



# BREAKING NEW GROUND WITH ALTAIR SIMULATION SOLUTIONS

## SUPREME INDUSTRIES ENTERS NEW PRODUCT SEGMENTS WITH ALTAIR AND DESIGNTech

### About the Customer

DesignTech Systems and Altair collaborated with India's leading plastic manufacturer Supreme Industries Limited to build high-quality, toughened, industry-grade plastic products. Established in 1942, Supreme Industries now has seven business divisions and has established itself as a market leader in plastics manufacturing in India.

The company has forayed into different types of plastic moldings, including injection molding, rotational molding (ROTO), extrusion, compression molding, blow molding, and more. Catering to wide industry applications, the company manufactures molded furniture, storage and material handling products, XF films and products, performance films, industrial molded products, protective packaging products, composite plastic products, plastic piping systems, and petrochemicals.

### Their Challenge

The plastic manufacturing industry is a highly competitive market, and to maintain its leadership position, it's essential for Supreme Industries to innovate and develop a new range of products for different sectors and industries without compromising on quality, robustness, and cost-effectiveness. They wanted to invest in proven CAE or product design analysis solutions that could help them meet their product design, performance, and manufacturing objectives.

Simulation plays a critical role in evaluating the performance and strength of Supreme Industries' products, as it helps them understand products' design errors and vulnerabilities. When these issues are addressed at the early stages in the design cycle, it curtails costs and development time, and improves product quality, durability, and performance.

**50%** ▼

REDUCTION IN  
NUMBER OF  
PROTOTYPES

**15%** ▼

WEIGHT REDUCTION



Try Product Today:  
**Altair® HyperWorks®**

Some Supreme Industries' products must sustain weight in tons. These products need a ribbing structure that fortifies their strength so they can endure these heavy loads. Most of the manufacturing at the company takes place using injection molding techniques, which makes it difficult to manufacture thick ribs – this causes constraints in the ribs' designs.

Some of their products are also used in the packaging industry, where products must sustain heavy loads incurred due to drops and heavy impacts. In both cases, using mathematical formulae to calculate the complex ribbing structure or the behavior of a product is difficult. In today's markets, product design must be validated and companies must be confident about products' quality and durability before launching them into the market.

### Our Solution

Supreme Industries relied upon the Altair® HyperWorks® CAE suite of solutions, especially Altair® OptiStruct® and Altair® Radioss®, for design optimization and structural static linear and non-linear analysis.

With these solutions, they could perform structural analysis and try different iterations of ribbed structures and thicknesses to achieve their goals. With these studies, the company could ensure their product design had the strength and capabilities to meet functional requirements, while also reducing the product's weight and manufacturing cost. They could also design other complex ribbed structures and add newer products to their offering, allowing them to enter new sectors and industries. These products include:

### Manhole Cover

The product was required to sustain a weight exceeding five tons. In addition, another major challenge was to manufacture it using composite glass fiber plastic material without increasing its weight, all while keeping its thickness at or lower than five millimeters without compromising its quality, robustness, or function. Identifying the right thickness for the end function was a crucial aspect of the project. To achieve these goals, Supreme Industries used OptiStruct for design optimization across topology, topography, size, and shape to check optimum material distribution for the given load conditions. This helped the company arrive at an optimum thickness for the manhole cover while meeting all design constraints.

### Defense Drop Box

Plastic drop boxes are used by the defense sector to protect goods like missiles and explosives; these boxes generally have a weight of up to 500 kilograms and a drop height of about one meter. The drop box must be secure so all internal material remains undamaged. Radioss helped Supreme Industries design a plastic drop box that could withstand impact loads while keeping its cargo unharmed.

### Septic Underground Tank

Septic underground tanks face heavy internal pressures, which can cause tank deformation. Using OptiStruct, Supreme Industries could analyze various ribbing patterns and reduce deformation to as low as 40%. In addition, OptiStruct helped the company design a change in the internal ribbing structure, which further reduced deformation.

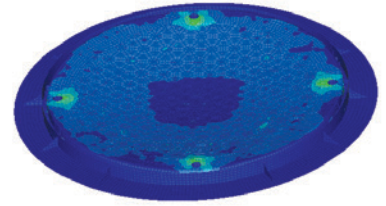
### Results

Thanks to HyperWorks, Supreme Industries reduced the manhole cover's weight by 15%. This helped them place their products more competitively in the market. Another major benefit the company gained from Altair solutions was consistent reduction in the time it took to develop and design products. This not only makes them more competitive, it also gives engineers the confidence to design complex design structures without worrying about time to market.

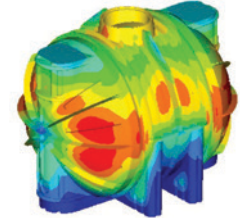
Manufacturing and making physical prototypes for testing critical products under different conditions and circumstances increases the time and cost of manufacturing, and in some cases, it becomes extremely difficult to derive results using prototypes.

Supreme Industries is looking to explore more Altair solutions for various applications and products, including Altair® AcuSolve® for fluid flow analysis and OptiStruct for structural optimization for bathroom fittings such as taps, faucets, and showers.

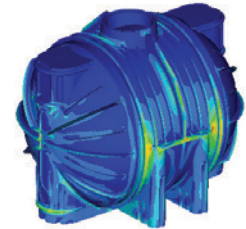
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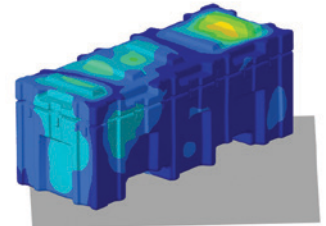
Manhole cover having rated capacity of 3.5 Ton (Structural Analysis: Stress Plot)



Septic Underground Tank (Sewage water pressure structural analysis: Deflection plot)



Septic Underground Tank (Sewage water pressure structural analysis : Stress plot)



Defense box used for transport of missile and bomb parts



With Altair's multiphysics simulation platform, Supreme Industries reduced the time and cost spent on designing and developing different products. For all of these products, the company reduced the number of prototypes by 50% thanks to Altair's solutions.



ALTAIR CHANNEL PARTNER