



# 拓樸\_底座剛度拓樸改善設計

Simple, but Everything.

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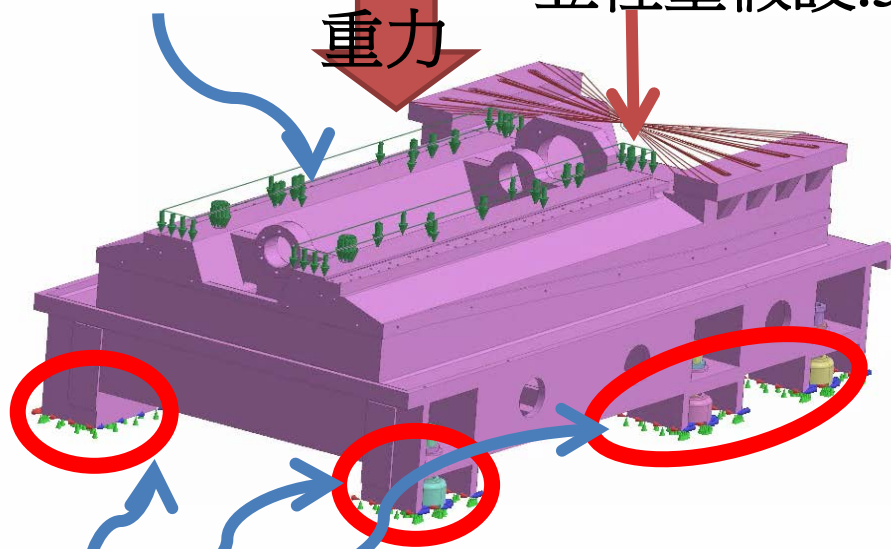
# 基座組件-靜剛度拓樸改善設計

MIDAS  
MESH FREE

滑軌均壓:  $20 \text{ Nt/mm}^2$

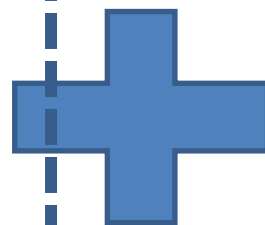
立柱重假設:  $500 \text{ Kg}$

重力

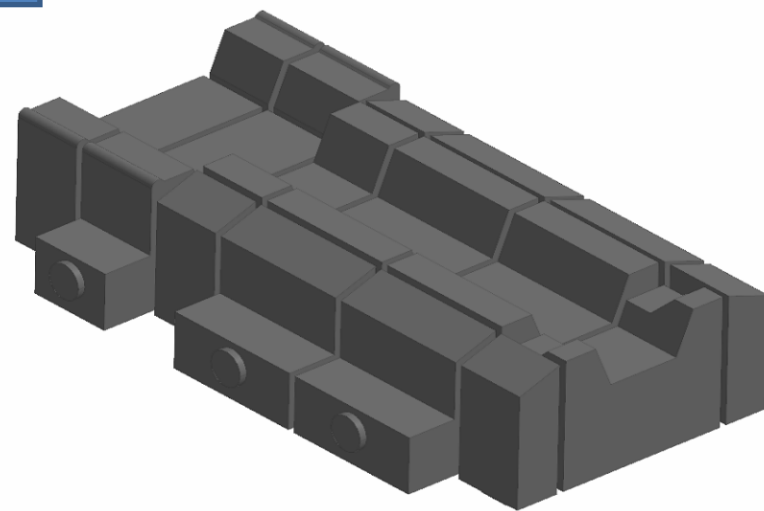


固定X,Y,Z

非設計區域

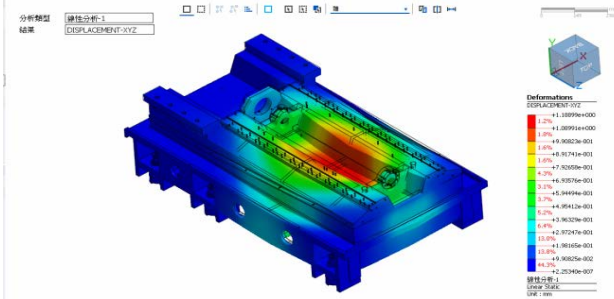


設計區域

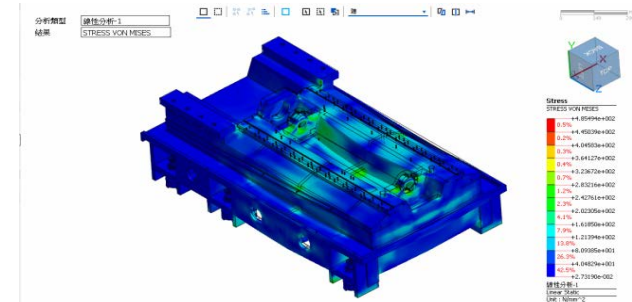


# 基座組件-靜剛度拓樸改善設計

最大變形量1.189(mm)

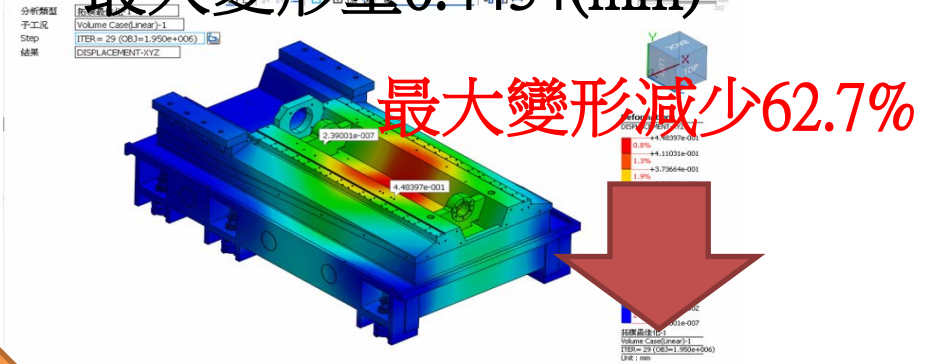


最大應力485.5(MPa)

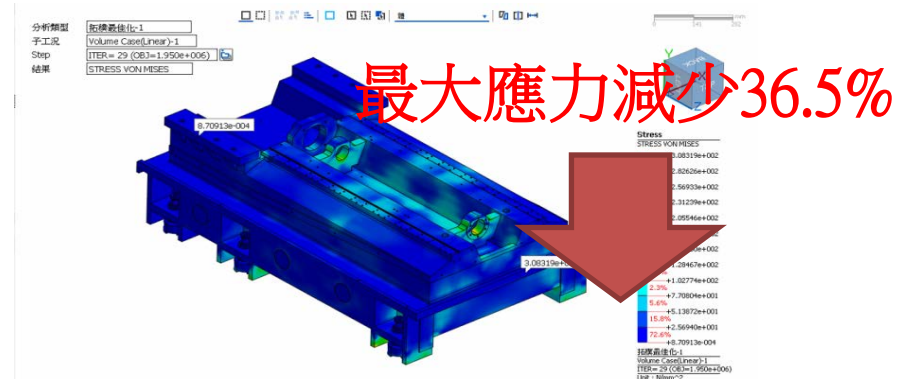


拓樸設計

最大變形量0.4434(mm)

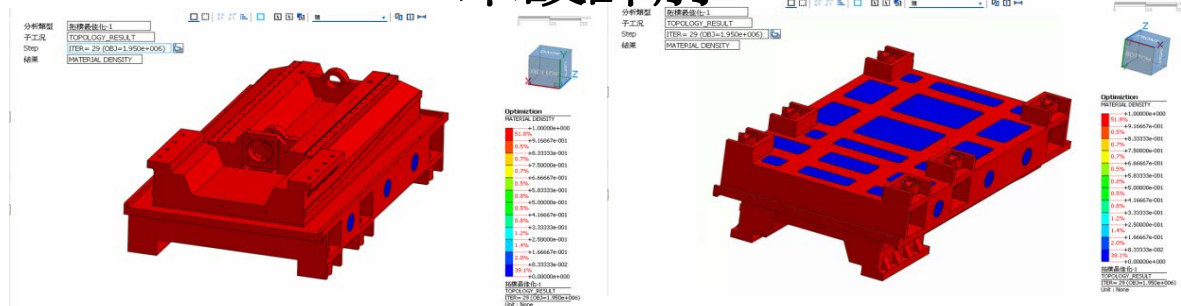


最大應力308.3(MPa)



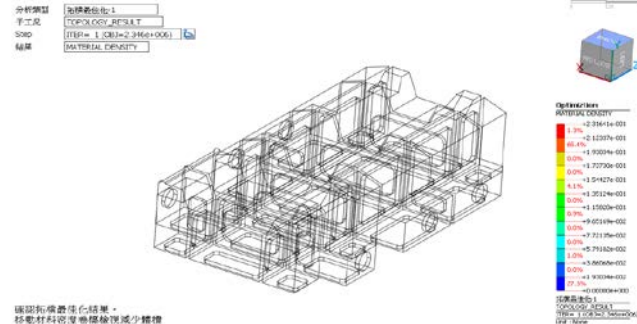
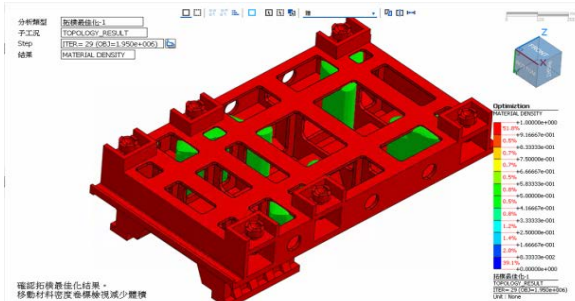
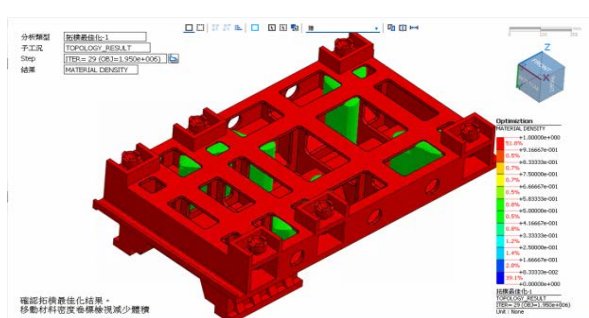
# 基座組件-靜剛度拓樸改善設計

## 未設計前



## 設計區:可變更的範圍

## 拓樸設計建議



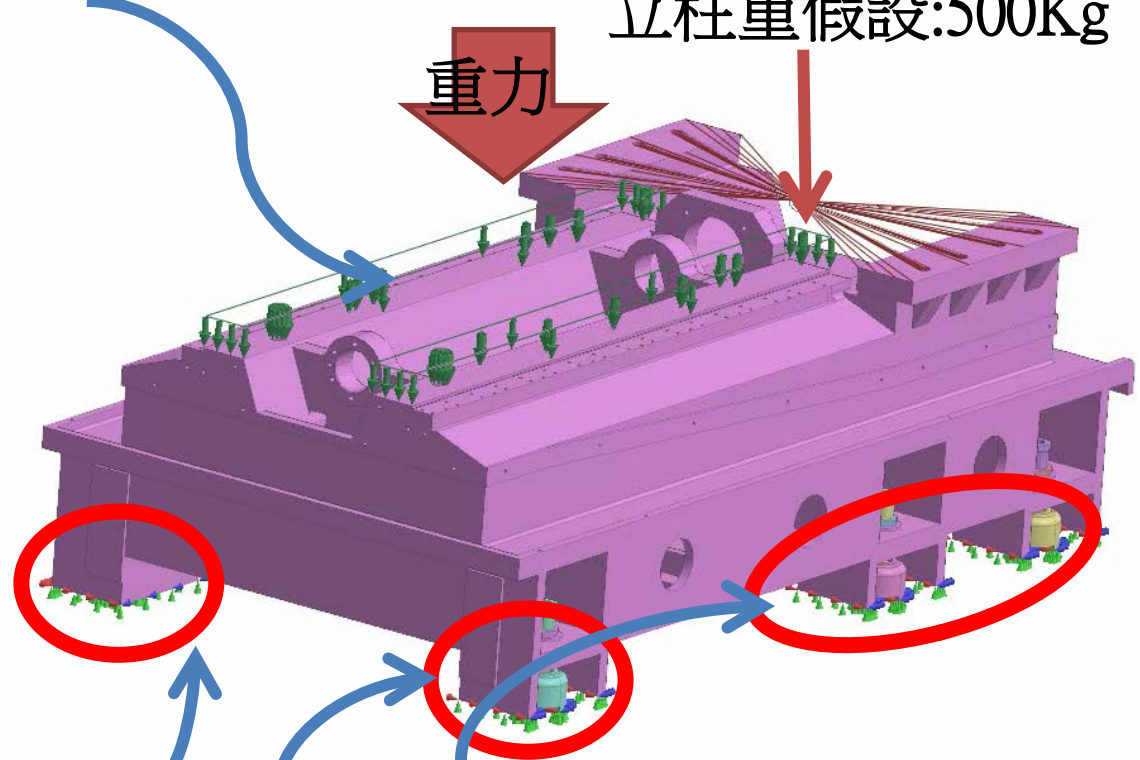
## 設計區域-材料分佈建議



滑軌均壓:  $20 \text{ Nt/mm}^2$

立柱重假設:  $500 \text{ Kg}$

重力

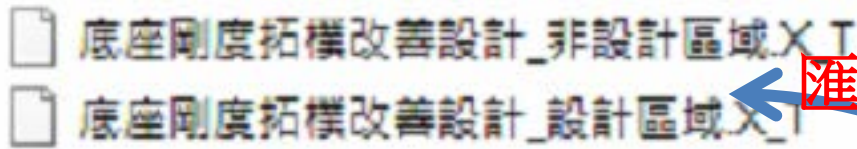


固定X,Y,Z

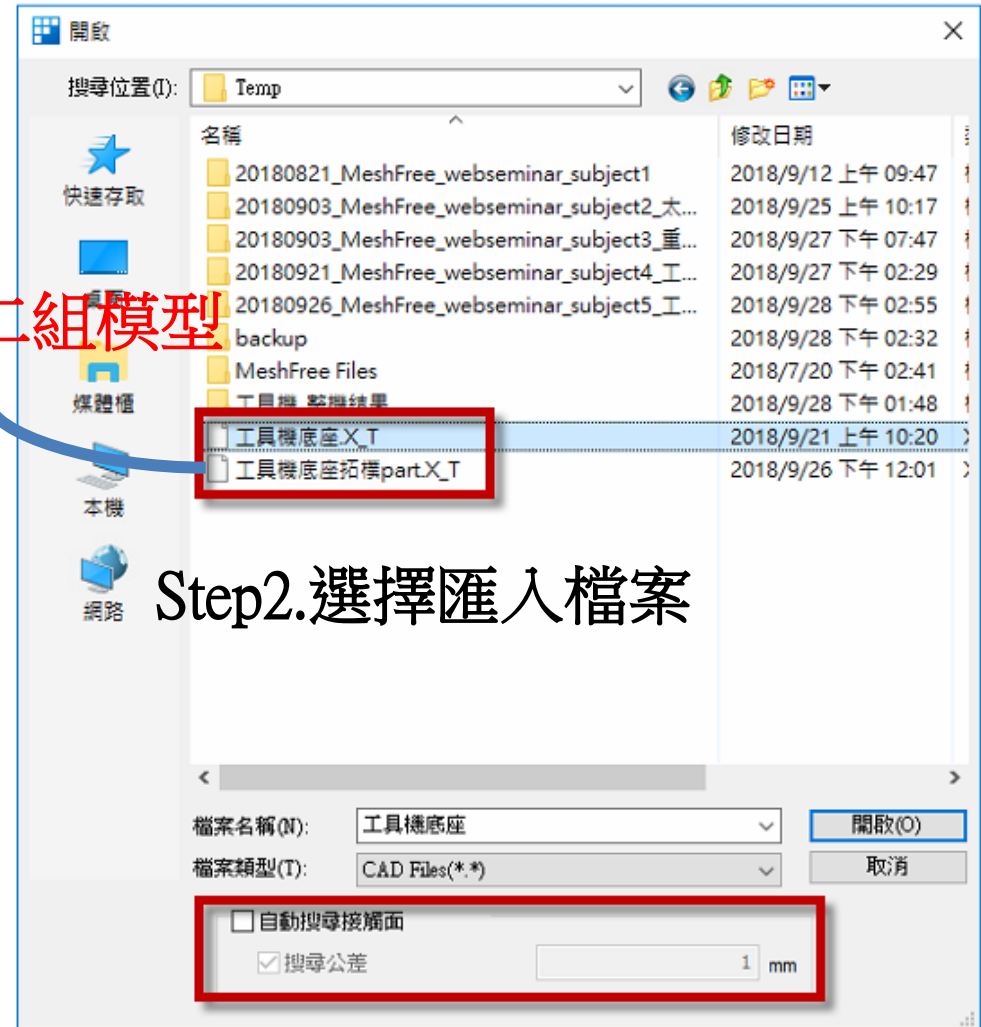
材料: Alloy Steel



## Step1.匯入3D 模型



匯入二組模型



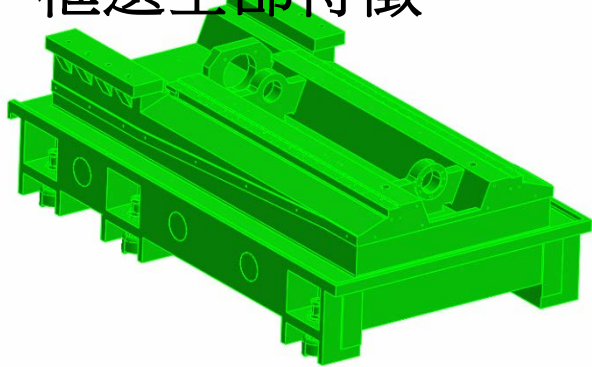
## Step2.選擇匯入檔案

## MeshFree支援各類CAD 格式

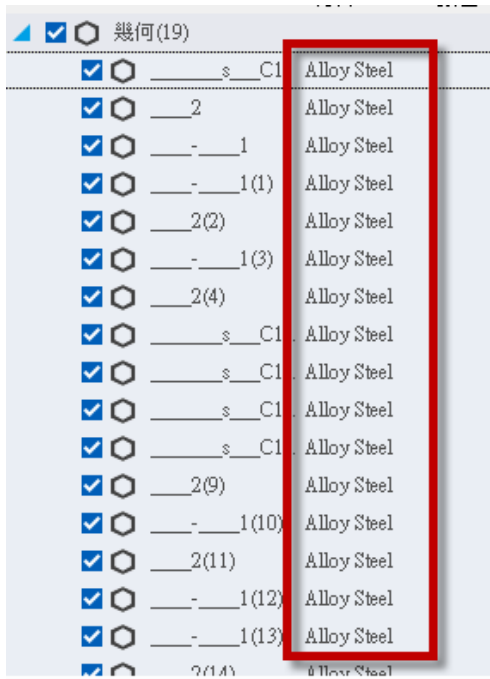
Parasolid (9 - 29) Files (\*.x\_t;\*.xmt\_txt;\*.x\_b;\*.xmt\_bin)  
 ACIS (R1 - 2017 1.0) Files (\*.sat;\*.sab;\*.asat;\*.asab)  
 STEP (AP203, AP214, AP242) Files (\*.stp;\*.step)  
 IGES (Up to 5.3) Files (\*.igs;\*.iges)  
 Pro-E (16 - Creo 3.0) Files (\*.prt;\*.prt.\*;\*.asm;\*.asm.\*)  
 CATIA V4 (CATIA 4.1.9 - 4.2.4) Files (\*.model;\*.exp;\*.session)  
 CATIA V5 (V5R8 - V5-6R2016) Files (\*.CATPart;\*.CATProduct)  
 Solid Works (98 - 2017) Files (\*.sldprt;\*.sldasm)  
 Unigraphics (11 - NX11) Files (\*.prt)  
 Inventor Part (V6 - V2017) Files (\*.ipt)  
 Inventor Assembly (V11 - V2017) Files (\*.iam)  
 Solid Edge (V18 - ST9) Files (\*.par;\*.asm;\*.psm)

## Step3.關閉自動搜尋接觸面

# 框選全部特徵



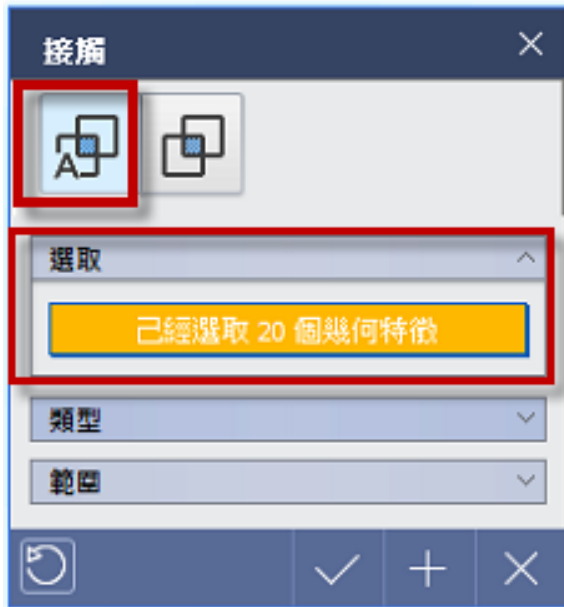
滑鼠右鍵,材料定義



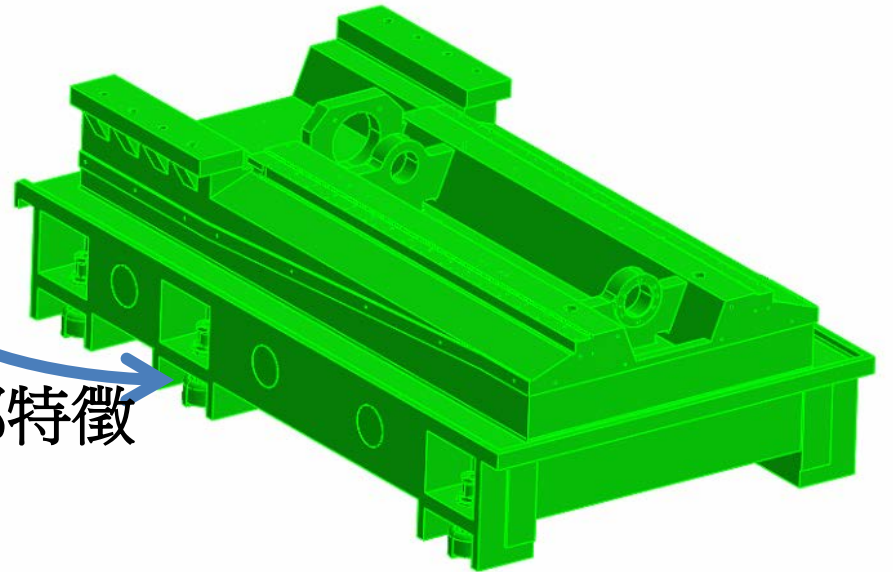
模型樹會顯示指定的材料



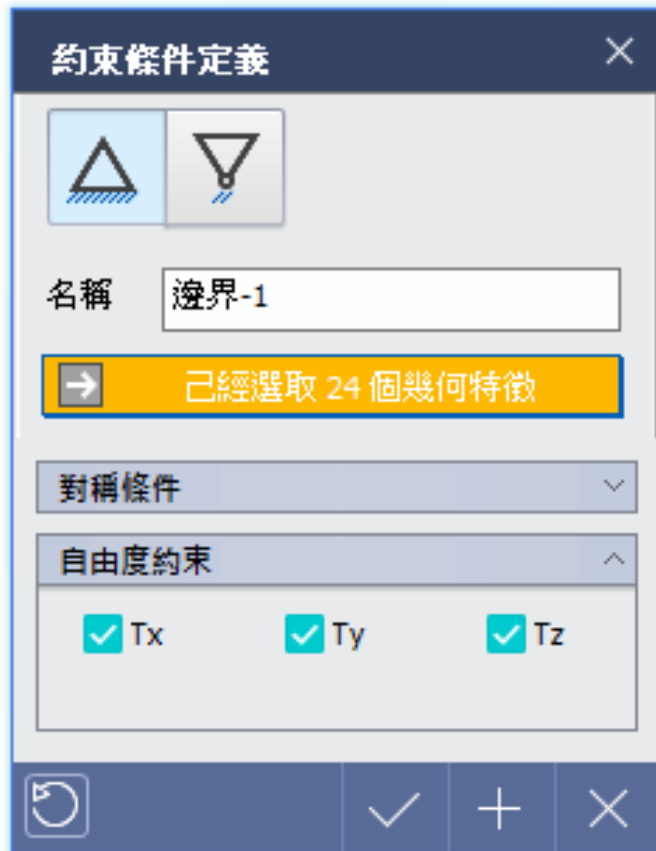
## 自動接觸定義



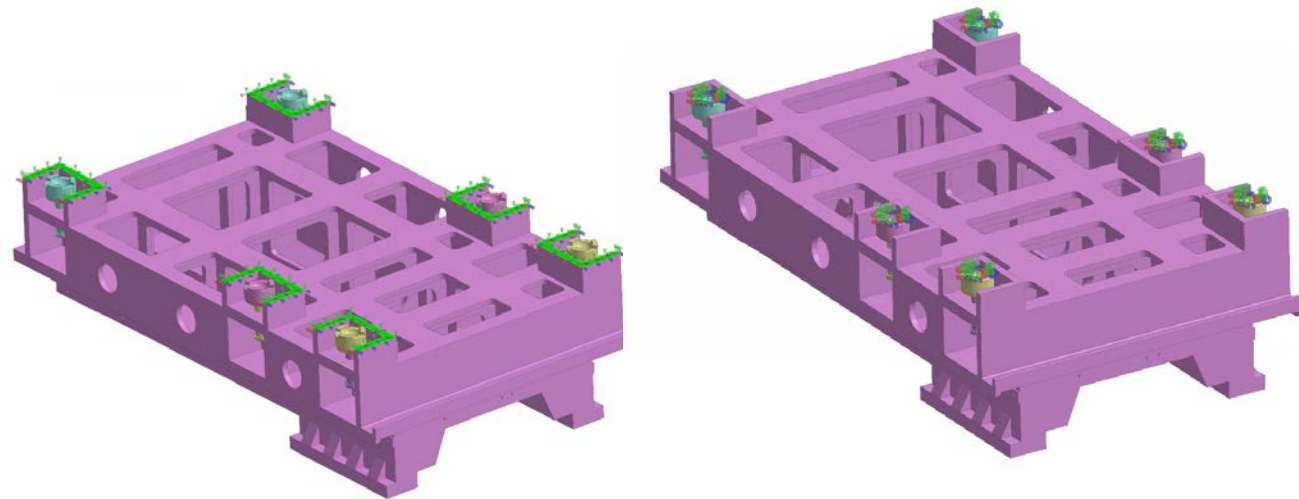
框選全部特徵

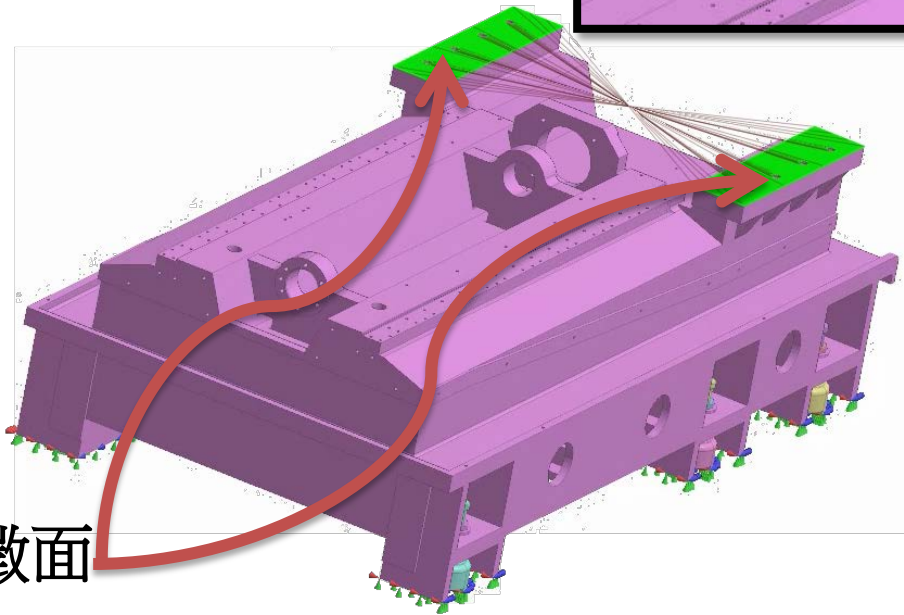
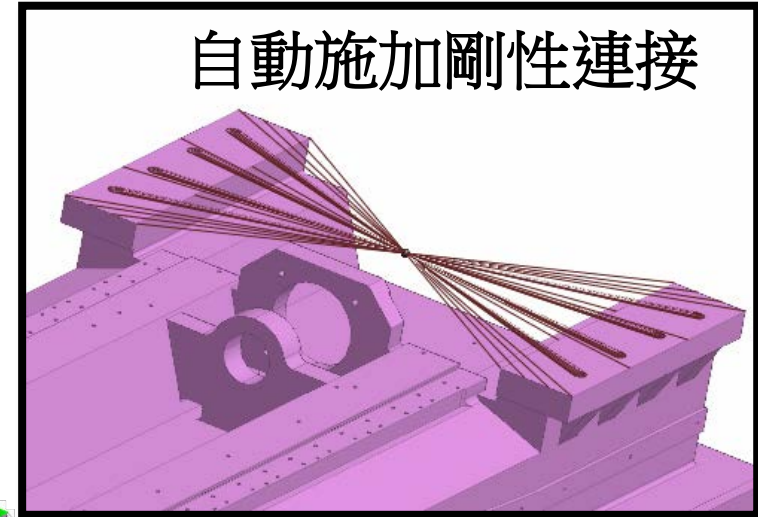






## 選取拘束底面特徵



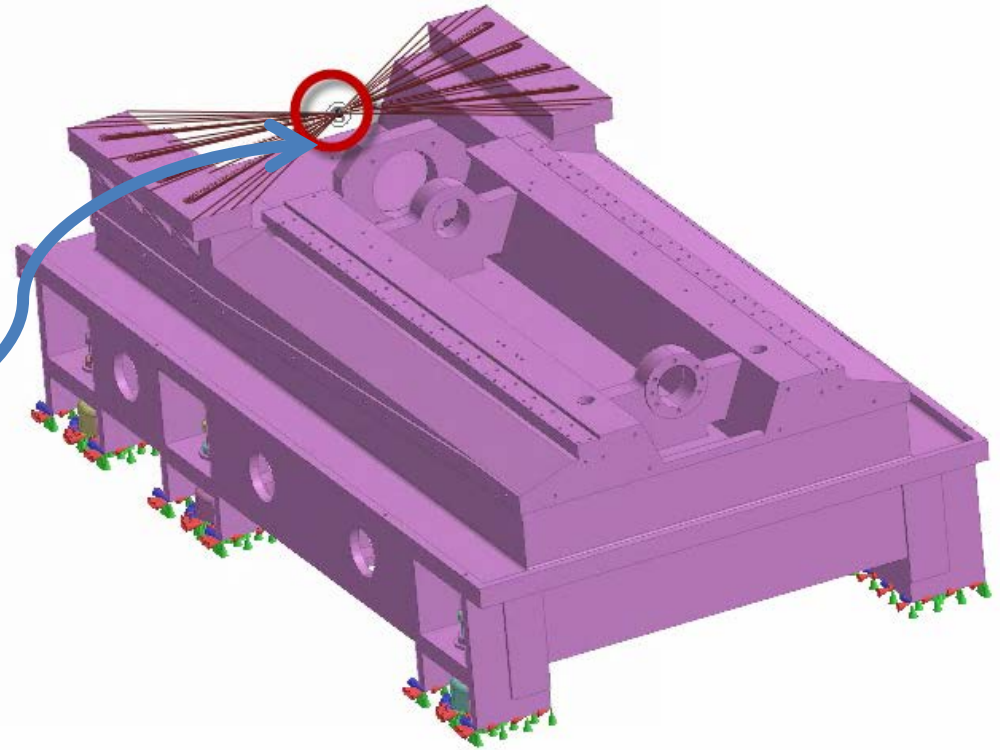
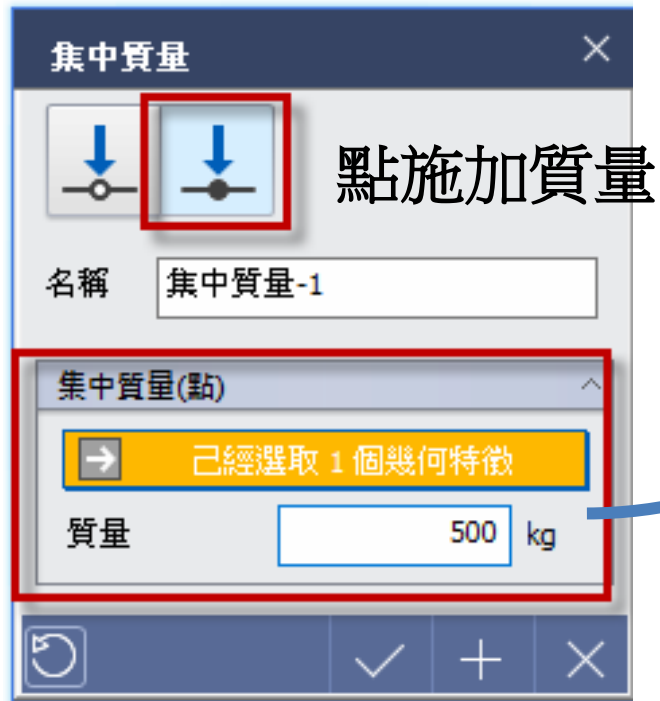


選取立柱鎖附位置特徵面



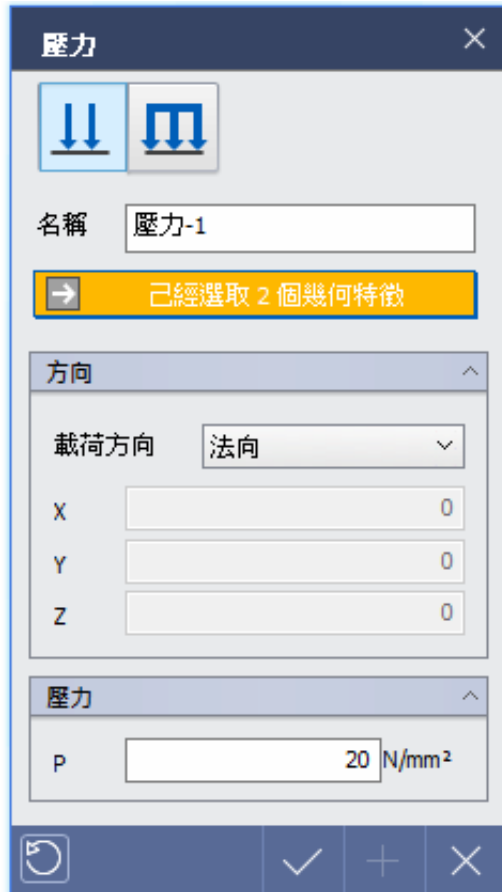
載荷

施加在剛性連接中間點

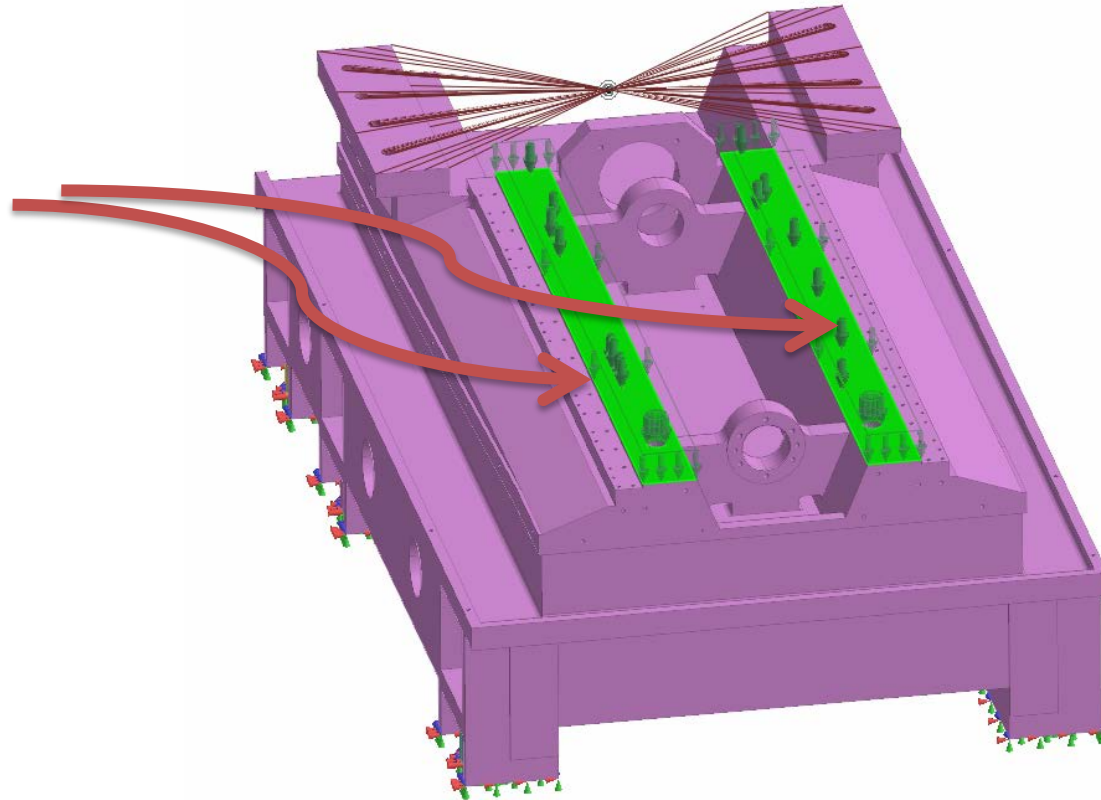




載荷

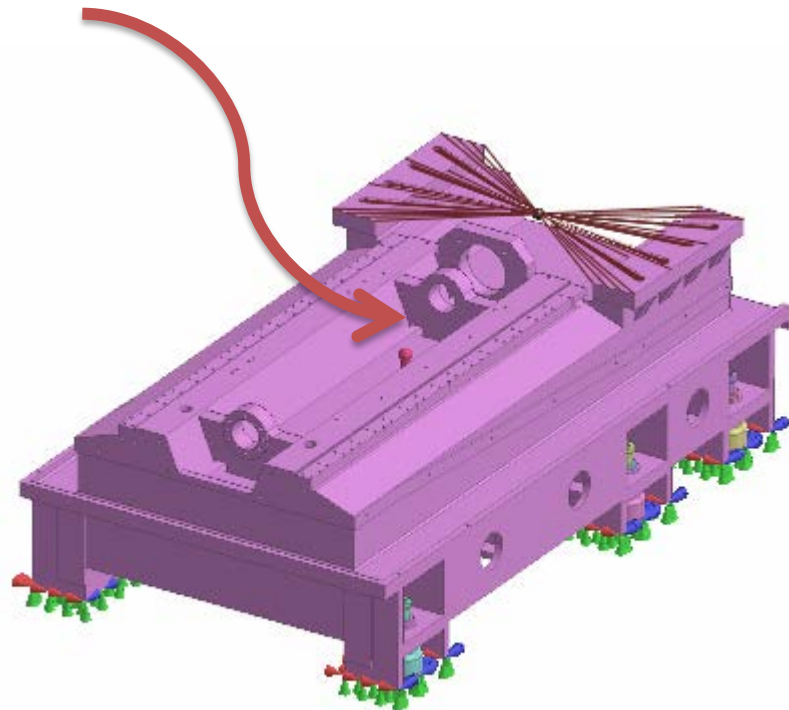


選擇滑軌特徵面

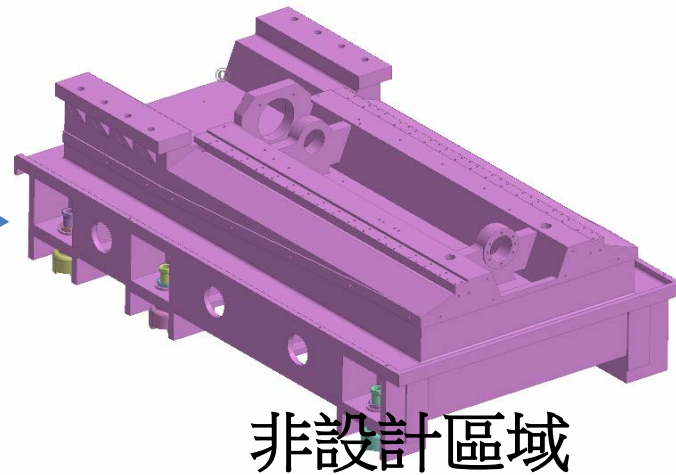
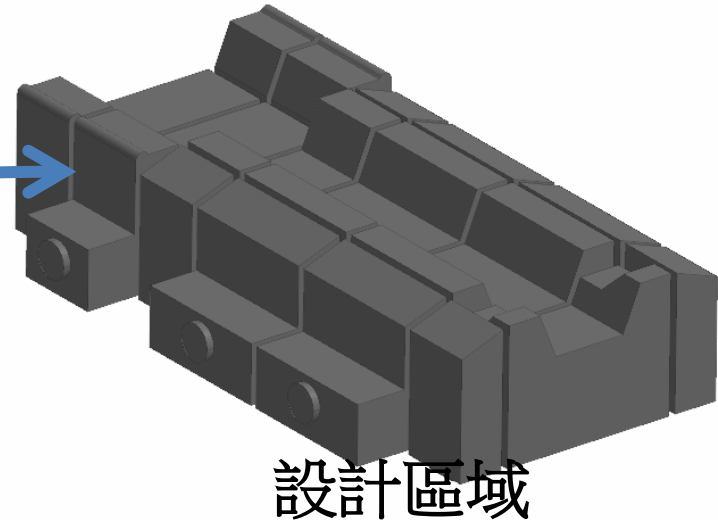




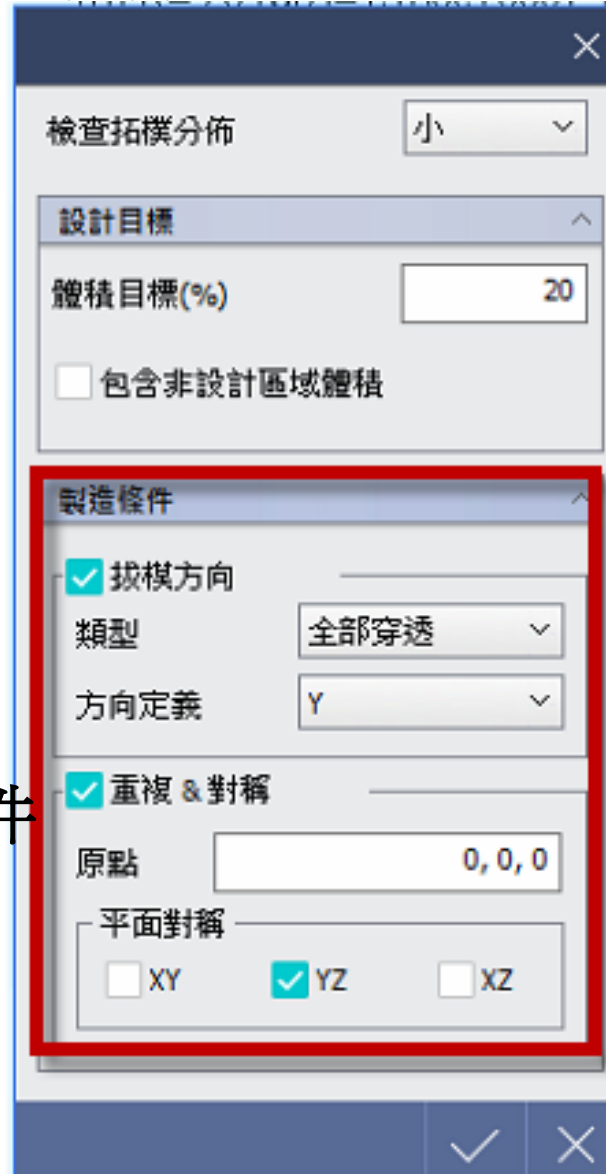
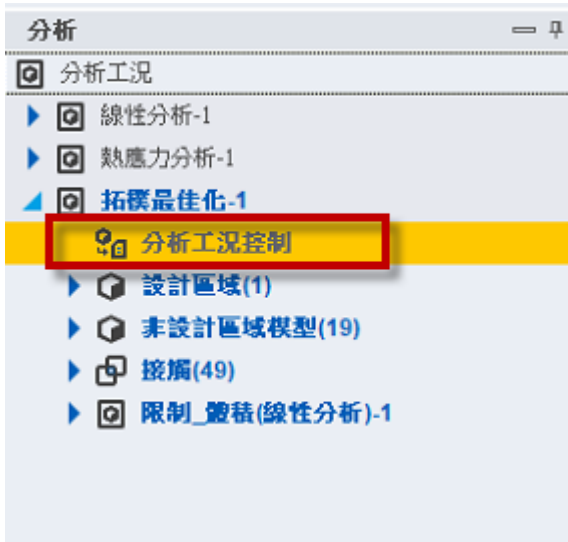
新增重力,視窗會顯示重力方向箭頭



## 滑屬拖曳指定設計和非設計區域

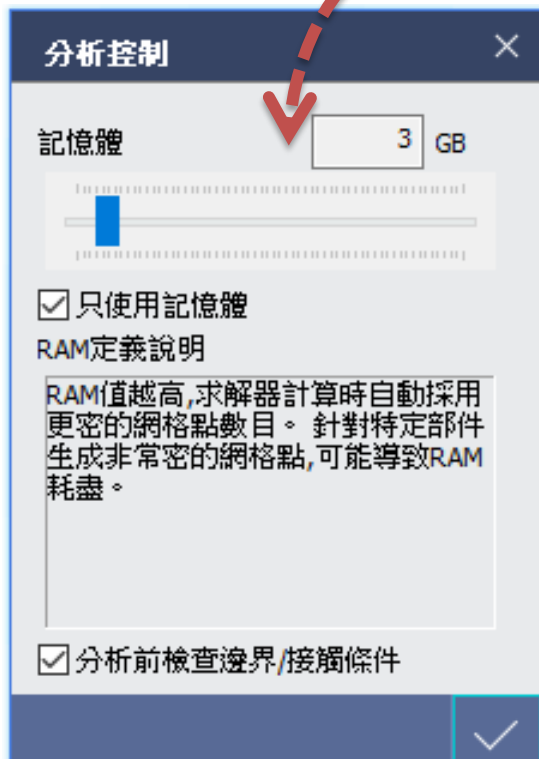


# 設計區域材料分佈大小



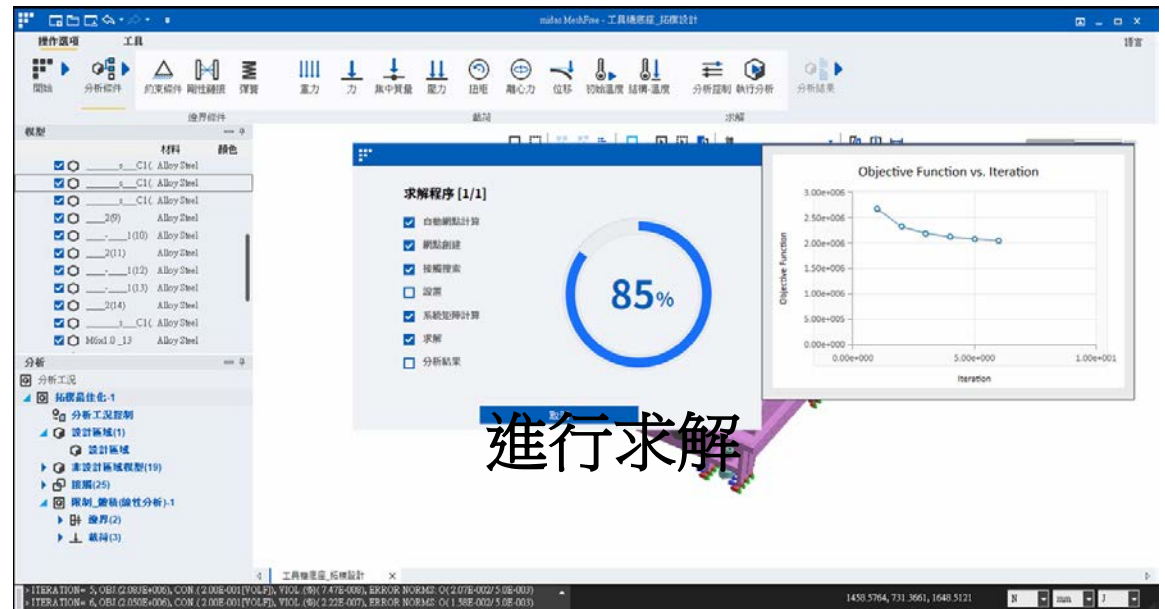
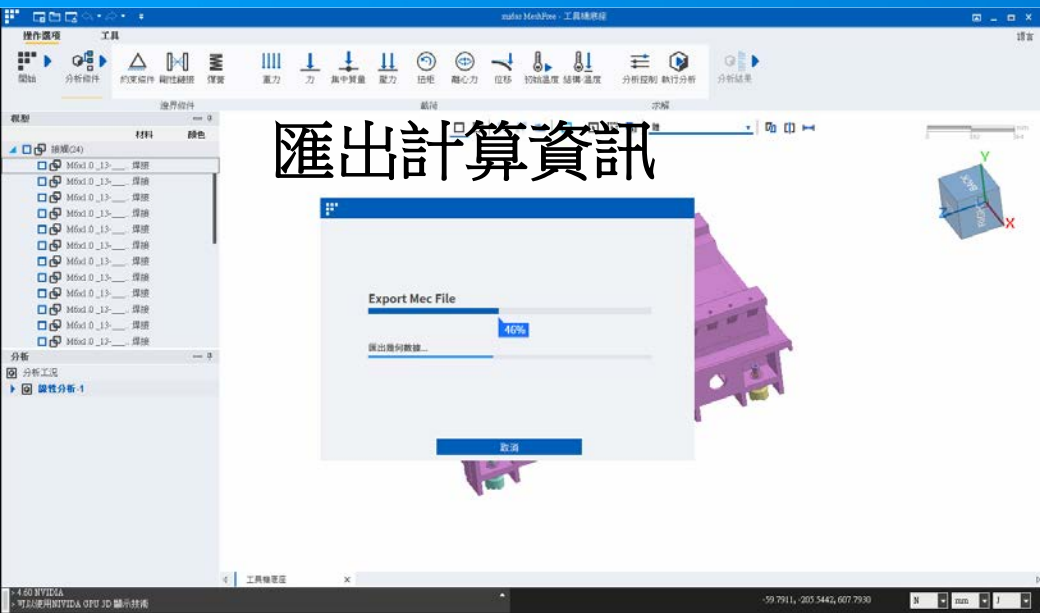
設計區域  
達到減少80%目標

加工&美觀條件



記憶體大小  
1.計算速度  
2.分析準確性





midas MeshFree - 工具椅底座\_拓樸設計1

操作選項 工具

開始 分析條件 分析結果 拓樸模型 模態表 查詢 曲線結果 結果檔

縮放(x1) 科學記號 連續輪廓 最大/最小 無網點 小數點位數 5 特徵線視圖 動畫 刻度顯示

分析結果 變形 數值顯示 顯示

模型

材料

- s\_C1( Alloy Steel
- s\_C1( Alloy Steel
- s\_C1( Alloy Steel
- \_2(9) Alloy Steel
- \_1(10) Alloy Steel
- \_2(11) Alloy Steel
- \_1(12) Alloy Steel
- \_1(13) Alloy Steel
- \_2(14) Alloy Steel
- s\_C1( Alloy Steel
- M6x1.0\_13 Alloy Steel

分析

- 分析工況
- 拓樸最佳化-1
  - 分析工況控制
  - 設計區域(1)
  - 設計區域
  - 非設計區域模型(19)
  - 接觸(25)
  - 限制\_體積(線性分析)-1
    - 設計區域(1)
    - 邊界(2)
    - 載荷(3)

分析控制

分析集合: 拓樸最佳化-1

分析步: ITER = 20 (OBJ=1.780e+006)

材料密度: 0 0.5 1

體積計算

計算

最佳化計算前體積: 582543548.3858 mm<sup>3</sup>

最佳化計算後體積: 0.0000 mm<sup>3</sup>

減少率: 0.00 %

確認拓樸最佳化結果。  
移動材料密度卷標檢視減少體積

Optimization MATERIAL DENSITY

- 55.0% +1.00000e+000
- 0.6% +9.16667e-001
- 0.5% +8.33333e-001
- 0.6% +7.50000e-001
- 1.0% +6.66667e-001
- 0.6% +5.83333e-001
- 0.7% +5.00000e-001
- 0.8% +4.16667e-001
- 0.8% +3.33333e-001
- 1.2% +2.50000e-001
- 1.8% +1.66667e-001
- 36.3% +8.33333e-002
- +0.00000e+000

拓樸最佳化-1  
TOPOLOGY RESULT  
ITER= 20 (OBJ=1.780e+006)  
Unit : None

TOTAL WARNINGS : 0

83.8506, 152.2173, -1204.5806 N mm J