Recycled Roads

Team Iceland: Amanda Heath, Rohit Panjala, and David Van de Water
Background

- Ahmed Khan is trying to solve two of India’s biggest problems\(^1\)
- His company is trying to solve both of these problems by using recycled plastic as road material\(^1\)

- India was not prepared to handle the increase in plastic waste that began in the 1980’s\(^1\)

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Background

- Waste plastic is mixed with asphalt to form a polymerized bitumen\(^1\)
- Polymer mixture consists of materials found in plastic water bottles\(^1\)

Relevant History

- Khan brothers
  - Determined right ratio of bitumen to plastic

- Lockheed Martin’s Bridge
  - No steel corrosion
  - Can carry equivalent loads as regular bridges
  - Faster maintenance

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Chennai Pista
Relevant History

- India
  - Plastic waste on beaches
  - Accumulated for years
  - Plastics can last hundreds and thousands of years

Surfing India
http://www.surfingindia.net/files/surf-files/u5/ChildOnTrashedBeach.jpg
Significance

- India’s beaches are getting polluted with plastic waste from the oceans
  - 60-80% of marine debris consists of plastic \(^1\)
  - Plastics are durable \(^1\)
  - Affects certain cities more \(^2\)

- Plastic is also affecting wildlife and domestic animals
  - 3000 Cows died in Lucknow, India after eating plastic \(^2\)
  - Absorb toxins which can damage organisms nearby \(^2\)

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2 Khullar, Mridu. (2009) "Plastic Roads Offer Greener Way to Travel in India."
Significance

- Plastic roads alone cannot fix this problem, but it can help remove some excess plastic waste.
Current State

- Bitumen aging is the main factor leading to road deterioration
  - These properties improved when plastic was added

- Research is still being done for cost efficiency
  - Is it better for the long term?

- Plastic-Modified bridges have also started making their way to India
  - Many of these exist in the US and England

1 Kumar, Praveen, and Rashi Garg. (2011) "Rheology of Waste Plastic Fibre-Modified Bitumen."

Fibercore Europe
Challenges of Current State

- Plastic collection
- Implementation
- Increase average cost of pavement by 9.91% 

News For Us

Challenges of Current State

- Industry for maintaining regular roads worth 350 billion rupees a year
- Adopting new technologies too rapidly
- Internal feud among companies and corruption
- Environmentalists believe in enforcing policy to reduce plastic


Future of Plastic Roads

- Mixture of PET is stiffer and more stable than the original asphalt solutions\(^1\)
- Materials bring benefits to highway construction, from longer lasting roads to decrease in maintenance cost\(^3\)
- Slowly growing industry\(^3\)

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India Civic http://indiacivic.com/savenature/jusco-plastic-road-future/


The End :)