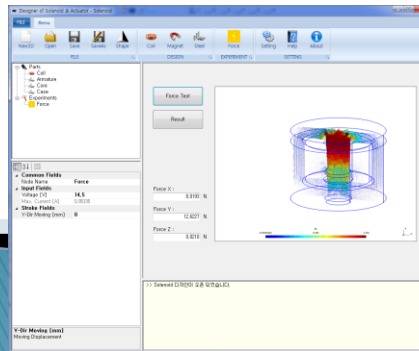
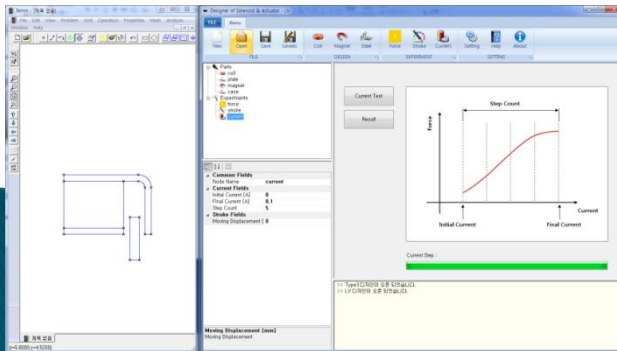


Drawing work guide before simulation

2022-05-06

zgitae@gmail.com



Part selection and Shape simplification

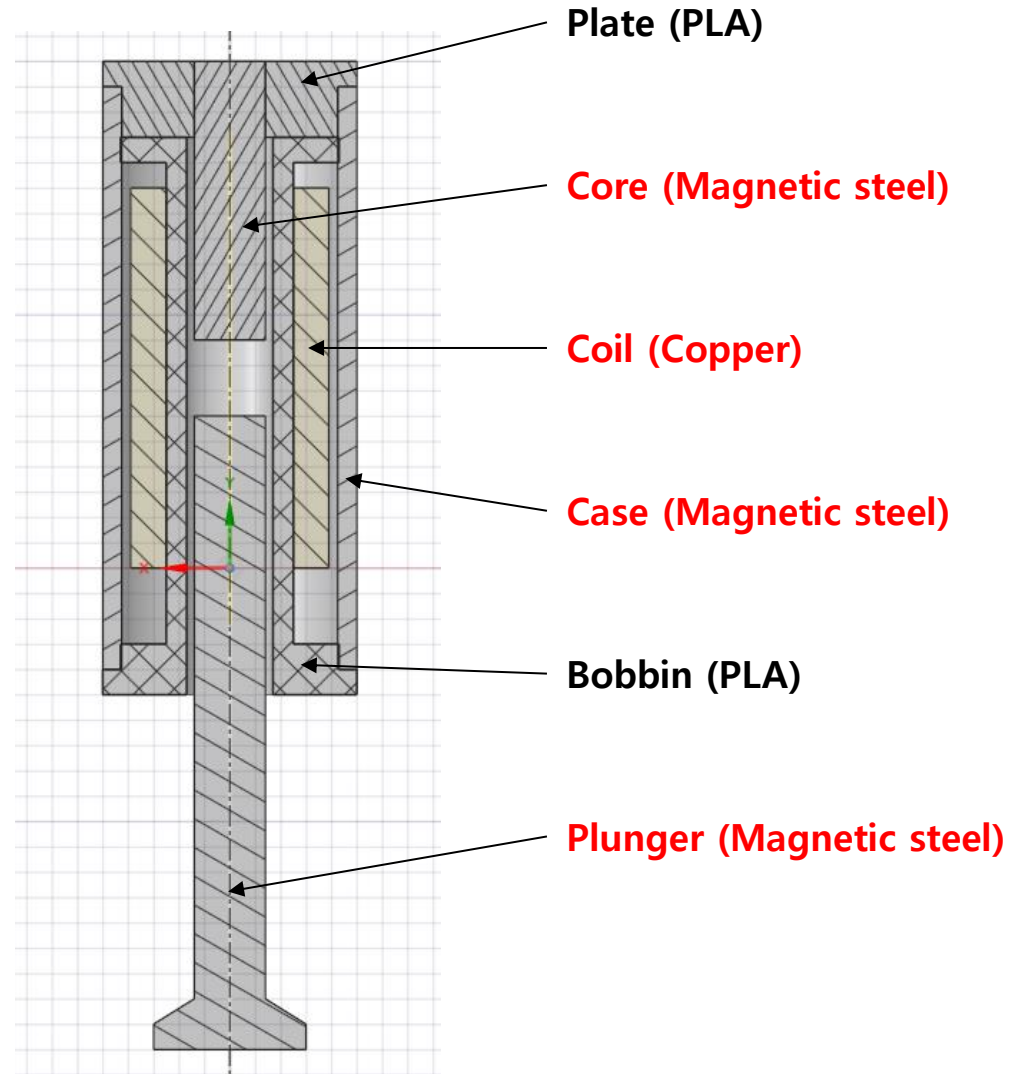
Part selection for magnetic analysis

1. Included parts

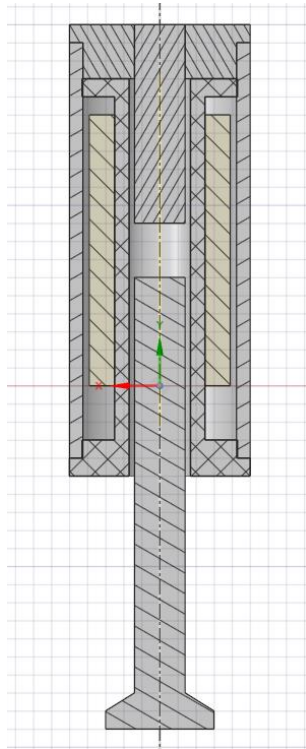
- Coil
- Magnet
- Soft magnetic steel

2. Excluded parts

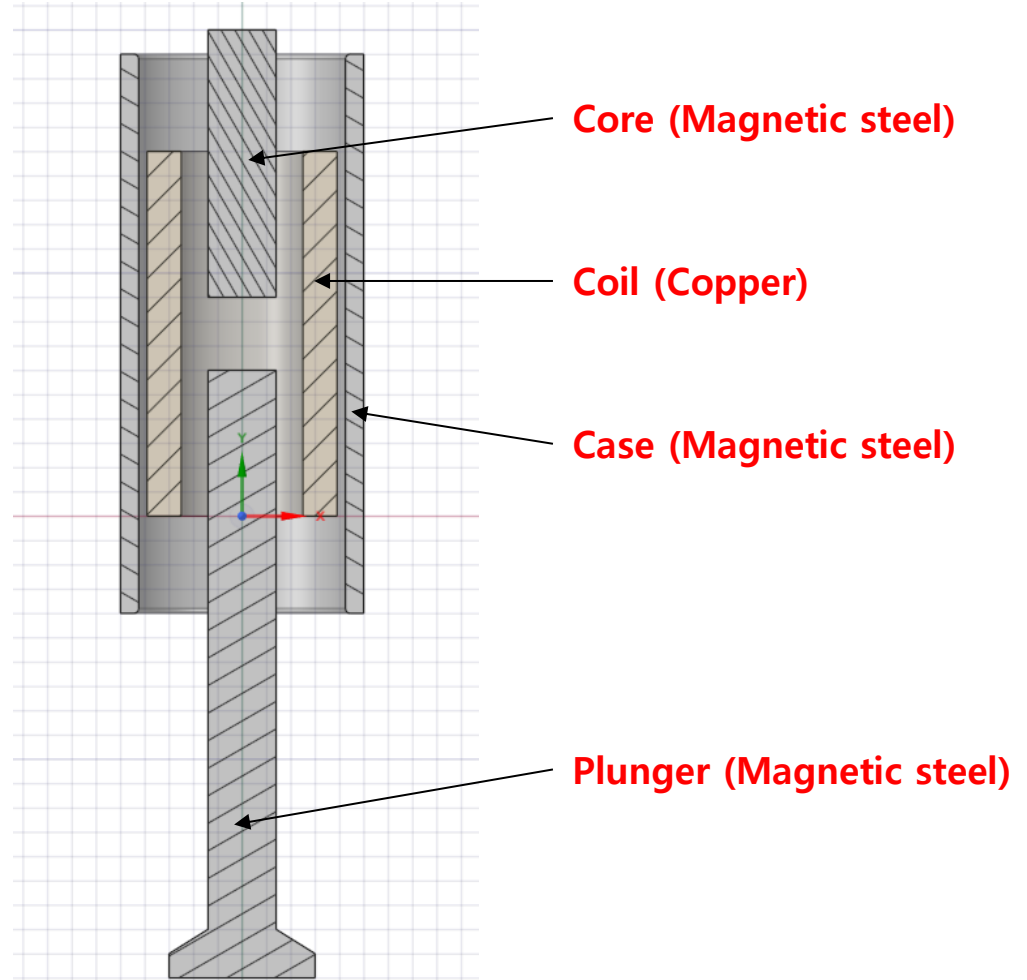
- Plastic, Rubber
- Non-magnetic metals
(SUS 300 series, Aluminum, Brass, ...)
- Other non-magnetic materials



Part selection for magnetic analysis



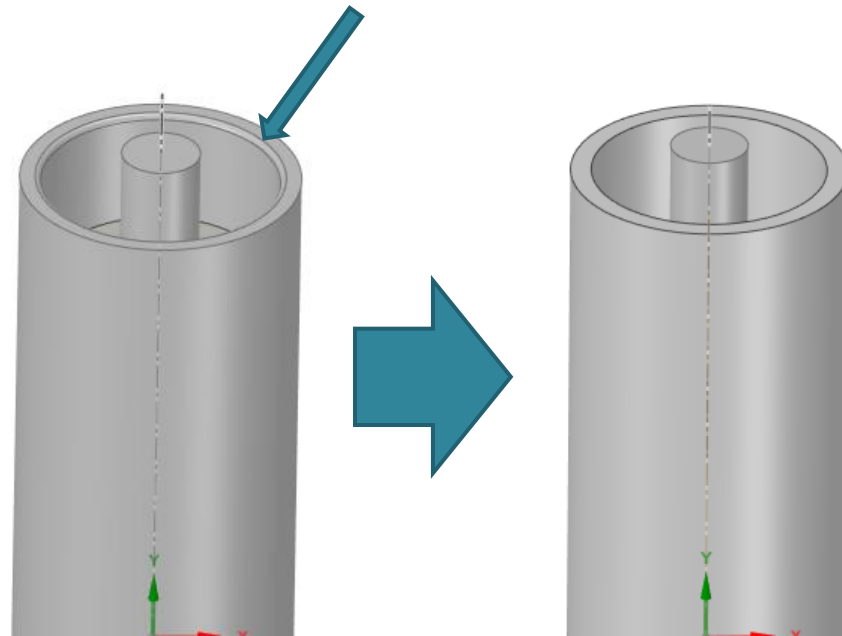
Remove
unnecessary parts



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

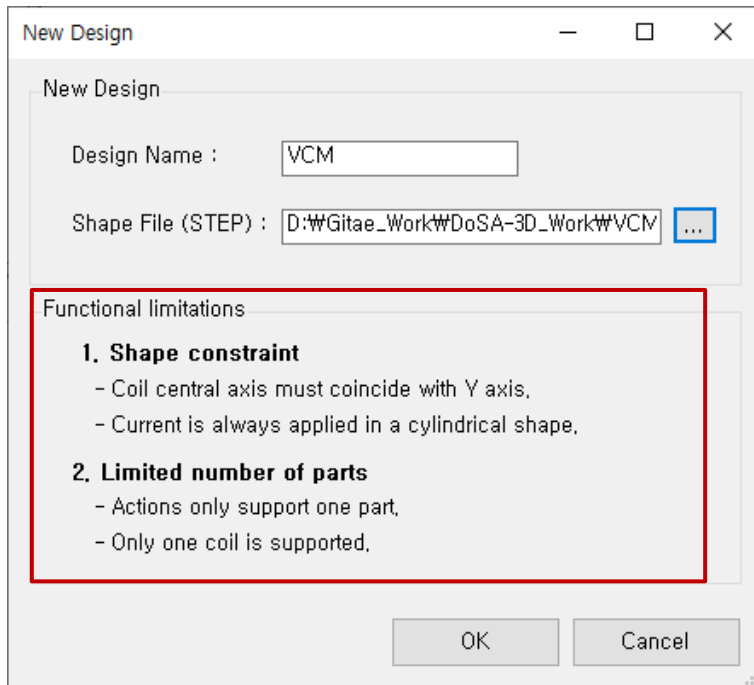


DoSA-3D Shape Caution Item

DoSA-3D Shape Caution Item

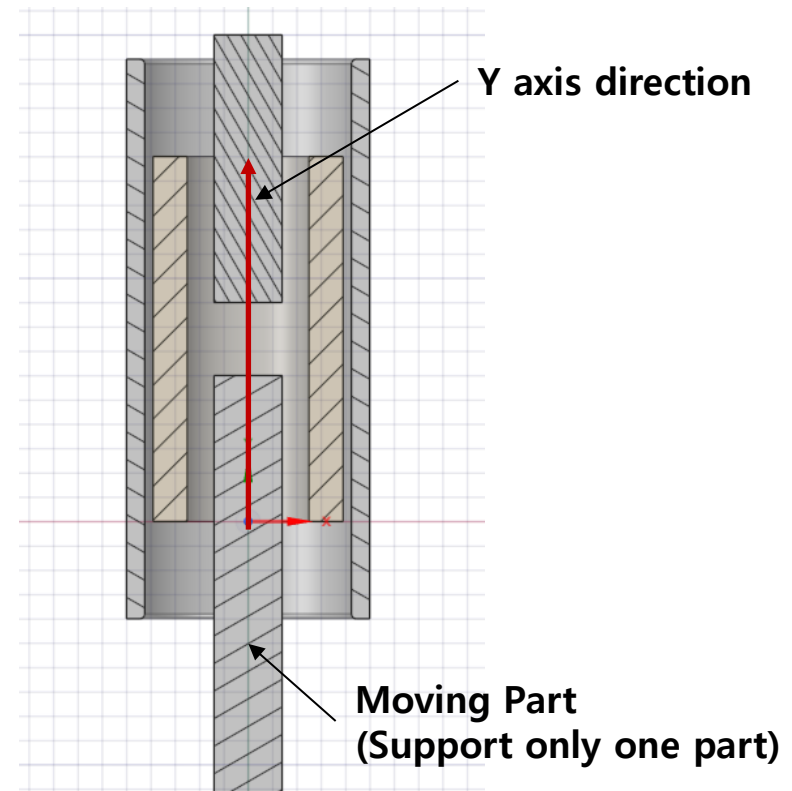
1. Coil Restriction

- Coil central axis must coincide with Y axis.
- Current always applied in cylindrical form.
(Polygon coils cause slight difference)
- Only one coil is supported.



2. Moving Part Restriction

- Moveable parts support only one part.

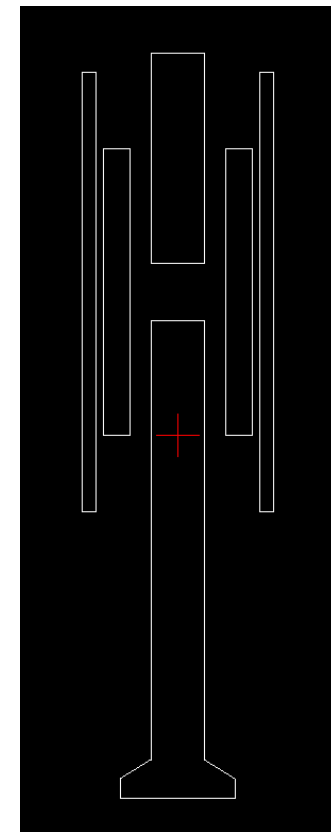
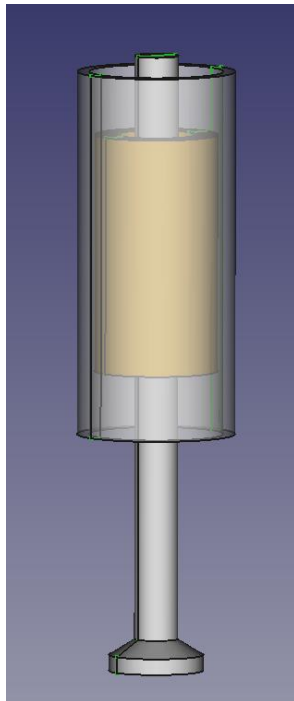


DoSA-2D Shape work

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



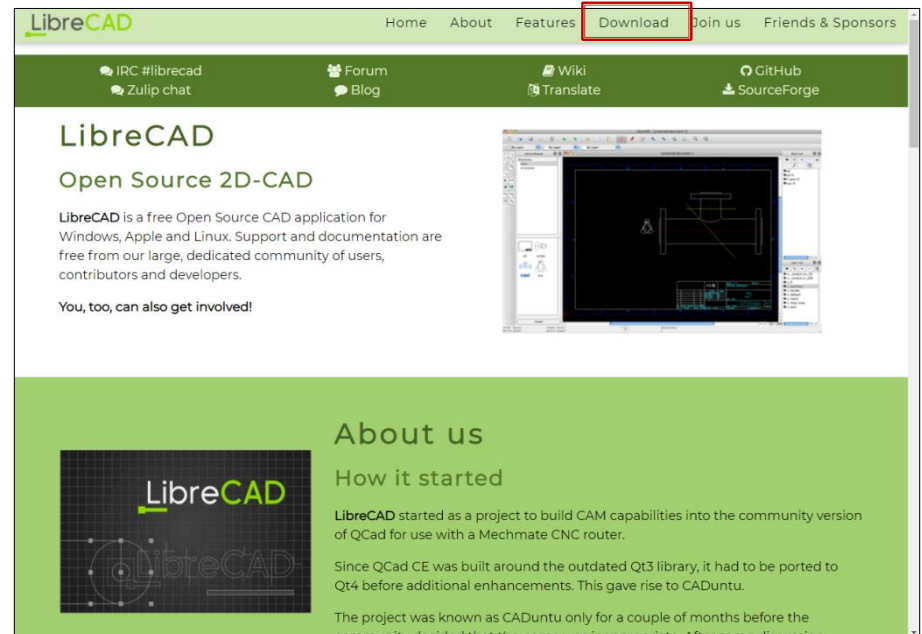
LibreCAD Introduction

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

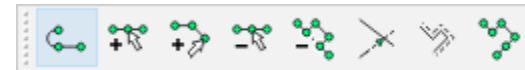
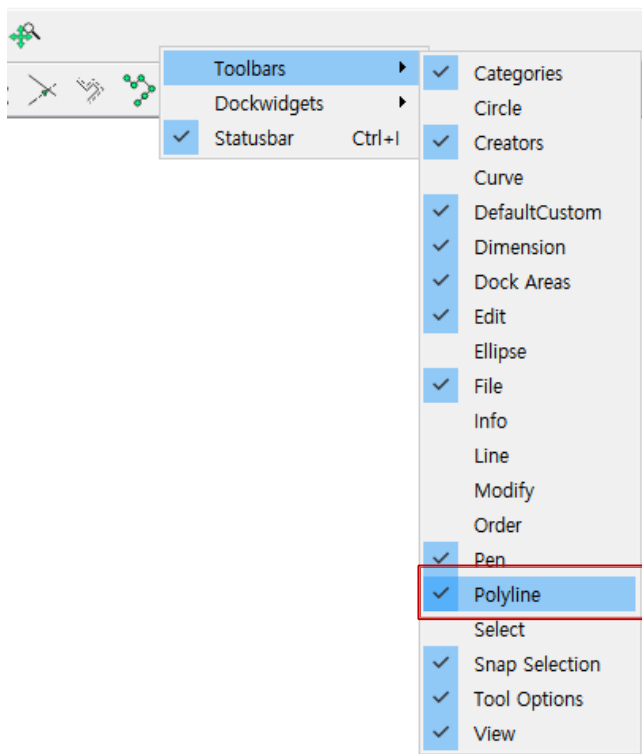
- A free 2D CAD program (LiberCAD) is also available.
- Download Link : <http://librecad.org>
- LibreCAD is used for 2D shape work practice in this document.



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

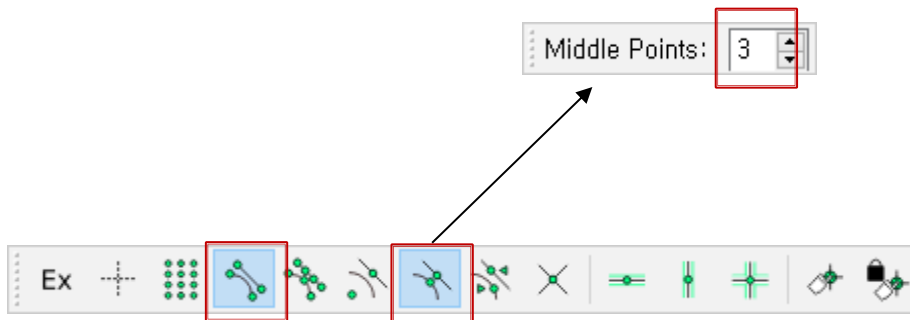
2. Layer 생성

- Layer List window on the right > Click "+" button
- Layer Name : polyline
- Color : Red

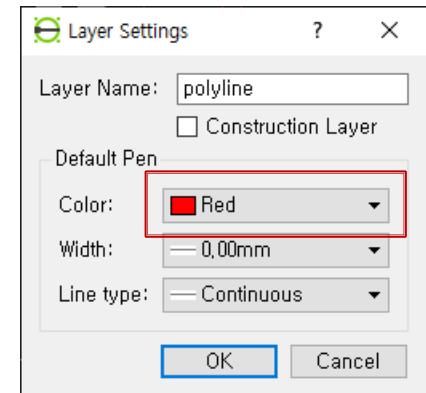
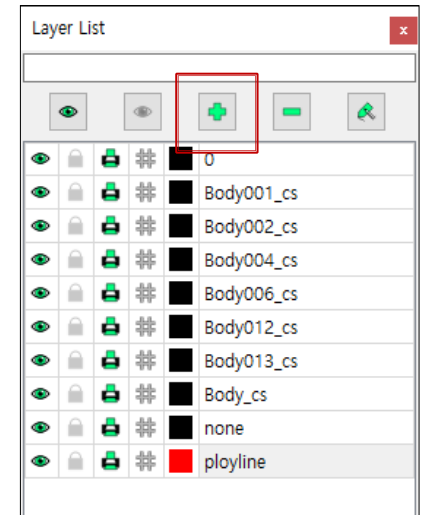
3. Snap Setting

- Only turn on Endpoints, Middle
- Middle Points : 3

3



2



Working with part geometry

1. To Create Part Geometry

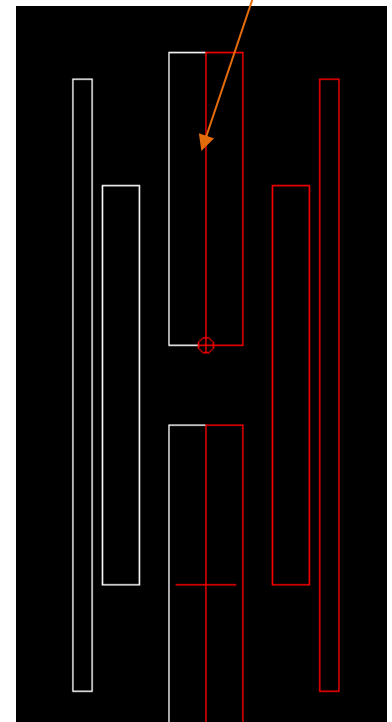
- Create part shapes as a ployline on top of the read DXF shape using the Snap function.

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 ployline :
 - * Select the first point last and
 - Use the Esc key or the Close button on the Middle Points toolbar

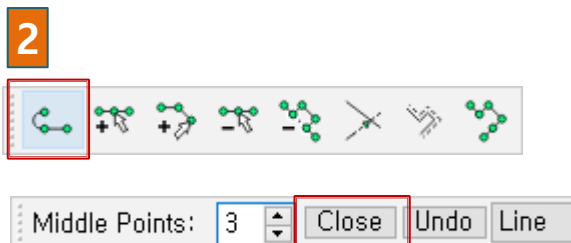
Central axis and Y axis coincide

3



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.



Arc processing while working

1. Simplify Arc Geometry

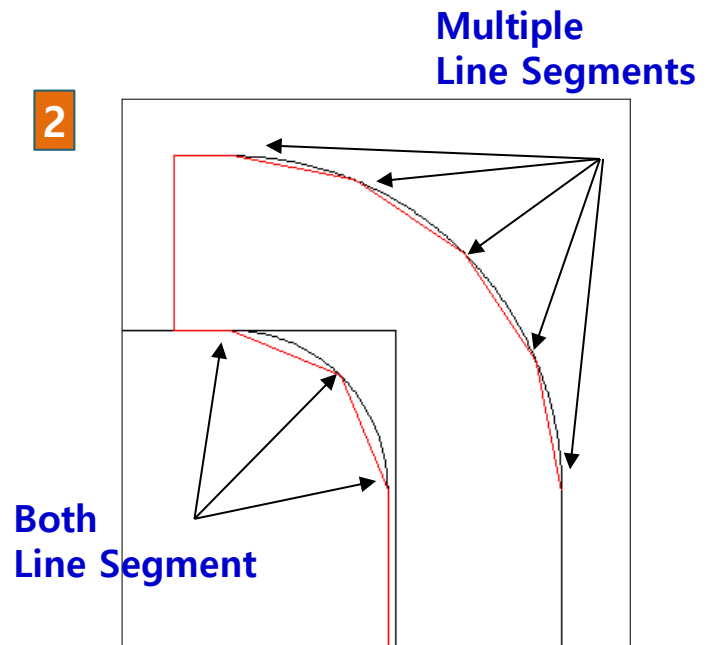
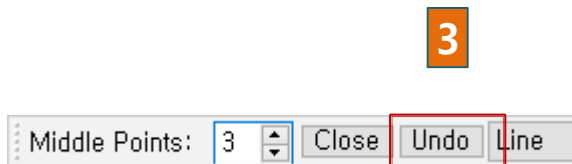
- Arc geometry needs simplification because unnecessary meshes are added.

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

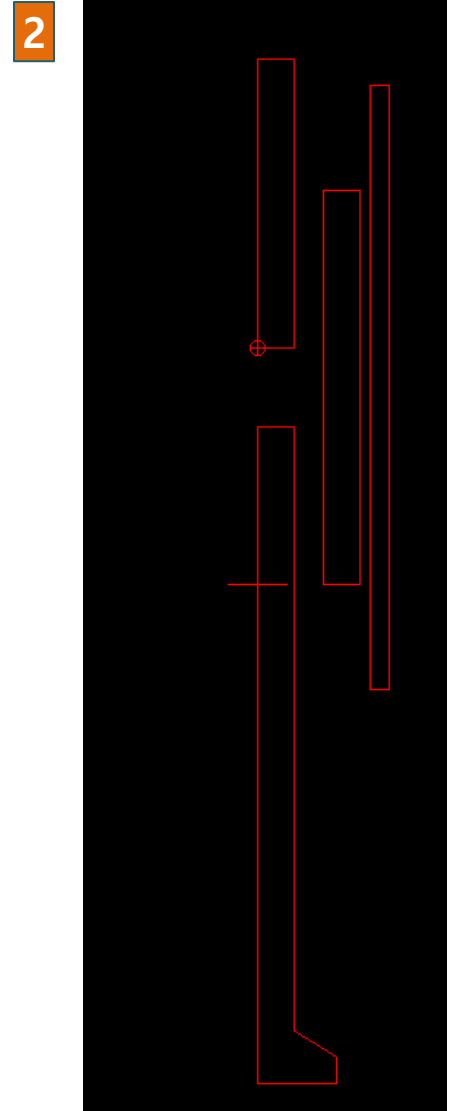
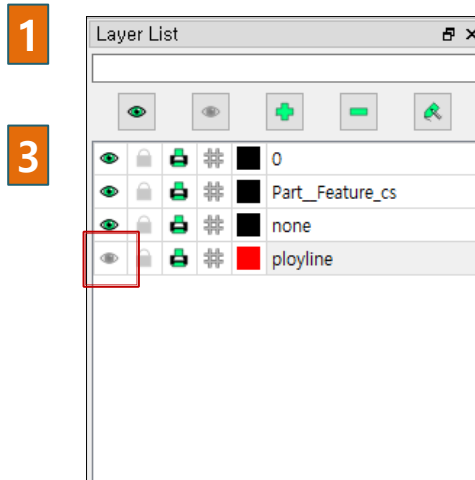
- Layer List window on the right > turn off polyline layer

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 ...



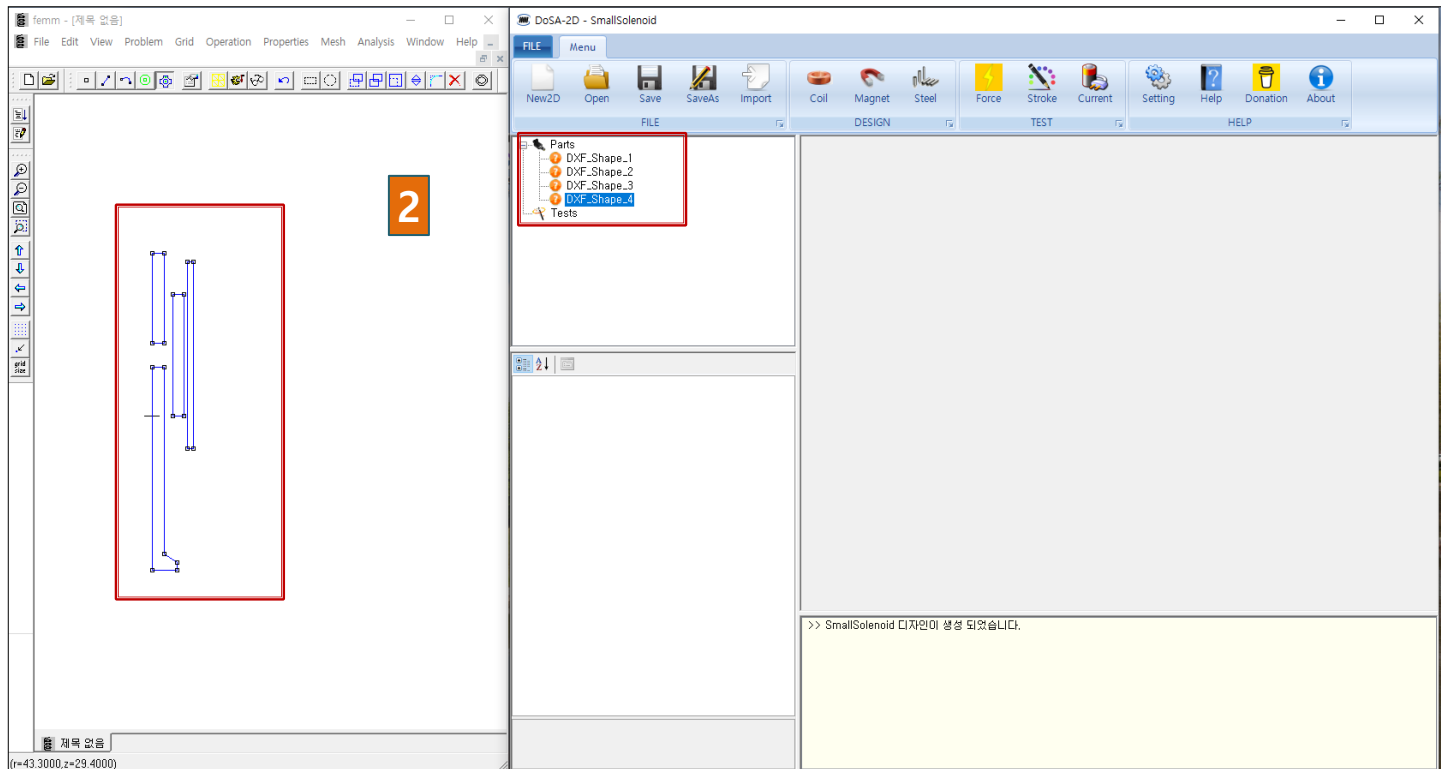
Reading the shape of DoSA-2D

1. Read DXF file

- Ribbon Bar FILE > Import



2. Check the cross-sectional shape



Thank You

Email : zgitae@gmail.com

Homepage : <http://openactuator.org>

