

資 本 雜 誌

# CAPITAL

## GreenGran Natural fibre reinforced polymers: fighting the war on white pollution

Widely used in many industries, plastics have become the source of white pollution. While the world is struggling to deal with this problem, GreenGran BN (HK) Limited has been ardently advocating a new technology that replaces glass fibres with natural materials. Natural fibre reinforced polymers, with qualities that rival traditional plastics, is paving a new path to a better environment.

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CEO of GreenGran BN (HK) Limited Martin Snijder (right) with Sales Manager of Bio-Natural Technology Co., Ltd. William Chow



Global environmental pollution has reached a very serious stage, said Martin Snijder, CEO of GreenGran BN (HK) Limited. Land, air and sea pollution is everywhere, with plastic pollution topping the list. Its seriousness is visible in a plastic rubbish island the size as big as Spain. In Hong Kong, according to the 2008 Hong Kong solid waste monitoring report by the Environmental Protection Department, solid wastes dumped in landfills last year mounted to 13,503 tonnes per day, in which plastic wastes reached 1,702 tonnes. In other words, Hong Kong produces plastic wastes at an alarming rate of 620,000 tonnes per year.

### Developing new materials

Plastics have all the characteristics of durability - malleable, mouldable, insulating, incorrosive against acidity and alkalinity, and low air and liquid permeability. Its durable feature has sped up its popularity since the 1950s, but also makes it extremely difficult to naturally decompose. Degradation takes a few hundred years, while incineration releases toxic substances that cause immeasurable pollution problems. Recycling plastic meanwhile has low efficiency which is the major reason for the low response in plastic waste collection. In recent years, scientists have been looking for materials that reduce the consumption of plastic and petroleum products. They found that "natural fibre reinforced polymers" have the greatest potential for development.

In the 90s, European countries began to focus on recovering, reusing and recycling automobile materials and spare parts, especially on glass fibre reinforced plastic (GFRP) parts which are widely used but difficult to recycle. With financial support from the UN and EU, the Wageningen University of the Netherlands commenced research on the development of natural fibre reinforced polymers. The result was the invention of GreenGran natural fibre reinforced polymers (NFRP) which became a registered patent in the late 90s.

### Excellent results

Using sustainable and renewable natural plant fibres (such as flax, jute, hemp and kenaf) and through industrial production techniques that distribute them into plastic, GreenGran NFRP are made from the combination of these natural fibres with polypropylene, thus reducing the use of petroleum products. Five times stiffer and 2.5 times stronger than its raw material polypropylene, it will not cause wear and tear to the screw and the mould like GFRP do, and unlike GFRP, it does not pose safety and health risks. Its recoverable component comes from these natural plants and can occupy over half of its weight, up to 80 percent. All these features make it suitable for the production of durable products.

Snijder listed out the many advantages of GreenGran natural fibre reinforced polymers: good insulation, dimensional stability at high temperatures, high thermal deformation temperature, flame retardant, impermeability, possessing a stiffness and strength similar to traditional GFRP, can withstand long machine resistance time, low water absorption rate, high resistance to ultraviolet radiation and demonstrates normal flow behaviour, making it the best substitute for glass-reinforced plastic.

### Cradle-to-Cradle life cycle

"For a material to be genuinely environmentally friendly, its entire production process should be a closed system. The waste released by each production process should be usable in the next process, forming a cradle-to-cradle production cycle. In addition, as the raw materials of GreenGran's natural plastic come from plants and petrochemicals, the whole product can be collected and reused."

Snijder added that lab figures showed that GreenGran natural fibre reinforced polymers products can be reused as many as seven times. Even when the product has reached the end of its life cycle, it can be collected and made

## Capital Outstanding Green Performance Award



The directive that promoted new materials development

The EU has long realized the environmental cost of improper waste disposal. Over the years, it has been launching measures to encourage manufacturers to recycle materials. In October 2000, the EU issued the End-of-Life Vehicles Directive which stipulated that from 1 July 2003, vehicles must not contain harmful materials; by 1 January 2006, a minimum of 85% of vehicles should be reused or recovered and at least 80% must be reused or recycled, increasing to a 95% reused or recovered (including energy recovery) and 85% reused or recycled by 2015. This directive brought not only great shudder to automobile manufacturers and related industries, but also great business opportunities to industries engaged in the development of recoverable materials. Snijder said that in the past, automobile manufacturers mostly used glass fibres, which have a low rate of recycle and damage machines during the course of collection. GreenGran natural fibre reinforced polymers, on the contrary, feature not only multi-reusable characteristics, but also properties that are comparable to GFRP. That is why it has found a lot of room for development in the automobile industry.





into energy pellets for electricity generation, during which only water and carbon dioxide will be released when combusted.

### Wide applications

To promote GreenGran natural fibre reinforced polymers, Wageningen University moved from innovation to commercialization. It shared its technology and partnered with Bio-Natural Technology Co., Ltd. to form GreenGran BN (HK) Limited. Snijder said that GreenGran natural fibre reinforced polymers is currently produced in Europe intending for using in automobiles, construction materials, toys and electronic products. These include the fuse holder, battery tray, and underlay of automobiles; structural parts for wood plastic composites and injection molded accessories in construction; green toys; and housings for electrical appliances.

Custom made orders are also available to tailor for clients' products. The type and

amount of natural fibres can be adjusted to manufacture products of different features and appearances. Last year the EU automotive industry decided to shift from press moulded parts to injection moulded parts, replacing GFRP that have been used for years with plastics reinforced by natural fibres. This has set off a trend which guarantees a bright future for GreenGran.

### Protecting dams and rebuilding coral reefs

Apart from conventional industrial usages, GreenGran is initiating researches to apply its natural plastics in innovative applications. Among them is a partnership with the government of the Netherlands in which 35,000 protective blocks made from GreenGran natural fibre reinforced polymers are placed on riverbanks and dams to prevent riverbank erosion. Experiments have shown great results.

Snijder pointed out that as GreenGran materials can be made of biodegradable plastic, they will decompose in a specified time period during which no harmful substances will be released, making it ideal for different areas of application.

"Coral reefs around the world are dying in massive numbers due to various reasons. The traditional method of reviving the coral colony is by sinking a ship that acts as a new home for corals. But the ship's paint and other substances will pollute the sea. On the other hand, as GreenGran natural fibre reinforced polymers is made from natural materials that decompose naturally, we can expect that after a few years, GreenGran natural fibre reinforced polymers will disappear and be replaced by coral reefs. This meets the purpose of coral reefs rebuilding."

Speaking of the progress and outlook of the environmental, Snijder stressed that although some scientists describe the global environmental situation as "minutes to midnight", he believes that if all countries can actively implement measures to save the environment, there can be a chance to reverse the situation. After all, the key to environmental protection lies on the user.

"We use a lot of plastic products which will end up in the landfills. The only way to alleviate this situation is to change our habits: use less disposable products and use more recyclable products. This is the best way to protect the environment." 

