Nanyang Technological University

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# On the road to contain steel waste

## If a Jurong experiment goes well, NatSteel needn't worry about slag disposal - it will be used for paving

By GOH CHIN LIAN

ROADS in Singapore could one day be made of steel waste. Whether or not this happens will depend on a year-long experiment that begins tonight in Jurong.

At 10 pm, a stretch of Jurong East Central near the junction with Jurong Street 13 will be paved with a mixture of material that contains slag, which is generated during the process of refining steel.

The idea of using the waste on roads came about because of the amount of money that NatSteel, the only steel-making company in Singapore, has to spend on disposing its waste.

At $77 a tonne to dump, and with 24,000 tonnes to get rid of, it is causing the steel maker to run up a bill of close to $2 million every year.

So the company turned to the Nanyang Technological University's Environmental Engineering Research Centre four years ago to find a better use for the waste.

As it turned out, tests showed that if slag is further processed, it is superior in many ways to granite, the conventional material used on roads. Slag is hardier, keeps its shape under heat, does not hold as much water and binds better to other materials.

So roads made with it would last longer and cost less to maintain.

The trial in Jurong involves a 40 m stretch of road and will cost $65,000, half of which will be paid for by the National Environment Agency from its $20 million innovation fund.

Dr Josephine Kwa, NatSteel's executive vice-president for technology, said that whether or not steel waste will be used to pave other roads will not only depend on this experiment, but also on whether the cost of processing the slag is lower than throwing it away.

She declined to say how much it costs to process, but revealed that her company has already invested about $1.9 million in the project.

This is not the first time that waste material has been used or tested on roads.

Another form of slag has been made into stones by NatSteel since 1994 and used in the topmost layer of roads.

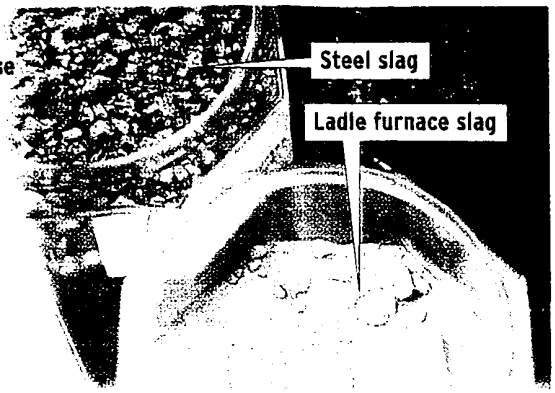
Touted to toughen highways, it has been used to pave the stretch of St Andrew's Road between the Padang and City Hall, the Normanton Park exit from the Ayer Rajah Expressway, and the junction of Still and Marine Parade roads.

Ash from burnt rubbish was used last year to help form the base of a 150 m stretch at Jalan Buroh, near Pandan Reservoir. Groundwater samples have been taken regularly to check the environmental impact of the ash, and the results are still being compiled.

# PAVING THE WAY FOR RECYCLING

**1st layer**

**Wearing course** (25 to 50 mm) Asphalt mix (black tar) with small granite pieces which drain rainwater and provide smooth surface.




**Alternatives:**

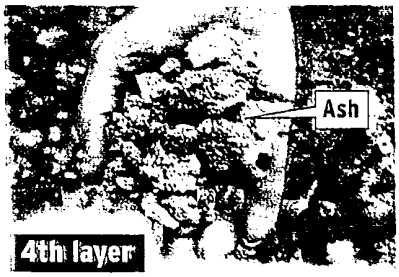
- Steel slag left over after melting down steel scrap toughens the road, reducing upkeep costs. It has been used to pave several roads.
- Ladle furnace slag from refining molten steel is being tested at Jurong East Central in a year-long trial run.

**2nd layer**

**Base course** (75 to 120 mm) Similar asphalt mix layer which spreads the load of vehicles.

**3rd layer**

**Graded stone layer** (200 to 250 mm) Loose granite stones – a cheaper subsitute for asphalt – to spread the load.

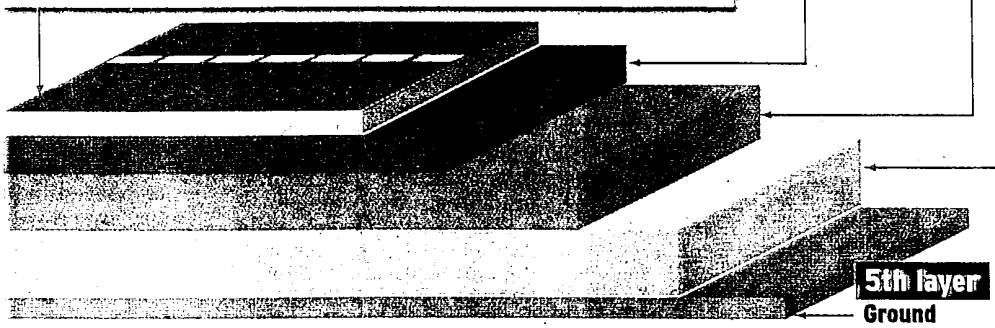



**4th layer**

**Sub-base layer** (200 to 300 mm) Even larger and cheaper granite stones to spread the load.

**Alternative:**

- Ash from burnt rubbish was tested last year on a road near Pandan Reservoir.




Graphics: G. CHANDRADAS