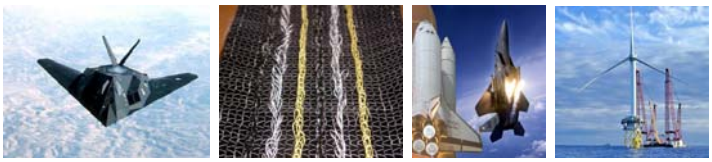
ICCM17 Edinburgh
27-31 July 2009, Edinburgh, UK



Automotive Applications & Recycling

New Automotive Composites Based on Glass and Carbon Fibre Recyclate
J Palmer, O Ghita, L Savage, KE Evans (Univ of Exeter)
This study reports on development of a new sheet moulding compound (SMC) manufacturing technique which allows incorporation of glass and carbon fibre recyclate. The mechanical results revealed that at specific percentages of virgin glass fibre replacement with glass and carbon glass fibre recyclate, the new SMC retain properties close to virgin SMC. **(A3:1)**

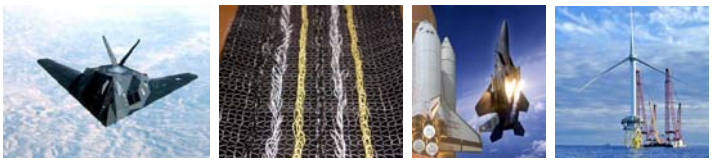
A New Compression-Moulding Approach Using Unidirectionally Arrayed Chopped Strands
I Taketa (KU Leuven) N Sato, M Yamanouchi, E Wadahara, A Kitano (Toray Industries) T Okabe (Tohoku Univ)
In this study, we propose a new compression-molding approach using a sheet-like molding material made by regularly and unidirectionally arrayed chopped strands (UACS). UACS achieves both excellent flowablity during molding and distinguished mechanical properties comparable to continuous fiber composites. **(A3:2)**

Re-Use of Carbon Fibres in High Value Moulding Compounds & Pre-Pregs
TA Turner, NA Warrior, SJ Pickering (Univ of Nottingham)
High quality carbon fibres recovered from fluidised bed and pyrolysis processes have been incorporated in bulk & sheet moulding compounds and prepreg composite materials. Various influencing factors have been investigated including fibre length, filler types and levels and mat binder types and levels. Demonstrator materials have shown excellent mechanical properties. **(A3:3)**

Biocomposites in Challenging Automotive Applications
RH Martin, S Giannis, S Mizra, K Hansen (MERL)
This paper presents the results of a recently completed EC part-funded consortium project with the aim of developing biocomposites for challenging applications. This incorporates developing the material and processing approaches and evaluating demonstrator products. This paper gives the results of several automotive parts evaluated including automotive panels and structural beams. **(A3:4)**

Post-Consumer Poly(Ethylene Terephthalate) in Composites and Blends for Automotive Applications
V Castelvetro, S Savi, F Signorini, A Manariti, C Bruni, F Ciardelli, MB Coltelli (Univ of Pisa) S Bianchi (CNR-ICCOM)
The possibility of employing materials based on post-consumer PET for external and internal injection moulded parts in automotive and other applications requires that the mechanical properties, surface stability, weathering and fire resistance of the former be improved. The promising performance of polyolefin-toughened PET with P-based fire retardants and surface-modified inorganic fillers are presented. **(A3:5)**

Novel Precursor Materials and Approaches for Producing Lower Cost Carbon Fiber for High Volume Industries
CD Warren, FL Paulauskas, AK Naskar, CC Eberle, S Ozcan (Oak Ridge National Lab) AP da Costa, RM Barata Dias, PFM de Magalhães (FISIPE)
Oak Ridge National Laboratory (ORNL), and FISIPE S.A. have developed a lower cost carbon fiber precursor based on textile grade, polyacrylonitrile (PAN) fiber containing vinyl acetate co-monomers. An in-plant chemical pretreatment of the textile grade material was developed and precursor-to-carbon fiber processing conditions have been determined. This lower cost precursor is targeted to produce a new grade of carbon fiber for applications for high volume industries. **(A3:6)**



Impact Strength and Response Behavior of CFRP Guarder Belt for Side Collision of Automobiles
Y Aoki, G Ben, HS Kim (Nihon Univ)
The CFRP door guarder belt is developed for the purpose of designing impact energy absorption members under side collision. A drop weight impact tests are carried out to investigate impact response behaviors and impact energy absorption of the CFRP door guarder belt. Also, a finite element model was developed to simulate the impact response behavior and the absorbed energy. **(A3:7)**

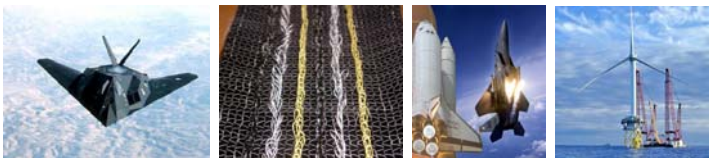
Design of Hybrid Tubular Braided Composites with High Energy Absorption Capability
S Terada, Y Yang, M Okano, A Nakai, H Hamada (KIT)
Braided textile was used as reinforcements of FRP. Braiding technique can make matrix hybrid structure with prepreg yarn easily. Hybrid tubular braided composites with flexibility were fabricated. Mechanical property of this hybrid braided composite was investigated by longitudinal compression test and cross sectional observation of tested specimen. Specimens which the flexibility was inserted in braiding yarn showed high energy absorption capability. **(A3:8)**

Development of New Side Impactor
Y Yang, S Terada, M Okano, A Nakai, H Hamada (KIT) K Nakajima (Fukui-Fibertech Co Ltd) Y Aoki, G Ben (Nihon Univ)
In this study, as a door side impact beam, new side impactor was developed by inserting circular composite tubes into square composite tube. As a result, new side impactor showed higher energy absorption capability than that of square tube without circular tube when the quasi-static lateral compression tests were performed. **(A3:9)**

Proposal of CFRTP Automobile Bonnet for Pedestrian Safety
J Takahashi, H Koyama, K Uzawa (Univ of Tokyo) R Shida (Mitsubishi Research Institute, Inc)
We propose adoption of CFRTP for the body parts of automobiles as an alternative to steel, especially focused on the bonnet, where the pedestrian's head is most likely to be struck in case of collision. The results show that the bonnet using CFRTP has an advantage compared to that of steel in terms of pedestrian safety and lightweight. **(A3:10)**

Improvement in the Impact Energy Absorption of Recycled CFRP
K Uzawa, J Takahashi, K Kageyama, H Uno, T Okazumi*, I Ohsawa (Univ of Tokyo) (*now Kawasaki Kisen Kaisha)
We developed recycled CFRTP by using waste CFRP for secondary structural parts of automobile. A possibility that impact energy absorption of CFRTP would be improved by the optimization of crush process of the waste CFRP and the addition of an aramid fiber to the CFRTP was examined. **(A3:11)**

Recycling Carbon Fibre Composites under Reduced Oxygen Concentrations: The Effect on Kinetics
K Jiamjiroch, KH Wong, SJ Pickering (Univ of Nottingham)
Thermo-gravimmetric analysis was carried out on carbon fibre composite material under reduced oxygen conditions. The results showed that reduced oxygen levels had a small effect on rate of the devolatilisation of the polymer but played a more important role in slowing down the char oxidation. The effect of this on the operation of recycling processes is discussed. **(IA3:1)**



Characterization of Energy Absorption of Unidirectional CFRP using a New Plug

T Tsuji, M Ueda, Y Kato (Nihon Univ)

A new type of plug was developed to characterize energy absorption capability of CFRP. Energy absorptions due to every fracture mode on progressive crushing were evaluated quantitatively. It was found that unidirectional carbon/epoxy tube could be showed wide rage capability of energy absorption from 7 to 178kJ/kg. **(IA3:2)**

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