One-step Unforming and Formability Analysis

One-step: a FEM-based sheet metal unforming, flattening and formability analysis solution

Benefits
- Easily create accurate blank shapes
- Automate the process for blank creation making it faster and more accurate
- Reduce and eliminate physical die try-outs
- Minimize costs by improving material usage
- Reduce die design errors
- Streamline blank, scrap and strip design

Business challenges
- Generating accurate representations of the flat blank for complex shapes
- Allowing for material deformation in design patterns
- Job turnaround and project time
- Cost control
- Software investment and solution cost
- Eliminate data translation and data transfer to third-party applications
- Process efficiency
- Waste and human error
- Tool quality

Summary
NX™ Progressive Die Design software includes One-step Unforming and Formability Analysis, a state-of-the-art FEM (finite element method) based unforming, flattening and analysis solution for tool and die makers. By combining industry knowledge, best practices and automation, One-step enables the rapid creation of flattened blanks and preforms from complicated freeform sheet metal part geometry. NX Progressive Die Design with One-step excels at unforming and flattening the most complex and challenging sheet metal components; One-step Formability Analysis helps tool and die makers save time by effectively validating designs for thinning, stress/strain and springback.
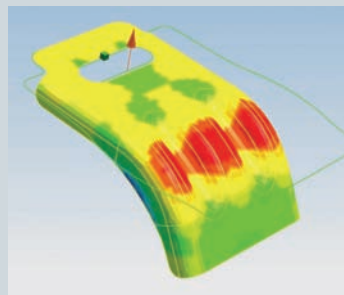
Finite element mesh.
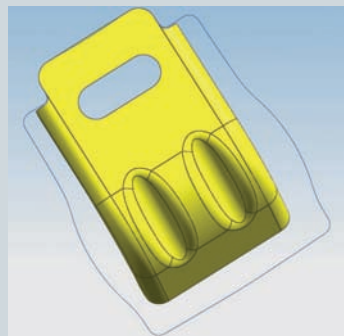
Blank profile.

The One-step Unforming and Formability Analysis command helps save costs by reducing physical try-outs. It offers a streamlined workflow based on industry best practices:

Easily work with freeform sheet metal part geometry One-step effectively works with both NX and translated geometry. Part files do not require features and include solid and surface geometry.

Define material type One-step supports an extensive set of material types provided within NX Progressive Die Design. Definition of the material properties affects the unformed shape solution.

Control boundary conditions and tip direction Boundary conditions are applied to control how geometry is unformed. The entire part may be flattened or portions of a part unformed.

NX

SIEMENS

One-step Unforming and Formability Analysis

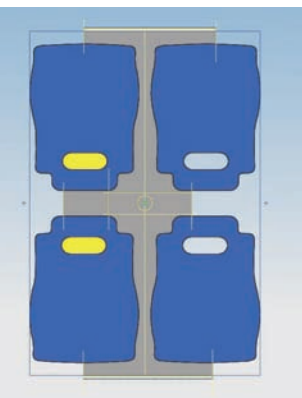**Finite element mesh generation and finite element analysis** One-step automates meshing with the creation of high quality meshes based on best practices and eliminates the need to manually mesh the part. A fast and accurate state-of-the-art solver calculates the blank profile using industry proven formulas.
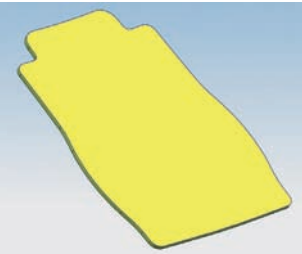
Sheet metal blank.
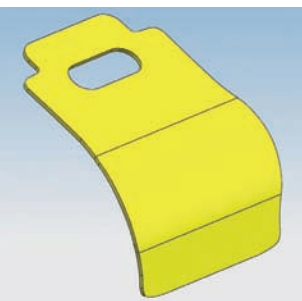
Preform.

Blank profile/outline generation and blank modeling The blank and preform outlines are output from One-step and used to quickly model the flattened blank and intermediate form.

Blank layout and strip layout design Leverage the full power of NX Progressive Die Design to fulfill downstream design requirements for blank nesting and strip layout design.

Blank layout/nest/scrap.

Powerful and flexible Use predefined standard materials, or configure new material properties. Leverage advanced controls to specify mesh and element type. Automated report generation captures and documents analysis results.

"One-step Unforming, a fast and accurate freeform sheet metal unforming solution, can help to reduce and even eliminate effort/time on costly physical try-outs. Additionally, since One-step Unforming is included within NX Progressive Die Design, we can ultimately save on our overall software investment by no longer having to rely on third-party flattening applications."
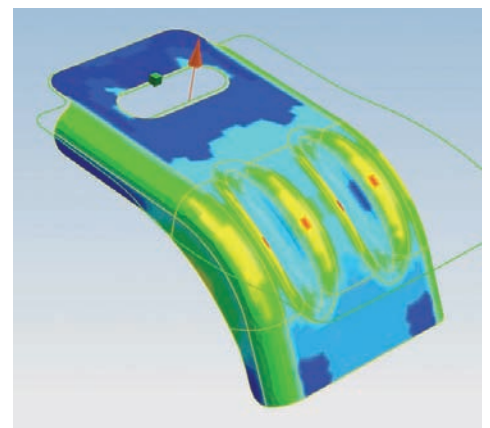*Rainer Lahme, Software-Consultant CAx, EDM Chief Information Office, Wincor Nixdorf*

One-step Unforming and Formability Analysis are available within the NX Progressive Die Design module and Mach 3 Progressive Die Design product.
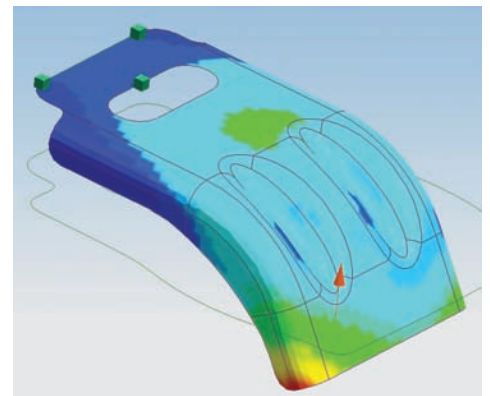

Automated meshing.
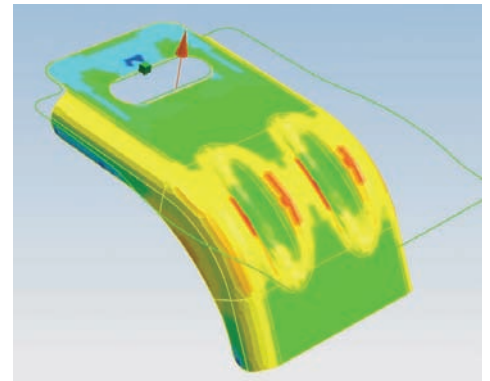
Stress results.

Strain results.

Springback results.