

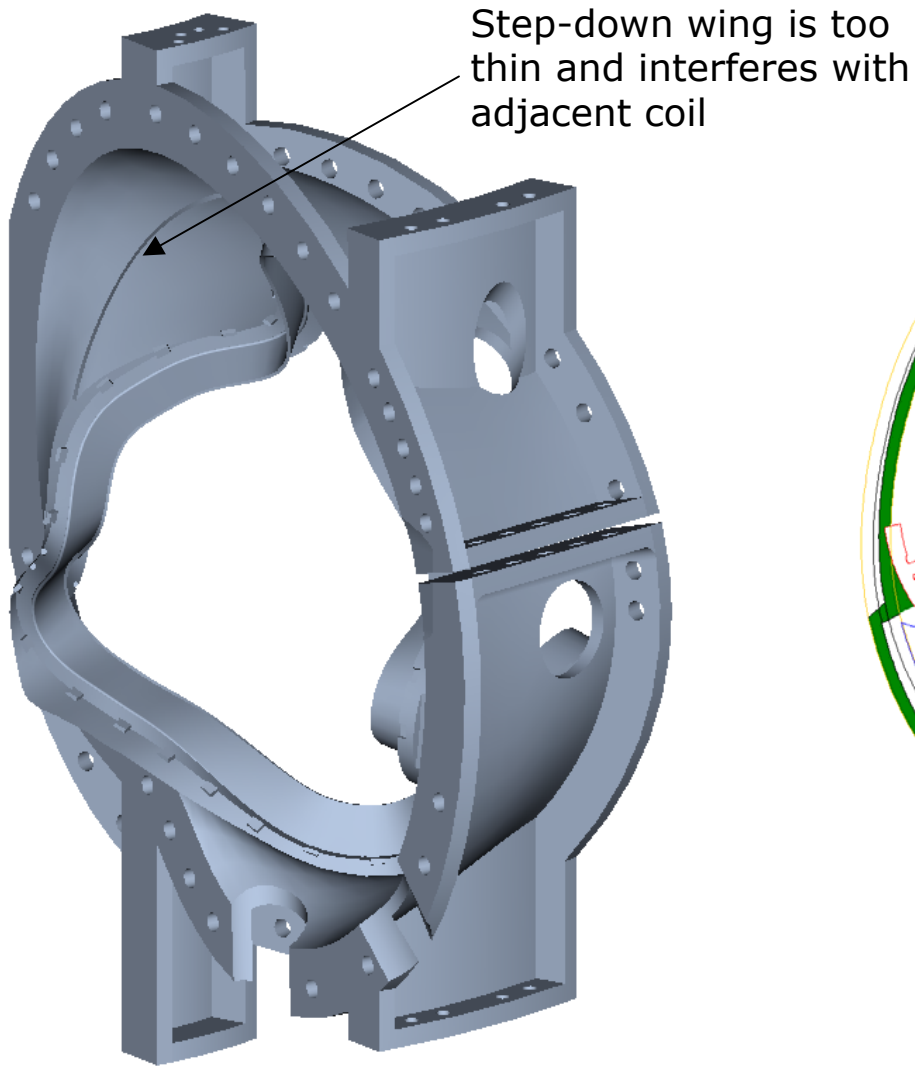
Modular Coil Winding Form Status

David Williamson
8/13/03

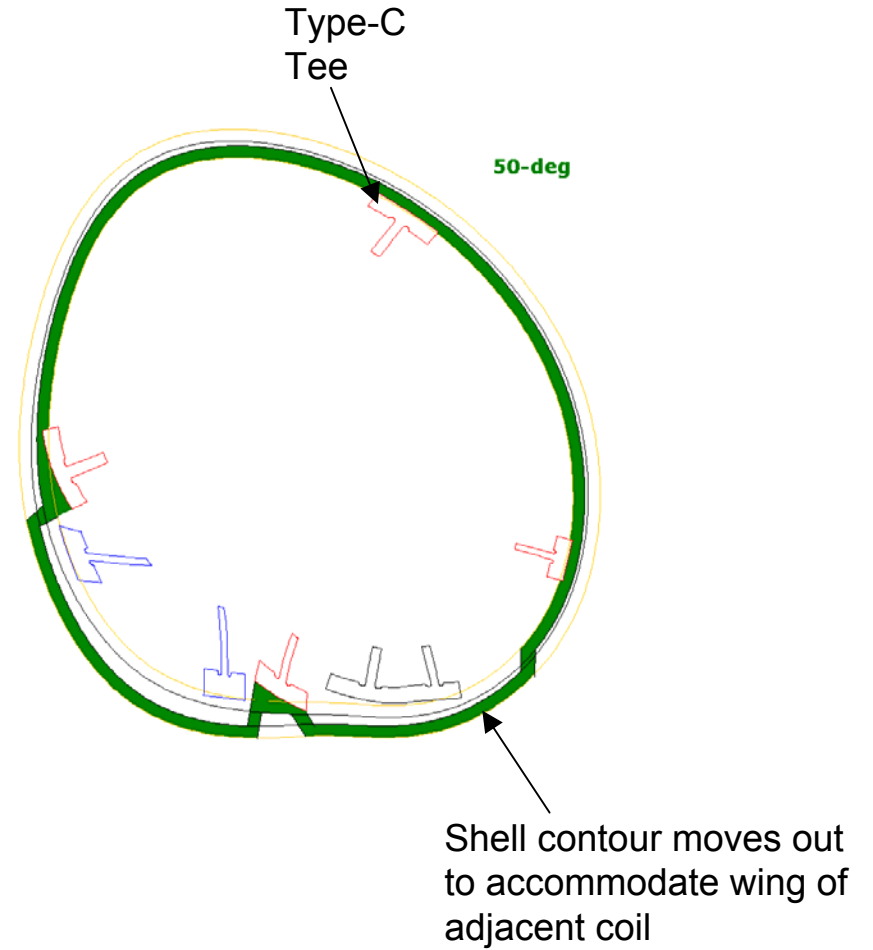
Status

- Winding forms continue to have geometry issues:
 - Overlap of tee base prevents use of standard clamp in places
 - Nesting surfaces of wings is a challenge
- Comparison with Altair models indicates similar outer shell surface, but their inner surface is simple offset which gives a very long reach from winding pack to shell. Advantage is a smooth shell structure with uniform thickness.
- Our baseline approach is to model a unique inner surface for each shell segment that makes space for the wings of adjacent coils. The outer surface is a fairly smooth offset of the winding surface. Two approaches to inner surface:
 - Blend-from-file surface that smoothly transitions from one offset distance to another.
 - Create divots in shell by subtracting 1/2-in stocked boundary surface of adjacent shell.
- Tee base appears manageable, nesting surfaces is critical task.

Original model of Type-C winding form

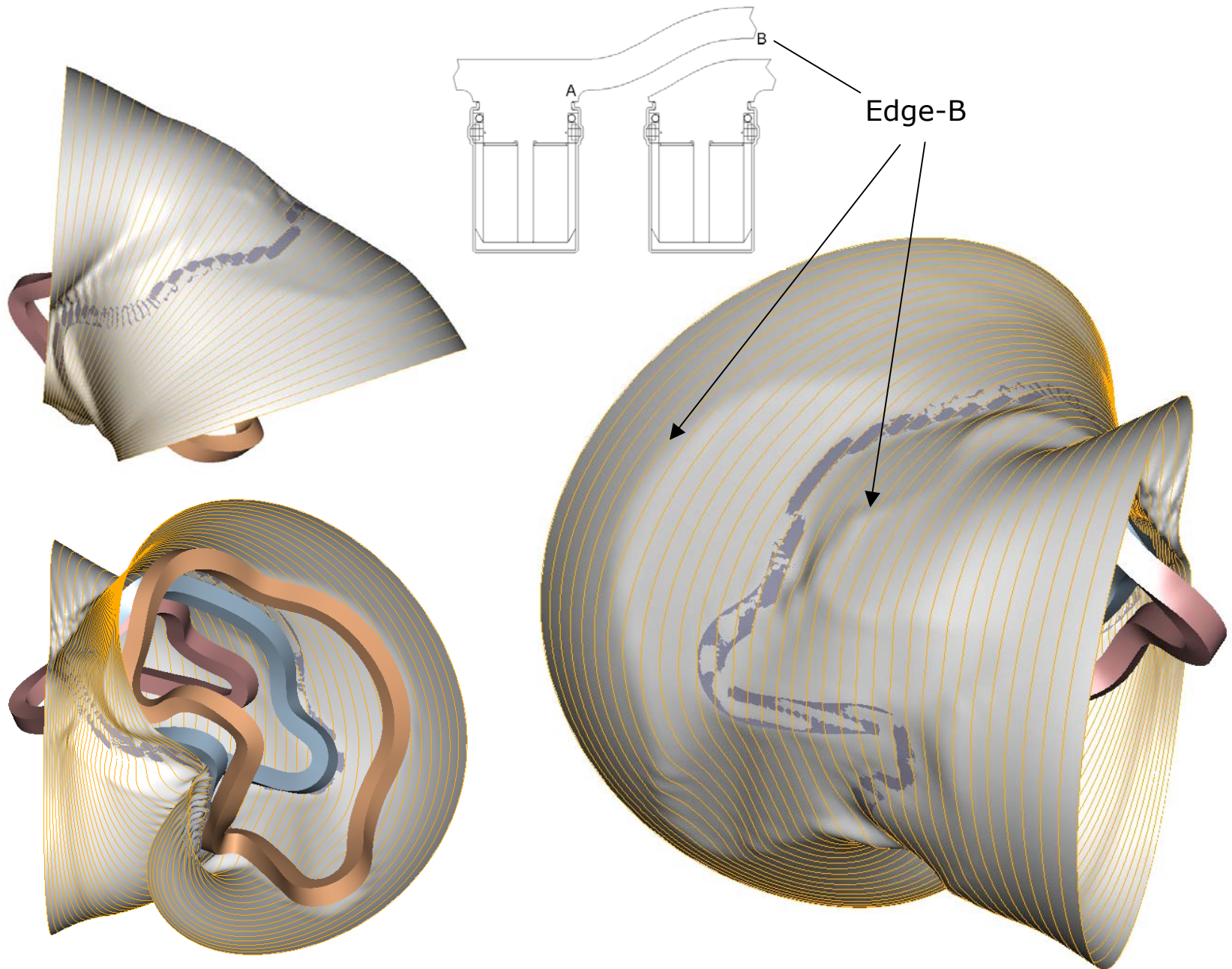


SE141-013 – Focus of drawings

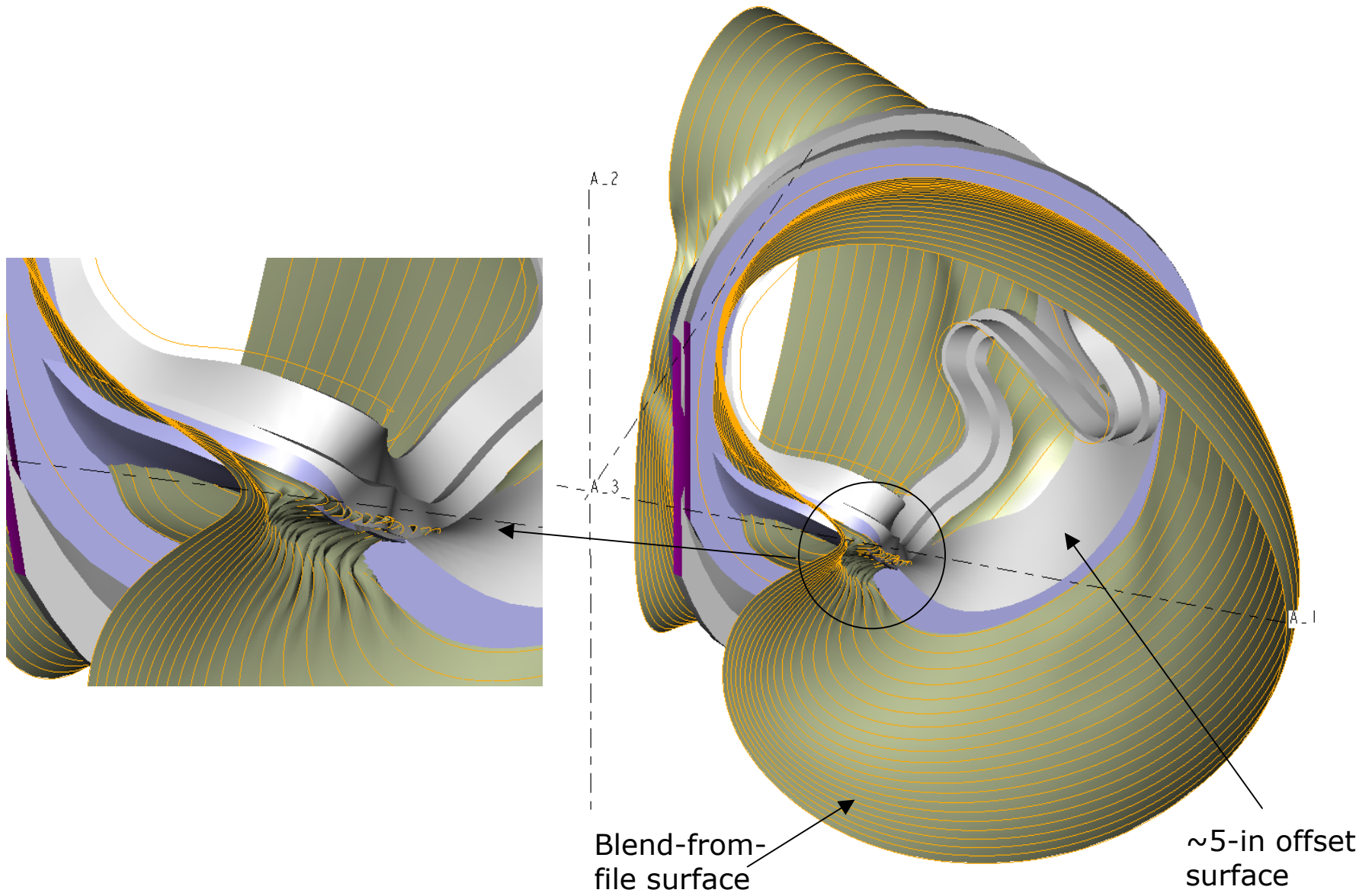


Schematic of desired shell profile

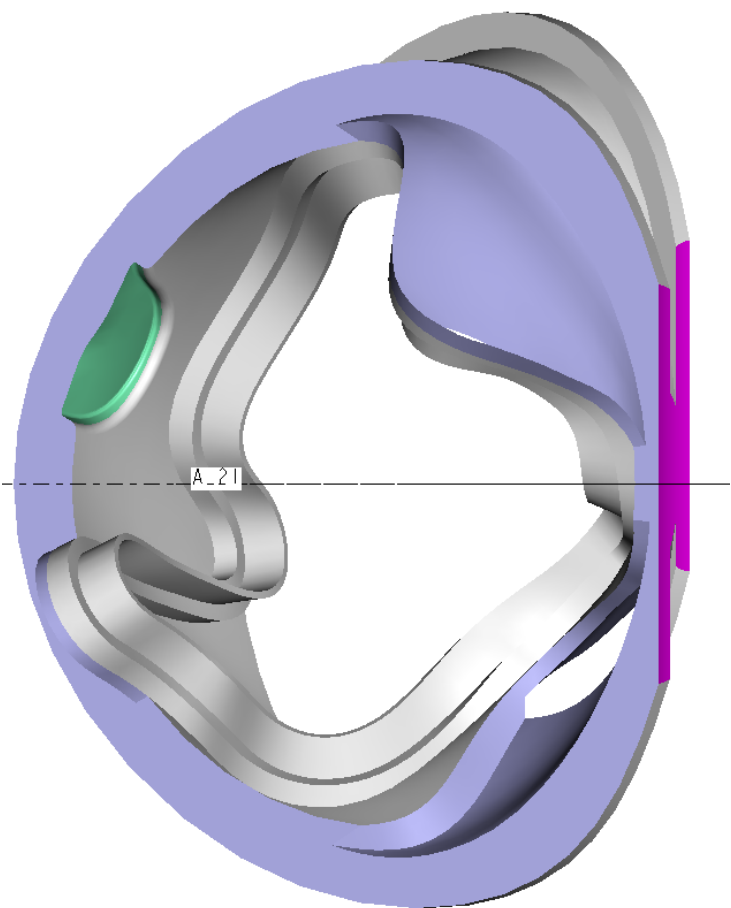
Blend-from-file inner surface for Type-C winding form



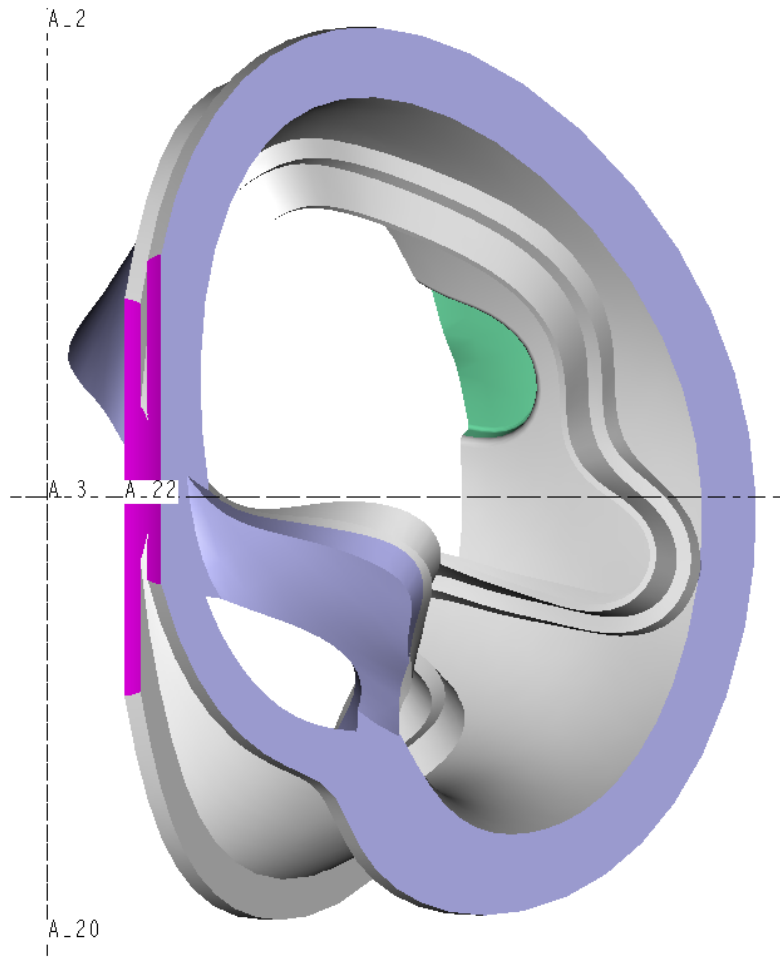
Blend-from-file inner surface, continued



Subtraction of 1/2-in stocked Type-C from itself

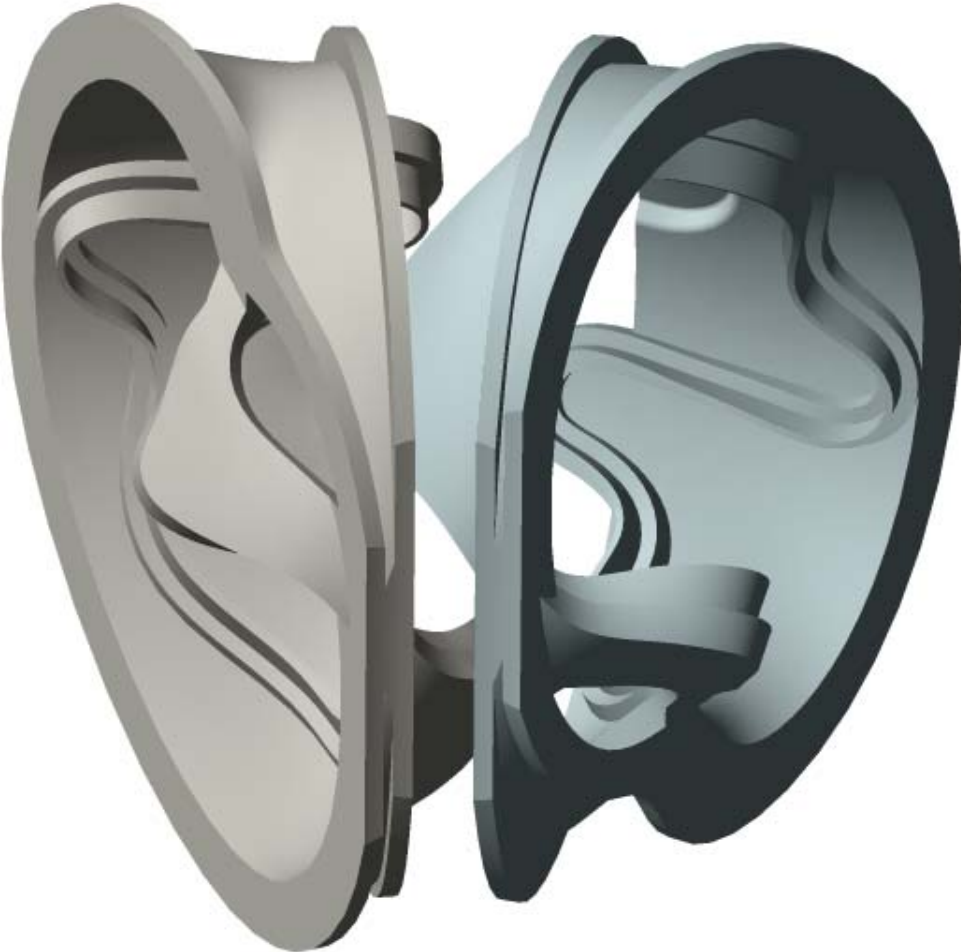


Left

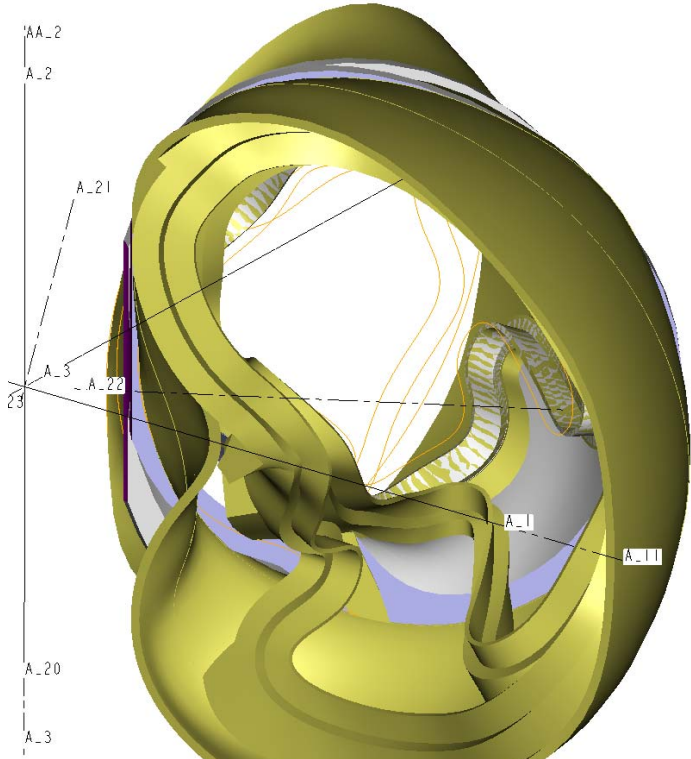
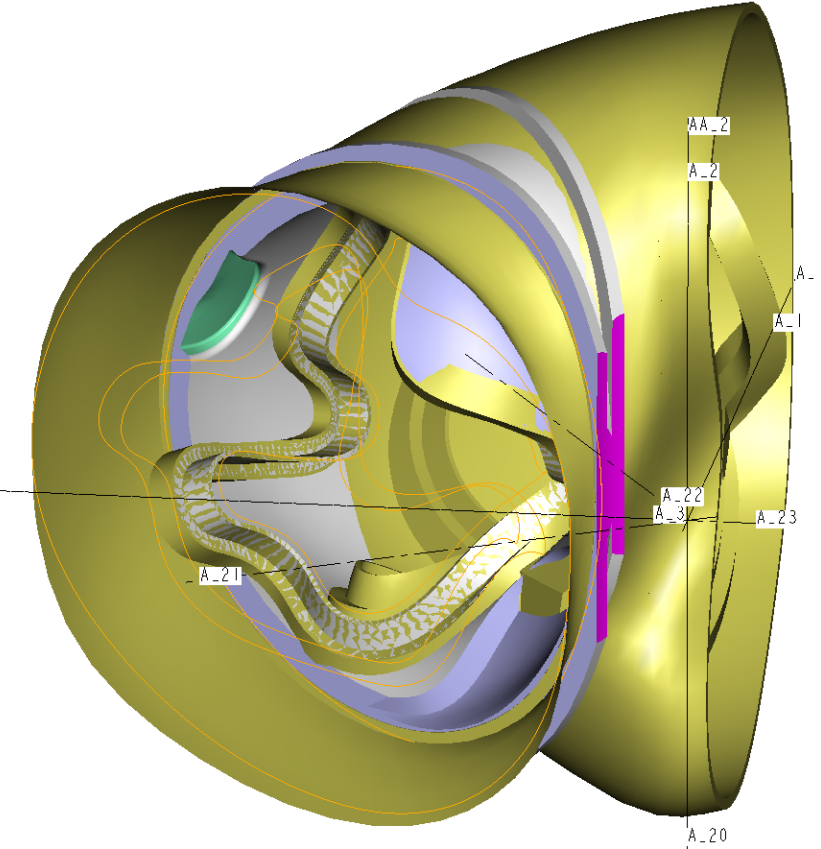


Front

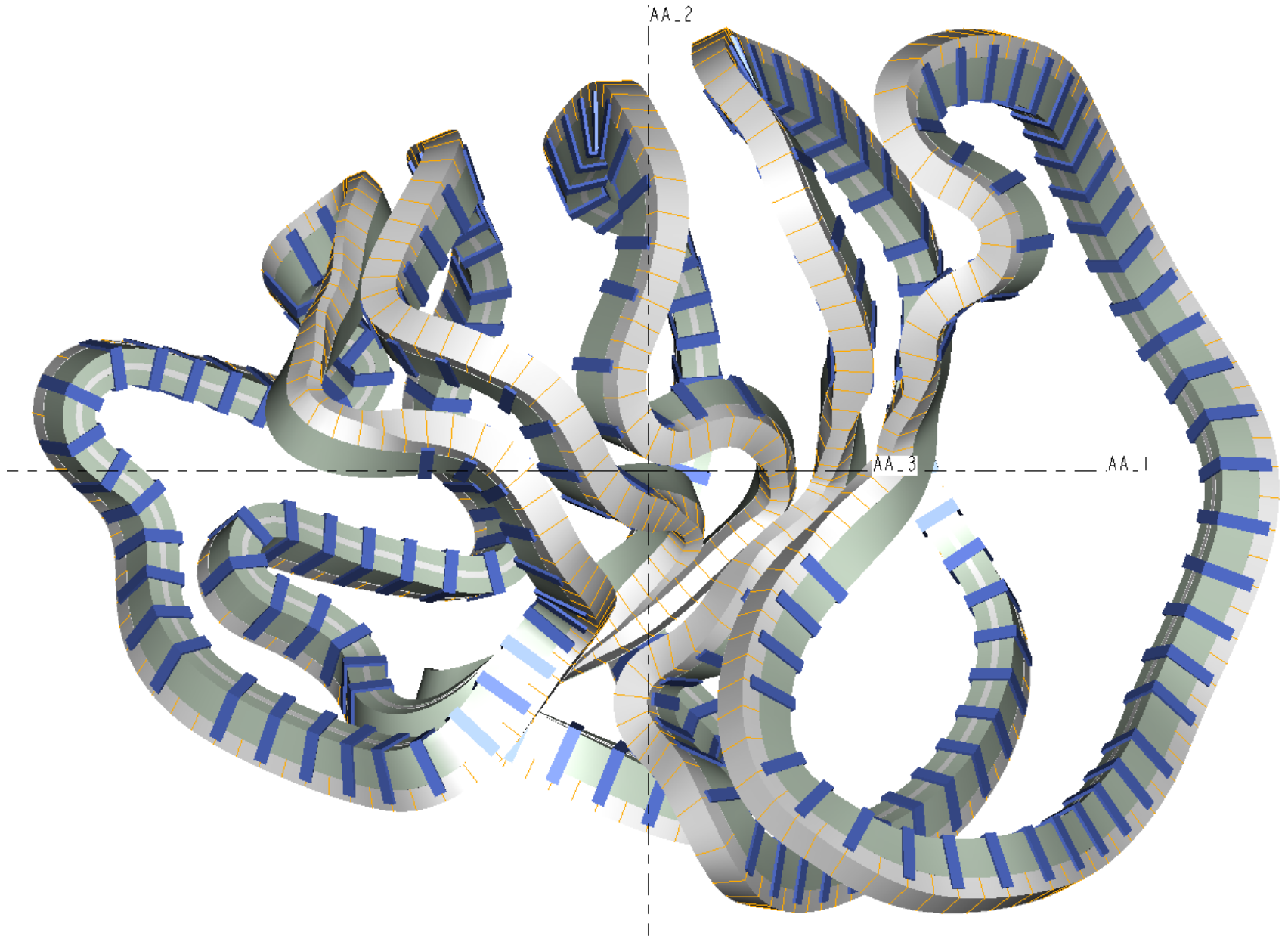
Subtraction method, continued



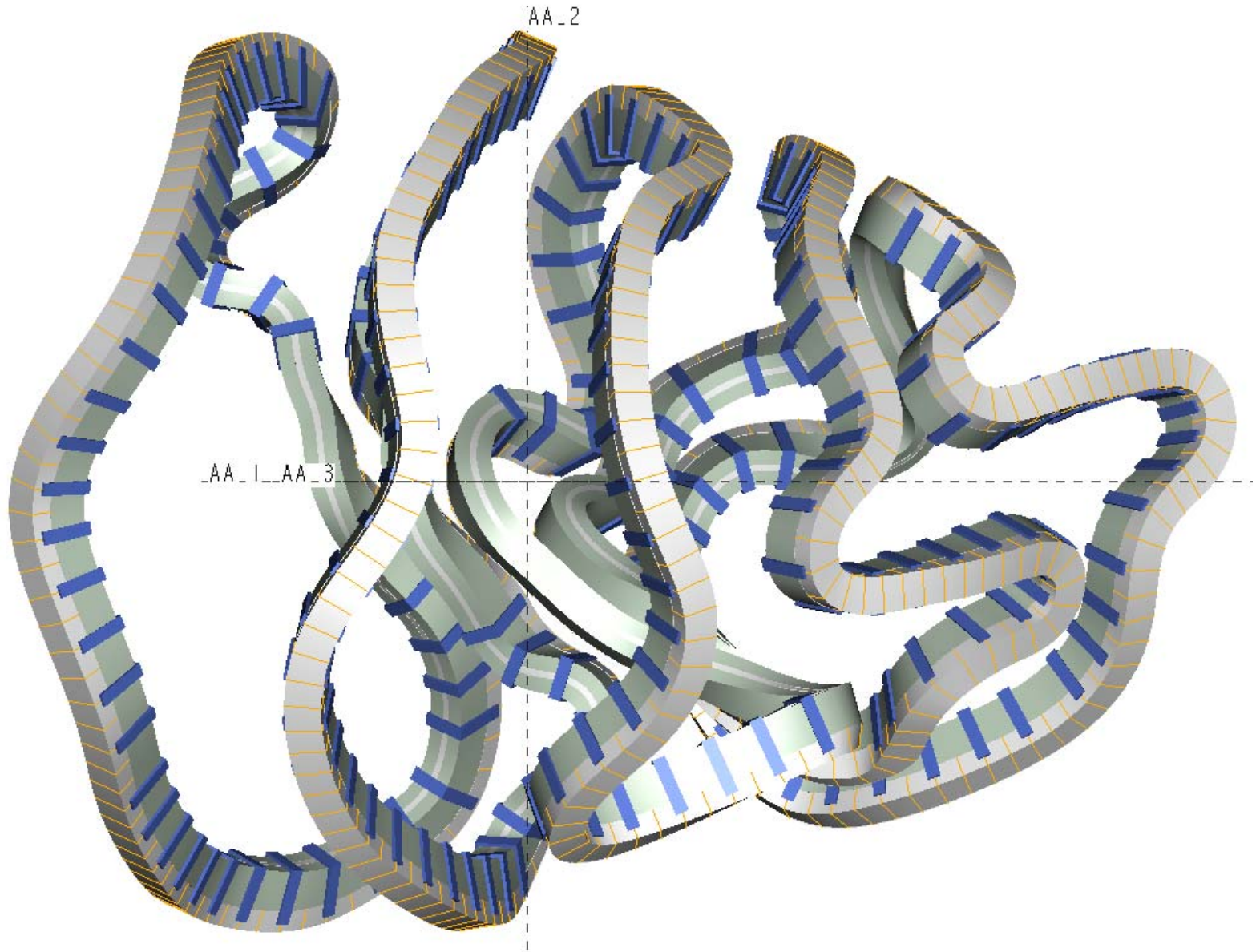
Altair model comparison



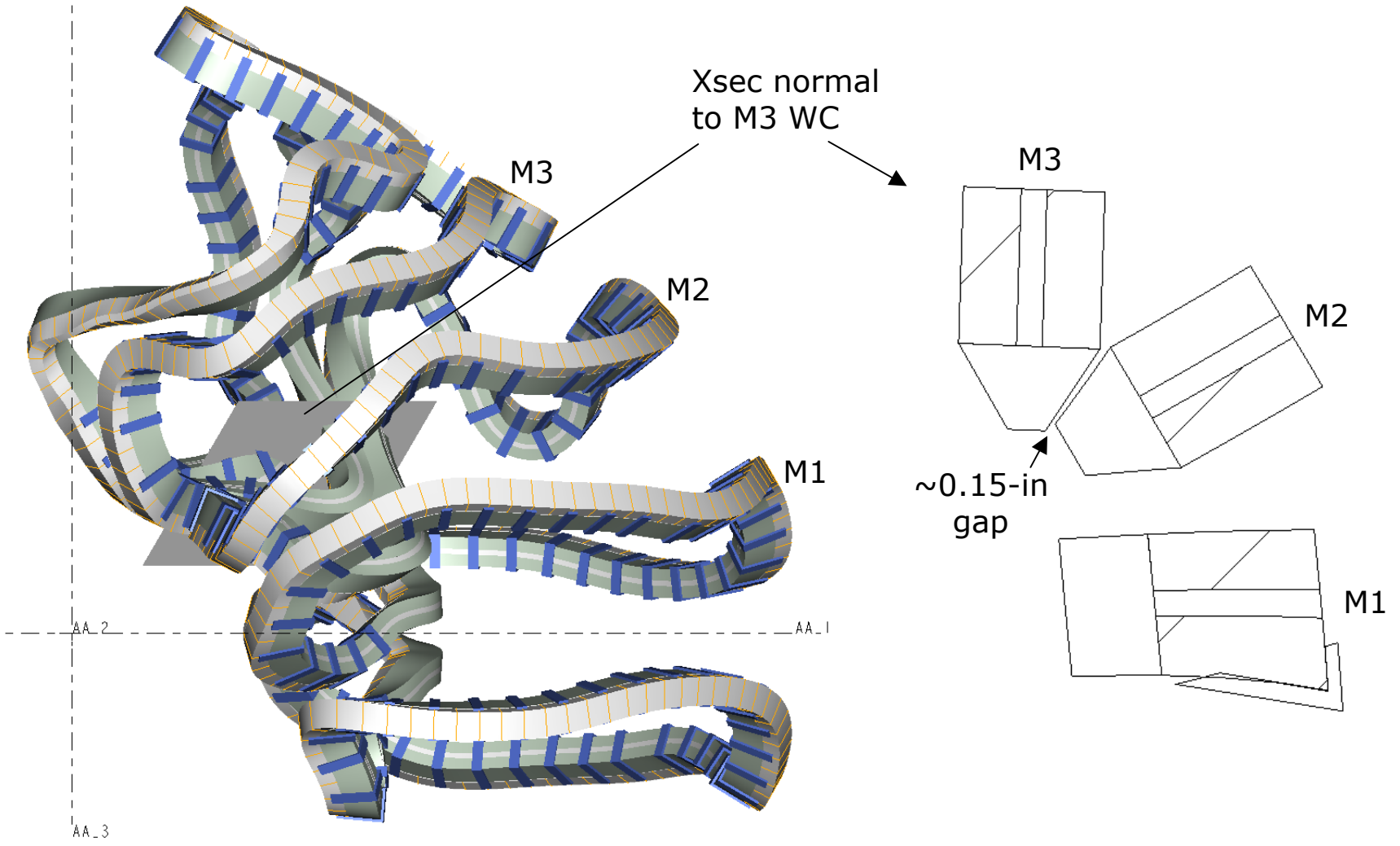
Overlap of tee base resolved by tapering sides



Clamps are omitted in regions where sides taper

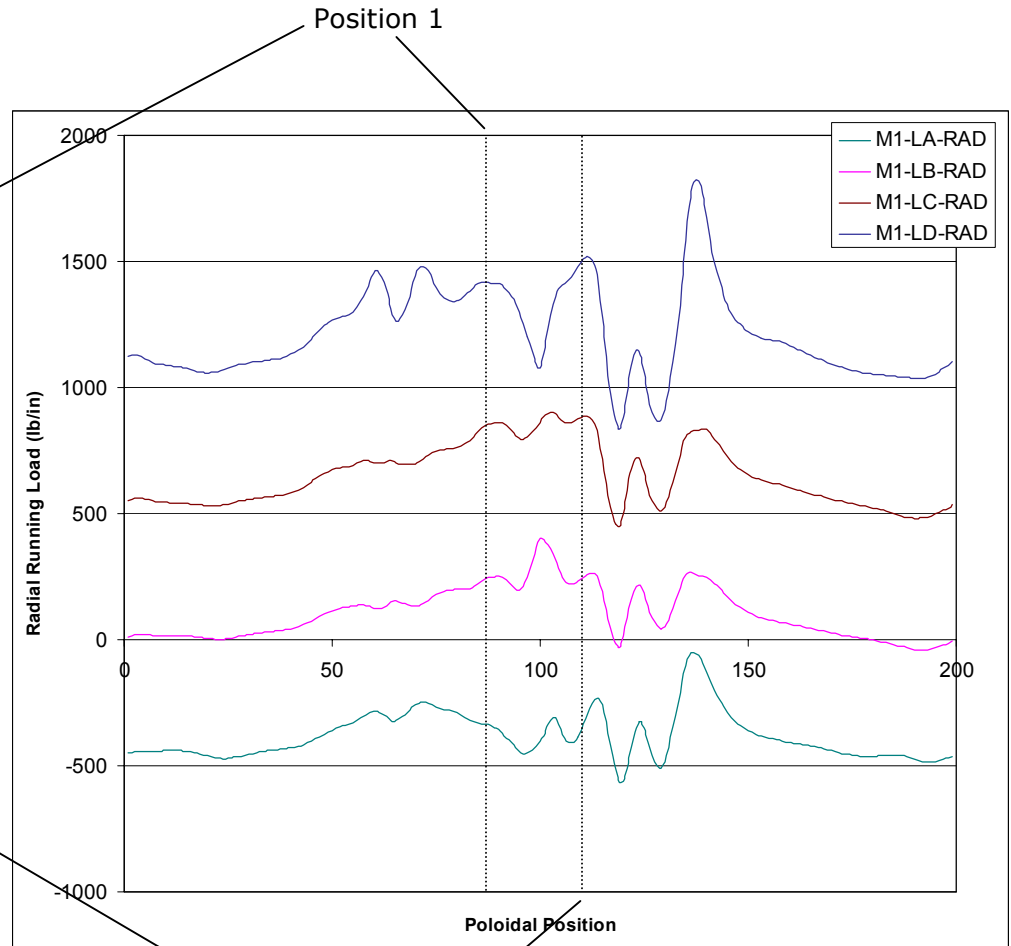
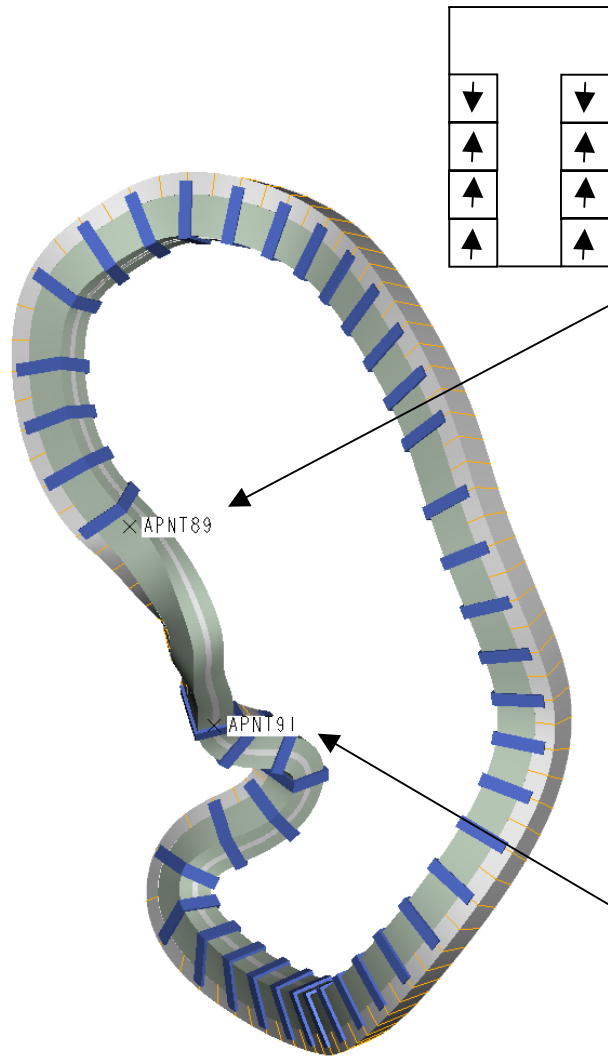


Cross-section through tee base

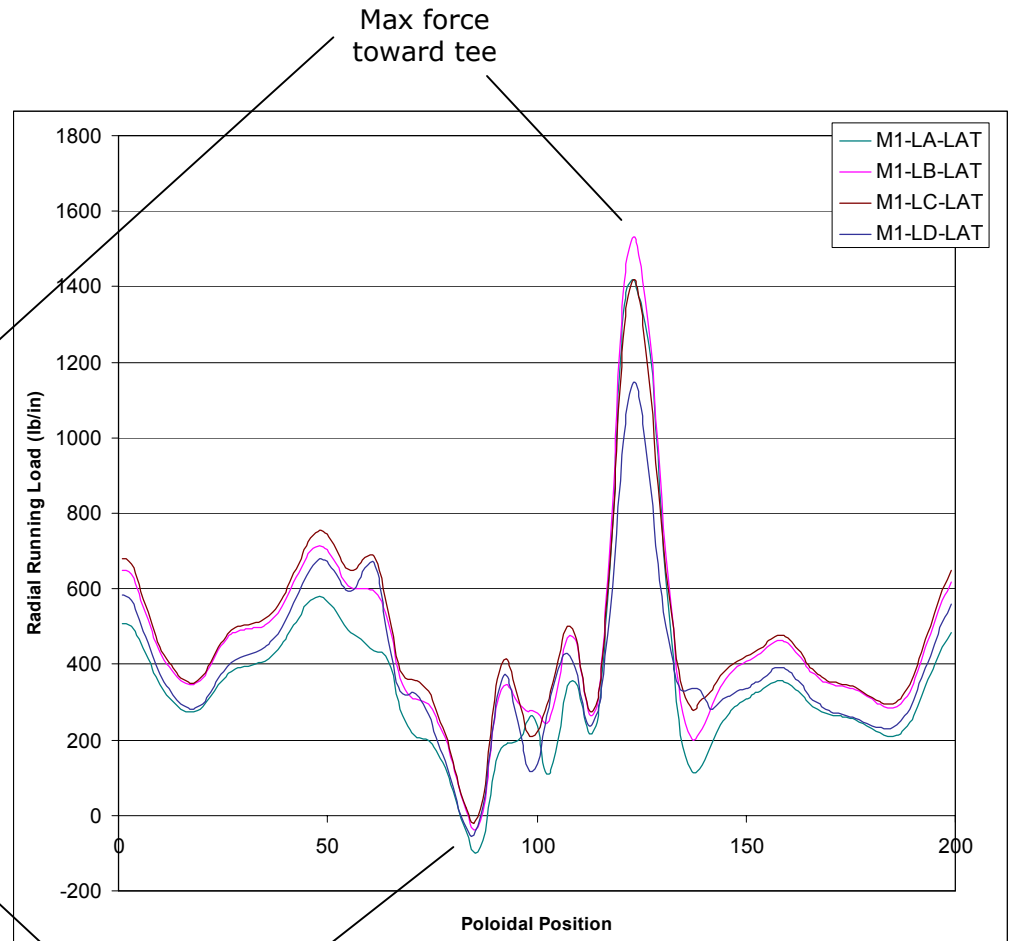
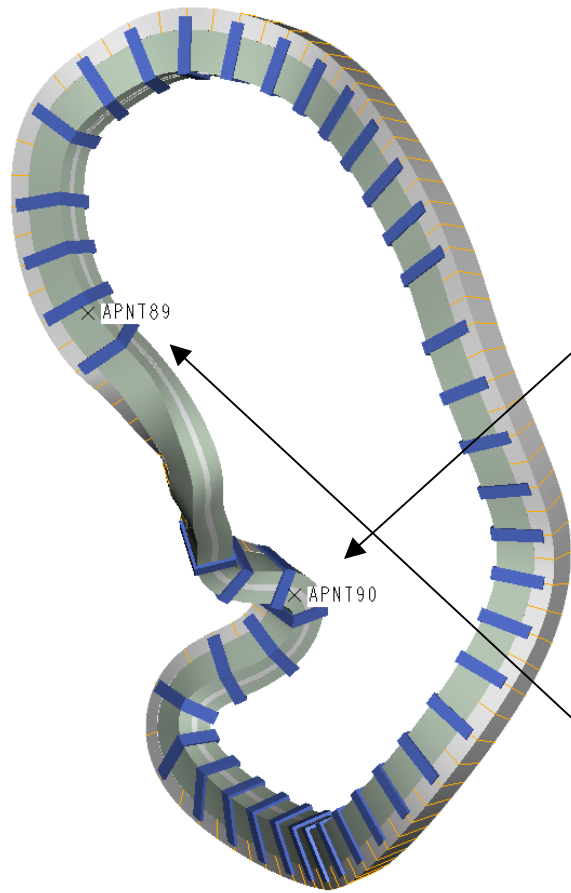


Radial EM Force on Coil M1

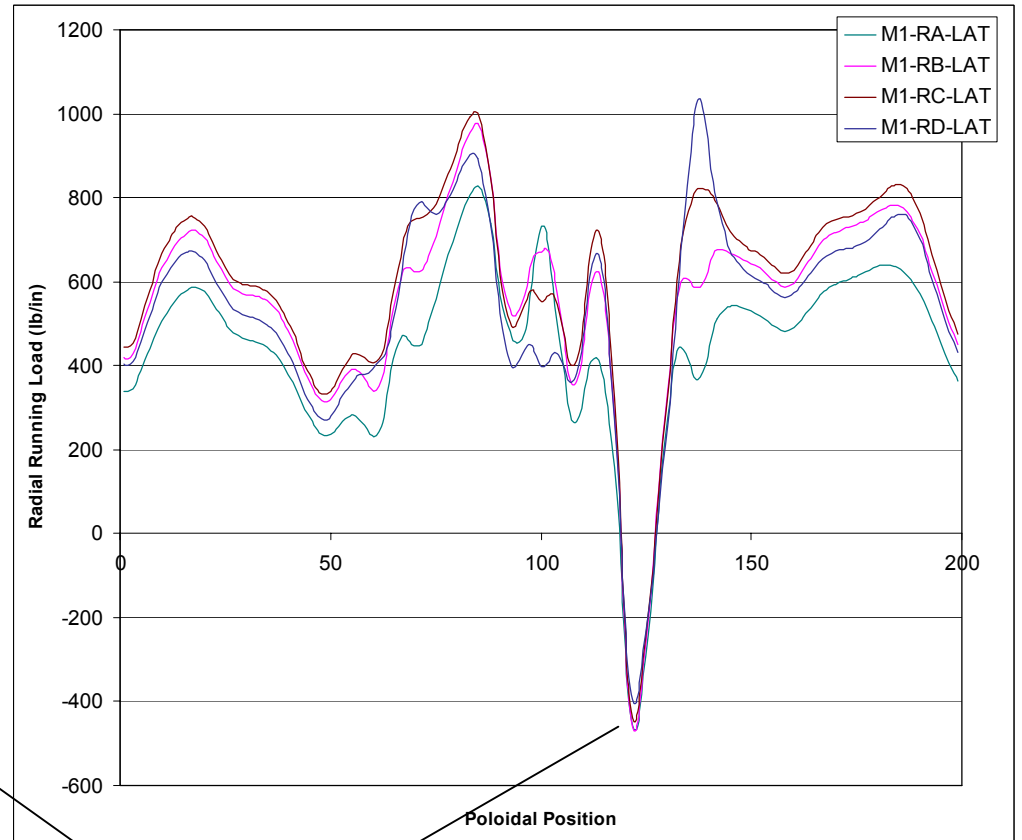
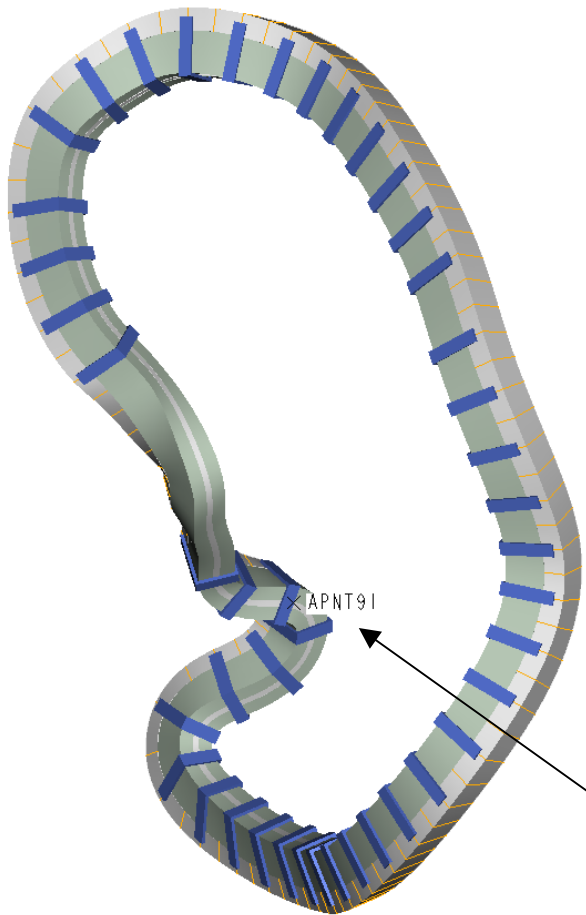
- 1x4 turns per winding pack



Lateral EM Force on Coil M1, Left Winding Pack

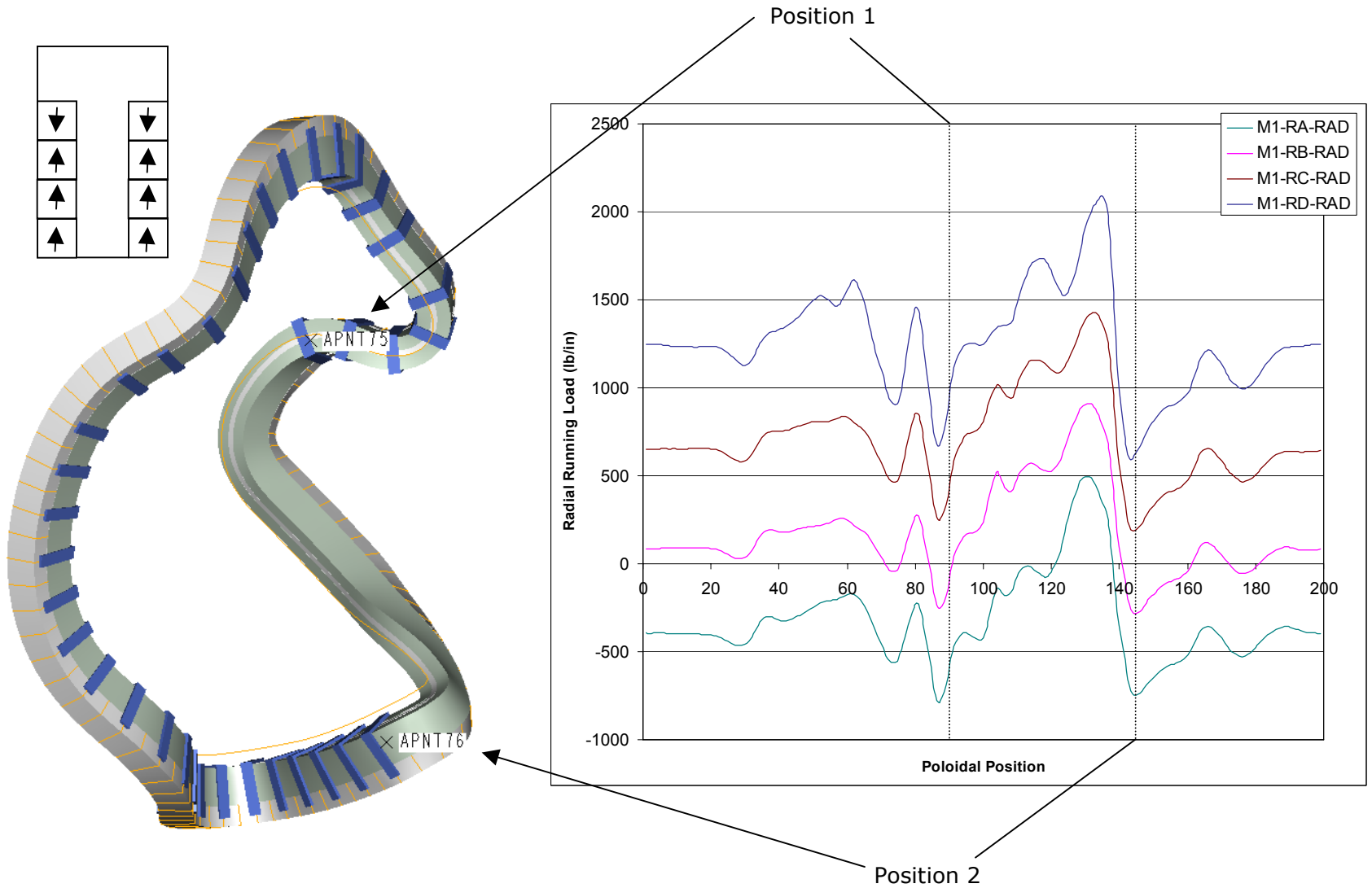


Lateral EM Force on Coil M1, Right Winding Pack

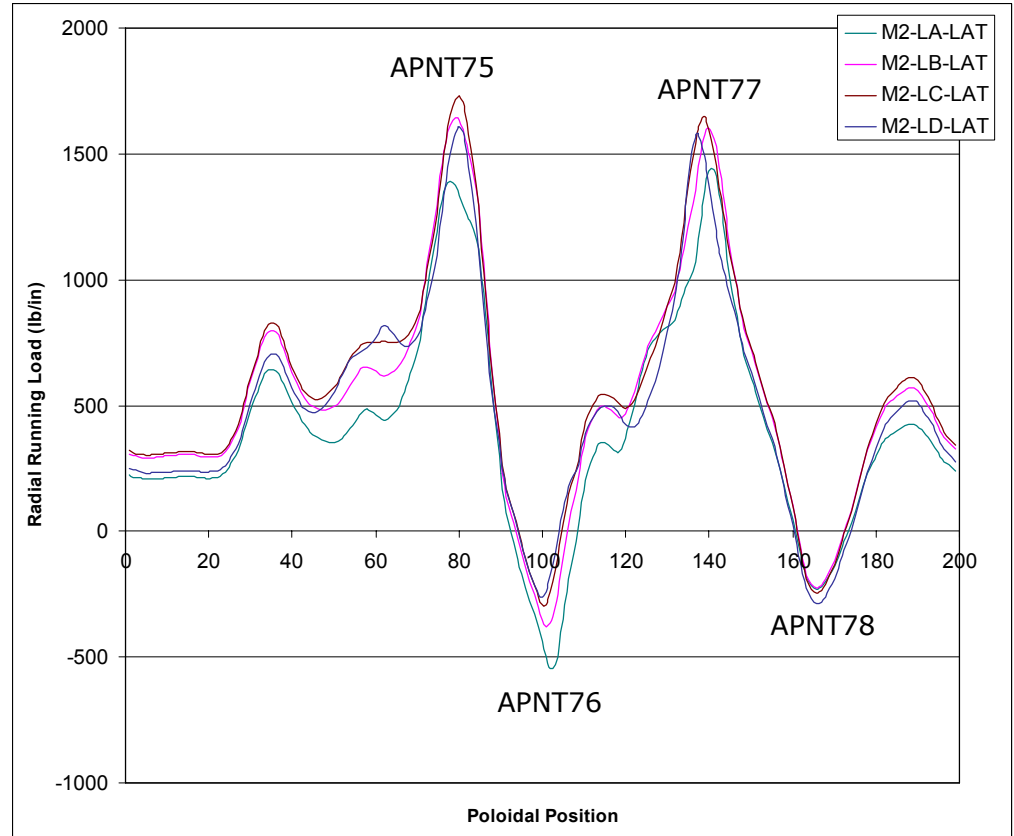
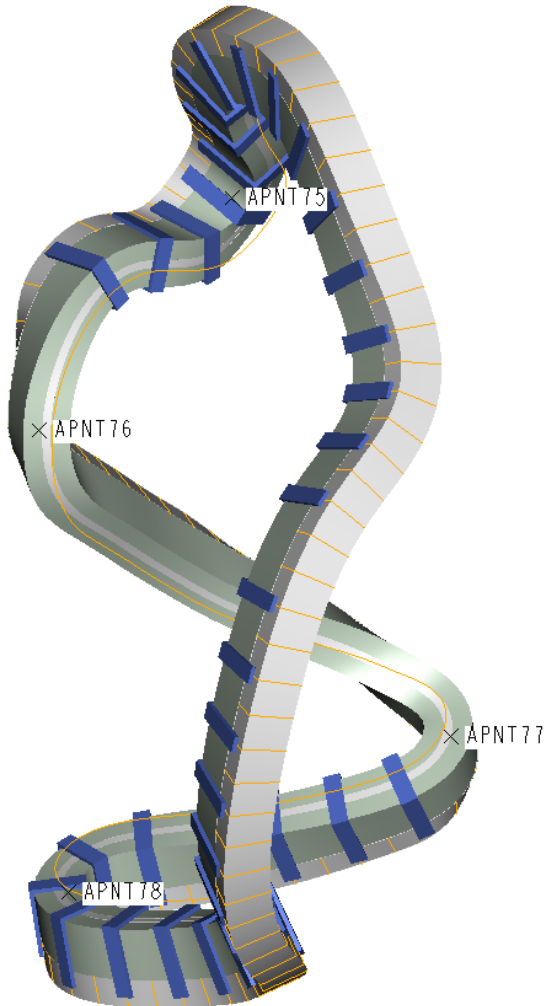


Force away from tee

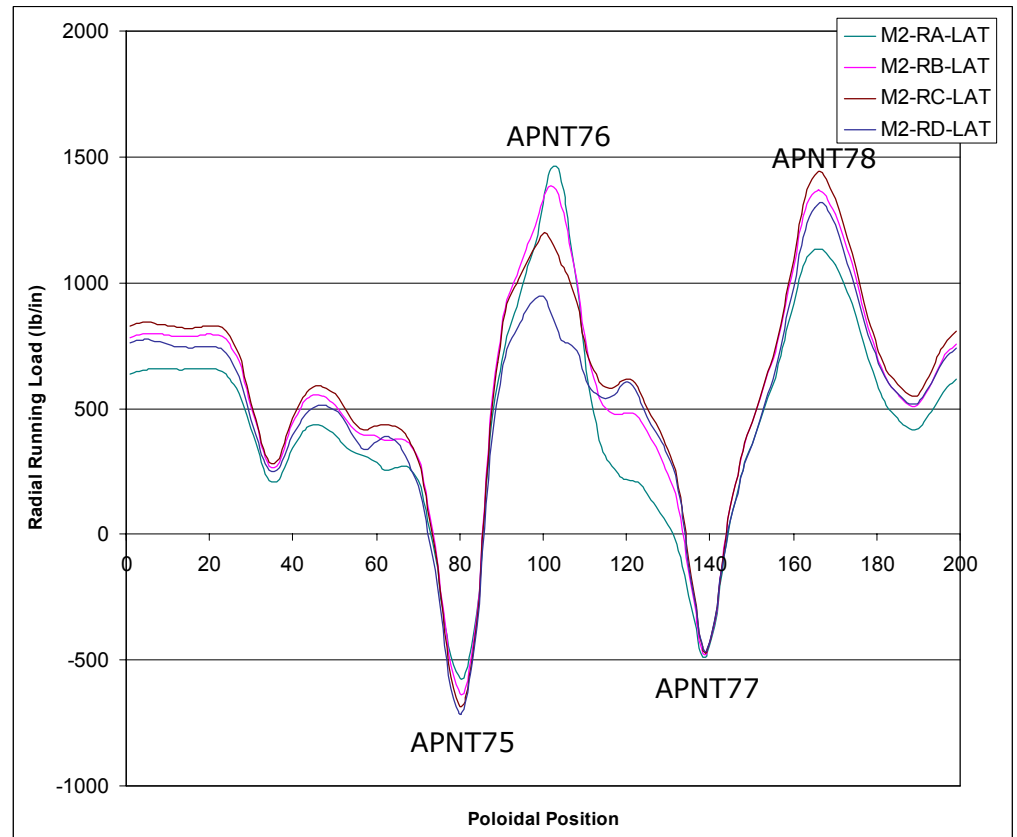
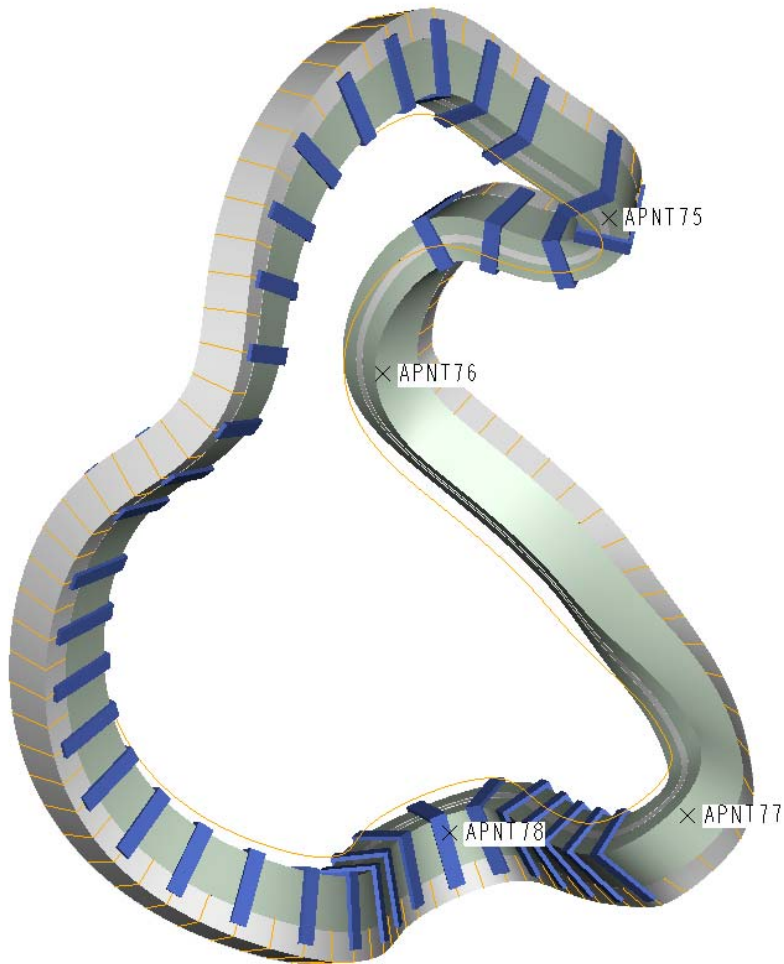
Radial EM Force on Coil M2



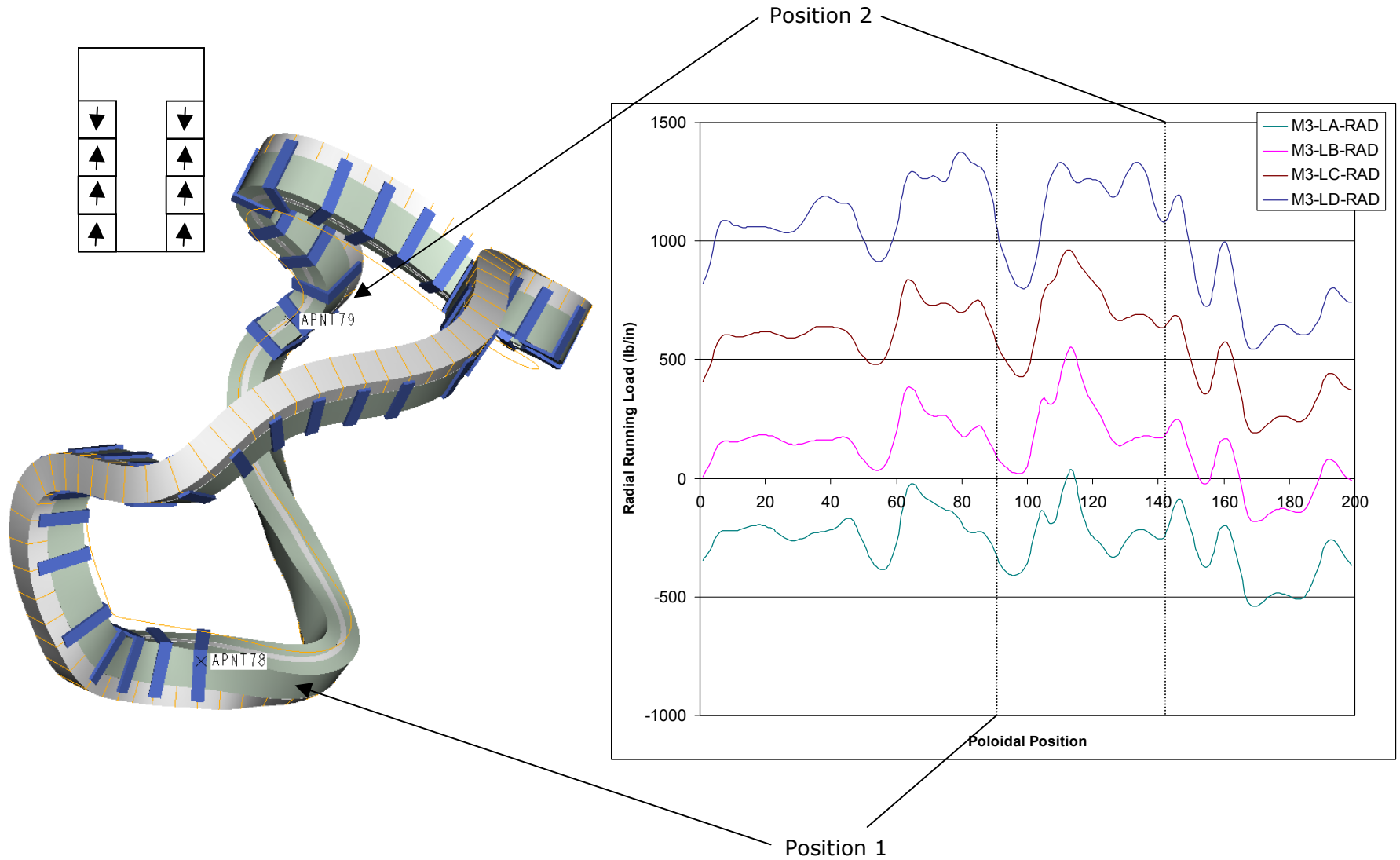
Lateral EM Force on Coil M2, Left Winding Pack



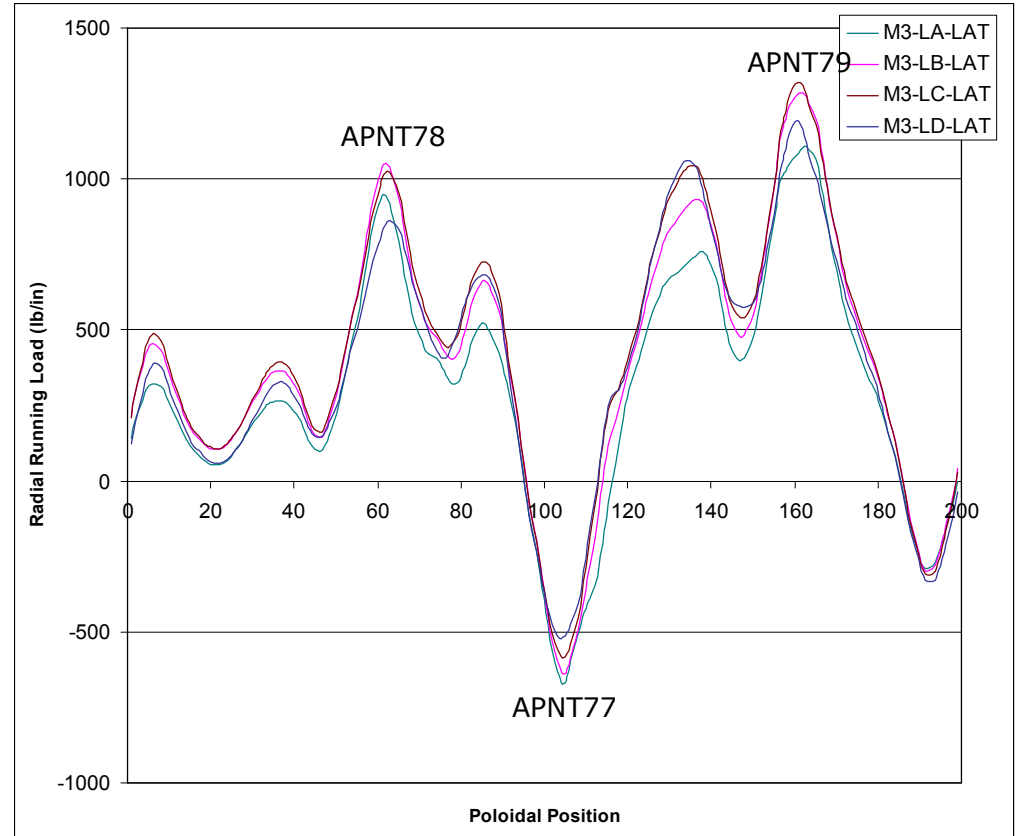
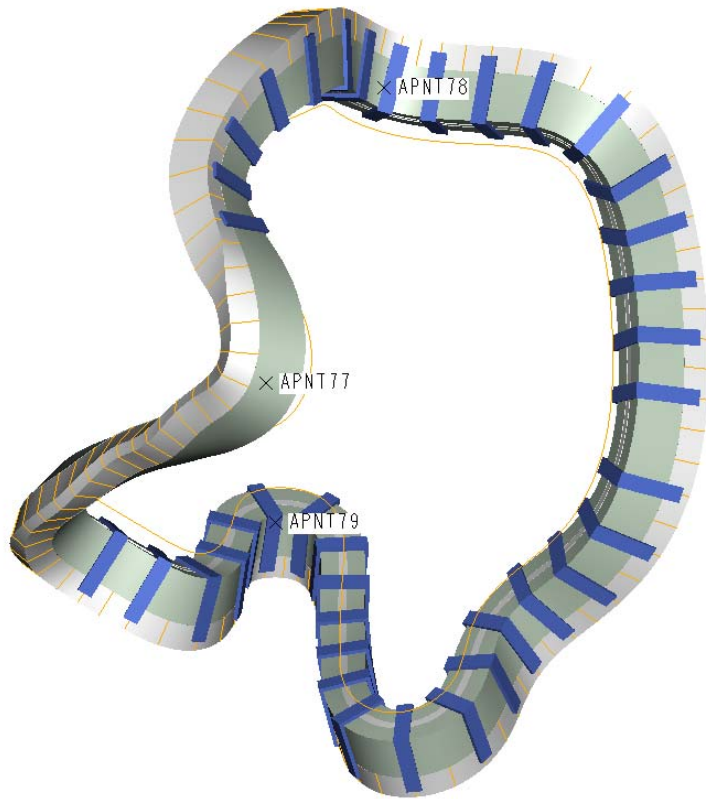
Lateral EM Force on Coil M2, Right Winding Pack



Radial EM Force on Coil M3



Lateral EM Force on Coil M3, Left Winding Pack



Lateral EM Force on Coil M3, Right Winding Pack

