

We bring  
**creative ideas**  
to reality

FRECON®





## Who

FRECON consists of an experienced group of engineers and designers who can supply your need for technical solutions with creativity and a high sense of professionalism. Furthermore we are in compliance with the regulatory requirements and ensure the optimal conditions for implementing your project.

FRECON offers a wide range of competences, handling your project in a factual and competent manner through all phases from concept to final product.

We provide dedicated consultants for your project. Your idea combined with our knowledge results in high quality solutions.

We look forward to realizing your project!

Your idea  
+ our knowledge  
= high quality solutions



## About

FRECON was founded in 1999 by Frederik Rytter. The starting point was to be a credible partner in mechanical engineering, with primary focus on consulting services mainly in the wind industry.

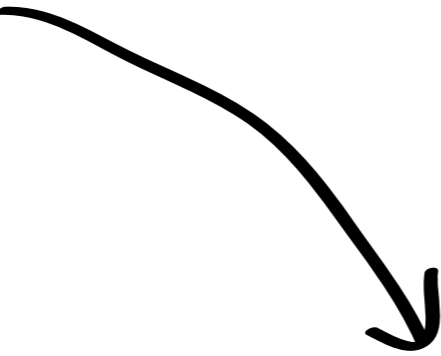
Over time we have evolved into a well-established consultant house of engineers, design engineers, production technologists, technical illustrators and other talented professionals.

We are located in Horsens, Denmark, where we support our customers throughout Denmark and Europe.

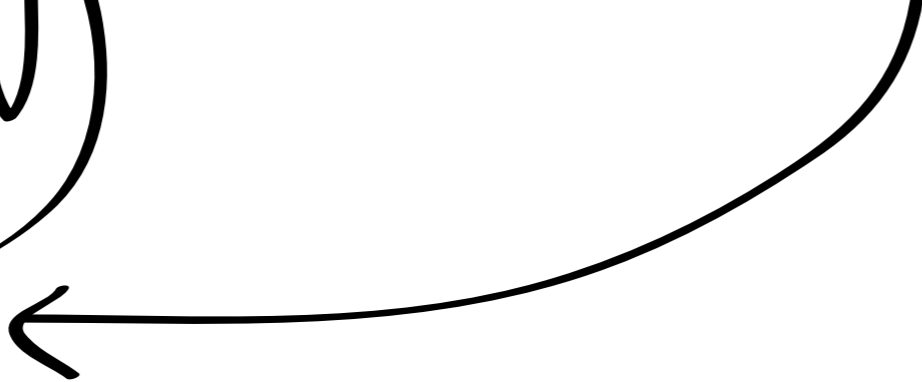
Our employees have the status of specialists, as they each have a background and education which excel the individual and increases the overall knowledge in the team.

So when you place an assignment with us, you do not just get one specialist, but an entire dedicated team that will ensure your project becomes a success!

IDEA



PLAN



ACTION

## From creative idea to reality

- FRECON is there every step of the way

## What

At FRECON we take on all kinds of technical challenges. Our core competence is mechanical engineering, but you can also rely on us to prepare the documentation necessary for verification and approval of the component by the authorities.

We handle both small and large projects and will gladly manage complete projects. All of the design, construction and documentation is done using our own equipment with our own licenses.

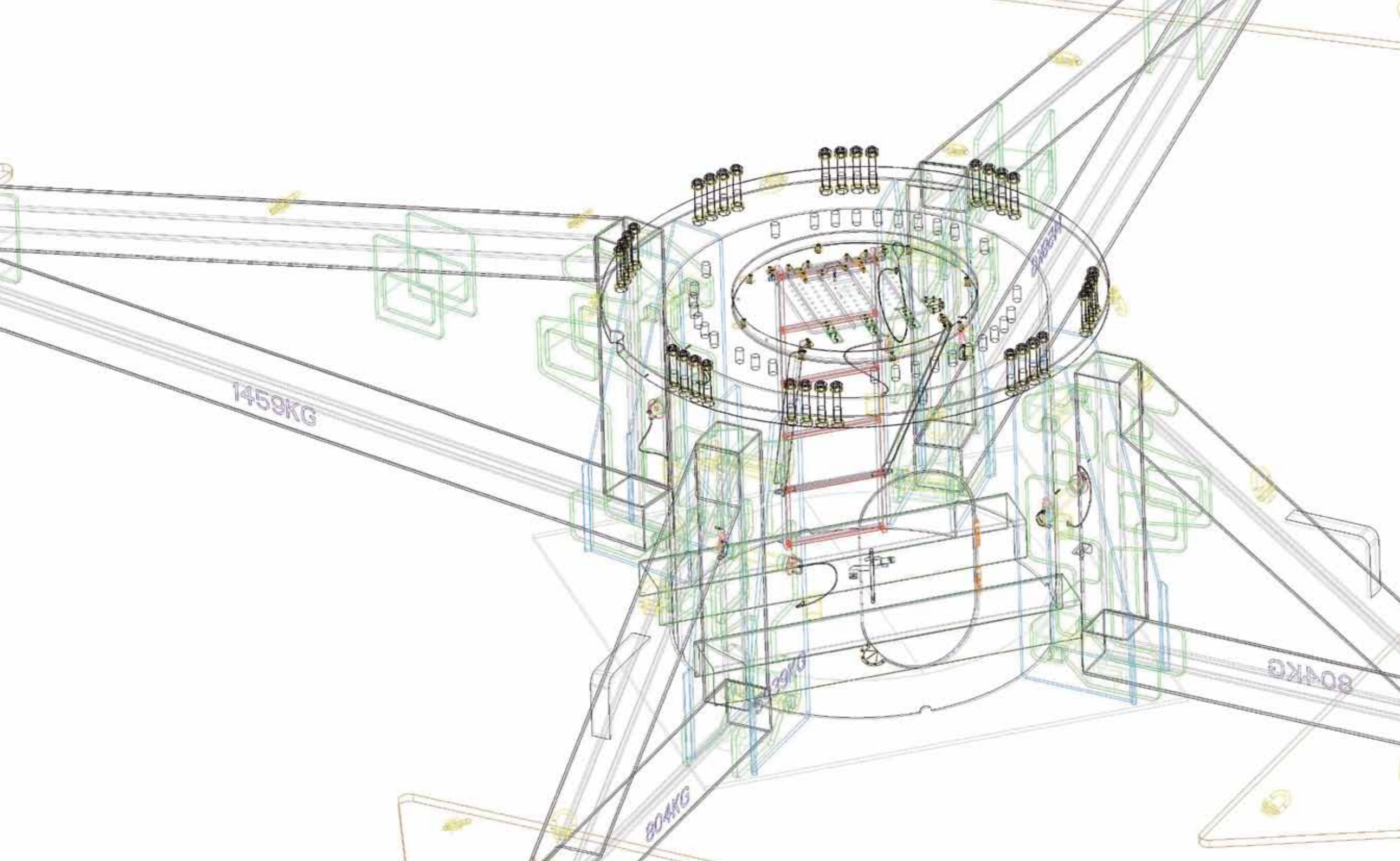
## How

We take pride in creating the exact solutions you need to get past your challenges. Here is what we do to take your project all the way to the finish line:

We clarify the design - in close collaboration with you to make sure we understand your requirements for functionality and design. With this insight we compile a thorough requirements specification. This is a powerful tool for dialogue and alignment of expectations for the product and the prioritization of requirements.

We present alternative designs - with different solutions at hand you have a solid foundation for making a qualified decision.

We provide innovative designs - not only do they comply with the functional and technical requirements, they are also user-friendly and aesthetic. And of course, we also factor in production and economic optimization.



Mechanical  
design  
is our  
core  
business

## Core

Mechanical design is our core business. We create professional solutions by developing new products as well as optimizing and documenting existing products. Everything is designed in 3D using Creo Element, AUTODESK Inventor or a similar program depending on your needs. We prepare everything in 2D documentation and ensure that production is possible based on this. To confirm the quality and tolerances of your product we offer to include Geometric Product Specification (GPS) in the drawings.

We have many years of experience in construction of components for wind turbines, special machinery, production tools, transportation equipment, safety equipment, and components for cars, boats and buildings.

Our design engineers possess extensive expertise, and we are more than happy to take on new challenges and use our capabilities in new fields.

# Cost-Effective Innovation with...

## FEA

### FINITE ELEMENT ANALYSIS (FEA)

FEA is an effective tool to verify the durability of the structure. This method is often time-saving and can be used with both simple components and complex constructions. We use ANSYS for conducting the analyses.

### WE OFFER

- Strength analyses of steel, composite and plastic materials
- Fatigue calculations
- Dimensioning of composite structures, for example fiberglass
- Optimization of existing structures
- Strength analyses and optimization of structures during the development process (Simulation-Driven Product Development)
- Natural frequency analyses
- Documentation for authentication (DNV, GL, CE marking, etc.)

### ADVANTAGES

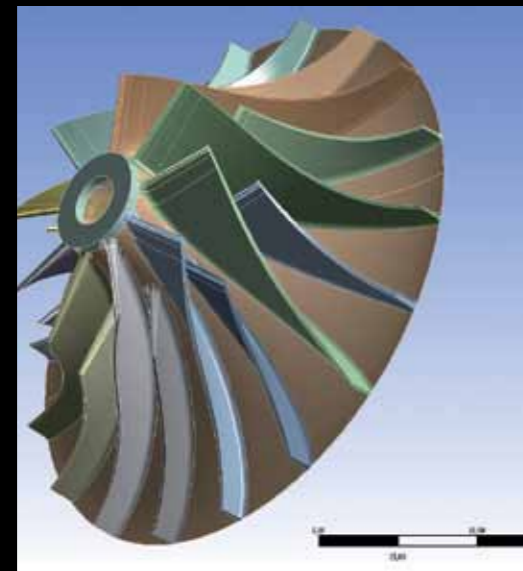
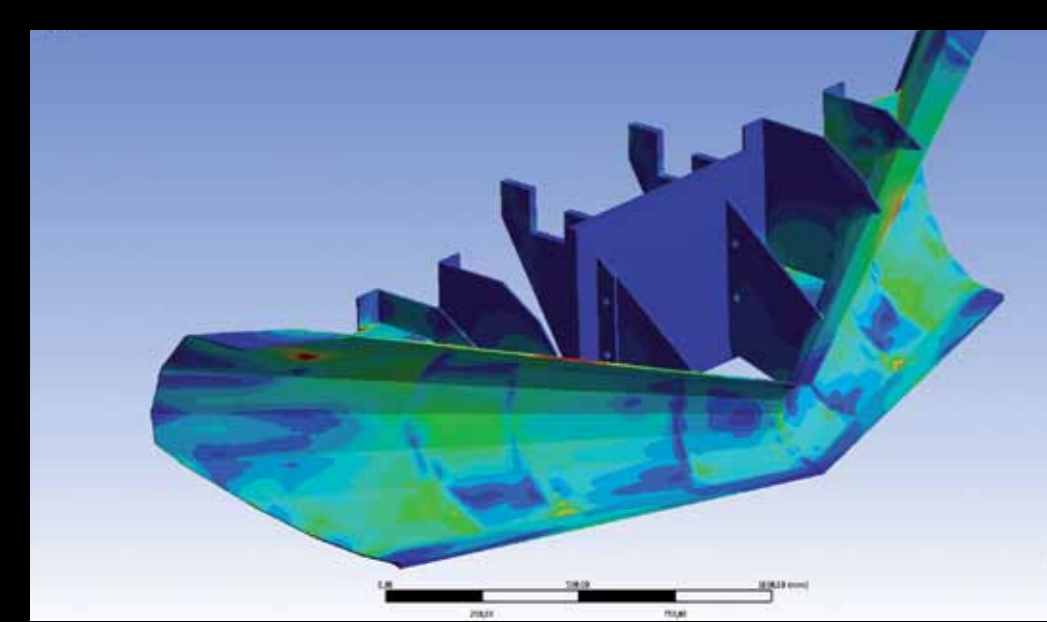
- In the early part of a project you can get a quick indication of whether the structure is on the right track in terms of intensity – This can be supplemented with a final calculation report
- We are flexible and can work in your offices with our own equipment, or solve the whole project in our offices
- Calculations are performed concurrently with the construction process to reduce the cost of the prototypes

### ANALYTICAL CALCULATION

FRECON has 12 years of experience in calculating and developing the strength of various types of equipment. In many cases we use the FE analysis to identify critical areas in a construction. This tells us where to focus the analytical calculations, ensuring that you get:

- A construction that meets your strength requirements as well as those given by standards or regulations
- The optimal product
- A good and durable product that is optimized to the lowest possible material and production costs

MathCad is our primary calculation tool, and we document the calculations with calculation reports.





» We share our  
**knowledge** to  
strengthen  
your project «

## A-Z

FRECON is a strong collaborator in larger projects. In addition to the technical solutions, we also offer to manage the entire process from start to finish. We follow your project closely, ensure that all deadlines are met, update all interested parties, and collect all the relevant documentation.

In the initial phase we deep dive into the project objectives and associated success criteria, ensuring that our services are consistent with your project objectives. The definition of the objective can be based on technical and functional requirements, overall schedules or budgets. We are always available with suggestions and guidance in relation to the prioritization of these.

Based on our extensive experience, we have developed a process in which all phases are defined by project specifications and are continuously approved as the construction proceeds. This protects you from any unnecessary waste of time. Of course the process can be adapted to suit your internal procedures, resources and deadlines.

During the project process we conduct a number of reviews. During these sessions we coordinate project stakeholders, provide factual input to the debate on possible design solutions, and ensure well-founded and motivated decisions about the continuation of the project.

In addition to guiding you safely through all project phases, we also offer to join your company's internal teams, sharing our knowledge to strengthen your internal processes and documentation.



CE

At FRECON we take great pride in providing safe and reliable solutions. And of course they meet the regulatory requirements of the countries in which they are to be used.

Therefore we offer to prepare the necessary documentation for your tasks - large or small. We also help with the preparation of the CE marking of your machines and components.

We can either compile the full technical dossier or join your team and work out the documentation in collaboration with them.

We can CE mark complete installations, subassemblies, machinery, lifting equipment and safety components.

All our designs regardless of size will be risk assessed according to ISO 14121, and we always recommend a Failure Mode Effect Analysis (FMEA) to ensure both you and us, that the design can cope with all the possible scenarios to which the product might be exposed.

All our design engineers have extensive knowledge of the Machinery Directive 2006/42/EC, and are continuously updated with existing and new national and international standards.

A TYPICAL CE MARKING WITH FRECON WILL PROCEED AS FOLLOWS

- In collaboration with you we create an overview of the challenges that might be

- We collect the documents, calculations, drawings and diagrams needed to draw up the documentation
- We create a complete "to do" list of documentation such as risk assessments, charts, manuals, operator instructions, assembly instructions, service instructions, maintenance schedules, etc.
- We make a clarification of your tasks vs. our tasks
- We clarify what tools you have
- We figure out if we should offer you business and/or industry related courses enabling you to handle the risk assessment and CE marking yourself
- We construct utilities such as templates etc. for/with you
- Offer consultancy support on an hourly basis in separate projects (machinery / plant)

Furthermore, we have experience in providing engineering design for the U.S. market, where we ensure that both international and national regulations are adhered to.

TEST  
During the past 10 years FRECON has conducted prototype tests on our constructions. We offer to prepare all the relevant documentation, perform tests and write test files for test runs of the product.

Often, testing is a large part of the documentation proving that the product can withstand the given loads and values. It is a requirement of the Machinery Directive 2006/42/EC that the test is to be performed on certain equipment.

Among others, we have performed overload tests on equipment with more than 100 tons in overload.

- WE OFFER
- Overload test
  - Production test
  - Functional test



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