



## Program System for Turbomachinery Rotordynamics Analysis

# ***DYNAMICS R4***

### Rotor Dynamics Case Studies

Alfa-Tranzit Co., Ltd



# Hydropower plants and sample of research

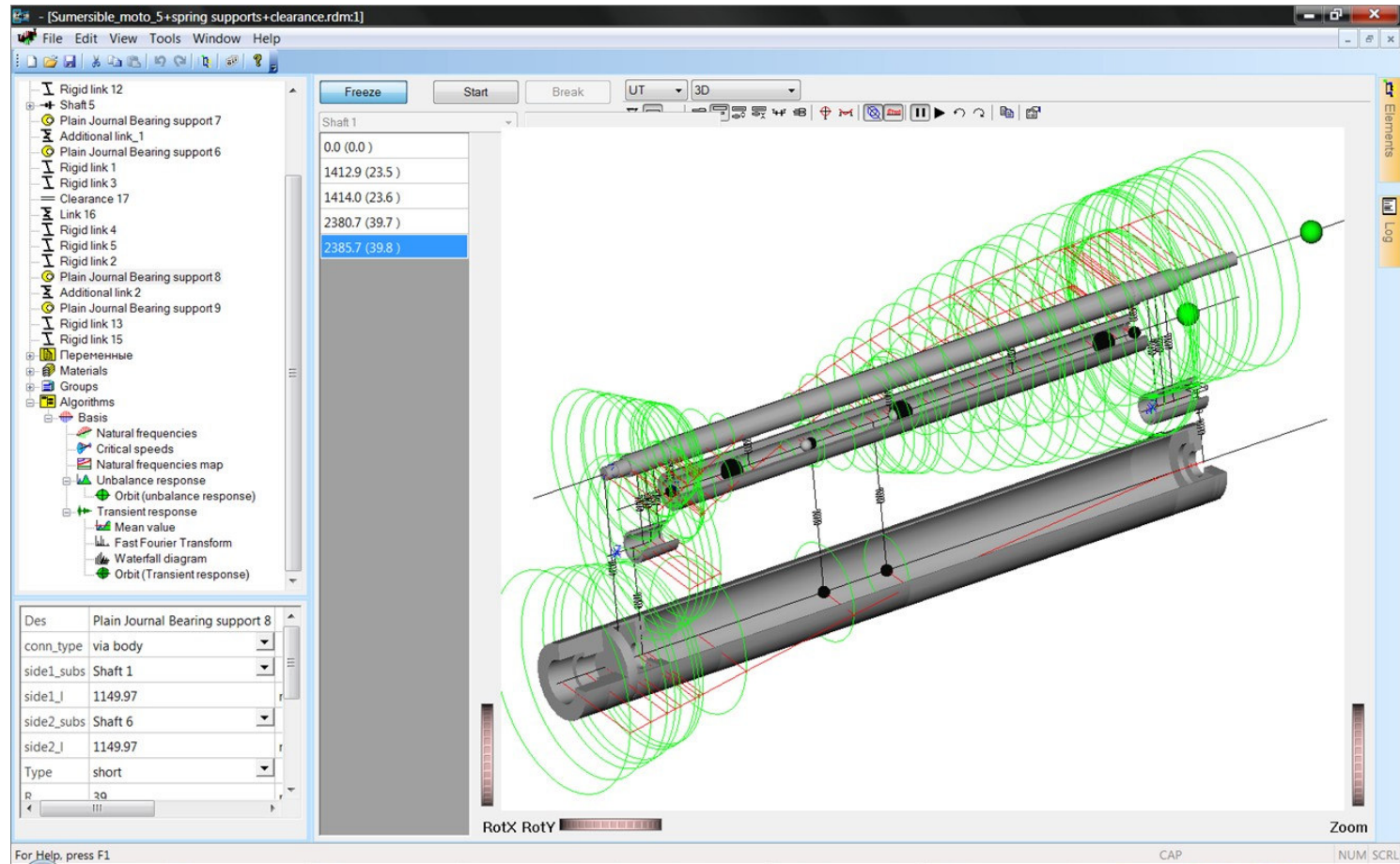


The screenshot displays the ANSYS software interface for a hydrogenerator rotor model. The main window shows a 3D model of the rotor with a green wireframe mesh and a red coordinate system. The left sidebar contains a tree view of the model's components, including Generator, Turbine, Shaft, and various bearings. The top toolbar includes buttons for Freeze, Start, Break, and UT. The bottom left panel shows material properties for the rotor, including Poisson's ratio (0.3), density (7850 kg/m³), and Young's modulus (19404.2 GPa). The bottom right panel shows a list of analysis tools, including Non-linear support, Plain Journal Bearing support, Ball Bearing support, Roll Bearing support, Active Magnetic Bearing support, Damper support, Clearance, and TemplateScript. A small window in the bottom right corner displays a graph of the rotor's natural frequencies and mode shapes.

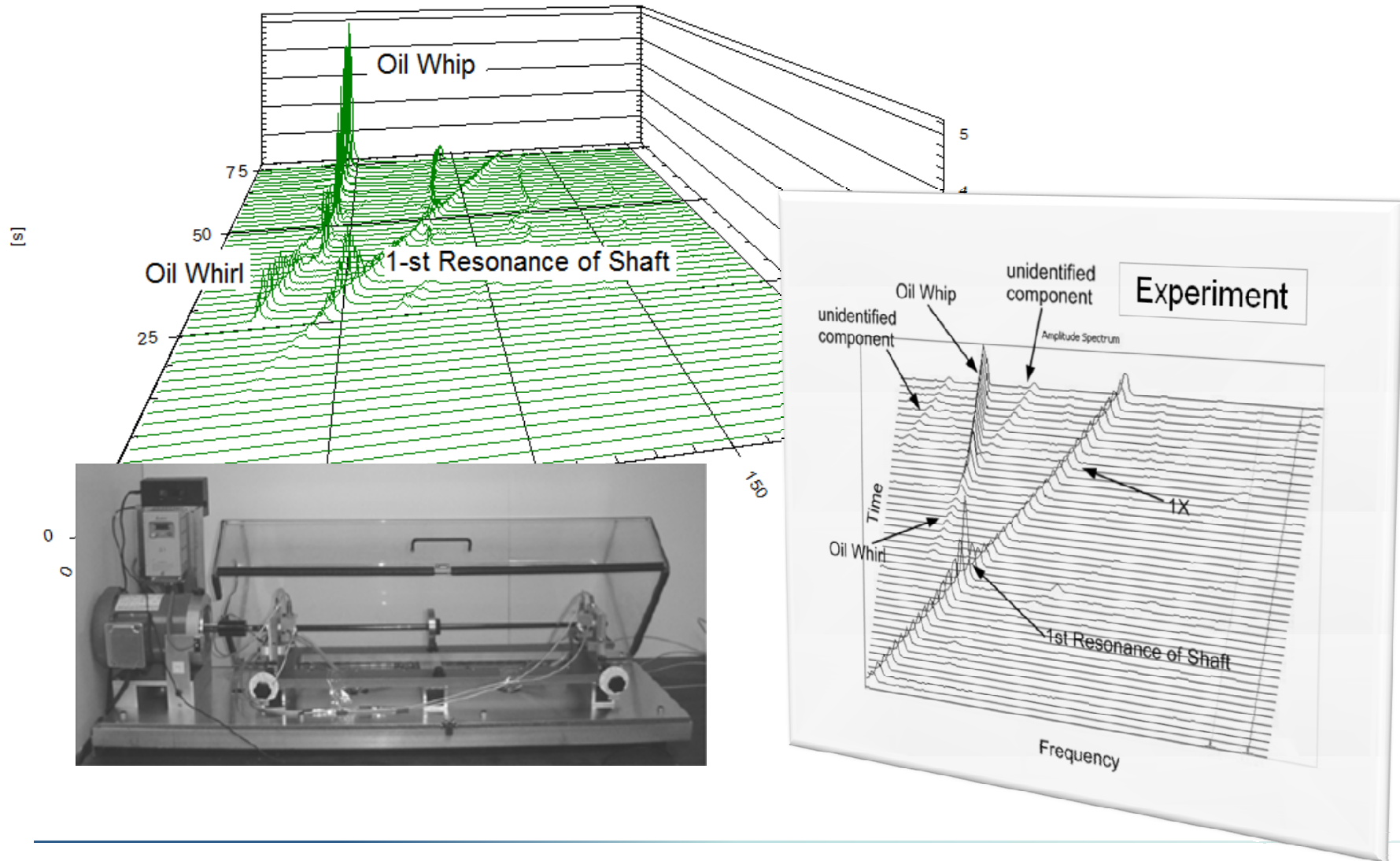
Generator	Value
0.0	(0.0)
0.0	(0.0)
177.1	(3.0)
301.9	(5.0)
476.6	(7.9)
583.8	(9.7)

Property	Value	Unit	Description	Value
Nue	0.3		Poisson	19404.2 (323.4)
rho	7850	kg/m3	Density	19868.4 (331.1)
Ln_dec	0		Logarit	
cs	1e+007	mm	calcula	
Visibility	0.8		Elemen	

# Submersible motors and pumps



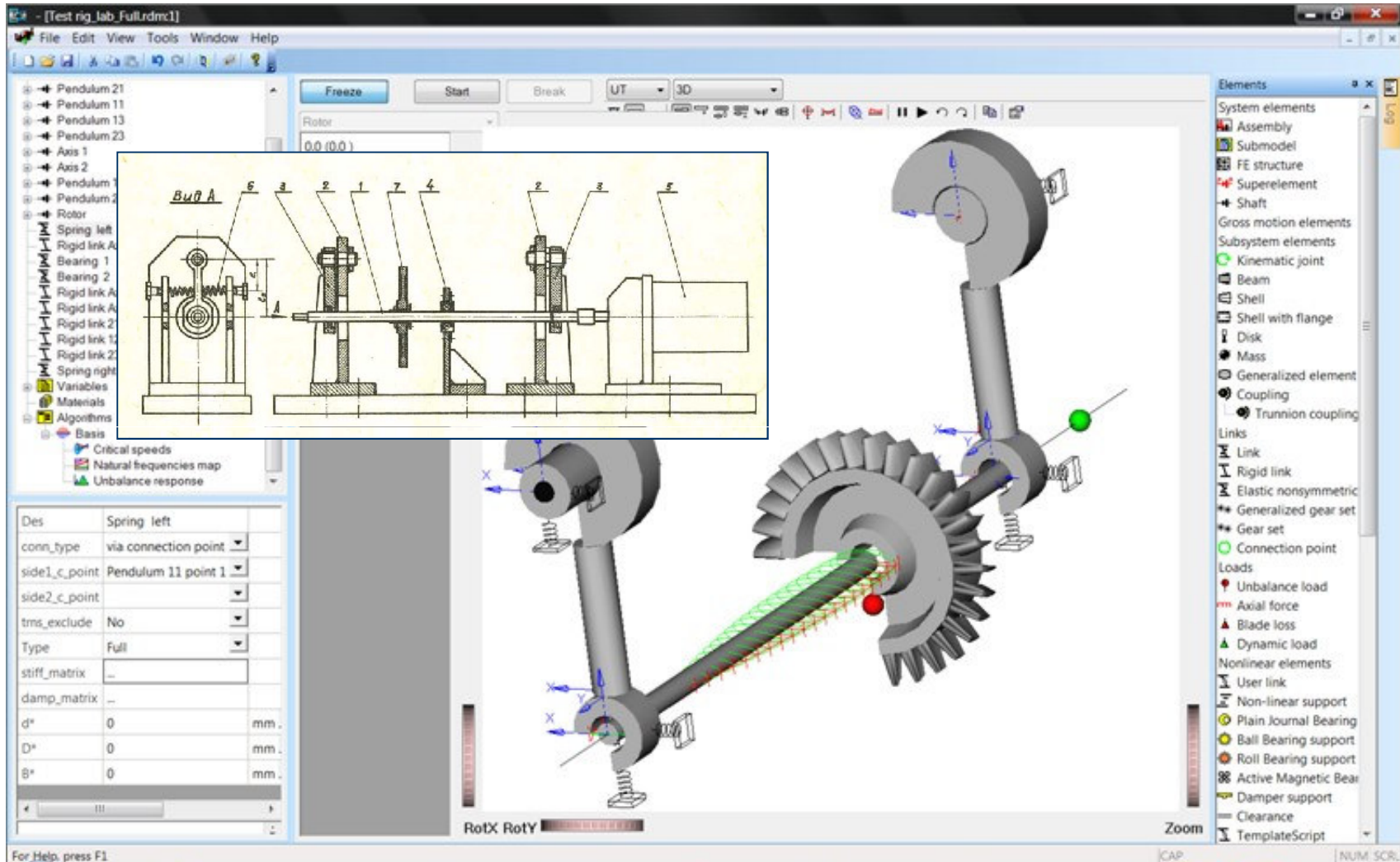
# Spectra-Quest Rotor Dynamics Simulator - Oil Whirl and Whip



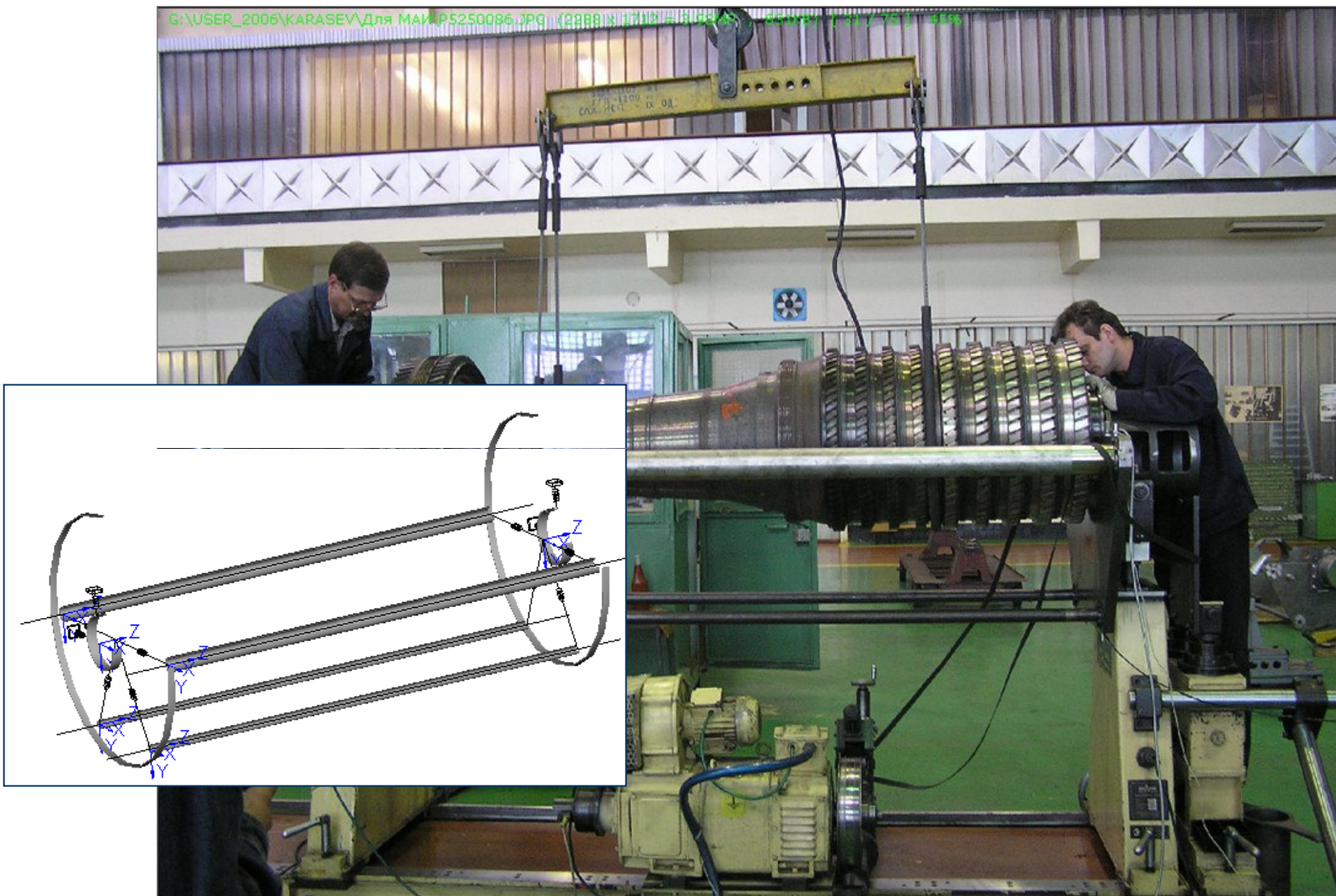
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# Laboratory plant with the pendulum support



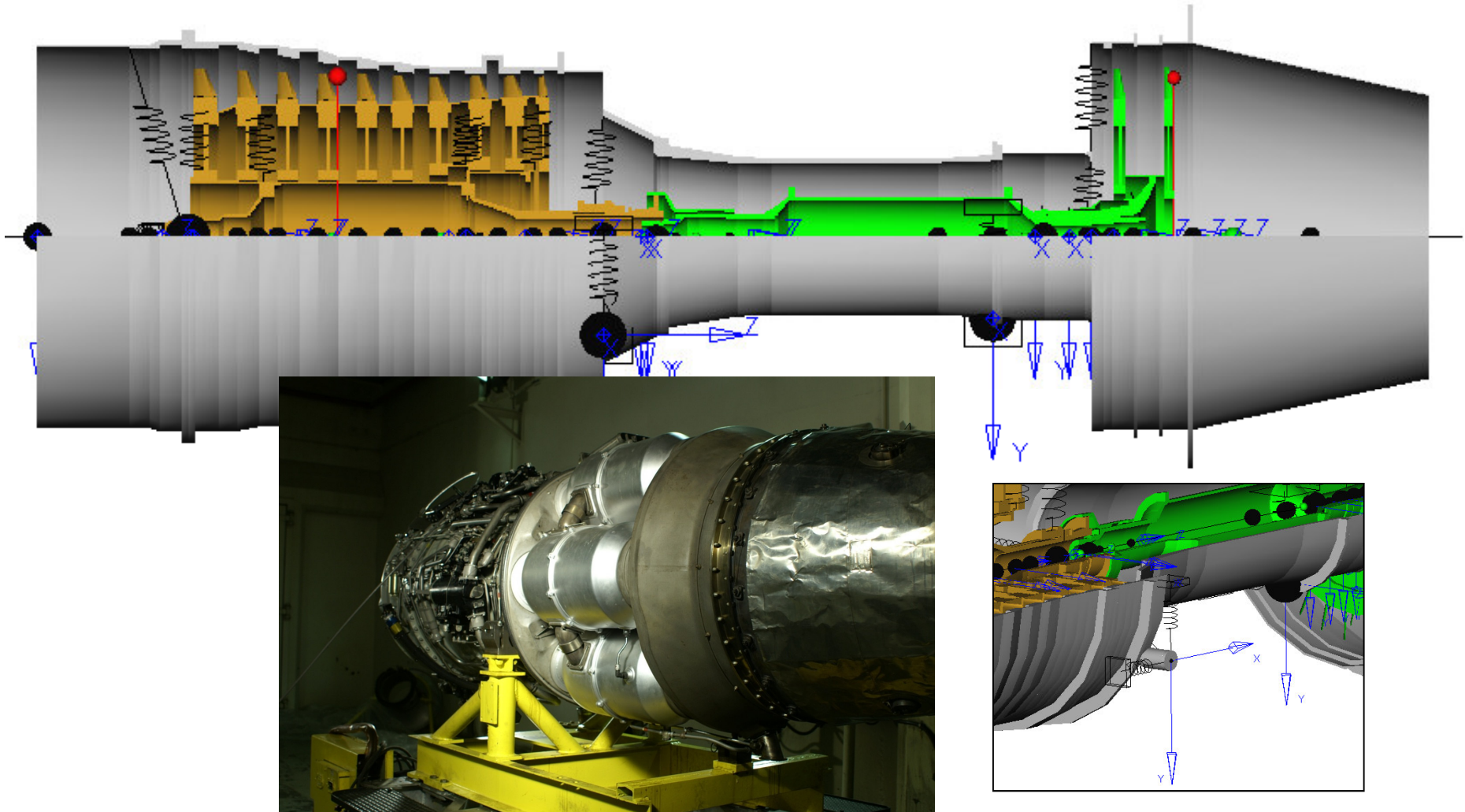
# Balancing bench



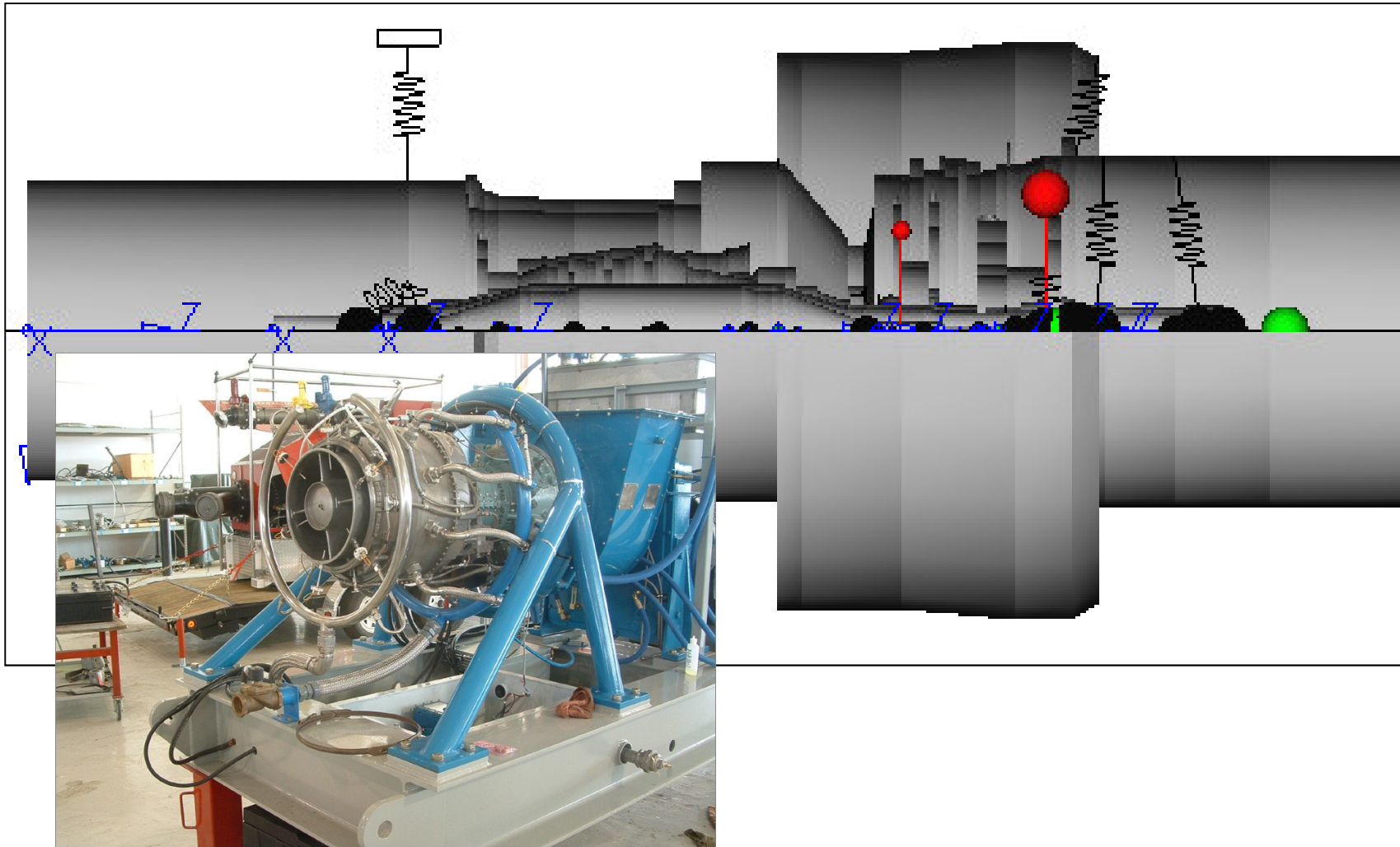
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# OT-3 Gas producer 3D- model



# LYCOMING T-53 Gas-Turbine Engine for industrial application



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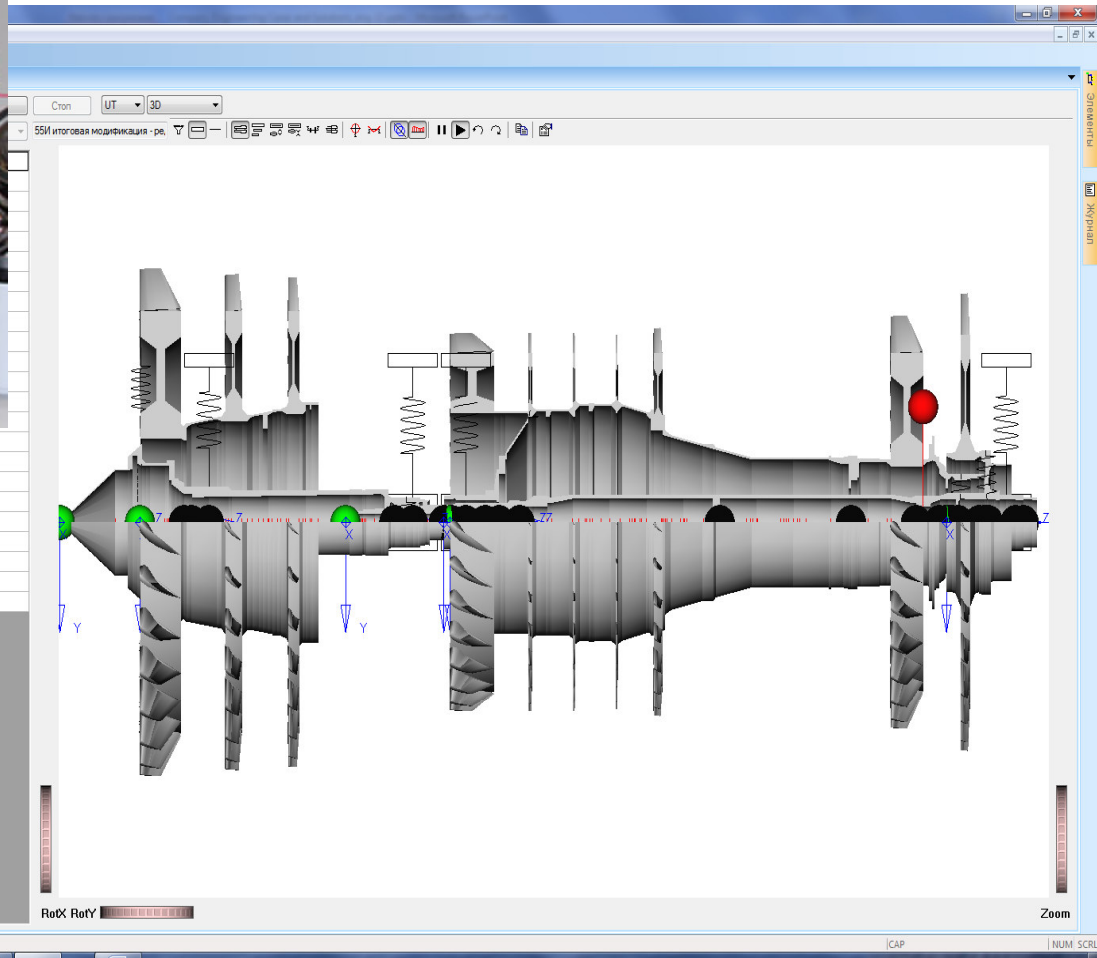
# Twin-Shaft Gas-Turbine Engine AL-55



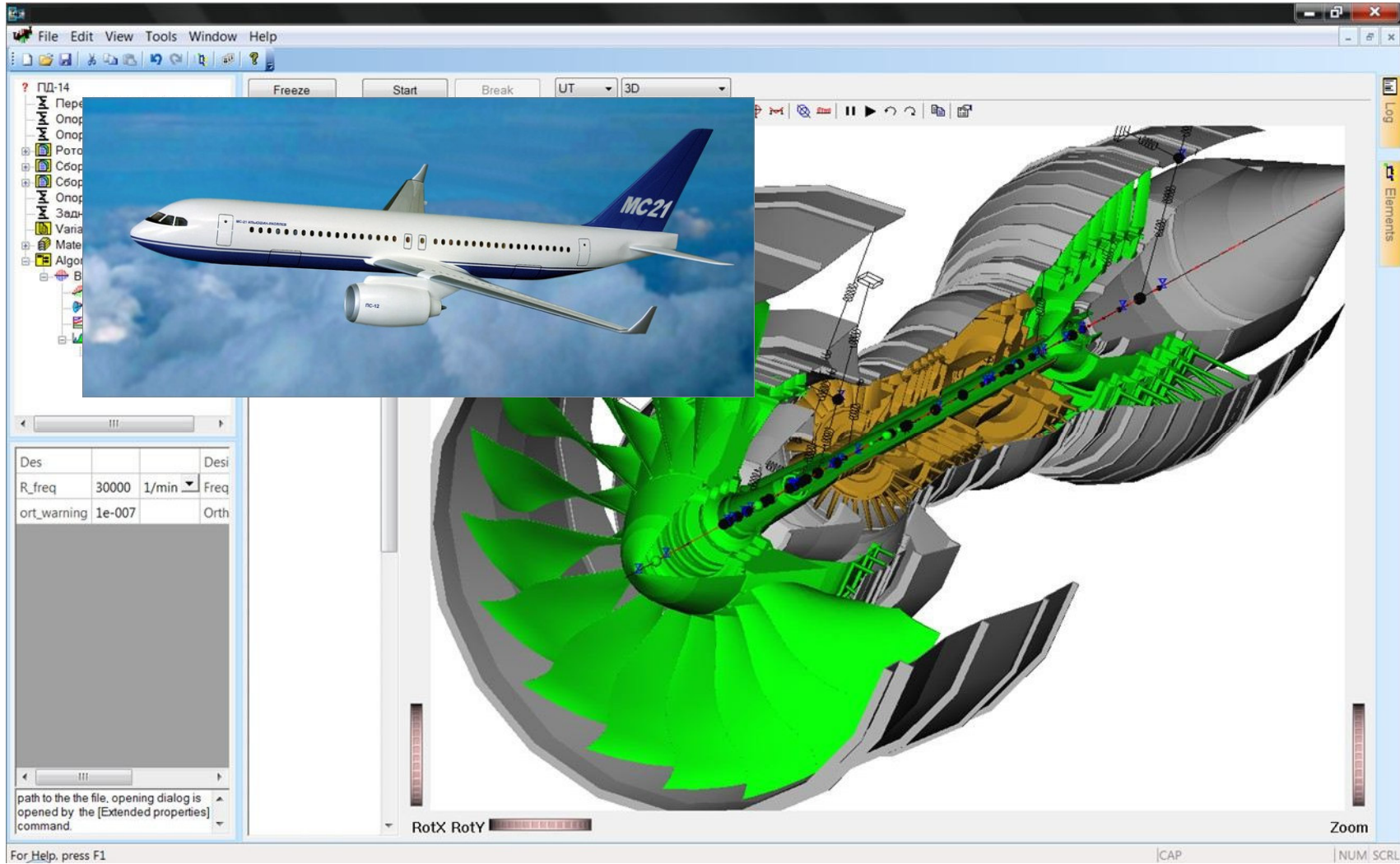
Urbalance response

Des	Basis	Название
R_freq	50000 1/min	Частотный диапазон
ort_warning	1e-006	Порог предупреждения по ортого

- 14180.9 (236.3)
- 25422.7 (423.7)
- 25422.7 (423.7)
- 31048.9 (517.5)
- 31048.9 (517.5)
- 32651.7 (544.2)
- 32651.7 (544.2)
- 42089.9 (701.5)
- 42089.9 (701.5)



# MC-21 gas-turbine project (version Dynamics R4.6.5)



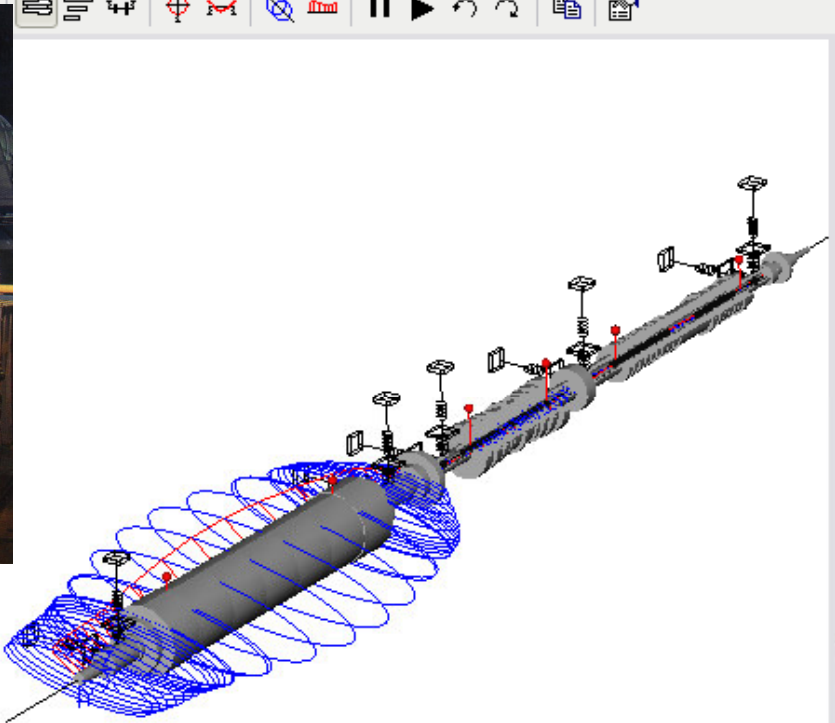
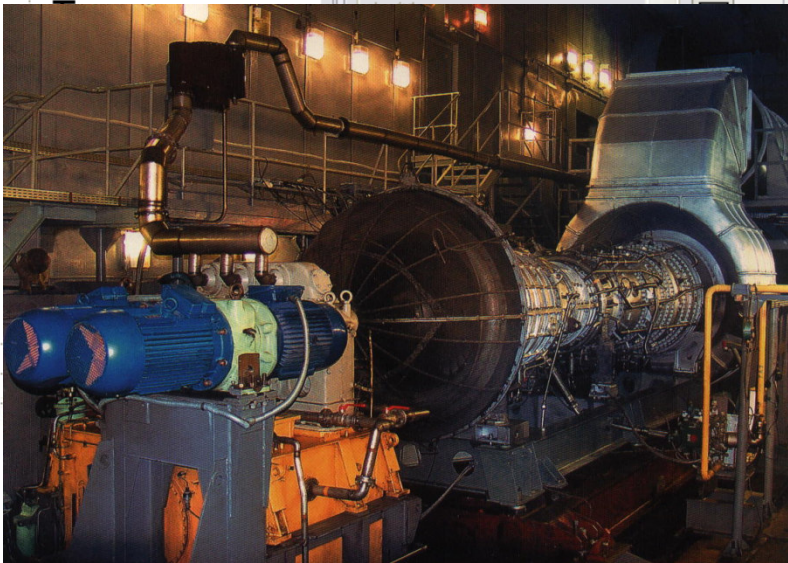
# Gas-turbines on journal bearings



EX.46\_Turbine\_5 sleeve bearings.rdm:1

System  
assmb1

Freeze Start Break UT 3D



Orbit (unbalance)

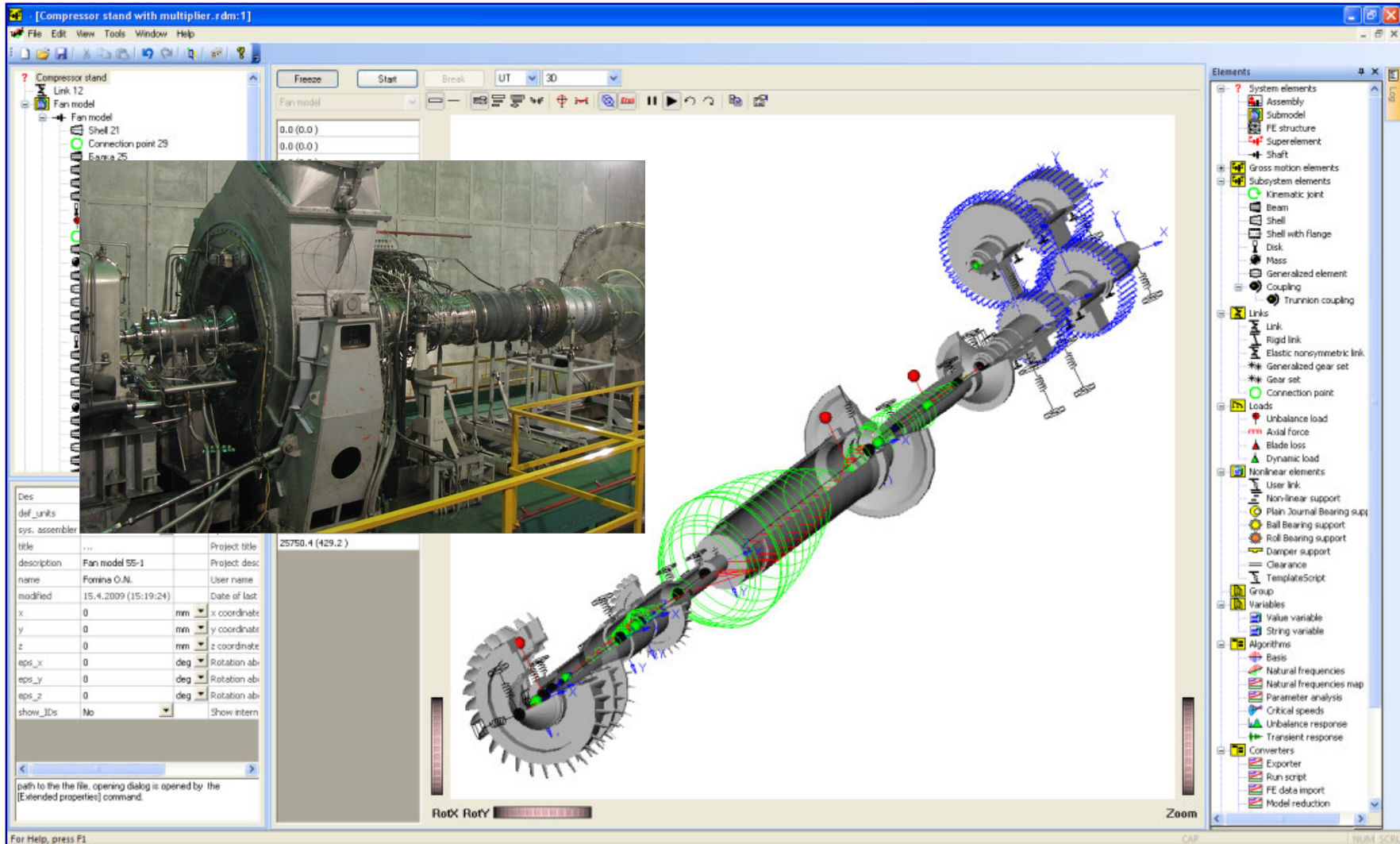
2963.9 (49.4)
2999.0 (50.0)
3453.4 (57.6)
3638.2 (60.6)
5175.4 (86.3)
5739.6 (95.7)
6047.2 (100.8)
7310.8 (121.8)

Des Designation  
t\_pr 3600 Time parameter  
The variable defines time parameter for computing of dynamical system

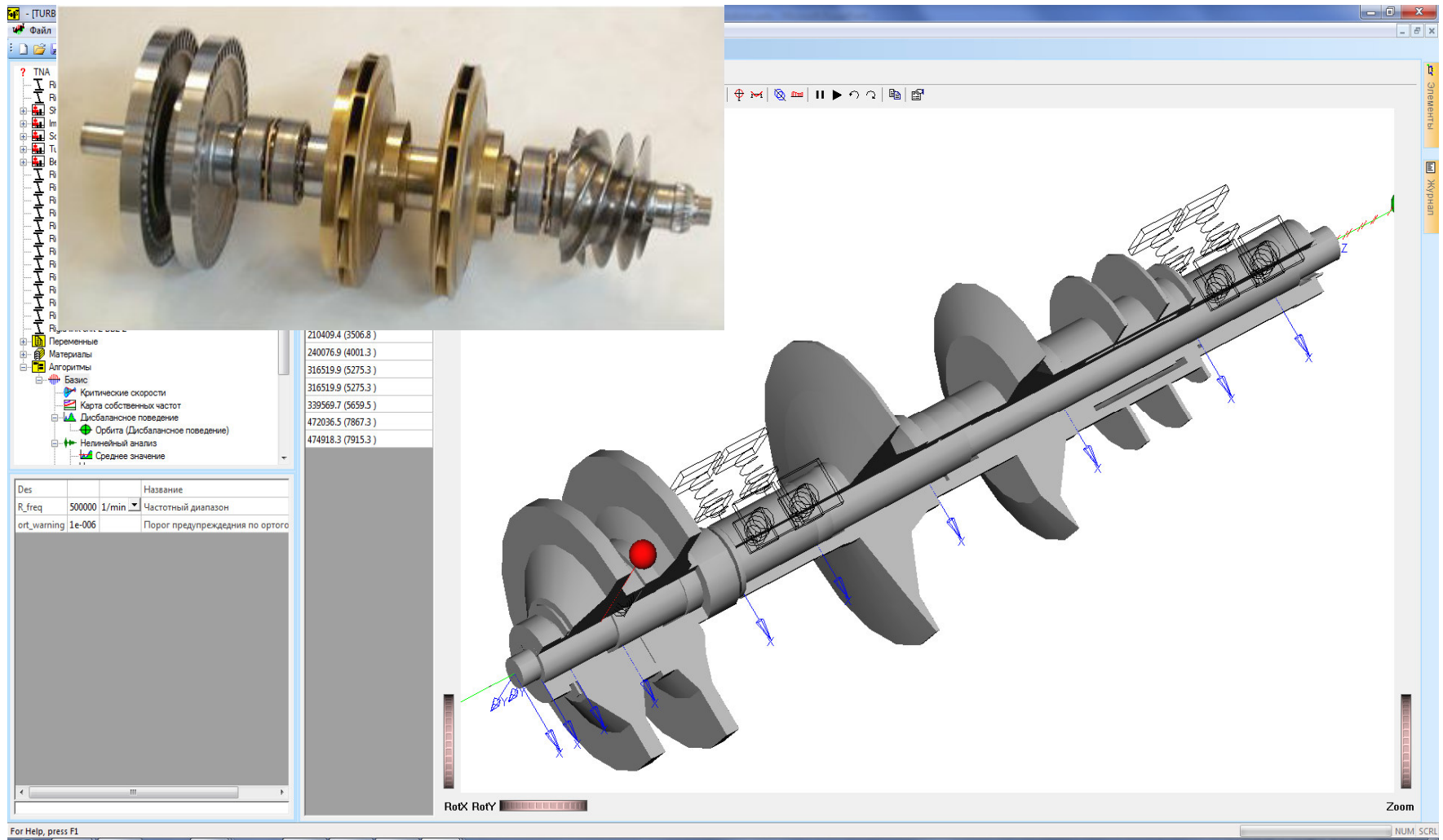
RotX RotY

Zoom

# OT-3 Gas producer 3D- model



# Turbopumps modeling and analysis



# Drive train modeling and analysis



[- [Ingersoll\_2.rdm:1]

File Edit View Tools Window Help

Freeze Start Break UT 3D

System

- Shaft 3
- Shaft 1
- Gear set 1
- Gear set 2
- Shaft 2
- Rigid link 10
- Link 3 5
- Link 3 5 7
- Link 3 4
- Link 2 5
- Link
- Link
- Link
- Rigid
- Vari
- Mat
- Algo

Shaft 1

0.0 (0.0)
0.0 (0.0)
1907.9 (31.8)
7352.4 (122.5)
44473.5 (400.0)

Features and benefits of the ZH4000/7000

- Low-speed shaft.
- One vibration probe per compressor stage provided as standard.
- Optional adjustable inlet guide vanes provide efficient control at constant speed over a broad capacity range.
- High-performance impellers conform to your flow and pressure requirements. Open backward-leaning blade designs provide maximum efficiency.
- Horizontally-split gearbox facilitates inspection and maintenance of gearing and horizontally-split bearings.

Des

side1_c_pc		
side2_c_pc		
type_gear		
gearing		
z1	20	
z2	180	
module	3	mm
alpha_wn	20	deg
beta_w1	0	deg
Kc	1e+010	N/m^2
h	20	mm

RotX RotY

Zoom

For Help, press F1

|CAP |NUM SCRL

# Modeling UGT 25000 +BRUSH generator



File Edit View Tools Window Help

Spline shaft  
Friction clutch

Freeze Start Break UT 3D

Cutaway of a typical BRUSH DAX turbogenerator available up to 300MVA for gas or steam turbine drive

Des		Designation	
R_freq	20000	1/min	Frequency ra
ort_warning	1e-006		Orthogonalit
		4967.2 (82.8)	
		5608.1 (93.5)	
		5819.1 (97.0)	
		6350.4 (105.8)	
		6781.6 (113.0)	
		6821.8 (113.7)	
		6836.8 (113.9)	
		9214.6 (153.6)	
		10216.9 (170.3)	
		10234.9 (170.6)	
		10579.5 (176.3)	
		10580.2 (176.3)	
		11262.1 (187.7)	
		12602.8 (210.0)	

RotX RotY

Zoom

Copy the selection and put it on the Clipboard

|CAP | NUM. SCRL