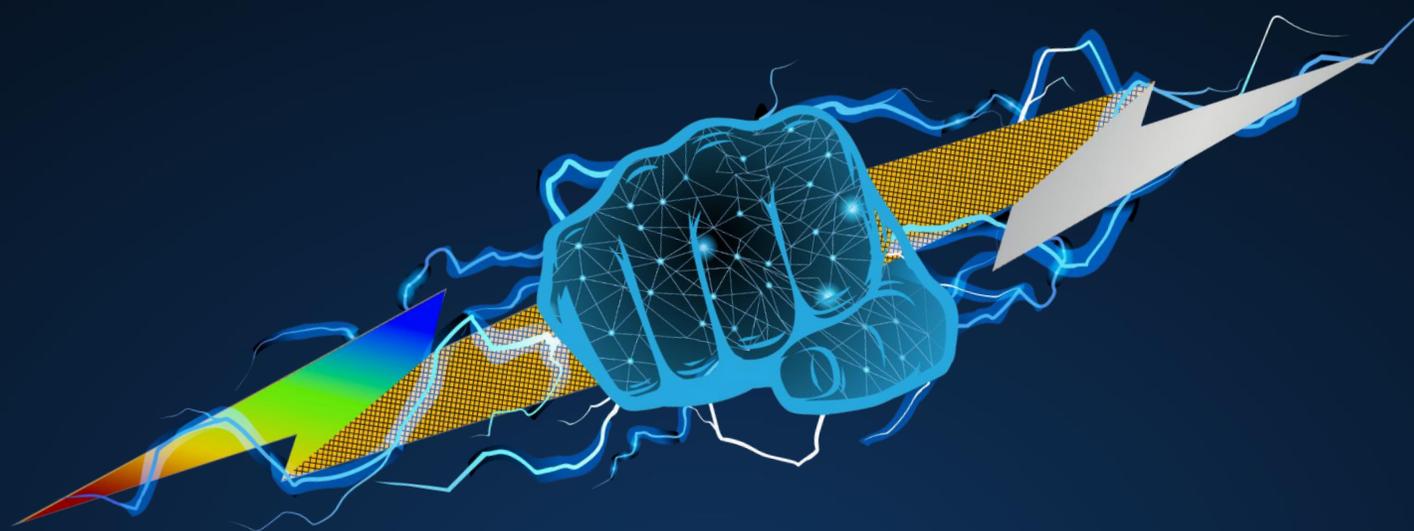


公众号/视频号搜索“MeshWorks”
扫描下方二维码添加微信号

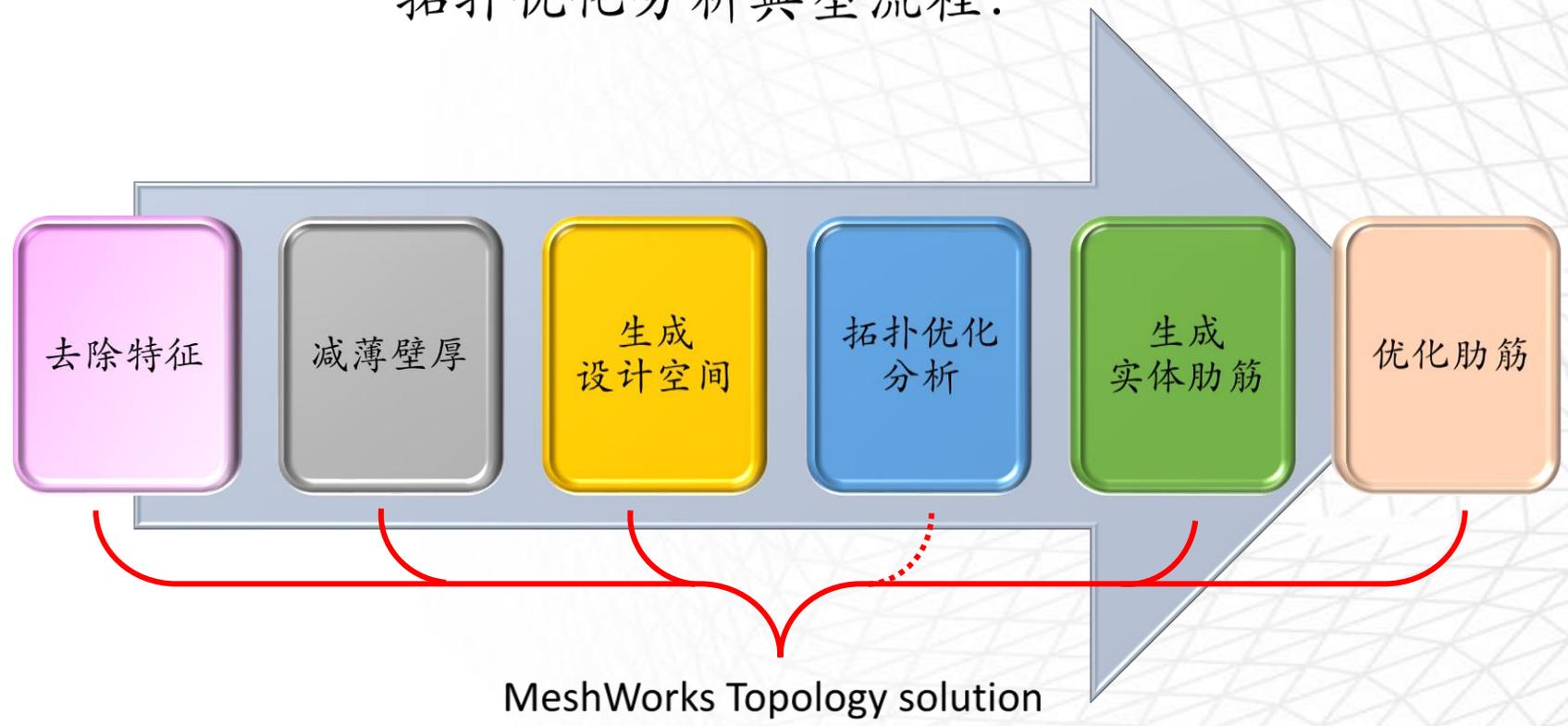


拓扑优化解决方案

The power of CAE to
ACCELERATE. TRANSFORM. AUTOMATE. INNOVATE.

DEP
MeshWorks

拓扑优化分析典型流程：



去除特征

应用“Feature Removal”面板快速删除肋筋

- ① 提取肋筋表面网格
- ② 一键删除肋筋

I. Method 1 去除各种凸起特征如肋筋、凸台

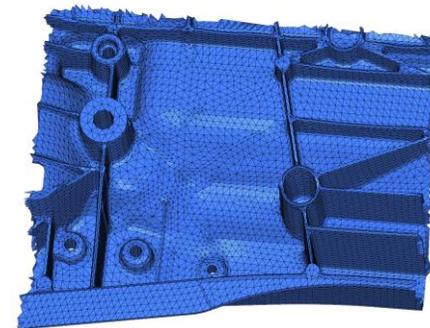
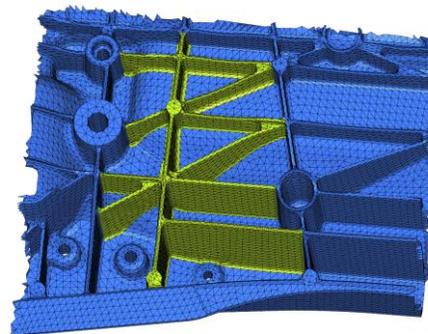
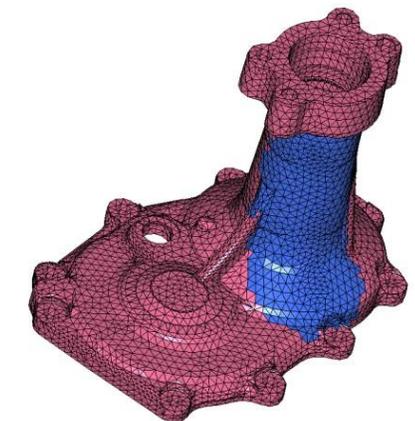
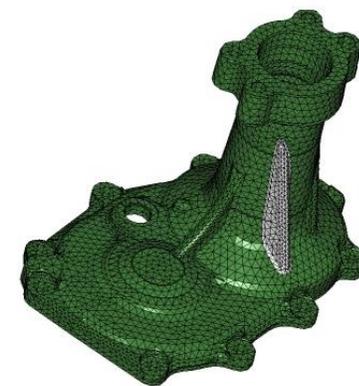
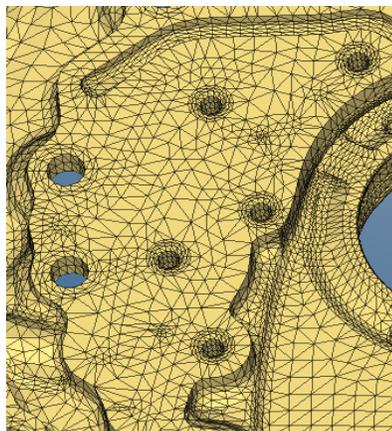
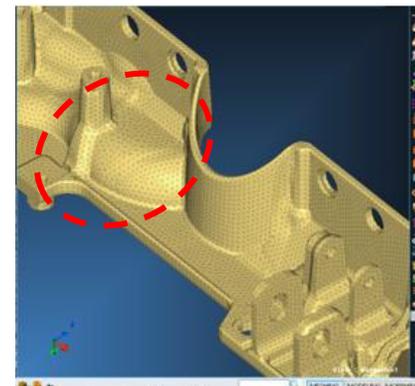
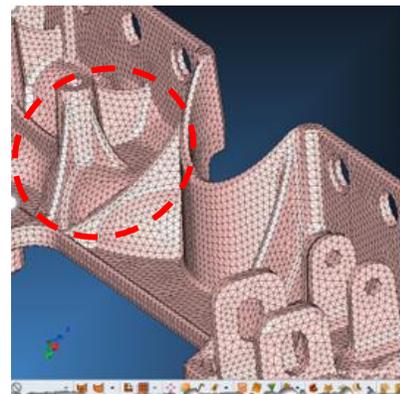
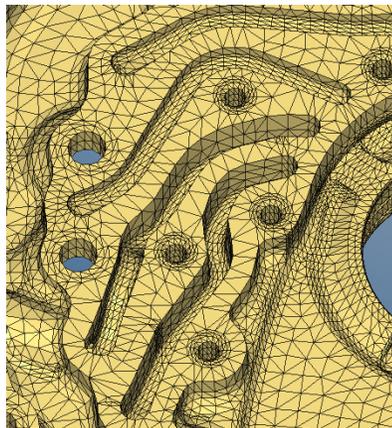
若结果出现坑洼可采用以下两种方法进行修补:

a) 采用带Morph的映射功能进行修整

- Ruled Mesh创建平面
- Project with Morph填补坑洼

b) 用Method 2进行填补

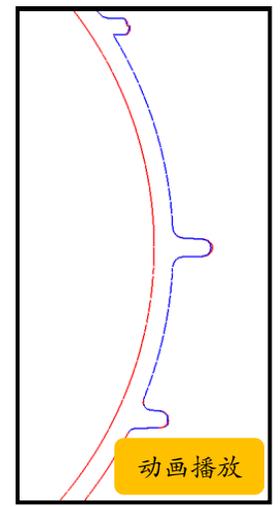
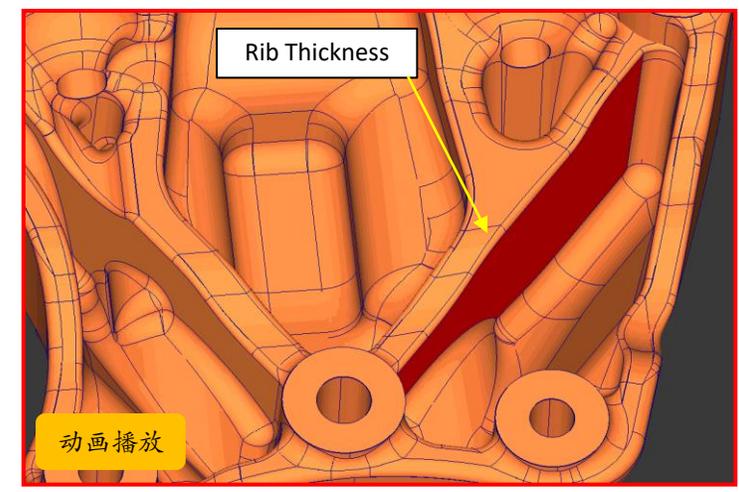
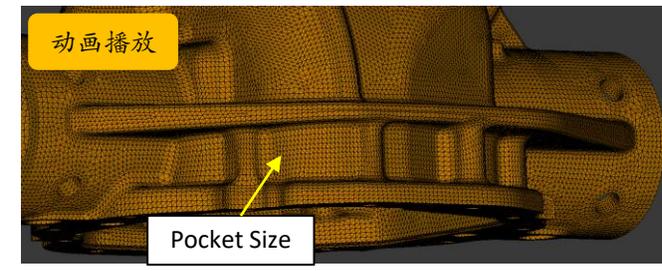
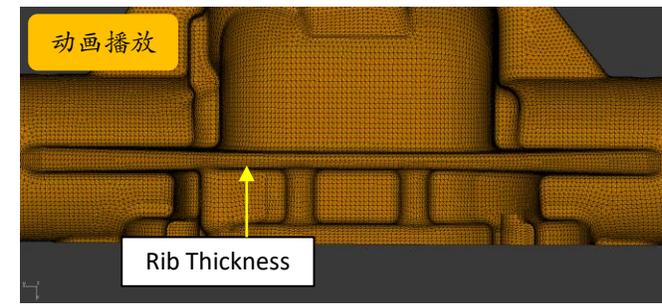
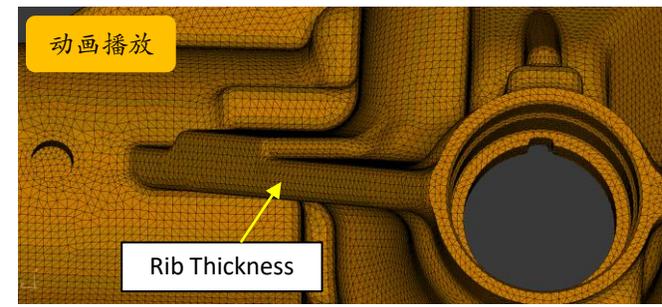
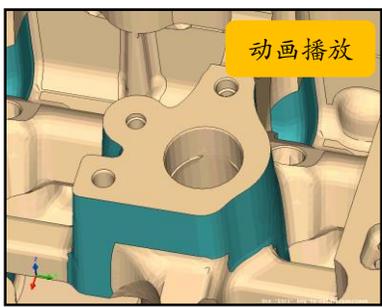
II. Method 2 去除各种凹陷特征，如沟壑、坑洼



减薄壁厚

可采用两种方法减薄壁厚，预留最大的设计空间：

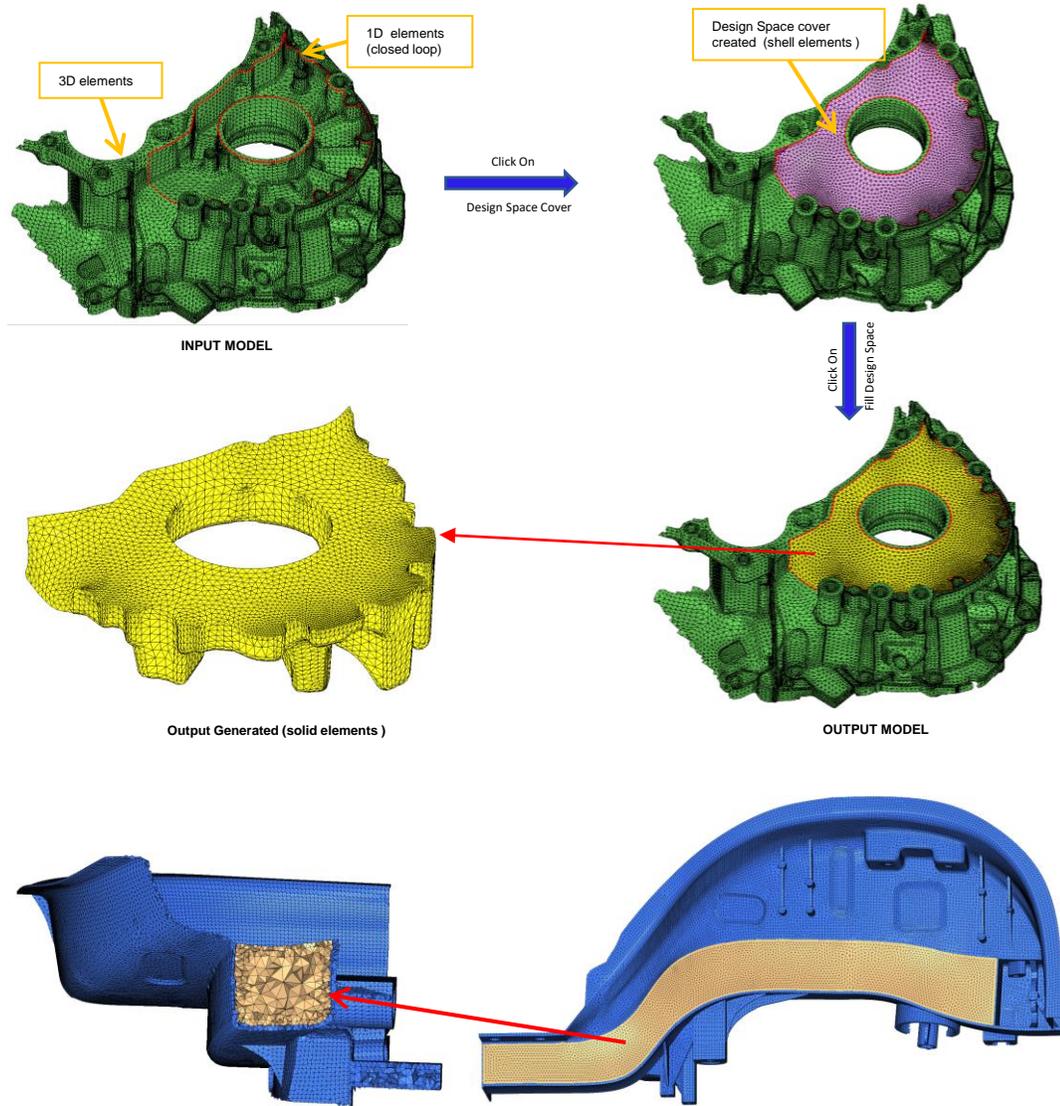
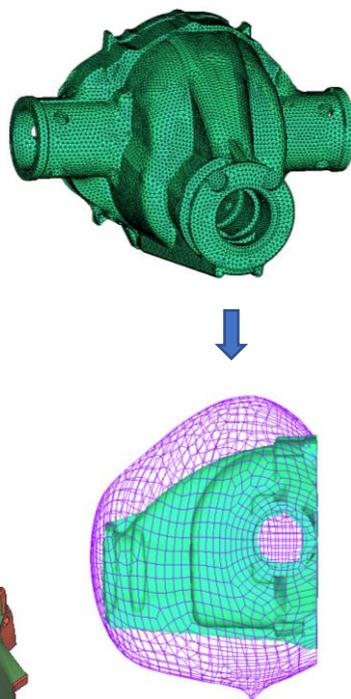
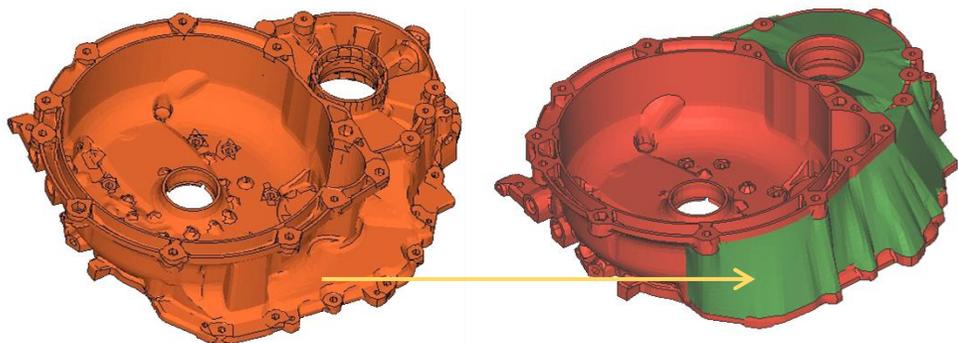
- ① 网格变形 (Freeform)
- ② Auto Parameterization Casting面板



生成设计空间

一键式生成拓扑优化设计空间：

- ① Design Space Filling面板
- ② 创建1D封闭线条 (Edge Tracking, 不能用Create 1D Mesh, 防止出现1D节点与四面体节点不对应情况, 需共节点)
- ③ 填补孔洞
 - a) Find face
 - a) Organize the tube face elements
 - b) Hole Filler
 - c) Equivalence
 - d) Tetra Mesh
- ④ 一键生成设计空间 (模型需全部为四面体单元, 不能是混合单元模型)
- ⑤ 调整空间大小 (Translate)

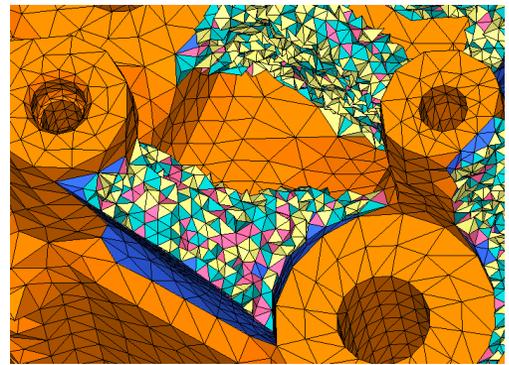


拓扑优化分析

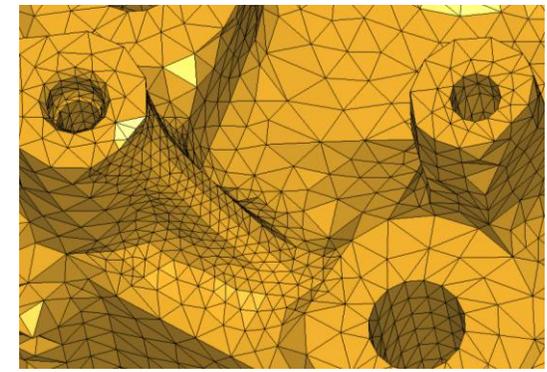
MeshWorks无求解器模块，需要借助第三方求解器进行拓扑优化分析，如Optistruct，Tosca等：

- ① 根据拓扑优化结果确定材料位置
- ② 为后续创建肋筋提供方向

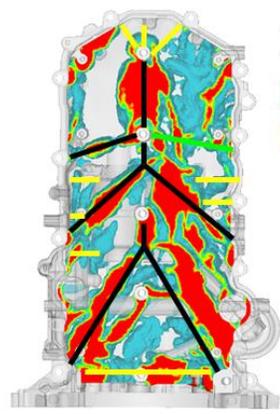
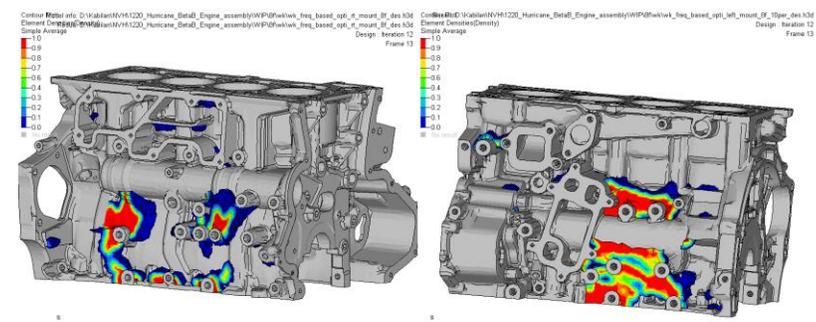
拓扑优化结果



创建肋筋

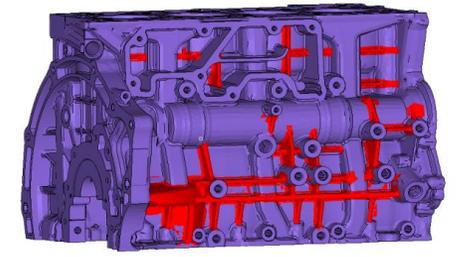
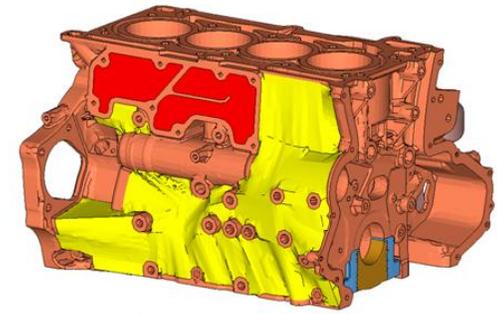
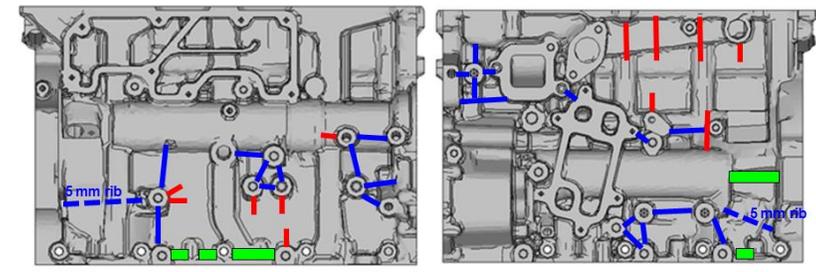


拓扑优化结果



- Ribs needed to be created as per the Optistruct results
- Ribs proposed for symmetry.
- Ribs proposed for supporting the structure.

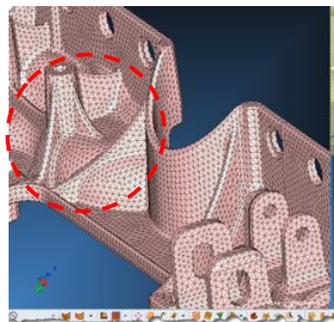
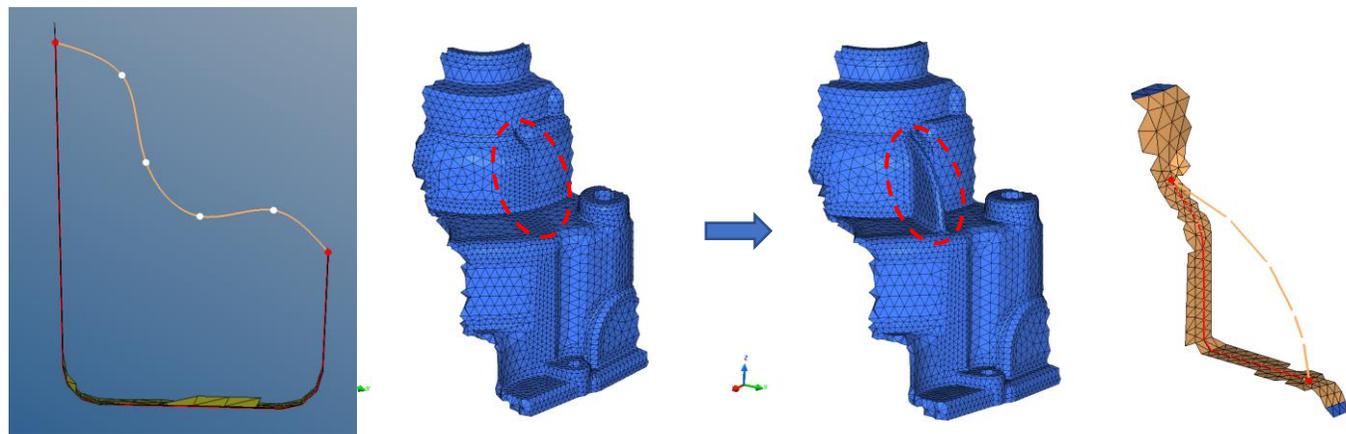
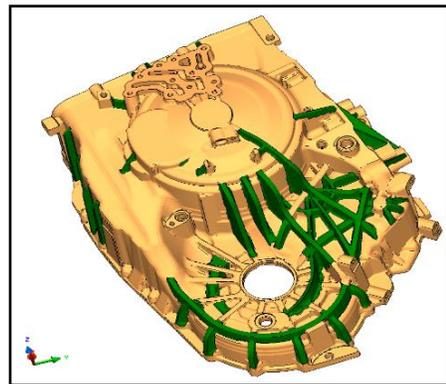
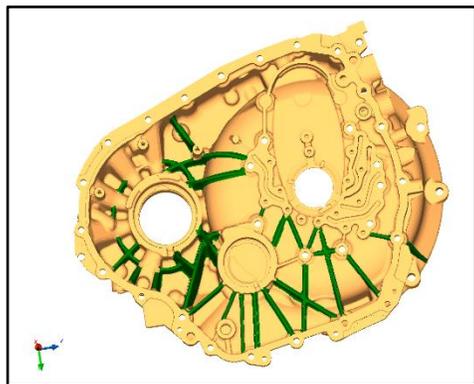
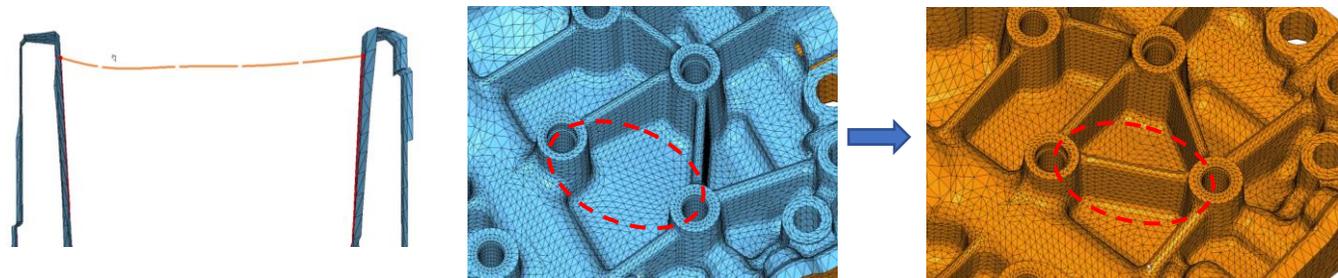
肋筋位置



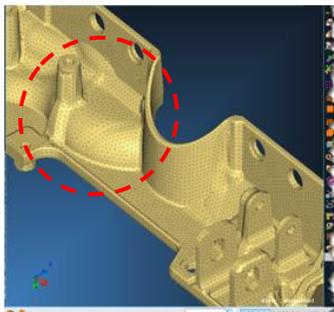
生成
实体肋筋

根据拓扑优化结果，直接在四面体网格模型上创建3D实体肋筋：

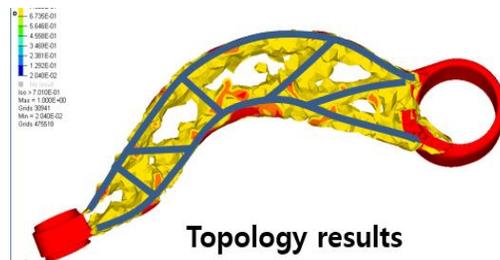
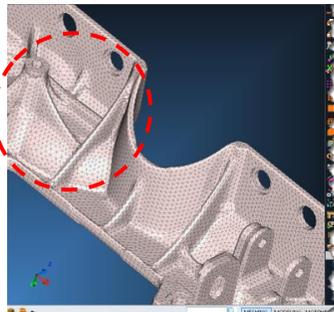
- ① 无需CAD数据
- ② 草图功能可以灵活创建任意轮廓的肋筋
- ③ 定义拔模角度及倒角
- ④ 可以创建自定义阵列式多肋筋



去除肋筋



创建新肋筋



Topology results



优化肋筋

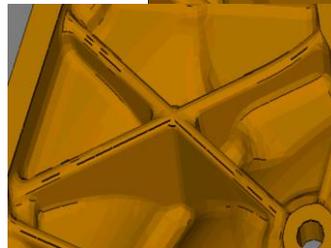
生成新肋筋后，可以快速对肋筋进行参数化，用于优化分析。可实现参数化功能如下：

- ① 肋筋高度参数化
- ② 肋筋厚度参数化
- ③ 肋筋数量参数化
- ④ 肋筋位置参数化
- ⑤ 倒角半径参数化

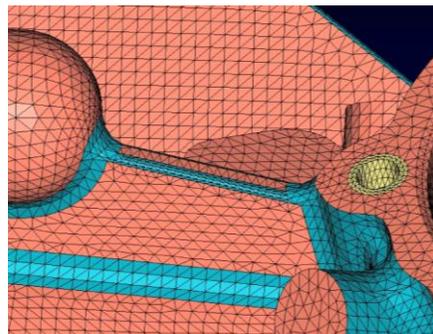
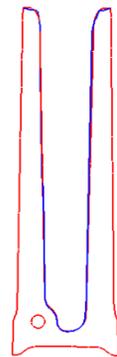
- 应用Auto Parameterization Casting面板
- 应用Tetra Rib Parameter面板



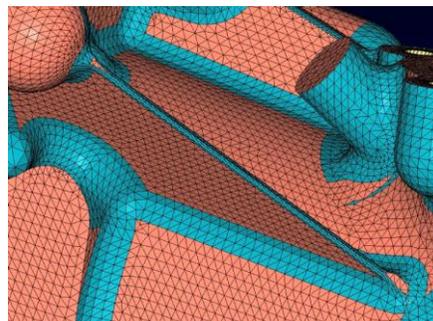
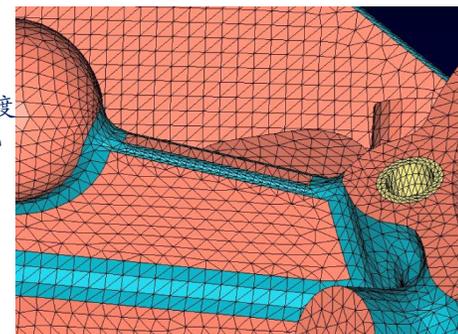
动画播放



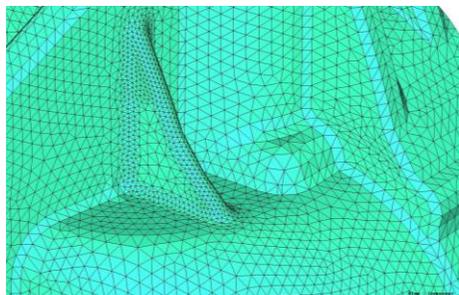
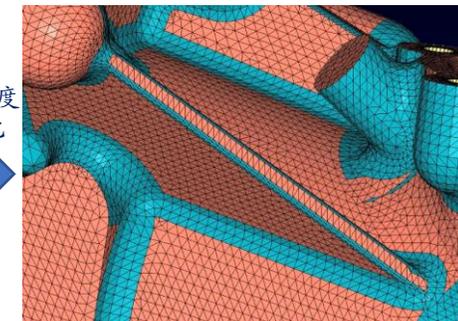
动画播放



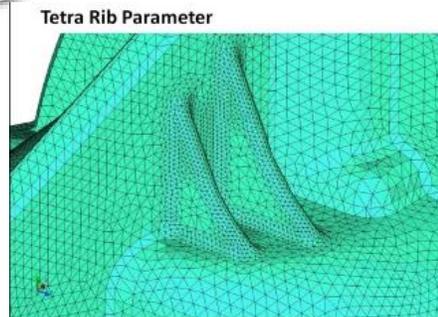
肋筋高度参数化



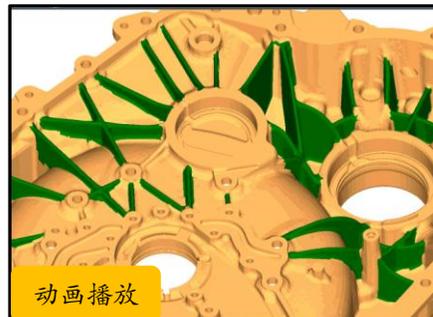
肋筋厚度参数化



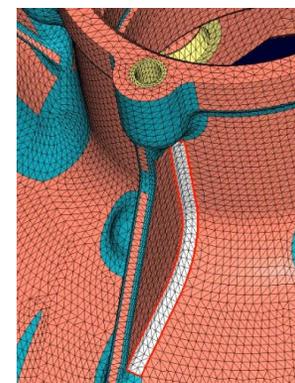
肋筋数量参数化



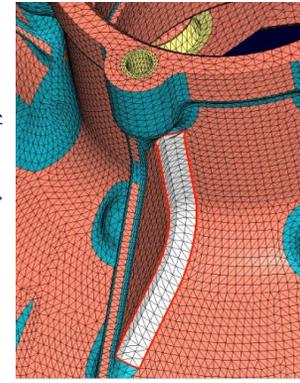
Tetra Rib Parameter



动画播放



倒角半径参数化





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