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Chrysler Group's Sterling Heights (Mich.) Assembly Plant Rises to the Occasion as it Prepares for the All-new 2015 Chrysler 200

- Company invests nearly \$1 billion in the Sterling Heights Assembly Plant (SHAP) for production of the all-new 2015 Chrysler 200 sedan
- All-new, state-of-the-art one million square-foot paint shop provides premium finish
- All-new UWE Braun lights installed to evaluate paint quality
- World-class sealing of the new 200 means a quieter interior compartment
- Zero emissions of powder prime through recirculating powder spray booths
- Friction Drive Conveyor system is all electric and only moves when needed, reducing energy usage and noise
- All-new body shop is fully-robotic and features leading edge technology
- Automated closure panel line features robotically guided lasers; precisely measures critical aspects of each body to ensure best fit and finish, consistently
- New Metrology and Quality Assurance Centers focused on ensuring quality assembly of the new 200 and customer satisfaction
- Several significant upgrades to assembly line through World Class Manufacturing integration result in higher quality that customers will appreciate
- More than 900 jobs added at SHAP since 2011

March 21, 2014, Auburn Hills, Mich. - First established in 1953 as a jet engine plant, Chrysler Group's Sterling Heights (Mich.) Assembly Plant (SHAP) has experienced a cycle of changes in its lifetime, with none more significant than what lies ahead. The facility plays an integral role in the production of the all-new 2015 Chrysler 200.

SHAP's story is one of rags to riches. In June 2009, as a new company emerged from bankruptcy, the plant found itself left behind as part of the estate of the Old Company and slated to close in December 2010. Operating at only 50 percent of one shift, there appeared to be no future for the once booming facility. But as quickly as hope faded, SHAP and its employees began to see a glimmer of renewed optimism in a series of positive announcements.

In March 2010, with sales of the Chrysler and Dodge mid-size sedans rebounding, Chrysler Group announced that it would repurchase the plant and extend production through 2012. In July 2010, during a visit by President Obama to another Detroit-area Chrysler Group facility, the Company announced that SHAP would remain open indefinitely and add a second shift of production (about 900 jobs) in the first quarter of 2011. At a celebration event in December 2010, Chrysler Group confirmed that with continued growing demand and new product on the horizon, SHAP would receive a nearly \$850 million investment that would include construction of an all-new, state-of-the-art paint shop, as well as the installation of new machinery, tooling and material-handling equipment.

The second shift began production in February 2011 and yet another investment announcement followed in October 2011. This time, \$165 million would be spent to add a one million square-foot body shop. Combined, the new paint and body shops make SHAP one of the most versatile, flexible and state-of-the-art production facilities in the Company.

"For SHAP, the road has not been an easy one, one often filled with uncertainty and doubt," said Mauro Pino, Vice

President – Head of NAFTA Manufacturing/World Class Manufacturing. “But in spite of significant obstacles in their path, the employees rose to the challenge and persevered, proving that SHAP could play a critical role in the long-term success of the Company. It was because of their dedication and commitment that we decided to invest in the plant and give them the proper tools to chart a new course.”

Part of SHAP's rise from the ashes had to do with the implementation of World Class Manufacturing (WCM). Introduced to Chrysler Group through its alliance with Fiat, WCM has proven to be transformational in the Company's success. WCM focuses on reducing waste and increasing productivity while improving quality and safety in a systematic and organized manner. WCM engages the workforce to provide and implement suggestions on how to improve their jobs and their plants.

Although SHAP's future was uncertain, it began implementing WCM in June 2009. The plant underwent its first audit in May 2010. The plant endured performance audits approximately every six months, improving its results with each one. Now as SHAP focuses on the launch of the all-new 2015 Chrysler 200, it is also striving to achieve Bronze status along the WCM milestones, one of the critical WCM milestones on the journey to World Class. A Bronze award would mark a significant achievement for the plant.

“The pride that beams from every worker here at SHAP is truly incredible,” said Tyree Minner, Plant Manager – SHAP, Chrysler Group LLC. “That pride is delivered in every minute detail of each vehicle that crosses their path. SHAP employees want our customers to know that passionate people created their vehicle with a lot of heart.”

SHAP body shop: designed for flexibility and increased quality

SHAP's new body shop is a reflection of the global standard that was developed jointly between Chrysler Group and Fiat. It is the third iteration to be deployed in Chrysler Group's U.S. plants of an all-new body shop that is fully cross loadable with any model from the Company's A to D segment products. The first was at the Belvidere (Ill.) Assembly Plant, home of the Dodge Dart, followed by the one at the Toledo (Ohio) Assembly Complex, where the all-new Jeep® Cherokee is built. Fiat has installed three similar body shops: two in Italy and one in Serbia. SHAP's

new body shop is capable of building up to four different models.

In the all-new body shop, the main lines consist of modular standard configurations. This design, referred to as a BRIC (Basic Robot Integrated Configuration), reduces the installation time of equipment because the robots, equipment and associated electrical control panels are shipped as a complete unit. The BRIC eliminates the need to disassemble and reassemble the equipment at the OEM. In addition, this design provides other advantages, such as high density welding ease of maintenance and excellent visual management compared to other conventional welding systems.

Through this standard approach, Chrysler Group has carried over nearly all of the documentation from its previous launches pertaining to the Professional and Autonomous Maintenance pillars (part of the WCM methodology) including machine ledgers and standard maintenance procedures. Deployment of Early Equipment Management, another WCM pillar, which ensures lessons are learned with rigor and discipline, is the key enabler to a vertical launch in the body shop and substantially reduces model changeover and start-up time. This is particularly important when looking at the innovative assembly techniques utilized, including the extensive use of lasers for brazing and welding applications.

The laser braze welding process uses an intense laser-light beam to melt a piece of silicon wire, applied by four robots, into a predetermined location between the body side aperture and roof panel, allowing for a seamless transition between mating surfaces and eliminating the need to cover the attachment area with a secondary trim component. Laser braze, widely used by Fiat, was first introduced at Chrysler Group's Brampton (Ont.) Assembly Plant for the launch of the 2011 Chrysler 300 and Dodge Charger, the 2013 Dodge Dart in Belvidere (Ill.) and again on the 2014 Jeep Cherokee in Toledo, Ohio. This fully automated technology gives Chrysler Group vehicles a best-in-class sculptural appearance, while improving aerodynamics, customer quality and achieving optimal process cost reductions.

On the automated closure panel installation line, the vehicle's body shell enters the cell and robots, utilizing measurement lasers, identify critical characteristics of each body. The data is then used to automatically fit decklid, doors, fenders and hood panels. This process ensures each vehicle meets exacting fit and finish specifications. As

the vehicle continues to move through the process, these measurements are again utilized to robotically guide lasers to precisely cut the front rails of the car to length. This provides a precision mounting surface for the front-end module that is installed in the final assembly area.

Another area that was jointly developed by Chrysler Group and Fiat is where the vehicle body is framed, called the Open Gate Framer. This area is capable of building four different car models. There are 18 robots, eight on the floor and 10 hung from above, which precisely weld the panels to the body, ensuring a consistent and dimensionally repeatable build of each vehicle.

Chrysler Group added a 28,000-square-foot metrology center at SHAP. Now located in most of Chrysler Group's assembly plants, the metrology centers reflect the Company's heightened dedication to quality. SHAP's metrology center employs 30 people, who are responsible for the measurement and validation of the vehicle's body geometry. The tools within the metrology center include state-of-the-art inspection equipment, like a Meisterbock gauge and blue light laser scanners that allow for 3-D measurement and certification of both plant processes and incoming supplier parts. The goal is to efficiently deviations identify and root cause issues, starting with the early pilot builds, so that customers receive the highest quality vehicles.

"There has been a fundamental shift in how Chrysler Group is manufacturing vehicles today. In the past, the car designs would arrive at the plant and we would build them," said Bernie Mitchell, Director, Manufacturing Engineering Body-In-White — Chrysler Group LLC. "Now, there is much more effort and more involvement in the manufacturing process upfront. We are not just designing for cars; we're designing for manufacturing too."

SHAP's paint shop adds a new dimension to watching paint dry

As Chrysler Group's first full, all-new, start-to-finish paint shop in 13 years, the Company broke ground in June 2011 and construction was finalized in August 2013. At nearly a combined one million square feet, spread over three floors, the all-new SHAP paint shop is a leader in technique and waste management. It is so flexible that it could paint nearly all of Chrysler Group's entire product line.

"The first question most people are asked when they buy a new car, 'What color did you get?'" said Richard Owusu, Director — Paint Operations, Chrysler Group LLC. "Having spent several decades in this field, I know how important an exceptional paint job is to creating a positive first impression. I believe we have accomplished that with this new facility.

"Countless hours of research between several teams of employees went into developing the new paint shop," said Owusu. "We have utilized the most advanced equipment and distinctive processes to provide a beautiful and durable color and shine to the 2015 Chrysler 200 that will exceed our customers' highest standards."

SHAP's paint shop has some very unique features that set it apart from other facilities. First, SHAP is one of only three paint facilities in the United States with a 180-degree rotating conveyor system to apply Underbody Sealing and Underbody Coating (UBS/UBC). (The other two are Chrysler's Belvidere and Toledo Assembly Plants.)

Working much like a rotisserie with 24 robots, the vehicle body is rotated completely upside down to ensure world-class sealing of underbody seams and underbody coating. This process utilizes gravity to its advantage because all of the overspray ends up on the areas where it is intended. This innovative, state-of-the-art technology also reviews all seams to ensure they are in place prior to rotating right-side up. By rotating the product at the Masking and Demasking stations, operators are able to work in the "golden zone," the 60-degree window directly in front of them for optimum ergonomics. Of the 24 operating robots on the UBS/UBC line, eight were recycled from the former Newark, Del., and St. Louis paint shops.

Second, Chrysler Group has implemented a UWE Braun Lighting System along the final paint review line. The lights automatically adjust intensity based on the vehicle's paint color or reflectivity. This provides optimum conditions to review the final painted body, eliminating operator eye strain and fatigue.

The new paint facility also uses a Friction Drive System (FDS) to move the vehicle on a carrier seamlessly and silently on eight miles of conveyor through the different phases of the paint process. It indexes vehicles using drives with friction wheels, instead of the conveyor chains traditionally used in most assembly plants. With fewer moving parts, the system reduces equipment cost, energy consumption, noise and maintenance cost, while decreasing

sources of contamination due to the lack of chain oil.

Unlike some of its competitors, Chrysler Group continues to use powder primer to provide better chip resistance and durability than liquid primer. The Powder Primer System consists of eight wall-mounted robots, which along with a pressurized conveyor shroud, helps reduce powder contamination on the equipment and protects the carrier. In keeping with the facility's high attention to waste management, this system utilizes 97 percent of its powder material. Virgin powder is sprayed on the top of the vehicle. Any unused powder is collected, filtered and mixed with more virgin powder to make reclaimed powder, which is then also sprayed on the vehicle. The powder process is environmentally safe providing zero VOCs to the powder exhaust.

The paint mix rooms house tanks containing 14 colors, plus two spare tanks for replacement or new colors. The anti-static floors are lined with a special coating, grounding anything that enters the room to eliminate potential fire hazards. All paint tubs were re-used from former Chrysler facilities in Newark.

Located on the third floor alongside the powder spraybooth are three separate topcoat spraybooths. The use of full glass walls on the spraybooths allows for ideal visual management throughout the completely robotic system. All three spraybooths utilize wall-mounted robotic automation to minimize overspray contamination. After the topcoat spraybooths, each vehicle spends approximately 33 minutes in the topcoat oven. All oven exhaust is routed to a Regenerative Thermal Oxidizer (RTO) to properly cleanse the exhaust air of any VOCs.

The Topcoat System utilizes three recirculating spray booths to maximize energy conservation. The 68 wall-mounted robots spray waterborne basecoat and 2K clear coat. Like the Powder Primer System, the Topcoat System integrates a pressurized conveyor shroud to minimize paint overspray contamination.

Within a paint shop, the most significant energy users are the paint spray booths, requiring several million cubic feet of air per minute with very tight temperature and humidity specifications. The booths utilize natural gas, electricity and water in order to meet stringent process control requirements. The paint shop at SHAP uses a "Cascading Air/Recirculating Air" process to significantly reduce energy and water usage by replacing 100 percent of the fresh air from outside with mainly recycled ambient plant air as the input to the paint spray booths, then 90 percent of that air is re-circulated. This innovation results in significant annual energy and water savings, and is also practiced at other Chrysler Group locations, including the Brampton (Ont.) Assembly Plant and Toledo (Ohio) North Assembly Plant.

Building the next generation vehicle

While the most visible and significant changes to the SHAP facility were the addition of the new paint and body shops, which together utilize 22 percent less energy than the old facilities, the assembly plant is making improvements to cater to the next generation of vehicles in Chrysler Group's pipeline. In preparation for the production of the all-new 2015 Chrysler 200, SHAP installed a Work Place Integration (WPI) room to continue advancing the plant's progress in WCM. In the WPI room, every operation in every workstation for the assembly of the new 200 is reviewed; best practices evaluated and processes verified before a single vehicle is built. Using ICIDO virtual technology, the movements of each operator are simulated and evaluated in the WPI room to ensure that they are working with precision and addressing ergonomic concerns upfront, before the first vehicle is built.

As a result of the WPI process, smaller teams have been created – one team leader to six team members (previously 10 to 1) – to establish better communication, awareness and expedited problem solving. Learning from vehicle launches at other facilities, SHAP management began familiarizing its workers with the new 2015 Chrysler 200 by building early prototypes on the existing lines throughout the plant and on both shifts.

With production of the all-new 2015 200, SHAP will bring in-house the assembly of the rear suspension, which was previously outsourced. By bringing this process in-house, the Company will realize greater cost savings, eliminate logistical challenges and enhance build quality. Through the many WCM audits over the last four years, SHAP was able to reconfigure its equipment to accommodate this addition within the plant's existing footprint. The rear suspension line is reinforced with wood floors and aligned specifically to optimize ergonomics for the assembly workers.

Another significant change to the assembly plant is the addition of the Quality Assurance Center (QAC), which performs extensive testing and analysis on parts received from suppliers in order to guarantee the highest quality components. The convenience of the QAC allows for immediate feedback to suppliers. The QAC houses a chemical

and vibration analyses conducted by certified chemists in its laboratory, but also manages testing in appearance, mechanics/chassis, weight, heating, ventilation and cooling (HVAC) and underbody. A sample of assembled vehicles is randomly selected to run through the QAC each day.

In addition to the rear suspension system and the QAC, another improvement made at SHAP in preparation for the 2015 Chrysler 200 includes the addition of a Materials Conveyance System. This system automatically moves material to the proper location on the line in pre-selected kits, making the assembly process more efficient for the operator and helping to improve quality. Additionally, the system allows the plant to be 100 percent fork-free, resulting in a cleaner and safer environment for employees.

"After being slated for closure, every person at SHAP is humbled and honored to be contributing to the success of the Company's newest vehicle," said SHAP Plant Manager Minner. "This is our second chance, and we are proud to be helping Chrysler Group shine again."

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