



Story courtesy of Normand Clements

Employer Supports High School Program



Negotiations between Composite Studio, Innovation Training & Skills Centre and the High School followed to determine how the school program could work. The end result was that Norm and two assistants, Jeff McKeown and Greg Fulwood would donate their time and expertise, while the school provided the facilities in which the work could occur. Next on the agenda was to decide what the students could undertake that would enable them to meet the requirements of the course, they needed a project.

“The students were divided into groups, each group would have a leader, and a schedule of work that had to be completed each day.”

Norm regularly participates in club events at the local raceway, his Clubman, a Clemente designed and built by himself and a group of other enthusiasts (Story in issue 6 pg 16 of CKC). Norm decided that lightening his race car would give him an advantage in lowering his lap times, problem solved as the students now had a project.

The students were divided into groups, each group would have a leader, and a schedule of work that had to be completed each day. Members of each group would be required to record their progress with photos and write a report of events daily on ▶

A group of Murray Bridge High School students studying polymers were looking for work experience placements as a requirement to complete their studies, unfortunately with the GFC taking its toll on local businesses the School was having difficulty placing the students. The Murray Bridge High School contacted Norm, owner of Composite Studio and asked for assistance, he generously agreed to help the group of students. High school students Australia wide will eventually become our trade's people of tomorrow; therefore it is paramount that all employers support these school programs. If you are an employer or know of someone who is, then please help in supporting students where-ever you can.



their computers. This project would give the students skills in multiple areas including communications. The skills learnt will greatly assist them in finding employment once their schooling is completed.

Norm arranged for the moulds to be delivered to the High School along with all the materials required for producing the lighter panels. The light-

weight components would consist of one layer of carbon fibre tissue and two layers of 2 oz carbon fibre, covered in a blue gelcoat. Where additional stresses were anticipated an additional layer of 4 oz carbon fibre was used.

Each group managed by their leader (a student from the group) would commence the day by discussing what

Top left - The group learn the skills of vacuum moulding, which greatly improves the composite strength and appearance.

lower left - A template made from paper is traced onto cardboard and then used to cut out the carbon fibre material. This minimises waste and reduces cost.

Lower centre - Students learn the art of working with composites, which involves many complicated processes each of which must be perfect.

Top right - Removing the parts from the mould is a delicate process or damage to the part and mould can occur.

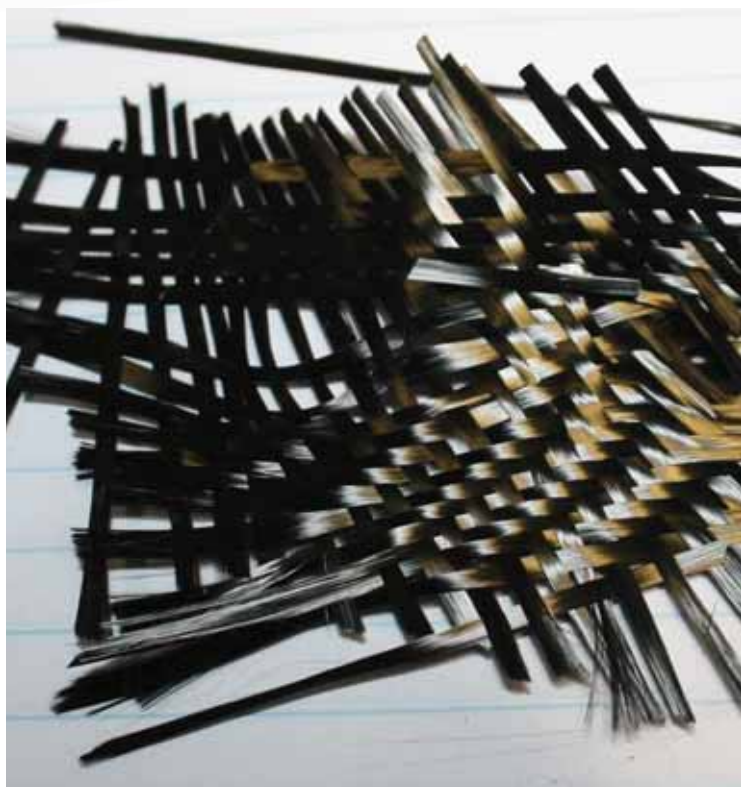
Centre - Each student was given the responsibility for one mould and for making the part in that mould.

Lower centre - Templates are important; a paper version is transferred to cardboard prior to cutting the carbon fibre.

Lower right - Carbon Fibre up close is a woven fabric which when mixed with resin becomes very light and very strong.



CKC FEATURE ARTICLE



was required and who had the responsibility for each task. The workshop was treated as an actual business workshop; therefore OH&S issues were maintained by each student. Norm also generously donated T-Shirts ▶

“Students started the project by inspecting and cleaning their allocated mould then applied the release agent ready for production. Because of the expense of carbon fibre (very expensive), wastage was to be minimised, paper patterns were made, followed by a cardboard copy.”



Top - Many moulds are used to make a car, production needed to progress to a strict timetable, group leaders were responsible for this task.



Lower left - Peel ply was used to ensure all parts were smooth on the inside as well as on the outside, attention to detail is very important in this industry.

Top left - Vacuum bagging is relatively new to the composite industry, it greatly improves the quality and strength of components manufactured.

Top right - Every student in the group worked diligently on their tasks, knowing that it is the attention to detail that makes all the difference.

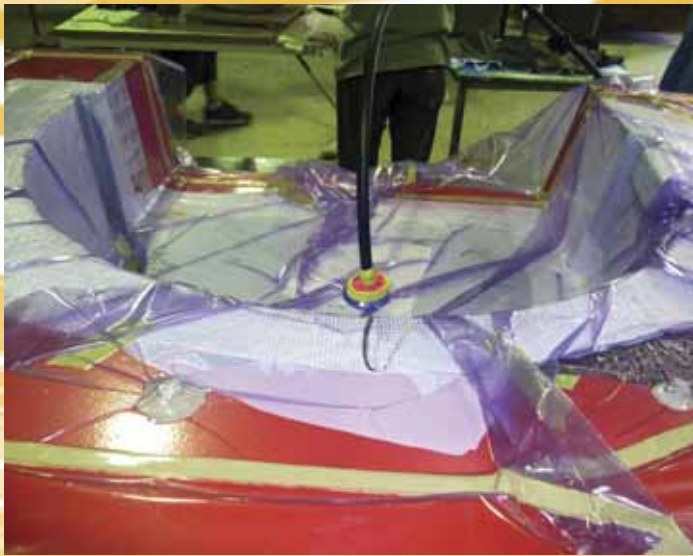
Centre - Working with composites involves the use of chemicals, therefore safety is very important, correct equipment must be used.

Lower Right - In many cases the moulds themselves required repairing before they could be used, gel coat is used to perform this task.

Top right - Every student in the group worked diligently on their tasks, knowing that it is the attention to detail that makes all the difference.

Centre - Working with composites involves the use of chemicals, therefore safety is very important, correct equipment must be used.

Lower Right - In many cases the moulds themselves required repairing before they could be used, gel coat is used to perform this task.



“vacuum bagging was used throughout the project. This process utilises atmospheric pressure to force the resin through the layers, removing any trapped air particles. The end result is a very strong component that is also light-weight.”

A final layer of peel ply cloth was incorporated to give the inside of the parts a smooth finish. A manufacturing technique known as vacuum bagging was used throughout the project. This process utilises atmospheric pressure

to force the resin through the layers, removing any trapped air particles. The end result is a very strong component that is also light-weight.

Students were also required to remove the existing panels from the Clubman and fit the new lighter sections that they had manufactured. This required the learning of additional skills as well as developing patience and a sense of pride in their work. Norm estimates old body to be 65 kilograms, 26 kilograms of weight was removed by using carbon fibre, with finished body weight coming at 39 kilograms.

The photos indicate the various components being manufactured as well as the ▶



“The skills learnt went far beyond working with composites and will benefit all who participated in the program for the rest of their lives.”

steps involved within the various processes. Students found the experience valuable and enjoyable, stating that “it was a real project”, as these

components would actually be used to replace the existing parts. Quality control was strict and students took this to heart.

During the work experience period, no students were absent and in one case where a student was late to start one morning, he insisted that his mother come into the class and apologise for it being her fault for the late start. He did not think anyone would believe him otherwise. This positive

experience will stay with these students forever; it goes to show what can be achieved if someone as generous as Norm lends a hand in supporting the local High School and their students.

Congratulations must also go to all those who helped during the project by providing their time for free, as well as the students themselves for taking this project seriously. The skills learnt went far beyond

Top left - Resin is used to bond the carbon fibres together, when mixed with a catalyst it produces a chemical reaction bonding the components together.

Top centre - A gel coat is sprayed into the mould and becomes the outer surface of the part made.

Lower left - Once everything has set hard the peel ply can be removed and the part taken out of the mould.

Centre - The bonnet now features vents to aid engine cooling.

Lower centre - Prior to fitment of the new light-weight panels the old parts had to be removed, the students performed all tasks involved in the project.




Top right - Another mould that needed some minor repairs, a colour can be mixed to the gel coat to match the final colour.

Centre - The Clubman assembly is almost complete, only guards to be fitted front and rear.

Lower centre - The completed car looks great and is sure to be a few pounds lighter thanks to the carbon fibre componentry.

Lower far right - Group shot of the completed car along with the students who made it all possible, or was that the car that made the class possible? Thanks Norm.

working with composites and will benefit all who participated in the program for the rest of their lives. The School also benefits by having the students successfully complete their course. We will have to wait and see if Norm benefits, as he has not yet returned to the track to test out the new body!

Thank you to the sponsor, Composite Studio supported by Innovation Training & Skills Centre, and the Murray Bridge High School for supporting these students. 

Participating Students

- Mario Deionno – Rear body
- Daniel Hand - Bonnet
- Brayden Gommers - Bonnet
- Brandon Ward – Front Guards & Rear Guards
- Mathew Hocking – Boot Lid
- Aaron Harper - Boot
- Brett Hocking – Boot
- Lincoln Williss – Nose Cone & Exhaust Cover
- Andrew Smart – Front Guards
- Steven Jackson – Rear Guards
- Chris Carter – Removal of parts & fitment
- Jack-Henry Hill – Boot Floor



Normand Clements
The Innovation Training And Skill Centre
(The leaders in Composite Training)

ABN 99 534 116 430
Email: innotr@chariot.net.au
Web: www.innotrg.com.au