HYDRO AND EOLIC PLANTS

ESF II project of the University of West Bohemia in Pilsen, reg. number: CZ.02.2.69/0.0/0.0/18_056/0013239



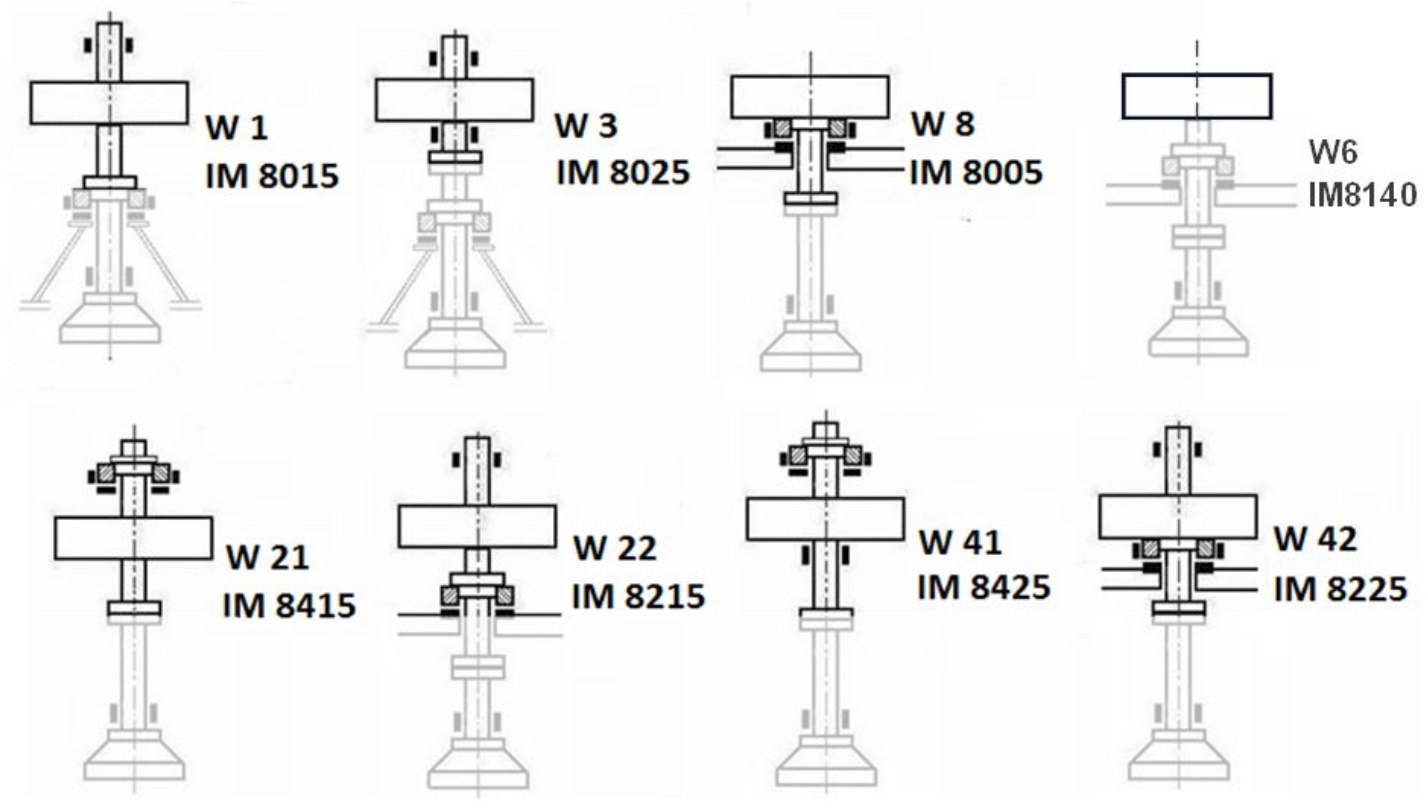
EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education



Hydrogenerator

Milan Bělík

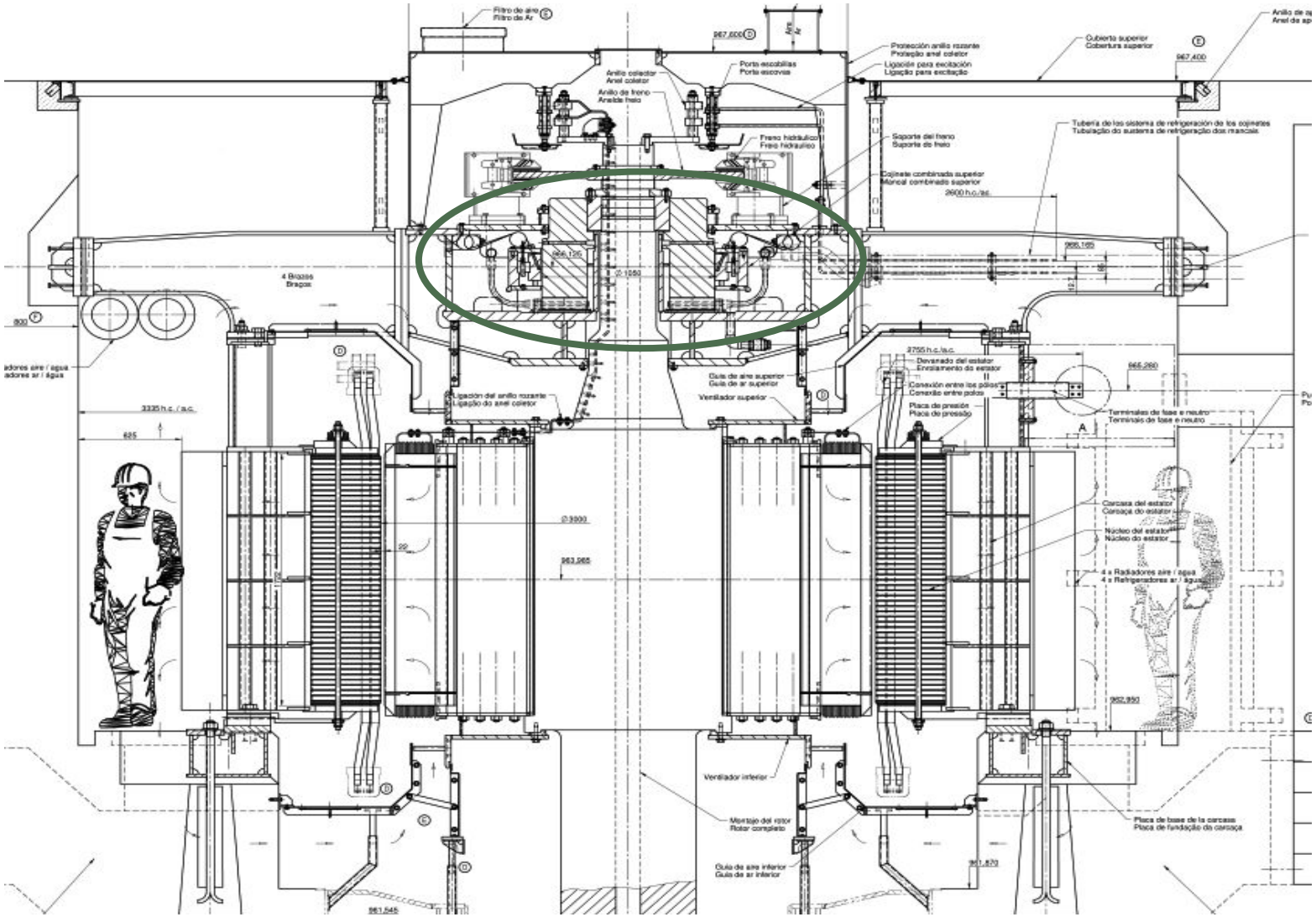
Vertical generators



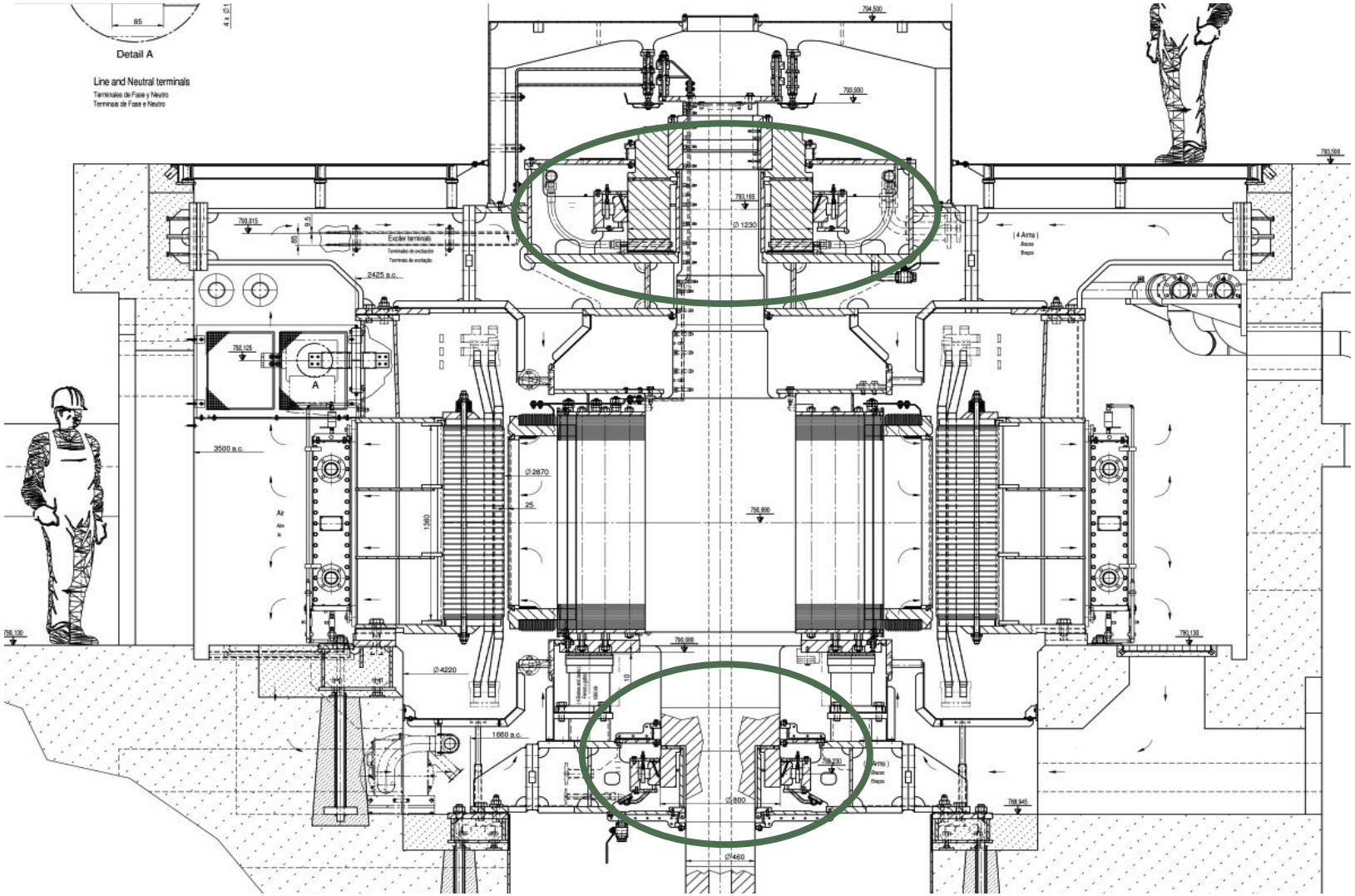
VOITH

IEC 60034-7

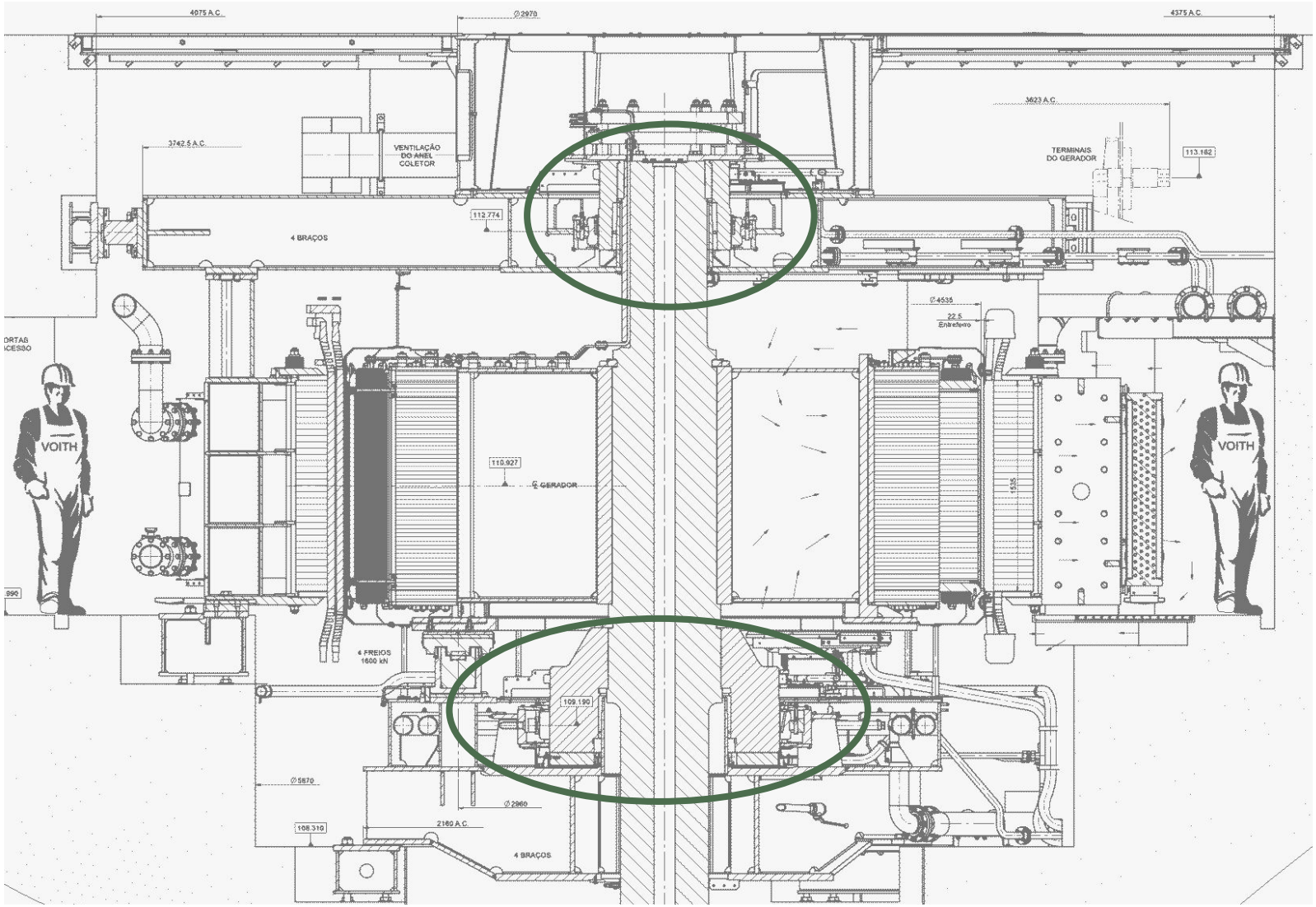
Upper radial – axial (Voith W21)



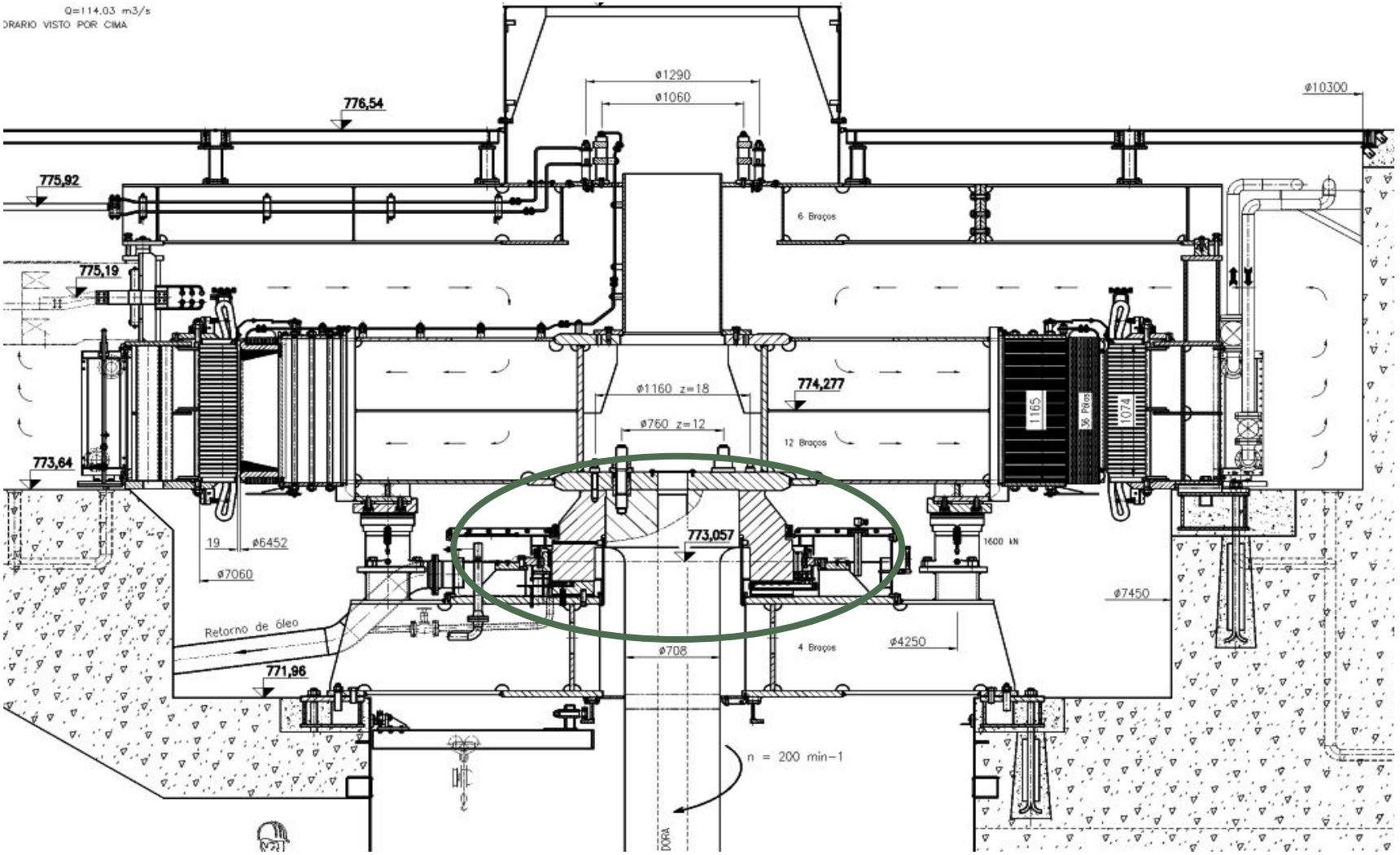
Upper radial – axial, lower radial (Voith W41)



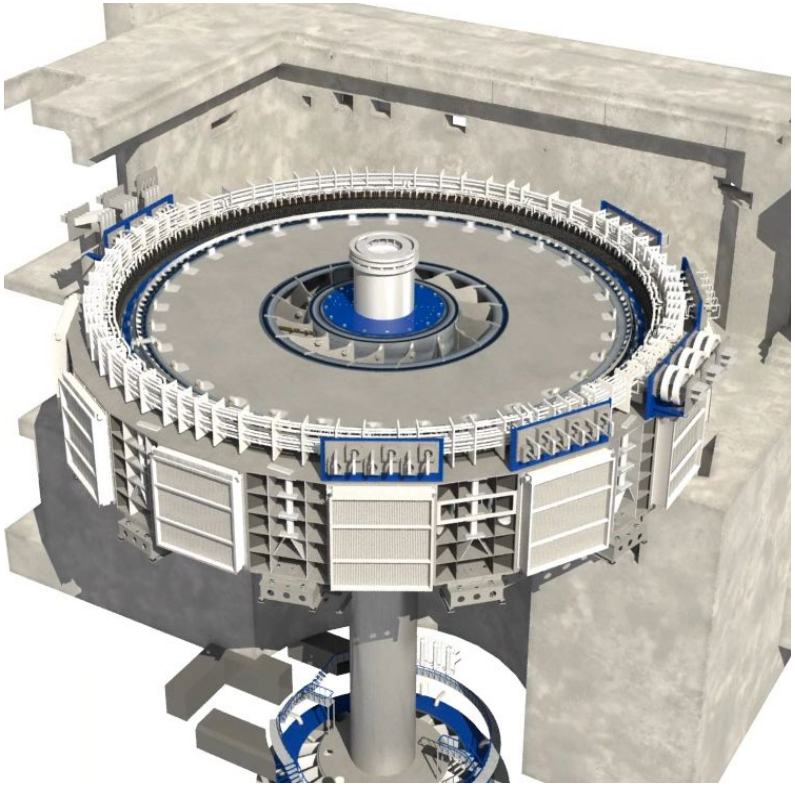
Upper radial, lower radial – axial (Voith W42)



Lower radial – axial (Voith W8)

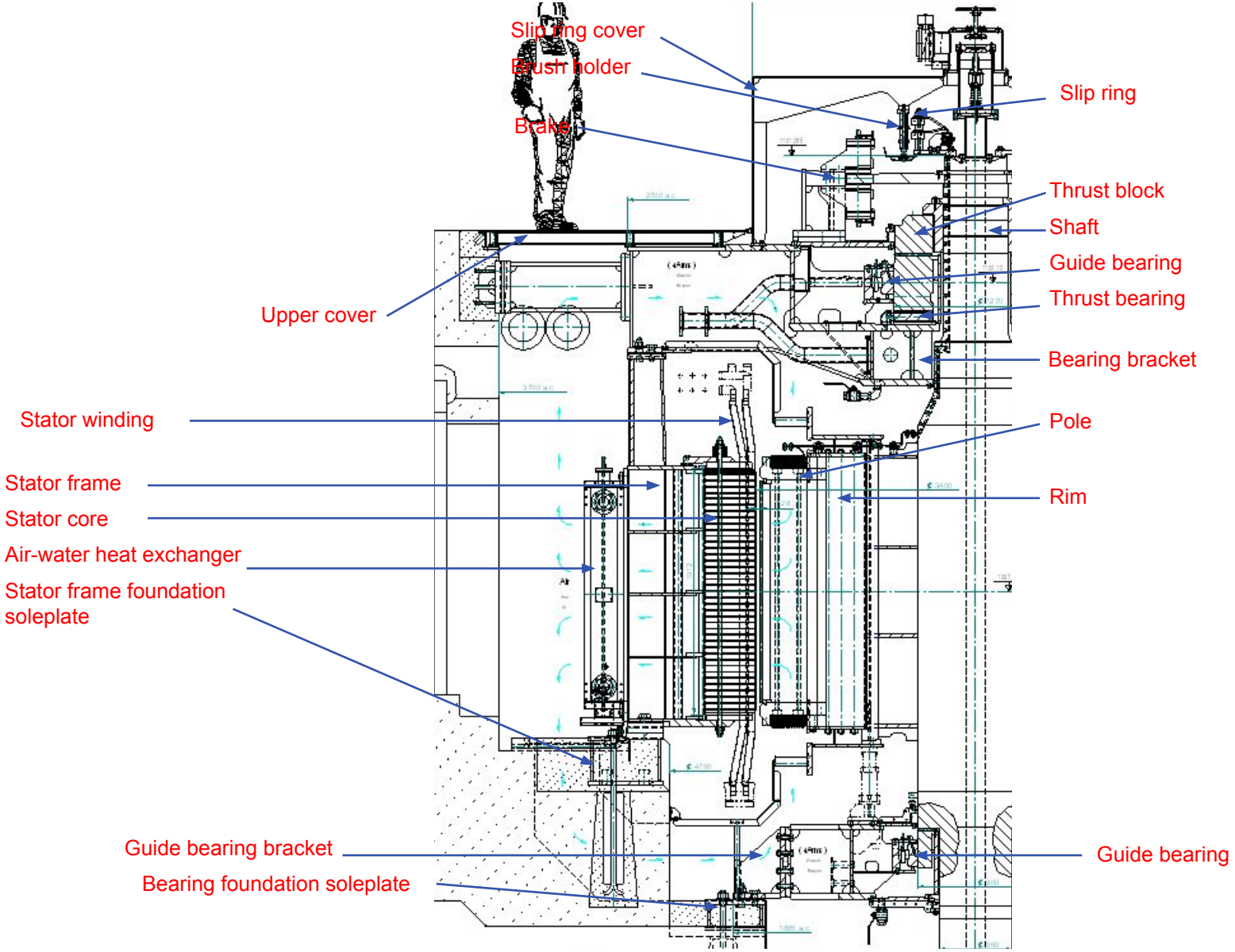


Generator

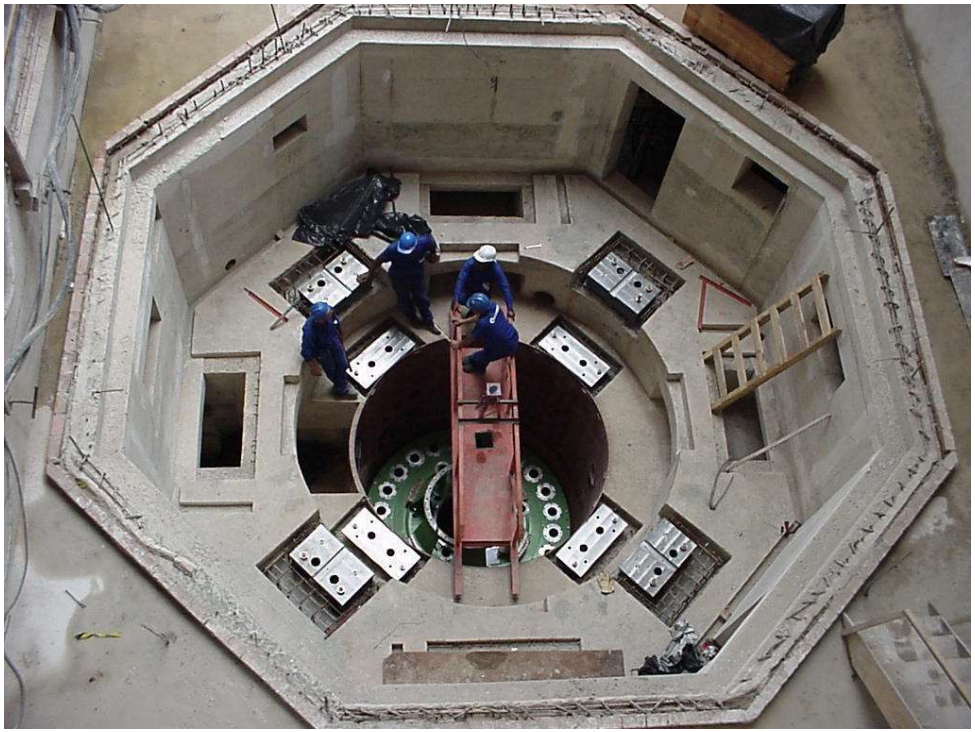




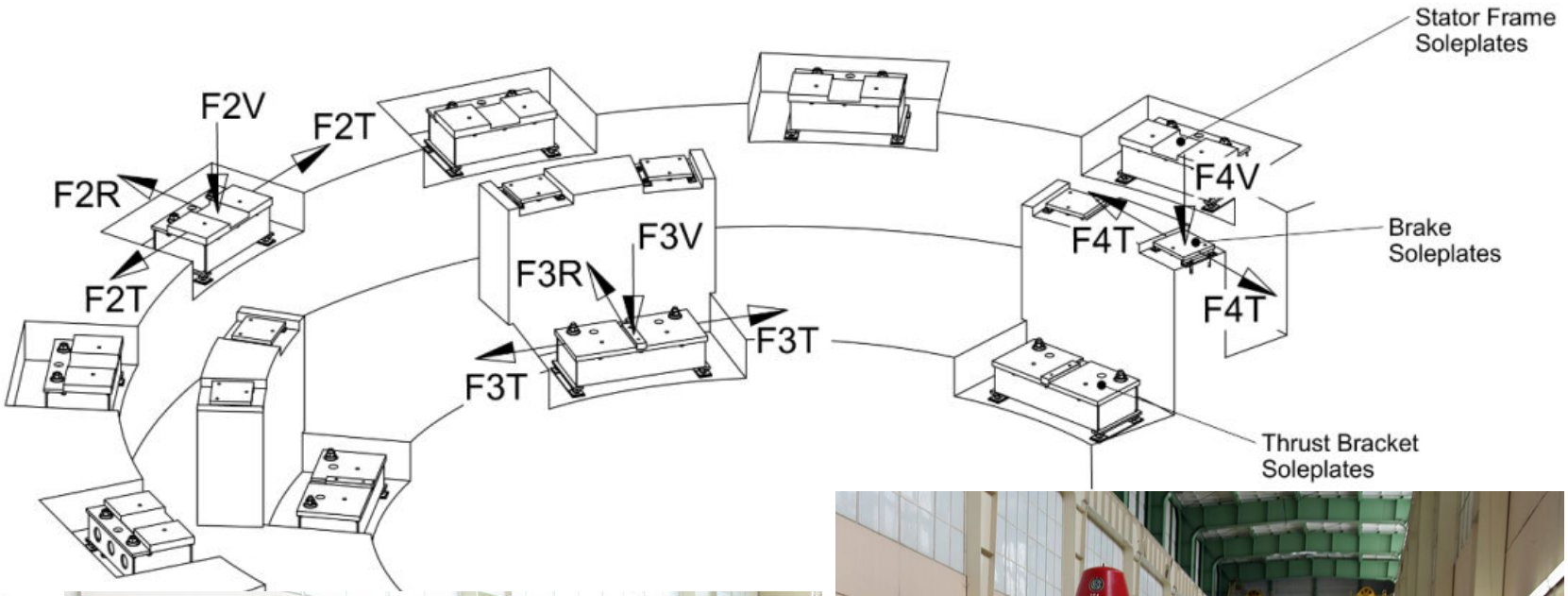



Slip ring cover
Brush holder
Brake
Slip ring
Thrust block
Shaft
Guide bearing
Thrust bearing
Upper cover
Bearing bracket
Stator winding
Pole
Stator frame
Rim
Stator core
Air-water heat exchanger
Stator frame foundation soleplate
Guide bearing bracket
Guide bearing
Bearing foundation soleplate

Basic composition



Foundation – press distribution

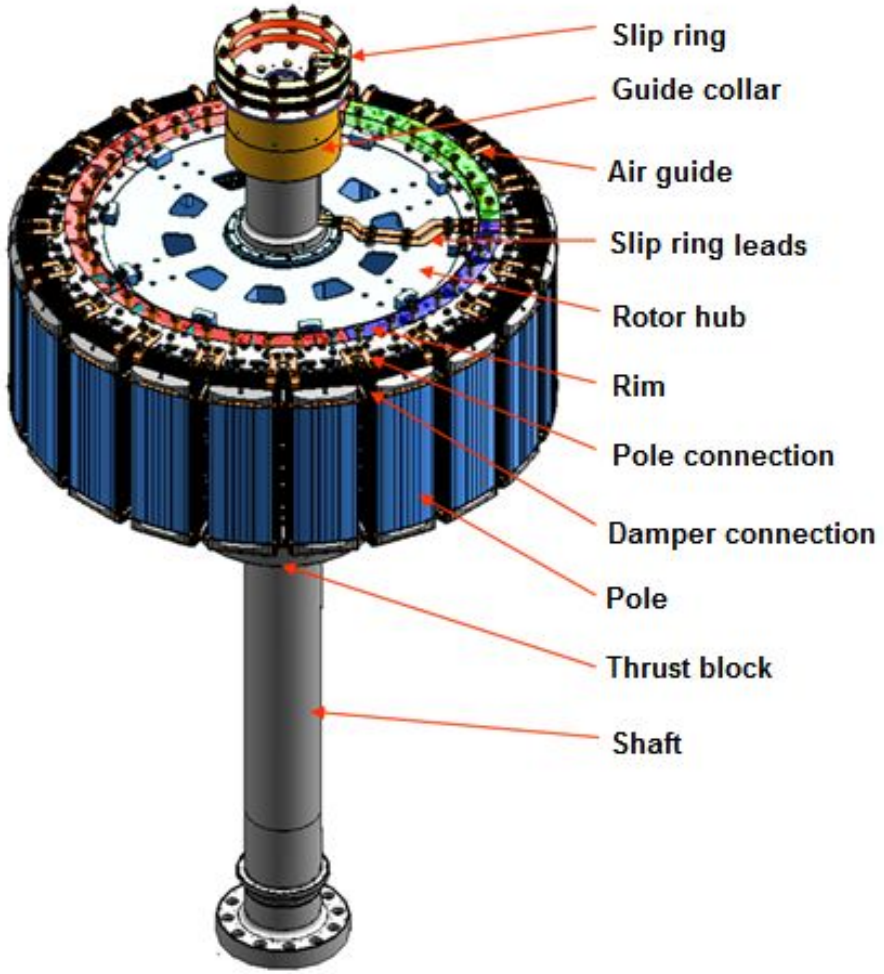






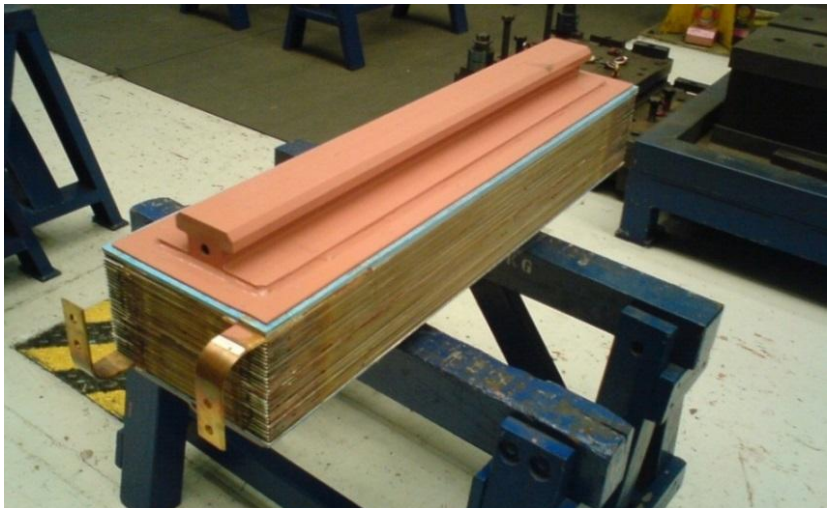
Rotor

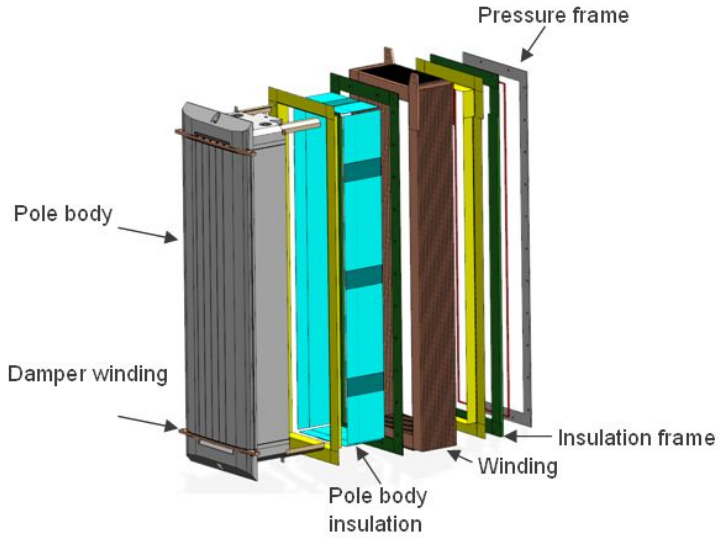


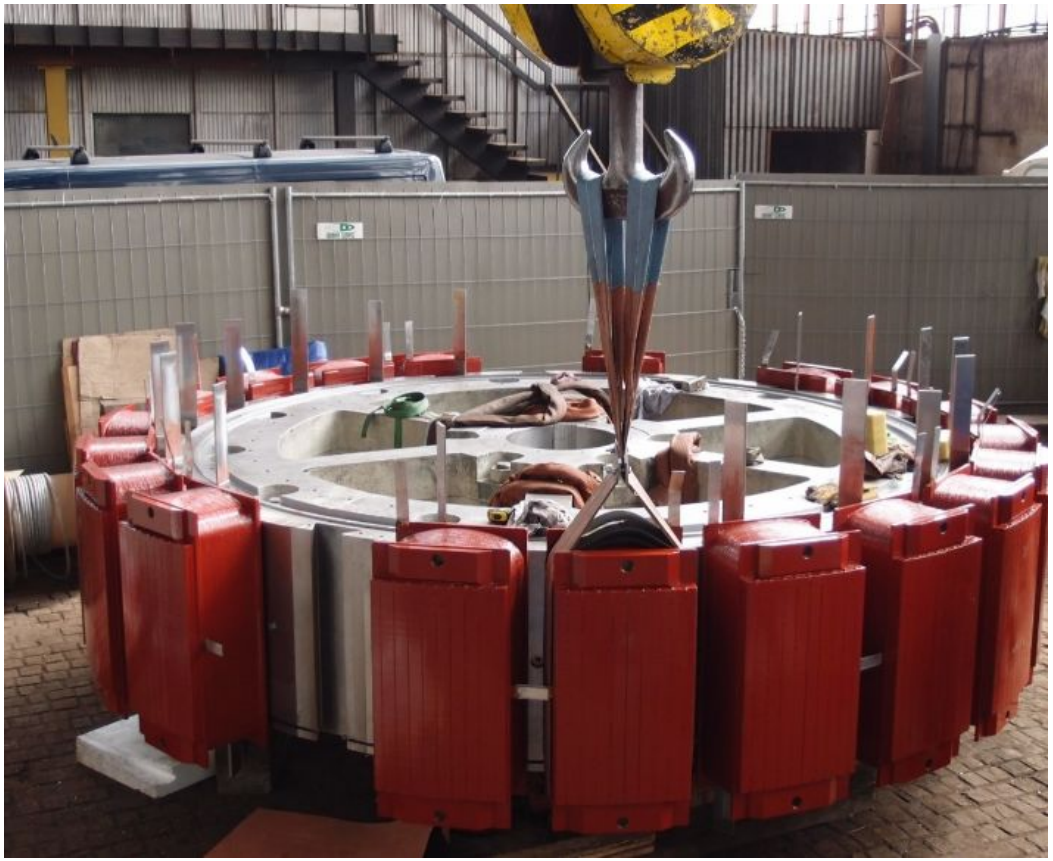

Slip ring
Guide collar
Air guide
Slip ring leads
Rotor hub
Rim
Pole connection
Damper connection
Pole
Thrust block
Shaft

Poles - coils

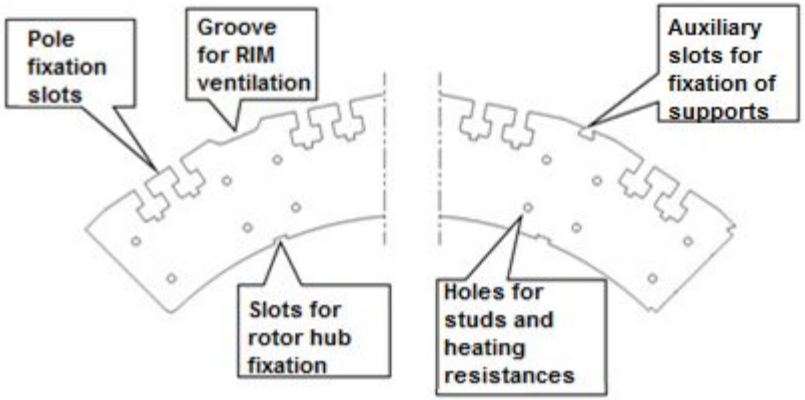
- mechanical
- elektromagnetical

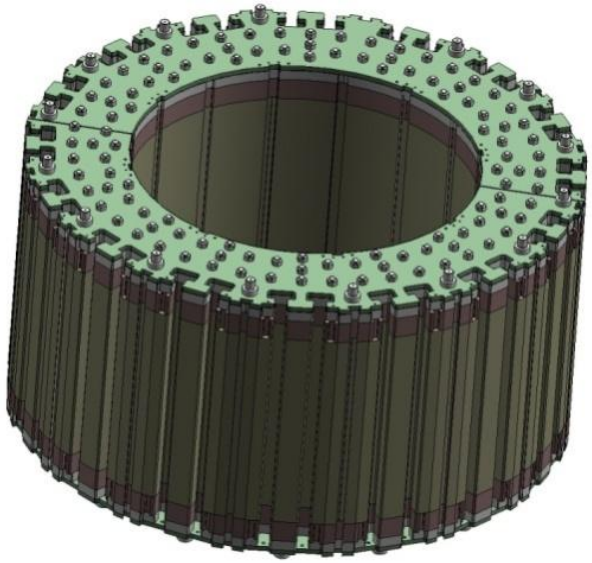


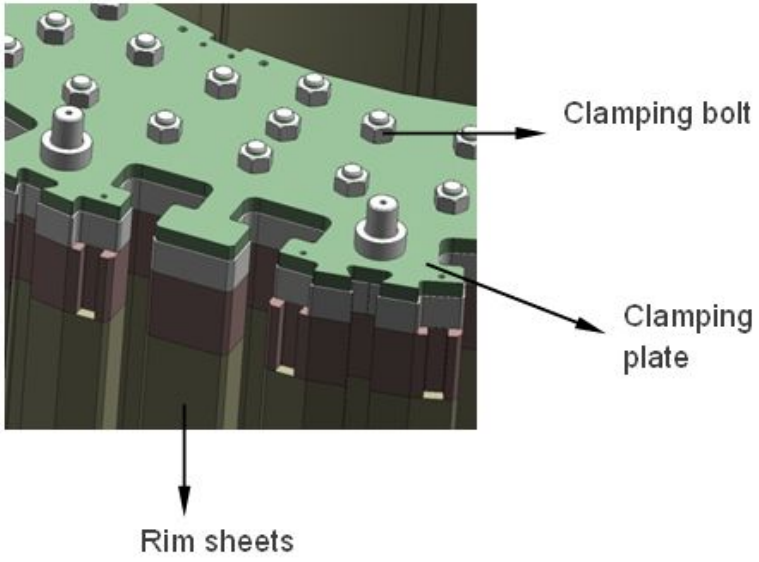




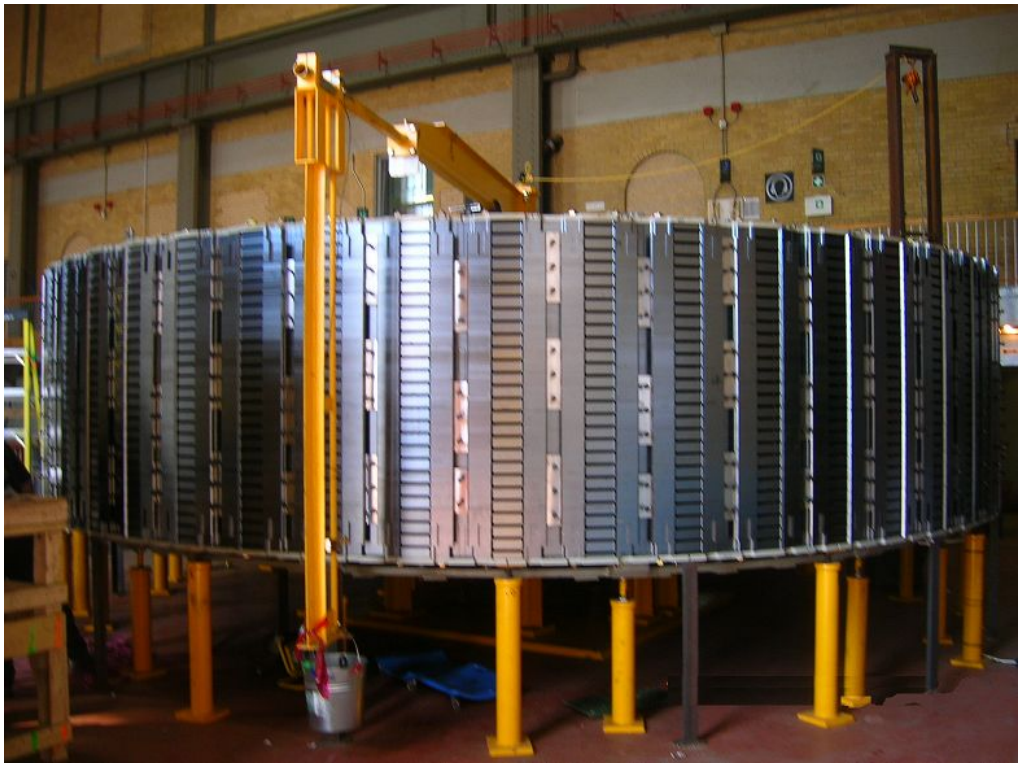
Hub

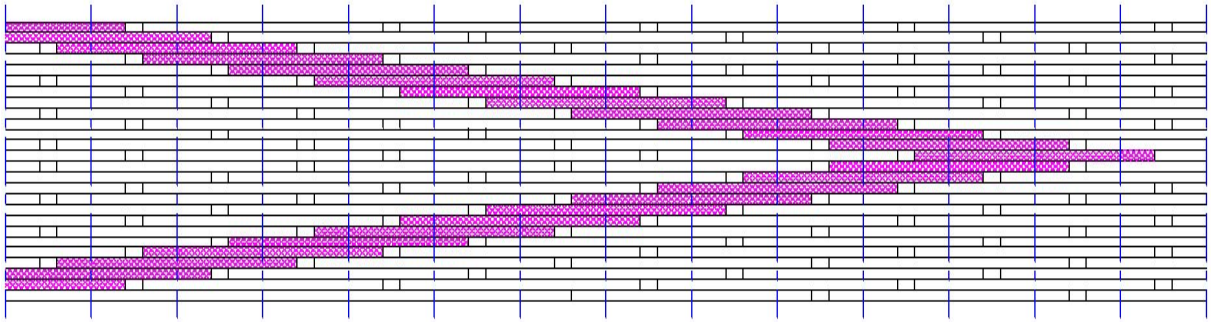

Pole fixation slots
Groove for RIM ventilation
Auxiliary slots for fixation of supports
Slots for rotor hub fixation
Holes for studs and heating resistances

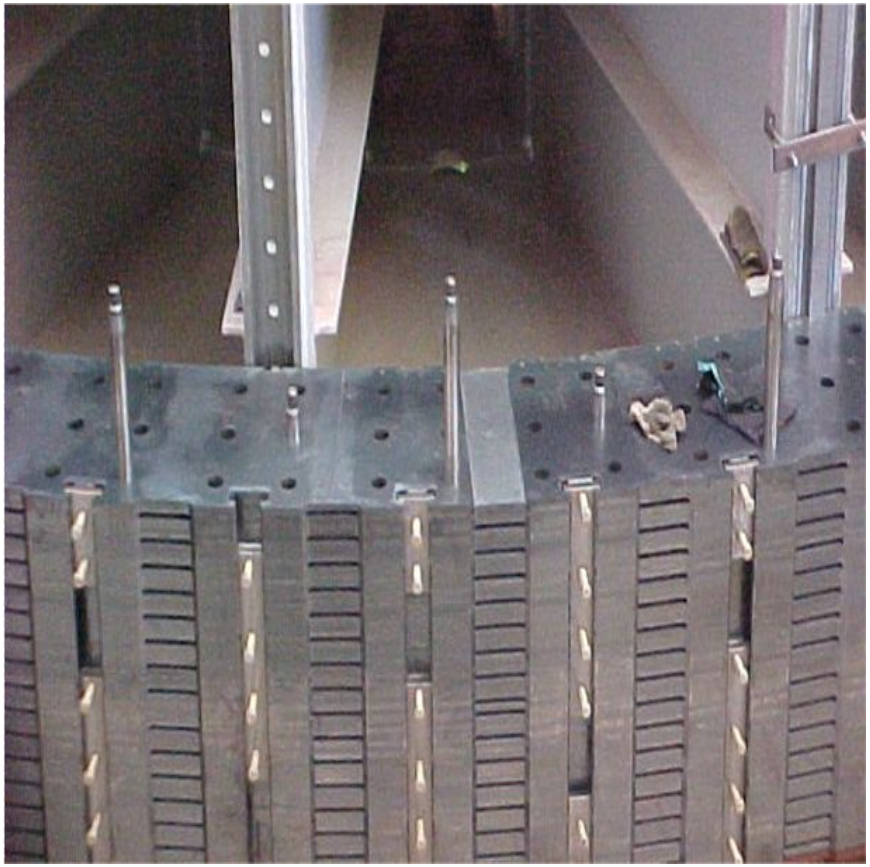


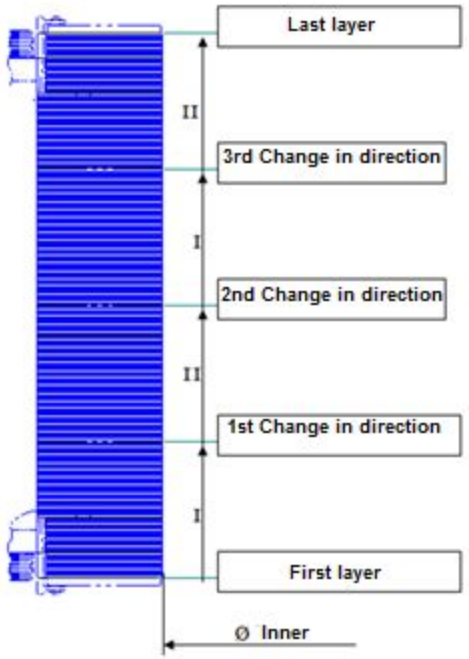

Clamping bolt
Clamping plate
Rim sheets

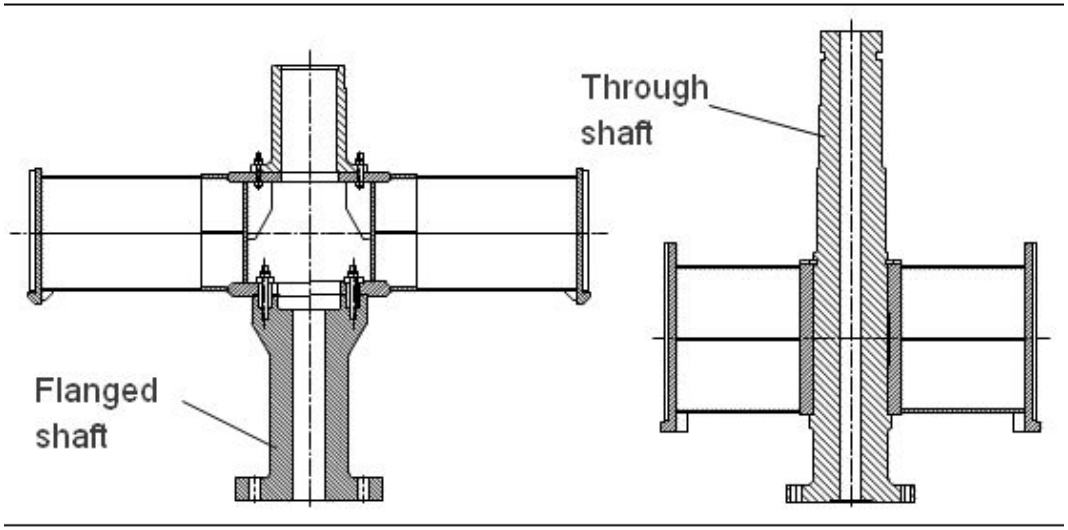






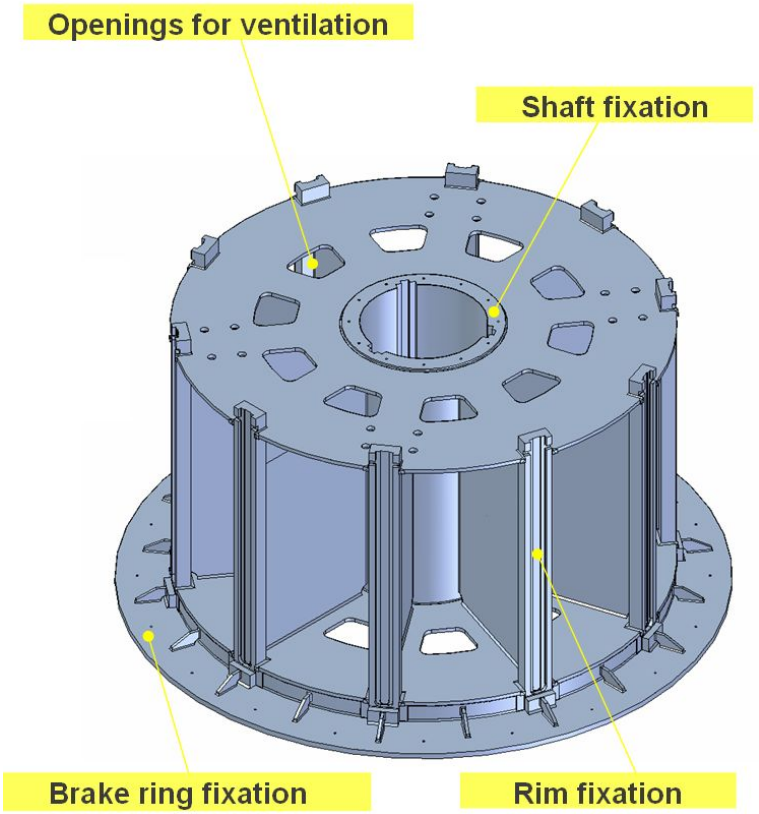


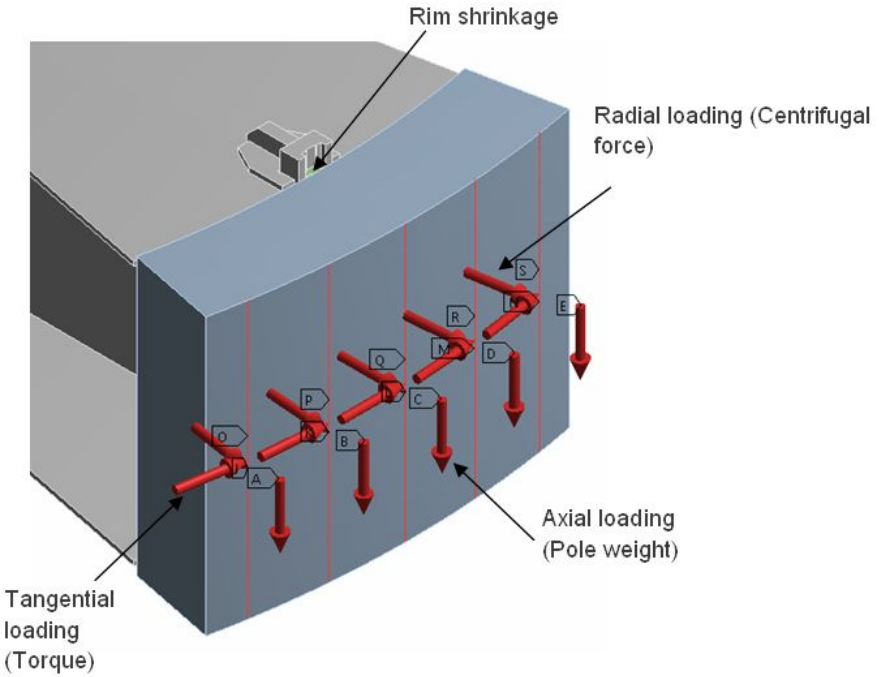

Last layer
II
3rd Change in direction
I
2nd Change in direction
II
1st Change in direction
I
First layer
Ø Inner


Through
shaft
Flanged
shaft

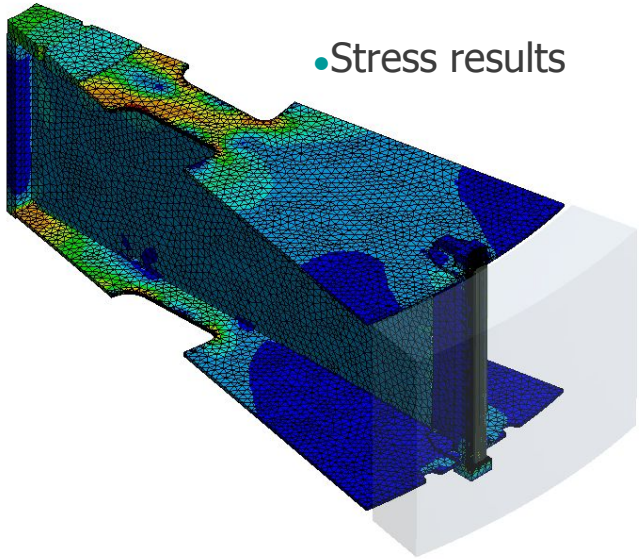

Descida do Rotor do Gerador
Potência Nominal 404.45 MVA
Rotação Nominal 75 rpm
Diâmetro 16.49 m
Altura total 2.6 m
Massa Total 710.4 T
Número de polos 96
VOITH


20-Fev-09 14:49



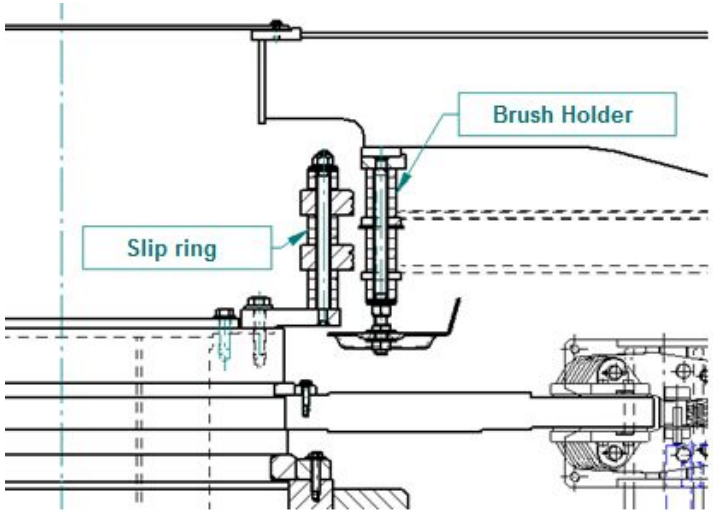


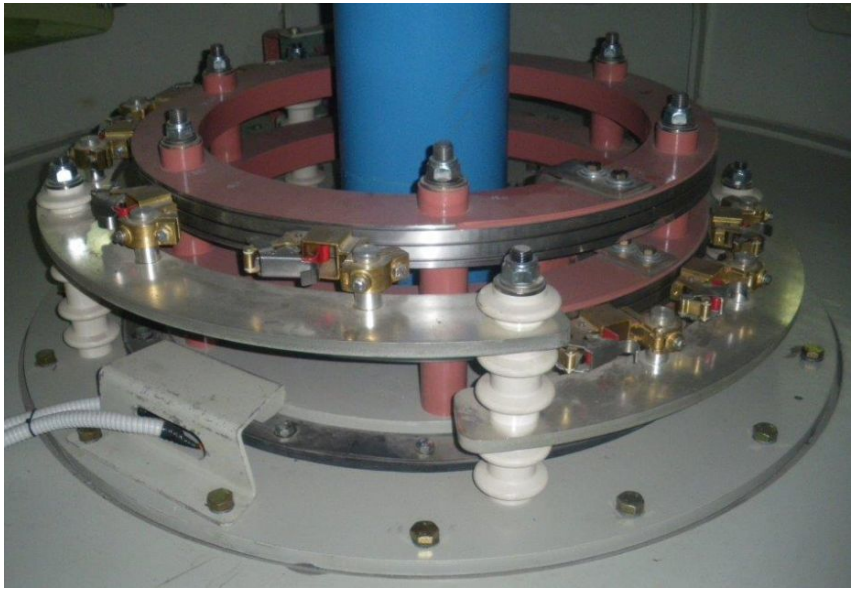
- Stress results

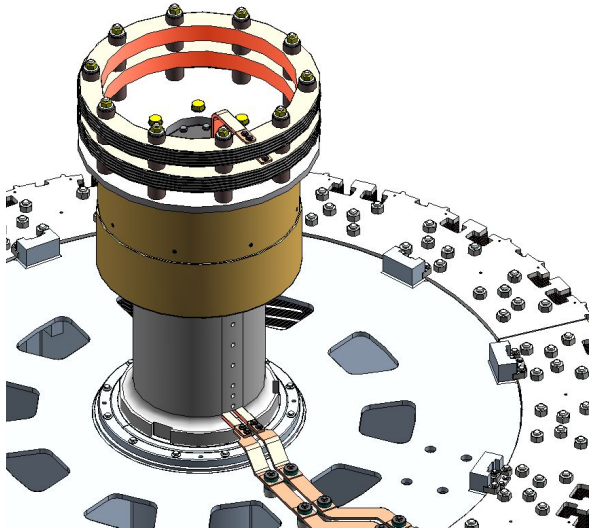


Rings

- current
- slips
- rings

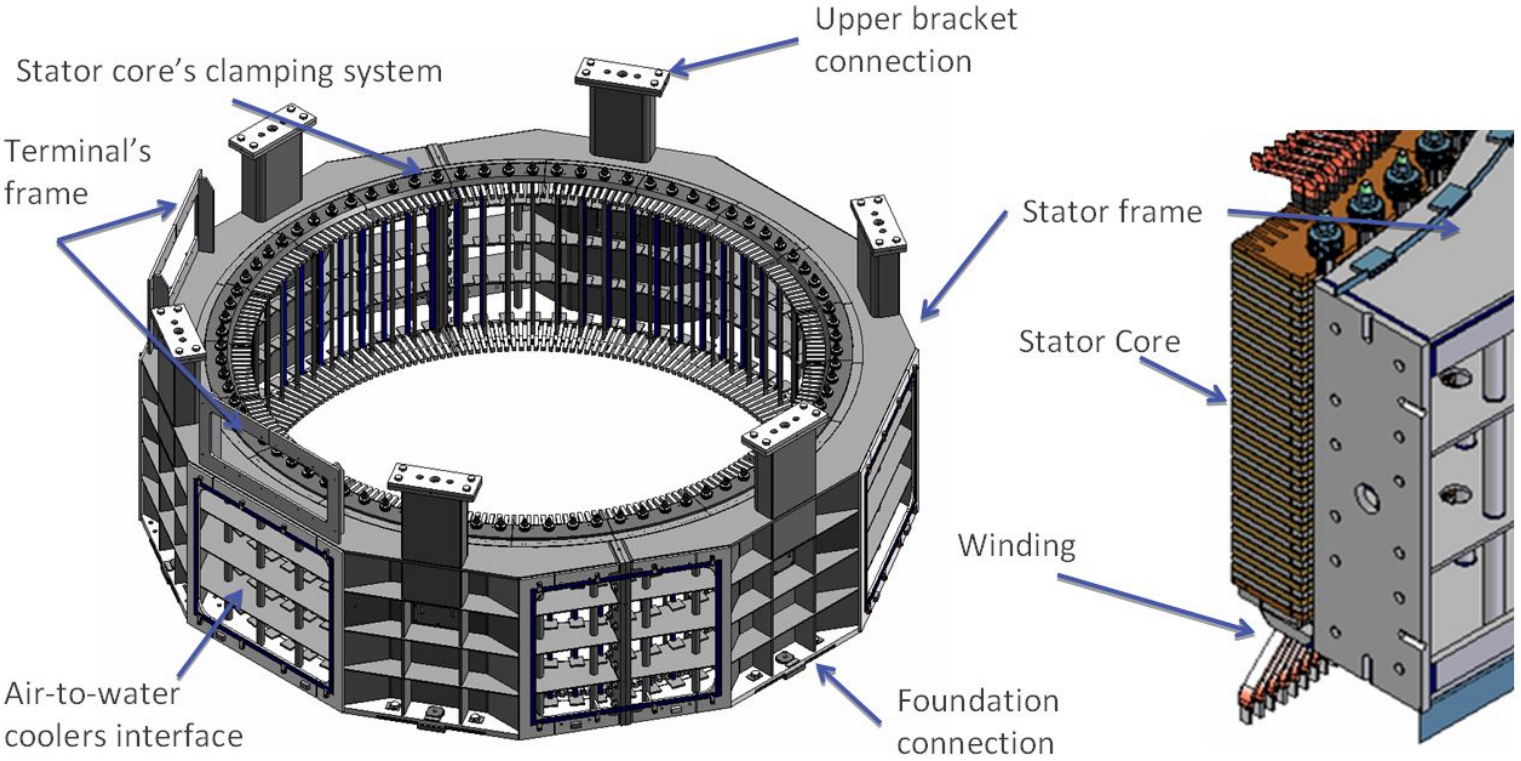


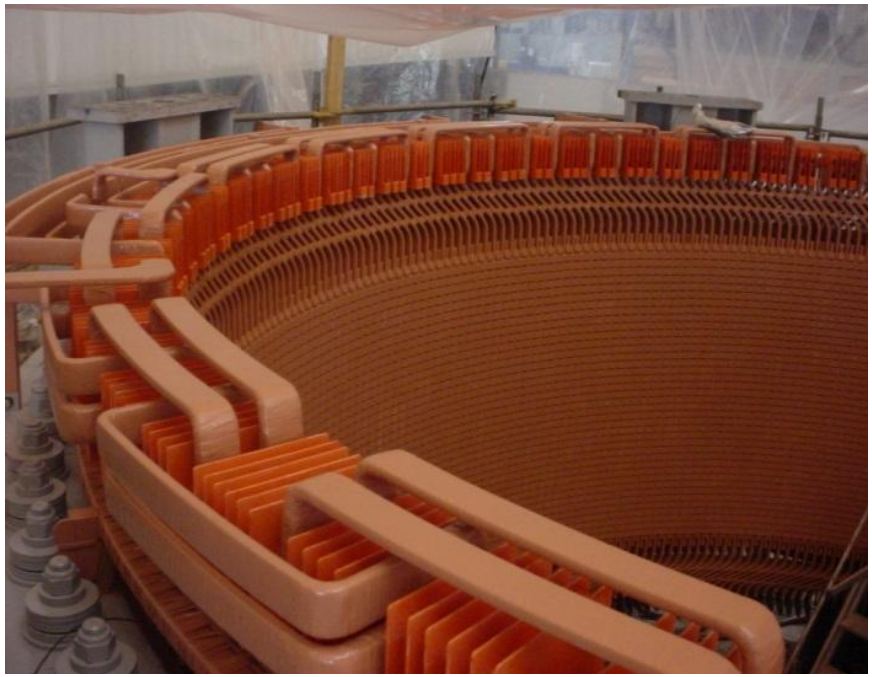


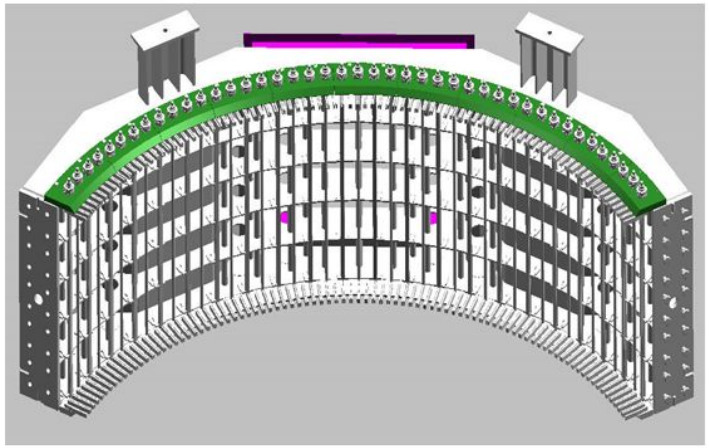


Stator

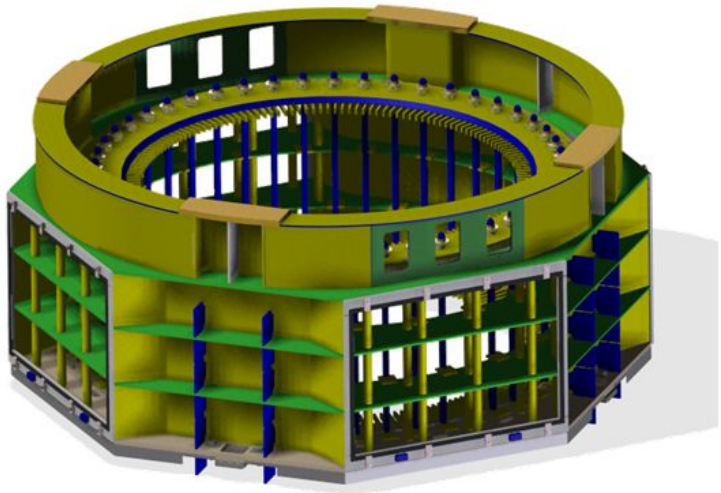

Hansen
Electric


Upper bracket connection
Stator core's clamping system
Terminal's frame
Stator frame
Stator Core
Winding
Air-to-water coolers interface
Foundation connection



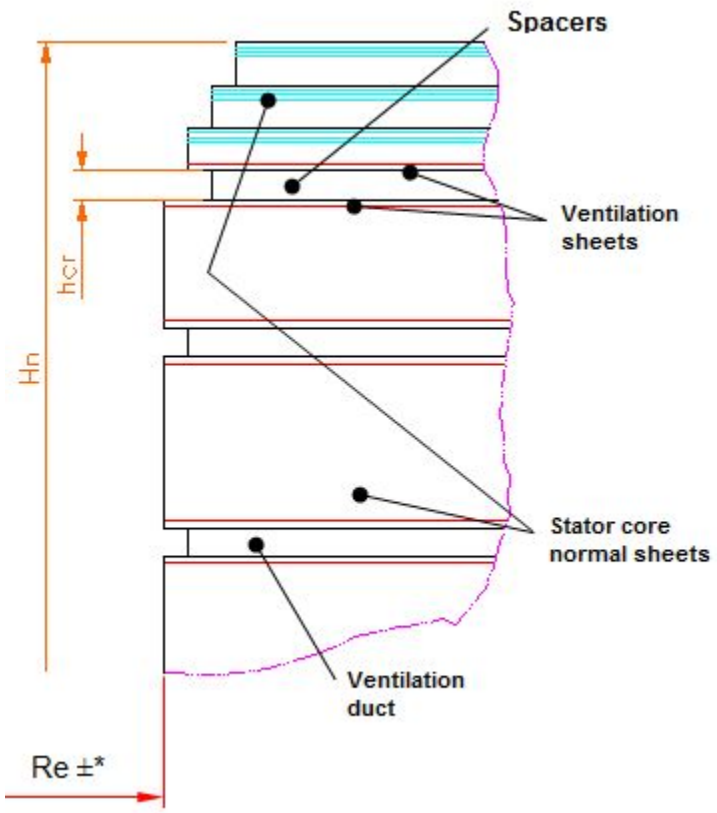


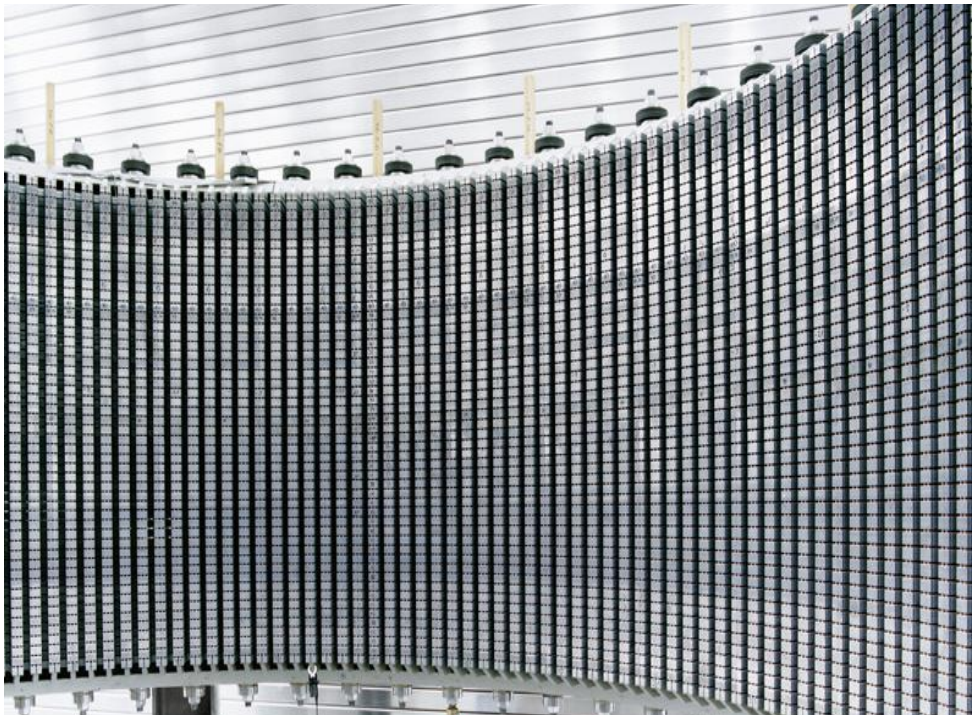
Split stator frame

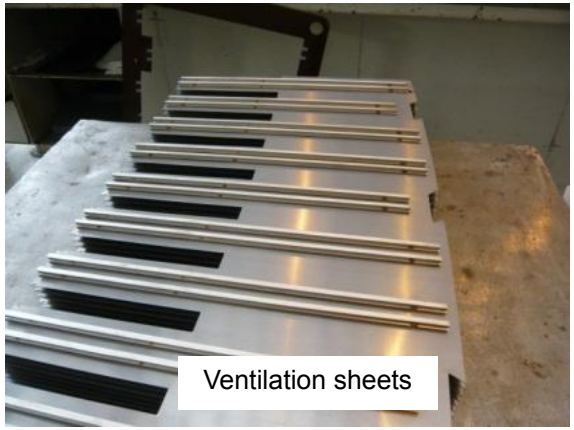


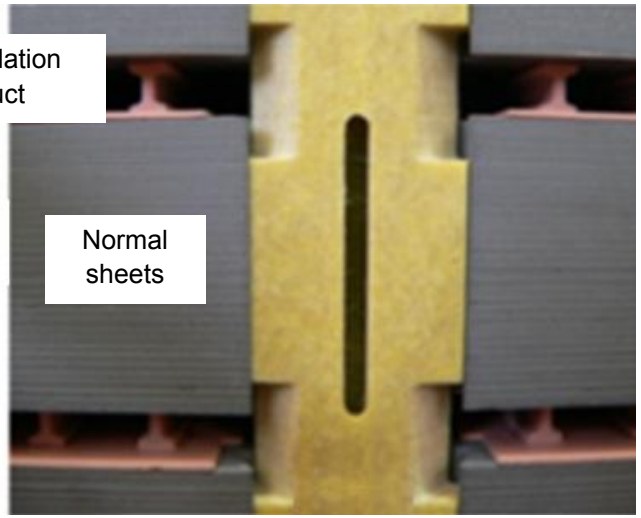
Single piece stator frame



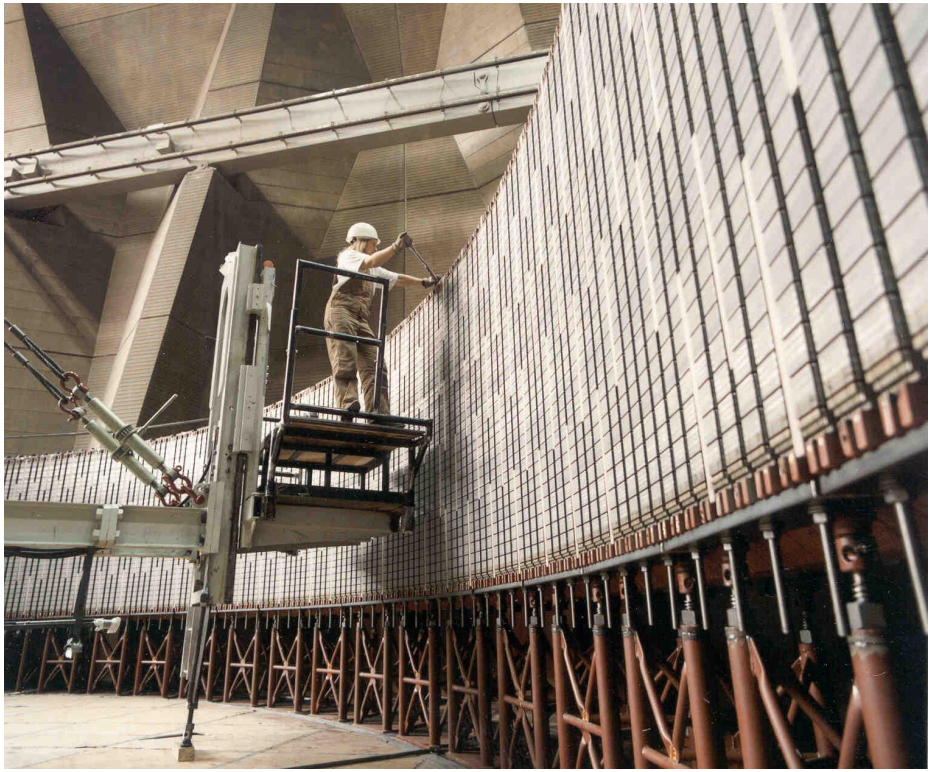

Spacers
Ventilation sheets
hcr
Hn
Stator core normal sheets
Ventilation duct
Re ±*

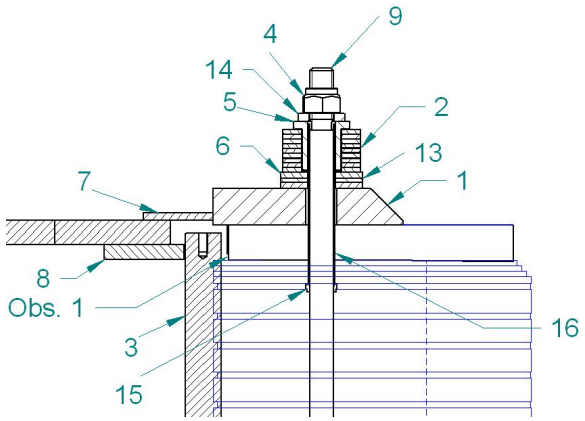


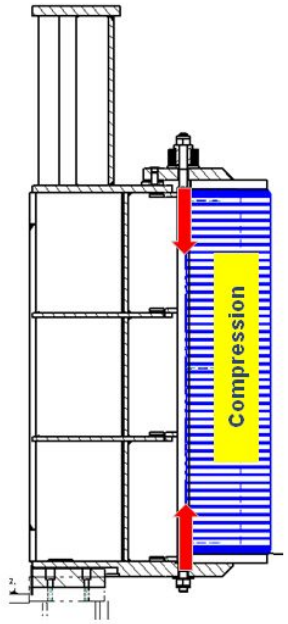

Ventilation sheets


Ventilation duct
Normal sheets

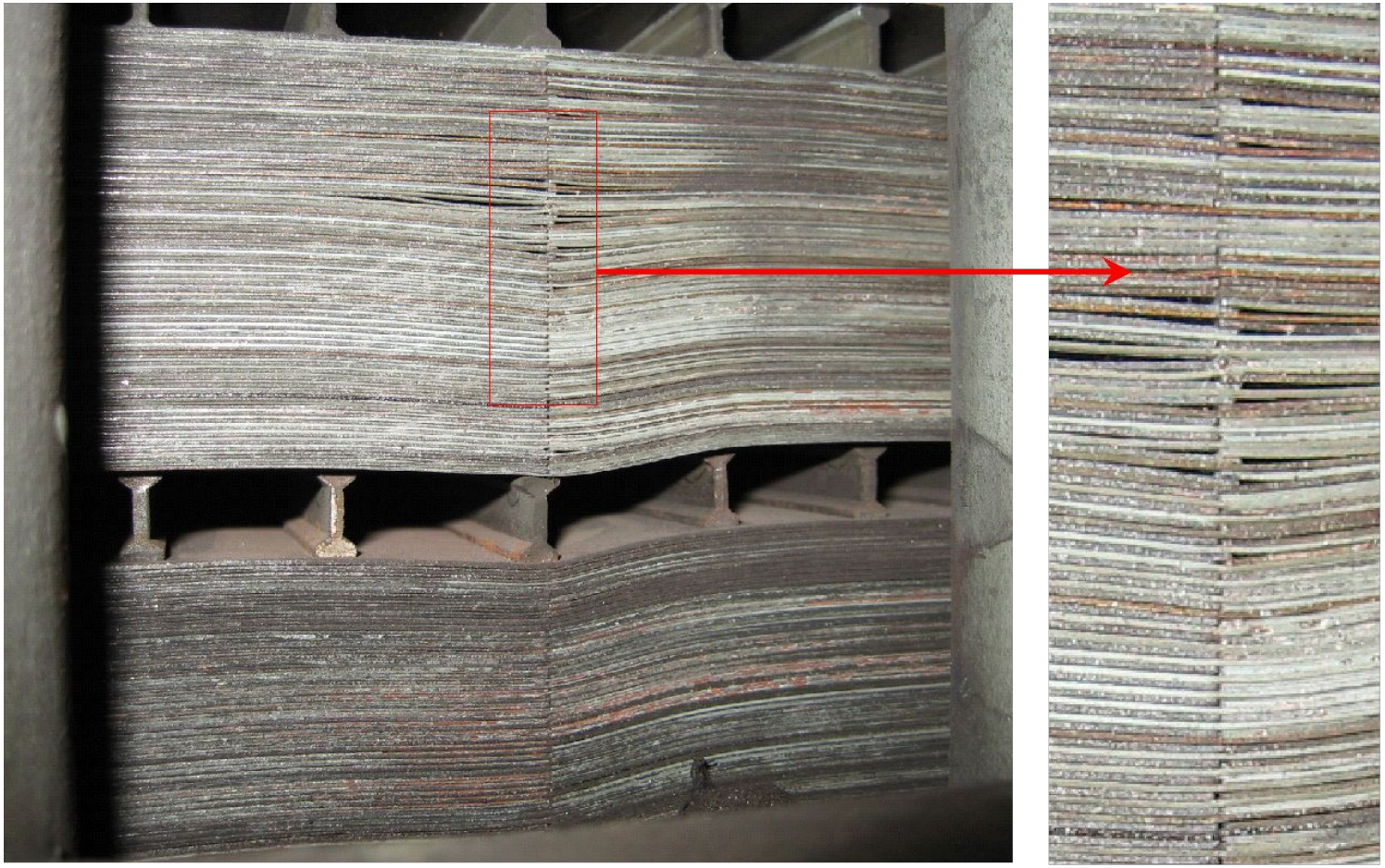
Stator core





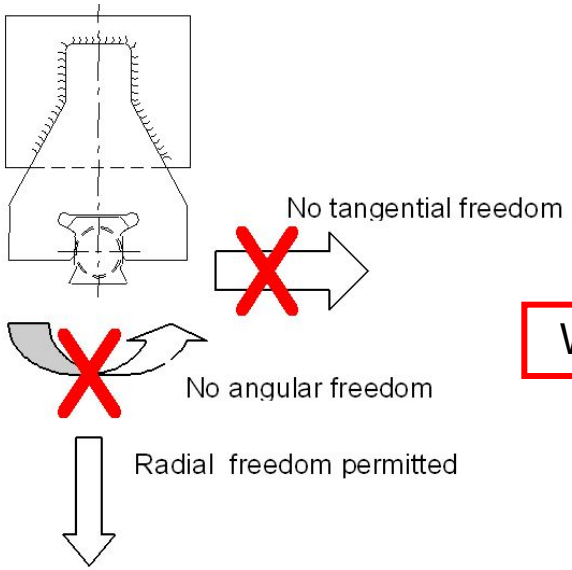


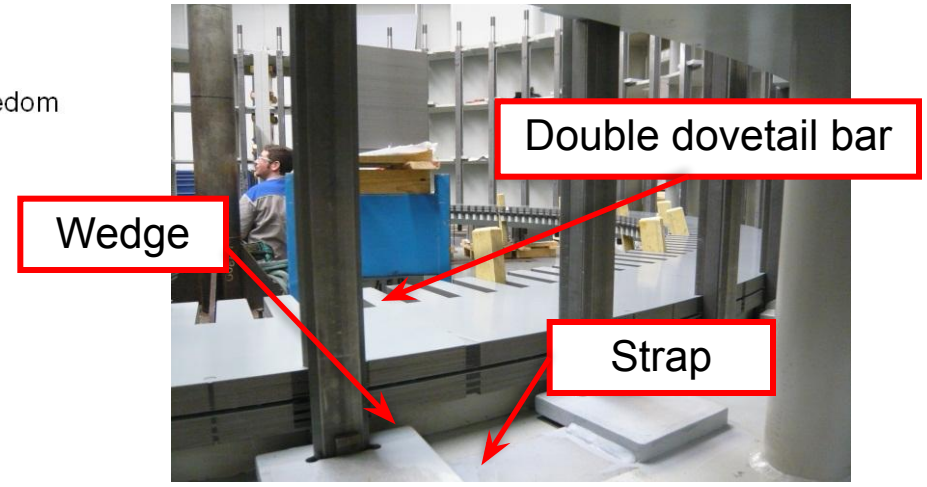


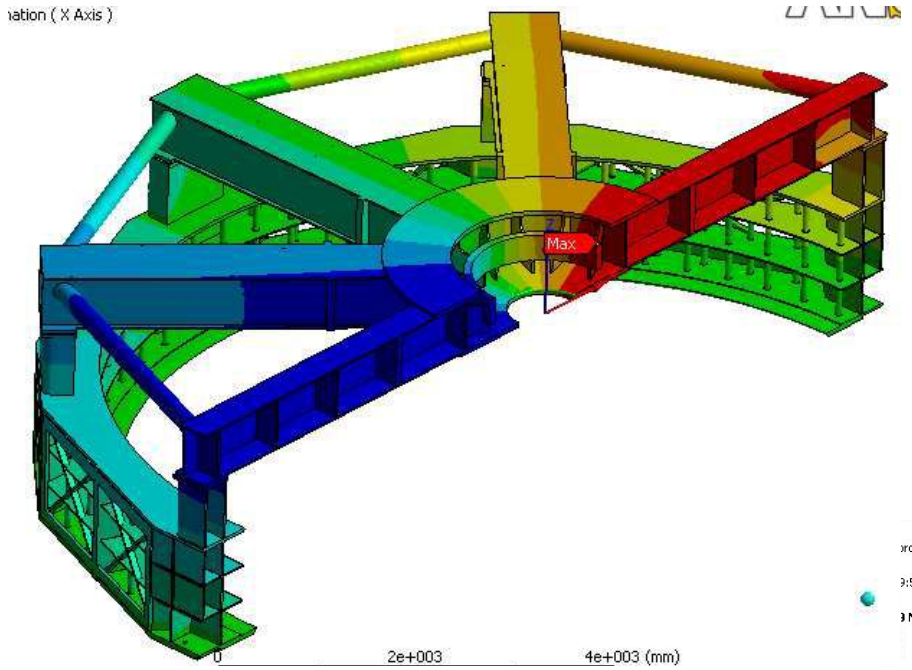


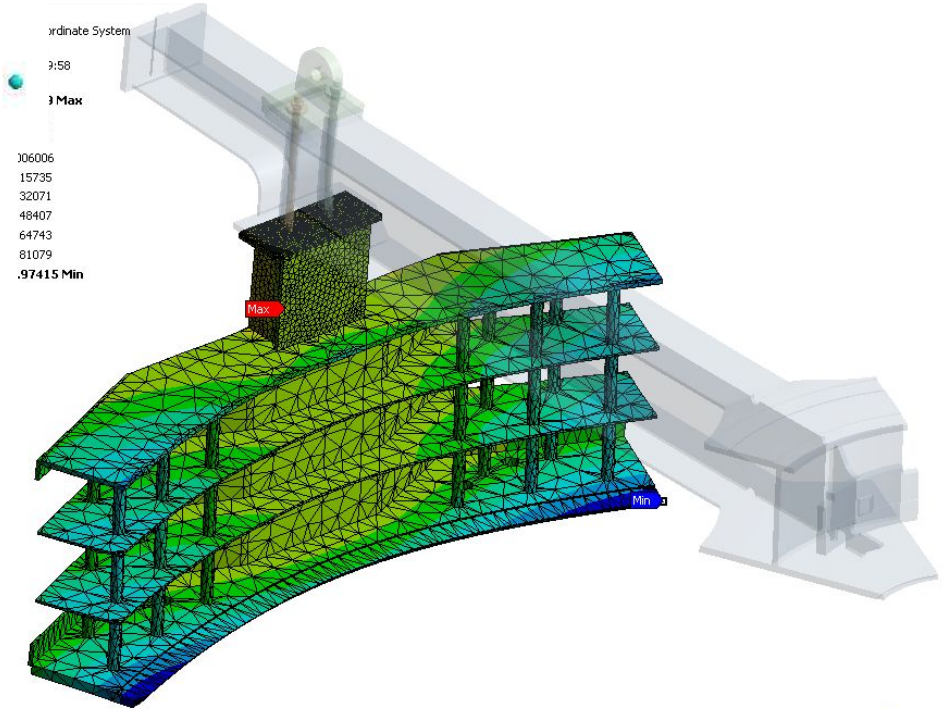
Stator core fixation



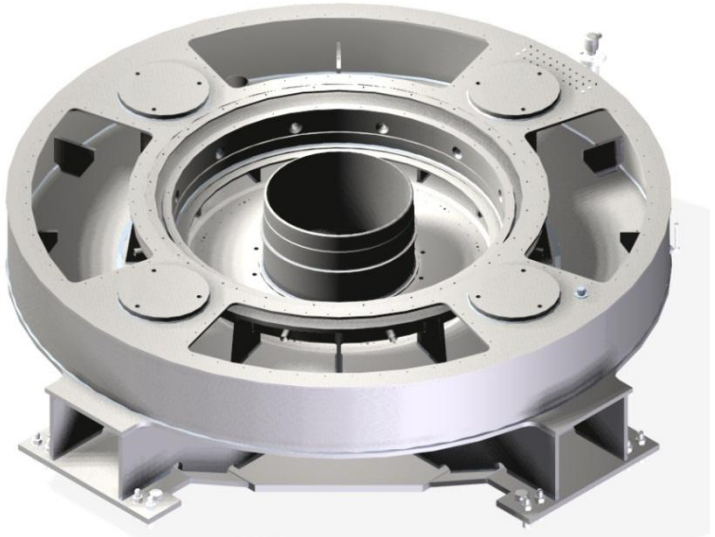





ıation (X Axis)
Max
0
2e+003
4e+003 (mm)


ordinate System
9:58
Max
006006
15735
32071
48407
64743
81079
.97415 Min
Max
Min

Bearings

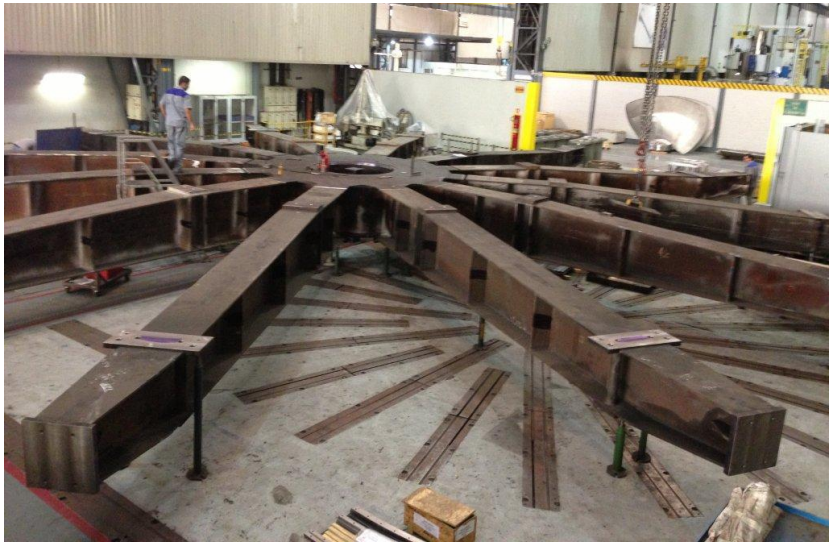




Upper / lower guide bearing bracket



Lower guide bearing bracket



Upper guide bearing bracket

Upper bearing bracket

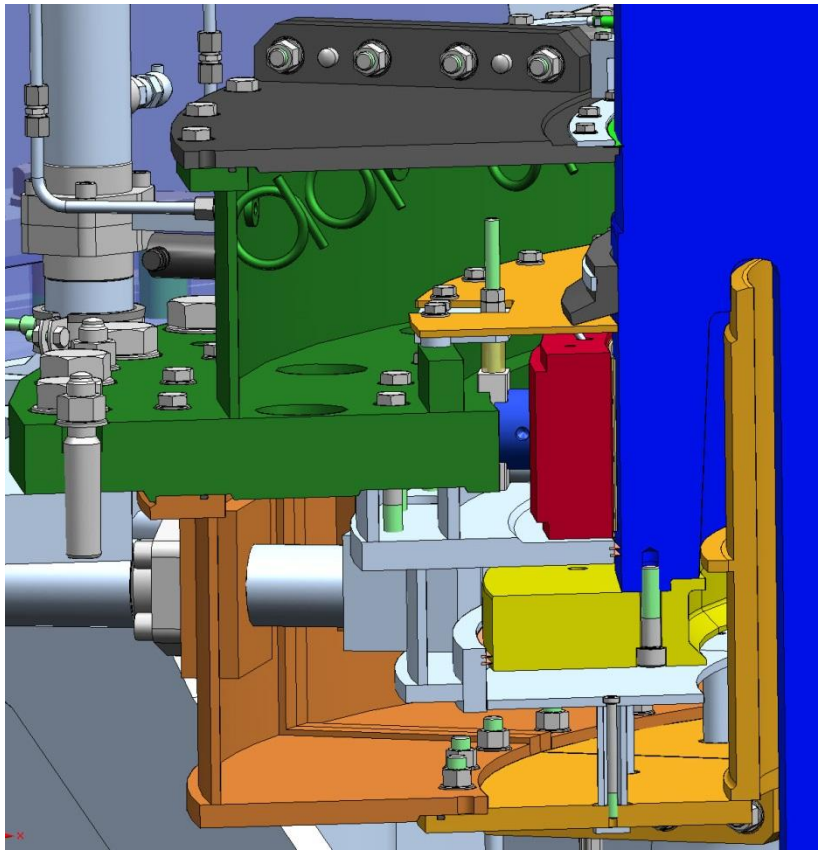


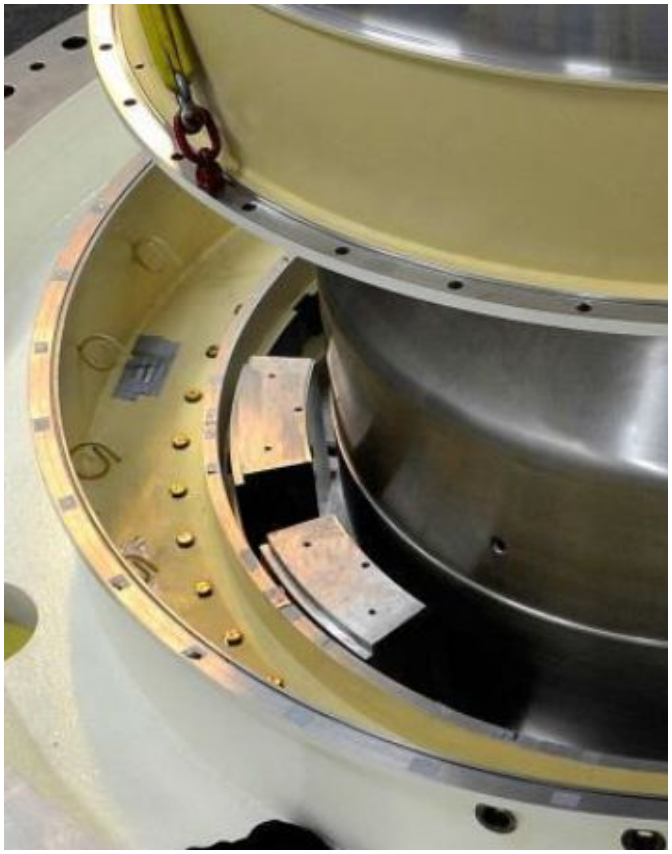
Radially supported on concrete



Not radially supported on concrete

Guide bearing





Thrust bearing

