

# NX 4 Electrode Design

## New Add-on Module and Enhancements

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Product Manager: Aaron Frankel



# Tooling Industry Challenges...

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



## Time

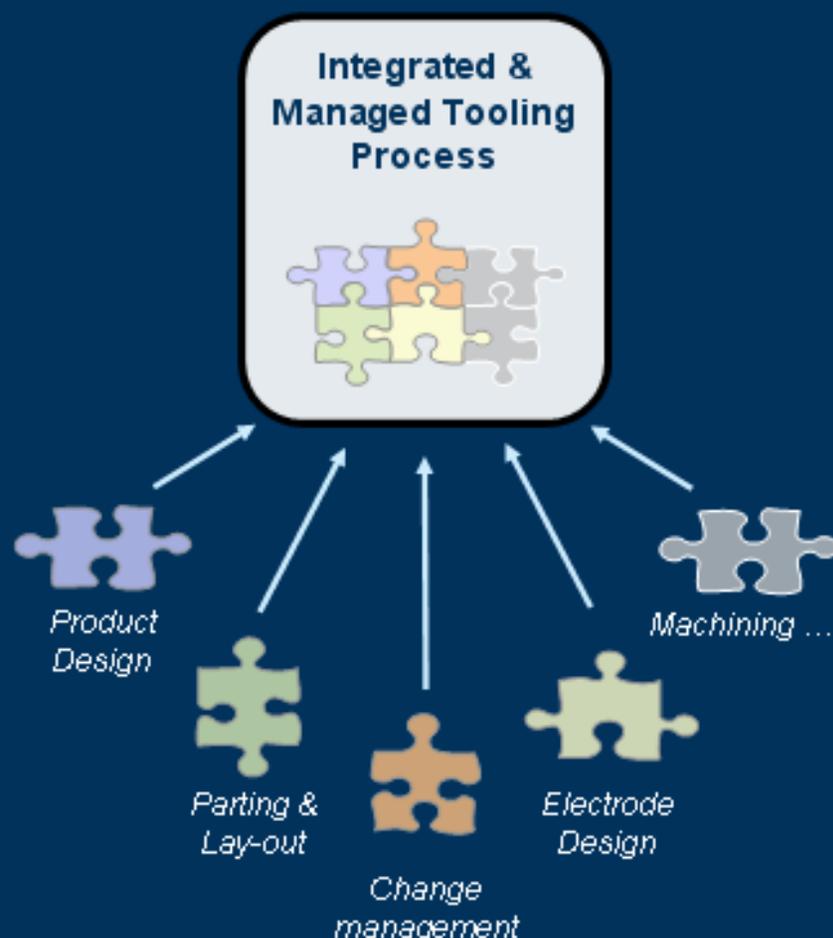
- ▶ Reduce design lead time
- ▶ Reduce cycle times
- ▶ Increase production volume
- ▶ Reduce manufacturing / machining time

## 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



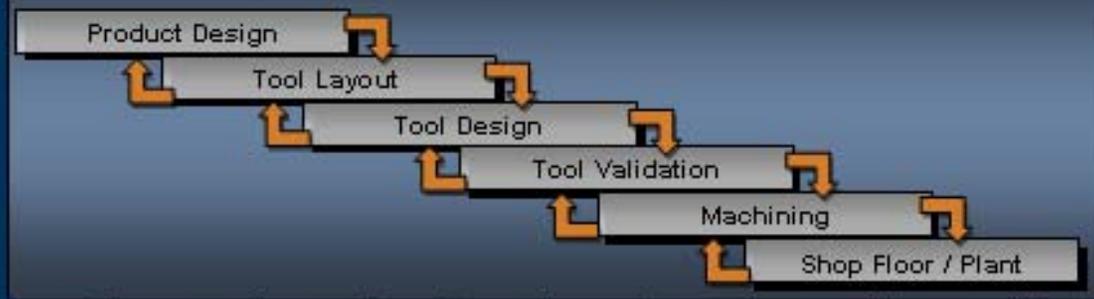
# Tooling vision



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



## Managed Development Environment



## 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



# Electrode Design Process Overview

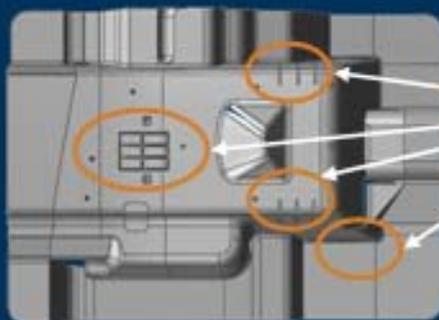


***NX 4 Electrode Design un-complicates and accelerates designing electrodes with a step-by-step process:***

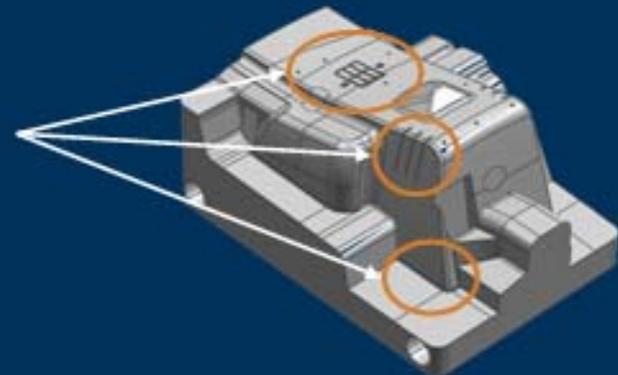
- Integrate mold design, electrode design, and machining*
- Automate design tasks and reuse knowledge*
- Rapidly perform design changes with associativity*
- Validate and guarantee the design*

***“The new NX 4 Electrode Design product provides the breadth of integrated tools necessary for the electrode design process.”***

*Takahiro Maruyama, Chief Tool Design and Manufacturing Engineer,  
Shonan Design Co., Ltd*



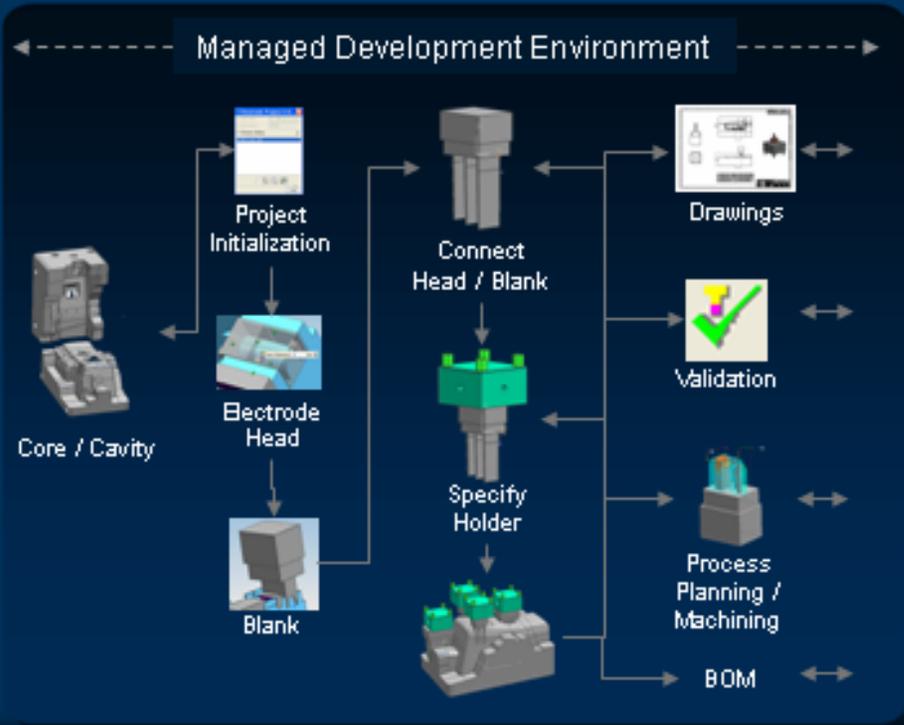
**EDM  
Features**





# NX 4 Electrode Design

## NX 4 Electrode Design Add-on Module



## Process Solution

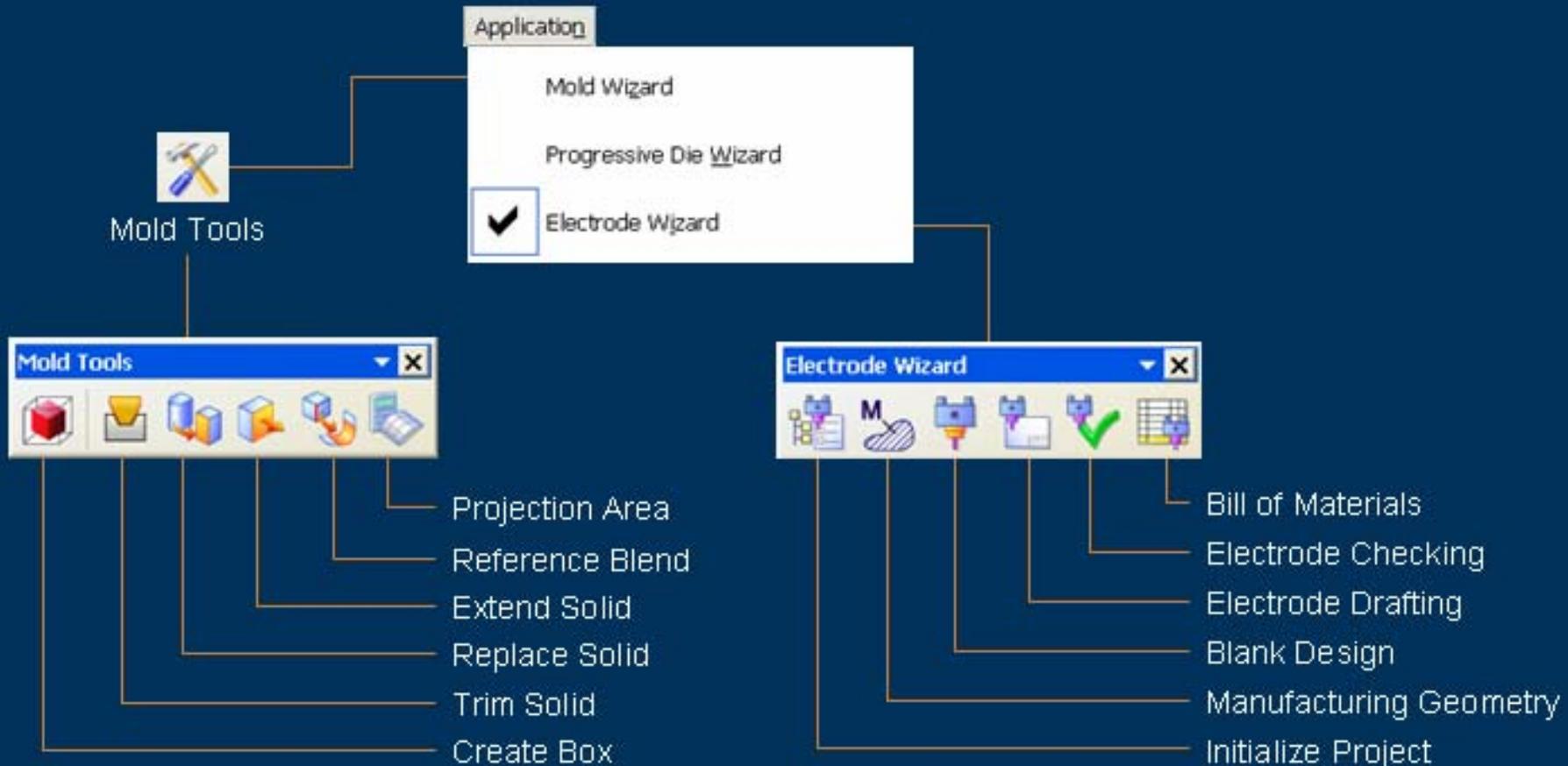
- ▶ Project definition
- ▶ Concurrent team design
- ▶ Customization and reuse capabilities
- ▶ Sparking area design
- ▶ Blank & holder design
- ▶ Design checking
- ▶ Drawing creation / automation
- ▶ BOM creation / automation
- ▶ Direct machining automation
- ▶ Teamcenter integration
- ▶ [Step-by-step tutorial \(NX 4.0.1\)](#)

- ▶ **Design electrodes within a team concurrently**
- ▶ **Associativity within the mold / electrode process**
- ▶ **Automate drawing and BOM creation**
- ▶ **Tools to guarantee electrode design**
- ▶ **Associative Mold design and CAM integration**

***“UGS has satisfied a wealth of requirements that enable a flexible and fully capable electrode design process.”***  
*Takahiro Maruyama, Chief Tool Design and Manufacturing Engineer, Shonan Design Co., Ltd*



# NX 4 Electrode Design Features



**Electrode Working Area Design**  
(new and enhanced features with NX 4)

\*\*also available with NX Electrode Design

**Electrode Design Process Automation**  
(new add-on module with NX 4)



# Mold Wizard Electrode Features

## Integrated Tools for Designing Electrodes

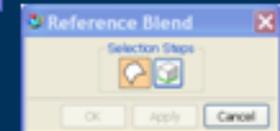
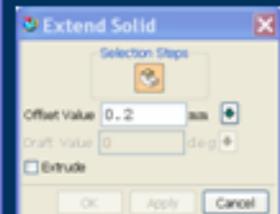
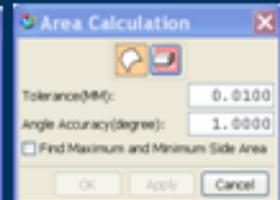
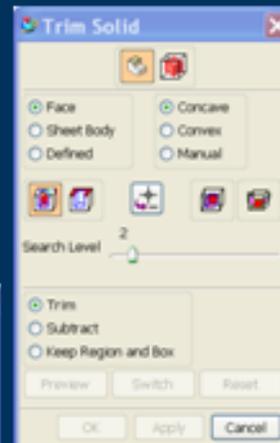
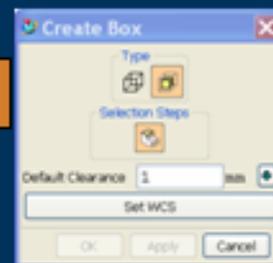


- ▶ Mach 3 Mold Design (includes Mold Wizard) contains the following functions useful for electrode design:

**Pre-NX 4 Mold Wizard**  
(blank design & sparking head trim)



**NX 4 New Functions Added to Mold Wizard**  
(sparking head design & projected area calculation)





# NX 4 Electrode Design

## Process Automation



### Initialize Project (create design setting)\*

- ▶ Create electrode project, machine setting (MSET), working coordinate system (WCSYS), and create links to working objects\*

### Manufacturing Geometry

- ▶ Add CAM attributes for downstream tooling

### Sparking Head Design

- ▶ Add CAM attributes for downstream tooling

### Blank Design

- ▶ Create blanks and add electrode heads

### Electrode Checking

- ▶ Check for touch points and interference, calculate burn areas

### Electrode Drafting

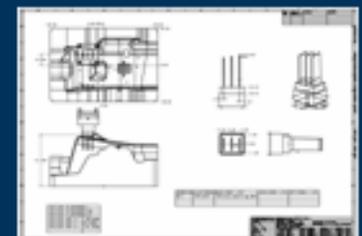
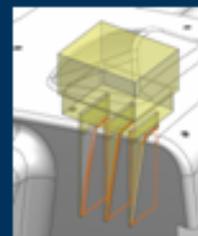
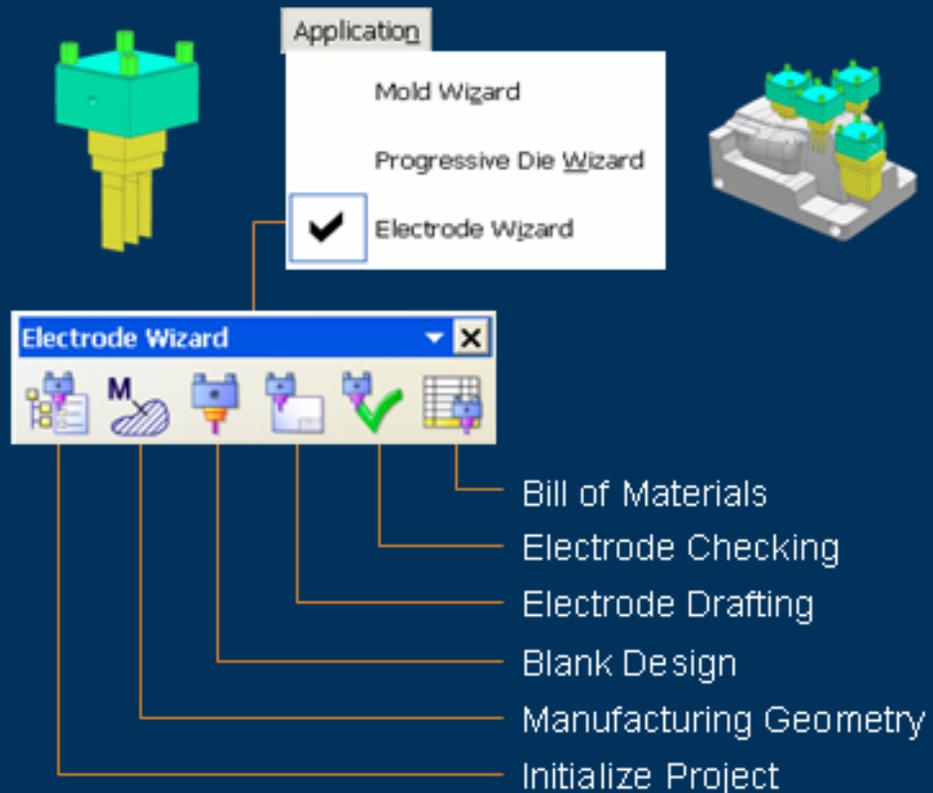
- ▶ Create a multi-view layout and detail electrode geometry

### BOM

- ▶ Automate generation and management of BOM

### Direct Machining of Electrodes

- ▶ Associative machining and automated set-up



\*Design setting enables concurrent development.



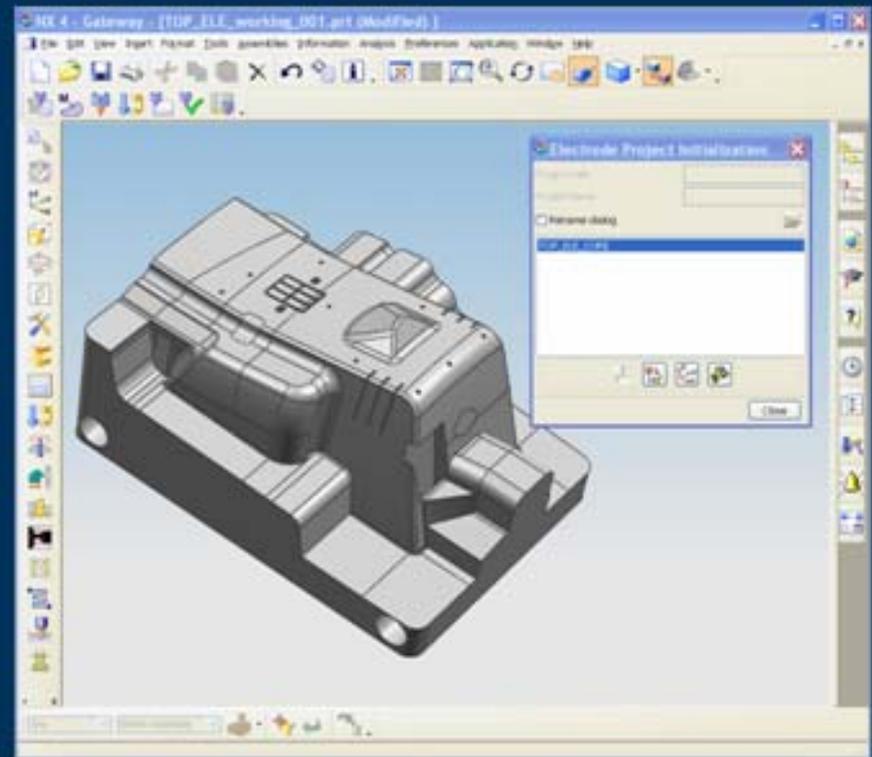
Demo / Process Details...



# Initialize the Electrode Project



- ▶ Automatically generate an assembly for organizing and managing the electrode project
- ▶ Define multiple EDM design settings to enable concurrent design and establish EDM machining settings
  - ▶ Origin point
  - ▶ Machining orientation
- ▶ Associatively link core / cavity to electrodes

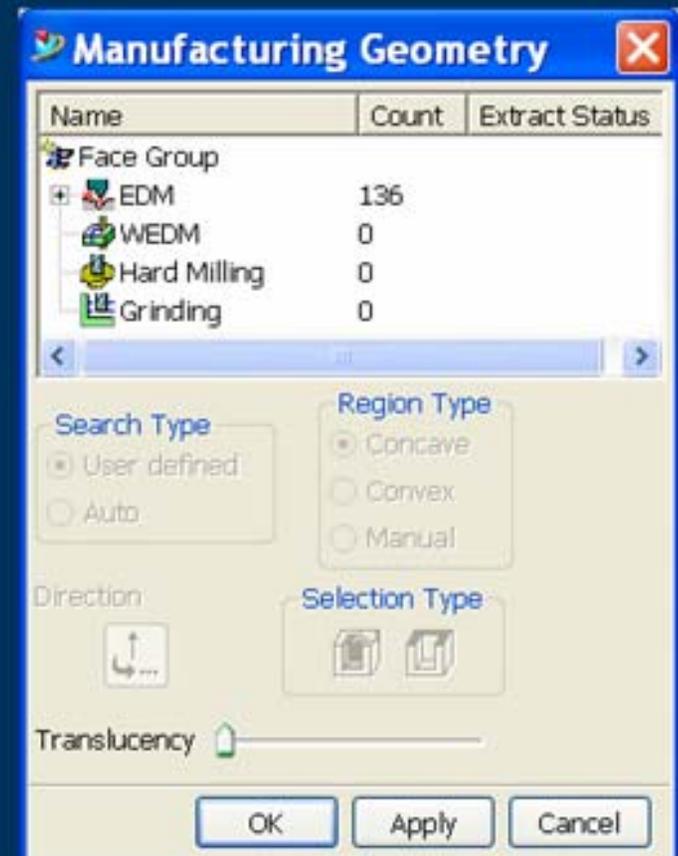




# Manufacturing Geometry



- ▶ Plan machining processes early in the design cycle
- ▶ Automatically search and recognize machining surfaces on core / cavity
  - ▶ EDM
  - ▶ WEDM
  - ▶ Hard Milling
  - ▶ Grinding
  - ▶ Other
- ▶ Automatically specify machining attributes to surface sets for downstream CAM operations
  - ▶ Face color specification
  - ▶ Face / region extraction





# Electrode Sparking Head Design



Easily and efficiently model the working area / sparking faces of electrodes.

## Create Box

- ▶ Quickly create a box to specify the working area

## Trim Solid

- ▶ Drag a box to fill a space without changing its shape

## Replace Solid

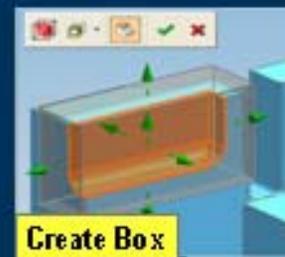
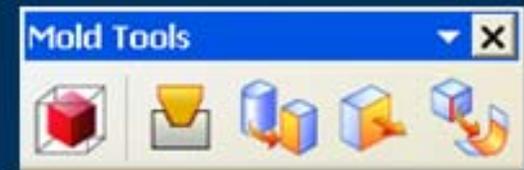
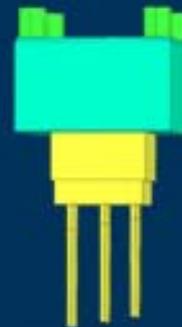
- ▶ Define a box based on selected boundary faces

## Extend Solid

- ▶ Extend the size of a box by dragging its faces

## Reference Blend

- ▶ Add an associative blend to a box by referencing an adjacent blend curve

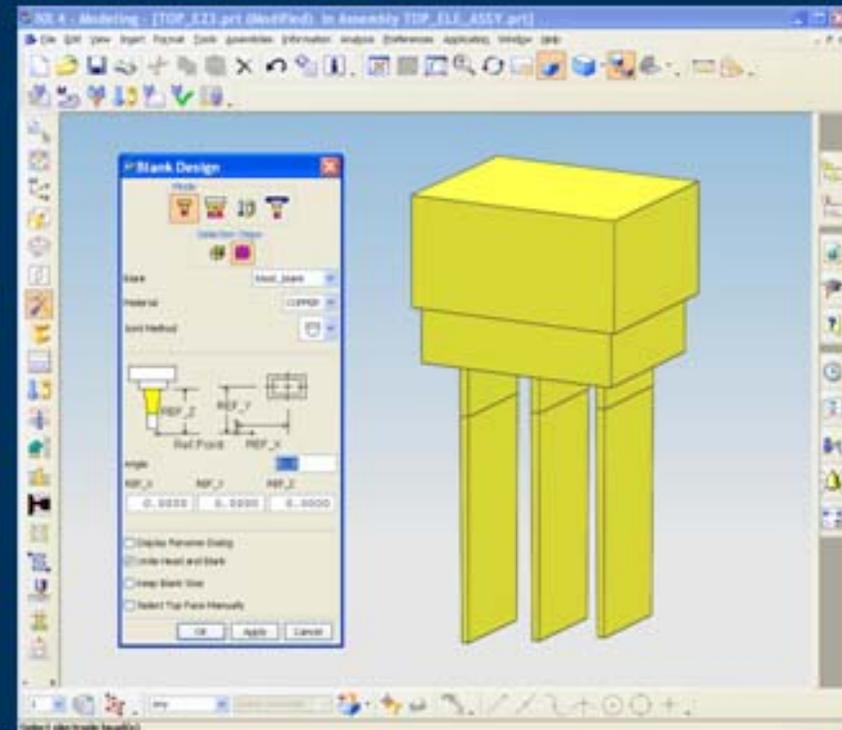




# Design the Blank



- ▶ Define and customize blank stock size and shape in spreadsheet for reuse
- ▶ Automatically search spreadsheet and find proper blank identified electrode working area
  - ▶ Possible to specify 1 blank per multiple working areas
- ▶ Create position report relative to MSET coordinate system (used for machine setup)
- ▶ Capture machining parameters for automated machine set-up

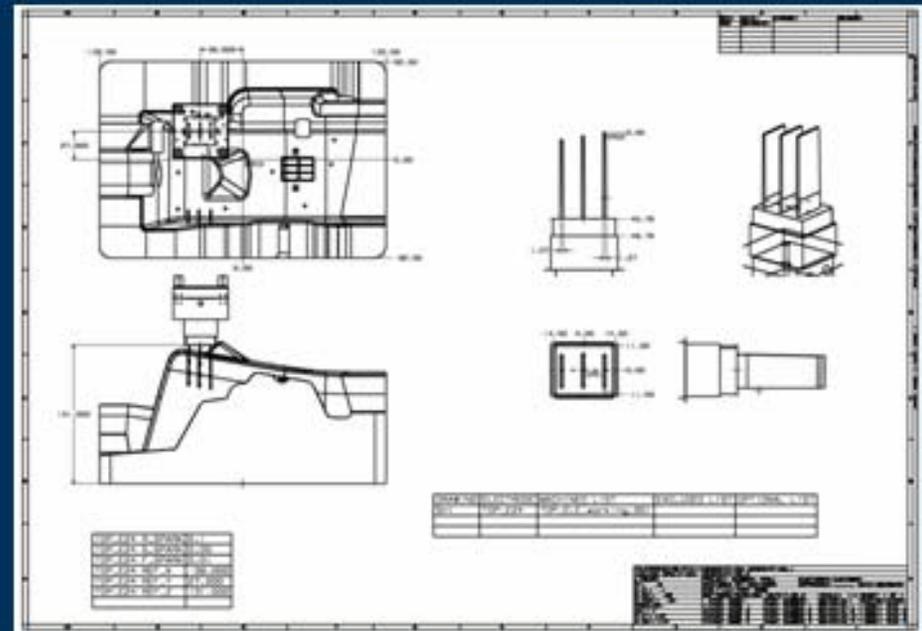




# Generate the Drawing



- ▶ Apply pre-defined drafting template to automatically generate drawings
  - ▶ Electrode design and drawing are associative
- ▶ Automatically assign design attributes (position, dimensions, spark gap, material) to drawing and tables
- ▶ Automatically create electrode detail and assembly drawings

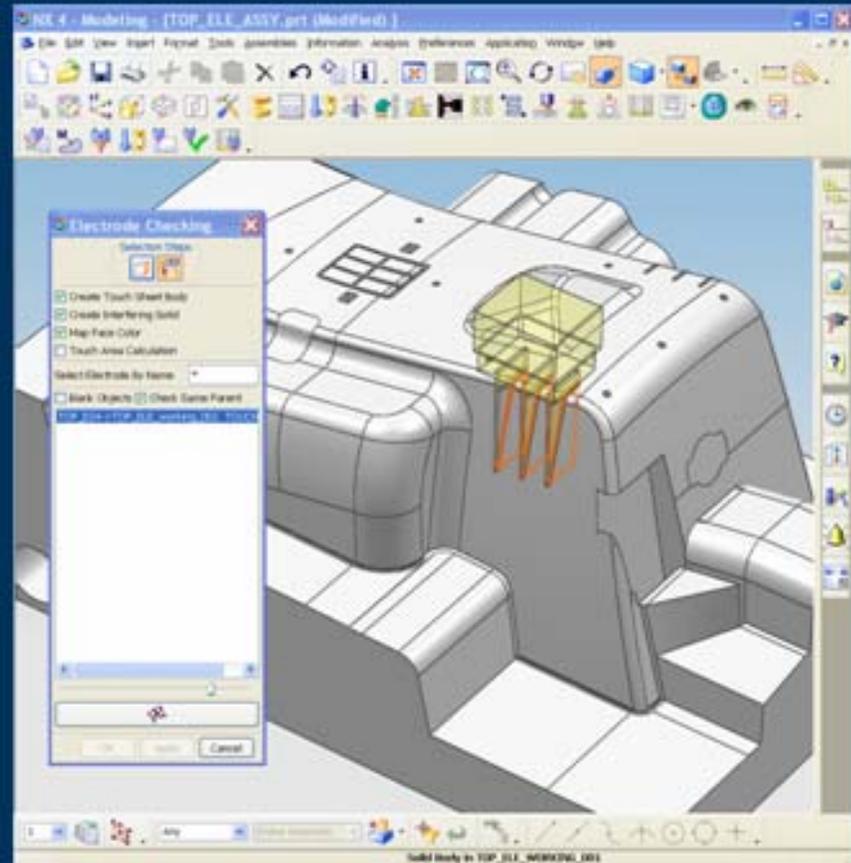




# Validate the Electrode Design



- ▶ Automatically identify interferences between electrodes and targets
- ▶ Identify problem areas visually
- ▶ Calculate (includes batch checking capabilities)
  - ▶ Sparking area
  - ▶ X, y, z dimensions
- ▶ Automate face color mapping from core / cavity to electrode (useful for manufacturing process planning)





# Generate the BOM



- ▶ Automatic BOM generation
  - ▶ Position
  - ▶ Material type
  - ▶ Sparking area calculation
  - ▶ Blank stock size
  - ▶ Additional customizable content

**BOM Record Edit**

BOM List | Hide List

PC NO	CATALOG	D_SPARK	S_SPARK	F_SPARK	STOCK_SIZE	MATERIAL	PART NAME
1	2-1/2" x 5"		0.05	0.01		COPPER	1500_BLOCK_BLANK_059
2	1" x 2-1/2"		0.05	0.01		COPPER	1500_BLOCK_BLANK_059
3	3/4" x 1"		0.05	0.01		COPPER	1500_BLOCK_BLANK_059

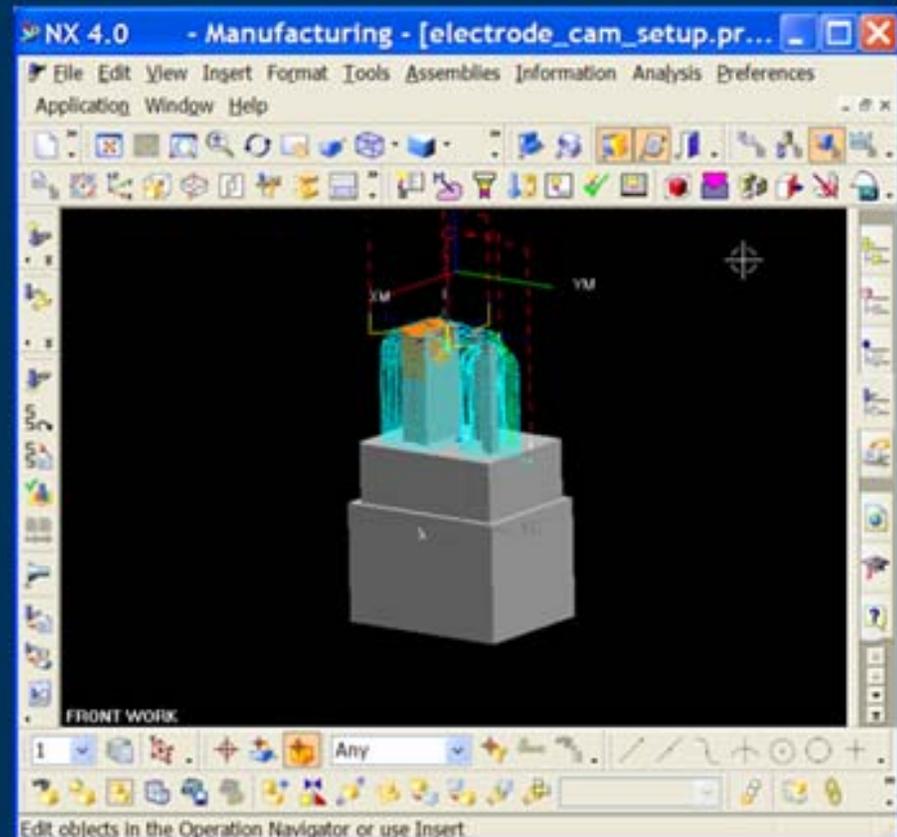
PC NO: 3 | CATALOG: 3/4" x 1" | D\_SPARK: | S\_SPARK: 0.05 | F\_SPARK: 0.01 | STOCK\_SIZE: | MATERIAL: COPPER | PART NAME: 1500\_BLOCK\_BLANK\_059 | QTY: 1

Buttons: Edit Stock Size, Export Excel, Hide Component, Add to BOM List, Component Info, OK, Apply, Back, Cancel

# Enable Associative Electrode Machining



- ▶ Direct machining of electrodes
- ▶ Leverage CAM templates to automatically generate NC
- ▶ Associativity between the electrode design and CAM enables automatic toolpath update
- ▶ Leverage part attributes to automate machining setup and machining parameter definition



The logo consists of three overlapping triangles forming a larger triangular shape, with the top triangle pointing upwards and the two bottom triangles pointing downwards.

Thank you.