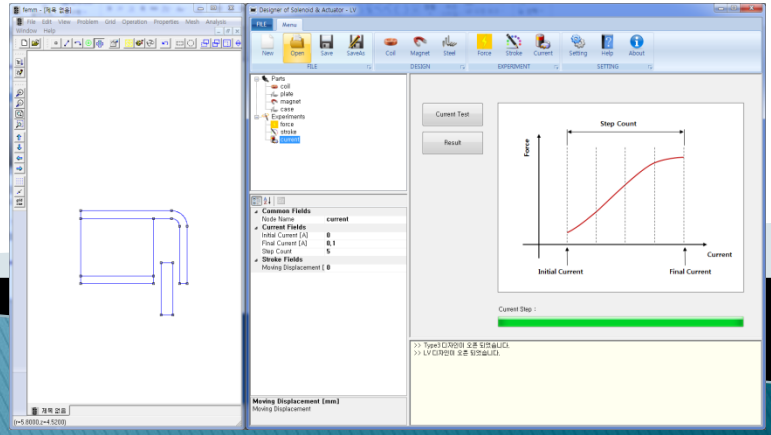
DoSA-2D 사용 메뉴얼

Linear Vibrator Example

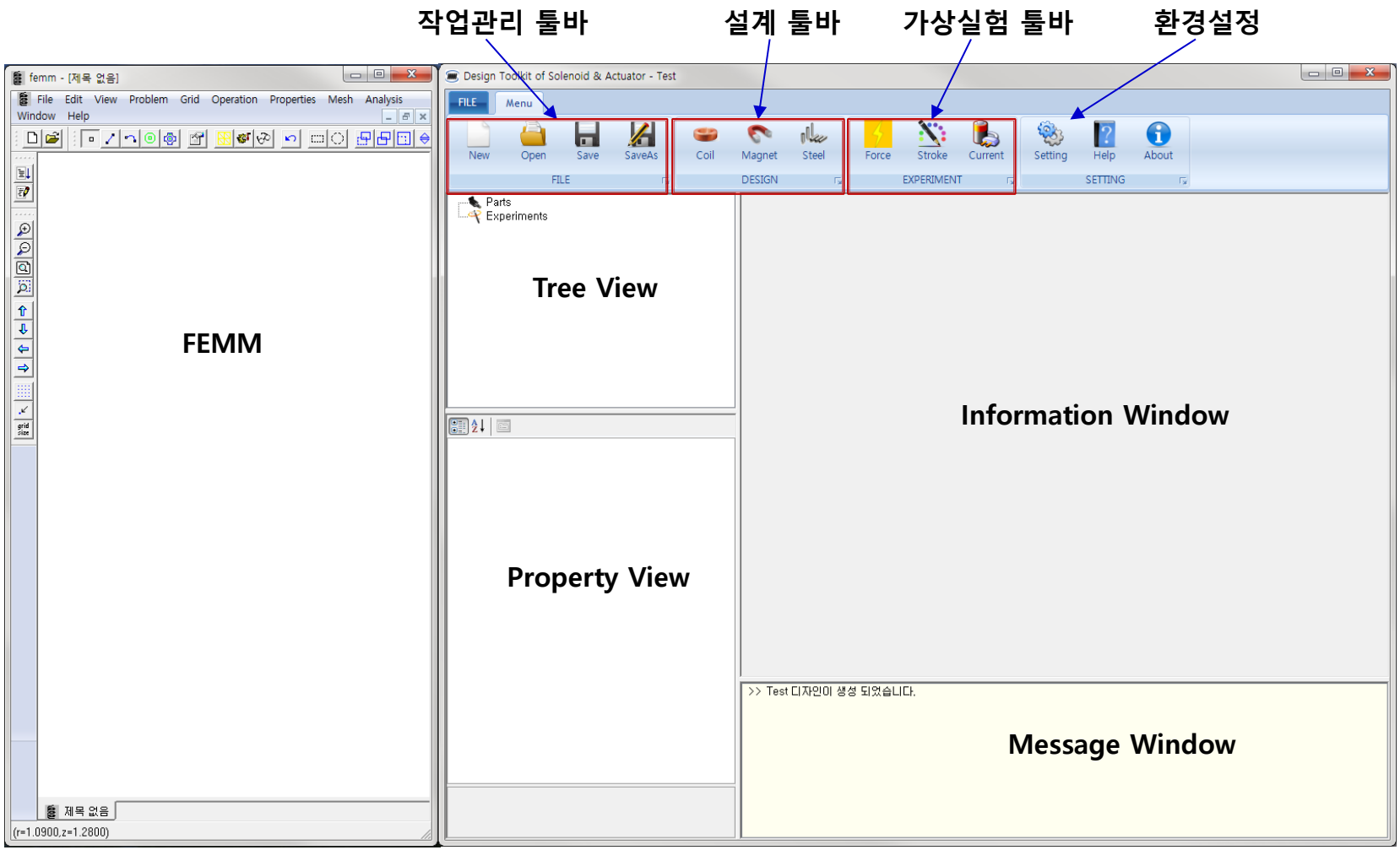


2022-03-19

GiTae Kweon (zgitae@gmail.com)

DoSA 구성

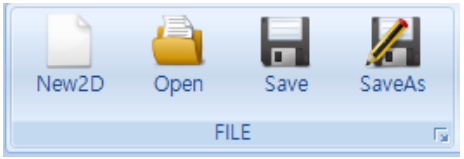
프로그램 구성


작업관리 툴바
설계 툴바
가상실험 툴바
환경설정
femm - [제목 없음]
File Edit View Problem Grid Operation Properties Mesh Analysis
Window Help
FEMM
Design Toolkit of Solenoid & Actuator - Test
FILE
Menu
New
Open
Save
SaveAs
FILE
Coil
Magnet
Steel
DESIGN
Force
Stroke
Current
EXPERIMENT
Setting
Help
About
SETTING
Parts
Experiments
Tree View
Property View
Information Window
>> Test 디자인이 생성 되었습니다.
Message Window

Toolbar

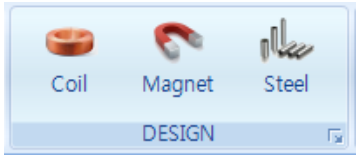
1. 작업관리

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



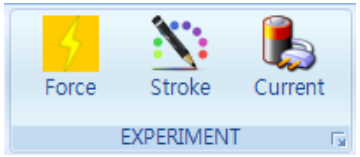
2. 설계

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



3. 가상실험

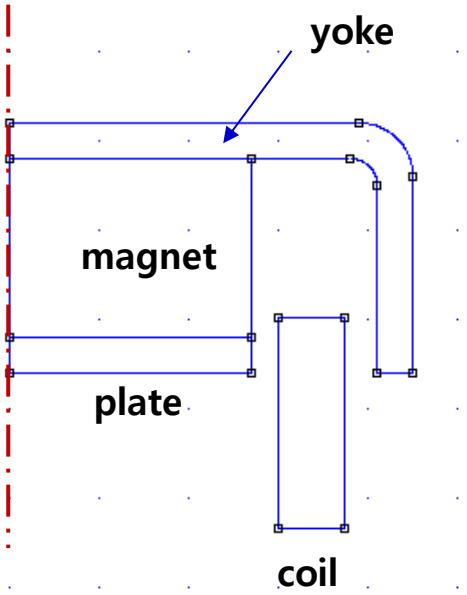
- ✓ Force : 자기력 예측
- ✓ Stroke : 변위별 자기력 예측
- ✓ Current : 전류별 자기력 예측



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

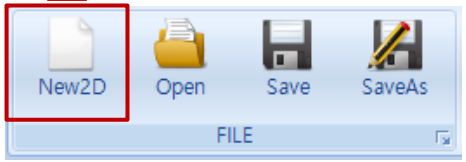
- Voltage : 2.5V

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

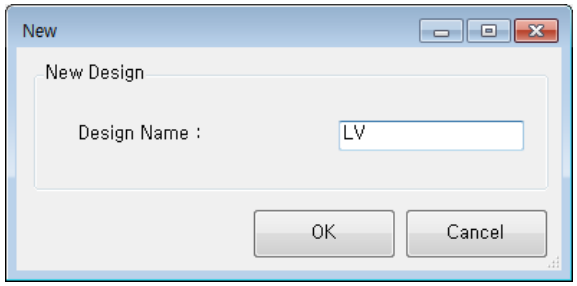
Design 생성

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

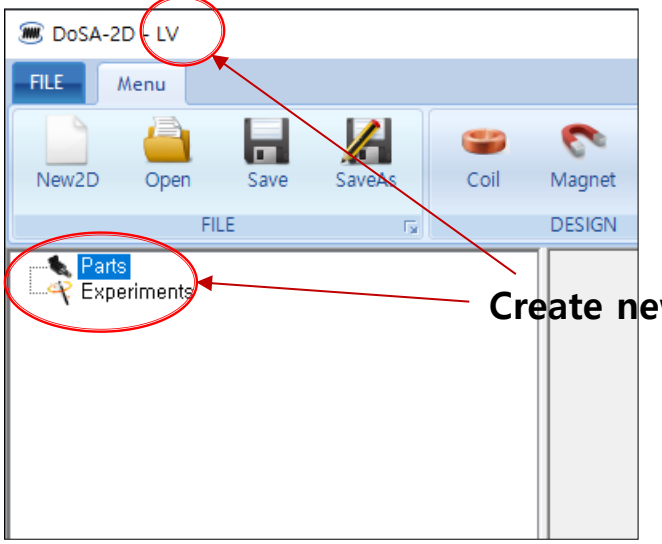
1



2



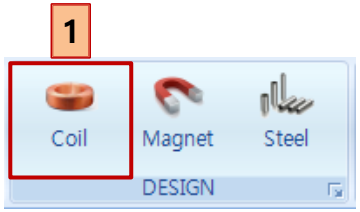
3

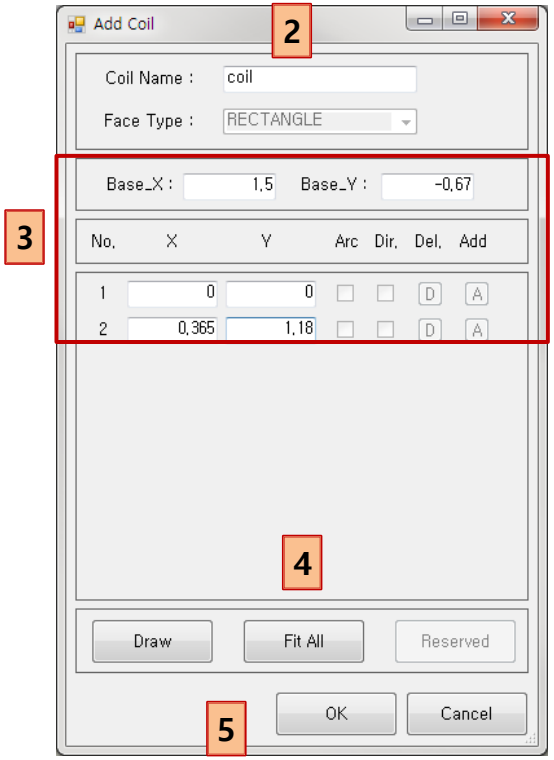


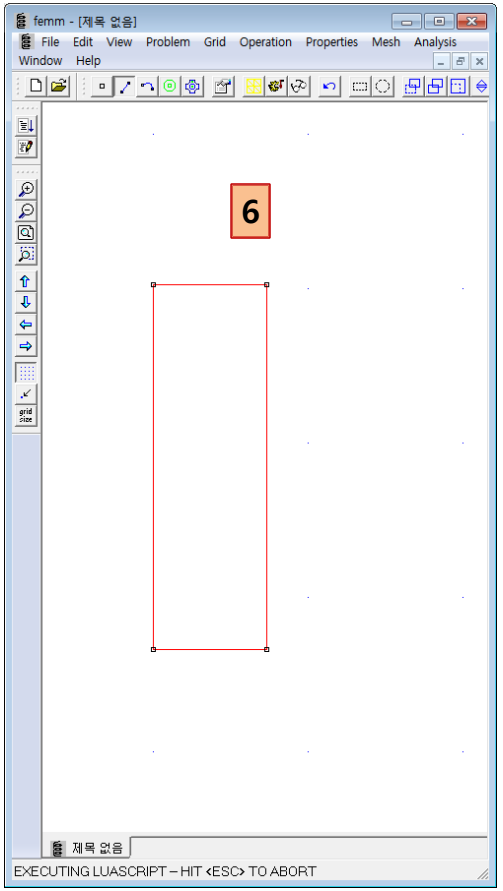
Part Design

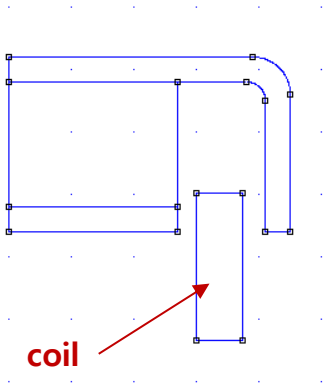
Coil 생성

1. Toolbar > Coil 버튼 클릭
2. Coil Name 입력 : “coil”
3. Coil 형상 입력
   - ✓ 코일 위치 : Base_X 1.5, Base_Y -0.67
   - ✓ 좌하 점 : X 0, Y 0 (상대 좌표)
   - ✓ 우상 점 : X 0.365, Y 1.18 (상대 좌표)
4. 화면 조정 : Fit All 버튼 사용
5. OK 버튼 클릭
6. 형상 확인 (FEMM 창)







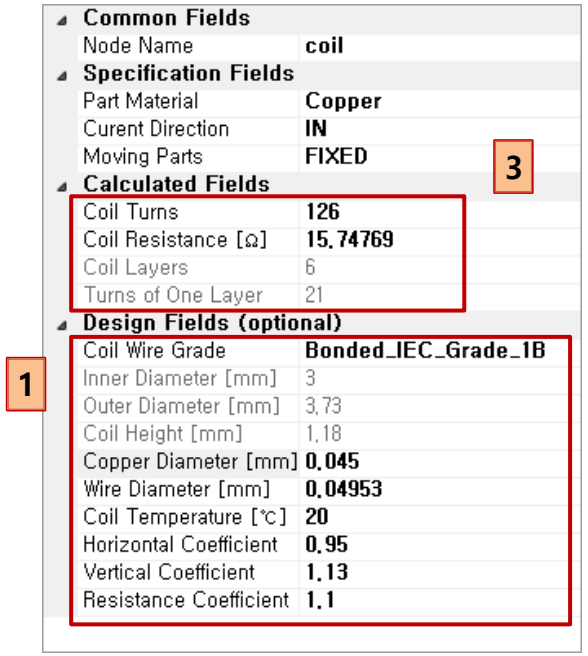


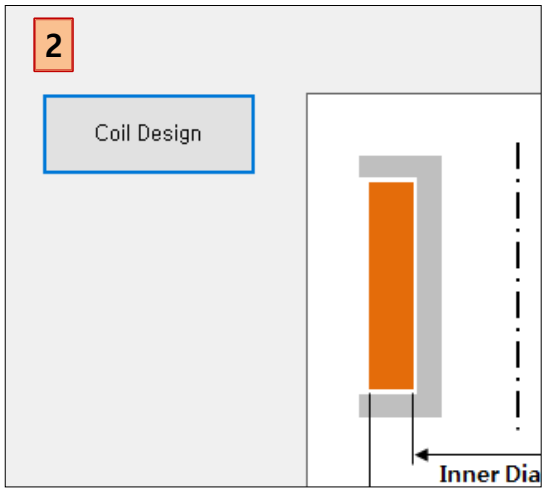
Coil 설계

1. Coil 기구사양 입력
   - ✓ 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

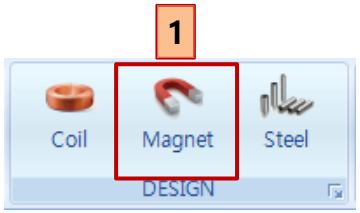
3. Coil 사양 확인

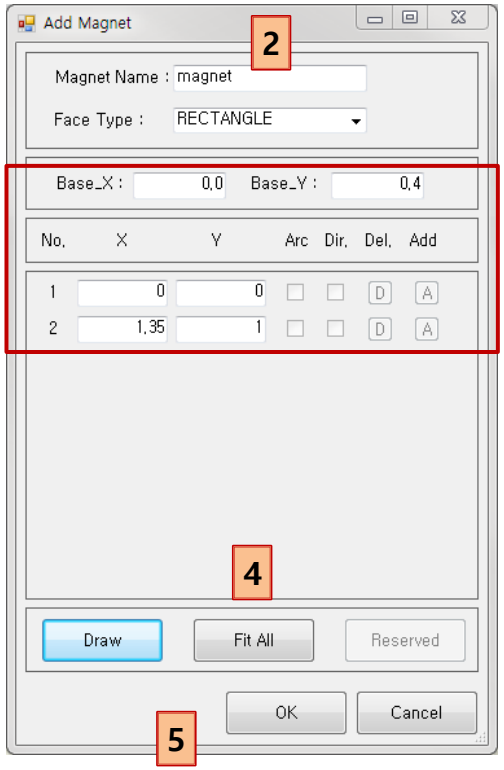


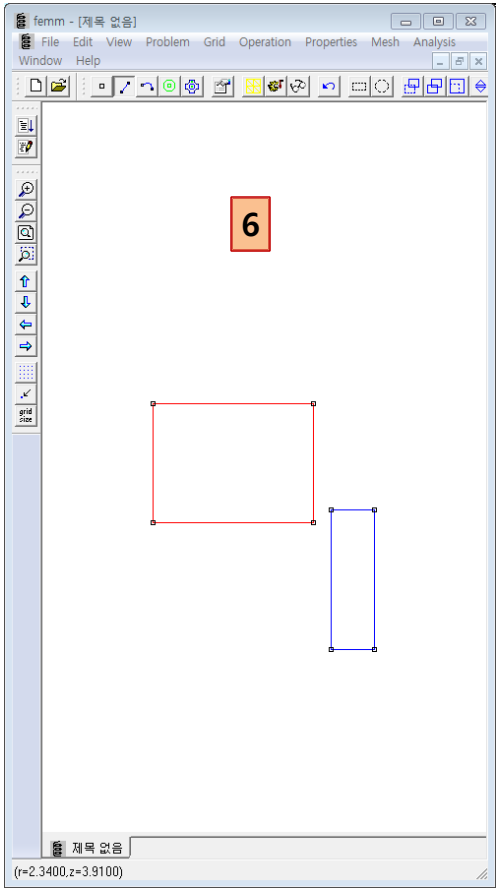


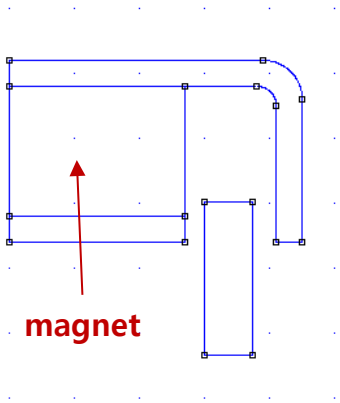
Magnet 생성

1. Toolbar > Magnet 버튼 클릭
2. Magnet Name 입력 : “magnet”
3. Magnet 형상 입력
   - ✓ 자석 위치 : Base_X 0, Base_Y 0.4
   - ✓ 좌하 점 : X 0, Y 0 (상대 좌표)
   - ✓ 우상 점 : X 1.35, Y 1 (상대 좌표)
4. 화면 조정 : Fit All 버튼 사용
5. OK 버튼 클릭
6. 형상 확인 (FEMM 창)



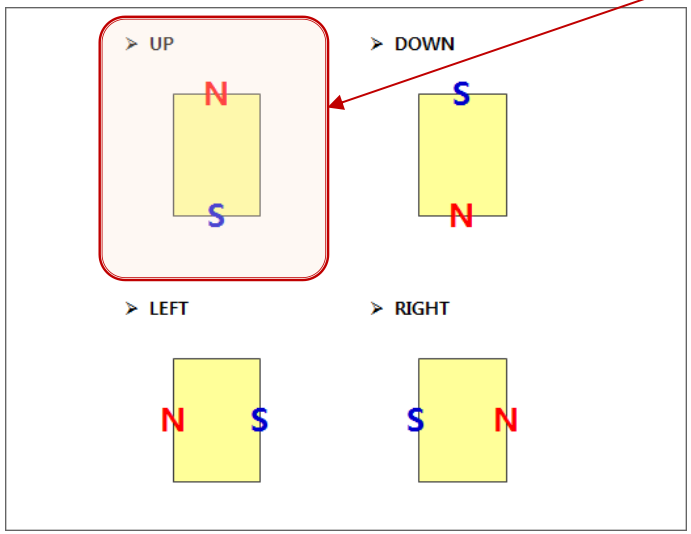






Magnet 설정

1. Magnet 속성 설정
   - ✓ Part Material : N52
   - ✓ Direction : UP
   - ✓ Moving Parts : **MOVING**



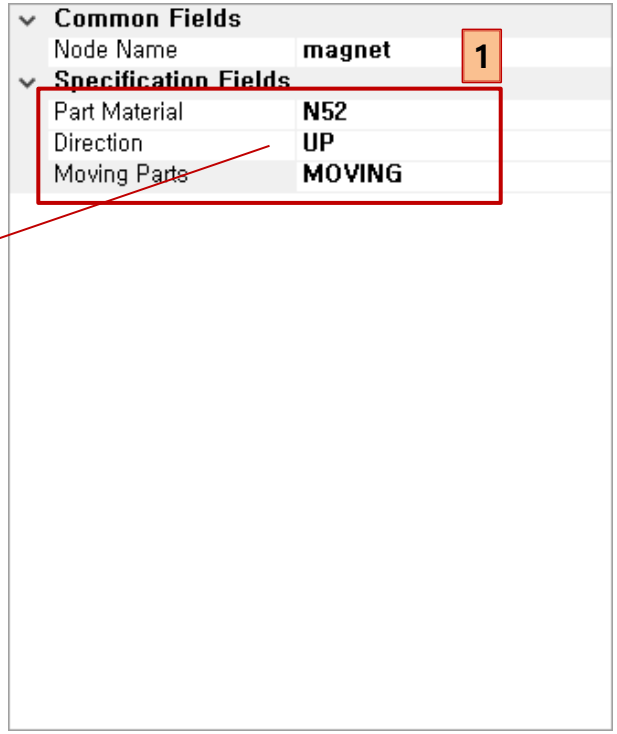
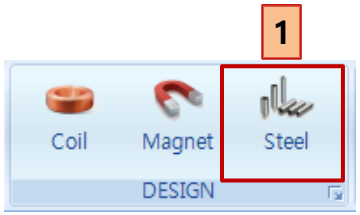
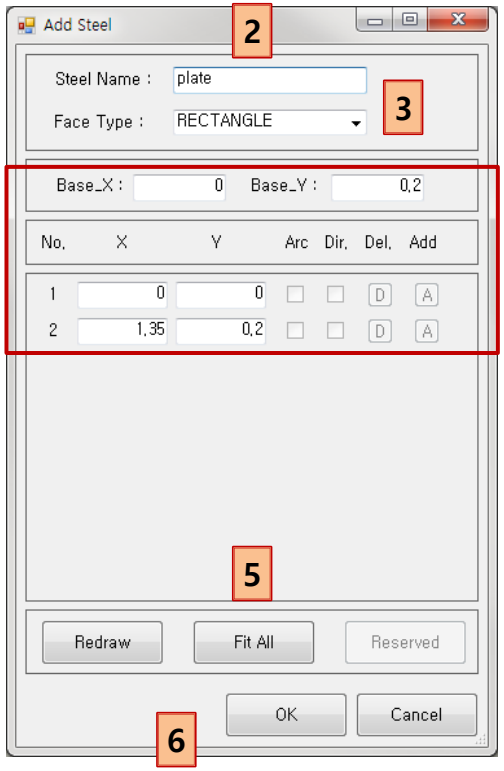
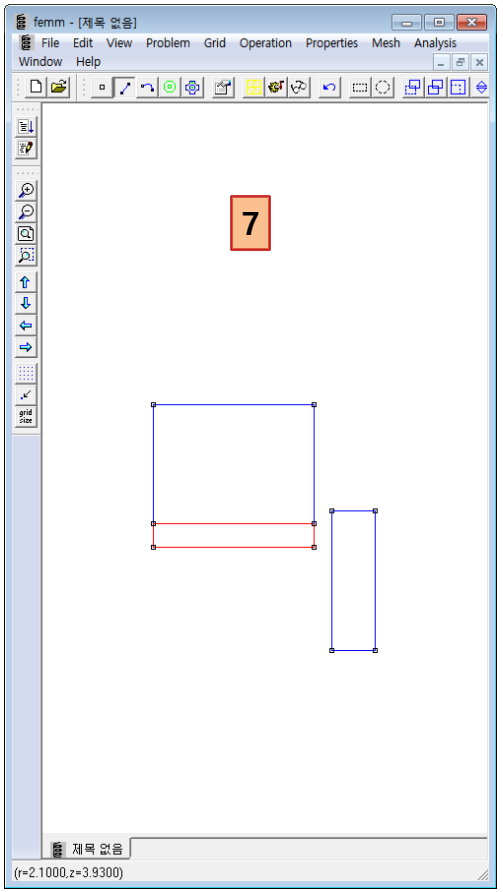


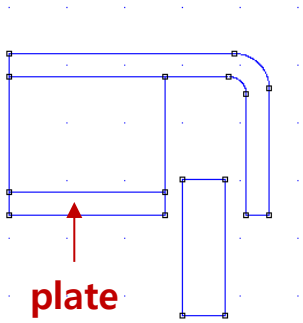
Plate 생성

1. Toolbar > Steel 버튼 클릭
2. Steel Name 입력 : “plate”
3. Face Type : **RECTANGLE**
4. Plate 형상 입력
   - ✓ 자석 위치 : Base_X 0, Base_Y 0.2
   - ✓ 좌하 점 : X 0, Y 0 (상대 좌표)
   - ✓ 우상 점 : X 1.35, Y 0.2 (상대 좌표)
5. 화면 조정 : Fit All 버튼 사용
6. OK 버튼 클릭
7. 형상 확인 (FEMM 창)



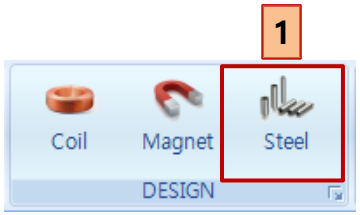


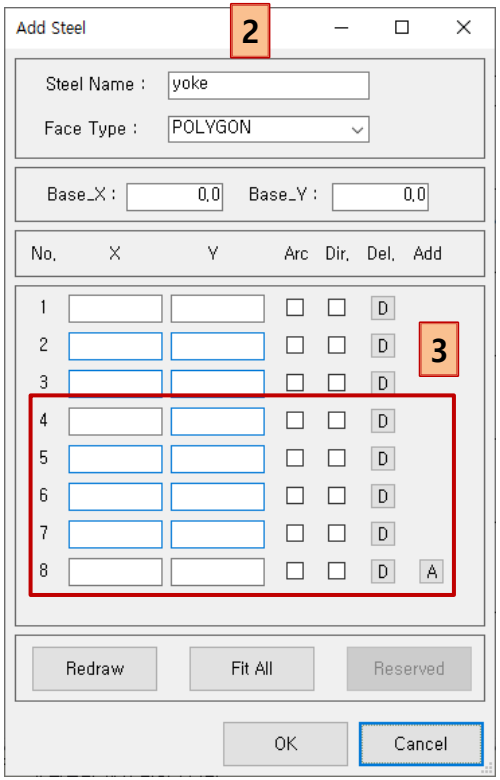


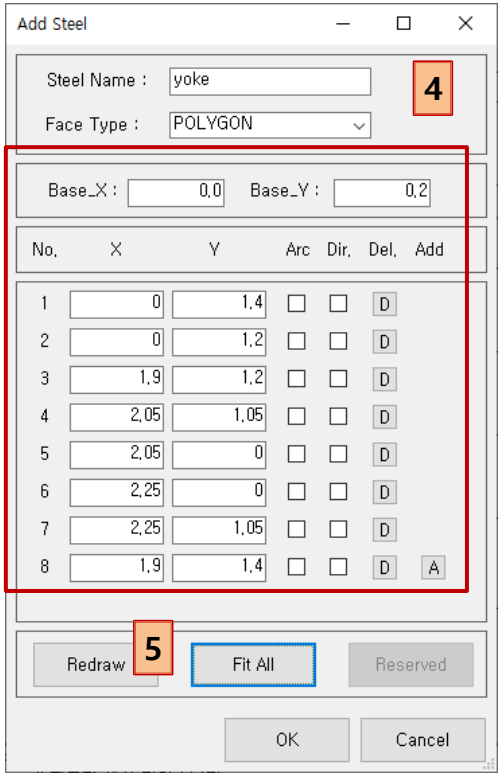


Yoke 생성

1. Toolbar > Steel 버튼 클릭
2. Steel Name 입력 : "yoke"
3. 좌표 입력 라인 추가
   - ✓ 'A' 버튼 4번 클릭
4. Yoke 형상 입력
   - ✓ Yoke 위치 : Base_X 0, Base_Y 0.2
   - ✓ 1 점 : X 0, Y 1.4
   - ✓ 2 점 : X 0, Y 1.2
   - ✓ 3 점 : X 1.9, Y 1.2
   - ✓ 4 점 : X 2.05, Y 1.05
   - ✓ 5 점 : X 2.05, Y 0
   - ✓ 6 점 : X 2.25, Y 0
   - ✓ 7 점 : X 2.25, Y 1.05
   - ✓ 8 점 : X 1.9, Y 1.4
5. 화면 조정 : Fit All 버튼 사용

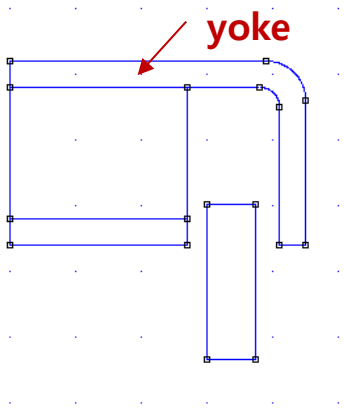


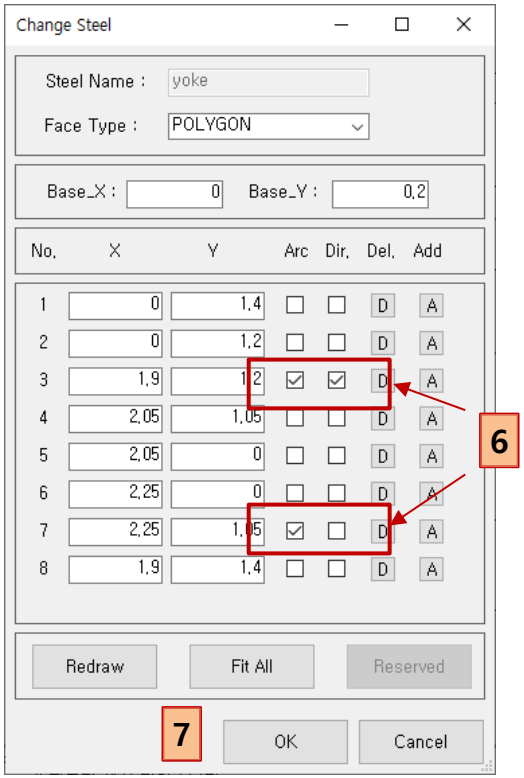


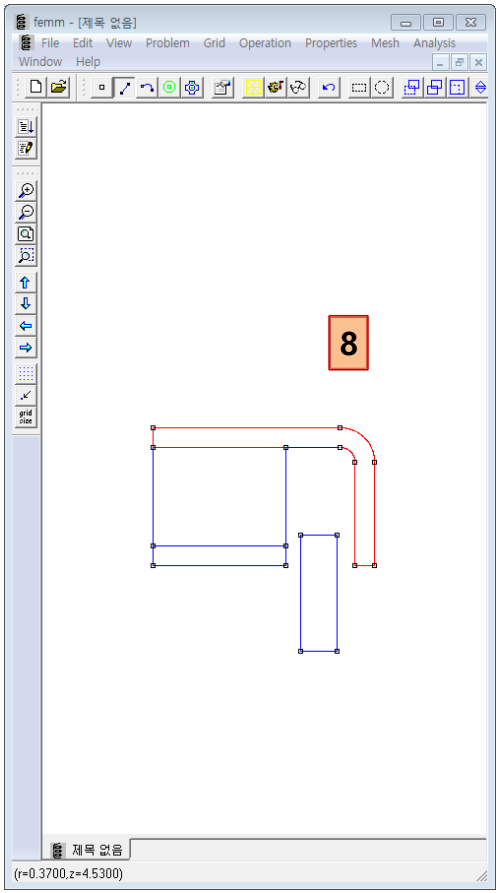


Yoke 생성

6. Arc 형상 추가
   - ✓ 3 Point : Arc, Dir 선택
   - ✓ 7 Point : Arc 선택
7. OK 버튼 클릭
8. 형상 확인 (FEMM 창)

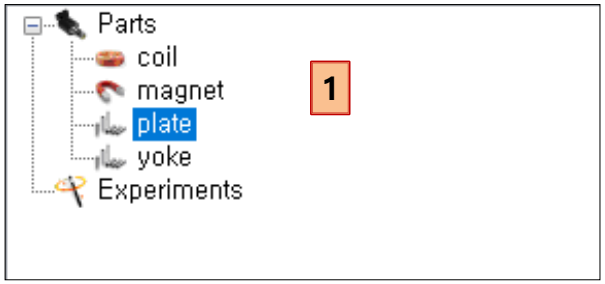




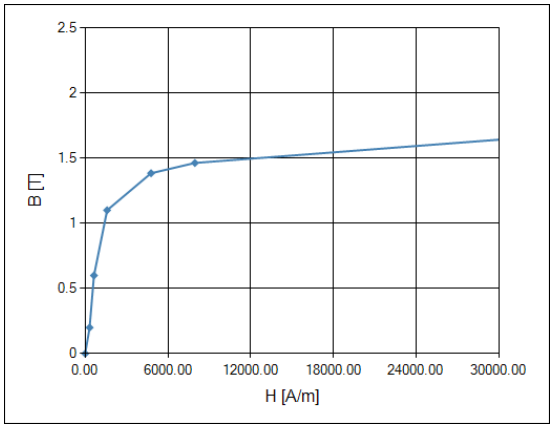


Plate, Yoke 설정

1. Plate 선택 (Treeview)
2. Plate 속성 설정
   - ✓ Part Material : 430 Stainless Steel 선택
   - ✓ Moving Parts : **MOVING**
3. Yoke 선택 (Treeview)
4. Yoke 속성 설정
   - ✓ Part Material : 430 Stainless Steel 선택
   - ✓ Moving Parts : **MOVING**



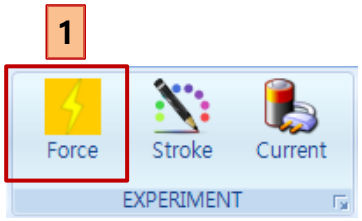
[BH curve]

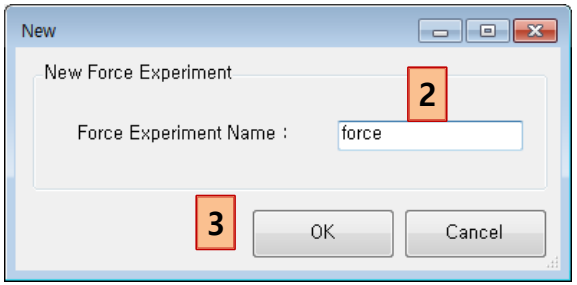


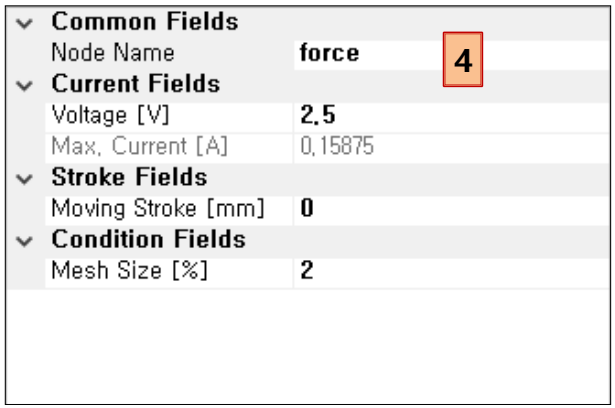
Virtual Test

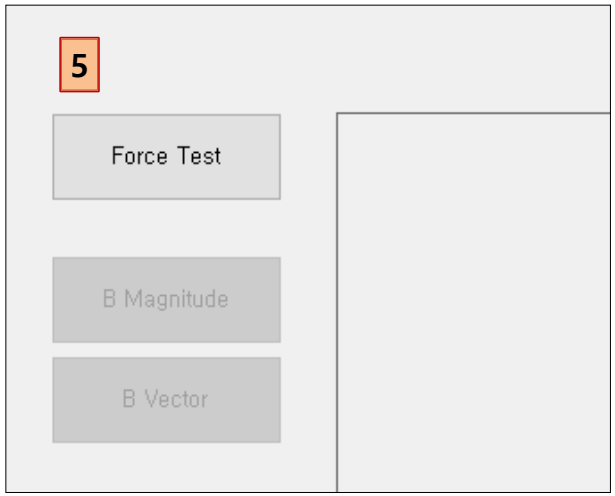
자기력 가상실험

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



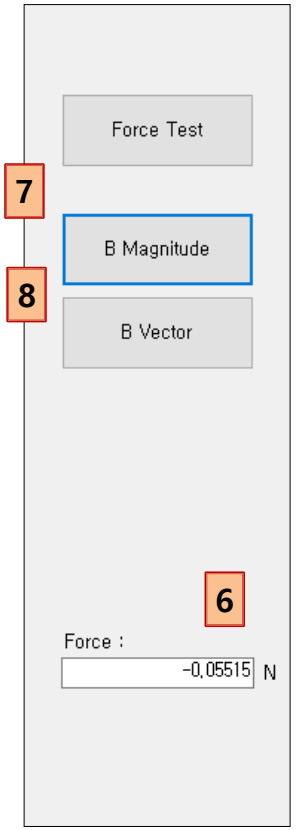


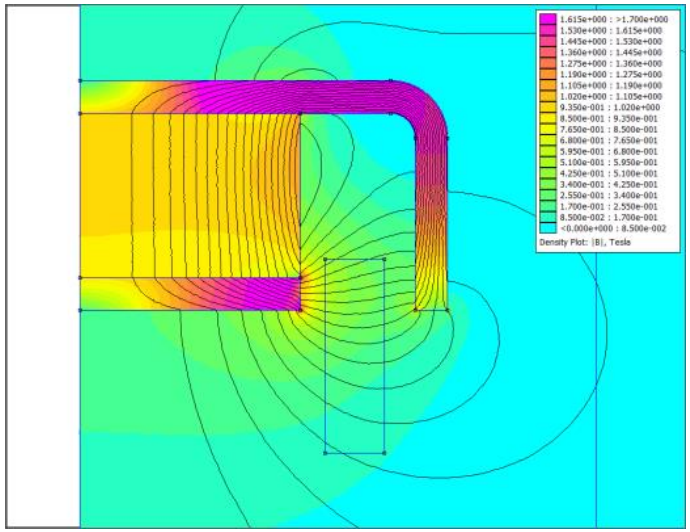


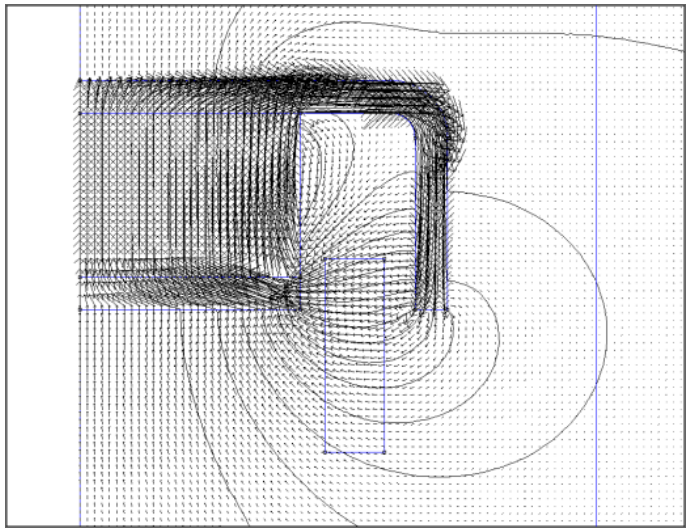


자기력 가상실험 결과

6. 자기력 확인 : -0.05515 N
7. 자속밀도 확인
   - ✓ B Magnitude 버튼 클릭
8. 자속밀도 벡터 확인
   - ✓ B Vector 버튼 클릭

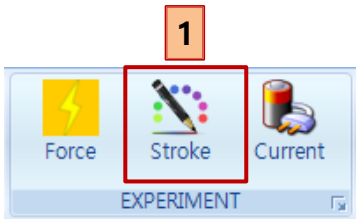


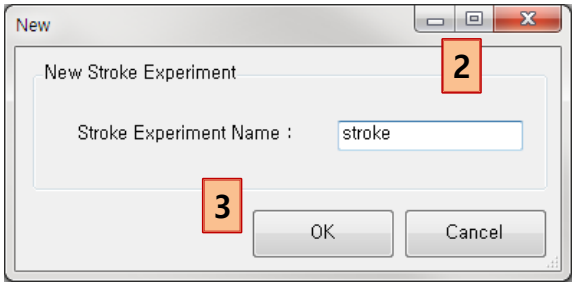


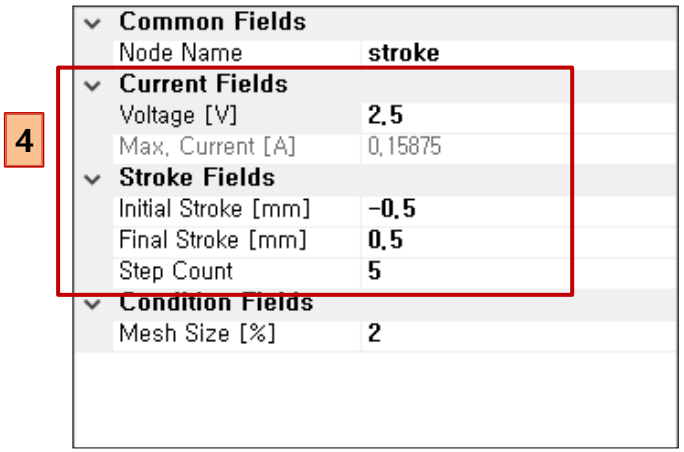


변위-자기력 가상실험

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

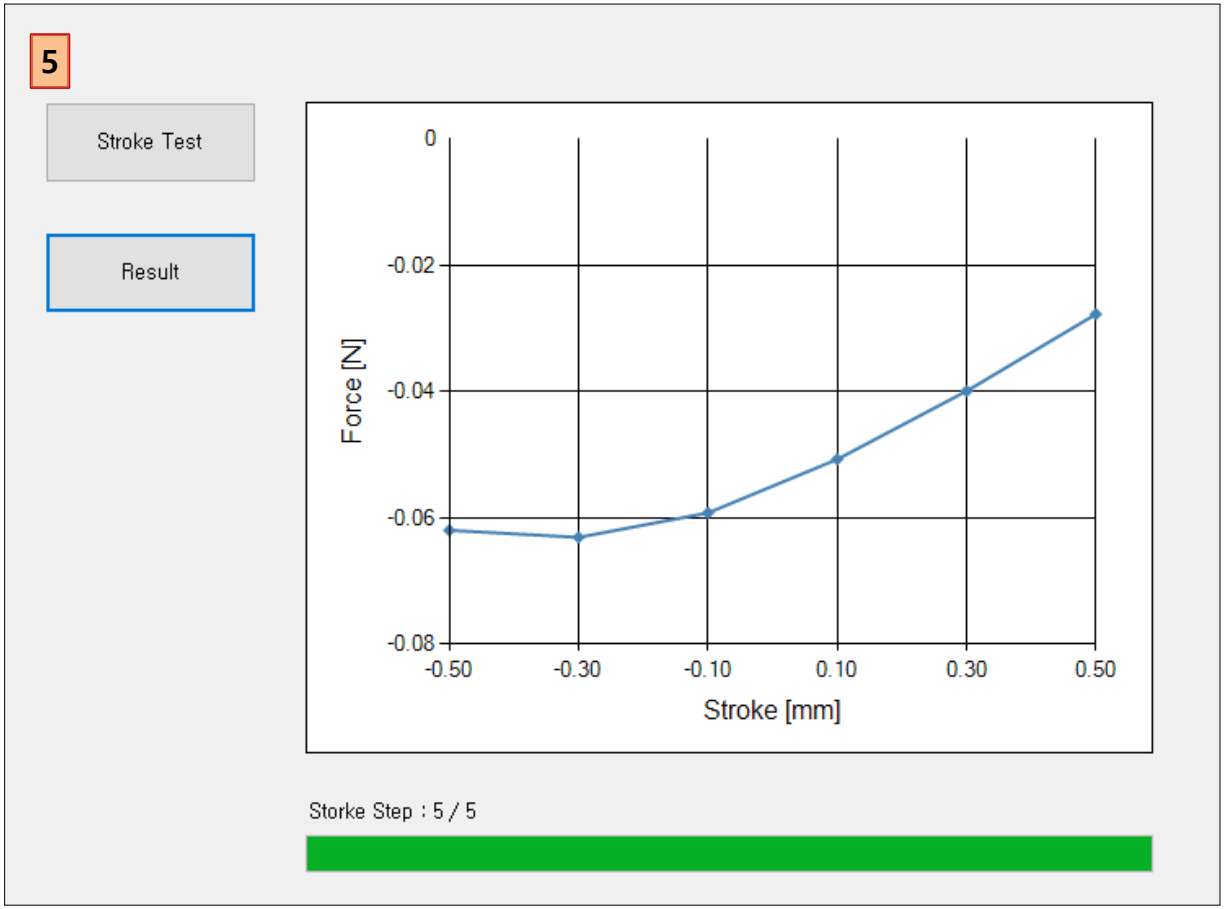






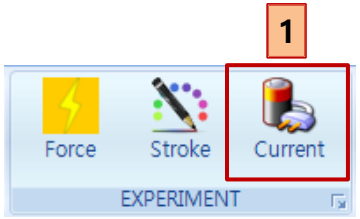
변위-자기력 가상실험 결과

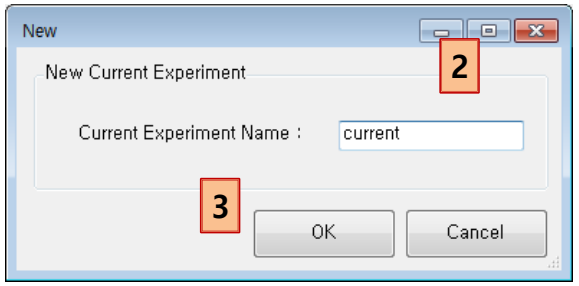
5. Stroke Test 버튼 클릭

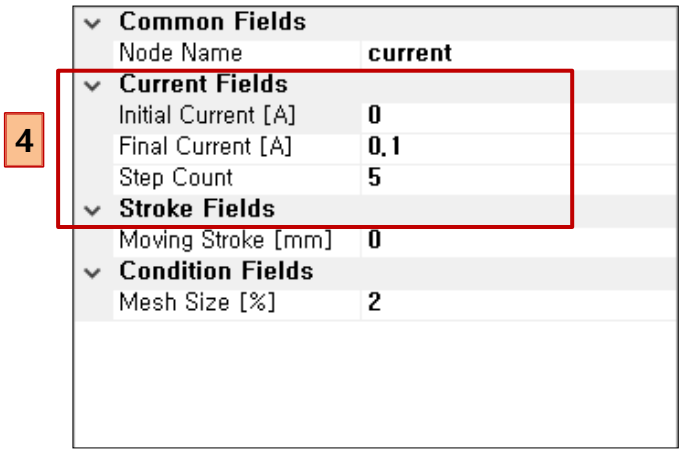


전류-자기력 가상실험

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

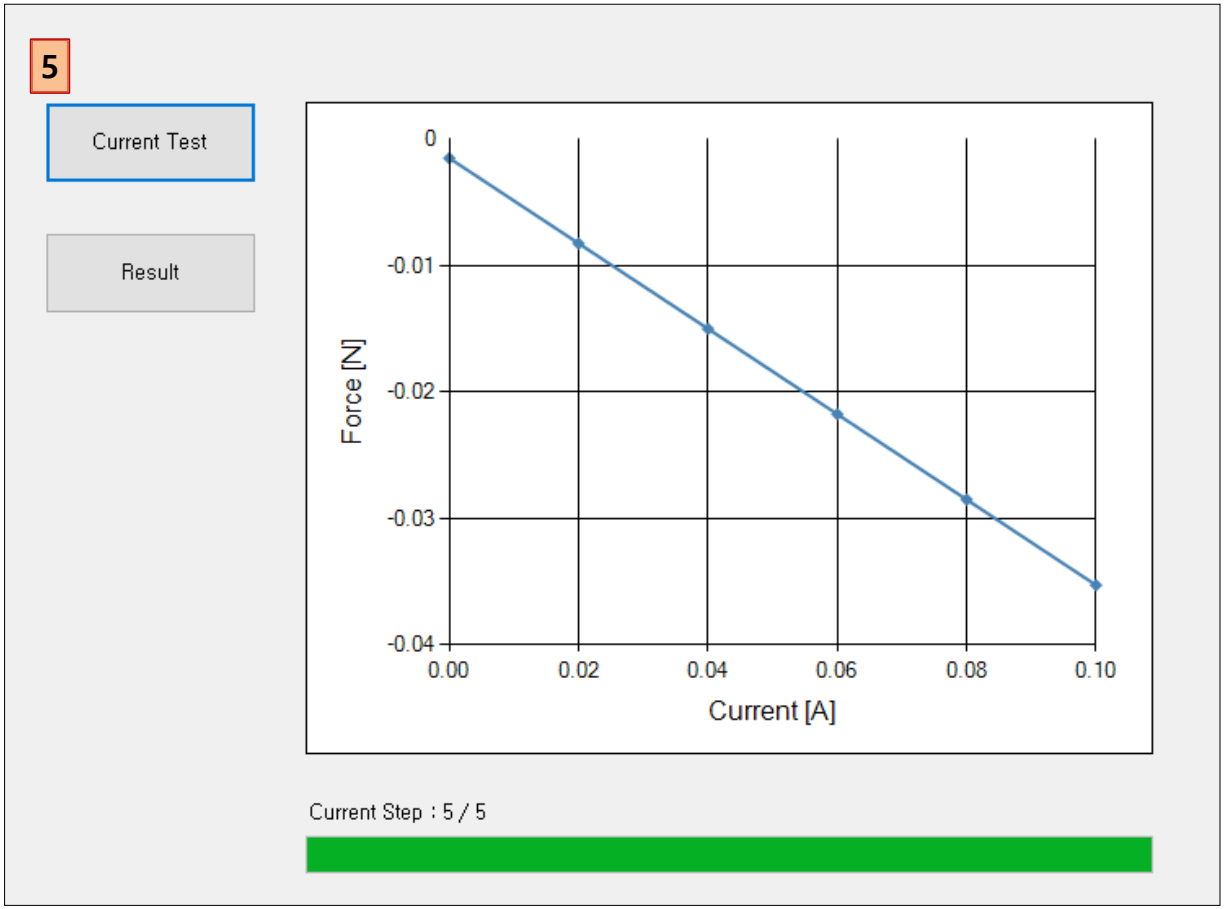






전류-자기력 가상실험 결과

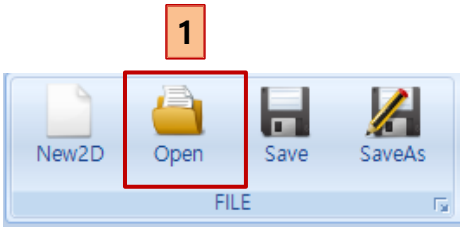
5. Current Test 버튼 클릭

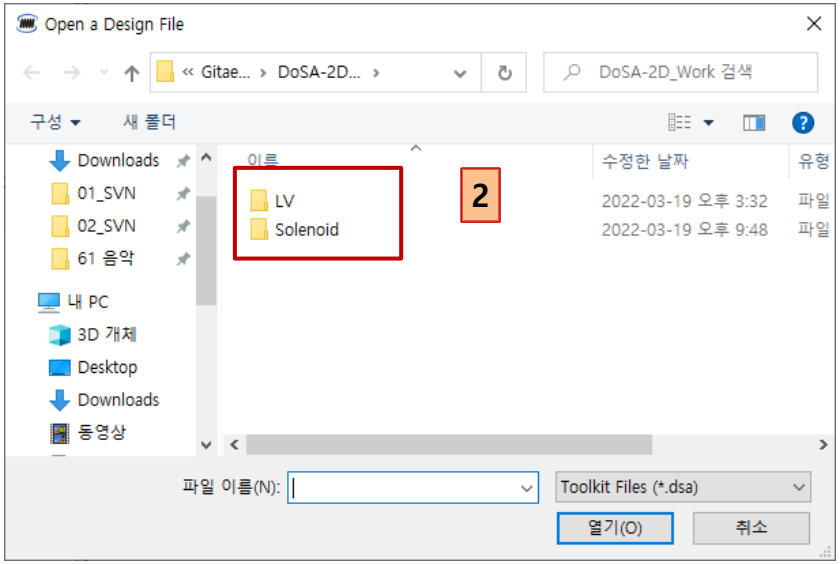


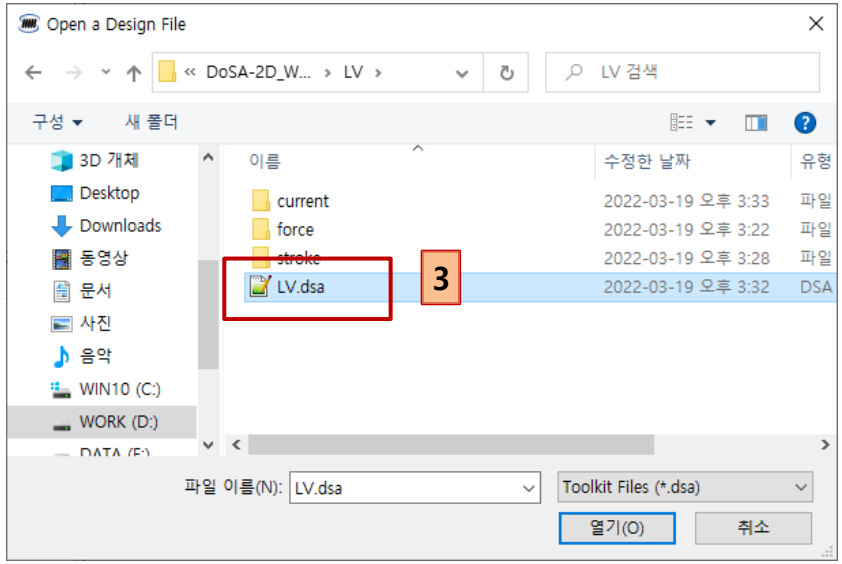
Tips

Design 열기

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







감사합니다

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