



Lotus Engineering



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LOTUS ENGINEERING AND JACOB COMPOSITE PURSUE COMPOSITE CAR INNOVATION

British consultancy Lotus Engineering and Germany's Jacob Composite GmbH announce 'ECOLITE', a collaborative investigation into an innovative fibre reinforced composite material that is economically viable for medium volume automotive production.

The ultimate objective of the ECOLITE programme (Efficient Composites - Lightweight and Thermoformed) is the development of a typical medium volume passenger car with a chassis structure and body panels produced predominantly from composite materials.

Composite parts for structural applications typically suffer from high per-unit costs and slow cycle times which confine their use to premium ultra-low volume products. It is anticipated that the collaboration between Lotus Engineering and Jacob Composite will yield a solution that rewrites the business case for automotive composite applications through innovative material design and new production techniques.

Today's passenger car industry faces significant challenges. Legislation is forcing producers to concentrate on fuel-efficiency and recyclability. Meanwhile, drivers demand more comfort, speed and performance, refinement and safety features. Car buyers also want more choice and greater individuality, which is forcing down model lifecycle volumes.

"Consumer and legislative pressures threaten the profitability of traditionally-built steel cars which rely on high volumes to be cost-effective. I see ECOLITE generating exciting solutions that offer a number of advantages over metallic solutions," explains Steve Swift, head of Vehicle Engineering at Lotus Engineering. "We anticipate the new production techniques will require much less investment than metal stamping tools and also offer cycle times faster than current manufacturing methods for structural composite materials.



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The polymeric materials are recyclable which is highly significant given the EU's End of Life Vehicle legislation. Finally, as OEMs struggle to reduce vehicle mass due to ever increasing feature content, composite materials offer considerable potential for weight saving."

Joint Managing Director of Jacob Composite, Dr. Marcus Ruf explains "Together we have approached this project as experts in the manufacture of advanced composite structures, not as car designers. We have therefore needed to question thoroughly the traditional car build methodology to obtain optimum results"

The ECOLITE team aims to deliver a range of composite technologies with polyamide, PBT (polybutylene terephthalate), and polystyrene resin systems. These will be initially based on glass fibre reinforced materials tuned to meet the required performance targets.

Considerable effort will be targeted at developing an appropriate range of thermal and mechanical properties for these new thermoplastic composite structures. The key will be appropriate selection of thermoplastic resin and fibre sizing chemistry, and development of the impregnation and consolidation phases of the manufacturing process. Used in conjunction with advanced CAE techniques to simulate crash behaviour the ECOLITE team believes fast and accurate data can be obtained to rapidly optimise the part design. Similarly, tooling development will be undertaken using a unique thermoforming simulation programme that will offer early feasibility data, reduced risk, shortened lead time, and lower investment.

The nine-month first phase of the collaborative research programme scheduled for completion in October 2005, will concentrate on the crash performance of the front-end module of a leading Five-Star family hatchback car. The research team will design and develop the material and processes for the crash structure components. The front end of the vehicle will then be subjected to a range of tests to assess the structure's performance against its steel donor. Meanwhile, the viability of mass-producing the material will receive considerable focus, as this is key to the economic targets for the programme.



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The second phase of the ECOLITE programme will expand the project to include the remainder of the vehicle structure and body. Using the experience gained from the first phase and developing the concept further, Lotus and Jacob Composite plan to present a vehicle with a complete composite body structure. In parallel, the ECOLITE team will concentrate on proving a business case for production volumes in the region of 30,000 – 50,000 units per annum. In the longer term, the ECOLITE team anticipates that further development of the material and of the production techniques will make the technology viable for volumes in excess of 50,000 unit's p.a.

Visitors to this year's JEC Show in Paris, taking place between 5 – 7 April, will be able to view elements of the ECOLITE Structure on the joint Jacob Composite GmbH and Lotus Engineering stand (Hall 1, booth number E54/F95).

Ends.



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Editor's Notes

Lotus Engineering

Lotus Engineering is an internationally recognised automotive engineering consultancy based in Norfolk, UK. Its global facilities include those in Michigan, USA and Kuala Lumpur, Malaysia, and offices in Germany and China. It provides comprehensive and versatile consultancy services to many of the world's car manufacturers and tier one automotive suppliers, from initial concept and project design through development to full production prototype build.

Jacob Composite GmbH



Jacob Composite GmbH is a highly innovative and capable manufacturing company specialising in the design and manufacture of ultra-lightweight and high performance composite structures. With its team of experts, its experience and specialised knowledge in this field, Jacob is now acknowledged as a major development partner for the automotive, aerospace and sports industry.

Jacob Composite GmbH is a subsidiary of Manfred Jacob Kunststofftechnik GmbH. Based in Wilhelmsdorf, Germany; it has over 30 years of thermoforming experience and is market leader for specific innovative technologies such as Insert Molding and the processing of Advanced Composites. It also offers specialised, high performance packaging for the electronics and semiconductor industry as well as various technical components and handling systems.



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