BAUXITE RESIDUE VALORISATION AND BEST PRACTICES CONFERENCE

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Bauxite Residue and other Waste Materials in Light Weight Aggregate Production using a Trefoil Kiln

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Problem

- Wastes such as sewage sludge and fly ash from power stations, cost money to dispose of *.
- There is an added danger that heavy metals can leach into the environment.

* Some fly ash could be used as an additive to cement but some compositions of fly ash cannot be used and cause a problem

Solution

- The trefoil process: converts waste into energy and light weight aggregate (Lwa)
- Waste materials are combined and fired to produce a light weight aggregate.
- During the process, the heavy metals are locked inside the aggregate and do not leach.
- Paid to recieve the wastes, and product is sold.

Tilbury, UK

(Mark I full scale plant, built around 2001, due diligence by star capital)

Plant capacity 240,000m^3 aggregate pa

Chongqing Demo Plant, China

Demo plant for the Mark II design: using this demo plant it was proven that the local waste could be used for the process

Materials Used

Bulking materials

- Any material which can be handled, dried to powder and will sinter below 1200^{O}C including:
- Pfa
- Clay
- Other ashes from MSW, CHP, sewage incineration etc.
- Shales
- Aggregate crushing / washing fines
- Glass fines (also acts as flux)

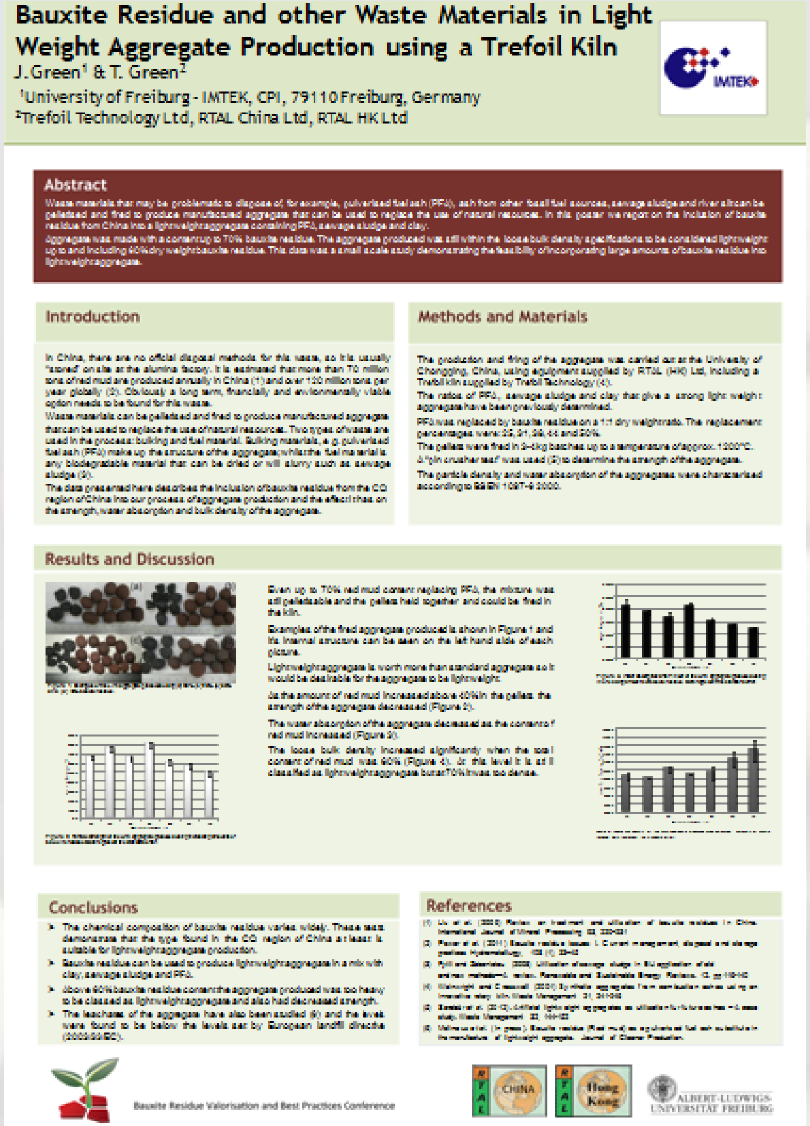
Fuel Materials

- Any biodegradable material which can be handled and can either be dry powdered or will slurry including:
- Sewage cake
- Biodegradable part of MSW
- Carbon / slag from gasification
- Paper pulp cake
- Farming slurries and Chicken/turkey wastes

For all materials a balance has to be determined between waste revenue, effect on product and resulting product revenue, cost to incorporate into process and effects on emissions

Inclusion of Red Mud in the Process

- Using a predetermined ratio of PFA:sewage sludge:clay as the starting point. PFA was replaced by red mud on a dry weight basis.
- Mixes were made from 20-70% red mud and these were pelletised and put though the process.
- The aggregate produced was evaluated in terms of strength, water absorption, loose bulk density.



Come and read the results at coffee time.