

No Ordinary Car Seat

Lear Corporation creates an optimal seating experience using ESI Virtual Seat Solution during the conception phase



Challenge

Lear wanted to design an innovative seat concept that would maximize comfort and reduce muscular fatigue, while improving the posture of the occupant.

The optimization of such new concept, including an innovative air bladders system used to promote good posture for each occupant morphology, required an entirely new development method.

Benefits

The use of ESI's Virtual Seat solution early in the seat development process allowed for virtual seat testing and optimization of several air bladder configurations.

By using ESI's Virtual Seat Solution, Lear was able to accurately predict the occupant's posture before and after the air bladders were inflated.

"ESI Virtual Seat Solution was used to determine the exact position of an occupant settling into the seat. We also used the software to simulate the inflation of the bladders and to determine how the bladders could change the posture of the seated occupant. This information allowed us to place the multi-contour bladder positions appropriately in the seat."

"Thanks to ESI Virtual Seat Solution we have been able to model the seat behavior and how it impacts the occupant's position."

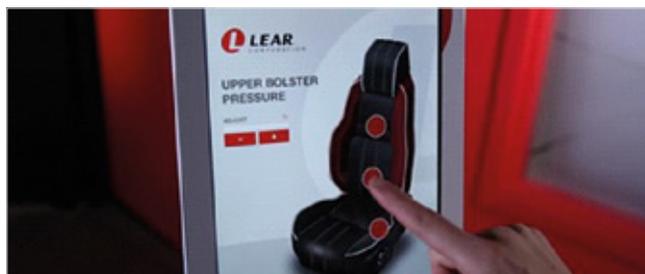
Missy A. Pereny
Seat Comfort Manager
Lear Corporation

Background

Lear Corporation, a Fortune 200 company, is a leading supplier of automotive seating and electrical, serving customers all across the globe.

As one of the world's only fully integrated manufacturers of the entire seat, Lear has a proven track record in delivering quality seating systems to the auto industry. To stay at the forefront of technological innovation, they decided to use a new method - virtual seat prototyping - for their newest concept, the ProActive™ Posture Seating System.

The ProActive™ Posture Seating System optimizes a driver's



seating position, by utilizing Lear's MySeat by Lear™ app. This enables auto adjustment of the bladders in the seat, based on sensor data and personal settings.



Fig.1: Real and virtual seats with inflated bladders



Using ESI Virtual Seat Solution, Lear first determined, for multiple anthropometries, the exact position of an occupant when he or she initially settles into the seat.



Fig.2: Seating of the human model in the Lear virtual seat prototype

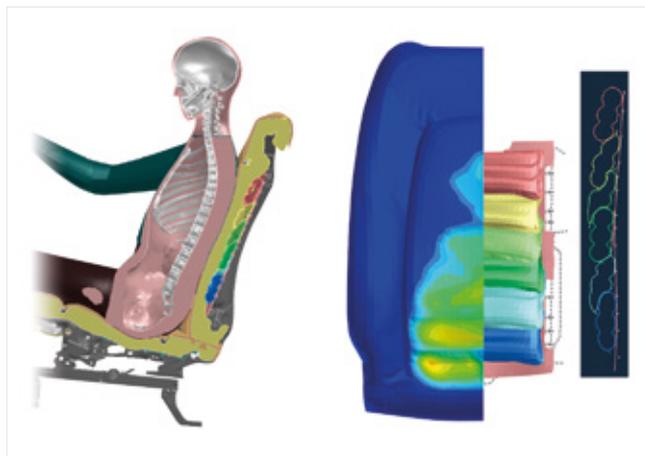
With this reference posture, as well as demographic, anthropometric and subjective feedback data, the optimal seat position for each type of driver was determined. Then, Lear's team worked on controlling the bladder system within the seat to position each occupant in their ideal driving



Fig.3: Inflation of the pneumatic bladder system

position, promoting proper posture and improving long term wellness. Virtual Seat Solution enabled the modelling of the inflation of the bladders and predicted how the bladders affect the posture of the occupant.

By simulating the inflation of the bladders and the impact on the occupant's posture, Lear was able to optimize their seat concept. "The information allowed us to place the multi-contour bladder positions appropriately in the seat structure", says Missy Pereny, Seat Comfort Engineer for Lear.



Finally, they created the MySeat by Lear™ algorithm, TheraMetric™. This app allows the driver to enter their personal information, and the TheraMetric™ algorithm then optimizes their seating position by processing this personal data alongside sensor data. The app controls the system within the seat, inflating and deflating the bladders as needed, maneuvering the driver into the ideal position. A secondary setting then takes the driver into a 'wellness' position which promotes focused support to the thoracic region of the spine and secondary support to the upper back, lumbar and sacral regions of the spine.

The project was fully successful in faithfully simulating Lear's lumbar support system and its effects on driver posture, allowing for more predictable results earlier in the development phase and a final product in line with Lear's expectations.



virtual seat | ground transportation



Lear Corporation

Lear Corporation is one of the world's leading suppliers of automotive seating and electrical systems. Lear serves every major automaker in the world, and Lear content can be found on more than 350 vehicle nameplates. Lear's world-class products are designed, engineered and manufactured by a diverse team of approximately 140,000 employees located in 36 countries. Lear currently ranks #154 on the Fortune 500. Lear's headquarters are in Southfield, Michigan. Further information about Lear is available at lear.com or follow us on Twitter @LearCorporation.

About ESI GROUP

ESI is a pioneer and world-leading provider in Virtual Prototyping that takes into account the physics of materials.

ESI boasts a unique know-how in Virtual Product Engineering, based on an integrated suite of coherent, industry-oriented applications. Addressing manufacturing industries, Virtual Product Engineering aims to replace physical prototypes by realistically simulating a product's behavior during testing, to fine-tune fabrication and assembly processes in accordance with desired product performance, and to evaluate the impact of product use under normal or accidental conditions.

ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping. These solutions are delivered using the latest technologies, including immersive Virtual Reality, to bring products to life in 3D; helping customers make the right decisions throughout product development. The company employs about 1000 high-level specialists worldwide covering more than 40 countries. ESI Group is listed in compartment C of NYSE Euronext Paris.

ESI Group Headquarters | 100-102 Avenue de Suffren | 75015 Paris | FRANCE | T. +33 (0)1 53 65 14 14 | F. +33 (0)1 53 65 14 12 | info@esi-group.com