I-CAR NEW ZEALAND

TECHNICAL REPORT

Carbon Fibre Why Does It Matter?

Carbon fibre is being used on many late-model vehicles and has become a buzzword in the industry. This article answers some questions you may have been wondering about on the use and repair of carbon fibre.

Carbon fibre is only on high-end low production vehicles. I don't work on high-end vehicles. Why should I worry about carbon fibre? While it is true that carbon fibre is only on high-end vehicles today, it doesn't mean that won't change in the very near future. Just take a minute to think back 15 years ago. Would you have ever thought that Ford would have an aluminium box and cab on a full-size pickup truck? Did you ever think that an everyday car like a Honda Accord would have steel rated at 1,500 MPa? Probably not. Back then, aluminium-intensive or UHSS structures would have only been on high-end low production vehicles. Yet in that short time span of 15 years, this is the current reality of the collision repair industry.

So now think of carbon fibre in that same context. Carbon fibre is relatively new to the automotive industry and is currently being used on high-end low production vehicles. If history were to repeat itself, as it often does, in a short time period the collision repair industry could be faced with repairs of everyday vehicles made of carbon fibre. At this point you can either wait until there's a vehicle sitting in a stall that no one has a clue how to repair or you can start the process of learning about this new material so you will be prepared for the not-to-distant future.

Where should we begin?

Let's start with what is carbon fibre? Carbon fibre is a man-made filament or fibre that has a high-carbon content. The carbon content is typically between 92 - 99% carbon, which is one of the reasons that carbon fibre has a grayish-black look. It is made into a variety of different cloths, weaves, or chopped fibres. There are also different weights and qualities of carbon fibre that can vary greatly and need to be chosen based upon the requirements of the part. The fibres are combined with a resin material to make parts. This resin might be vinyl, vinyl-ester, epoxy, or one of many other types of resin. Once the resins and fibres are cured, you have a composite part. In the end, carbon fibre is the buzzword for a specific kind of composite that has amazing possibilities now and into the future (see Figure 1).

Is carbon fibre just used for exterior panels?

Carbon fibre is not a material that will only be used for body and trim panels, it will often be used anywhere steel and aluminum are commonly used. Carbon fibre is being used to build the structure of the entire vehicle like the

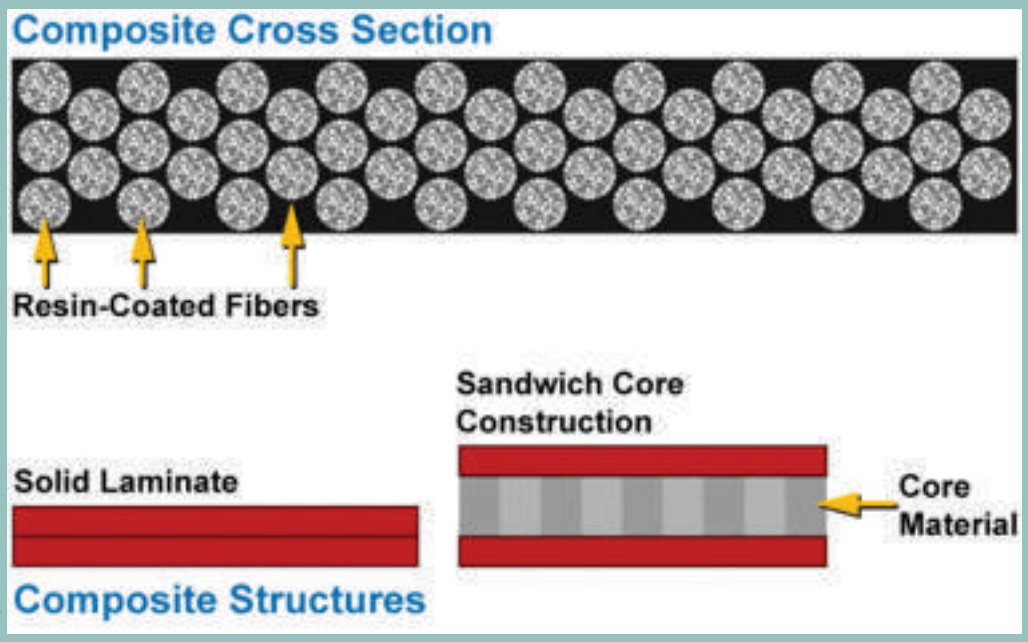

Fig. 1

Fig. 2

Lamborghini Aventador. The BMW i3 and i8 are going to have almost the entire passenger cell made of carbon fibre. With carbon fibre being used as structural parts, the industry will have to learn a whole new process of what it will take to repair the vehicle after the collision (see Figure 2).

Is carbon fibre repairable?

Carbon fibre is repairable depending on the damage. There are new tools and equipment, repair techniques, and areas of knowledge that will need to be applied to repair a carbon fibre part or structure. Some examples of tools and equipment that will be needed are tap testers, vacuum pumps, and hot bonders. Repair techniques will include accurate ply orientation and creating a scarfed (tapered) repair. If some of these terms are unfamiliar to you, it's understandable. To get a better understanding of this new and complex material, take the online I-CAR "Introduction to Carbon Fibre (CFR01e)" course.

Conclusion

The first step to meet the challenges that carbon fibre presents, is to begin to acquire knowledge about the material and what is involved in the repair process with this space age material. The industry will need to identify when to make the investment in tools, material, and training. It is not a question of if carbon fibre is going to appear in high production vehicles, but when it will appear.

This article first appeared in the I-CAR Advantage Online, which is published and distributed free of charge. To learn more about I-CAR, and to subscribe to the free publication, visit the i-car.co.nz website