

## Memorandum by Milled Carbon Ltd

Milled Carbon Ltd is an SME formed 4 years ago to seek a route to recycling carbon fibre composites. We have developed a process that continuously recovers carbon fibre from carbon fibre composites be they cured or un-cured. We are selling the recovered fibres back into the industry at a much reduced cost relative to virgin fibres with only a 10% reduction in physical and mechanical properties. We have captured the attention of major companies such as Boeing, Airbus, Bombardier, BAe, GKN, GE, Ford, BMW, Renault, Maclaren, Honda, the marine industry and the MOD to name but a few.

We work closely with a number of UK universities on research into recycling methods and materials testing.

### Better design and the use of materials

- What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Quite simply, designers must consider the whole lifecycle of the product they are designing. This means they must consider how all the component parts will be dealt with at end of life, and in some cases choosing materials for which there is a known route to recycling. Thought must also be given to how the material is used to minimise waste arising from the manufacturing process. This consideration is taking longer to sink in, but having said that current manufacturing processes will be slow to change simply because this does not happen overnight.

- What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Cost, availability and fitness for purpose. The choice of materials will depend ultimately on cost of raw materials and the on cost to consumers. If consumers want a greener world they are more likely to pay for a more sustainable product, although sustainability has its limits. Availability of materials is paramount, if like in our industry, carbon fibre, there is a shortage, designers will shy away from specifying a material that has limited availability. Fitness for purpose should not be underestimated, no matter how green a designer wants to be, if a material is not fit for purpose it defeats the object of the design and perhaps less sustainable materials will have to be considered.

- To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

See above.

- What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

In my experience there is a considerable gap between what scientists say can be done with materials and what engineers can actually do, as in the case of nano-carbons. In some cases there have been up to 50% of failures in the production of nano carbon fibres. It's the job of the engineers to feed back to the scientists so that we can get the best of research commercialised in a timely manner.

- Can better designed products offset the increase in consumption?

As long as it is cheaper to buy a new appliance than repair it, consumption will continue unabated. An enlightened few will attempt to reverse this by personal effort but on the whole the populace just wants a working toaster or iron by the easiest and cheapest method. Better design can push us in the right direction but ultimately we need a long term plan for reducing the "throw away and buy new" mentality. In terms of the carbon fibre industry, if better design equals lower cost, longer life and better margins, the fact that the method used to get it is actually wasteful is pushed to the back of the mind. No one really wants to contemplate the sea changes throughout industry that this will actually entail.

- Are there any other gaps in knowledge and how are they being addressed?

In my humble opinion Government fails miserably when trying to get the message across. At best we get mixed messages which are then further muddled by all the Government Agencies and NGO's all extolling the virtues of sustainability without ensuring the full message is delivered, i.e. sometimes full sustainability in a product is just not practical unless we stop the habit of consuming it.

### **Business framework**

- Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

Business has got the message, loud and clear, although I am astonished to hear the introduction of new products for which no lifecycle analysis has been carried out, most recently at a conference in Barcelona. The main driver is money, as is to be expected, but I fear, that in their eagerness to appear green, some companies have perhaps overstated their green credentials which just puts people off.

The regulatory changes over the last few years have made life far more complicated. Government brings in new regulation to engender innovation. But the regulation is not keeping pace with the innovation. It took 3 years to get guidance from the Environment Agency about where our recycling process sits within the new regs. Having said that I cannot fault the help our local EA have given us.

- How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

I have found that there is a mixture of company policy and personal conviction which drives the sustainability message. We have many enquiries from individuals within

companies who want to “do the right thing”. In the case of supply contracts for new products we are seeing the message driven home in more practical methods by having contract clauses that state that there must be a route to recycling as part of the supply contract. I do worry that some businesses are jumping on the green bandwagon just to get the kudos without really believing in the message.

- What other measures can promote a focus on waste reduction among businesses?

Greater awareness of the cost of disposal, most companies we deal with have no idea of the amount of material they waste and as such seem not to know what the bottom line costs are. We have been able to show a positive cost reduction for disposal purely by making companies take note of what they are throwing away and diverting it from landfill to recycling.

- What lessons can business learn from international experience?

Just how bad the rest of the world is at sustainability. Perhaps a little unfair as there are some very good efforts by a number of countries, just not enough.

### **Government policy**

- What is and should be the role of Government in addressing the issue of waste reduction?

Stop trying to change consumption habits by hitting us with green taxes. I think given the chance to be more sustainable most people will take it, making us pay for it just causes resentment and resistance.

- How does Government policy link up with European strategies and action plans?

Quite well in many respects, but there is still an element of over subscription. We are involved with several UK and EU Government initiatives but we are in danger of being swamped with requests to join the plethora of initiatives that seem to appear every month. In some cases there is considerable overlap which just dilutes the effort. There should be one central body in the UK and the EU and they should co-ordinate to avoid overlap.

- What lessons can be learnt from other countries – within the EU and globally?

I am not best placed to comment.

### **Consumer behaviour**

- How can better product design be used to effect a change in consumption patterns and behaviour?

Better design will always influence consumption patterns, but only because it is “new” and hopefully because the new design does have beneficial impact on the environment. But in the end cost will be the main arbiter. If we really want to change consumption habits then we have to change the industrial model of the country. Retail manufacturing is built around being able to sell the newest model irrespective of the fact that the last model is only six months old and as long as we are bombarded with messages to continually adopt the newest thing, we will.

- What role do marketing strategies play in influencing more sustainable design?

As suggested above, marketing is a major influence on how we consume and as such, companies must take greater heed of the effect their marketing will have on consumer habits. Companies need to be a little more honest about what their true green credentials are.

- Are there any gaps in knowledge in this area?

### **Skills**

- How is sustainable design integrated into the design syllabus?
- To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

I can only comment on direct experience which seems to show that sustainability is becoming a central pillar in current training and education.