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Elastomers in Infrastructure

18th June 2021

Brian Kent
National Technical Director

Global warming

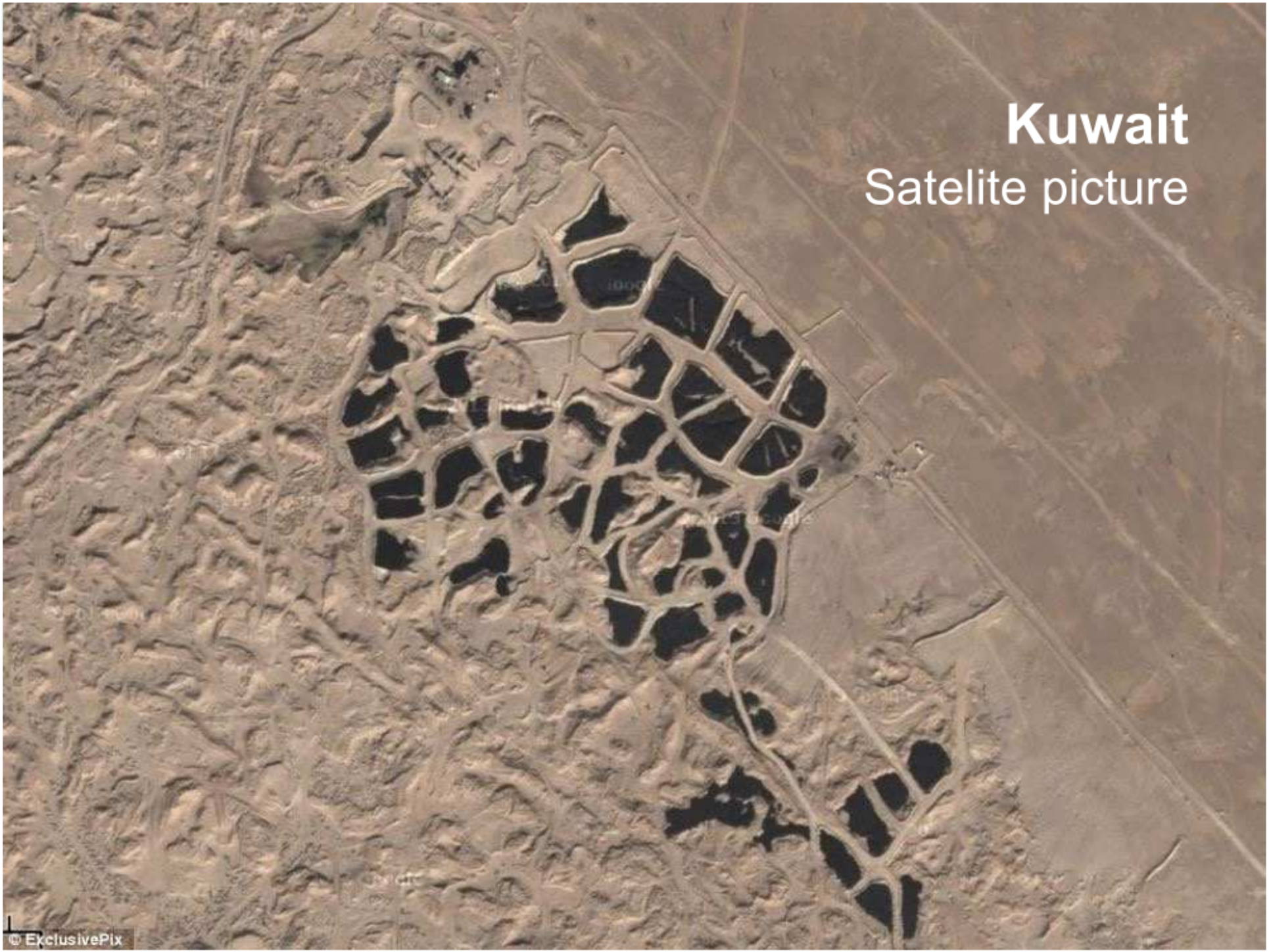
Cutting carbon emissions to as close to zero as possible

Capturing and storing or ‘offsetting’ emissions that can’t be eliminated

- UK first major economy to commit to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels
- Scotland has set a net zero target by 2045
- Wales has a target of 95% reduction by 2050
- The UK has already reduced emissions by 42% while growing the economy.


inroad
Tyre technology
waste to pavement
recycled technology
tyre rubber

Kuwait


Kuwait
Satelite picture
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UK's waste tyres

- EU law since 2006 – cannot be placed in landfill
- 40m UK waste tyres every year
- UK recycling processes shredded granulated tyre rubber for sports pitches and safety surfaces
- Waste tyres used as fuel in cement kilns
- Recycled back to tyres
- Despite current use in various industries in the UK there is still circa 120,000 tonnes exported / year – Subject to change ?

40m
waste tyres
produced
every year

1 in 4
waste tyres
are exported

America's tire mountains: 90 percent are gone, thanks to recycling programs

Once we had 2 billion tires scattered around the U.S. landscape, but now 90 percent of the piles are gone. Ground rubber from tires is becoming roadways, playground equipment and auto floor mats.

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Rubber Modified Asphalt

- Used in many parts of the world and supplied in pre-blended bitumen or using the dry mix process.
- Over 3 million tonnes of dry mix process asphalt laid to date in the USA.
- USA experience has found that the use of the rubber mechanically restricts crack propagation and that it provides some low grade PMB flexibility benefits
- UK currently does not have the facilities to shear rubber into bitumen.
- Tarmac have been exploring rubber use since 2011.
- Our designs are based on using a fine milled tyre rubber which is blended at the asphalt plant


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Rubber Modified Asphalt

- At only 0.67% rubber content in asphalt, this will equate to waste from roughly 1 tyre in every tonne of asphalt
- Therefore potentially circa 500 tyres in each kilometre of road depending on layer thickness.

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Birmingham Trial - November 2011

Still performing in May 2020

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Whitley Bay – 2013

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Whitley Bay – August 2020

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Coventry – July 2018

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Rubber Modified Asphalt

- Currently available in SMA type products
- Available as Warm mix only
- Utilises a slightly softer binder than 50 pen in recognition of interaction with rubber
- Delivers similar performance characteristics to those required from a 50 pen
- Typical carbon footprint will be circa 8% lower than the equivalent 50 pen SMA
- Largest job to date completed in Leicestershire earlier this year – 4,800 tonnes

LA Progress

- Rob Little, Senior Engineer, Highways Technical, Coventry City Council :

  "***Coventry City Council is delighted with the rubberised asphalt trial; we hope we can use more of the product across the city in the future to help divert waste tyres from landfill and incineration to reduce the carbon footprint for road construction projects in Coventry. We are proud to be leading with our partners, Balfour Beatty and Tarmac in providing road surfaces which are providing significant environmental benefits for our communities***."

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LA Progress

- Peter Taylor OBE, Secretary General of the Tyre Recovery Association :

"***While there has been significant progress in reusing and recycling waste tyres in the UK, there is still an over reliance on the export of used tyres to countries such as China, India and Pakistan, who are importing fewer tyres as they become self-sufficient. The UK needs a second disposal route for used tyres. Tarmac's commitment to developing rubberised asphalt provides an excellent opportunity to achieve this and deliver environmental savings for this under-used waste stream.***"

Additional Rubber

Highways England – UltiPave 'R'

- 1% rubber trial material supplied to HE on the M1 Jtns 22-23 in late May 2019, as we review USA claims re superior performance to a straight run binder option and low grade PMB properties
- Longer term potential exists to achieve a 'middle market' option between straight run bitumen and PMB re performance and cost.
- Now BBA HAPAS 942 Approved – April 21

- Martin Bolt Corporate Group Leader, Operations Directorate (Midlands), Highways England

"Highways England is committed to investing in innovation to help us meet the economic, environmental and efficiency challenges we face in our changing world and also to delivering environment improvements as we strive to ensure our road network works more harmoniously with its surroundings.

The economic and environmental benefits of this new asphalt could be very significant and we are delighted to be working with Tarmac to trial this new product"

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Next Steps

- Quantify pavement life benefits
- Whole Life Cost analysis
- Increase promotional activities
- Expand relevant asphalt range to optimise use of waste tyres and reduce exports further.


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