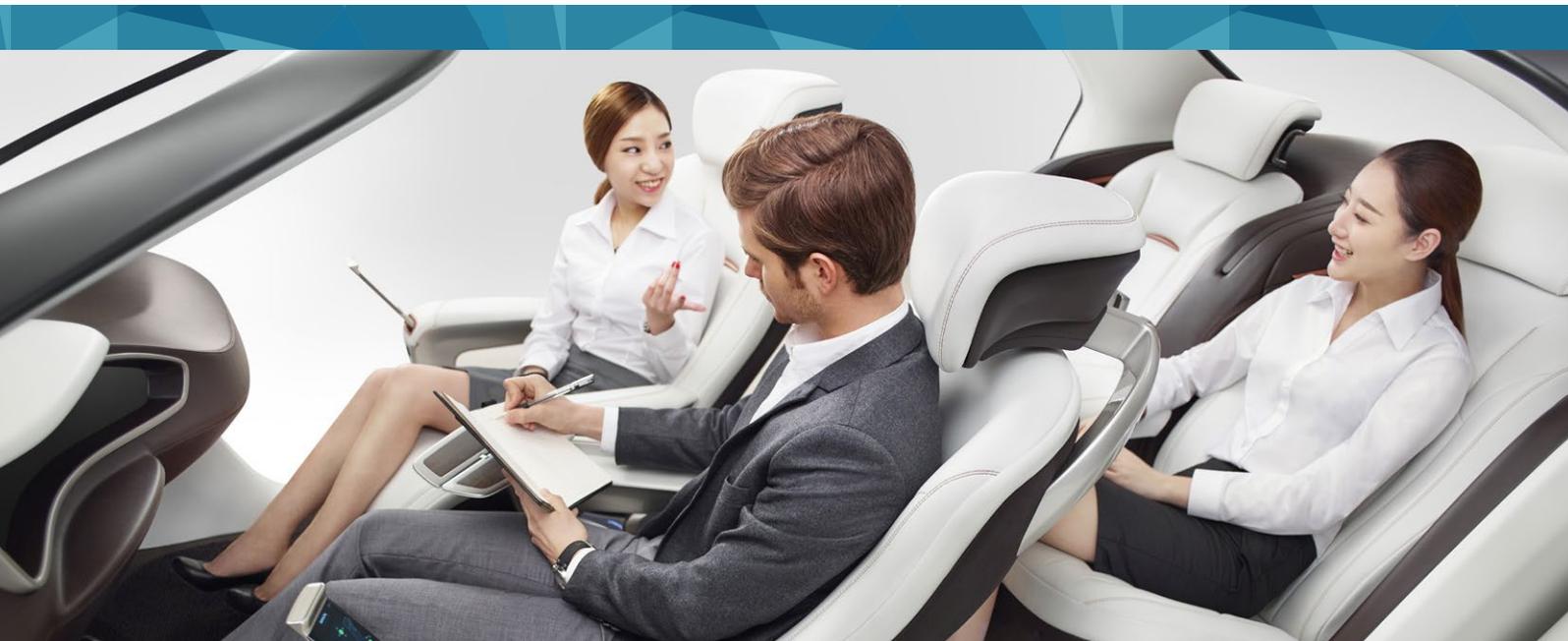


# CAR SEAT MANUFACTURER CUTS COSTS AND IMPROVES QUALITY WITH STAMPING ANALYSIS TOOL

ADIENT, MICHIGAN, USA



Automotive company uses FormingSuite COSTOPTIMIZER® Professional sheet metal simulation software to efficiently communicate design changes and reduce rework.

**According to automotive manufacturer Adient, 1/3 of all cars feature the company's components. As such, there's an inevitable pressure on Adient to continually innovate its offering and manufacturing processes.**

With increasing incentives for manufacturers to deliver more fuel-efficient products, Adient's Michigan-based team opted for a new stamping analysis tool to help design lighter car seats while improving processes to save time and reduce material waste.



Every year Adient supplies seats and components for more than 25,000,000 cars. But the company's influence in the automotive market isn't limited to its overwhelming representation in today's vehicles. It also places an incredible responsibility on the company's designers and engineers to lead the way for tomorrow's vehicles.

More and more, the automotive industry is under regulatory pressure to boost fuel efficiency and cut emissions. As such, vehicle weight is an increasing focus for automotive manufacturers, particularly given the growing prevalence of electric vehicles and consumer concern about how far these vehicles can travel before needing to recharge. To drive greater fuel economy in gas and electric vehicles, Adient is continually working to make seating even lighter. Since 2010, Adient has reduced the weight of its seats by between 20 to 30 percent. The current goal: to produce seats weighing only 10 kg (22lbs) or less by 2020.

To achieve this, the team at Adient explored the forming capabilities of higher strength steel and hybrid materials, as well as lighter and thinner structures and mechanisms to lower weight by up to 25 percent. But the company's previous methods of determining manufacturability of new designs was causing problems.

Adient wanted to test the feasibility of design changes before parts reached the production floor to avoid splitting, necking, wrinkling, and other stamping defects. With the company's previous process, a drawing would be signed off by stamping engineers, but the assessment of its feasibility was largely unstandardized and based on each engineer's experience. The tooling shops would produce a forming simulation, and if issues were found it would be sent back to the stamping engineers, who would in turn send it back to the product engineers.

Besides causing inefficiencies and contributing to lost time and materials, this process didn't maximize the team's capabilities for innovation, as past experience didn't offer the full understanding designers needed to assess different forming capabilities and potential problems that might occur using new alloys and high strength materials.



CAMISMA Seat Section View

## Optimizing Manufacturability

Adient's partnership with FTI stretches back into the company's history before its emergence as a spin-off of Johnson Controls, which saved time and money by acquiring a range of FTI solutions, including the material cost reduction tools COSTOPTIMIZER®, FASTBLANK®, and FASTFORM® Advanced.

Adient opted for FTI's stamping analysis tool FormingSuite COSTOPTIMIZER® Professional to evaluate the manufacturability of designs, performing accurate blank size calculation, blank overlap detection, springback analysis, as well as determining both wrinkling and splitting issues.

Using COSTOPTIMIZER® Professional, the designs are evaluated according to three key factors: Forming Limit Diagram (FLD), thickness strain, and thinning and gathering limits. For Michael Walters, Advanced Manufacturing Engineer, Adient, the FLD is absolutely crucial. "The FLD is everything. It's different for every material. It doesn't matter what the thinning or thickening strain is; if there are points above the Forming Limit Curve, the part will fail."

COSTOPTIMIZER® Professional's user-friendly capabilities for interpreting these three factors has enabled Adient to drive improvements in the use of materials and product design. For example, by giving designers precise insight into the percentage and location of thinning strain occurring in a mounting foot for a seat track, Adient could increase the part's thickness from 2.2 to 2.5 mm while reducing thickness strains from 32 to 18 percent. Similarly, the

software's springback analysis capabilities has enabled easy negotiation of tolerances. Michael says, "If an engineer wants a 1 mm profile around a hole, let's say, we can now easily use the springback data to show whether or not it's possible and make sure we get the right requirements."

The digitization and simulation of part manufacturability has been invaluable for Adient in gaining a greater understanding of their parts. "When looking at a blank it might appear normal, but the software makes it easy to identify characteristics that you might not perceive with the naked eye, like for example blank overlap where flanges are too tall in the corner," says Michael. "Previous processes were very much based on drawing upon experience, and FormingSuite® really allows us to build on that, increasing confidence in our analyses."

"Since introducing FTI, Adient now requires a passing grade for forming simulation on all stampings prior to being released for production. Forming-related problems during

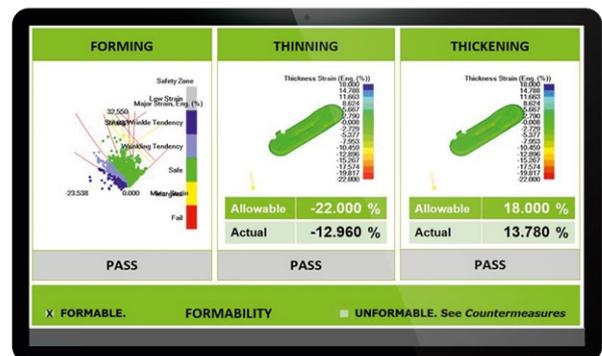
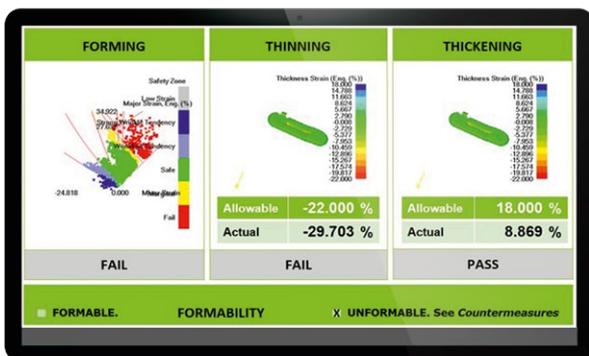
die try-out have been practically eliminated, which in turn saves money on the bottom line. In 2018 alone, I performed approximately 1,800 feasibility simulations," adds Michael.

The communicative capabilities of FormingSuite® have helped Adient avoid making parts that are unfeasible, saving time and resources and reducing bottlenecks. Using the software's intuitive countermeasures page enables users to communicate to the product engineer important changes that need to be made. "We now have a stronger communication process and can ensure that designs that have issues don't go to production," says Michael. "By catching and fixing problems early on, significantly fewer parts are coming back from our tool shops and we've seen an encouraging reduction in waste and reworks."

With a more streamlined manufacturability assessment process, Adient is firmly in the driver's seat to continue solidifying its position as one of the leaders in automotive seat production.

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**Michael Walters**  
Advanced Manufacturing Engineer



The Adient team uses the Countermeasures page of COSTOPTIMIZER® Professional to easily inform product engineers what needs to be changed to make the part formable.

By simply reducing the depth of the bead at the ends, the part now passes all three criteria: FLD, Thinning, and Thickening.

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