european aluminium association

AluDrive
SPRING 2007

NEWS

INTRODUCTION

Dear Reader,

Welcome to the fourth edition of Aludrive, the newsletter from the European Aluminium Association (EAA). Aludrive provides readers in the automotive sector with updates on innovations and projects in the aluminium industry directly affecting the automotive sector.

This issue brings you details of a new study outlining the increased use of aluminium in European cars along with the results of a new study by IKA on the use of aluminium in the front structure of a C class car and it's effects on reducing emissions and improving safety.

The Automotive Market Group at the EAA is responsible for this newsletter. This group comprises seven aluminium companies that are supplying the automotive industry.

We hope you find it a useful and enjoyable publication. Feel free to forward it and invite others to subscribe.

To either subscribe or provide comments, email us at **auto@eaa.be**

STUDY PROVES INCREASING USE OF ALUMINIUM IN NEW EUROPEAN CARS, SAVING WEIGHT, REDUCING FUEL CONSUMPTION AND CUTTING CO_2 EMISSIONS

A new study shows the amount of aluminium used in new European cars has risen from 50kg in 1990 to 132kg in 2005 and is predicted to grow by another 25kg by 2010. In 2005 two million tonnes of aluminium components were put on European roads in new passenger cars. The achieved weight savings will lead to an annual fuel saving of 1 billion litres and will save roughly 40 million tonnes of CO_2 emissions over the lifespan of the vehicles.

The study by Knibb, Gormezano & Partners (KGP) in cooperation with the European Aluminium Association (EAA) includes data from automotive companies and suppliers, EAA member companies and past data from KGP. The study is based on the analysis of the 15 million cars produced in Europe in 2005 and investigates 20 body components, 17 chassis and suspension components and 25 powertrain components.

The study focuses on different aluminium semi-materials – castings, extrusions, forgings and sheets. In the car body the largest quantity of components made from aluminium are air conditioning systems, bonnets, bumper beams and steering columns. Aluminium parts in the chassis and suspension section of the cars are mainly wheels, suspension arms and steering components. Cylinder heads, cylinder blocks, engine covers, pumps and radiators represent the majority of aluminium components in the drivetrain of new cars. Today, a growing amount of aluminium sheets, extrusions as well as high quality, structural castings are being used in particular in closures, body structure and chassis applications, improving also automotive safety and performance.

For more information: **auto@eaa.be**

ALUMINIUM BONNETS MOVE INTO POPULAR "HIGH-VOLUME" SEGMENTS

The application of aluminium bonnets has, for some years now, become a standard solution for lowering the weight on the front section of luxury cars. Recently, Renault introduced this solution on its New Clio model. In co-operation with *Aleris Aluminum Duffel BVBA*, part of *Aleris International, Inc.*, the 6016-T4 pre-bake quality Superlite®-IV, was chosen for the outer panel of this bonnet. It was selected for its combination of high formability/hemming performance in T4 condition, combined with good strength/indentation resistance after the paint bake cycle, allowing a maximum down-gauging and thus weight saving. This example shows that aluminium bonnets are increasingly finding their way into "high-volume" B-segment vehicles.

For more information go to **www.aleris.com**

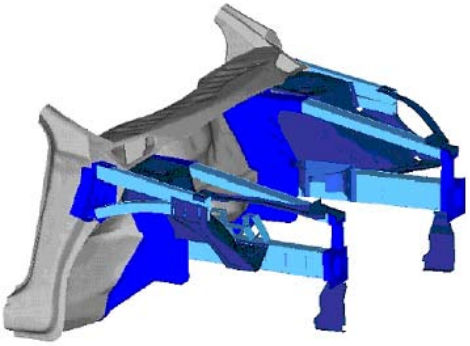
ALUMINIUM FRONT SECTION REDUCES WEIGHT AND EMISSIONS

A new study from the *Institut fur Kraftfahrwesen Aachen (IKA)* in cooperation with the European Aluminium Association shows further potential to reduce emissions from cars through lightweighting with aluminium. An aluminium concept front section for a C-Class vehicle reduces weight as well as exceeding the structural performance of a state-of-the-art section using advanced high strength steels.

The study shows a weight reduction potential of 35% for a Conservative approach and 41% reduction for a Progressive approach, with a significant increase in stiffness plus improved energy absorption in case of a crash.

This new study analysed the application of aluminium for the structural components of the front section of typical C-class vehicle. The aim was to develop and numerically analyse two aluminium design concepts. The Conservative Concept was developed considering the exact design space limitations of a steel reference vehicle. For the Progressive Concept the design space was expanded, as far as possible with respect to the major package components of the reference vehicle, in order to achieve more design freedom and encourage innovative ideas. Both concepts had to offer at least the same bending and torsion stiffness as well as crash performance as the reference structure. The objective was to achieve a high level of weight reduction under these constraints.

For a copy of the full report e-mail **auto@eaa.be**



LOTUS WINS ALUMINIUM AWARD IN ESSEN FOR ALU 4X4 PROTOTYPE

The European Aluminium Award is presented to the inventors of smart, innovative and efficient aluminium solutions in six different categories. The winners were announced at the ALUMINIUM world trade fair on the 20th September in Essen, Germany.

When choosing the *Lotus* for the top prize in the Industrial/Semi Products Transport and Automotive category the jury felt the design was innovative, versatile and courageous, noting that Lotus took quite a risk building such an interesting car. They felt they made good use of their technological know-how in lightweight materials such as aluminium. The APX is powered by a V6 engine designed by the Lotus Engineering Power Train Division.

It is a 7-seater (in reality a 5 + 2 with the two rear seats being occasional) four-wheel drive "Crossover" vehicle with a front mounted 300hp supercharged V6 petrol engine. Weighing in at only 1,570 kg and with a power to weight ratio of 191 hp per tonne, the APX has sports car performance of 5.4 seconds to 100 km/h (5.0 seconds to 60 mph) before reaching a top speed of 245 km/h (152 mph).

These performance figures are as good as the highest performing 4x4 "Crossover" vehicles from other brands with up to 195 hp per tonne. Crucially though, whereas those vehicles need higher output engines to compensate for heavy weight, the APX does not. Combined fuel consumption for the APX is estimated to be 8.7 litres / 100 km (or 32 mpg) – an achievement on its own.

A BREAKTHROUGH IN MULTI-ALLOY ALUMINIUM SHEET INGOT CASTING

Novelis recently announced the introduction of a new process that simultaneously casts multiple alloy layers into a single aluminium rolling ingot. This technology provides a cost-effective way of producing sheets with different core and surface properties.

The *Novelis Fusion Technology*^{TM} is based on the traditional continuous casting process, but includes a secondary heat removing chamber. Multiple coolant flows and liquid metal streams are controlled by a set of flow and metal level sensors to guarantee the necessary thermal and mechanical conditions during solidification. Simultaneous casting of the various layers of alloys into a single ingot creates a metallurgical bond between the layers, virtually free of any defects. The multi-alloy ingots produced in this way are then hot and cold rolled – just like traditional aluminium sheet products.

In the automotive market, further advances of aluminium sheets into vehicle body applications are frequently prevented by application-specific technical issues, for example because of limited rigidity (in comparison to new types of high-strength steel) or lower formability when compared to deep-drawing steel qualities. Multi-alloy ingot casting allows a high strength core material to be combined with a highly formable surface layer. This material combination enables the realisation of flat hems even for high strength aluminium materials in strongly pre-deformed areas and thereby offers the possibility of a significant sheet thickness reduction in comparison to conventional aluminium car body alloys which have been optimised for this type of application. As another example, core alloys, which are perfect in terms of strength or formability for the anticipated purpose, but do not demonstrate the required level of resistance to corrosion, can be combined with a surface alloy which is ideal for corrosion protection.

For more info go to: **www.novelis.com**