

PULSIMSUITE TECHUPDATE

EFRC 2018 | Ir. L.J. Buijs

TNO innovation
for life

TNO PULSIMSUITE

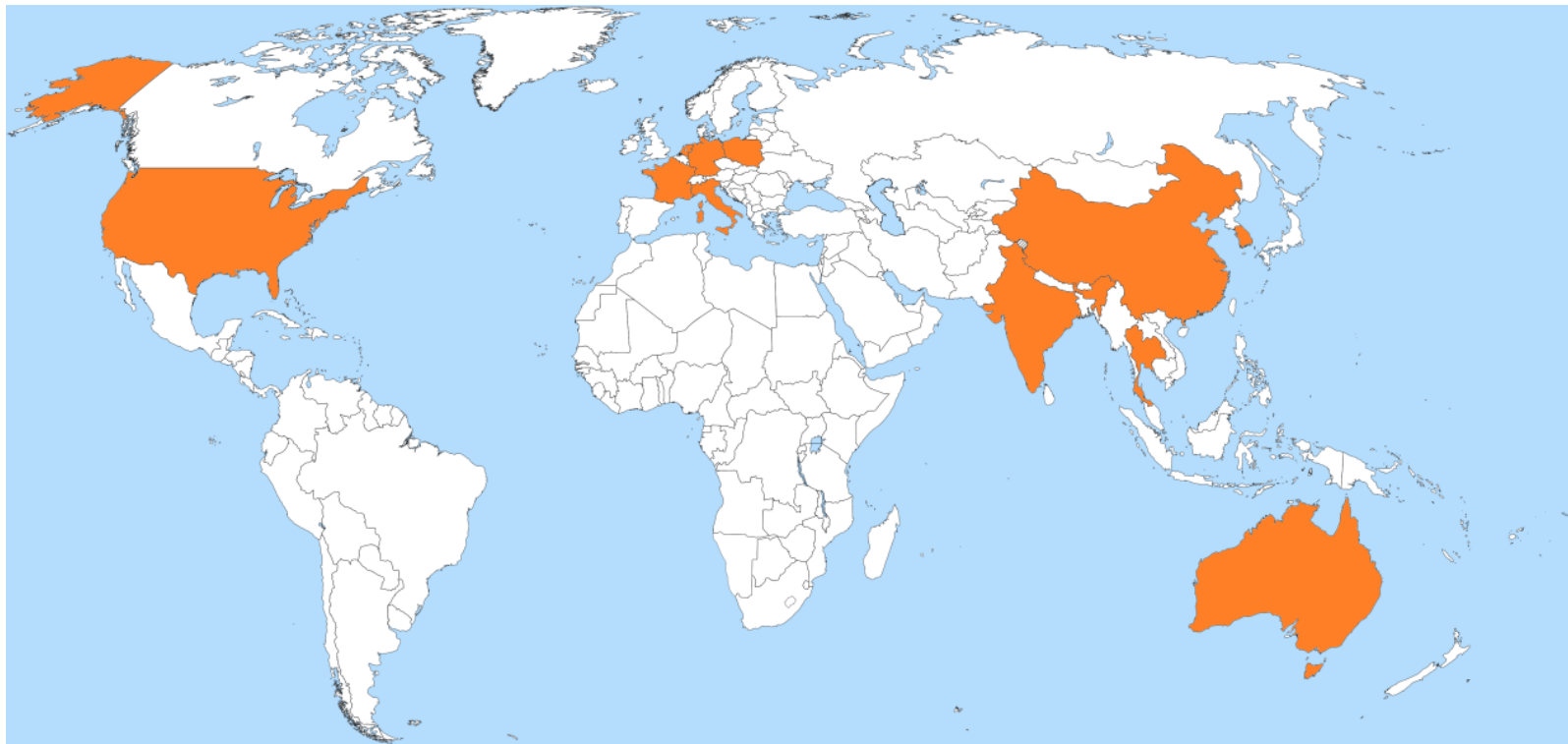
Software

Development
Customer Support

Services

Independent Reviews
Pulsation Analyses
Field Surveys
Root Cause Analyses

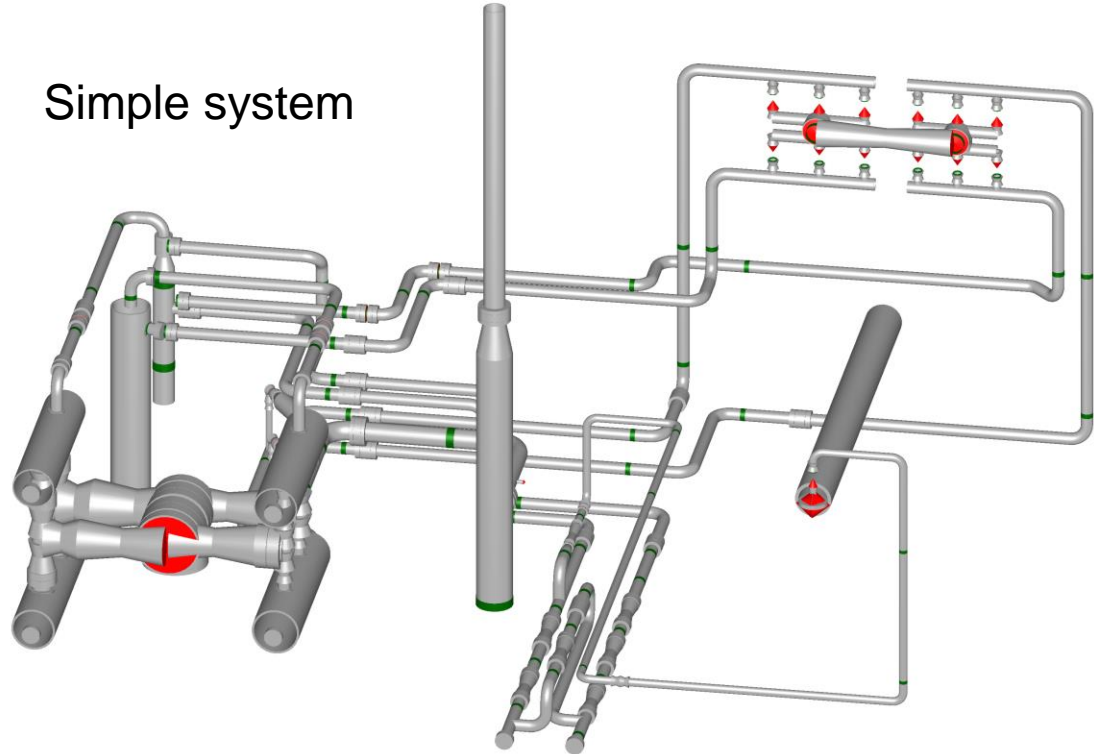
PULSIMSUITE OVER THE WORLD



PULSIMSUITE – PULSATION ANALYSIS

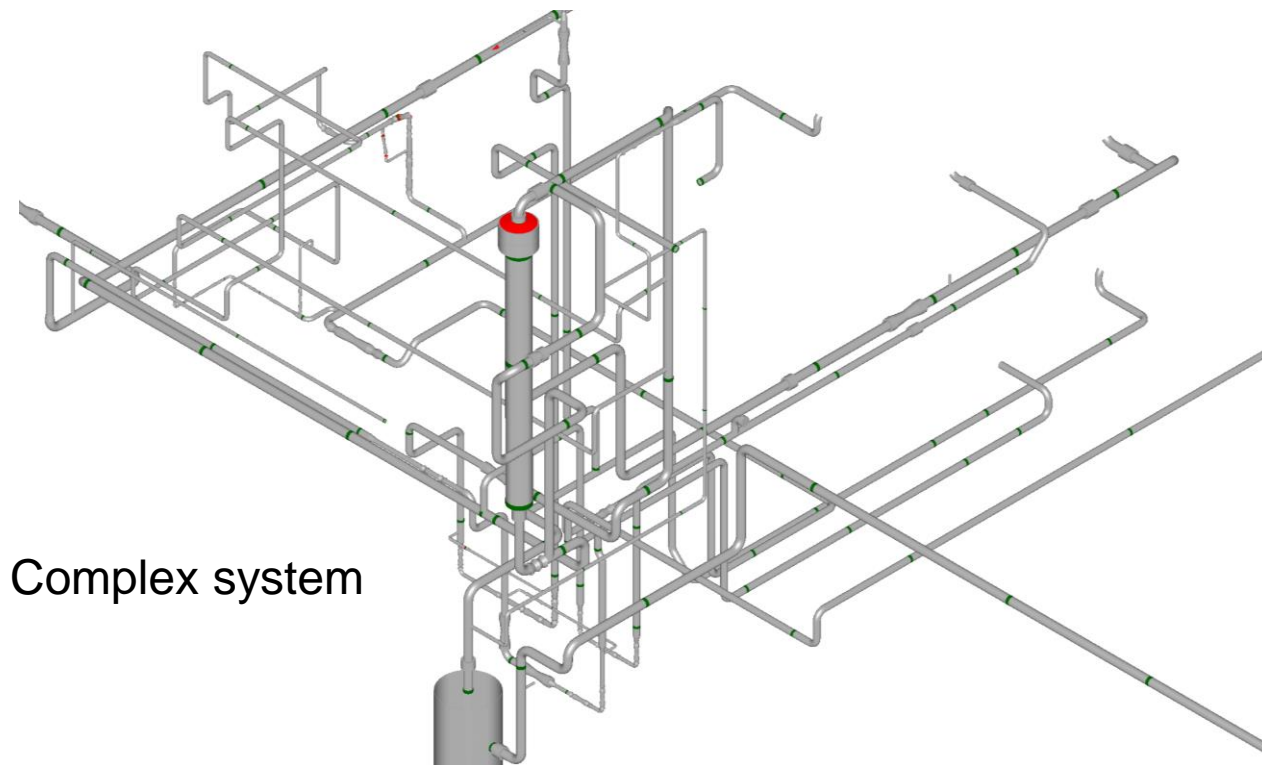
- › Create or import your model

Simple system



PULSIMSUITE – PULSATION ANALYSIS

- › Create or import your model



Complex system

PULSIMSUITE – PULSATION ANALYSIS

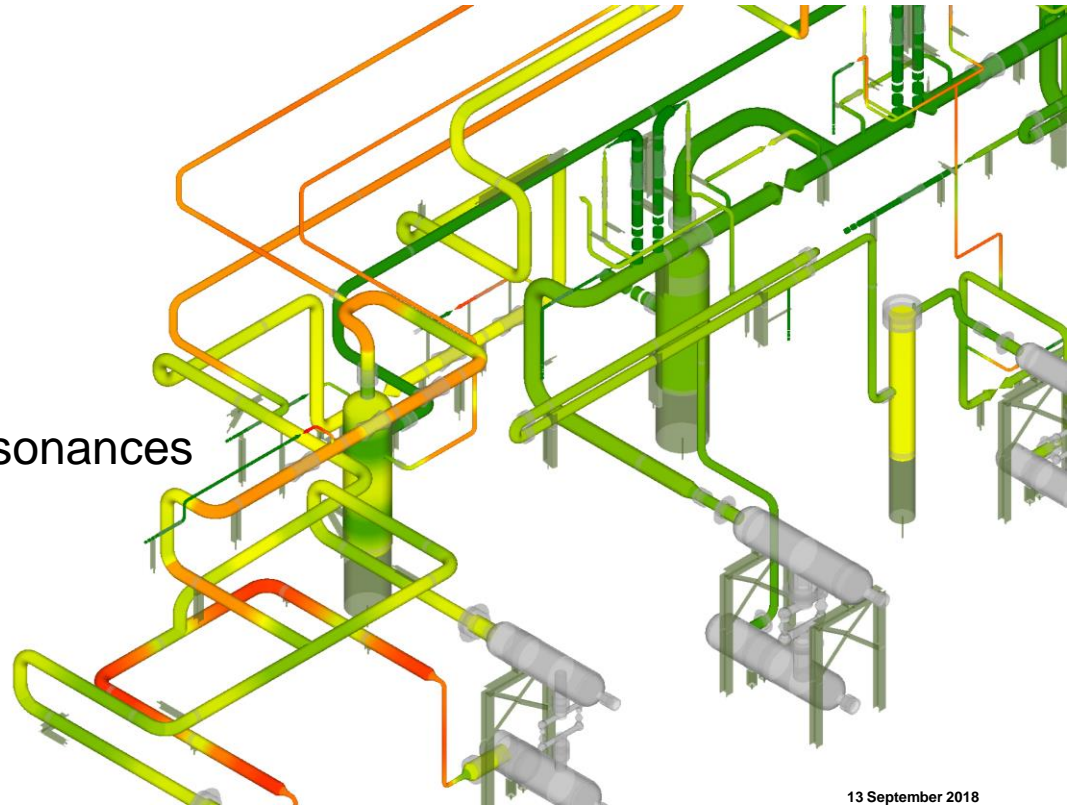
- › Create or import your model
- › Define your current and future operating conditions

Run cases				
	Id	Name	Duty	Load
▶	1	Par SOR A 100% load	SOR	Par ComprSys01A 100% load
	5	Par SOR A 30% stplss	SOR	Par ComprSys01A 30% stplss
	4	Par SOR A 50% stplss	SOR	Par ComprSys01A 50% stplss
	3	Par SOR A 67% stplss	SOR	Par ComprSys01A 67% stplss
	2	Par SOR A 83% stplss	SOR	Par ComprSys01A 83% stplss
	6	Par SOR B 100% load	SOR	Par ComprSys01B 100% load
	7	Par SOR B 50% load	SOR	Par ComprSys01B 50% load valve lift
	15	Par SOR ComprSys0...	SOR	Par ComprSys02 100% load
	19	Par SOR ComprSys0...	SOR	Par ComprSys02 30% stplss
	18	Par SOR ComprSys0...	SOR	Par ComprSys02 50% stplss
	17	Par SOR ComprSys0...	SOR	Par ComprSys02 67% stplss
	16	Par SOR ComprSys0...	SOR	Par ComprSys02 83% stplss
	35	Sgl EOR ComprSys0...	EOR	Sgl ComprSys01A 100%
	39	Sgl EOR ComprSys0...	EOR	Sgl ComprSys01A 30%

PULSIMSUITE – PULSATION ANALYSIS

- › Create or import your model
- › Define your current and future operating conditions
- › Investigate the pulsation in the system, and locate issues.

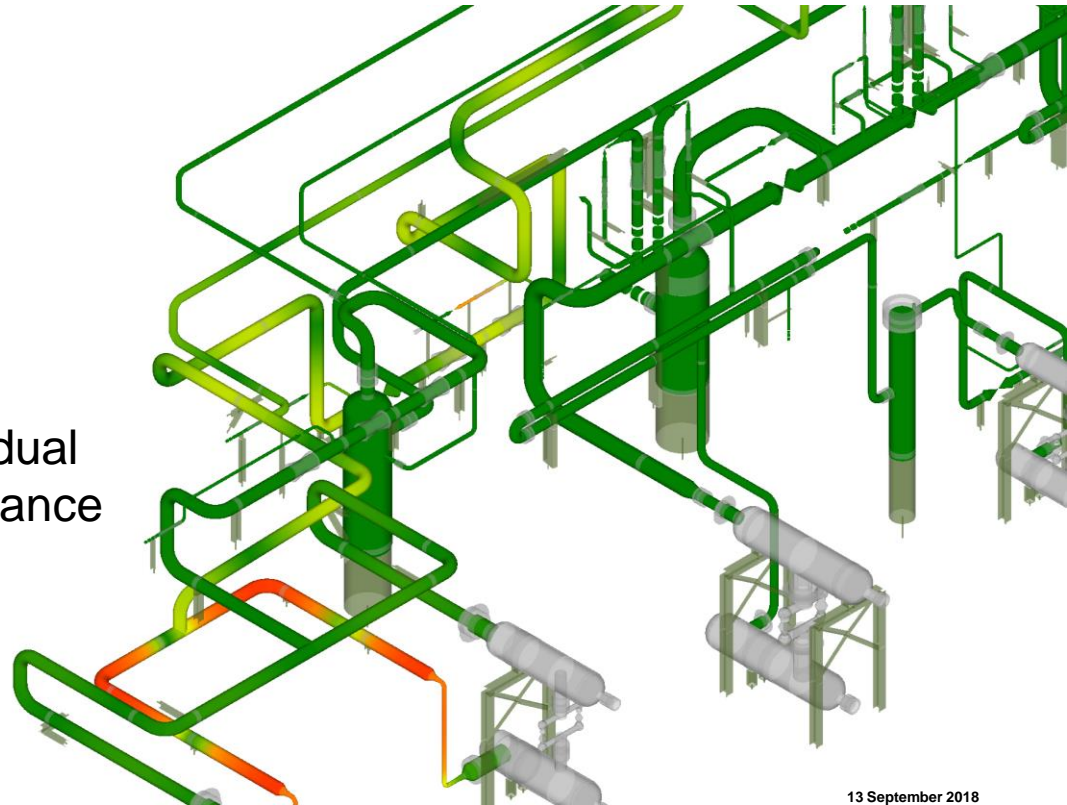
All resonances



PULSIMSUITE – PULSATION ANALYSIS

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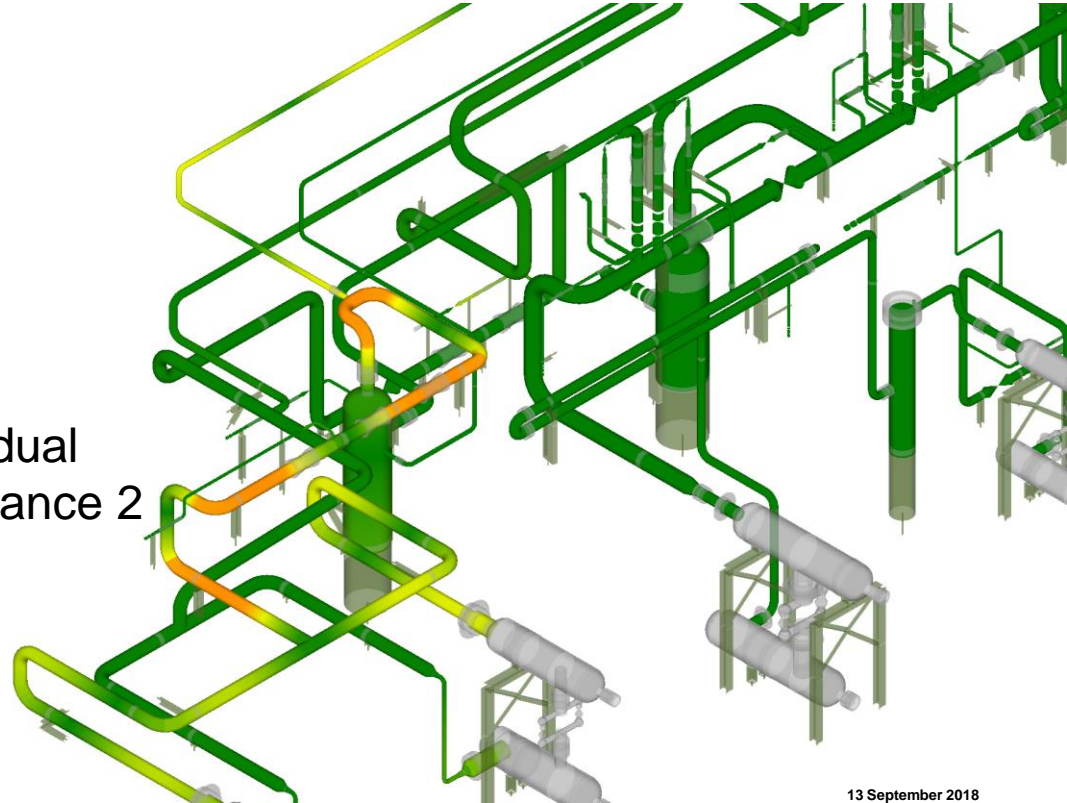
individual
resonance



PULSIMSUITE – PULSATION ANALYSIS

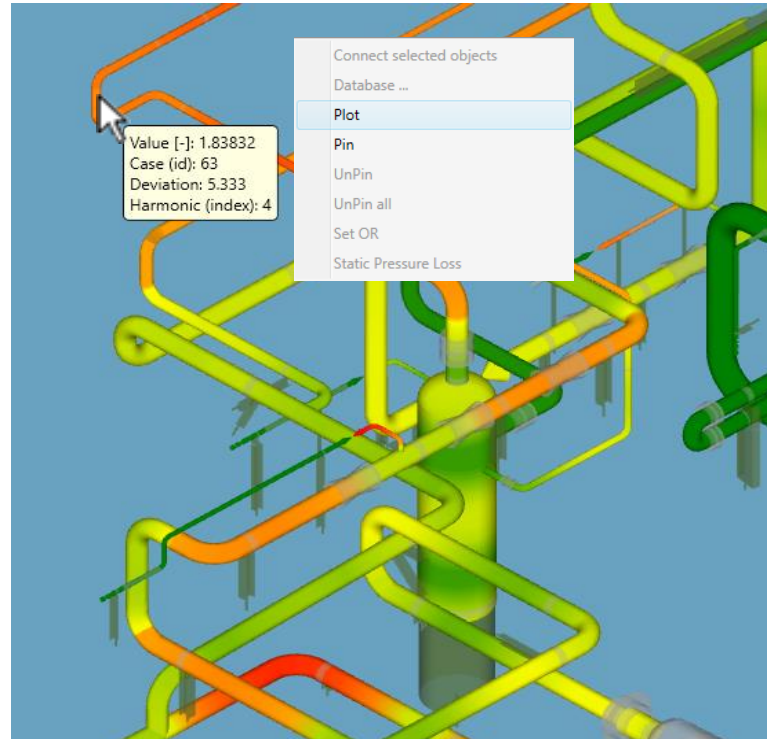
- › Create or import your model
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individual
resonance 2



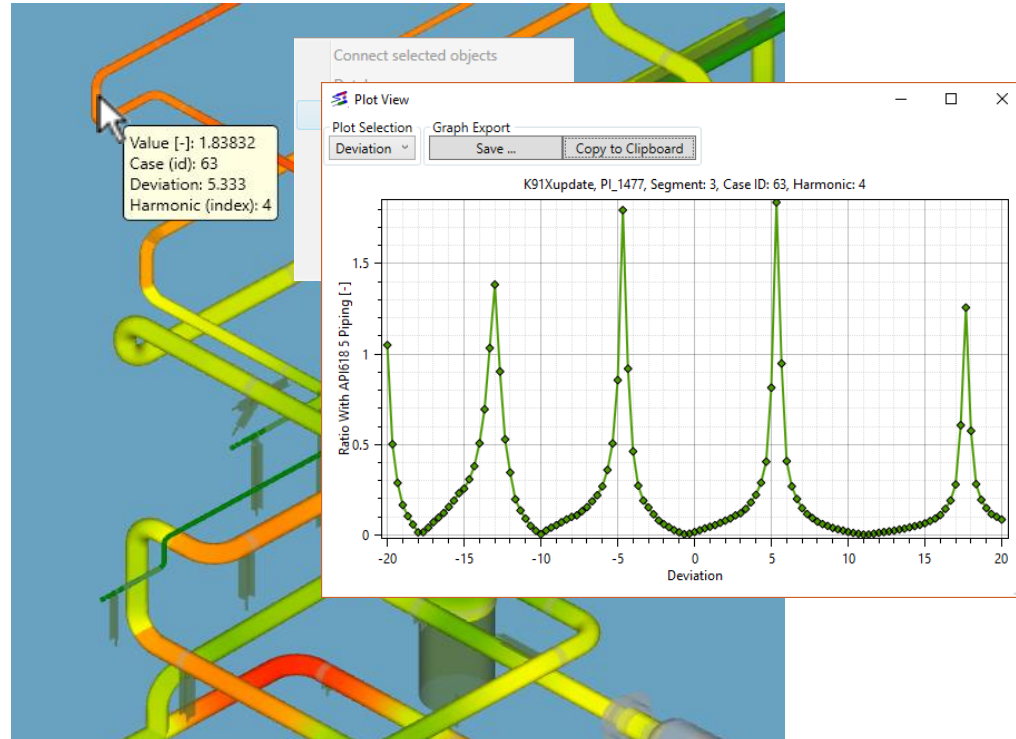
PULSIMSUITE – PULSATION ANALYSIS

- › Create or import your model
- › Define your current and future operating conditions
- › Investigate the pulsation in the system, and locate issues.
- › Intuitively solve the issues



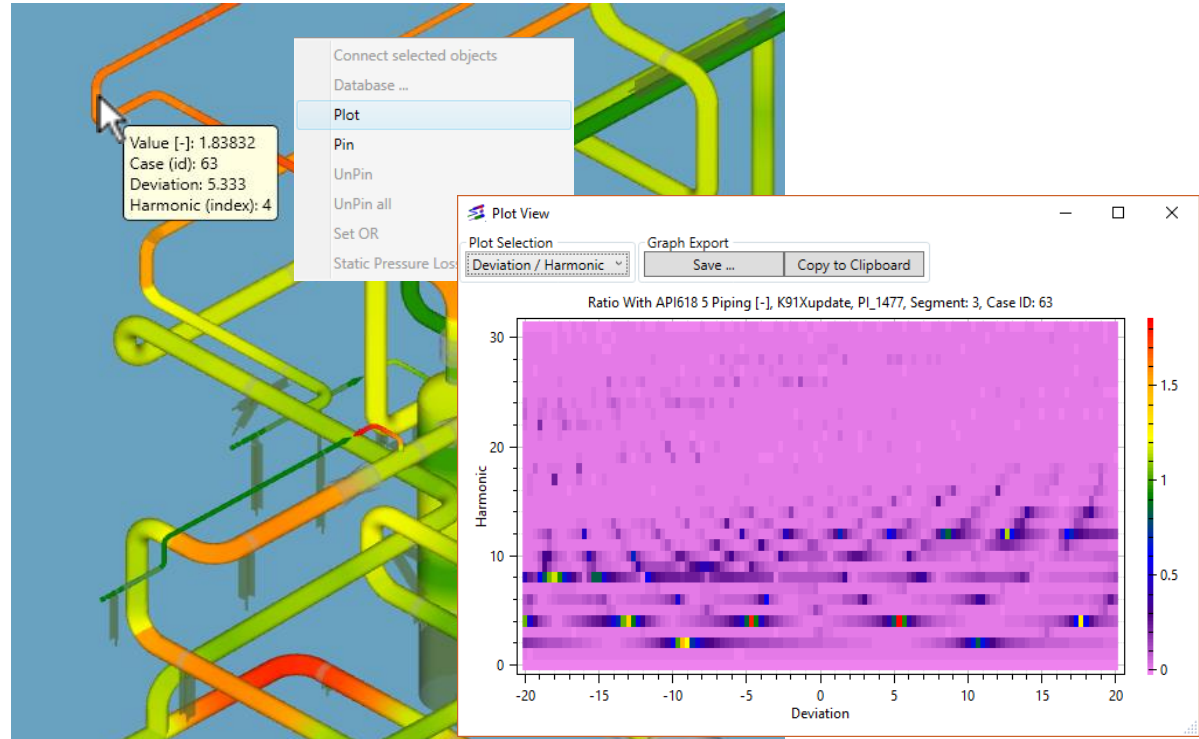
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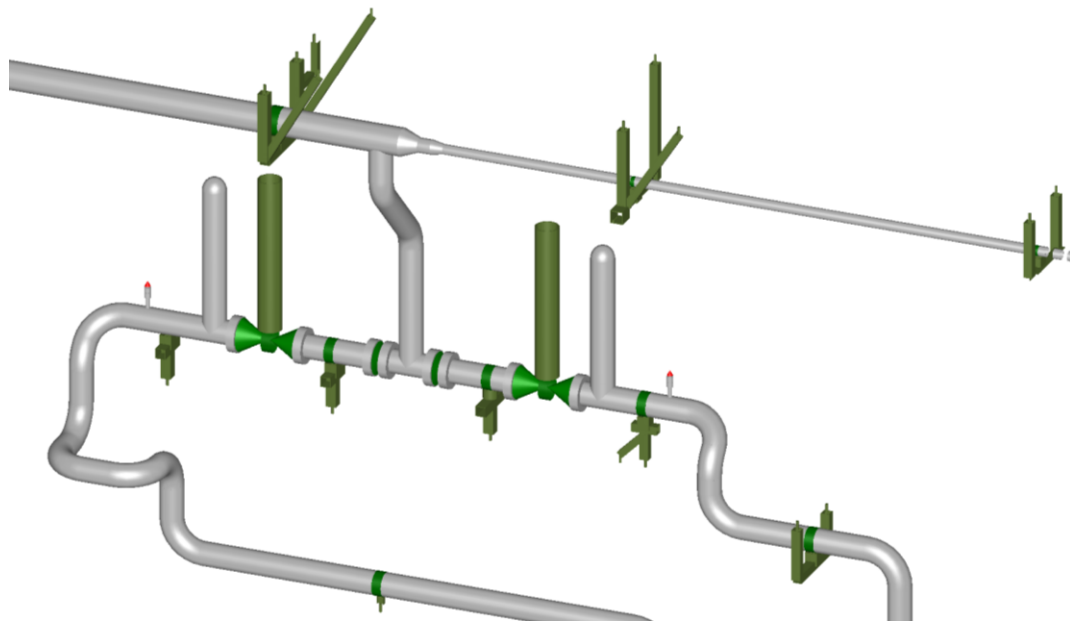
PULSIMSUITE – PULSATION ANALYSIS

- › Create or import your model
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- › Intuitively solve the issues



PULSIMSUITE – MECHANICAL ANALYSIS

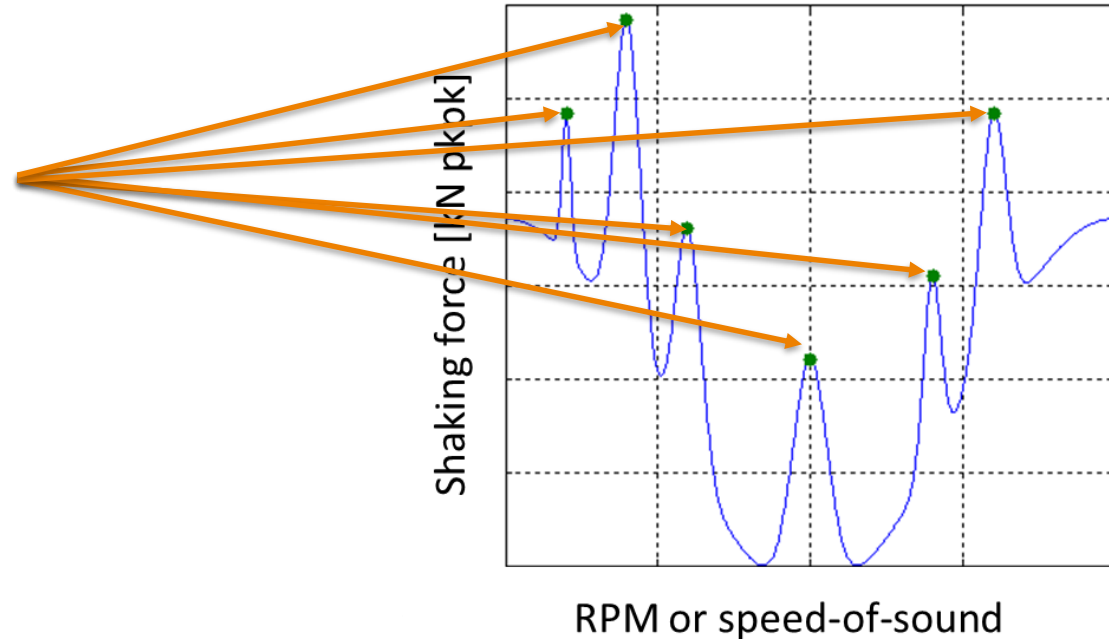
- › Add the mechanical supporting structure



PULSIMSUITE – MECHANICAL ANALYSIS

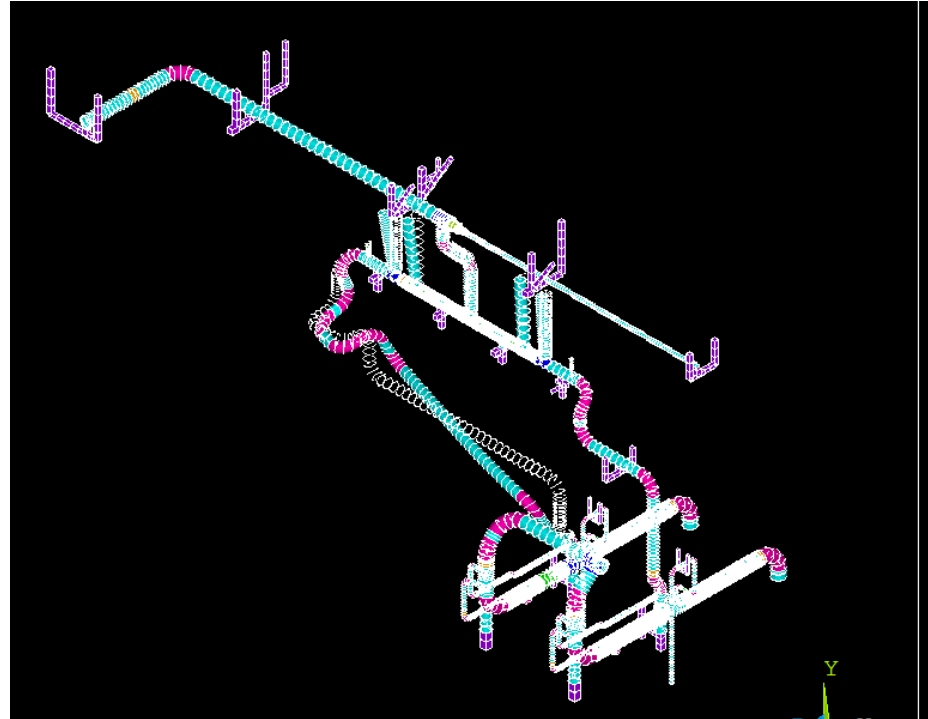
- › Add the mechanical supporting structure
- › Let PulsimSuite identify worst case forces

Selecting worst case conditions



PULSIMSUITE – MECHANICAL ANALYSIS

- › Add the mechanical supporting structure
- › Let PulsimSuite identify worst case forces
- › Obtain the magnitude and locations of computed levels
- › Implement mitigation measures



PULSIMSUITE – OUTPUT IN DOCX OR XLSX

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6.1 Results at Nominal Conditions.....30

6.2 Results on the Simulation Sweep.....32

☐ nr of pipes (rows)

☐ nr of devs (columns)

☐ per pressure loss

☐ results

☐ nal pipe results

☐ overview

☐ ts summary

☐ ts per case

Default Select all Deselect all

PART : discharge piping
DUTY : duty1
LOAD : 100%

☐ Force
☐ Pressure
☐ Flow
☐ UD Forces

P-V Diagram

Pressure [Bar]

Volume [m³]

Pressure in Cylinder

Pressure [Bar]

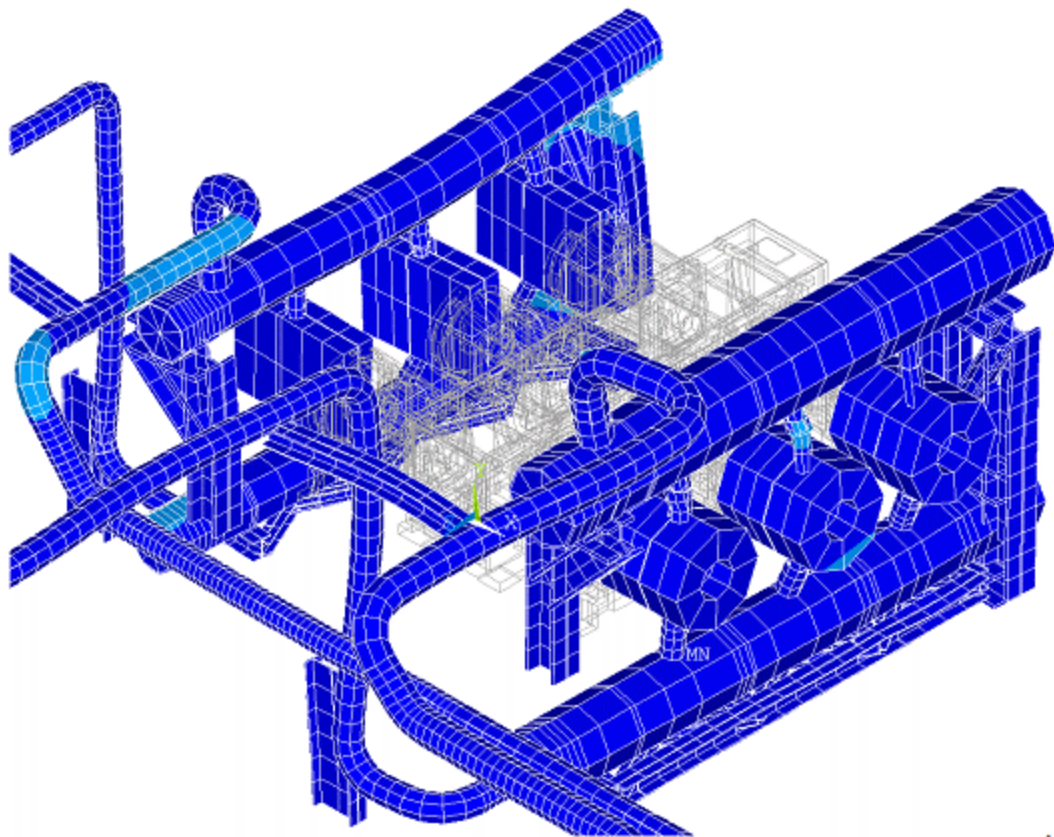
Crank Angle [°]

Padiabtic [kW]: 272.62
Pactual [kW]: 291.72
QmeanIdeal [kg/h]: 11425
Qmean [kg/h]: 9745

Start Cancel

PULSIMSUITE – NEW ¹

- › Combine your PulsimSuite mechanical model to your detailed mechanical model
- › Compressor Manifold
- › Detailed mech models



PULSIMSUITE – NEW FEATURES

- › Combine your PulsimSuite mechanical model to your detailed mechanical model
 - › Compressor Manifold
 - › Detailed mech models
- › Run simulations in parallel



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PULSIMSUITE – NEW FEATURES

- › Combine your PulsimSuite mechanical model to your detailed mechanical model
 - › Compressor Manifold
 - › Detailed mech models
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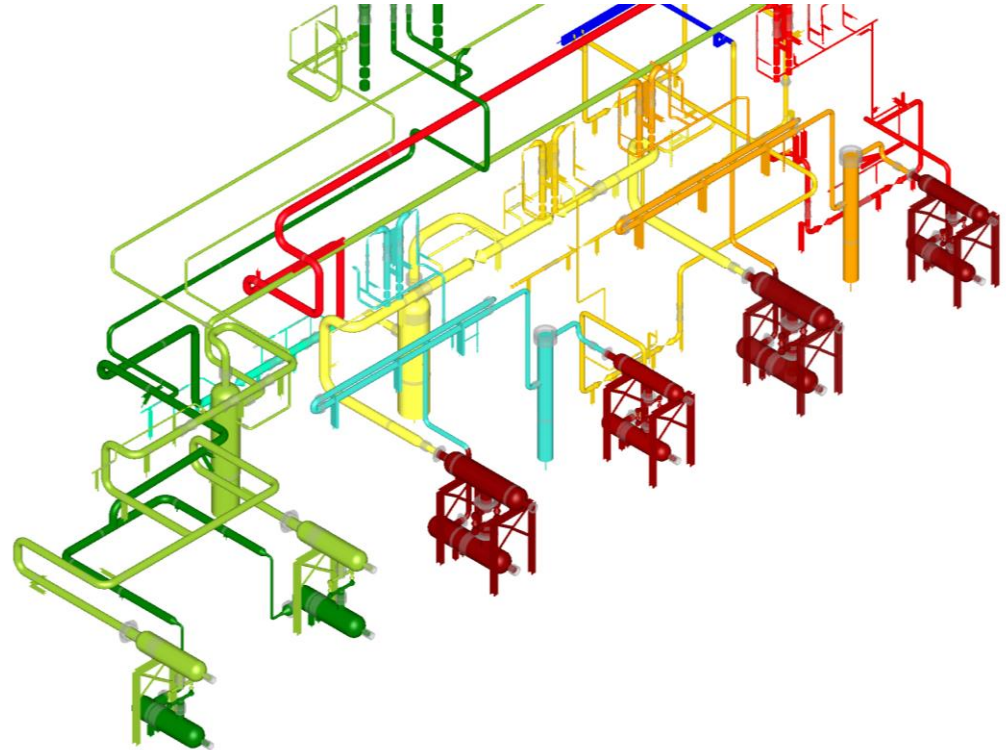
Max Verstappen
winning GP of Spain



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PULSIMSUITE – NEW FEATURES

- › Combine your PulsimSuite mechanical model to your detailed mechanical model
 - › Compressor Manifold
 - › Detailed mech models
- › Run simulations in parallel
- › Perform MRA on parts of system



PULSIMSUITE – NEW FEATURES

- › Combine your PulsimSuite mechanical model to your detailed mechanical model
 - › Compressor Manifold
 - › Detailed mech models
- › Run simulation in parallel
- › Perform MRA on parts of system
- › Many improvements in modelling and feedback



PULSIMSUITE FOR YOU

- › Pulsation analysis performed internally:
 - › Continuous updating and balancing between static and dynamic model, saving time and frustrations
 - › Challenge your static stress engineers
 - › Save money on pulsation analysis studies

PULSIMSUITE FOR YOU

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- › TNO is available:
 - › Customer support – Clicking buttons
 - › Customer support – How to optimize the system
 - › Independent final review → Obtain the TNO report with the quality you are used to.



PULSIMSUITE FOR YOU

See you at our stand for
questions and demo's.