

Significant cost and time savings through simulating sheet metal prototyping with FormingSuite®

FormingSuite® enables Quality Pattern to significantly ease the process of blank development, drastically reducing time to market and component cost.



Established in 1990, Pune-based Quality Pattern Works Pvt Ltd is engaged in designing and developing prototype sheet metal parts, assembly fixtures, panel checkers, models, and moulds. In addition, it also provides mock-up models, soft tooling for sheet metal components, and inspection fixtures for sheet metal components.

The company's clientele consists of leading automobile OEMs including Tata Motors, Mahindra, Eicher, and Volvo among several others.

During new product development, when automotive manufacturers provide CAD data, there is very little time available to turn around prototyping results, including the blank development. Traditional blank development entails starting with an over-sized rectangular blank, crash forming the part, and checking the quality for both formability and trim line accuracy. A check fixture or 'buck' is required for quality inspection to verify the geometric dimensioning and tolerancing (GD&T). In

the second iteration, the rectangular blank's corners are cropped (chamfered) and the process is repeated. With many more iterations a more developed or "tuned blank" will be developed until the required accuracy is met. Oversized blanks generally lead to more formability issues and this trial and error method is precise within 15 – 20%. Geometric unfolding of part geometries using CAD is at best 10% over-sized.

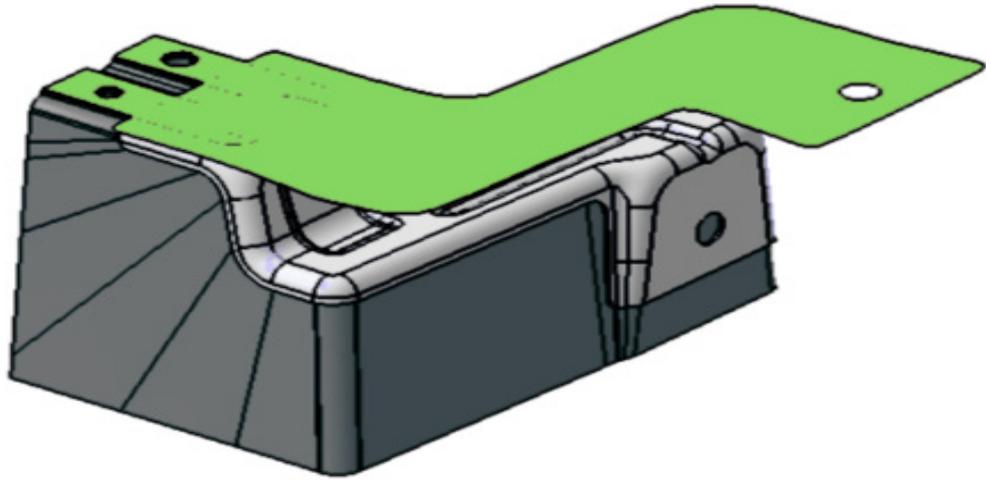


Figure 1: Blank Development with FormingSuite®

Earlier, Quality Pattern was performing this entire process manually in the absence of a simulation tool. This was an extremely time-consuming process and resulted in considerable material wastage.

In addition, the team was using its multiplatform CAD software suite for blank development. This presented challenges especially when there were any changes required in the design.

The blanks developed using the CAD software were often uneven in shape and size. In the absence of the ability to select pilot holes, the blank location was sometimes not accurate. This meant that the team had to perform a number of try-outs in order to get the exact blank.

The process was especially challenging when it came to developing complex shaped blanks.

Overall, the existing process meant that the Quality Pattern team required more effort from its people, more time on the machines, and more material to execute each project.

Using simulation for sheet metal forming

Quality Pattern knew there had to be a more scientific and precise way to determine the optimal blank shape. That is when they turned to FormingSuite®, a premier software package for sheet metal forming from Hexagon.

FormingSuite® is used by OEMs and suppliers across the globe to optimize the design, feasibility and costing of sheet metal components.

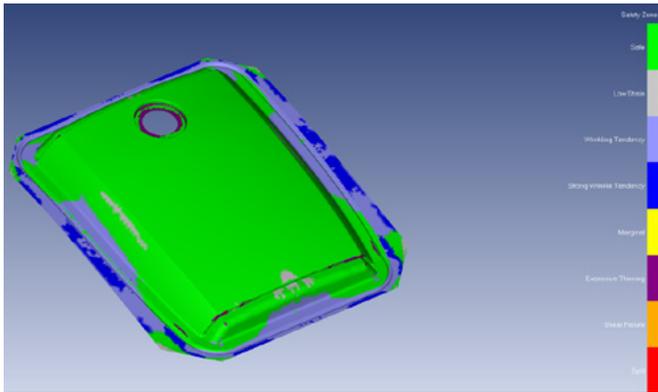
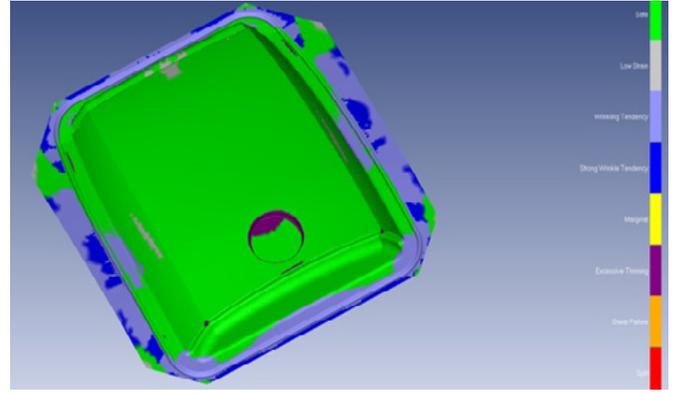
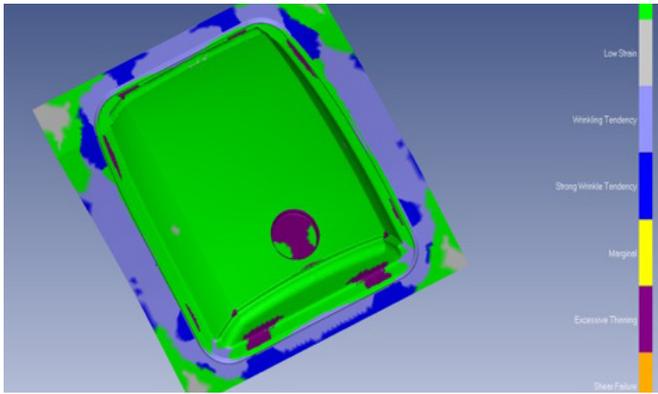
FormingSuite® helps significantly ease the process of blank development, thereby drastically reducing time as well as component cost. It also automatically generates a report to summarize product and tool design issues. In addition, it identifies complex forming challenges during the early phase of tool development, thus reducing the number of press try-outs required.

FormingSuite® enables the accurate prediction of forming problems such as splitting, wrinkling, thinning, and spring back before committing to physical tools. Parts can be analysed in seconds to predict formability issues early in the product development cycle.

Greater accuracy, lower time, cost savings

The implementation of FormingSuite® offers several advantages to help streamline the process of sheet metal prototyping. The blanks developed by the software are precise within 0.7%. Blank positioning can be accurately determined the first time since the software makes it extremely simple to select and define pilot/locating holes. As a result, the overall number of try-outs is reduced. In turn, this results in time savings of about 30 percent.

With FormingSuite®, Quality Pattern has been able to avoid material wastage and has achieved 50 percent savings in Prototype material costs. Most importantly, the team is well equipped to deliver the required components to customers well in time and even ahead of schedule.



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Figure 2: Optimizing the blank size to achieve improved formability (1) Rectangular blank, (2) Chamfered rectangle blank, (3) Developed blank with reduced size and improved formability





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Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Forming Technologies (FTI), part of Hexagon's Manufacturing Intelligence division, provides computer-aided engineering software to optimise the design for manufacturing, material utilisation and cost of sheet metal components. Learn more at forming.com. Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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