BEPA

ENGINEERING A GREEN FUTURE

BRINGING HIGH VALUE TO ENGINEERS

BEPA VN, www.bepa.dk, +84 703 267 480, Applications@bepa.dk

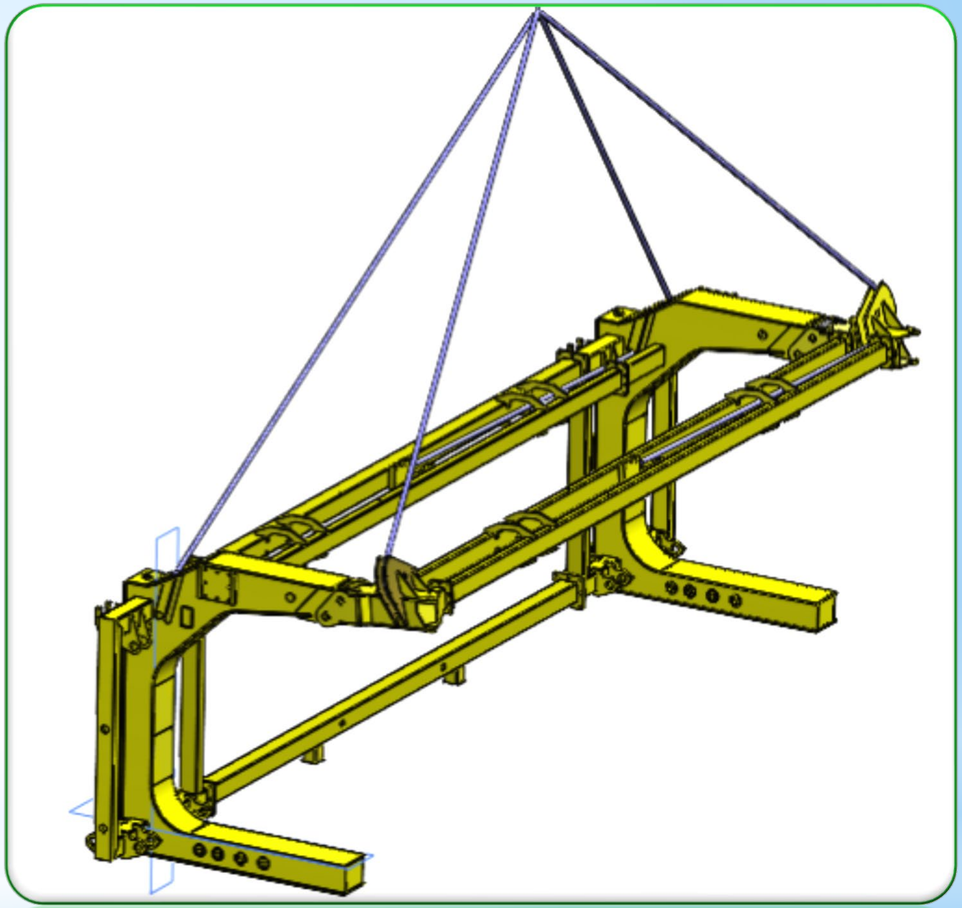
Agenda:

-Job opportunities in Bepa

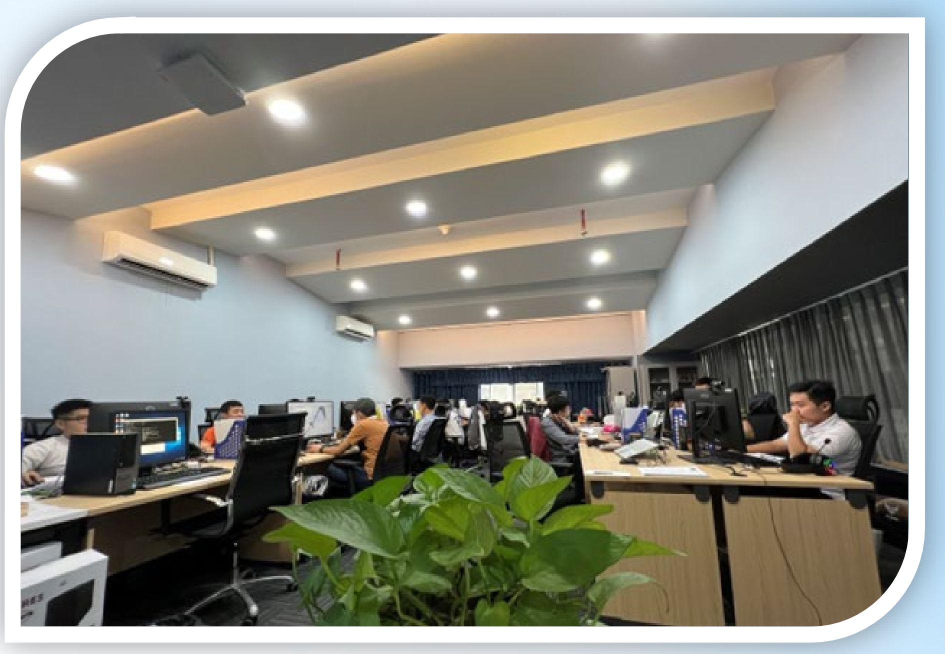
-Projects for engineers in Bepa

-Benefits and Policies for employees

-Contact for career



Job opportunities in Bepa

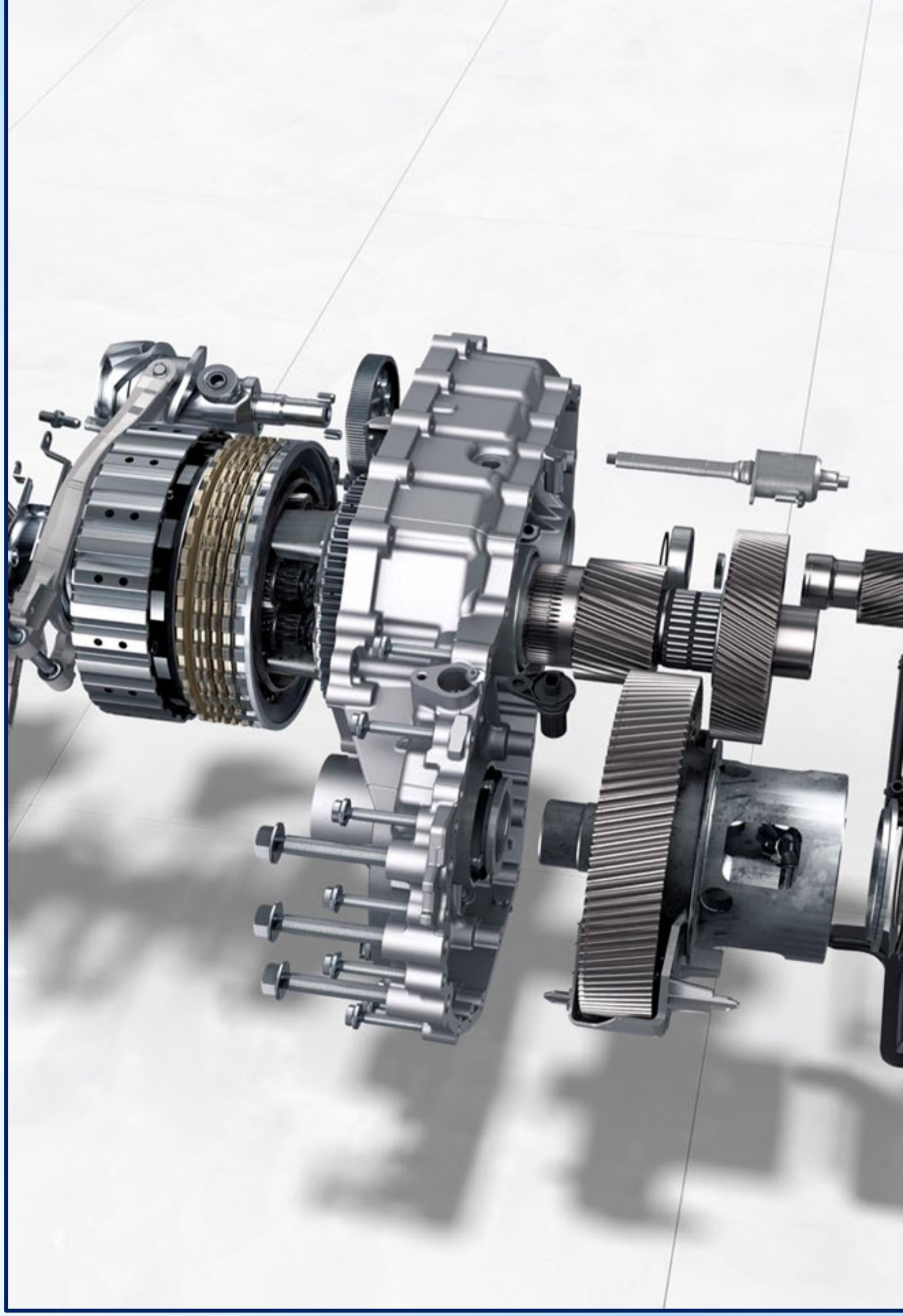


Happy customers require happy employees. We strive to make BEPA the most attractive consultancy company. We offer our employees:

- A good environment and top wages
- Team bonuses based on profit sharing
- Partnerships and stock dividends
- A small, flat organization with self-driven employees

BEPA VN, www.bepa.dk, +84 703 267 480, Applications@bepa.dk

Projects for engineers in Bepa



BEPA VN, www.bepa.dk, +84 703 267 480, Applications@bepa.dk

Testing against permissible stresses

Material check of permission stress base on standard have required (e.g.: EN 13155 or …)

At the end of each calculation the result is either a stress or a utilization. To test these results these formulas are used.

For a calculated stress the following is used.

$$Test(X_1, Y_1) := \text{if } |X_1| < Y_1 \;\|\; \text{“OK”} \;\text{else}\; \|\; \text{“NOT OK”}$$

$$UR(X_1, Y_1) := \frac{X_1}{Y_1}$$

Where X_1 is the calculated stress and Y_1 is the permissible stress.

UR is the utilization.

$vM_1 := 100\ MPa$

$Test(vM_1, \sigma_{S355.16}) = \text{“OK”}$

$UR(vM_1, \sigma_{S355.16}) = 0.64$

For a calculated utilization the following is used.

$$Test_{UR}(UR) := \text{if } UR < 1 \;\|\; \text{“OK”} \;\text{else}\; \|\; \text{“NOT OK”}$$

Where UR is the utilization. Example

$UR(vM_1, \sigma_{S355.16}) = 0.64$ $\quad$ $Test_{UR}(UR(vM_1, \sigma_{S355.16})) = \text{“OK”}$

Loading calculation base on requirement (using Mathcad)

- Sling forces
- Distribution forces
- Concentrated force
- Spring force (if any)

WLL (Mainhouse):	$m_{WLL} := 60\ tonne$	
WLL:	$S_{WLL} := m_{WLL} \cdot g$	$S_{WLL} = 588.4\ kN$
Spreader beam weight:	$m_{sp\_beam} := 5\ tonne$	
Transport beam weight:	$m_{tp\_beam} := 0.5\ tonne$	
Rigging weight:	$m_{rig} := m_{sp\_beam} + 2 \cdot m_{tp\_beam} = 6\ tonne$	
Load from Rigging:	$S_{DL} := m_{rig} \cdot g$	$S_{DL} = 58.84\ kN$
Hook load:	$F_{Hook} := S_{DL} + S_{WLL}$	$F_{Hook} = 647.24\ kN$

Spring sling angle from vertical:	$\alpha_{A\_MH\_spring} := \operatorname{atan}\left(\dfrac{\frac{l_{1\_s4.7}}{2}}{h_{spring\_MH}}\right) = 24.46\ deg$	
Spring tension when lifting yoke:	$F_{s\_A\_MH\_spring} := \dfrac{\left(\frac{m_{tp\_beam\_low} \cdot g}{2}\right)}{\cos\left(\alpha_{A\_MH\_spring}\right)} = 2.48\ kN$	$\dfrac{F_{s\_A\_MH\_spring}}{g} = 253\ kg$
Spring extended when lifting yoke:	$\delta_{spring\_MH\_1} := \dfrac{F_{s\_A\_MH\_spring}}{k_{spring}} = 127\ mm$	
Spring extended when lifting Mainhouse:	$\delta_{spring\_MH\_2} := l_{2\_s4.7} - l_{3\_s4.7} = 299\ mm$	
Total spring extended when lifting Mainhouse:	$\delta_{spring\_MH\_total} := \delta_{spring\_MH\_1} + \delta_{spring\_MH\_2} = 426\ mm$	
Total spring length when lifting Mainhouse:	$l_{spring\_MH} := l_{spring\_0} + \delta_{spring\_MH\_total} = 1520\ mm$	
Total tensile force on spring when lifting Mainhouse:	$F_{t\_spring\_MH} := \delta_{spring\_MH\_total} \cdot k_{spring} = 8.3\ kN$	$\dfrac{F_{t\_spring\_MH}}{g} = 846\ kg$
Check of spring stroke utilization:	$Check_{s4.7} := Test\left(\delta_{spring\_MH\_total}, \delta_{spring\_per}\right)$	$Check_{s4.7} = \text{"OK"}$
	$UR_{s4.7} := UR\left(\delta_{spring\_MH\_total}, \delta_{spring\_per}\right)$	$UR_{s4.7} = 0.91$

Mathcad calculation:

Check the critical stress in the weak section with

- Bending stress
- Torsion stress
- Normal stress
- Shearing stress
- Buckling check for the beam
- Combination stress

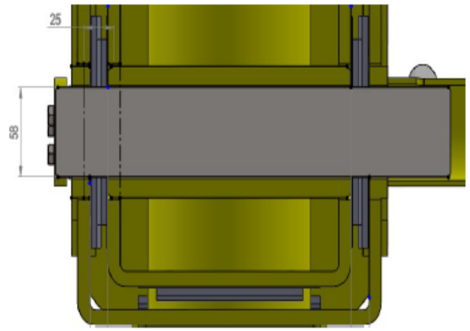
Tension force per bolt: $F_{t9.Ed} := \frac{R_A \cdot \sin(6\ deg)}{3} = 3.75\ kN$

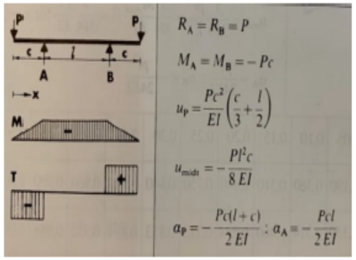
Tension resistance factor: $k_{2\_cs} := 0.9$ (hex head screw)

Tension resistance per bolt: $F_{t9.Rd} := k_{2\_cs} \cdot f_{ub} \cdot \frac{A_{s\_M8}}{\gamma_{M2}} = 6.96\ kN$

Tension utilization: $UR_{t9} := \frac{F_{t9.Ed}}{F_{t9.Rd}} = 0.54$ $\quad Test_{UR}(UR(UR_{t9}, 1)) = \text{"OK"}$

5.10 Equivalent stress in locking pin between TPS's - bending





Pin diameter: $d_{s10} := 58\ mm$

Section area: $A_{s10} := \frac{\pi \cdot d_{s10}^2}{4} = 2642.08\ mm^2$

Section modulus: $W_{s10} := \frac{\pi \cdot d_{s10}^3}{32} = 19155.08\ mm^3$

Length to section: $l_{s10} := 25\ mm$

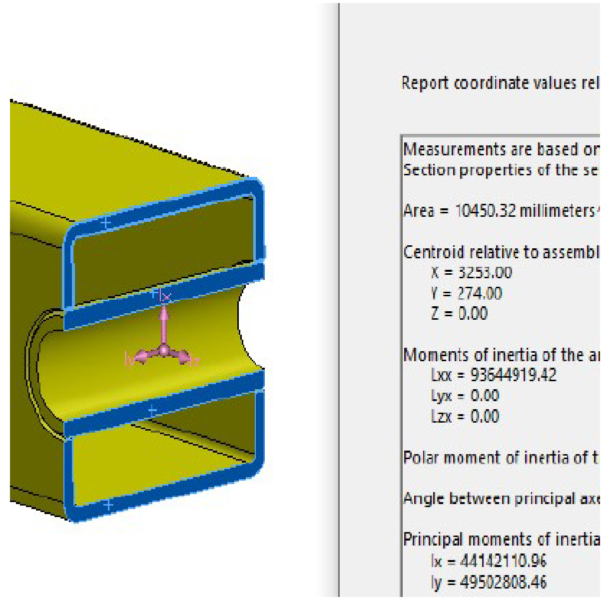
Bending moment: $M_{s10} := \left(\frac{F_h}{2}\right) \cdot l_{s10} = 1904.84\ N \cdot m$

Bending stress: $\sigma_{b\_s10} := \frac{M_{s10}}{W_{s10}} = 99.44\ MPa$

Mathcad calculation:

Check the critical stress in the weak section with

- Bending stress
- Torsion stress
- Normal stress
- Shearing stress
- Buckling check for the beam
- Combination stress



Section area	$A_{s1} := 10450.32\ mm^2$
Normal stress	$\sigma_1 := \frac{F_h}{A_{s1}} = 14.58\ MPa$
	$E := 210\ GPa$
Moment of inertia:	$I_{s1} := 44142110.96\ mm^4$
	$l_{s1} := 10\ m$
Effective length coefficient (Free - Free):	$K_{s1} := 1$
Effective length:	$l := l_{s1} \cdot K_{s1} = 10\ m$
Radius of gyration:	$r_{s1} := \sqrt{\frac{I_{s1}}{A_{s1}}} = 64.99\ mm$
Slenderness ratio:	$\lambda_{s1} := \frac{l}{r_{s1}} = 153.86$ > 85 => Euler buckling check

Mathcad calculation:

Check the critical stress in the weak section with

- Bending stress
- Torsion stress
- Normal stress
- Shearing stress
- Buckling check for the beam
- Combination stress

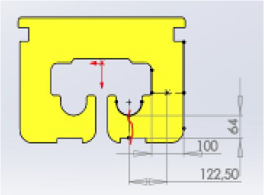


Plate thickness: $t_{s9} = 40\ mm$

Section height: $h_{s9} := 39 \cdot mm$

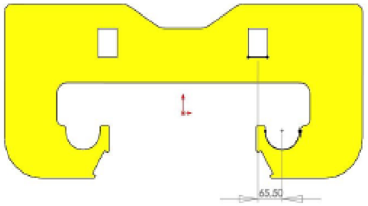
Shear stress: $\tau_{s9} := \dfrac{F_{Hook}}{4 \cdot t_{s9} \cdot h_{s9}} = 126\ MPa$

Equivalent stress: $\sigma_{von\_s9.2} := \sqrt{3 \cdot \tau_{s9}^{2}} = 218\ MPa$

Check of stress: $Check_{s9.2} := Test(\sigma_{von\_s9.2}, \sigma_{S690.50})$ $Check_{s9.2} = \text{"OK"}$

$UR_{s9.2} := UR(\sigma_{von\_s9.2}, \sigma_{S690.50})$ $UR_{s9.2} = 0.85$

Cut at point



$l_{s9.3} := 65.5\ mm$

Area of cross section $A_{s9.3} := 2760 \cdot mm^{2}$

Moment of inertia $I_{s9.3} := 7486882 \cdot mm^{4}$

$c_{s9.3} := \max(215 - 135.74, 135.74 - 75) \cdot mm$ $c_{s9.3} = 79.26\ mm$

Section modulus $W_{s9.3} := \dfrac{I_{s9.3}}{c_{s9.3}}$ $W_{s9.3} = 94459.78\ mm^{3}$

Bending moment $M_{s9.3} := \dfrac{F_{Hook}}{4} \cdot l_{s9.3}$ $M_{s9.3} = 12.85\ kN \cdot m$

Stresses $\sigma_{s9.3} := \dfrac{M_{s9.3}}{W_{s9.3}}$ $\sigma_{s9.3} = 136\ MPa$

$\tau_{s9.3} := \dfrac{F_{Hook}}{4 \cdot A_{s9.3}}$ $\tau_{s9.3} = 71.06\ MPa$

Equivalent stress: $\sigma_{von\_s9.3} := \sqrt{\sigma_{s9.3}^{2} + 3\ \tau_{s9.3}^{2}}$ $\sigma_{von\_s9.3} = 183.43\ MPa$

Check of stress: $Check_{s9.3} := Test(\sigma_{von\_s9.3}, \sigma_{S690.50})$ $Check_{s9.3} = \text{"OK"}$

$UR_{s9.3} := UR(\sigma_{von\_s9.3}, \sigma_{S690.50})$ $UR_{s9.3} = 0.71$

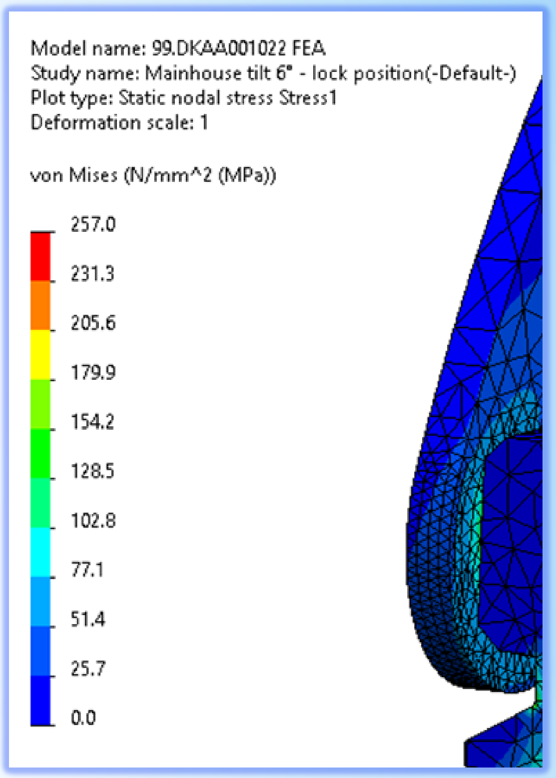
Cut at point

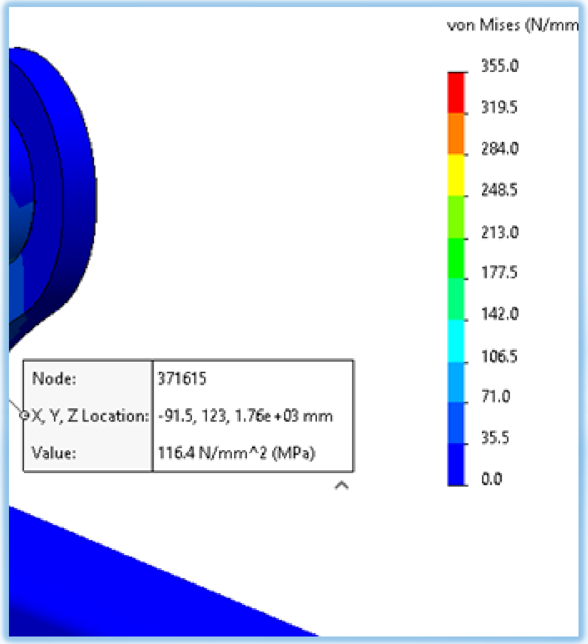
$l_{s9.4} := 95\ mm$

FINITE ELEMENT ANALYSIS (FEA)

- Perform the FEA tools can help Bepa engineers with all of design and optimize products and systems, reduce the need for physical prototypes and experiments, and enhance safety and performance.

- FEA is a powerful tool for simulating complex physical phenomena using computers and mathematics.



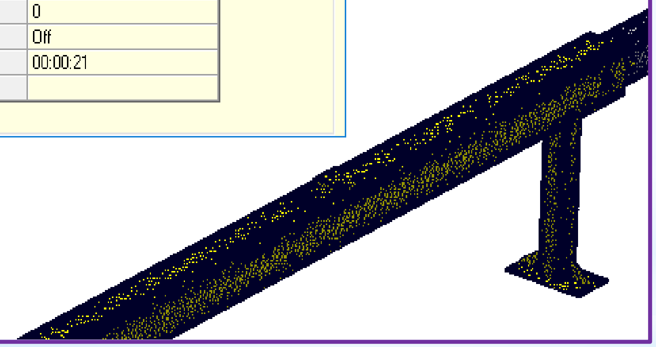


FEA for Lifting yoke

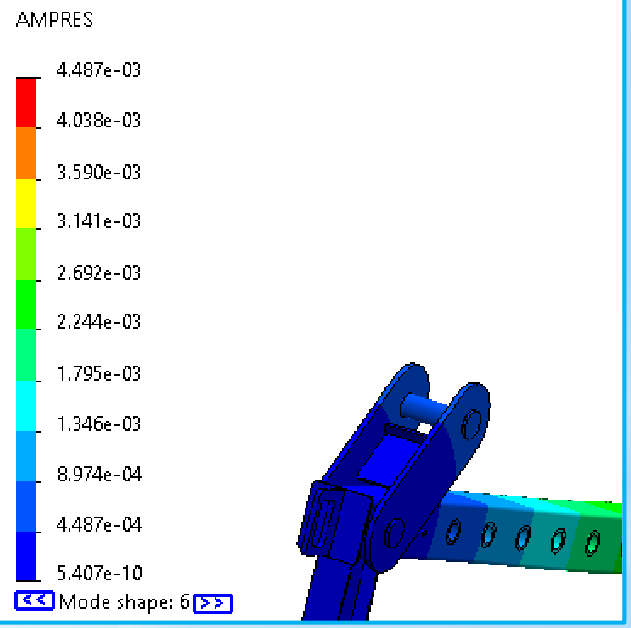
Model name: 13.9967-410179_FEA_buckling
Study name: Tilt 6° - Buckling(-10m dia-)
Plot type: Mesh Quality1

Mesh Details

Study name	Tilt 6° - Buckling (-10m dia-)
Mesh type	Solid Mesh
Mesher Used	Curvature-based mesh
Jacobian points for High quality mesh	16 points
Mesh Control	Defined
Max Element Size	40 mm
Min Element Size	10 mm
Mesh quality	High
Total nodes	624854
Total elements	324374
Maximum Aspect Ratio	660.83
Percentage of elements with Aspect Ratio < 3	84
Percentage of elements with Aspect Ratio > 10	0.235
Percentage of distorted elements	0
Number of distorted elements	0
Remesh failed parts independently	Off
Time to complete mesh(hh:mm:ss)	00:00:21
Computer name	

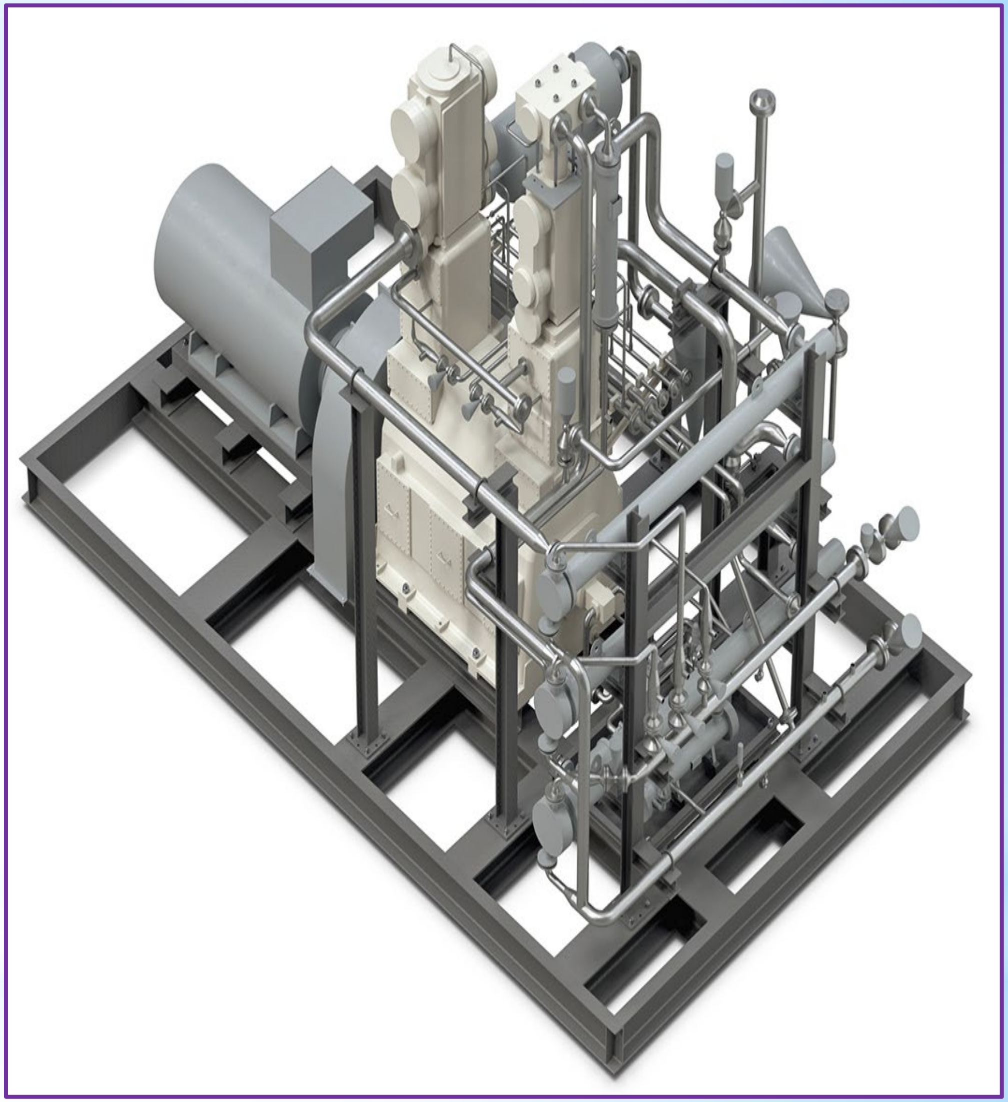


Model name: 13.9967-410179_FEA_buckling
Study name: Tilt 6° - Buckling(-10m dia-)
Plot type: Buckling Amplitude6
Mode Shape : 6 Load Factor = 19.624
Deformation scale: 238.015



Piping and Machinery design

- BEPA Piping team with proven specialized and highly practical skills involving the fundamentals of piping system components, specifications, regulations, 2D and 3D drawings, and applications.



- Our engineers can delve into the engineering of complex process facilities, including plant layout planning, piping and equipment, design and software skills, and related standards.

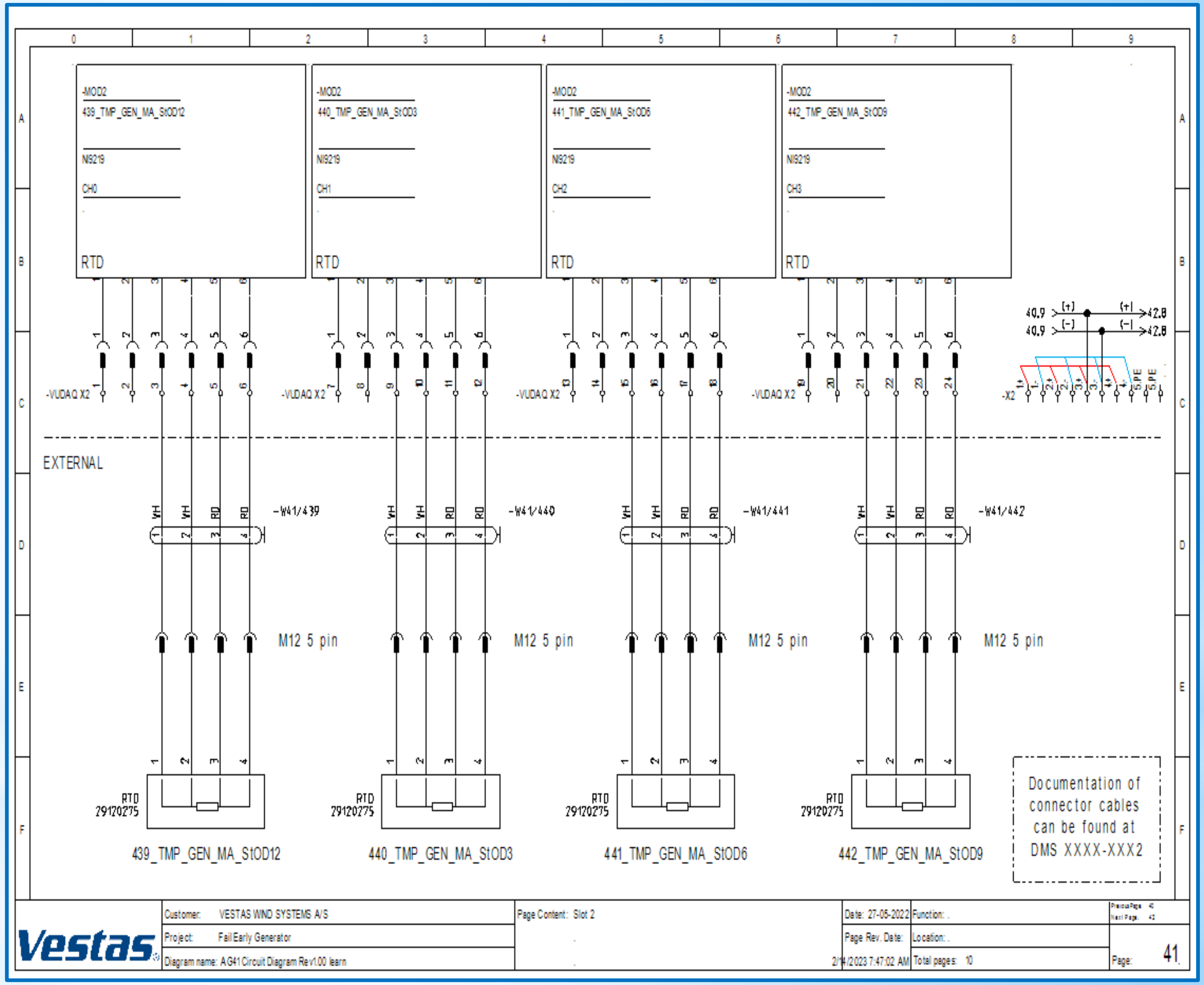
Image	Valves	Butt weld Symbol	Flanged Symbol	Socket or Threaded Symbol	Valves	Image
	Gate				Gate	
	Globe				Globe	
	Ball				Ball	
	Plug				Plug	
	Butterfly			...	Butterfly	
	Needle				Needle	
	Diaph	...			Diaph	
	Y-type				Y-type	
	Three way				Three way	
	Check				Check	
	Bottom	...		...	Bottom	
	Relief	...		...	Relief	
	Control straight	...		...	Control straight	
	Control angle	...		...	Control angle	
Image	Valves	Butt weld Symbol	Flanged Symbol	Socket or Threaded Symbol	Valves	Image

- We have given our hand to developing many kinds of processes and piping engineering projects. Having dealt with little to huge scale works with paying detailed consideration to every single importance.

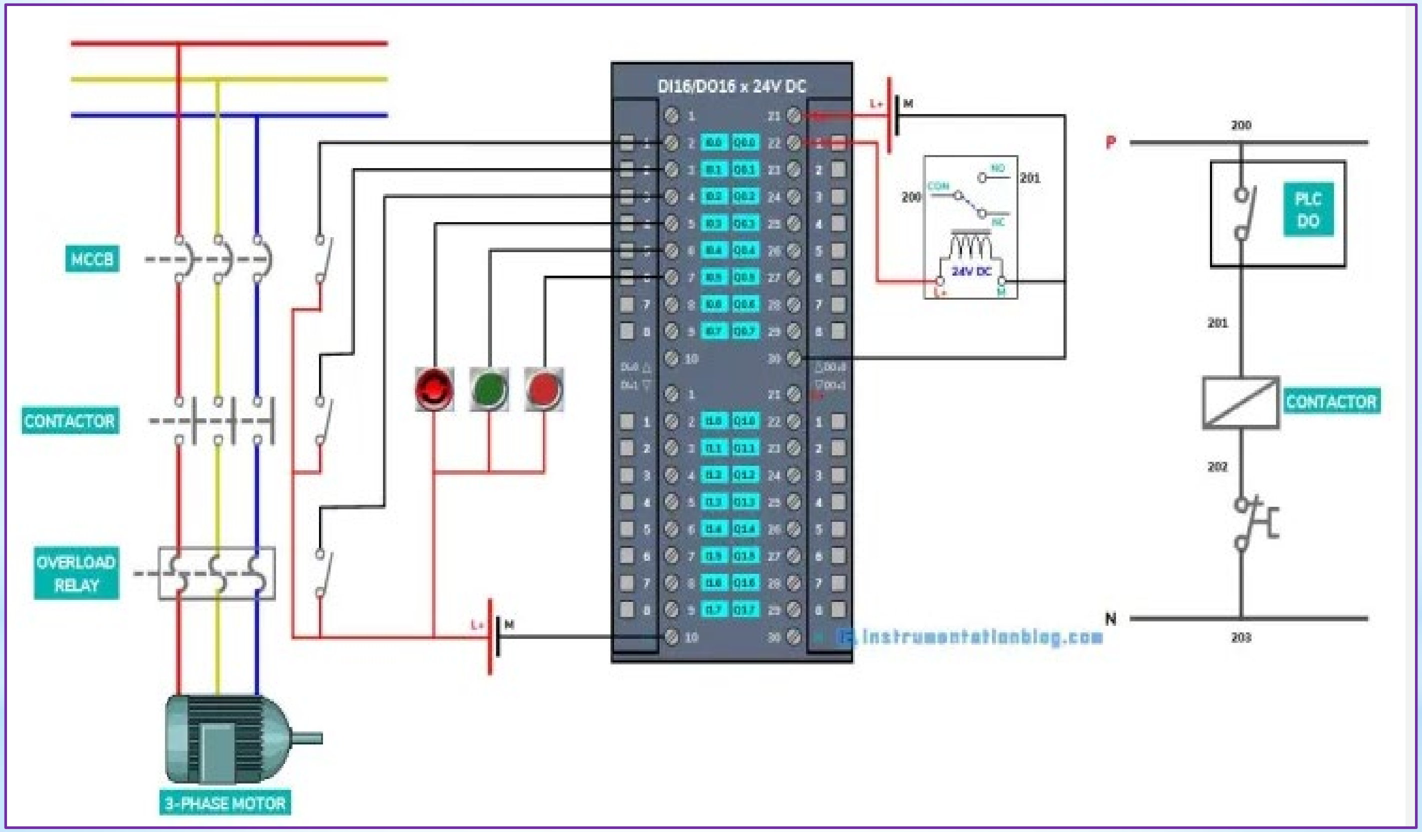
- We have delivered design and engineering solutions that are technically followed, manufacturable, safe, and complied with the latest technology and international standard varieties

Electrical Schematic Drawing

Sketch electrical wiring diagram as requirement from Client - Power and PLC control circuit for Wind System



Development of the Electrical circuit design and upgrade the application by using SEE Electrical software. Electrical design is complied with IEC standards - Power distribution circuits - Control circuits - Cabinets and Equipment layout according to customer requirements.



Company Requirements For Candidates

- English level must be enough to read and write English.

- Within 1 Year we expect English level to be sufficient to conduct meetings in English.

- We provide english classes by english professor.

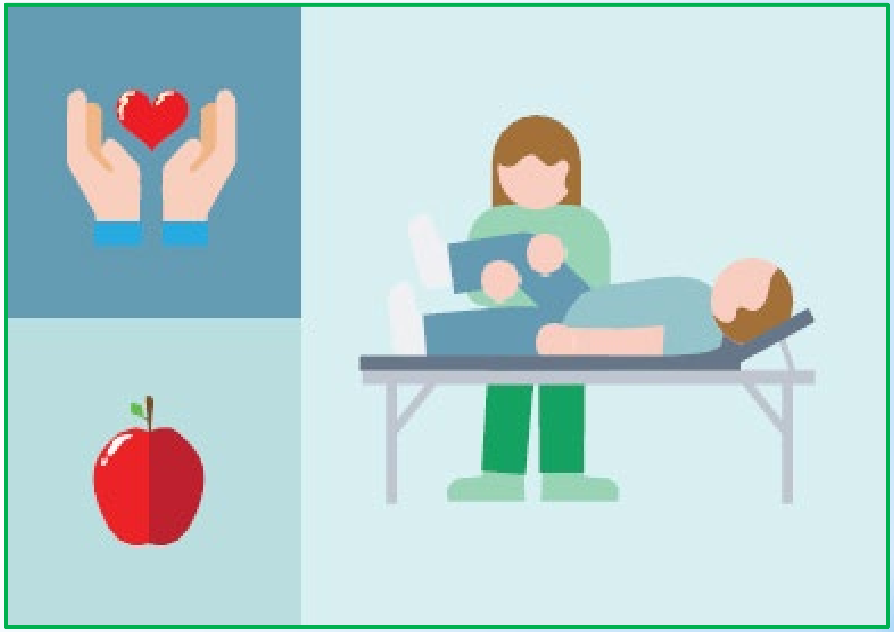
- Study outside work hours when required (English, calculation and engineering related topics).

- Professional conduct.

BEPA VN, www.bepa.dk, +84 703 267 480, Applications@bepa.dk

Benefits and Policies for employees

- Annual profit sharing
- Annual bonus
- PVI insurance
- International working environment.



Contact for career

BEPA VN is an engineering consultancy. Our mother company is BEPA A/S in Denmark.

- We offer our customers engineering services. The right quality - at the right price - at the right time.
- We do this by offering services from high-level specialists in Denmark and skilled,low cost engineers from Vietnam.
- At BEPA, we are building a Talent Community of highly talented and motivated professionals for future job roles. If you match the described job role and are as excited as we are to have you on-board in the future, please send us CV or contact us as below:

. BEPA office in Vung Tau City

. Add: Floor 4th , Vung Tau Plaza Building, 207 LE Hong Phong Street, Ward 8, Vung Tau city, Vietnam.

. Contacts in Viet Nam:
Office : +84 703 267 480 , Applications@bepa.dk