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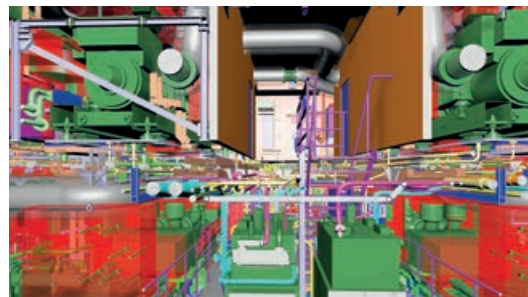
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CADMATIC Marine eXperience 03
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Cover picture: Visualisation of approx. 3787 GT fishing vessel designed by Petrobalt. Picture © Petrobalt. The CADMATIC Marine eXperience Magazine is published twice a year by CADMATIC Oy. CADMATIC believes that all information provided in this publication is correct at the time of printing. CADMATIC is not responsible for any inadvertent errors.

Investing in the future

The second and third quarters of 2019 have been particularly busy at CADMATIC. We have welcomed many new customers while two strategic investments have bolstered our capacity to serve our customers more comprehensively going forward.



I am happy to announce that in the shipbuilding industry alone we have gained 90 new clients in the last 12 months. At the same time, large existing customers such as Tsuneishi Heavy Industry in Japan, Meyer Group in Finland and Germany, and PT Pal Shipyard from Indonesia have also increased their number of CADMATIC licences significantly. Damen Mangalia in Romania is the newest and largest shipyard of the Dutch-based Damen portfolio that has implemented CADMATIC to build cruise ships, RoPax ferries and big offshore vessels and structures.

The trust that these successful shipyards have placed in CADMATIC bodes well for the future. We have been able to develop a flexible software configuration that can be adapted easily for different types of shipyard organizations, production lines, workshops and assembly sites.

In May of this year, we acquired Eagle technology from Macrovision, which has been used as a development platform for our ship hull 3D design products.

The deal enables the flexible and independent development of the technology and its commercial exploitation as part of CADMATIC's product portfolio. It also means that we will be able to respond even more rapidly to future needs and to flexibly utilize different future opportunities.

In August, we acquired Finnish software company Kymdata and its CADS software. CADS Electric 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 structural design. The CADS products are an excellent complement to CADMATIC's product portfolio.

Automation levels are increasing rapidly also on ships and offshore platforms. Now, CADMATIC can provide fully integrated software functionality for all shipbuilding 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. We now have

over 200 professionals serving our 7000 customer organizations in 60 countries.

This edition of the Marine eXperience is packed with many interesting customer articles from clients around the globe. We hear, for example, how CADMATIC eShare has digitalized the operations of Scheepswerf Slob, significantly reducing the number of drawings needed. We also see how C-Job Naval Architectures have taken their basic design to new levels with our software. Both Nava from Poland and Headway from China present how they are efficiently using CADMATIC and laser-scanned materials in their retrofit projects. We also highlight the latest new software features and have an in-depth look at drawingless ship design, something we are all very excited about.

I wish you happy reading.


Jukka Rantala
CEO

Digitalizing information management from design to production



Scheepswerf Slob implements


In late 2017, Scheepswerf Slob in the Netherlands implemented CADMATIC eShare to reduce the number of printed technical drawings generated for its production purposes.

A further goal was to provide shipyard staff with more up-to-date information on site. Since then, eShare has also been successfully linked with the company's Nestix nesting software.

Scheepswerf Slob implemented CADMATIC already in 1998, when it was still marketed under the Nupas-Cadmatic brand name. The software is currently used to engineer the hulls of superyachts built at the yard and do equipment outfitting.

Gaining efficiency with eShare

In the autumn of 2017, Scheepswerf Slob implemented the



"eShare has saved us a lot of paper and time."

CADMATIC eShare

CADMATIC information management system, eShare. The solution includes a link to the shipyard's document viewer to export PDF drawings from CADMATIC Hull, like sheet drawings and profile sketches. Outfitting drawings from CADMATIC Outfitting are also available in eShare/eGo.

The implementation was born out of the idea to reduce the amount of drawings that are

printed, which in turn would reduce paper costs and give production staff more up-to-date information.

Paul Buijs, the CADMATIC Hull Administrator at Scheepswerf Slob says they wanted to work with a basic set of drawings and supplement the drawings with information on tablets for workers on site. This also meant that the workers had access to more up-to-date

information due to the link to the design application.

"This was a good solution for us. It saves a lot of paper and time and it is very nice to always have correct and up-to-date drawings only one click away," says Paul.

Linking model with plate nesting data

An additional benefit of eShare implementation has been the

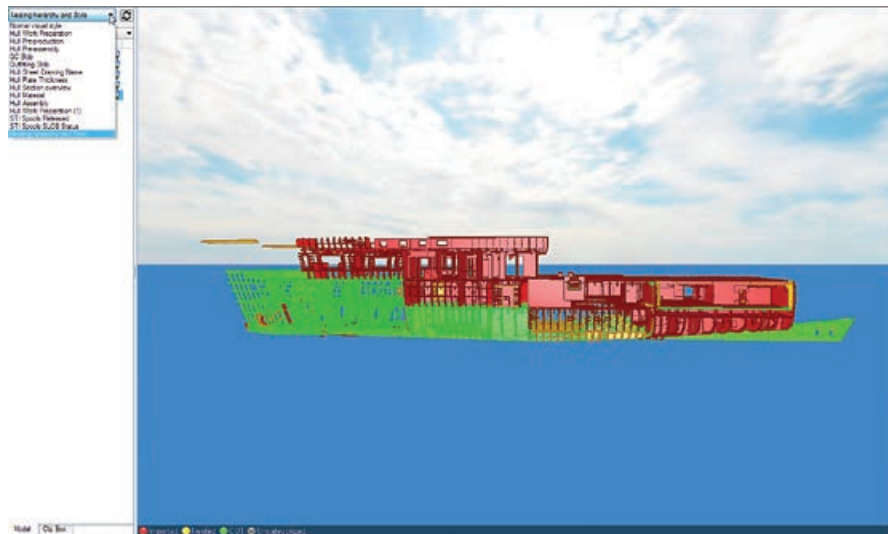


Figure 1. An eShare model of the hull indicating the parts already imported into Nestix (red), nested on a plate (yellow) and parts that have already been cut (green).

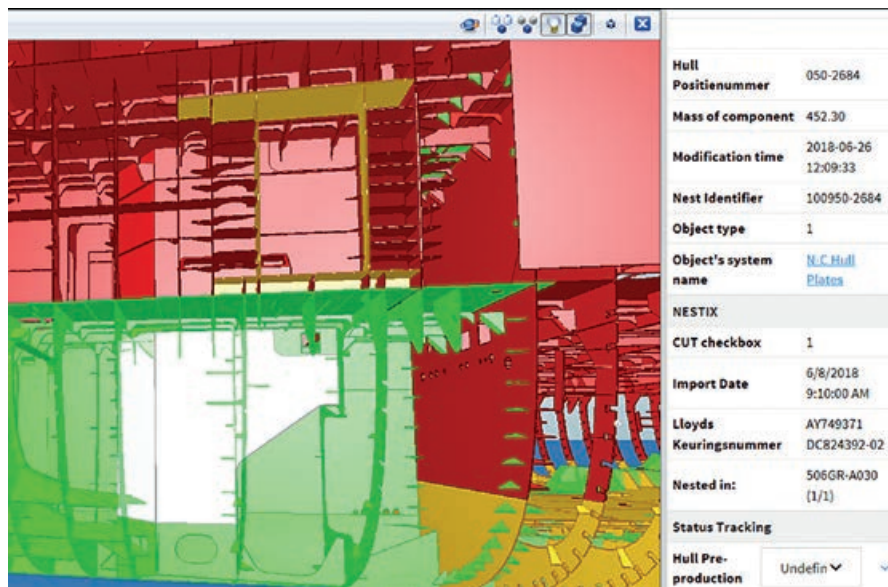


Figure 2. When searching for parts, Scheepswerf Slob staff can see if parts have been cut and what their nesting status is.

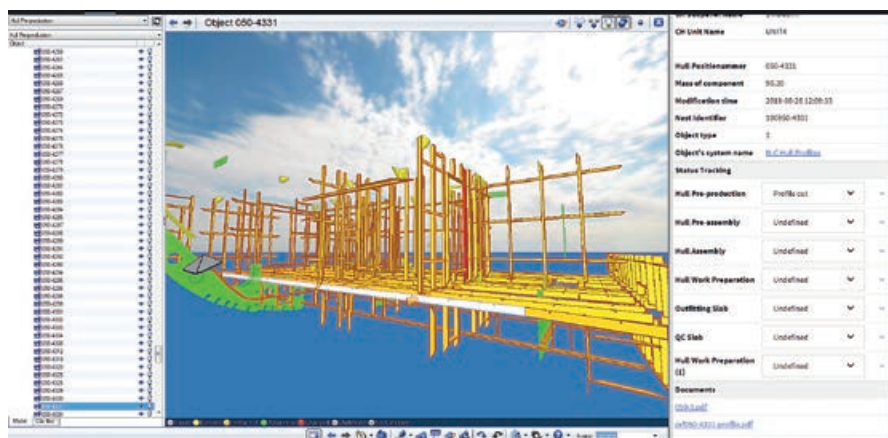


Figure 3. The statuses of objects are displayed according to the color code in the legend. The status is also displayed on the right under Status Tracking.

Paul Buijs is happy that correct and up-to-date drawings are always only one click away.



ability to link the application with the Nestix plate nesting software used at the yard. This has enabled Scheepswerf Slob to track the hull building process accurately. See Figures 1 and 2.

"With this link between eShare and our Nestix we can see exactly what parts have been imported and cut. Everyone can check the progress without the need to re-request this information from elsewhere. We also can see the Lloyd inspection number of the plate," explains Paul.

Keeping track of blocks and projects

eShare is also applied at Scheepswerf Slob to track the progress of blocks and projects and to facilitate

inspection of parts by the foreman on site.

"Tracking the blocks and projects means that all the managers, directors, engineers and project leaders are kept up to date. When everything is visible, it greatly reduces the amount of questions and uncertainties," says Paul.

Every construction part in the building process is assigned a status, with separate visual styles for all the steps it goes through before it is placed onboard the yacht. See Figure 3. With the new 2019T2 version of eShare it is even possible to select multiple objects and simultaneously assign a status.

"Overall, we are very happy with the eShare integration. It is easy to use and greatly reduces the

amount of emails required. Our production people can now see the status of the parts they need to work with," Paul sums up the contribution eShare has made.

Scheepswerf Slob is not satisfied at leaving eShare integrations there: Paul indicates that they have plans to connect it with the shipyard's Teamcenter PLM software, Siemens Primavera as well as their Inventive ERP system.



Drawingless production in digital and data-driven shipbuilding

Text: Ludmila Seppälä

Can 3D models replace traditional design drawings? If the question were formulated like this, most people would answer in the affirmative. Several would question whether it has not already been achieved and, if not, that it was only a matter of time.

If the answer to this question is that straightforward and such an obvious direction for the development, one can only wonder why this change has not happened already. 3D models have been around in shipbuilding for almost 50 years. Has this not been enough time to polish the technology and replace old artefacts, such as 2D drawings?

This article shows that the answer is not that simple and does not depend exclusively on technological aspects.

The power of creative destruction and Kondratieff's waves theory

Kondratieff's waves theory provides a broad structured view of the history of technological development. Based on the financial data from rolling 10-year returns of Standard

& Poor's top 500 companies, spikes or waves can be observed that match technological changes. Figure 1 presents these waves along a timeline. Behind every significant upswing in financial returns, which moved societal development forward, there is a considerable step in the use of new technology: steam engines, railways, electricity, automobiles and petrochemicals, and information technology. None of the technologies is an isolated innovation or achievement: it is something that society was able to adapt and use profitably. Technological breakthroughs are tightly linked to societal development in terms of adaptation and acceptance.

According to Kondratieff's theory, the next and sixth wave of creative destruction will be fueled by intelligent technologies. There are many ongoing discussions in industry about digitalization, digital transformation and digital manufacturing, industry 4.0 and smart factories, as well as AI and the use of digital twins in production.

Intelligence is a key aspect of the sixth wave and differentiates it from its predecessor, which was based on information technology. One can speculate whether intelligence means actual AI or the possibility to be not only digital, but also data-driven.

One practical example of this change is the ongoing development of digital twins. As elaborated by Cabos and Rostok (2018), a digital twin is a digital representation of an object, enriched with behavioral models and configurations

or conditions. As Hafver, Eldevik and Pedersen (2018) point out, the novelty of digital twins is not the existence and use of 3D models as assets, but how these models are bundled.

In other words, it is not about IT anymore; it is not about the possibility to digitalize all data and the 3D model, but about the intelligence behind this data.

Deep transitions theory and evolution of CAD as innovation

According to the theory of deep transitions developed by Schot and Kanger (2018), there are more details inside each wave as it can be split more accurately into approximately 50-year cycles. An interesting result can be observed if this theory is applied to changes in shipbuilding. Figure 2 illustrates the main technological changes and innovations concerning deep transitions.

The era of IT in shipbuilding aligns with the beginning of commercialized use of CAD systems. Triggered by IT advancements, CAD evolved in the early 1970s from an innovation into something that became a common and essential part of shipbuilding projects. It took about 50 years for the technology to mature, for the newest hardware to be taken into use and for it to be fully accepted practice. In turn, the increased accuracy of design allowed even larger and more complex projects to be handled, a development that took shipbuilding to an entirely new level. The innovation served the industry and changed it. It was, however, not an isolated phenomenon. It was made

Figure 1. Kondratieff (1935) waves: linking rolling 10-year returns on the S&P top 500 and technological disruptions.

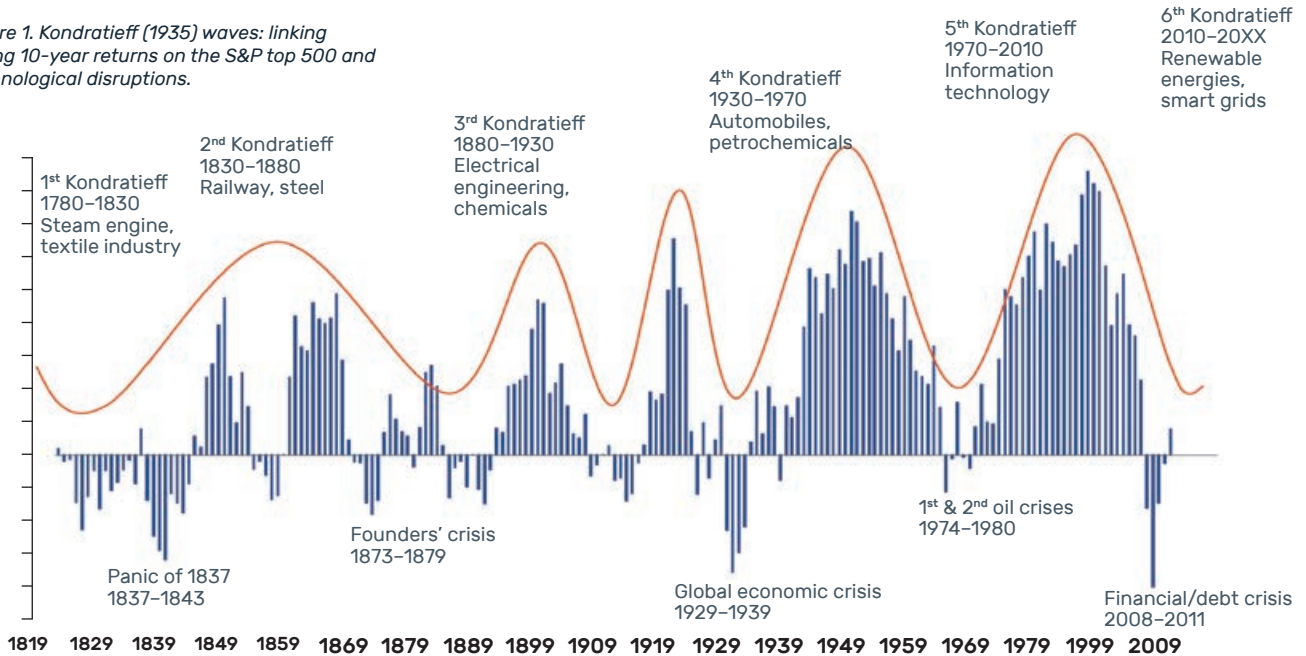
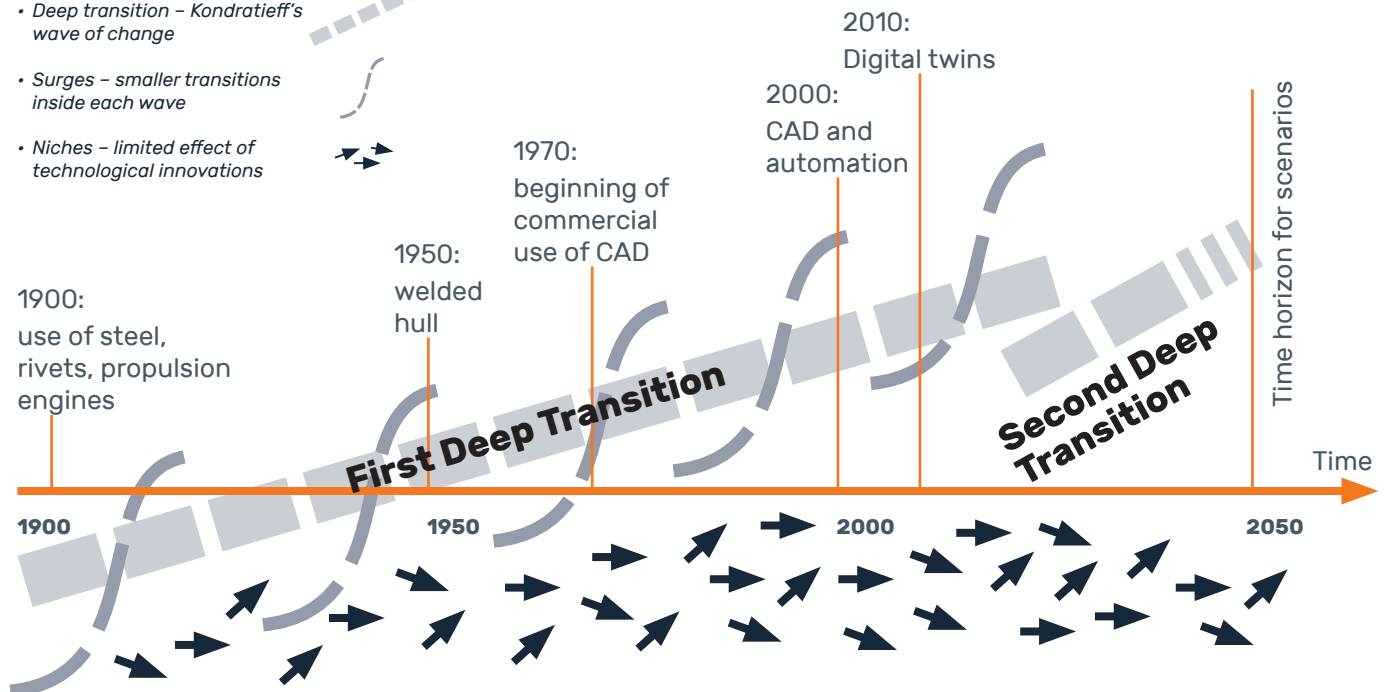


Figure 2. Deep transition transformation and historical shipbuilding milestones, including CAD development.

• Deep transition – Kondratieff's wave of change

• Surges – smaller transitions inside each wave

• Niches – limited effect of technological innovations



possible by societal developments that required a large number of cargo ships and other types of vessels for global trade. As such, the context of innovation plays an essential role in the transition.

Multi-level perspective – innovations in context

The Multi-Level Perspective (MLP) framework is useful in understanding how a transition occurs and what makes it possible for an

innovation to become viable and widely used.

The multi-level perspective approach was originally developed by Frank Geels to explain socio-technological transitions, with a focus

on sustainability. It presents a transition process in the context of three main layers: landscape, regime, and niche.

The landscape layer represents the most stable structure – the existing state of things; it is a mixture of the political and economic landscape, the historically and socially stable way of doing things, and time-proofed technology that has been in use for a long time. The regime layer is more dynamic and consists of existing practices and the ways of process organization. Niches are the most dynamic places for incubation of new ideas and practices. Presumably, niches appear and frequently disappear, often having little impact on the system. However, when there is pressure from the landscape, the regime level has cracks and openings, creating space for the niche to enter the regime level and reshape it. *“Niche-innovations may break through more widely if external landscape developments create pressures on the regime that lead to cracks, tensions and windows of opportunity”* (Geels, 2010).

The tension, caused by globalization and the development of IT technologies, such as increased computing power and graphics cards, created a *“window of opportunity”* and allowed CAD to progress to regime and landscape levels. A side effect of the transition was that CAD providers became significant players in the maritime industry.

Next wave of intelligent technologies

The intelligence of IT allows the provision of data in digital format that is suitable for production. For example, based on the data collected by CADMATIC, when the first 3D viewer, eBrowser, was introduced on the market in 2000, the

direct estimation from shipyards was that they were able to reduce the number of drawings needed for production by 30%. The 3D model became accessible not only to CAD users – typically designers in the office – but also to production staff. It also did not require any special skills or training to use. It provided a powerful push to reduce the number of drawings. However, there are still cases when the amount and types of production drawings are justified by tradition and processes at a shipyard, and less by the practical need for these drawings in production.

It is not about the IT anymore, but about the intelligence behind the data.

Following this development, after introducing CADMATIC's eShare as a central portal for all interlinked project information, a further reduction of 70% of drawings was achieved. This is only one example where increased intelligence in IT technology significantly affected the number and types of drawings involved in production but was capped by societal readiness to change the existing regime. Pioneering yards, focused on innovation and effectiveness, were more ready to make the change than yards where tradition and maintaining the status quo were stronger driving forces. The human and societal factors conflict with technological possibilities in this case.

The level of automation is a key dimension in the discussion about automated production. There are many possibilities to automate production: steel cutting and bending, welding robotics, 3D printing, and

automatic adjustments for workshop flows based on data analysis. Together with developments in robotics, this has become an essential factor for ship manufacturing. The cost of machinery and implementation has been a holding element in this regard.

The future of drawingless production

Figure 3 illustrates four main possible scenarios for the future of drawingless production. They are based on a division of high to low levels of IT intelligence and automation. Two stereotypical scenarios present *“business as usual”* and *“high hopes for change”* possibilities. The other two illustrate conflicting trends and tensions in the landscape that provide opportunities for innovations to grow.

While all four scenarios are possible, the continuous growth scenario is perhaps preferable, if one wants to be optimistic and disregard natural developmental limitations. A combination of scenarios for transformation and robotics would present a somewhat realistic picture in the medium-long perspective. In both cases, the gradual elimination of drawings in the production process is a likely outcome.

Considering the main driver of intelligent IT, drawings are already being gradually substituted with 3D viewers and with direct data transfer to production or manufacturing control systems. CAD plays a key role in the substitution process by providing interactivity with data and faster access to it within change management.

Originally, input to CAD was provided by users. This is slowly changing, however, towards the use of embedded design rules and the substitution of direct parameter inputs with inputs based on analysis or AI.

Intelligent IT: transformation

- Sophisticated IT design solutions and low level of automation. Boom of highly customizable designs with high range reuse
- Design can adapt to any production and provide data for manufacturing in any required format.
- Boost of independent design providers while shipyards slowly get to higher levels of automation.

Continuous growth

- AI-ruled factories, similar to the automobile or airplane industry.
- State of the art IT with a high level of automation and low level of customization.
- Standardized main types of ships and centralized production in mega yards.

- Slow development similar to the current regime without significant disruptions.
- Slow pace of IT intelligence development
- No considerable adaptation to data-driven shipbuilding and low level of automation in manufacturing.

- Intensified automation with varieties of custom-made designs.
- Shipyards take a leading role in automation driven by economic reasons
- Shipyards create pressure for development of intelligence in IT.

Business as usual

Robotics: disruptions

Figure 3. Future scenarios of drawingless production in digital and data-driven shipbuilding towards 2050.

Interaction with data distinctively differentiates the digital era. The first attempts to standardize drawings aimed to improve readability and production quality. For the data-native generation, this poses unnatural limitations. Instead of a static snapshot, people prefer to obtain data on demand, and then manipulate it.

The following use case illustrates this process. Traditionally, many drawings in shipbuilding come from piping production data or spool drawings. Estimations are that a big cruise liner, of about 350m, has about 10,000 spools. With current practices, these drawings are automatically generated and annotated. However, about 5% (with effective use of CAD and settings matching production needs) require manual work.

The process itself is quite laborious and time-consuming. However, the main culprit is the use

of these drawings in production. Every drawing must be manually examined and used as an instruction to manufacture a piece of pipe and often the data provided on the drawing is not sufficient or outdated due to changes in design by the time it reaches the workshop. The possibility to generate and visualize production data at any time would remove the disconnect between design and manufacturing.

As a practical example of such developments, some CADMATIC customers already use provide an online connection to design data in the production workshop and display the data in 3D viewers with annotated models. Alternatively, they use AR with HoloLens or VR interfaces directly with the 3D model.

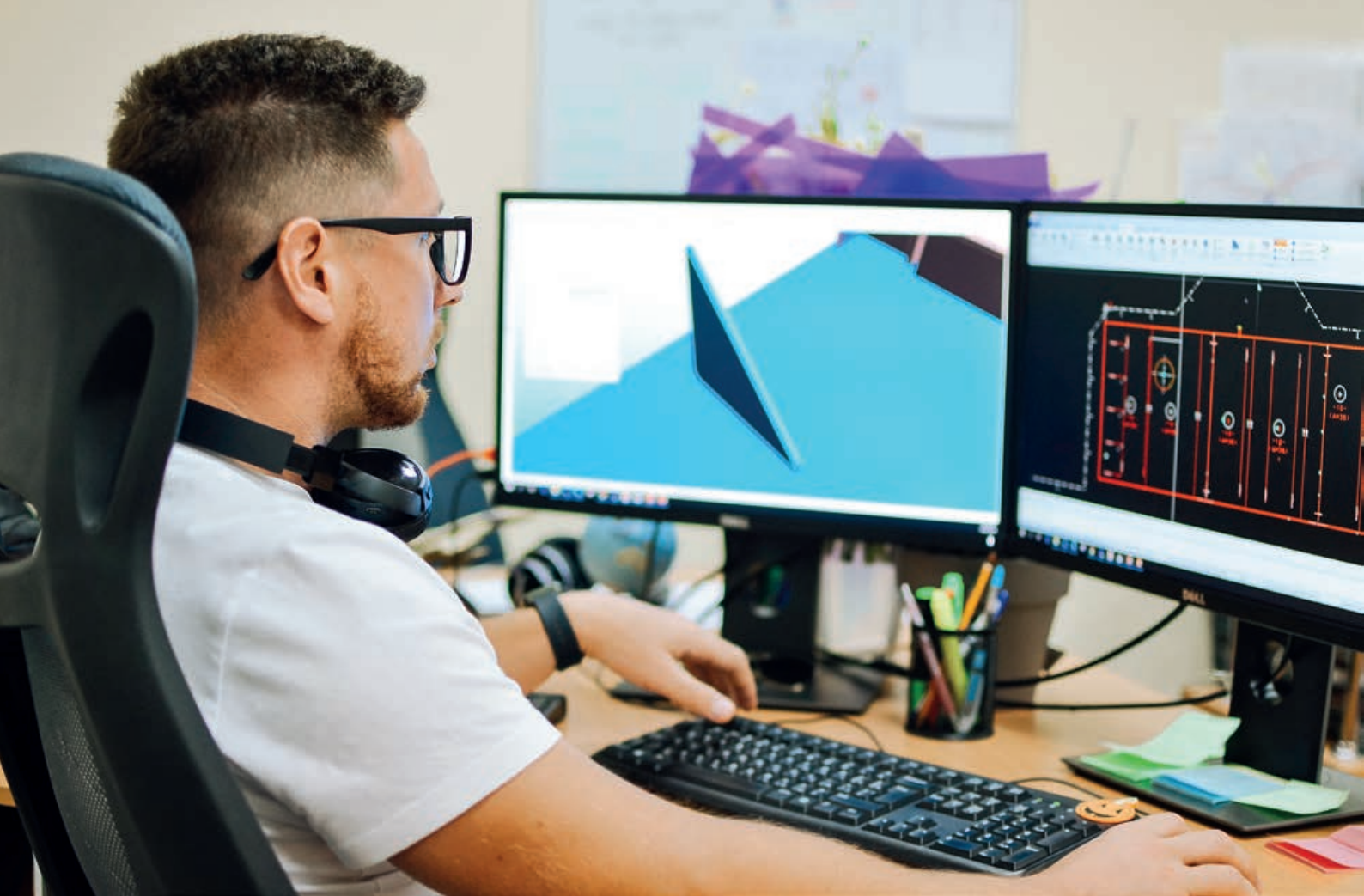
The foundational technologies for drawingless production are set and the direction is well-defined. The question remains whether the

window of tension is enough for the innovations to progress, spread and become part of the regime.

Disclaimer: This article is a shortened version of a paper presented at COMPIT2019.

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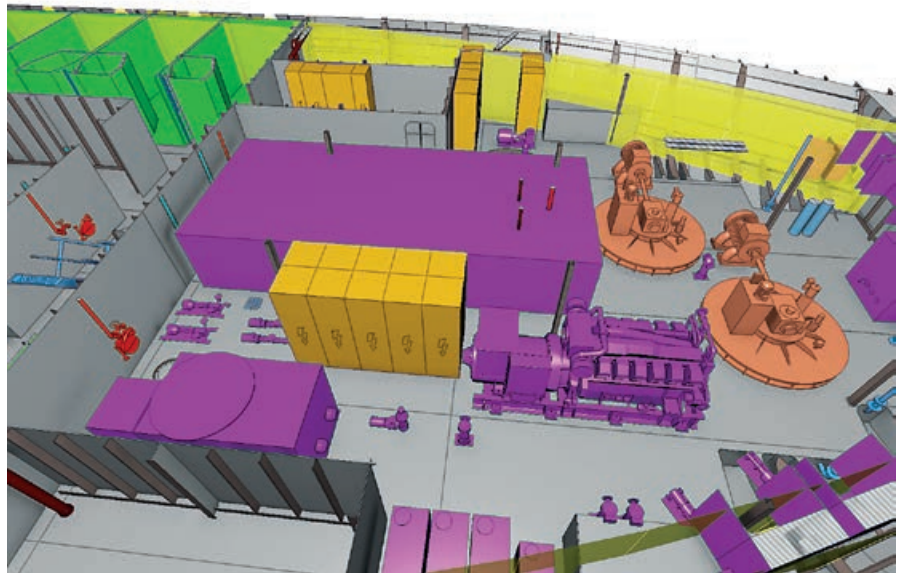
C-Job Naval Architects

Taking 3D ship modeling to a new level

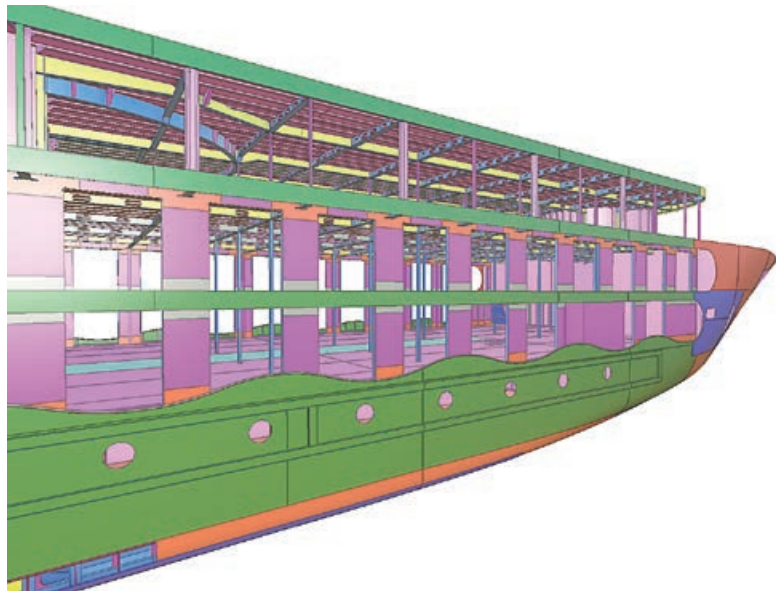
C-Job Nikolayev is a part of the independent ship design company C-Job Naval Architects. Its first international office was opened in Nikolayev, Ukraine in September 2017. The naval architecture company focuses mainly on 3D basic design modeling and full-scope detail engineering. CADMATIC has been an integral part of the company's toolset in taking its basic design to a new level.

According to C-Job Nikolayev Director Andrey Zhrebetsky, the global order book for cruise vessels, superyachts and special vessels has grown steadily this year. He also points to a report by international classification society RINA Services that indicates a trend towards larger vessels and more high-tech engineering. Some more traditional trends include the minimizing of building costs and reduction of lead times.

The bow thruster room of a 135-meter cruise vessel designed by C-Job Naval Architects.



A side view of the cruise vessel engineered by C-Job Nikolayev.



Integration of disciplines in basic design

Andrey indicates that the integration of all disciplines within basic design is one of the biggest challenges faced by naval architects.

"Unfortunately, it became normal practice in our industry to produce visually attractive and approved basic designs, while shifting all the integration challenges to the detail design and production stages. Here I mean HVAC, cable

trays, exhaust, ER and machinery space arrangements and principal routing. What is very convenient for design companies, turns out to a big problem at shipyards with massive additional costs for the production phase."

In order to avoid the aforementioned problems, C-Job Nikolayev employs a novel approach of creating both basic and functional design. The approach, which has become the standard way of working

at C-Job Nikolayev, uses and relies on principle solutions designed by C-Job Naval Architects and further development during the 3D modeling processes with CADMATIC by the C-Job Nikolayev team. Thanks to this approach, C-Job Nikolayev's engineers can provide fast and reliable design solutions for mega yachts, cruise ships, dredgers and offshore vessels.

"It is fast and easy to create a CADMATIC model from scratch and



Andrey Zhrebetsky has been impressed with how fast and easily a CADMATIC model can be created from scratch

to create arrangement, structural and layout drawings and generate sketches. Due to the unique and optimized procedures, C-Job Nikolayev can respond quickly to changes and modifications with the CADMATIC Hull and Outfitting

modules. Combined with the drafting functionality, we develop basic designs, take care of the details and further production activities,” says Andrey.

Visualization of 2D plans

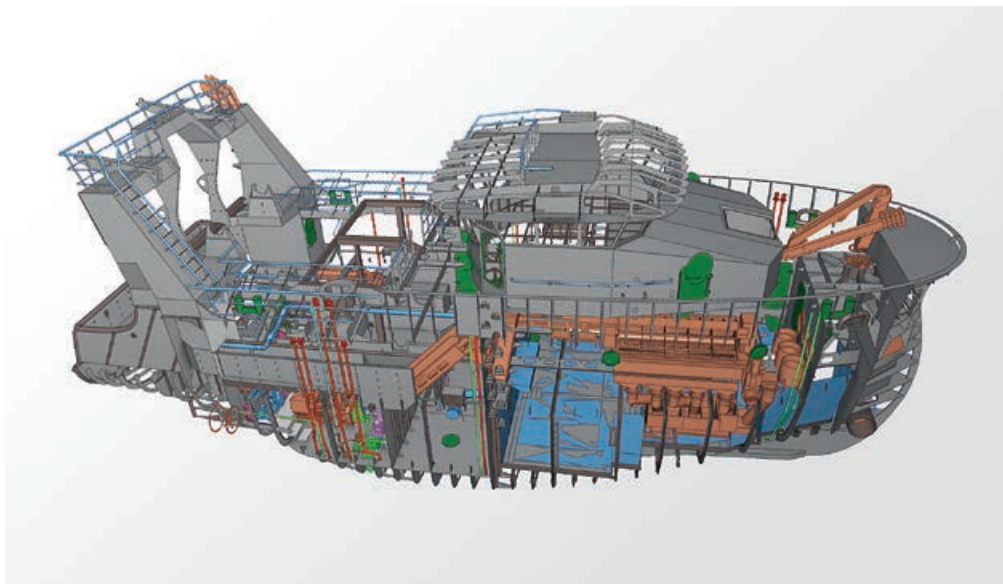
Typically, C-Job Nikolayev starts modelling simplified panels of major structural elements in CADMATIC Hull. The model highlights areas that require additional attention.

“Even though structural 2D plans may be good, the 3D model takes your design to the next level.

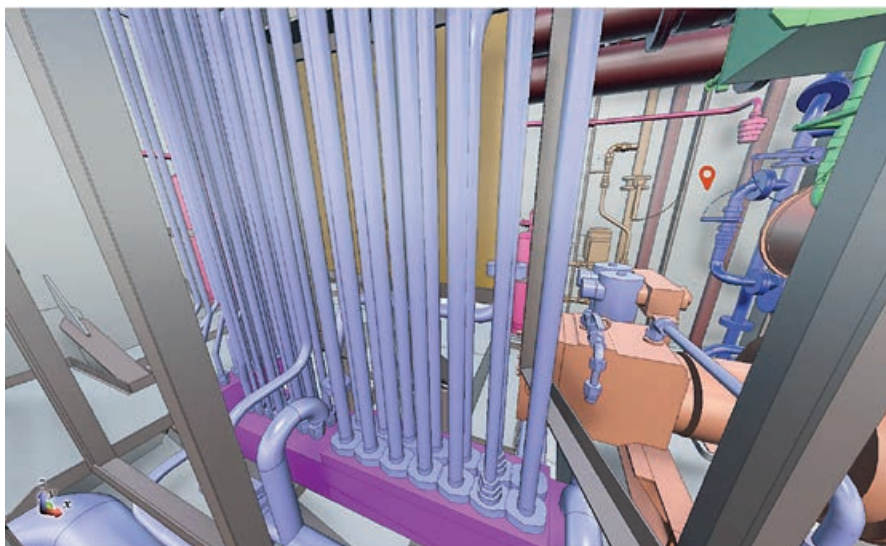
It allows us to set priorities and take control of the design process from the very beginning. Any issues that may arise can be solved and excluded during early basic 3D design. If you use only a 2D approach, such issues may only pop up during detail design, or even worse, during production. This in turn influences resources, materials and planning,” Andrey explains.

C-Job Naval Architects uses CADMATIC models to provide their clients with real-time updates on steel and equipment weight estimations as well as material

A 25-meter fishing vessel. C-Job Nikolayev was responsible for the vessel's 3D basic design, detail design and workshop documentation: hull, pipes, and outfitting.



According to C-Job Naval Architects, the use of point clouds does not only improve efficiency during surveys of client facilities, but also increases the accuracy of the final 3D model.



take-offs that can be used by the shipyard for placing precise material preorders much earlier.

Solving challenges

All major equipment, pipelines, HVAC and cable trays require space reservation. At C-Job Nikolayev, these elements are part of the model already at the basic design stage. This allows the designers to do their work while also taking other disciplines into consideration. Areas that require additional attention are identified and registered in the system. C-Job Nikolayev

delivers basic and functional design to the client that is ready for the next stage: detail design.

"Working with laser-scanned data is fast, easy and efficient."

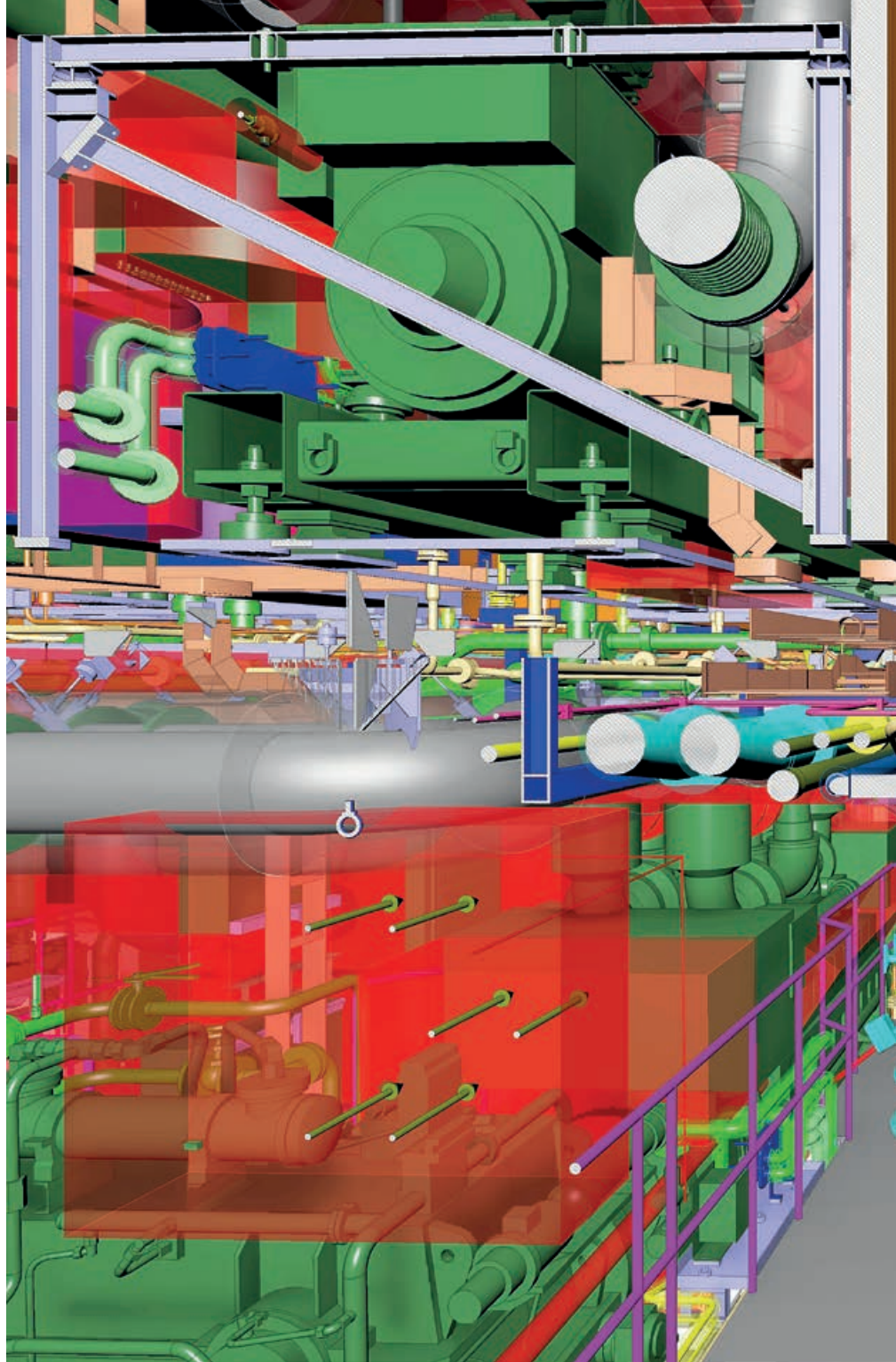
C-Job Naval Architects also makes use of CADMATIC's distributed design system that allows design teams to collaborate and work simultaneously on the same projects.

"With CADMATIC's 3D model and master-replica solution, our teams are linked in the main project environment from the start. Different teams and subcontractors may be working on different areas they're responsible for, but thanks to the software they always work with the most up-to-date model."

Access to design data and facilitation of class approval

In addition to efficiency gains during basic design, C-Job Nikolayev appreciates how CADMATIC

The machinery and technical space of a 110-meter mega yacht engineered by C-Job Nikolayev.



improves access to design data and facilitates class approval.

“There is no need to wait for the next revision of specific arrangement drawings anymore. The design data is available in real time. This allows our engineering team to control all critical areas via markups during the full design process,” says Andrey.

He indicates that the CADMATIC eBrowser model facilitates class review and approval, which means that there is no need to produce 2D drawings first.

Newbuilds and conversions based on laser-scanned data

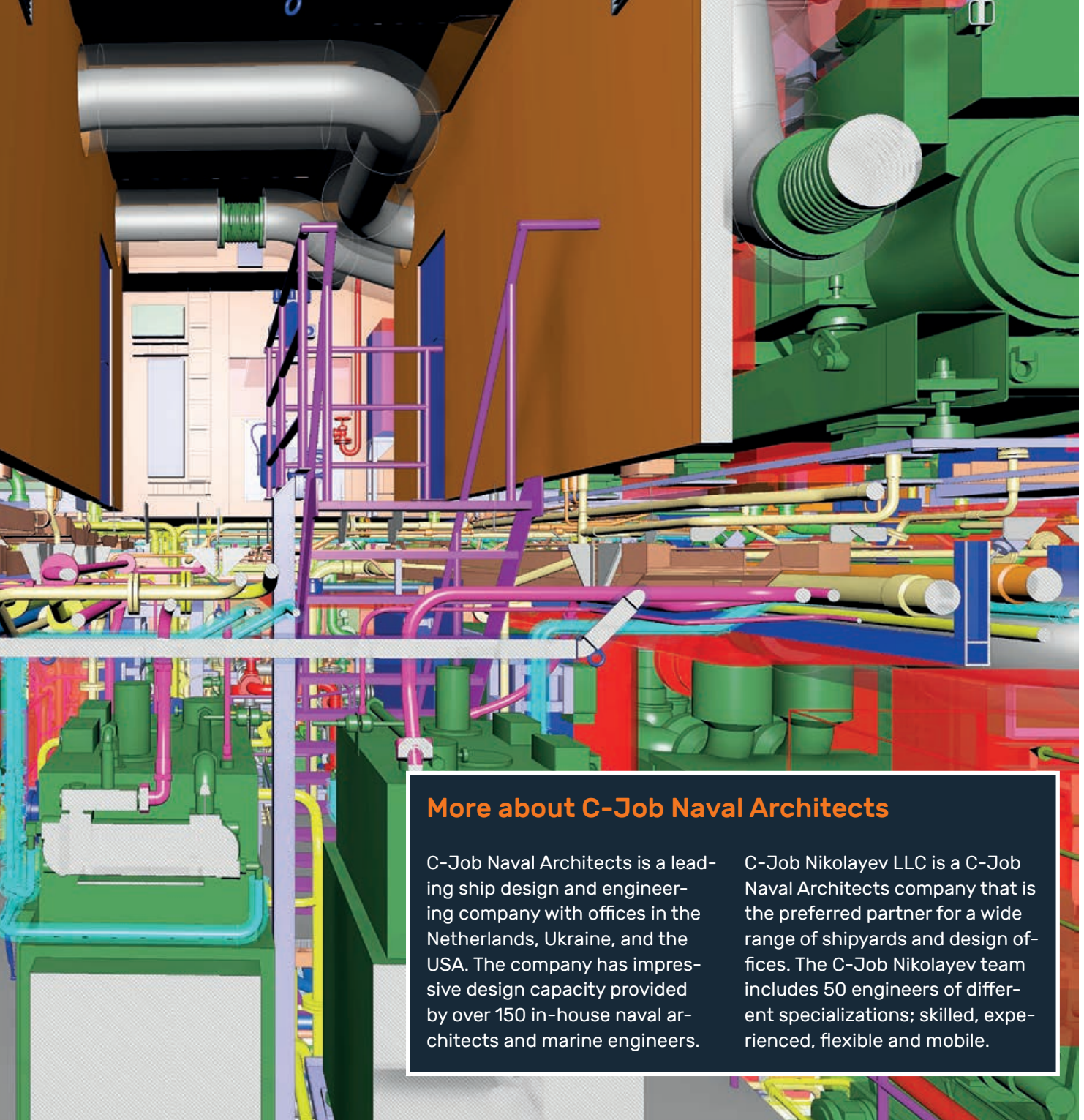
The number of engineering projects with laser-scanned data as inputs has significantly increased in the C-Job Nikolayev portfolio over recent times. Andrey says

that C-Job Nikolayev has successfully delivered more than 20 “point cloud designs” from 2018 to 2019.

“With CADMATIC solutions, working with laser-scanned data is fast, easy and efficient nowadays. The opportunity to examine an existing ship model with a laser scanner is advantageous

compared to traditional ways of handling such projects. To sketch a new model, we need to refer to existing equipment placement in order to avoid equipment collisions. The point clouds give us a starting point with gaps we need to fill.”

Andrey explains that the use of point clouds does not only improve



More about C-Job Naval Architects

C-Job Naval Architects is a leading ship design and engineering company with offices in the Netherlands, Ukraine, and the USA. The company has impressive design capacity provided by over 150 in-house naval architects and marine engineers.

C-Job Nikolayev LLC is a C-Job Naval Architects company that is the preferred partner for a wide range of shipyards and design offices. The C-Job Nikolayev team includes 50 engineers of different specializations; skilled, experienced, flexible and mobile.

efficiency during surveys of client facilities, but also increases the accuracy of the final 3D model.

"At C-Job Nikolayev we use point clouds not only for retrofit projects, but also for newbuild designs. It is a challenge to design a new vessel with laser-scanned data from the client that provides

an obligatory layout for machinery solutions. No ship is the same, but it is a good idea to use the client's best and known practices. While developing documentation, we need to manage changes fast and effectively. Point cloud implementation ensures project accuracy based on an existing ship model

and that there are no unfortunate surprises during installation."



Introducing Johan Knap:

Team Leader, Outfitting Customer Services

Who is Johan Knap?

I was born in the Dutch town of Assen. I grew up with many siblings and family is very important to me. I am a husband to the love of my life, Ine, and since last November, the proud father of our son Nathan. My faith in God is very important in my life and I believe that you should count your blessings no matter what surprises life has in store for you. In my free time, I like to play chess and table tennis.

How and when did you end up at CADMATIC?

I graduated in 2000 from the Hanze University of Applied Sciences in Groningen, with a bachelor's in electrical engineering. I have an affinity for software: my first acquaintance with software was at a young age when I wrote basic scripts with Commodore64.

After graduating, I wanted a job where I could combine engineering and software. When I came across Numeriek Centrum Groningen, now CADMATIC BV, it seemed a good match. I have never regretted my decision. In the first year, I was a junior software developer for CADMATIC Hull and switched to CADMATIC Outfitting support later.

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

I am the Team Leader for outfitting customer services in Groningen. Together, we try to serve our clients

as best as possible by helping them with their questions, issues and requests. Besides answering direct requests, I also try to optimize the way our customers use CADMATIC. I hope that our customers feel encouraged to contact us; the only stupid question is the one that has never been asked. I occasionally also do customization jobs for customers, from specifications to building software macros.

What are the most typical support requests you get from customers?

Incoming support requests differ greatly: you never know what's next. This variance makes every day exciting. It's like doing puzzles, some you know instantly, others require thorough and systematic examination by asking the right questions and analyzing data. Customers can usually find answers to basic questions internally, so when a CADMATIC administrator contacts us, the challenge is often more significant. When the same issue pops up frequently, it is a signal to improve the documentation or the software.

What are the most challenging aspects of your work?

The most challenging part of my work is avoiding tasks piling up on my to-do list. As our customers have tight schedules, our answers or solutions are only useful if provided timely.

I am proud to be a member of a global team that has received very positive feedback from our customers. At the same time, I strive for personal improvement in aspects of my work where needed.

What do you like most about your work?

I like finding solutions to challenging issues or building software scripts to utilize CADMATIC for the specific needs of a customer. I have a lot of contact with customers, an aspect of my work I appreciate very much. I like helping them to deal with questions or challenges. It can be done by email, but also by more direct contact via the phone.

The most important reason I have enjoyed my 19 years at CADMATIC is the atmosphere of mutual respect in the company. It is like a big family, which does not mean that everything is perfect because it's not. In this sense, it is like a real family. There is a sense of a common purpose and a willingness to put one's shoulder to the wheel, to work together to achieve mutual goals.

Our customer base is growing fast. It is nice to see that the number of CADMATIC employees is likewise growing in all departments. This year already we have several new application specialists that have reinforced the support team. I think part of professional enjoyment is also having the resources to do your job properly.



The typical idea of a software support person is someone who works alone with a headset. Is that accurate?

No, that is not accurate. Most of the time, I do not have a headset on as requests are commonly sent via our online web-based support portal. I do have to work on my own at times, but teamwork is essential. All emails sent to our support team automatically result in a new ticket. Globally, we have a team of 30 outfitting application specialists in many countries. We are responsible for handling all the tickets and other tasks such as training. We have

close contact with each other, in weekly meetings, direct contacts, or exchange programs. This makes it easy to consult each other. The support persons on the phone are not left alone: they are backed up by an international team, software specialists from our product creation department and our technical director.

One of CADMATIC's values is succeeding together. What does this mean to you?

Last summer, I went on holiday with my wife and son. From the road, we saw a few shipyards that

all use CADMATIC. When I see the amazing end products our customers make, be they yachts, cruise ships, naval vessels, or dredgers, it makes me proud to be a part of the CADMATIC family. I am happy to contribute to our customers' success. Our driving force and strength is succeeding together, building the future.

GONDAN scaling new heights with CADMATIC





Spanish shipbuilder GONDAN has a rich maritime history that stretches back more than 90 years. The family-owned company has built over 300 vessels with greatly diverging specifications. In May 2017, the shipyard took the leap to invest in more powerful design software with the implementation of CADMATIC Hull, Outfitting and the design review tool eBrowser.

GONDAN operates from three facilities within the environmentally-protected area of the Eo River estuary. The facilities are in the town of Castropol; the main shipyard is in the port of Figueras, while it also has a steel-cutting workshop and large equipment warehouse in the Barres Industrial Park. Altogether, GONDAN's facilities cover 43,000 m² with an annual processing capacity of 3,000 MT of steel.

In mid-2017, after more than 20 years of working with a first-class Spanish naval design software, GONDAN decided to take a leap of faith and change to CADMATIC.



The VILJA icebreaking tug was delivered in June 2019. It does duty in the of the northern Gulf of Bothnia.

"After studying different options and managing the doubts and fears, the decision was taken to bet heavily on CADMATIC and sign the contract to implement Hull, Outfitting and eBrowser," says GONDAN Technical Office Manager, Javier García Llana.

Javier adds that the biggest challenges in implementing CADMATIC were changing from Spanish to English and overcoming the natural resistance to change.

"It is natural for people to want to stay in their comfort zone and use familiar tools and processes, so this is something you have to

manage with any change. After a reasonable adaptation period, the implementation was fast and smooth."

Noticing improvements

Javier indicates that they have been able to boost their capacity with the use of CADMATIC.

"GONDAN is a medium-sized shipyard, and even though it has a sizeable technical office, our ability to increase capacity locally is limited. Projects are more complex nowadays and delivery times are shorter. We therefore felt that a new powerful tool was needed

to allow us to work with external designers and to increase our capabilities. CADMATIC has helped us to achieve this goal. CADMATIC's ability to distribute design work seamlessly to our partners is one of the most appreciated features."

Javier adds that the entire process of distributing design tasks works smoothly.

"We don't see any disturbances in our daily work, and we have complete control of the whole model. We think this is the best way to improve our delivery times without losing quality."

GONDAN used CADMATIC for the structural and outfitting design of the VILJA icebreaking tug.



VILJA icebreaking tug project

The design of the icebreaking tug VILJA was the first CADMATIC project at GONDAN. The hull of the vessel was launched in October 2018 and the vessel was delivered in June 2019.

The compact icebreaker is the most powerful hybrid escort tug of this size in the world. It is equipped with an innovative hybrid propulsion system featuring diesel main engines, shaft motor/generators and batteries. The provides great operational flexibility and results in lower maintenance costs, reduced emissions and fuel savings. The

tug is fully customized to operate in extreme climate conditions in the icy waters of the northern Gulf of Bothnia.

"I don't know if CADMATIC is the best naval software, but it's probably the one that best suits our needs today."

GONDAN was responsible for all the structural and outfitting design of the vessel.

"Besides being the first project in CADMATIC of a new complex vessel, we had the added challenge of a generational change with several people who were working in critical design phases. Curiously, the senior draftsmen adapted very easily to the new tool, which shows how easy it is to learn."

Steady increase in CADMATIC use

Since the first implementation of CADMATIC there has been a steady increase in the use of the software. After starting with Hull, Outfitting



Javier García Llana indicates that GONDAN has managed to boost its capacity with CADMATIC.



3D model of fishing stern trawler designed by GONDAN.

and eBrowser, GONDAN is currently testing the CADMATIC information management tool eShare to gain more control over project statuses. The shipyard also plans to start using CADMATIC Diagram in future projects.

GONDAN is currently designing two fishing stern trawler designs with CADMATIC. The 77m and 70m vessels will do duty in Norway. The

basic design was performed externally. GONDAN is collaborating with an external company to conduct the steel detail engineering, while the outfitting detail design is being done exclusively in-house.

"After the delivery of VILJA and with the two new fishing vessel projects we can say that the implementation of CADMATIC has been a success, despite the expected

challenges. We have reached a very important level of development and with new growth objectives in Diagram licenses, eShare, and connection implementations with our ERP system."

GONDAN
SHIPBUILDERS



NAVA masterclass in BWT retrofit projects

You name it. We do it. This is the apt company slogan of versatile Gdańsk-based ship design company Nava. The company provides an exceptionally wide range of smart engineering services to the Marine sector.

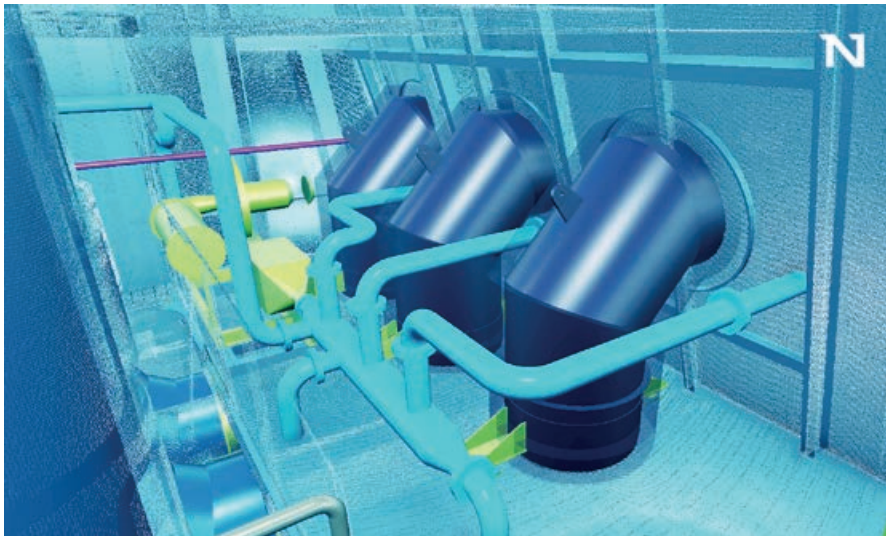
Nava implemented CADMATIC software around 2005/2006. According to Paweł Strzelec, from Nava, the user-friendliness of the software is greatly appreciated. Nava uses CADMATIC for newbuild design and reverse engineering of ballast water treatment systems (BWTs) and exhaust gas cleaning systems (EGCS).

"We can design in 2D and then visualize the whole project in 3D. CADMATIC allows us to easily present the results of our hard work to our clients in eBrowser," says Paweł.

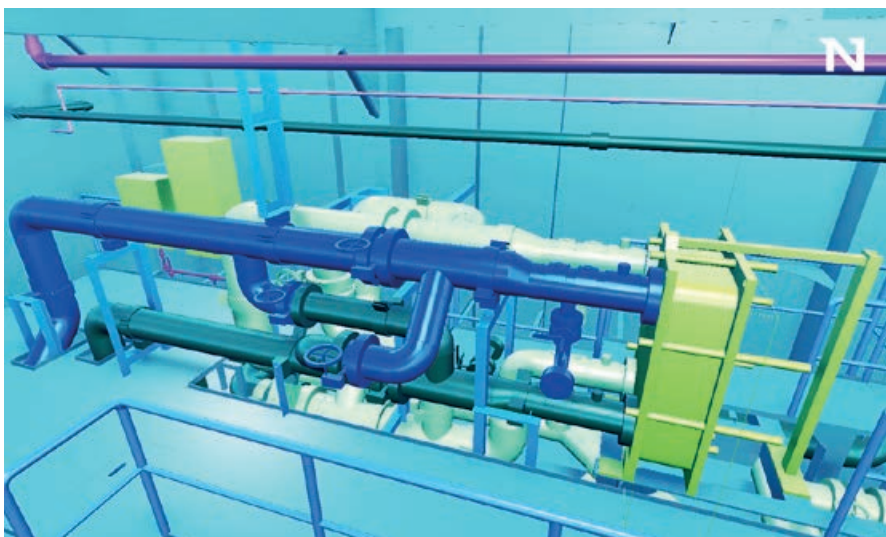
BWT retrofit demand growing

Paweł indicates that the demand for BWT retrofit projects has been growing rapidly over the last few months. Nava expects this growth to continue. The Ballas Water Management Convention entered into force on 8 September 2017, but shipowners have until 8 September 2024 (depending on planned IOPP renewal survey date) to install BWTs onboard.

"The renewal survey dates are being planned right now, so there are more and more BWTs retrofits that need to be done prior to this date. It is a massive challenge to deliver projects at short notice, but



CADMATIC 3D model images from retrofit projects designed by Nava.



With CADMATIC point clouds you can easily and precisely arrange complete retrofit projects.”

we are ready to meet this challenge. We started working on BWT retrofit projects several years ago, so now we have all the necessary knowledge, experience and resources to deliver top-quality engineering,” Paweł explains.

From Nava’s perspective, the greatest challenge related to BWTS projects is the tight schedules, followed closely by the restricted space available on vessels for the systems. For older vessels, all the required documentation is also not always available. In such cases, Nava relies strongly on laser-scanned point clouds and data gathered during onboard surveys.

“The ballast water treatment integration interferes with the existing ballast system. These retrofits include more than just locating new equipment on board and designing related piping and structures. In order to get it right, we need to see the bigger picture, such as giving consideration for how the vessel operates its ballast system. We have to ensure that none of the vessel’s current functionalities are compromised,” says Paweł.

CADMATIC is efficient tool for retrofit projects

Paweł says that CADMATIC is very efficient in handling retrofit projects. He indicates that the software is dedicated to marine projects and that it contains many built-in functions that are helpful for the user, for example the ability to show the distance and location

in relation to the vessel’s frames and longitudinal stiffeners.

Nava also makes use of the CADMATIC distributed design system to share design work between teams.

“As most of our retrofit projects have very tight schedules, it is also crucial that CADMATIC allows multiple engineers to work simultaneously in the same model and for them to see changes made by other team members in real time. CADMATIC handles point clouds without any problems and makes it easy to avoid collisions with existing structures and piping. Using CADMATIC point clouds you can easily and precisely arrange complete retrofit projects,” says Paweł.

Retrofits step-by-step

Typically, the first step in a Nava retrofit project entails an inspection

on board and 3D laser scanning. When the point cloud has been processed, it is positioned correctly in CADMATIC in relation to the vessel’s coordinates.

After this, a feasibility study is conducted to determine the best place on board for new equipment and piping. If needed, existing piping and structures are modeled in the area of the planned installation. Thereafter, the layout of new piping and structures are designed. When the 3D model has been completed, Nava generates the fabrication and installation documentation.



Nava in a nutshell – You name it. We do it.

Nava is a leading ship design office located in Gdańsk, Poland. Since 1992, Nava has delivered bespoke engineering services to major companies all around the world. Today, Nava has over 25 years’ experience, over 100 specialists and a palette of cutting-edge software solutions and creative tools at its disposal. The company’s services include:

- Virtual & Augmented Reality
- 3D Laser Scanning
- On-Site Quality Control & Supervision
- Naval Architecture & Marine Engineering
- Ballast Water Treatment Systems BWTS
- Exhaust Gas Cleaning Systems
- Ship Spare Parts

New Software Features

CADMATIC's 2019T2 software release is packed with exciting new features in Diagram, Outfitting, Hull and Information Management. This article highlights some of the new features.

Diagram

Template configuration and exporting object information to Microsoft Excel

The new Diagram listing configuration tool considerably reduces design hours as designers do not need to spend time creating documents and ensuring that format is consistent and correct.

When the project administrator has created suitable listing configurations for a project, designers can generate diagram object documentation at any time, either from the active diagram or from the whole project, using a single button. Designers can, for example, generate data sheets for all equipment in an active project, or a list of all valves in a whole project.

Move and break connections

The Move and Break Connections tool allows moving a set of objects so that connection lines are broken off from the objects that are not

included in the selection box. This is useful, for example, when relocating branches in P&I diagrams or organizing cables in electric diagrams. The tool automatically breaks off the connection lines, either from the side of the object or from the end of the connection

lines, depending on what the user has selected.

Different node types for pipes, instruments and cables

Node Properties has a new setting, Node Type, which allows the designer to select whether the

Tools

- Catalog Mappings
- Consistency Check
- Follow Up
- Work Requests
- Listing**

Listing from Active Diagram

Listing from Project

CADMATIC PLANT DEMONSTRATION PROJECT

Valve Position ID	Operating temperature	Operating pressure	Design temperature	Design pressure
V005	75°C	15 bar	-15 - 75°C	15 bar
V010	75°C		-15 - 75°C	
V006	75°C		-15 - 75°C	
V014	75°C		-15 - 75°C	
V001	155°C			
V129	65°C			
V127	65°C			
V013	155°C			
V001	155°C			
V008	155°C			
V018	75°C			
V987	75°C			
V801	75°C			
V011	75°C			
V123	155°C			
V012	75°C			
V121	75°C			
V009	75°C			
V002	65°C			
V007	65°C			
V016	65°C			
V015	65°C			
V004	155°C			
V0136	65°C			

CADMATIC DATA SHEET

TUBE HEAT EXCHANGER

Doc. no. D-456789 Rev. 1.3 Date: 10.05.2019
Proj. no. P-456789K Drafted: LEH
Equipment no. 1001 Checked: KMS
Heat exchanger Confidential

Client: Customer 1
Plant: Beverage
Project: P-456789K
Reference: Tube heat exchanger

TYPE: vertical/horizontal/vertical
orientation: vertical
bundle: bundle

PERFORMANCE OF ONE UNIT

SHELL SIDE		TUBE SIDE	
IN	OUT	IN	OUT
150 000	150 000	23 000	23 000
150 000	150 000	128 000	128 000
1000	670	1000	1000

Fluid circulated: Hot water with some impurities
Total fluid entering: 150 000 l/s
Composition of fluid:
Liquid without H₂O: 150 000 kg/h
Water: 150 000 kg/h
Vapour without H₂O: 150 000 kg/h
Steam: 150 000 kg/h
Non condensables: 150 000 kg/h

Input with: Density: 1000 kg/m³
without: Dynamic viscosity: 670 cP
H₂O: Specific heat: 4.18 kJ/kgK
Latent heat: 2257 kJ/kg
Max WT: 150 000 kg/h
Vapour with: Density: 1000 kg/m³
without: Dynamic viscosity: 670 cP
H₂O: Specific heat: 4.18 kJ/kgK
Latent heat: 2257 kJ/kg
Thermal conductivity: 0.6 W/mK
Velocity: 70 m/s
Temperature: 148 °C
Max WT of non condensables: 148 kg/h
Number of passes: 2
Operating pressure: 400 bar abs
Pressure drop: 21 bar abs
Pressure resistance: 21 bar abs
Total heat transferred: 1500 MW
Transfer rate: 1500 MW
CONSTRUCTION OF ONE SHELL
Design pressure: 1500 bar gauge
Design temperature: 180 °C
Nozzles: Shell side, INLET
Tube side, INLET
Materials: Plates: 4)
Tubes: 4)
Channel: 4)
Code requirements: SHELL TUBE PLATE
Corrosion allowance: 4)

REMARKS:
1) Wash liquor is a mixture of:
2) Supplier to propose.
3) Volume flow approximately 150 m³/h. Density approx. 1000 kg/m³. Dry content approx. <5%.

Generation of diagram object documentation from active diagram or whole project.

node is a generic node or specific to pipes, instruments or electric cables.

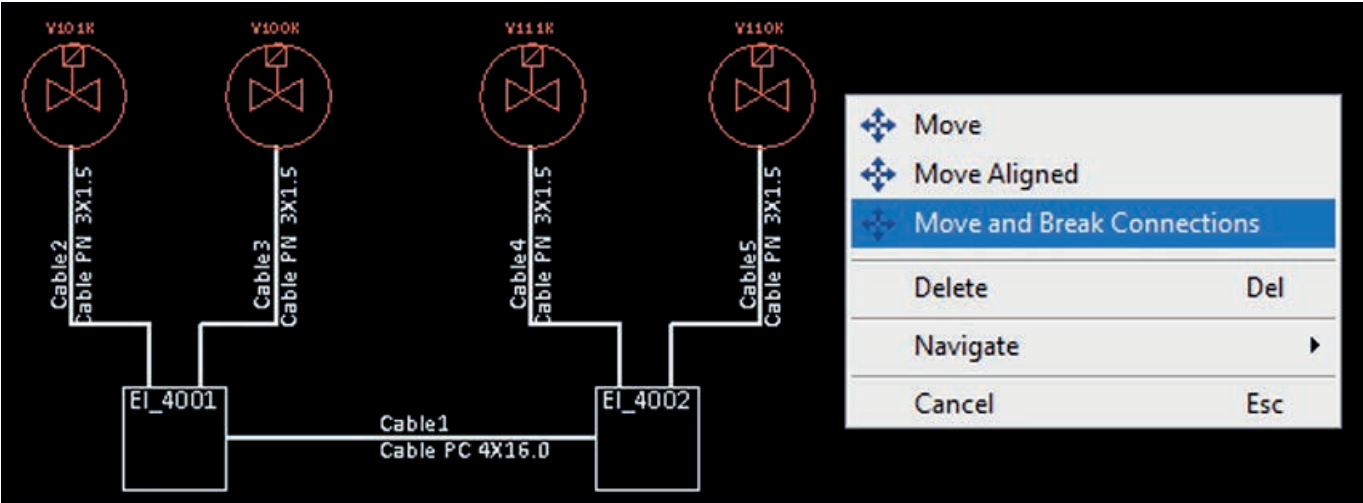
This is a first step towards allowing future Diagram versions to perform consistency checks for nodes and to report topology more precisely.

File import enhancements

The Import objects tool has new features for redesign and using parts of diagrams in other diagrams or the same diagram.

The user can select which data columns to display so that it is easier and faster to select objects

for modification. The tool displays the old position IDs of the imported objects, allowing them to be pre-served, if needed, and new position IDs can be generated with a script that defines how to replace old IDs with new ones.



Node Type: Generic

Node Name: Electric

Selection of node type.

Connection lines are broken off from objects when moving an object set, if objects are not in selection box.

Configuration of column display in file import to ease object selection for modification.

Import objects

Collapse All Expand All Columns

Object Type	Position Id	Old Position Id	Object Id	System in Diagram	Line in Diagram
Pipeline	FRESHW3		QS4VGIALGD_7...		
System	Equipment		5z0wZRBQHOs...		
Pipeline	PULP01		T55JNT1vGL_7C...		
Armature	V042		RcDaVU3uSIJp...	PULP	PULP01
Piperun			8ffZmq1HHGM...	PULP	PULP01
Piperun			fSR6GQ_KikUW...	PULP	PULP01
Pipeline	FRESHW5		.jmiFIEZihEu_k...		
Pipeline	FRESHW1		ccOD6M3bGjlg...		
Pipeline	PULP03		hQOK3mN5Hto...		
Pipeline	PULP04		Zr3lzhT6G1YTza...		
Pipeline	FRESHW4		KMrA_GmwJUo...		
Pipeline	PULP02		c12q9lqPGr6ZO...		

☒ Link objects

Edit Object
Generate Position Id
Generate Position Id via Script
Use Old Position Id
Assign to System
Assign to Pipeline

Ok Cancel Help

Outfitting

Support for more point cloud file formats

In addition to previously supported file formats, Laser Scan Modeller can import E57 files (vendor-neutral, binary format), PTX files (ASCII format of Leica Cyclone software), and CPX files (binary format produced by eShare server).

Enhanced point cloud manager

In Point Cloud Manager, the new **Rescale** tool allows both active and inactive point clouds to be rescaled. The **Relocate** tool can now also be used on point clouds that are not active.

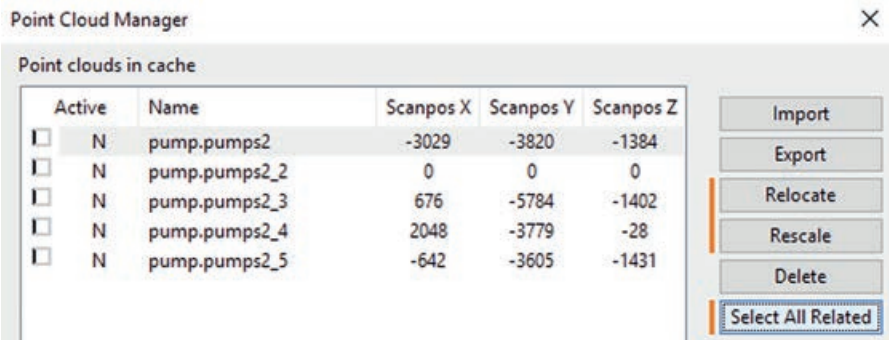
When an imported file contains multiple point clouds, they are now stored as separate CPD files, and the original file name is used as a prefix for the new files. Clicking **Select All Related** selects all files with a name prefix that is the same as that of the currently selected file.

Bubble views shown as 3D images in Laser Scan Modeller

Opening a bubble view generates a 3D panorama image from the point cloud data, instead of showing it as points. The optimized image increases the quality of the view, providing a better user experience. As before, the user can rotate the view around the scanner position, zoom the view, and jump from one bubble view to another. If needed, it is possible to switch back to using traditional point cloud views instead of panoramic pictures.

Support for new duct shapes

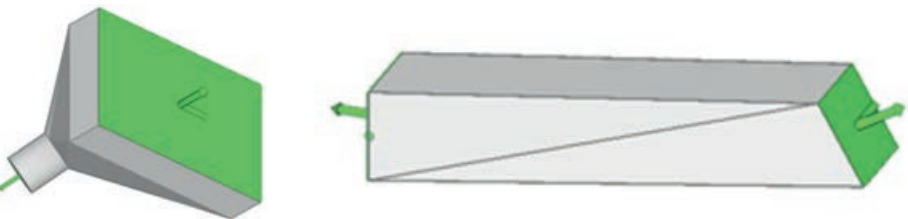
In CADMATIC 2019T2, there is support for new duct shapes. Both rectangular to round transitions as well as rectangular angled transition is now supported.



Both active and inactive points clouds can be rescaled.



3D panoramic images are generated from point cloud data in bubble views.



New duct shapes: Rectangular to round angled transition (left) and rectangular angled transition (right)

Part numbering rules for duct spool documents

Duct spools that consist of more than one part can now be assigned separate part numbers for each part. Duct spool numbering uses settings that allow the project administrator to define how part numbers are generated for duct spool parts and to choose whether publishing a new revision requires new/changed parts to be assigned completely new part numbers.

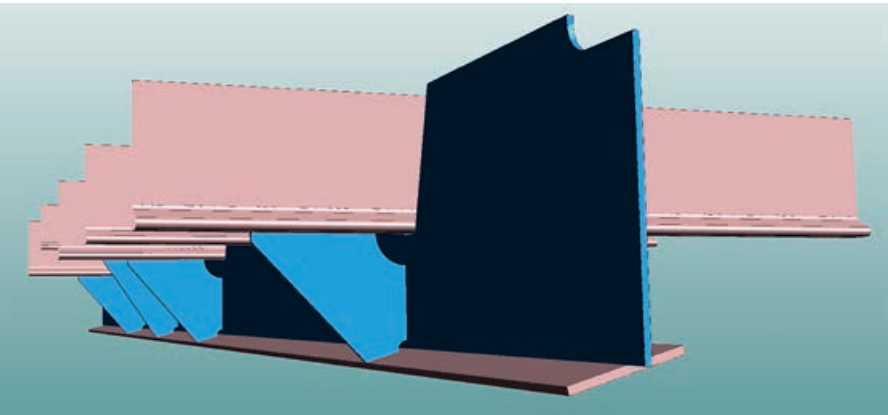
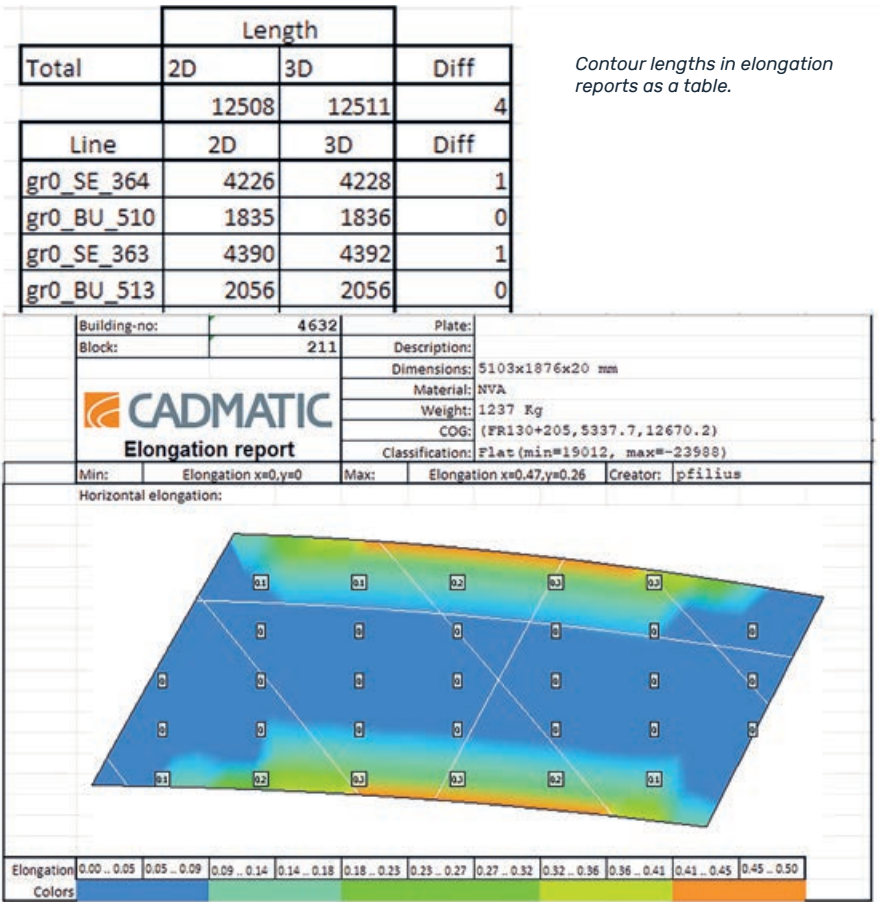
Hull

Developments in Shell application

Contour lengths are now available in elongation reports as a table. The table contains the length of each shell plate contour relation and/or the total contour length. The system calculates the contour length in 2D and 3D for each relation. This information can be used for checking the contour length before and after deformation. Elongation totals along the contours are presented as “Diff” values. They are calculated with a formula in the Excel sheet cells.

Face plates

The face plate functionality has been improved so that the user now has more flexibility when inserting and modifying face plates.



A wide range of options are available when inserting and modifying face plates.

With the new face plate function, the user can create a face plate on more than one plate contour, even when the plates do not have the same thickness. The system automatically makes a distinction between straight and bent face plates. When a face plate is straight, the angle between the plate plane and the face plate can be adjusted.



Related plates are automatically adjusted to the correct face plate plane.

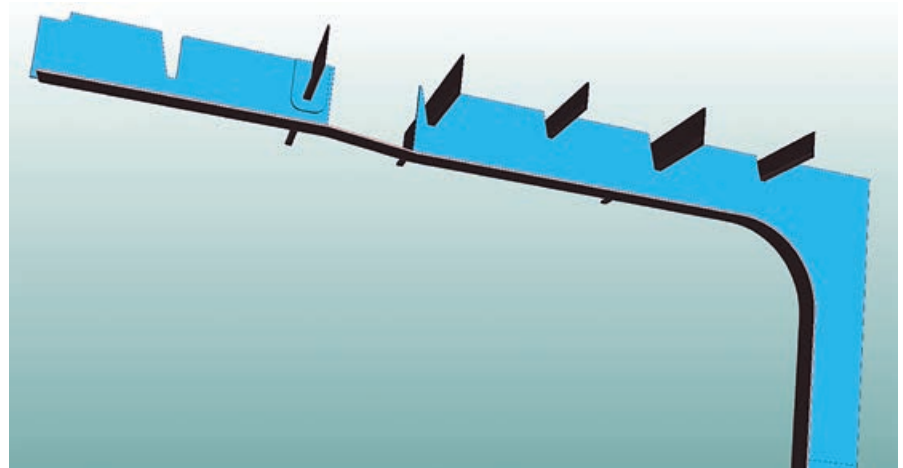
Information Management

eShare

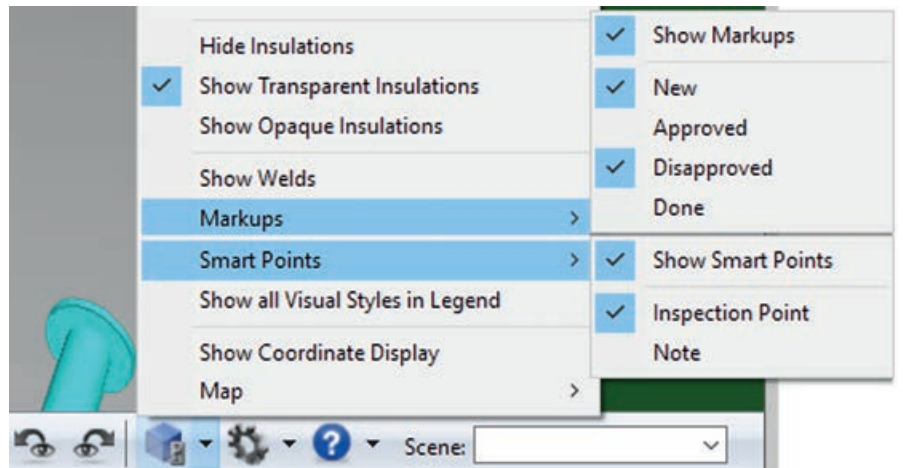
Infrastructural improvements allow eShare to operate more quickly than before. The server starts up faster, model publishing is faster, and because documents that the user opens are now cached, they are faster to re-open. There is also automatic handling for DWGs that do not have a proper print layout stored in the file, so that even very large DWG documents get scaled down to a more manageable paper size.

Built-in document viewer

eShare is no longer dependent on third-party PDF viewers. By default, documents are viewed using a built-in document viewer that automatically zooms in to the correct object when the user clicks a document link in the 3D view or uses the search. The search tool of the document viewer allows a text string such as an object ID to be found from any part of the links in the document, or the user can narrow the search to a specific tag such as an *Equipment Position Id*.



Face plate relations are like the relations of bent profiles. In this example, the face plate uses the crossover to jump from one plate corner to another.



Adding smart points and markups to a model when in point cloud bubble view.

Enhancements in 3D

In the main tool, the **Visualization Control** menu has new options that allow the user to select which markup statuses and smart point types to show as points of interest in the 3D view.

In addition, smart points and markups can now be added to the model when in point cloud bubble view.

eShare and eBrowser – more point cloud formats supported

E57 and PTX point clouds can now also be added to the point cloud folder of eShare projects. The server automatically converts them into CPX files that have a much smaller

file size and are therefore better for viewing in eShare and eGo clients. In eBrowser, the user can open E57, PTX, and CPX files.

eGo – Connection points in 3D View

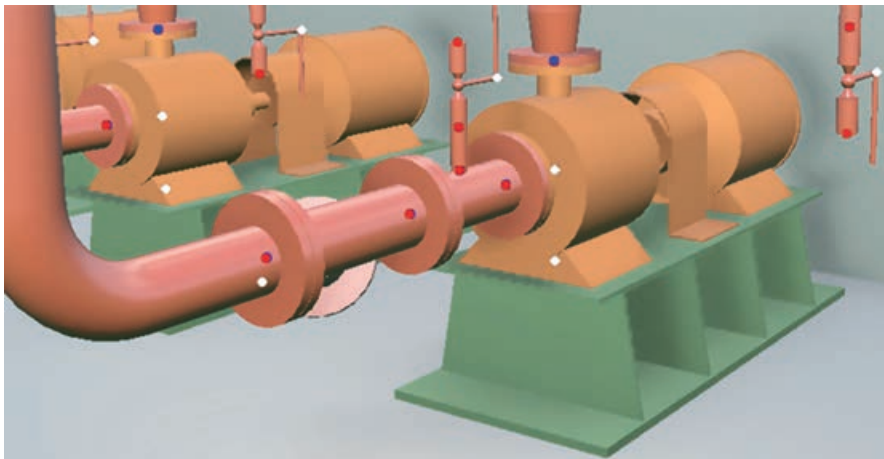
In **Model Settings > Visualization / 3D**, the **Connection Points** setting allows the user to select whether equipment nodes and pipe nodes are displayed in the 3D view. When connection points are displayed, the measuring tool can snap to them.

Improved access to documents

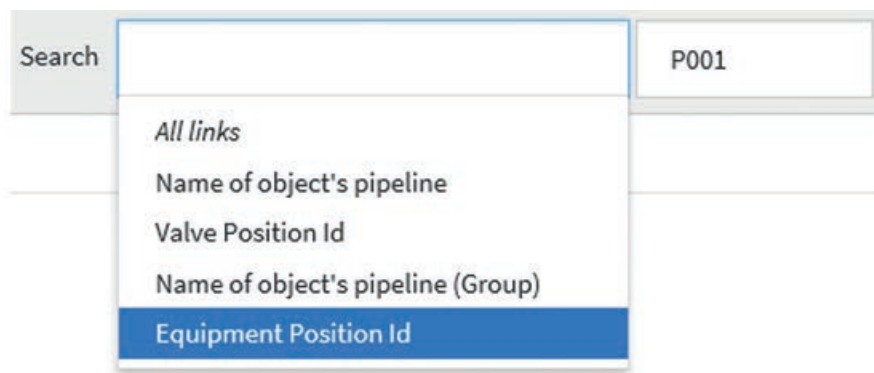
All document trees and document hierarchies are now synchronized

from eShare, and the user can easily select which hierarchy to use to arrange the document tree in eGo. When opening a document, the built-in document viewer limits the total number of pages to ten so that all documents open relatively quickly; documents that are longer than that should be opened in a separate viewer application. When using the search tool of the built-in document viewer, the user can see the number of search results. Jumping from one result to another automatically zooms in to the object in question.

When eGo is connected to eShare, documents show the document metadata from eShare.



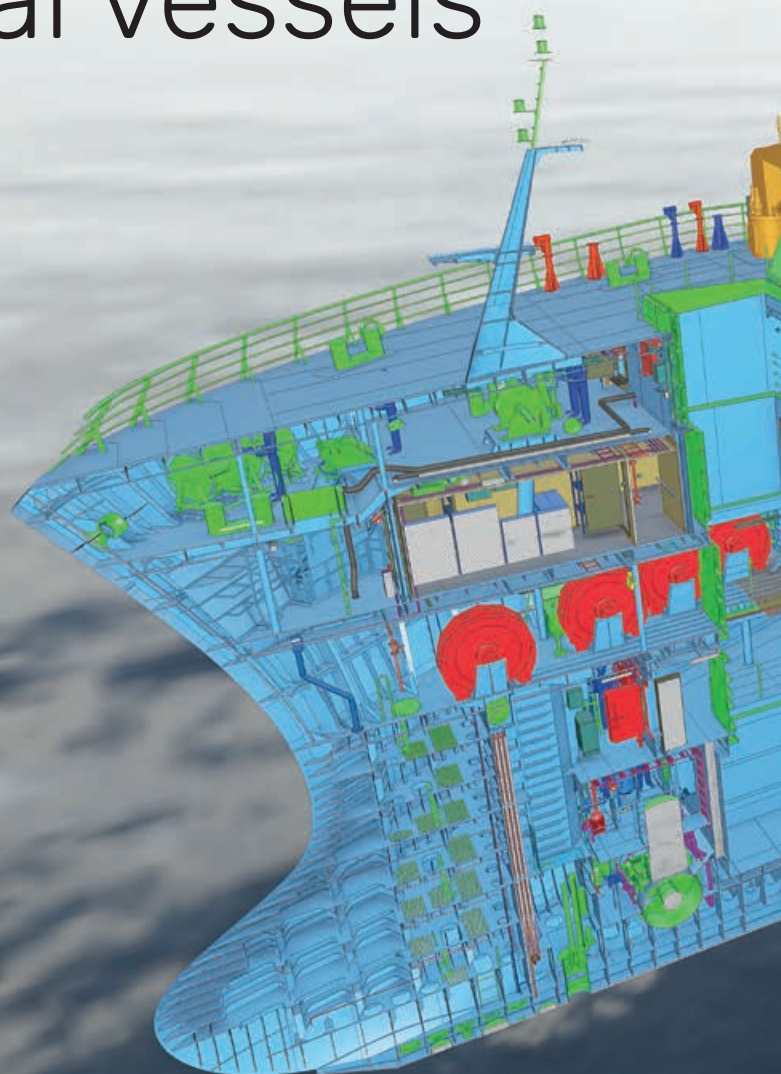
The user can select whether equipment and pipe nodes are displayed in the 3D view.



Searching for a text string, e.g. object ID from any part of the links in a document.

Petrobalt designing safe and functional vessels

Design Bureau Petrobalt was established in 1995. The St. Petersburg-based company is an experienced CADMATIC user that focuses on the basic and detail design of various types of vessels.



Petrobalt designs vessels for both Russian and foreign customers and conducts research and development tasks in the shipbuilding sector. The development targets include, among others, feasibility studies, optimization of transport schemes, the preparation of technical proposals, tender and contract documentation for the

construction of new vessels, as well as technical/classification ship projects.

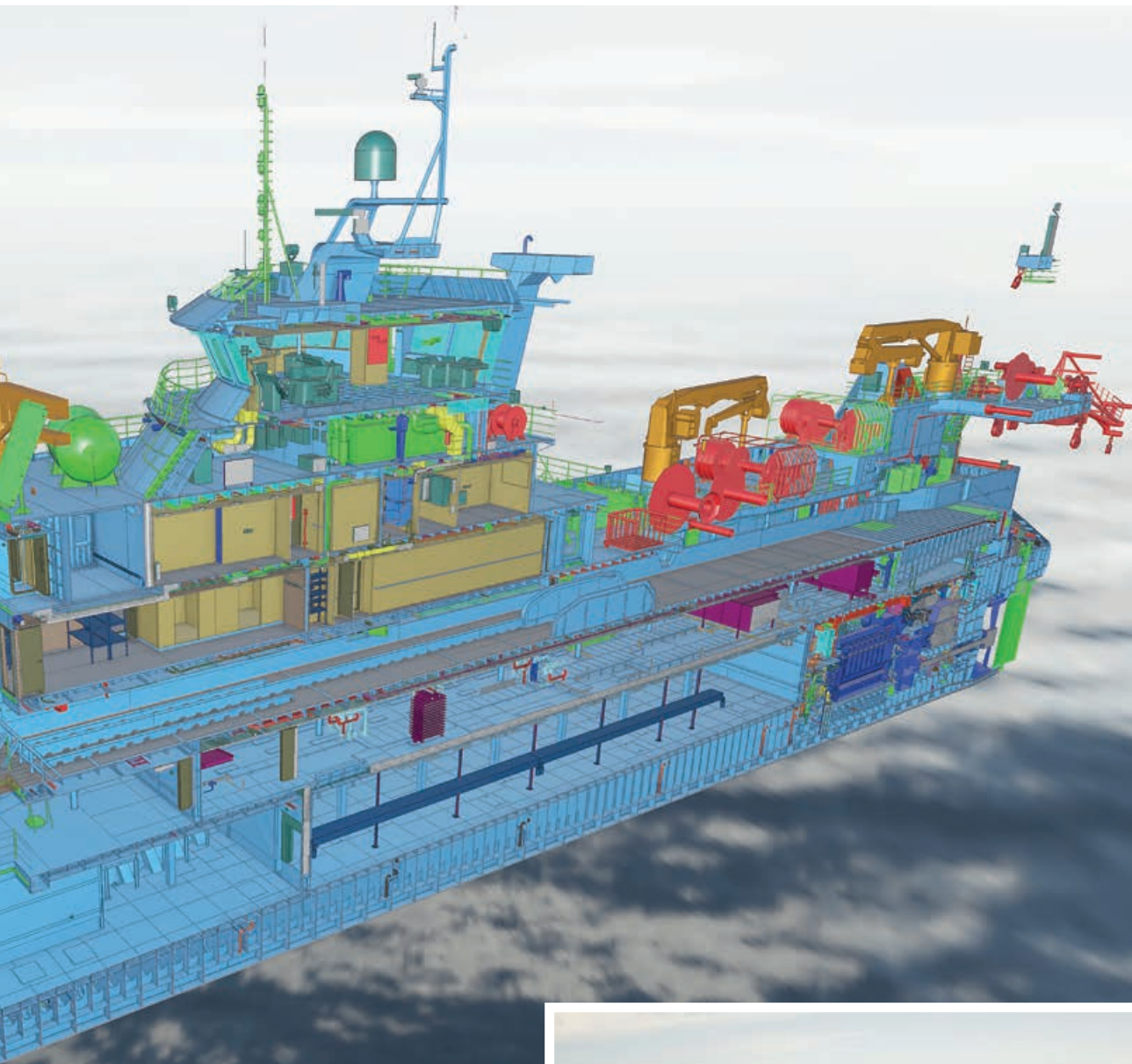
Hull and outfitting design

Petrobalt uses CADMATIC Hull for 3D hull modeling with full details of the planes and curved structures of the hulls, superstructures and the foundations of main and

auxiliary mechanisms, devices and outfitting.

Petrobalt Chief CAD Engineer Ramil Bagautdinov says that with CADMATIC they can generate a complete environment for creating functional and safe vessels.

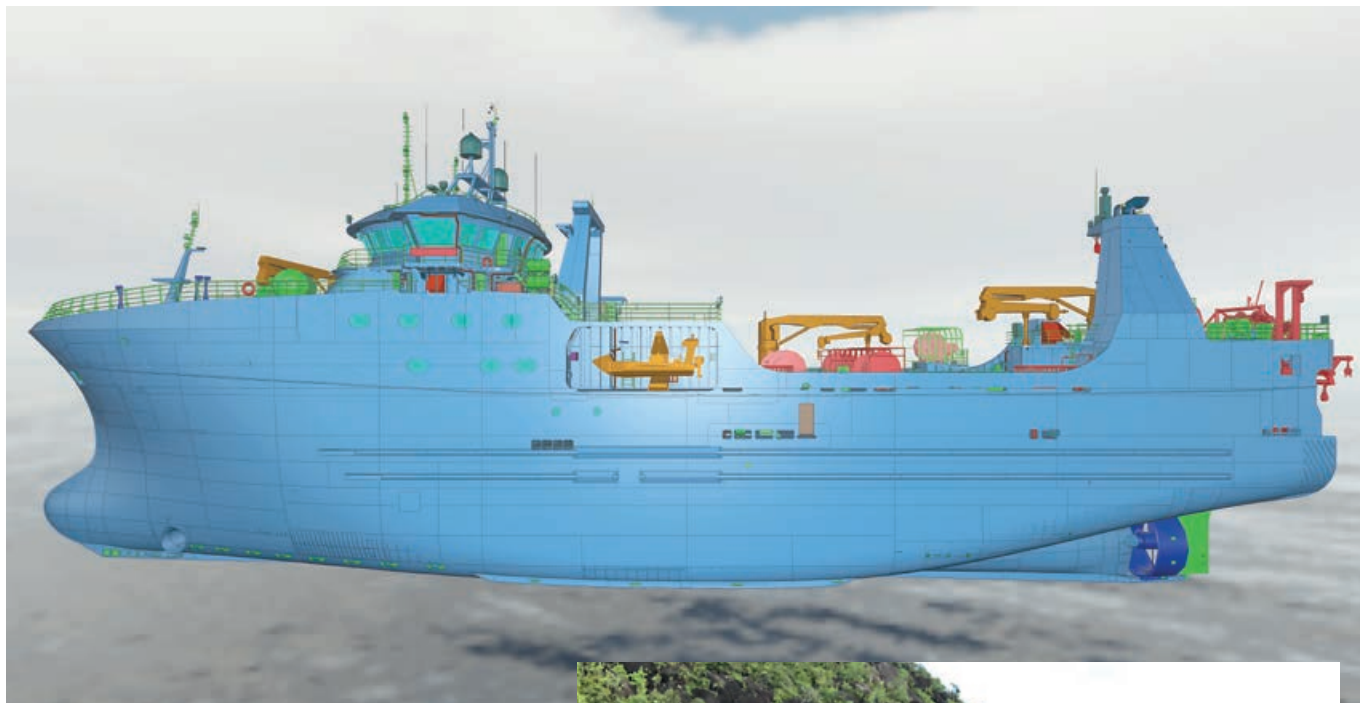
"The 3D model of the vessel helps to determine the best options for the relative positioning



3D model of approx. 3787 GT fishing vessel designed by Petrobalt.

of ship equipment, pipelines and cable routes. After working out the pipelines in the 3D model, we generate sketches of the pipes that have all the necessary information for manufacturing. We also use CADMATIC to create drawings for the installation of equipment, ship devices, pipelines and electric routes,” says Ramil.





Petrobalt Chief CAD Engineer Ramil Bagautdinov is happy with how effectively CADMATIC is able to distribute work across design teams.

Ramil further states that CADMATIC assists them to generate technical documentation and data from the model to create production drawings that are transferred to shipyards. They can also export models for the strength calculation of vessels or individual structures.

"When you know all the features of CADMATIC and can use it properly, it is fully suited to the design of vessels," says Ramil.

Petrobalt designers have been particularly happy with CADMATIC's ability to quickly build and adjust structures with reference to the coordinates of the vessel and adjacent

structures. Ramil also indicates that the threshold for new users to start using CADMATIC is relatively low, even for those that are not familiar with shipbuilding CAD systems.

"We are also very happy with the ability to distribute work across our teams in a single project model," Ramil adds. Petrobalt uses the CADMATIC CoDesigner to distribute work between subcontractors for both hull and outfitting design.

Demanding fishing vessel project

Petrobalt recently completed the design of a fishing vessel with CADMATIC software. The project was challenging as the design

office and the customer also made changes to the basic design project, which had to be worked out in the model and detail design and production documentation, in parallel with the construction work of the vessel.

The over 80-meter-long vessel has a gross tonnage of approximately of 3787 GT and freezer cargo capacity of 2050 m³. The vessel can accommodate 46 persons and includes a medical facility.





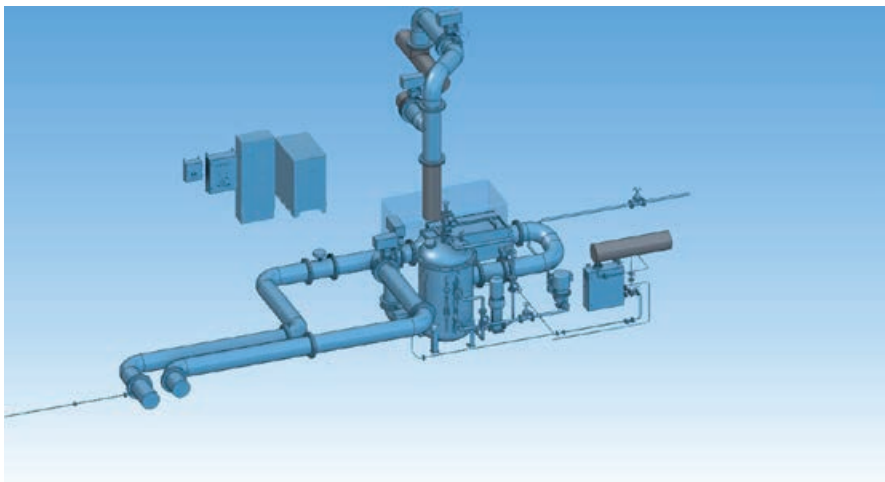
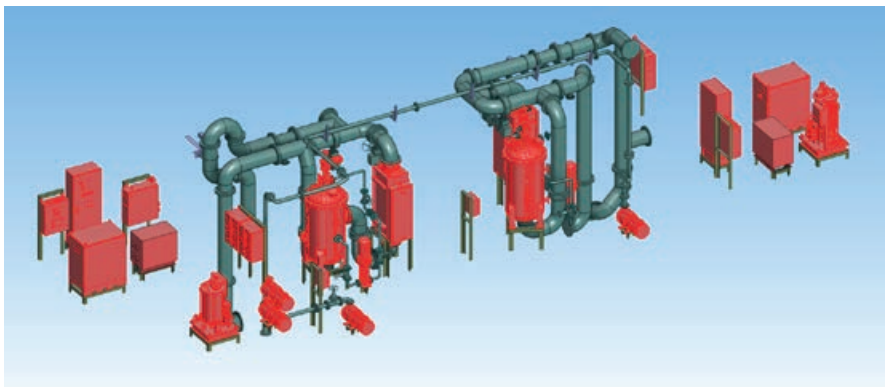
HEADWAY

Boosting ballast water treatment projects in China

In May 2019, Headway Technology Group (Qingdao) Co., Ltd purchased CADMATIC software for the design of modified ship ballast water treatment projects. The high-tech company is headquartered in Qingdao, China from where it provides R&D services and produces and sells high-tech marine accessories worldwide. Headway's OceanGuard Ballast Water Management System (BWMS) is the first non-European brand to obtain DNV Type Approval.

In recent years, Headway has seen strong growth in the number of orders it has received. At the same time, its customers' requirements have also become more demanding. As a result, the company's original design methods could no longer meet the design standards required on the market.

Headway saw this as an opportunity to acquire more powerful design software. They found that CADMATIC's "forward design mode" was in line with Headway's design concept and that it, therefore, allows them to work based on Headway's internal logic of how design projects start and progress.



3D arrangement of piping and equipment in bulk carrier design.

Fast implementation

After software training, Headway directly applied CADMATIC in its latest design project. Mr. Haifeng Lin, who is responsible for designing installation plans for ballast water equipment in ships, indicates that CADMATIC's pipeline generation is very convenient.

"With CADMATIC we can complete design work better and faster."

"We get alerts if there is a collision and the various views help the user to meet design requirements. For example, surrounding images are clearly visible in the tracking view."

In addition, the generated data is extremely accurate. CADMATIC updates features according to users' needs, which helps us to use the software better. CADMATIC's powerful functions fully meet our design requirements."

Advantages in ballast water treatment projects

Ballast water treatment projects are an important business area for Headway. The company's OceanGuard Ballast Water Management System (BWMS) is a high-tech marine product independently developed and produced by the company. It is the first non-European brand to obtain DNV Type Approval in the world. Headway

is also the first BWMS manufacturer to win full-scale DNV Type Approval. The OceanGuard BWMS has already obtained approval by USCG, DNVGL, ABS, BV, CCS, NK, RINA, RS, and certification from mainstream countries.

When asked about the advantages of CADMATIC in ballast water treatment projects, Mr. Lin highlights the following points:

1. Complete and powerful functions such as model creation.
2. The database can be built for file sharing. Multiple people can work on one project at the same time.
3. Automatically-generated piping spools, foundation drawings, BOMs, which greatly shortens the production design time.

Headway headquarters in Qingdao, China.



Headway's compact OceanGuard ballast water management system boasts low power consumption and advanced technology.

According to Mr. Lin, the developments in Headway's scale and business led to greater demands on the integrity and accuracy of designs. The use of CADMATIC has helped the company to cope with these demands.

"With CADMATIC we can complete design work better and faster."



About Headway

Headway Technology Group (Qingdao) Co., Ltd. is a high-tech enterprise that specializes in professional R&D as well as the production and sale of high-tech marine accessories. It also provides a professional after-sales service worldwide.

Headway has an independent R&D center and production base in the Qingdao Hi-tech Park. In addition, it has a subsidiary company in Shanghai, and branch offices in Guangzhou, Shenzhen, Dalian, Zhoushan, Shanhaiguan, Nantong, Huangdao and other cities. Headway has more than 120 service stations in 56 countries around the world, creating a uniquely comprehensive global service system.

Headway's product range covers environmental protection, communication and navigation, automation equipment and other fields.

The internally-developed OceanGuard BWMS has gained a significant global market share quickly due to its advanced technology, compact structure and low power consumption.

Voyage Data Recorder, another mature product to which Headway owns the complete independent intellectual property rights, has successfully been applied to ships around the world.

Headway also produces a range of high-power LED lighting products that are sold around the world.

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 staff in Australia, China, Hungary, India, Italy, Russia, Singapore, Spain and the UAE.

- 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.



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