



# ROBUST CNC MACHINE DESIGN SOLUTIONS

## ALTAIR SIMULATION HELPS JYOTI CNC IMPROVE THEIR MACHINE PERFORMANCE

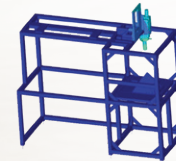
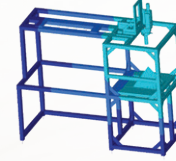
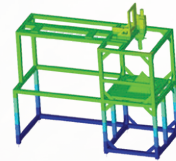
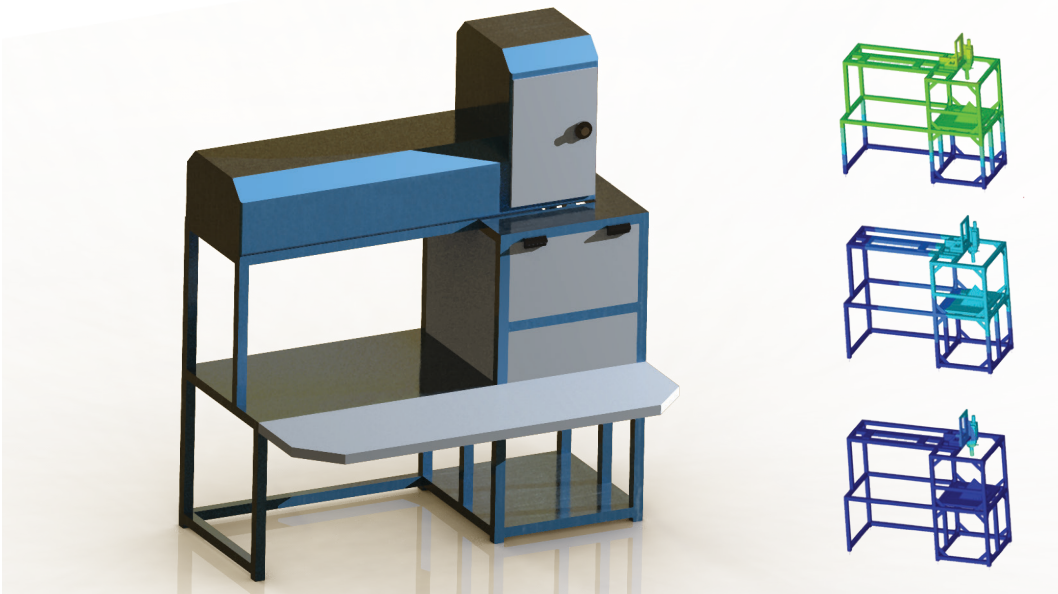
### About the Customer

Jyoti CNC Automation Ltd., is a reputed and reliable name in the area of computerized numerical control metal cutting machines. The company designs and manufactures a wide array of CNC Machines for metal cutting industries. It is well-equipped to meet the unique requirements of customers from a range of industry sectors, including Aerospace, Automobile, Agriculture, Die and Mould, Railways, Infrastructure, Medical, Oil and Gas, Power, Jewellery, Telecommunications, to name a few. With its state-of-the-art Research and Application Facilities equipped with advanced technology, the company is able to meet evolving customer expectations and deliver products of world-class quality.



Simulation has played a critical role in our product development process. FEA analysis and Product Design Optimization solutions from Altair helped us obtain desired mechanical accuracies. We were able to increase the static stiffness in Machine's X and Y axis by 73% and 64% respectively. We are now using Altair solutions extensively in our R&D activities and will continue to evolve and expand use of these solutions for our upcoming product lines as well.

Vijay Zala  
General Manager (R&D),  
Jyoti CNC Automation Ltd.



### Their Challenge

The company relies heavily on innovation and continually develops new products to meet the ever-changing unique requirements from various industry sectors in manufacturing metal cutting components. These new, optimized products need to be developed within stringent timeframe while ensuring machine accuracy in microns. For one such project, Jyoti CNC was working on the task to optimize the current design and improve static stiffness of its machines. Given the complexity of the project, the company decided to use simulation technology to ensure smooth and fast product development, while reducing the cost and resources involved.

### Our Solution

In one of the machine tools exhibitions, Jyoti CNC was introduced to Altair solutions. Post comparing the products to other solutions in the market, the company decided to go ahead with Altair® HyperWorks® for finite element analysis (FEA) to improve static stiffness of its machines. As stiffness is dependent on mounting conditions and operating conditions (such as load and speed), the company used simulation capabilities of Altair simulation tools to reach the optimized design and arrangement.

Using advanced creation and editing tools, the company was able to obtain the optimized design in a faster and efficient manner. Altair® OptiStruct® solver was then used to validate the effectiveness of the optimized product design. Using data analytics and true-to-life visualization and rendering capabilities of Altair solutions, Jyoti CNC could perform analysis of various iterations and compare and review the results for different parameters. The company benefitted significantly with the ability to eliminate the errors at the design stage itself.

### Results

Simulation played a big role in enhancing Jyoti CNC's product development efforts. The company benefitted immensely in terms of resources and cost saved as mechanical accuracies were ensured right at the stage of FEA software level, without having to create the physical prototype. For one of its machines, the company was able to increase static stiffness in machine's X & Y Axis by nearly 73% and 64% respectively, while keeping almost the same mass. Satisfied with the results and excellent technical support, Jyoti CNC now uses Altair simulation platform as a part of its regular design flow process in R&D.

**LEFT:** Machine's X, Y & Z axis final result after design change.  
**TOP:** Machine's X axis results at initial design stage.  
**MIDDLE:** Machine's Y axis results at initial design stage.  
**BOTTOM:** Machine's Z axis results at initial design stage.