

## **PRESS RELEASE**

### **Fire and Emergency Support Vehicle Manufacturers Overcome Problems Using Crestabond® Structural Bonding Solutions**

#### ***Introduction***

Specialist manufacturers of fire fighting vehicle bodies and emergency vehicle subcontract component suppliers are increasingly turning to composite materials and structural bonding technologies to help overcome problems and improve product performance. By creating new designs using proven composites materials and structural adhesives for bonding both FRP and metal parts, tangible benefits and solutions have been found in the key areas of: assembly and productivity; production quality; weight saving; and most critically for an emergency vehicle, reducing maintenance time and improving performance in use reliability.

#### ***FRP Tank Designs for Fire Engines***

In the Czech Republic, Zico s.r.o., established in 1995, specialises in the design and manufacture of parts for the automotive and transportation sectors fabricated from composite materials. This includes a range of lightweight FRP holding tanks for water or foam, specially designed for leading European firefighting and rescue emergency vehicle bodybuilding manufacturers, who adapt the chassis, crew cab and running gear from key OEM producers such as IVECO and TATRA.

Zico produces two types of composite tank to accommodate the requirements of the various designs and type of emergency vehicle; an internal FRP storage tank, or a fully integrated 'self-supporting' FRP tank storage unit which forms part of the construction of the fire truck's chassis and frame. The sizes of tank offered by Zico range from a 400 litre (400kg) capacity internal tank up to a massive 23,000 litre (23mT) self-supporting tank, specified for certain types of highly specialized fire-fighting vehicles which typically operate in locations with no immediate access to a fire hydrant. Depending on the tank size, type and specification requirements, Zico fabricates its composites tanks by hand lay-up or closed mould vacuum infusion using a variety of FRP laminate design specifications based on polyester and epoxy resins in combination with glass fibre, carbon and aramid fibre reinforcements.

#### ***Leak Free Adhesive Solution***

An interfacial joint problem due to metal to FRP adhesive failure had a tendency to occasionally arise on the bigger self-supporting fire vehicle storage tanks supplied by Zico; low level leakages occurred in some instances after prolonged operational service due to the higher stress forces on the fitted steel flanges of larger tanks. This leakage problem was solved when Zico switched to bonding in all the stainless steel flanges fitted to the FRP tanks with one of three Crestabond® M1 (10:1 mix ratio) grades from Scott Bader's range of primer-less MMA structural adhesives. Depending on the tank size, design and the number of steel fittings being bonded, Zico uses Crestabond M1-05, M1-20, or M1-30, which gives them a choice of working times on the shop floor during production. In addition to providing the best combination of mechanical properties, one of the key reasons Zico uses Crestabond is its versatility for structurally bonding all the metal, plastic and composite substrates used on the shop floor, with minimal surface preparation. Mr. Jan Jakab, General Manager of Zico commented: *"We looked at various adhesive options to eliminate this low level leakage problem around the steel flanges. We have found Crestabond to be the best overall solution for us. It has proved to be the toughest, most reliable long term structural steel-GRP joint for our tanks."*

### ***Corrosion Free Rapid Access Equipment Storage***

Slide and Tilt Ltd, a UK manufacturing company based in Wrexham, north Wales, designs and manufactures bespoke rapid access equipment storage systems for rescue service units, such as fire and road traffic collision emergency support vehicles. To save weight, reduce costs, improve aesthetics and avoid corrosion, Slide and Tilt changed its production process to bonding the sides and floor of the stowage drawers together in preference to welding or drilling and using screw fixings. All of the heavy duty modular aluminium drawers used in its 'pull out and tip down' stowage systems are now assembled significantly faster and with an improved finish using Crestabond M1-04 primer-less structural adhesive. Before switching to using Crestabond, drawers were assembled using a minimum of 20 screws, which also needed screw holes to be positioned and predrilled as a separate production step after the aluminium sheeting had been cut to size. Load bearing strength, impact toughness and durability are key factors for the drawer units specified to handle the equipment carried by these types of emergency vehicles. As part of the specification process, aluminium drawers assembled only using Crestabond structural adhesive were subjected to rigorous testing with a minimum 500kg load during a series of trials successfully carried out by Slide and Tilt Ltd.

As well as the advantages of increased productivity, weight savings and more competitive production costs, there is a practical operational benefit from having a smooth, clean lined, surface finish; bonded drawers are completely wash down corrosion resistant, since potential crevice, stress cracking and galvanic corrosion problems, which can arise over time in use with mechanical fixings, are avoided.

### ***GRP Cab Doors Assembled Faster***

Leading fire fighting vehicle superstructure manufacturers, such as Rosenbauer International AG, are increasingly specifying composite materials to find innovative ways to improve performance and reduce overall vehicle body weight. The Rosenbauer Group is one of the world's three largest manufacturers of fire-service vehicles, with its head office and European production in Leonding, Austria, as well as manufacturing operations in the USA.

KUTEC Kunststofftechnik GmbH, based in Taufkirchen, Austria, is an approved subcontract supplier of composite parts manufactured for Rosenbauer, as well as other emergency and specialist vehicle producers. GRP parts supplied by KUTEC include custom made lightweight crew cab doors, which are manufactured for a variety of fire engine and support vehicles used to respond to domestic, industrial, road and airport emergencies. The GRP cab doors are manufactured in two halves by RTM using glass fibre reinforcements, foam core stiffeners and Scott Bader's Crystic® 2.446 PA UPR resin. The next stage in the door assembly process is to first bond into place all the powder coated steel and aluminium profile sections and fixtures required inside the door, and then to join together the inner and outer GRP moulded door sections using Crestabond structural adhesives. Crestabond M1-20 has been specified by KUTEC for bonding the GRP doors halves together, which has a specified working time of 16-22 minutes. The faster M1-05 grade, with a working time of only 4-7 minutes, is used for bonding in the steel and aluminium parts into place on the GRP sections; both adhesive grades meet all the adhesion and mechanical performance requirements needed by KUTEC for the range of substrates being bonded and end use applications.

The two 10:1 mix ratio Crestabond grades were chosen by KUTEC's technical team in preference to a two part methacrylate adhesive option from another producer, after conducting a number of in-house bonding trials on all the substrates using pneumatic hand guns and cartridges. According to KUTEC, Crestabond M1-05 has been of particular benefit because of its very rapid fixture time of only 12 minutes, with no requirement to use a primer. This has enabled significant increases in productivity by debottlenecking the door assembly production process, as well as for other assemblies where metal fixtures need to be structurally bonded to moulded GRP parts used on vehicle superstructures.

Christoph Kugler, director and co-owner of KUTEC explained about another production benefit from using Crestabond MMA structural adhesives: *"We discovered that we can apply a pigmented topcoat directly over the Crestabond adhesive around a joint, with no need to abrade or apply any primer layer first. This also helps to reduce production time and costs even more."*

## **Conclusions**

Using composite materials and the latest structural adhesive technologies to reduce weight, overcome engineering problems and improve performance is now being adopted by leading fabricators of parts for emergency and related specialty vehicles, not just by designers of parts for aerospace and defence, high performance cars, and mass transportation vehicles. The combination of both end use application benefits and reduced production costs are proving to be strong incentives for manufacturers and key players in the specialty vehicle supply chain to continue to invest in innovation and production capabilities to offer customers cost effective solutions with composites.

In response to growing demand from the specialty vehicle and transportation sectors, KUTEC is expanding and will shortly be opening a new and much bigger purpose built manufacturing facility close to its current location in Taufkirchen. Other manufacturing players supplying into these sectors are also expecting to see similar business growth going forward.

For more information about the Scott Bader Group of companies worldwide and details about the complete range of high performance resins, gelcoats, pigments, bonding pastes and structural adhesive products offered globally for advanced composites applications, visit [www.scottbader.com](http://www.scottbader.com)

**End**

**[Word Count: 1426 ]**

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## **Website of Key Companies in the Press Release**

[www.scottbader.com](http://www.scottbader.com)    <http://www.kutec.at/>    <http://www.zico-gfk.cz/en/>    <http://gsf-slides.co.uk/>

## **Photos & Captions**



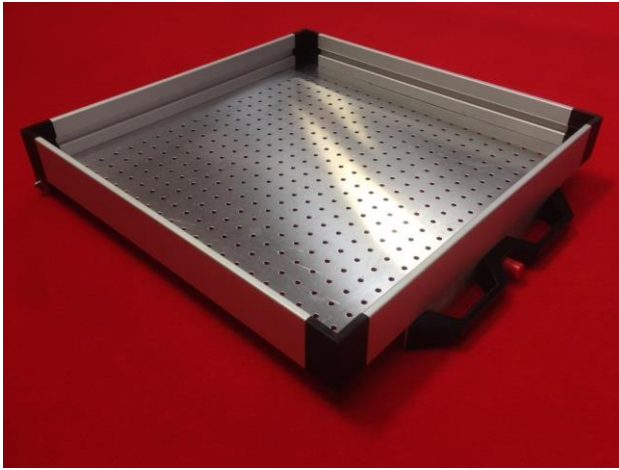
**Photo 1: Emergency vehicle – front view**

**Photo 1 caption:** A fire and road traffic incident emergency services vehicle currently in service on the island of Jersey in the Channel Islands.



**Photo 2 : Emergency vehicle – side view shutters up showing the slide and tilt draw system**

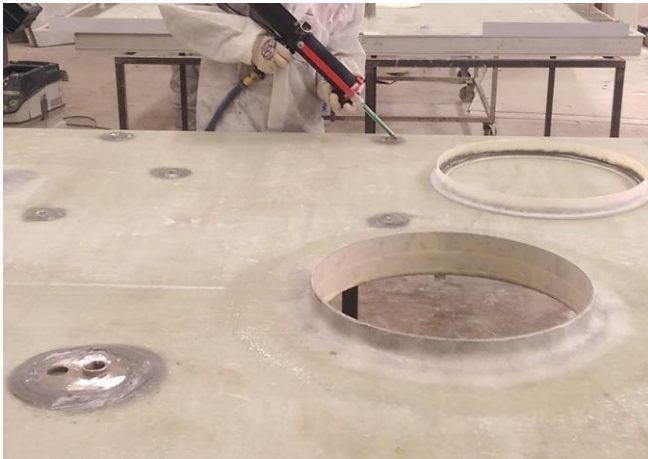
**Photo 2 caption:** Bonding with Crestabond® M1-04 primer-less structural adhesive is now specified by Slide and Tilt Ltd, which assembles all of its modular aluminium drawers by bonding in preference to welding, or drilling holes and using screw fixings, which still pass rigorous testing with a minimum 500kg load.



**Photo 3 : Heavy duty 'slide and tilt' aluminium storage drawer**

**Photo 3 caption:**

All of the heavy duty modular aluminium drawers used in its 'pull out and tip down' stowage systems are now assembled significantly faster and with an improved finish using Crestabond® M1-04 primer-less structural adhesive.



**Photo 4: Zico Production Shot** – Bonding stainless steel insert parts into GRP wall panels used on a self-supporting fire engine holding tank.

**Photo 4 caption:** Zico switched to bonding in all the stainless steel flanges fitted to the FRP tanks with one of three Crestabond® M1 (10:1 mix ratio) grades.



**Photo 5: Zico Production** - Assembling the GRP firefighting truck water tank

**Photo 5 Caption:** Depending on the tank size, design and the number of steel fittings being bonded, Zico uses Crestabond® M1-05, M1-20, or M1-30, which gives them a choice of assembly working times on the shop floor.



**Photo 6: Finished Slovakian Fire Department Emergency vehicle** - fitted with an integrated GRP water tank manufactured by Zico.



**Photos 7 and 8: KUTEC GmbH Manufactured FRP Fire truck doors on Rosenbauer vehicles**



[Images: Courtesy of Rosenbauer International AG ]



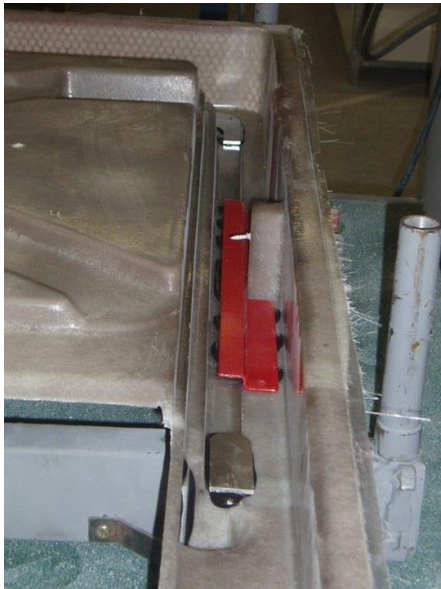
**Photo 9: KUTEC GmbH Manufactured FRP Fire truck doors bonded with Galvanized Steel parts**

**Photo 9 caption:** The KUTEC GmbH door assembly process is to first bond into place all the powder coated steel and aluminium profile sections and fixtures required inside the door, and then to join together the inner and outer GRP moulded door sections using Crestabond structural adhesives.



**Photo 10: KUTEC GmbH - Bonded FRP Fire truck door panel**

**Photo 10 caption:** Crestabond M1-20 has been specified by KUTEC for bonding the GRP doors halves together, which has a specified working time of 16-22 minutes.



**Photo 11: KUTEC GmbH Fire truck door assembly close up**

**Photo 11 caption:** The faster Crestabond®M1-05 grade, with a working time of only 4-7 minutes, is used by KUTEC for bonding in the steel and aluminium parts into place on the GRP fire truck door sections

### **About Scott Bader**

Scott Bader was established in 1921. Today it is a €237 million global chemical company, employing over 640 people worldwide. It is a common trusteeship company, having no external shareholders, with a strong commitment to supporting its customers, workforce and the environment.

Scott Bader's headquarters is based in the UK where it has purpose-built, state-of-the-art technical facilities that provide R & D as well as complete evaluation, testing and application support. It has manufacturing facilities in Europe, The Middle East, India, South Africa, Canada and South America.

For further information regarding Scott Bader, please call +44 (0)1933 666638, visit [www.scottbader.com](http://www.scottbader.com), or e-mail: [enquiries@scottbader.com](mailto:enquiries@scottbader.com).

<b>GENERAL INFORMATION</b>	
SUPPLIER:	Scott Bader Company Limited
READER INQUIRIES TO:	E mail : <a href="mailto:enquiries@scottbader.com">enquiries@scottbader.com</a> Tel: + 44 1933 666638
PRESS OR PUBLISHING INQUIRIES TO: Nigel O'Dea, Director	<b>OB2B Industrial Marketing &amp; PR</b> Office: +44 1536 210133 Mobile: +44745 695984 e-mail: <a href="mailto:nigelodea@outsourcingb2bmarketing.com">nigelodea@outsourcingb2bmarketing.com</a>
ATTACHMENTS:	11 x Jpeg photos