



Newsletter 2 | Building 313

# Sustainable construction site

DTU Campus Service  
Technical University of Denmark

## Sustainability in the center

DTU is the university where people think, talk, and work together across disciplines and cultures to create a sustainable future.

In the Climate Challenge Laboratory (Building 313), DTU will establish a state-of-the-art research environment and create a platform for new collaborations across institutes and disciplines, researchers, sectors, and companies, all of which work to solve the climate challenge.

That is why DTU CAS puts sustainability at the center when we design and build Building 313.

Read about how we make the vision reality in this newsletter

# A sustainable construction site

In November 2021, we dive into how DTU Campus Service and the main contractor MT Højgaard work with sustainability on Building 313's construction site

Dear reader

At DTU, we strive to develop technologies that create sustainable change and work for society. The Climate Challenge Laboratory, also called Building 313, will provide a framework for a state-of-the-art research environment where researchers across disciplines can develop new solutions to the climate challenge.

DTU Campus Service puts action behind the vision. When we plan our campuses, renovate and build new, sustainability is at the center. In the newsletter you can read how we – DTU CAS, consultants, contractors and future users, actually do it.

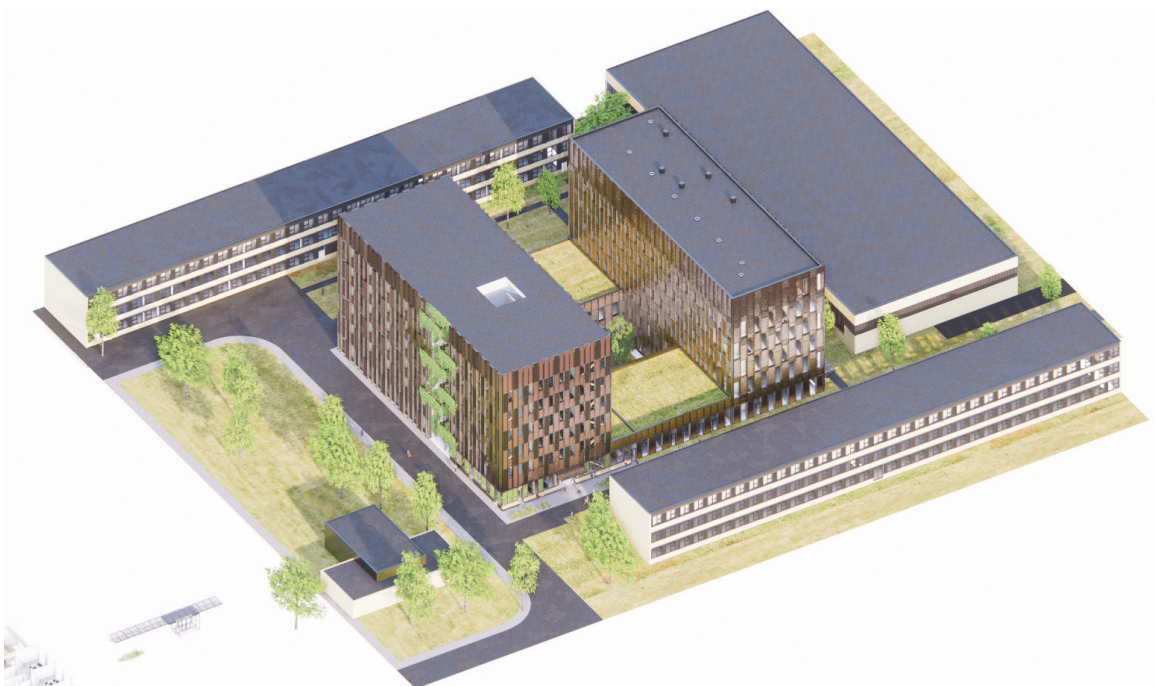
The first activities on the construction site are slowly underway. In the newsletter we are zooming in on the sustainable construction site. You will meet Nicolai B. Bredal-Jørgensen, project manager at DTU CAS,

and Karsten Bak, project manager at MT Højgaard, who tell how they work to reduce CO<sub>2</sub>-emission, minimize consumption of resources and create a good working environment.

If you want to know how far we are with the construction and when we make noise, you will find information at the end of the newsletter. Here is also our contact information, so you can always reach us with questions or comments.

We hope you enjoy reading.

Many greetings  
The Project Team for Building 313  
DTU Campus Service



Building 313 will be built west of Building 310. The building will have laboratory facilities and will enable researchers across disciplines to collaborate on the development of sustainable technologies. There is a construction site on the site and north of Building 314. Photo: DTU / CCO

# Builder: It's about doing the work once

Sustainability is drawing the building correctly and building it once, says DTU's project manager Nicolai B. Bredal-Jørgensen



Nicolai B. Bredal-Jørgensen  
Project Manager, DGNB Consultant Buildings, CAS Client, DTU Campus Service

## What is your role in the project?

I am project manager in a team with Laila Halkjær and Francois Payen-Court. In the initial phases of construction, I have focused on planning the construction phase of the project, and now that we are entering the execution phase, I will be the daily project manager of the construction of the project.

## What is your background?

I am a trained carpenter and constructing architect. With my many years of experience as a construction manager and project manager, I have worked on many construction sites, and for the last five years I've been on the client's side of the building projects. I am also certified as a DGNB Consultant for buildings. Working with DGNB has opened my eyes to how many factors you have to consider and keep

## DGNB

DGNB is a tool and a system that evaluates the qualities of a building or an urban area within the environment, economy, technology, process, and social and area qualities. DGNB is based on the UN definition of sustainability.

As part of DTU Campus Services' sustainability strategy, DTU's buildings must be DGNB-certified, as a minimum to gold level.

in mind when you are building sustainably. It's not just whether you drive a diesel car or an electric car. There are so many things to be aware of and DGNB is a good checklist.

## What motivates you in working with sustainability?

It is a good feeling. The fact that through my work I can help make things better and smarter. If you look at it soberly, then sustainability is about me only having to do the work once. It is very impractical. Draw it right the first time. Build it once.

In the building industry, there is a huge waste of resources, and we work to avoid that. We can do this because we have the contractor with us from the start, so he is an active partner when the architects and engineers design and calculate the building. This means that the contractor can provide input along the way and can plan a construction and a construction site where we only have to do things once. That way, we expect to be able to use fewer resources than we would otherwise have done - fewer materials, less waste, less transportation and fewer manpower hours to rebuild. In addition, we get an efficient construction process, a high motivation amongst those work on the construction site and we can reduce CO2 consumption.

## How do you work with sustainability?

At DTU CAS, we work strategically with sustainability when we plan campus and new buildings.

At building 313, we have translated the strategy into a sustainability vision, where we work consider DGNB Gold as a baseline, but we test what it takes to achieve DGNB Heart and the voluntary sustainability class. At the same time, we work with design for disassembly, biodiversity, universal design and the UN's 17 sustainable Development Goals (SDGs).

When we build Building 313 for research, it also makes sense that we think sustainability into all the construction processes. We say that sustainability is a design driver, and that means that we think about

it all the way down to the work environment, materials, and planning. It requires us to be innovative and push to today's standards in the building industry.

### What other initiatives are you working on at the construction site?

We have both small projects that are effective now and here, and activities that will be profitable in the long run. It is especially planning and material consumption that have my focus in terms of my role. An example of a smaller initiative is the construction site fence. In recent years, DTU CAS has painted our construction site fences in DTU's red signature color, but we have opted out, because then we save more 200 liters of paint. It is a small but visible initiative. If we look at the construction site in a more long-term perspective, we can plan activities between several construction cases. For example, we established a crane foundation when we built building 310, which we can now reuse. We have also made sure that the former construction site still works so that we can recycle sewage, water and electricity. And when we have to build building 313, we are also preparing for the area north of B314 to be laid out as a future construction site. We might as well do that now that we're digging out.

### Are all the ideas implemented?

We work actively with all the ideas that arise along the way, but not all of them are realized. For example, we have investigated whether the soil we dig up can be used in future construction cases at DTU. We know there is starting to be a shortage of raw materials, so it was a matter of sustainability rather than

saving money on transportation.

Unfortunately, it turned out that the soil was not high enough quality, so we had to give up that idea. But we spent time researching whether that was possible. In this way, we work with sustainability to a much greater extent on this issue than I have previously tried.

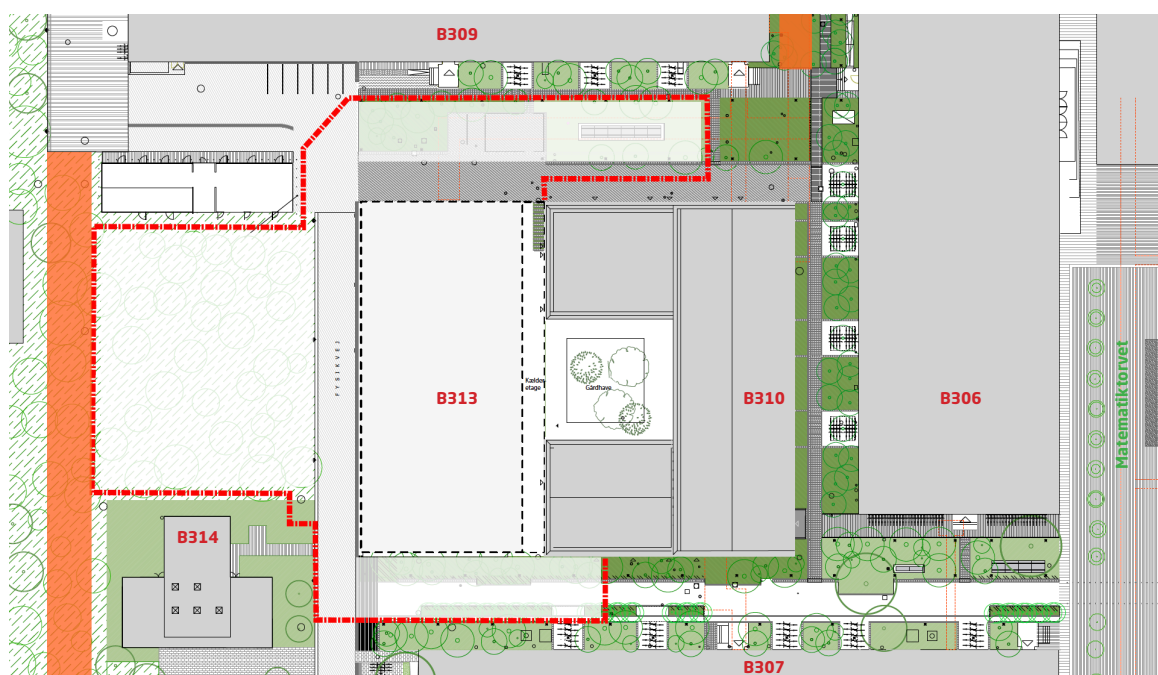
### What actions do you expect to make the biggest difference?

It is that we are spreading the knowledge of work of sustainability. That we work to make all parties involved in the process understand how important sustainability is.

It is a place like DTU that can move on this agenda. There are many things that are meant to be sustainable, and everyone is talking about sustainability. We prioritize creating an understanding of what sustainability is - at least for DTU, and then do it in practice - right down to the outer ranks of e.g., the painter.



DTU Campus Service is erecting fences around the construction site for Building 313. In the background is Building 310. Photo: DTU



There is a construction site on the site and north of Building 314. The red line shows the fence. Map: DTU

# Contractor: Planning is key to build sustainably

Sustainability is a matter of planning the construction correctly and in good time, says Karsten Bak, project chief at MT Højgaard



Karsten Bak is Project chief at MT Højgaard

## What is your role in the project?

I am the project manager on behalf of MT Højgaard, who is the main contractor on the construction case. That means I have the overall responsibility and gather the threads in the spider web. In everyday life, it is me who drives the collaboration across 3-4 other parties involved - first and foremost the engineering company MOE and the architectural studio Christensen and Co Arkitekter and then their sub-consultants.

## What is your background?

I have a degree in civil engineering from Aalborg University, originally in Urban Design. Over time, I switched to the client side, and I have been a project manager in DTU Campus Service. For the last six years, under the auspices of MT Højgaard, I have worked on several buildings here at DTU, including building 310, which is located next to the plot where we are now constructing building 313.

## What motivates you in working with sustainability?

It's a big motivation for me that we do things right, that we get off to a good start. The biggest benefit is that we do not do things multiple times because we plan the construction efficiently. That to me is sustainability. I also think that the work with materials is exciting,

for example that we use wood in parts of the construction of building 313.

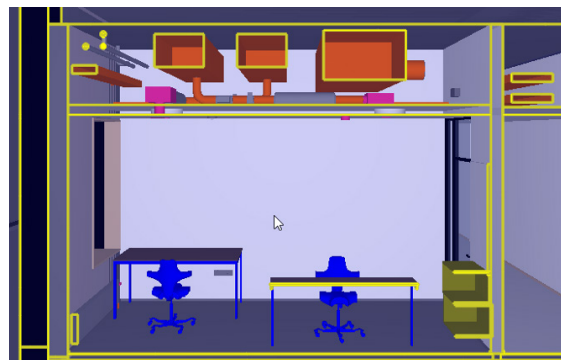
## How do you work with sustainability?

In the planning, we focus on recycling, energy consumption on the construction site and focus on digital design, so we avoid changes in the project during the execution of the construction. For example, we look at reinforcement of plaster walls and bracing of doors and keep an eye out that, for example, a ventilation pipe is not by mistake designed to be in the same place as, for example, a door. We can check this already now in the 3D model. This is to avoid collisions and thus provide greater buildability. In addition, we focus on timely planning by involving and anchoring initiatives in the construction value chain and planning execution with exchanges, so that we avoid decline and thus extra waste.

## The Sustainability Vision for Building 313 states that you must reduce CO2 consumption on the construction site. How do you do that?

We do not have a target in numbers. But it will not make sense either, because there is no 'benchmark' we can use. When you build a building, it's a new situation every time.

So, we are looking at how we can optimize our construction site in relation to the construction industry in general. It is usually said that construction work is planned by doing the construction in two rounds.



In Building 313, the contractor checks the consultants' 3D model, so that there is a focus on building parts not colliding. This ensures that the craftsmen do not have to rebuild on the construction site, and minimizes material consumption and waste. Photo: DTU / MTH

There is an unimaginable waste of resources when we build buildings, and therefore we focus especially on minimizing the consumption of materials and transportation.

### **It does not sound sustainable to build the same building twice... why is it happening?**

It often happens due to collisions in construction. Perhaps installations or building parts have been drawn into a 3D model, where there is no room for it in reality, and because construction is underway, you will have to solve it on the construction site, i.e., re-build along the way. Therefore, you will spend double on materials and transport. It is a waste of resources and demotivating for the craftsmen that they must pick down something they have just built up.

That's what we mean by building only once, which is why I see planning as the key. Construction is the planning of many unplanned things, we try to create systematics and follow up, so we keep the flow and motivation.

Another factor is social sustainability. We check the 3D model and see if there is room for the craftsmen to build and install on the site. Therefore, we expect fewer accidents at work, and this also provides a better working environment, which is one of the social parameters we have from the UN's global goals.

### **How is it happening on the construction site?**

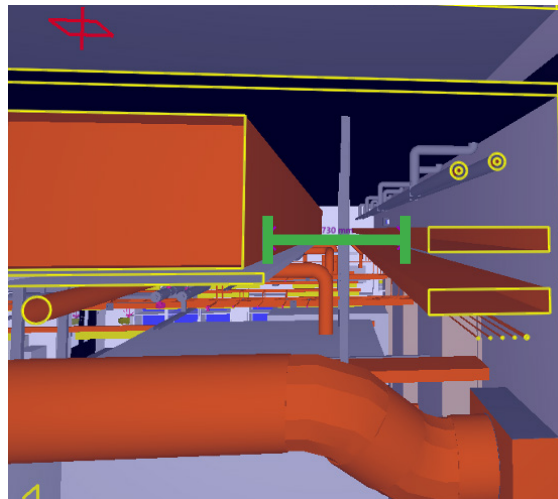
Our construction manager on site keeps track of materials, ensures they are treated according to the book and that the craftsmen can find the things they need. It is very practical.

In addition, we run courses for our subcontractors to ensure they understand the project properly and become ambassadors for sustainability. It is important they know why the building and the construction site are designed as they are, and that we get the opportunity to make a layout of a site, that works in everyday life.

### **What actions do you expect to make the biggest difference?**

It is coordination and the fact that we can plan the construction with consultants.

This is also essential for our collaboration with our subcontractors, who we bring in to execute construction work. We can involve them along the way. This means we can collaborate closely, and ensure the value chain, because we can transfer knowledge to each other in overlapping processes.



The picture shows a section of the 3D model. Here, the contractor continuously checks whether there is room for the craftsmen on the construction site by measuring distances between pipes and installations (purple measurements). It is important to ensure a good working environment and avoid accidents on the construction site. Photo: MTH / DTU

### **Sustainability in the eyes of production**

MT Højgaard and the consultants have a special focus on recycling, the construction site and digital design, when they develop Building 313 and plan construction. Concrete measures include the following:

#### Recycling

- The existing crane foundation from DTU B310
- Accessed sand for filling at DTU B310 is recycled at DTU B313

#### The construction site

- Recycling of existing crane foundation from DTU B310
- Toilets, showers, sheds, and offices on the site that are heated with heat pumps
- Energy-saving lighting of common access roads
- Sorting of waste into fractions
- Measures on main boards for sheds and other construction sites to increase awareness of electricity consumption
- Measures to the water supply to increase awareness of water consumption

#### Digital design

- Use of central heating for the interim heating of the construction site
- The 3D project is ready so that it can be used by the production people

# Basic information

## Construction works

In November 2021, we will erect the construction site, demolish the facade of Building 310 and begin work on the construction pit. Until March 2022 there will be construction work that periodically causes vibrations, noise and dust.

## Status of the project

In November 2021, the project proposal will be completed. The project proposal is the basis on which the client makes decisions about the task's aesthetic, functional, technical, and financial solution as well as, operating and maintenance principles as well as about financing. All investigations, including registration of existing conditions necessary for the further design, have been completed.

## Next step

In the coming months, the consultants will prepare the execution project, which the contractor will build on. At the same time, the construction is processed by the authorities and the contractor begins work on the construction.

## Contact information, DTU CAS' project team

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## Time schedule



## Construction site

