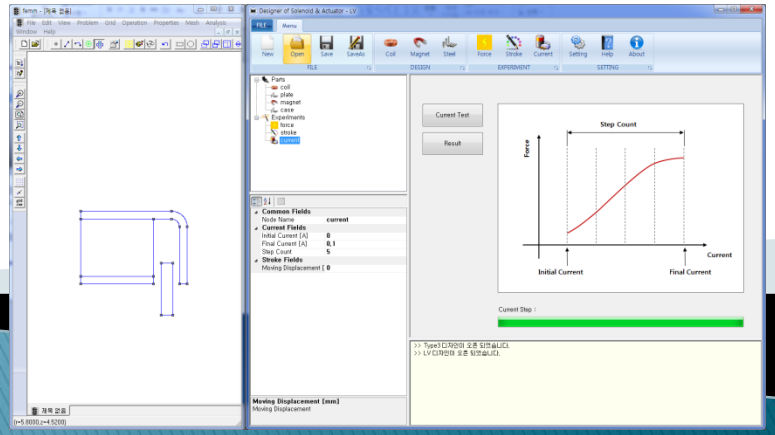
DoSA-2D 사용 메뉴얼

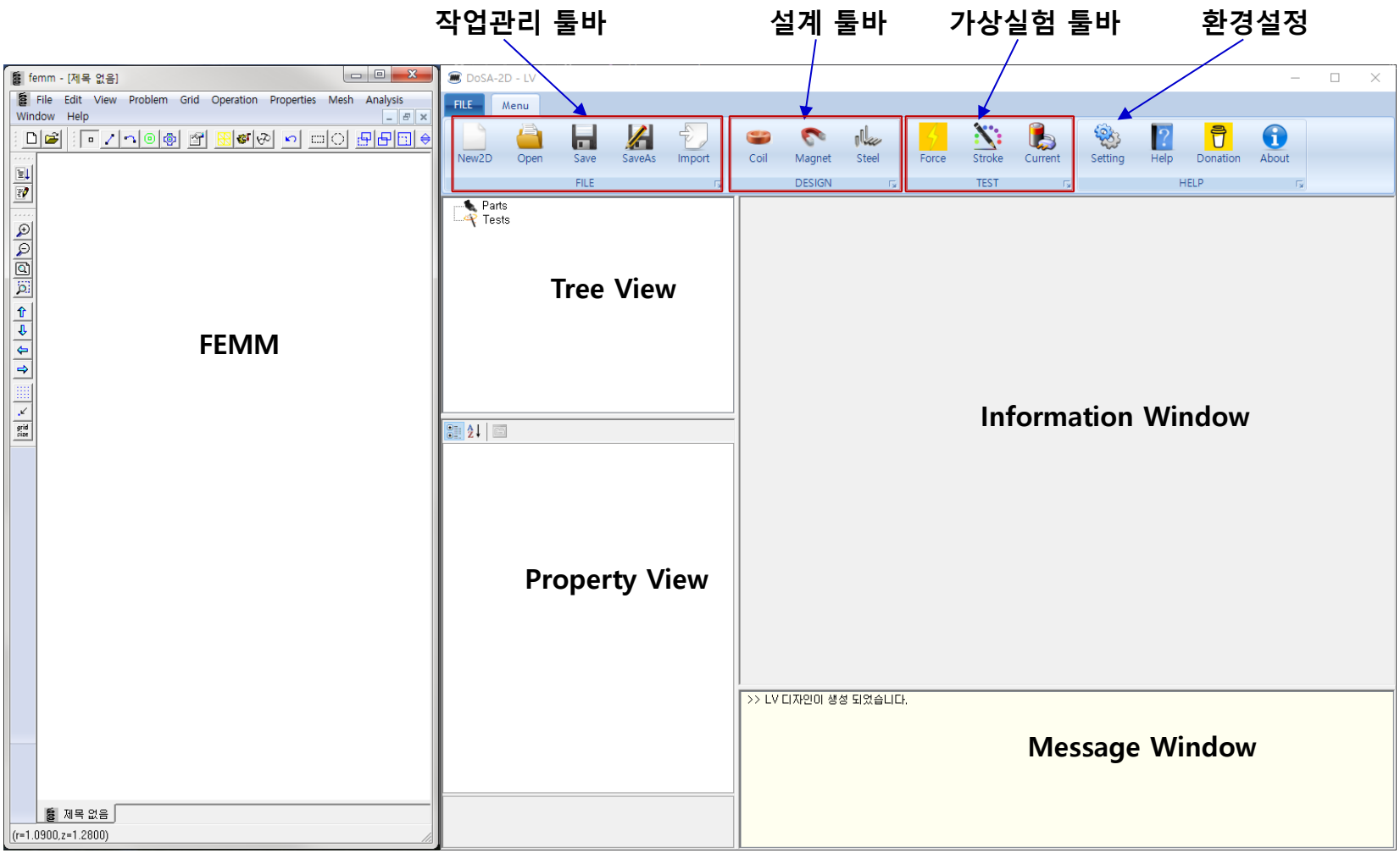
Solenoid Example



2022-05-30
zgitae@gmail.com

DoSA 구성

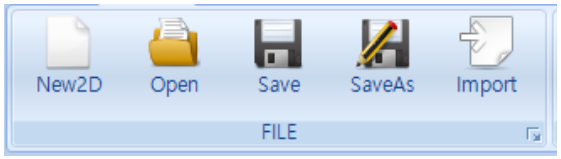
프로그램 구성


작업관리 툴바
설계 툴바
가상실험 툴바
환경설정
femm - [제목 없음]
File Edit View Problem Grid Operation Properties Mesh Analysis
Window Help
FEMM
제목 없음
(r=1.0900,z=1.2800)
DoSA-2D - LV
FILE
Menu
New2D Open Save SaveAs Import
FILE
Coil Magnet Steel
DESIGN
Force Stroke Current
TEST
Setting Help Donation About
HELP
Parts
Tests
Tree View
Property View
Information Window
>> LV 디자인이 생성 되었습니다.
Message Window

Toolbar

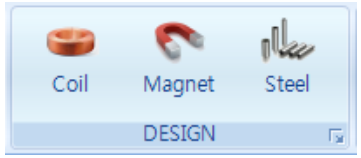
1. 작업관리

- ✓ New : 신규작업 생성
- ✓ Open : 이전작업 열기
- ✓ Save : 작업 저장
- ✓ SaveAs : 다른 이름으로 저장
- ✓ Import : DXF Import



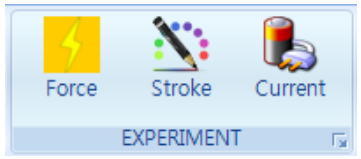
2. 설계

- ✓ Coil : 권선 추가 및 사양 설계
- ✓ Magnet : 영구자석 추가 및 사양 설정
- ✓ Steel : 연자성체 추가 및 사양 설정



3. 가상실험

- ✓ Force : 자기력 예측
- ✓ Stroke : 변위별 자기력 예측
- ✓ Current : 전류별 자기력 예측

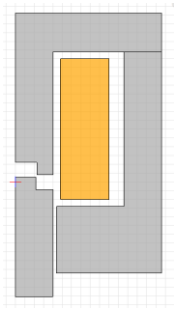


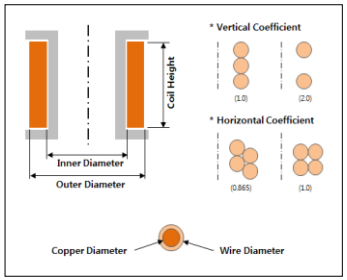
작업 흐름

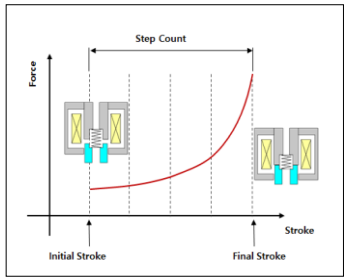
제품 설계

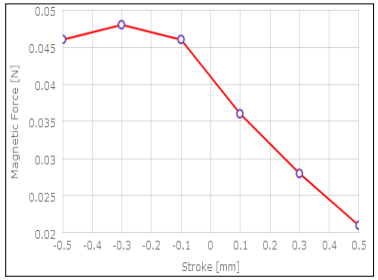
가상 실험

1. 형상설계 → Geometry
2. 부품설계 → Components
3. 시험조건 → Test Condition
4. 가상실험 (자동실행) → Virtual Test
5. 결과확인 → Results





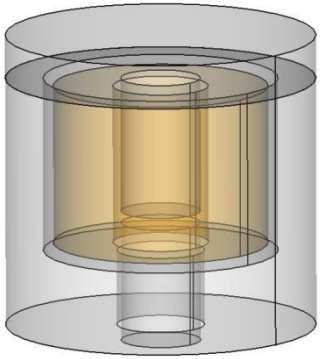


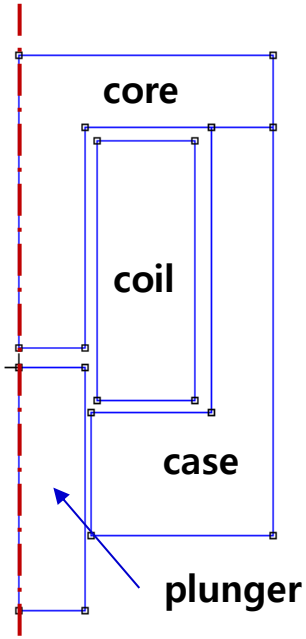


해석 모델

해석모델 설명

1. 형상 모델





2. 제품 사양

가. 코일권선

- Coil Turns : 1040 turns
- Coil Resistance : 15.2 Ohm

나. 전원

- Voltage : 14.5V

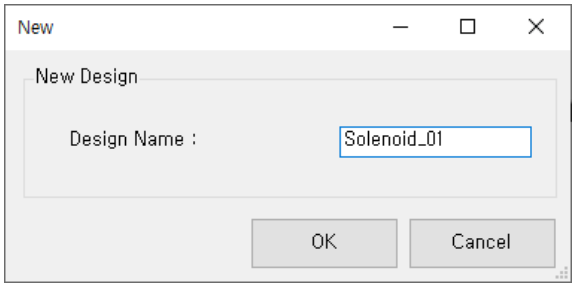
(작업 예제파일 : DoSA-2D 설치 디렉토리 > Samples > Solenoid)

Design 생성

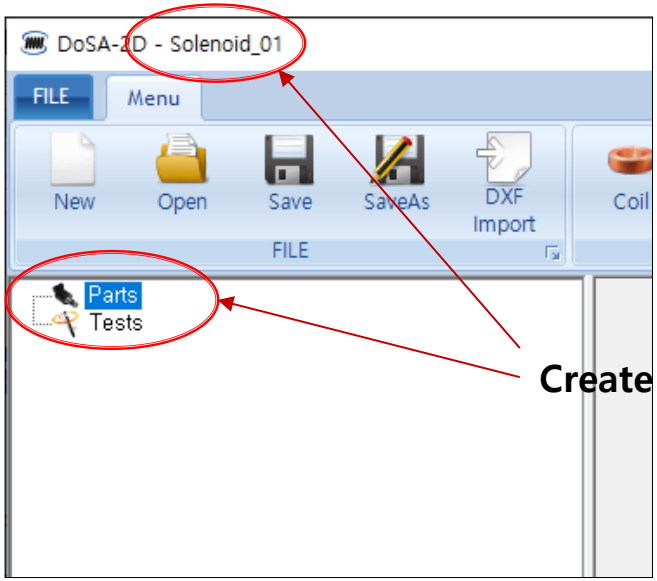
1. Toolbar > New 버튼 클릭
2. Design Name : "Solenoid_01"
3. OK 클릭

1

2



3

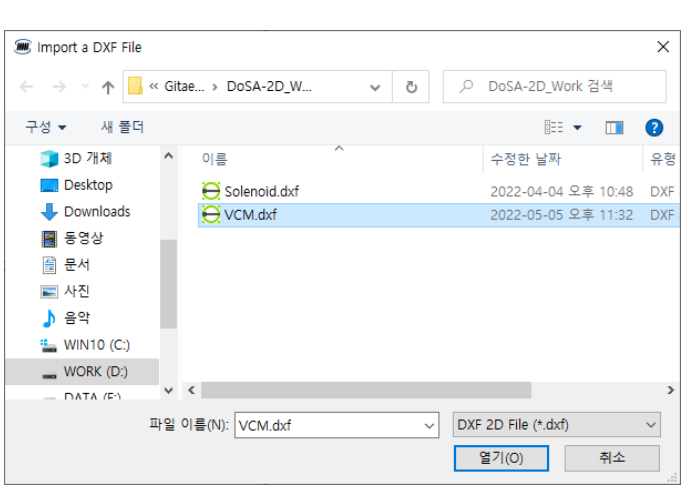


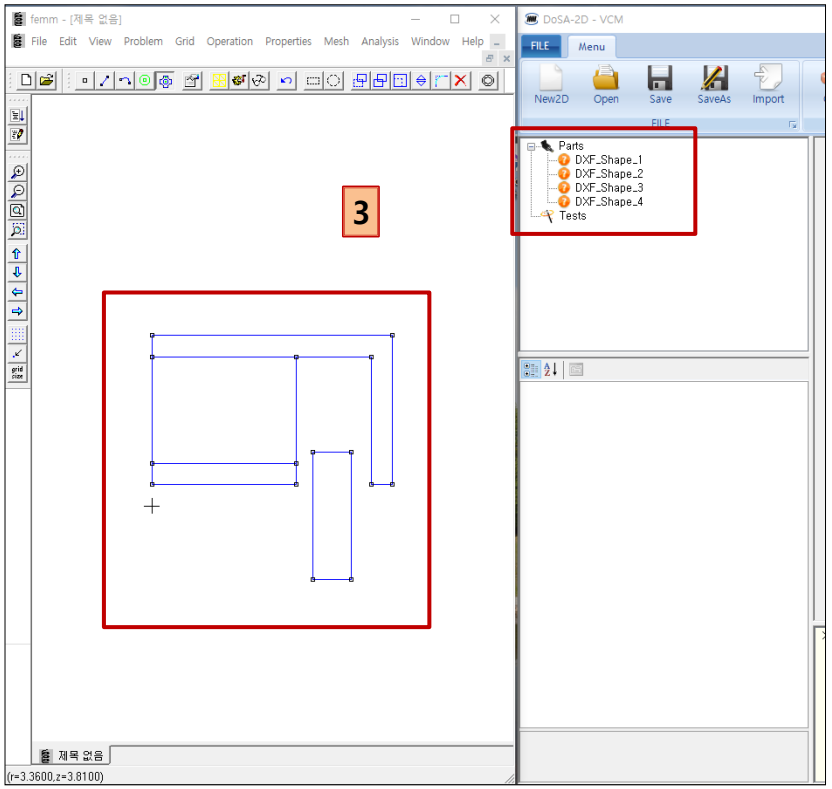
형상 Import

1. Toolbar > Import 버튼 클릭
2. "Solenoid.dxf" 선택 후 열기버튼 클릭
3. 부품 형상 확인

[형상작업 주의사항]

- Part 는 Polyline 으로 작성되어야 함
- "해석 전 형상작업 가이드" 참고 할 것
- https://solenoid.or.kr/data/Drawing_Guide_KOR.pdf

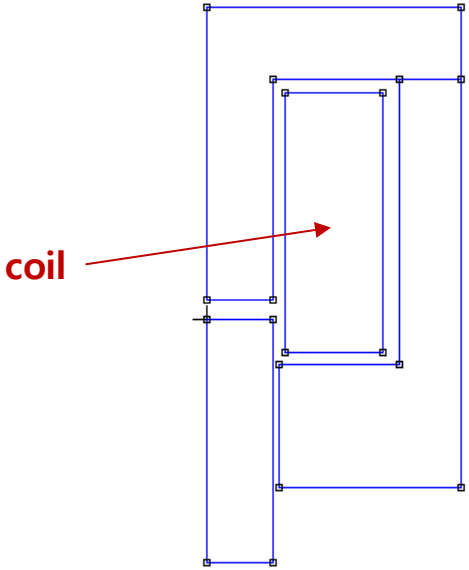


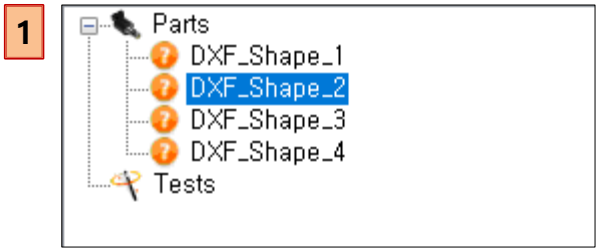


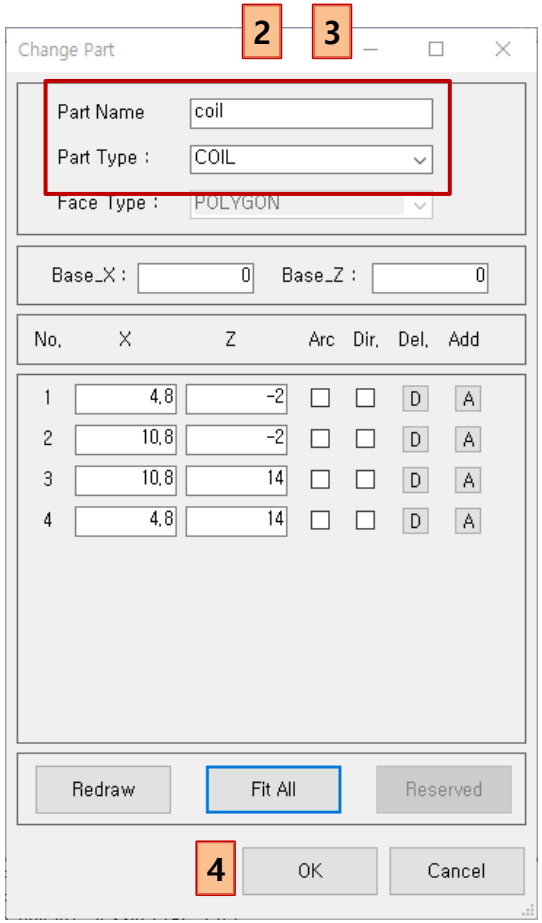
Parts Design

Coil 지정

1. Treeview > “DXF_Shape_2” 더블 클릭
2. Name 변경 : “coil”
3. 파트 속성 변경 : COIL
4. OK 버튼 클릭







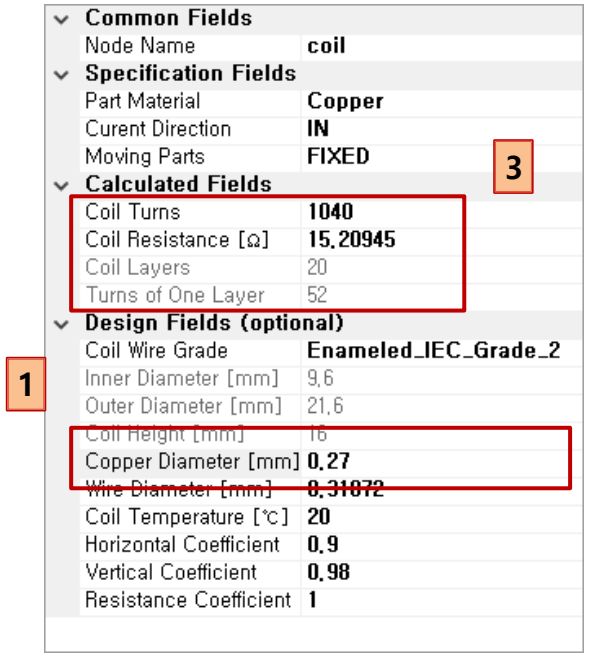
Coil 설계

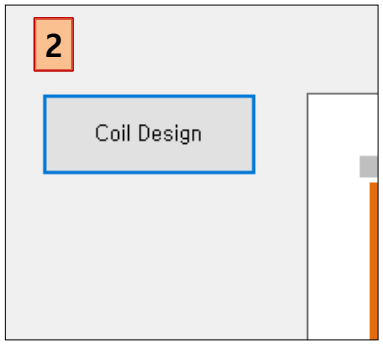
1. Coil 기구사양 입력
   - ✓ Copper Diameter : 0.27

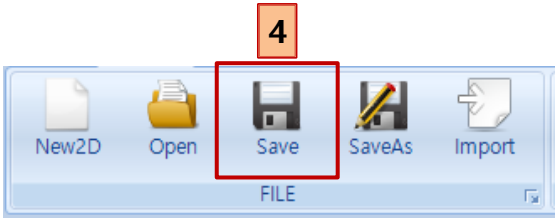
2. Coil 사양 계산
   - ✓ Design Coil 버튼 클릭

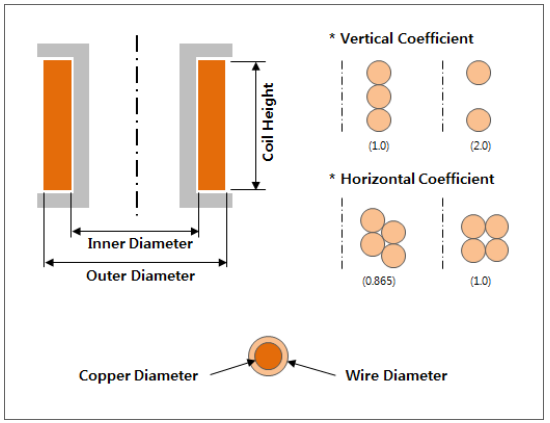
3. Coil 사양 확인

4. 리본 바 > Save



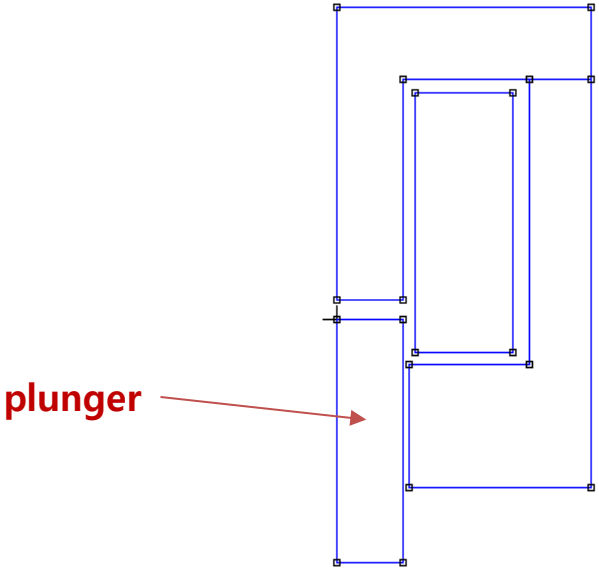


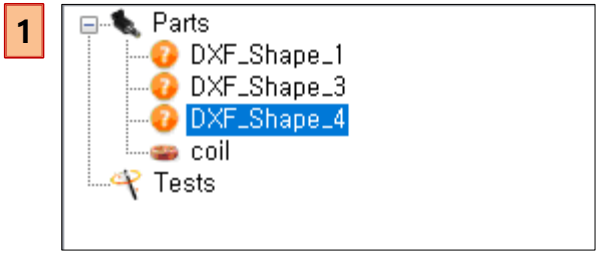


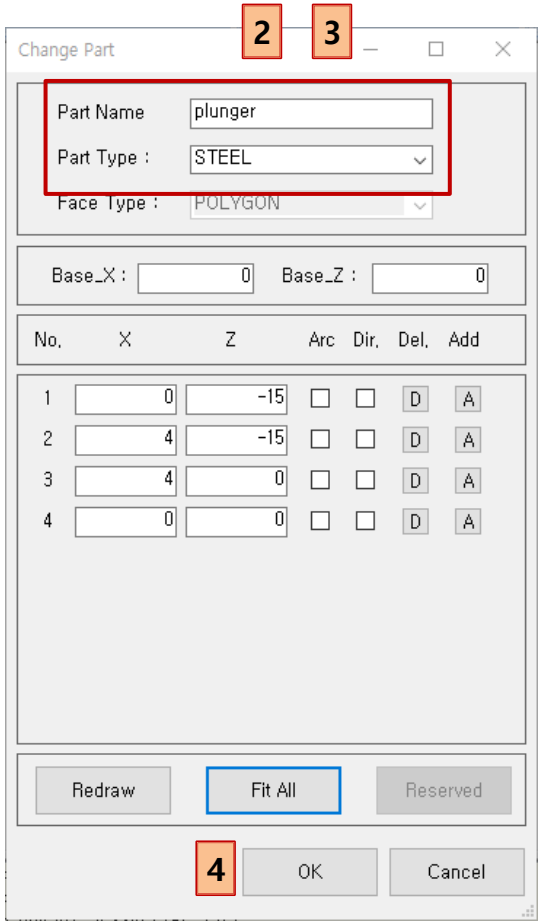


Plunger 지정

1. Treeview > “DXF_Shape_4” 더블 클릭
2. Name 변경 : “plunger”
3. 파트 속성 변경 : STEEL
4. OK 버튼 클릭







Plunger 설정

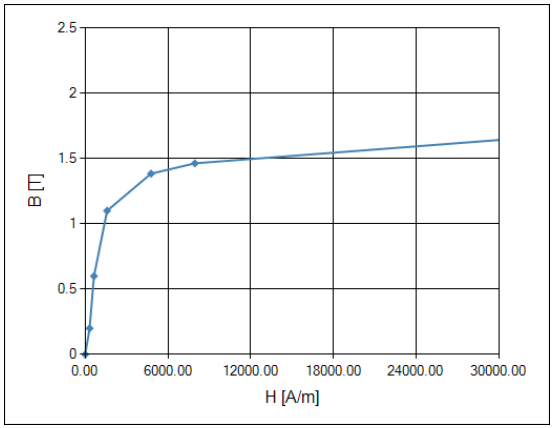
자기력 계산 파트 선정

1. Plunger 속성 설정
   - ✓ Part Material : 430 Stainless Steel 선택
   - ✓ Moving Parts : **MOVING**

1

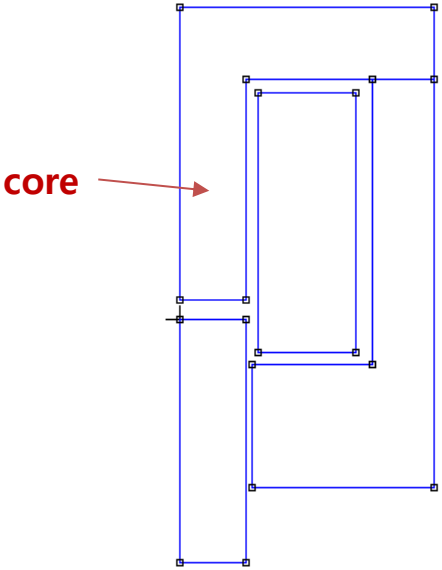
Common Fields	
Node Name	plunger
Specification Fields	
Part Material	430 Stainless Steel
Moving Parts	MOVING

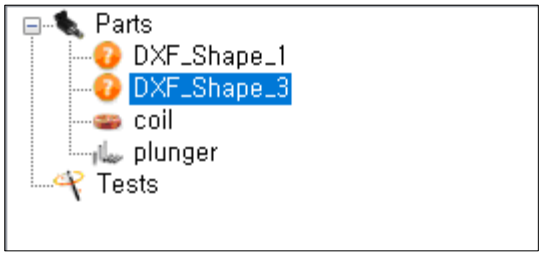
[BH curve]

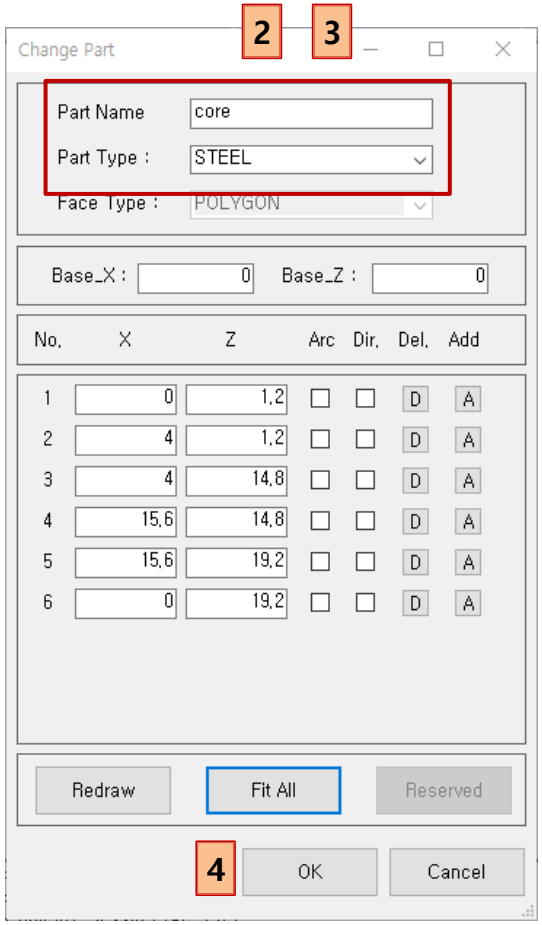


Core 지정

1. Treeview > “DXF_Shape_3” 더블 클릭
2. Name 변경 : “core”
3. 파트 속성 변경 : STEEL
4. OK 버튼 클릭

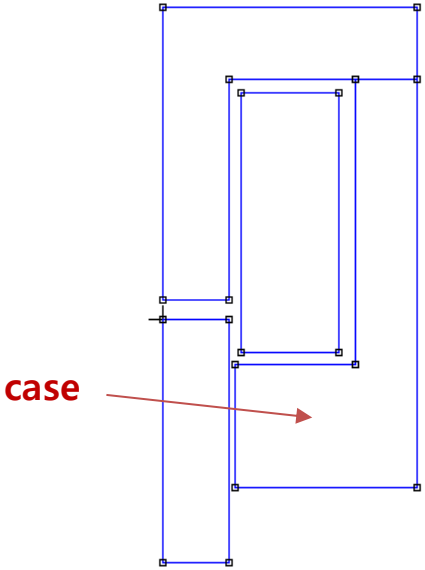


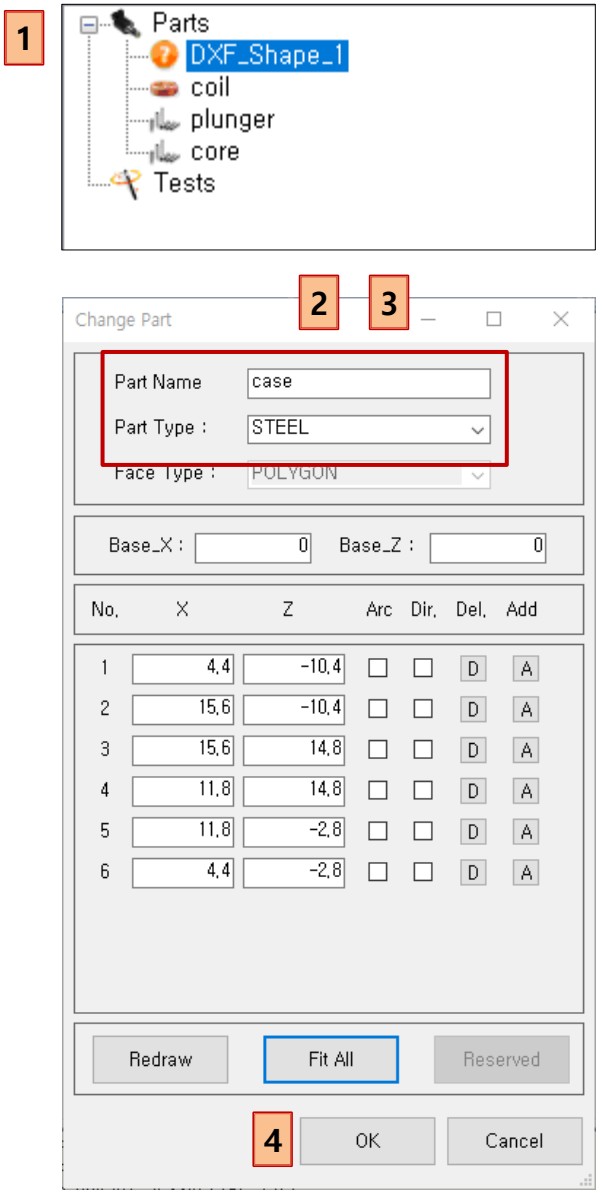




Case 지정

1. Treeview > “DXF_Shape_1” 더블 클릭
2. Name 변경 : “case”
3. 파트 속성 변경 : STEEL
4. OK 버튼 클릭

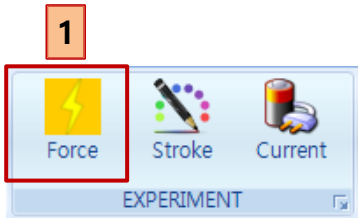


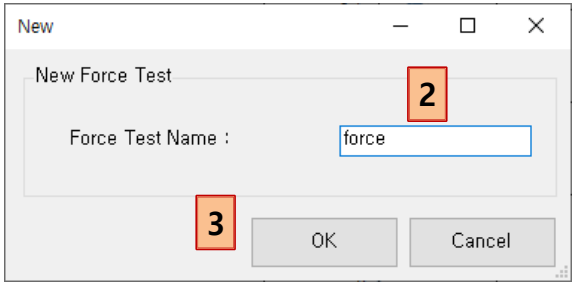


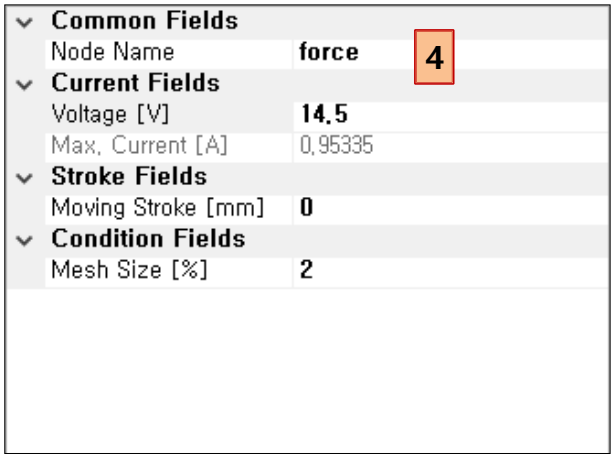
Virtual Test

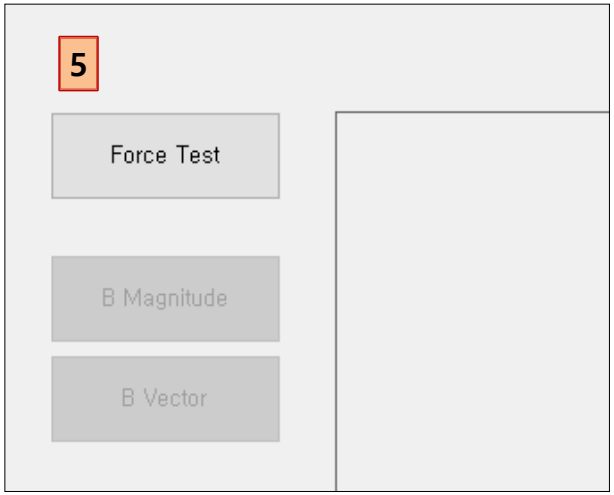
자기력 가상실험

1. Toolbar > Force 버튼 클릭
2. Test Name : "force"
3. OK 버튼 클릭
4. 자기력 가상실험 설정
   ✓ Voltage : 14.5 V
5. Force Test 버튼 클릭



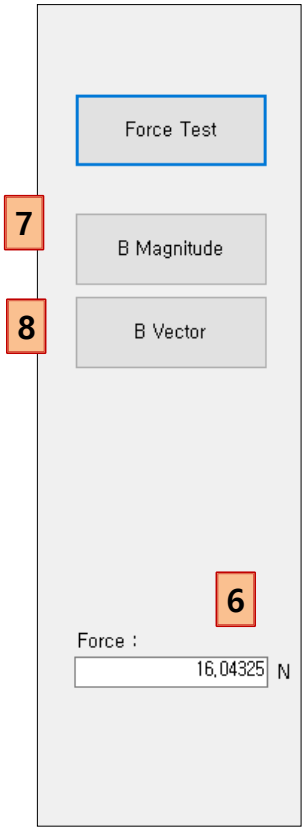


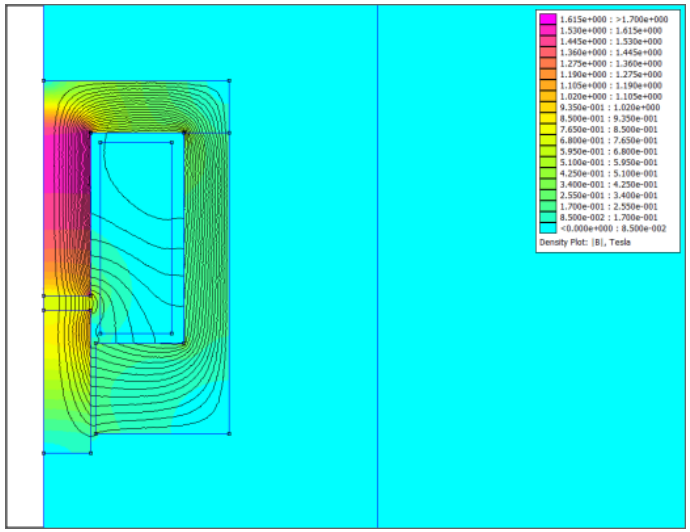


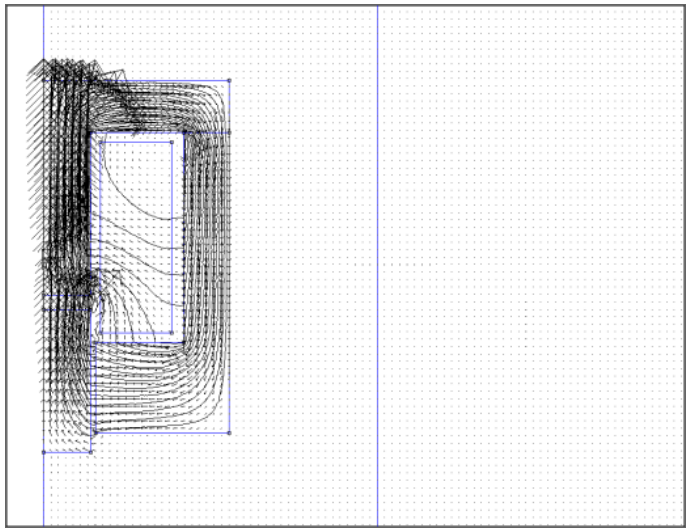


자기력 가상실험 결과

6. 자기력 확인 : 16.04 N
7. 자속밀도 확인
   - ✓ B Magnitude 버튼 클릭
8. 자속밀도 벡터 확인
   - ✓ B Vector 버튼 클릭

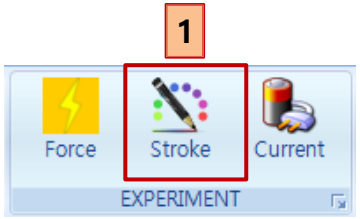


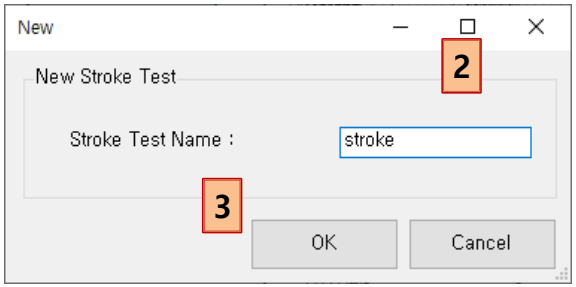


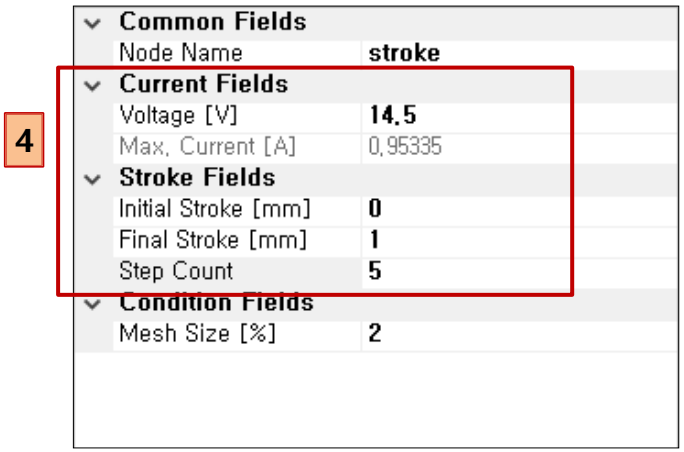


변위-자기력 가상실험

1. Toolbar > Stroke 버튼 클릭
2. Test Name 입력 : "stroke"
3. OK 버튼 클릭
4. 자기력-전류 가상실험 설정
   - ✓ Voltage : 14.5
   - ✓ Initial Stroke : 0.0
   - ✓ Final Stroke : 1.0
   - ✓ Step Count : 5

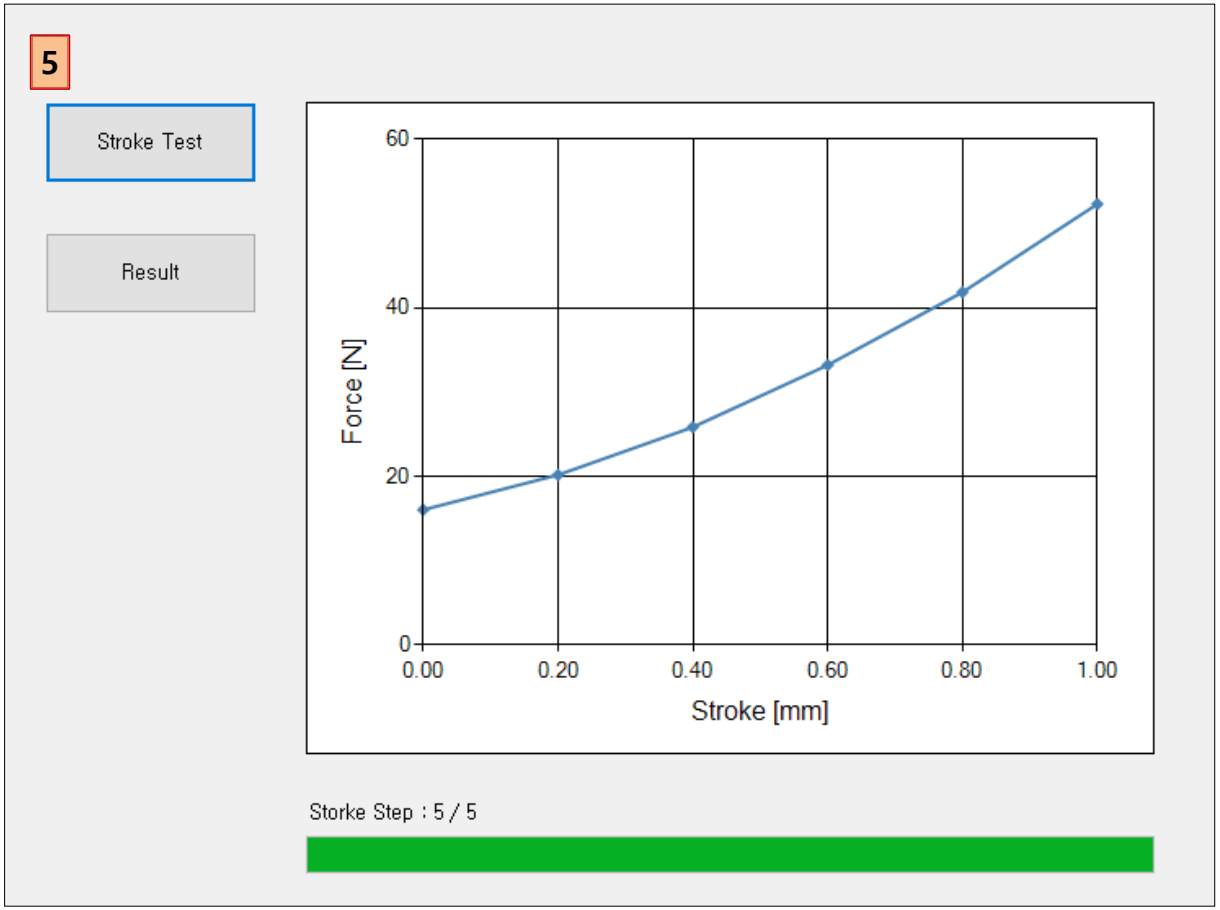






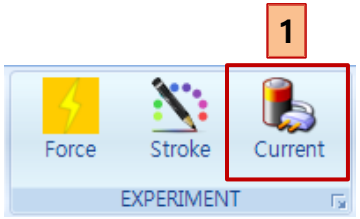
변위-자기력 가상실험 결과

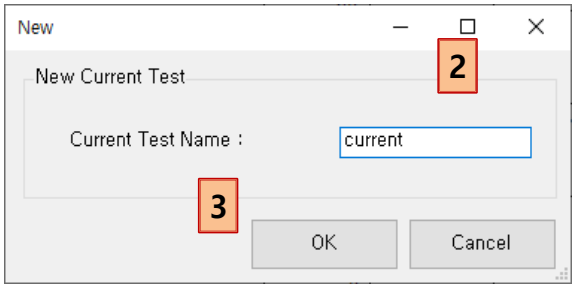
5. Stroke Test 버튼 클릭

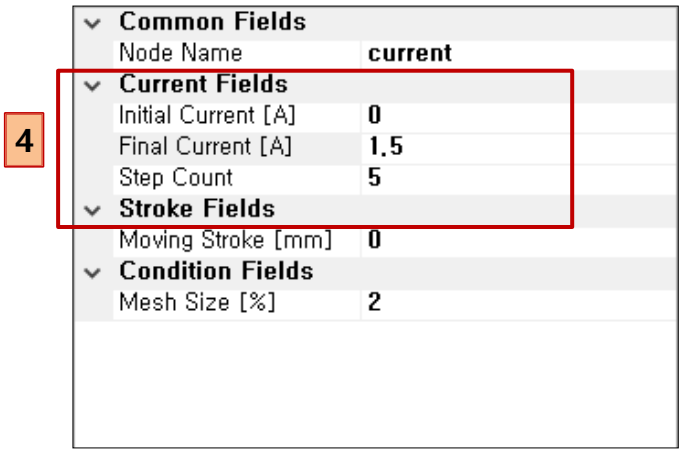


전류-자기력 가상실험

1. Toolbar > Current 버튼 클릭
2. Test Name 입력 : "current"
3. OK 버튼 클릭
4. 자기력-전류 가상실험 설정
   - ✓ Initial Current : 0.0
   - ✓ Final Current : 1.5
   - ✓ Step Count : 5

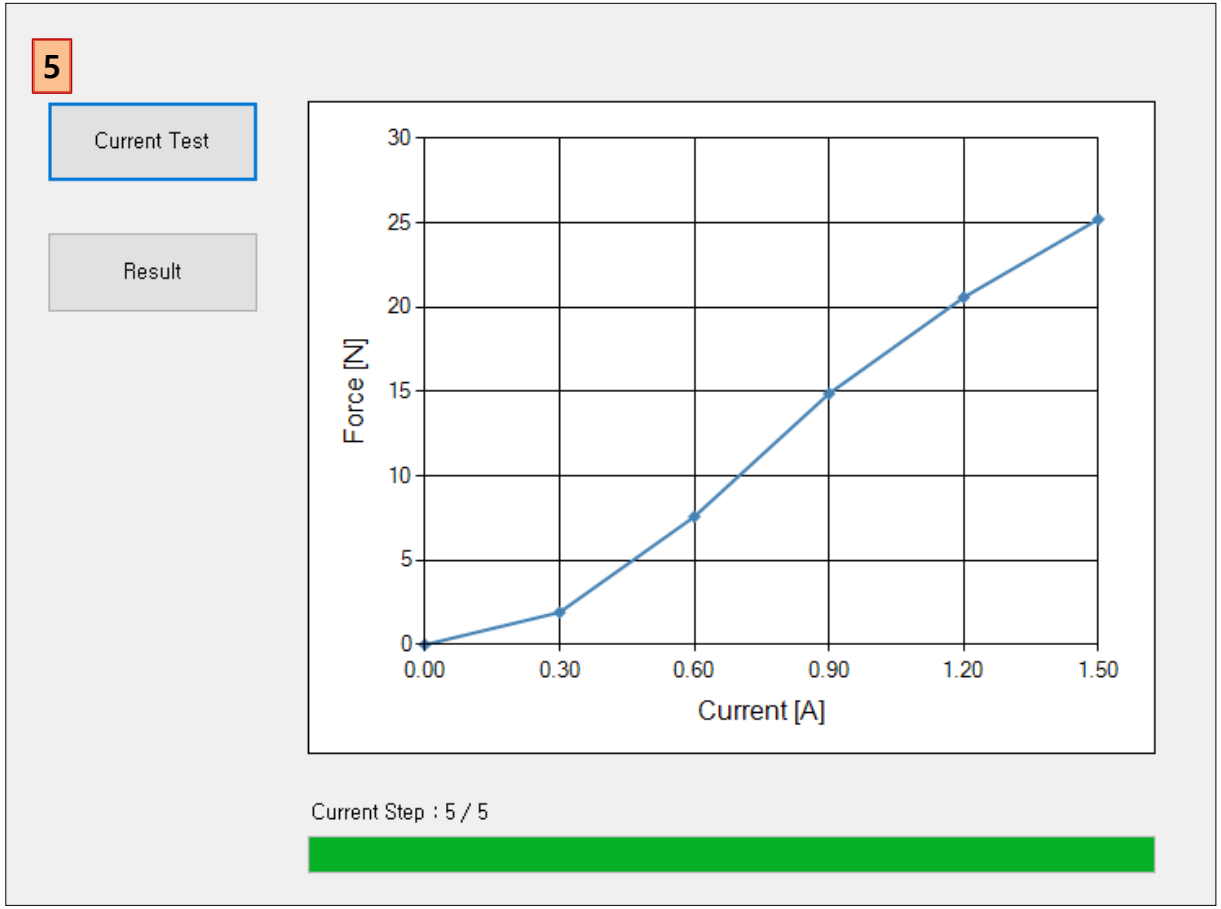






전류-자기력 가상실험 결과

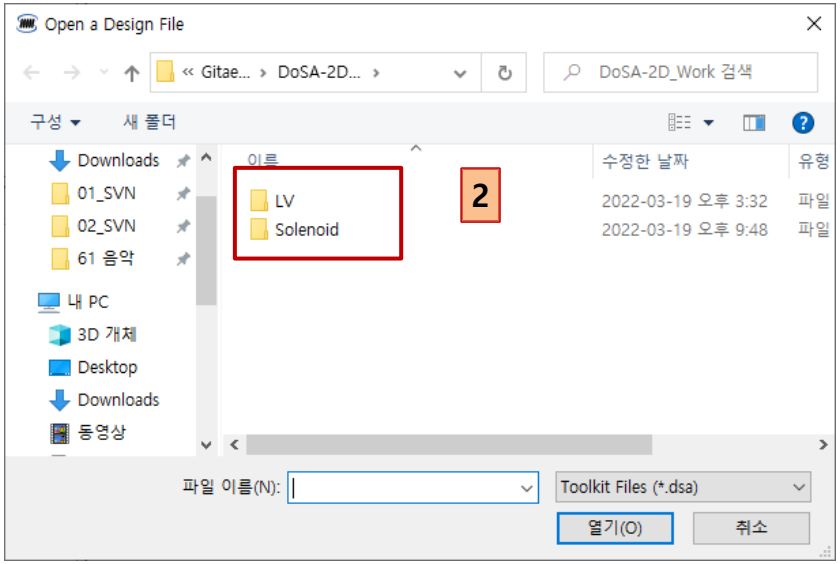
5. Current Test 버튼 클릭

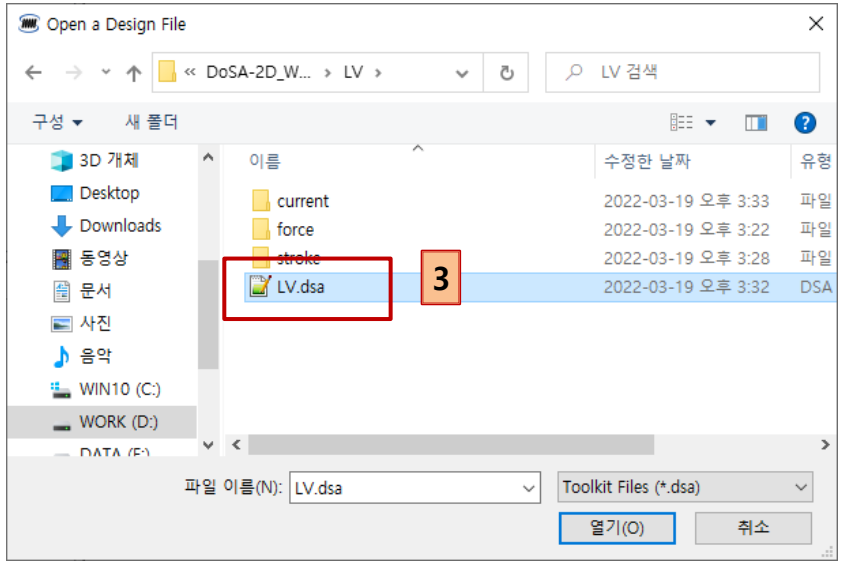


Tips

Design 열기

1. Toolbar > Open 버튼 클릭
2. Design 디렉토리 더블 클릭
3. Design 파일 더블 클릭





Thank You

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