the design packages used by our contractors. It is critical for our construction system*

implementation that we can convert models from different software providers for use in eShare," says Massimiliano.

"When you visualize data in a realistic digital image of the plant, it dramatically improves the quality of information conveyed to the user."

According to him, the greatest benefits of eShare are its flexibility in configuration, the relatively small size of the converted model

without information level loss and resultant smooth navigation, as well as its user-friendly interface and navigation tools.

eShare in action in Algerian gas treatment plant project

The construction of a Bonatti gas treatment plant project in Algeria is currently entering the critical piping erection phase. It is the first project where they started adopting workplace planning in a structured way. eShare is interfaced with the project control system, which allows the workplace planner to easily visualize the different installation work packages for



Checking foundations progress in CADMATIC eShare.

analysis. This is done in dedicated meetings jointly with construction supervision staff to optimize the erection sequence.

The project's progress status is also currently updated weekly and visualized in eShare, thereby providing the management with a visual status of plant accomplishments in the different disciplines, in addition to usual data reporting.

Massimiliano indicates that the gradual integration of eShare with Bonatti's other corporate systems is progressing.

"From the beginning, we decided to implement eShare on projects gradually. We continuously

tune the user environment based on project requirements, while at the same time keeping in mind the final standard configuration we want to reach for the initial setup of every new project. We have not reached a definitive scenario yet, and we are still working to complete the integration with our corporate systems. This is especially applicable in the project control area, for example, for workspace planning and progress assessment and for document management, where we are creating a direct link to our EDM system. We are always on the lookout for possible new applications, thanks to the flexibility

offered by eShare in interfacing and visualizing different data sources."



eShare digital twin platform

Addressing information management challenges in EPC and asset management projects

Text: Ludmila Seppälä

A picture may be worth a thousand words – but an interactive 3D dashboard answers thousands of questions and helps to facilitate EPC projects. Integrating 3D, 2D, and data from constructability and site management systems allows CADMATIC eShare to take a central role in the project management process.

Complex engineering and construction projects are often split into phases, each focusing on a particular goal. The phases include FEED, detailed process design and engineering, constructability analysis, the generation of documentation for construction, change management, as well as project handover and asset management.

Different teams or subcontractors produce a range of data with the goal of ensuring that the project is completed and that the target budget and deadlines are met. Two main factors contribute to the complexity of the process: cooperation between project teams with

different functions, and differences in information types and formats produced.

Due to the divergent nature of the work, different types of documentation are sometimes produced and stored in different systems. Together, all these factors lead to information that is distributed in different bits and pieces, sometimes in files, sometimes in databases. Occasionally, this data is stored in document management systems, or simply in file directories in shared drives, or on an intranet. Some project information can be classified as tacit information, which exists only inside people's heads because they have no time or means to "attach" it to other project data.

The data is linked and can be easily accessed, searched for, and visualized without the need to move it from origin databases and systems or validate it.

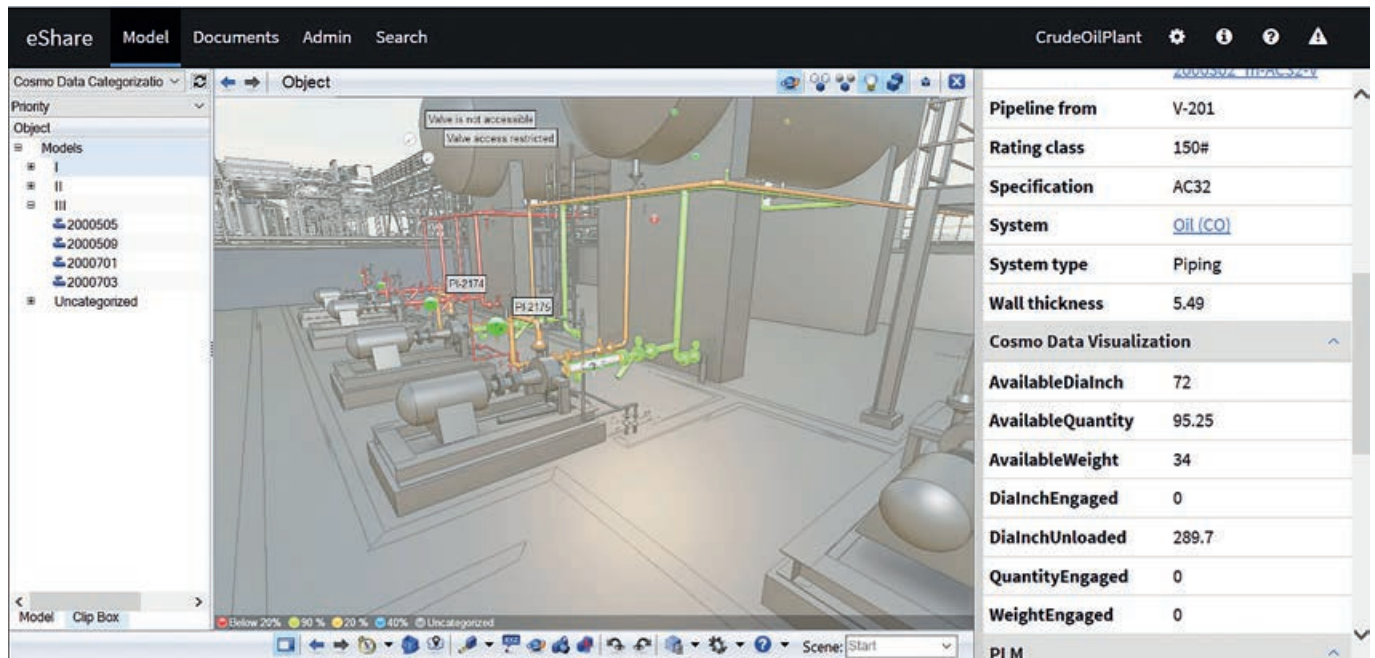
The digitalization trend aims to resolve these challenges by unifying access to information and resolving differences in information storage formats. The discussion

about digital twins has revolved around the search for a universal approach to storing all data related to as-build and as-operating process plants. However, the latest research in this area advocates for a more realistic approach of creating digital twins for specific use cases, instead of a universal one. An all-purpose digital twin would lack functionality specific for diverse project phases or have too much unnecessary data, which would lead to fuzzy and misleading information for end users.

CADMATIC eShare provides a platform for collecting digital data related to industrial design and engineering, construction, procurement and operation data, without the need to relocate data from systems that are already in use. The platform supports specific use cases tailored to EPC and owner-operator goals.

3D information model as interface to project-related data

The 3D model contains a large amount of data that is used for the post-design phases. However, it is often difficult to access for people who do not use CAD software and only need partial information from the design stages. eShare combined with eXchanger converters allow the combination of models from various formats, such as PDMS®, PDS®, S3D®, DWG, IFC,



3D dashboard to constructability information – select model hierarchy according to building priority categories and color based on constructability analysis data.

and more. Additionally, it is possible to upload data from laser scanners, adding a photorealistic as-build element to the 3D model. This allows the user to get a complete project in one window, even in cases where subcontractors and different disciplines use different CAD systems.

eShare provides access to the various types of information via one window: the 3D model, 2D drawings and documentation, overlaying layers of data such as data that is added to objects from constructability analysis, or tracing construction progress. The data is linked and can be easily accessed, searched for, and visualized without the need to move it from origin databases and systems, or validate it.

A lot of knowledge needs to be communicated to non-engineers and using the 3D model as a hub

of information provides an intuitive interface for this purpose. One picture is worth a thousand words, and a 3D model conveys more information than flat data tables.

The rapid development of IT infrastructure and software allows all data to be presented not only in a web portal, but also on tablets to take on site or to be used with HoloLens® for augmented reality tours. With eShare add-ons, all this is possible already – using eGo on Windows tablets and eShare for HoloLens makes complete project data available in the most suitable way.

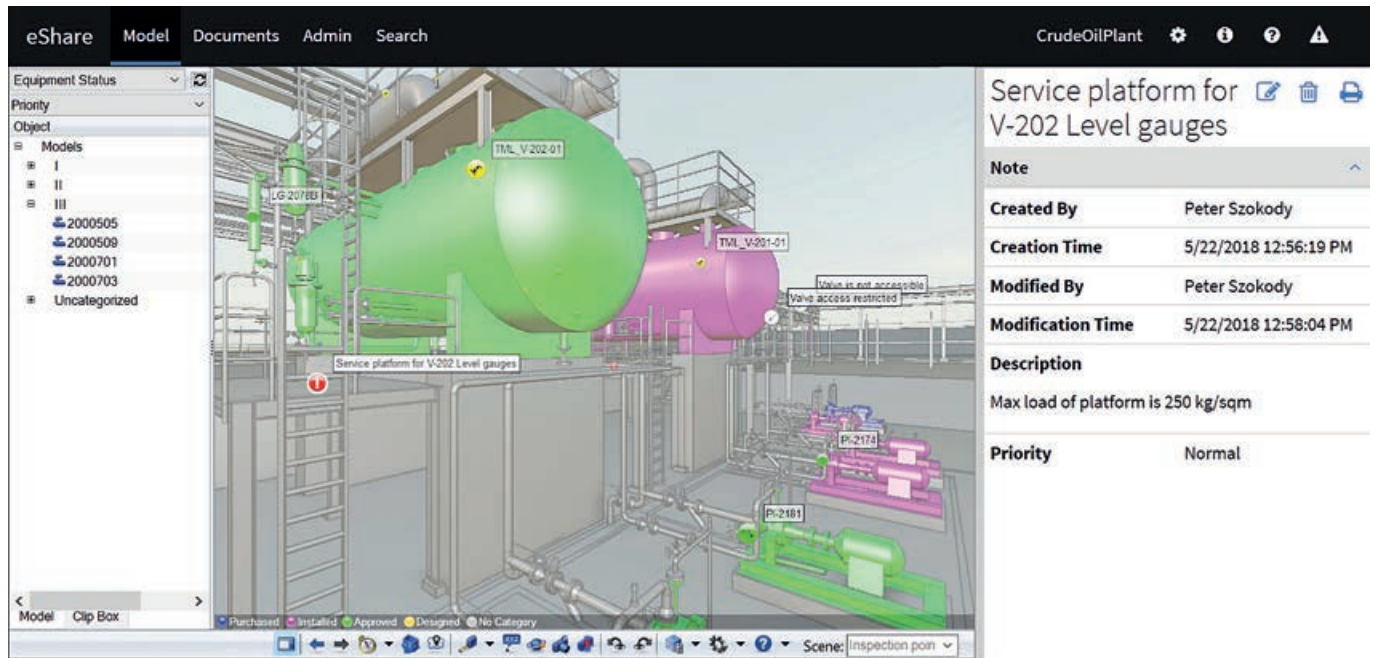
Supporting constructability review with 3D models

The 3D model provides powerful visual support for constructability reviews. Constructability analysis is usually performed in specialized

applications, such as work packaging, COSMO5®, or other similar systems. However, the data is difficult to work with in its traditional form, as it is often in numerical format and not visualized. eShare successfully solves this challenge by linking analysis data with the 3D model and visualizing the data. With a few clicks, it is possible to color parts of the 3D model according to constructability levels, with consideration for the calculated storage data values, shipment forecasts and warehouse data, piping fabrication, dia-inch pipeweld data, or any other relevant information.

Planning and scheduling for construction phase

Linking 3D engineering data with construction-phase scheduling improves overall project progress.



Collect notes from installation teams and use color-coding to visualize the installation status of the model in eShare.

Often, one part of the project is still in the design approval stage, while others are already scheduled for construction. Having the latest and complete documentation in the same window allows project managers to avoid costly mistakes. Site managers can monitor construction schedules, detect late deliveries early, expedite materials, and reschedule work packages as necessary.

A 3D model hierarchy based on defined construction priorities can be created. This enables the user to see what parts need to be constructed and in what order. Adding color-coding according to constructability analysis visualizes expected delays due to late material arrivals. This way, work packages can be redefined, and installation

teams' schedules corrected as early as possible.

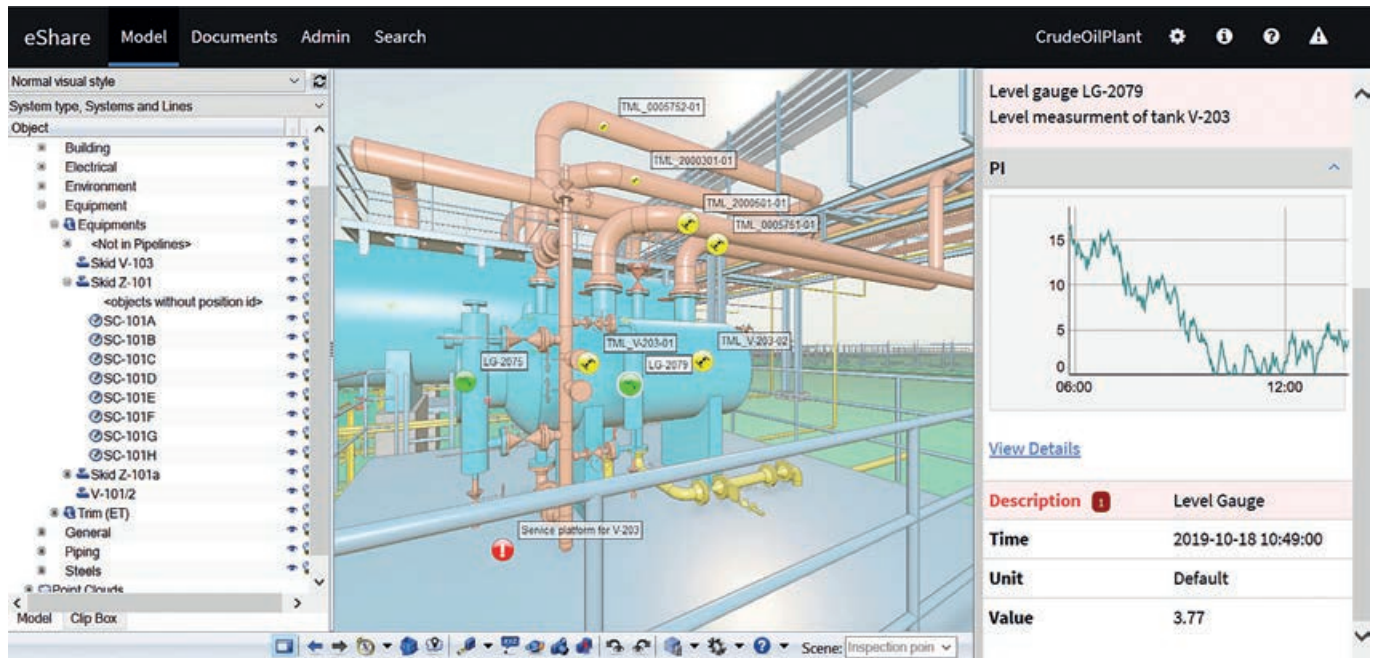
Monitoring construction progress

With the use of the 3D model as a dashboard, site planners can keep track on prefabrication and construction activities and constantly monitor the availability of materials in warehouses and shipping documents. Taking the 3D model on site with eGo on a tablet adds mobility and enables front-end inputs. On-site, information about installed items and pipelines can be easily marked in 3D and later synchronized with eShare to become available for all other project parties.

The updated installation status is critical not only for project management, but also to avoid design

eShare in brief

- One window provides access to all project related data
- Converges engineering 3D models with constructability analysis, construction scheduling and progress follow-up
- Links to asset management systems and provides platform to store digital twin
- No need to move, validate and copy data
- Intuitive user interface with 3D visual support
- Fast implementation – easy to take into use



eShare - linking 3D model with online data from sensors for asset management.

changes in locations where there are already installed parts, or at least to ensure that re-installation work is minimized.

Project communication channel and change management with visual support

The 3D model can be used as a discussion board to facilitate project change management and control the construction phase and planning. It is possible to store comments saved on top of the 3D model with labels and dimensions, compare the model with previous versions, or send an email with the attached picture.

The certification process from equipment suppliers can also be monitored with the visualization of status information. Smart

points in the model can store silent knowledge or even be linked with data from instruments. The extensive search functionality allows the location of any needed information and any data from eShare can be used for visualization purposes.

Adding value for owner-operators: asset management and operation support

eShare offers a platform to host a digital twin of projects. Besides consolidating all project-related data in one web portal and providing the most innovative technology for efficient handling of large 3D models in various formats, eShare ensures that any information is available in the optimal format to support decision-making.

Inspection data can be linked from maintenance systems and visualized without additional integration efforts. Any data can be added to eShare, irrespective of the storage system and database format. This includes data from maintenance systems or online streaming data readings from sensors. Once linked to eShare, it can be easily visualized and used alongside other project information. Notifications about abnormalities in operation can be handled more efficiently if data regarding normal values, maintenance history, manufacturers' manuals, process diagrams and 3D models are available just a click away.



Introducing Gianluca Ricozzi

Regional Manager: Italy, Switzerland, and Israel

Who is Gianluca Ricozzi?

Firstly, I have to say that I have been involved with CADMATIC for many years. I graduated in 2001 with a degree in communication, and I have a master's degree in European public relations. Outside work, I have a big family. My wife, Chiara, and our six children support

me every day and patiently accept all my business travels. In my free time, I like to read and go hiking with my family.

How and when did you end up at CADMATIC?

When I graduated in 2001, it was not a good time to be active in the

communication field. It was the same year which saw the September 11 terror attacks in the USA. The marketing and communication field was going through massive reductions in investments. In 2003, I got an opportunity to prepare a marketing plan for CADMATIC via my father. He had been a CADMATIC

partner in Italy for many years. I supported him in developing the marketing plan to evaluate the country strategy. After that, I continued working as a CADMATIC reseller for my father's company. After seven years of cooperation as a reseller, CADMATIC hired me as a full-time employee in 2010.

What is your current position and what are your most important tasks?

My current position is Regional Manager for Italy, Switzerland, and Israel. My main task this year has been establishing a new office in Milan. In this regard, I am supporting my new colleague, Alessandro Percivalle, and planning our actions for the next few years. We have challenging targets and it is very exciting to decide what our strategic actions should be to achieve these goals.

My main sales focus is promoting our eShare information management solution, which I am marketing actively in Italy. The solution is unique with many benefits for EPCs and owner-operators.

Another critical focus area is finding, selecting and activating partners to maximize lead generation. I firmly believe that such partnerships will help us to achieve a leadership position in the plant market in a few years.

What are the most challenging aspects of your work?

In the CAD plant business, CADMATIC has not been in a leadership position. Therefore, when we have a new opportunity and

visit a new prospect, we must demonstrate in a limited time that our solution is worth it. It needs patience and the capability to understand and later use any critical issues that customers may have.

In business, you come across many kinds of people, but they all have a straightforward need: they want to ease their activities as much as possible. And this is the part that I love the most: to prove to them that they can trust us so that later they can feel empowered!

What do you like most about your work?

My work is all about relationships and trust: I must find a way to gain the confidence of the person in front of me and understand the needs of the company he or she represents. This is an exciting part of my work.

In many cases, expectations are similar, but commonly you cannot present the solution in the same way. The differences mean that I must deliver the same message with a different approach depending on the situation. I like the challenges this poses.

What do you think makes CADMATIC's eShare information management product special?

Of all the products in our product portfolio, CADMATIC eShare is the one that I'm pushing most in Italy. The solution is unique with many benefits for EPC companies and owner-operators. This is my main sales task today. The key benefit of eShare is the possibility to share the model over the Internet without

a cloud approach. This makes it easy for our customers to link all their data and documents, without the need for a new data warehouse and the time-consuming collection and management of different and unstructured information. Eventually, this will make our IM solution a real game-changer on the market!

How do you see the potential of CADMATIC in your responsibility areas?

CADMATIC has great potential! We offer a solution that has the same features as our most significant competitors on the market, but with a price model and an easy-to-learn approach in line with basic solutions on the market. This puts us in a unique position.

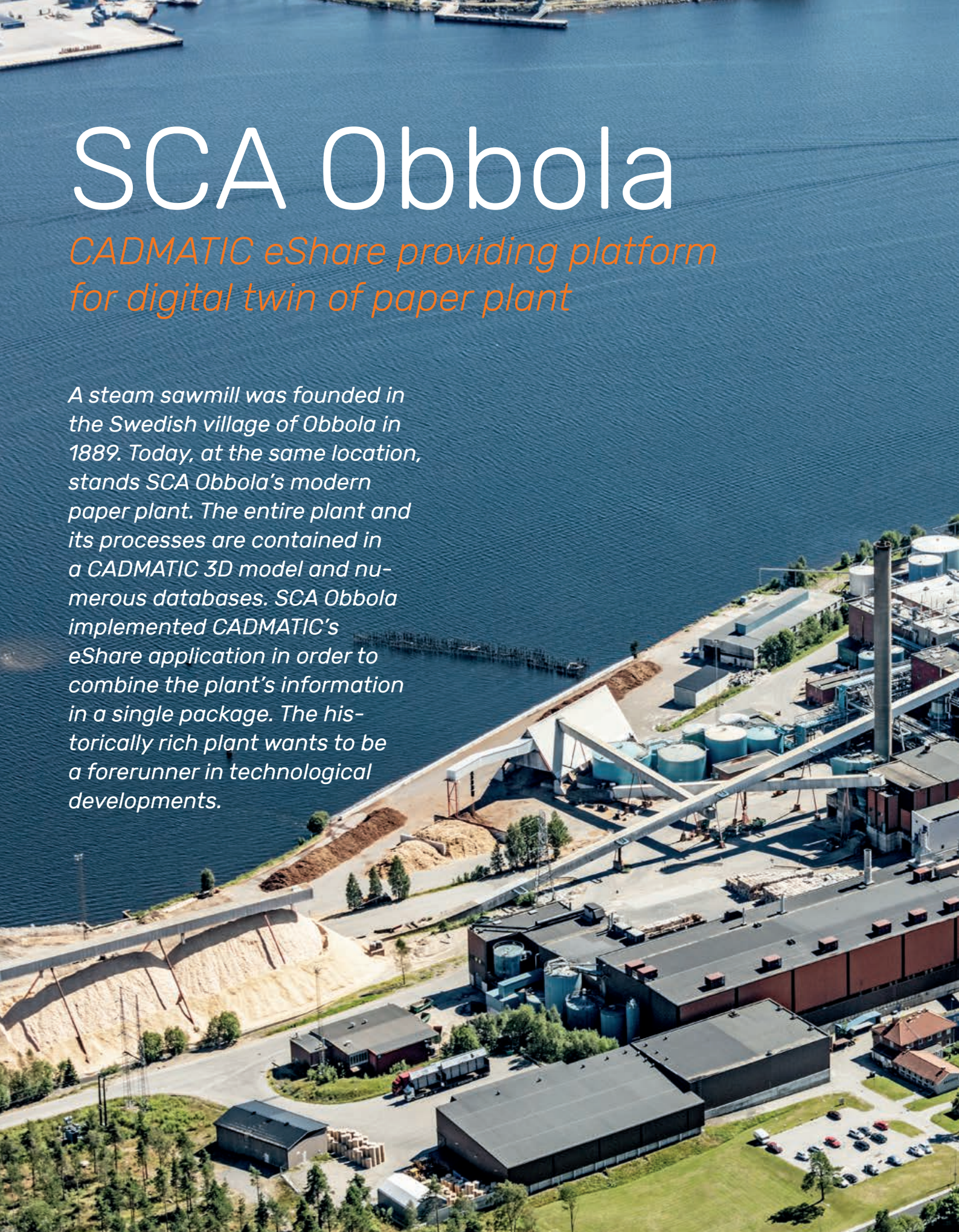
Italian companies are now finally noticing that they can avoid dedicating a huge budget without compromising on features by investing in CADMATIC. Furthermore, our customers appreciate the stable partnerships we have created with other players to present integrated solutions. Cooperating with companies like CSA, CLA, and Unitec has made it possible to provide high-quality services and solutions without any delays or compromises.

One of my customers in Saudi Arabia once told me that they invested in CADMATIC because we developed a solution they requested in the same time that other suppliers would have taken to evaluate whether such development was possible. This is still valid today and the base of what makes CADMATIC an exclusive partner.

SCA Obbola

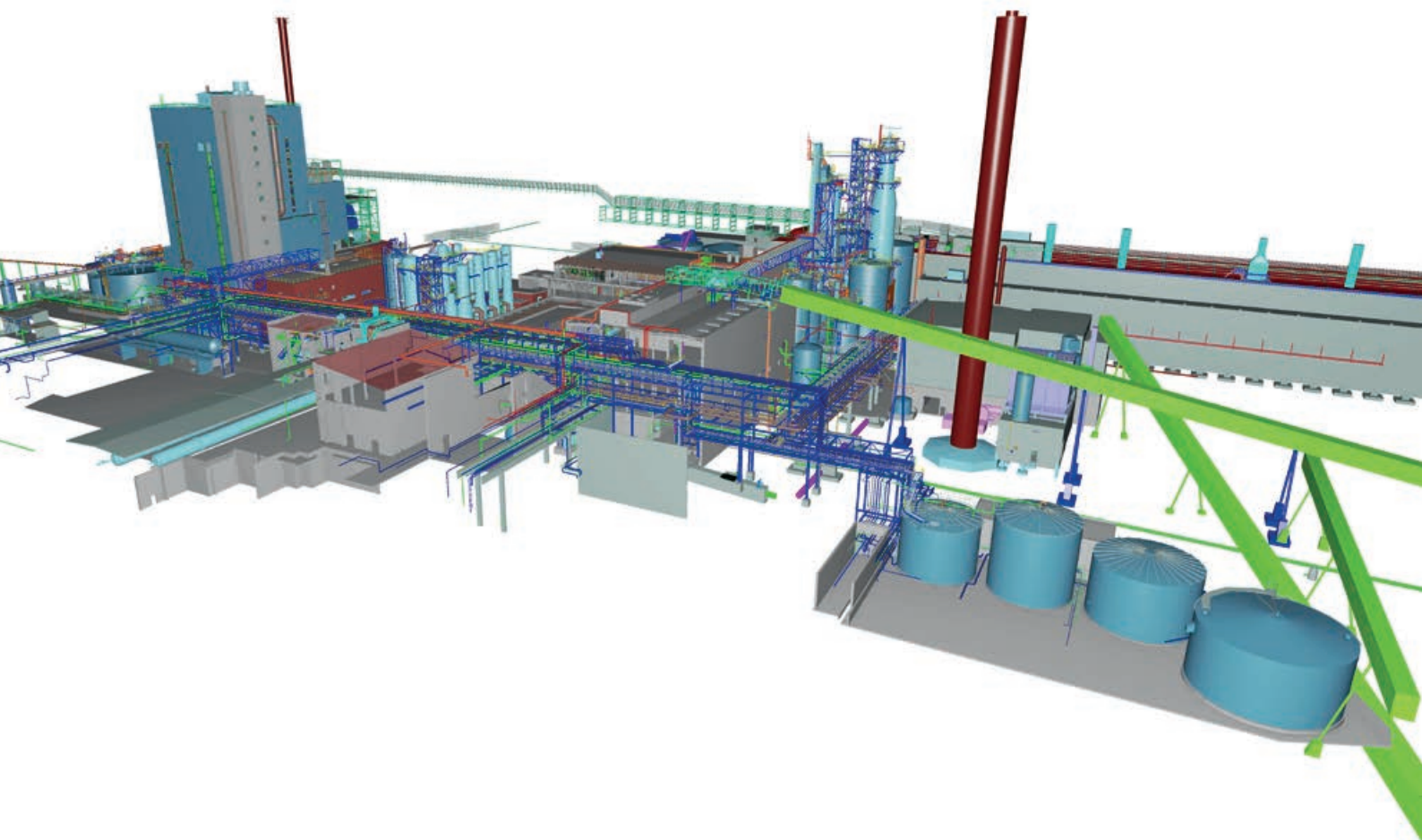
*CADMATIC eShare providing platform
for digital twin of paper plant*

A steam sawmill was founded in the Swedish village of Obbola in 1889. Today, at the same location, stands SCA Obbola's modern paper plant. The entire plant and its processes are contained in a CADMATIC 3D model and numerous databases. SCA Obbola implemented CADMATIC's eShare application in order to combine the plant's information in a single package. The historically rich plant wants to be a forerunner in technological developments.





The 3D model of the plant includes 100 km of pipeline, 3,000 pipelines, 6,000 vents, 700 instruments, and more than 2,000 devices.



The SCA Obbola cellulose and paper plant is in Northern Sweden, near the city of Umeå. The plant has produced kraftliner since 1975. Liner is the strong, unbleached paper forming the flat surface layer of corrugated board. The Obbola plant produces 450,000 tons of cardboard every year, 80% of which is exported. The plant has about 300 employees.

Long co-operation with CADMATIC

At the turn of the millennium in 2001, SCA Obbola were faced with the challenge of replacing the system that hosted the company's P&IDs; the system was set to disappear from the market. They required a more sophisticated

system for P&IDs that also included tools for 3D design.

Christer Björk, project engineer and CADMATIC administrator at SCA Obbola, introduced and recommended CADMATIC based on his knowledge of and experience with the software in an earlier project. Based on this recommendation and testing, SCA Obbola selected the CADMATIC solution.

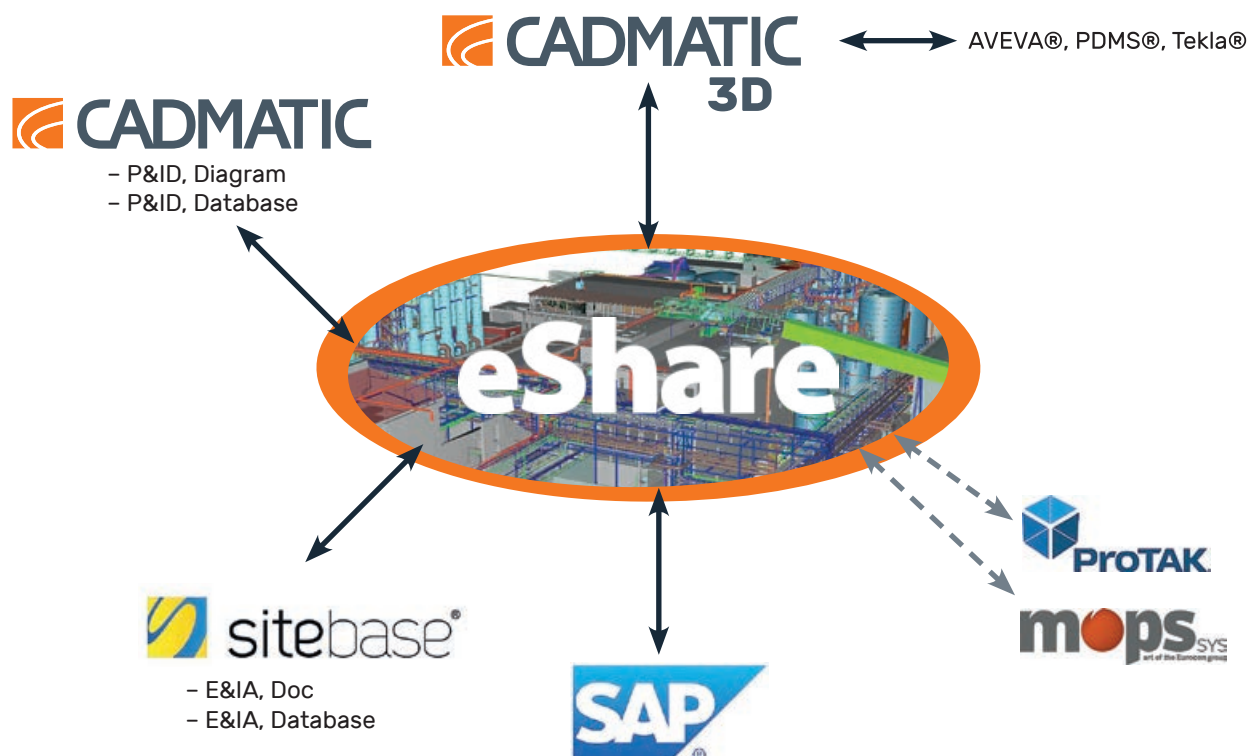
Around 230 existing P&ID drawings and paper copies were imported into CADMATIC. Today, all the Obbola plant's P&IDs are managed with CADMATIC Diagram and are integrated with design tools and the eShare information management system through the database.

Large 3D model in use

In addition to Diagram, 3D design tools, eBrowser, and information management applications, SCA Obbola uses more than ten of CADMATIC's modules and special interfaces. SCA Obbola's 3D model now contains more than 100 kilometers of pipeline, 3,000 pipelines, 6,000 vents, 700 instruments, and more than 2,000 devices.

"The 3D model is a master document, so it is no longer necessary to store piping layouts or isometric drawings in a document management system. This means we don't have to update hundreds of drawings and documents while modifications and improvements are done at the plant. As the model is always in the as-built

Diagram 1. CADMATIC eShare integrates plant information spread across different systems.



phase, the master document reflects the real situation. This saves a lot of time and helps us to make decisions based on facts," says Christer.

Linking dispersed plant information

SCA Obbola used the CADMATIC eBrowser viewer for the inspection of the 3D model for about 10 years. They were pleased with the application but needed a more diverse tool for viewing different kinds of documents.

The plant's information was spread across three different systems, the CADMATIC 3D model, the SAP production management system and the Sitebase plant database. CADMATIC eShare seemed

to provide an opportunity to link the different systems. See Diagram 1.

eShare links plant data

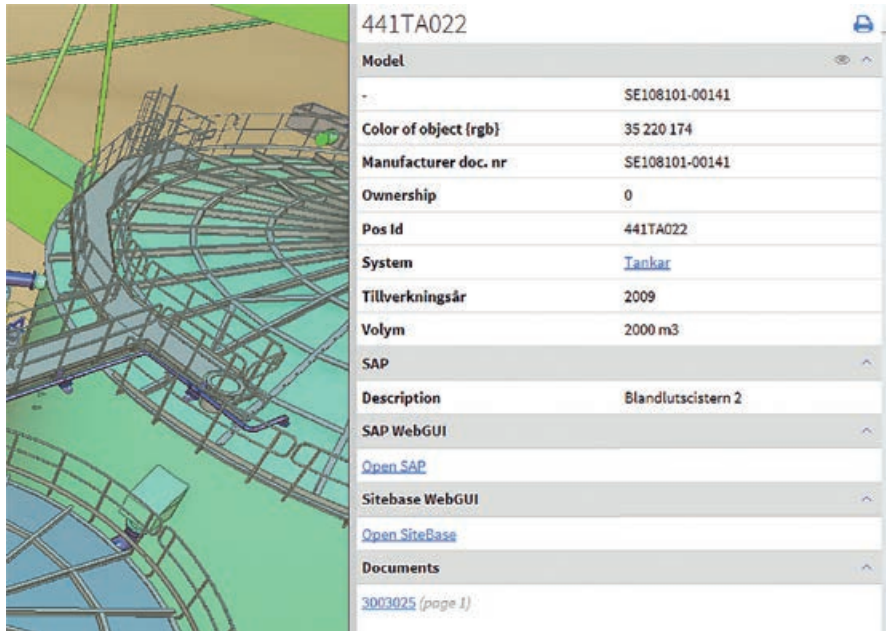
eShare links plant 3D models, process diagrams, isometric drawings, databases, production management systems, installation statuses, and production information. Through eShare, information can be searched for from all the systems linked to it. The search results are provided as desired: different colored objects in a 3D model, lists, drawings, graphs or diagrams.

SCA Obbalas IT manager, Peter Brunesson has been impressed with CADMATIC's search functionality.

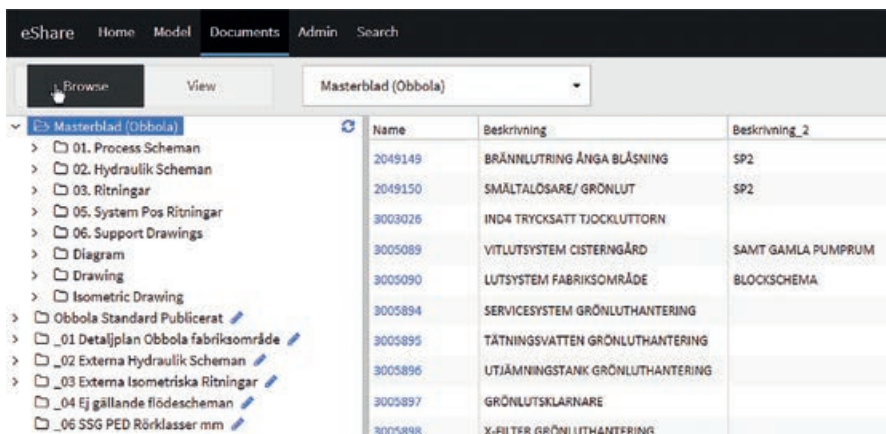
"Earlier we used special systems to publish P&IDs on our intranet. Nowadays they are not needed, since we search for the documents in eShare and inspect them there. Even the 3D model information can be accessed through eShare," says Peter.

CADMATIC first installed a pilot version of eShare for SCA Obbola's evaluation. The integration of the information in the process diagrams and the plant database went as expected, after which the full version of the program was installed in 2016.

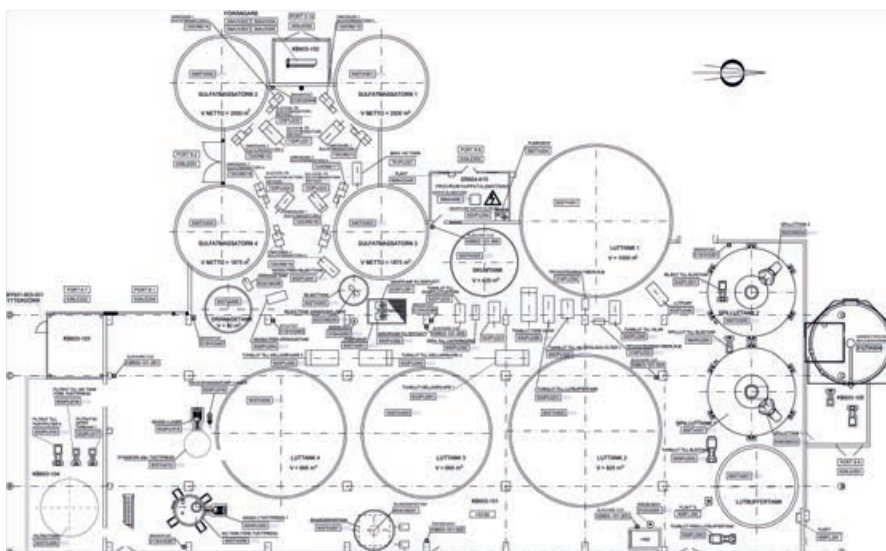
After that, everything happened quickly. Through eShare, the process diagrams published in Diagram were immediately available for the user and maintenance



An external link to equipment in eShare.



The Obbola SCA document hierarchy in eShare.



Links to objects in the 3D model from old drawings of parts that were created before the 3D model was generated.

personnel. The models that were published daily in the 3D design program were freshly available for inspection through eShare, as well as isometric drawings and piping and instrumentation diagrams.

"Thanks to eShare we can find all the information we need easily and fast, and in the same place."

Finally, even the production management system and the plant database were linked to eShare. All models, drawings, diagrams and databases can now be accessed in one place.

Quick training, easy to use

Today, SCA Obbola has about 100 eShare users, including maintenance, project and production personnel, and process engineers. New users receive training that takes two hours, after which they can use the program without difficulty. For persons who have earlier experience of CADMATIC eBrowser, an even a shorter introduction suffices.

More information can be added

SCA Obbola has noticed that the eShare information integration tools are very efficient. The plant's own personnel can modify the tools largely on their own, which makes using eShare even smoother. They plan to add their hydraulics process diagrams to eShare soon.

eShare also provides easy access to the plant's existing overview drawings of older parts of the system created before the 3D model existed. Links to the objects that exist in the 3D model provide seamless access, even though it is not always complete for all parts of the plant.



Converting PDMS® models to CADMATIC

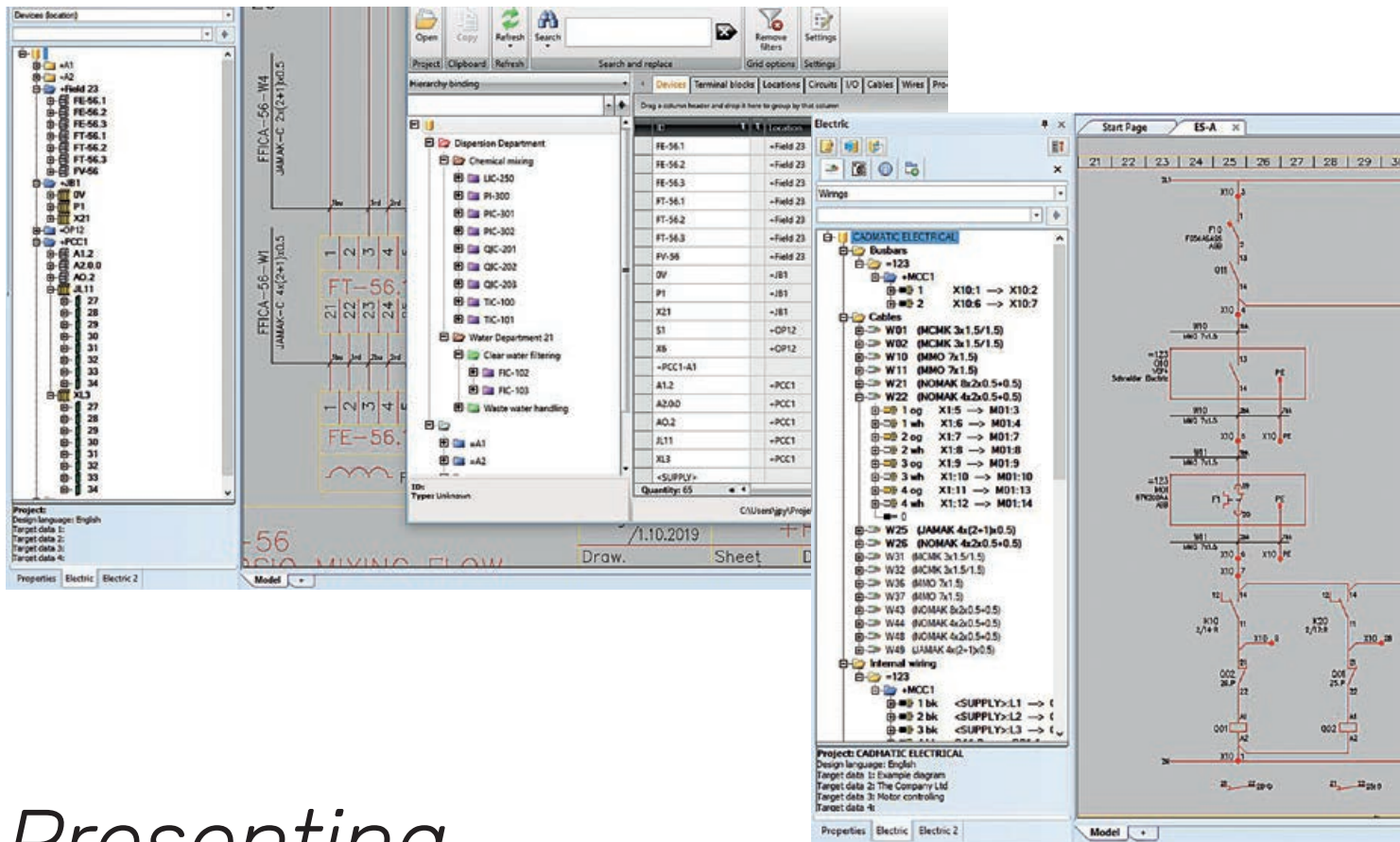
In some SCA Obbola projects, different design systems must be used. In such cases, then CADMATIC eXchanger for PDMS®, for example, is used to convert 3D models from PDMS® to CADMATIC. This means that the complete project and plant model also includes parts from other systems.

In most cases, the piping of the imported models is converted to "fully intelligent CADMATIC piping", while other parts remain as reference models with tags and attribute information.

In some cases, documentation needed as the starting point

for modelling on a project is poor and/or outdated. In such cases, laser scanning is an ideal solution.

"When the initial data is lacking, we find laser scanning to be the most efficient way of getting an accurate model of the surroundings into the 3D model. We import the point clouds into the 3D model with the CADMATIC Laser Scan Modeler and then use it as part of the model to avoid collisions with existing piping & structures." – Christer Björk, SCA Obbola Project Engineer and CADMATIC administrator

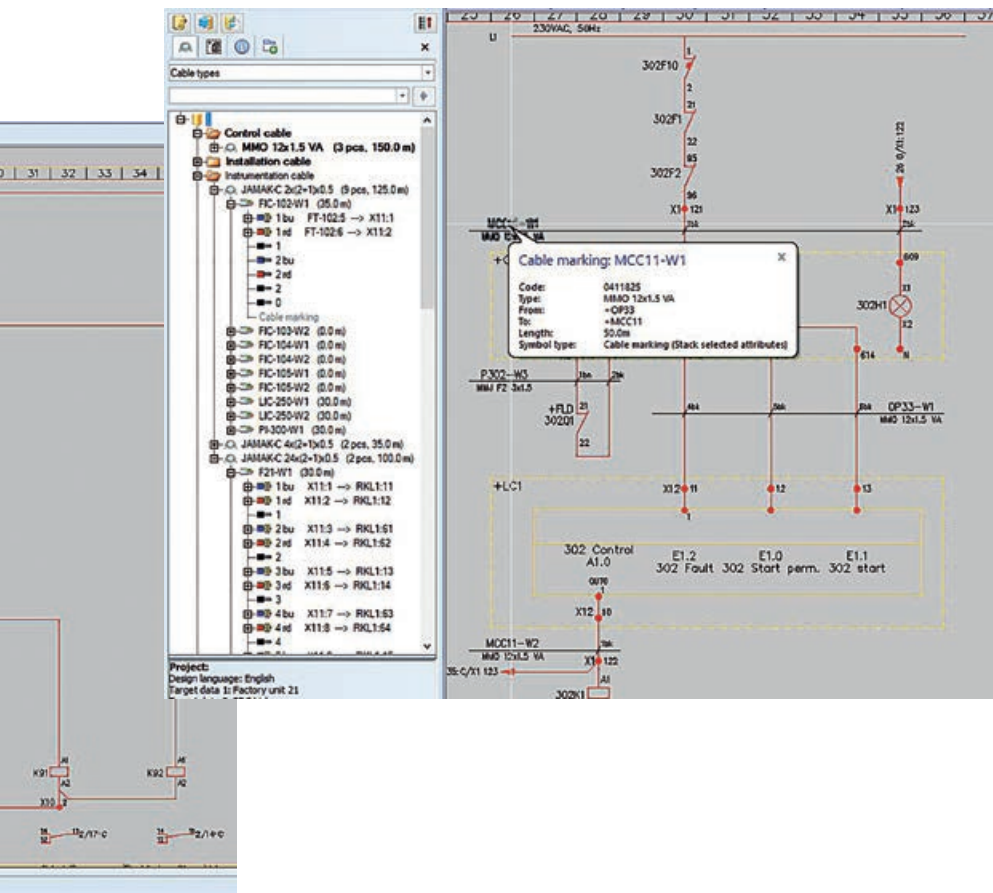


Presenting

CADMATIC Electrical

Comprehensive electrical & automation design system

In August 2019, CADMATIC acquired Finnish software company Kymdata Ltd and its CADS software. CADS software is a market leader in Finland and Estonia and an excellent complement to CADMATIC's design and information management applications in the Process & Industry business segment.



CADMATIC Electrical is suitable for a wide variety of design and documentation needs in electrical and automation engineering.

Electrical and automation engineering connected with 3D modeling and cable routing provides support for multi-disciplinary design, comprehensive engineering, and project information management.

CADMATIC Electrical (formerly known as CADS Electric) used in conjunction with 3D Plant Design and eShare ensures consistency of project information and eliminates interdisciplinary errors. It integrates the 3D information model, electrical and automation installation

project data, manufacturing information, and overall construction data in the project with suppliers' data and PDM/PLM/ERP data.

CADMATIC Electrical – independent and compatible

CADMATIC Electrical is a comprehensive solution for the different design and documentation needs of electrical and automation engineering: building electrification (BIM/3D), industrial electrical and automation engineering, instrumentation, layout design of

CADMATIC Electrical in brief

- **Superior database functions:** Centralized data management allows editing data wherever needed
- **Product models:** Manage all product data in project and get all benefits in one definition: 2D and 3D occurrences, product data, pins, plates, additional information etc.
- **Automated reports:** Fast and easy generation of customizable reports
- **Installation drawings:** 2D/3D and BIM
- **Efficient cabinet layouts in 2D and 3D:** Place devices and equipment directly into cabinet layouts in product models



Industrial electrical and automation design

Suitable for a wide range of industrial electrical and automation design needs, such as industrial electrification and instrumentation as well as machine automation and logic design.



Building electrical design

An effective solution for building information modelling (BIM) based building electrical design. Most extensive software on the market for the design and documentation of electrical systems of properties.



Contracting

The safest and most efficient choice for the different CAD needs of electrical contracting. Includes easy-to-use tools for as-built documentation, design and quantity calculation.



Manufacturing switchboards and distribution boards

Centralized solution for the CAD needs of switchboard and distribution board manufacturers. One product meets all needs.

switchboards and the design of distribution networks. The software automates drawing and editing functions, which frees up the designer's time to focus on the design process itself.

CADMATIC Electrical is a comprehensive solution for the different design and documentation needs of electrical and automation engineering

CADMATIC Electrical includes both a 2D and 3D CAD platform. The software reads and generates DRW, DWG, DXF and PDF files as well as IFC data models. Project-specific

information, reports, and lists can be imported and exported to Excel for further processing and then back to CADMATIC Electrical.

The software is suited to teamwork thanks to its multi-user and database-based features. Genuine compatibility enables both effective use of old CAD drawing archives and easy cooperation between the different parties involved in the design work.

Industrial electrical and automation design

CADMATIC Electrical is suitable for a wide range of industrial electrical and automation design needs, such as industrial electrification and instrumentation as well as machine automation and logic design. It can e.g. create motor schemas, control schemas and

wiring, IO-schemas (PLC and automation controlling systems), process instrumentation, and one-line diagrams.

Building systems and factory layouts

CADMATIC Electrical is the ideal tool for the design and documentation of energy supply, lighting, heating, process electricity, telecommunication and security systems, etc. Its basic functions include symbols, wirings, cable routes, centers etc. It also automatically calculates group lengths, short-circuit currents, outputs and voltage drops, BOM etc.

The software includes 2D and 3D formats (BIM) and can be used to design distribution networks as well as switchboards schemas (groups, centers, supply etc.)



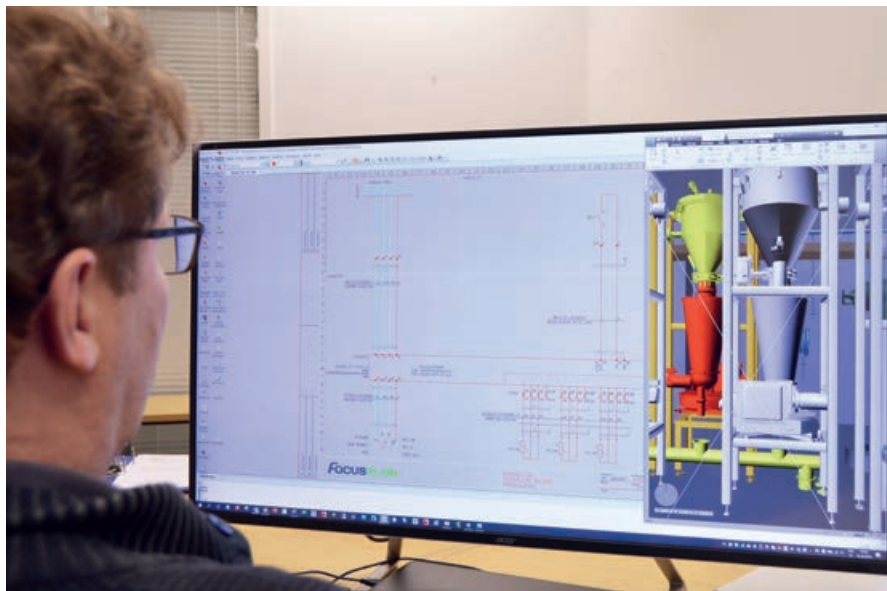
Industrial side streams generating new business

Circular economy already part of design value chain

Engineering office Focusplan from Turku, Finland, has been a design partner of industrial companies for over 30 years. Many things have changed over the decades, but one remains: confidence and good relationships with customers. The strong know-how of Focusplan specialists and long life-cycle design solutions have kept the co-operation vivid and worthwhile.

There has been much talk about the circular economy in recent times. To many, it is still a concept, but the circular economy is, in fact, already here – and is making money.

The Finnish Innovation Fund Sitra forecasted already a few years ago that the circular economy will generate billions of euros of new business in Finland. Various reuse solutions, recycling of energy,



Circuit schema designer Kalevi Virtanen appreciates CADMATIC Electrical's illustrative views and ease of use.



The potato protein recovery process is a key part of Finnamy's Kokemäki mill operations.

remanufacturing etc. are already the target of growing interest within industrial enterprises. This can be seen in design offices as well.

"Industrial side streams, as left-overs from industrial core processes are called, are already part of every-day engineering design," says department chief Esa Helenius from Focusplan. "Within plant and process design, the side streams are taken care of already at the beginning of the project.

Raw materials that earlier ended up on waste dumps can nowadays be turned into totally new products. Or it can at least be more valuable as recycled goods than waste."

The importance of power distribution network grows

"The increasing demand for energy efficiency and general environmental awareness can be seen also in electrical design," says

Helenius. "The design itself doesn't affect energy consumption, but for example various surveillance and control systems have become more and more common. With an intelligent power network, power consumption can become part of energy production, and reduce energy costs. Most of our design projects are related to power distribution in one way or another."

In the future, power distributors will play a key role in deciding how

Focusplan was responsible for the process and layout design, as well as the electrical and instrument design of the Finnamyli plant.



much transfer capacity is needed in the distribution network, and this is where design also steps in.

"The maintenance of the network, service response times and, for example, data transfer will increase the need for remote monitoring," Helenius points out. "Within electric design, however, we could do much more. We have taken part in only relatively small design projects, whereas our design tool and competence could offer much more to clients. CADMATIC Electrical has probably the most efficient database features on the market, and this is something we haven't been able to make use of yet."

Turku area growing with marine industry

Factories and energy plants in the Turku area have traditionally been the source of Focusplan's customer base, but lately new design projects have especially been related to the marine industry.

"CADMATIC Electrical has probably the most efficient database features on the market."

"It is obvious that the growth in the marine sector affects us too," says Helenius. "And CADMATIC, which we use in plant design, has brought us new offshore customers. Luckily, our designers have good basic competence levels, so we have been able to increase our CADMATIC use quite fast according to our customers' needs."

CADS has become a part of CADMATIC – what does this mean?

Focusplan's toolbox includes two Finnish design software packages – CADMATIC and CADS – which are both under the same roof after CADMATIC's acquisition of CADS in August 2019. How does this affect

the designer's work? CADMATIC is well known among plant and marine engineers, whereas CADS is most familiar as a specialists' tool within HVAC, electrical and construction design. *"They of course have much in common," says Helenius. "We have used CADS for electrical design in industry and CADMATIC for process design. The boundaries between the design areas are not so precise in the end. The process design industry is a lot about pipes and tubes. For our customers, the main issue is that we can solve their problems, regardless of the business area or design tool."*

INSINÖÖRITOIMISTO
FOCUSPLAN

Petrolterv

Hungarian Oil & Gas



Excellence



Petrolterv Ltd. is an experienced user of CADMATIC software from Hungary. For almost ten years, the company has used CADMATIC to design mechanical and piping engineering parts for a wide range of industrial facilities. The company reports that they have gained efficiencies with CADMATIC's database-driven solution by reducing planning errors and by distributing the design of projects between different design teams.

Petrolterv is based in Szeged in southern Hungary near the Romanian and Serbian borders. The general contracting and design company has over 50 years' experience of designing newbuilds and reconstructions of oil and gas facilities. In recent times, it has diversified and provides design services, for example, also to the chemical and agricultural industries as well as to processing and heavy industries.

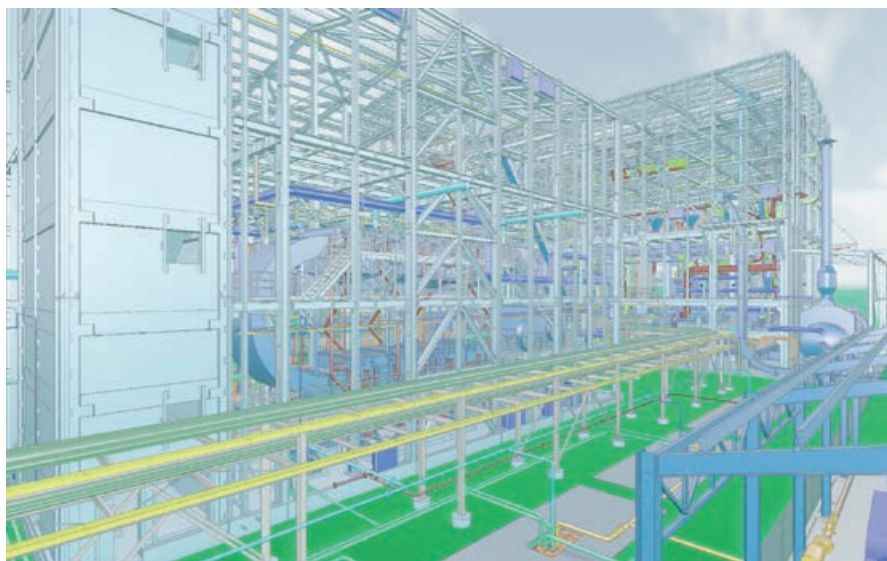
According to Ákos Juratovics, Environmental and Quality Assurance Manager at Petrolterv, they prepare the steel structures, implement piping systems, pipe fittings, pipe supports, and any equipment built on lines in CADMATIC. They also use the 3D models to present projects to their customers during discussions and to communicate quickly and effectively.

"After we get approval from our customer via eBrowser, we generate different fabrication drawings like isometrics and layouts required for basic and detailed engineering design documents," says Ákos.

CADMATIC's database-driven system is highly appreciated by Petrolterv's design team.



Members of the Petrolterv design team.



3D model of a cooking oil processing facility designed by Petrolterv.

"Designing with a data-base-driven system like CADMATIC helps us to be more effective and to execute our projects faster and more accurately compared with classical drawing software," Ákos explains.

He adds that with almost 10 years' CADMATIC use, he can confidently say that the software has helped to increase the quality of their designs due to its ability to easily provide a comprehensive

overview of complex plants and facilities in 3D environments.

"The internal rules of the software also help us to be more accurate as there is no way we can connect different pressure-nominated systems and mediums by mistake."

eBrowser a trusted tool for project review

The CADMATIC 3D viewer eBrowser is a popular tool at Petrolterv and

one of the most important parts of the software package. It is used to present project progress and to share the different expertise areas of the Petrolterv engineering team.

"eBrowser is also easy to install and use. We usually share our eBrowser model with customers so they can comment on the layout, pipe routes, and everything related to the actual look of the designed facility," Ákos adds.

Petrolterv Environmental and Quality Assurance Manager, Ákos Juratovics, says that with CADMATIC, Petrolterv can execute projects faster and more accurately.



Expanding CADMATIC use

Ákos says that Petrolterv recently started studying CADMATIC Diagram for P&ID development and that they expect it has great potential to develop better plans with higher efficiency. They are also interested in the CADMATIC Laser Scan Modeller, which will allow them to directly implement 3D geodetic surveys of any facility.

CADMATIC helps us to be more effective and to execute our projects faster and more accurately.

"The use of point cloud materials will help us to improve the early design phase and reduce the

amount of manhours of actual surveying, while also improving accuracy," Ákos says.

Design of vast gas processing facility

Petrolterv recently completed the design of a massive gas processing facility in Hungary for a foreign concession company with CADMATIC. The 19,525 m² plant included more than 800 pipe isometrics, including hundreds of valves and other equipment. Ákos indicates that the greatest challenge was developing the vast number of isometrics and over 50 pieces of transport and processing equipment.

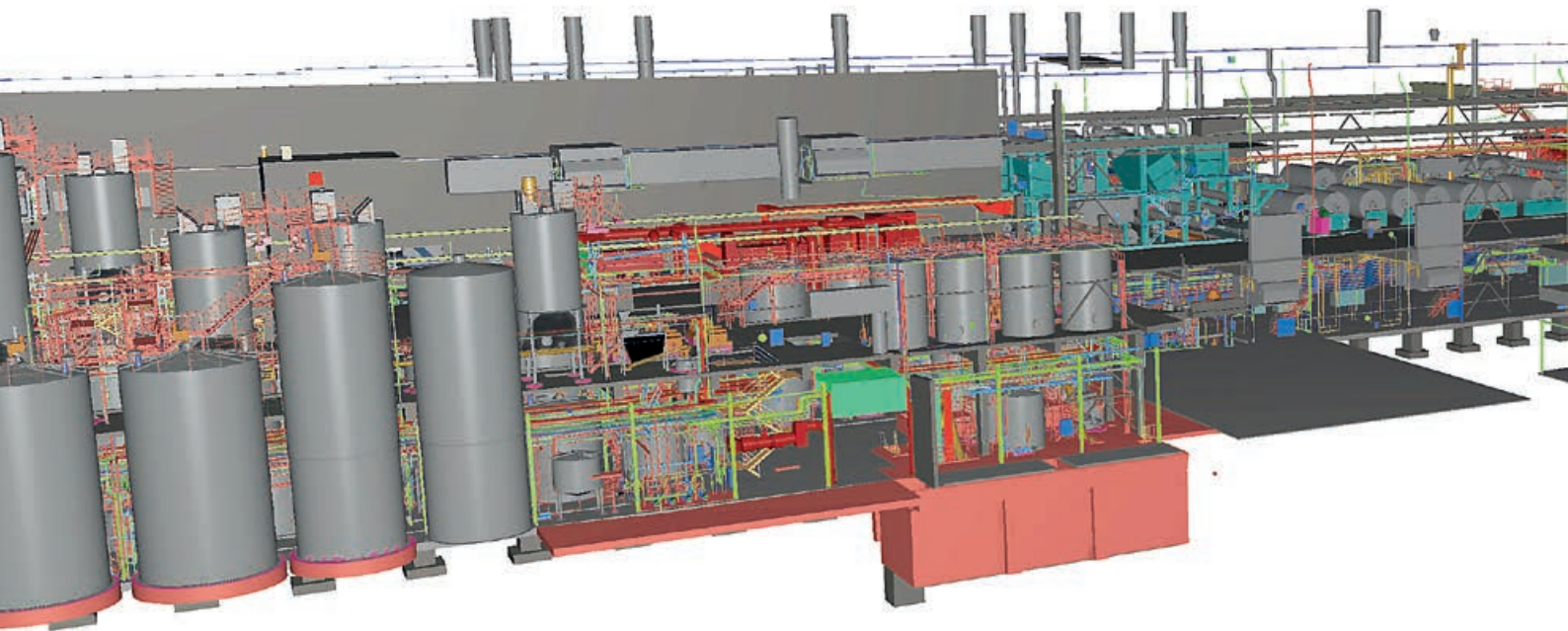
Ákos adds that Petrolterv is currently designing several demanding agricultural industry-related projects including a cooking oil processing facility and a five-floor

milling plant of 1,200 m², as well as an extraction plant of over 700 m².

"The pipe routing in the extraction plant is quite challenging as the pipes sometimes have to be routed from the base to the top of the building. CADMATIC's handling and 3D movement have come in handy during this project," Ákos explains.



PETROLTERV KFT.



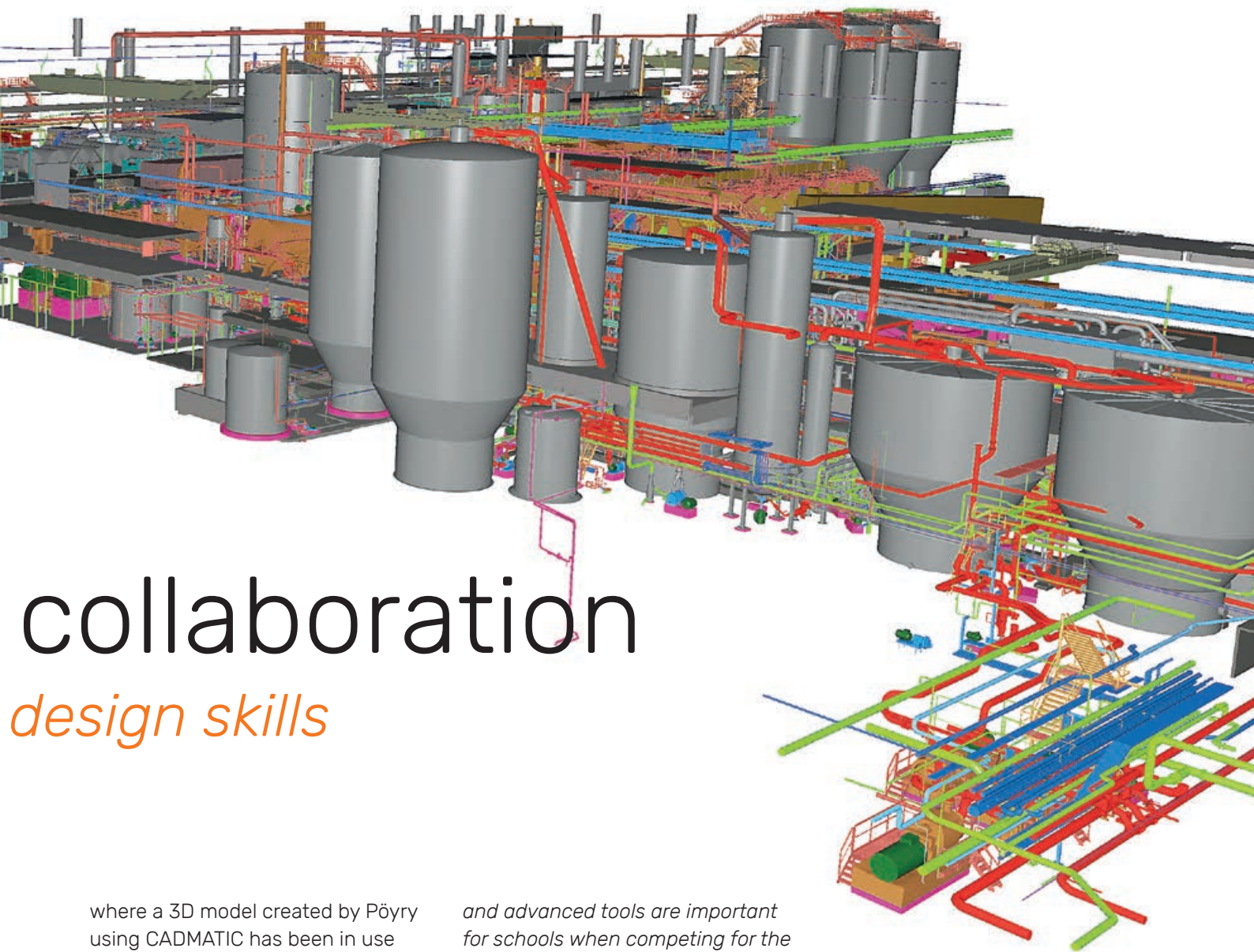
Multilateral plant design

Equipping future engineers with CADMATIC

Text: Written in collaboration with Sappi Kirkniemi Mill and Metropolia University of Applied Sciences

When the Metropolia University of Applied Sciences implemented CADMATIC 3D plant design software in educational use, the course included a practical assignment at the Sappi Kirkniemi Mill under the guidance of consulting and engineering company Pöyry. A digital twin of the mill designed with CADMATIC has been maintained at the site since 1995. The dedicated training benefits the students immediately, and in the long run, it will benefit companies in need of design services as well as the employment market and economy.

CADMATIC's long-term cooperation with consulting and engineering company Pöyry and the Sappi Kirkniemi Paper Mill was reinforced when the Myyrmäki campus of the Metropolia University of Applied Sciences chose to use CADMATIC software as part of its plant design course and studies. The design system does not require client installations and can be accessed from 30 workstations at the school, using licenses worth about 400,000 euros. CADMATIC introduced the course, which was attended by 58 students. The practical assignment for the course included the design of a raw-water pump for the Sappi Kirkniemi Mill,



collaboration

design skills

where a 3D model created by Pöyry using CADMATIC has been in use since 1995. The course also included student visits to the factory.

"It is important for educational institutions to provide training directly based on industry needs and practices, not only on theory," says CADMATIC sales manager Jim Nyroos. *"In addition to Metropolia, we have previously collaborated in a similar manner with the Turku University of Applied Sciences. I am sure that the engineering students are grateful for the opportunity to create designs for a real purpose using advanced tools, as this experience will effectively prepare them for employment. Real assignments*

and advanced tools are important for schools when competing for the best talents. In time, the increase in human capital will impact industrial competitiveness and thereby economic growth. From the point of view of the engineering company and the mill, the collaboration with the educational institution will improve their employer image as well as recruitment potential."

First ever plant design course of this type in Finland

"This course has been a unique opportunity. Nothing like this has ever been organized by an educational institution in Finland before," notes lecturer in chemical and

process engineering Timo Seuranen of Metropolia. According to Seuranen, the thanks for the initiative go to the PSK Standards Association's PSK24/2 piping design team and executive director Jukka Koistinen. *"Through the PSK development unit, the representatives of Finnish industries commit to supporting education and hands-on practice."*

"This is the first time that chemical and process engineering students participate in plant design training, and five of the participants have already been recruited,"



The course included student visits to the factory and the design of a raw-water pump.

Seuranen says. "Installing the software in the school's workstations was a long process, but the CADMATIC representatives have been flexible. We have Pöyry's Mika Pirttinen to thank for the Kirkniemi Mill assignment. For security reasons, the visit by more than 50 persons to the factory to learn about the process was a rare opportunity, and we are very grateful to Sappi for that."

"The three days of software training by Henri Särkkä of CADMATIC was an excellent and effective introduction to the project," Seuranen continues. "All of the enrolled students were present, committed to the course and learned to use the software at a sufficient level. We would like to continue and expand the collaboration and the concept to energy engineering and biotechnology, for example, even if updating the curricula and building the necessary relations is a time-consuming effort. There is great demand for skilled employees in the industry, and young people are highly motivated to obtain an applicable education. It is a major advantage

for companies to receive software-savvy recruits fresh out of university, and CADMATIC is intuitive and easy-to-use software developed in Finland."

Quick software learning experience for an exceptionally large teaching group

"We've received great feedback about the course from both Metropolia staff and the students," says the course instructor, application specialist Henri Särkkä of CADMATIC. "Universities of applied sciences usually cooperate with local companies and provide employees for their needs. However, it is important to expand the practice to other industries and regions, too. Using basic software tools cannot be avoided at work, and hands-on experience is necessary in addition to software skills. The students need to see what engineering is like in practice and why certain tasks need to be completed. An actual assignment provides a realistic idea of what design work consists of in practice."

"Our software has been praised for being very easy to learn," Särkkä

continues. "The skill level required for plant design can be achieved in about one week. This was an exceptionally large group that included a wide range of skill levels, but I was surprised by how quickly the group were able to start using the software. Nobody fell behind, and everybody seemed to realize what was being done and how to perform certain functions. The main point of teaching was to help them understand why certain aspects are displayed in a certain way in the software. In my opinion, applied science education provides good prospects for Finnish plant engineers."

The training course used an easy-to-share software license structure, and the students were also able to use the software on their private computers, with a VPN. "I was fairly impressed to hear the students ask whether they could use the system in their own time and where they could find further information," Särkkä says. "During the course, all users committed 100% and proactively, even if their ages varied from 20 to 40 years."

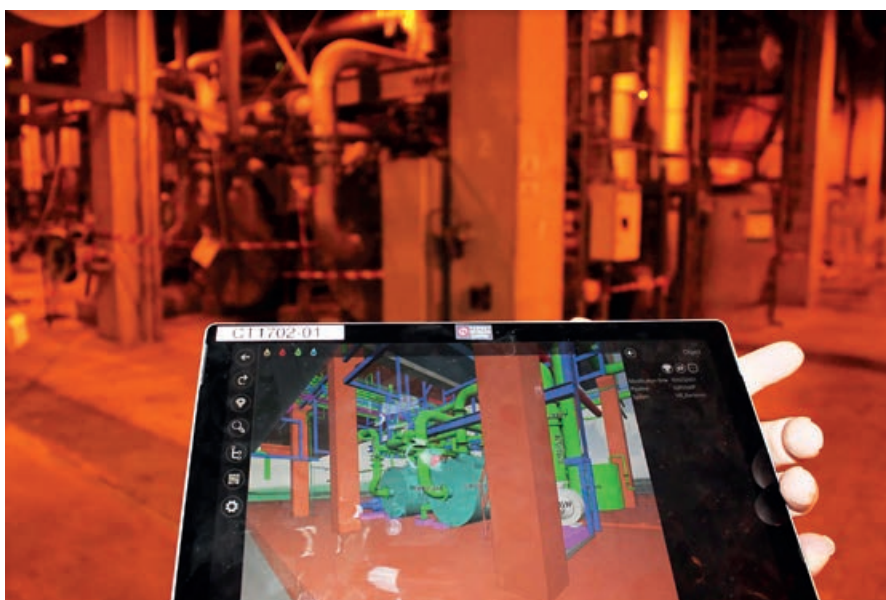
A student compares the CADMATIC 3D model to the corresponding area in the plant.



Clear demand for plant design competence in Finland

"There is a need for plant design training in Finland in order for the students to learn the realities of engineering work," confirms engineering manager Mika Pirttinen of Pöyry, who guided the practical assignment for the mill. "It is not clear to many engineers how to design a factory with piping based on their basic training. Pöyry delivers engineering projects all over the world, and there is a great demand for new specialized designers. Graduates with hands-on experience easily find employment in engineering projects. In addition, we have our own two-year Pöyry Stars career path program, in which some of the students on this course are also participating."

"The Sappi Kirkniemi Mill provided an actual need for conversion in order to improve the paper production process," Pirttinen explains. "The visit to the factory provided an opportunity to see the real environment and understand how the model compares to reality. At the factory, the students were expected to make notes on what to

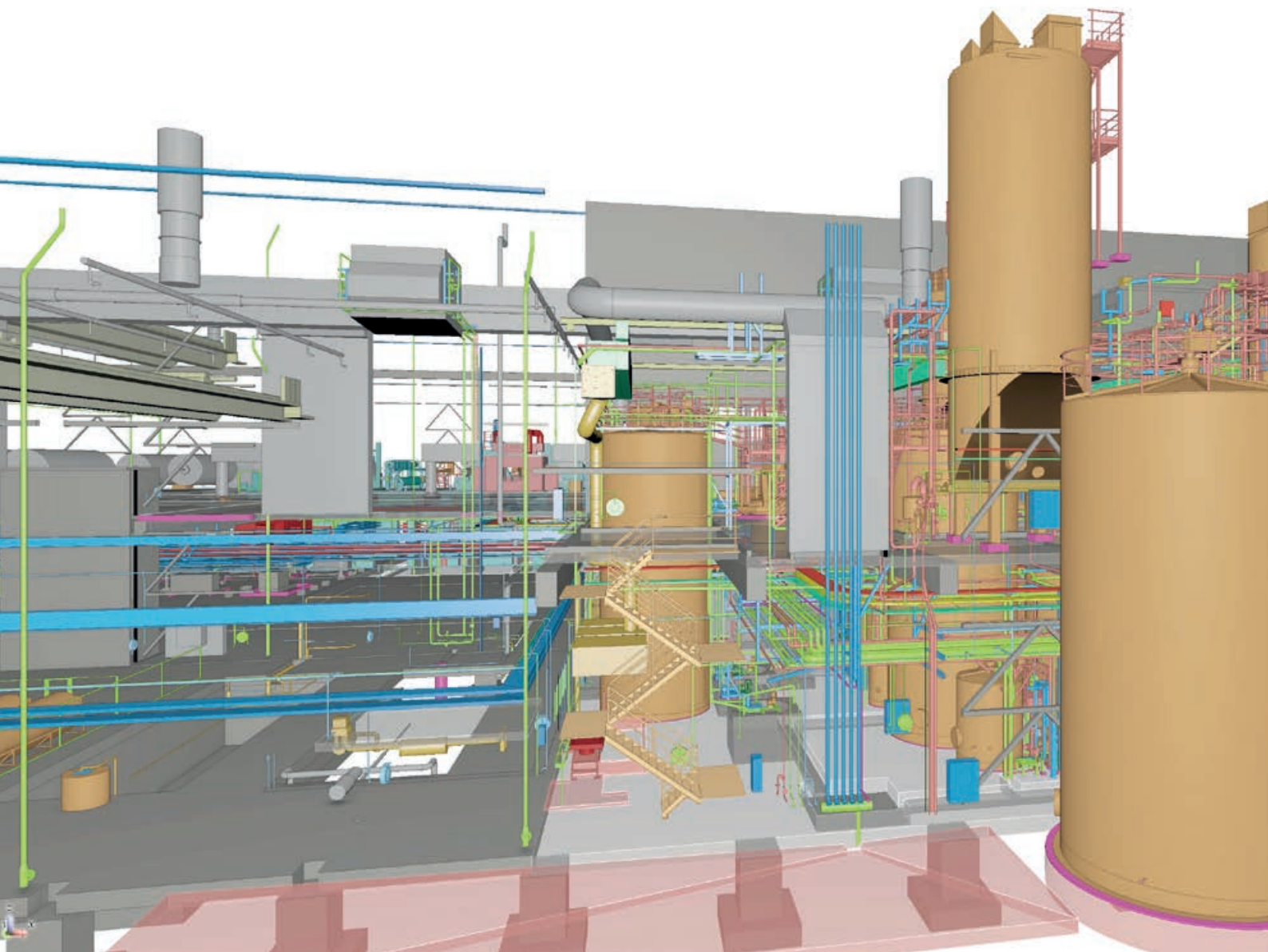


consider when designing the new pump. These issues, which include space reservations, changes in piping and ease of maintenance, were discussed in advance during the course."

3D modeling is standard in plant design

"The Sappi Kirkniemi Mill was the first large paper mill in the world designed completely using 3D modeling," says Kai Vikman, chief operating officer at Pöyry Finland. Vikman was the project manager of the Sappi mill project in the

mid-1990s. "At the time, the project was unique for both engineering offices and the industry; perhaps not technically, but in terms of implementing 3D design. After that, all major engineering offices moved on to model-based 3D plant design. Factories have abandoned 2D design, and today's design is all about digital twins and integrated building information models. Along with the development of cloud technology, communication has improved and become faster, but the basis for all this was created already in the mid-90s."



Model-based design is at a world-class level in the Finnish construction industry, too."

"The Kirkniemi factory was also the first modeled plant to integrate the model directly with management systems and databases using SSOT, Single Source of Truth. The model created at the time is still in use and accessible online wherever, which makes spare part procurement and change management, for example, much easier," Vikman notes.

"Involving students and institutions in the modeled factory environment significantly helps

developing plant design teaching and standardizing ways of working. Design must aim at safety, efficiency and ease of maintenance. It is truly worthwhile investing in competence, knowhow and understanding of young engineers. It allows us to achieve the competitiveness needed on the global markets," Vikman concludes.

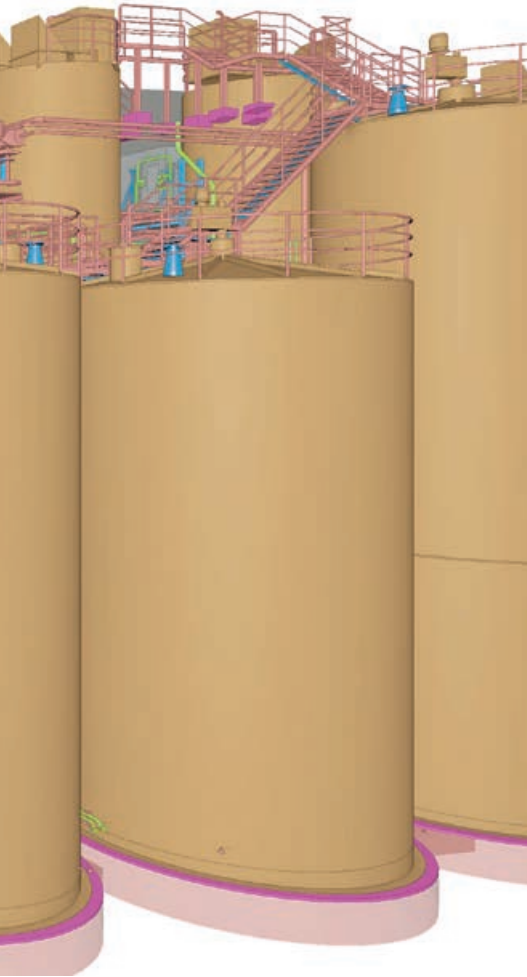
Support of training will pay off in the future

"The course assignment involved designing a raw-water pump we need to feed lake water to the heat exchangers of a paper machine,"

explains project engineer Christer Råbergh, who has worked at the Kirkniemi Mill since 1995. *"The purpose of raw water is to cool the process water that is too hot to be sent to the water treatment utility. A warm summer is the most challenging season regarding cooling. In order to increase capacity, the pump needed to be designed and dimensioned anew, which requires changes in piping. The space for the pump is only about four by four meters. The pump is expected to be completed in 2020."*

The PK3 paper machine and special pulp mill (EMT) at Kirkniemi

The Sappi Kirkniemi plant was the first large paper mill in the world designed completely in 3D.



were designed using CADMATIC software. The factory started operations in 1996.

"After that the model has been extended with a grindery, a thermo-mechanical pulp plant and a reject plant as well as the first parts of the PK1 and PK2 paper machines," explains Råbergh. "In principle, sections are added to the model every time something new is designed or something old is changed. At the time, CADMATIC was chosen for the job perhaps partially because it is a Finnish software product. The benefit of ordering the pump design as a

practical assignment is low to us at this point, but it will increase in the future when new specialists enter the field. Now, our resources at the factory are tight, and our main task is not to educate but to produce paper and maintain the equipment. However, there are not many CADMATIC designers outside the capital area of Finland, and the factory prefers to use local skills. It would be ideal if plant design specialists were available near the factory in the future."

"Our cooperation with CADMATIC started in the mid-90s

and continues to this date," confirms engineering manager at the factory Rauno Timperi. "Kirkniemi was the first 3D project, after which the model has been extended step by step. The largest engineering offices have moved on to 3D plant design as the technology has developed, and the visit to the factory was a unique opportunity for the students to compare the modeled environment with reality. This type of cooperation will create more CADMATIC users in the future, in which case various industries will benefit from plant design competence."

CADMATIC is a leading 3D design and information management software developer and supplier for the marine, process and energy industries.

- CADMATIC's main offices are located in Turku, Finland and Groningen, the Netherlands.
- We have certified resellers and support partners in 15 countries in Europe, Asia and America. Our growing customer base includes over 7000 customer organizations in 60 countries.
- We have staff in Australia, China, Estonia, Hungary, India, Italy, Russia, Singapore, South Korea, Spain, Sweden and the UAE.



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