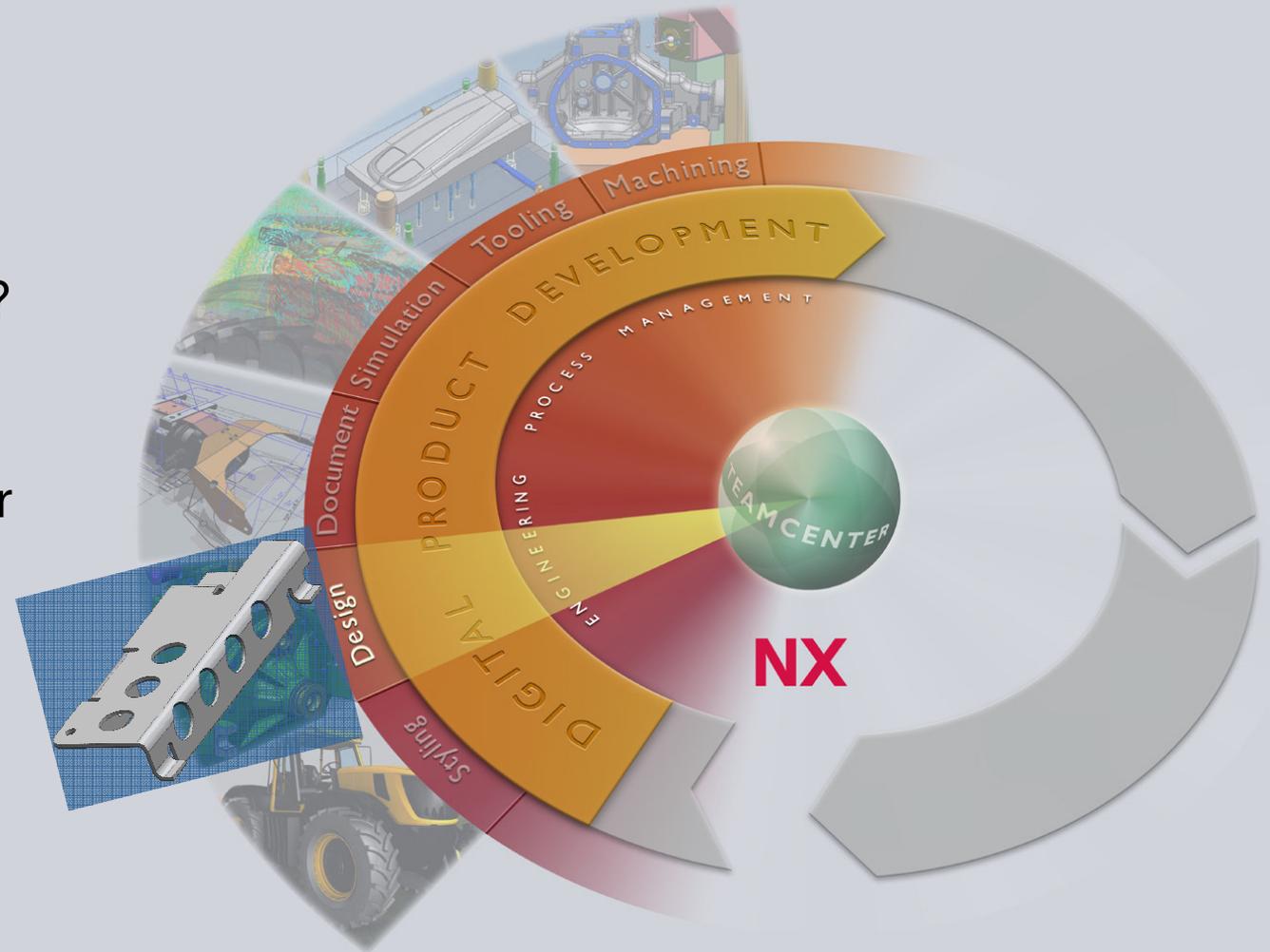


NX Sheet Metal

PLM World 2008
Ashley Eckhoff – Product Manager

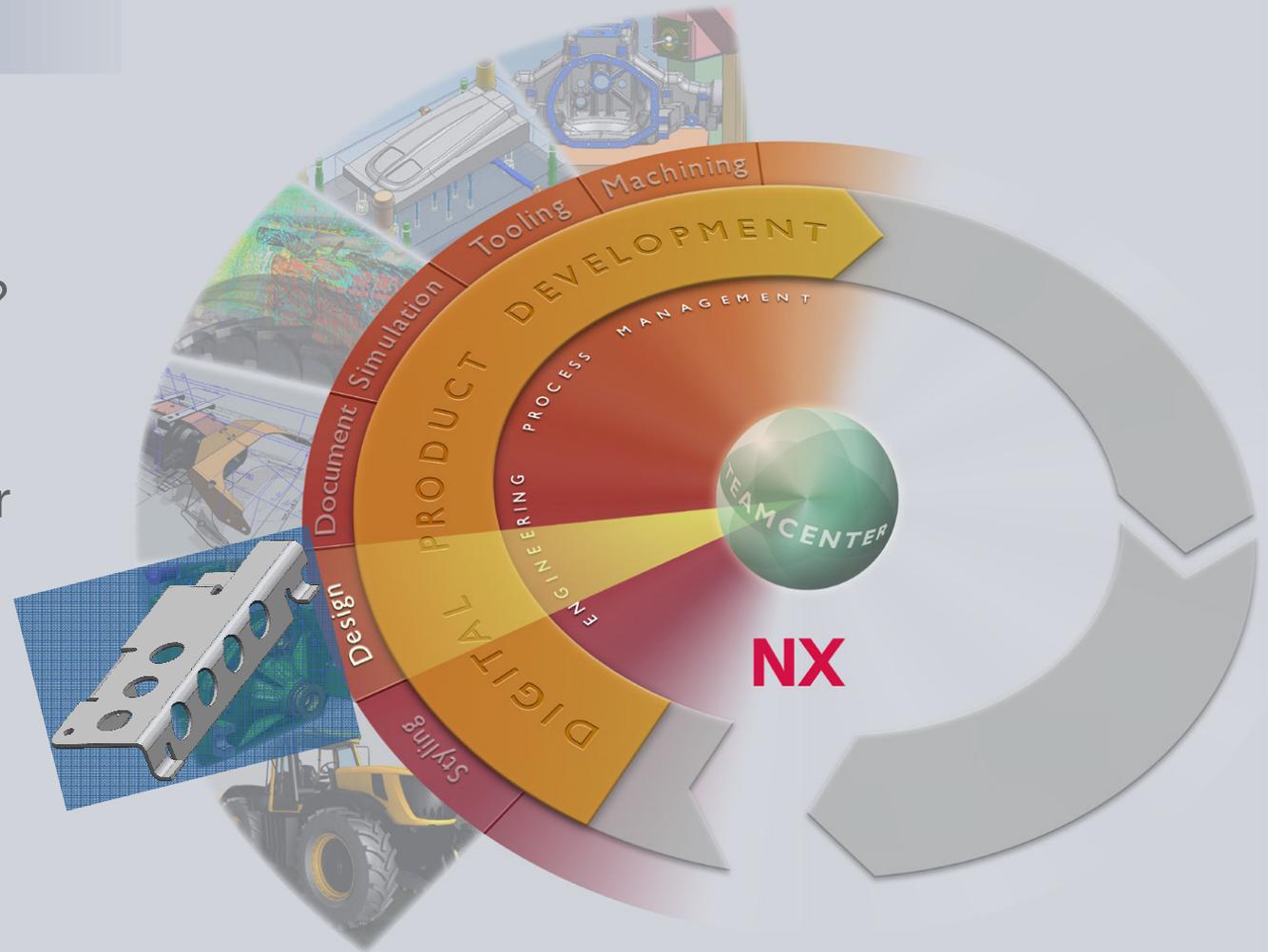
NX Sheet Metal - Topics

- Introduction
- Where are we now?
 - NX 6
 - I-deas Migration
- Where are we going?
 - NX 7 and beyond
- Further information
 - Beta testing & other



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NX Sheet Metal

History

First introduced in NX 3

Based upon an entirely new architecture for sheet metal in NX

Straight-brake bending only

- Conical and cylindrical bend regions

Expanded through NX 4 and NX 5

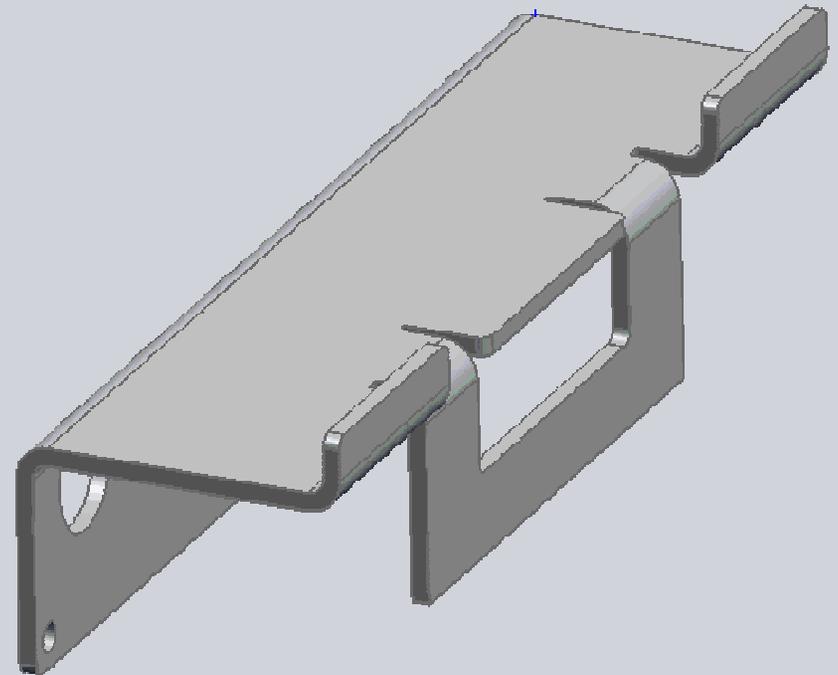
- More bending and punching options

- Bend tables, material selection

- Flat Patterns and manufacturing information

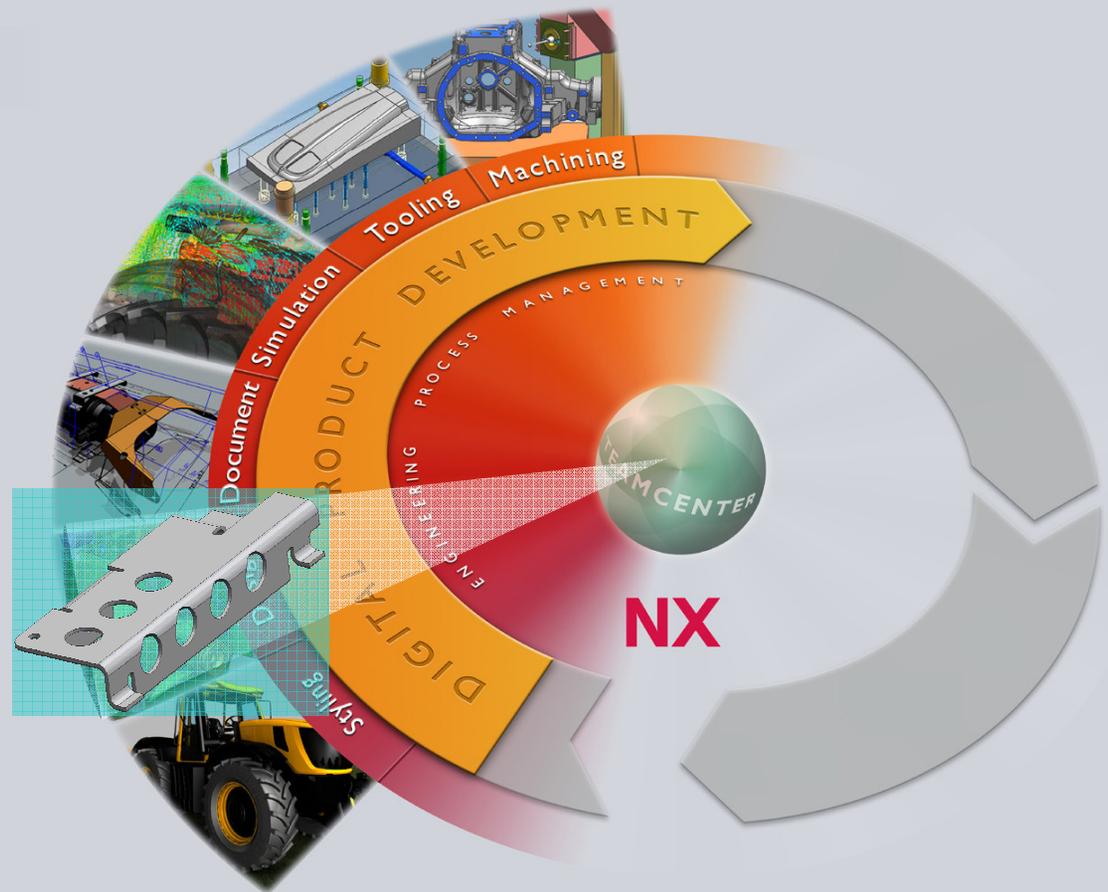
Quick adoption by customers and very well received

Large customer base

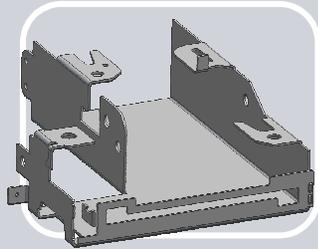


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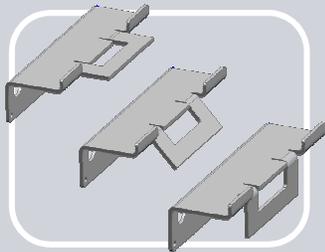


NX Sheet Metal Strengths – NX 6



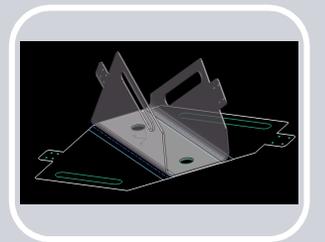
Complete suite of features for sheet metal design

Value: ability to design almost any straight-break sheet metal part (bending & embossing)



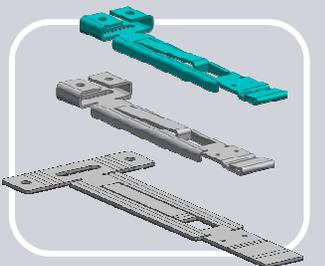
Simulation of bending order or multiple forming states

Value: assists with manufacturing process and minimizes manufacturing errors



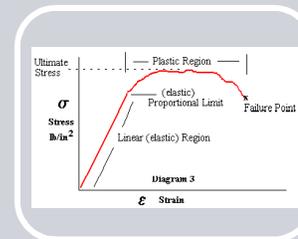
Robust flat patterning

Value: trouble-free use for final manufacturing of part whether automated or manual



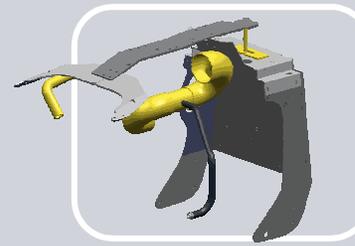
Ability to convert to sheet metal

Value: allows for use of parts designed in other CAD systems as native NX Sheet Metal parts



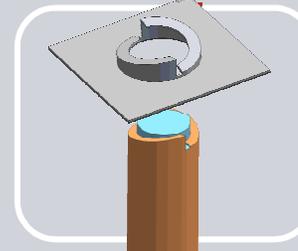
Multiple methods for defining bend region deformation

Value: coverage for all major methods of deformation calculation (tables, formulas, materials, etc.)



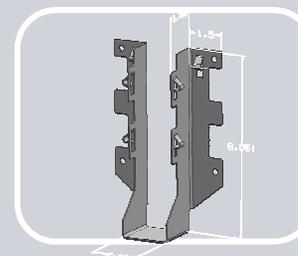
Intuitive user interface

Value: easy in-context design with no guessing about the outcome of an operation



Complex Punching

Value: use of solid punch tool allows for more than just simple offset punches



Completely integrated with NX core functionality

Value: easy interoperability with PMI, Assemblies, Design Logic, and Drafting

Sheet Metal Part Design

Capabilities

Multiple bend region types
Cylindrical, Conical, and now simple curved arc bend regions

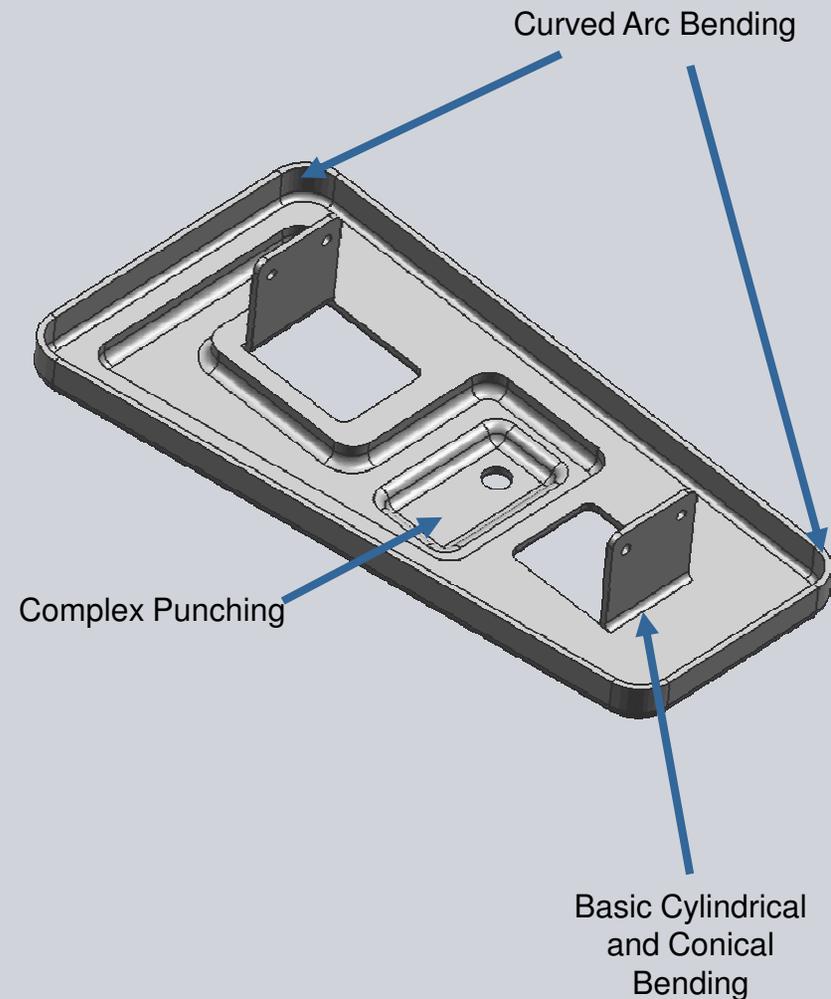
Punching features
Dimples, Louvers, and Beads

Flattening
Unbending, Flat Solid, Flat Patterns

Customer Value

Allows you to design almost any sheet metal part that can be created with a brake press

Robust flattening means that you always have access to the initial blank shape



Sheet Metal Manufacturing Support

Capabilities

Use any of four different methods to define bend region behavior

Bend Tables	Material database
Neutral Factor	Bend Allowance Formula

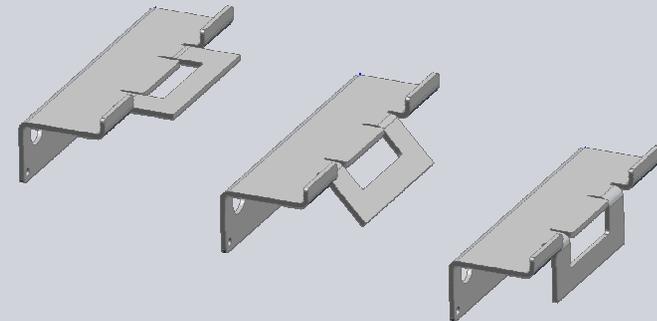
Easily create flat patterns for input to a machine tool and for use on the shop floor

Validate designs according to preset rules

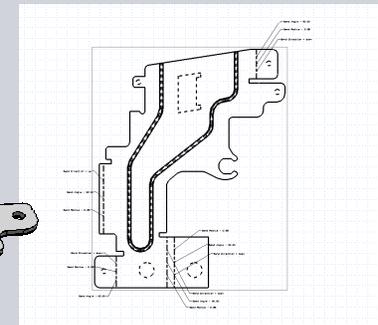
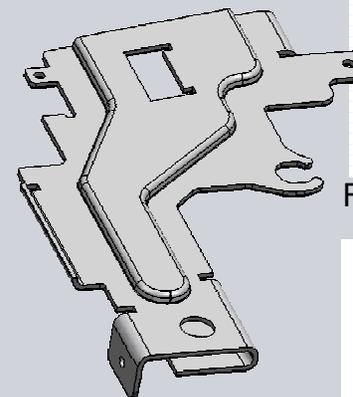
Customer Value

Complete freedom to design your sheet metal parts according to your manufacturing methods and needs

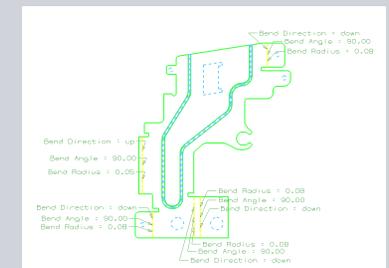
More options for control of part behavior than any other system on the market



Show various stages of manufacturing



Flat Pattern for shop floor



Flat Pattern for export
Siemens PLM Software

Sheet Metal Design Reuse

Capabilities

Quickly convert unparameterized geometry into NX Sheet Metal parts

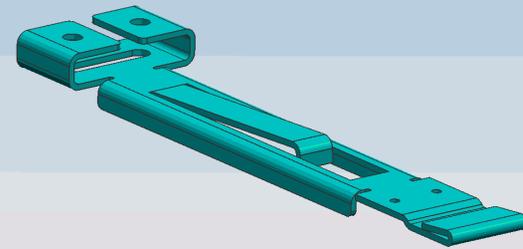
Creates a part that can be modified or edited using NX Sheet Metal features

Converted parts can be flattened and used to generate a flat pattern for manufacturing

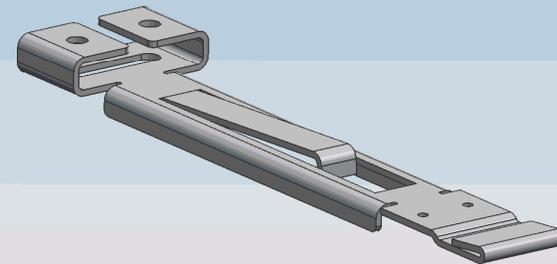
Customer Value

Keeps legacy data from becoming obsolete or requiring redesign

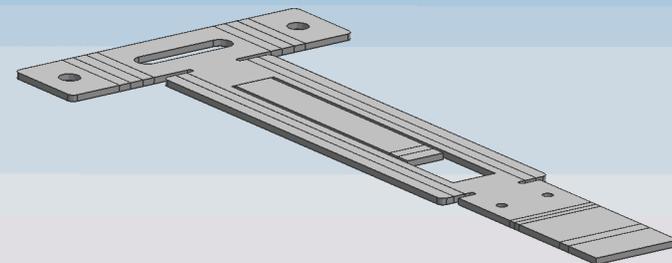
Easy integration of models created in other CAD systems



Geometry only – no features



Conversion to Sheet Metal + Automatic Recognition of Bends



Unfolded Part

Sheet Metal from Solid

New for NX 6

Capabilities

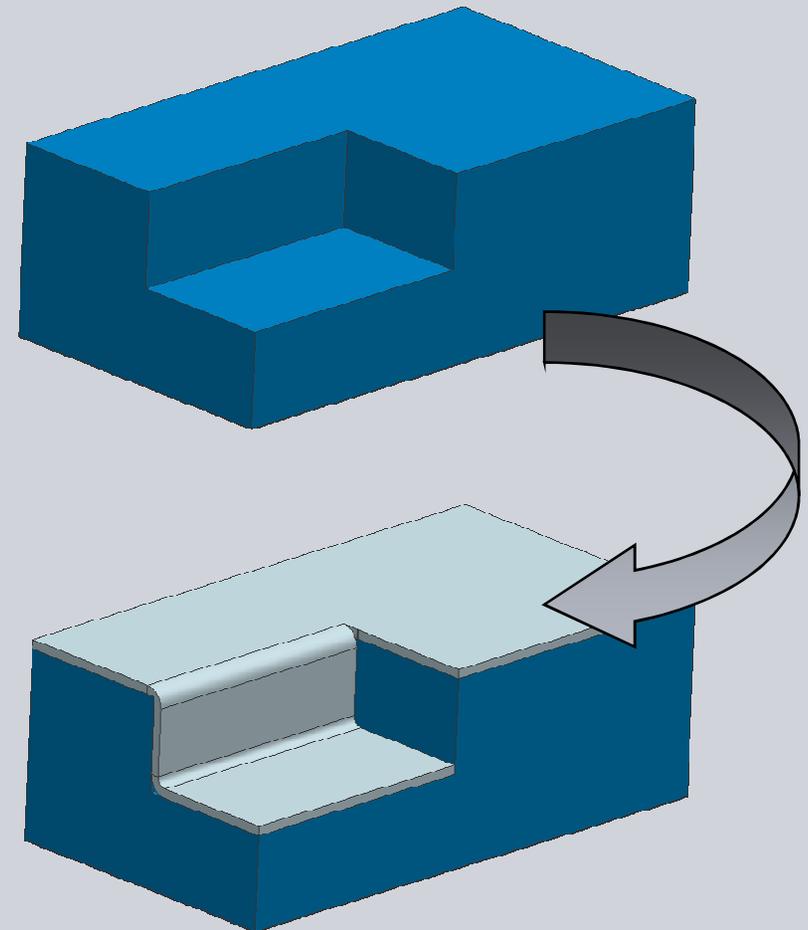
A new method for users to generate sheet metal parts from a solid by identifying faces as Tabs and edges as bend regions

Customer value

Allows you to design the void region and then quickly generate an enclosure around it

Assists with design of models consisting of complex angles and unusual bends

Sheet Metal from Solid workflow example



Bend Taper Angles

New for NX 6

Capabilities

A new feature to allow for tapering of Bend regions

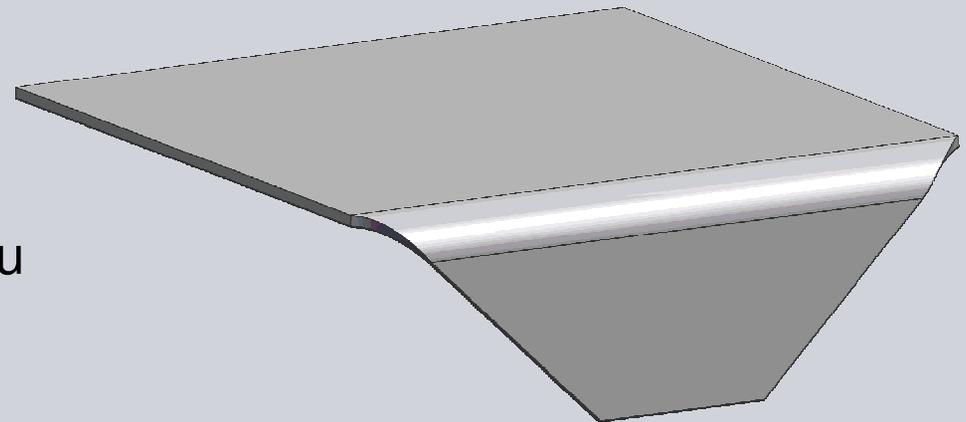
Enables users to define taper angles for each side of the Flange and the bend or web region independently

Customer value

Saves design time by allowing you to directly set side tapers by an angle value

Tapering a flange or other bending feature will no longer require editing of the underlying sketch or adding extra cutouts

A bend region with two 45-degree tapers



Flat Pattern/Flat Solid Enhancements

New for NX 6

SIEMENS

Capabilities

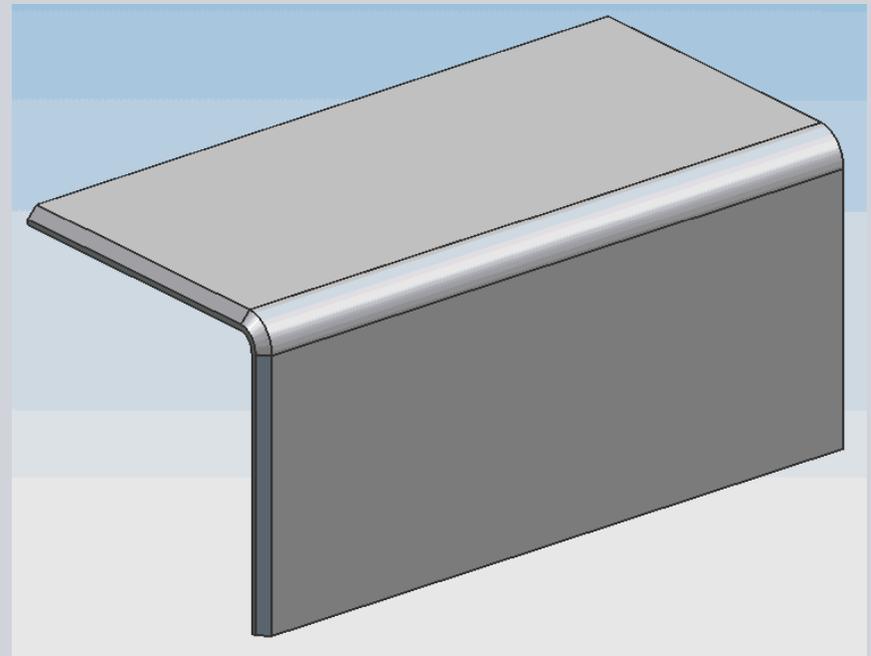
Improvements to the Flat Solid and Flat Pattern utilities to handle parts with non-uniform thickness

Allows chamfered edges for welding prep

Customer value

Allows flat patterns to show properly the hidden edges of a non-uniform thickness solid

Proper un-forming of weld preparations across bend regions



Multiple-segment Lofted Flange

New for NX 6

Capabilities

Allows for Lofted Flanges consisting of segmented bend regions

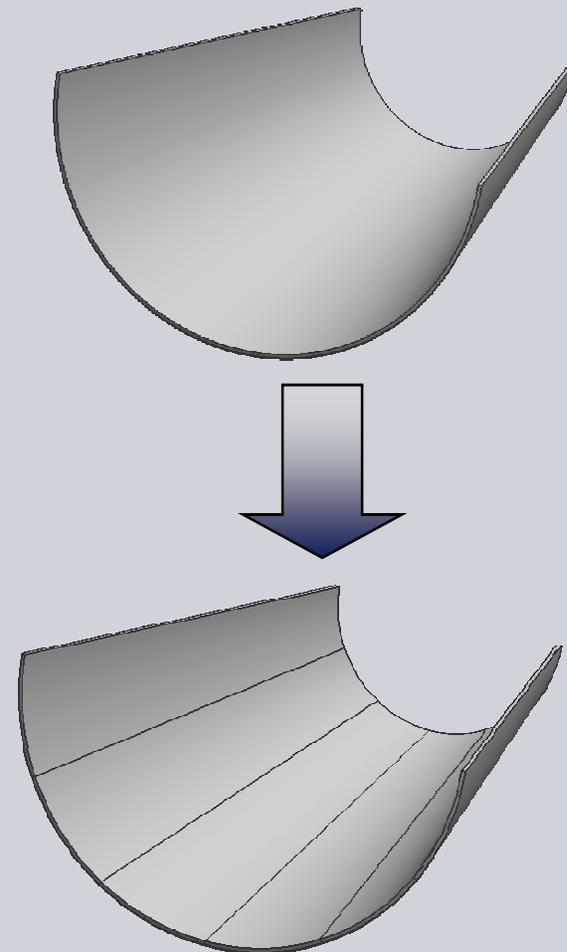
Updates Unbend/Rebend code to handle forming of these parts

Customer value

Follows the manufacturing method that many users use for creation of conical-shaped parts

Creates bend lines that will be automatically reflected on the flat pattern

Segmenting a Lofted Flange



3D Curve Input for Normal Cutout

New for NX 6

Capabilities

A set of 3D curves for use as a cutout

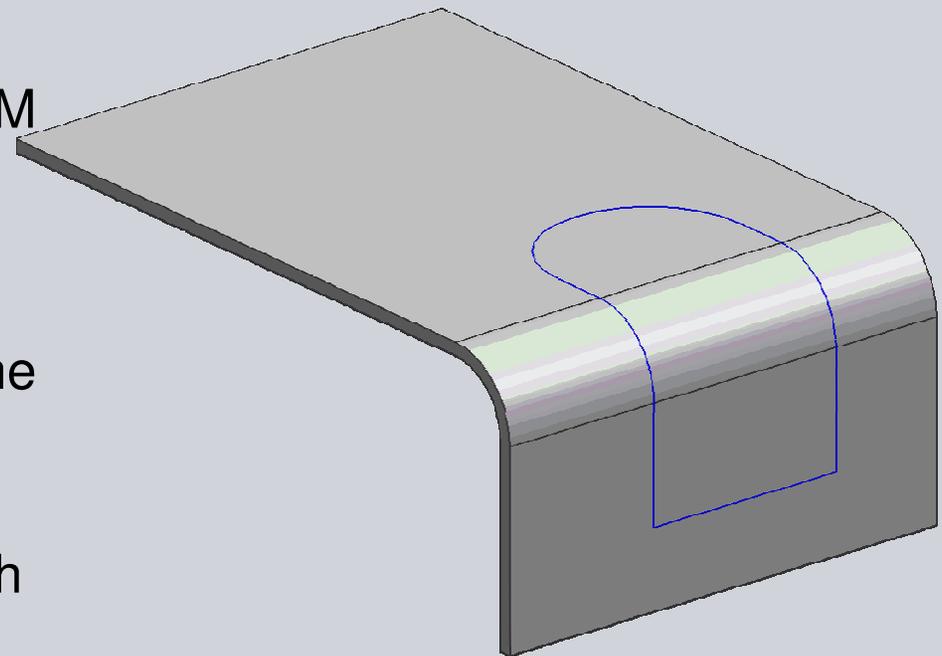
Adds the ability to give a 3D curve as input for the Normal Cutout feature

Curves will be projected to placement faces as with legacy SM Cutout feature

Customer value

Gives you exacting control over the actual cut shape

No guessing as to where the cut edges will land on the solid as with a projected sketch



Sheet Metal Validation

New for NX 6

Capabilities

Ability to validate clearances for bending and punch tools

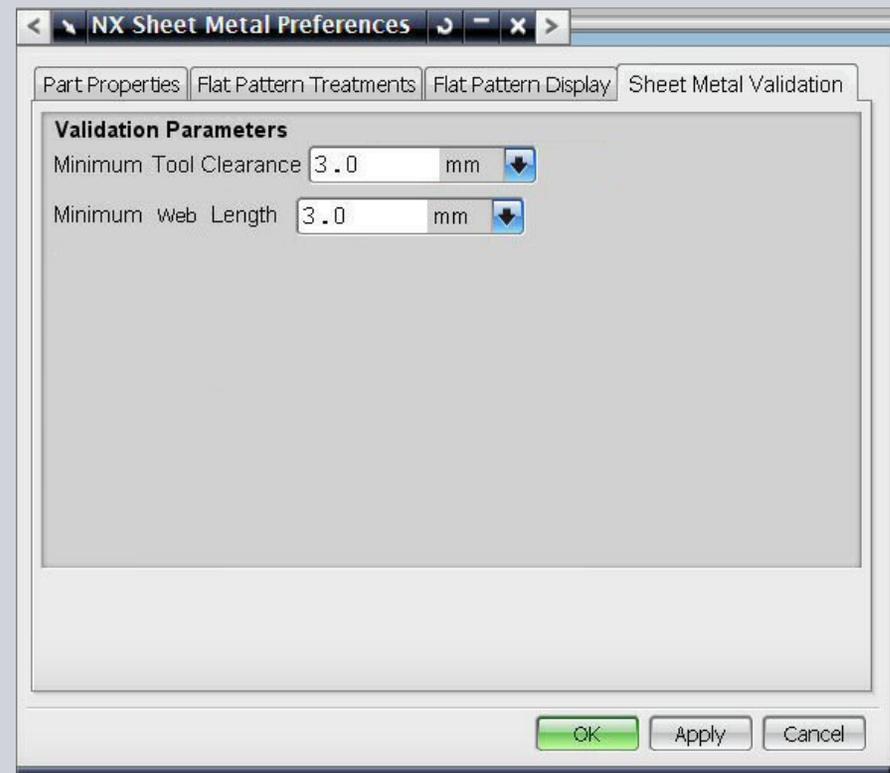
Validation of bending sequence and bending limits

Customer value

Validation gives you information about the manufacturability of your part before you ship it to the design floor

Allows you to ensure that your design conforms to your company manufacturing abilities

Two new validation values added in NX 6



Improved Corner Conditions

New for NX 6

Capabilities

Adds several capabilities to the Closed Corner feature

Support for up-down corners

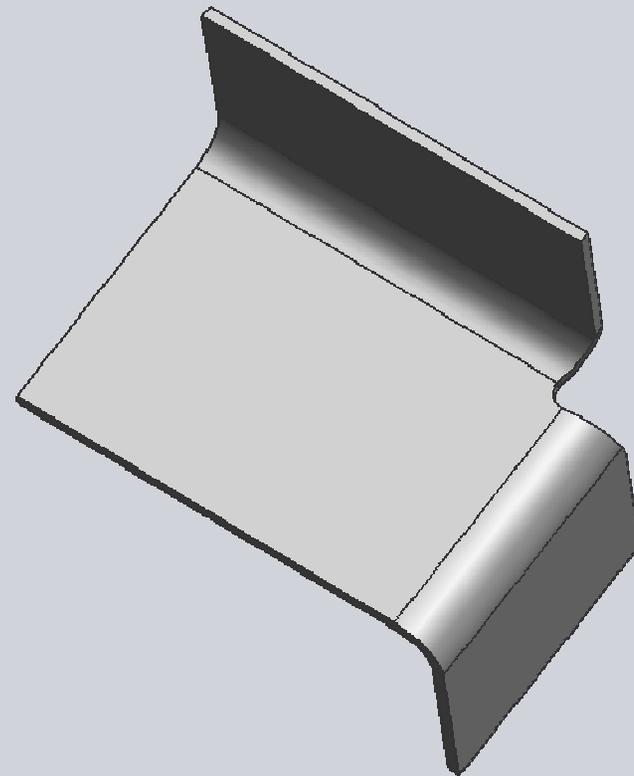
Support for corners of varying radii or angles

Customer value

Improves range of conditions handled by the Closed Corner feature

Allows creation of models not previously possible with NXSM

A V-shaped relief on an up-down corner area



Corner Relief Improvements

New for NX 6

Capabilities

Enhancement of the Closed Corner feature to create new relief shapes in the corner between two flanges

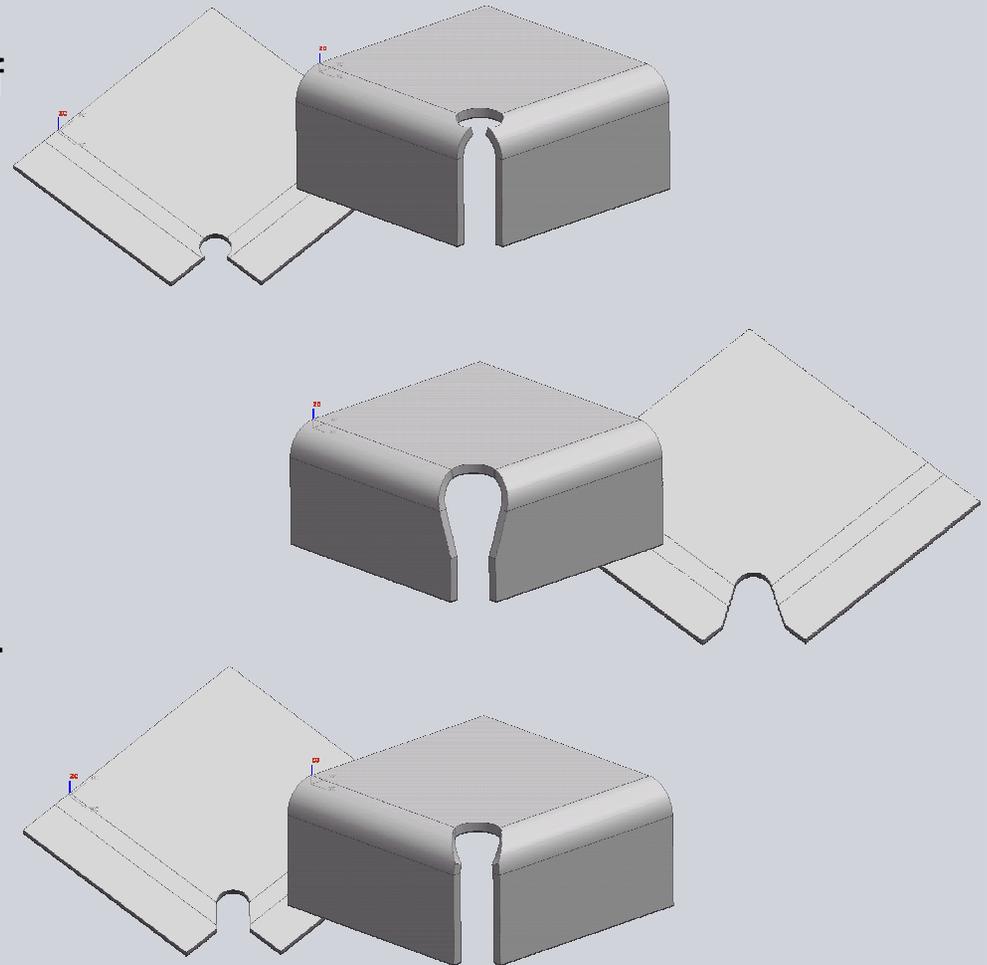
Customer value

Saves time by automating the creation of relief features

Includes several standard relief shapes such as U-shaped, V-shaped, Rectangular, and Circular

More options for position of relief

Sample corner relief types



Flat Pattern Improvements

New for NX 6

Capabilities

Ability to select additional curves to be included in flat pattern

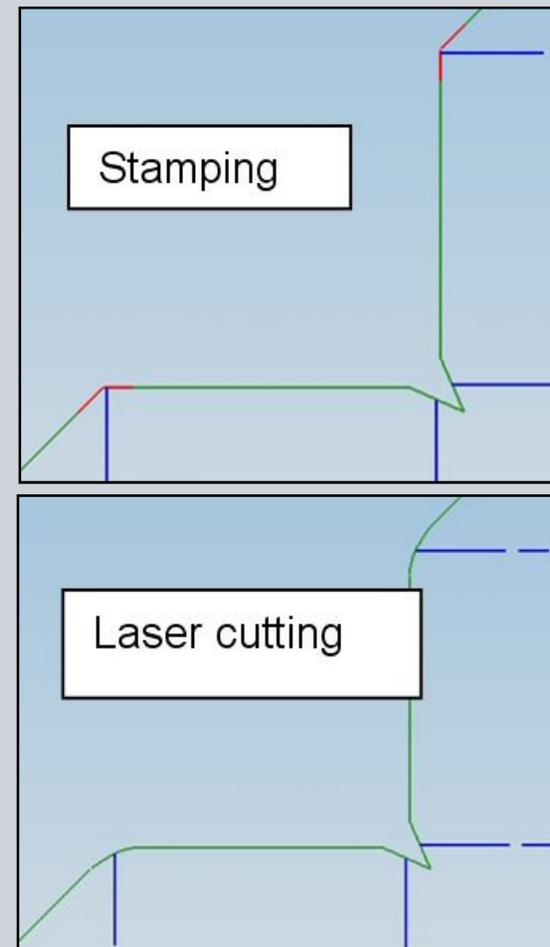
Special handling for laser cut vs. stamped profiles

Customer value

Further strengthens the flat pattern capabilities for sheet metal in NX

Allows for more accurate representation of flat pattern according to manufacturing method

Flat pattern shape defined by manufacturing method



Bend Properties from Tool IDs

New for NX 6

Capabilities

Allows users to drive the parameters of the bend region by assigning a tool name

Bend Radius

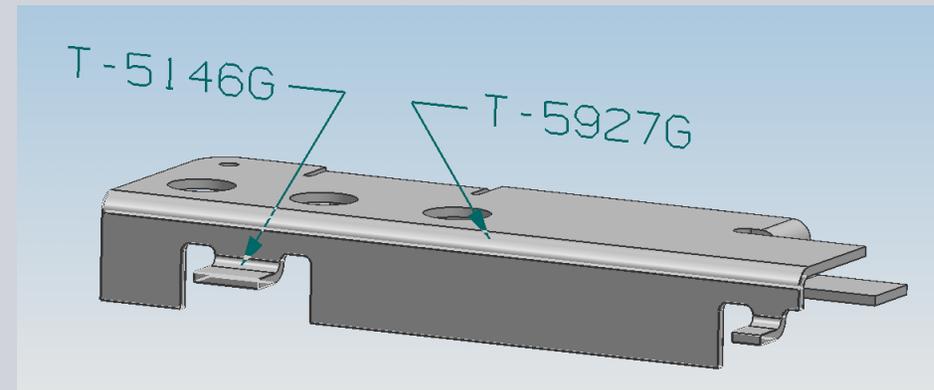
Neutral Factor

Tool name attributes associated with bend regions

Customer value

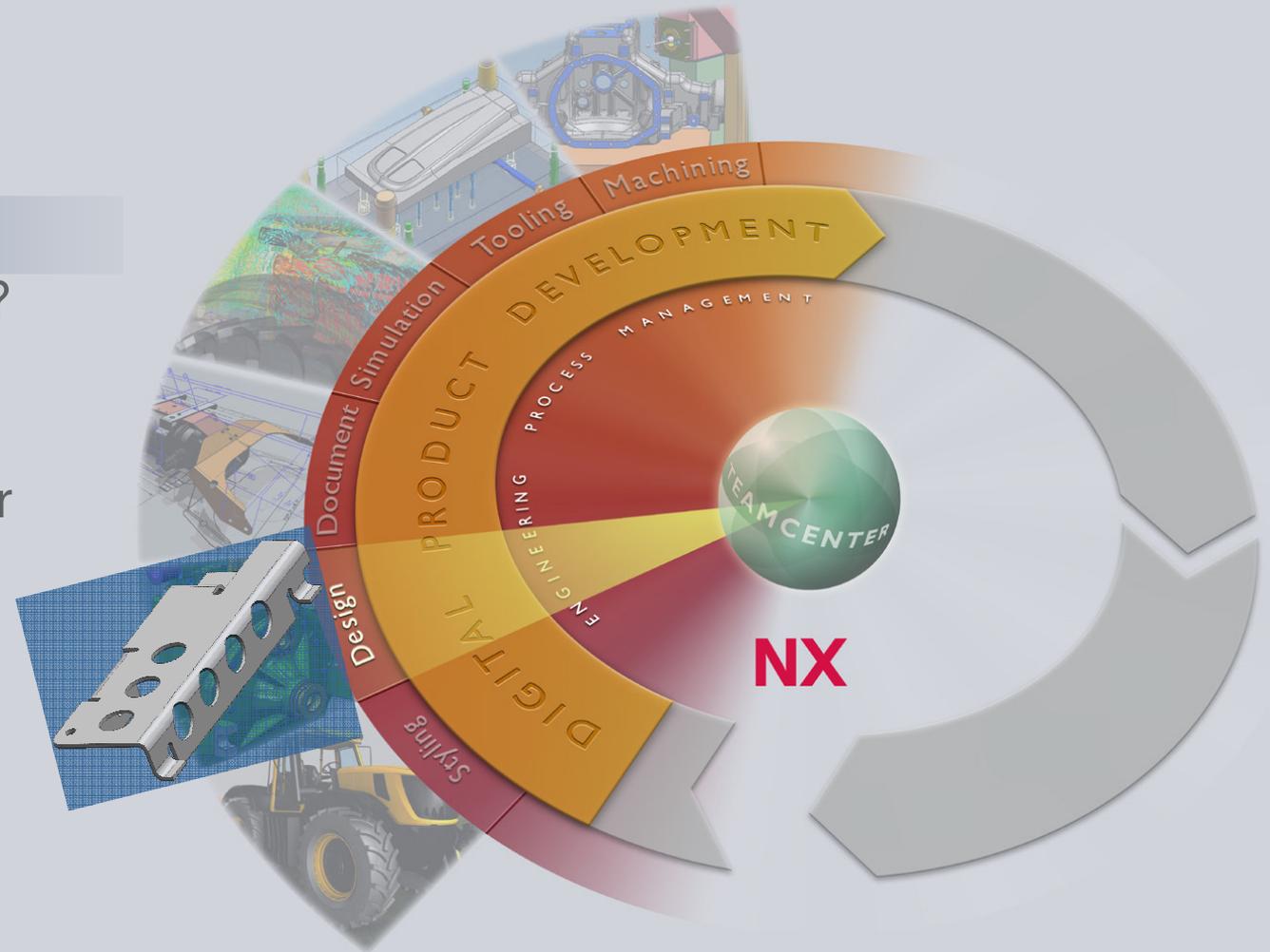
Important for users whose designs are driven by their manufacturing tooling

Especially used in the machinery market where tooling drives the design parameters



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I-deas Sheet Metal Migration

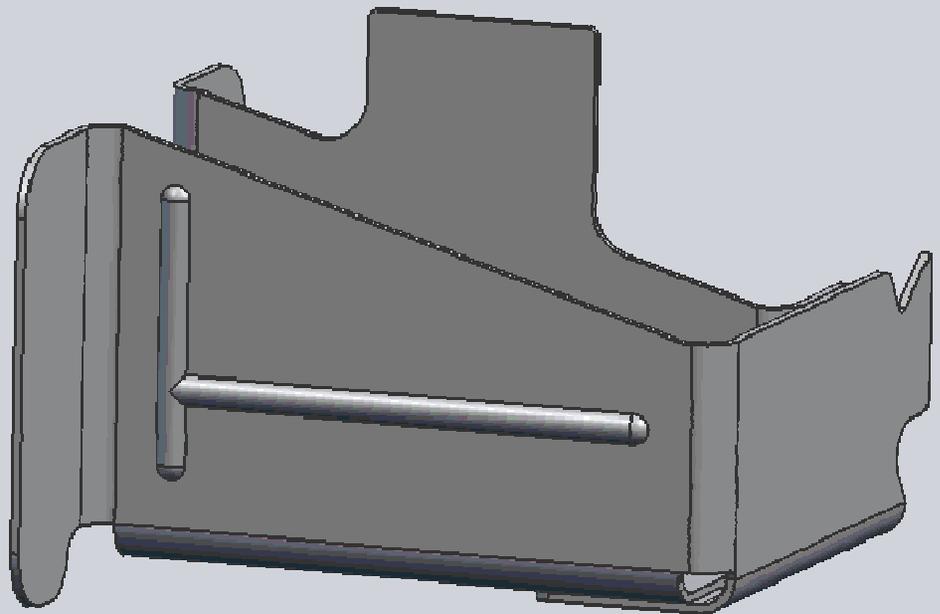
Current Status

Many algorithm improvements over the past year

Migration of Drafting drawings available

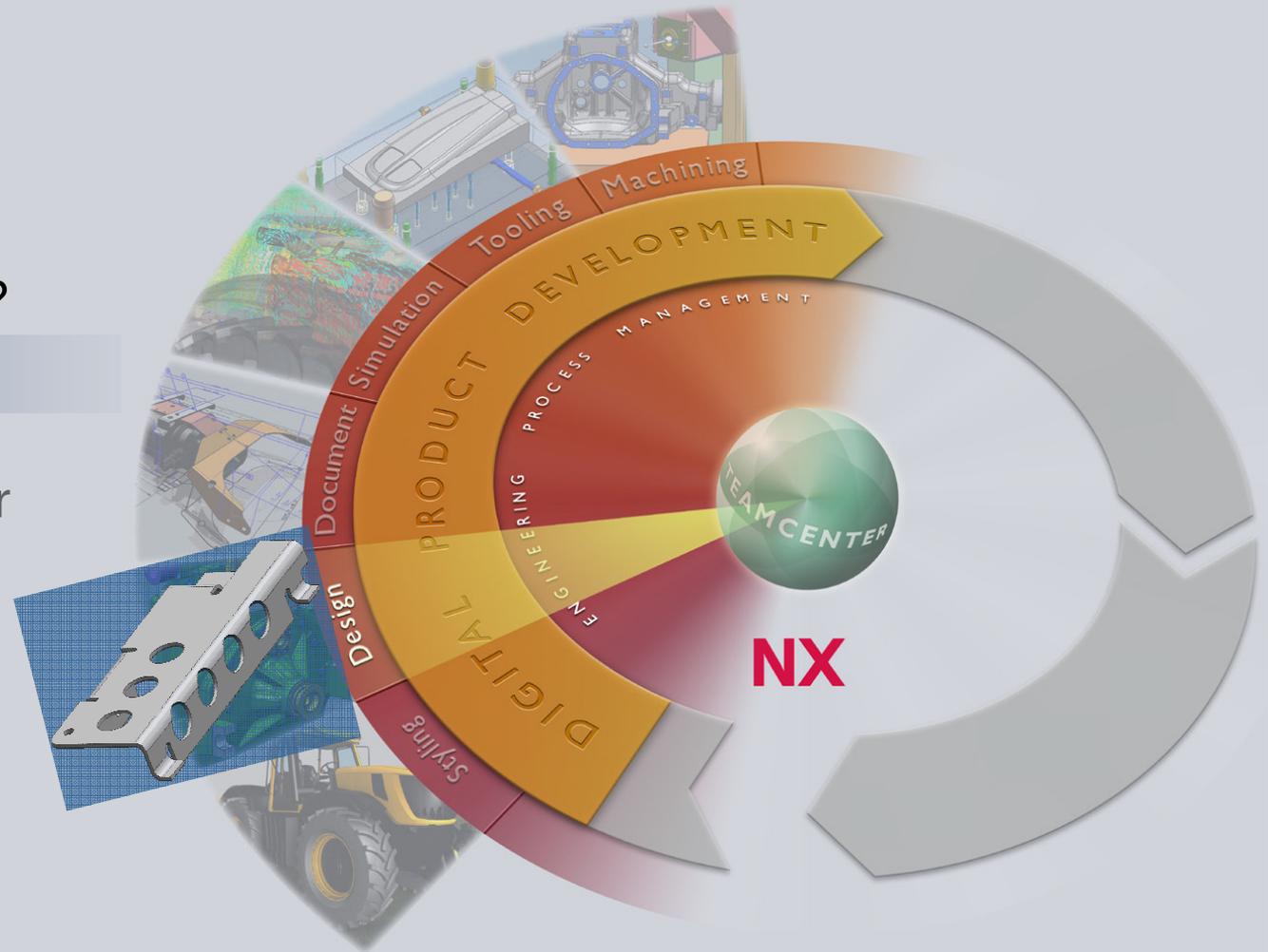
Features between Sheet Metal & Shell nodes being investigated

New workflow identified for tool catalog parts (Extrude instead of Solid Punch)



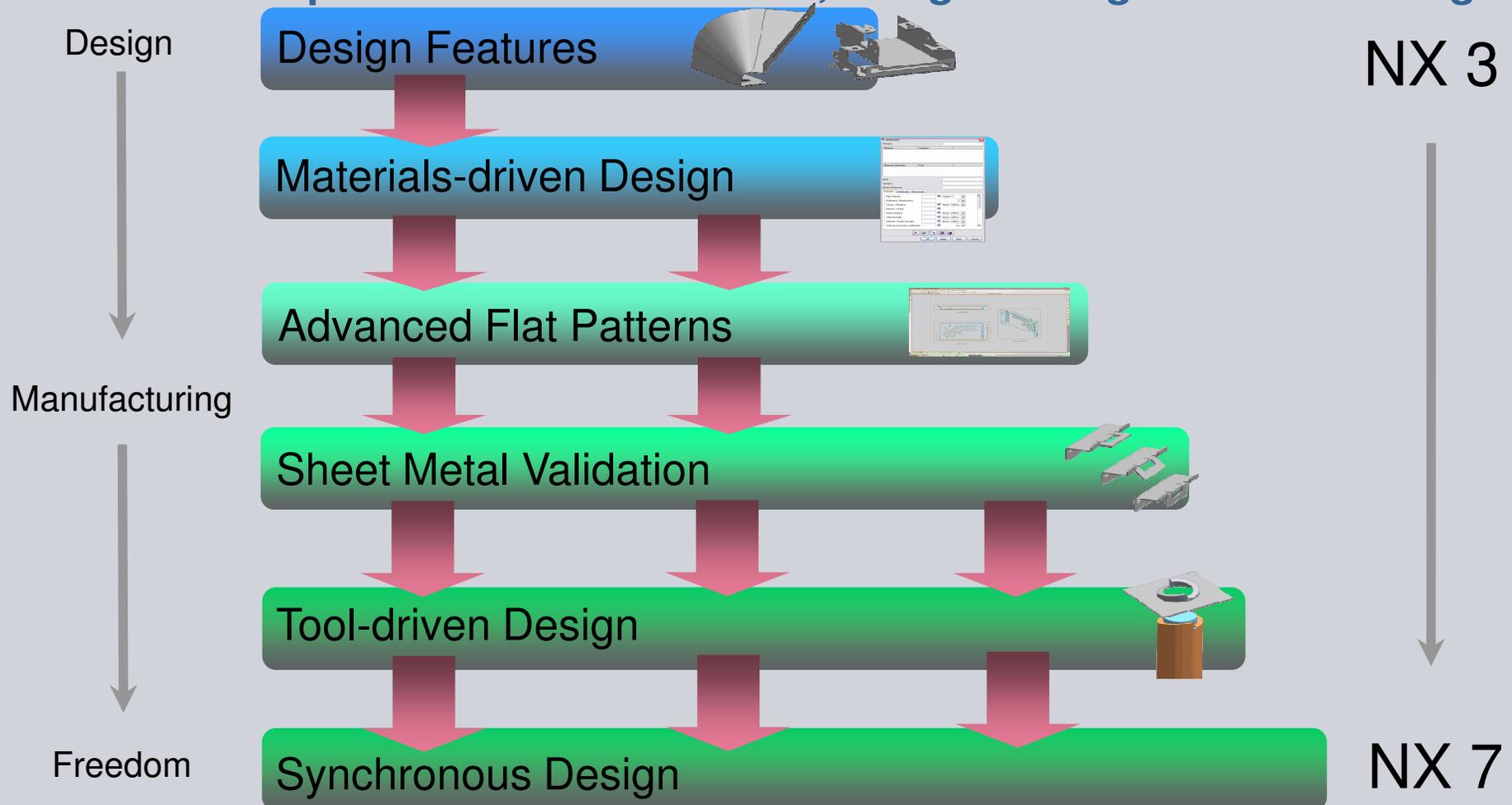
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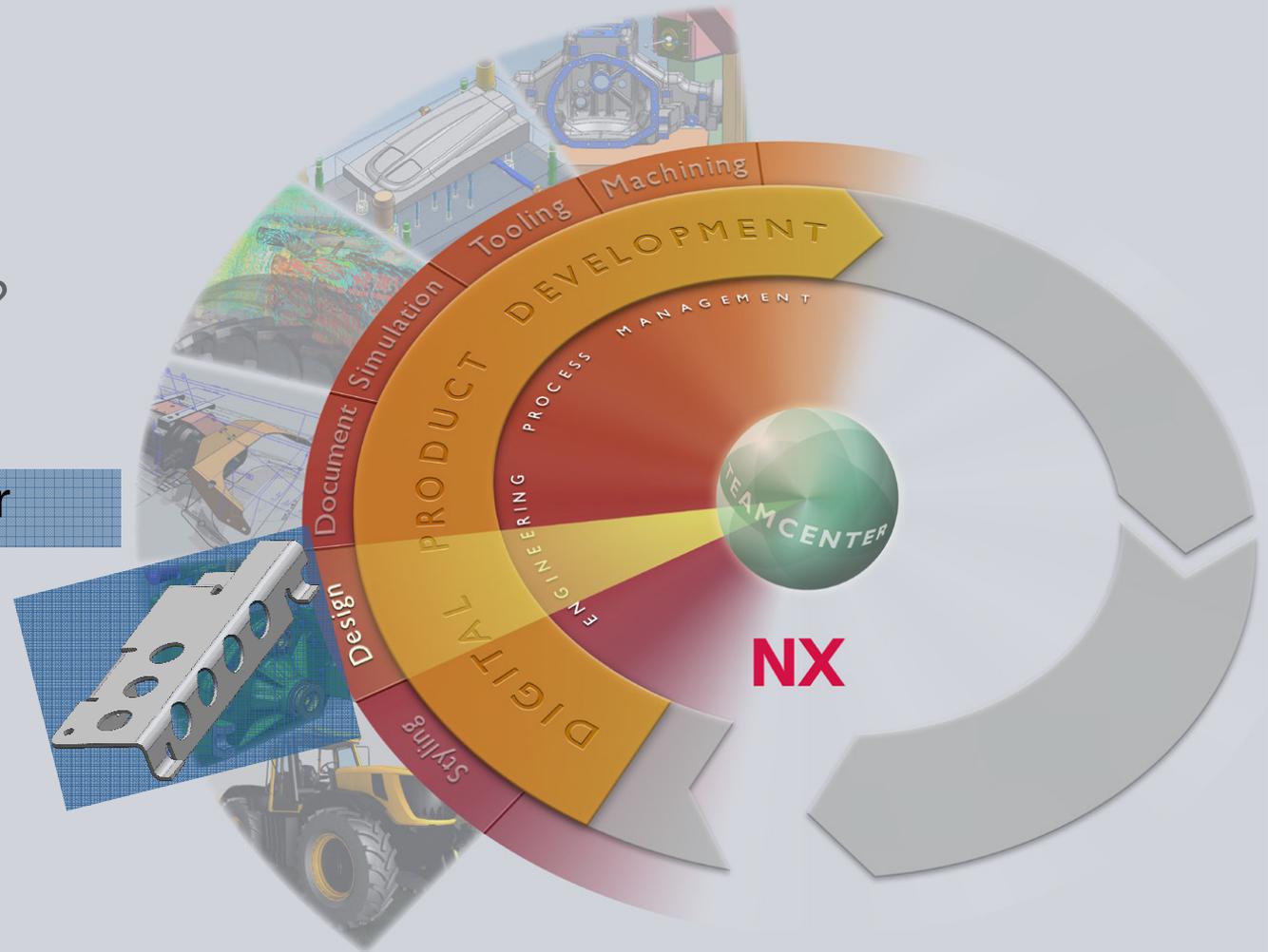
NX Sheet Metal - Vision

The NX Sheet Metal package began with intuitive sheet metal features and will encompass the entire workflow, design through manufacturing...



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Final Items

Beta Testing

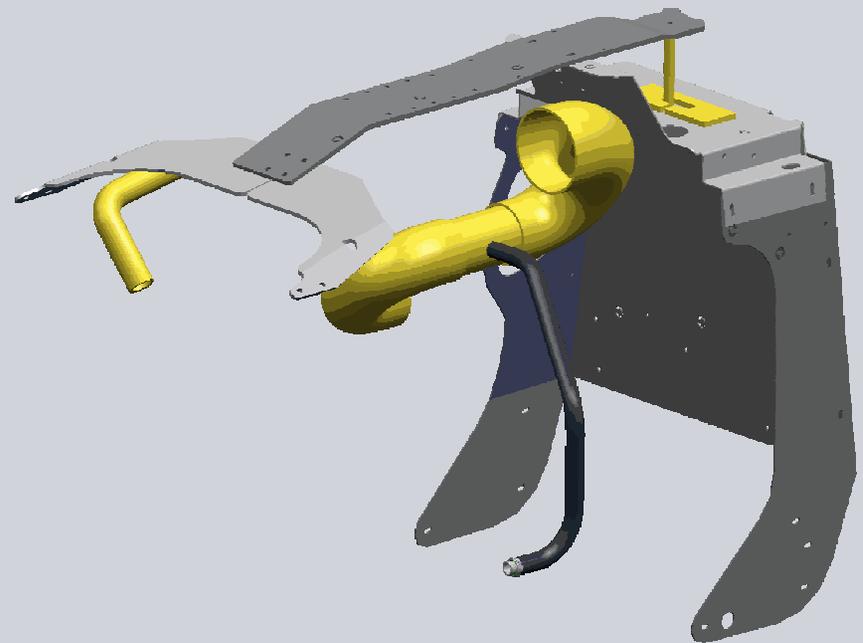
- Contact Ashley Eckhoff for beta testing information
- Sheet Metal-specific –St. Louis, MO
- European testing –Langen, Germany

Courseware

- Official instructor-led course covering NX 3 – 6
- CAST not yet available

NX Sheet Metal Summary

- New features added to NX Sheet Metal (Sheet Metal from Solid, Reliefs, Tapers)
- Improved functionality (non-uniform thickness, segmented Lofted Flange)
- Expanded support for flat patterns and Drafting drawings
- Sheet metal part validation



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Thank you for your attention!

www.siemens.com

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