

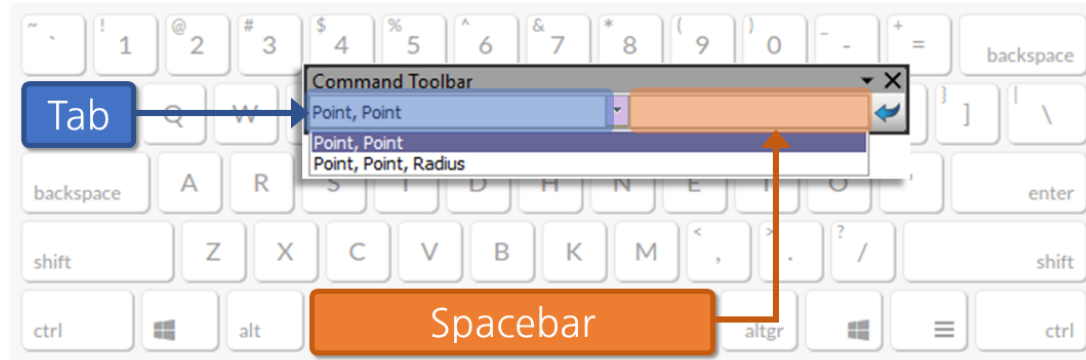


RecurDyn/Professional

1. View Operation Enhancement (1)

1. Input shortcut for Modeling Option

- 1) Users can change the Creation Method and enter a value in the Input Window with a keyboard shortcut (Tab + Spacebar)



2. Reference point selection for Zoom (Ctrl+Mouse Scrolling)

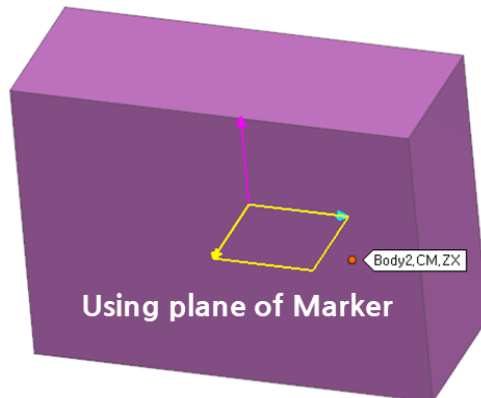
3. View at Plane and Change to Plane



View at Plane



Change to Plane



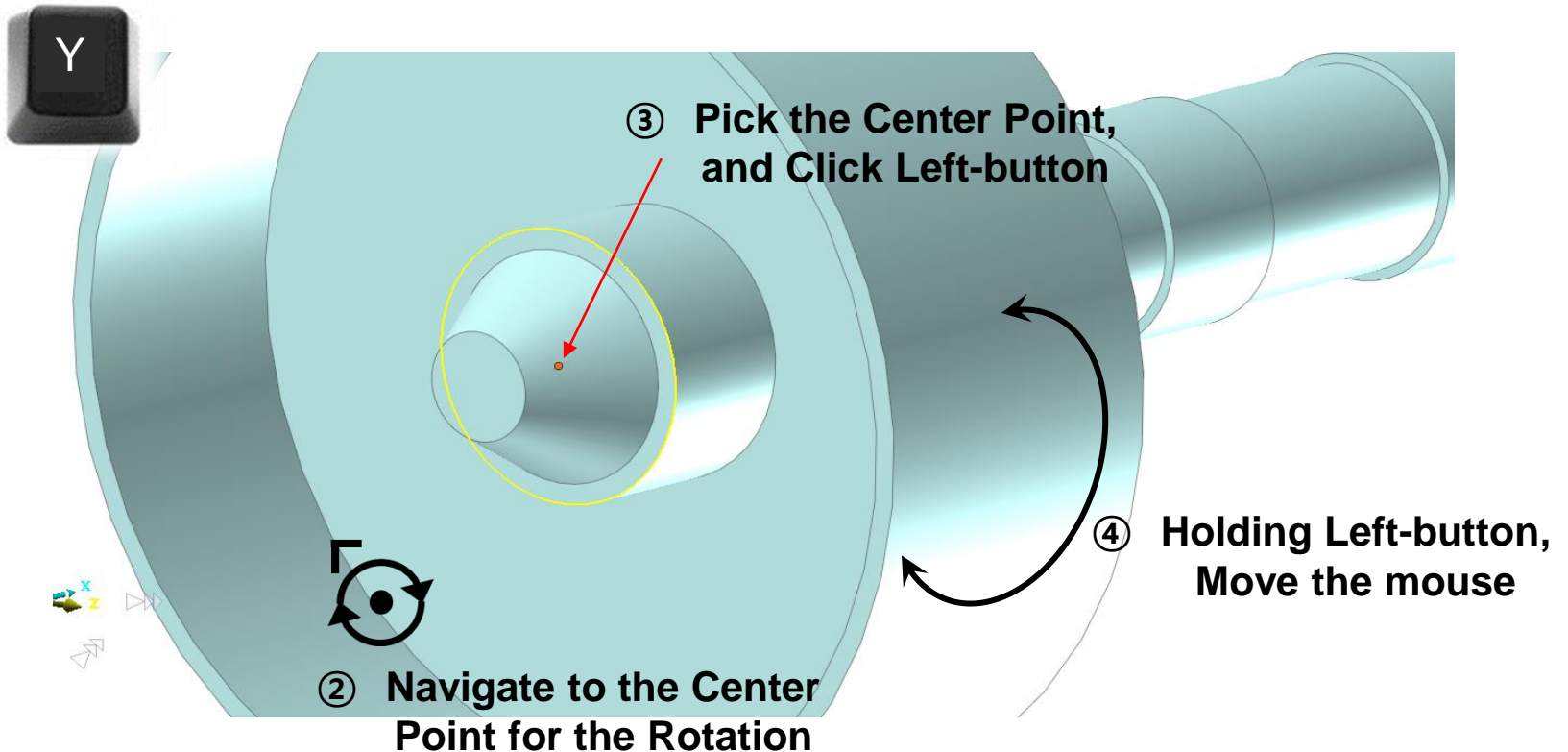
Using plane of Marker

1. View Operation Enhancement (2)

4. Rot. View Operation Upgrade

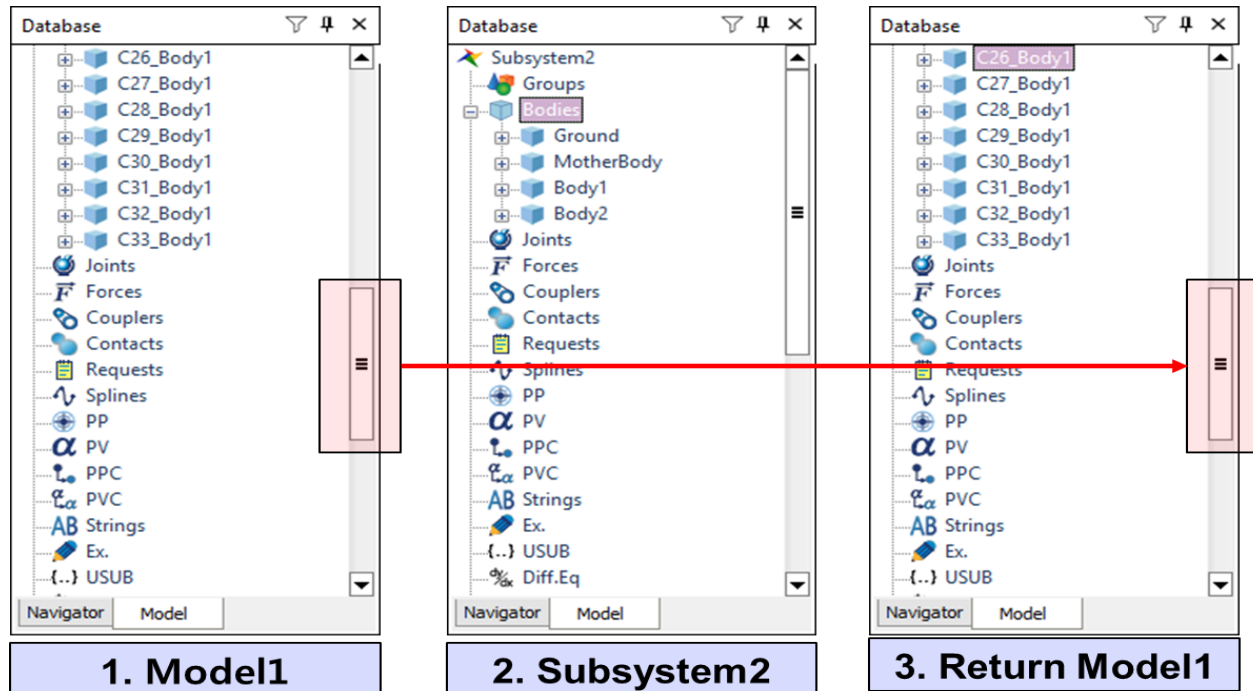
User can pick a Geometry Point as desired during Rotation View Operation to define the Center Point for Rotating the View

① Press the “Y” key



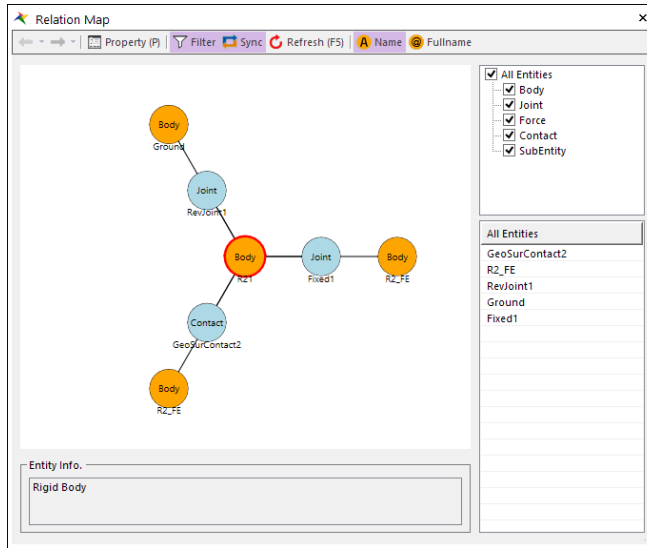
2. Database Convenience

The Database window remembers and keeps the last spot of the scroll bar when moving to the Edit Mode.

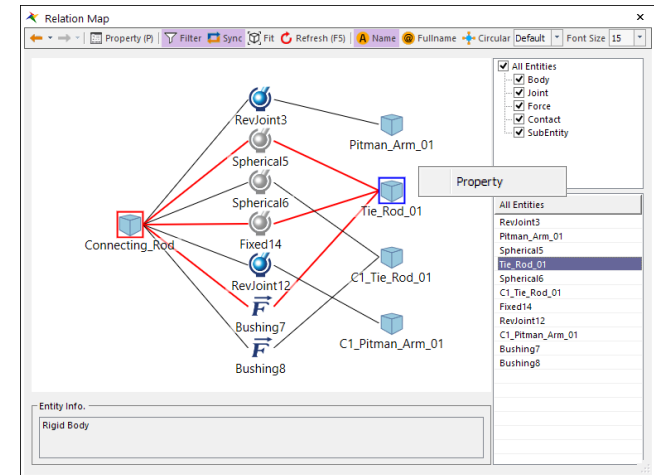
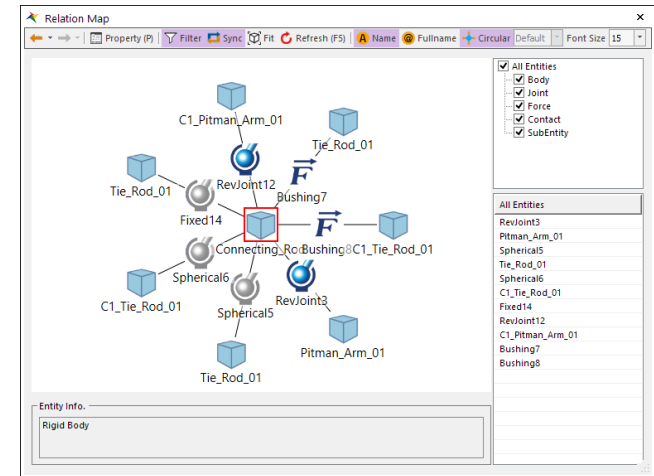


3. Relation Map Enhancements

1. Intuitive icons
2. Highlight the selected relations
3. Property Dialog using pop-up menu



V9R2



V9R3

4. Exception handling for interrupted trial during DOE

A DOE simulation may be interrupted due to an error in a specific trial. In this case, an exception handling function has been added so that the entire DOE completes to the end and is not interrupted.

Design Study

Parameter Design Study

Design Variables

No	Name	Type
1	DV_PV_Second_X	DV
2	DV_PV_Second_Y	DV

Performance Indexes

No	Name	Type
1	PI1	PI

Parametric Study Design of Experiments

Built-in DOE Technique: [Full Factorial]

Number of Levels: 3. Number of Trials: 9 R

Save Results test_R3

Save Model in Each Case Simulate Result Sheet

When Simulation Fails, Continue with Next DOE Trial.
On Failure, Set PIs to: -1.

OK Cancel Apply

Result Sheet

Trial	DV_PV_Second_X	DV_PV_Second_Y	PI1
1	10.	10.	0.230916084188...
2	10.	20.	0.34730843872966
3	10.	30.	0.50965354909...
4	20.	10.	0.432060463880...
5	20.	20.	0.584963153443...
6	20.	30.	0.649024379233...
7	30.	10.	
8	30.	20.	
9	30.	30.	

Design Variables: DV_PV_Second_X, DV_PV_Second_Y

Performance Indexes: PI1

Multi-variate: PI1

What-if Study: Export, Update DV, Trial 1, Close

V9R2



Result Sheet

Trial	DV_PV_Second_X	DV_PV_Second_Y	PI1
1	10.	10.	0.230916084188...
2	10.	20.	0.34730843872966
3	10.	30.	0.50965354909...
4	20.	10.	0.432060463880...
5	20.	20.	0.584963153443...
6	20.	30.	-1.
7	30.	10.	-1.
8	30.	20.	-1.
9	30.	30.	-1.

Design Variables: DV_PV_Second_X, DV_PV_Second_Y

Performance Indexes: PI1

Multi-variate: PI1

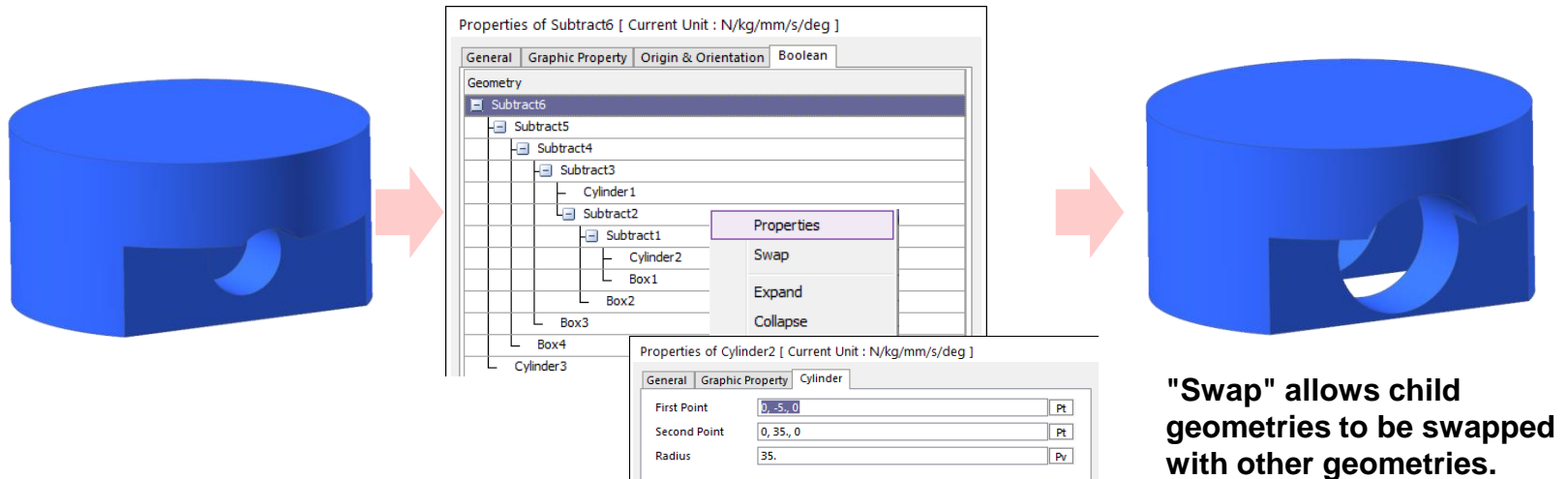
What-if Study: Export, Update DV, Trial 1, Close

V9R3

5. CAD Enhancements: Boolean and Local

1. Support Modification

- 1) Parameters for Local/Boolean can be modified



Properties of Subtract6 [Current Unit : N/kg/mm/s/deg]

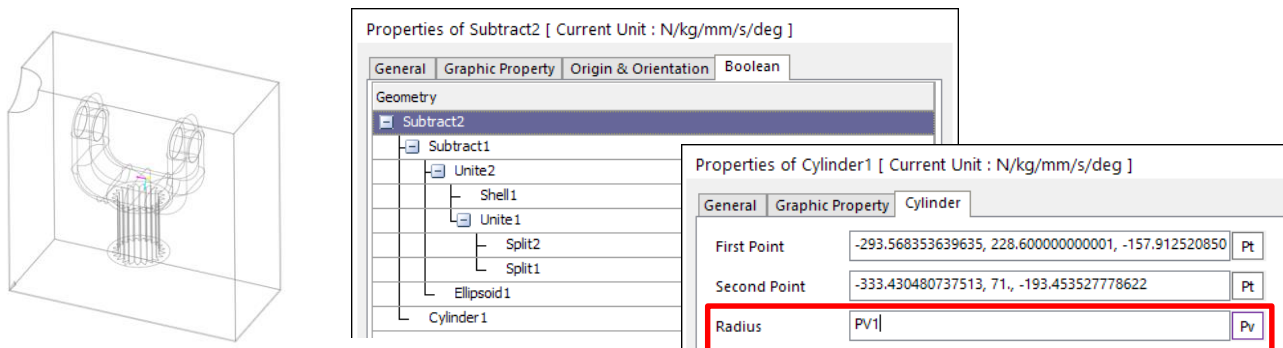
General	Graphic Property	Origin & Orientation	Boolean
Geometry			
Subtract6			
Subtract5			
Subtract4			
Subtract3			
Cylinder1			
Subtract2			
Subtract1			
Cylinder2			
Box1			
Box2			
Box3			
Box4			
Cylinder3			

Properties of Cylinder2 [Current Unit : N/kg/mm/s/deg]

General	Graphic Property	Cylinder
First Point	0, 35, 0	Pt
Second Point	0, 35, 0	Pt
Radius	35.	Pv

"Swap" allows child geometries to be swapped with other geometries.

2. Parametric Value is supported (Parametric Modeling)



Properties of Subtract2 [Current Unit : N/kg/mm/s/deg]

General	Graphic Property	Origin & Orientation	Boolean
Geometry			
Subtract2			
Subtract1			
Unite2			
Shell1			
Unite1			
Split2			
Split1			
Ellipsoid1			
Cylinder1			

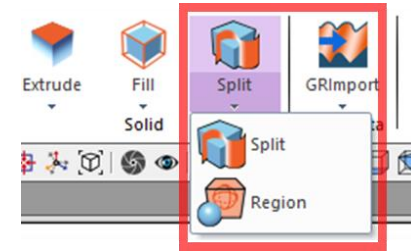
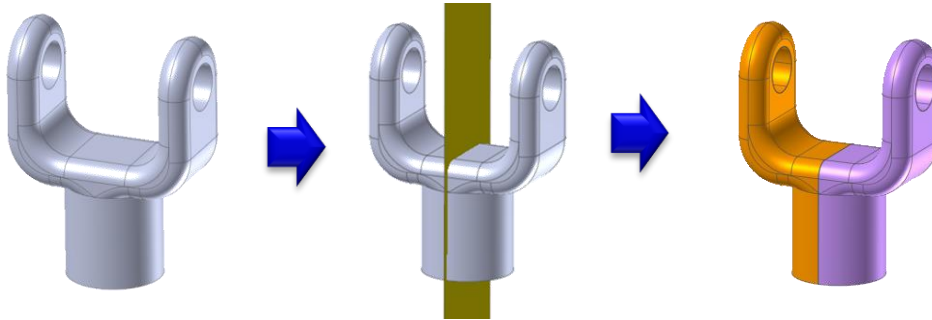
Properties of Cylinder1 [Current Unit : N/kg/mm/s/deg]

General	Graphic Property	Cylinder
First Point	-293.568353639635, 228.600000000001, -157.912520850	Pt
Second Point	-333.430480737513, 71., -193.453527778622	Pt
Radius	PV1	Pv

6. CAD Enhancements: Split Solid, Create Solid with Region

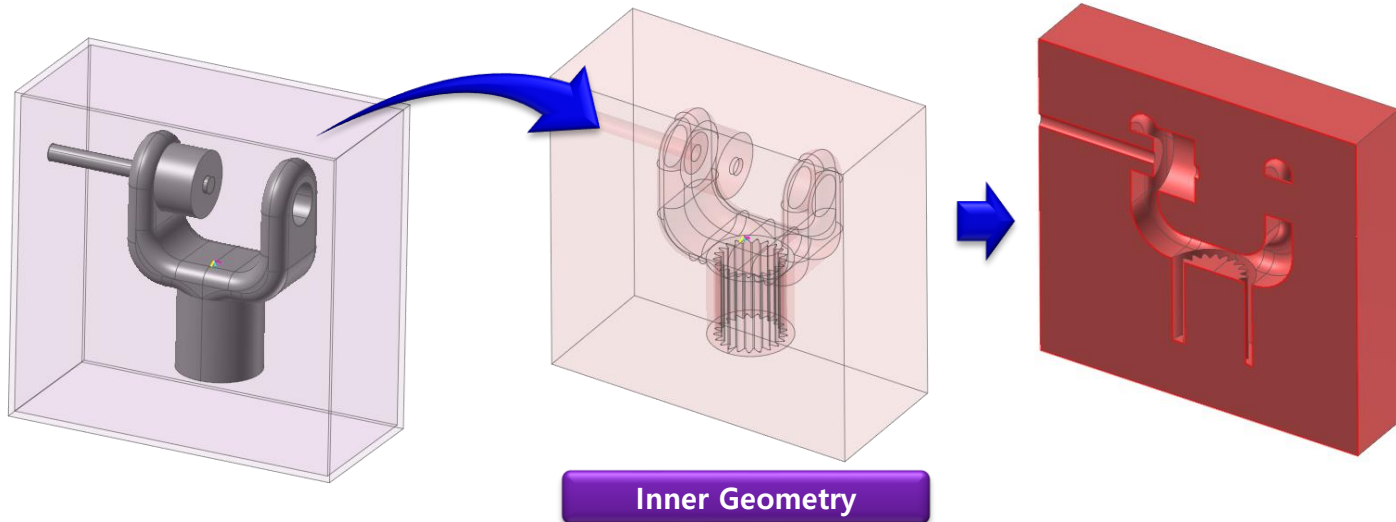
1. Split

1) The Split Solid separates solids using a surface



2. Region

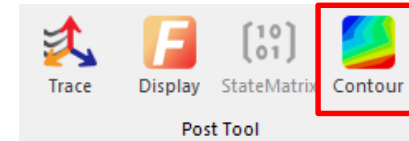
1) This operation is similar to the casting manufacturing process



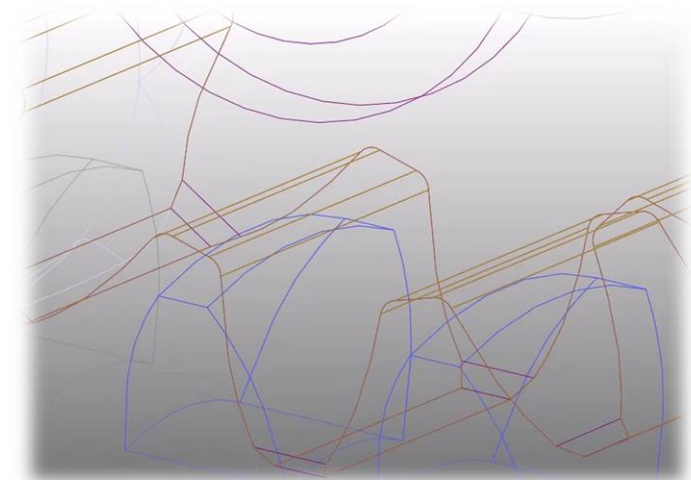
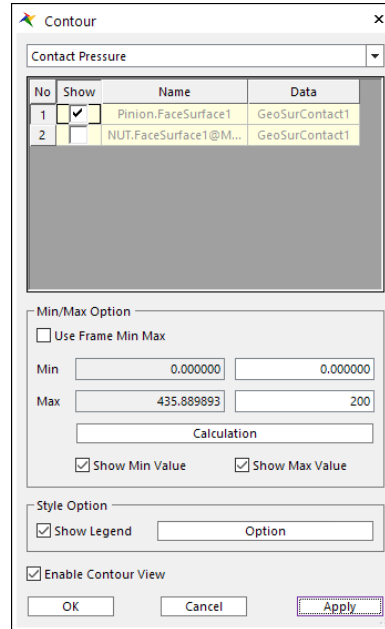
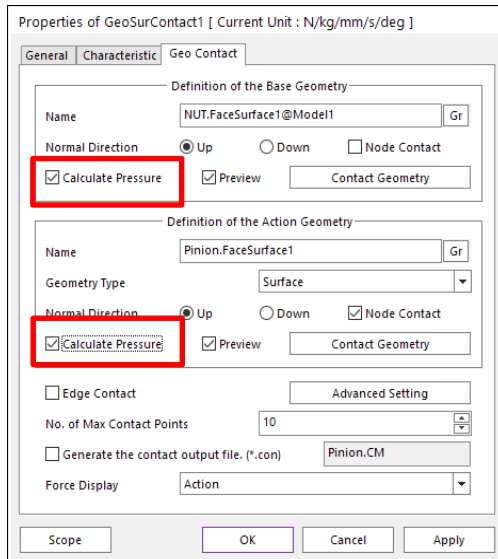
7. Contour and Contact Pressure for Rigid Body

1. It is now possible to calculate the Contact Pressure for a rigid body using a Geo Surface Contact

- 1) Geo Surface, Geo Sphere, Geo Cylinder
- 2) Gear Involute
- 3) UV-Surface To Sphere



2. Calculate Pressure must be checked



8. Added Thickness and Radius Setting for Geo Contact

1. Thickness of a curve for Geo Curve-Surface

1) the curves of rigid bodies and line sets of flexible bodies

Curve Segment

Curve Name: SetLine1

Curve Type: Line

Curve Segment: 40

Bounding Buffer Length: 50. Pv

Cubic Cell Size (X, Y, Z): 1, 1, 1

Thickness: 0. Pv

OK Cancel



2. Sphere Radius for Geo Sphere Contact

Definition of the Action Geometry

Name: Body2.Ellipsoid1 Gr

Geometry Type: Sphere

Normal Direction: Up Down

Preview

Contact Sphere

Contact Sphere Option

Synchronize with Geometry

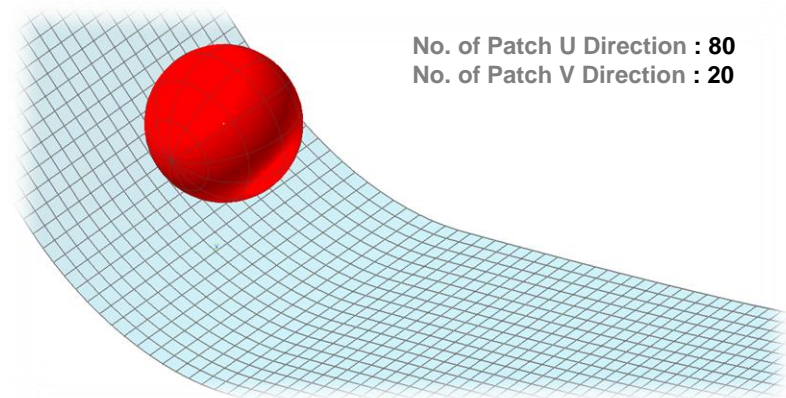
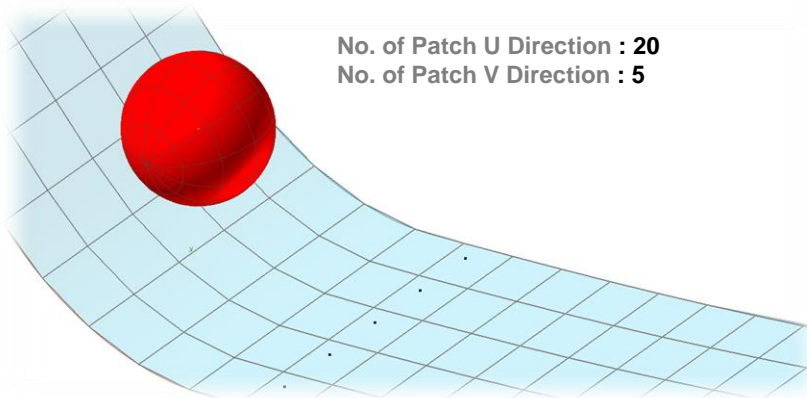
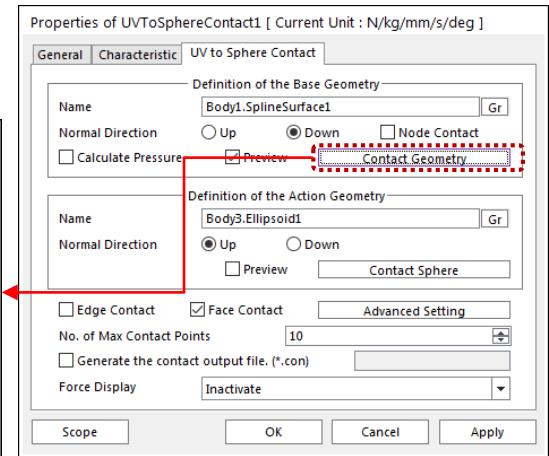
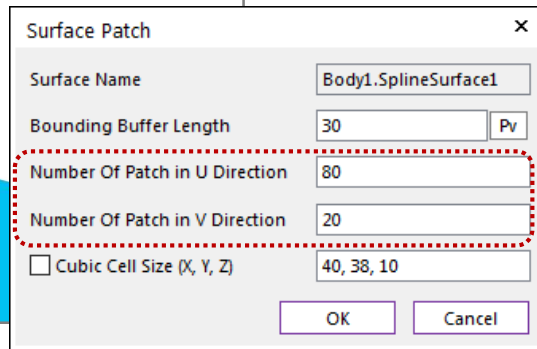
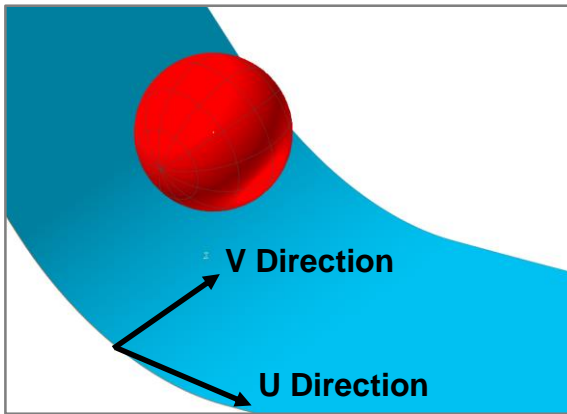
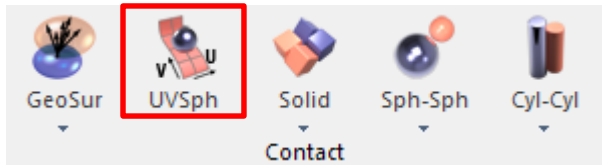
Radius: 100.0

OK Cancel

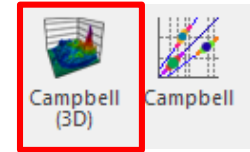


9. UV Surface to Sphere Contact

Smooth and fast contact using UV parameters (UV mapping)



10. Campbell Diagram (3D)



Campbell Diagram

Analysis Plot

Input Data

Input File

Time: TIME Plot Index: 1

Tacho: Request/Expressions/ExRq1/F3(C1_Tacho) Plot Index: 1

Signal: Joints/RevJoint1/Driving_Torque Plot Index: 1

Tachometer Type: Tacho Pulse/rev: 1.

Interpolation: Linear dt: 0.

Update Signal Information

Signal Information

Time(sec): 0. ~ 1. Max. Frequency: 2046.49963369963

RPM Band: 353.980692505361 ~ 391 Max. Order: 31

Sampling Time(sec): 2.e-004 RPM Draw Signal

Use Recommend Time Zone

Time: 0 Frame: 1

Start Frame: 0.9654 End Frame: 4828

Campbell Diagram

Analysis Plot

Graph Type: Color Map (2D) Surface Contour (3D)

Graph Option: RPM - Frequency RPM - Order

Swap Axis

Order Line: Draw Order Line Automatic

Minimum Order: 0

Maximum Order: 72

Gap: 18

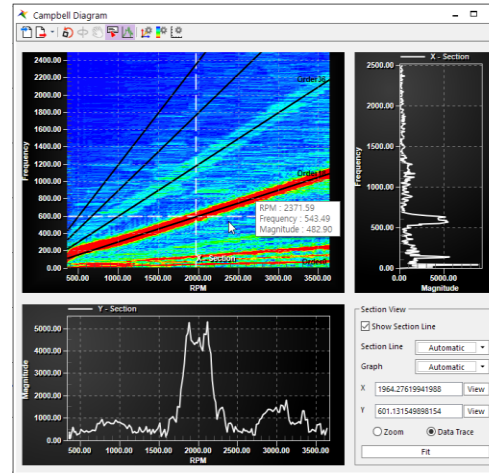
Resolution: 10

Use Recommend Frame Settings

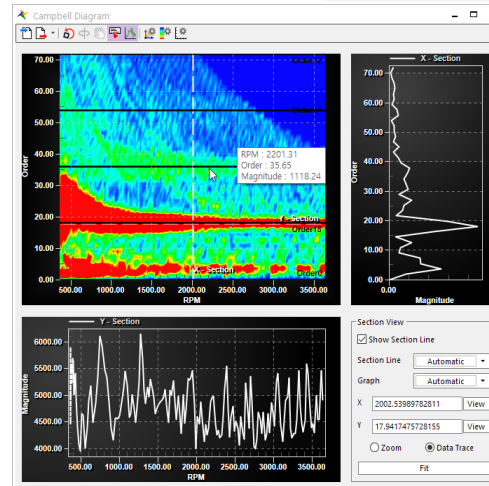
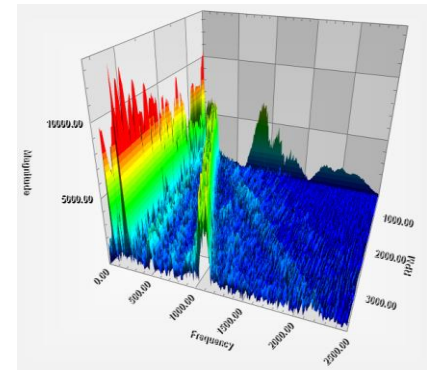
Overlap (%): 94.9119373

Frame Size: 512

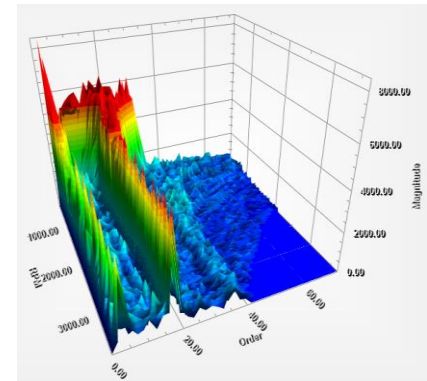
Advanced Setting



RPM vs Frequency



RPM vs Order



11. Merge Result Files

1. Merge two RecurDyn analysis result files into one result file.

- 1) RPLT, RAN, Particles Data (rpa, rwa, bin)

The image illustrates the process of merging two RecurDyn analysis result files into one. It shows two input graphs on the left, a central dialog box for merging, and the resulting merged graph on the right.

Input Graph 1 (Top): Shows Force (N) vs Time (s) for Model1. The force starts at 0, peaks at approximately 120 N around 1.0s, and then oscillates between 20 N and 60 N. A red dot is marked at the end of the plot (Time = 2.50s).

Time (s)	Force (N)
2.45	2.44
2.46	2.45
2.47	2.46
2.48	2.47
2.49	2.48
2.50	2.49
2.51	2.50

Input Graph 2 (Bottom): Shows Force (N) vs Time (s) for Model1. The force oscillates between 20 N and 40 N. A red dot is marked at the end of the plot (Time = 3.50s).

Time (s)	Force (N)
3.494	3.495
3.495	3.496
3.496	3.497
3.497	3.498
3.498	3.499
3.499	3.500
3.500	3.501
3.501	3.502
3.502	3.503
3.503	3.504
3.504	3.505
3.505	3.506
3.506	3.507
3.507	3.508
3.508	3.509
3.509	3.510
3.510	3.511
3.511	3.512
3.512	3.513
3.513	3.514
3.514	3.515
3.515	3.516
3.516	3.517
3.517	3.518
3.518	3.519
3.519	3.520
3.520	3.521
3.521	3.522
3.522	3.523
3.523	3.524
3.524	3.525
3.525	3.526
3.526	3.527
3.527	3.528
3.528	3.529
3.529	3.530
3.530	3.531
3.531	3.532
3.532	3.533
3.533	3.534
3.534	3.535
3.535	3.536
3.536	3.537
3.537	3.538
3.538	3.539
3.539	3.540
3.540	3.541
3.541	3.542
3.542	3.543
3.543	3.544
3.544	3.545
3.545	3.546
3.546	3.547
3.547	3.548
3.548	3.549
3.549	3.550
3.550	3.551
3.551	3.552
3.552	3.553
3.553	3.554
3.554	3.555
3.555	3.556
3.556	3.557
3.557	3.558
3.558	3.559
3.559	3.560
3.560	3.561
3.561	3.562
3.562	3.563
3.563	3.564
3.564	3.565
3.565	3.566
3.566	3.567
3.567	3.568
3.568	3.569
3.569	3.570
3.570	3.571

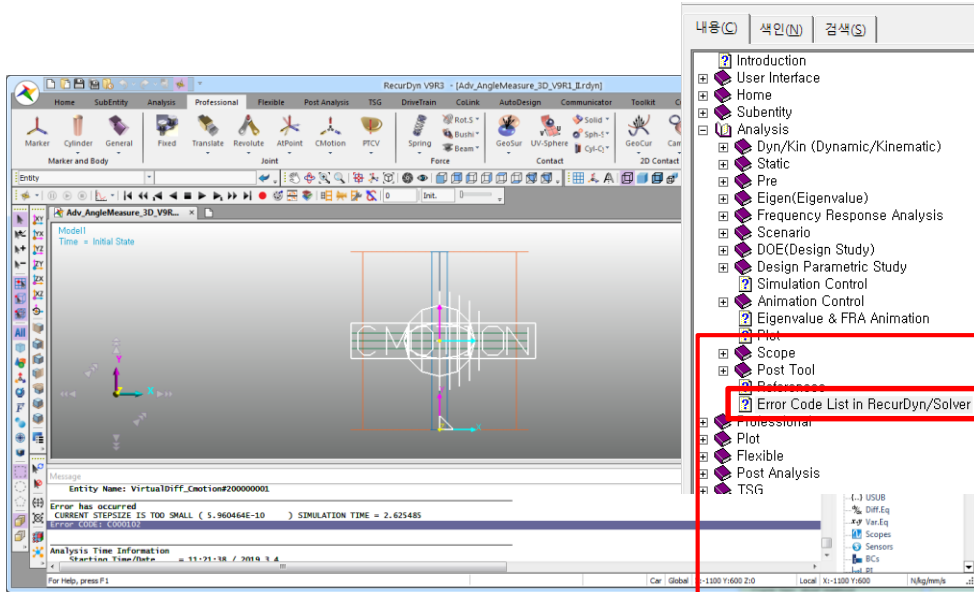
Merge Result Files Dialog Box: The dialog box is titled "Merge Result Files" and has a "Version: 1.0" label. It has two tabs: "General" and "Advanced". The "General" tab is selected. There are three sections: "Merge RPLT", "Merge RAN", and "Merge Particles Data (*,rpa, *.rwa, *.bin)". The "Merge RPLT" section has three rows: "First RPLT", "Second RPLT", and "Merged RPLT". Each row has a red box around it and a "..." button to its right. The "Merge RAN" section has three rows: "First RAN", "Second RAN", and "Merged RAN", each with a "..." button. The "Merge Particles Data" section has three rows: "First Output Folder", "Second Output Folder", and "Merged Output Folder", each with a "..." button. There is a "Run" button at the bottom right.

Output Graph (Right): Shows Force (N) vs Time (s) for Model1. The force starts at 0, peaks at approximately 120 N around 1.0s, and then oscillates between 20 N and 60 N. A red dot is marked at the end of the plot (Time = 6.00s).

Time (s)	Force (N)
3.740	5.99
3.741	5.99
3.742	5.99
3.743	5.99
3.744	5.99
3.745	5.99
3.746	5.99
3.747	6.00
3.748	6.00
3.749	6.00
3.750	6.00
3.751	6.00
4.113	41.13
4.171	41.71
4.128	41.28
4.128	41.28
4.107	41.07
4.180	41.80
4.029	40.29
4.029	40.29
4.158	41.58
4.111	41.11
4.111	41.11
4.123	41.23

12. RecurDyn/Help – Error Code description

Solver Error Code description in Help



Entity Name: VirtualDiff_Cmotion#200000001

Error has occurred
~~CURRENT STEPSIZE IS TOO~~ SMALL (5.960464E-10) SIMULATION TIME = 2.625485
Error CODE: C000102

Analysis Time Information
 Starting Time/Date = 11-21-38 / 2019.3.4

Analysis

Error Code List in RecurDyn/Solver

[Previous](#) [Next](#)

Code	Error Message
C0001	The simulation terminated because the current step size is too small (%-16e).
C0002	Linear solver factorization failed.
C0003	Acceleration analysis failed to converge.
C0004	FFlex bodies cannot be used in Eigenvalue analysis.
C0005	Eigenvalue analysis failed because the number of eigenvalues is zero.
C0012	FRA can only be used once during a simulation.
C0013	Memory could not be allocated.
C0017	The input must be defined.
C0018	The output must be defined.
C0019	Unable to compute the eigenvector.
C0020	FRA failed because the total number of system modes is zero.

13. Other New Functions in RecurDyn/Professional (1 of 2)

- (G092) **"ModelName_mck.m"** file containing the mass, stiffness, and damping matrix of the **"Rigid-RFlex"** system can be generated, after performing **"State Matrix"**, **"Eigenvalue analysis"**, or **"FRA analysis"**.
- (G102) **"Starting Time"** and **"Starting Date"** are printed in the message file (*.msg), when starting a simulation.
- (G313) **"View Center"**, **"Rotate with Point"**, **"Zoom"**, **"Zoom with Ctrl key"**, **"Change to Plane"**, and **"View at Plane"** functions are available while an animation is playing.
- (G314) **"Offset Edge Imprint"** function is added. It can imprint an edge with the offset value in the solid and surface geometries.
- (G313) **"View Center"**, **"Rotate with Point"**, **"Zoom"**, **"Zoom with Ctrl key"**, **"Change to Plane"**, and **"View at Plane"** functions are available while an animation is playing.
- (G321) **"Sort By Type"** function is added to arrange the entities on **"Database Window"**. The entities are sorted by entity types.
- (G414) Apart from what is defined in a *.rmd file, there is an option file that allows you to set the number of threads and whether to create a ran file in **"Standalone Solver"**.

14. Other New Functions in RecurDyn/Professional (2 of 2)

- (32634) **“Improvement Pre Analysis Accuracy”** option is added in **“Simulation Setting”** dialog to improve accuracy for Pre-Analysis. It is useful when the results of **“Dynamic Analysis”** are incorrect because of the accuracy of Pre-Analysis.
- (33617) The view status of a body or a subsystem is maintained when moving into **“Body Edit Mode”** or **“Subsystem Mode”**, if **“Auto Fit for the Change for Working Window”** option in **“Display Setting”** is turned off.
- (33512) The center of a sphere is available when navigating a point.
- (32565) A menu to open **“Utility Folder”** is added on the ribbon help menu.
- (32943) **“User-Subroutine”** examples are included in Linux install package.
- (32967) **“CMOTION”** expression function is added.
- (31888) The shortcut **“Shift + I”** is supported to exit edit modes or subsystem modes.
- (30994) **“Result Sheet Export”** function in **“Design Study”** supports *.csv formatted file.

15. RecurDyn/ProcessNet - New Functions

- (G093) **“Frequency Response Analysis”** is supported in ProcessNet.
- (G281) New **“IBody.FileExportGeometry”** function exports geometry to **“Parasolid File (*.x_t or *.x_b)”**.
- (G333) **“CloneBodyChange.dll”** is added in **“<Install Dir>/Bin/Addin”** folder. The **“CloneBodyChange.dll”** changes clone bodies of the toolkit assembly to general bodies with general connectors such as **“Geo Contract”** and **“Bushing Force”** by using ProcessNet.
- (G341) **“ProcessNet Helper”** is added in RecurDyn/Help to help you to find ProcessNet functions.
- (32662) New **“IBNPBody2DGuideLinear.NormalDirection”** sets the normal direction of **“2D Linear Guide”** in the Belt toolkit.
- (32693) New **“IFFlexBody.LayerNumber”** sets the layer number for a FFlex body.
- (32693) New **“IRFlexBody.LayerNumber”** sets the layer number for a RFlex body.
- (33304) **A property to set the color is added in following functions**
 - **IDisplaySettingPropertyComponent**
 - **IDisplaySettingElementComponent**
 - **IDisplaySettingNodeSet**
 - **IDisplaySettingElementSet**
 - **IDisplaySettingPatchSet**
 - **IDisplaySettingLineSet**

15. RecurDyn/ProcessNet - New Functions

- (32975) New “IRFlexToolkit.SwapBodyGeneralRefFrame” function is added to set the reference frame when importing a *.rfi file.
- (33173) New “IParametricPoint.Text” function to get or set the text information directly in “Parametric Points”.
- (32563) “IMTT3DSubSystem.CreateSensorTension2”, New functions are added. to create a tension sensor with a point, a sensed entity, and the range.
- (32712) “IFFlexPatchSet.AutoAdjust”, “IFFlexPatchSet.AutoSwitch”, and “IFFlexPatchSet.ManualSwitch” functions are added to change the normal direction of a patch set.
- (32712) “IFFlexLineSet.AutoAdjust”, “IFFlexLineSet.AutoSwitch”, and “IFFlexLineSet.ManualSwitch” functions are added to change the normal direction of a line set.
- (32713) “GetReferenceByIndex”, “NumOfReferences”, and “DeleteAll” functions are added to “IParametricValueConnector” interface.
- (34065) “CreateSensorTensionEx” function and “ISensorTensionEx” interface are added to set “Type” of “Tension Sensor” in Chain.
- (34285) “IPlotDocument.DeleteRPLT” function is added to delete a rplt file in “Database Window” of Plot.
- (33752) “CreatePlantOutputWithArguments” function is added to create a Plant Output with an argument list.

15. RecurDyn/ProcessNet - Upgraded Functions

- (G345) Namespaces are included in the ProcessNet example: “ProcessNet/Help”.
- (32665) New
“IBNPBodyBeltBeam.Geometry.UseUpdateGeometryInformationAutomatically”
function.

New Functions

- (32549) Simulink interface functions are added. They are also added in “General Co-Simulation Simulink” interface.
- (30944) A *.rfi file can be imported to define a RFlex Body.

Upgraded Functions

- (32365) “ADVHYBRID” and “HYBRID” integrators are added.
- (33527) “Parametric Value” can be used in “Simulation Setting”.
- (34511) When executing eTemplate with “eTemplateForAutoRun” program or “Drag & Drop function”, “ToolkitSubsystemName” must be set on the template file.

Fixed Problems

- (33737) When importing a *.rfi file, if the file path was set to a relative path, it was not imported.



Thank you

ST GEORGE, UT | Wed Sept 25 - Thur Sept 26, 2019



USERS CONFERENCE

Thursday, September 26th

10:00 am EDT (8:00 am MDT)	RecurDyn/Acoustics updates and Tutorial	Nelson Woo
12:00 pm EDT (10:00 am MDT)	Break	
1:00 pm EDT (11:00 am MDT)	Tutorial of RecurDyn setup for co-simulation with Particleworks with model including FFlex bodies, review of results	Zach Smith
3:00 pm EDT (1:00 pm MDT)	Conference review, Solicitation of input for the next conference	Brant Ross
3:15 pm EDT (1:15 pm MDT)	Adjourn	



PORT USERS CONFERENCE

Thursday, September 26th

10:00 am EDT (8:00 am MDT)	RecurDyn/Acoustics updates and Tutorial	Nelson Woo
12:00 pm EDT (10:00 am MDT)	Break	
1:00 pm EDT (11:00 am MDT)	Tutorial of RecurDyn setup for co-simulation with Particleworks with model including FFlex bodies, review of results	Zach Smith
3:00 pm EDT (1:00 pm MDT)	Conference review, Solicitation of input for the next conference	Brant Ross
3:15 pm EDT (1:15 pm MDT)	Adjourn	

Follow-up on the True-Load software:

- Can you share this information with someone in your test group?
- There will be an overview True-Load Webinar next week (Thursday, 10/3 @11 AM CST). Contact Brant for the link to join the webinar.

Connect to All

Multidisciplinary integrated analysis solution implemented in one environment



RECURDYN

Particleworks

CFD

DEM

MBD

Control

FEA

MFBD

MBS-FE Coupling

CoLink

Simulink

FMI

SimulationX

AMESim

Simplorer

Self-contained solution for multidisciplinary integration including MFBD, CoLink and AutoDesign

Scalability through connection with analysis solutions

FEA – MFBD, G-Modeling, Durability, MBD for ANSYS

CFD - Particleworks (fluid particles) EHD (lubrication)

Control – CoLink, Simulink, FMI, AMESim, SimulationX, Simplorer

DEM - EDEM (solid particles)

Optimization – AutoDesign, Mode Frontier

Customization – Excel, C#

Others – KISSsoft (Gear/Bearing), TSG toolkit (experimental data)