

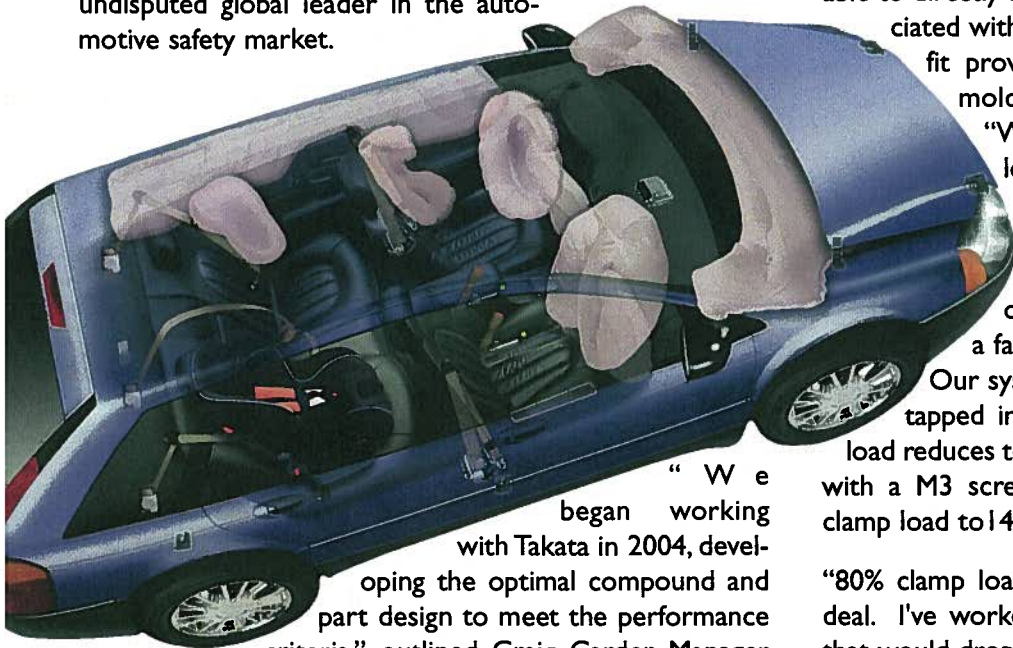


BMCI's commitment to organic market growth through the appropriate replacement of metal in high tolerance components has resulted in another success story. Since the fourth quarter of 2008, BMCI's Far East unit (located in Dongguan, Guangdong Province, P.R.C.) has supplied a proprietary grade of **BMC 605** for use in injection molding the housing of a Takata brand (www.takata.com) Airbag Control Unit (ACU). Takata, with engineering based out of Farmington Hills, Michigan, is manufacturing this ACU in China for automobiles built and sold in China (brands include SAIC, First Auto Works, Chery and London Taxi). This device is the central control unit for all of the airbag sensors throughout the vehicle, and the first ever to use a BMC compound as its housing material.

continued

(BMC Airbag Sensor, continued)

Takata began its safety device business in 1952 with a limited line of seat belts for the Japanese automobile industry. Over time, through the inventiveness and hard work of its employees, Takata has grown to be a major supplier of a broad range of passenger and driver safety systems and devices serving the automotive community through extensive global operations. Today, Takata's revenue comes almost equally from the Americas, Europe and Asia. With over 75 years of 'success in safety', Takata continues to meet greater challenges, establishing themselves as the undisputed global leader in the automotive safety market.



“We began working with Takata in 2004, developing the optimal compound and part design to meet the performance criteria,” outlined Craig Carder, Manager of Technical Services at BMCI. The project began as paper sketches, gained momentum and then progressed through test plaque evaluations, FEA and finally, prototype tooling/injection molding. Fred Oswald, Integration Engineer with Takata, worked with the technical team at BMCI to create several design iterations that were molded at BMCI's West Chicago applications development laboratory. Mr. Oswald commented, “This is the best supplier that I have worked with in 25 years in automotive engineering. Prototyping at BMCI allowed five iterations of tooling in less than two months, with parts being assembled and tested in between.” (See “Rapid Prototype” article, page 5)

During intensive test review, the injection-molded BMC housings passed all of the same performance tests required of the aluminum die cast alternative. In fact, the BMC component was found to be stiffer than the aluminum incumbent. This functional advantage was realized during vibration testing. Stiffness is critical to the performance of an ACU as its technology is dependent upon the accurate conveyance of forces acting upon a vehicle during a crash event. The resonant frequency of

accelerometer assemblies approached 1000 HZ with **BMC 605**.

Takata also established BMC advantages associated with the assembly and attachment of their ACUs. Fred Oswald continues, “self threading fasteners used in aluminum ACU housings result in scrapped housings if, for any reason, disassembly is required. **BMC 605** self tapping bosses held fast through 30+ cycles, allowing for potential to rework versus the sure expense of scrap.” In addition, Takata was able to directly attach BMC covers without the cost associated with torque limiters or inserts: another benefit provided by the uniquely rigid **BMC 605** molding material. Mr. Oswald concludes, “When a screw is fastened it creates a clamp load. Specifically our M3 screws (we are using Delta PT 30 M3 x 9.5mm long screws produced by ATF, Inc.) will provide almost 200lbs of clamp load when 0.4Nm of torque is applied. After thermo-cycling a fastening system will lose some clamp load. Our system would drop to 80% with a M3 screw tapped into **BMC 605** (this would mean clamp load reduces to 160lbs). Our system would drop to 70% with a M3 screw tapped into aluminum (reducing final clamp load to 140 lbs).”

“80% clamp load retention after thermo-cycling is a big deal. I've worked on some aluminum with steel screws that would drop to 50% in automotive designs. If you can retain clamp load you can use smaller fasteners for weight savings but, more importantly, in automotive electronics modules you waste less space on expensive PC boards. Also, clamp load retention gives you better margins for ‘torque and torque to strip’ ratios as compared to ‘torque and torque to loosen’.”

Supplementing the many performance enhancements mentioned above, **BMC 605** furnished measurable cost reduction opportunities. Through the elimination of secondary operations Takata saved over 60% in part cost by replacing aluminum with **BMC 605**. This calculation overlooks the amortized savings involved with extended tool life. Well maintained BMC injection molds last for millions of accurate shots. In most cases, manufacturers will realize less than a half million cycles per tool when die-casting aluminum.

BMCI is proud to be affiliated with Takata and would like to offer special thanks to Fred Oswald for his tireless, expert contributions to this metal to plastic success story. Please go to www.takata.com to learn more about this exceptional firm and their proven product line.