

NX • Teamcenter

## Maruti Suzuki

Slashing product time-to-market through die design automation

### Industry

Automotive

### Business challenges

Improve die design process to accelerate time-to-market, improve quality and reduce costs

### Keys to success

Employ the die design tools of NX and the product data management capabilities of Teamcenter to the die development process

Leverage best-practice standardization technology, including templates and family of parts

Continue to invest in and improve process automation

### Results

90 hours saved in designing draw die structure components

10 hours saved per die involving cam units

10 hours saved per die involving standard parts

Higher quality dies produced for tangibly reduced costs

Opportunities for further die design process automation and savings well underway

**Using NX and Teamcenter, Maruti Suzuki Die Shop realizes dramatic time savings in press die development cycle; savings include 90 hours in designing draw die structure components**

### India's largest passenger car company

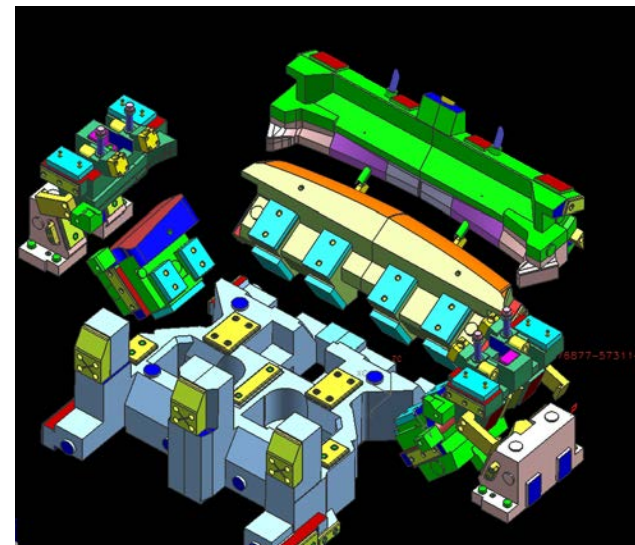
Maruti Suzuki India Limited (MSIL), formerly Maruti Udyog Limited, a subsidiary of Suzuki Motor Corporation of Japan, is India's largest passenger car company. Maruti Suzuki accounts for around 50 percent of the car market in India. That represents a yearly turnover of \$6 billion, one million+ cars sold annually and more than 800 sales dealerships in 555 cities. The company offers 14 brands and more than 80 variants of these brands. Its product line extends from practical to powerful and from hatchback to SUV. With its corporate office in New Delhi and 16 regional offices across India, production facilities in Gurgaon and Manesar, and more than 7,000 employees, Maruti Suzuki faced a number of imminent business challenges.

The company was experiencing increasing pressure to introduce new models in a shorter time frame. There was also growing pressure to improve quality and reduce costs. To complicate matters, customer needs and perceptions were no longer gradually evolving, but now rapidly changing. More specifically, certain product development domains represented the greatest opportunity to address these key challenges. These included reducing new

tooling development time, reducing die design time, reducing costs by substantially decreasing the need for rework, and improving quality. "Our die design process clearly represented and still represents one of the most important opportunities for reducing overall die development time and thereby accelerating car-to-market time," says Mayank Varma, assistant general manager, Tool and Die Shop, Maruti Suzuki.

### Stamping domain represents significant opportunity

Maruti Suzuki Die Shop uses a number of traditional and advanced processes in the design, validation, manufacturing and commissioning of its dies, including NX™ software and Teamcenter® software from Siemens PLM Software.

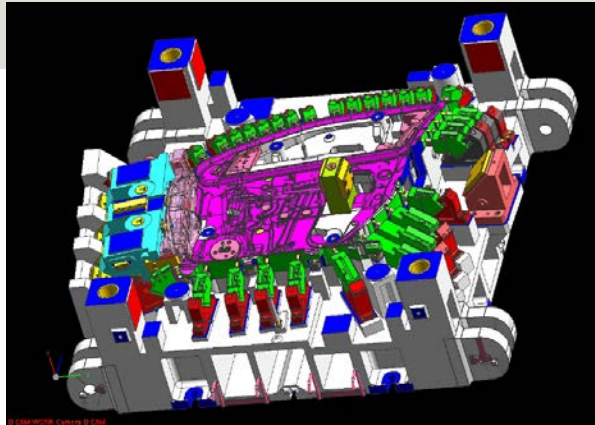


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Mayank Varma  
Assistant General Manager  
Tool and Die Shop  
Maruti Suzuki

“We plan to slash at least 50 percent off the draw die design cycle in the first year, then 60 percent within the next two to three years. We have a vision and we feel Siemens’ technology has much to offer to make it happen.”

Vidur Kaushik  
Manager  
Die Design, Die Shop  
Maruti Suzuki



### **NX Die Structure Design applications play key role in die design standardization**

Data is received from the Product Design Group of Maruti Suzuki in NX format. Then the die face, which includes addendum, binder, draw bead, etc., is designed using NX tools. The data is transferred to external computer-aided engineering (CAE) software to do the validation of forming simulation, e.g., addressing wrinkles in the sheet metal folds, thinning, bend and trim line issues, etc. “This is quite time-consuming; however, we have plans for improvements here,” notes Vidur Kaushik, manager – Die Design, Die Shop, Maruti Suzuki.

Once the simulation is done, the part is tipped to the die position based on CAE feedback and a layout is prepared via NX 2D drafting by taking sections on the parts. The die structures are then built. Finally, it’s 2D and 3D machining, die assembly and tryout, and off to production.

The entire process is similar to that used by other original equipment manufacturers (OEMs), except Maruti Suzuki Die Shop has made significant process advancements in a number of areas, especially relative to its die structures preparation and building.

### **Templates yield 90 hours saved for draw die structure components**

Using NX die design tools, Maruti Suzuki Die Shop has built many templates for its die design stage. Here’s how it works. The designer is presented with the template, which shows the parameters of the parts. The designer simply enters the new product

specifications to update the template to the current design. The mating of the standard parts is captured, so that any change to a part reflects the position of the standard parts as well. This substantially accelerates the speed with which die structures are designed.

Maruti Suzuki Die Shop accomplished this important time reduction through what it describes as its “cloning concept” in which the repeated structures in a design are identified and treated as standard structure parts, creating the primitive or basic template design. Mating points are defined, mounting bodies created, map files identified for positioning, etc., using the template structure.

“It used to take approximately 180 hours to build the components of the draw die structure,” says Hardeep Singh, deputy manager “Die Design, Die Shop, Maruti Suzuki. “Using Siemens’ product lifecycle management (PLM) tools, now it takes about 90 hours – a 50 percent improvement.”

### **Standardization delivers 10 hours saved per die involving cam units**

Similarly, Maruti Suzuki Die shop has brought design standardization to its cam unit creation. Instead of modeling each cam one by one, the company has created standard parts to automatically build the cam unit. The company has achieved a time saving of 10 hours per die involving cam units, which translates to potentially exponential savings depending on the project.

## Solutions/Services

NX  
[www.siemens.com/nx](http://www.siemens.com/nx)  
Teamcenter  
[www.siemens.com/teamcenter](http://www.siemens.com/teamcenter)

## Customer's primary business

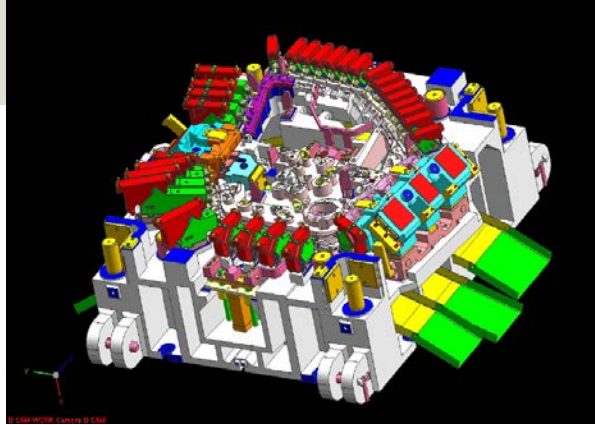
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[www.marutisuzuki.com](http://www.marutisuzuki.com)

## Customer location

New Delhi  
India

**"We plan to slash at least one month in the first year of the die development cycle, then two months in the coming years. Siemens' solutions are integral to making our vision a reality."**

Joy Lakra  
GM – Body Engineering  
Maruti Suzuki



## Teamcenter manages family of parts repository, resulting in another 10 hours saved per die for standard parts

To date, Maruti Suzuki Die Shop has 75-80 family members in its standard parts library, enabling the quick creation of thousands of standard parts. The family of parts library is managed by Siemens' Teamcenter, which connects people throughout the lifecycle with a single source of product and process knowledge.

Maruti Suzuki Die Shop's leveraging of a family of parts repository has resulted in additional important die development process efficiencies – 10 hours saved per die for standard parts.

"Using the die design tools of NX and collaboration capabilities of Teamcenter – through cloning, cam standardization and family of parts knowledge re-use – we've realized significant time savings in the development cycle," says Santosh Kumar, deputy manager – Die Design, Die Shop, Maruti Suzuki. "Rework is dramatically down. Quality is up. Costs per die have decreased. Considering the number of brands we market, including 80 plus variants, we are quite excited about our opportunities for exceptional results from a continuously improving stamping operation. We are definitely headed in a very good direction."

## A vision for continuous die process improvement

"We plan to slash at least 50 percent off the draw die design cycle in the first year,

then 60 percent within the next two to three years," says Vidur. "We have a vision and we feel Siemens' technology has much to offer to make it happen."

For example, Maruti Suzuki Die Shop plans to move from the visual editing tools of NX to its powerful Knowledge Fusion capabilities, such as Product Template Studio, which a number of OEMs are already using.

Maruti Suzuki Die Shop's goal is to do the entire validation in a wholly integrated environment that includes forming simulation, dynamic kinematics simulation, etc. This would essentially eliminate the sometimes awkward and time-draining steps involved in transferring data through the initial graphics exchange specification (IGES), standard for the exchange of product model data (STEP) or other formats. As part of this new approach, the company is also evaluating the dynamic collision checking tools of Siemens to identify and eliminate any interference that may occur during die operations.

The bill of materials (BOM) represents another item that Maruti Suzuki Die Shop wants to leverage for time and cost savings. Currently the designers manually enter each material item, including associated data, onto a spreadsheet – a very time-consuming process. "The plan is to generate the BOM automatically from the 3D models," says Vikram Kathula, deputy manager – Die Design, Die Shop, Maruti Suzuki. "While this will require some process change on our part, it's part of our overarching plan. We have a vision for continuous improvement across our entire die design and related processes – one that results in constant quality, time and cost improvements for our customers, partners and shareholders."

## Siemens Industry Software

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