



What's new in CADfix 13

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CADfix DX 13 Summary

- Import/Export
 - Latest CAD versions supported
 - Much improved STL export
 - New CAE mesh export (tri/quad/tet)
- Assemblies
 - New compression fix to remove duplicates
 - Smarter auto-build from existing duplicated bodies
- Model Tree/Assembly Tree/Probe
 - New Slide-in panels for easier access
- Wizard
 - Transform: New Extrude simplification tool
 - Transform: New Split overlapping bodies tool
 - Transform: New medial thickness tool (preview)
- Diagnostics
 - New fix for non-manifold shells
- Tolerances
 - New controls over modelling tolerances
- Defeature
 - New deconstruct tool for splitting complex bodies
 - New simplification to primitives tool
 - New simplification to extrusions tool
 - New logo and lettering removal tool
 - Much improved hole/protrusion removal tools
 - Improved internal detail removal tool
- Morph
 - New morphing when virtual topology present
- Split
 - Upgraded planar body splitter
- 3D Thickness tool
 - New medial thickness computation tool (preview)
- GUI
 - Improved responsiveness when busy & interrupts
- Platforms
 - Windows 10 & 11, Linux RHEL8

Rollup of CADfix 12 Service Packs

- 12/SP1

- Import/export
 - New SolidEdge import
 - New IFC import
 - New VRML export
 - New XDMF export
- Morphing in batch
- New compact probe tool
- New model orientation tool
- Improved swept body tool
- Improved part scaling tool
- Faster screen picking

- 12/SP2

- Import/export
 - New glTF import/export
 - New DGN import
 - New CONVERGE CFD export
 - Improved IFC & OBJ import
- STL facet quality checks in batch
- New auto-build assembly tool
- Improved hole and protrusion removal
- Faster, more successful face joins
- New HTML mass property reports

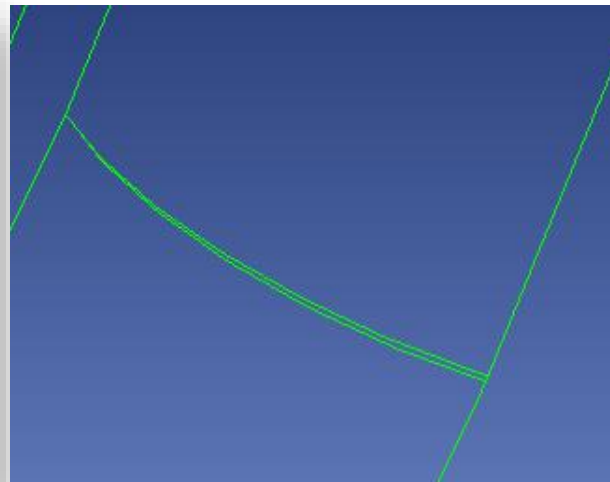
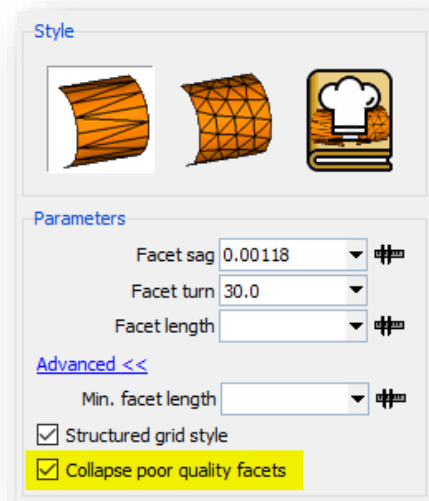
DX13: Import/Export

- CAD version support updates
 - CATIA V5-6 R2023
 - NX 2212
 - Creo 9.0
 - SolidWorks 2023
 - SolidEdge 2023
 - Inventor 2023
 - Linux support for native CAD formats
- IFC Import
 - More entities/attributes supported
- DGN Import
 - More entities/attributes supported
- OBJ Import
 - Option to import quad facets
- STL export
 - Improved facet quality
 - More regular structured style
 - Automatic CAD defeaturing
 - Smart sizing with proximity refinement
 - New custom sizing recipes
 - Faster ASCII export
 - New non-manifold check/fix
 - Easier to use GUI
- New CAE Mesh export
 - Tri/Quad/Tet meshes
 - Smart sizing with proximity refinement
 - Automatic CAD defeaturing
 - Custom style and sizing recipes

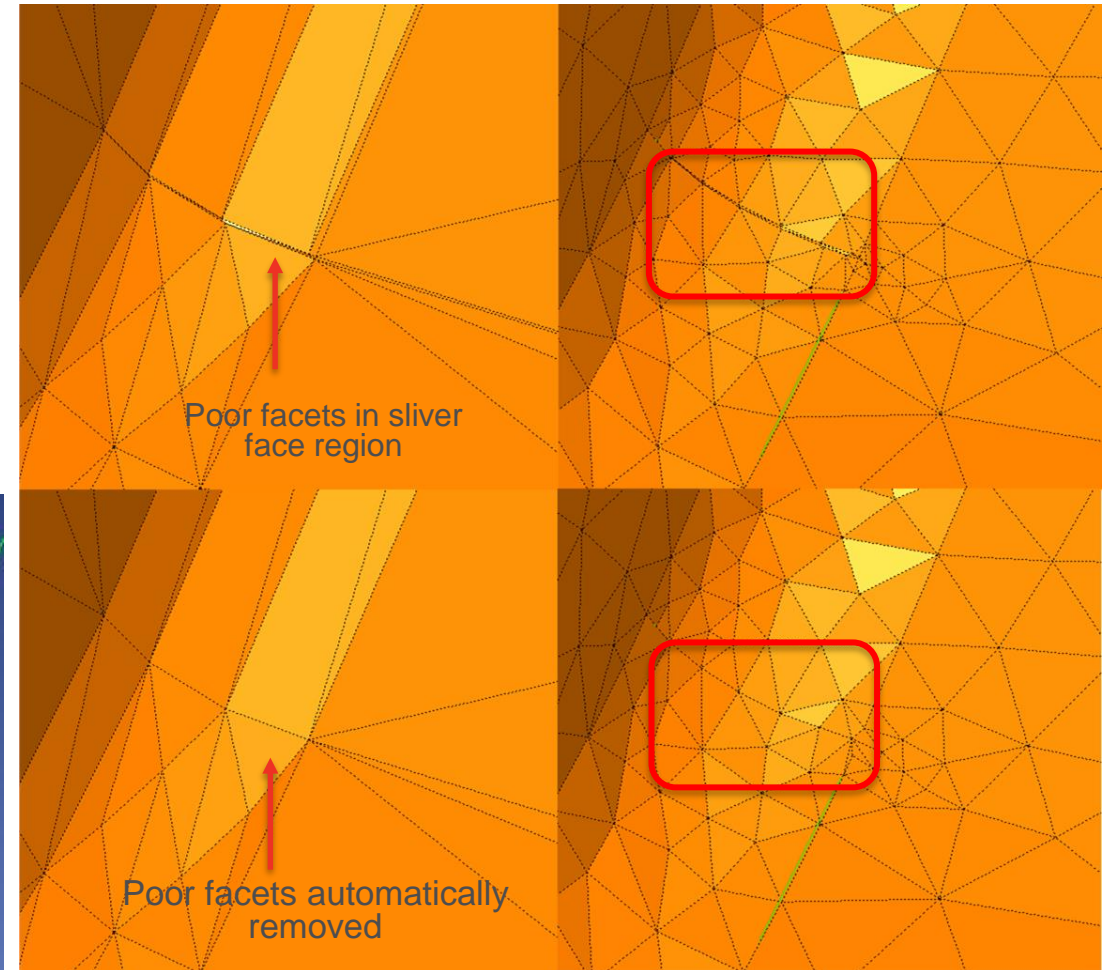
Improved STL Export

Automatic CAD defeaturing

- Facets from short edges and thin faces are collapsed automatically
- Size can be controlled by “Min. facet length” option
- New STL export option



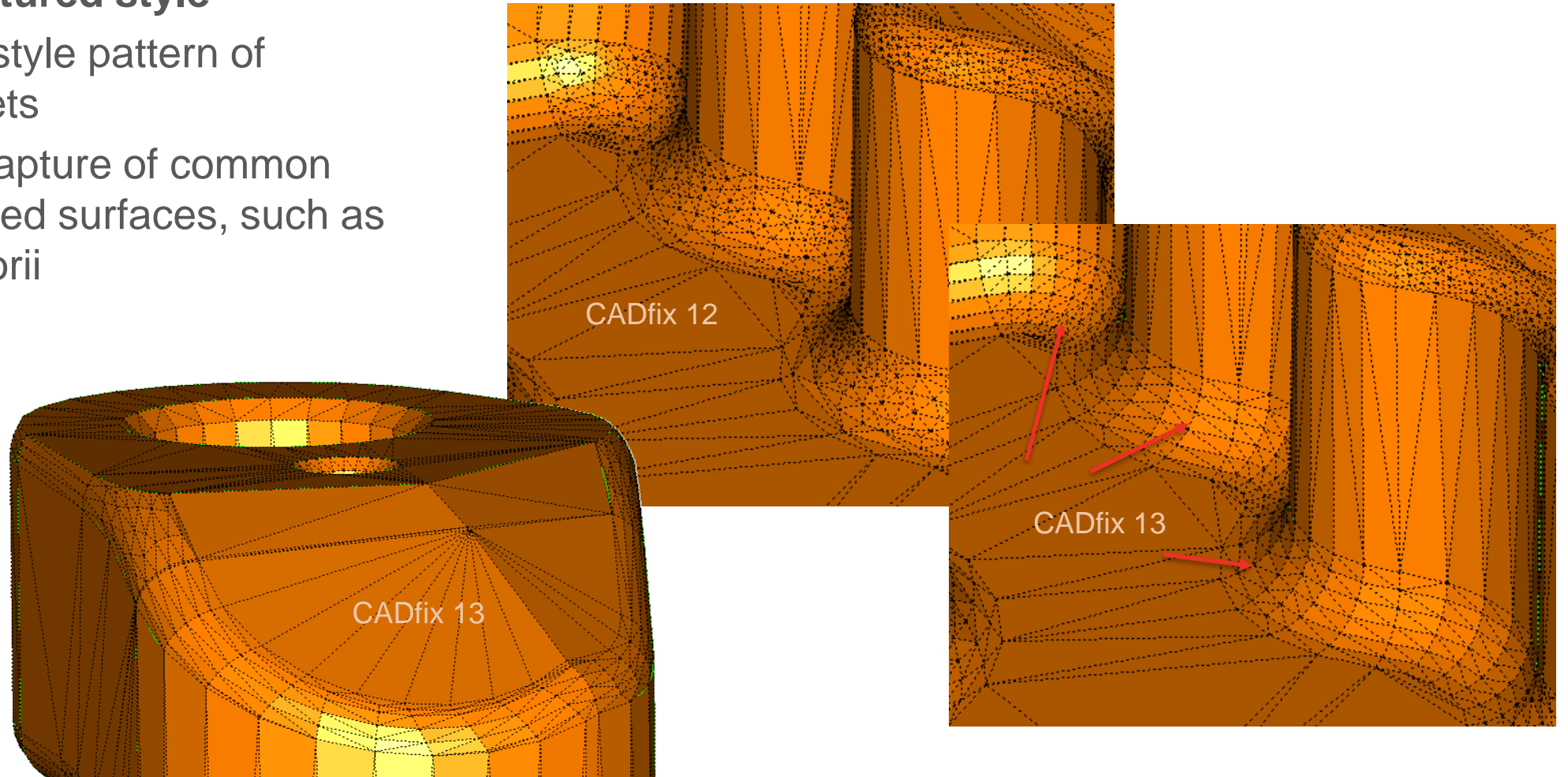
Sliver face in CAD



Improved STL Export

Regular structured style

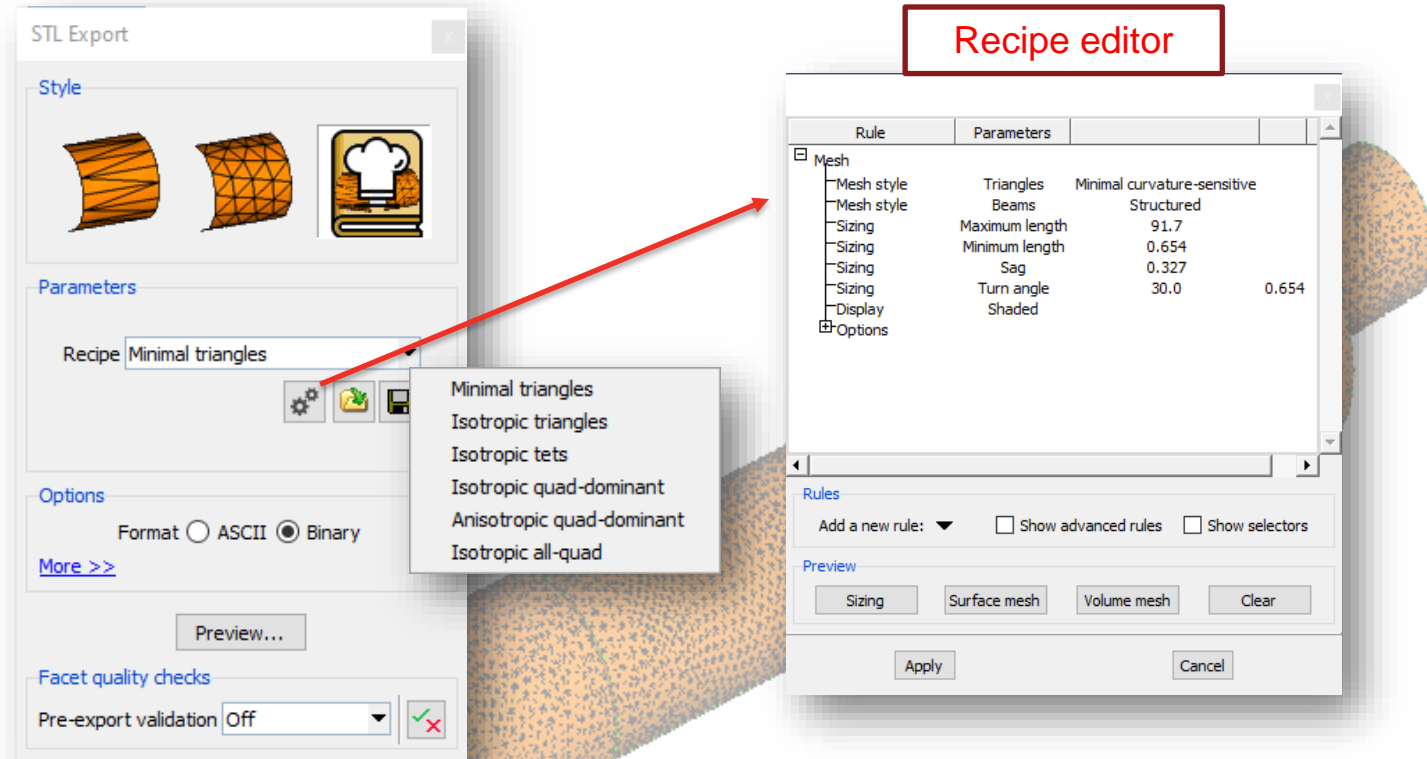
- Structured style pattern of regular facets
- Improved capture of common doubly curved surfaces, such as fillets and torii



Improved STL Export

Custom sizing recipes

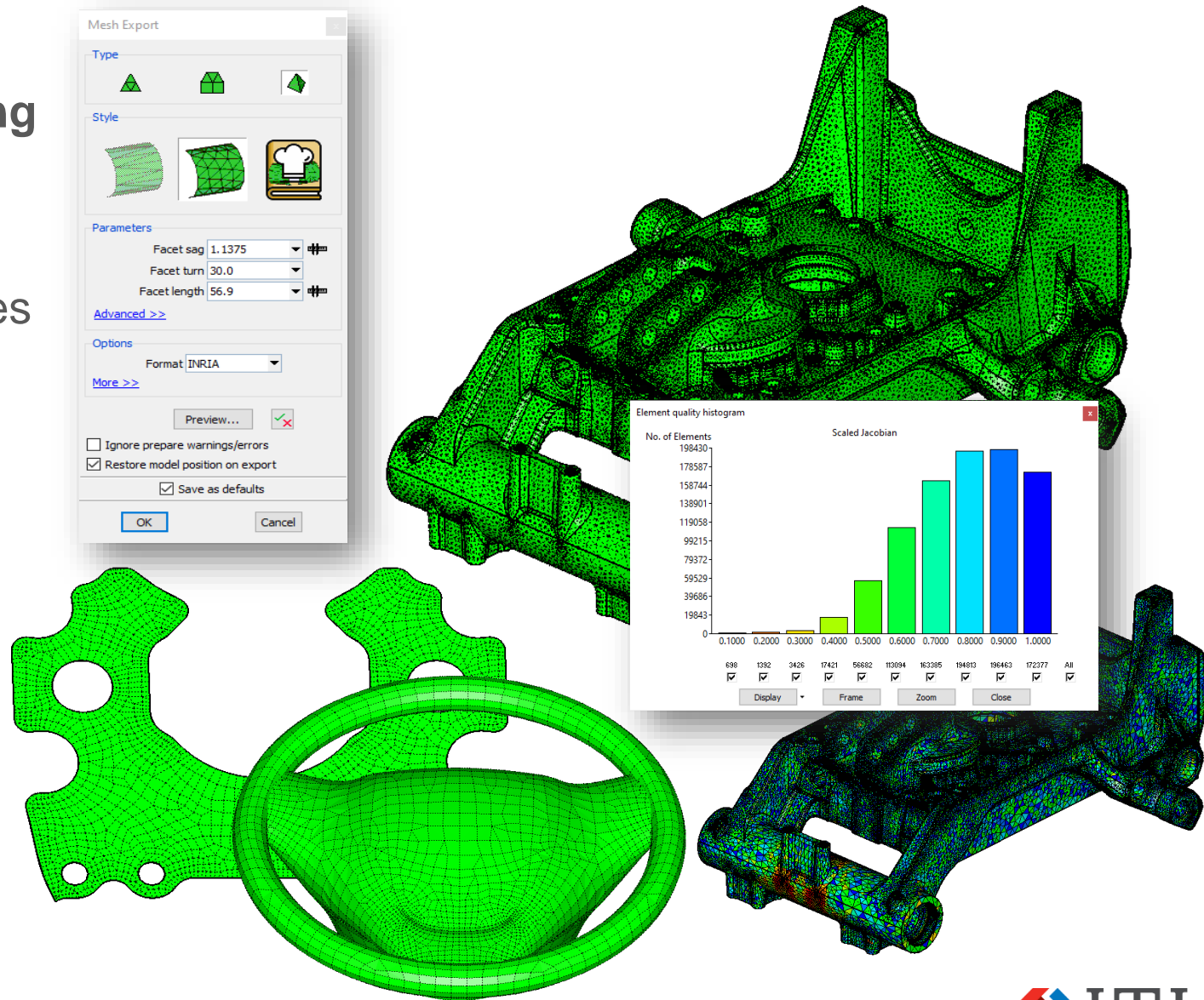
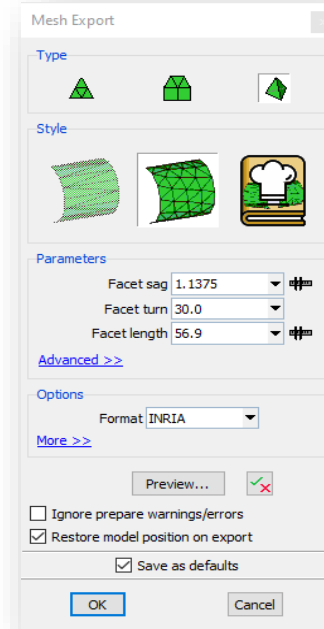
- When complex sizing required, or different sizing in different locations, then a recipe can capture and save these rules
- Example recipes provided for curvature and quality STL generation
- Supports flexible selection of faces based on attributes such as label or colour
- Recipe editor for modifying or creating a new recipe
- Save recipes and use in automated batch process via .cwc option



New CAE Mesh Export

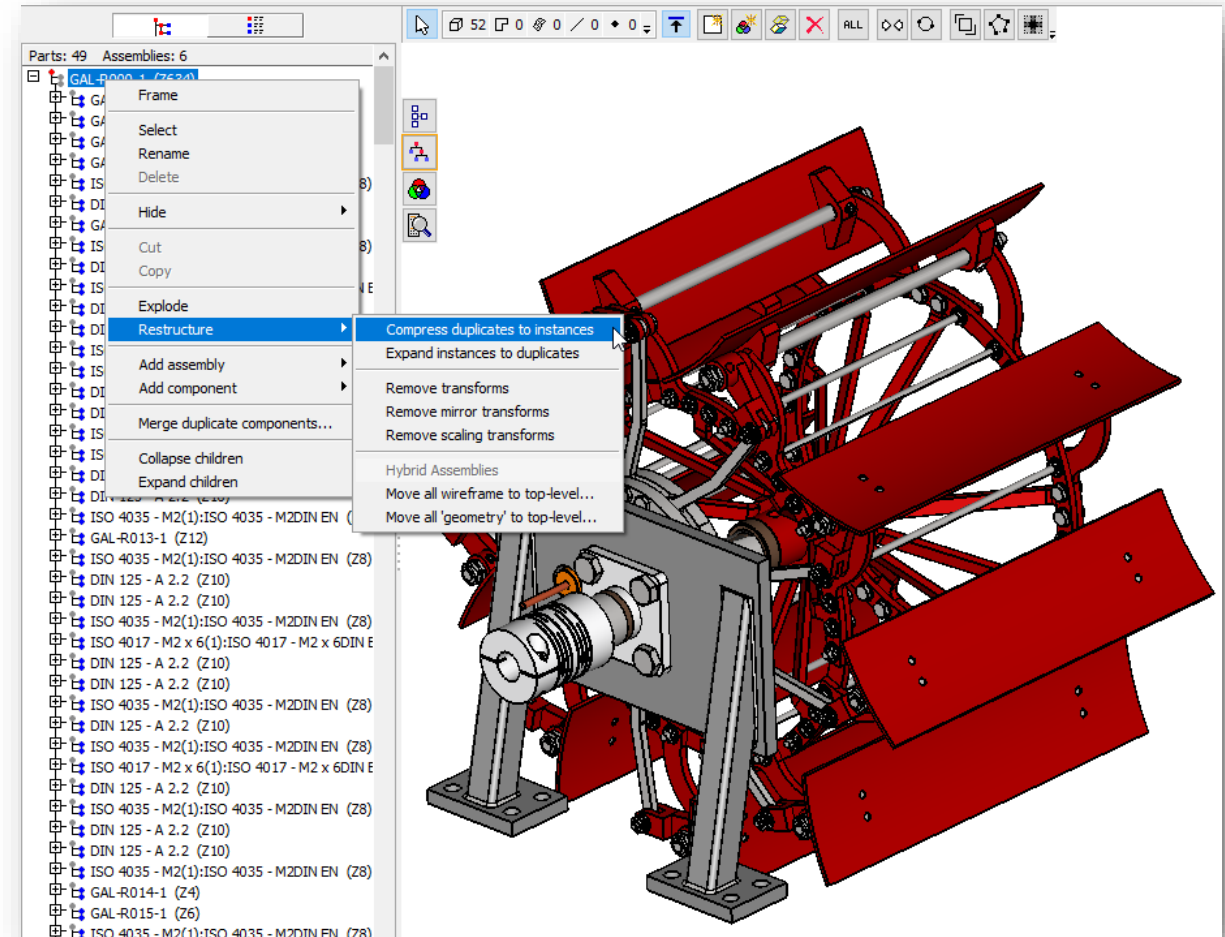
Robust automatic Tri/Quad/Tet meshing

- Smart geometry-based sizing
- Auto-proximity refinement
- Auto-defeaturing of small CAD features
- Multi-solid contact supported
- Custom recipes for applying user-defined sizing rules
- Element quality assessment
- Available in batch for automation
- Exports to Nastran/ABAQUS/...
- **Mesh preview available to all CADfix users** (exports require purchase)



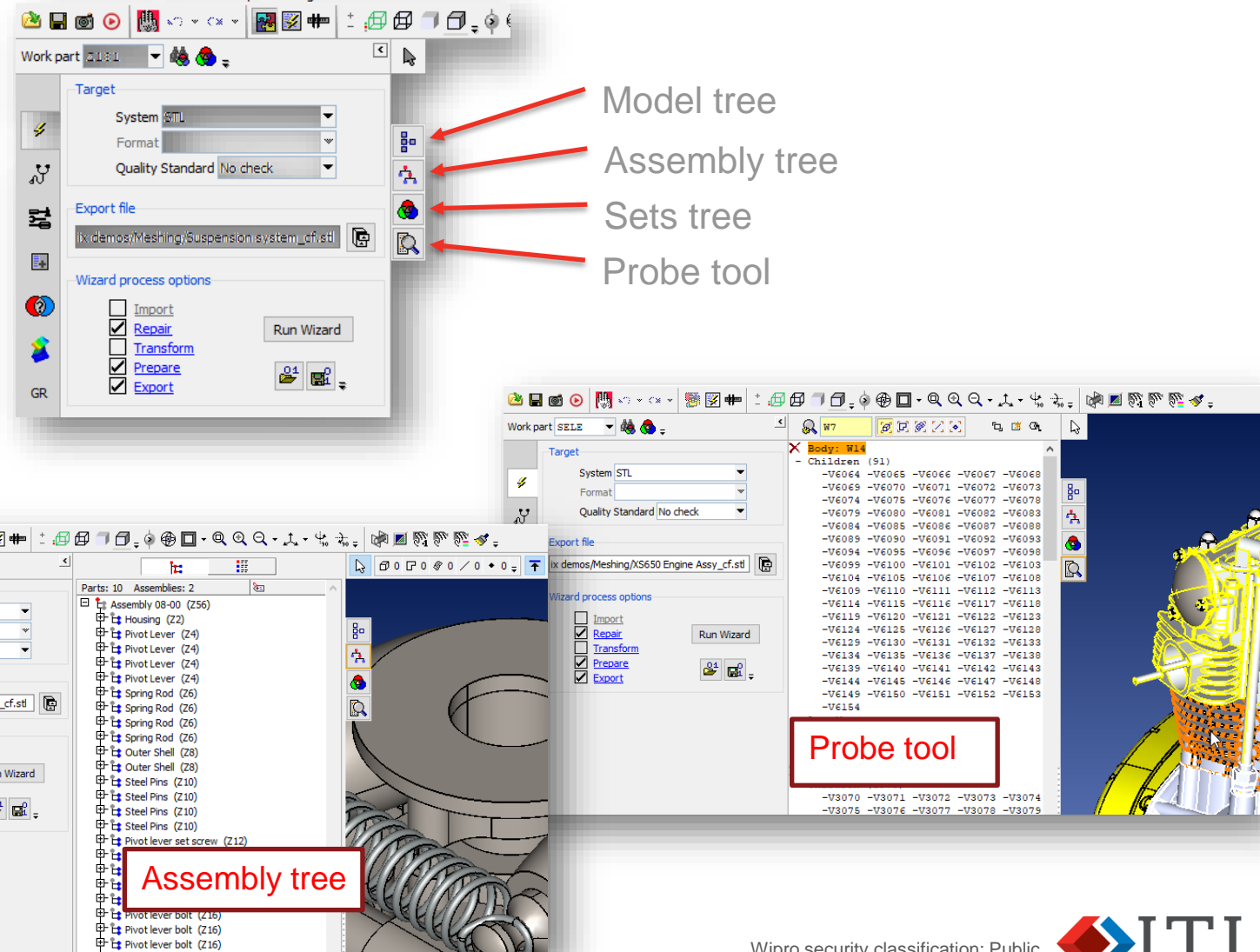
DX13: Assemblies

- New assembly compression
 - Detect duplicated parts and convert to sub-assemblies of instances
- Better auto-build from repeated bodies
 - Detection of duplicated parts uses smarter body comparison technology to find more copies
- Improved removal of mirror transforms
 - less duplication of parts and more instancing
- Faster display and updating of large assembly trees



DX13: Model Tree

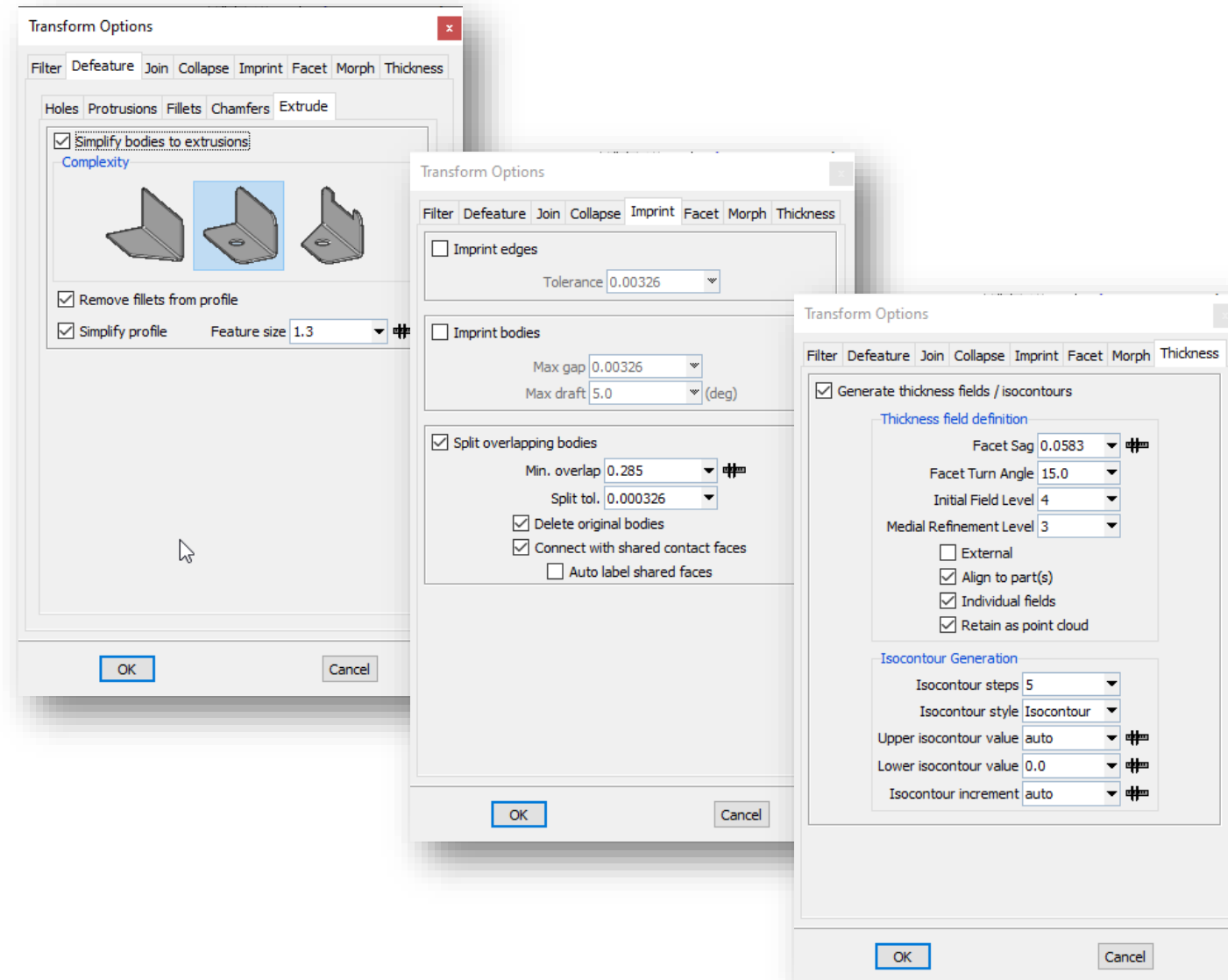
- New slide-in panels for quicker access
- Tree now accessible when using other tools



DX13: Wizard

New Transform tools for batch automation

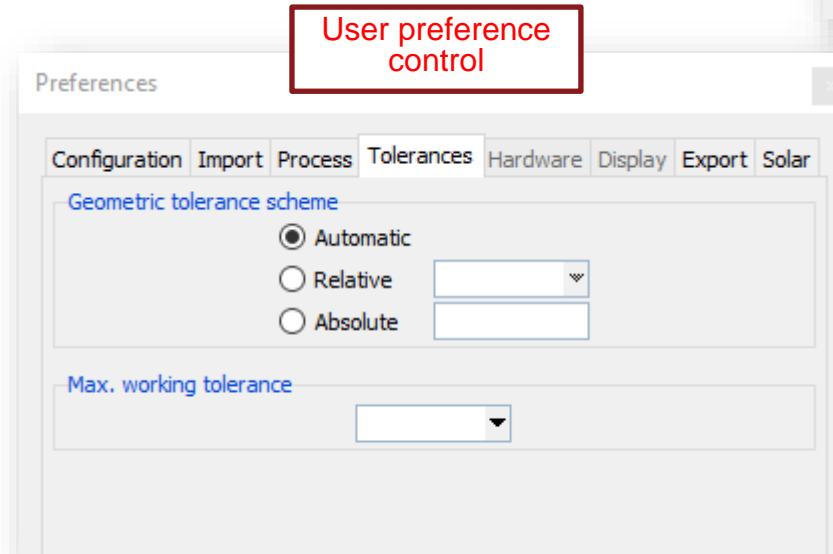
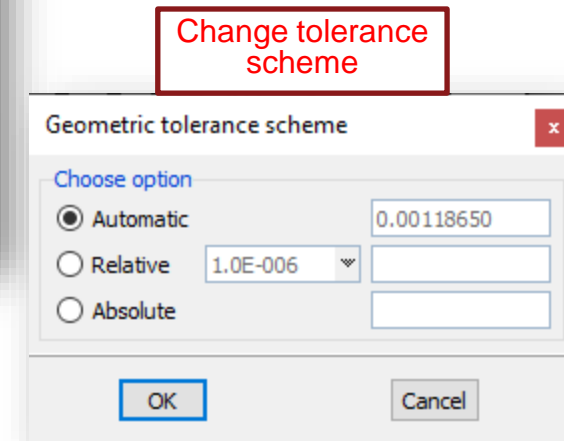
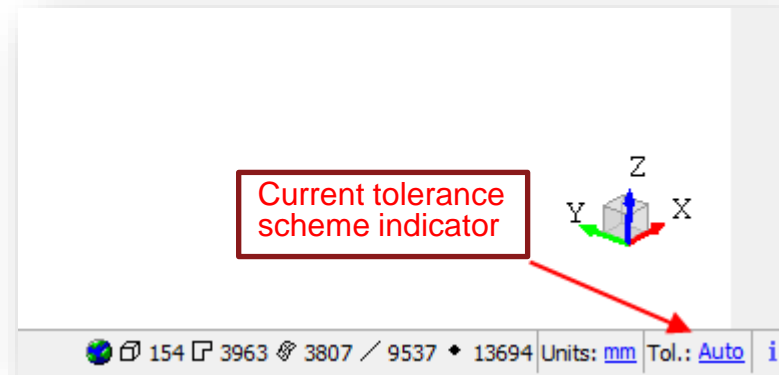
- Simplify bodies to extrusions
 - Defeature bodies to simpler extrusions
- Split overlapping bodies
 - for automation of contact simulation models
- 3D Medial thickness
 - Generate internal/external 3D thickness maps
- Logo/Lettering removal
 - Defeature a model by removing logos and/or lettering



DX13: New Tolerance Controls

User control over CADfix modelling tolerances

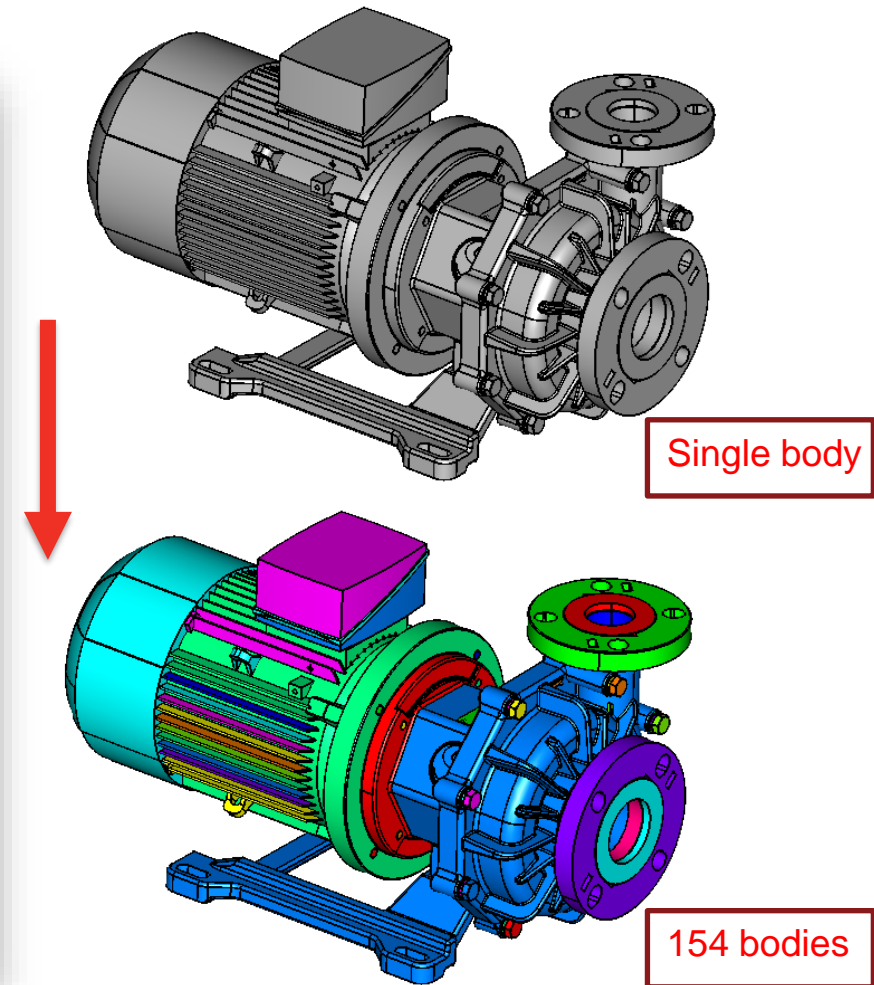
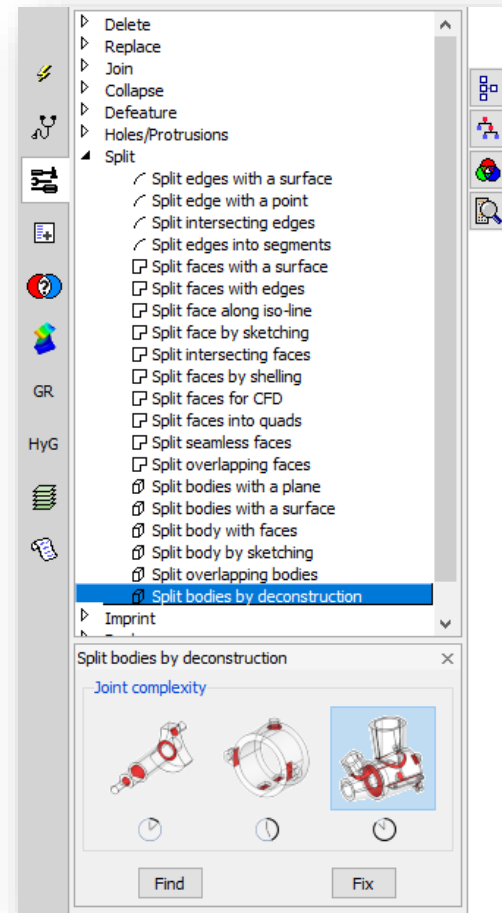
- New control over CADfix tolerance scheme
- Choose between auto (default), fixed or user defined
- Allows better processing of very large or very small models
- New absolute mode locks tolerance and hence many tool defaults to a fixed value
- Absolute mode helps to process multiple models with the same defaults and settings, i.e. model size does not affect values



DX13: Defeature – Deconstruct Bodies

New tool to split complex bodies into smaller, simpler pieces

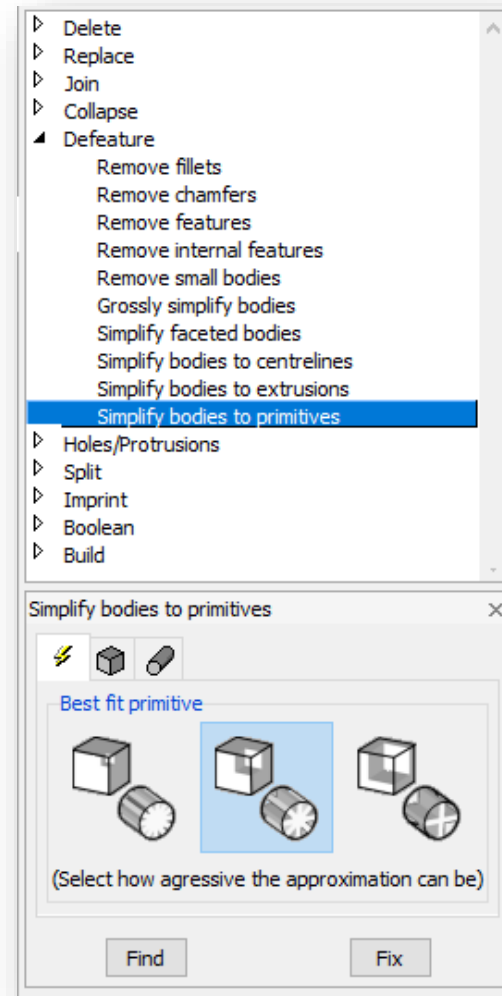
- Detects and splits complex joints within a body
- User control over level of complexity to split at
- Resulting bodies can be deleted or further simplified



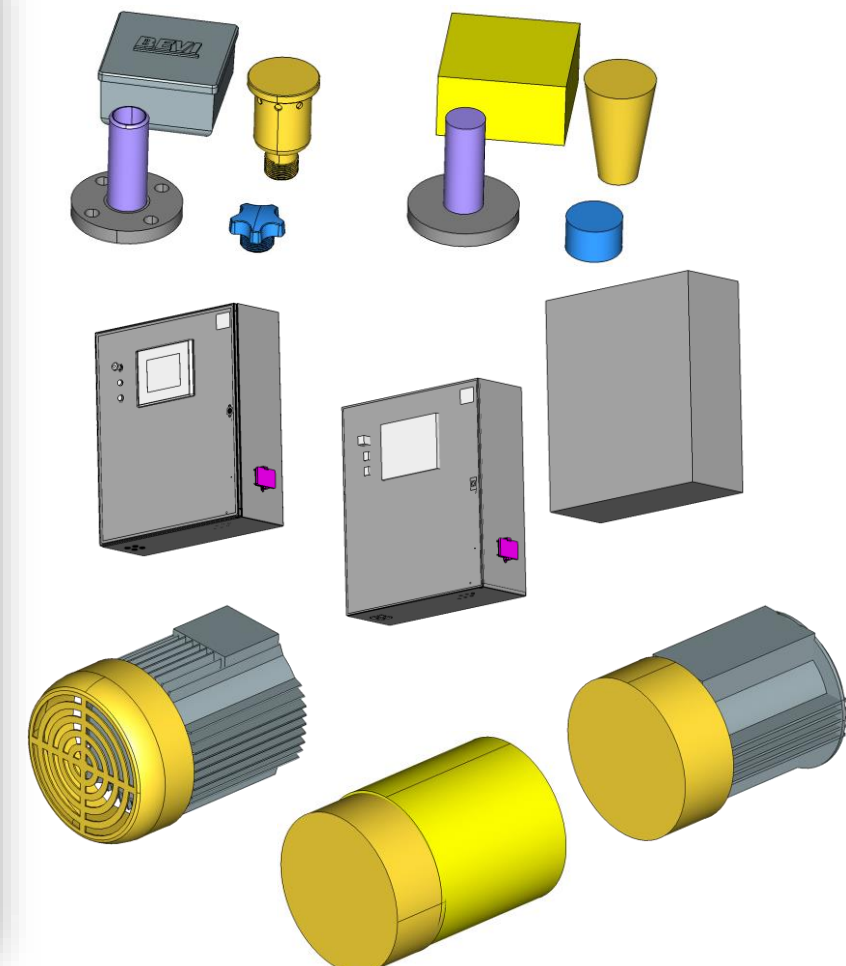
DX13: Defeature – Simplify to Primitives

New tool to simplify a body to the best-fit primitive form

- Simplify to best-fit box or cylinder primitive form
- User control over level of simplification
- Auto mode selects best primitive form
- Manual modes for box and cylinder simplification



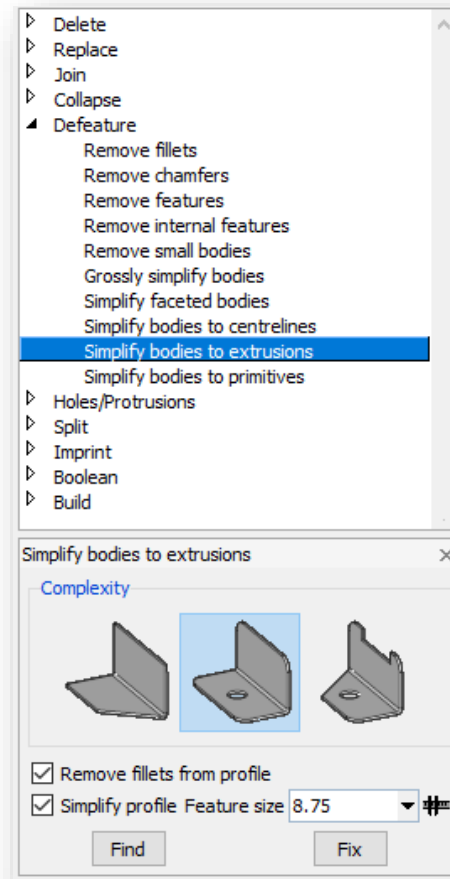
Automatic selection of best-fit box or cylinder



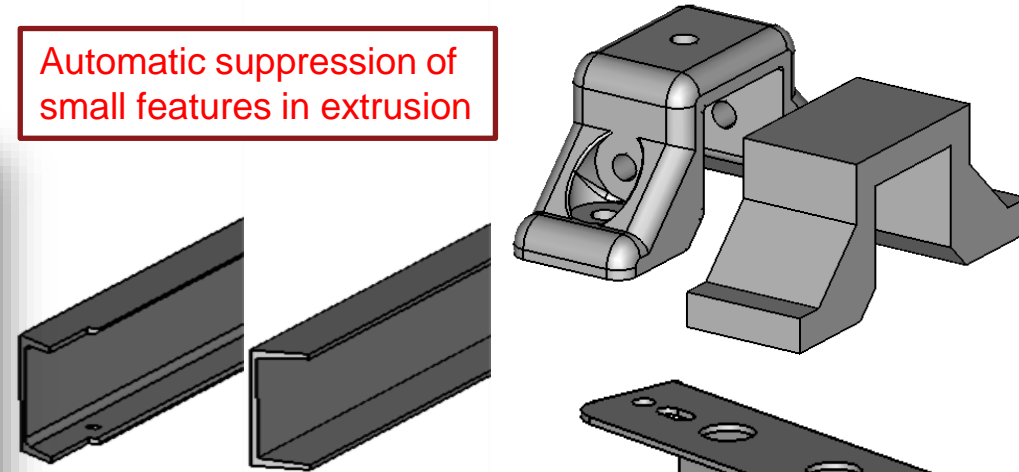
DX13: Defeature – Simplify to Extrusions

New tool to simplify bodies to an extruded form

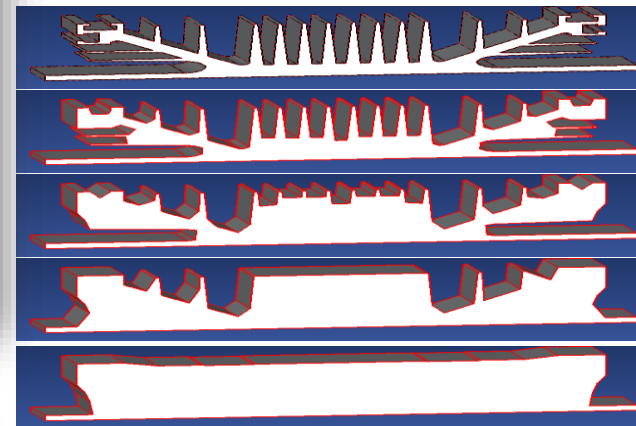
- Automatic detection of extrusion-like bodies
- Automatically suppresses small features in extrusion
- User control over level of simplification
- Automatic fillet removal from extrusion profile
- Automatic simplification of extrusion profile
- Available in batch for automation



Automatic suppression of small features in extrusion



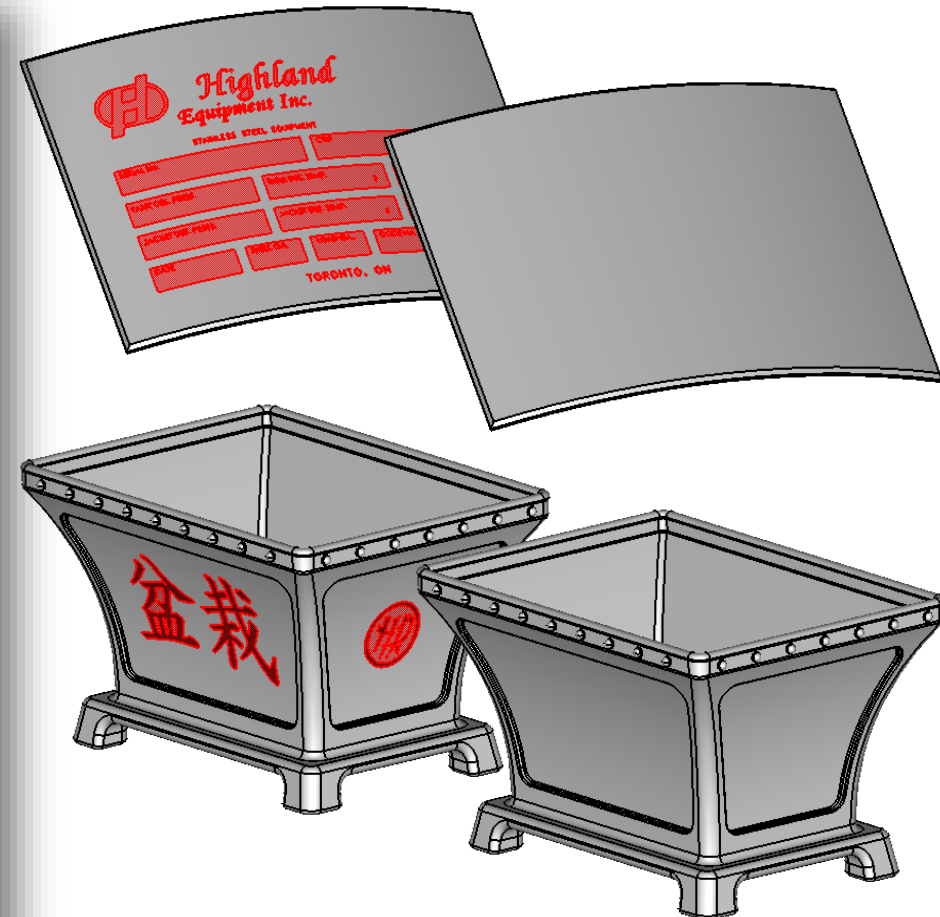
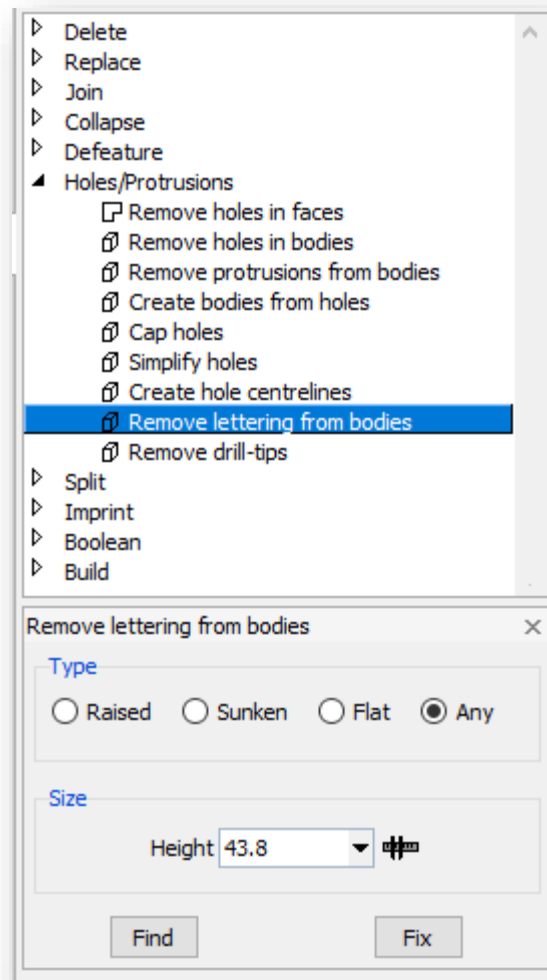
Variable profile simplification and de-filleting



DX13: Defeature – Remove Logos/Lettering

New tool to remove logos and lettering

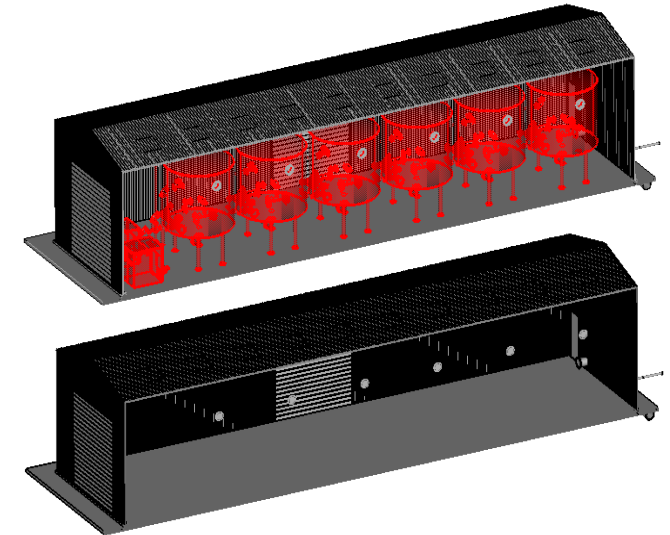
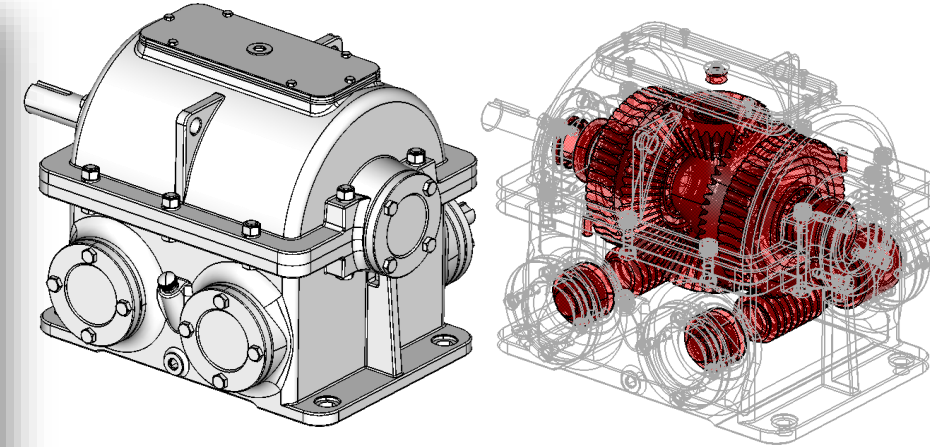
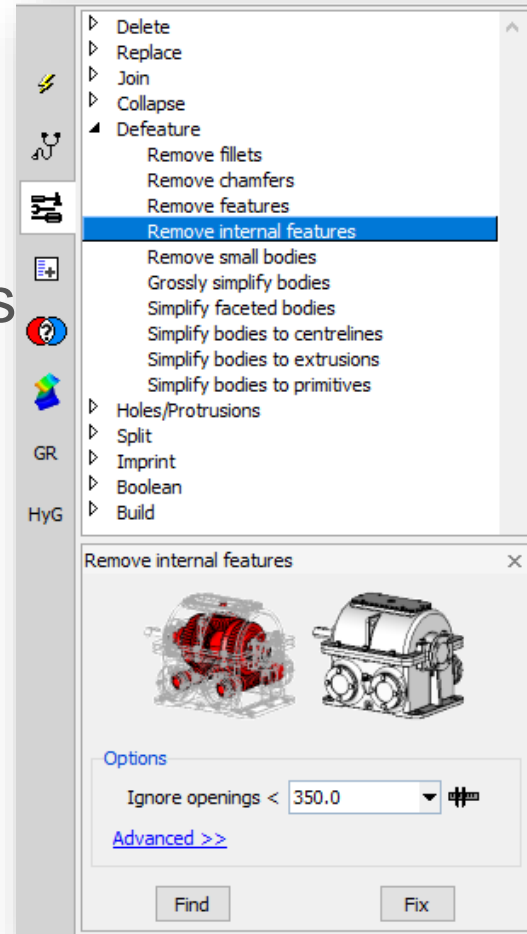
- Automatic detection of logos/lettering
- User control over type: raised, sunken or flat
- User control over height of logo/lettering
- Available in batch for automation



DX13: Defeature – Internal Detail Removal

Improved internal detail removal

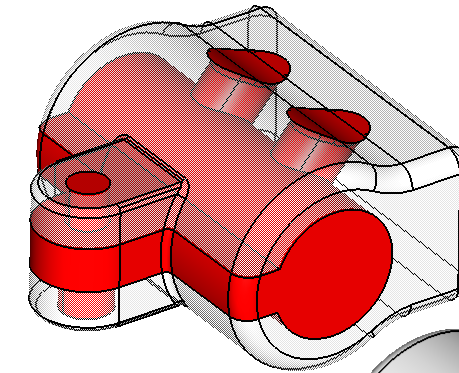
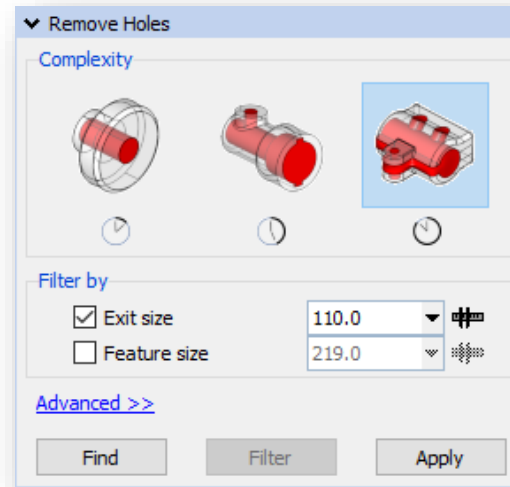
- Better detection and suppression of large openings
- More robust on thin-walled objects
- Parallel algorithm for large model performance
- Available in batch for automation



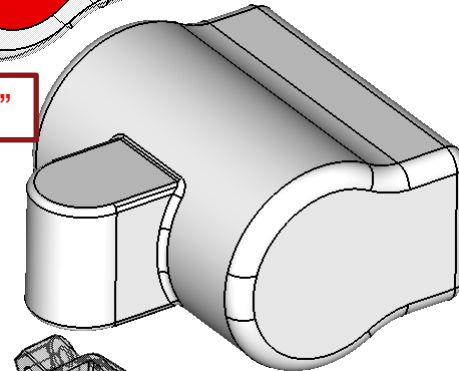
DX13: Defeature – Hole Removal

Improved hole detection

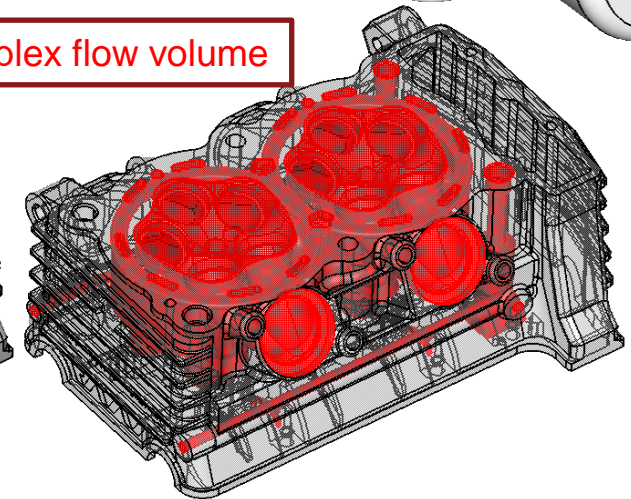
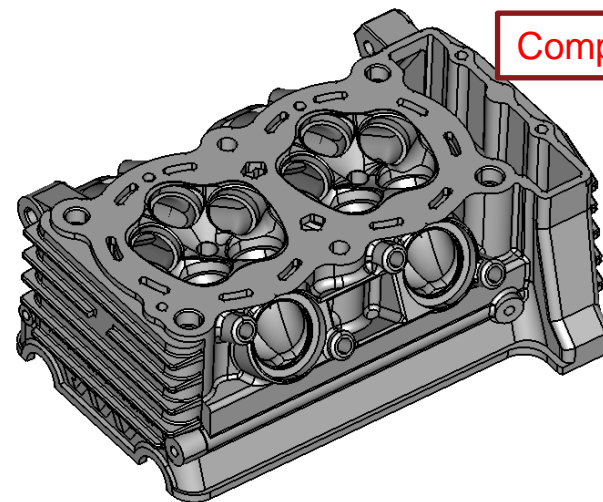
- Finds holes with complex entry/exits, e.g. split across multiple faces
- Auto-constructs complex hole cap geometry
- New user control over level of hole complexity
- Same enhancements to all hole tools for bodies, e.g. more complex internal flow volumes now found



Hole with complex "exit"



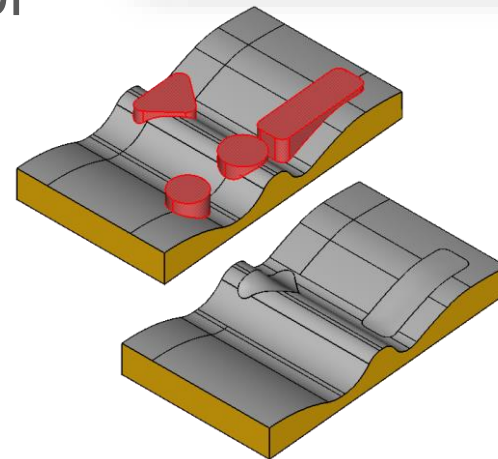
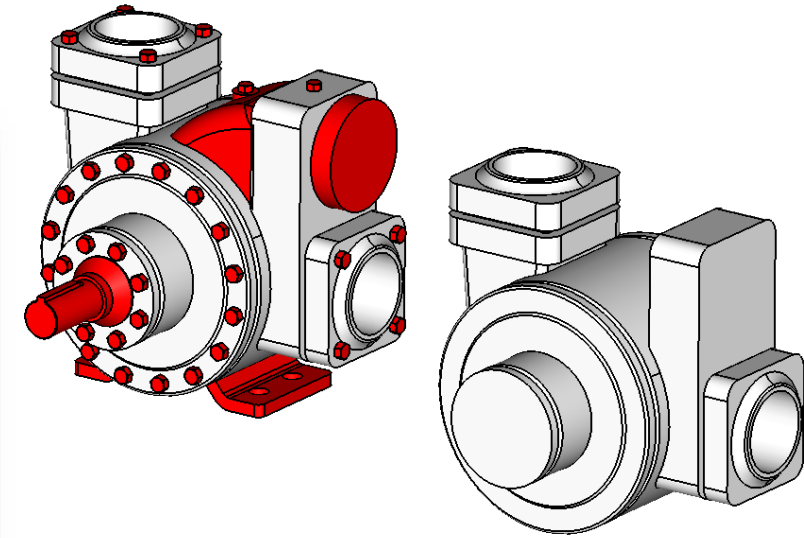
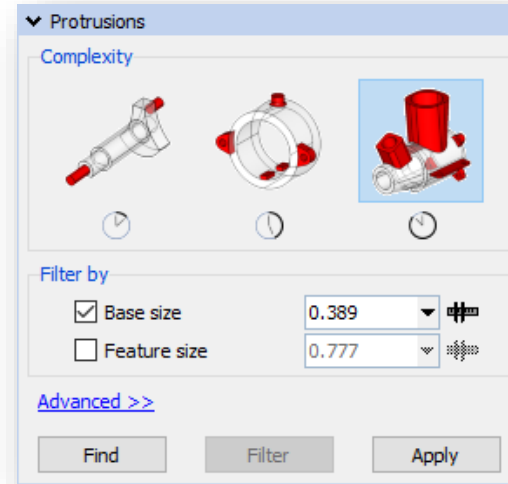
Complex flow volume



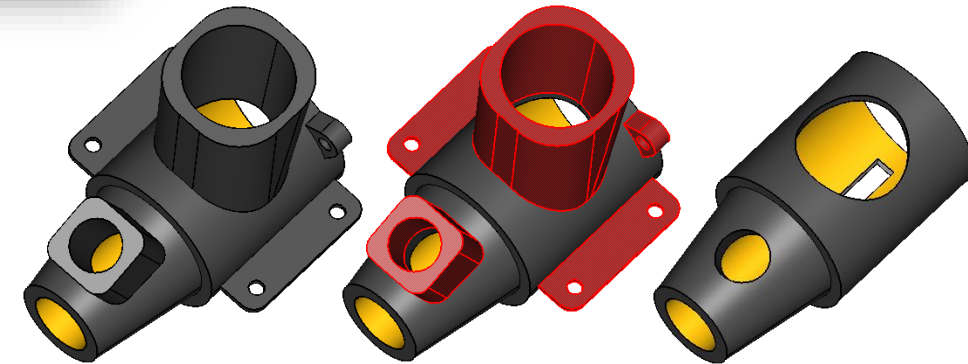
DX13: Defeature – Protrusion Removal

Improved protrusion detection

- Finds protrusions with complex bases, e.g. split across multiple faces
- Auto-constructs complex base cap geometry
- New user control over level of protrusion complexity



Protrusions spanning multiple faces

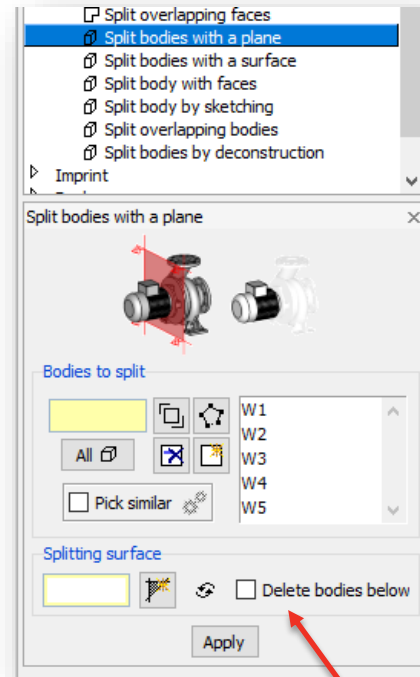


Complex protrusions with through holes

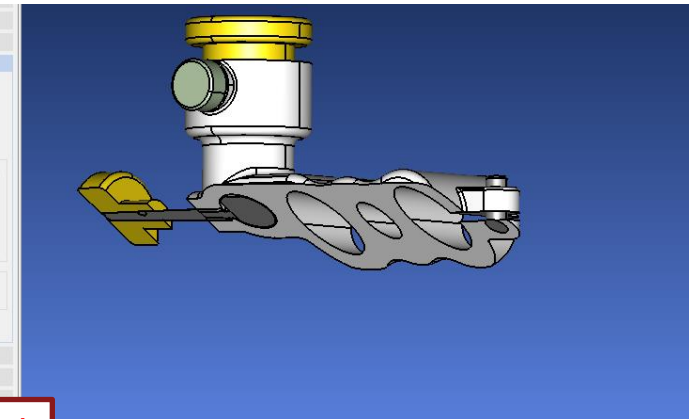
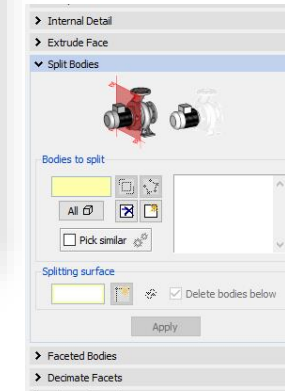
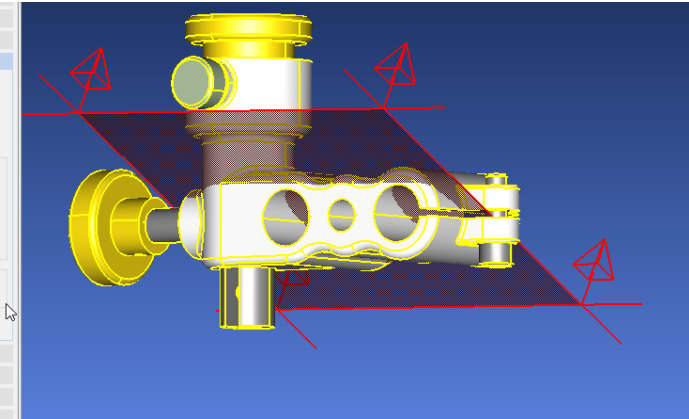
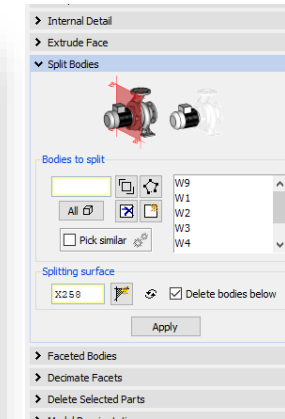
DX13: Split – Upgraded Planar Splitter

New tool for splitting bodies with a plane

- Now supports splitting a body(s) in an assembly
- Splitting plane can be defined from picking assembled point locations
- New option to delete new bodies below the plane
- Improved splitting robustness



Splitting multiple bodies in an assembly

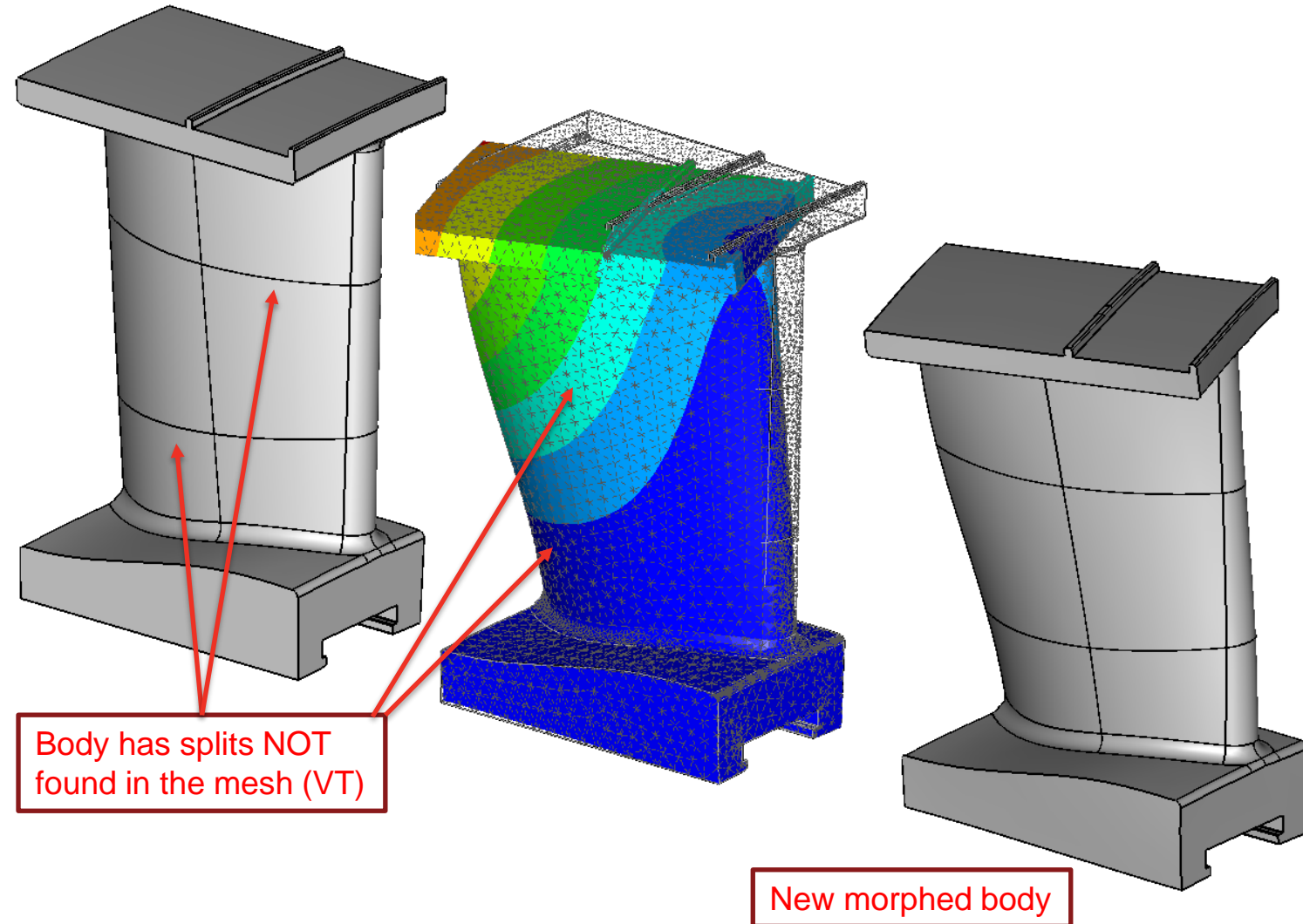


Bodies below plane automatically deleted

DX13: Morph

Morphing with unaligned mesh (virtual topology, VT)

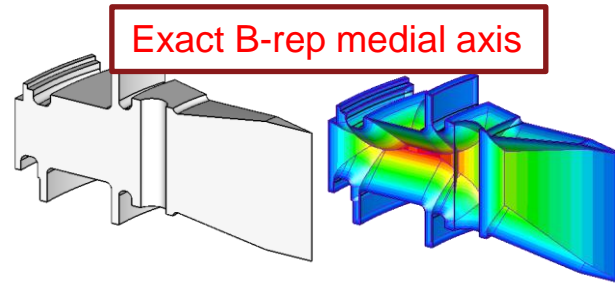
- VT: Where CAD topology has more edges/faces than the mesh, causing mesh/CAD mismatches
- Morph tool now automatically detects and copes with any VT
- Removes a key limitation in the use of Morph



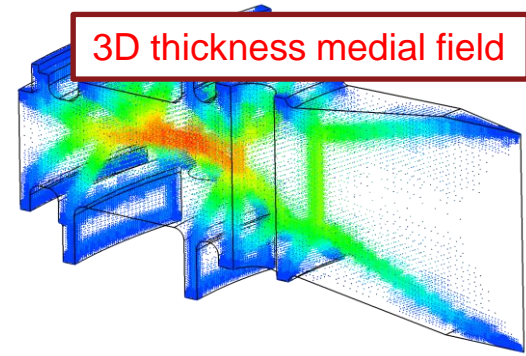
DX13: 3D Thickness

New 3D Thickness Tool

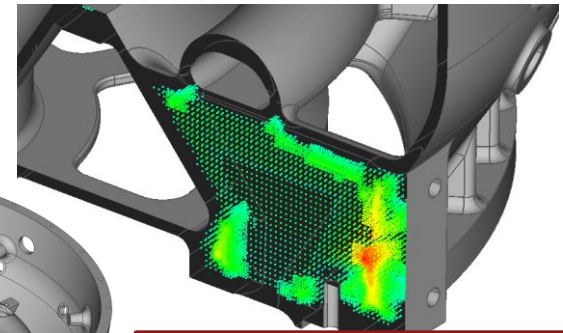
- Computes 3D medial thickness fields for complex bodies, assemblies or facet models (3D scans/STL)
- Thickness data as point cloud or iso-contours generated at user defined thickness values
- External thickness also supported for collision/gap analysis or detection of flow paths between single or multiple bodies
- Robust, parallel algorithm gives good performance even with large models
- Applications include: casting validation, AM validation, medical scan analysis, collision detection, gap analysis,...
- Export to visualisation formats, e.g. JT, FBX, glTF
- **Preview status:** Official release planned for 13/SP1 in Q4 2023



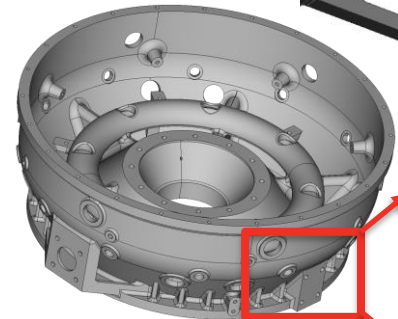
Exact B-rep medial axis



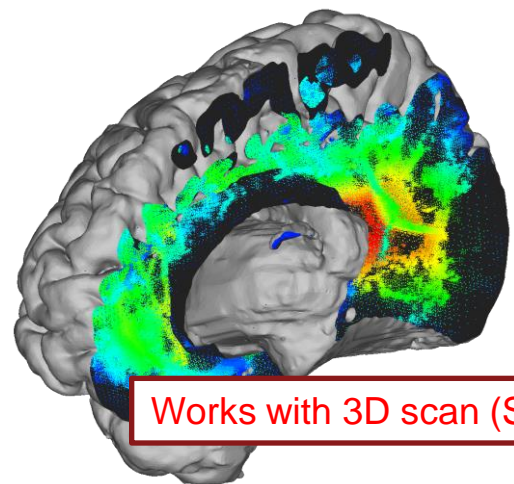
3D thickness medial field



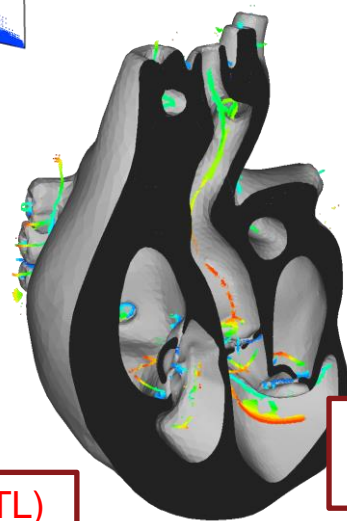
Thickness as point cloud



Thickness as iso-contours



Works with 3D scan (STL)



External thickness gives flow paths through heart

DX13: Coming in 13 Service Pack 1 (Q4 2023)

- **Import/Export**
 - Latest CAD version support
 - New NVIDIA USD
 - New 3MF
- **CAE Mesh export**
 - Support for 2nd order element creation
 - New recipes for hex meshing
- **Defeature**
 - New mid-surf creation tool
 - Improved split face into quads (for quad/hex meshing)
- **3D Thickness**
 - Official release
 - Improved results on scan/STL data
- **3D Shelling**
 - New robust 3D shell creation tool
- **Subdivision Surfaces**
 - Create and manipulate SubD geometry imported from CAD B-rep



Thank you!

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