

# One-step Unforming and Formability Analysis

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

### Benefits

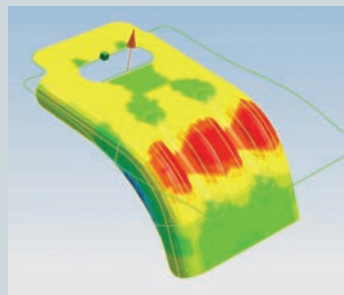
- Easily create accurate blank shapes
- Automate the process for blank creation making it faster and more accurate
- Reduce and eliminate physical die try-outs
- Minimize costs by improving material usage
- Reduce die design errors
- Streamline blank, scrap and strip design

### Business challenges

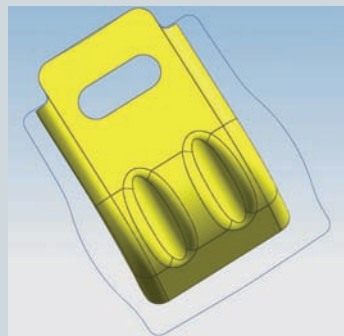
- Generating accurate representations of the flat blank for complex shapes
- Allowing for material deformation in design patterns
- Job turnaround and project time
- Cost control
- Software investment and solution cost
- Eliminate data translation and data transfer to third-party applications
- Process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

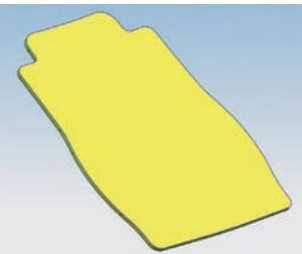
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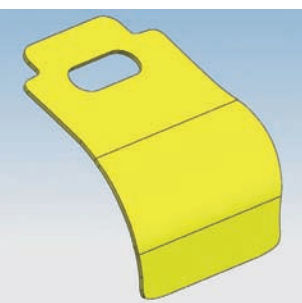
## One-step Unforming and Formability Analysis

### Finite element mesh generation and finite element analysis

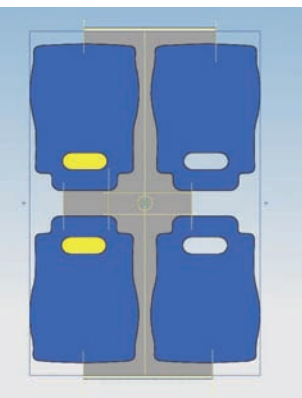
One-step automates meshing with the creation of high quality meshes based on best practices and eliminates the need to manually mesh the part. A fast and accurate state-of-the-art solver calculates the blank profile using industry proven formulas.



Sheet metal blank.



Preform.



Blank layout/nest/scrap.

### 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.

**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.

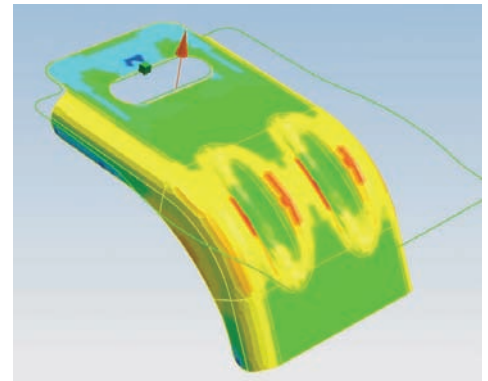
**“One-step Unforming, a fast and accurate freeform sheet metal unforming solution, can help to reduce and even eliminate effort/time on costly physical try-outs. Additionally, since One-step Unforming is included within NX Progressive Die Design, we can ultimately save on our overall software investment by no longer having to rely on third-party flattening applications.”**

*Rainer Lahme, Software-Consultant CAx, EDM Chief Information Office, Wincor Nixdorf*

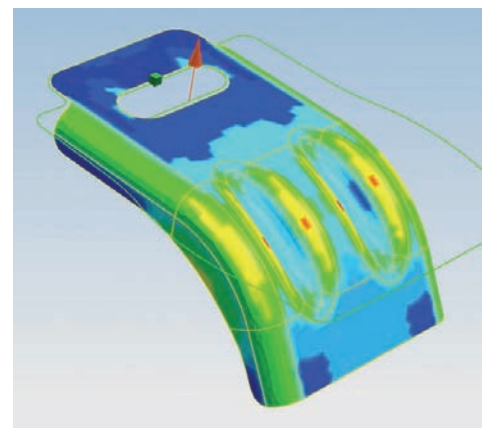
One-step Unforming and Formability Analysis are available within the NX Progressive Die Design module and Mach 3 Progressive Die Design product.



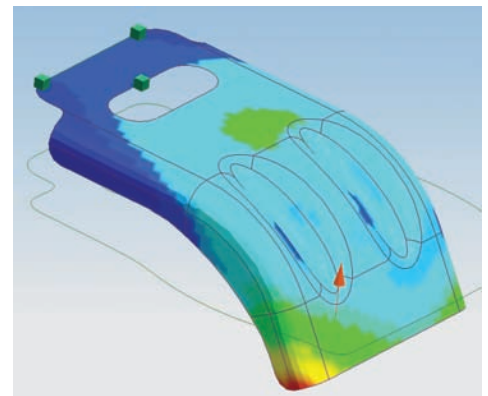
Automated meshing.



Stress results.



Strain results.



Springback results.

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