NX 9 for Manufacturing

What’s New
NX 9 for Manufacturing – What’s new

- NX CAM
- NX CMM Inspection Programming
- Manufacturing Resource Library
- Tooling design
Enhanced level of cut control and faster NC programming.

- Mold and die machining
- Prismatic parts machining
- Complex parts machining
Mold and die machining

Interactive cut region management

• Control machining methods for each region

• Preview and edit regions graphically

• Adjust tool axis per region

• Faster programming, precise control of machining strategy, and superior finish
Mold and die machining

High speed tool path transitions

- Smooth transition moves throughout the system
- Optimized engages, retracts, stepovers, and traverses
- Collision avoidance with alternative connections
- Enables fast and smooth machine operation
Mold and die machining

Efficient, hybrid rest milling

- Combination steep/non-steep cut patterns for uncut corners and valleys
- Top-down cutting sequence of corner/valley regions
- Available optimized cut levels and between-level patterns
- Easy, efficient programming of remaining uncut valleys with good tool performance – ready for finishing
Mold and die machining

Divide tool path for long reach tools

- Divide tool path at collision or at transfer point
- Specify overlaps, minimum cut lengths, and trimming steep angle as needed
- Specify a list of tools to use up front and divide as often as needed
- Program regions with difficult reaches quickly and efficiently – use long tools only where needed
Prismatic parts machining

Multiple part programming

- Quickly program tombstone and fixture configurations
- Work in full setup context
- Intelligently distributes complete machining sequences to all workpieces
Prismatic parts machining

Manual feature drilling

• Program holes without selecting geometry

• Use feature groups without using full process automation

• Visualize the in-process feature for each operation

• Allows fast, confident programming of parts with many holes, even where full automation is not available
Prismatic parts machining

Groove milling for T-cutters

- One click geometry selection
- Options for pass sequencing
- Dual tracking points engaged automatically
- In-process feature provides IPW awareness at each stage
- Fast effective cutting of side grooves
Prismatic parts machining

4-axis cylindrical milling

• Finishing cylindrical floors
• 4 axis with lead angle
• Smart avoidance by tilting
• Optimized sequencing with smooth stepovers
Prismatic parts machining

Turning enhancements

• New Part-off operation with options for cleaning walls, depth control, pre-plunging and chamfering

• Multi-thread engage with infeed section for cutting multi-start tapered threads cleanly

• Program special case turning options with out-of-the-box ease
Prismatic parts machining

On-machine probing for turning

• Probing operations available for turning setups
• Use complex probes
• New sub-ops provide for several turning probe motions and allow selection of different probe tracking points
Complex part machining

Automatic Tool Tilting

• Expanded capabilities for 3 to 5 axis tool path conversion, including undercuts

• Automatically adjusts tool axis or retract to avoid holder collisions

• Available for 3 axis roughing operations

• Safe machining with shorter tools and reduced vibration
Complex part machining

Turbomachinery Milling

• Rough with bullnose and flat endmills
• Swarf option for blade finishing
• Better surface quality for blade and blend finishing
• Faster calculation times
• Fast, efficient results for specialized geometry case
NX CMM Inspection Programming

Inspect a wider range of parts and analyze results graphically.

- Sheet metal programming
- Multi feature paths
- Results analysis
NX CMM – Sheet metal inspection

Edge point features

• Specialized inspection method for edges of thin parts
• Defined by face, point on edge, with parameters set automatically
• Automatic creation of relative measurement on adjacent faces
• Streamlined programming of sheet metal components
NX CMM – Cylindrical Probe Tips

Cylindrical Probe Tips

- Probes can be spherical, cylindrical, or both
- Can be used with any sub-operation
- Control the tracking point along the axis of the cylinder
- Ideal for measuring edge locations
NX CMM – Inspection programming automation

Multi-feature path creation

• Sensor selected for a range of measurement features

• Sensor inputs are applied to each selected feature

• Saves time programming and provides a consistent inspection path across several features
NX CMM – Results analysis

Display of results in the context of the 3D part model in NX.

- Graphical display of measured features
- Instantly see results in operation navigator
- Open .mea or .dml inspection data files
- Analyze measurements with quick graphical comparisons to aid decision making
Manufacturing Resource Library

Easily access a fully classified tool library from NX.

- Manufacturing Resource Library (MRL)
- MRL Connect for NX
Manufacturing Resource Library

• New solution for complete tooling and resource data management
• Fully defined data structure for components and assemblies
• Accessible in the fully managed environment

Intelligent 3D tool assembly

• Tool assembly management empowered by component compatibility filtering
• Pull accurate 3D models of selected tools directly into CAM sessions
• Easy to implement, even for native NX
Manufacturing Resource Library Tool Assembly

Tool Vendor Catalog

- Resource Management
  - Vendor Catalogs
    - CIMSOURCE
    - Sandvik Tooling
    - ISCAR Catalog
    - Schunk Fixture Library
    - TDM Catalog

Customer Components

- Customer Tools
  - Components
    - Turning
    - Milling
    - Drilling
    - Boring
    - Inserts
    - Tool Holder
    - Beam Adapter

Customer Assemblies

- Customer Tools
  - Assemblies
    - Turning
    - Milling
    - Drilling

CAM System

- CAM

Import Components

Assemble

Use Tool
MRL Connect for NX

Access the Manufacturing Resource Library (MRL) from NX native environment

- Directly connect NX to a stand-alone installation of the MRL
- Use NX to browse, search, select, and use tools from the MRL
- Full solid models are used directly in NX machine simulations
- Easily implement a fully classified tool management system in any NX installation
NX Tooling Design

Accelerate preparation of tooling models.

- CAM data preparation
- Tooling design tools
- Workflow enhancements for:
  - Mold design
  - Progressive die design
  - Automotive stamping die design
  - Die validation (Trim angle check, LS-Dyna interface)
CAM data preparation

Special modeling functions for NC programming preparation

• 3D offsets and blends quickly show acceptable tool traces
• Extensions and surface trimming quickly provide machining surfaces
• Radius adjustments provide needed clearances for certain tooling
• Cleanup tools quickly fix bad geometry
• Surface analysis ensures correct tools are selected for machining
• Quickly prepare for downstream tasks
CAM data preparation

Radius Reduction

• Adjust radii of blend surfaces in a die component to improve forming

• Dynamic handles control the areas of reduction

Analysis Tools

• Distance deviation and slope analysis with optional PMI notations

• Concave Face analysis with dynamic graphic display and data table
Tooling Design Tools

Extended Reuse and Management

- Manage standard parts using multiple databases and access mold bases through the reuse library
- Add, edit or delete attributes of selected components, bodies or faces in an attribute table, connected to an external spreadsheet
- More direct, more useful access and processing of all tooling items throughout the design environment
Workflow enhancements

Mold Design Workflow

- Work piece command is enhanced for the sketch-based design
- New ejector pin table creates a template-based drawing and a table with classified ejector standard parts

Progressive Die Design Workflow

- Create design insert groups such as piercing, forming, bending, burring
- Visualize multiple strips in tooling motion simulation
Workflow enhancements

Stamping Die Design Workflow

• Follow multiple parts workflow (Die layout, die tipping, etc.)

• Create die components in the context of die assembly structure

• Design with feature groups and reusable features

• Thoroughly analyze die trim angles

• Automatically assign color and attributes with customer defaults

• Efficiency gains come from additional automation and improved usability
Workflow Enhancements

LS-Dyna Interface for Progressive and Stamping Die Workflows

• Access LS-Dyna mesh, materials, solver capabilities from NX

• Pre-process, solve, and post-process formability analyses inside NX

• Prepare die, binder, punch, and blank geometry for LS-DYNA solver

• Eliminates the need to move out of NX and helps perform entire die development process in a single CAD environment