Lear *Puts* Quality *in the* Driver's Seat

Cutting-edge technology and team players are a winning combination in Alabama.

A PC-based interlock system displays electronic standardized work instructions at each workstation. *Photo courtesy Lear Corp.*

Assembly Plant of the Year 2006

■ *By* **Austin Weber**
Senior Editor

Paul "Bear" Bryant was one of the most successful coaches in college football history. During the 1960s and 1970s, his University of Alabama players always knew how to compete as a team.

That same spirit is alive and well today at a Tier One automotive supplier in the central part of the state where the late Bryant is considered a legend. Teams of employees at the Lear Seating Plant in Montgomery, AL, manage their own budgets, attendance, job assignments, housekeeping and performance discipline.

The innovative approach to labor relations is paying big dividends. It's helping the plant achieve impressive results, such as 1 percent absenteeism, zero plant-controllable ergonomic issues, and high levels of measurable safety, quality, delivery, cost, process and environmental standards.

Every team member is certified to perform each of the assigned team operations. "Every hour, they rotate jobs," says Duk Kim, plant manager. "The advantages of this approach are increased ownership, morale and accountability."

The two-year-old Montgomery plant, which serves as a benchmark for other facilities operated around the world by Lear Corp. (Southfield, MI), is the recipient of ASSEMBLY magazine's third annual Assembly Plant of the Year award. The company is the first supplier to win the award, which has previously been presented to OEMs.

Lear Montgomery assembles more than 300,000 sets of seats annually for the Hyundai Sonata sedan and the Santa Fe sport utility vehicle. By applying Six Sigma and lean manufacturing principles, in addition to state-of-the-art production tools and equipment, the Lear facility builds seats just a few hours before they are inserted into vehicles at Hyundai's assembly plant, which is located a short drive away.

"Our self-directed teams worked hand in hand with advanced manufacturing engineering, product development, plant engineering and plant operations to design and set up all workstations on the Sonata assembly lines," says Kim. "The core members from the Sonata launch team moved to the Santa Fe launch team and repeated the process to design and install all workstations for the Santa Fe assembly lines."

To improve productivity and reduce defects, operators use DC electric tools and radio frequency identification (RFID) technology. That allows Lear to achieve some impressive delivery and quality statistics, without sacrificing safety. At the same time, there have been zero plant-controllable ergonomic issues.

Lear is one the world's largest suppliers of automotive interior systems and components. The $17 billion company was founded in 1917. Traditionally, Lear has manufactured seats and other interior components, such as instrument panels,

Lear's Montgomery, AL, plant assembles seats for the Hyundai Sonata (above) and the Hyundai Santa Fe (bottom).
Photos courtesy Hyundai Motor Manufacturing Alabama

for Detroit's Big Three. However, instead of relying solely on domestic automakers, the Tier One supplier has been diversifying its customer portfolio. Since 2003, Lear has doubled its sales to Asian automakers, such as Hyundai Motor Co. (Seoul, South Korea).

Seating accounts for approximately two-thirds of Lear's revenue. The company works closely with automakers to provide innovative components that address styling and weight concerns. Traditionally, seat systems are designed for specific vehicle models or platforms. Seats typically represent 30 percent to 40 percent of the total cost of an automotive interior.

As consumers spend more time in their vehicles—for instance, the average weekday commute to and from work in Chicago is 90 minutes each way—seats and other interior features are becoming extremely important. Indeed, interiors have become a hot topic in the automotive industry today.

"Consumers form their opinion on a vehicle based on the look and feel of its components and the level of perceived quality," says Douglas DelGrosso, president of Lear. "Increased consumer attention to 'look and feel' has spurred heightened automaker focus on interior quality and craftsmanship."

Seats are the only part of a vehicle that drivers have a personal connection with. And, consumers are demanding more interior features that provide comfort, convenience, safety and security. "Our goal is to help create an environment which makes the driving experience something to anticipate, as opposed to dread," says DelGrosso.

According to J.D. Power and Associates (Westlake Village, CA), seats are typically the highest-rated component when it comes to quality. However, when it comes to satisfaction, seats are the second-lowest-rated vehicle component. Indeed, consumers who drive vehicles with seat-related features, such as heated seats, reported higher scores in a recent quality and satisfaction study.

Hyundai boasts one of the best warranties in the auto industry, and its Santa Fe and Sonata vehicles rank extremely high in quality studies. Part of that success is directly due to the seats built by the 2006 Assembly Plant of the Year.

New Plant, New Philosophy

Lear's Montgomery plant opened in 2004 to support Hyundai Motor's first U.S. manufacturing venture, which ramped up production last year. Hyundai's new plant has a capacity to build 300,000 vehicles annually for the lucrative U.S. market.

A decade ago, Hyundai sold less than 100,000 vehicles in the United States. But, the company is expanding aggressively, and is on target to sell more than 500,000 vehicles in the United States in 2006. In fact, Hyundai currently ranks

as the fifth largest automaker in the world. Its U.S. sales are up 6 percent this year, and the automaker plans to sell more than 1 million vehicles here by 2010.

By focusing its efforts on stylish designs, low prices and safety features, backed by a 10-year warranty, the upstart automaker has emerged as a major force in the industry. Even more impressive, it has managed to make those big strides in approximately half the time that it took Japanese automakers.

Hyundai was attracted to Alabama because of reasonable land prices and the availability of a nonunionized workforce. When the automaker announced plans to invest $1 billion in a new 2 million square foot assembly plant in Montgomery several years ago, Lear successfully bid for the seat manufacturing contract.

Lear purchased 20 acres of farmland near the Hyundai plant and built a $17 million facility. The state-of-the-art plant is located 8 miles southwest of the Alabama state capitol and less than 2 miles from its customer's vehicle assembly line.

Hyundai Motor Manufacturing Alabama started building the Sonata in April 2005. Earlier this year, it ramped up production of the Santa Fe. In addition to body, paint and final assembly plants, the Hyundai complex includes an engine plant. As sales skyrocket, the automaker may expand the facility to accommodate new vehicles.

Lear decided to build a flexible plant that could easily be expanded in the future. When the 94,000-square-foot building opened in April 2004, it broke down several old stereotypes in the auto industry.

Traditionally, in a unionized factory, labor is divided into dozens of job classifications. Assemblers are rarely allowed to do anything outside their specific job classification. However, the 2006 Assembly Plant of the Year is a nonunion facility that subscribes to a self-directed team concept.

Operators are called "associates" and managers are called "resources." There is one team leader for every nine team members. "The resources support the teams by providing technical skills and by translating plant business objectives into team deliverables," says Kim.

Team leaders rotate every 6 months, and each team leader has a sponsor, who helps resolve issues or problems. The sponsors approve and monitor team projects, and provide guidance. There are 15 teams per shift, which are subdivided according to key steps in the assembly process.

About the Award

The ASSEMBLY magazine "Assembly Plant of the Year" award was initiated in 2004 to showcase world-class production facilities in America, and the people, products and processes that make them successful. All manufacturers that assemble products in the United States are invited to nominate their plants.

The goal of the award is to identify a state-of-the-art facility that has applied world-class processes to reduce production cost, increase productivity, shorten time to market or improve product quality.

An official nomination form was printed in several issues of ASSEMBLY earlier this year; in addition, an online version appeared on the magazine's Web site (www.assemblymag.com). Nominations were received from a diverse group of manufacturers that reflect the magazine's demographics.

All nominees were evaluated by a group of independent experts and by ASSEMBLY's editorial staff, based on the following criteria:

- Have assembly processes been improved through the use of new technology?
- Has the plant improved its performance by making more effective use of existing technology?
- Has the plant taken steps to reduce production costs?
- Have new or improved assembly processes resulted in increased productivity?
- Has the plant used assembly improvements to reduce time to market?
- Has the plant boosted bottom-line profits and competitive advantage?
- Did operators play a role in the successful implementation of new assembly strategies?
- Has a product been effectively designed for efficient assembly?
- Has the plant attempted to protect the environment and conserve natural resources?

As winner of the third annual Assembly Plant of the Year competition, Lear Corp. (Montgomery, AL) received a commemorative banner (left) and an engraved crystal award (right) during a special presentation at the plant.

Previous recipients of the Assembly Plant of the Year award are Xerox Corp. (Webster, NY) and Kenworth Truck Co. (Renton, WA). Nomination forms for the 2007 Assembly Plant of the Year award will be available early next year.

Photo by Ken Burton

Lear Montgomery currently operates two shifts per day. It has 408 employees who build approximately 1,000 seats a day, or an average of 73 seats per hour. All employees wear colorful t-shirts and polo shirts that sport the Lear logo. According to Kim, the uniform appearance helps promote team spirit.

"Empowering our self-directed work groups to make decisions has developed an attitude of ownership," adds Mike Groce, operations manager. "This ownership drives awareness and accountability down to the team member level, which is where we are significantly impacting our bottom line in areas such as scrap and PPE (personal protective equipment)." The self-directed teams use an engineering change request procedure to communicate ideas to the engineering and operations groups.

"We have implemented an extensive pre-employment physical evaluation process and a thorough ergonomic evaluation program, both of which have allowed us to minimize the plant's medical and workers' compensation expense," says Cindy Cole, human resources manager. Job applicants also must take a test that helps determine if they can work effectively in teams.

After they're hired, employees go through a rigorous training program. For instance, they learn key principles of lean manufacturing and Six Sigma. A lean learning lab is conducted twice a week to develop leaders at all levels within the plant. The facility currently boasts six Six Sigma-certified black belts.

A side-impact airbag is attached to a passenger-side front seat. ***Photo courtesy Lear Corp.***

As part of their training, employees are also exposed to the "twelve bites," which form the guiding principles of Lear Montgomery. For example, one bite states: "Every day provides learning opportunities," says Kim, who joined Lear earlier this year, after a 20-year stint with Ford Motor Co. (Dearborn, MI). "We encourage all employees to learn from their past actions and make improvements."

Team leaders conduct daily production meetings, in addition to weekly safety training programs. Every morning and afternoon, they lead their colleagues in warm-up exercises that help reduce the threat of ergonomic injuries.

No Seat-of-the-Pants Assembly

Most drivers don't pay much attention to car seats, unless they're uncomfortable. They think of seats as just a piece of fabric stretched over a lump of foam or some coil springs. But, there's much more to a car seat than meets the eye. And, as consumers demand seats with more features, the assembly process is becoming more complex.

A seat system consists of numerous electronic and mechanical components that must be squeezed into the restrictive space of metal seat frames. Those components control a wide range of manual and power features, such as vertical and horizontal adjustment, lumbar supports, heaters, back bolsters, side-impact air bags and leg supports.

Seats have become more sophisticated as Hyundai and other automakers add more standard features, such as power seat recliners. For instance, an eight-way power driver seat with adjustable lumbar

Lear Montgomery assembles more than 300,000 sets of seats annually. This assembly line builds front seats for the Hyundai Sonata sedan and Santa Fe sport utility vehicle. ***Photo by Austin Weber***

These foam seat bottoms will be covered with fabric trim, then attached to metal frames. ***Photo by Austin Weber***

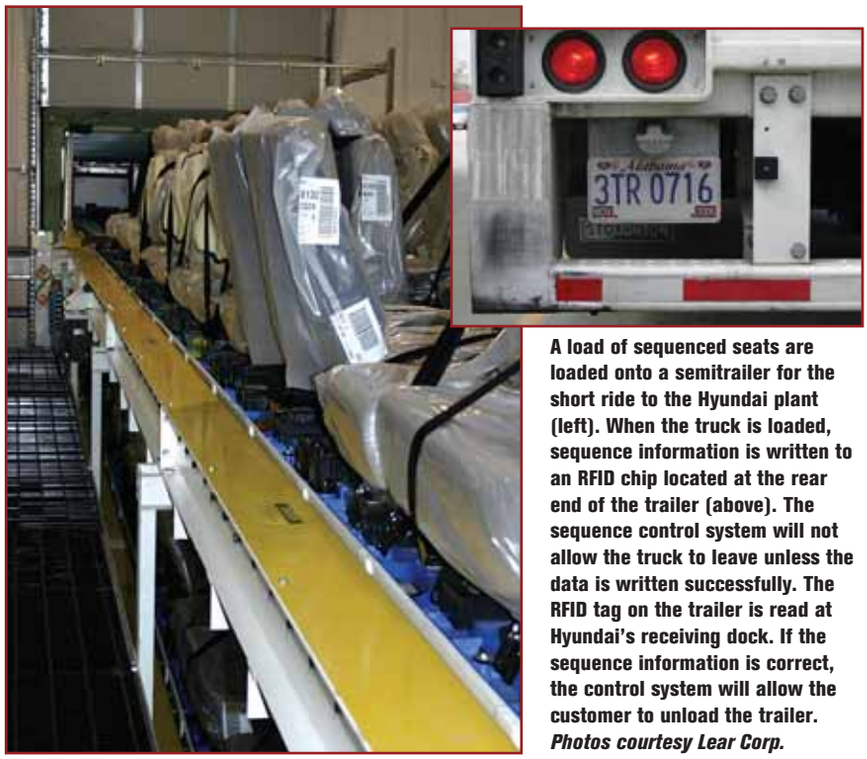
The PC-based interlock system improves overall quality by monitoring the entire seat build process. ***Photo courtesy Lear Corp.***

system is available on all Sonata models. The high-option seat contains four motors that control the forward-backward direction; the up-down direction; the recliner; and the lumbar support system.

Lear Montgomery produces 56 unique seat combinations. In addition to electromechanical controls and features under the seats, options include a choice of leather or cloth fabric trim in three colors: beige, black and gray.

Key components include seat backs and cushion frames, seat tracks, foam cushions, trim and coverings. Other components include wiring harnesses, electric motors, air bags, heat mats and seat belts.

Metal frames, guide rails and other items are outsourced, and delivered to Lear Montgomery on a just-in-time basis. The majority of suppliers deliver to the plant four times a day. Less than 4 hours of finished goods inventory is maintained, allowing the seats to be delivered in sequence to the Hyundai plant several hours after they are assembled.



A load of sequenced seats are loaded onto a semitrailer for the short ride to the Hyundai plant (left). When the truck is loaded, sequence information is written to an RFID chip located at the rear end of the trailer (above). The sequence control system will not allow the truck to leave unless the data is written successfully. The RFID tag on the trailer is read at Hyundai's receiving dock. If the sequence information is correct, the control system will allow the customer to unload the trailer. ***Photos courtesy Lear Corp.***

"Total raw material inventory is maintained at less than 1.7 days on hand," says Eric Chartrand, materials planning and logistics manager. "Most of our major commodities are maintained at a level equal to half a shift's requirements. Engineering allows changes to occur as fast as the supply base can make the change."

To boost productivity and maintain high levels of quality, the Lear Montgomery plant floor contains state-of-the-art technology, such as DC electric tools, RFID systems and paperless work instructions. The entire assembly process is controlled by a PC-based interlock system called the quality gate.

It improves overall seat quality by monitoring the seat assembly process. The system displays electronic standardized work instructions for each station, and it works in conjunction with the RFID system to provide positive seat identification and data tracking. The quality gates are interlocked to an indexing conveyor system to prevent indexing before each assembly and inspection step is completed at a particular workstation. Once a "work complete" message appears on the computer screen, operators can unclamp the part they're working on and activate the conveyor.

The system utilizes various tool, equipment and operator inputs to determine whether a seat assembly or component is considered a "pass" or "fail." It also routes defective seats to a repair station, provides immediate in-station notification of visual defects found at inspection to the operation that caused the defect, and provides an efficient means of tracking internal defects.

The quality gate system automatically sends information to an AS400 computer at several points in the assembly process. That information is used to trigger other events in the system, as well as communicate data associated with a seat.

Lear Montgomery operates four assembly lines:

- The A-Line is responsible for

assembling front seats for both the Santa Fe and Sonata. It consists of 17 workstations that are fed by 22 off-line subassembly workstations that build components such as the power recliner. Front seats have more complex features than rear seats, so they require more parts and components.

- The B-line assembles the rear seats of the Sonata. It consists of 15 online workstations and seven feeder lines for components such as left-hand and right-hand bolster subassemblies.
- The C-Line builds the Santa Fe's second row of rear seats. It has 13 online workstations and six offline workstations that assemble components such as the load riser leg.
- The D-line assembles third-row seats for the Santa Fe. There are 13 online assembly workstations supported by six feeder stations that perform prep work, such as setting Velcro strips in place on foam and trim. Trim is also attached to foam with hog ring guns.

Seats are assembled on pallets that can rotate and tilt for accessibility and flexibility. ***Photo courtesy Lear Corp.***

All seats are assembled on pallets that can rotate and tilt for accessibility and flexibility. Lear Montgomery uses several types of conveyor systems on the plant floor. For instance, the A-line uses a nonsynchronous looping system. It features an automated takt time release, but an operator has the ability to hold a station if necessary. The station will not release a pallet until all conditions are met.

The A-line also includes a loop to a repair center. Integrated decision points at the entry to the repair area automatically decide to ship or repair product based on RFID information, such as test and assembly results.

Passive read-only RFID is used in the indexing conveyor systems for product tracking. An RFID chip is embedded in the on-line build fixtures. RFID antennas are located at the quality gate interlocked stations. A seat-build sequence number is tied to a build fixture when introduced to the line.

As seats arrive at a station, the RFID chip is read and seat type-sequence number information is passed to the quality gate system. RFID technology allows automated routing of seats into test and repair areas. "The RFID system ensures that a defective seat will not be allowed out of the system until fully repaired," says Jeff Kotila, engineering manager.

"The assembly process is unique for each row assembly," adds Kotila. "However, each assembly line does share some common items."

For instance, at the beginning of the lines, the seat build sequence number is scanned into the system and is associated with the pallet. This is done through the use of RFID tags on the build pallets.

"The build sequence number and specific work instructions for the seat type are displayed at critical workstations," says Kotila. Critical data, such as torque and angle, is recorded and tracked to a seat build sequence number.

Ergonomic Initiatives

Traditionally, car seat assembly lines have spawned numerous ergonomic challenges. Due to jobs that require highly repetitive operations, assemblers are often susceptible to elbow, forearm, shoulder, thumb and wrist injuries. In fact, that's one of the reasons why many automakers decided to outsource seat production back in the 1980s.

Lear Montgomery has addressed those ergonomic issues and improved overall plant safety by using a wide variety of material-handling devices. In addition, a job rotation schedule ensures that operators are not continually exposed to the same repetitive tasks. The rear seat cushion team has an ergonomic relief station that provides operators with a 1-hour break from assembly tasks that traditionally cause excessive amounts of effort and strain.

"We use several different ergonomic aids to reduce employee fatigue and injury," says Groce. "Each application is reviewed by a team of associates and resources to ensure correct application."

Specific ergonomic tools include:

- A floor-mounted torque reaction system that incorporates a set of linear slides, a pneumatically balanced torque reaction arm and a spherical bearing. The system is mounted with slides underneath the conveyor to improve operator access to work. It allows controlled three-axis movement of DC electric tools, and absorbs a maximum torque of 65 newton-meters.
- A table-mounted torque reaction system that uses a pneumatically balanced torque reaction arm and a spherical bearing. It is mounted to a subassembly workstation and absorbs a maximum torque of 55 newton-meters.
- Rail-mounted torque reaction tubes that are mounted to the rail above the operator, due to space constraints under the conveyor. It provides controlled three-axis movement of fastening tools, and absorbs a maximum torque of 65 newton-meters.
- Spring-mounted tool balancers are used in various operations to reduce the amount of weight that operators have to lift.
- Each assembly line is equipped with multifunction build pallets that can

This set of seats is ready to be shipped to the Hyundai plant. They will be installed in a vehicle in just a few hours. ***Photo by Austin Weber***

be rotated and tilted while work is performed.

■ Each assembly line uses a seat transfer system that moves completed seats from a build pallet to a shipping pallet. Each system uses pneumatically balanced cable reels to raise and lower seats. A series of clamps engage the seats while they are being moved.

Fastening is a critical part of the assembly process at Lear Montgomery. Operators use a combination of bolts, nuts, machine screws and self-tapping screws. "Threaded fasteners utilize thread-locking compounds or prevailing torque features to ensure joint longevity," says Kotila.

To decrease the total number of parts within the plant, most of the seats share common fasteners. Each seat set contains about 30 fasteners, which are primarily used to assemble metal frames. According to Kotila, approximately 11 bolts are used in 22 different part-joining areas of the plant. In addition, three nuts are used in four applications; four machine screws are used in four steps; and four self-tapping screws are used in 16 processes.

Lear has installed DC electric tools throughout the Montgomery plant, but it also uses pneumatic tools for self-tapping fasteners. A wide variety of angle, straight and pistol-grip tools are used on the plant floor. All tools are tied into controllers that are networked so that run-down information can be accessed, torque values can be analyzed, and predictive maintenance can be performed. A 100 percent torque lock-out system allows manufacturing engineers to electronically monitor and report on all DC tools within the plant.

"Accuracy of threaded fastener joining has improved by using DC electric torque tools, as opposed to pneumatic tools," says Kotila. For instance, the fastening equipment provides superior torque control over traditional air-powered assembly tools. The electronic controls also enable error proofing. The tools automatically adjust themselves, based on specific seat configurations.

Once a "work complete" message appears on the screen, operators can unclamp the part they're working on and activate the conveyor. ***Photo courtesy Lear Corp.***

Photos used in the electronic work instructions serve as a visual aid to operators. A visual indicator array shows exactly where each fastener goes. Torque and angle are displayed on the screen and automatically captured by the quality gate system. The screen reads "pass" or "fail" as each fastener is installed.

Sequential Delivery

Lear Montgomery prides itself on timely delivery. In fact, that's one thing that sets it apart from other Hyundai suppliers. For instance, Lear has achieved 100 percent on-time delivery to the Hyundai plant.

The 2006 Assembly Plant of the Year has perfected the art of sequenced delivery. Lear Montgomery ships sets of car seats in sequence to the build schedule broadcast from Hyundai's assembly line on an hourly basis. The parts arrive on semitrailers, are unloaded and delivered directly to the line, where they are installed in the vehicles. The back seats are installed by operators with conventional lift-assist devices, but robots install the front seats.

When a set of seats is fully assembled at the Lear plant, they're wrapped in a plastic bag that contains a bar code tag. The seats are then transferred to the shipping area and prepared for delivery to the customer. An automated storage and retrieval system determines where to store the seats based on the bar code. The system selects the order of seats to be shipped based upon a live broadcast from the Hyundai plant.

Lear uses laser displacement sensors

At Lear Montgomery, DC electric tools play a critical role in ensuring quality. *Photo courtesy Lear Corp.*

Seats are assembled on a palletized conveyor system. This line assembles second-row rear seats for the Hyundai Santa Fe. *Photo courtesy Lear Corp.*

to verify shipping position of each seat. Analog output displacement lasers automatically verify the shipping position. The lasers are connected to a micro PLC for limit control and indication to the operator. Lasers are aimed at key points on the seat surface to detect position.

According to Kotila, the lasers can detect slight variations between seat materials and colors. The system is connected to the PC-based interlock system and will not allow seats to index out of station unless their shipping position is correct.

Sequenced delivery helps reduce parts inventory, reduces waste and increases efficiency. Lear Montgomery makes widespread use of RFID technology to eliminate human error and production mistakes. The system allows Lear operators to assemble several different types of seats on the same production line.

Passive read-write RFID is used in the outbound shipping sequence control system. A chip is mounted to the rear of Lear's fleet of semitrailers. Antennas are located on Lear's shipping dock and Hyundai's receiving dock.

Each semitrailer holds 54 pallets, which can be automatically loaded onboard a truck in less than 1 minute. When a truck is loaded, sequence information is written to the RFID chip on the trailer. Information is then checked to ensure that the write is successful. The sequence control system will not allow the truck dock lock to be unlocked unless the data has been written successfully to the chip.

The chip attached to the rear of the semitrailer is read when the truck backs into Hyundai's dock. If the sequence information is correct, the control system allows workers to unload the trailer. If the sequence is incorrect, an alarm horn and beacon are activated, and Hyundai employees cannot unload the truck.

Lear Montgomery has also accomplished some impressive environmental initiatives. For instance, the plant boasts a 3-to-1 recycle vs. landfill waste ratio. The plant's goal is 80 percent returnable packaging. "Paper, cardboard, metal and plastic are all recycled, and we are investigating the recycling of seat foam," says Kim Duk.

Continuous Improvement

Hyundai relentlessly pursues quality. That's one reason why it has achieved remarkable success in the competitive auto industry in a short amount of time.

The Lear motto, "advance relentlessly," is used throughout the Montgomery plant to eliminate defects, achieve 100 percent quality and meet Hyundai's stringent standards for customer satisfaction. Each assembly line includes workstations where operators visually inspect the seats. Automated heating stations on each line are used to eliminate wrinkles in leather and other trim.

In-line testing ensures that quality is built into every seat that leaves Lear's assembly line. A relatively new workstation, called the headrest effort test machine, automatically measures the effectiveness of active head restraints.

Lear engineers at the corporate R&D center in Detroit recently developed a self-aligning system called ProTec PluS. The active head restraint system protects front-seat passengers in the event of a rear collision. This standard safety feature helps prevent whiplash by moving forward to reduce the space between the occupant's head and the head restraint.

A hydraulic arm attached to sensors in the testing machine pushes each head restraint and measures the impact. The results are transferred to the quality gate system, which assigns a "pass" or "fail" status to each front seat.

Tests like that help Lear Montgomery operators ensure that every seat they assemble satisfies Hyundai and its customers. In addition, team members are constantly reminded about quality throughout the plant.

Signs hanging above numerous workstations read "J.D. Power Hot Spot!" Those signs serve as a visual reminder that Hyundai vehicles and Lear seats score high on J.D. Power's influential initial quality study (IQS)

"We walked the line with the IQS questionnaire and identified all areas in the plant's process that could affect the overall IQS score," says Patrick Danko, quality manager. "We also tied in the daily layered audits with these areas of concerns."

Things to watch out for include squeaks and rattles, material sags and loose or parting seams. Other hot spots alert operators to check for things such as how easy it is to adjust headrests or fold seats.

"This is Lear Montgomery's way of promoting the voice of the customer to the entire workforce," explains Danko. "We also use the warranty information we receive back from the customer and update these signs accordingly."

The plant also conducts regular kaizen events, with equal participation from management and plant floor personnel, to measure productivity and improve assembly processes. For example, the team recently conducted a kaizen to increase throughput, which was driven by a Hyundai demand for more second-row seats on its Sonata assembly line. That required Lear Montgomery to increase throughput on its B line from 40 jobs per hour to 59 jobs per hour.

"The team was tasked with minimizing manpower additions to accommodate the 48 percent increase in throughput," says Rob Sakey, production manager. "The main constraints of the B line were floor space, material flow and manpower. The team was tasked with incorporating a new layout that implemented cellular builds, to better utilize floor space, while providing a better flow of materials."

To identify where operators needed to be added, the kaizen team worked with Julius Martin, an in-house Six Sigma and lean manufacturing coach. He suggested using a corporate industrial engineering tool that includes computer simulation.

After identifying where people needed to be added on the assembly line, simulation models allowed the kaizen team to identify the best sequence of operation for the production tasks. The team then validated the study by conducting actual time studies to ensure that the operations could be performed at takt time.

Ultimately, the kaizen was a success, and Lear Montgomery met its customer's goals, delivering increased productivity through better material flow. **A**

Find out more about Lear with a click!

www.assemblymag.com