



AND THE ENVIRONMENT

ARTIS is working hard to develop green credentials and reduced carbon footprints for the rubber industry.

It is currently positioned as an expert in the rubber recycling market by offering a compound development service which includes converting rubber crumb from a range of sources into new or existing rubber formulations. It has been looking at understanding the key factors controlling the results of this process and has developed a good knowledge of the need for control and housekeeping by rubber material suppliers, the crumb manufacturers and the compound users.

ARTIS has also studied the alternative approach of pyrolysing rubber materials to produce a char that can be included in rubber compounds as a way of reducing carbon black volumes for some compounds. Again the need for controlled sourcing and good housekeeping are paramount.

ARTIS is part of a consortium created by Symphony Energy Ltd and funded by the Technology Strategy Board, which is looking at the disassembly of used tyres using ultra high pressure water jets to crumb the tyre and allow the steel cord and fabric to be separated and recovered. Microwave pyrolysis then converts the crumb to carbon and gas which can be condensed to form oil. This represents a much less energy intensive process than conventional shredding and gives lower CO₂ emissions than incineration. ARTIS will be involved in the initial system optimization and evaluation of the crumb as a product in itself or as a feedstock for the pyrolysis process. The carbon produced is a possible material for incorporation into rubber and ARTIS will be evaluating this material with Imperial College. It is expected that the oil will be used as fuel. It is anticipated that at the end of the project a full scale production facility will be developed and ARTIS will be closely involved in the set up and quality monitoring of this operation and act as technical resource for the business regarding the use in rubber compounds.

ARTIS is also working with a number of other companies in the recycling chain and the knowledge transfer networks set up by the UK Government.

Alongside recycling issues ARTIS is involved at the forefront of 'Green Energy' generation and has recently been awarded a development contract from the Carbon Trust supporting the development of the Anaconda sea energy device.



The Anaconda is a new concept for the generation of electricity from wave energy and is currently being developed by Melksham based Checkmate Sea Energy (www.checkmateuk.com/seaenergy).

Invented by Professors Francis Farley and Rod Rainey the design utilises a large distensible rubber tube of up to 200m in length and 5m in diameter, which floats at right angles to oncoming sea waves. Bulge waves are formed through interaction with sea waves, these pass along the inside of Anaconda, riding in front of the wave rather like a surfer, gathering energy as they move towards the turbine power take off unit at the end of the device.



ARTIS has been involved with the materials selection, engineering design and prototype testing stages of the device, with a view to maximising its efficiency and longevity. This will depend largely upon the correct choice and use of materials, an area where ARTIS has recognised expertise.

The Anaconda is one of an increasing number of programs where ARTIS is involved in green issues : ARTIS has a number of programmes looking at recycling, sustainability and environmental impact reduction and continues to grow its research activities inside and outside of Avon despite the poor economic climate.

Other areas of involvement range from the development of a rubber 'Portable Patio' containing around 80% sustainable materials to a development programme using MinTron 7 pulverised fuel ash in rubber which has been taken up by major tyre producers. ARTIS has carried out a significant amount of work looking at the removal of phthalate plasticisers from rubber compounds – an issue highlighted many times over the past few years – and has developed a number of solutions to resolve the health issue associated with use of these materials in rubber and plastics.

ARTIS continues to work with bodies such as the National Physical Laboratory, the Institute of Materials, Minerals and Mining, academia and Government organisations to improve the carbon footprint and green credentials of its customers, both internal and external.

RECYCLING SCIENCE

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