Drawing work guide before simulation

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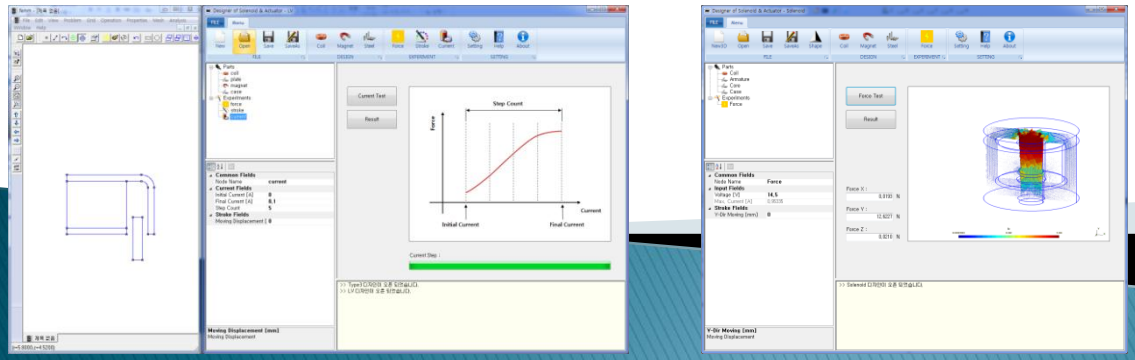
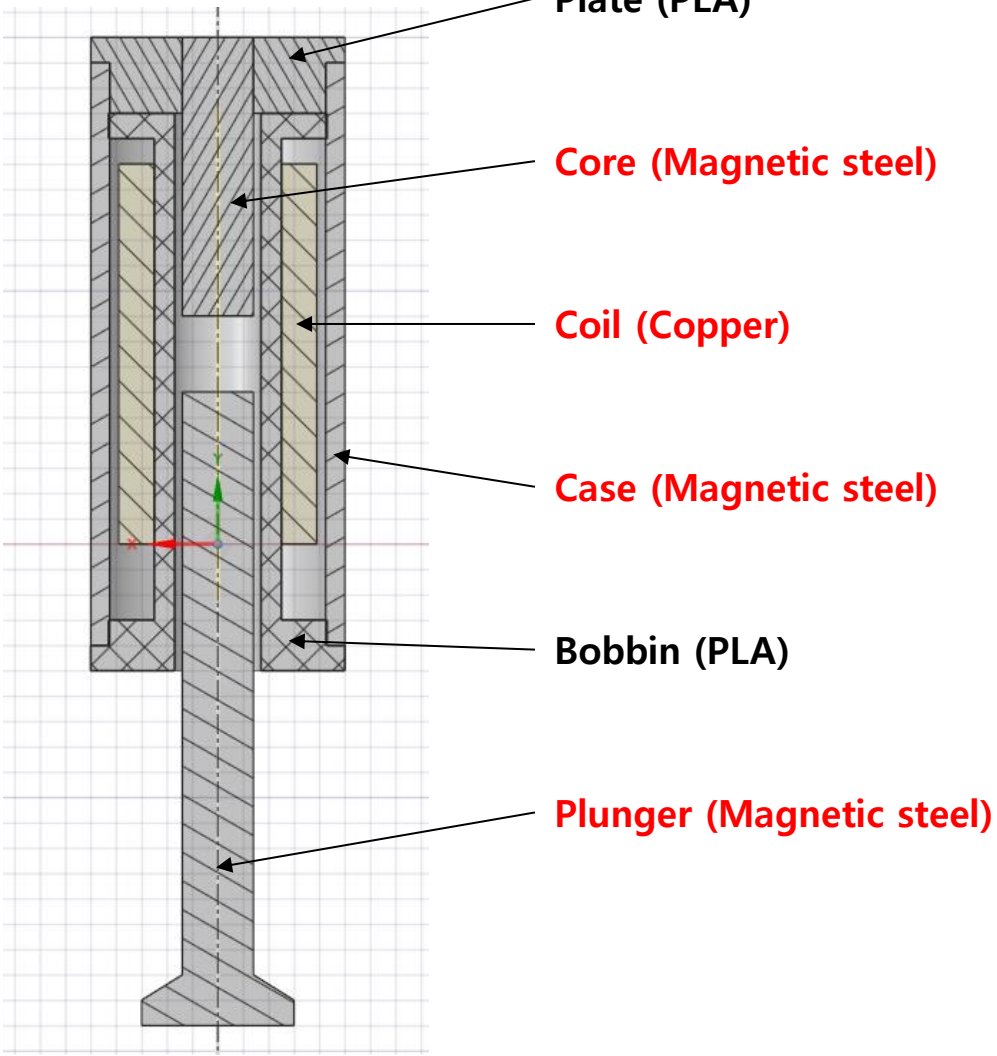


Part selection and Shape simplification

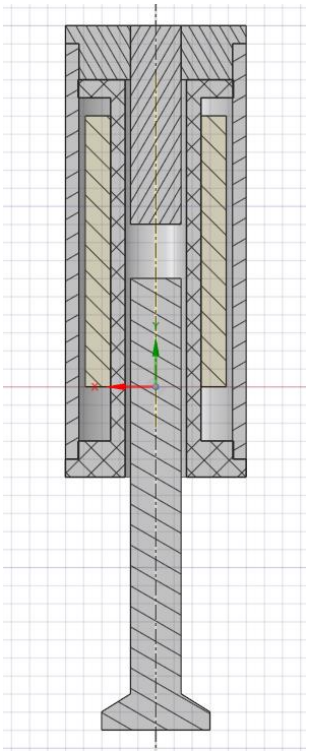
Part selection for magnetic analysis

1. **Included parts**
   - Coil
   - Magnet
   - Soft magnetic steel

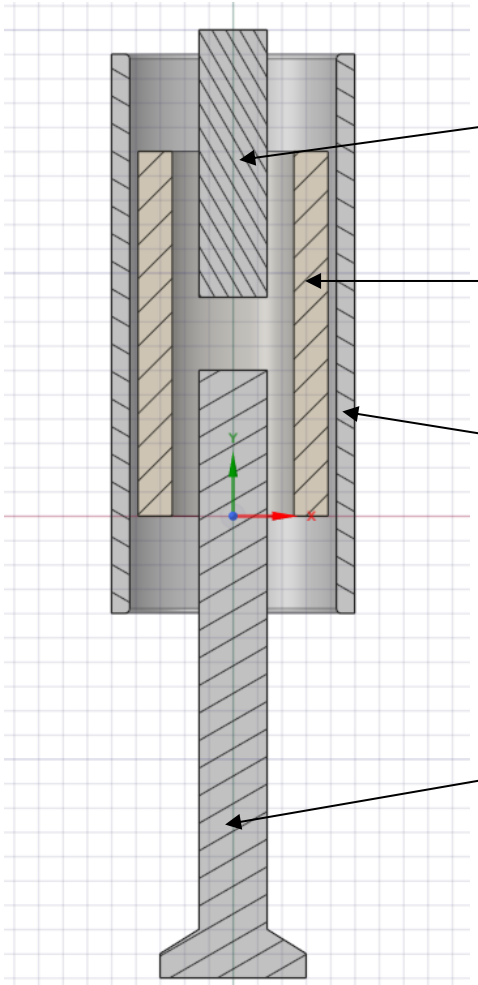
2. **Excluded parts**
   - Plastic, Rubber
   - Non-magnetic metals
     (SUS 300 series, Aluminum, Brass, …)
   - Other non-magnetic materials



Part selection for magnetic analysis

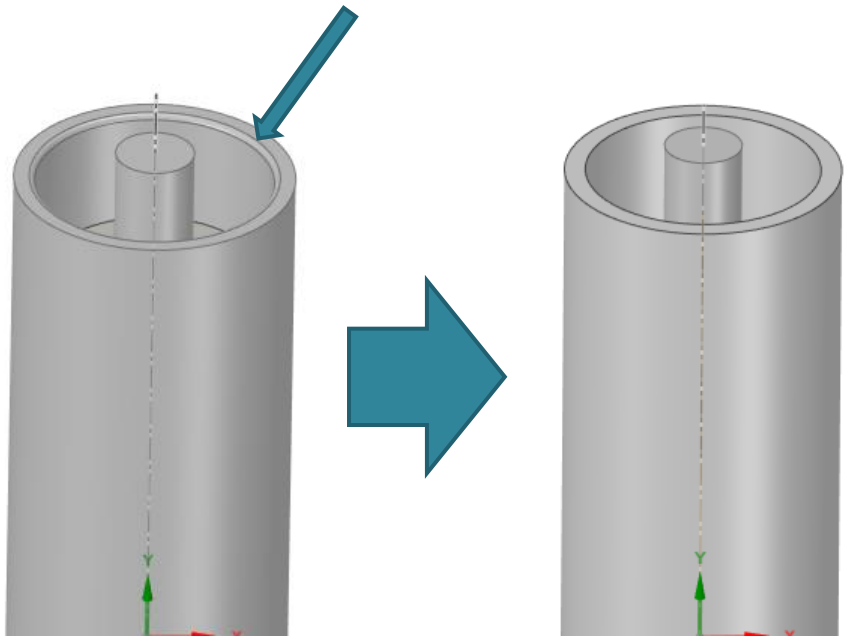


Remove
unnecessary parts



Shape simplification

1. **shape simplification**
   - Small Fillet → Remove or Chamfer
   - Small Gap (0.05 mm or less) → Remove
   - Small Hole (eyelet) → Remove
   - Unnecessary shape considering flux flow → Remove



DoSA-3D Shape Caution Item

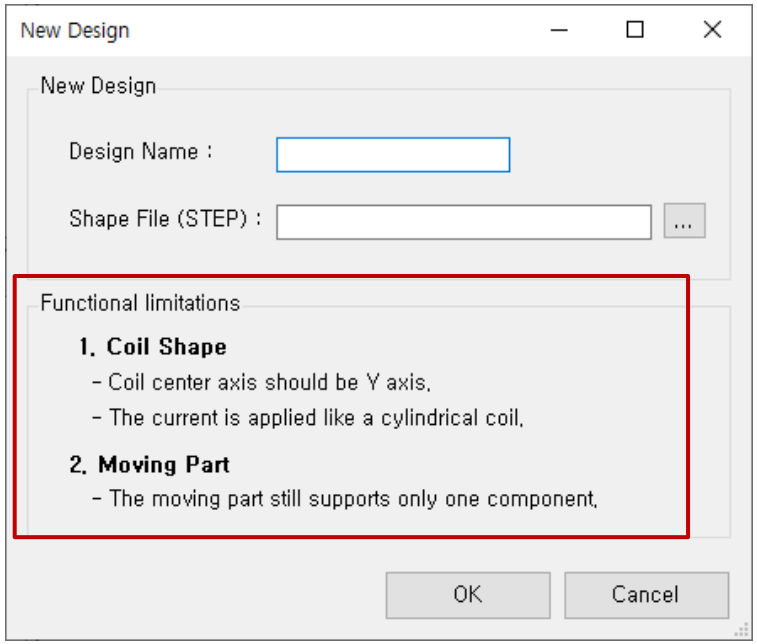
DoSA-3D Shape Caution Item

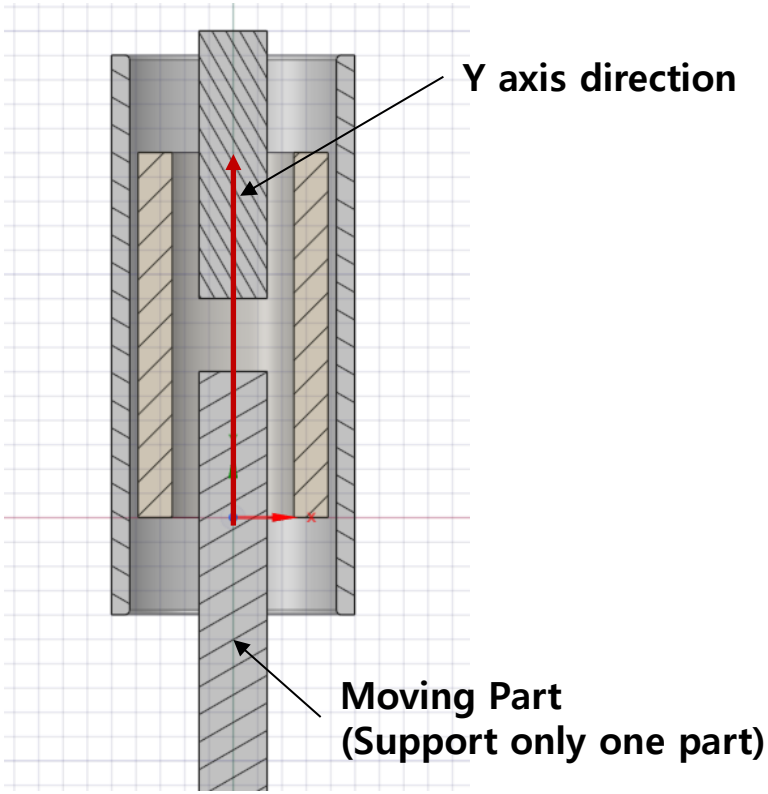
1. Coil restriction

- Coil center axis supports Y axis direction only
- Current applied in cylindrical coil form
  (Rectangular coils cause slight difference)

2. Moving Part Restriction

- Moveable parts support only one part

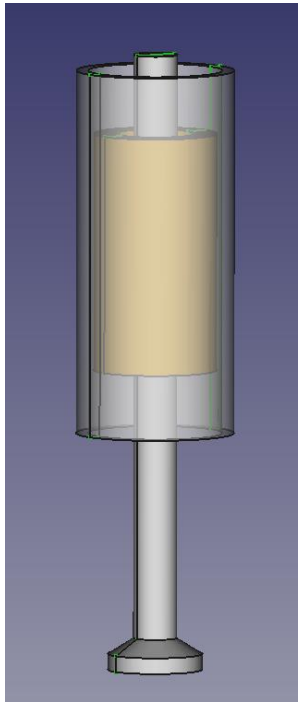




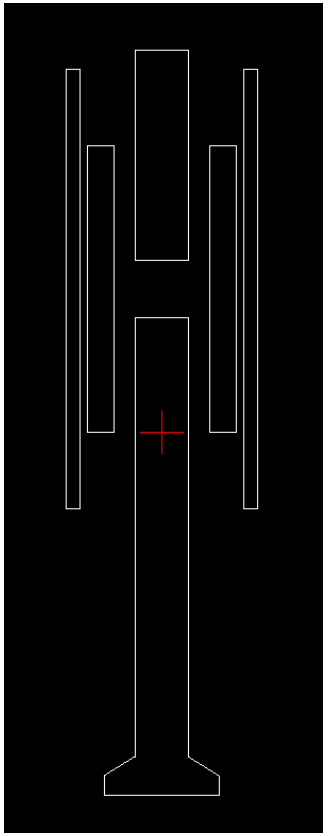
DoSA–2D Shape work

Create Section

1. **Caution Items**
   - The central axis of the 3D model coil is positioned to coincide with the Y axis
   - Choose an angle that can represent the axisymmetric shape
   - Rotate the above angle to be the XY plane and proceed to the XY section



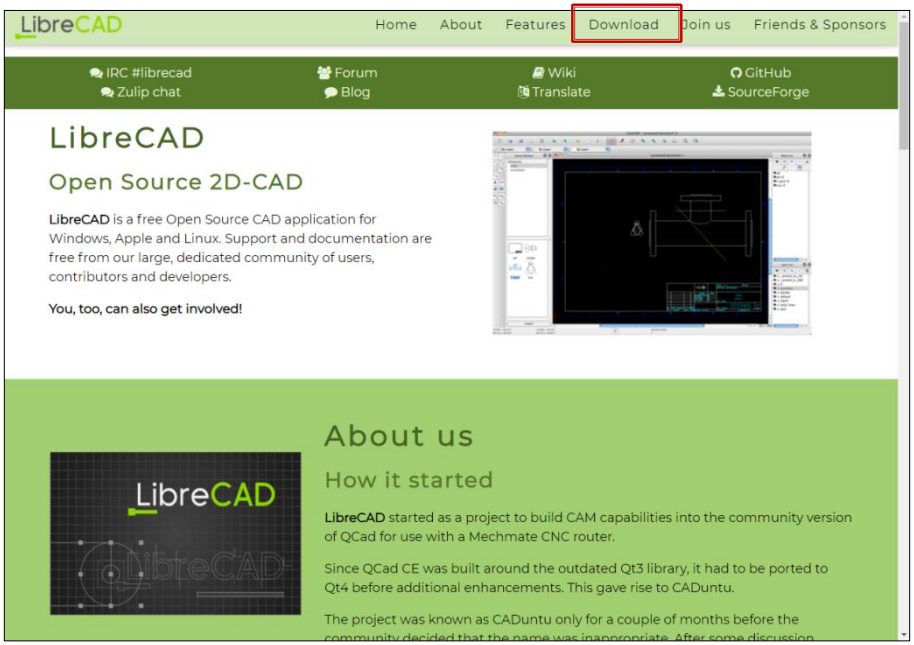
XY plane



LibreCAD Introduction

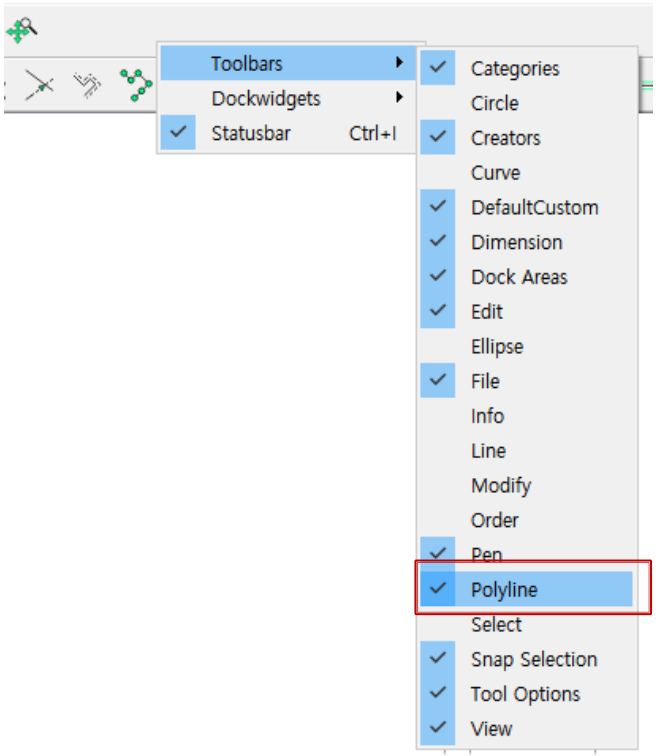
1. **2D CAD Program**
   - 2D CAD programming is required for 2D cross-sectional shape work (DXF file)
   - You can use AutoCAD or your own 2D CAD work program.

2. **Use a free 2D CAD program**
   - A free 2D CAD program (LiberCAD) is also available.
   - Download Link : http://librecad.org
   - LibreCAD is used for 2D shape work practice in this document.



LibreCAD Preferences (1)

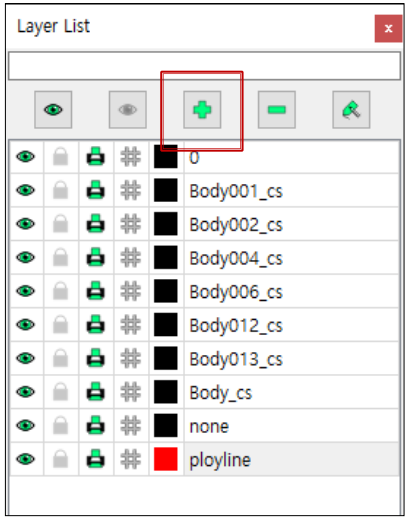
1. **Add Toolbar**
   - Right-click on the toolbar > Toolbars > Polyline (Enable polyline)

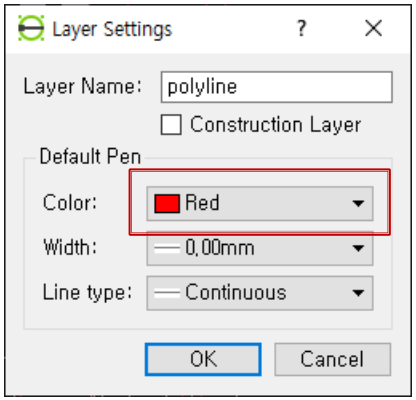


LibreCAD Preferences (2)

1. **Open 2D Section**
   - File > Open > Open *.dxf files
2. **Layer 생성**
   - Layer List window on the right > Click "+" button
   - Layer Name : polyline
   - Color : Red
3. **Snap Setting**
   - Only turn on Endpoints, Middle
   - Middle Points : 3

2





3

Open Actuator Project

Working with part geometry

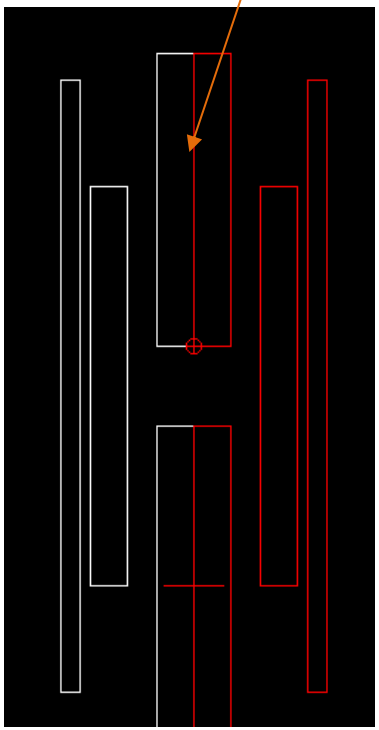
1. **To Create Part Geometry**
   - Create part shapes as a ploryline on top of the read DXF shape using the Snap function.

2. **Shape work**
   - Start Polyline: Click polyline on the Polyline toolbar
   - Straight section : Select endpoints or midpoints of DXF line geometry
   - Arc section : Select points differently based on size (see next page)
   - Close ploryline :
     * Select the first point last and
       Use the Esc key or the Close button on the Middle Points toolbar

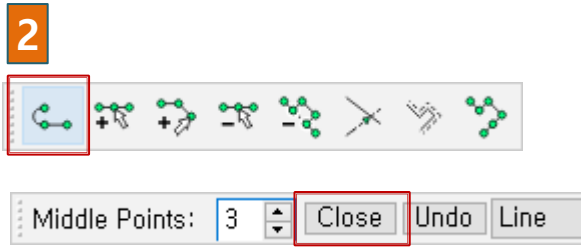
3. **Caution**
   - Part geometry uses only the right side (positive X side)
   - The left side (negative X side) must not have a shape
   - The central axis of the actuator must coincide with the Y axis.

Central axis and Y axis coincide

3



2

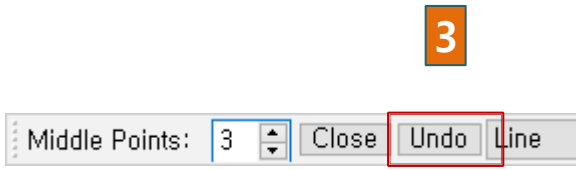


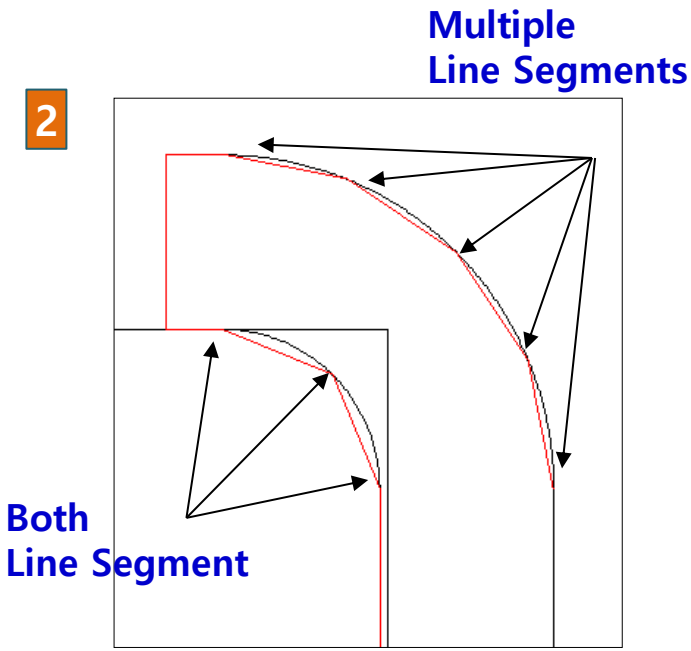
Arc processing while working

1. **Simplify Arc Geometry**
   - Arc geometry needs simplification because unnecessary meshes are added.

2. **Arc work**
   - Small Arc : Select both endpoints (Chamfer)
   - Middle Arc : Select both endpoints + 1 middle point
   - Big Arc : Select both endpoints + 3 middle point

3. **Cancel selection point**
   - Using the Undo button on the Middle Points toolbar



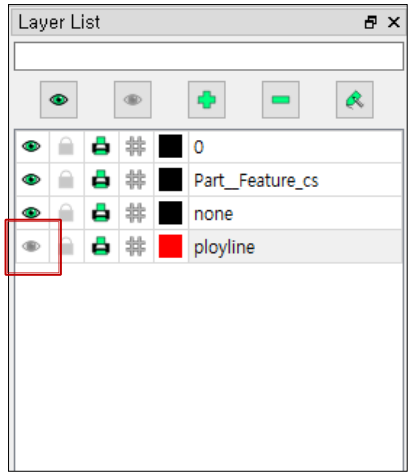


Save part

1. **Hide work layer**
   - Layer List window on the right > turn off polyline layer
2. **Delete the read existing shape**
   - Select All : Ctrl-A
   - Delete : Del
3. **Save As**
   - Layer List window on the right > turn on polyline layer
   - File > Save As ...

1

3



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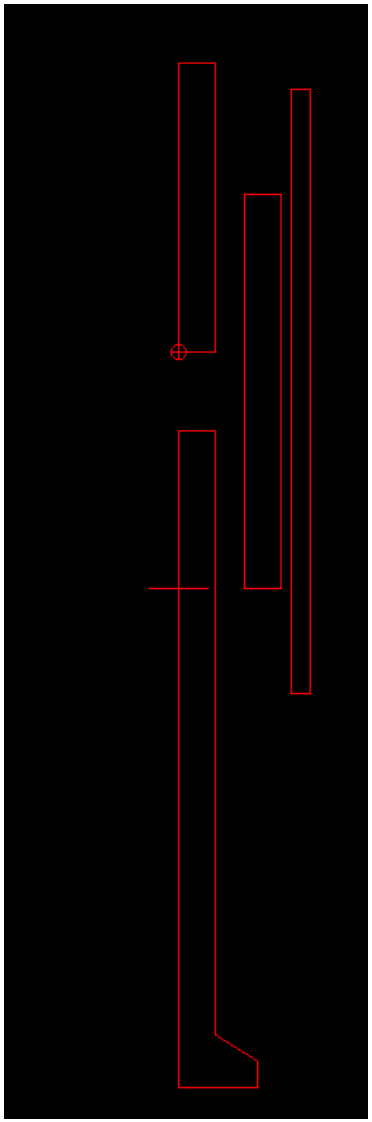
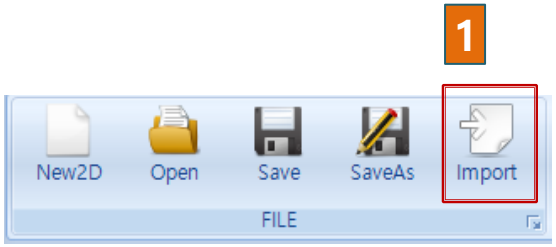
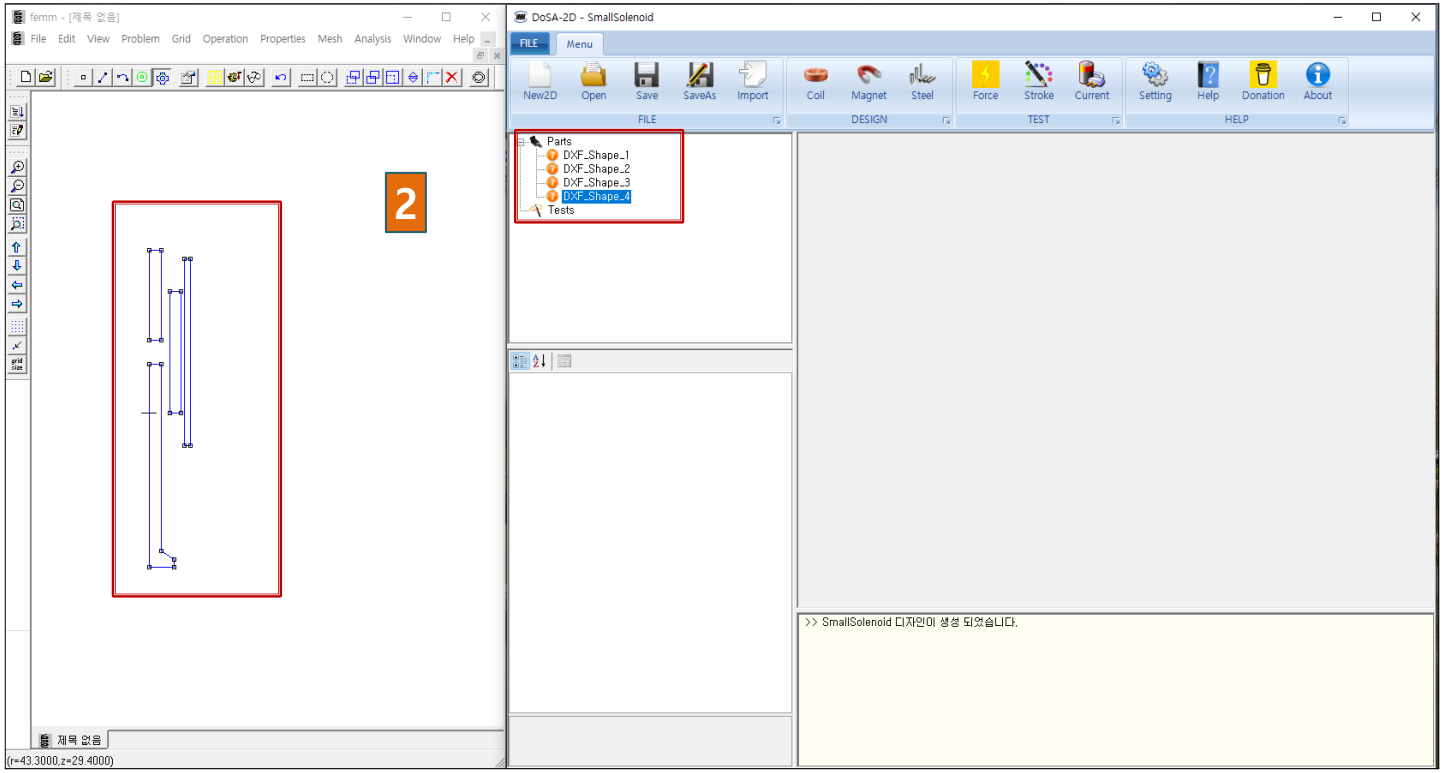


Reading the shape of DoSA-2D

1. **Read DXF file**
   - Ribbon Bar FILE > Import
2. **Check the cross-sectional shape**





Thank You

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Homepage : http://openactuator.org