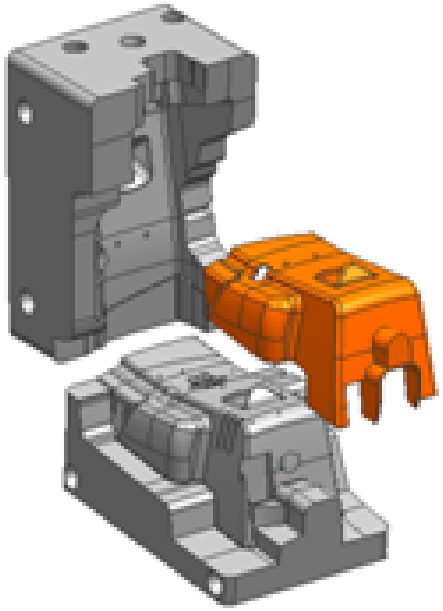

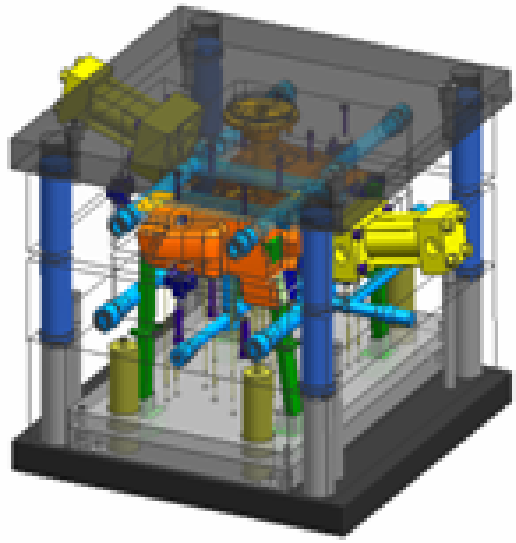

UGS
The PLM Company

NX Mold Design

What's New in NX 4

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Tooling Industry Challenges…

All else being equal, TIME is today's competitive measure

Time

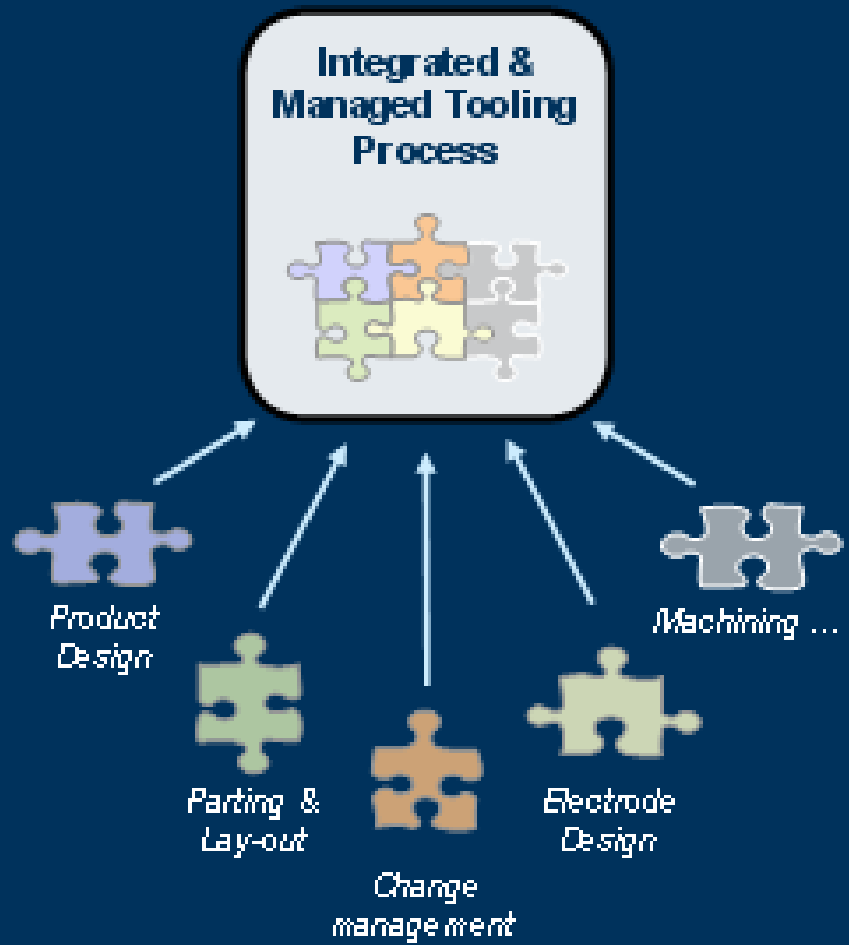
- Reduce design lead time
- Reduce cycle times
- Increase production volume
- Reduce manufacturing / machining time

Cost

- Manage and reduce costs
- Eliminate errors (human and design)

Quality

- Achieve first time quality on increasingly complex parts
- Achieve customer requirements
- Maintain tool design quality
- Maintain product quality

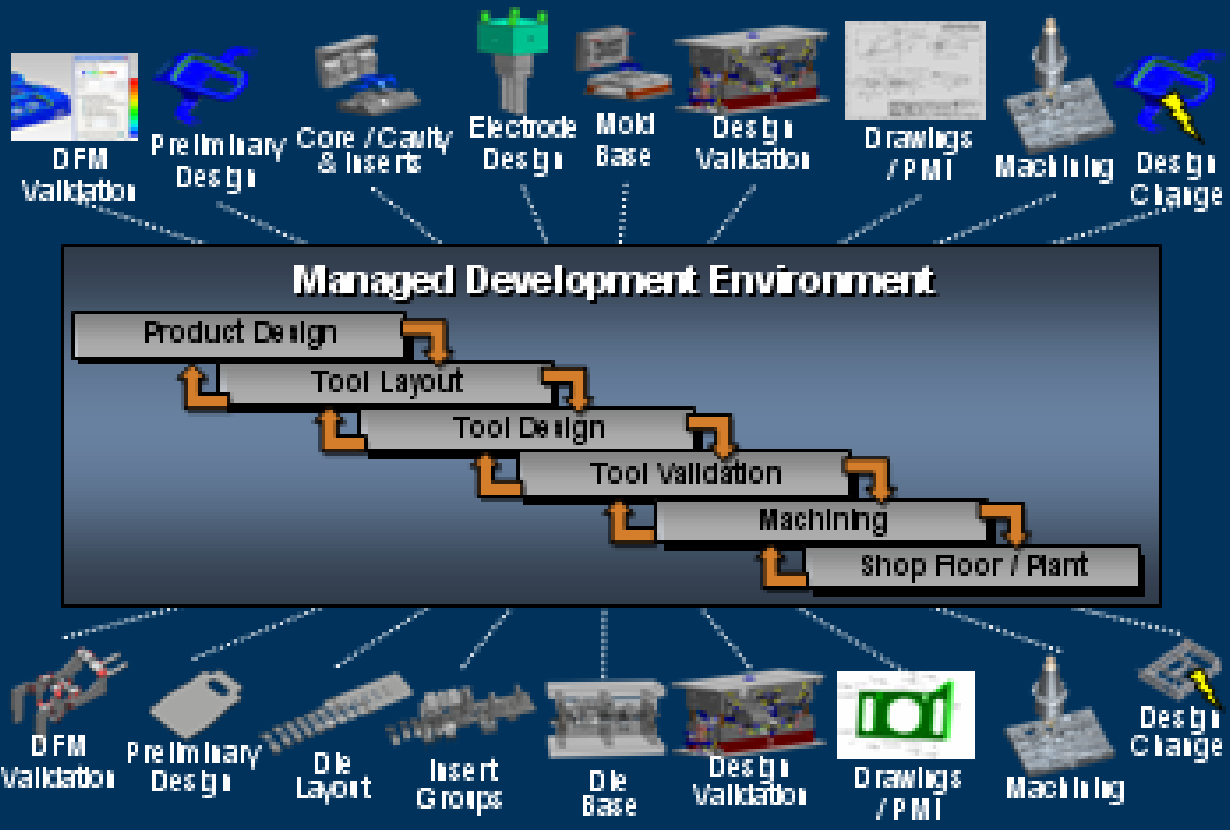


Sources of market challenges:

- *AMBA white paper, "Know the True Cost of Molds: US vs. Offshore"*
- *AMBA white paper, "What can US Mold Builders Do To Compete?"*
- *Market engagements*

Tooling vision

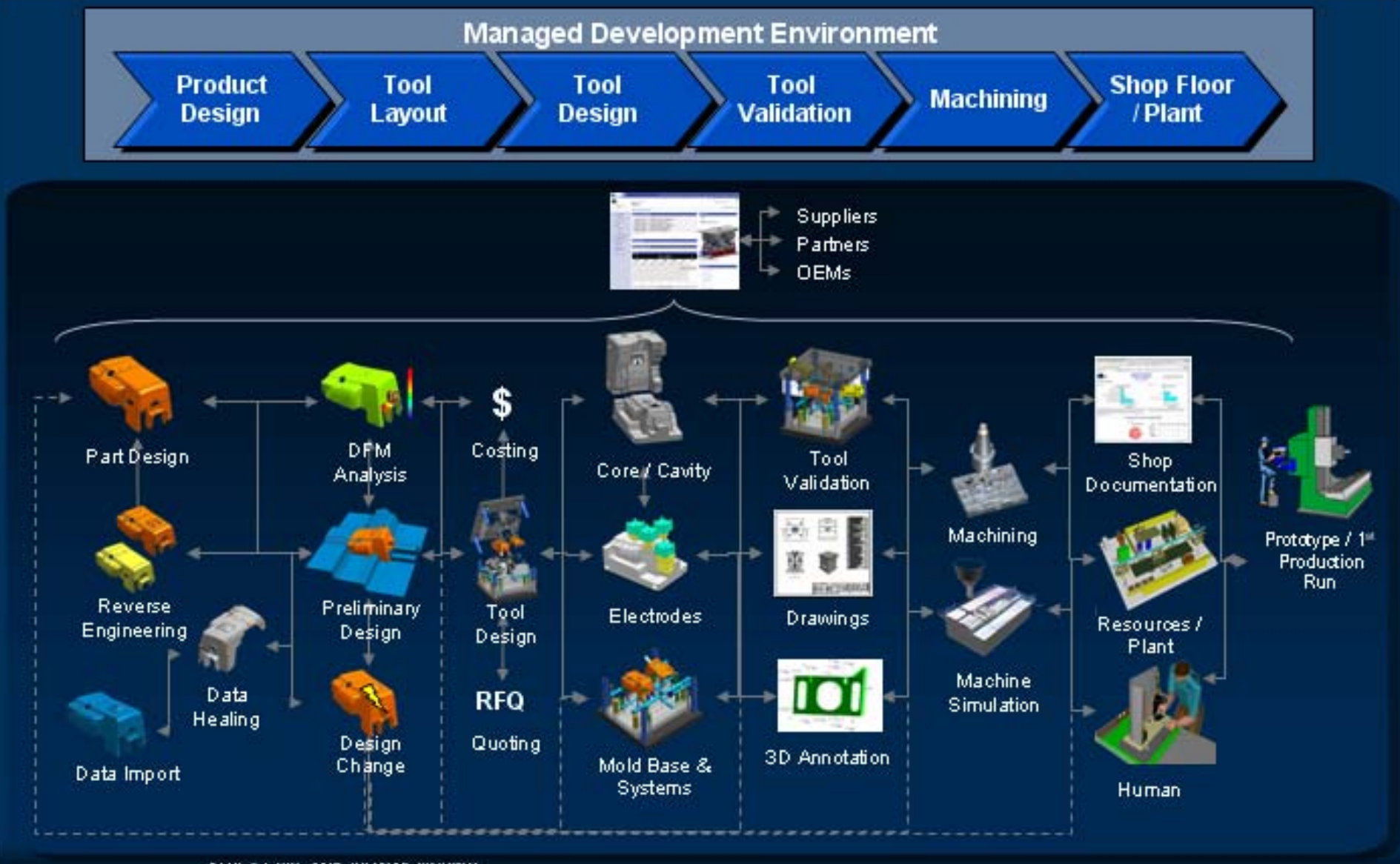
Deliver the most complete and fastest tooling process 'from design to production' through intelligent automation and process integration



Directions

- Usability & productivity
- Data preparation
- Bend definition / forming analysis
- Parting / patching
- Knowledge reuse templates
- Accurate DFM validation
- Managed Development Environment integration
  - Concurrent design
  - Design change management & propagation
  - Process and product data management
- Automatic machining operation selection
- Shop floor integration
- Quick Start Documentation

NX Mold Design Process



NX 4 Mold Design

Workflow Progress Examples

Wall Thickness Validation

I-deas (application w/o wall thickness validation)	3 weeks
NX 3 (enhanced further with NX 4)	1 day

Patching

NX 3	2 hours
NX 4 (new patching tools)	1 hour

Electrode modeling

NX 3 (simple and medium complexity cases)	20 to 80 minutes per
NX 4 (with new electrode capabilities)	50% or greater reduction

Electrode Interference Checking

New workflow with NX 4	Design quality checking Machining quality checking

NX Mold Design

Directions

- Improved integration within Managed Development Environment, and concurrent team design
- Streamlined design process and ease of use
- Validation for manufacturability

NX 4 Projects

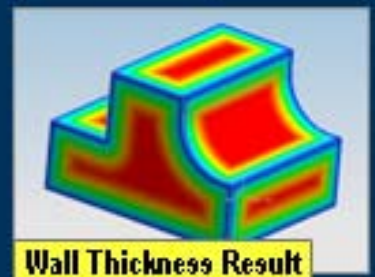
- Improved documentation with Tutorial
- Parting automation and enhancements
- New patch tools – bounding and trim box
- Enhanced 'Edge Patch' function
- Pocket / Thread hole improvement
- Ejector pin design improvement
- Wall thickness – new algorithm for maximum rolling ball
- Instance array & point pattern positioning
- Improved defaults & preferences
- Drawings – hole report
- MDE: Teamcenter Engineering integration
  - Library integration & part family support
  - Concurrent design within MDE
- **Electrode design – new add-on module

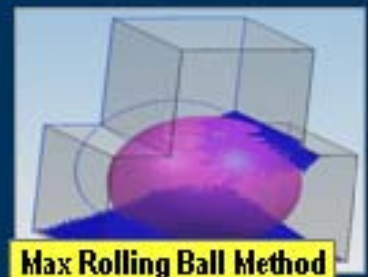

Ribbon Parting Surface


Tangential Parting Surface


Bounding Box


Trim Box


Wall Thickness Result


Max Rolling Ball Method


Electrode Design

NX Mold Design Documentation

"Quick Start" Tutorial

Directions

- Enable customers to more easily learn and accomplish the essential / foundation mold design tasks
- Provide entry level mold design competence through documentation such that instructor-led training becomes more tailored to advanced customer workflows

NX 4 Projects

- Provide process-based and task-oriented documentation for Mold Design
- Incorporate hands-on examples

Table of Contents

Parting Automation and Enhancements
Mold Design

Capabilities

- Parting enhancements
  - Improve overall parting definition by combining color region and automatic parting methodologies
  - Ribbon parting surface
    - Used in consumer products and molds for plastic parts
  - Tangential parting surface
    - Prevalent in automotive mold design
  - Redesign parting segment method

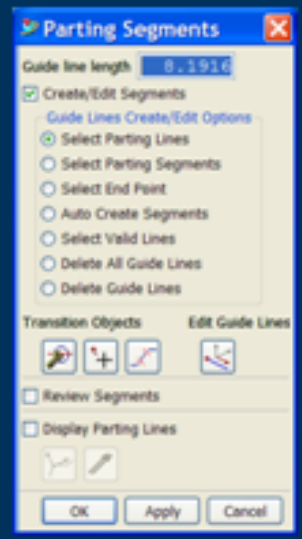
Why is it important to you?

- Delivers improved usability for parting creation of complex parts
- Greater flexibility with additional methods to achieve parting surface creation
- Speeds cove / cavity preparation and design
- Guided assistance for complicated geometric cases

Ribbon Parting Surface

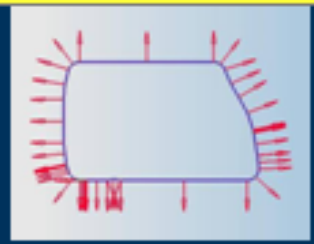
Tangential Parting Surface

Improved Dialog



Parting lines segment and guide creation

Flow direction automatically generated and displayed based on eject direction



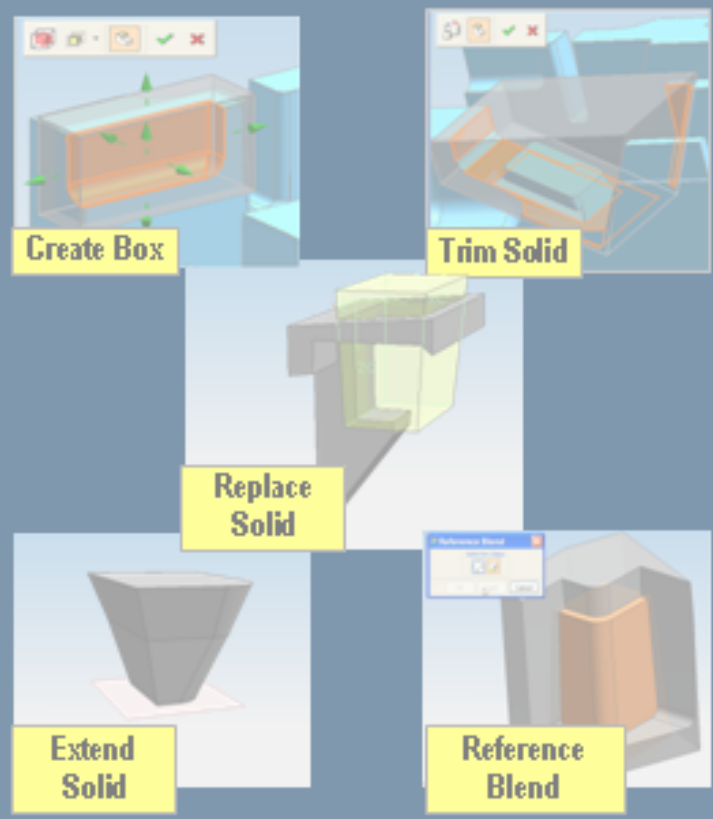
New Patch Tools
Mold Design

Capabilities

- Create Box
  - Quickly generate a box of appropriate size for patching
- Trim Solid
  - After box is defined and trimmed, the box size can be dragged to fill desired space while maintained it's trimmed shape
- Replace Solid
  - Define a box based selecting boundary faces
- Extend Solid
  - Extend the size of a box by dragging its faces to the appropriate size
- Reference Blend
  - Add blends to boxes by referencing blend on the part

Why is it important to you?

- Accelerate patching workflows for preliminary design
- Improved usability and incorporation of NX interaction model

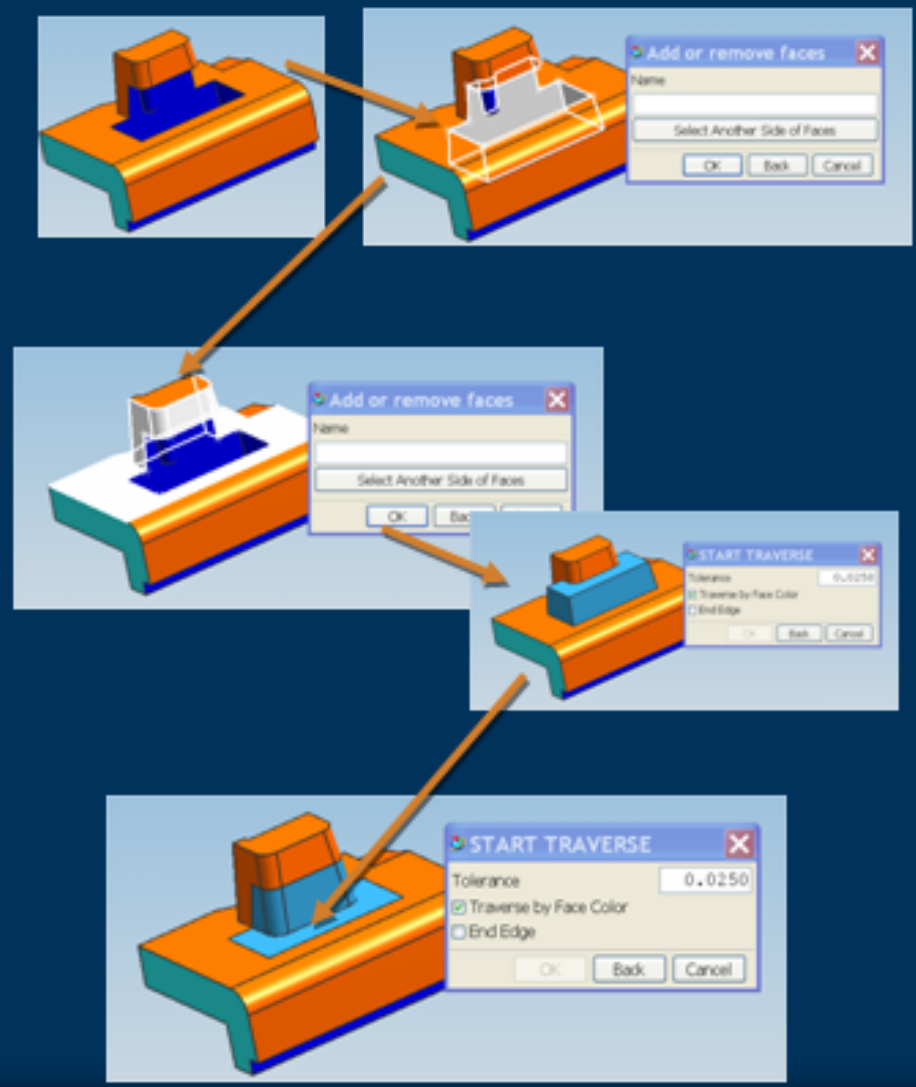


Enhanced 'Edge Patch' Function

Mold Design

Capabilities

- Enhanced 'Edge Patch' Function
  - Select entire patching region based on edge boundary and face color rule
  - Automatically trims patch solid to based on surrounding trim faces



Why is it important to you?

- Accelerate patching workflows for preliminary design
- Improved usability and incorporation of NX interaction model

Pocket / Threaded Hole Improvement
Mold Design

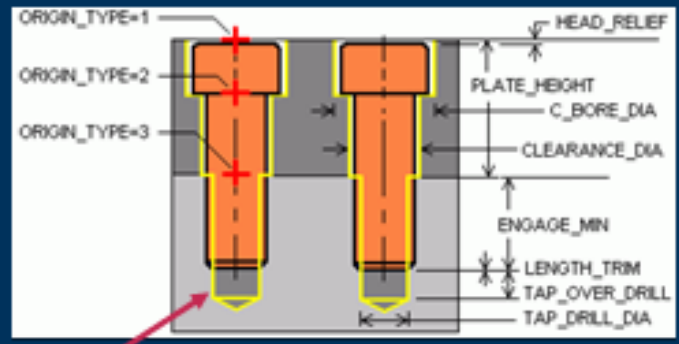
Capabilities

- Automatically specify and add correct symbolic thread to pockets
  - Rules-based spreadsheet search tap drill diameter
  - Symbolic thread applied to corresponding pocket faces based on attributes
- Enhanced ability to define thread information in thread spreadsheet
- Enhanced ability to leverage both English and Metric thread units in the same NX session
  - Merged thread spreadsheets into single file: thread_standard_dat.xls

Why is it important to you?

- Accelerate workflows for designing the mold base and components

Screw template & data file
var.prt & var.xls

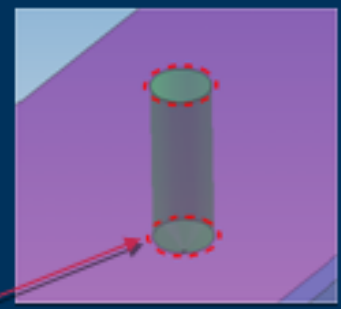


Setting of FALSE body
Face attribute:
MW_HOLE_THREAD

Expression of drill diameter:
TAP_DRILL_DIA

TAP_DRILL_DIA
<UM_VAR>::SCREW_TAP_DRILL_DIA_4
<UM_VAR>::SCREW_TAP_DRILL_DIA_5
<UM_VAR>::SCREW_TAP_DRILL_DIA_6
<UM_VAR>::SCREW_TAP_DRILL_DIA_8
<UM_VAR>::SCREW_TAP_DRILL_DIA_10
<UM_VAR>::SCREW_TAP_DRILL_DIA_12
<UM_VAR>::SCREW_TAP_DRILL_DIA_16
<UM_VAR>::SCREW_TAP_DRILL_DIA_20

When the pocket is cut, the TAP_DRILL_DIA value is read from the screw and the appropriate thread parameter is applied to the symbolic thread (based on predefined / configurable spreadsheet values)



thread_standard_dat.xls

Enhanced Ejector Pin Workflow

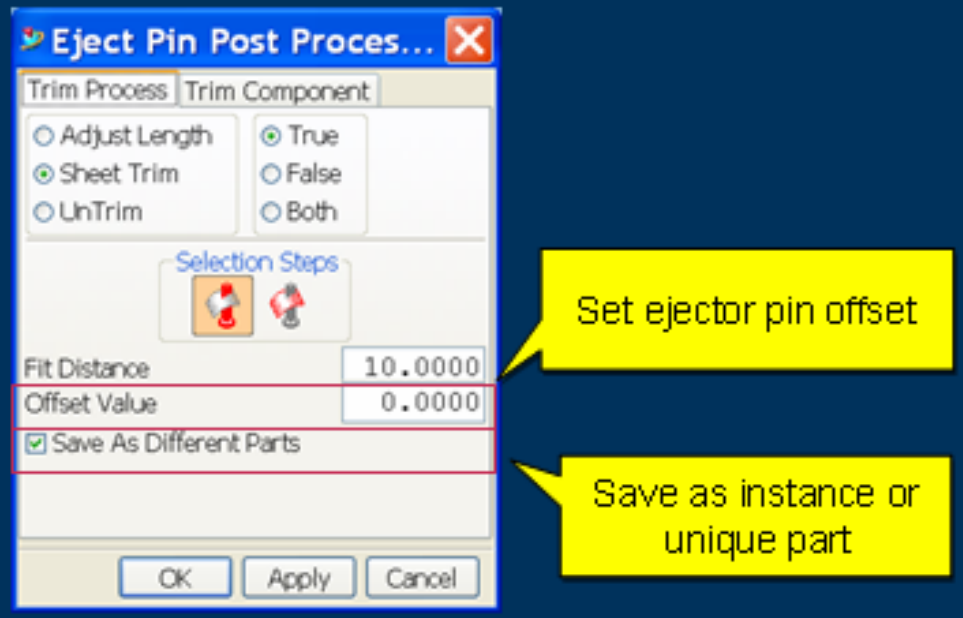
Mold Design

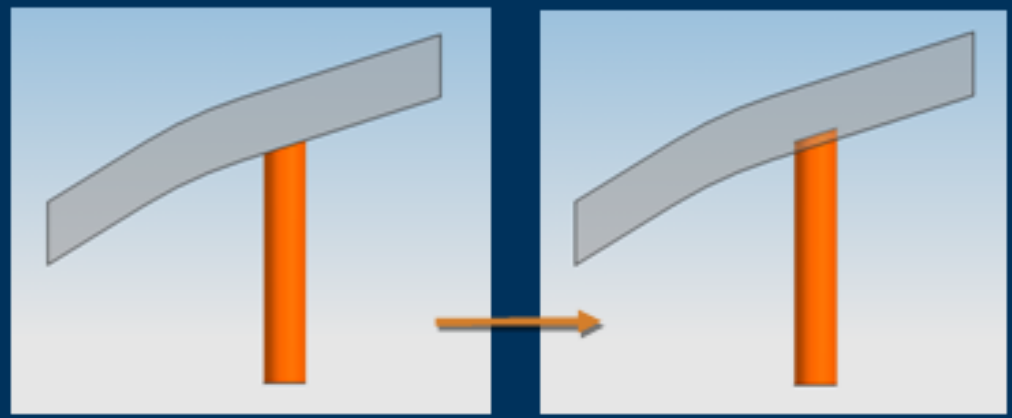
Capabilities

- New dialog option provides ability to specify pin offset distance
  - Can be applied in both positive and negative directions
- Option to save ejector pin as a unique component or new part

Why is it important to you?

- Accelerate workflows for designing the mold base and molding components





offset value applied

Wall Thickness Validation

New Algorithm

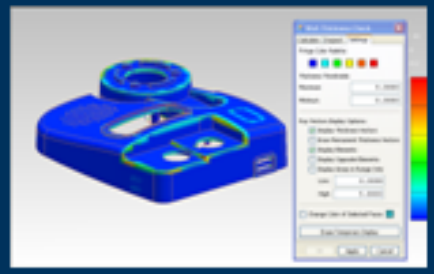
Capabilities

- Calculate wall thickness
  - Display wall thickness in color spectrum, ray lines
  - High performance
  - Precise results
- Find manufacturing features (wire cut, EDM, HSM)
- Added new optional method:
  - Maximum radius rolling ball method
  - The thickness at a point on a face of the part body is defined as the diameter of the largest possible ball inside the part model touching at that point
  - Method takes full advantage of the existing results reporting tools and options

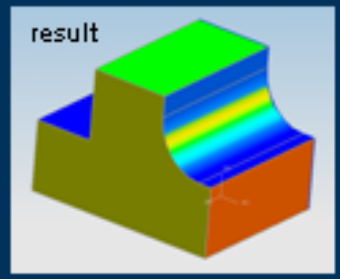
Why is it important to you?

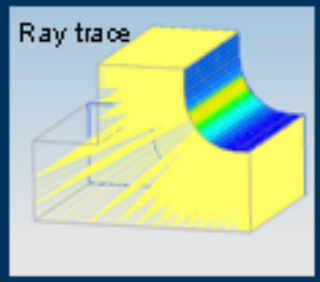
- Move the manufacturing awareness to the front of the design process, which reduces costs and re-design time
- Useful for plastic part and casting part design processes
- Improve product design quality
- Assist in lost-foam mold design process

Wall Thickness Check

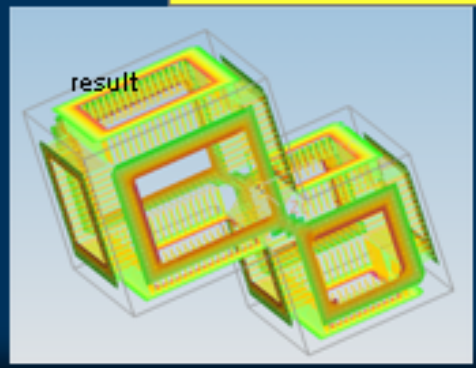


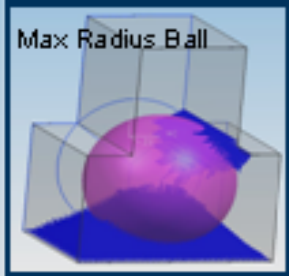
Normal Ray Trace – exiting method





Maximum Radius Rolling Ball



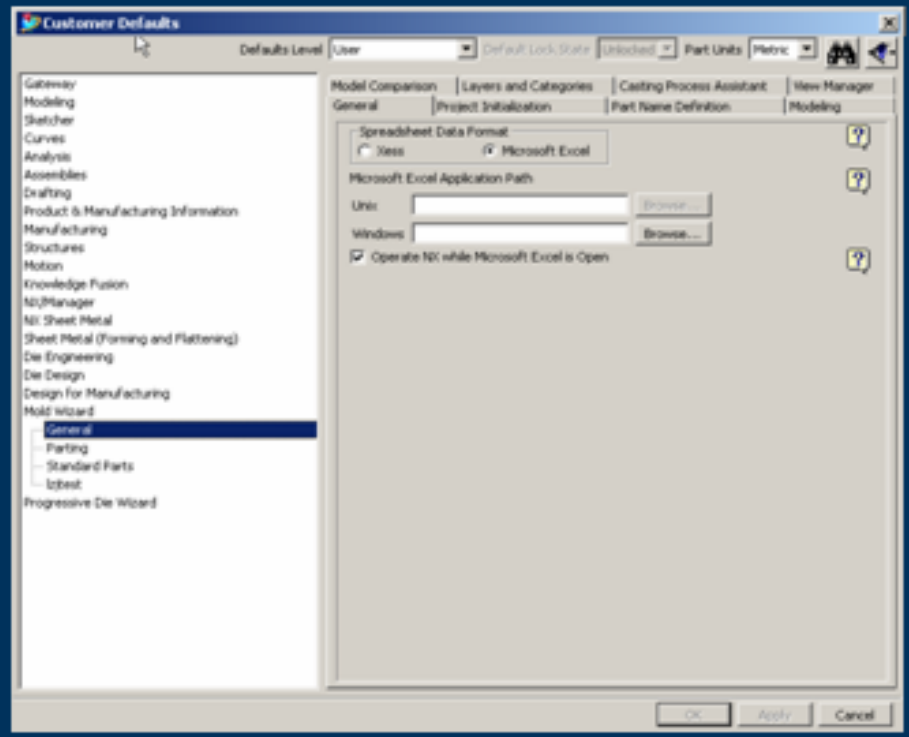


Defaults and Preferences

Mold and Progressive Die Design

Capabilities

- Now manages Mold Wizard and Progressive Die Wizard defaults and preferences
  - Previous .def files converted into .dpx files
- More control for implementing site-wide standards and preferences
- Three levels of settings (site, workgroup, user)
- Searching capabilities
- Help provided for settings



Why is it important to you?

- Improved version-up, searching, and privilege management capabilities
- Improved help

Hole Report / Drawing Workflow

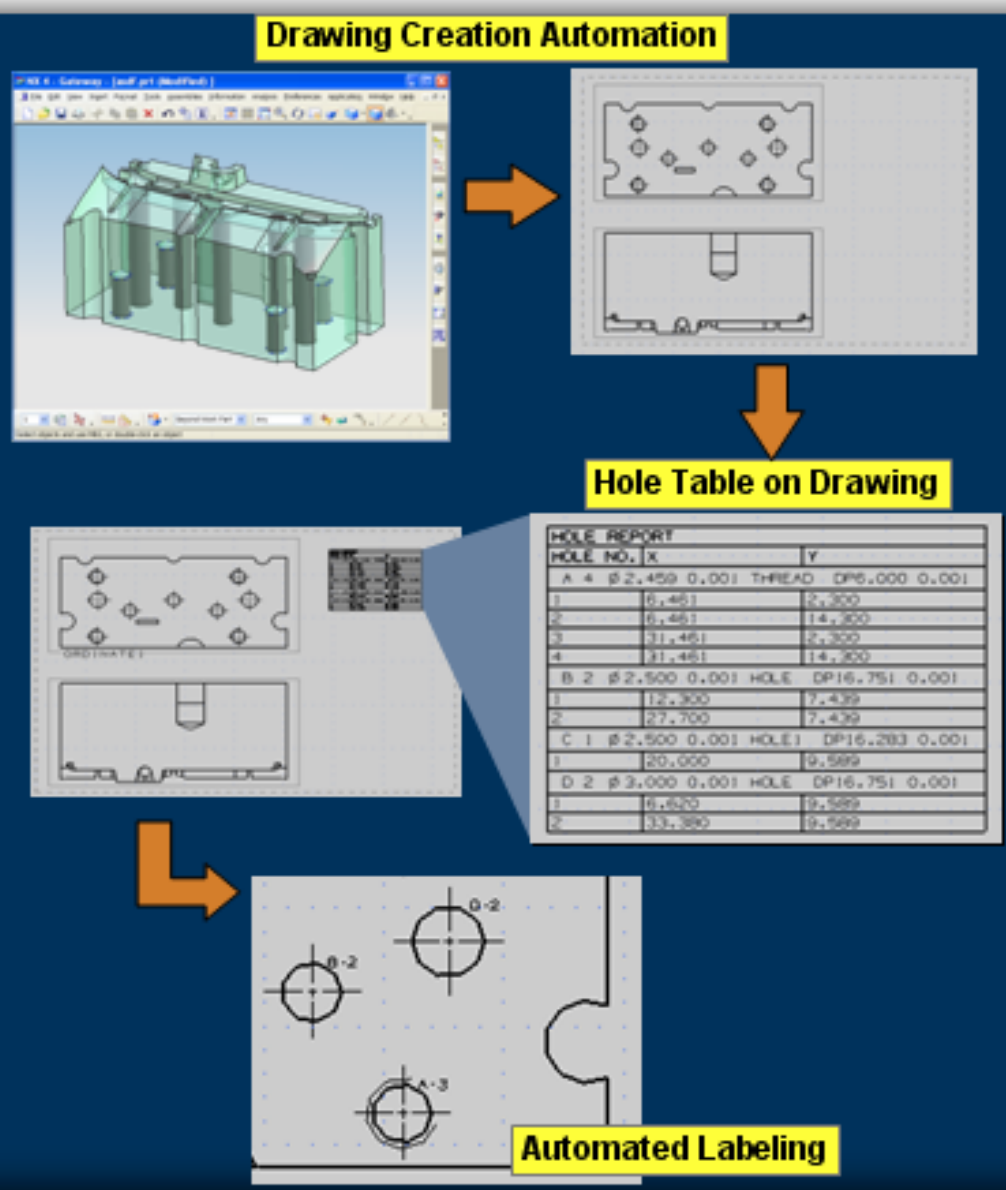
Mold and Progressive Die Design

Capabilities

- Recognize holes in unparameterized models
- Recognizes
  - threaded holes
  - blind holes
- Customizable hole report content
- Ordinate origin definition
- 4 quadrant dimensioning

Why is this important to you?

- Generate hole report completely and easily



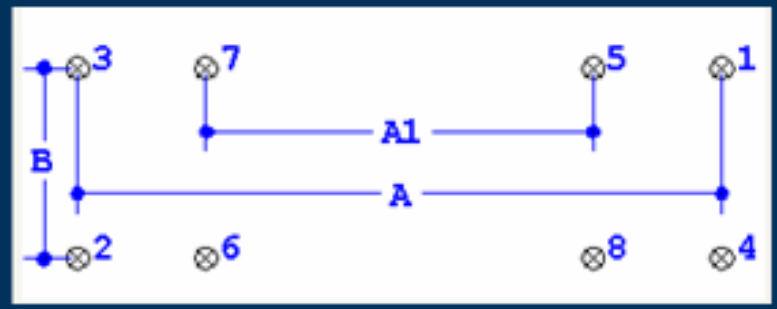
Point Pattern

Mold and Progressive Die Design

Capabilities

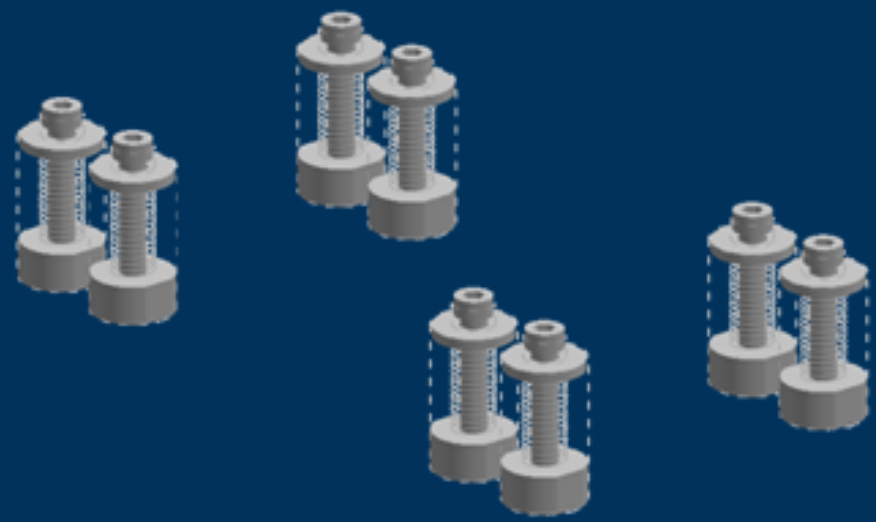
- Provides 15 commonly utilized OTB point pattern layouts
- Insert any standard part according to above pattern
- Customizable point patterns and catalog storage

Point Patterns for Insert Positioning



Why is this important to you?

- Easily add a group of standard parts to a pattern
- Speed up design
- Provides lighter weight of assemblies (create instance vs. multiple components)



Instance Array

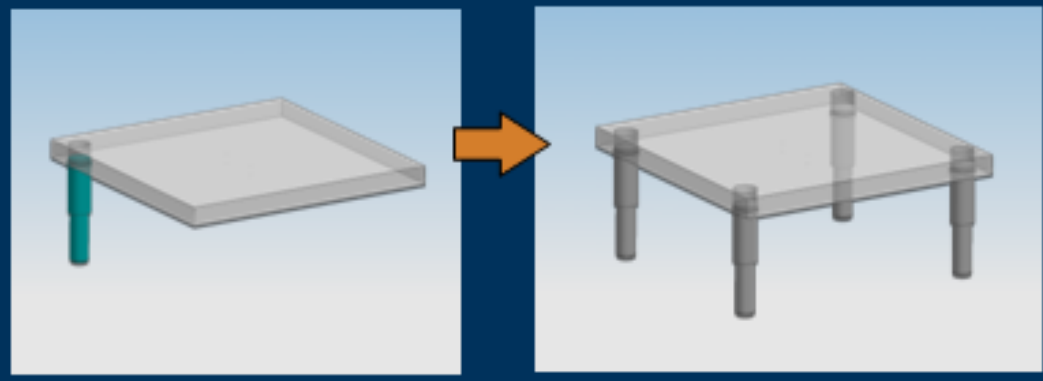
Mold and Progressive Die Design

Capabilities

- Design components according to circular array or rectangular array
- Edit insert array
- Delete array or individual component

Why is this important to you?

- Only need to design one component for an array
- Improve design efficiency
- Easy to make changes
- Lighter weight of assembly



Ejector Pin Design

Instance Array

MDE: Tooling Database Integration

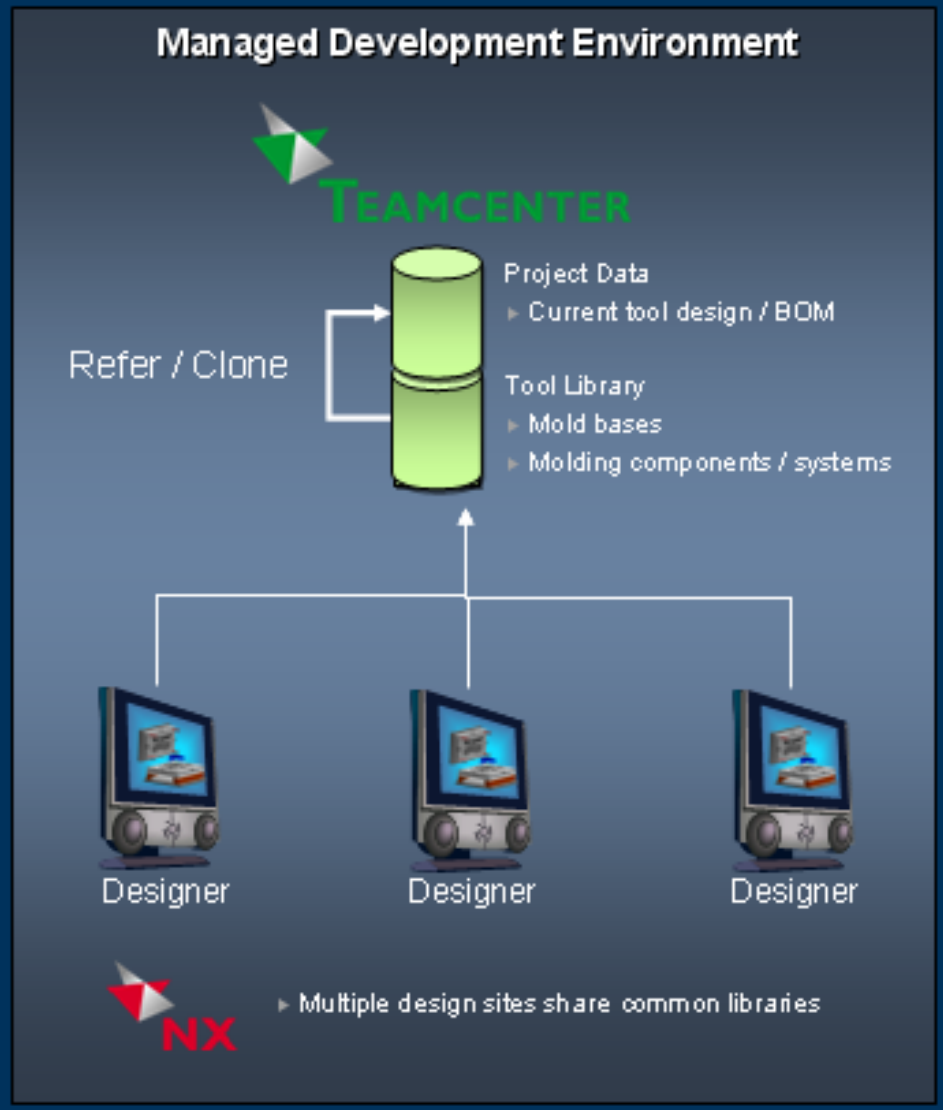
Mold and Progressive Die Design

Capabilities

- NX tooling database now supported within Teamcenter library
  - Mold and die bases
  - Standard mold and die components / systems
- New workflows:
  - Refer to:
    - Tool project references Teamcenter library component (no new part number for project BOM)
  - Clone:
    - Teamcenter library component copied into tool project (unique part number created within tool project BOM)

Why is it important to you?

- Provides ability to tool project follow corporate part numbering standards
- Enables distributed sharing of common tooling components and systems within the Teamcenter Engineering environment



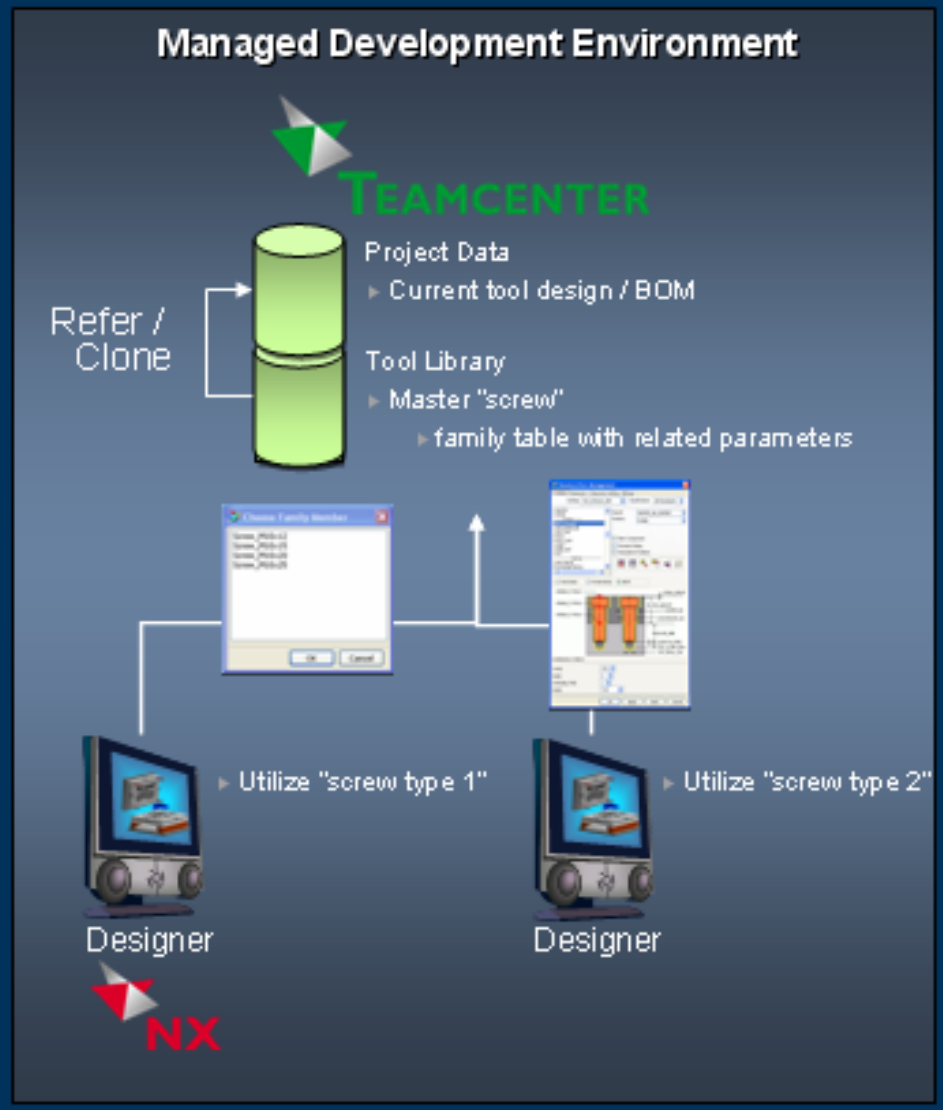
MDE: Part Family Support
Mold and Progressive Die Design

Capabilities

- Tooling database / part families now supported within Teamcenter library
  - "Master" component (parameter table embedded within component file) stored within Teamcenter Engineering library
  - User can refer or clone family member into project
- Standard

Why is it important to you?

- Enables ability to manage libraries of similar components / systems



MDE: Concurrent Tool Design

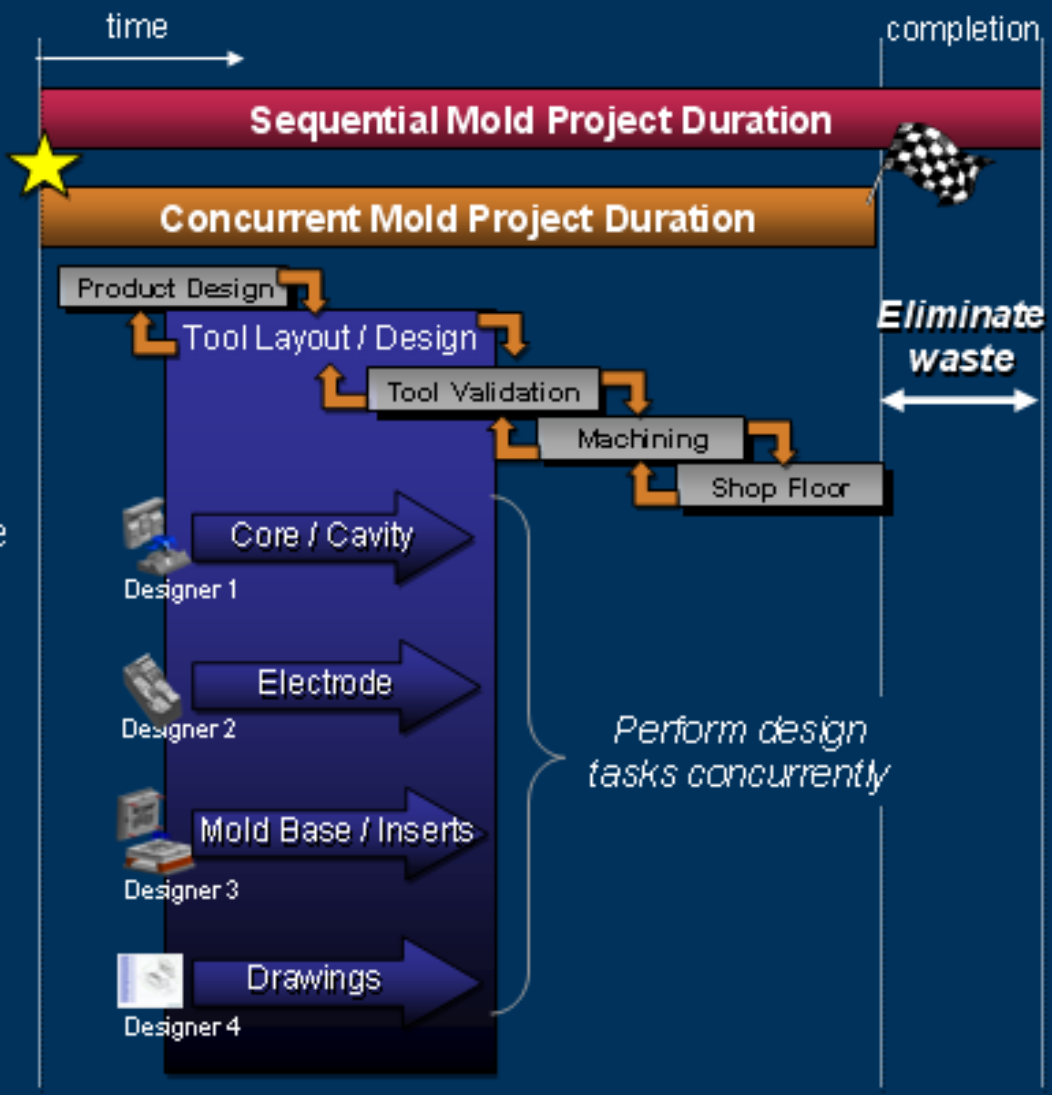
Mold Design Best Practice Example

Capabilities

- Team of several designers can simultaneously work on the same mold assembly
- Sub-assemblies representing different aspects of the mold tool can be distributed using WAVE
- Teamcenter Engineering integration
  - Locking mechanisms that prevent more than one user from making modifications to the same part file at the same time
  - Check who holds locks on part files
  - Track revisions / related information
  - Leverage workflow for design release approval, process and data access control

Why is this important to you?

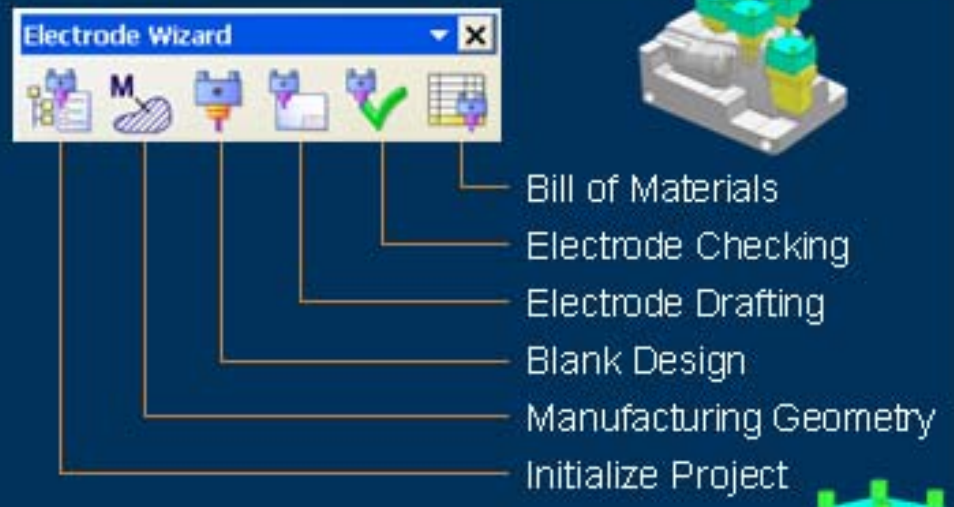
- Provide new capability to enable mold designers to implement concurrent design in order to shorten project delivery time



Electrode Design

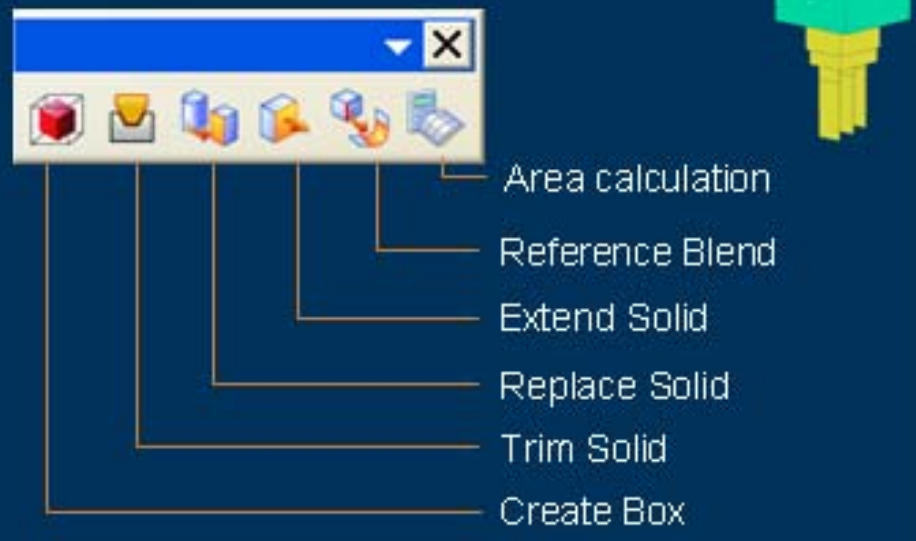
Capabilities

- Electrode Design Module
  - Project and process support
  - Blank design
  - Automation of assembly, drawing, BOM
  - Interference / clearance checking
- New design tools that support electrode sparking head / working area modeling



Why is this important to you?

- Optimized electrode design process
- Enables quick establishment of reference points, body, direction for electrode design
- Quickly create electrode blank



"The new NX 4 electrode design capabilities provide the breadth of integrated tools necessary for the electrode design process."
Takahiro Maruyama, Chief Tool Design and Manufacturing Engineer, Shonan Design Co., Ltd

Thank you.