

**A**s recession fades away, companies are too cautious about how to move forward and a great deal of effort is spent in strategising the future course. To cope up with the global competition, developing expertise on lowering product cost and quality manufacturing is going to be essential.

Designs need to contain only essential functional features and care needs to be taken to make the designs manufacturable using cheaper manufacturing processes, and with less scrap and rejections. This will not only make the designs cost effective but also greener, along with getting them to market faster.

### D For Design

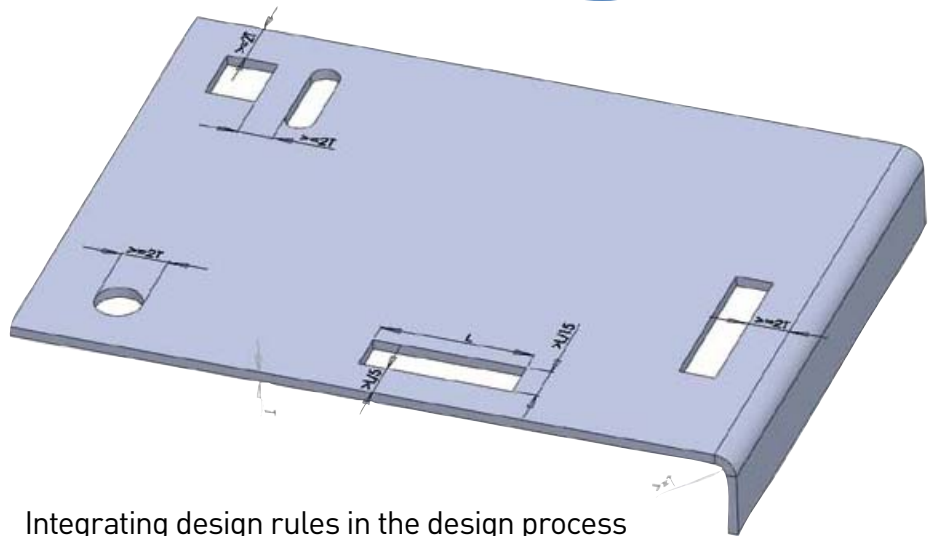
To facilitate such design process, Design For Manufacturing (DFM) and Design For Costing (DFC) principles have evolved to a good extent. But most of these principles are laid out in the form of design rules in manuals, which have become so voluminous that very few experienced designers are well versed.

Frequent design iterations and manufacturing hiccups due to poor designs are common place even today; and these only state that DFM and DFC are more said than done and not practiced rigorously. Few reasons for this scenario are (a) huge number of design rules to be followed (b) resistance to change (c) time consuming manual design checks (d) treating DFM and DFC design reviews as fault finding, etc.

### Sheet Metal Fabrication

Design modifications and identifying manufacturing bottlenecks at an early design stage are always cheaper and smoother. A hole too close to a bend or an edge will end up in poor quality of part; whereas a hole diameter smaller than the sheet thickness will require special processing, thereby increasing the processing

# Sheet Metal Fabrication: It Starts From Design



Integrating design rules in the design process help bring in considerable benefits in the long run especially in sheet metal fabrication.

By **Dr TR Kannan**, product manager, Geometric

cost; and a sheet metal part with non rectangular or complex design may lead to increased scrap and higher product cost.

Ensuring such simple checks in early stages of product design can bring in considerable benefits in the long run. It is even fruitful to use automated nesting at the design stage itself to verify designs for a material utilisation of say 90 percent and above. If utilisation is less than the said 90 percent, then it is advisable to redesign, as it increases the product cost.

### Automation In Design

A recent trend has emerged where design rules residing in manuals are being automated and integrated as part of the design process. Automation helps in design checks right at the early design stage itself without needing an expert for pointing out violations. By

automating design checks, young designers can have a feel of virtual DFM experts on their desktop without the occasional brow beating attitude.

Over time, designers learn how to design easily manufacturable components without violating design rules and at a lower cost. Such automation would facilitate easy and smooth knowledge transfer from experts to newcomers and to bring in consistent design verifications in place throughout the organisation.

Automated DFM software typically takes 3D models and highlights all the set design violations. In the present state, general design guidelines are available as out of the box rules for design checks and company specific design guidelines have to be added. Though such software can identify design violations to a

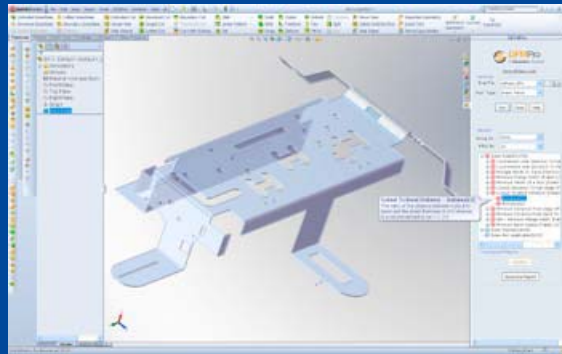
fair extent, further rules are to be framed to facilitate DFC as well.

Few companies have already started using such automated DFM software, and it can be expected to mature further with more acceptance and widespread adoption by the industry.

Considering both the tangible and intangible benefits by automated design verification, change should be driven and enforced by top management for effective deployment and implementation of such methodologies and processes. Manufacturing has matured from mere quality control to quality assurance and it is time to adopt manufacturing-quality assurance at design stage itself to boldly face and survive the global competition.

Enquiry No. **4302**

## Geometric: Analysis Tool For Design



DFMPro is an automated design for manufacturability analysis tool for design and manufacturing engineers. It facilitates upstream manufacturability validation, and identification of areas of a design that are difficult, expensive, or impossible to manufacture.

For organisations working with sheet metal designs, the product by Geometric provides design rules to ease fabrication processes. The automated checks provided lead to saving of any downstream time, money and effort associated with scrap and rework due to manufacturability issues. **MEN**

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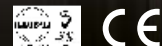
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