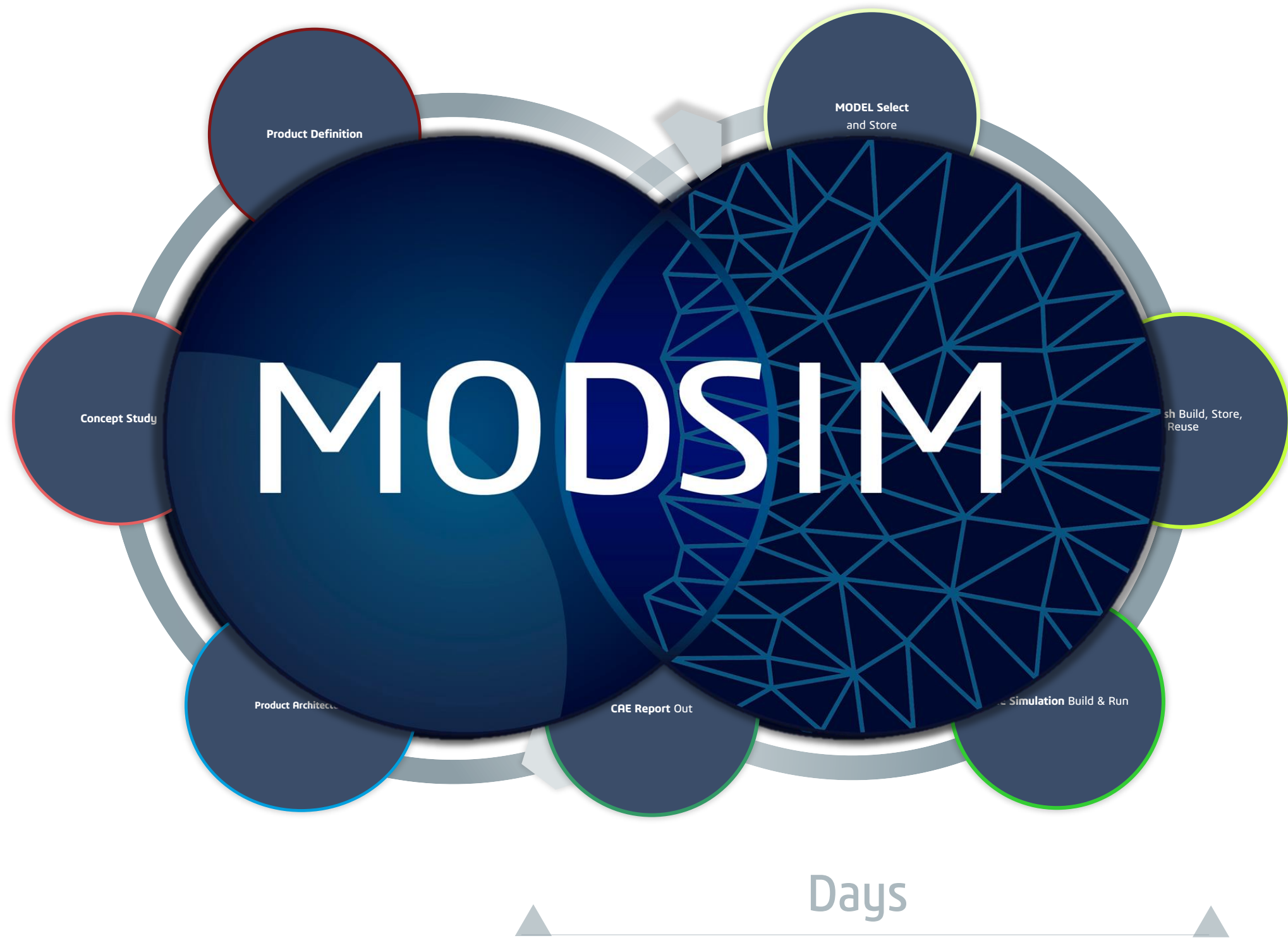
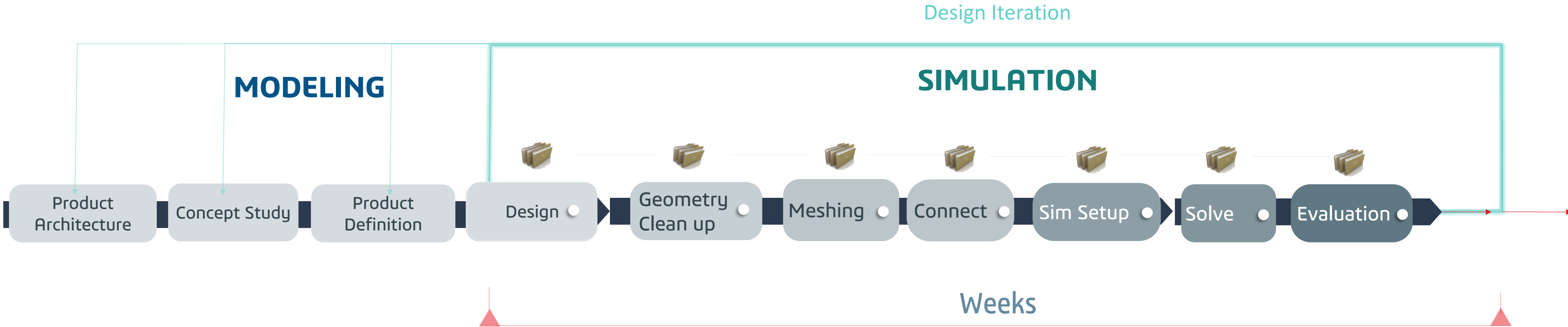
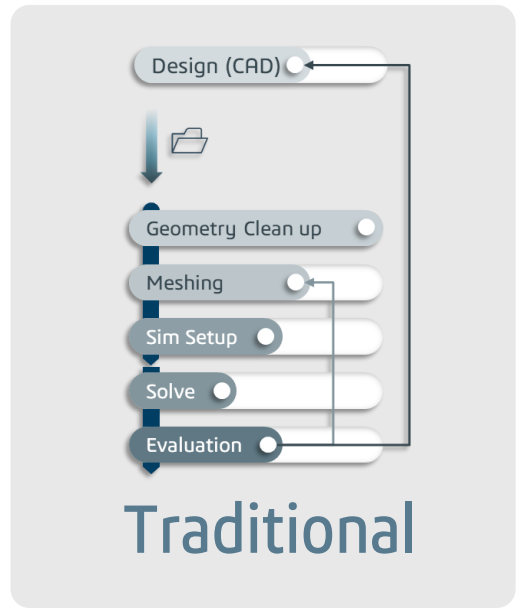


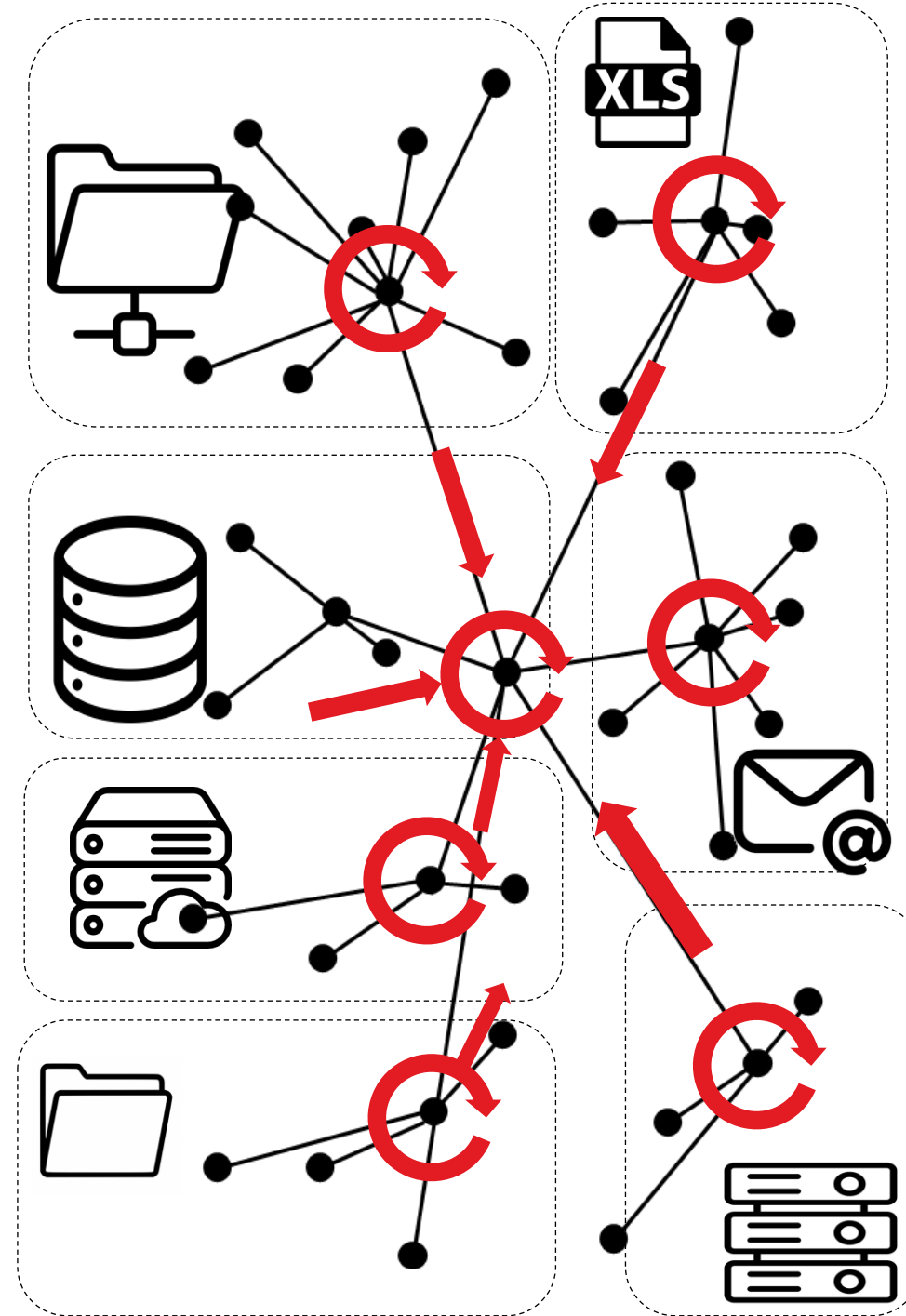
Ermüdungssimulation in **3DEXPERIENCE**

Kundentag
04.11.2025
12:05 Uhr

MODSIM

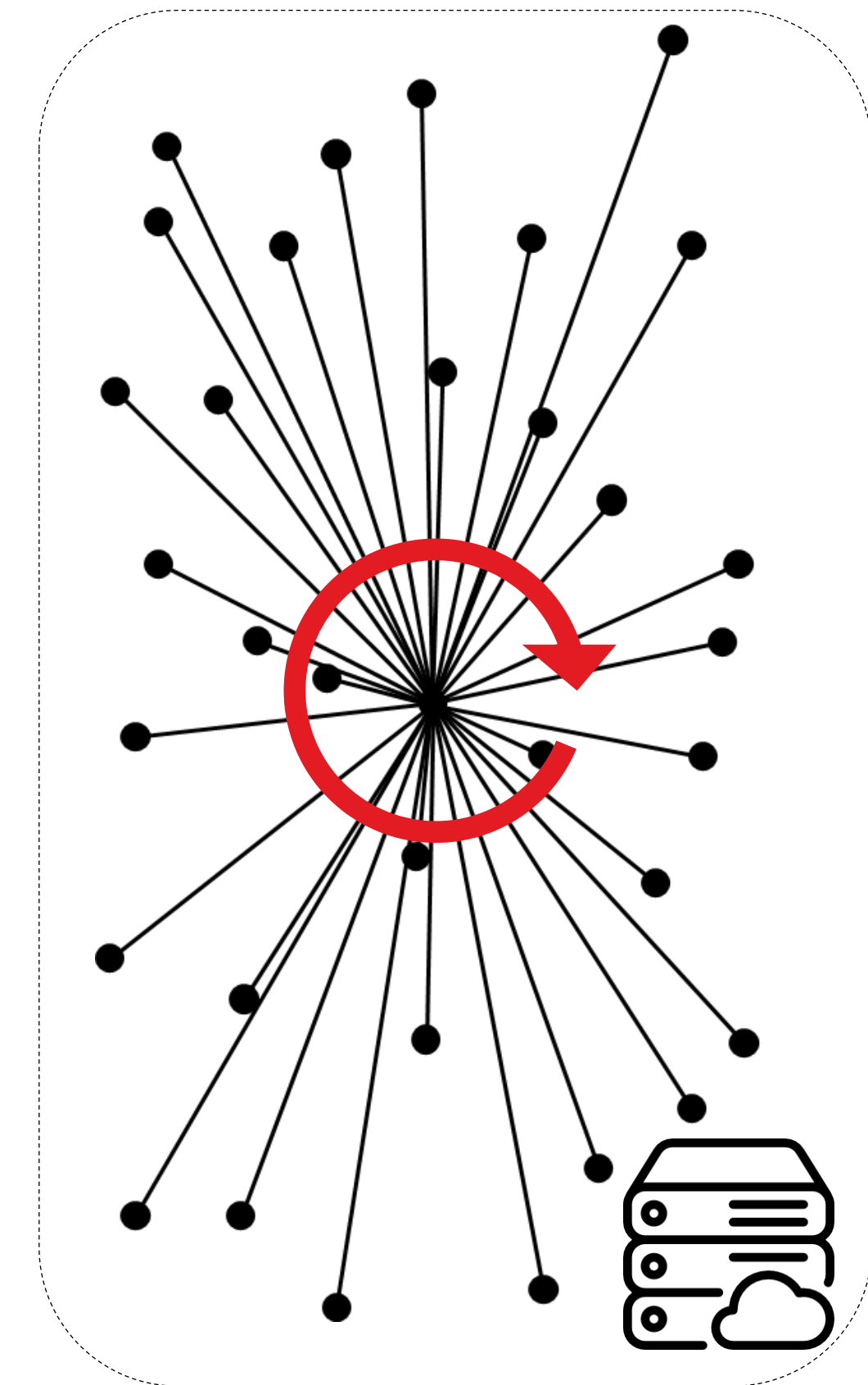


DATA Environment to develop complex products



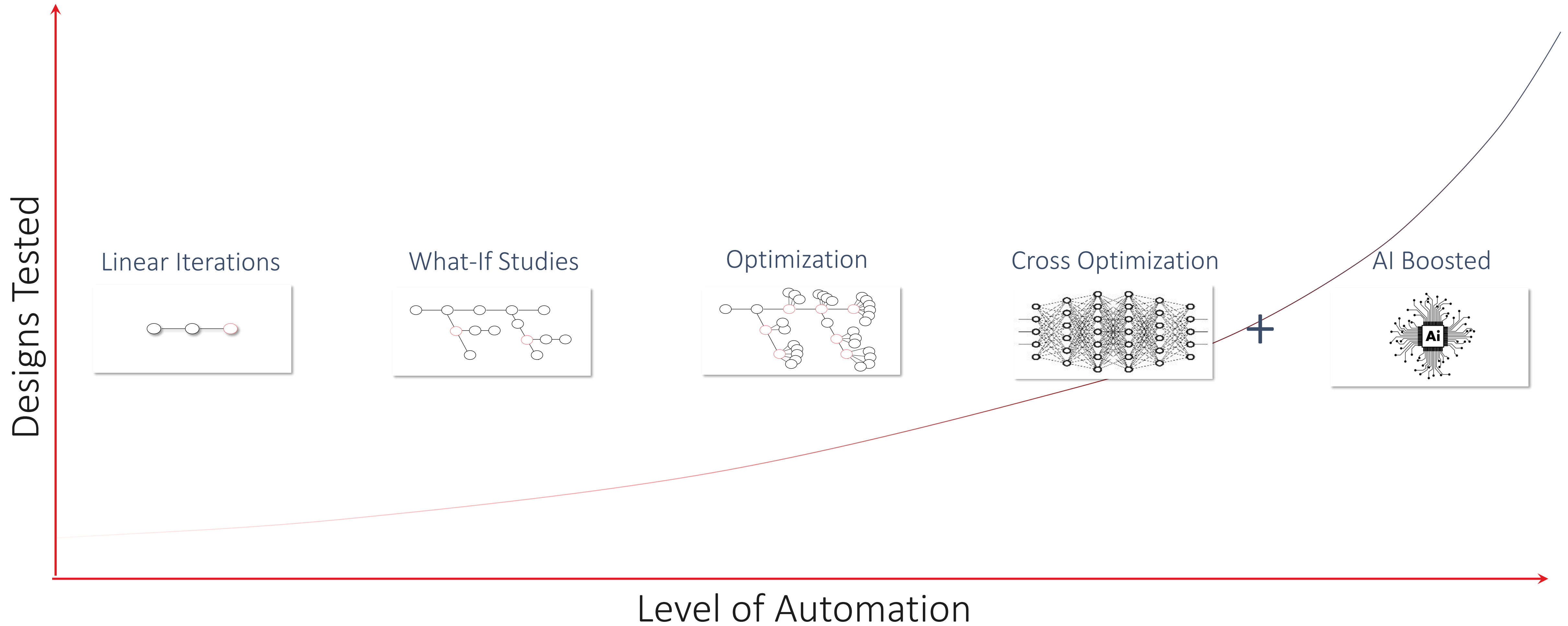
STATUS QUO

Vision:
Turn Concept Phase into a X-
Functional Multi-Physics
Optimization

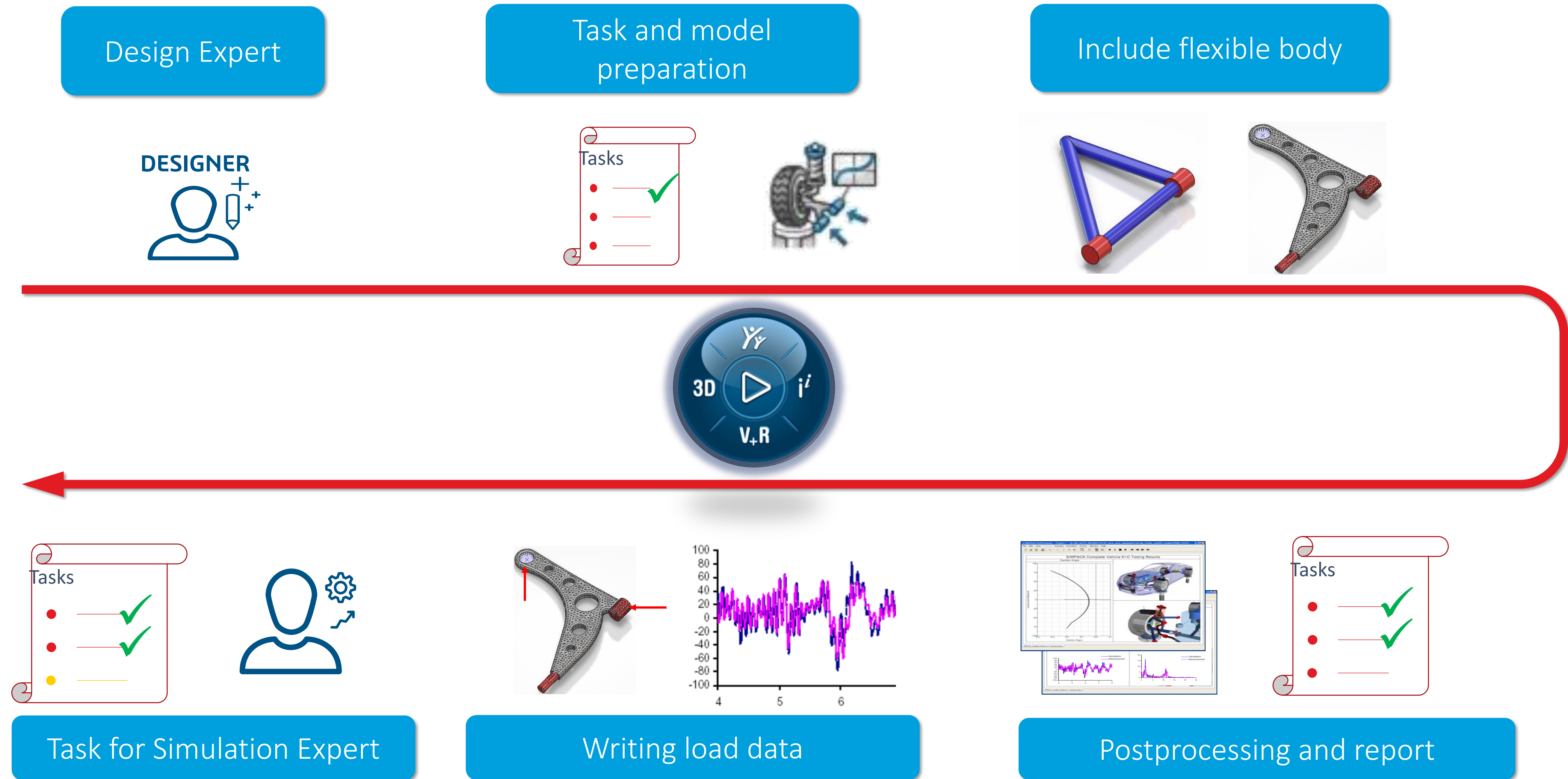


UNIFIED DATA MODEL

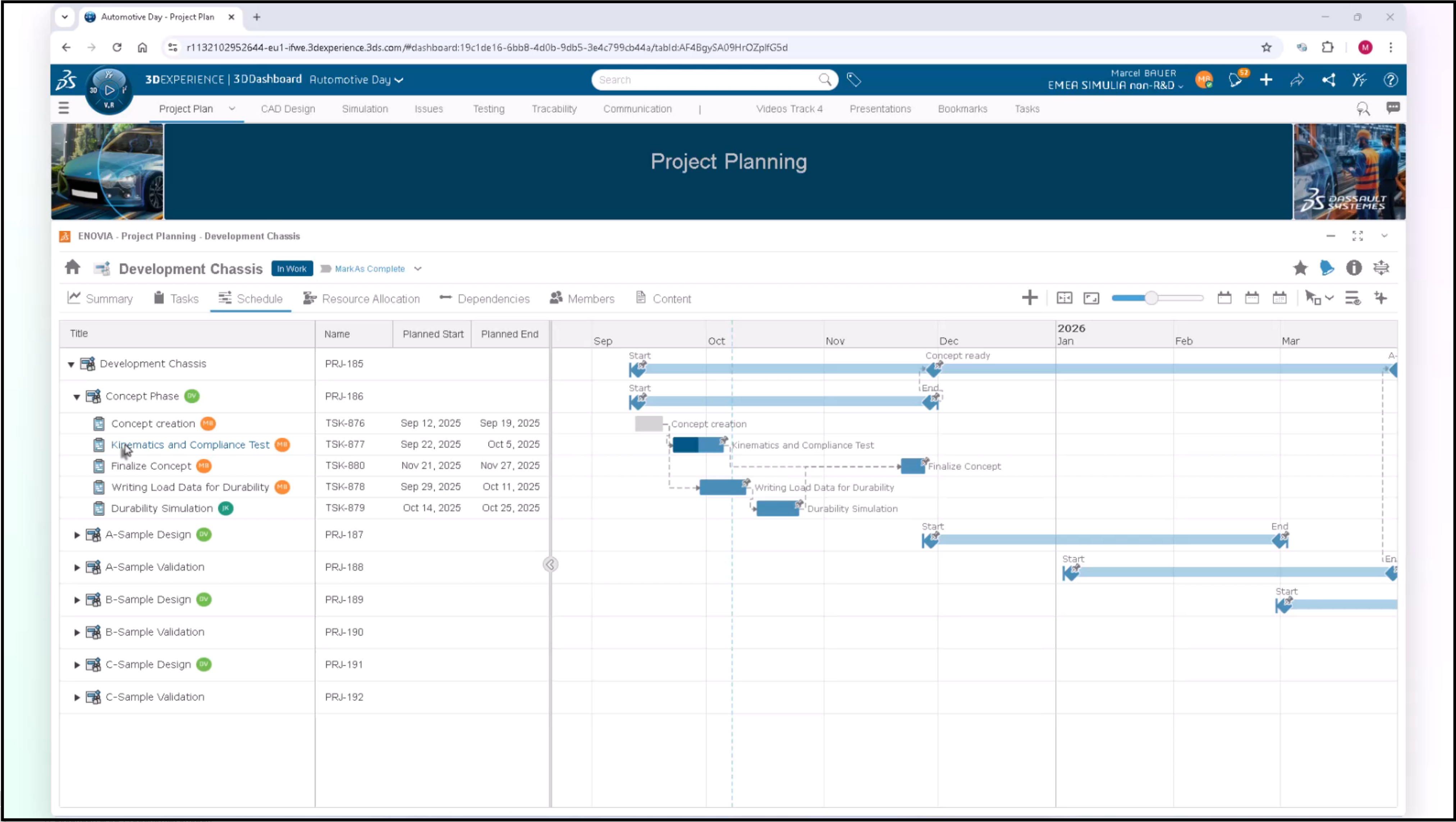
Evolutional steps and trends of concept modeling in MODSIM



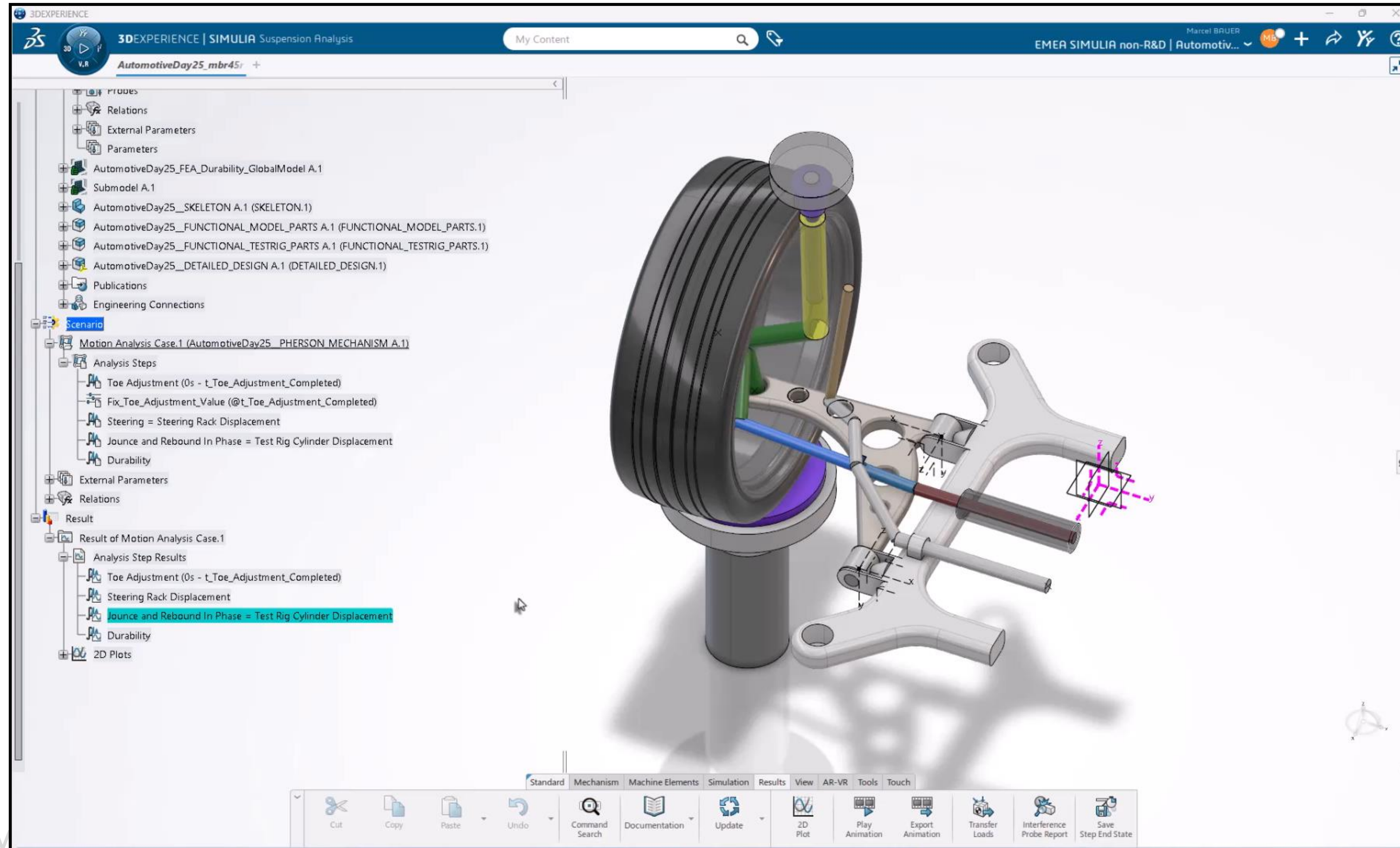
Simulation Assisted Design and testing of a suspension



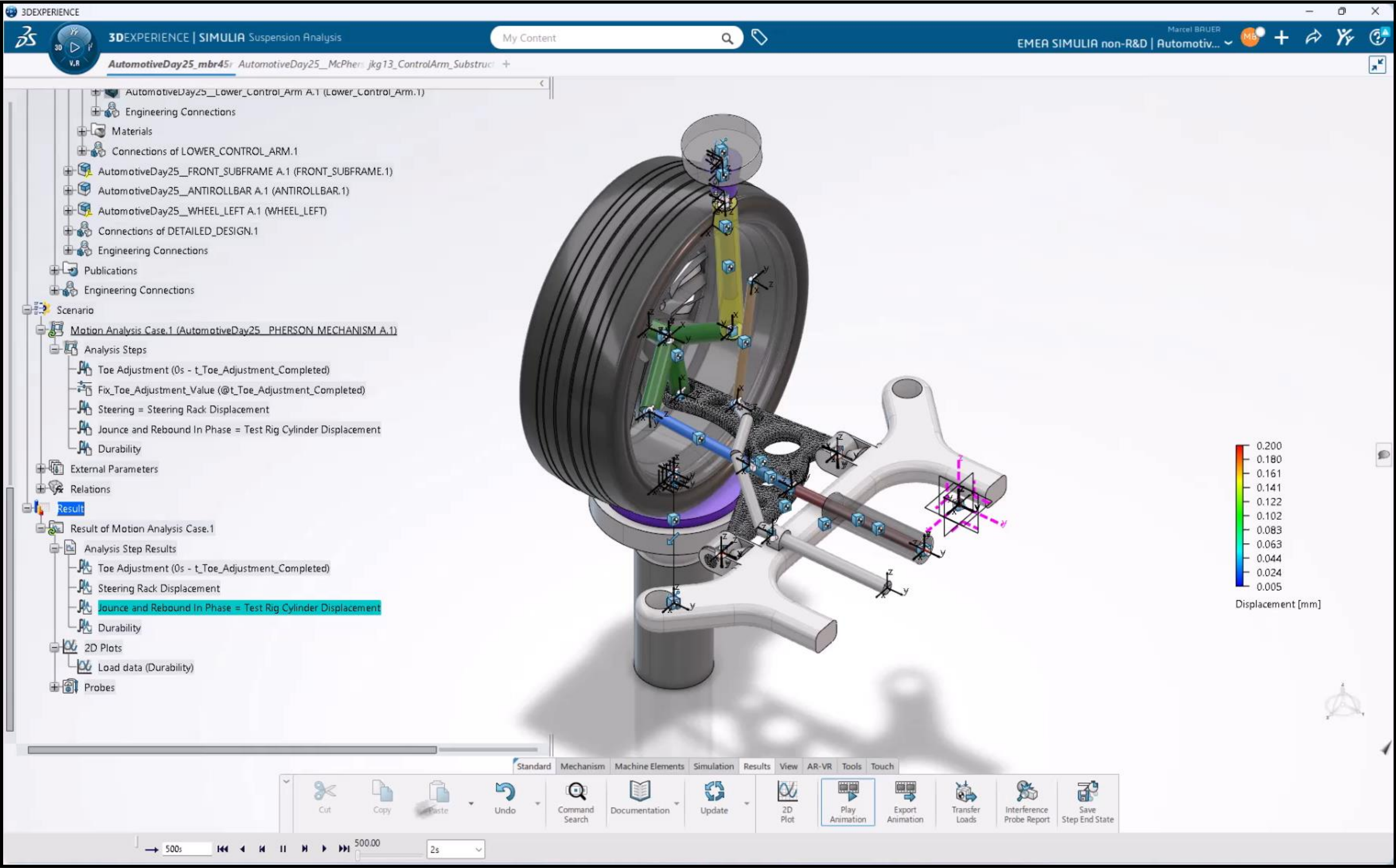
Step 1: Task and model preparation



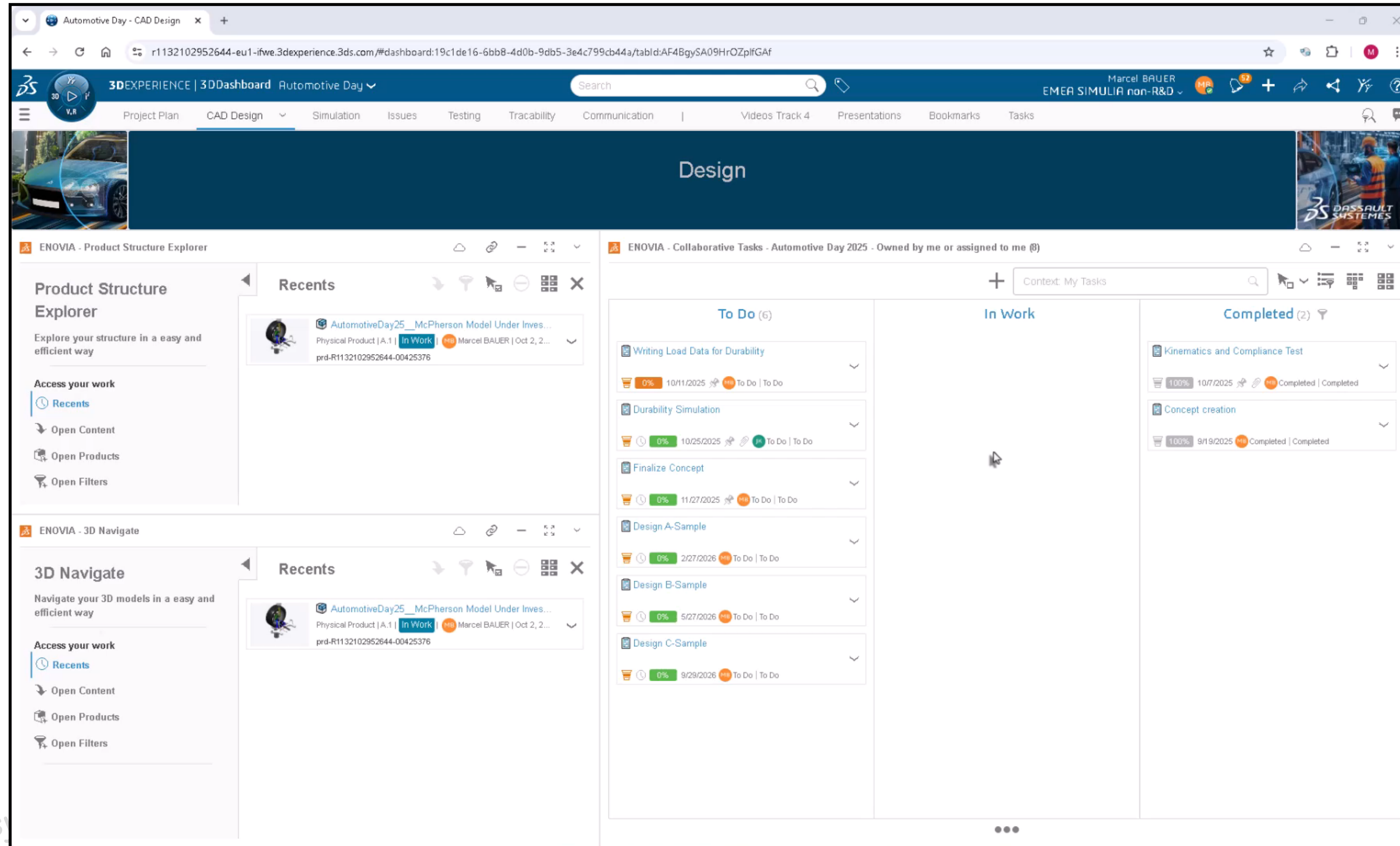
Step 2: include flexible body



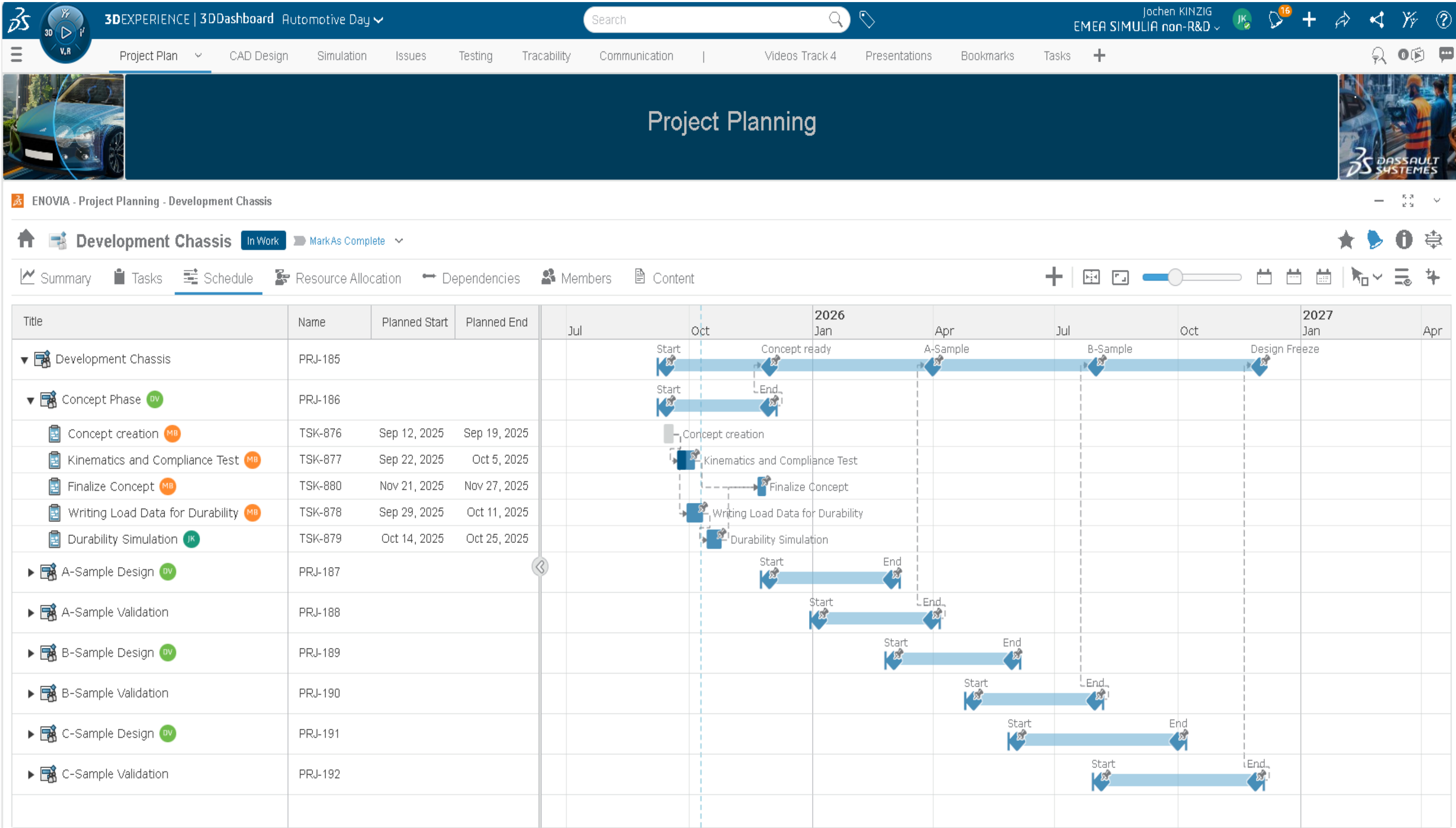
Step 3: postprocessing and report



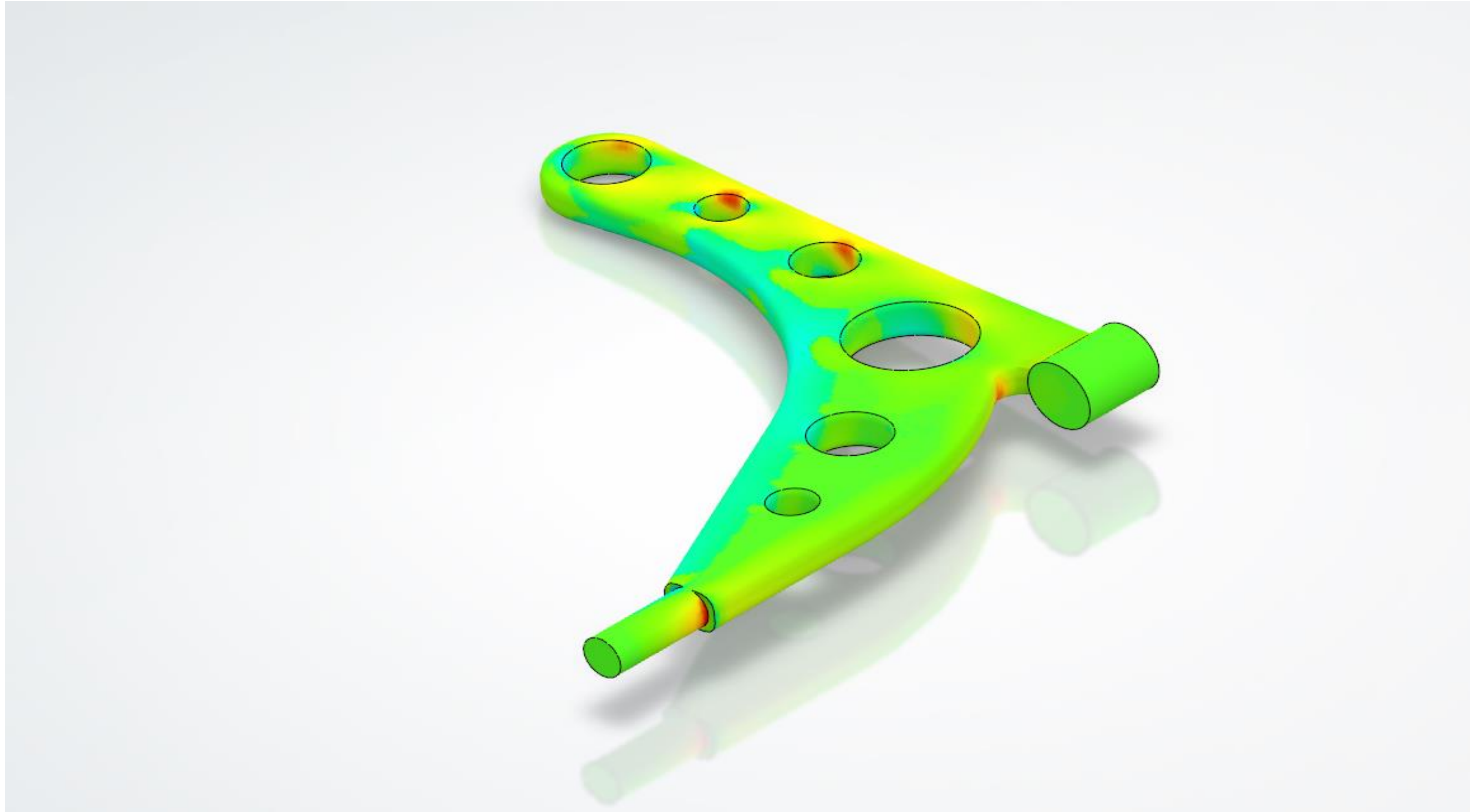
Step 4: writing load data



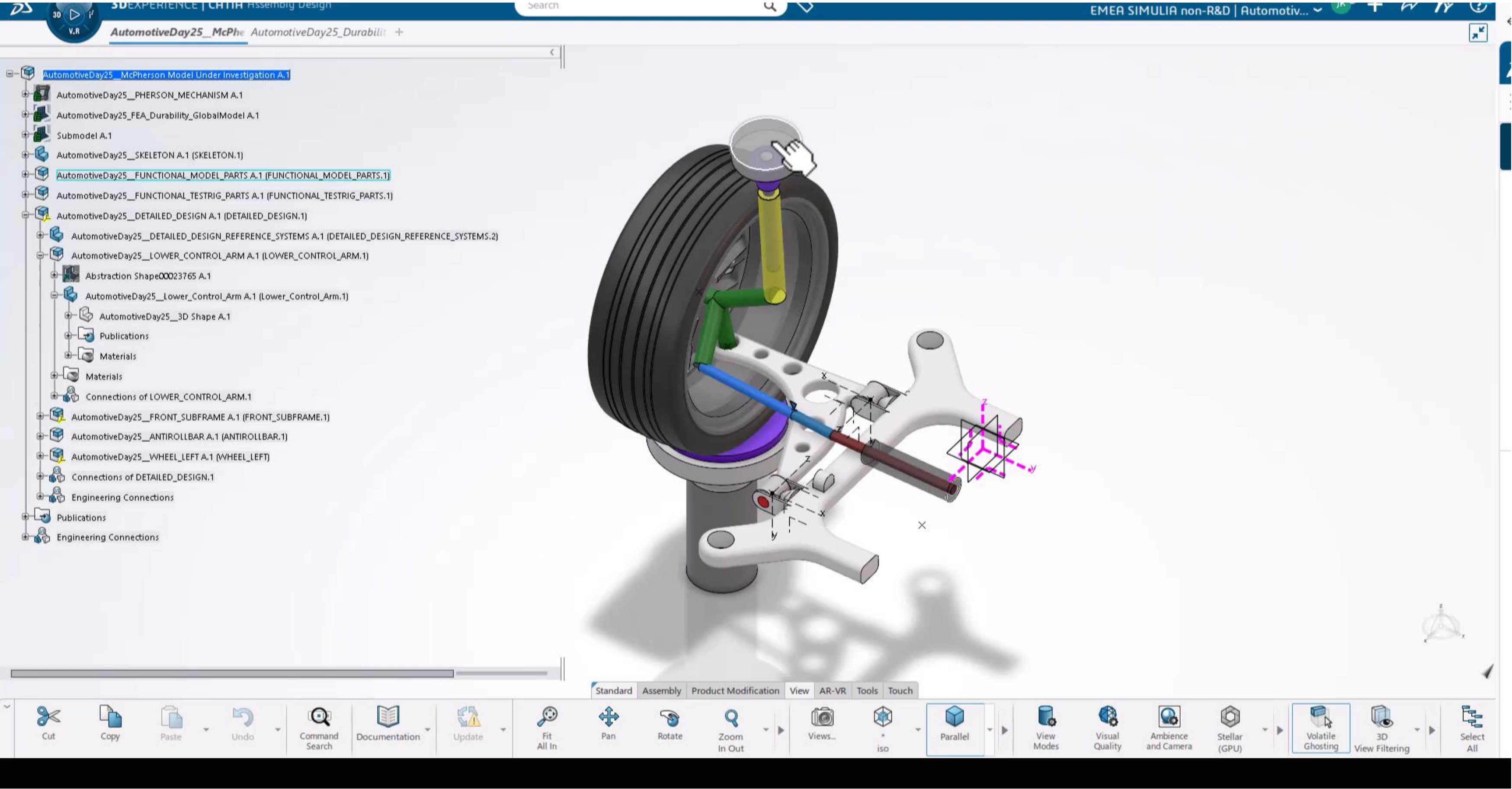
Step 5: Assigning Durabilty task



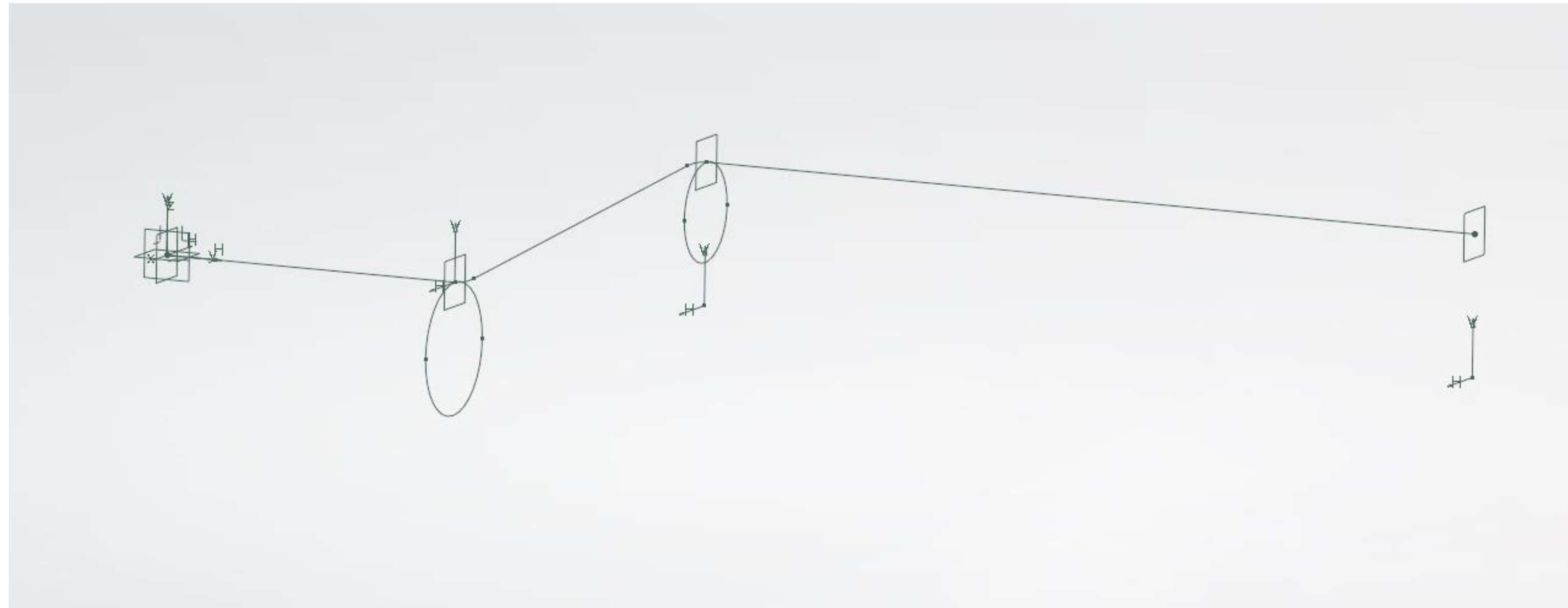
Step 6: Durability Simulation



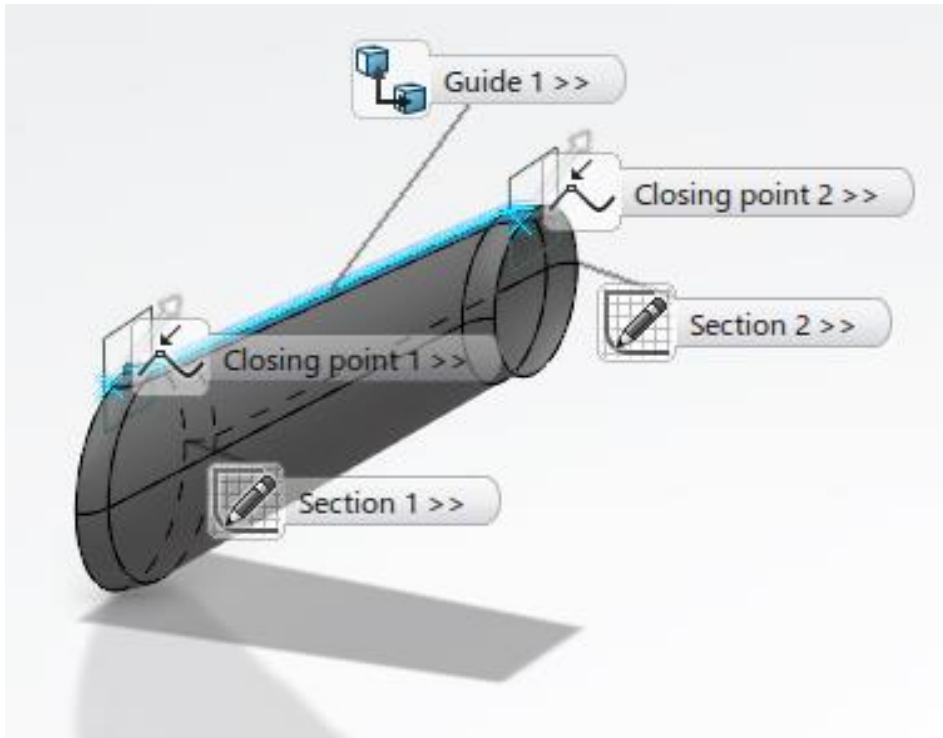
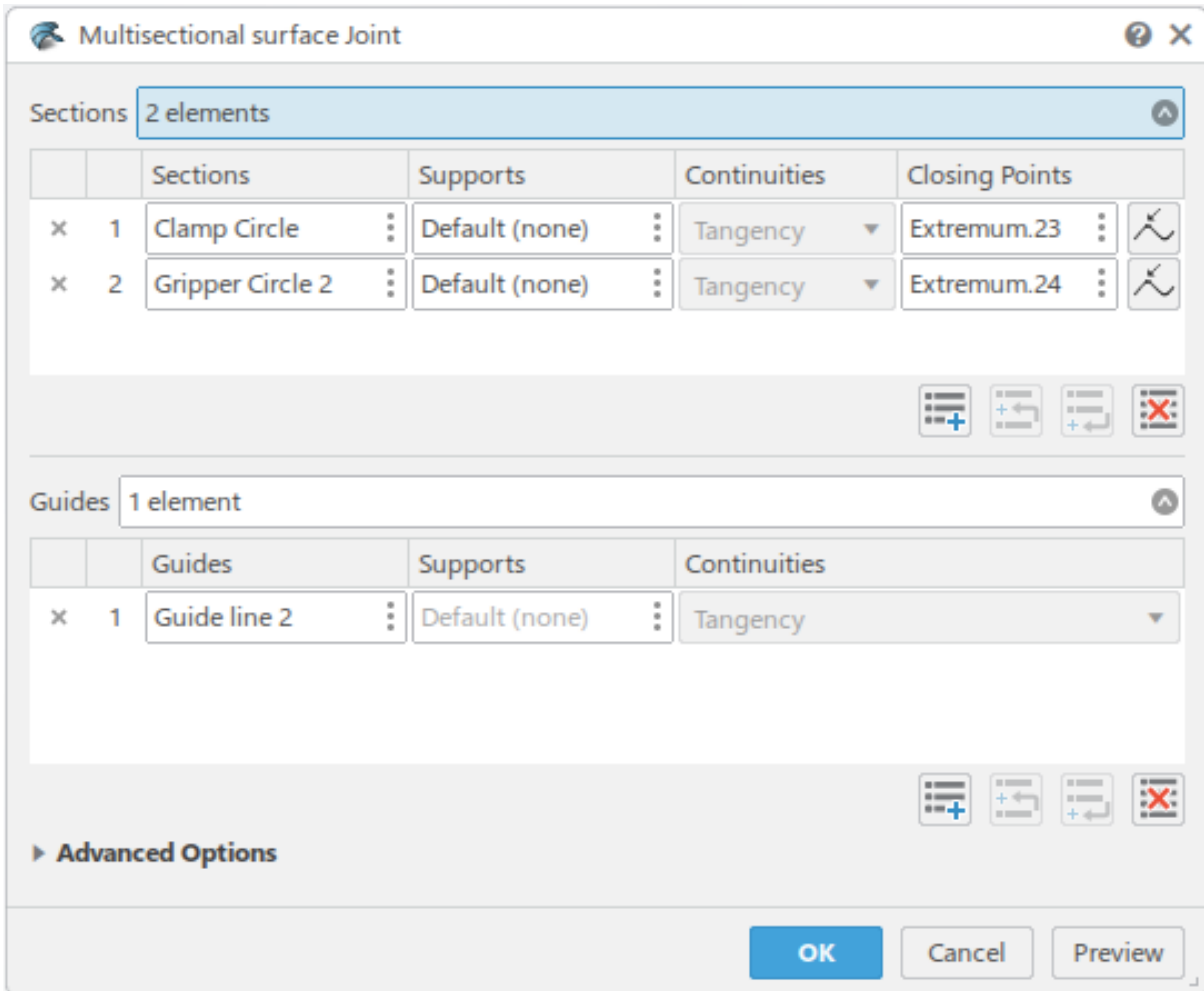
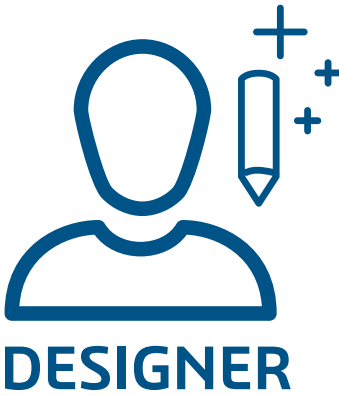
Step 7: Model Modification



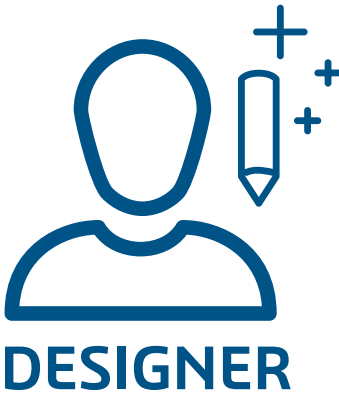
Design phase



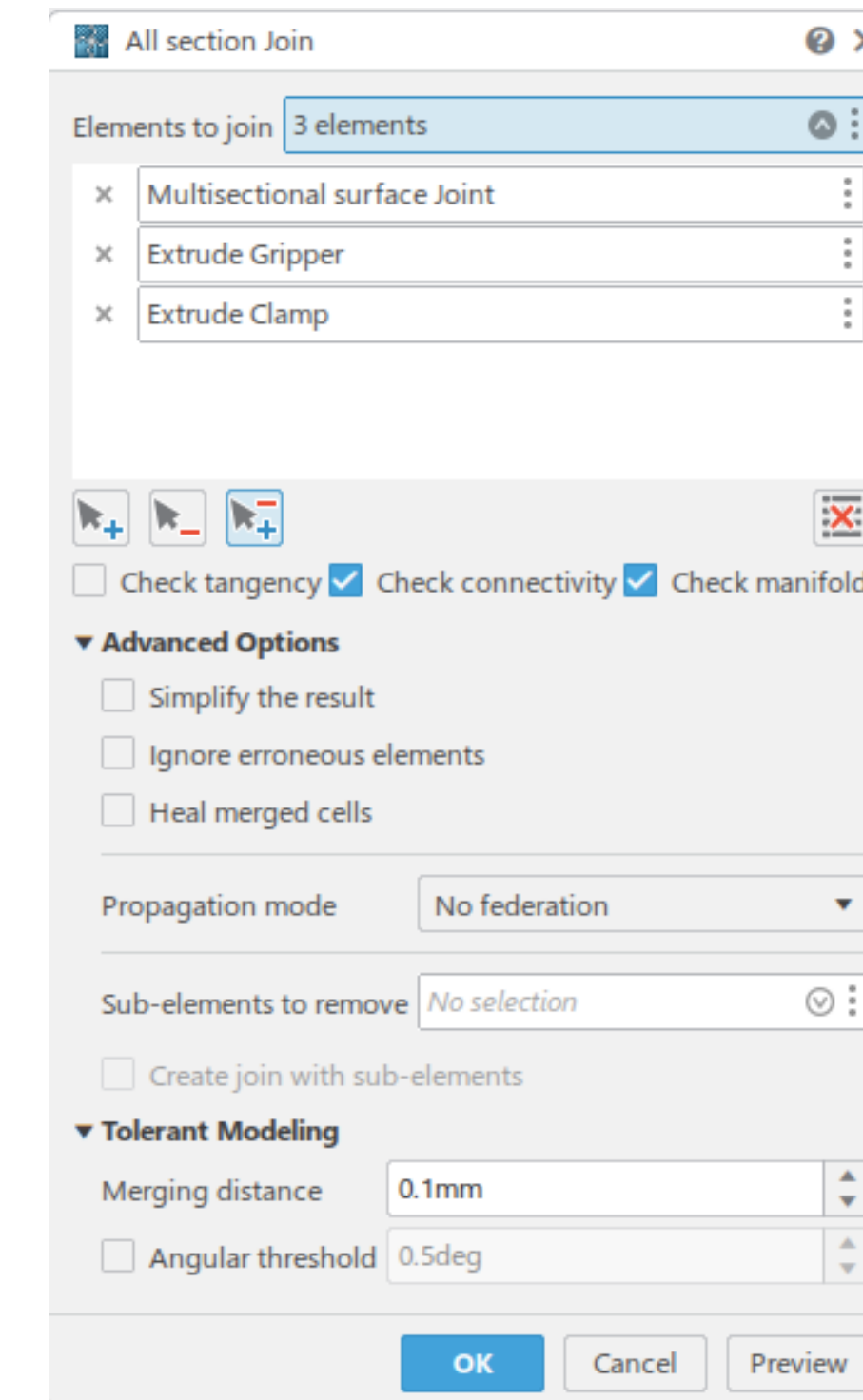
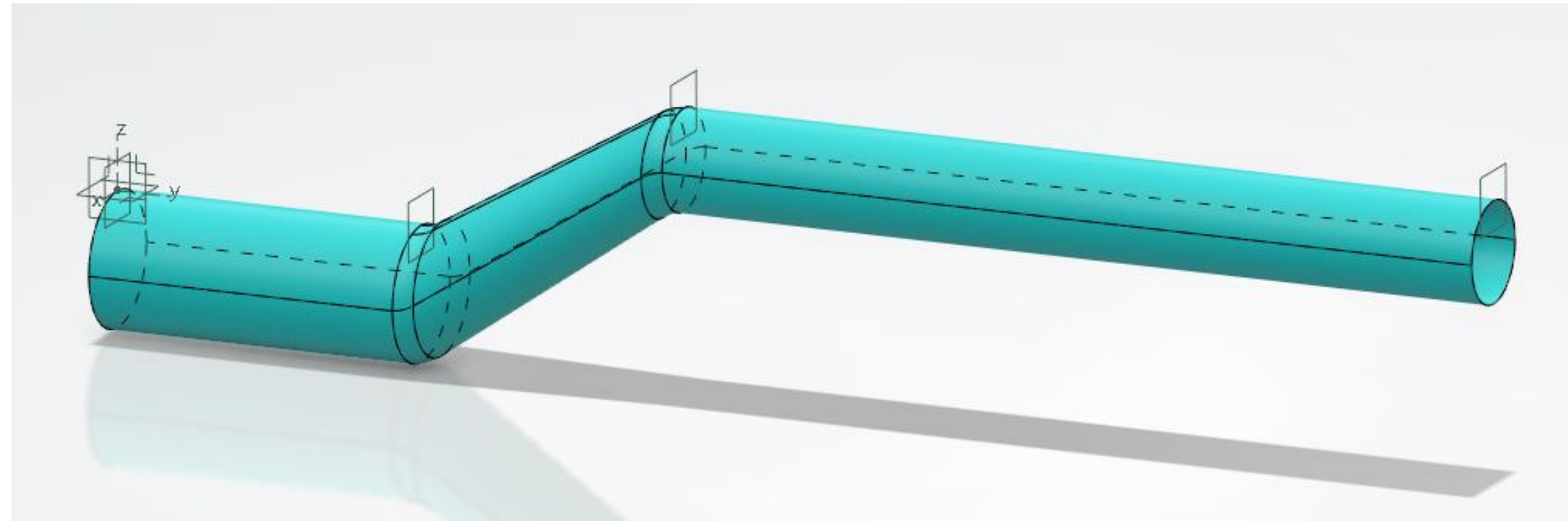
Design phase



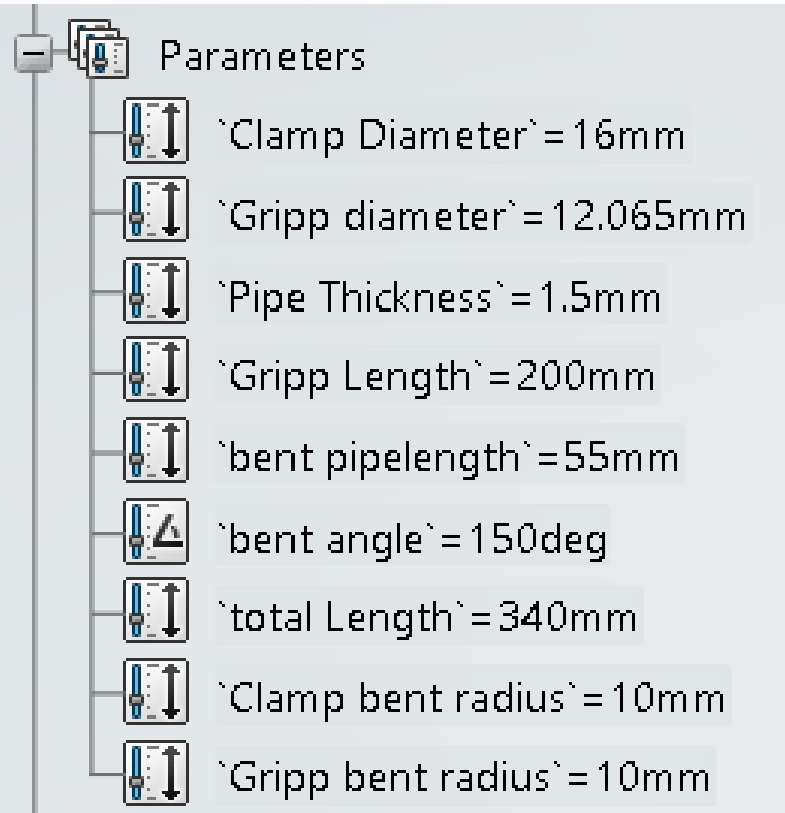
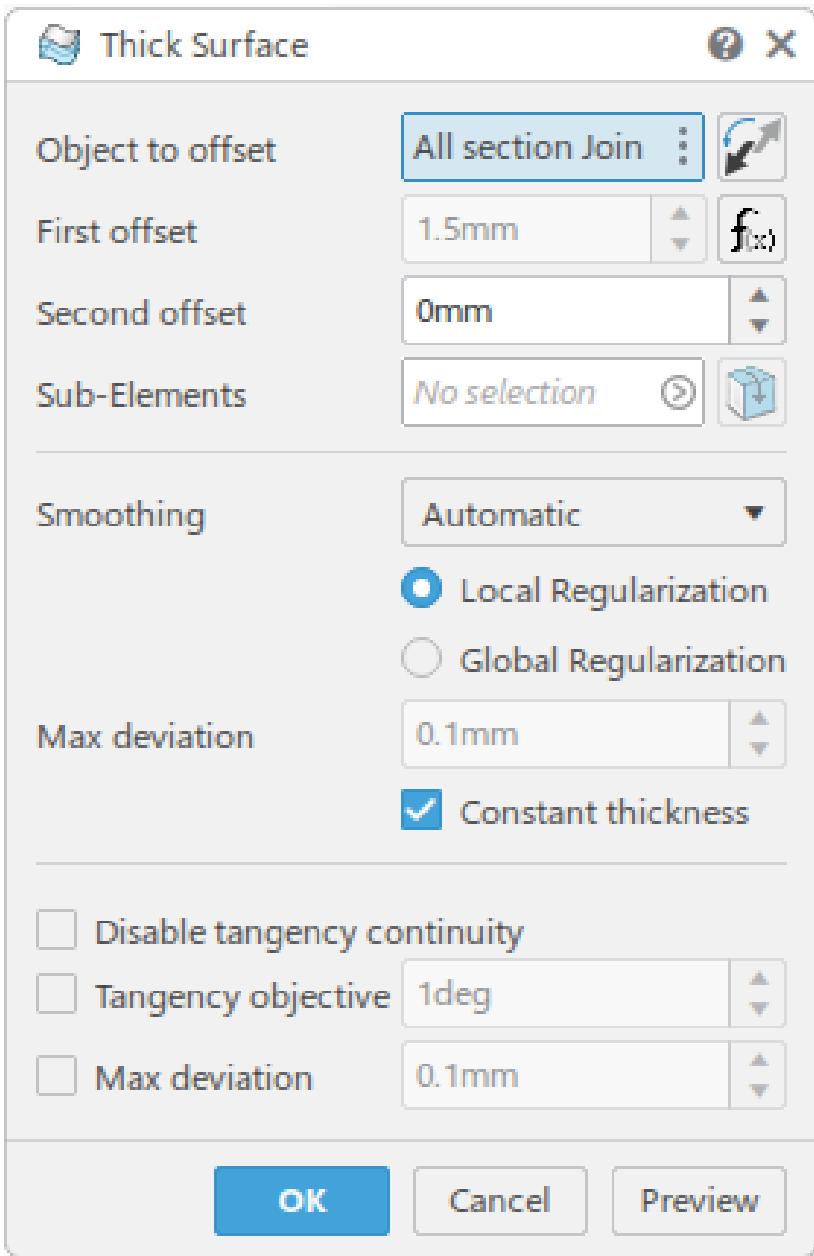
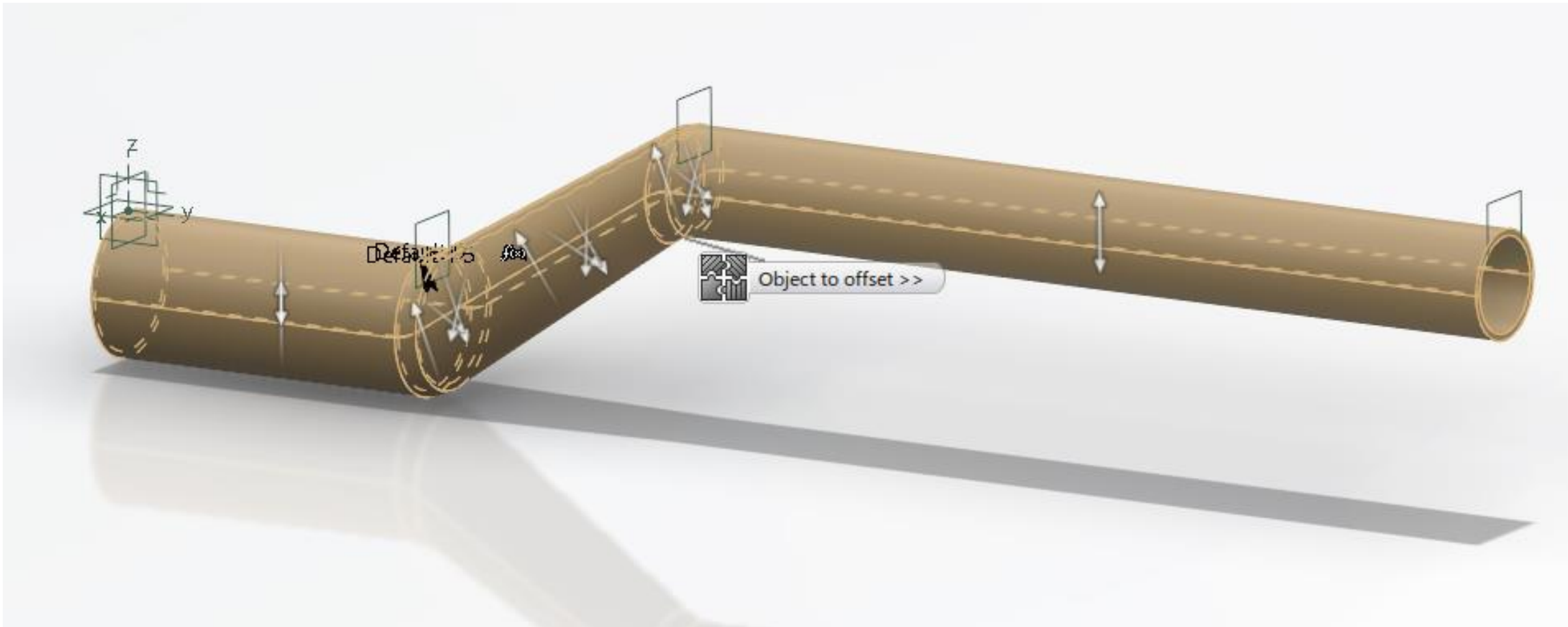
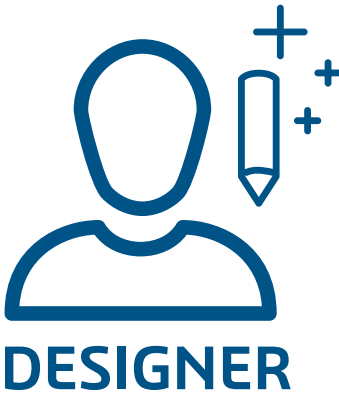
Design phase



Design phase



Design phase



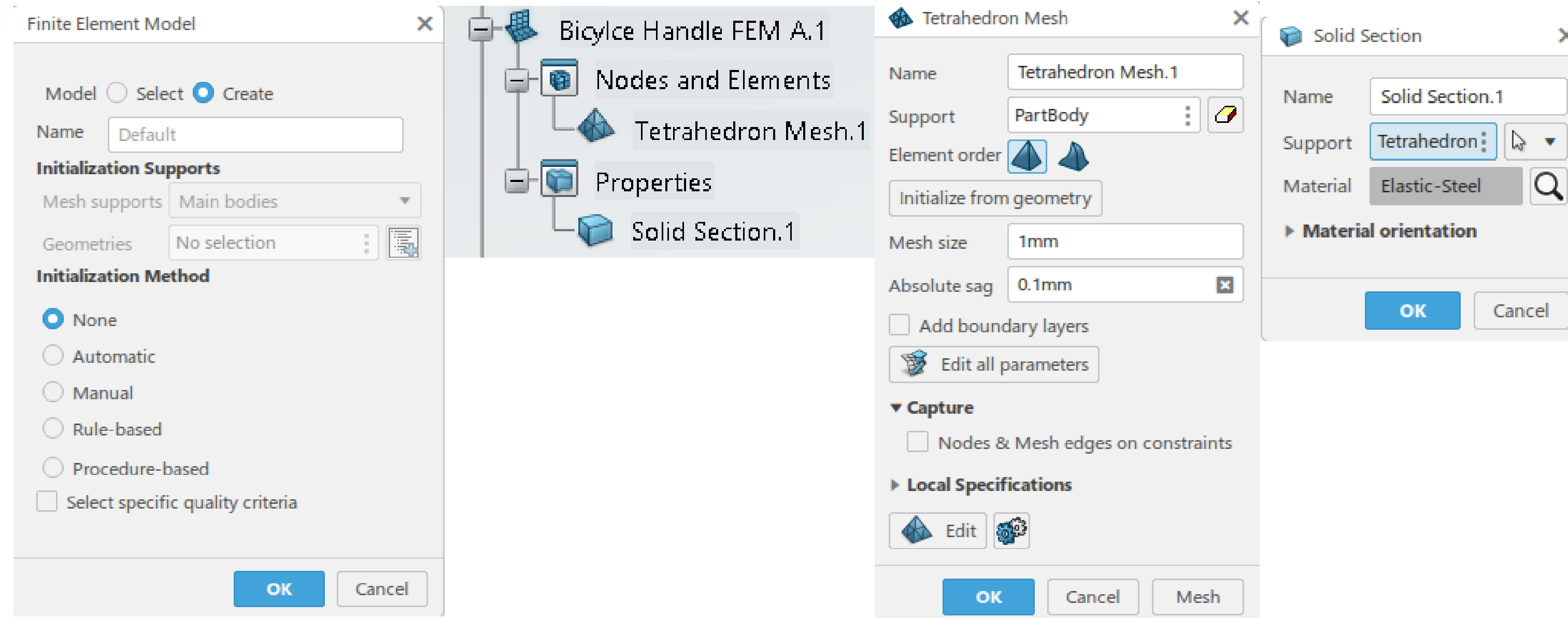
Meshing



From Designer



FEM Expert



Meshing



Further to Simulation Engineer



FEM Expert



Quality Report

Quality Criteria

Initialization criteria set: Mesh_Default_Checks

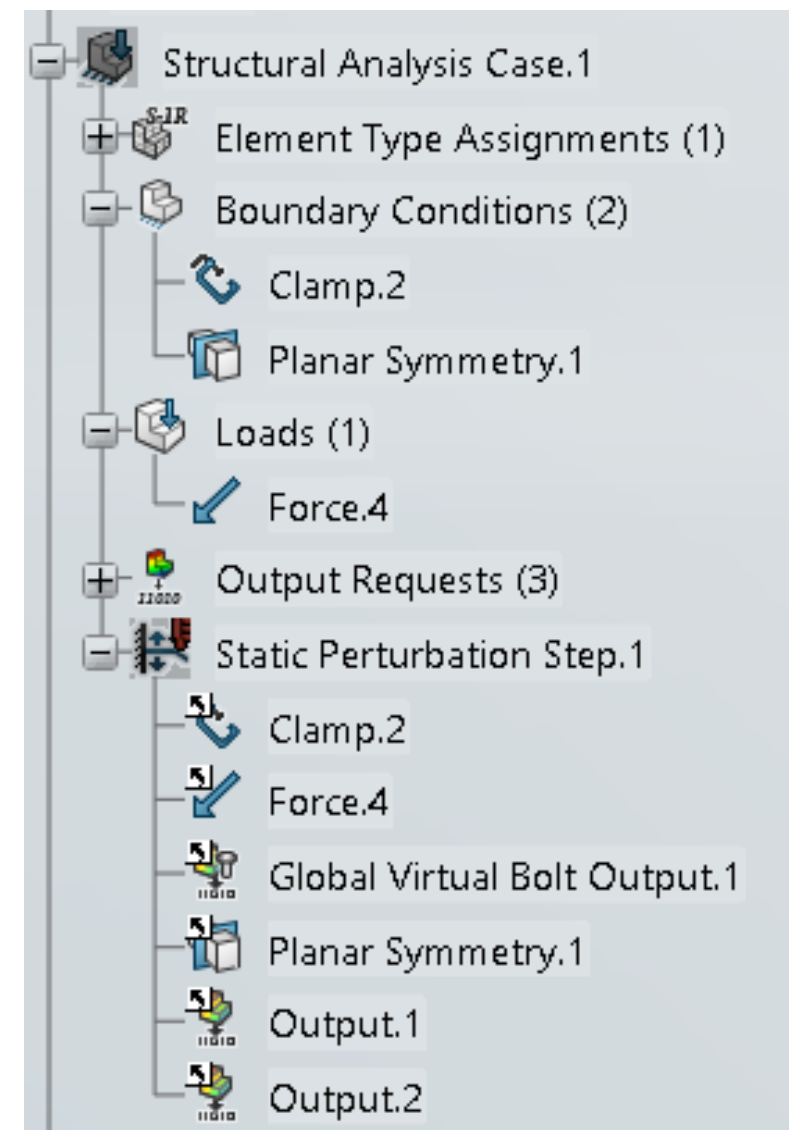
Criterion	Good	Poor	Bad	Worst	Average
Aspect ratio	215350 (100.00%)	0 (0.00%)	0 (0.00%)	3.181	1.959
Maximal angle	215350 (100.00%)	0 (0.00%)	0 (0.00%)	143.197deg	99.978deg
Minimal angle	215350 (100.00%)	0 (0.00%)	0 (0.00%)	17.463deg	42.282deg
Skewness	215350 (100.00%)	0 (0.00%)	0 (0.00%)	0.079	0.542
Stretch	215350 (100.00%)	0 (0.00%)	0 (0.00%)	0.348	0.611
-- Global (2153...	215350 (100.00%)	0 (0.00%)	0 (0.00%)		

Close

Static Simulation



Simulation
Expert



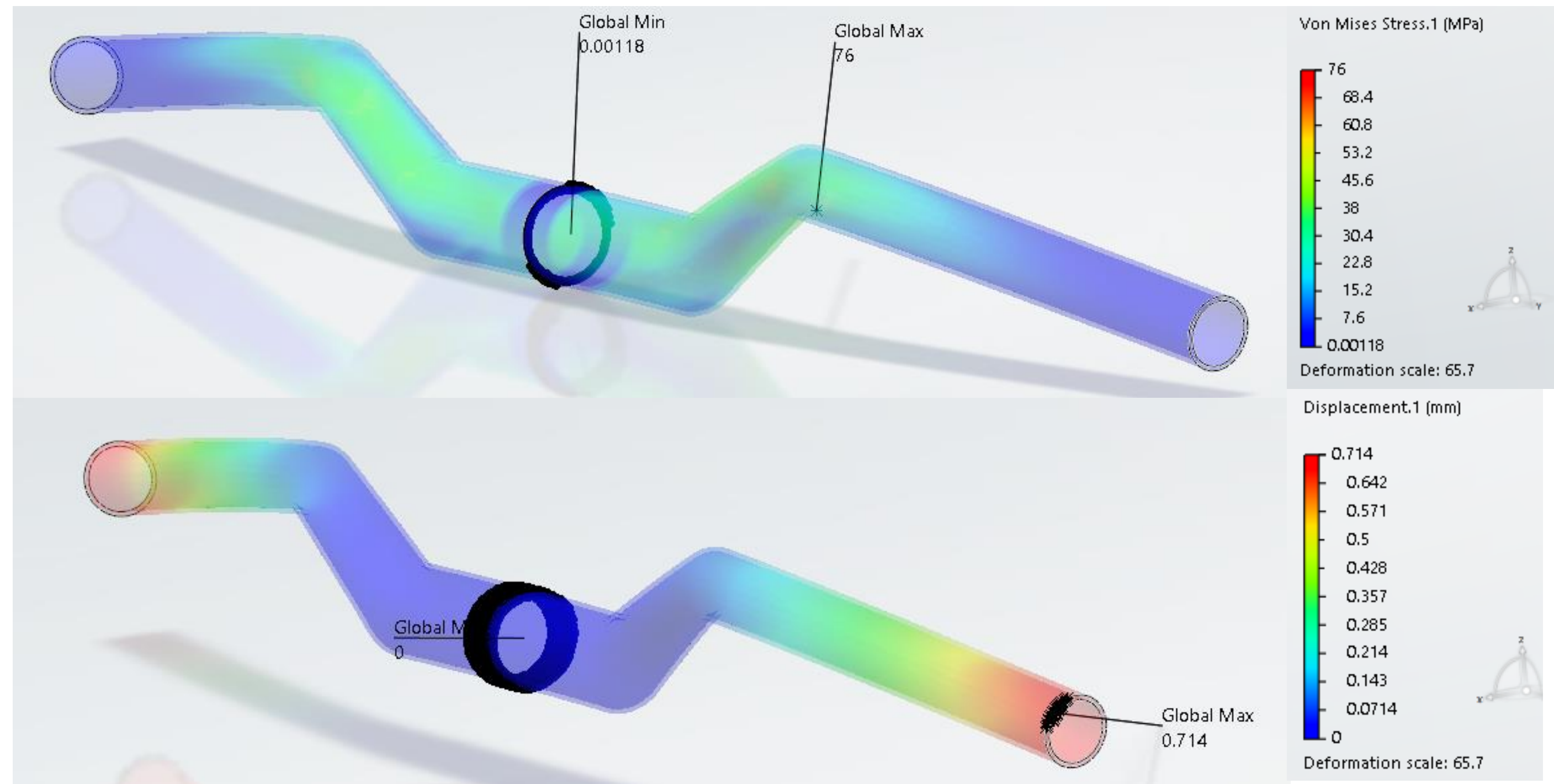
Static Simulation



Further to Fatigue Expert



Simulation
Expert

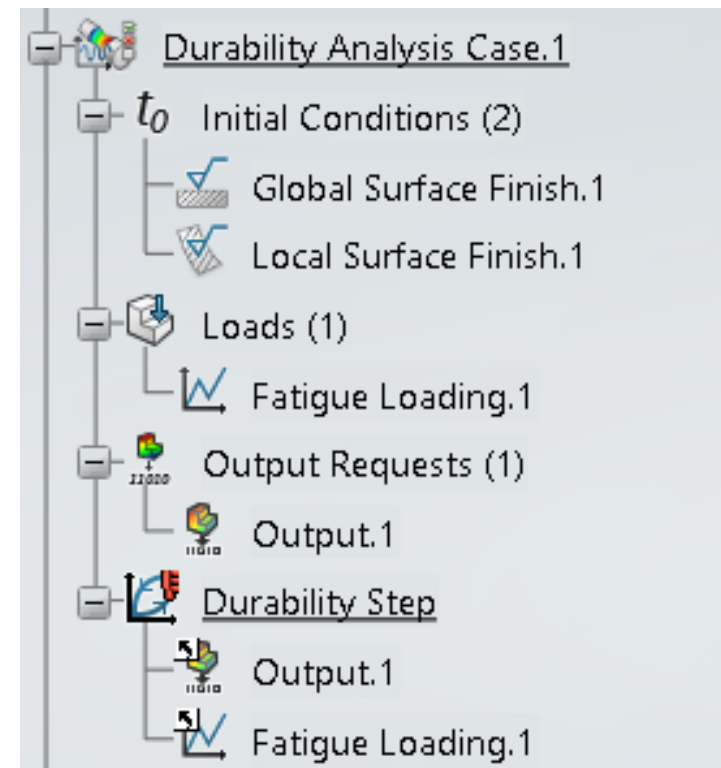


Fatigue Expert



Fatigue Expert

From Simulation Engineer



Global Surface Finish

Name: Global Surface Finish.1

Uni7670 1988 (steel) surface finishes

Finish quality: $0.6 < Ra \leq 1.6 \mu m$

OK Cancel

Fatigue Loading

Durability Analysis Case.1

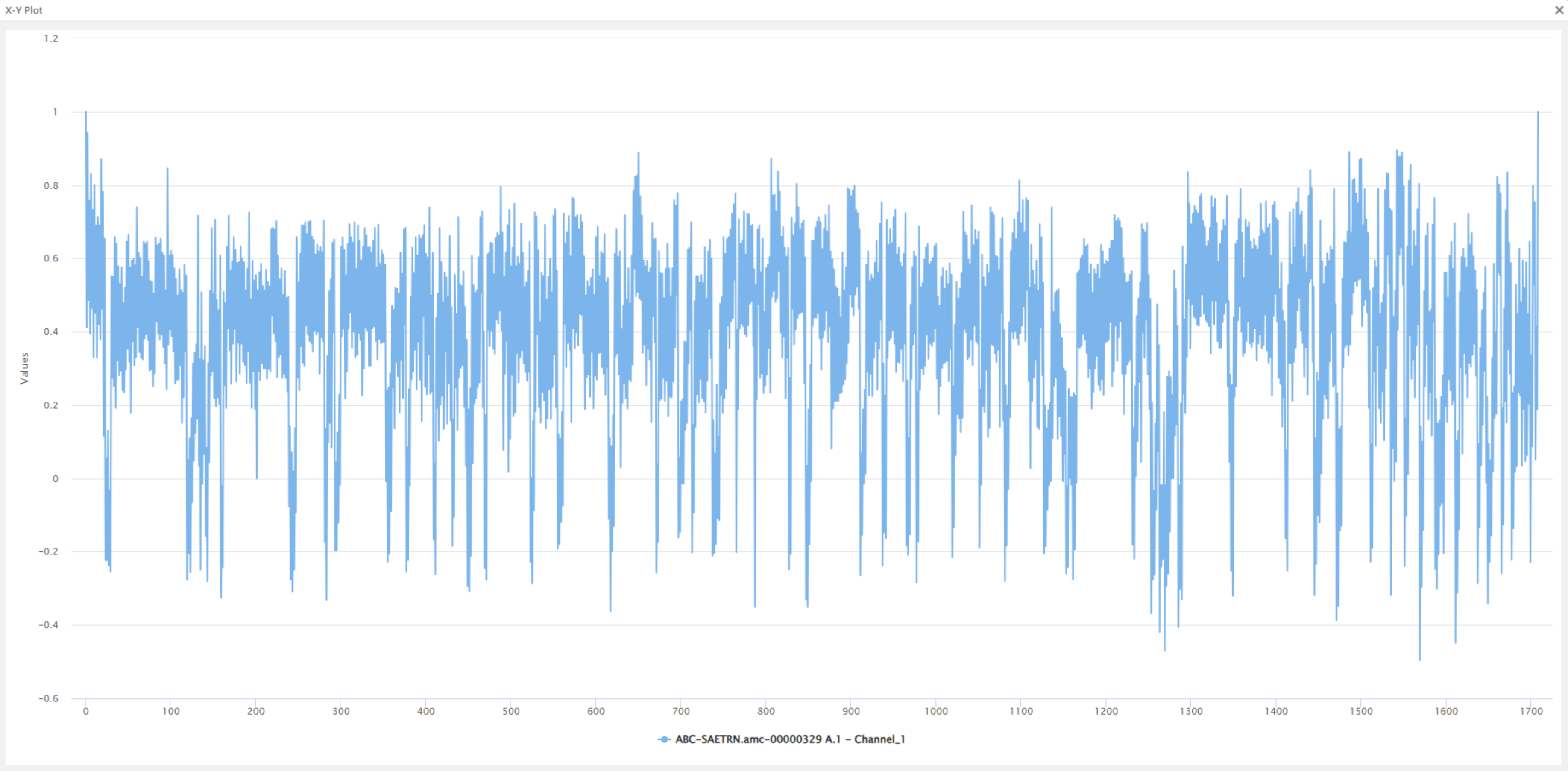
- Fatigue Loading
 - Global default temperature: 296.15Kdeg
 - Inter-event transitions: On
 - Superposition.2
 - Fields: Stress
 - Repeats: 1000
 - Scale: 1
 - Frames: Structural Analysis Case.1/Static Perturbation Step.1/Perturbation frame
 - Scale: 3
 - Offset: 0
 - Signal: ABC-SAETRN.amc-00000329 A.1 - Channel_1

OK Cancel

Fatigue Expert



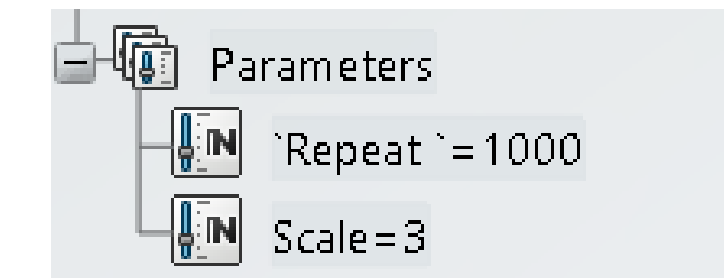
Fatigue Expert



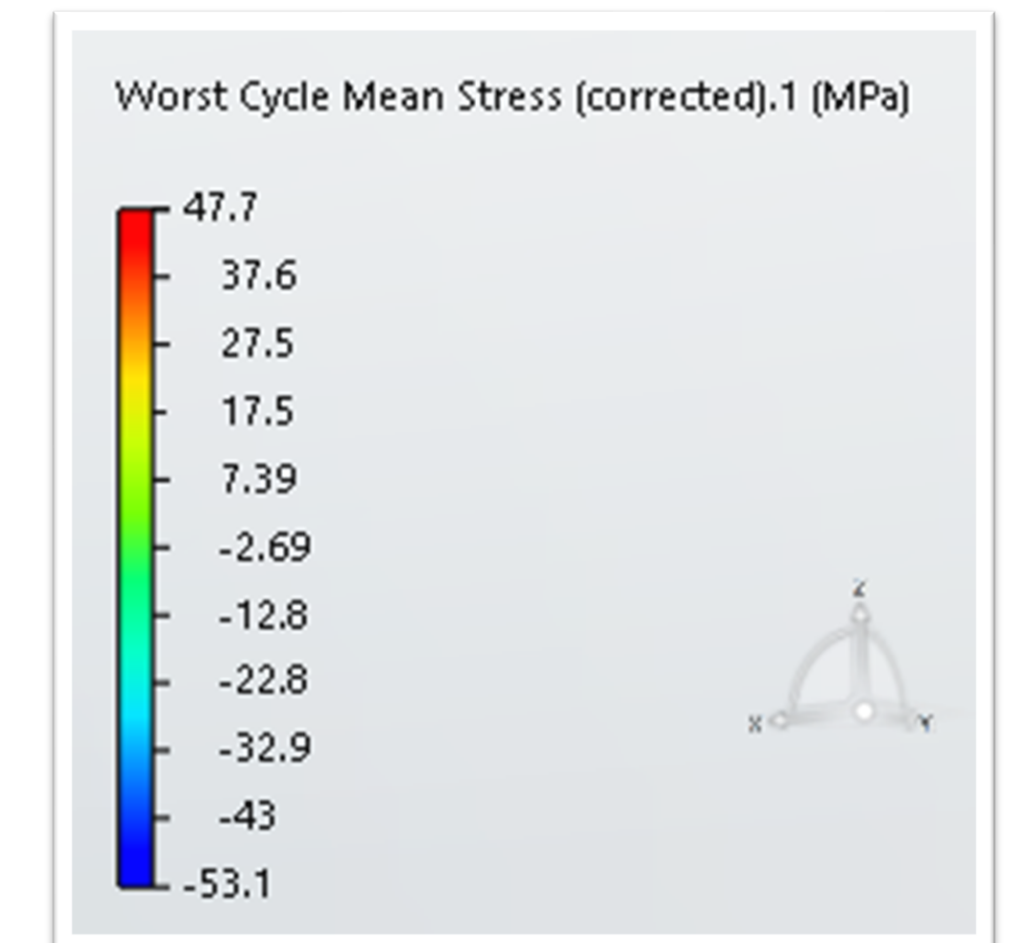
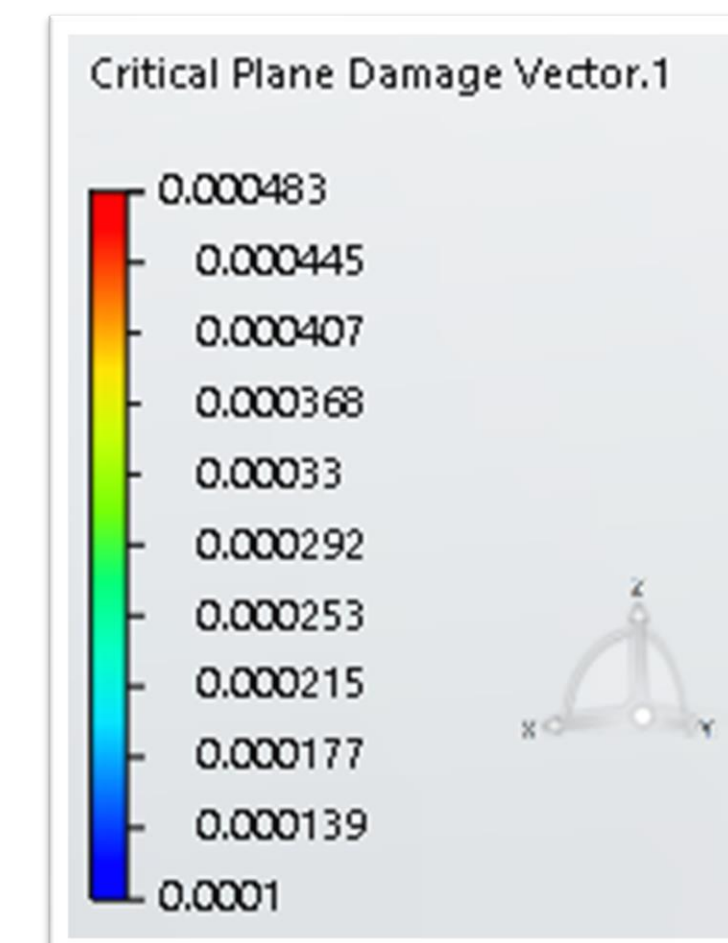
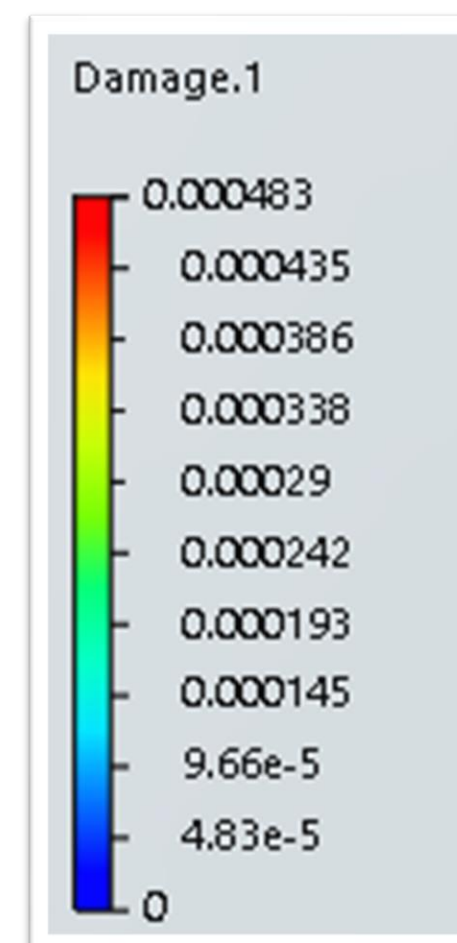
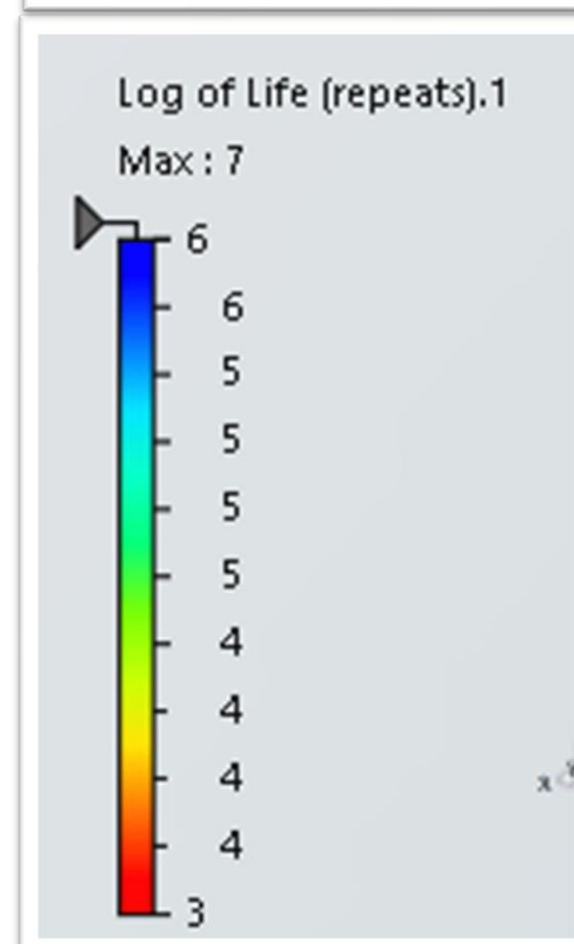
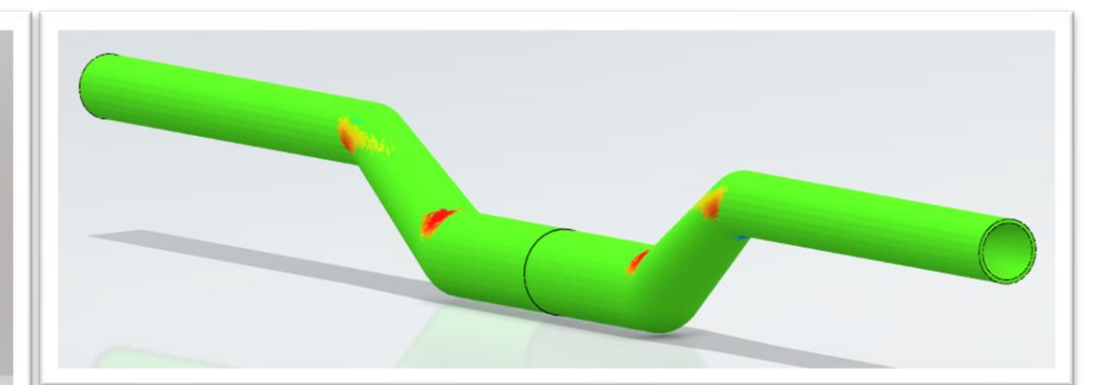
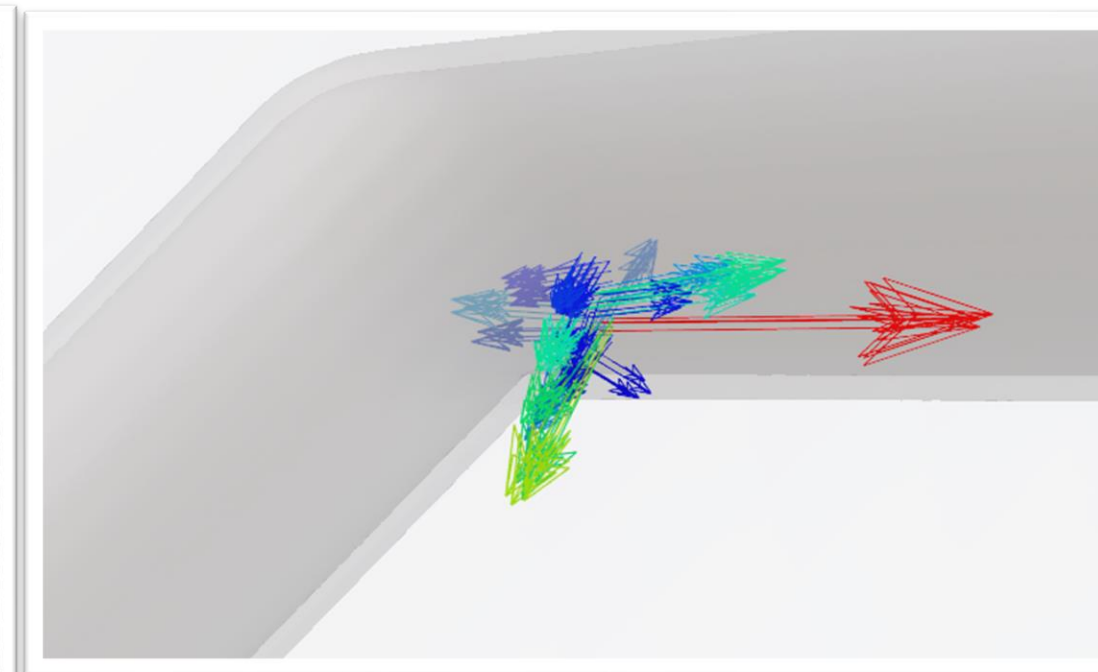
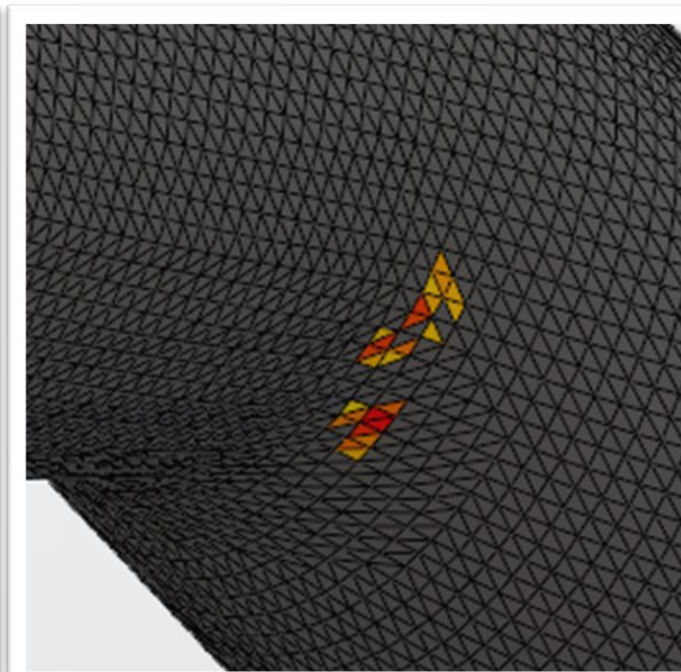
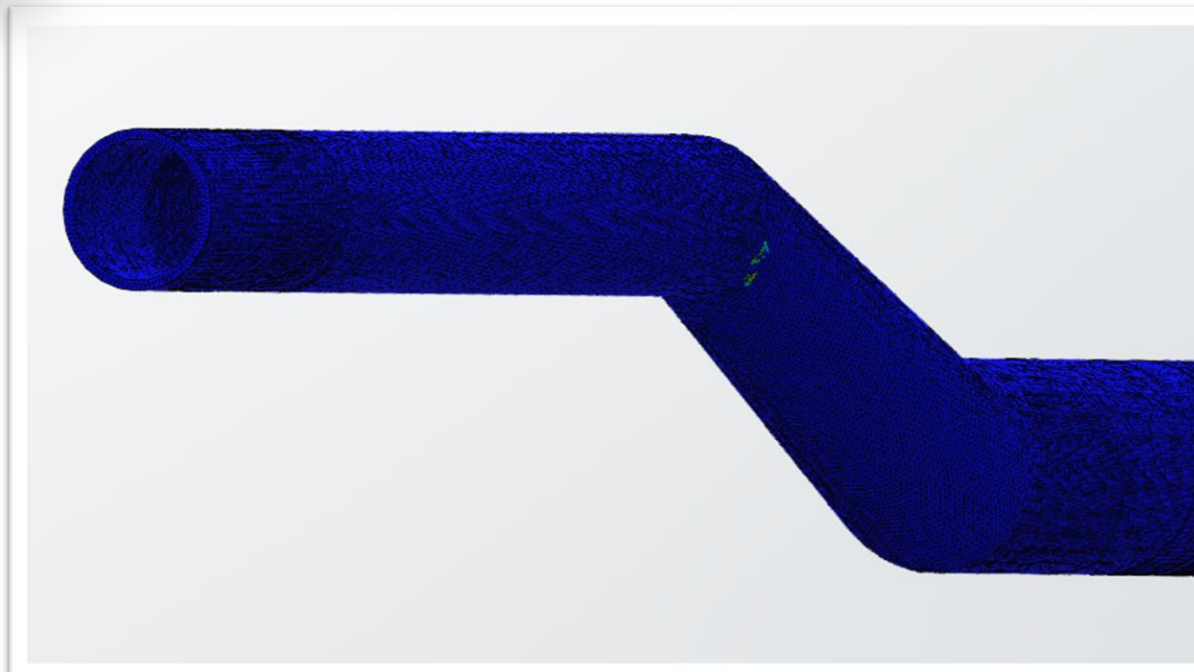
Fatigue Expert



Further to designer for Parametric Optimization



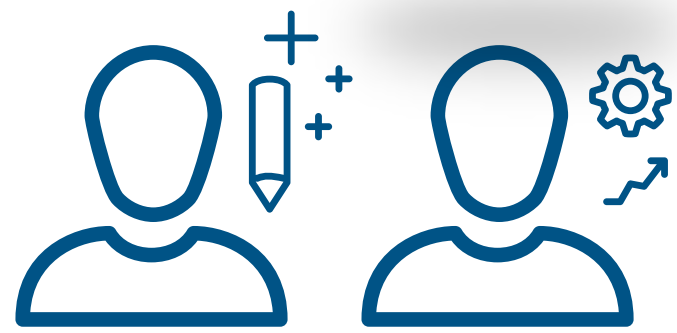
Fatigue Expert



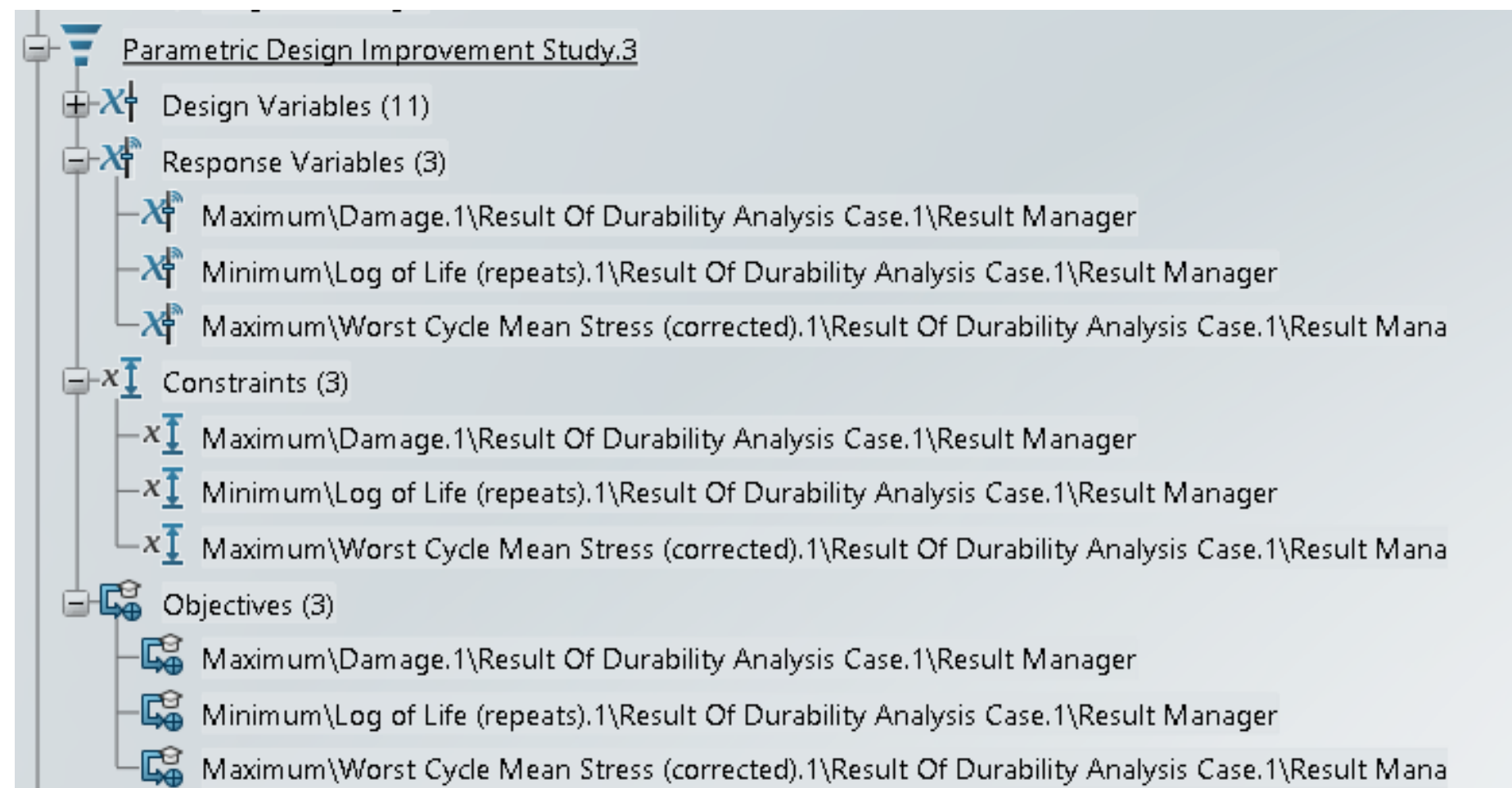
Parametric Optimization Setup



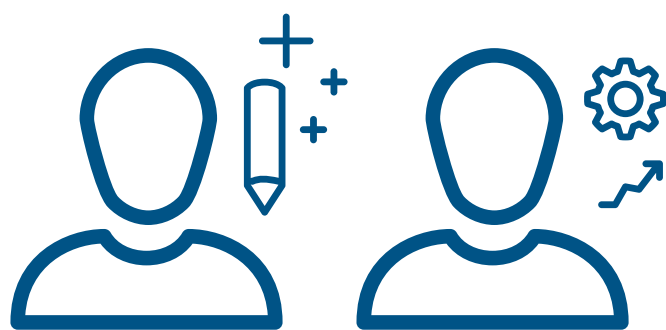
From Fatigue Expert



**CAD designer and
Simulation Engineer**



Parametric Optimization Setup



CAD designer and
Simulation Engineer

Design Variables Manager

Define the design variables of the current study

Select a parameter from the tree or a part in the 3D area to add a design variable. Use the table below to modify the ranges, step sizes, and allowed values for design variables.

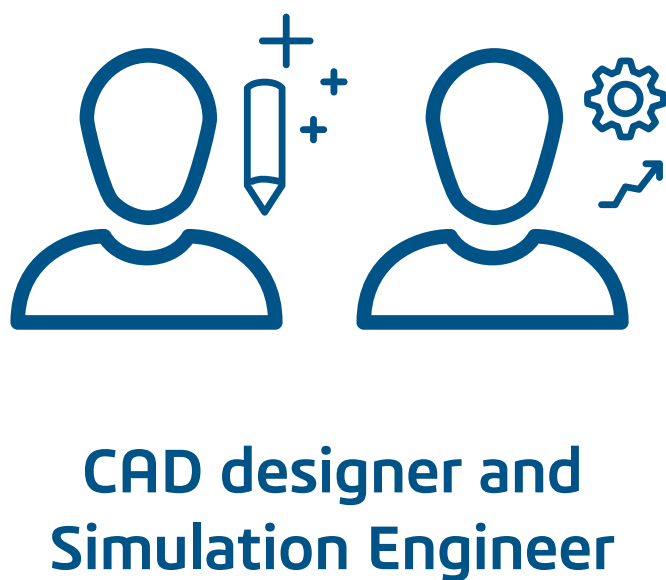
Parametric Design Improvement Study: Parametric Design Improvement Study.3

Name (Active 9/11)	Current	Nominal	Minimum	Maximum	Step Size	Allowable Values
Clamp Diameter	16mm	16mm	15mm	16mm		
Gripp diameter	12.065mm	12.065mm	11mm	12.5mm		
Pipe Thickness	1.5mm	1.5mm	1.5mm	3mm		
Gripp Length	200mm	200mm	100mm	200mm		
bent pipelength	55mm	55mm	50mm	70mm		
bent angle	150deg	150deg	150deg	175deg		
total Length	340mm	340mm	340mm	400mm		
Clamp bent radius	10mm	10mm	10mm	30mm		
Gripp bent radius	10mm	10mm	10mm	30mm		
Repeat	1000	1000	1000	3000		
Scale	3	3	3	5		

OK

Cancel

Parametric Optimization Setup



Response Variables Manager

Define the response variables of the current study

Select a parameter from the tree or a part in the 3D area to add a response variable. Use the table below to define objectives and constraints based on response variables.

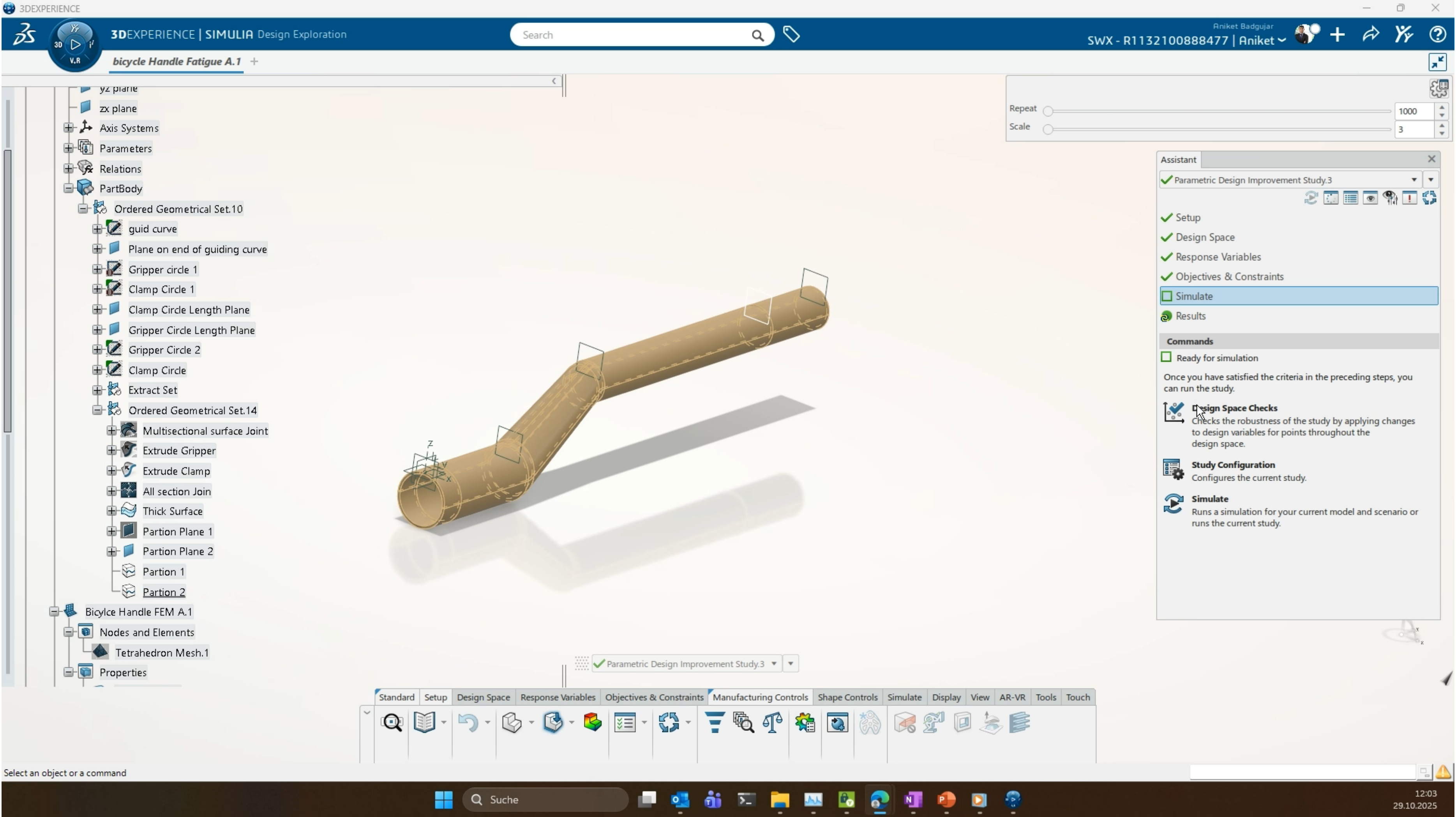
Parametric Design Improvement Study: Parametric Design Improvement Study.3

Name (Active 3/3)	Value	Minimum	Maximum	Objective	Target
Maximum\Damage.1\Result Of Durability Analysis Case.1\Result Manager	0.00048309	0	1	Minimize	
Minimum\Log of Life (repeats).1\Result Of Durability Analysis Case.1\Result Manager	3.315999985	4	7	Maximize	
Maximum\Worst Cycle Mean Stress (corrected).1\Result Of Durability Analysis Case.1\Result Manager	4.77e+007N_m2		90MPa	Minimize	

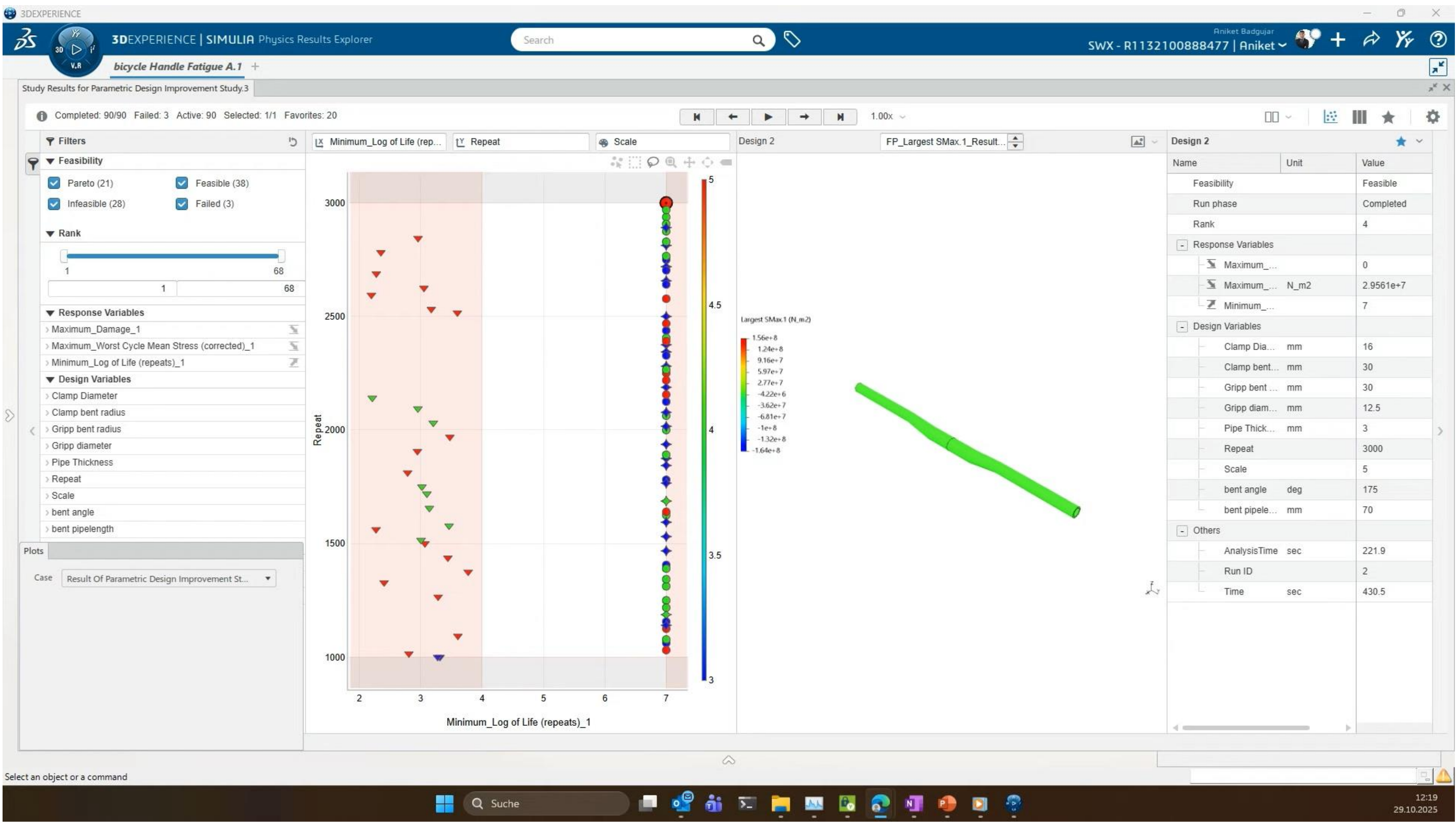
OK

Cancel

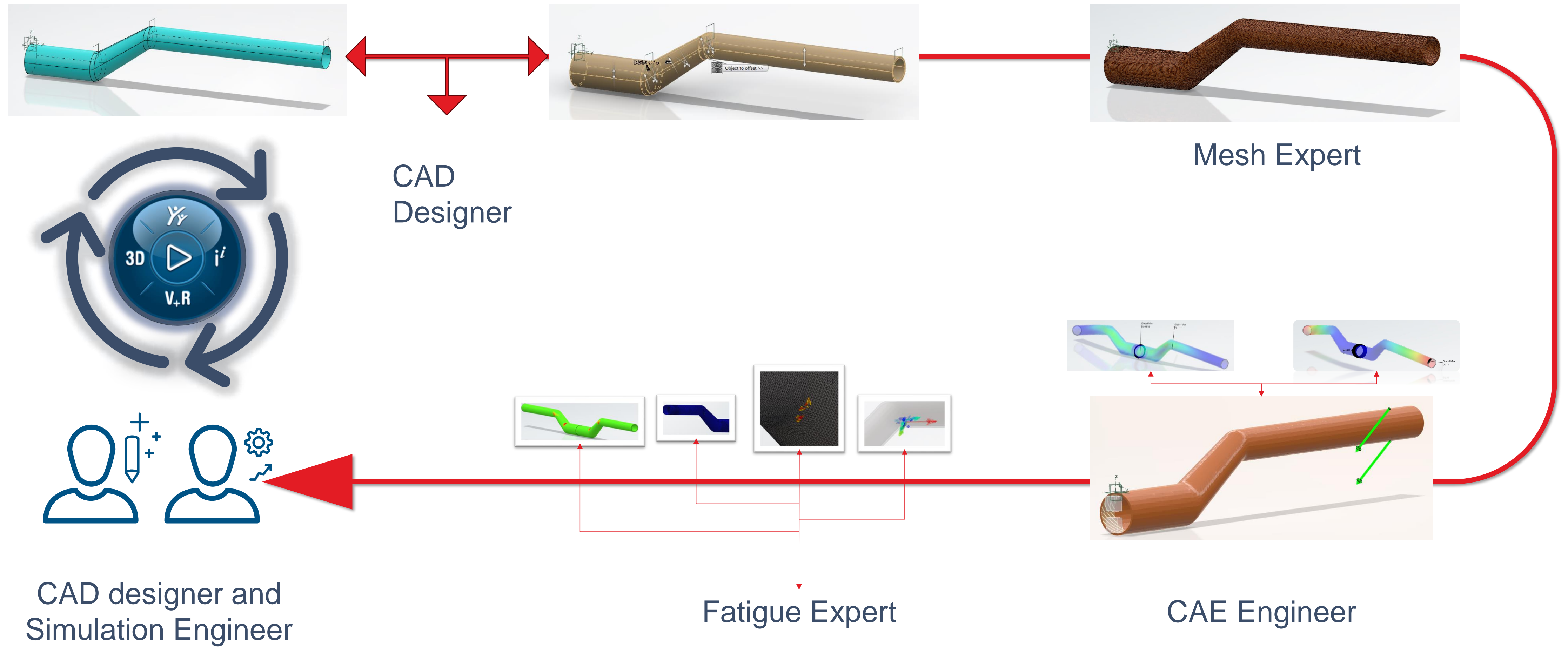
Design space check



Results of Parametric Optimization of Fatigue variants



Overview



Durability on the 3DEXPERIENCE Platform

ROLE	Trigram	Scenario App	Base metal fatigues, Infinite life FRF, Finite life, Multiaxial fatigue	Welded joint fatigues (Verity & FKM)
Structural Analysis Engineer	SYE	Mechanical Scenario Creation	YES	YES
Composite Structures Analysis Engineer	SNE	Mechanical Scenario Creation	YES	YES
Structural Generative Engineer	OPZ	Mechanical Scenario Creation	YES	YES
Durability & Mechanics Engineer	FGM	Mechanical Scenario Creation	YES	NO
Durability Performance Engineer	FGP	Structural Scenario Creation	YES	NO

Summary

- Leveraging simulation within the concept phase allows for additional freedom on styling choices
- A unified data model and a joint engineering environment deal with the major challenge in collaboration: exchange of information and data
- Guided workflows and web interfaces simplify the development processes for non-experts
- AI can further enhance the tested design space by providing fast results and minimizing computational cost



Danke für Ihre Aufmerksamkeit

Bei Fragen bin ich gerne persönlich
für Sie da!



Aniket Badgujar

Pre-sales and Simulation Consultant

+49 155 60684245

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