FCA CANADA
Safety & Technology
OVERVIEW & GLOSSARY

FCA US Breaking Out the Strong Stuff, Gets Lit for 2017

- **Higher-strength steel usage up 53 percent at FCA US since model-year 2012**
- **Advanced High-Strength Steel content highest in all-new, Canadian-built 2017 Chrysler Pacifica body structure**
- **LED headlamp technology debuts on 2017 Jeep Wrangler, delivering 90 percent more high-beam output versus halogen**
- **2017 lineup boasts more than 75 driver-assist, occupant-restraint and connectivity features that benefit safety and security**

As FCA US LLC expands and freshens its vehicle lineup, so goes the Company's use of higher-strength steels – a key contributor to improved crashworthiness.

Model-year 2017 also marks the debut of light-emitting diode (LED) headlamps in the FCA US lineup. The technology delivers greater light output, which allows drivers to see more – and potentially see it sooner.

"Our commitment to improving safety is unwavering," says Mike Dahl, Head of Vehicle Safety and Regulatory Compliance. "We are continually exploring the use of new materials and components that will boost the performance of our vehicles, for the benefit of our customers."

Compared with body structures of the vehicles they replaced, higher-strength steel content has increased more than 53 percent in the all-new, mainstream-segment vehicles introduced by FCA US since model-year 2012. These materials contribute to improved crashworthiness as well as weight reduction, which helps improve fuel efficiency.

Among the vehicles launched most recently, two have earned Top Safety Pick+ ratings from the Insurance Institute for Highway Safety (IIHS): Fiat 500X small crossover and the Chrysler 200 mid-size sedan. Higher-strength steel content levels in their body structures total 74 percent and 66 percent, respectively.

"It should also be noted this increased integration extends to the higher-end materials, such as Advanced High-Strength Steel (AHSS)," Dahl says.

AHSS accounts for 38 percent of the all-new 2017 Chrysler Pacifica's body structure – the highest such concentration in any FCA US vehicle. The 500X boasts the next-highest AHSS level at 28.3 percent.

Similar usage jumps have occurred with hot-stamped steel, which accounts for 14 percent of the Jeep Renegade's body structure.

According to the Steel Market Development Institute (SMDI):

- High-Strength Steel (HSS) is a medium-strength steel used in various body-structure components; it is up to 100 percent stronger than conventional or "mild" steel
- AHSS is a higher-strength steel used in parts such as beams, sills, cross-members and other energy-absorbing components; it is up to 300 percent stronger than mild steel
- Hot-stamped steel is press-hardened for use in parts with complex shapes; it is up to 500 percent stronger than mild steel

Higher-strength steels also are lighter than conventional grades, so vehicles may benefit from weight reduction and improved fuel-efficiency. The all-new Chrysler Pacifica is 113 kilograms (250 pounds) lighter than the vehicle it replaced, and more than half of that weight savings is attributed to body structure.

The debut of LED headlamps in the FCA US lineup further reflects the Company's staunch pursuit of technologies that improve the driving experience. The 2017 Jeep Wrangler's headlamps generate high-beam light output that is 90 percent greater than the halogen lamps in prior models; low-beam output also jumps 63 percent.

"Such lighting helps afford the driver a better view of the road ahead, the benefits of which are literally plain to see," Dahl says.

Despite their increased output, the new Wrangler's headlamps draw 67 percent less power than comparable halogen lamps.

Structural systems and advanced lighting technology comprise a snapshot of FCA US strategy. The following are among the additional safety and security features available in FCA US vehicles:

Structural system technology

1. **Energy-absorbing steering column:** Manual-adjust steering column features two hydroformed coaxial tubes that move relative to each other to allow for enhanced energy absorption during an impact; power-adjust steering column employs a calibrated bending element that deforms during column stroke for optimal energy management
2. **Front and rear crumple zones:** Specially-formed structural members that crumple and absorb energy in a collision, helping protect the occupant cabin
3. **Laminated glass:** Plastic sandwiched between glass panes to provide added strength; discourages break-ins
4. **Safety-cage body structure:** Helps protect occupants by managing and controlling energy in the event of an impact
5. **Side-guard door beams:** Reinforcement beams inside the doors that help provide occupant protection in certain side collisions

Driver warning and assist, chassis control and brake systems

1. **Advance Brake Assist:** Works with Forward Collision Warning with Active Braking; increases deceleration if the driver does not apply brake with sufficient force to respond to collision condition
2. **Adaptive Cruise Control:** Helps maintain a safe, driver-selectable distance from the vehicle ahead; under certain traffic conditions, the available Stop and Go function can bring the vehicle to a full stop without driver intervention and resume as traffic ahead clears when the driver taps the accelerator or depresses the resume button
3. **All-Speed Traction Control system:** While driving, helps keep wheels from spinning during acceleration from a stop or at speed by applying brakes alone or in combination with engine torque limitation
4. **Anti-lock Brake System (ABS):** Senses and prevents wheel lockup, offering improved steering control under extreme braking and/or slippery conditions
5. **Blind-Spot Monitoring (BSM):** Uses radar sensors to aid the driver when changing lanes, passing or being passed; blind-spot vehicle presence noted via illuminated icons in sideview mirrors and driver-selectable audible chime; paired with Rear Cross-Path Detection
6. **Brake Assist:** System applies maximum braking power in emergency braking situations, minimizing stopping distance

7. **Brake-lock Differential System:** Allows the vehicle to maintain forward motion if one or two wheels lose traction by selectively and aggressively applying brakes to the spinning wheels
8. **Brake-throttle override:** Standard equipment on every FCA US vehicle, it allows the driver to stop the vehicle when throttle and brake inputs occur simultaneously; electronic throttle control also reduces engine-power output
9. **Brake/park interlock:** Prevents transmission from being shifted out of "Park" unless the brake pedal is pushed
10. **Brake Traction-control System:** Helps to keep wheels from spinning during acceleration from a stop or during slow speeds by applying individual brakes to the slipping wheel(s)
11. **Electronic Brake-force Distribution:** Optimizes stopping distances and control under all vehicle loading conditions by regulating braking pressure, front-to-rear
12. **Electronic Roll Mitigation (ERM):** Uses input from electronic stability control (ESC) sensors to anticipate potential rollover conditions; applies brakes individually and modulates the throttle position to help driver maintain control
13. **Electronic Stability Control (ESC):** Enhances directional control and stability of the vehicle in various driving conditions; activation occurs when steering-wheel angle differs from the angle of the vehicle; automatically reduces throttle input and/or selectively deploys brakes to counteract oversteer or understeer
14. **Forward Collision Warning with Active Braking**: Radar and camera technology combine to determine if frontal impact with another vehicle appears imminent; if so, the system pre-fills the brakes, then transmits audible and visual warnings for the driver to intervene; no driver response triggers brief brake application as tactile alert; if the driver remains unresponsive and frontal collision risk remains, brakes are applied to slow vehicle before impact; system may bring vehicle to full stop if imminent frontal collision detected at speeds below 32 km/h
15. **Forward Collision Warning:** Radar determines if a frontal impact with another vehicle appears imminent; if so, system pre-fills brakes, then transmits audible and visual warnings for the driver to intervene; no automatic action is taken – the driver must remain responsible for safe operation of the vehicle
16. **Hill Start Assist:** Assists drivers when starting from a stop on a hill; maintains brake pressure for short period of time after the driver's foot is removed from the brake pedal; if throttle is not applied within short period of time thereafter, brake pressure will be released
17. **Lane Departure Warning with Lane Keep Assist**: Alerts and assists driver to correct unintentional lane drift; leverages electric power steering to deliver subtle steering-wheel input when system detects need for course correction

18. **Parallel and Perpendicular Park Assist:** Features ultrasonic sensors on the bumpers to find and guide the driver into a suitable parking space; guidance system automatically controls the steering angle while the driver controls gear position, brake, and accelerator; parallel parking possible on either side of the car; to accommodate perpendicular parking, vehicle is backed into the space
19. **Park-Sense Front and Rear Park Assist:** Park-Sense ultrasonic sensing technology assists at low speeds when backing up vehicle, or during parking manoeuvres, sensing objects up to 1.83 metres (6 ft) away; depending on the vehicle, ultrasonic sensors are discreetly integrated into the rear or front and rear bumpers; activate audible warnings and a visual display in the in-cluster display centre when the vehicle is close to encountering an object; signals increase in intensity as the vehicle nears the object; on select vehicles Active Braking capability can provide momentary autonomous brake pulse and, under certain conditions, bring the vehicle to a stop before releasing
20. **ParkView Rear Back-up Camera:** Provides wide-angle view of area immediately behind the vehicle, giving the driver greater peace of mind before reversing; some vehicles may feature dynamic grid lines to aid the driver when manoeuvring into parking spaces or narrow areas; also assists when lining up trailer to vehicle's hitch, when so equipped; image displayed on the multimedia screen or in the rearview mirror (depending on the multimedia centre) when the transmission is shifted into Reverse
21. **ParkView Rear Back-Up Camera with view at speed capability:** On select vehicles, ParkView Rear Backup Camera features "View at Speed" functionality; allows the driver to initiate their rearview camera while driving to easily check on attached trailers
22. **Rain Brake Support:** In rainy conditions, occasionally pushes brake pads lightly against brake rotors to keep rotors dry
23. **Ready Alert Braking :** Anticipates situations when the driver may initiate an emergency brake stop and uses ESC pump to set brake pads against rotors, decreasing time required for full brake application
24. **Rear Cross-Path Detection:** In parking-lot situations, warns drivers of lateral traffic when backing out of parking spaces; automatically activates any time a vehicle is in reverse gear; driver alerted of approaching vehicle(s) via illuminated icons on sideview mirrors and driver-selected audible chime; paired with Blind-Spot Monitoring
25. **Trailer Sway Control**: Uses input from electronic stability control (ESC) sensors to anticipate potential trailer-induced yaw conditions; applies brakes individually and modulates throttle to help the driver maintain control

Occupant restraint technology

1. **Active head restraints:** Deploy during collision; designed to help reduce injuries by minimizing gap between an occupant's head and the head restraint
2. **Advanced multistage driver and front-passenger air bags:** Inflate with force appropriate to the severity of the impact; meet FMVSS 208 advanced air bag requirements for smaller, out-of-position occupants
3. **All-row, full-length side-curtain air bags:** Extend to all outboard front- and rear-seat passengers; housed in headliner above side windows, each side air bag has its own impact sensor that triggers deployment on the side of the vehicle where impact occurs
4. **BeltAlert:** Activates chime and/or illuminates icon in instrument cluster to remind the driver and front passenger to buckle up if vehicle is driven without belted front-seat occupants
5. **Child Seat Anchor System:** LATCH (Lower Anchors and Tethers for Children) designed to ease installation of compatible aftermarket child seats
6. **Constant-force retractors:** Regulates force exerted on occupant by seat belt, then gradually releases webbing in controlled manner
7. **Front seat-belt pretensioners:** During a collision, impact sensors initiate front seat-belt pretensioners to remove slack in the seat-belt system, thereby reducing the forward movement of the occupant's head and torso
8. **Front-seat-mounted side pelvic thorax bags:** Help provide enhanced protection to the driver and front passenger in certain impacts; each side air bag has its own impact sensor that triggers deployment on the side where an impact occurs
9. **Driver's knee blocker air bag:** Deploys with advanced multistage driver air bag; located below instrument panel, device designed to properly position occupant during impact
10. **Height-adjustable seat belts (front row):** Outboard seat belts feature height adjustment, allowing for seat belt to be placed in optimal position for any driver
11. **Occupant restraint controller:** Detects impact and determines if air bag deployment, and degree of deployment is appropriate; also deploys front seat-belt pretensioners

Lighting and visibility systems

1. **Active turn signals:** Turn signal flashes three times when stalk is depressed for one second
2. **Auto-adjust exterior mirrors:** Sideview mirrors automatically adjust to accommodate rearview when vehicle shifted into reverse
3. **Auto-dimming rearview mirror:** Auto-dimming mirror automatically reduces glare from bright light allowing the driver to have a clearer view of the road ahead

4. **Automatic defog:** Automatic temperature control system measures interior humidity and activates defogging system without driver intervention
5. **Automatic headlamps:** Headlamps turn on and off automatically depending on exterior light levels and if windshield wipers are operating
6. **Automatic high-beam headlamps:** Headlamp system adjusts to ambient light and oncoming traffic to deliver maximum lighting
7. **Daytime Running Lamps (DRL):** Low-intensity halogen or signature LED lights that illuminate during daytime conditions, increasing vehicle's visibility to other drivers
8. **Enhanced Accident Response System (EARS):** Makes it easier for emergency personnel to see and reach occupants in the event of an accident by turning on the interior lighting and unlocking doors after air bag deployment; also shuts off flow of fuel to the engine
9. **Heated windshield washer nozzles:** Delivers heated washer fluid to more efficiently clear windshield in inclement weather
10. **High-intensity Discharge (HID) Headlamps:** Provide approximately three times the light output than conventional reflector lamps
11. **Halogen Infrared Reflecting Bulbs (HIR):** Unique component coating delivers greater light output than conventional bulbs
12. **LED fog lamps:** Provide improved illumination during inclement weather
13. **LED taillamps:** Provide dual-function illumination (brake, stop, turn and running light functions)
14. **LED headlamps:** Provide improved illumination
15. **Rain-sensing windshield wipers:** A driver convenience feature that automatically senses moisture on the windshield and activates wipers

Emergency connectivity and other features

1. **Auto-reverse sunroof:** Automatically reverses when it senses an obstruction while closing
2. **Auto-reverse windows:** Automatically reverses when they sense an obstruction while closing
3. **Capless fuel-filler door:** Enables fuel-filling simplicity
4. **Child-protection rear door locks:** Disables rear doors' inside-release handle by adjusting a small lever opposite the doorjamb
5. **Electronic locking fuel-filler door:** Prevents theft or tampering, which can lead to damage, inefficiency and unwanted fuel vapour release
6. **One-touch up/down windows:** One-touch express up/down window button located on the front driver and passenger-side door

7. **Global Position Sensor (GPS):** Used for navigation guidance
8. **Intelligent Battery Sensor:** Continually measures flow of current into and out of battery; if battery is running low, system shuts off less-critical electrical systems to conserve power; icon in cluster denotes activation
9. **Inside emergency trunk-lid release:** Glow-in-the-dark handle enables unlocking from inside trunk
10. **Keyless Enter 'n Go with proximity entry and push-button start:** Electronic sensors detect if unique vehicle key fob is present, which enables passive cabin entry and trunk access; illuminates interior lamps and enables push-button ignition – no need to insert key
11. **Remote Keyless Entry:** Locks and unlocks doors and turns on interior lamps. If vehicle is equipped with security alarm, remote also arms and disarms system
12. **Remote start:** Fob-activated convenience; starts engine and activates interior climate settings while maintaining vehicle security
13. **Sentry Key engine immobilizer:** Utilizes engine key with embedded transponder and preprogrammed security code to discourage vehicle theft; when key is inserted into the ignition, controller sends a random number to the transponder and engine is allowed to start; engine will shut off after a few seconds if an incorrect key is used
14. **Speed-sensitive door locks:** System automatically locks doors when vehicle acceleration reaches prescribed threshold
15. **Tilt-and-telescoping steering column:** Allows steering column to tilt and move toward or away from the driver to achieve a safe and comfortable distance from the advanced multistage front driver air bag, if deployed
16. **Tire-pressure Monitoring (TPM) System – Lock-on Sync:** Informs driver when tire pressure is too low; pressure-sensor modules within valve stems of all four wheels send continuous radio-frequency signals to a receiver; available systems use graphic display to indicate tire-specific pressure
17. **Voice Command:** One-step voice destination entry allows simple destination entry on premium navigation systems by stating the entire address; Hands-free texting: Uconnect can read or send text messages on your compatible MAP-enabled mobile phone; Voice text reply allows you to forward your choice of 18 – 20 (model-dependent) preset SMS messages, such as “Be there in 15 minutes,” without touching your phone; Hands-free calling means answering and making calls with the touch of a button and the sound of your voice; Siri Eyes Free allows the driver to initiate voice commands by holding down the voice command button on the steering wheel, allowing compatible iPhone models (4S or later) to send text messages, play music, place phone calls and access turn-by-turn directions (feature availability is dependent on radio)

About FCA Canada

Founded as the Chrysler Corporation in 1925, FCA Canada Inc. is based in Windsor, Ontario, and celebrates its 91st anniversary in 2016. FCA Canada Inc. is a wholly owned subsidiary of FCA US LLC, a member of the Fiat Chrysler Automobiles N.V. (FCA) family of companies. FCA Canada has approximately 440 dealers and markets Chrysler, Jeep®, Dodge, Ram and FIAT brands, as well as the SRT performance vehicle designation. The company also distributes Alfa Romeo models and Mopar products. In addition to its assembly facilities, which produce the Chrysler Pacifica, Dodge Grand Caravan (Windsor), Chrysler 300, Dodge Charger and Dodge Challenger (Brampton), FCA Canada operates an aluminum casting plant in Etobicoke, a research and development center in Windsor, and has sales offices and parts distribution centers throughout the country.

FCA, the seventh-largest automaker in the world based on total annual vehicle sales, is an international automotive group. FCA is listed on the New York Stock Exchange under the symbol “FCAU” and on the Mercato Telematico Azionario under the symbol “FCA.”