Femap with NX Nastran V12

Femap with NX Nastran Version 12 is on its way, and for keen users, there's another superb collection of productivity improvements.
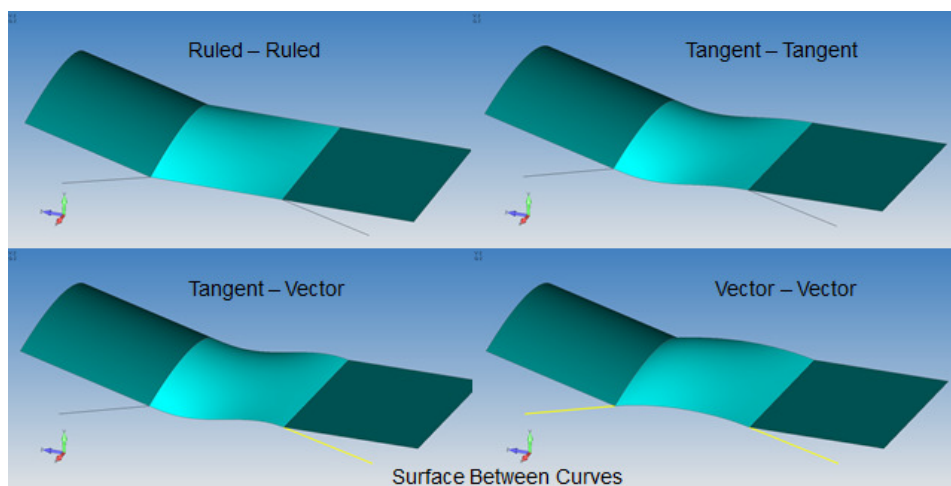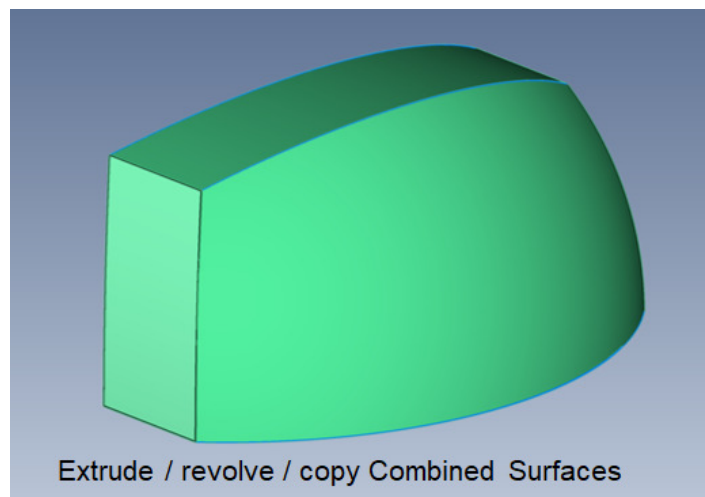
You can check out the details via Siemens web site (https://community.plm.automation.siemens.com/t5/CAE-Simulation-Femap-Forum/bd-p/Simcenter_3DFemap_forum), but here's a summary of our favourite new advances in productivity.

As is usual, many of these enhancements accelerate the creation/interpretation of quality FEA models - either from scratch or using imported CAD geometry which is often excessively detailed for engineering purposes, or otherwise "close enough is good enough" for appearance.

Geometry

Geometry Stitching works smarter with worse geometry: starts with tightest tolerances and works up to user-specified maximum = better outcomes with larger / untidier gaps. Preserves Loads/BCs/regions on original surfaces.

Combined Surfaces preserved when replicating: Combined Surfaces help improve mesh over superfluous geometric details – these Combined Surfaces can now be replicated (including loads / BCs / regions) when copied / reflected / rotated. Combined Surfaces can be used to create new geometry. This is particularly useful when rationalising untidy imported geometry into quality geometry for FEA. Extruding, copying, sweeping, offsetting etc. are now possible using Combined Surfaces, which adds an extra level of geometry power into the Femap toolkit.

Extrude / revolve / copy Combined Surfaces

Ruled – Ruled

Tangent – Tangent

Tangent – Vector

Vector – Vector

Surface Between Curves

Surface "Between Curves" added. This is like Ruled Surface, but with blending and tangency options added when the selected curves are edges of other existing surfaces.

Alignment of Surface Splits. Femap splits 360 degree surfaces into 180 degree segments (allows for superior mesh control). New capability improves intelligence and user choice of where splits occur, eg. relative to other geometry, to avoid small features.

Feature Removal speed improved by up to 30x.

Washer / Pad now includes non-circular holes, plus general edge offset for perfect FEA mesh / control at holes. Also works for solid brick meshed geometry!

Washer / Pad for precise mesh control around holes
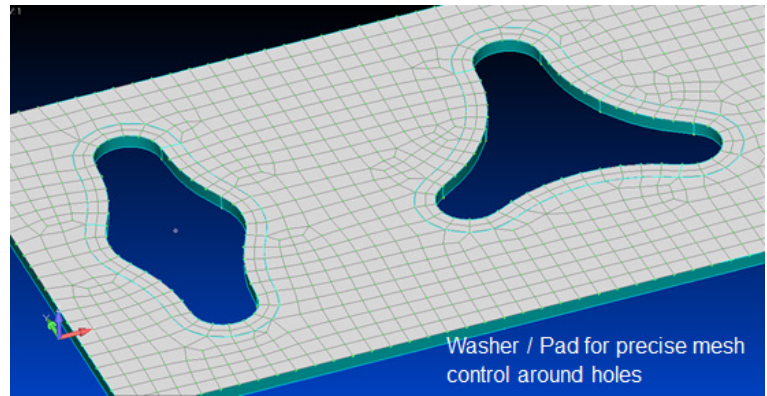
Geometry Copy / Rotate / Reflect can simultaneously replicate mesh (incl regions, BCs, loads and coords used for these). Plus, more options to specify orientations of transformed entities. Also allows optional control of relative numbering of new entities.

- Geometry reflected
- Mesh still associated
- Load reflected
- Dependent coordinate systems reflected
- Geometry based constraint reflected and attached
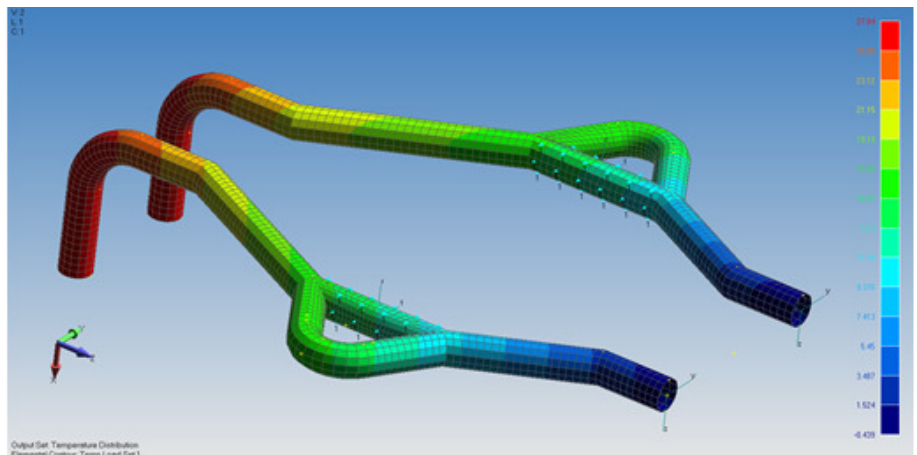
Similarly, when moving geometry, associated FEA entities can also simultaneously moved.

Mesh Point Editor added, for faster creation / visualisation / editing of FEA mesh points (commonly used when modelling numerous mesh-to-mesh fasteners like rivets, spot welds or bolts)
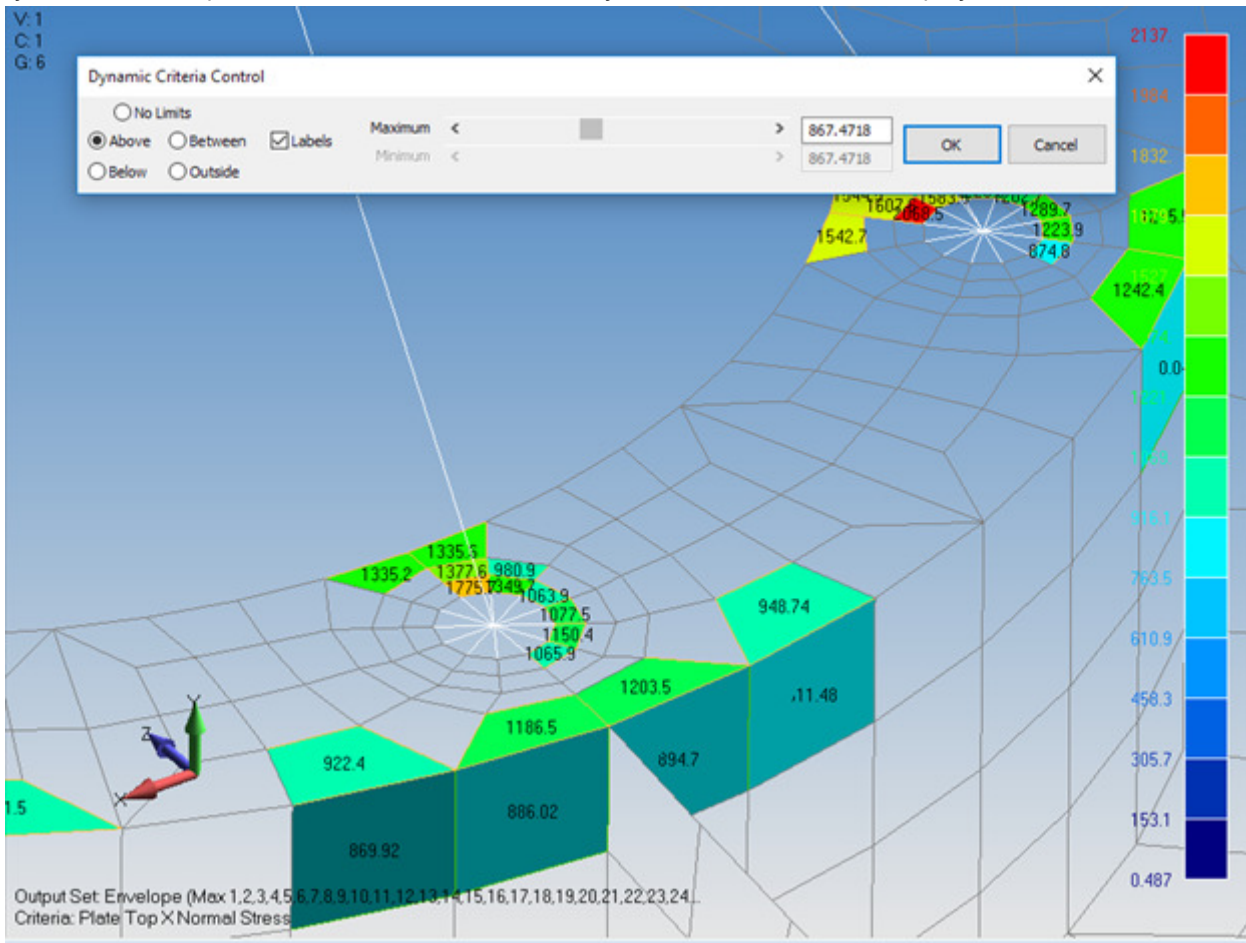
Beam Centreline Creator: create line members – with beam section FEA properties assigned - from CAD solid model of frame/truss members.

Create frame curves / FEA members from detailed CAD solid frame model.
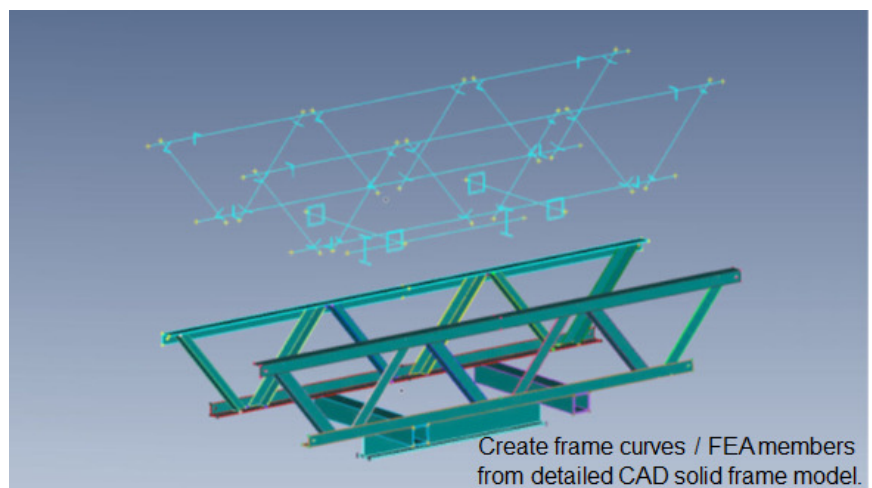
Results

Dynamic Criteria plot: use the slider to interactively set the threshold for displayed results.

Group | Operations | Generate from Criteria: create group based on results criteria.

Summary Microsoft Word report generator.

NX Nastran (Version 12)

Simpler memory management: Nastran Memory setting is a maximum available, not a hard allocation.

User interface support for (optional) SOL401 and SOL402 multi-step non-linear.

Additional UI support for Design and Topology Optimisation.

If you would like any further details, please get in touch (fea@cadcentral.co.nz) – we are happy to help.