



## Coil Spring Simulation using CATIA DMU Kinematics

The logo features a stylized graphic on the left consisting of a blue square, a red square, and a yellow square, with a black vertical line intersecting them. To the right of this graphic, the text "BND TechSource" is displayed in a large, bold, blue sans-serif font.

# BND TechSource

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- The following licenses are required to create the Spring Simulation:
  - Generative Shape Design
  - Mechanical Part Design
  - Digital Mockup Kinematics

The logo consists of a vertical black line intersecting three overlapping squares: a blue one at the top, a red one to the left, and a yellow one at the bottom. 

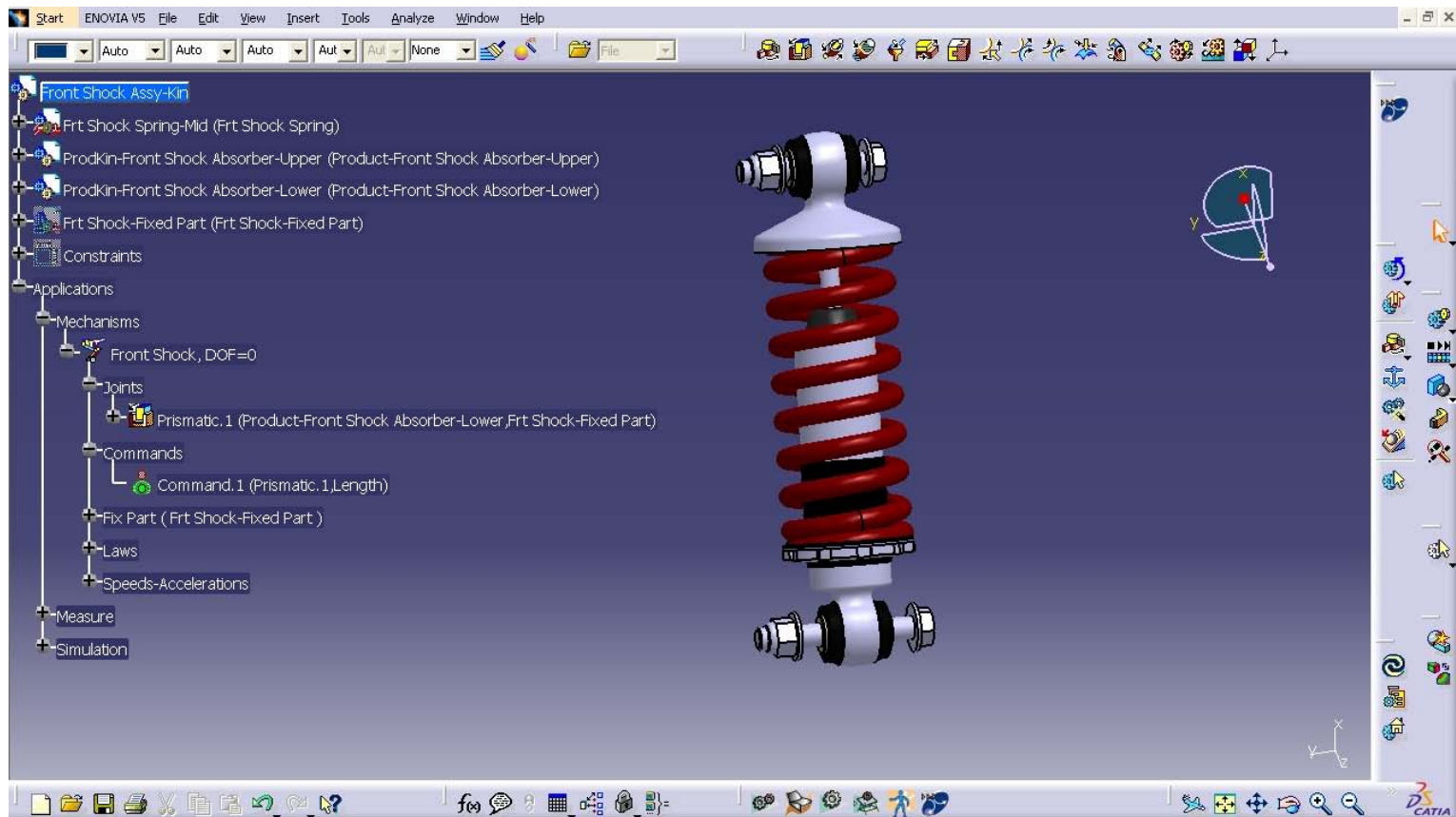
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- Before we begin, please understand that this is a “work-around”.
- Many times CATIA doesn't work the way we would like it to.
- Therefore, we must accept “work-arounds” to get the job done without using additional software.
- As always, if anyone has a different, more expedient process, please share your views on our website forum.

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- Step 1: Create the Parts, Assembly, and Kinematic.

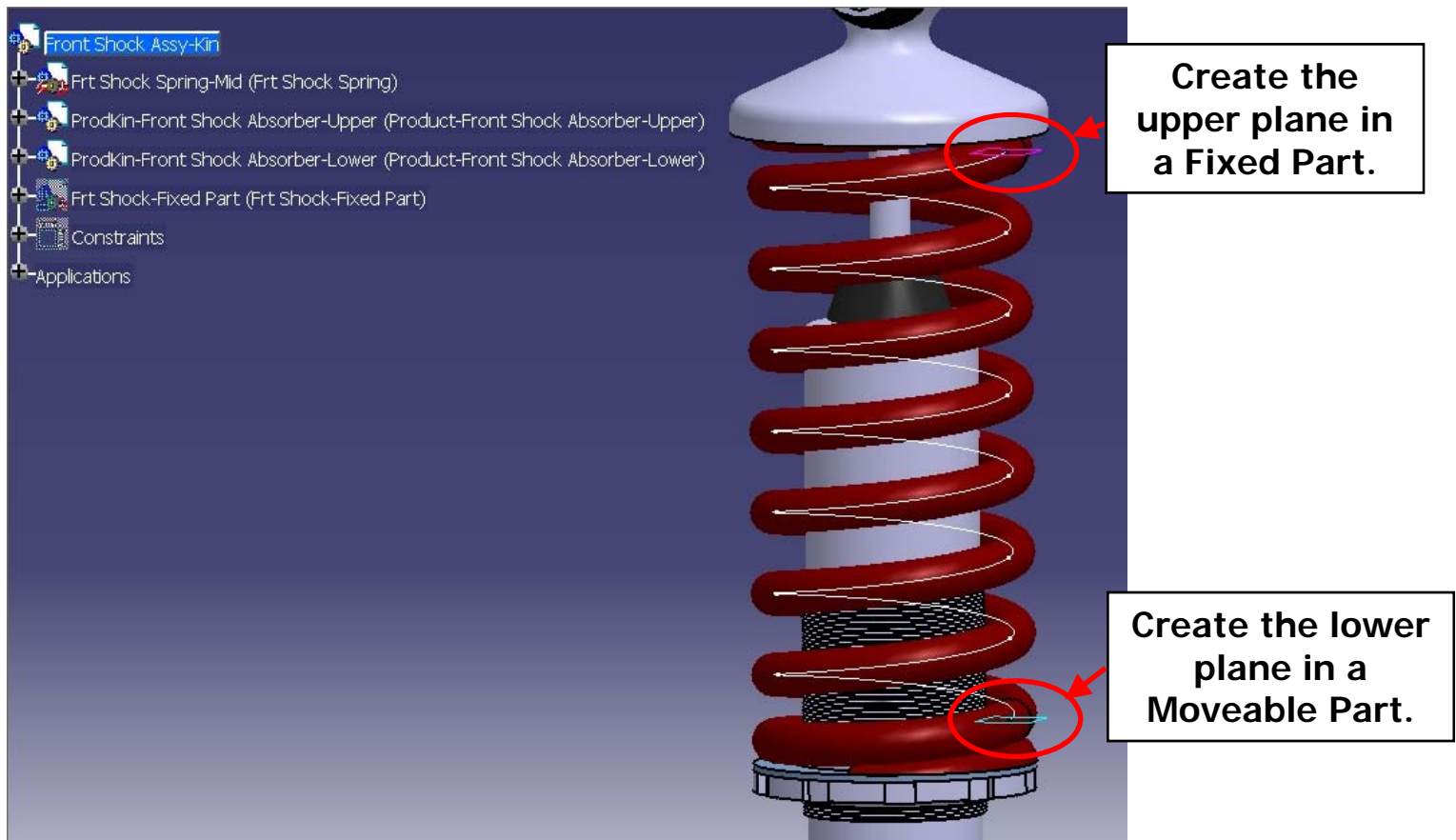


- Since we used a closed, ground end coil spring, we broke the spring to compress/extend the middle helix only.



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- Step 2: Create planes through upper & lower points of the spring helix.





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- Step 3: Apply Pitch formula to the helix.

a) Double pick 'Pitch', right click the value, edit the Formula.

b) Pick 'Height' to fill in the Parameter

c) Divide by the number of coils.

d) Pick OK.

Front Shock Assy-Kin

- Frt Shock Spring-Mid (Frt Shock Spring)
- Frt Shock Spring-Mid
  - xy plane
  - yz plane
  - zx plane
  - PartBody
  - External References
  - Geometrical Set.1
    - Plane.1

Helix.4-Mid

- Pitch
- Height
- aperAngle
- StartingAngle

Formula Editor : "Geometrical Set.1\Helix.4-Mid\Pitch"

Geometrical Set.1\Helix.4-Mid\Pitch = Geometrical Set.1\Helix.4-Mid\Height / 7

Dictionary

- Parameters
- Design Table
- Operators
- Pointer on value function:
- Law
- String
- Pick

Members of Parameters

- All
- Renamed parameters
- Length

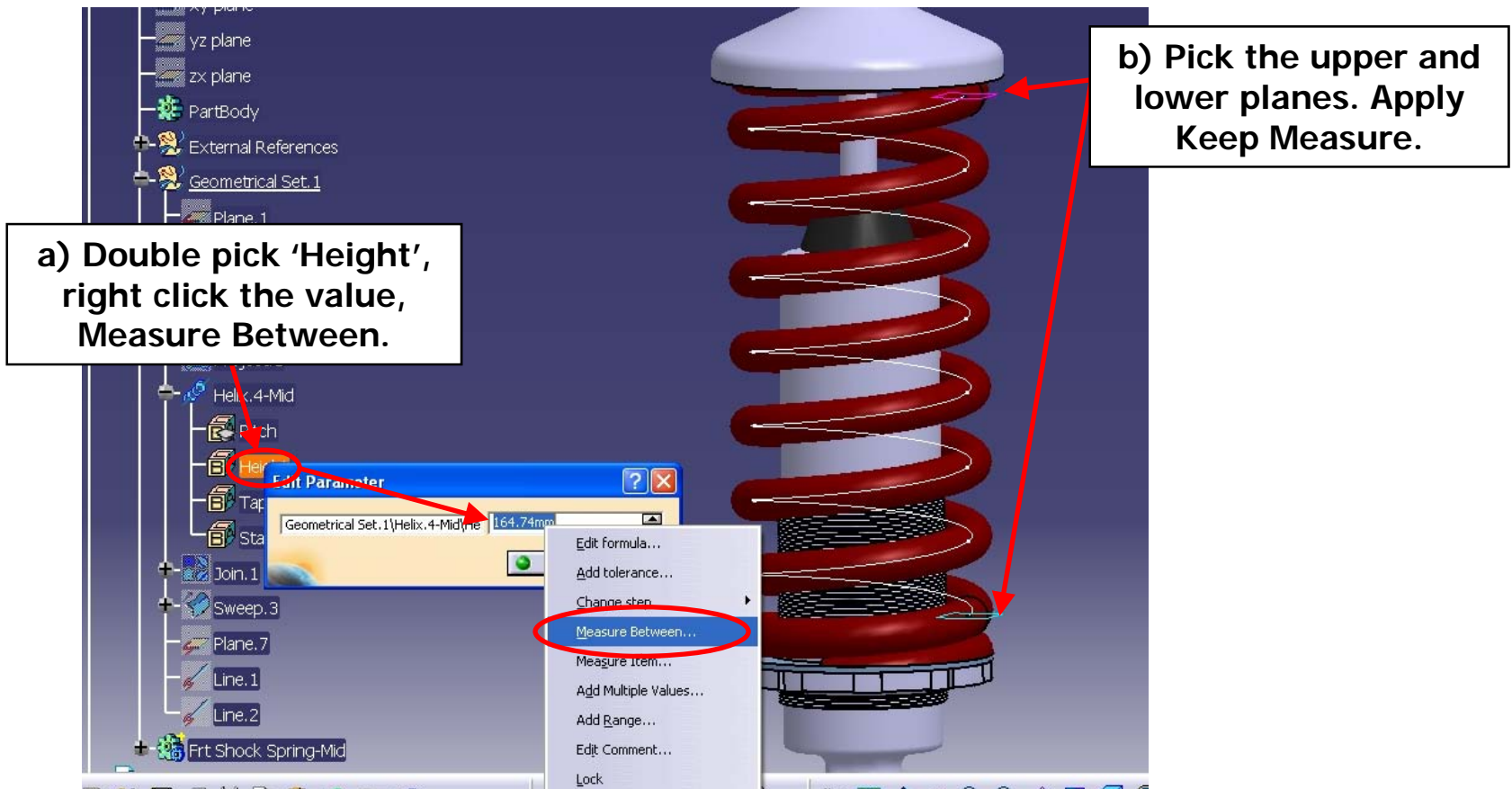
Members of All

- "Geometrical Set.1\Helix.4-Mid\Height"
- "Geometrical Set.1\Helix.4-Mid\Pitch"

OK Cancel

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- Step 4: Apply Height formula to the helix.





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## ■ Step 5: Run a Kinematic test.

**a) Run a Kinematic to check the applied formulas.**

**c) Pick 'Measure Between\Length'. Observed should be 'Yes'.**

Sensor	Unit	Observed
'Front Shock Assy-Kin\MeasureBetween.SiLength'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiLength'	Millimeter	Yes
'Front Shock Assy-Kin\MeasureBetween.SiMax Distance'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiAngle'	Degree	No
'Front Shock Assy-Kin\MeasureBetween.SiPt1x'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiPt1y'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiPt1z'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiPt2x'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiPt2y'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.SiPt2z'	Millimeter	No

**b) Activate Sensors.**

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## ■ Step 5 (cont'd): Run a Kinematic test.

**b) Notice the Spring is highlighted indicating an update is required.**

**a) Enter a value.**

**Sensors**

Sensor	Unit	Observed
Front Shock \Joints\Prismatic.1\Length	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Length	Millimeter	Yes
Front Shock Assy-Kin\MeasureBetween.5\Max Distance	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Angle	Degree	No
Front Shock Assy-Kin\MeasureBetween.5\Pt1x	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Pt1z	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Pt2x	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Pt2y	Millimeter	No
Front Shock Assy-Kin\MeasureBetween.5\Pt2z	Millimeter	No

**Kinematics Simulation - Front Shock**

Mechanism: Front Shock

Command.1: -36.1 48.7 **10.0000**

Activate sensors ☐ Plot vectors ☐

Reset Analysis... <<Less

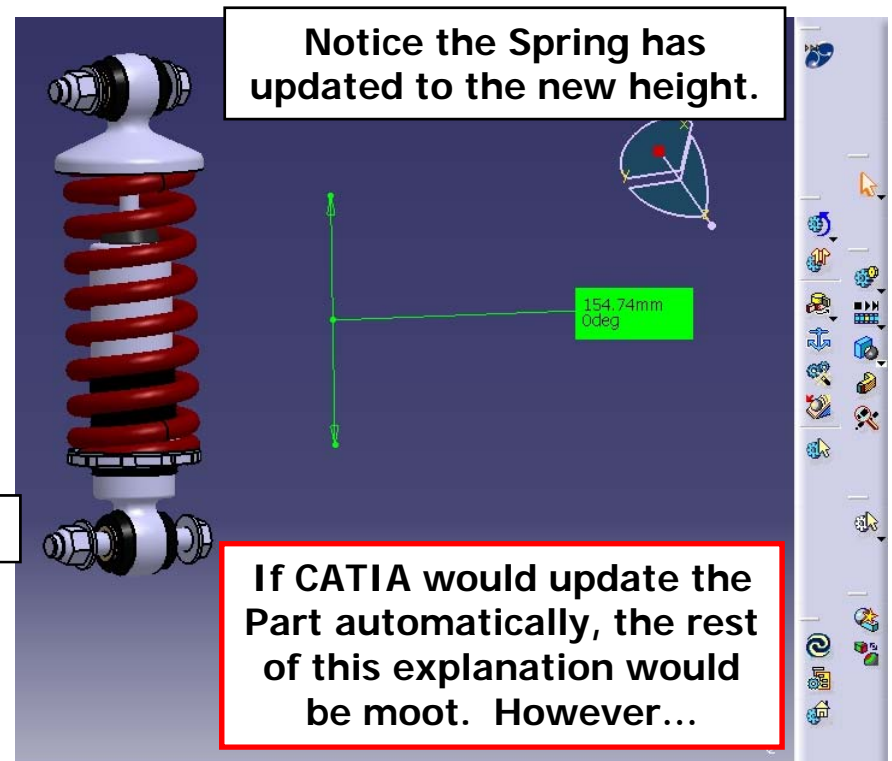
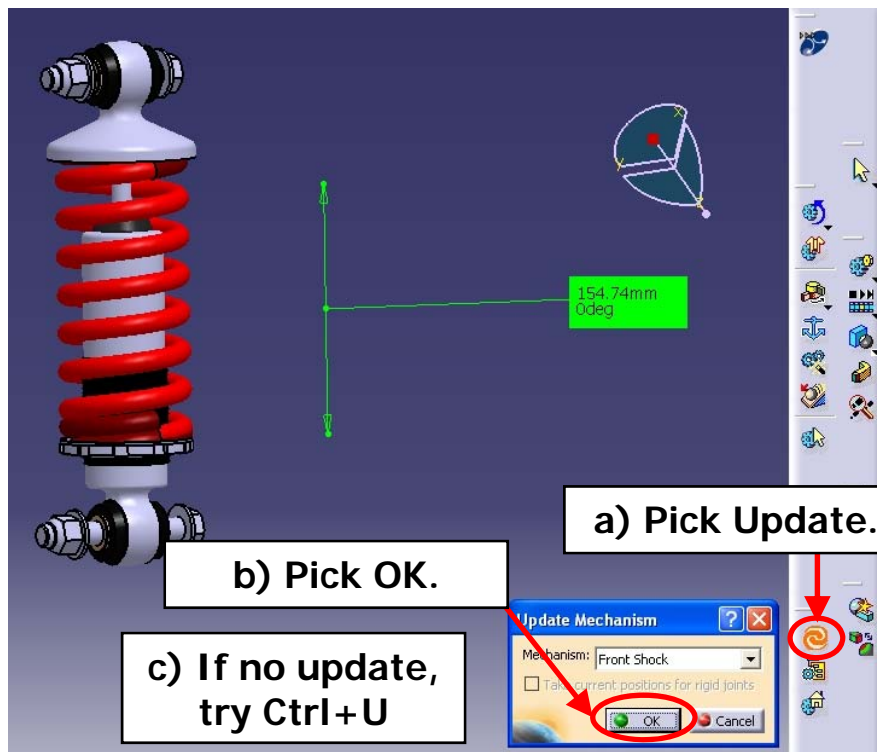
Simulation

Immediate ☒ On request ☐

Number of steps: 20

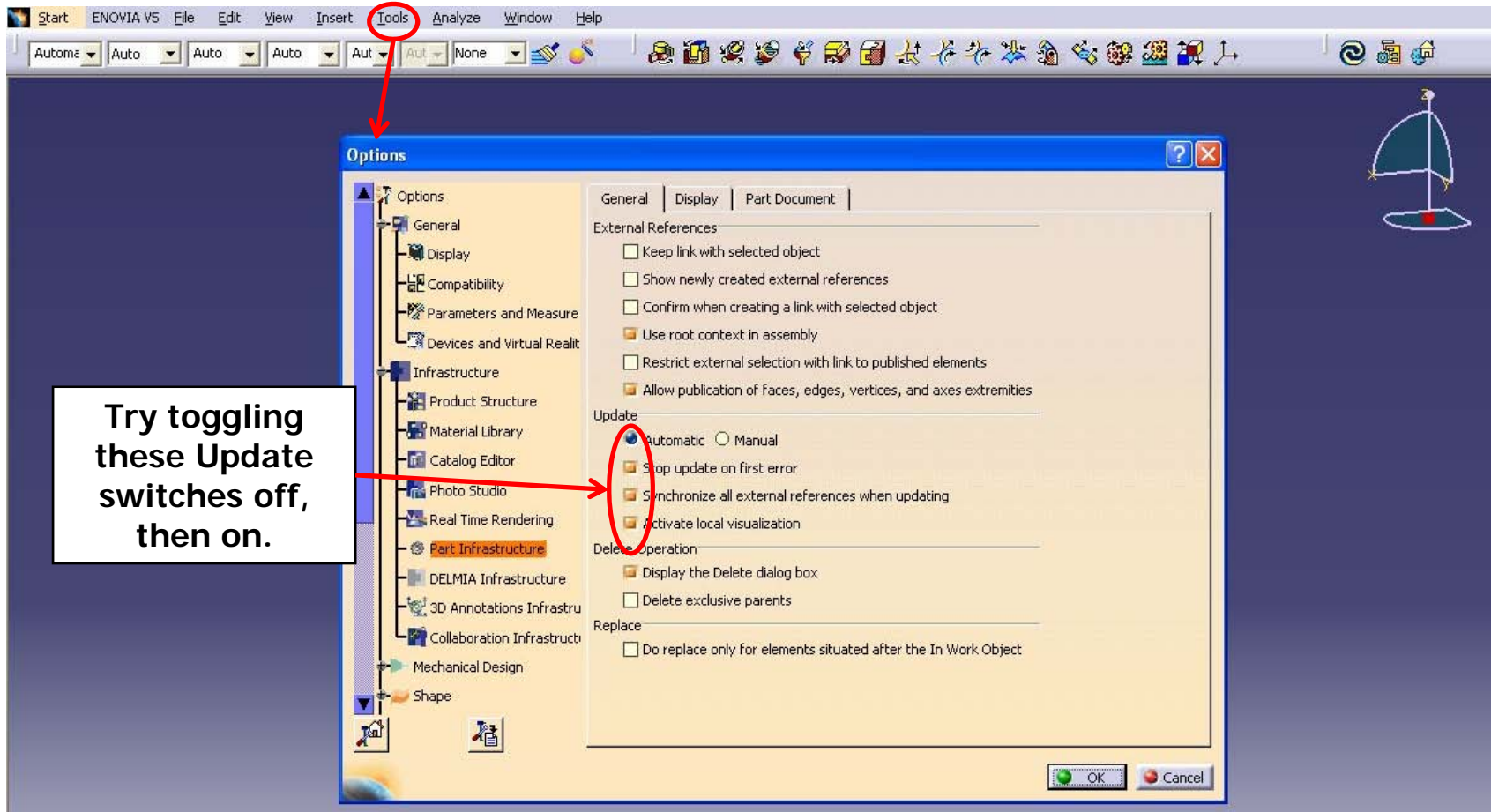
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- Step 5 (cont'd): Run a Kinematic test.



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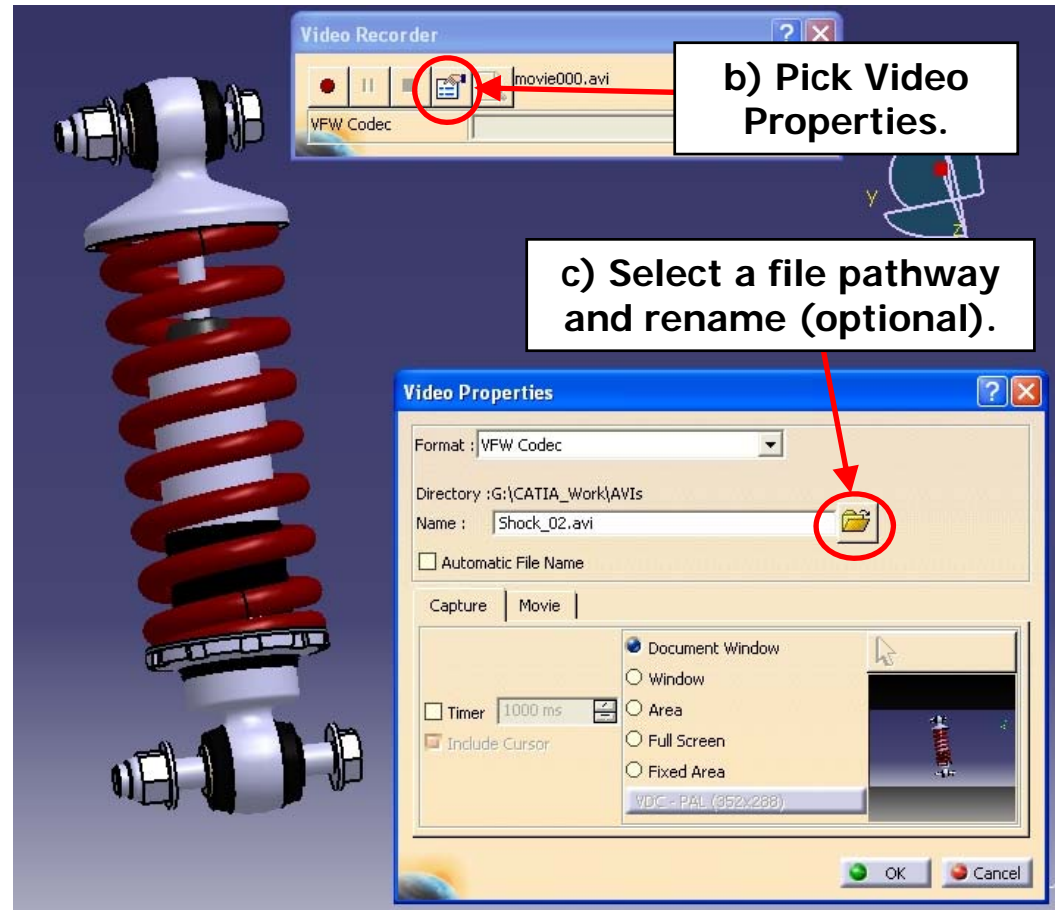
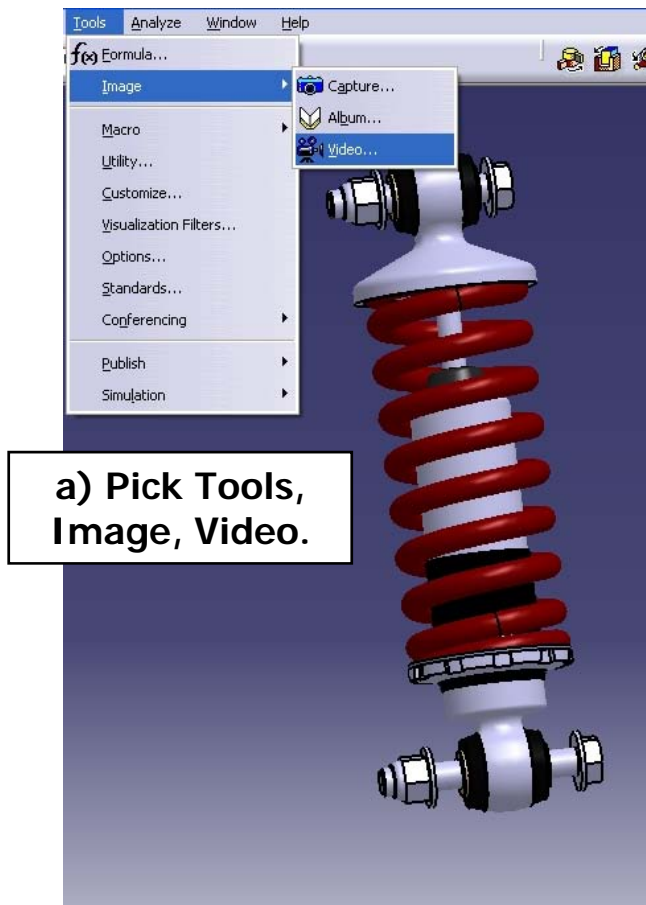
- Step 5 (cont'd): If Ctrl+U doesn't work...





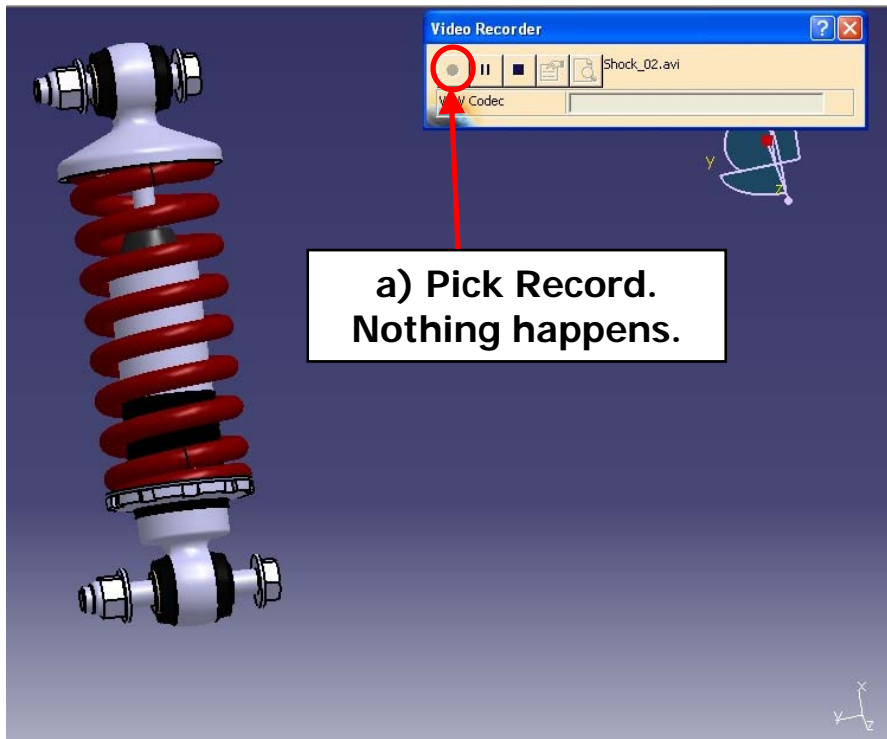
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## ■ Step 6: Record a 'Video Simulation'.



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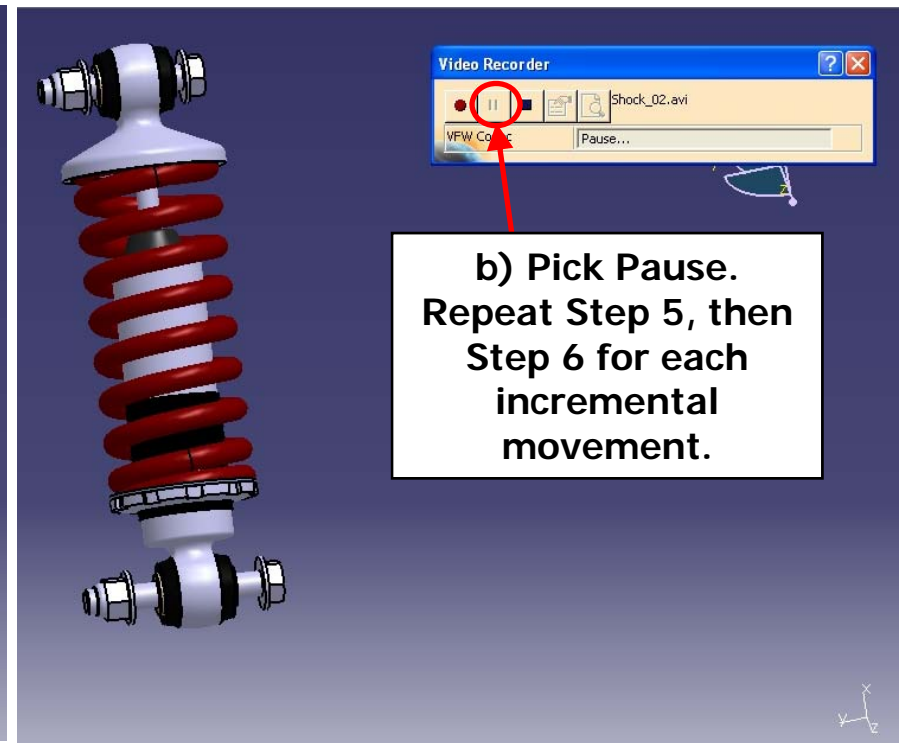
- Step 6 (cont'd): Record a 'Video Simulation'.





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- Step 6 (cont'd): Record a 'Video Simulation'.



The logo features a vertical black line intersected by a horizontal black line. To the left of the intersection are three overlapping squares: a blue one at the top, a red one in the middle, and a yellow one at the bottom. The text "BND TechSource" is positioned to the right of the graphic.

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- Conclusion: We hope this “work-around” proves useful for those who need to show a Spring Simulation.
- This Simulation was performed on CATIA V5 R17 SP8.
- Maybe in a subsequent release Dassault will make it possible for updates on Parts to occur automatically.
- As always, if anyone has a different, more expedient process, please share your views on our website forum.