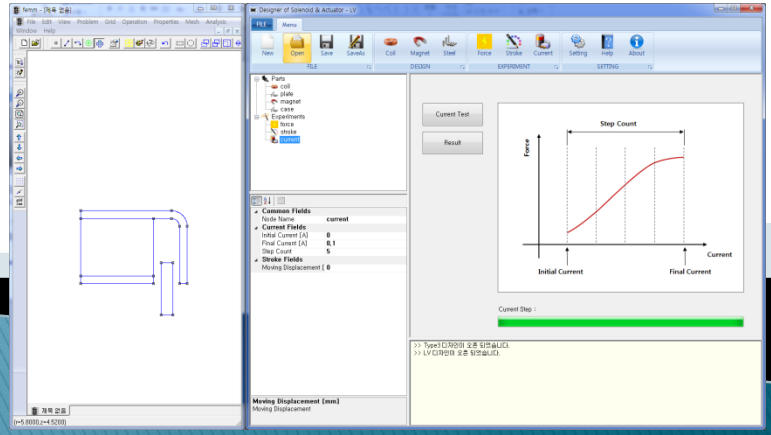
DoSA-2D 사용 메뉴얼

Voice Coil Motor Example

(Speaker, Auto-Focus, Linear Vibrator)

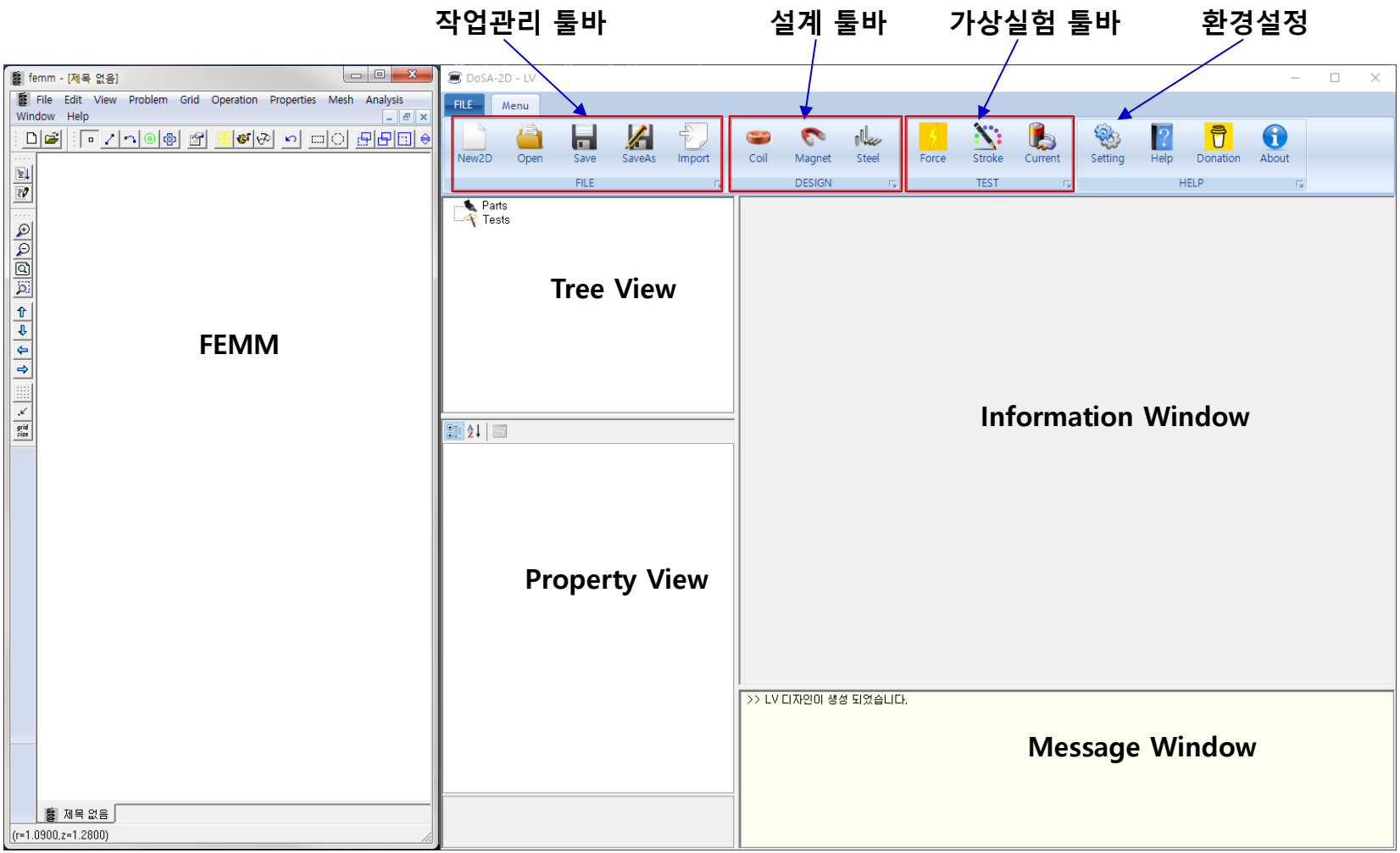


2022-05-30

zgitae@gmail.com

DoSA 구성

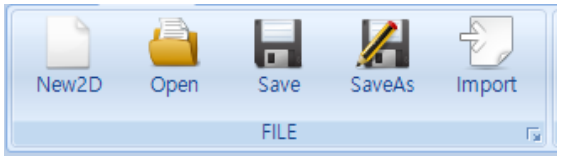
프로그램 구성


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

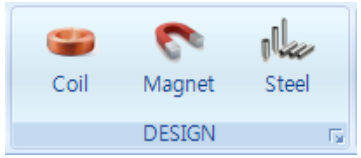
1. 작업관리

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



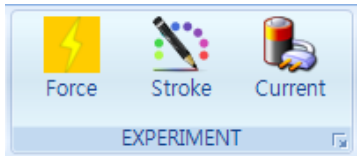
2. 설계

- ✓ 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

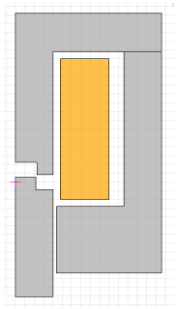


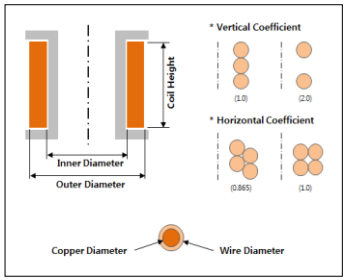
작업 흐름

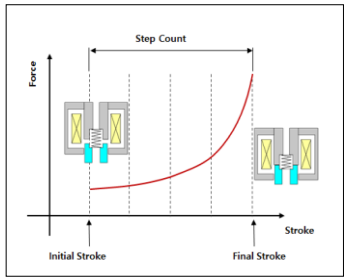
제품 설계

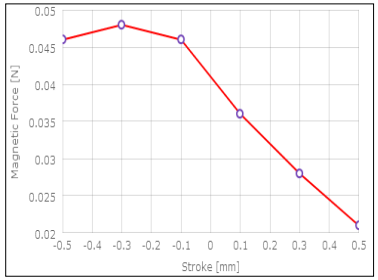
가상 실험

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





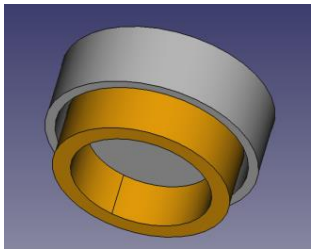


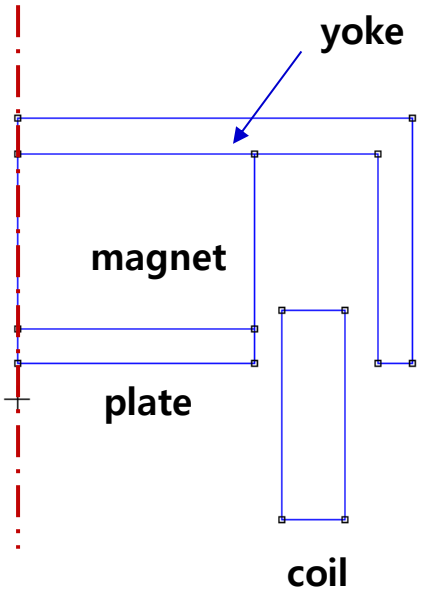


해석 모델

해석모델 설명

1. 형상 모델





2. 제품 사양

가. 코일권선

- Coil Turns : 126 turns
- Coil Resistance : 15.75 Ohm

나. 영구자석

- Material : N52 (NdFeB 52)
- 착자방향 : 90 (UP)

다. 전원

- Voltage : 2.5V

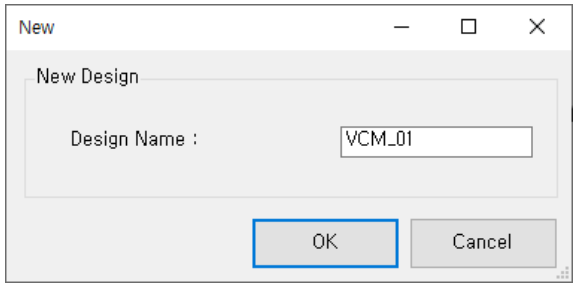
(작업 예제파일 : DoSA-2D 설치 디렉토리 > Samples > VCM)

Design 생성

1. Toolbar > New 버튼 클릭
2. Design Name : "VCM_01"
3. OK 클릭

1

2



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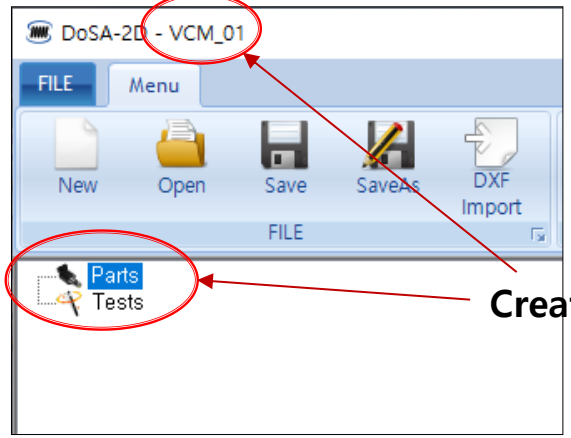
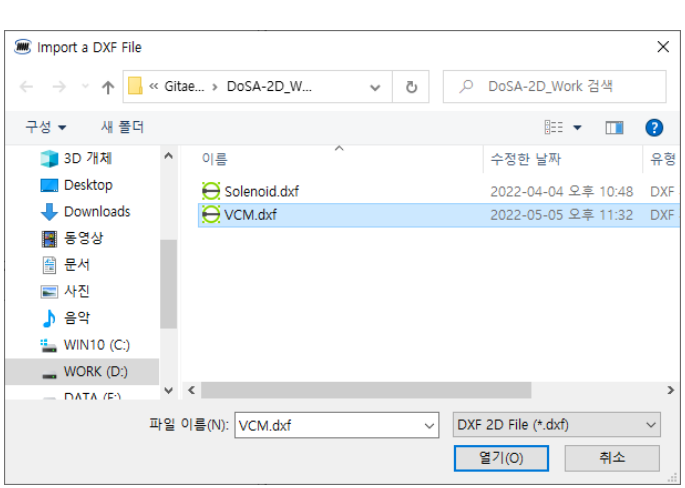


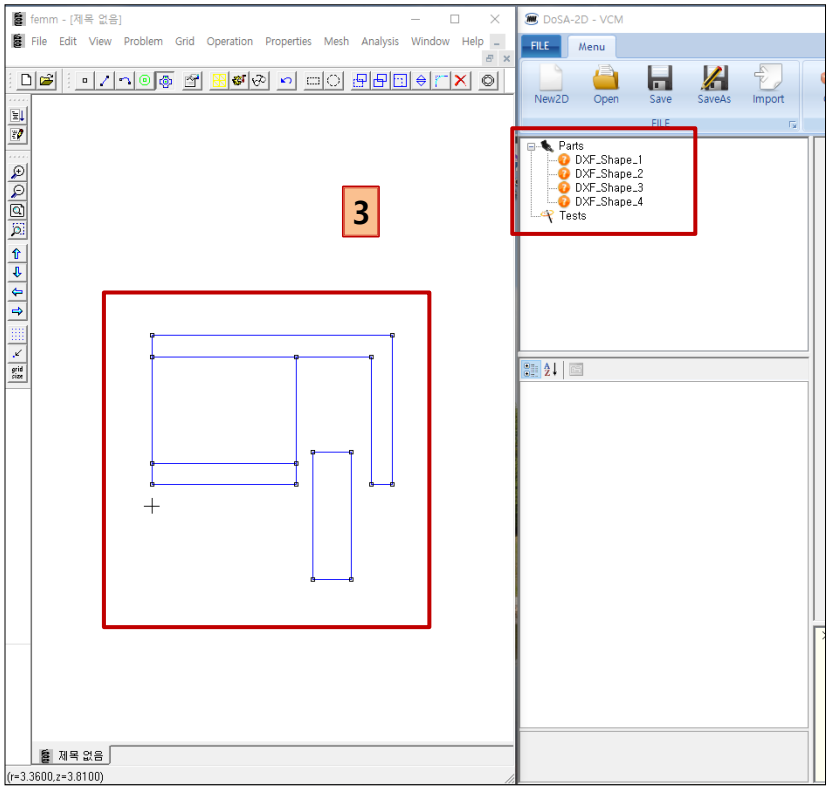
형상 Import

1. Toolbar > Import 버튼 클릭
2. "VCM.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

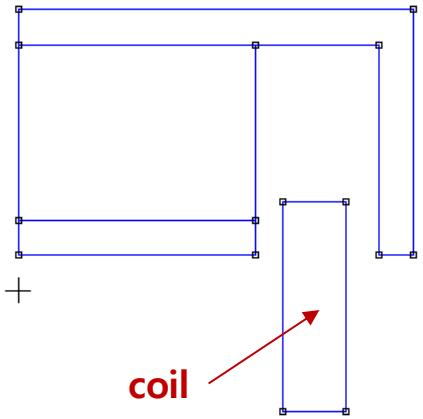


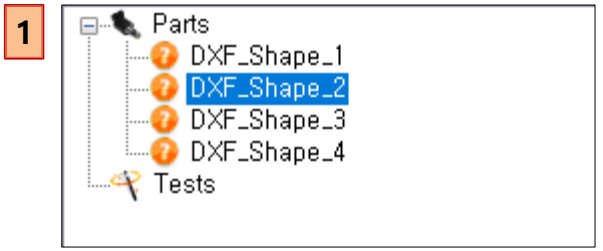


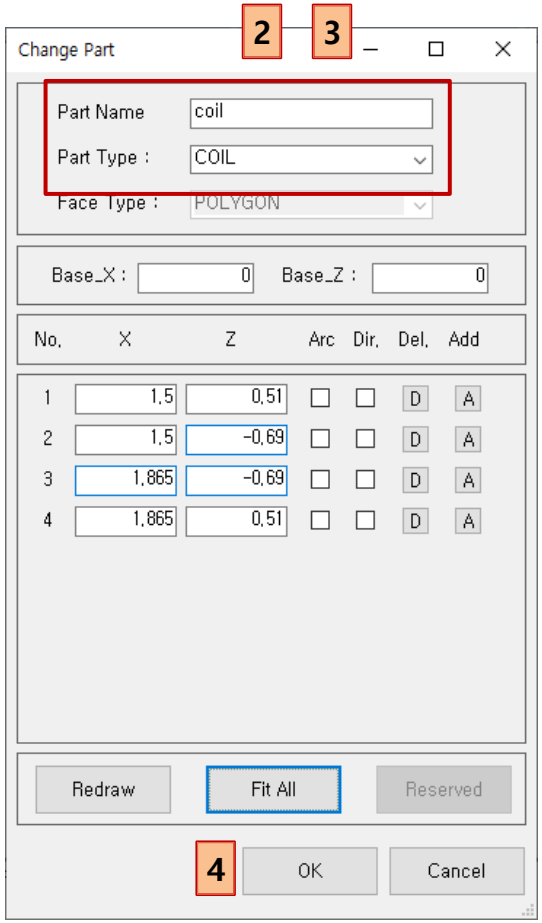
Part Design

Coil 지정

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







Coil 설계

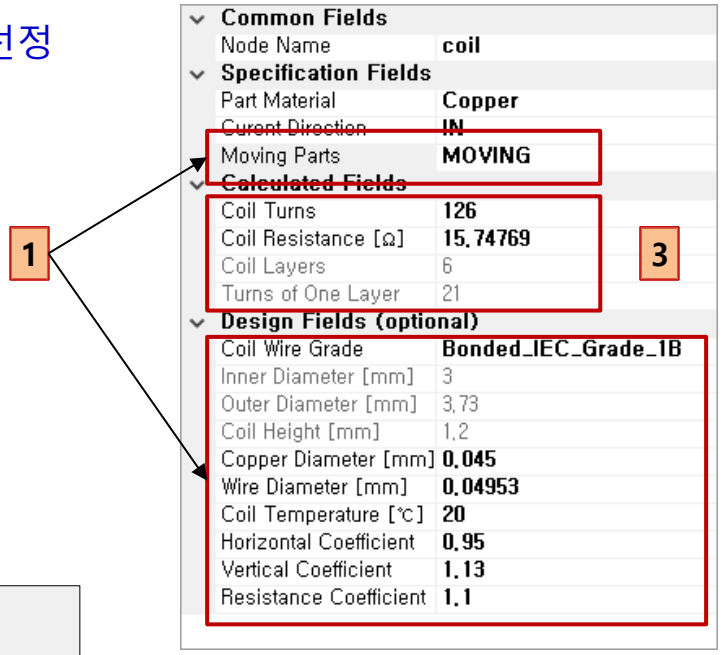
자기력 계산 파트 선정

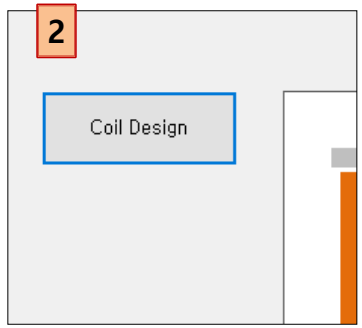
1. Coil 기구사양 입력
   - ✓ Moving Parts : **MOVING**
   - ✓ Coil Wire Grade : Bonded_IEC_Grade_1B 선택
   - ✓ Copper Diameter : 0.045 입력
   - ✓ Horizontal Coefficient : 0.95 입력
   - ✓ Vertical Coefficient : 1.13 입력
   - ✓ Resistance Coefficient : 1.1 입력

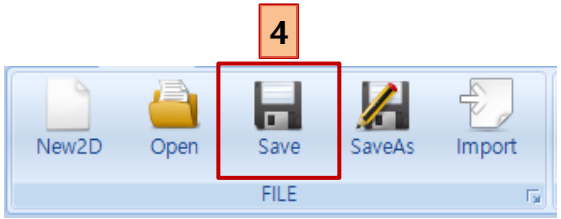
2. Coil 사양 계산
   - ✓ Design Coil 버튼 클릭

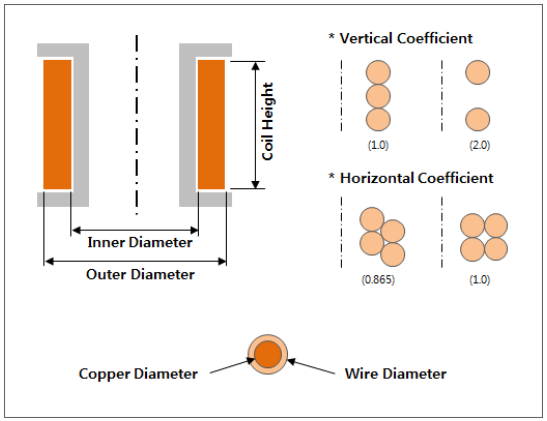
3. Coil 사양 확인

4. 리본바 > Save



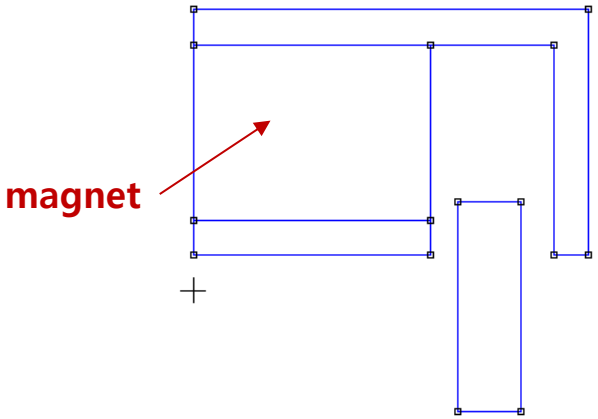


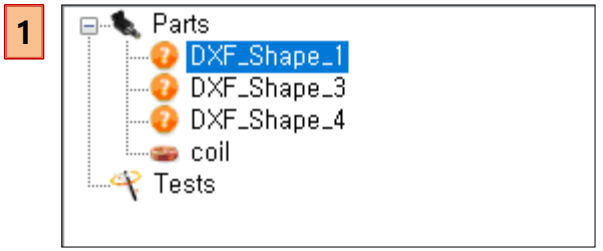


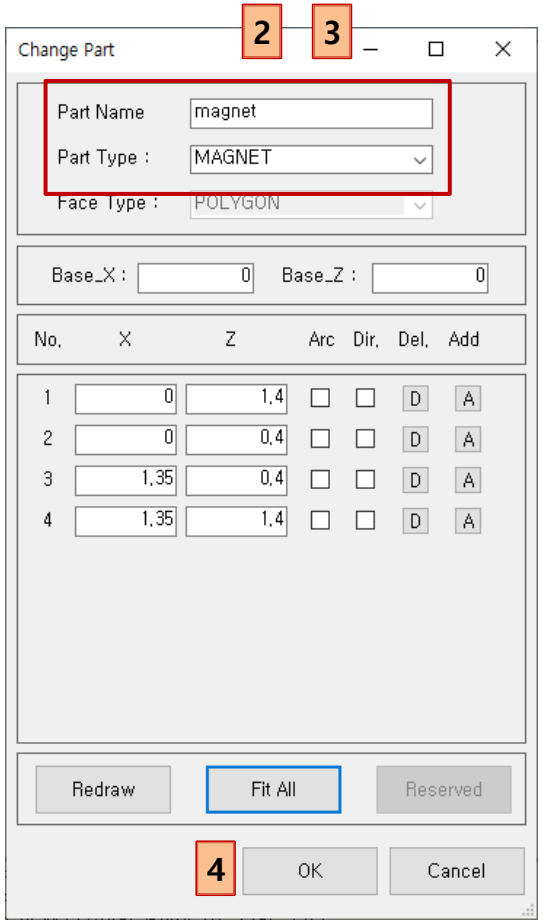


Magnet 지정

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

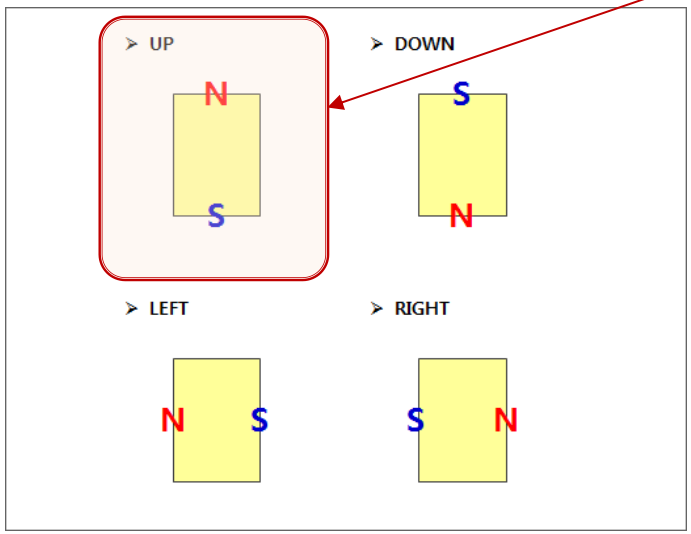






Magnet 설정

1. Magnet 속성 설정
   - ✓ Part Material : N52
   - ✓ Direction : UP



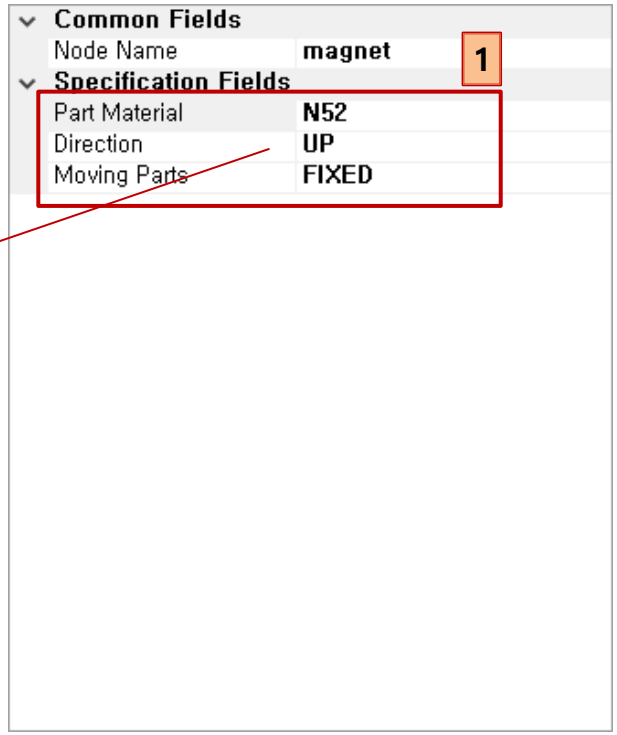
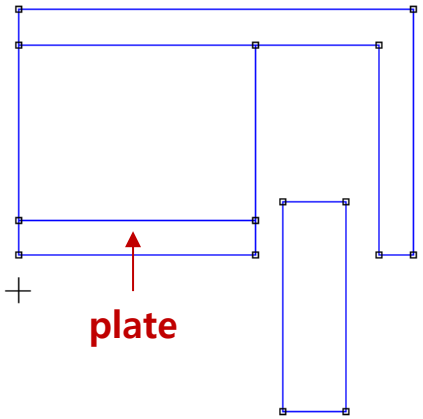
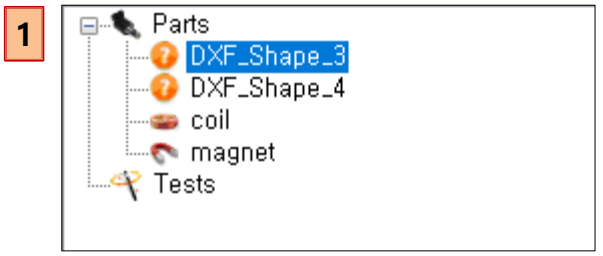
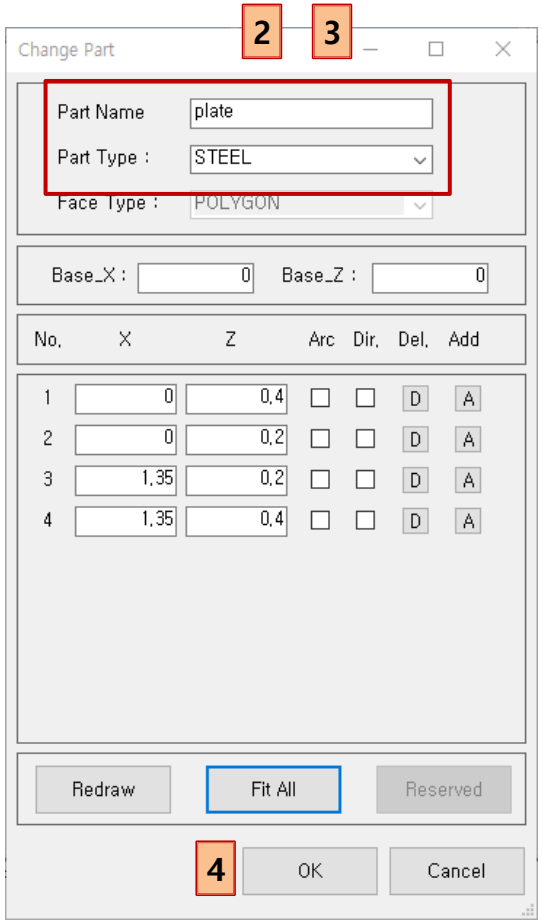


Plate 지정

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

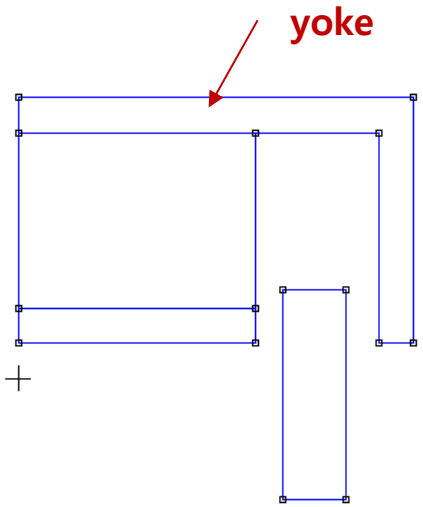


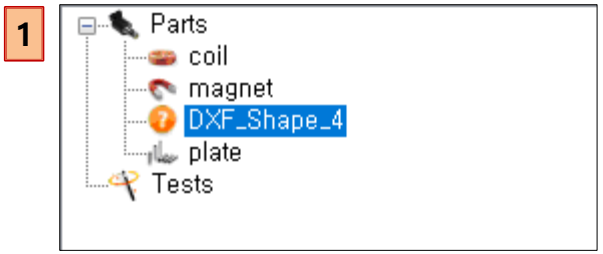


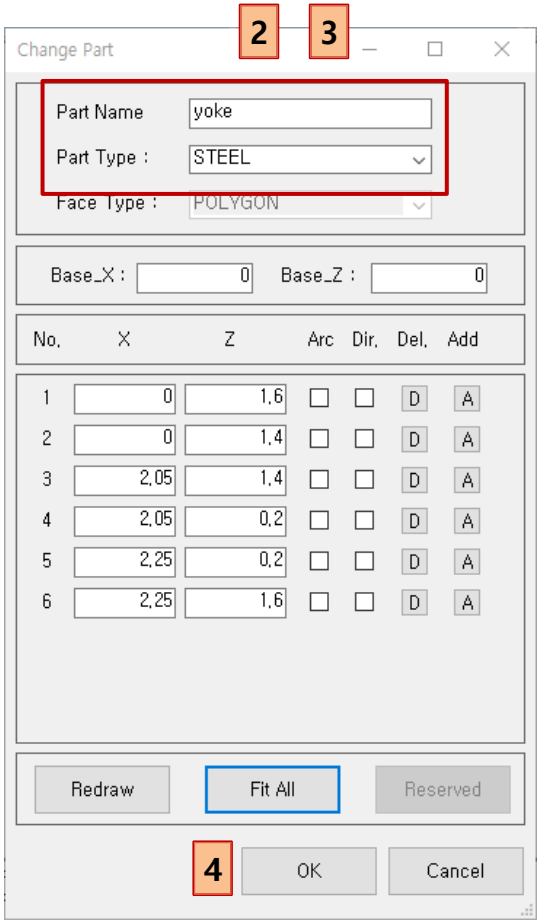


Yoke 지정

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



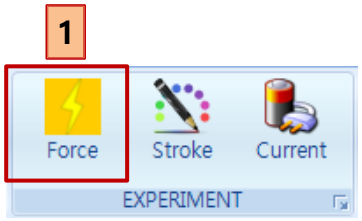


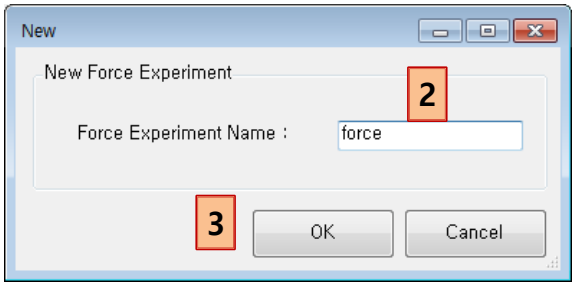


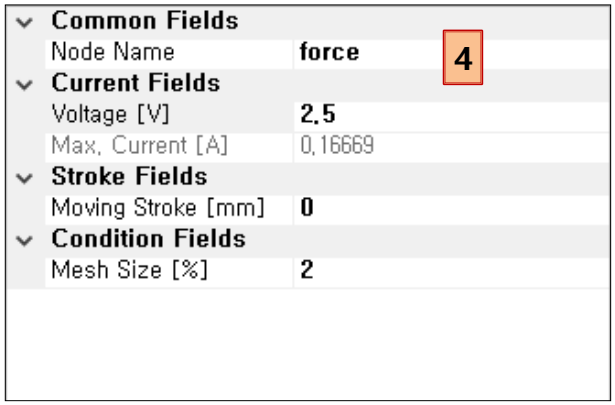
Virtual Test

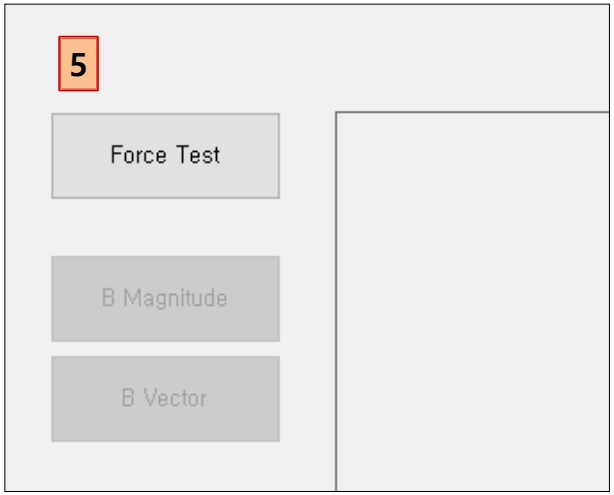
자기력 가상실험

1. Toolbar > Force 버튼 클릭
2. Test Name 입력 : “force”
3. OK 버튼 클릭
4. 자기력 가상실험 설정
   - ✓ Voltage : 2.5
5. 자기력 가상실험 실행



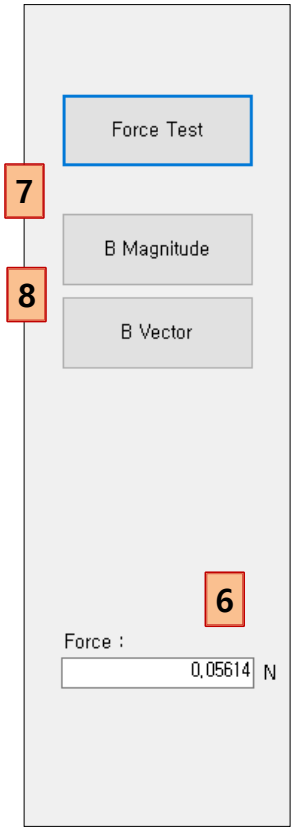


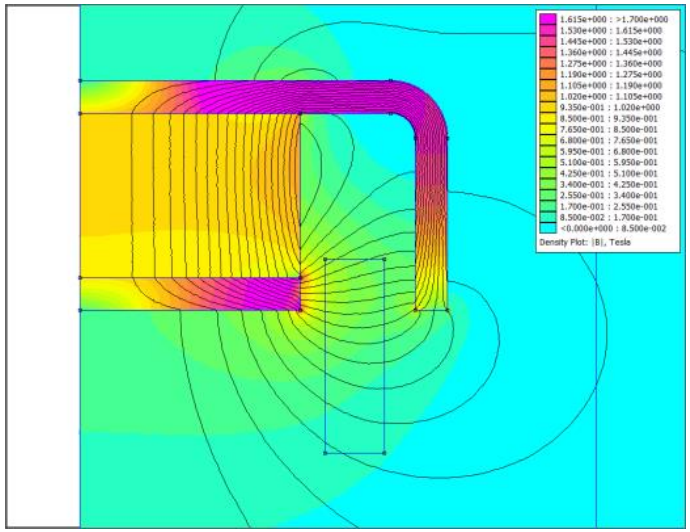


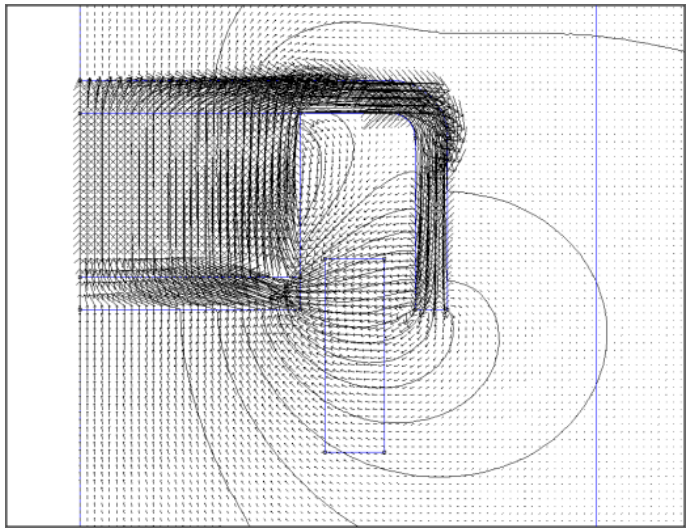


자기력 가상실험 결과

6. 자기력 확인 : 0.05614 N
7. 자속밀도 확인
   - ✓ B Magnitude 버튼 클릭
8. 자속밀도 벡터 확인
   - ✓ B Vector 버튼 클릭

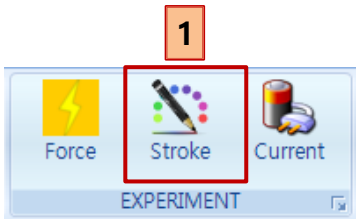


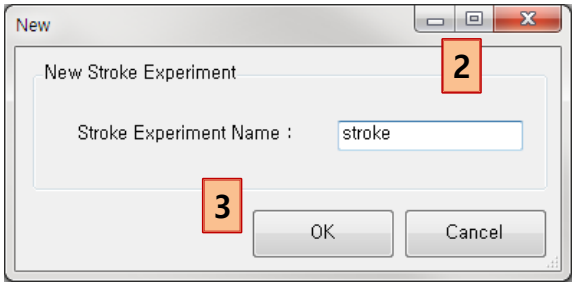


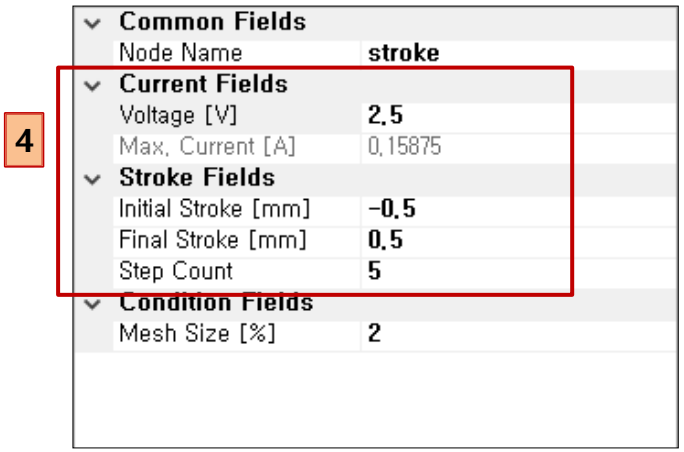


변위-자기력 가상실험

1. Toolbar > Stroke 버튼 클릭
2. Test Name 입력 : "stroke"
3. OK 버튼 클릭
4. 자기력-전류 가상실험 설정
   - ✓ Voltage : 2.5
   - ✓ Initial Stroke : -0.5
   - ✓ Final Stroke : 0.5
   - ✓ Step Count : 5

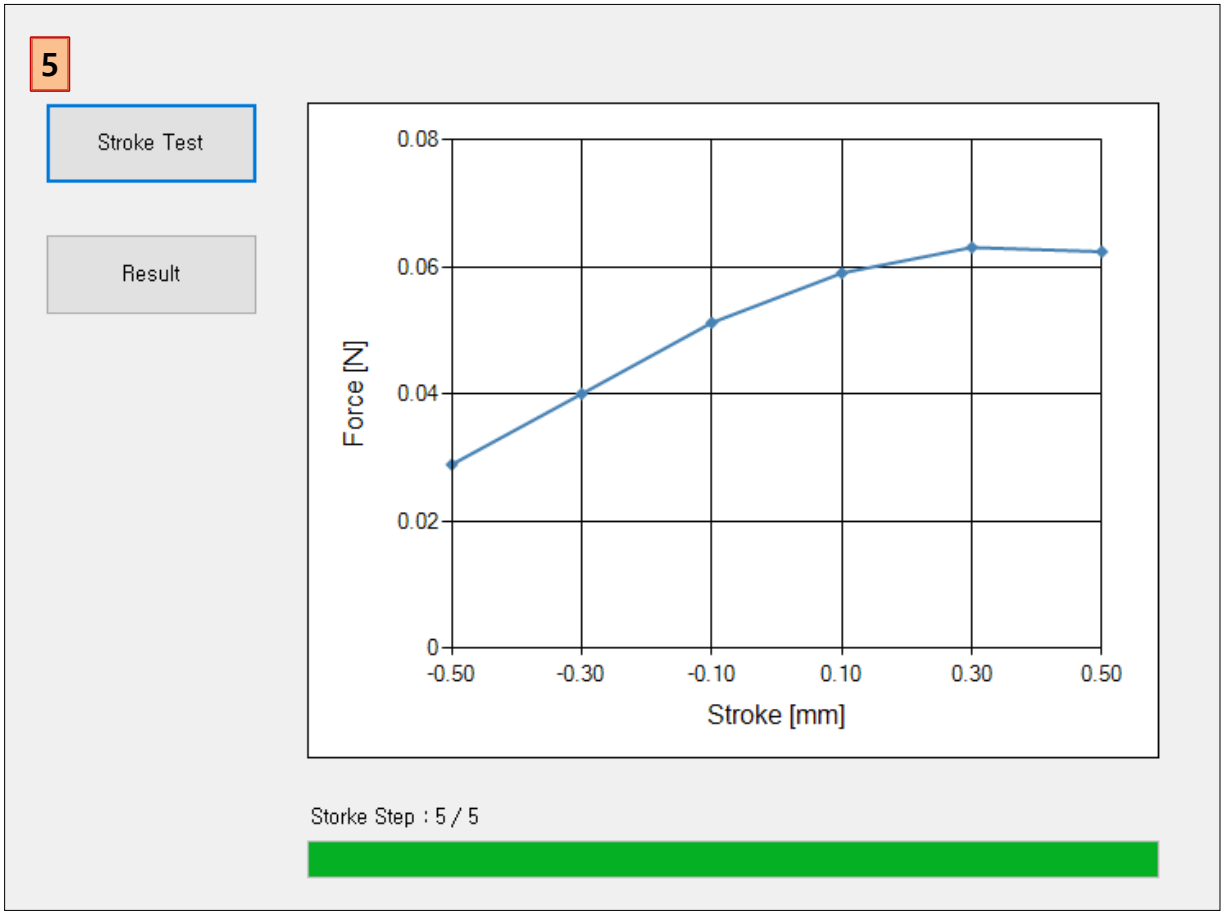






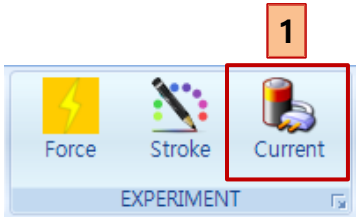
변위-자기력 가상실험 결과

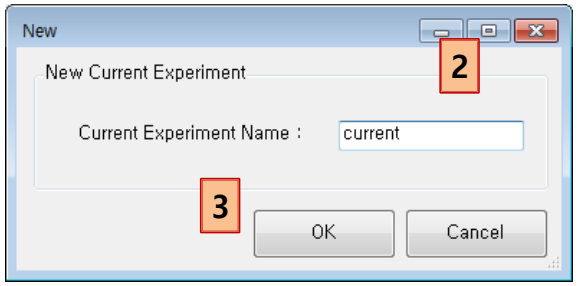
5. Stroke Test 버튼 클릭

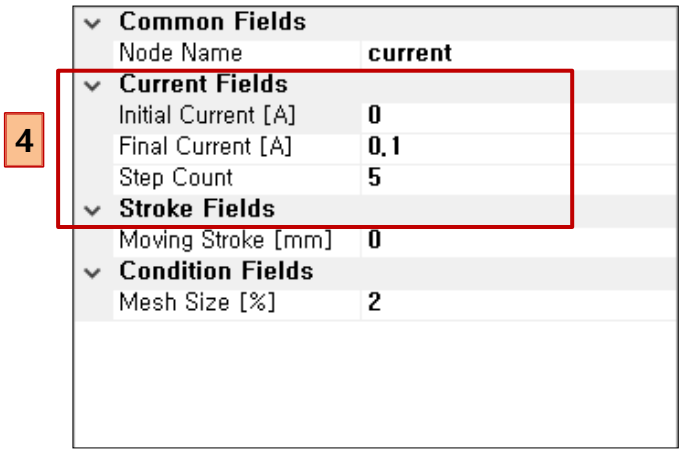


전류-자기력 가상실험

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 : 0.1
   - ✓ Step Count : 5

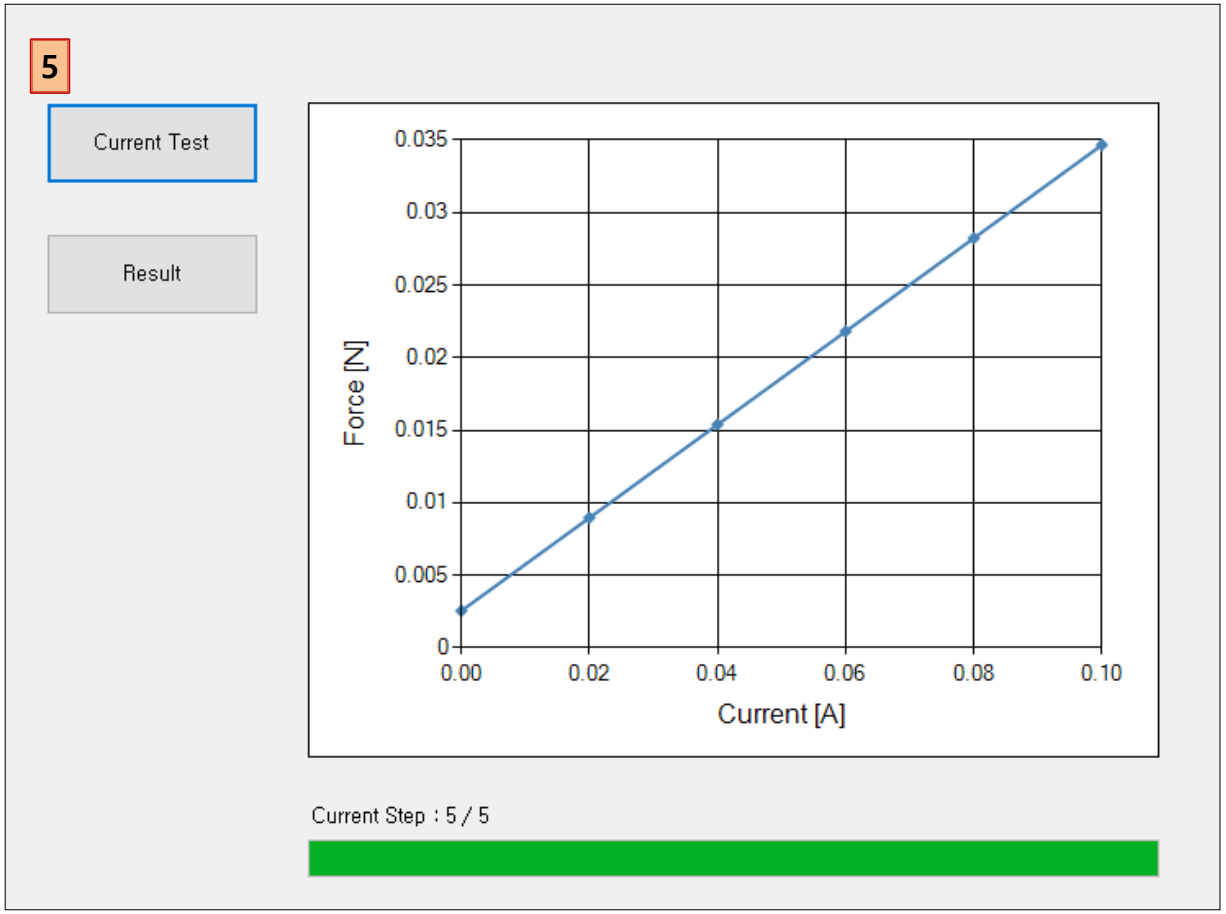






전류-자기력 가상실험 결과

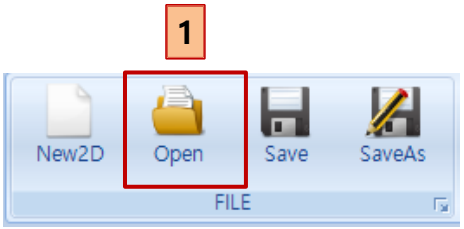
5. Current Test 버튼 클릭

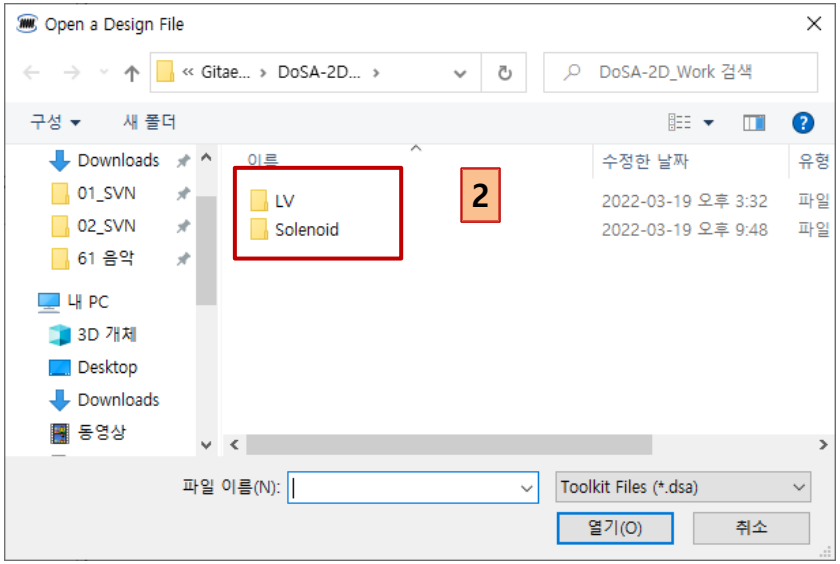


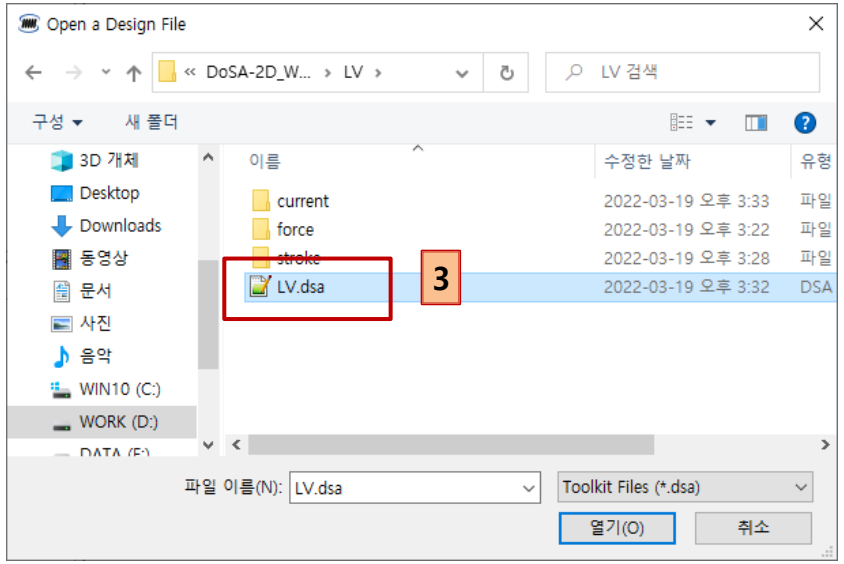
Tips

Design 열기

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







감사합니다

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