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'Oscar' Leads the Way in Developing Impala Seats

Despite all the high-tech tools available to GM designers – seat pressure mapping systems and a multi-part mannequin that feeds data into a comfort dimensioning system – there's no substitute for the human element when fine-tuning where people sit.

General Motors' human factors engineers who understand biomechanics, psychology, quantitative research and ergonomics, applied all these disciplines to help make the seats comfortable in the 2014 Chevrolet Impala, said GM spokesman Chad Lyons.

Customers for each car segment want more or less support and rigidity in their car seats, Lyons said. What the car will be used for – such as commuting, city driving or track racing – helps engineers establish precise parameters of comfort. Finding the "sweet spot" for each vehicle doesn't come easy.

For the new Impala, volunteer seat testers ranging from 5th percentile females (5 feet tall, 110 lbs.) to 95th percentile males (6 feet tall or taller, 223 lbs.) spent hundreds of hours and logged thousands of miles in prototypes of the redesigned flagship sedan to evaluate seat comfort, Lyons said.

Seat testers typically drive or ride in prototype vehicles for several 60-minute intervals at a time recording initial feedback after the first 10 minutes. At each 60-minute interval, they numerically rate every aspect of the seat: cushion, backrest, lumbar support, headrest and side bolsters.

But tester feedback is subjective and design changes are often subtle because seat designs evolve from past programs and reams of data collected with precision instruments, said Jill Green, GM seat comfort lab manager.

"Developing comfortable seats is both an art and a science," said Green. "Knowing how to translate a physiological impression into tangible design elements is the art, and knowing how to execute the design is the science."

Seat tester evaluations alone would have been insufficient to achieve such results, Green said. That's where tools like Oscar come in hand. The mannequin-like tool made of steel, plastic and aluminum is assembled in 18 removable parts weighing up to 170 pounds. Early in the Impala's

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GM seat engineers use hi-tech equipment for the Impala.

Malibu Improves With Age as Car Reaches 50

What a difference half-a-century makes.

In 1964, a gallon of gas cost 30 cents and a movie ticket cost $1.25. The Dow Jones Industrial Average closed the year at 874 and The Beatles made their historic appearance on the Ed Sullivan show.

It was also the year Chevrolet introduced the Malibu.

And it's not just the price of a gallon of gas or the cost of going to the movies that have changed.

The 2014 Malibu is a technologically advanced midsize sedan delivering efficiency, comfort and connectivity unimagined in 1964, said GM spokesman Chad Lyons.

Compared with even the 2013 model, a new, standard 2.5L engine with stop/start technology contributes to 14 percent greater fuel economy in the city (25 mpg) and 6 percent improved mileage on the highway (36 mpg).

The 1964 Malibu made its mid-1960s debut as Chevrolet's first "intermediate" car – and one of the first midsize cars in America, Lyons said. Before then, Chevrolet's passenger car lineup con-

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A Hundred Years Ago in a Factory in Highland Park

– Ford Founder's System Was Felt 'Round the World –

The date was Oct. 7, 1913, the site was Highland Park, and the event was felt around the automotive world – and, ultimately, the total industrial world.

It was the first day of the moving assembly line.

Henry Ford and his team at Highland Park assembly plant launched one of the world's great contributions to manufacturing that day.

The moving assembly line of the Ford Model T's 3,000 parts broke the task into 84 distinct steps performed by groups of workers as a rope pulled the vehicle chassis down the line.

The new process revolutionized production and dropped the assembly time for a single vehicle from 12 hours to about 90 minutes.

By reducing the money, time and manpower needed to build cars as he refined the assembly line over the years, Ford was able to drop the price of the Model T from $850 to less than $300. For the first time in history, quality vehicles were affordable to the masses.

Eventually, Ford built a Model T every 24 seconds and sold more than 15 million worldwide by 1927, accounting for half of all automobiles then sold.

"Ford's new approach spread rapidly, not only to other automakers but also to manufacturers of phonographs, vacuum cleaners, refrigerators and other consumer goods," said Bob Casey, former curator of transportation at The Henry Ford, and author of "The Model T: A Centennial History."

Casey continued, "The assembly line became the characteristic American mode of production."

At an event at the Highland Park plant last week, Ford celebrated the 100th anniversary of the creation of the moving assembly line. Ford Executive Chairman Bill Ford said, "One hundred years ago, my great-grandfather had a vision to build safe and efficient transportation for everyone.

"I am proud he was able to bring the freedom of mobility to millions by making cars affordable to families and that his vision of serving people still drives everything we do today."

In 1914, Ford instituted the $5 workday, a significant wage at the time, to enable his employees to buy the vehicles they built. The move created loyalty among Ford workers and is credited with giving rise to a new middle class of consumers unencumbered by geography, free to travel the open roads, free to live where they please and free to chase the American dream.

National Geographic Channel will mark the production line's anniversary on Friday, Oct. 18, with an in-depth new documentary as part of its "Ultimate Factories" program.

Ford's innovation in automotive production didn't stop in 1913.

For example, today, Ford engineers are developing a highly flexible, first-of-its-kind, patented technology to rapidly form sheet-metal parts for low-volume production use.

The technology, known as Ford Freeform Fabrication Technology, or F3T, will lower costs and speed delivery times for prototype stamping molds – within three business days versus two to six months for prototypes made using conventional methods.

Additionally, said Kristina Adamski, Ford Manufacturing and Purchasing Communications manager, Ford is expanding its capabilities in 3D printing, which creates production-representative 3D parts layer by layer for testable prototypes. With 3D printing, Adamski said, Ford can create multiple versions of one part at a time and deliver prototype parts to engineers for testing in days rather than months.

Ford also is investing in robotic innovations to improve vehicle quality and production efficiencies, Adamski said.

For example, the company's new dirt detection system uses robotic vision to create a digital model of each vehicle in final assembly to analyze paint and surface imperfections in comparison with a perfect model. The result has significantly improved surface quality on Ford vehicles and provided more time for operators on the assembly line to address complex issues, Adamski said.

Robotics, in this case, she said, allow Ford to work smarter in improving products for customers and allow workers to focus on more critical thinking tasks.

Finally, through Ford's "virtual factory," the automaker can improve quality and cut costs in real-world manufacturing facilities by creating and analyzing computer simulations of the complete vehicle production process, Adamski said.

This includes simulations of how assembly line workers have

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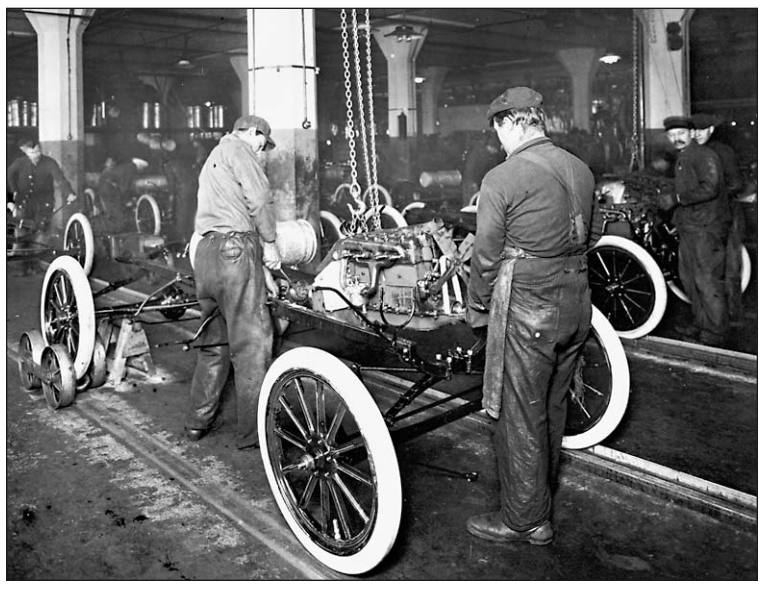
Ford Michigan Assembly's John Bizek, left, and Rob Hanson.



A historical photo of the 1913 Ford Highland Park moving assembly line.