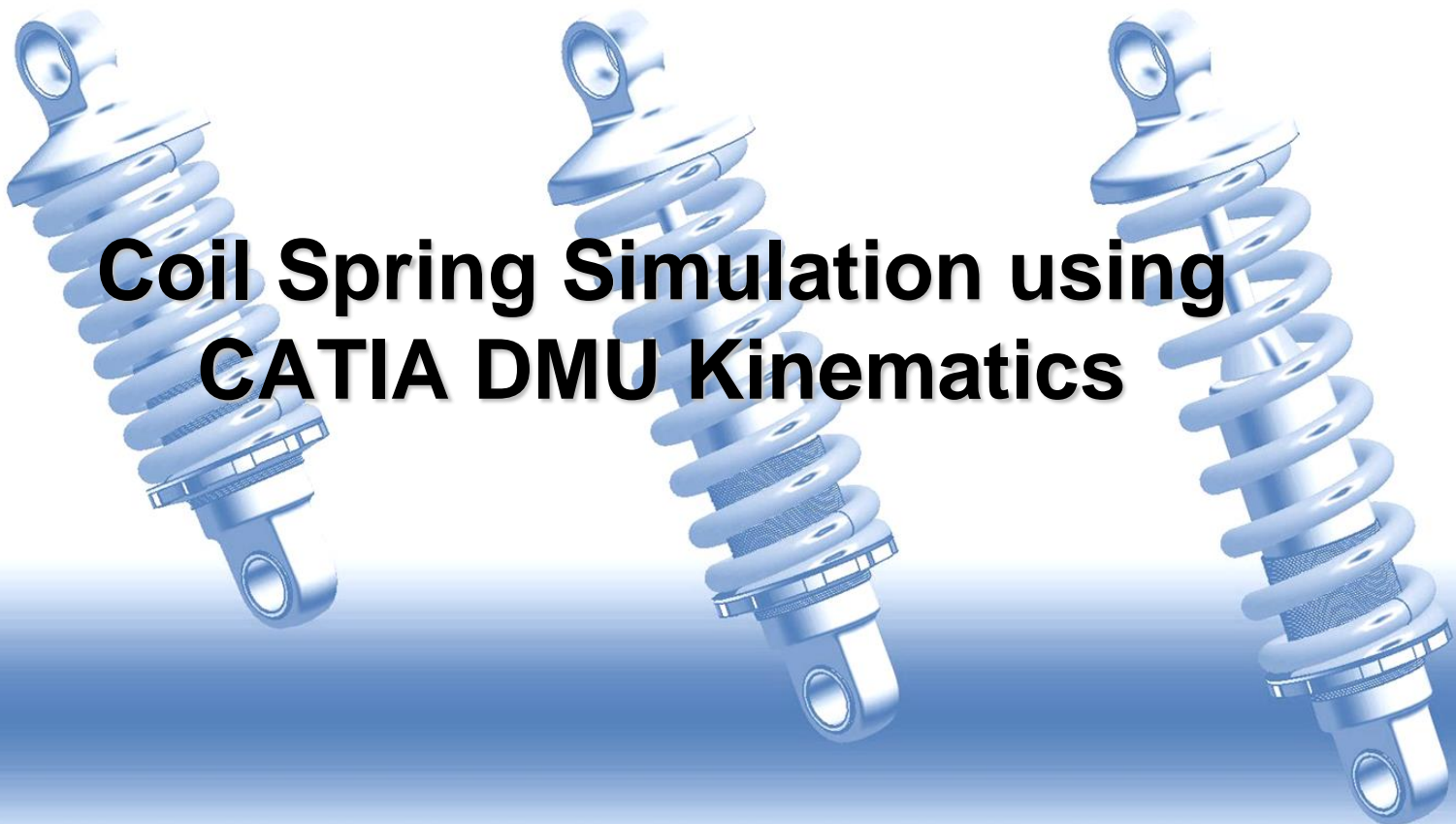
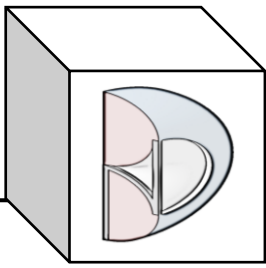


BND TechSource



Coil Spring Simulation using CATIA DMU Kinematics

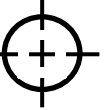




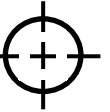
- The following licenses are required to create the Spring Simulation:
 - Generative Shape Design
 - Mechanical Part Design
 - Digital Mockup Kinematics



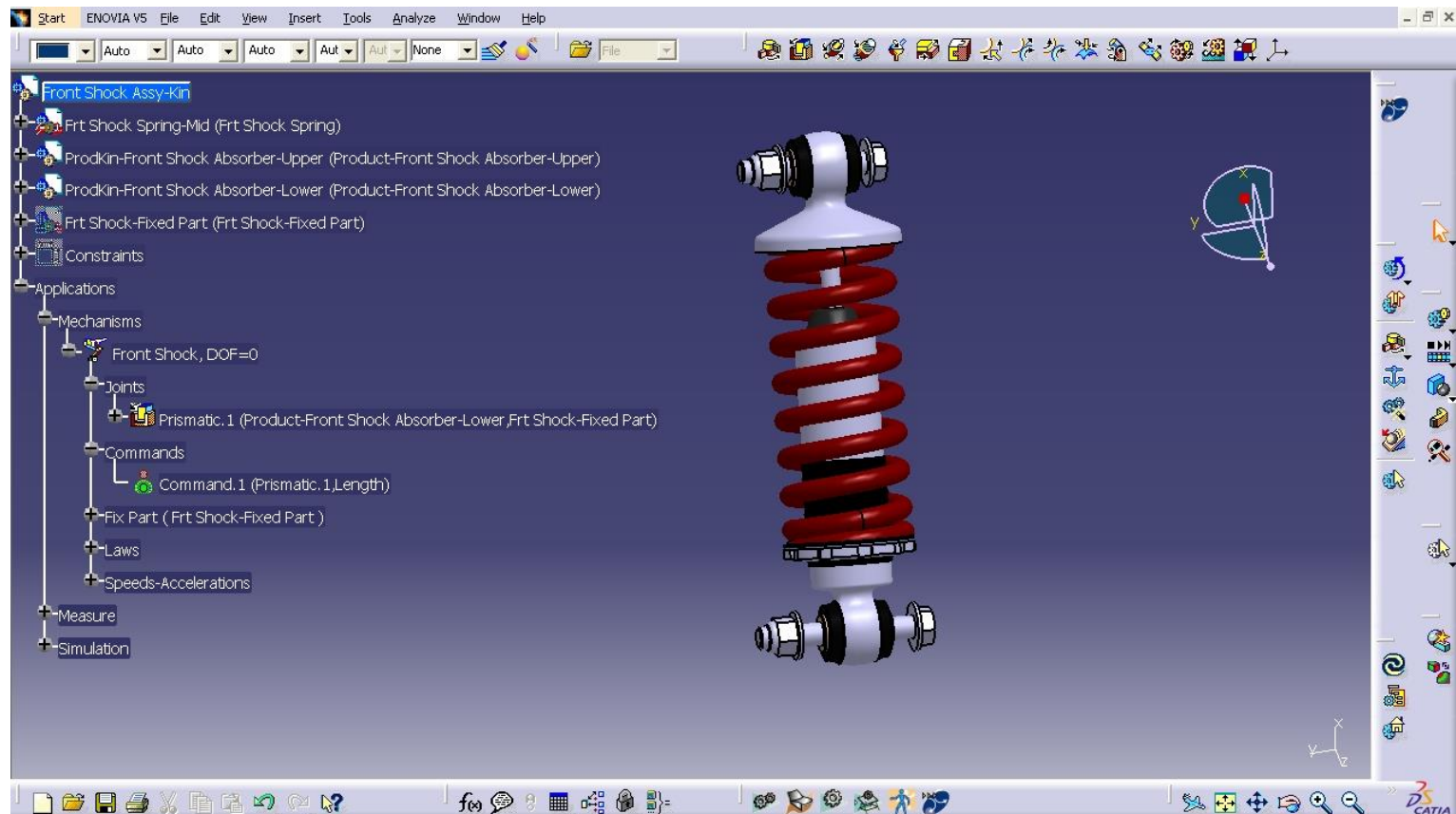
BND TechSource

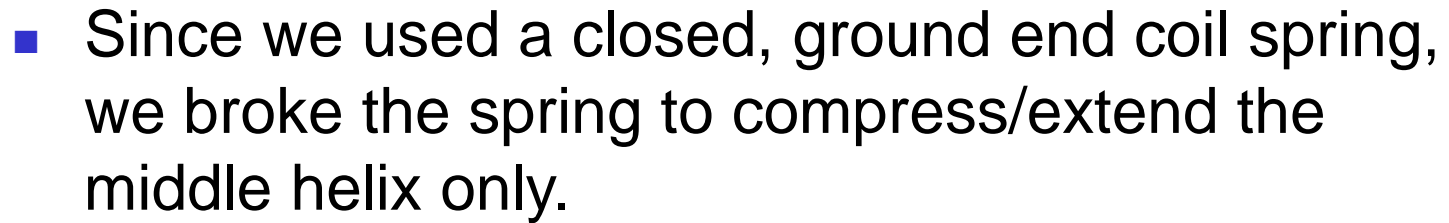


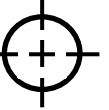
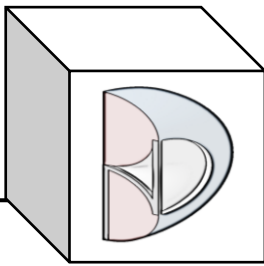
- Before we begin, please understand that this is a “work-around”.
- Many times CATIA doesn't work the way we would like it to.
- Therefore, we must accept “work-arounds” to get the job done without using additional software.



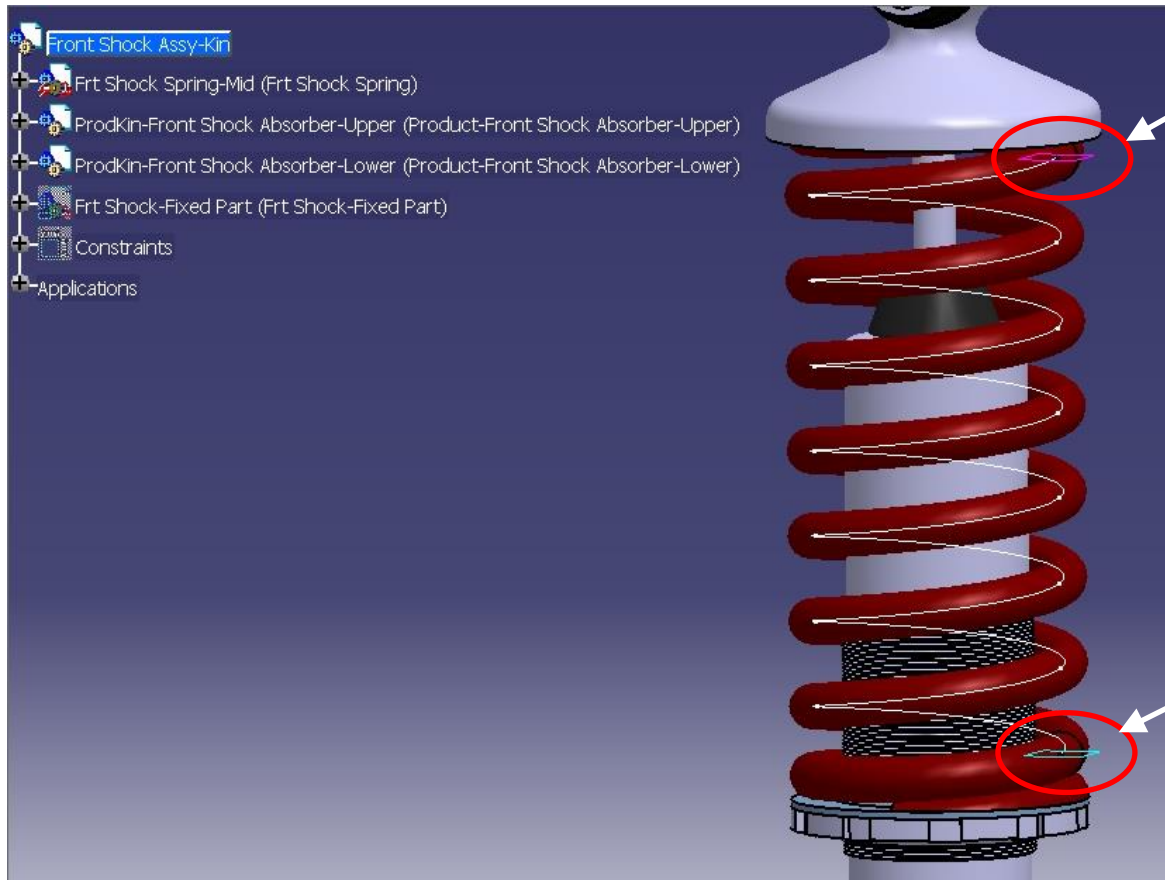
- Step 1: Create the Parts, Assembly, and Kinematic.







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



Create the upper plane in a Fixed Part.

Create the lower plane in a Moveable Part.



- 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
 - Helix.4-Mid
 - Pitch
 - Height
 - SuperAngle
 - StartingAngle

Formula Editor

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
- Pitch

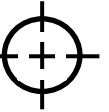
Members of Parameters

- All
- Renamed parameters
- Length

Members of All

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

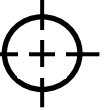
OK Cancel



- Step 4: Apply Height formula to the helix.

a) Double pick 'Height', right click the value, Measure Between.

b) Pick the upper and lower planes. Apply Keep Measure.



■ 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.S\Length'	Millimeter	Yes
'Front Shock Assy-Kin\MeasureBetween.S\Max Displacement'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Angle'	Degree	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt1x'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt1y'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt1z'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt2x'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt2y'	Millimeter	No
'Front Shock Assy-Kin\MeasureBetween.S\Pt2z'	Millimeter	No

b) Activate Sensors.

164.74mm
0deg

Kinematics Simulation - Front Shock

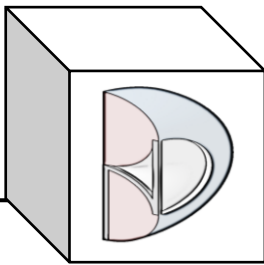
Mechanism: Front Shock

Command: 1 -36.1 48.7 0.0000

☒ Activate sensors

Simulation: Immediate On request

Number of steps: 20



BND TechSource



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

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

154.74mm
0deg

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\Pt1y	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**

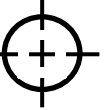
Activate sensors ☐ Plot vectors ☐

Reset Analysis... <<Less

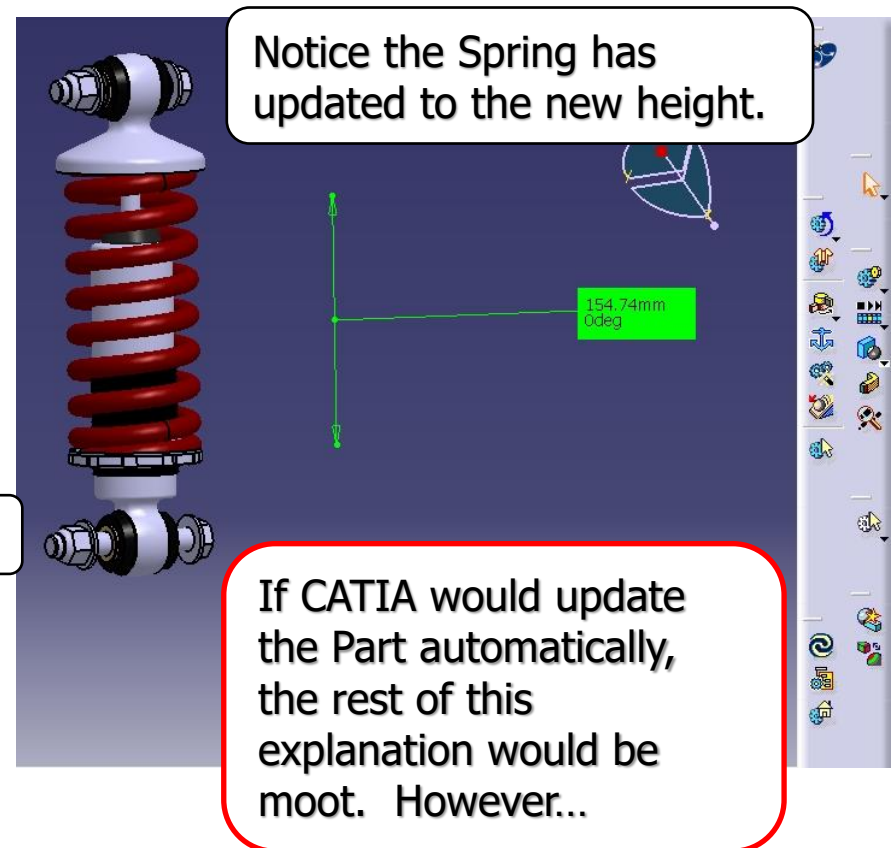
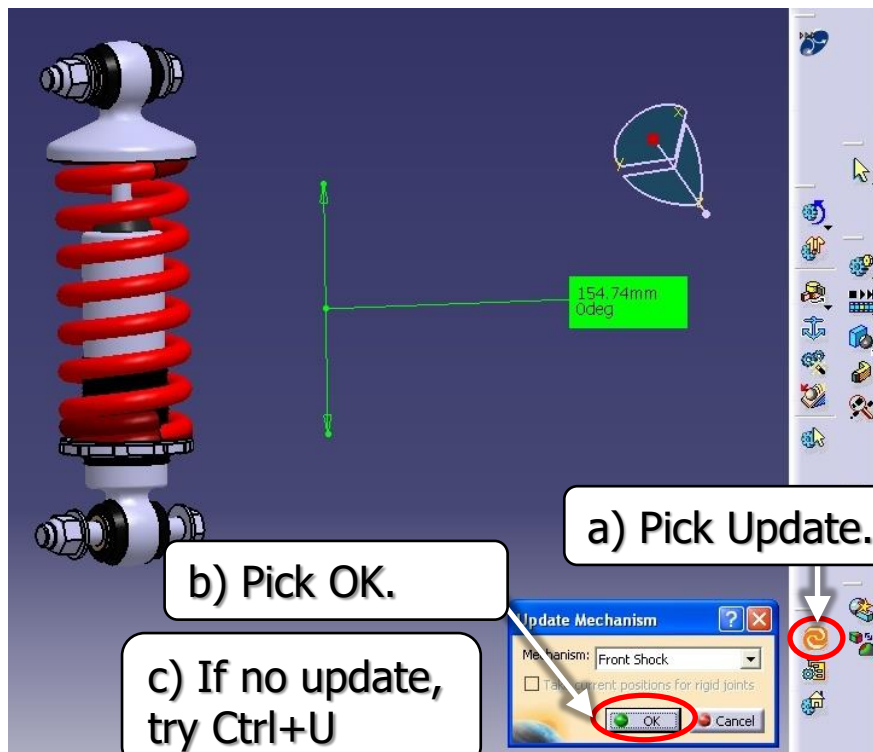
Simulation

Immediate ☒ On request ☐

Number of steps: 20

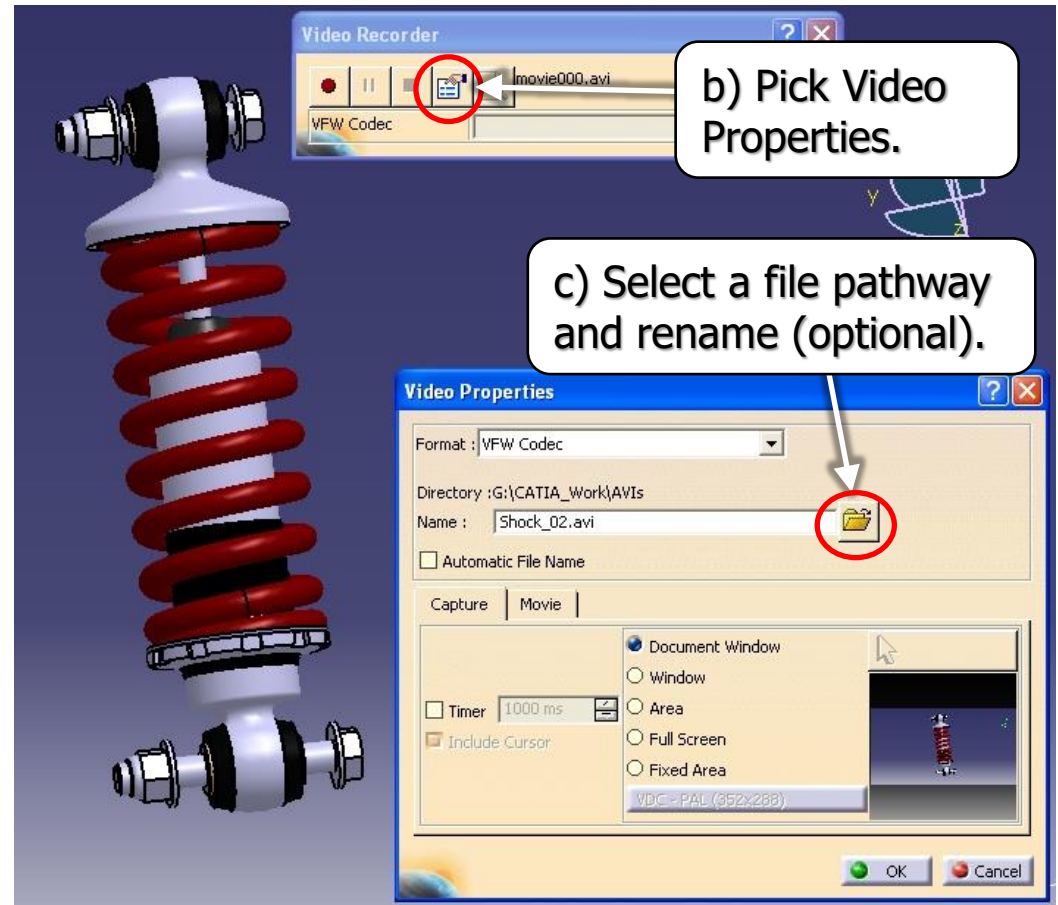


- Step 5 (cont'd): Run a Kinematic test.



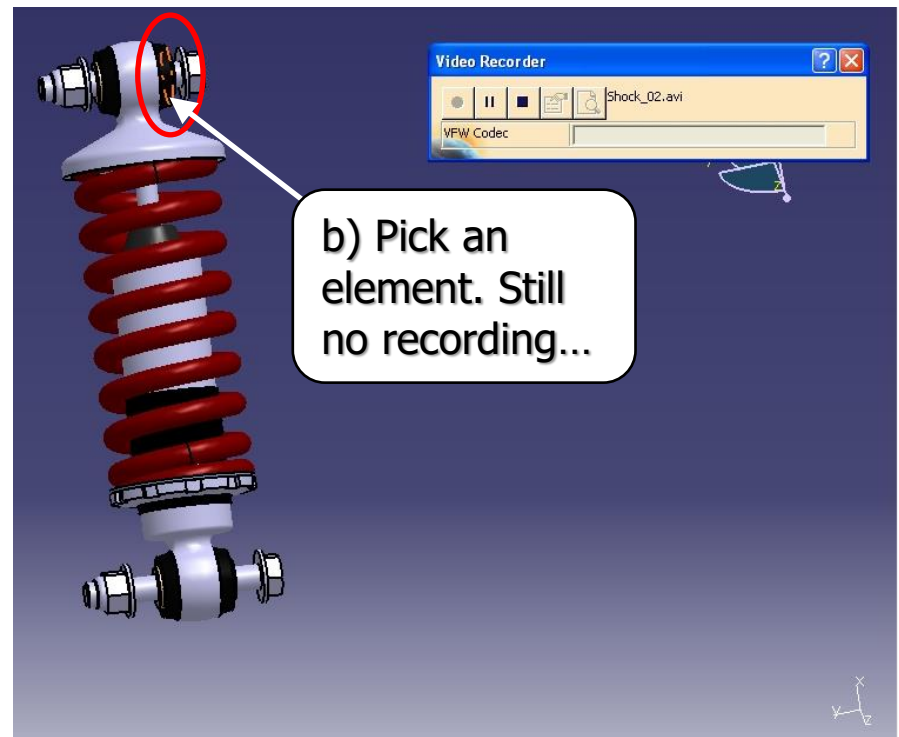
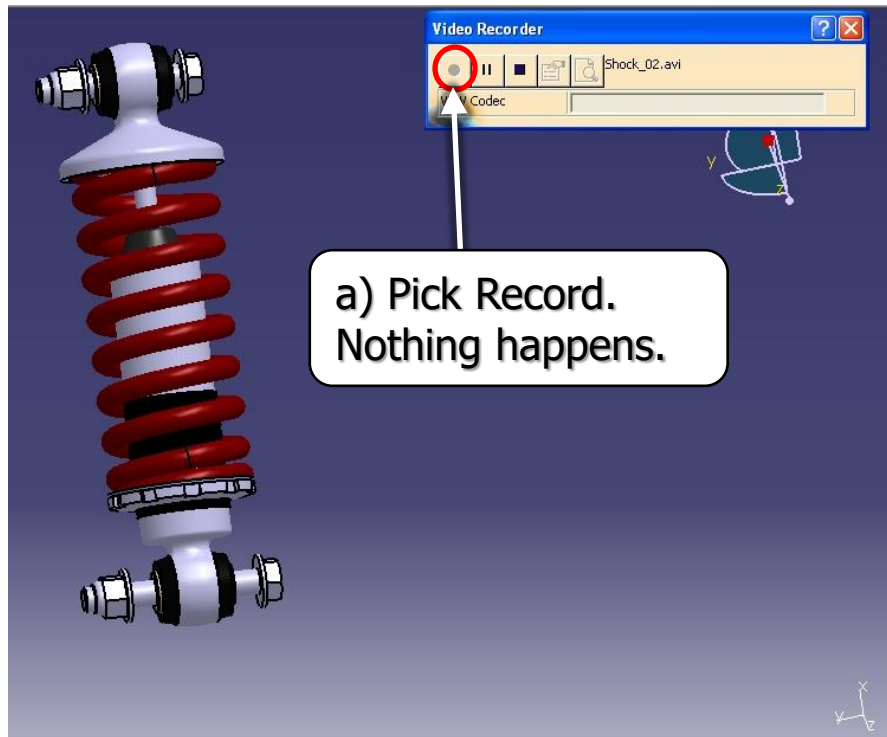


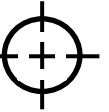
■ Step 6: Record a 'Video Simulation'.



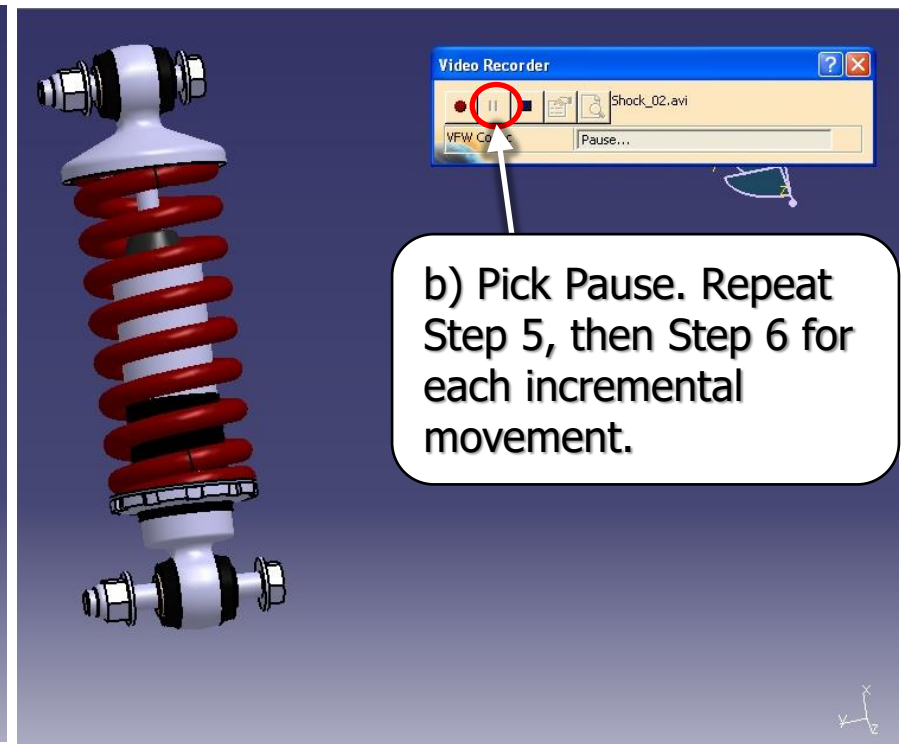
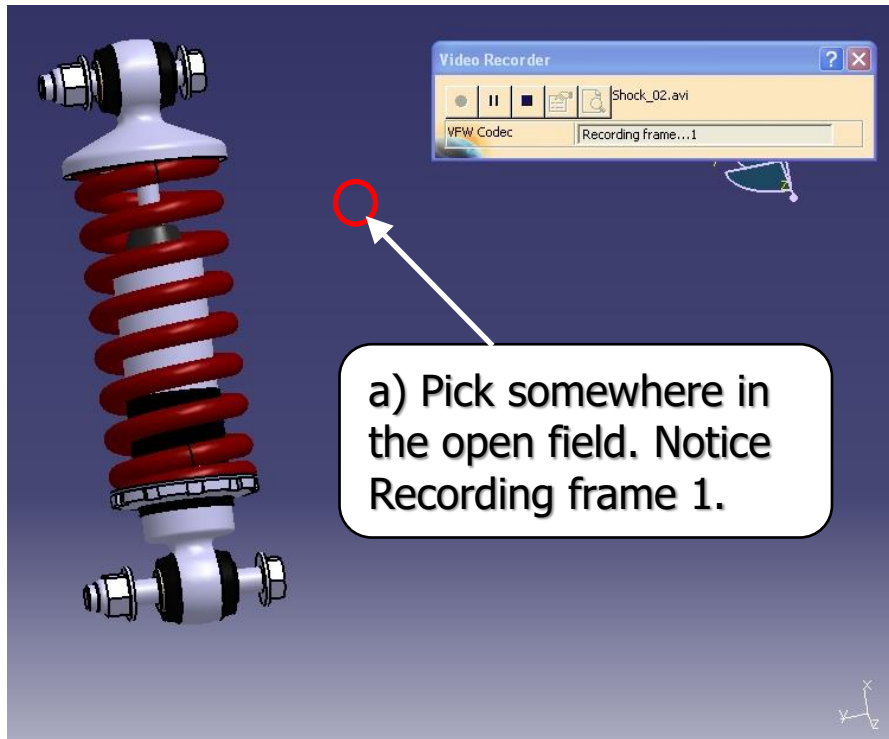


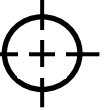
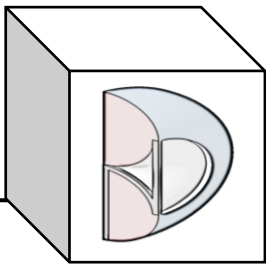
- Step 6 (cont'd): Record a 'Video Simulation'.





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





- Conclusion:

We hope this “work-around” proves useful for those who need to show a Spring Simulation.

Maybe in a subsequent release Dassault will make it possible for updates on Parts to occur automatically.

As always, we are open to any discussions this may bring.

Please ***subscribe*** to our YouTube channel!

