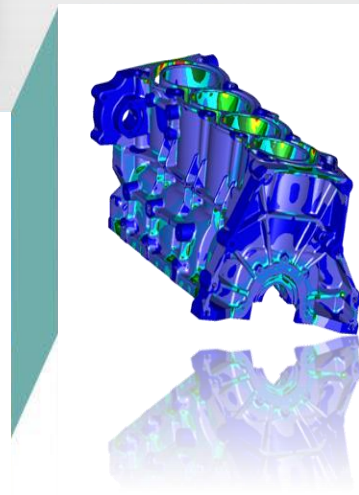
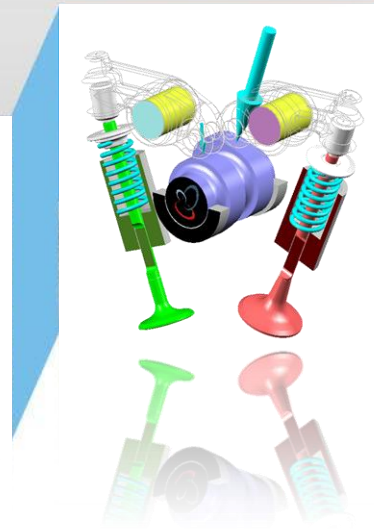
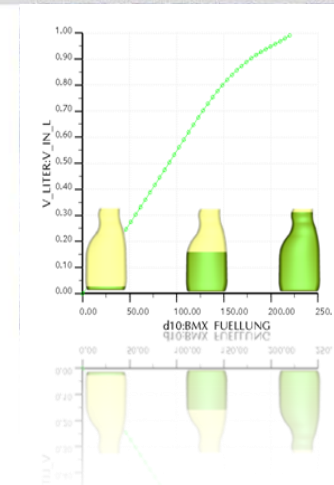
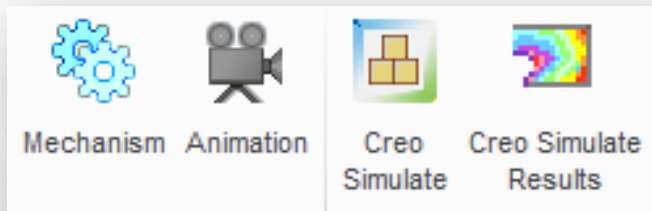
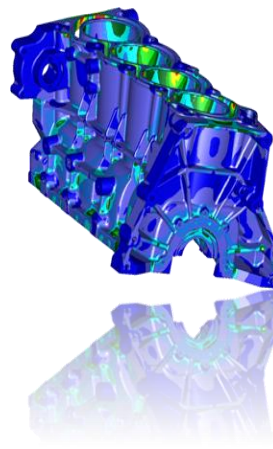
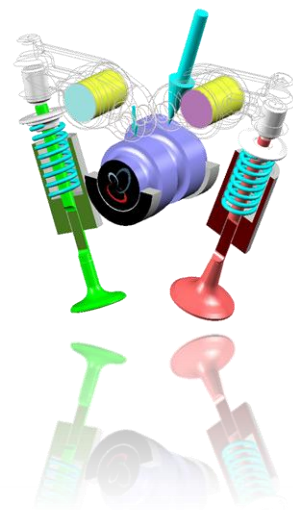
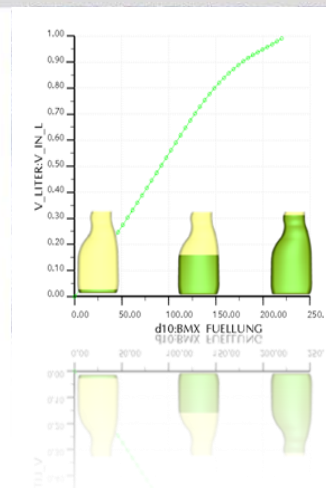


Simulation-News in Creo 1.0



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MECHANICA-News in Creo 1.0



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“Standalone” Mechanics Application

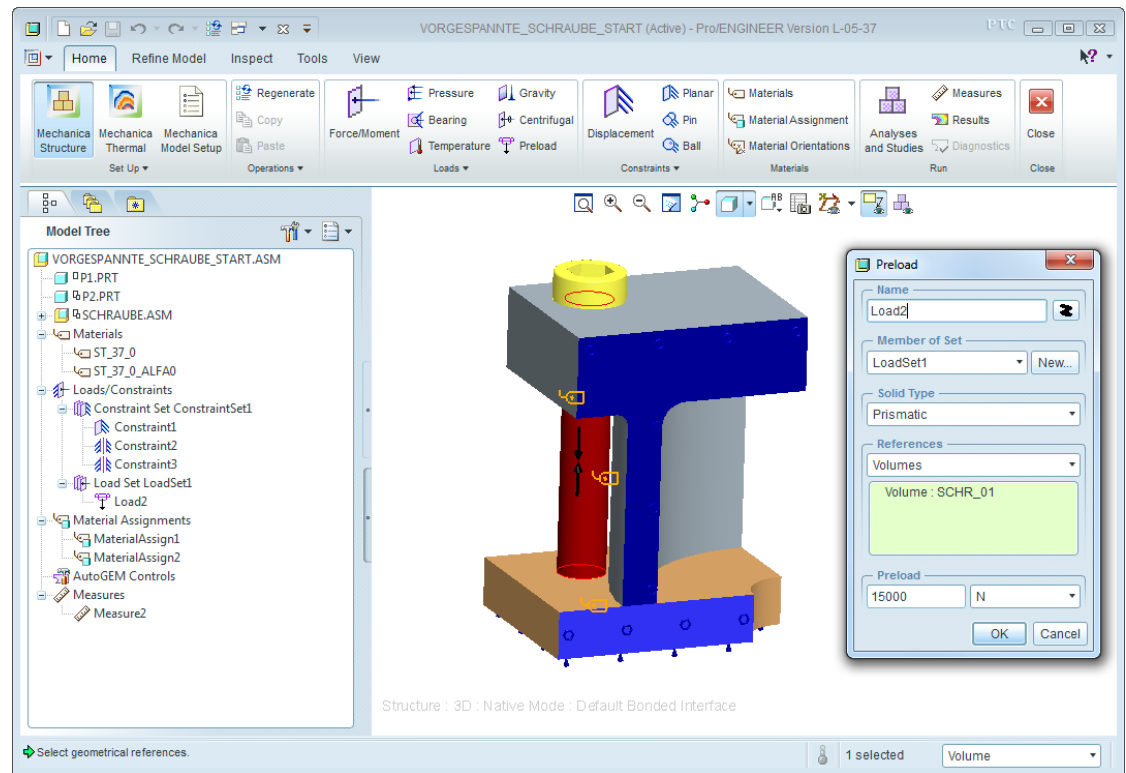
> Dedicated User Environment

- Only the capabilities a simulation user wants to see

> Geometry Cleanup and Simplification Tools

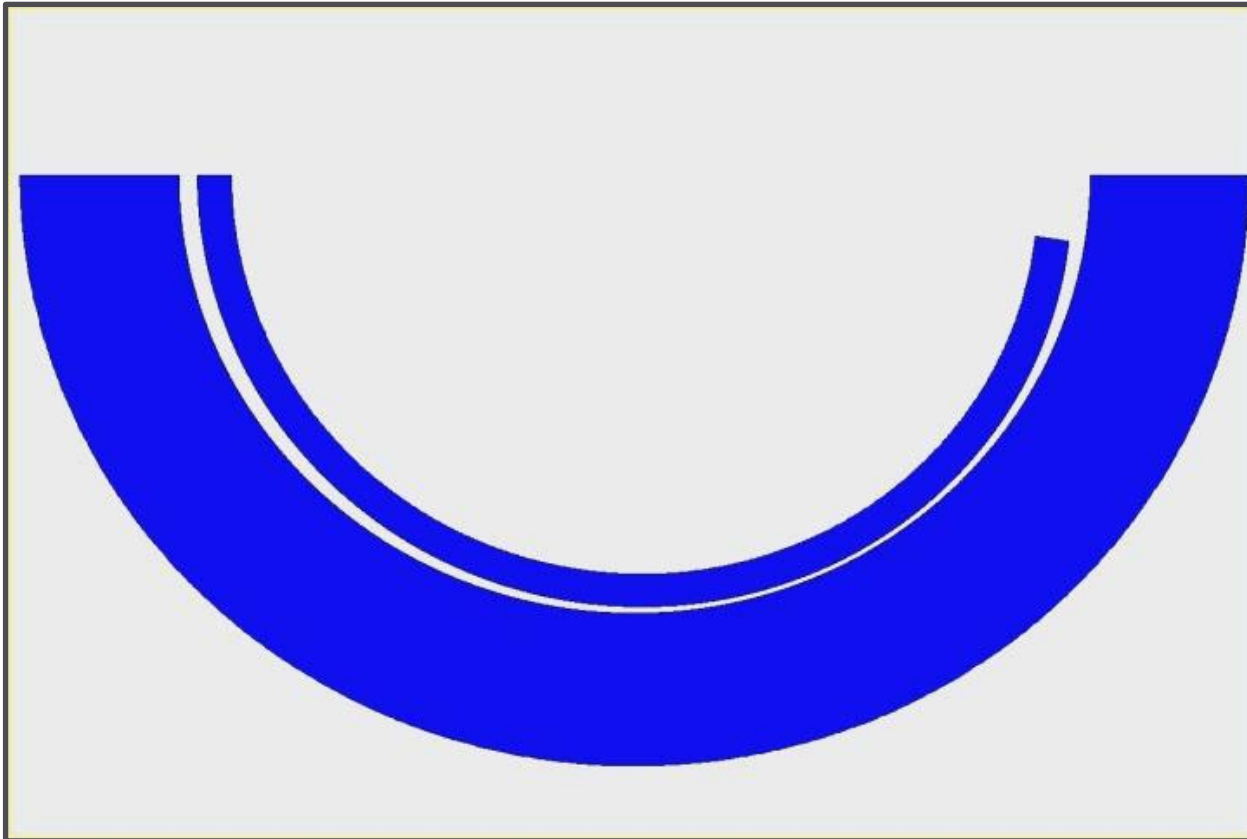
- Leveraging new Creo Direct Modeling App

> Support for the full set of Mechanics capabilities



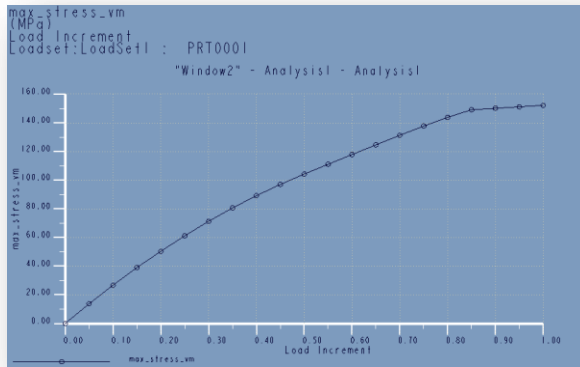
> Large Displacement Analysis

- LDA with Contact
- LDA for 2D axi-symmetric models
- Enforced UCS displacements in LDA
- Finite Strain Plasticity



> Examples:

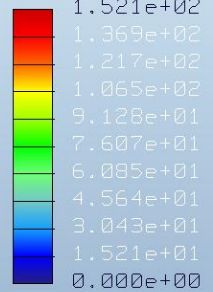
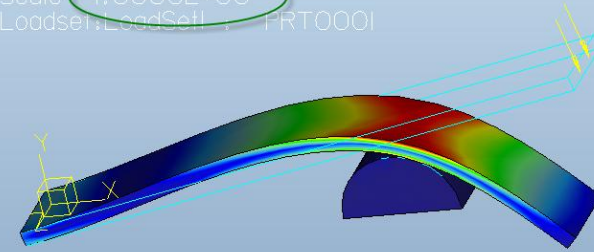
– LDA with Contact and Plasticity



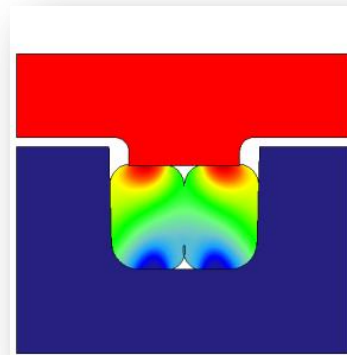
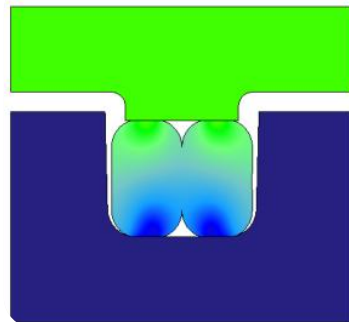
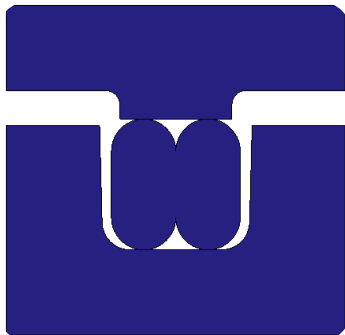
Step 0, Load Factor 0.00
Stress von Mises (WCS)
(MPa)
Deformed
Scale 1.0000E+00
Loadset: LoadSet1 : PRT0001



Step 20, Load Factor 1.0000E+00
Stress von Mises (WCS)
(MPa)
Deformed
Scale 1.0000E+00
Loadset: LoadSet1 : PRT0001

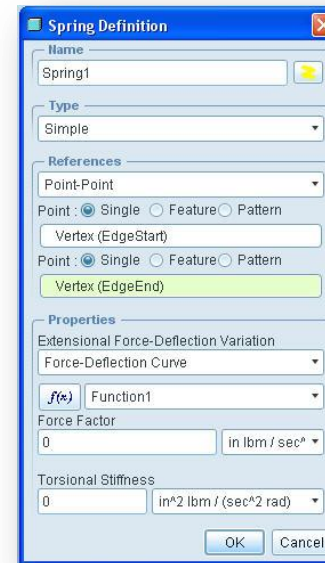


– LDA with Contact and Hyperelasticity



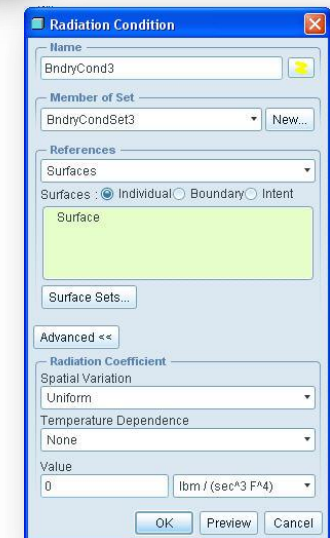
> Nonlinear Spring Stiffness

- Ability to specify a general force-deflection curve



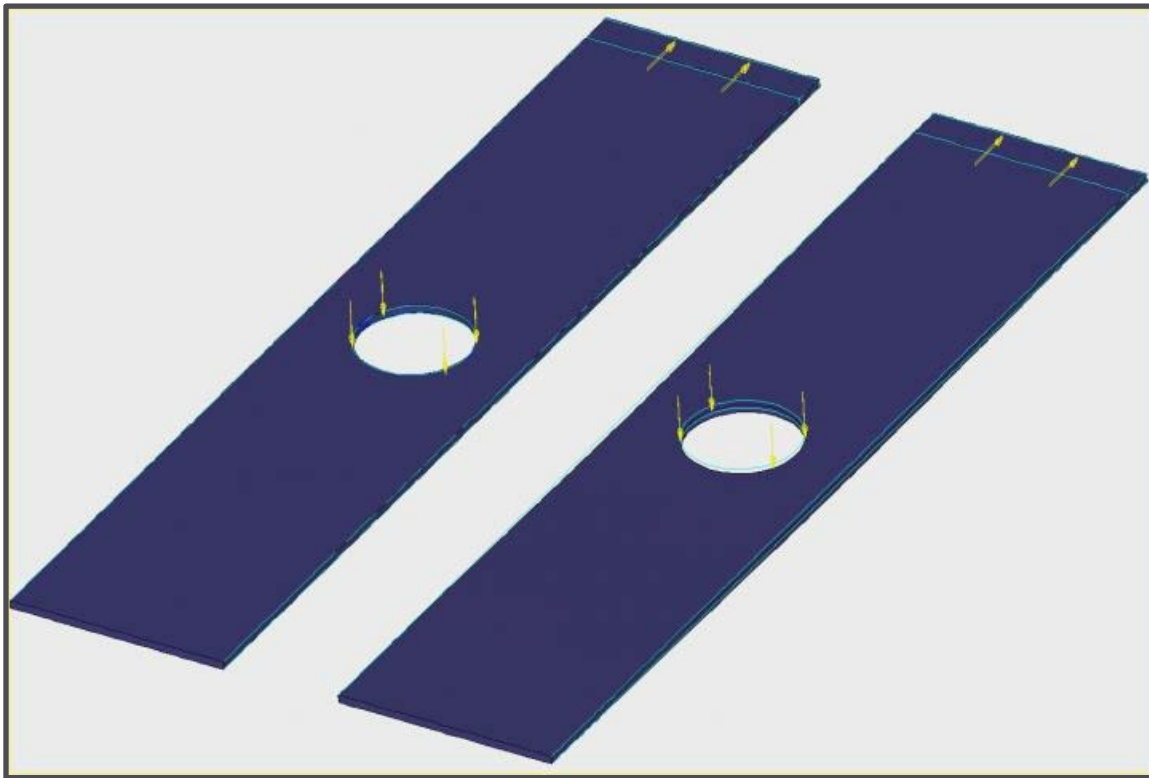
> Nonlinear Steady State Thermal Analysis

- Temperature dependent Conductivity
- General Convection and Radiation Conditions



> General Load Histories for Nonlinear Analyses

- Apply loads in sequence and with general ramp-up to simulate operating conditions, manufacturing processes



Static Analysis Definition

Name: st_load_history

Description:

☒ Nonlinear / Use Load Histories ☐ Inertia Relief

Nonlinear Options

☐ Calculate Large Deformations

Contacts

Hyperelasticity

Plasticity

Nonlinear Springs

Constraints

Constraint Set / Component	Time Dependence
<input checked="" type="checkbox"/> ConstraintSet1 / LOAD_HISTORY_ASM	$f(t)$ ramp

Loads

Load Set / Component	Time Dependence
<input checked="" type="checkbox"/> No_History / LOAD_HISTORY_ASM	$f(t)$ Linear
<input checked="" type="checkbox"/> Load_history_01 / LOAD_HISTORY_ASM	$f(t)$ Step_1
<input checked="" type="checkbox"/> Load_history_02 / LOAD_HISTORY_ASM	$f(t)$ Step_2

Temperature Distribution

Convergence

Output

Excluded Elements

Method

Single-Pass Adaptive

☐ Include Snap-through

☐ Localized Mesh Refinement ☐ Check Contact Force

☐ For Press Fit, Ignore Interpenetration Larger Than: 0 mm

Advanced Control...

OK Cancel

> General Temperature Loads

- Ability to simulate residual stresses as parts are glued together and tempered at different temperatures

> Traveling Heat Loads

- Ability to simulate the heat load of a moving welder $q=f(x,t)$

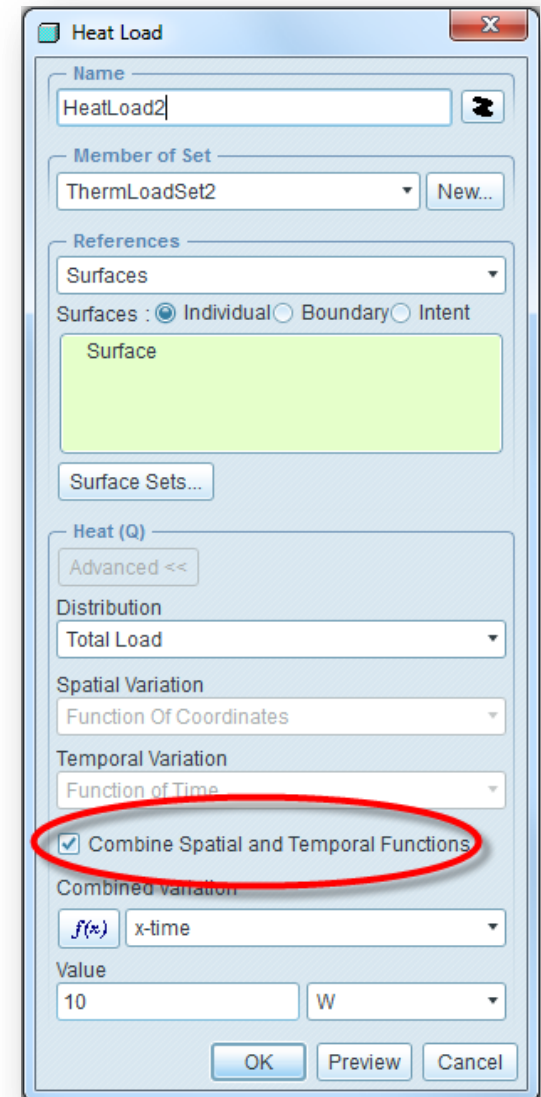
> Variable Thickness Shells

- Automatically calculate variable thickness on compression

> Base Excitation Enhancements

- General excitation with independent histories/psd's in different translational / rotational directions

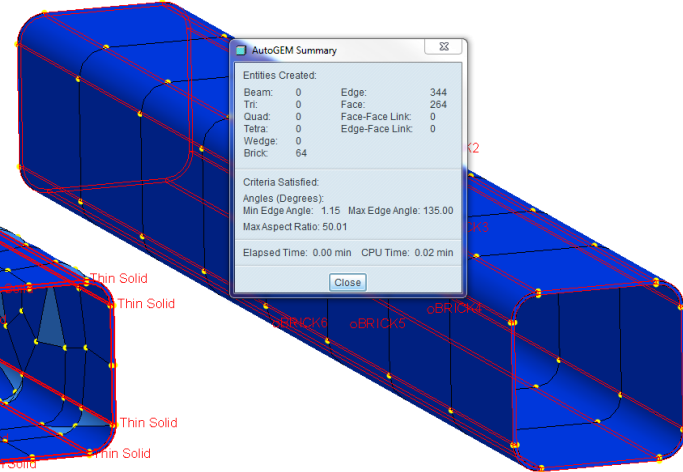
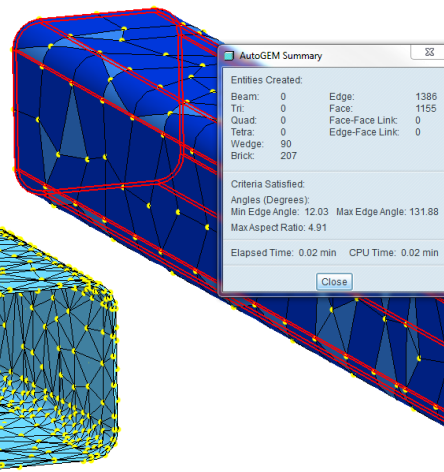
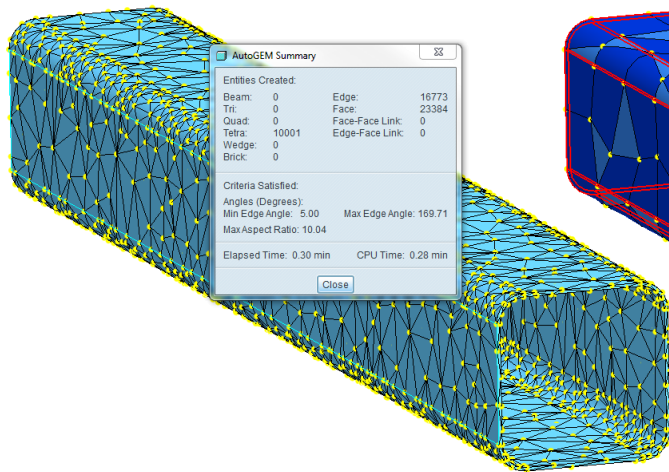
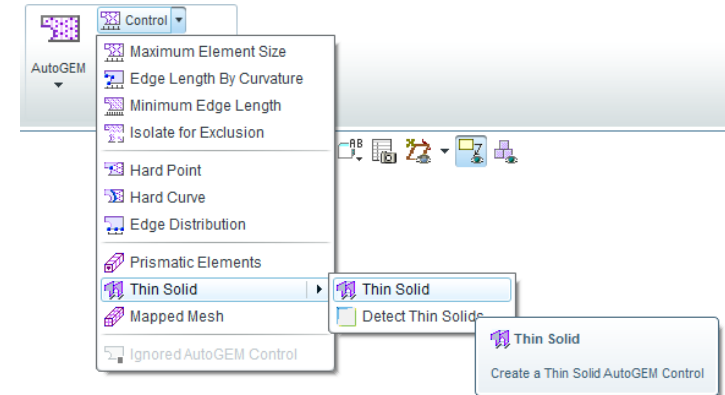
> PSD of von Mises stress



> Prismatic Elements

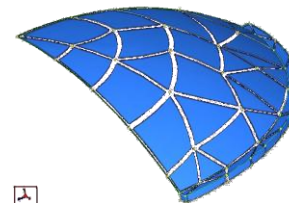
> Thin Solid Meshing

- Easily tag or automatically identify thin solid regions to mesh with bricks/wedges
- Automatic transition to the tetrahedron mesh in the rest of the model



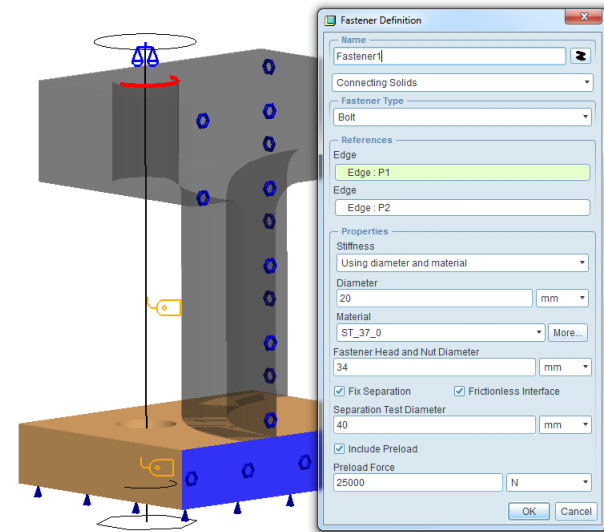
> Mapped Meshing AutoGEM Controls

- Carefully construct regular mesh in sensitive areas



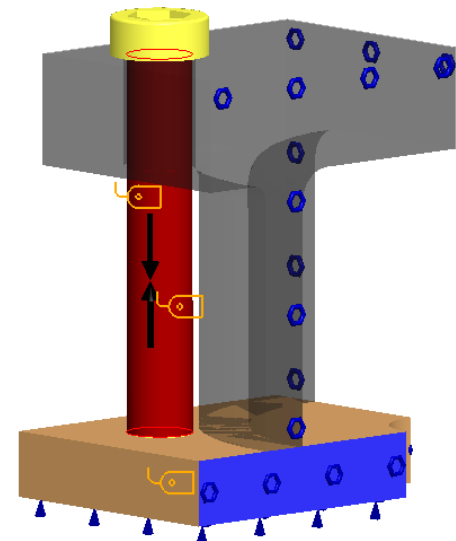
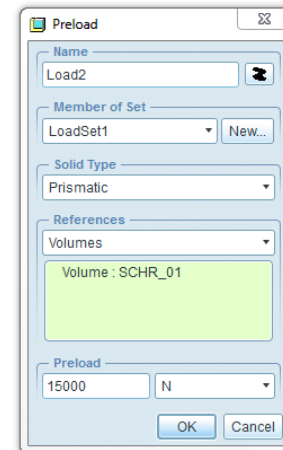
> Fastener Robustness

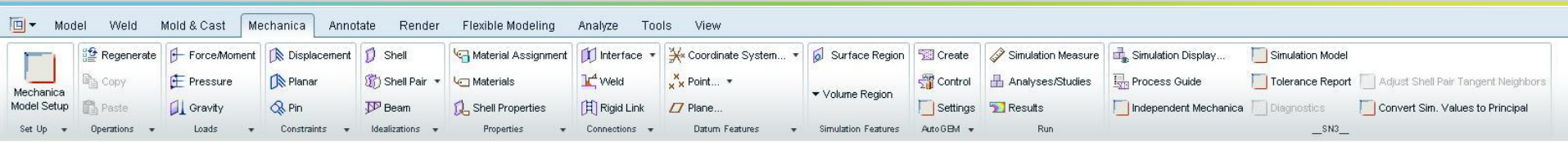
- Improved model for fasteners
- Enhanced measure output



> Bolt Preloads for Solids

- Automatically simulate a preload carried by a prismatic solid (shaft of a bolt)





> Ribbon UI

- Consistency across applications

> Default Results Templates

- Automatically display “typical” results for the analysis type

> Process Guide Enhancements

- Graphical tool to develop Process Guide templates

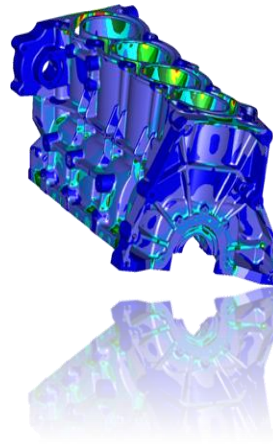
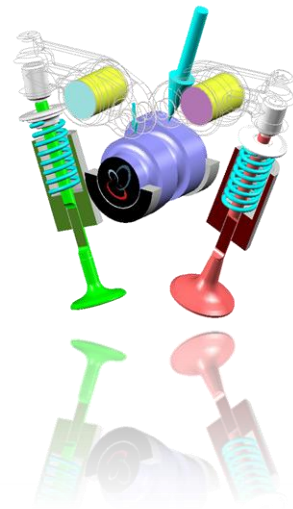
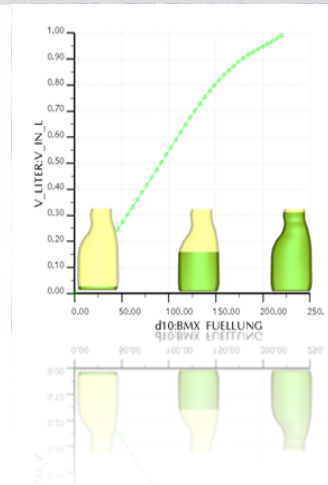
> Units Enhancements

- Unit options on Property Definition dialogs
- Assemblies with components with different principal systems of units

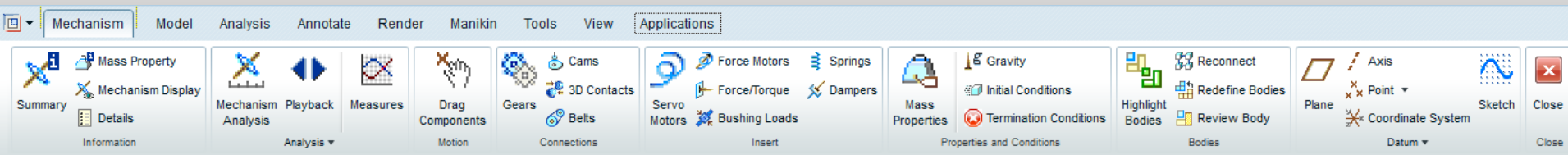
> MECHANICA Engine Jobs over the Network with dBATCh

> Animation of Dynamic Frequency Results

MECHANISM-News in Creo 1.0



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> Ribbon UI throughout

- Common ribbon for command access

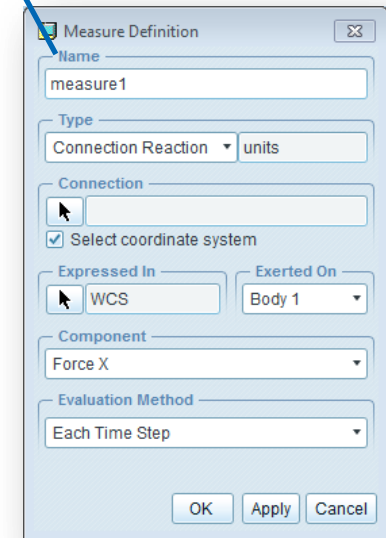
> User Selected CSYS for Measure Output

- Measures can be extracted in a user selected csys
- MDX/MDO measures now a superset of old Motion measures

> Closed CAM snapshot constraints

- Setting up initial conditions, etc... using snapshots easier than ever

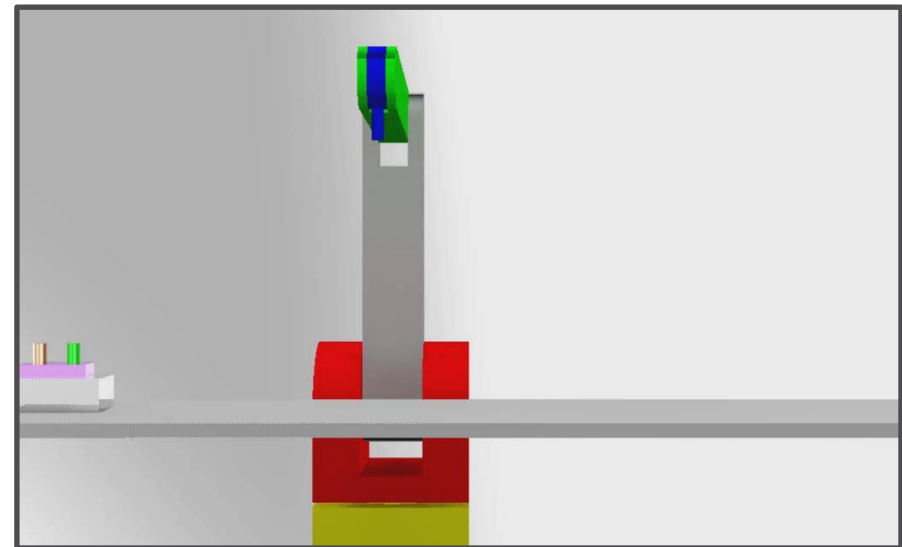
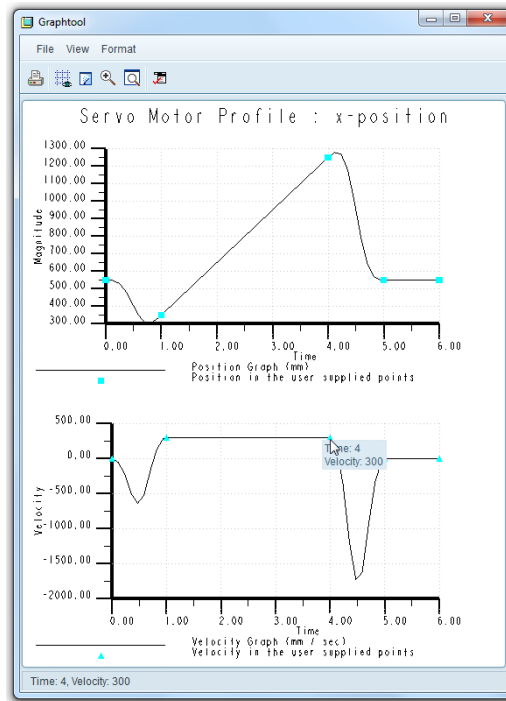
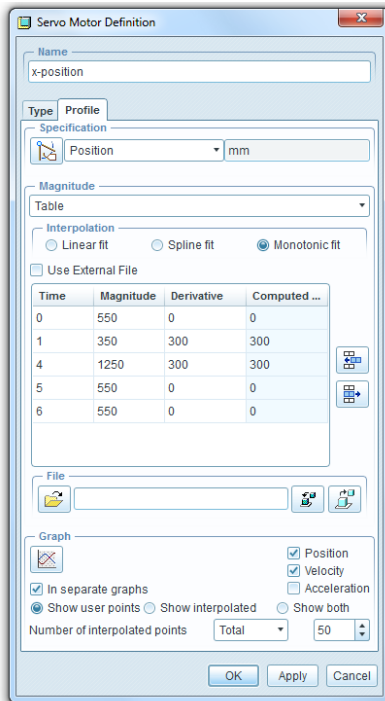
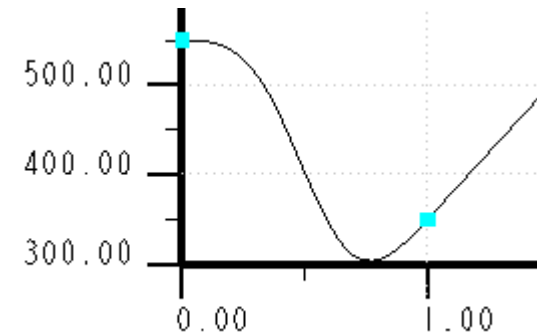
Select a CSYS for results output



> Transitions for Table Driven Motors

- New Continuous fit preserves profile segment behaviour
- Many servo motor graph enhancements
- Great for Mechatronic and Production cases
- Pre-analysis for PLC programming

Time	Magnitude	Derivative	Computed ...
0	550	0	0
1	350	300	300



> Gimbal Joints

- 3 rotations DOF, but axes are available for servos, forces, measures etc

> Bushing Loads

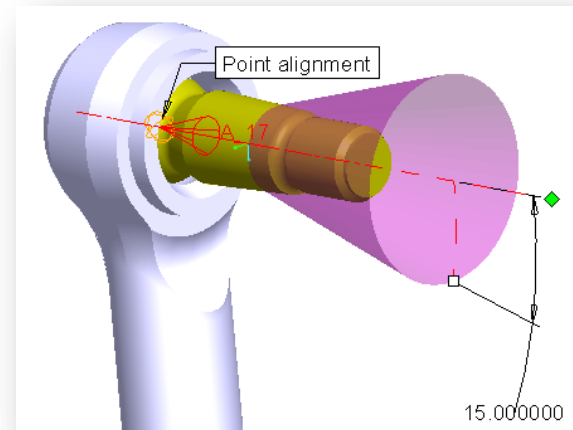
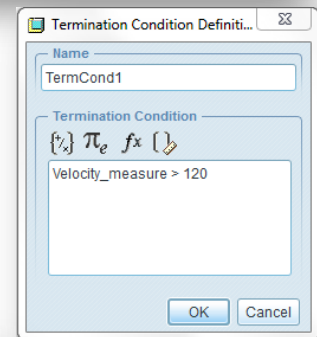
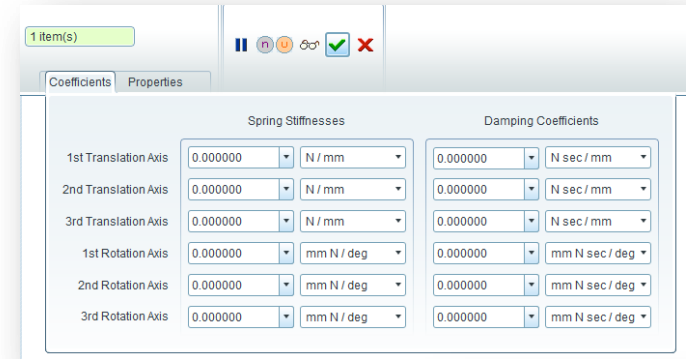
- Grouped springs and dampers
- Single load for 6 objects

> Conditional Termination of Analyses

- Termination based on values of measures, etc
- "Stop Analysis1 when distance3 >= 20mm"
- No longer purely time based termination

> Ball and Bearing Connection Limits

- "Cone angle" limit
- Coefficient of restitution can be applied



Mechanisms 3D contact – Phase 2

> Additional Bounded Surface Support

- Segment of Cylinder, segment of Sphere
 - (In Wildfire 5.0 full cylinder/sphere is used)
- Additional options include the ability to
 - Automatically close surface if desired
 - Check if the contact is internal/external
- Multiple surfaces (of the same type) may be included in the contact

> Enhanced friction performance

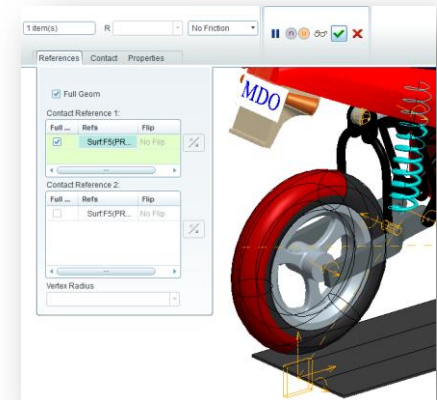
- Transitions between Bouncing and Continuous contact
 - Stick/slip analysis is power hungry
 - Proposed solution will remove normal DOF until the contact is broken
 - The following behaviors will be supported
 - Ball on surface rolling/sliding
 - Cylinder on surface rolling/sliding
 - Ball on Ball rolling
 - Cylinder on cylinder rolling

■ Support for internal contact

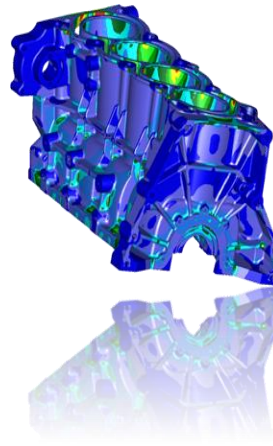
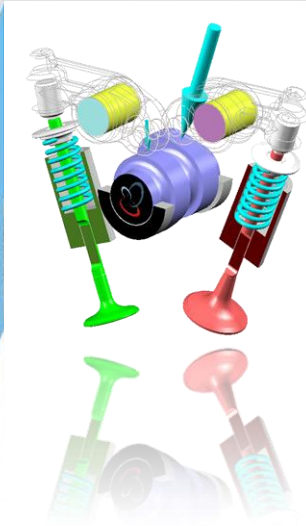
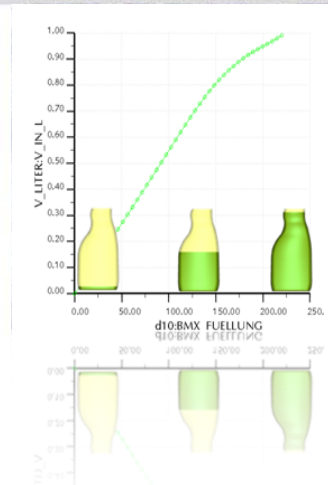
- Sphere-sphere
- Cylinder-cylinder
- Sphere-cylinder

■ Newly supported geometry cases

- Sphere-cylinder
- Toroid-plane
- Toroid-cylinder
- Toroid-sphere
- Cone-cone

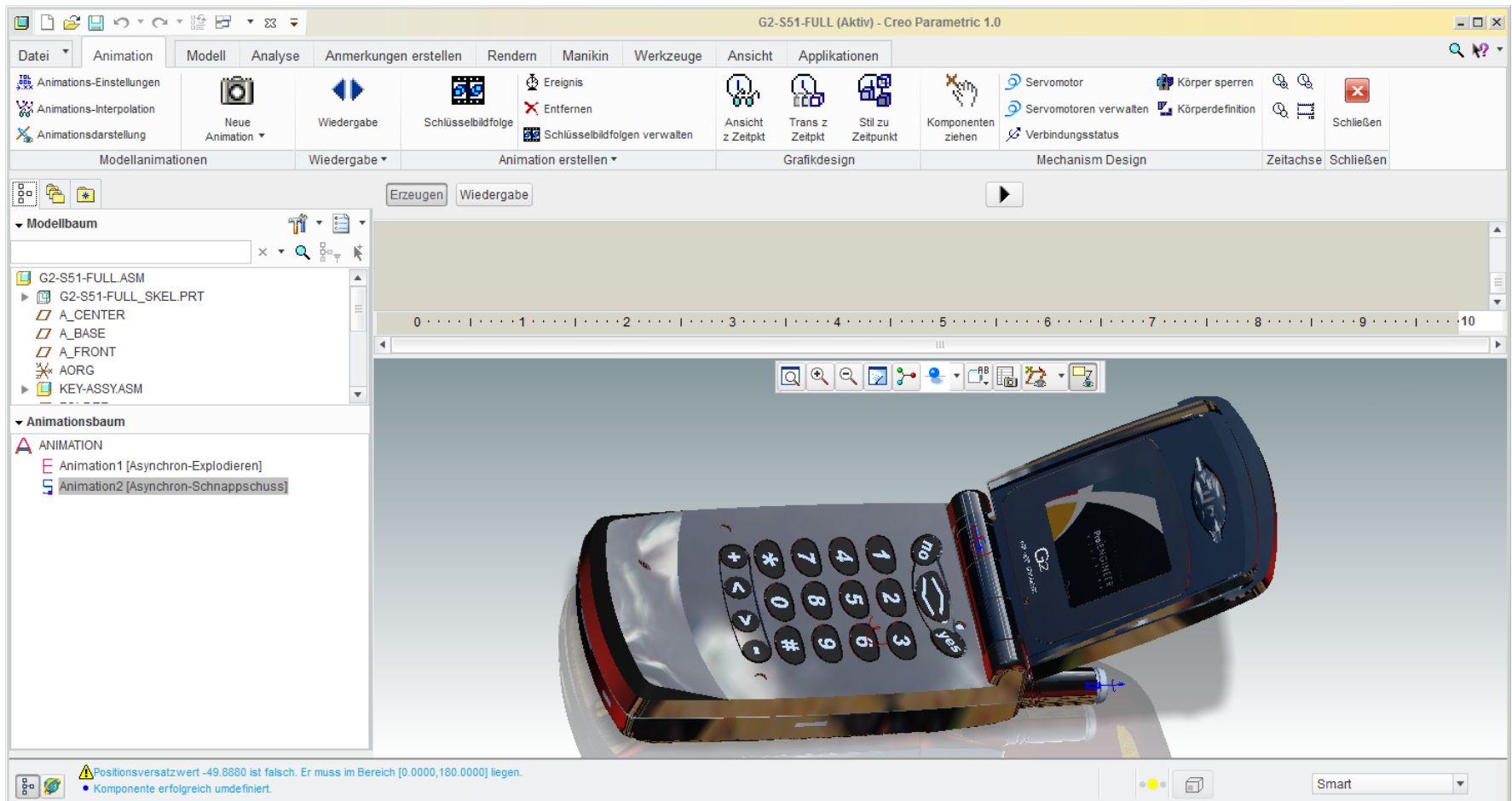


ANIMATION-News in Creo 1.0



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- > Ribbon UI throughout
 - Common ribbon for command access

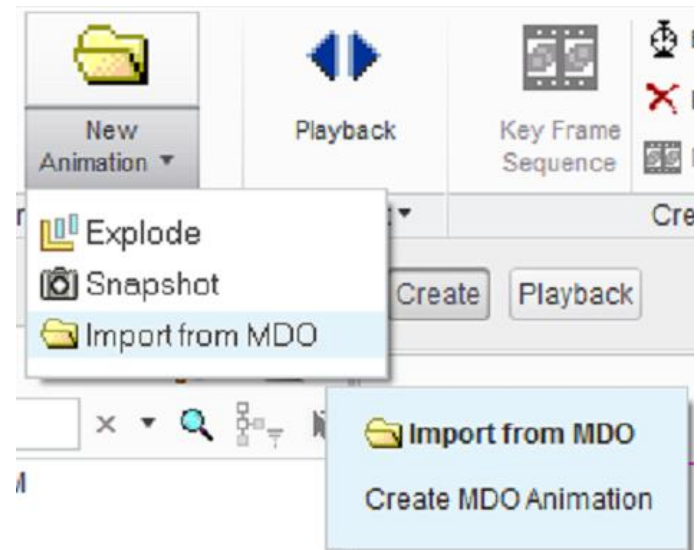
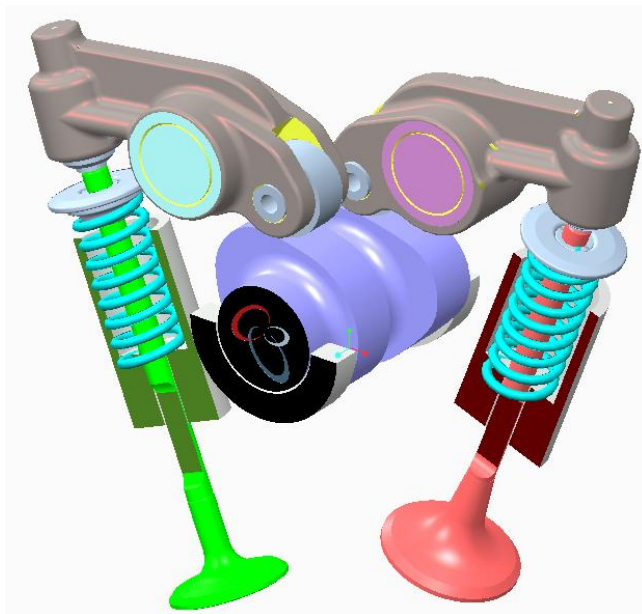


> New Design Animation workflow

- A complete overhaul of the DAO interface
- “Filmstrip” based animations

> MDO results in Design Animation

- Create “kinematic” presentations of Dynamic analyses
- Change views, blank components etc



Thank You