

# The future starts today

Consultant John Hockey hears at the Sustainable Manufacturing Forum how a tropical flower and lifestyle changes could help to save our planet

With a delegate list numbering more than 90 and visitors from as far afield as Japan, the recent Sustainable Manufacturing Forum held in Warwick had opinions as diverse as the attendees themselves. Representatives from industry and academia presented the audience with various viewpoints relating to sustainability.

The forum is being developed by Warwick Manufacturing Group (WMG), directed by Professor Lord Kumar Bhattacharyya and Warwick HRI (Horticultural Research Institute), which are involved in a range of research into many aspects of sustainable manufacturing.

The forum was presented as part of the International Forum of AC21 (Academic Consortium for the 21st century), which seeks to promote global cooperation for the benefit of higher education and its users. It is held every two years, with a range of activities within an overarching theme, in this case universities, innovation and the global age.

All this may seem a bit daunting until you realise that it is really about our planet and how we safeguard its future.

The sad fact is that although there is general agreement that something needs to be done, exactly what and how it is to be

carried out are far from clear.

## Do the right thing

The keynote presentation by Sir Nicholas Scheele, chancellor, University of Warwick and ex-chair of the Prince's Trust Business in the Environment programme, was an excellent scene setter.

Noting that inputting "sustainable manufacturing" into Google generated 32 million references in 0.23 seconds, Sir Nicholas went on to state that industry had not fully explained the need for sustainable manufacturing (SM) and nor had government.

Other than a vague notion by the general public that SM is a good thing to do (certain related aspects such as recycling and even buying organic food are both on the increase), there is no master plan that industry is working to and that consumers can engage with.

Even if the principle was agreed, both consumers and manufacturers will not make it happen unless the economics are right. In a competitive world, few are altruistic. Sir Nicholas concluded that much work is still to be done and educationalists and academia have a key role here.

The fact that even the goals of SM are "work in progress" was further illustrated by comments from Dr Geraint Williams of WMG, standing in for

Orsolya Csorba of the European Commission.

The European Council has agreed to have an integrated policy on environmental impact by employing a "life cycle strategy" of products, implemented via economic and legal frameworks.

The main categories chosen as priority are food, housing and transport but work on this initiative is reported as ongoing. There is now a "sustainable consumption and production" goal, with a path forward to achieve this being mapped out by the end of 2006.

Commitment and good words at the highest government levels though have not yet translated into action by business in the UK or wider EU. There are relatively weak links between EU political groups and industry and so as yet there has not been much progress.

## Flower power

A fascinating paper was put forward by Dr Takuya Nishimura of Toyota Motor Corporation, the makers of the Prius car.

In it he outlined what Toyota is doing with a new plant-based material – Kenaif (*Hibiscus cannabinus*) is being mixed with PP to form a board suitable for door trim once skinned.

Currently, mechanical properties – such as impact performance and heat distortion temperature



A representative of Toyota, maker of the Prius hybrid car, said: "Take action now."

– are lower than oil-based materials, but it is hoped this will change in time because of development and creative design. The ultimate goal for Toyota is to have light, strong, sustainable body panels in the future.

Whether Dr Nishimura can ever face his bosses back in Japan though is open to doubt, as he prefaced his paper with the refreshingly honest comment that "if you really want to do something to help the planet, stop driving your car!"

The seemingly simple route of making an internal body panel or tyre cover from a partly plant-based product that could be grown each year threw up many conundrums. First, the plant side of the equation, for example, agriculture is variable, as the weather is different each year and crop growth is seasonal.

On the other side of the equation, manufacturing

requires predictable parts with constant quality which are suitable for mass production. Kenaif is a fast-growing plant but only if conditions are right and this means warmth and good rainfall.

The second conundrum is that these conditions prevail broadly around the equator, in the poorest regions of the world (Indonesia, Africa, South America). Consumption, and to a certain extent industrial production however, is centred in the wealthier regions which tend to be further north (Japan, Europe, North America).

So is it clever to make a sustainable product and then transport it thousands of miles? Demand for such bio plastics is expected to grow strongly and that raises the third problem.

Would there be enough land to grow the volumes of crops required for bio polymers and maybe bio fuels? Fossil fuel is a very concentrated form of energy and to replace it with plant-based solutions would require thousands of acres of land. It would make no sense to cut down rainforests to make way for such crop production.

At the end of his talk, Dr Nishimura said everyone asks in relation to climate change and sustainability, "What can I do?" His answer: "Take action now, like Toyota."

At a more local level, Dr Guy Barker and Kerry Kirwan (from HRI and WMG) spoke about their "helix of sustainability".

Warwick is currently working with scientists, chemists and manufacturers to make SM happen locally.

Instead of embarking on a lengthy crop breeding programme to produce the ideal product for either fuel or plastic, they are optimising the properties of synthesised oils and then going back to change the crop properties accordingly.

In this way, crops such as oil seed rape can be brought into the SM loop more quickly than normal. The helix of sustainability includes education, research, engagement and knowledge transfer, all of which are laudable objectives.

## Save your energy

Prior to a round table discussion, director of Forum for the Future Sarah Parkin outlined that in her view, engineers had a responsibility to educate both the general public and government.

Apparently, we need to adjust our use of energy to live (food, transport, etc) by a factor of 10 just to counter predicted population and general consumption growth.

In a rousing finale, Sarah pleaded that we all need to do something now and commented "we all need to be regularly 'sheep-dipped' in sustainable development".

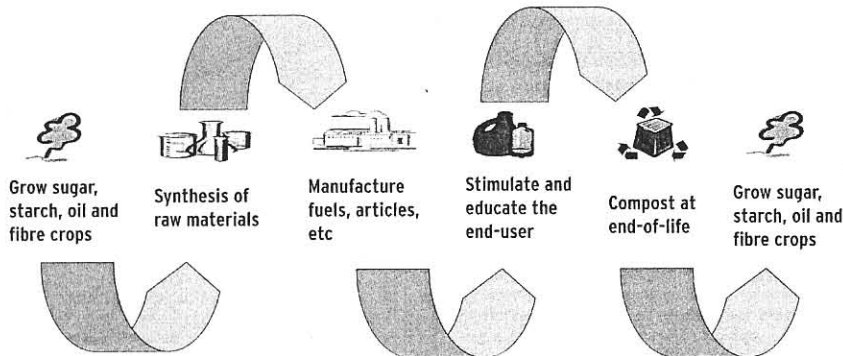
Attending this forum certainly made me think about sustainability, which seems to be the latest buzz word used *ad nauseam*. It seems there is agreement that there is a problem (climate change caused by industrialisation). It is also clear there is no general agreement about the scale of the problem or how to tackle it at a country or continent level.

This debate is not just about oil and new ways to substitute it. As someone remarked in the discussion afterwards, the Stone Age did not end because we ran out of stones.

For those interested in sustainable manufacturing and the wider debate, here are the addresses of some suitable sheep-dips: [www.forumforthefuture.org.uk](http://www.forumforthefuture.org.uk) [www.cfsd.org.uk](http://www.cfsd.org.uk) [www.crystalfaraday.org](http://www.crystalfaraday.org)

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## The helix of sustainability



Source: K Kirwan, N Tucker, M Johnson. *Nature's Way - Sustainable Polymers & Composites*. Materials World, October 2003.