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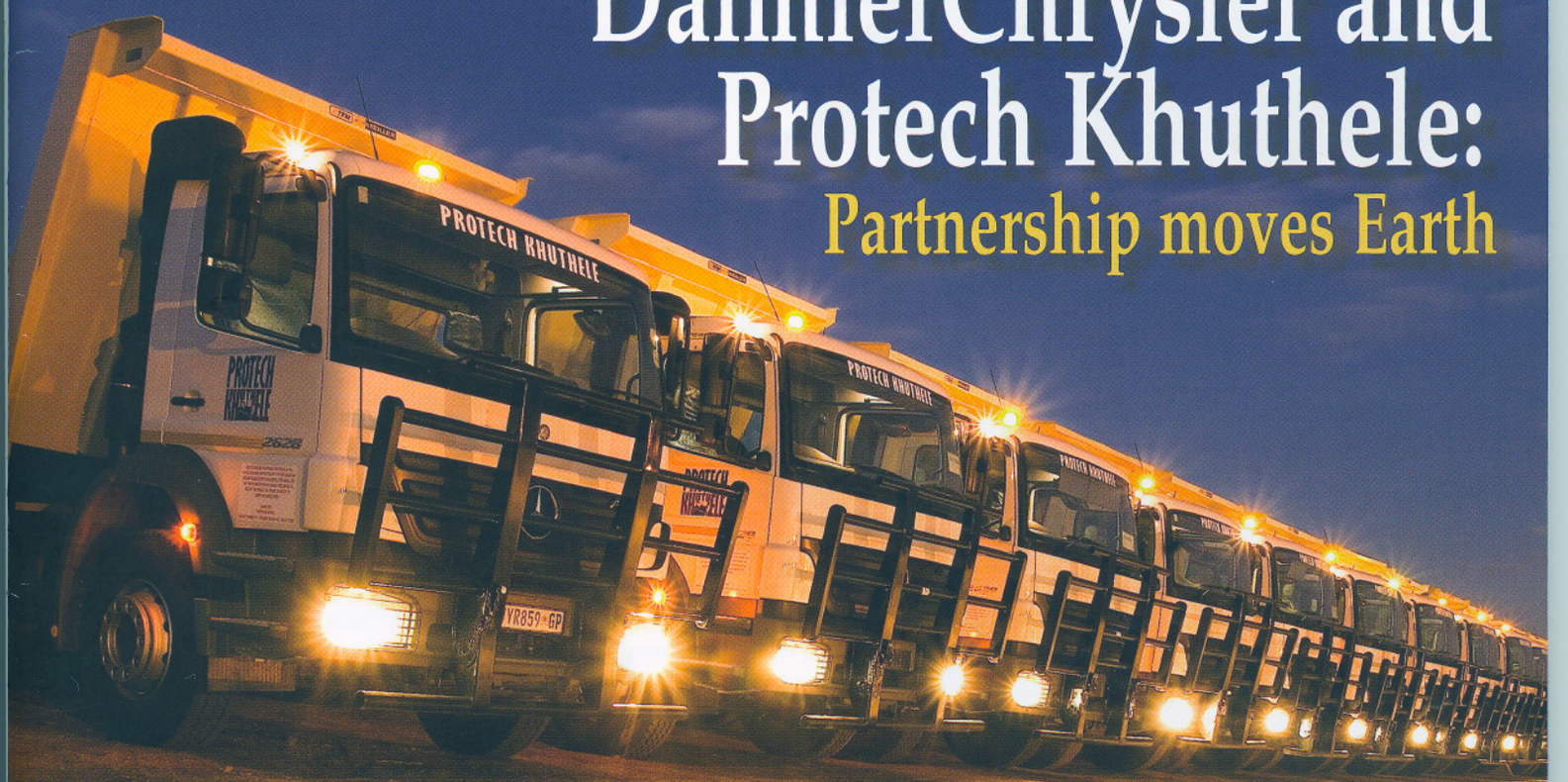
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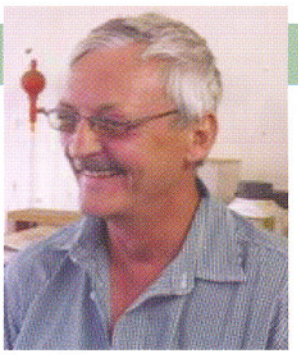
Africa's make-or-break solution:

Waste goes to work

by Olaf Pollmann and Frans Wilson



Olaf Pollmann



Frans Wilson

Most people, including whole industries and economies, classify a range of resources as 'waste', which should be taken 'away', without trying to find ways of realising the residual values in this 'residual' stream of resources.

Anything that is concentrated, changes character and behaviour when it becomes over-concentrated. This rule applies in particular to man-made resources. Even organisms, animals and people change their behaviour when over-concentrated. Overpopulated cities in all historical eras are proof of this statement.

When the planet was formed, certain elements were concentrated in the crust, mostly in chemical equilibrium. Wherever the chemical equilibrium is knocked out of balance, disaster is certain. In this sense, waste landfills are areas of potential chemical and biological disaster.

Recycling politics

Research at an Impact-SupaZorb waste recycling facility in Richards Bay, in collaboration with North-West University, set out to fulfill the aims of the forthcoming National Waste Bill. The results were reported to the Department of Environmental Affairs and Tourism (DEAT).

Waste separation and recycling was done at the facility on a conveyor belt and by hand, ensuring some job creation. However, corrupt municipal officials, nepotism, ethics problems and the ongoing strike action by separation staff had forced unconventional solutions.

Despite these problems, the waste had to be processed as the municipal landfill site had been closed by the Department of Water Affairs and Forestry and the DEAT for being over its capacity. And being a coastal town with many wetlands, no suitable land could be located for a new landfill site.

Furthermore, historical data on the composition of the municipal waste was very far from correct. The separating plant was designed to deal with 54 types of waste. Government guidelines indicated that by weight plastics made up 5% of landfill, but we found that by weight plastics made up a massive 70%.

Light construction slabs

Here was a ready-made solution. The chemical combination of plastic and its characteristics make it excellent binding material for the rest of the waste.

A machine was developed to compress and melt the waste, and then to use the plastics as cement is used in concrete. However, this process presented challenges, one being finding the correct particle sizes.

Products included chairs, tables, bricks and construction slabs for buildings, walkways, roadside curbing, safety barriers and signposts

The waste mix was first stripped of most glass and metal, and sand particles posed a problem regarding wear and tear on the machine. Pressure, temperature control and moisture content



Three waste-to-product processes

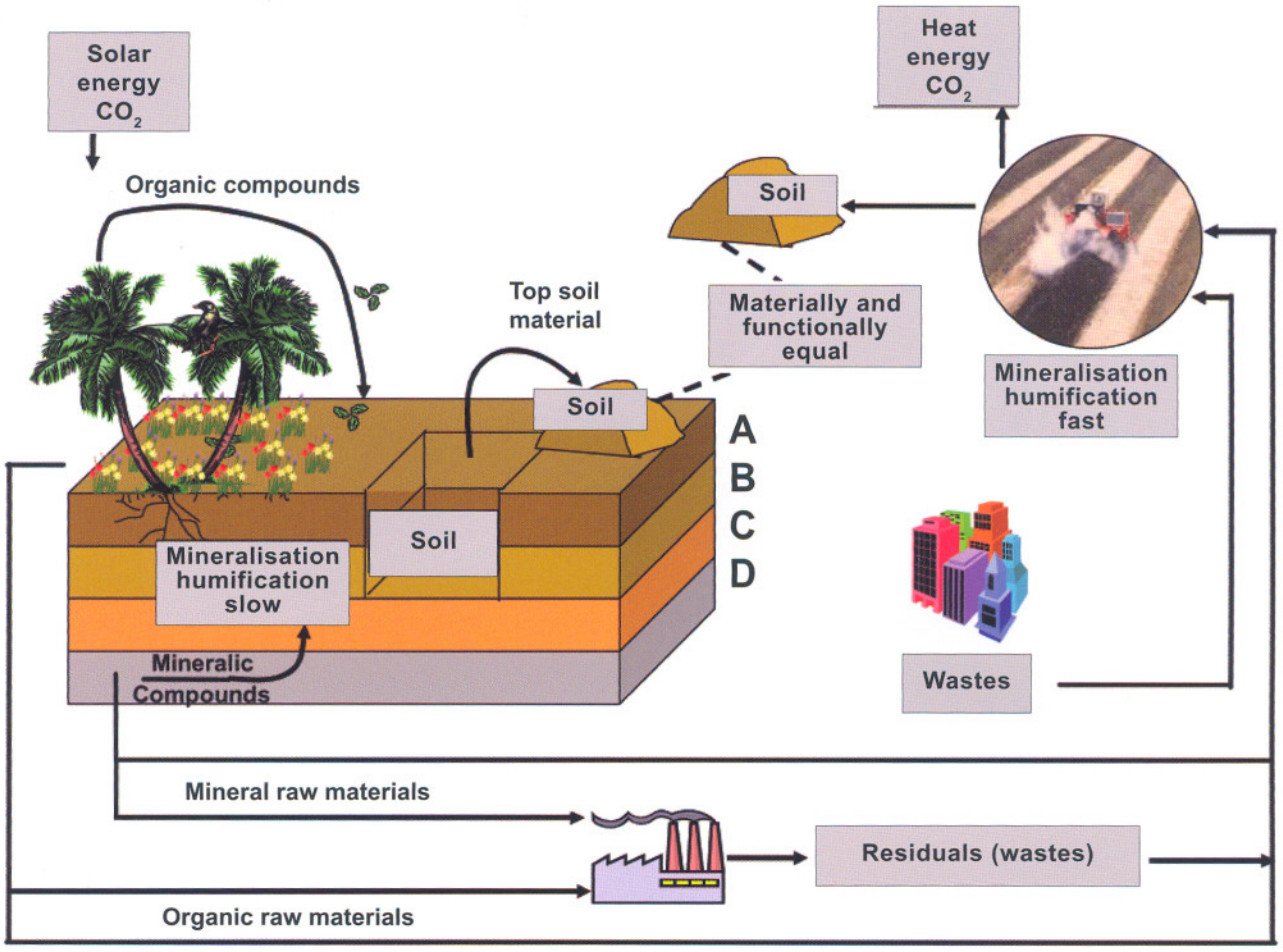


Figure 2: Soilificatin – equivalence of natural and man-made soil

had to be dealt with too. For melting to occur a temperature above 180°C was required for a period longer than 20 minutes, incidentally to kill known pathogens. Under pressure, the melted waste mix was pressed into shapes to create new products of 'plastic wood'.

The wood or carbon fibre component comes either from garden refuse, paper or cardboard. The composition of the refuse stream, the components and the compaction force to make 'plastic wood' remain industrial secrets for the moment. Products manufactured from the 'plastic wood' include chairs, tables, bricks and construction slabs for buildings, walkways, roadside curbing, safety barriers and signposts among others.

The new material could reduce the use of wood by almost 80%, saving forests and reducing global warming.
The new products are UV-resistant to the level of one micron per year, until the carbon is exposed.

Making soil

Remaining human waste, like sewage sludge, paper fibre pulps, timber, biological wastes and other organic wastes can be used to make fertilizers for several defined products. This process is called the soilification of man-made waste, closing the loop of natural resources.

The new fertilizer offers very good water retention, mineral retention and crop yield.

Results

The outcome of the test did not even require public participation, which is always a difficult ingredient in any waste management plan. The public would appreciate standardised panels from which to build houses and other structures. These products could be used as payment for waste collection programmes. The net result of the test goes beyond recycling. We believe it could be termed up-cycling. 3S

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