

Asphalt Development- What's next?

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Contents of presentation

- A brief history
- Setting the scene in Ireland
- Standards & Specification
- Asphalt Development
- Installation
- Future Highways

A very brief history!



John Mc Adam
Develops Macadam roads
1816-1819

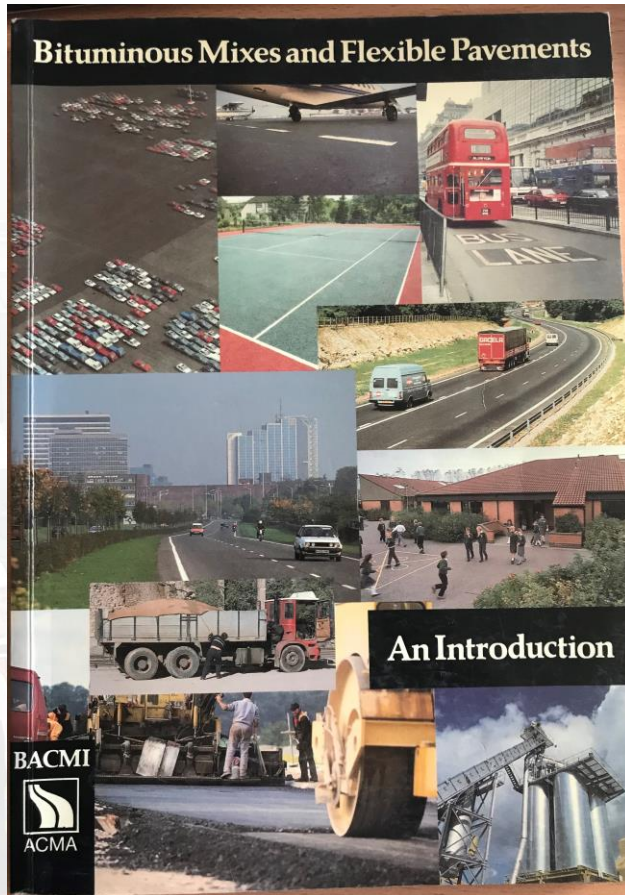


Edgar Hooley discovers
Tar- Macadam
Tarmac formed in 1903

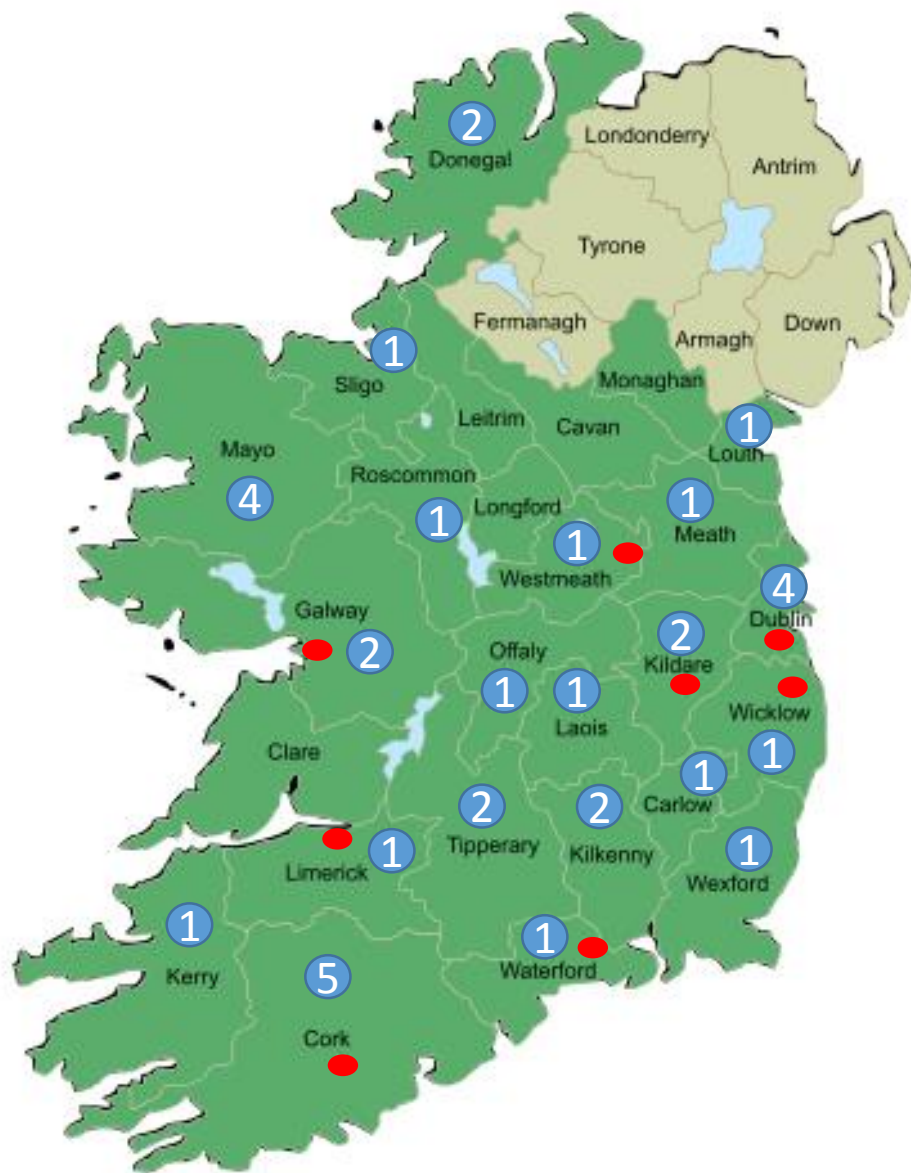


- 1919 Asphalt Institute formed
- 1933 RRL (now TRL formed)
- 1962 First Analytical pavement design
- 1966 IAT (UK) formed
- 1986 IAT (Ireland) formed
- 2006 EN 13108 published

1990's- Asphalt Development



- Porous Asphalt
 - 20mm with 3.7% bitumen
- Recycling
 - Insitu repave
 - Off site recycling
- Additives
 - Rubber, EVA, Sulphur, Resin
- Plant
 - Vibrating rollers, extending and compacting screeds, recycling plant
- The Future!
 - EN standards, performance mixes, full depth construction, HD overlay



Setting the Scene

Asphalt Plants In Ireland

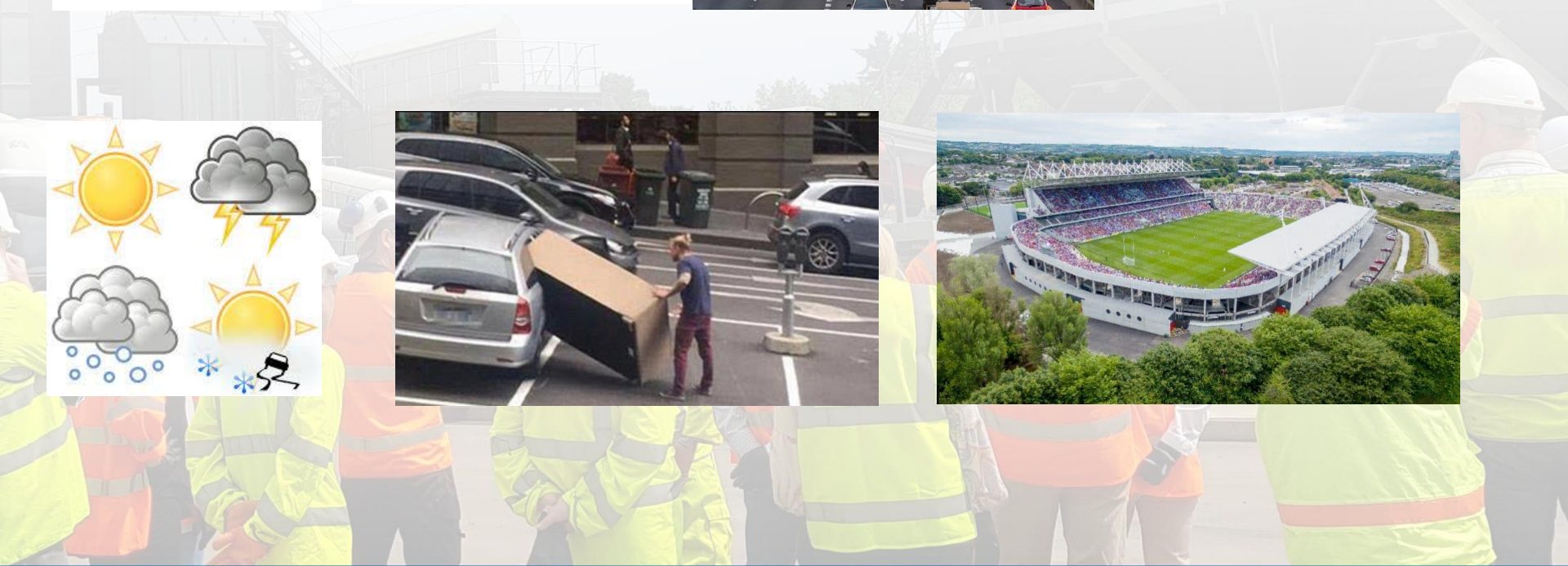
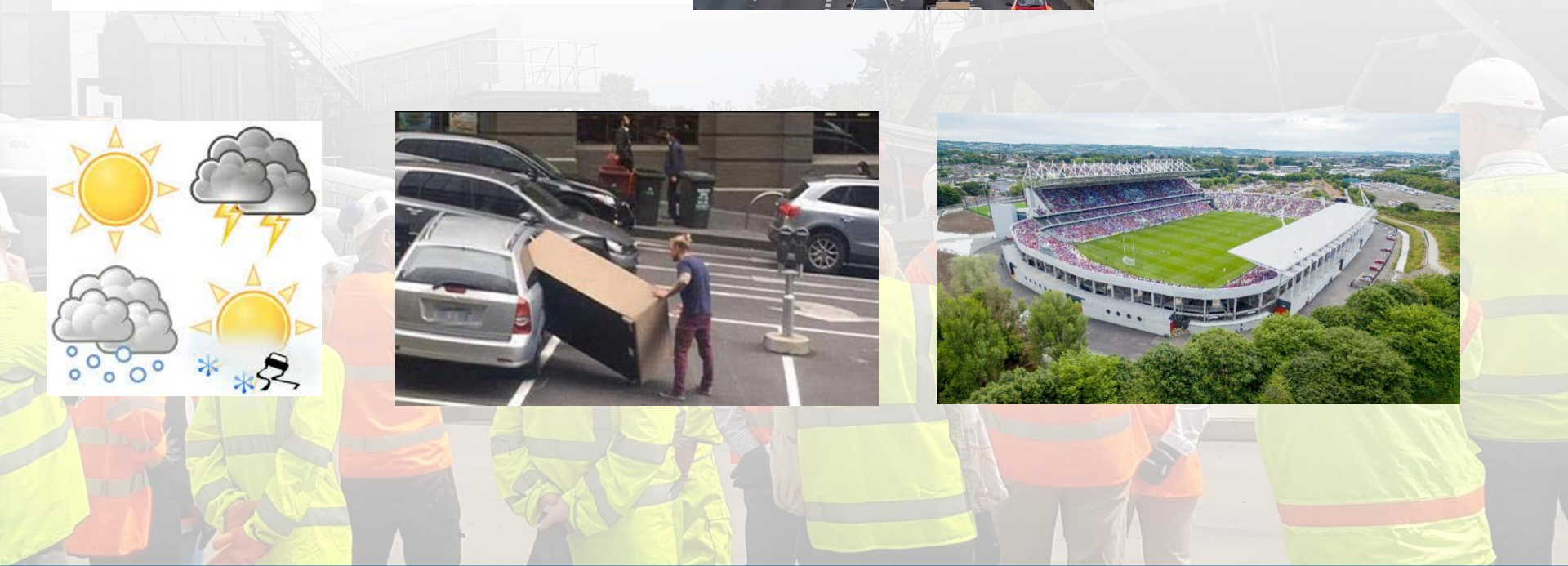
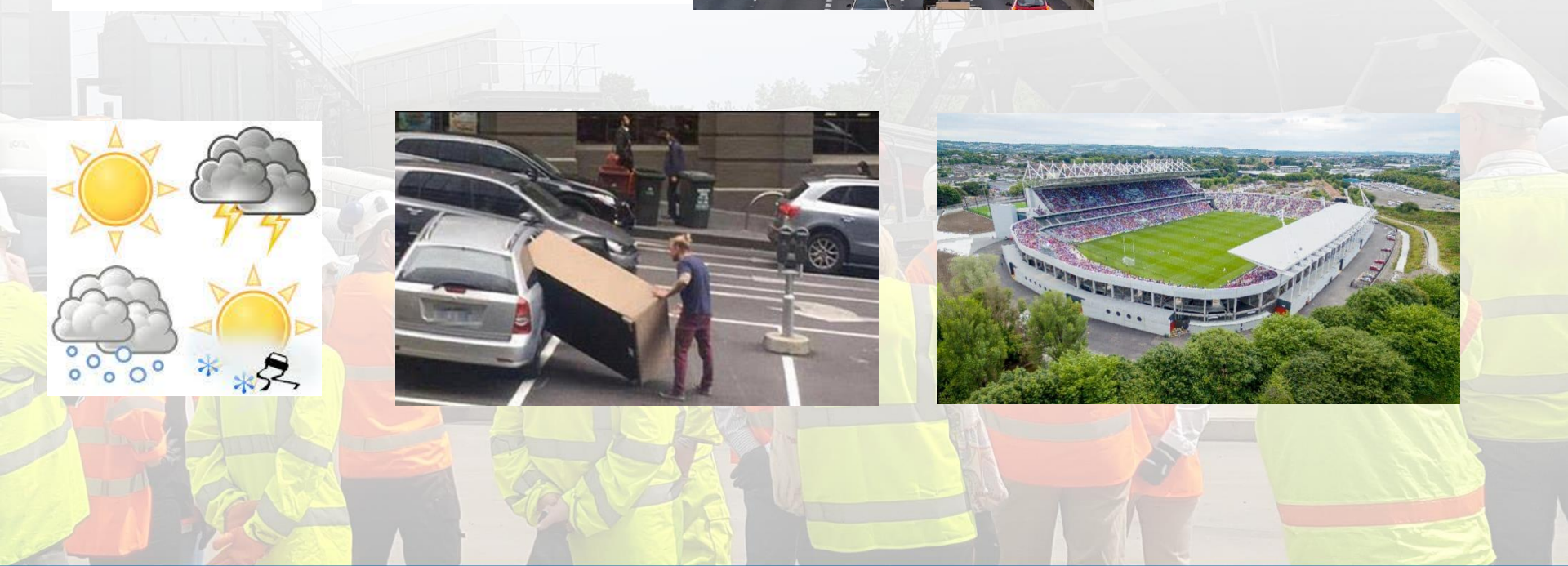
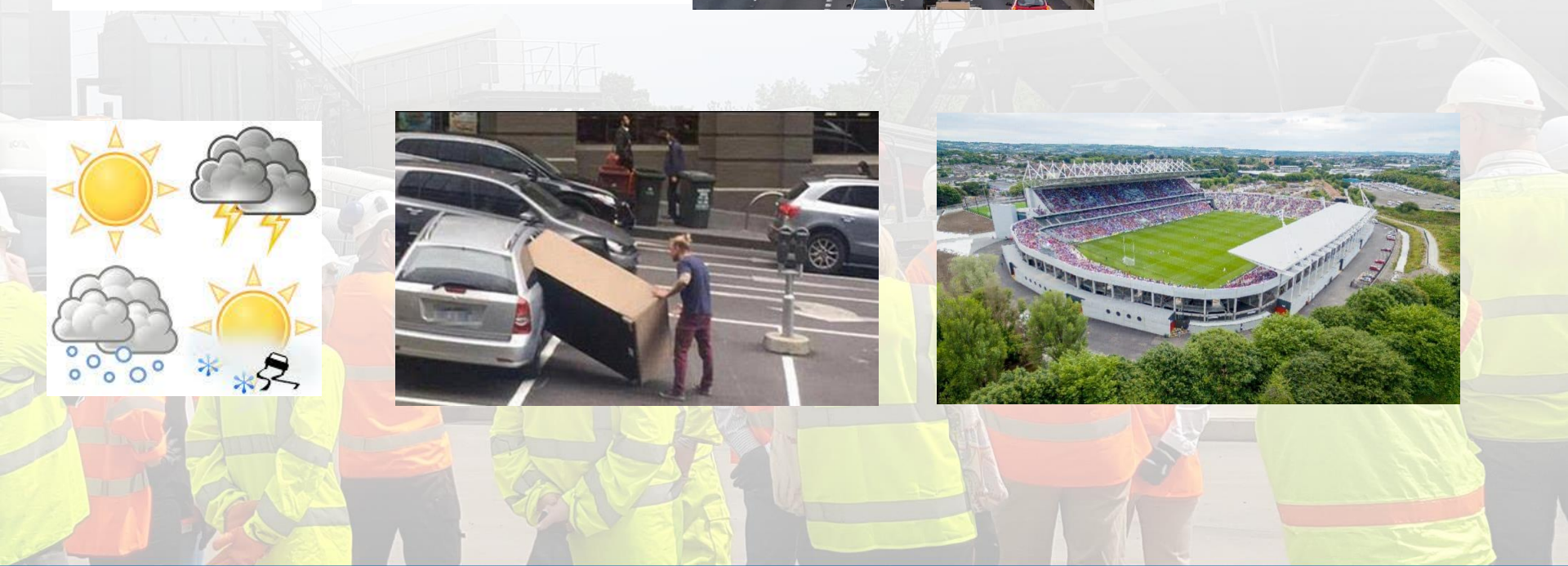
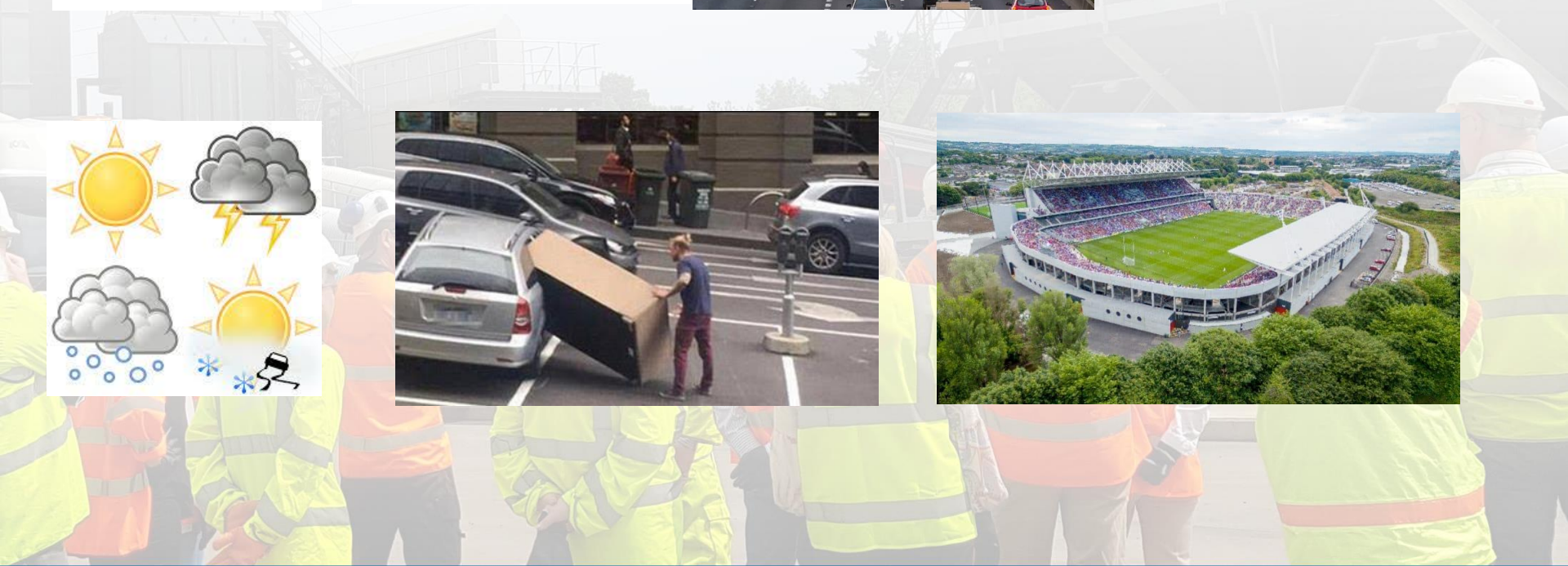
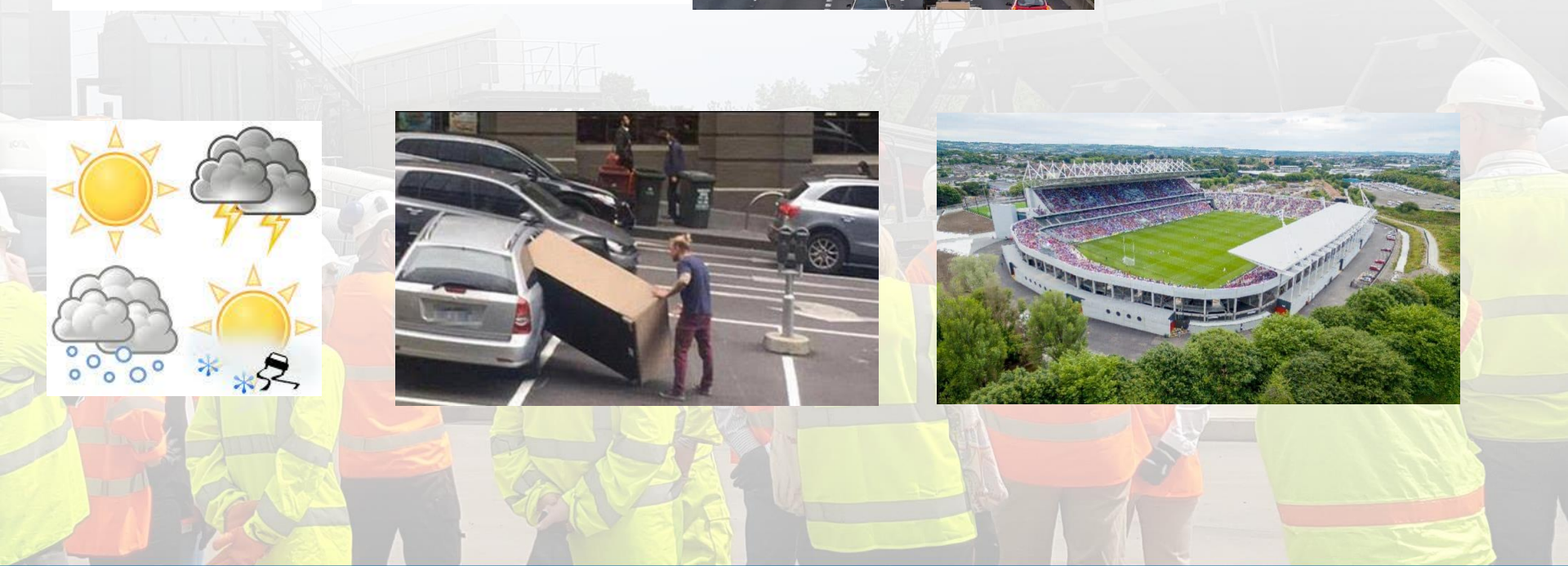
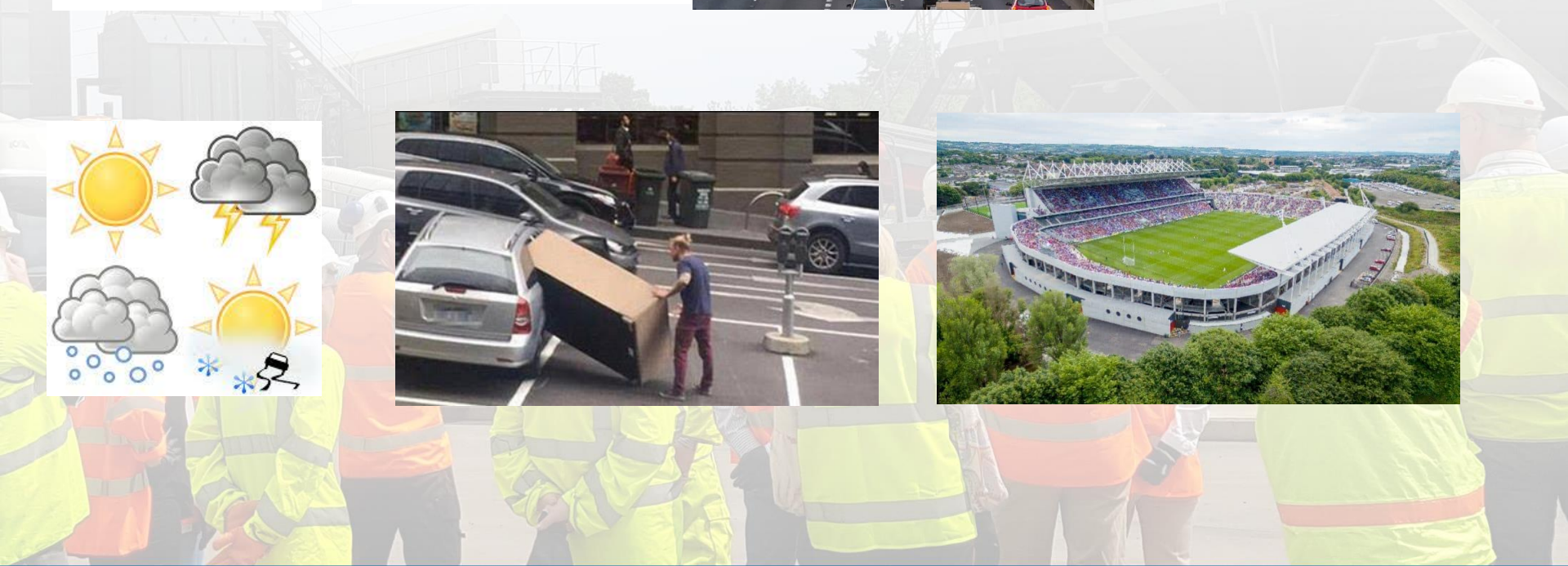
- 38 plants ●
- 8 plants with Recycling ●

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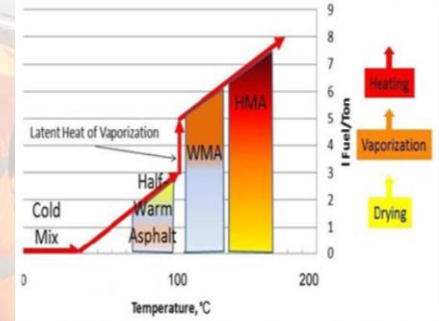
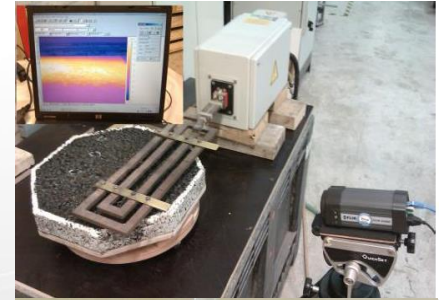


A collage of four images. The top-left image shows four weather icons: a sun, a cloud with lightning, a cloud with rain, and a sun with snowflakes. The top-right image shows a person in a blue shirt and red pants moving a large cardboard box from a silver car. The bottom-left image is an aerial view of a large stadium with a green field and many spectators. The bottom-right image shows a group of people wearing high-visibility yellow and orange safety vests and hard hats.



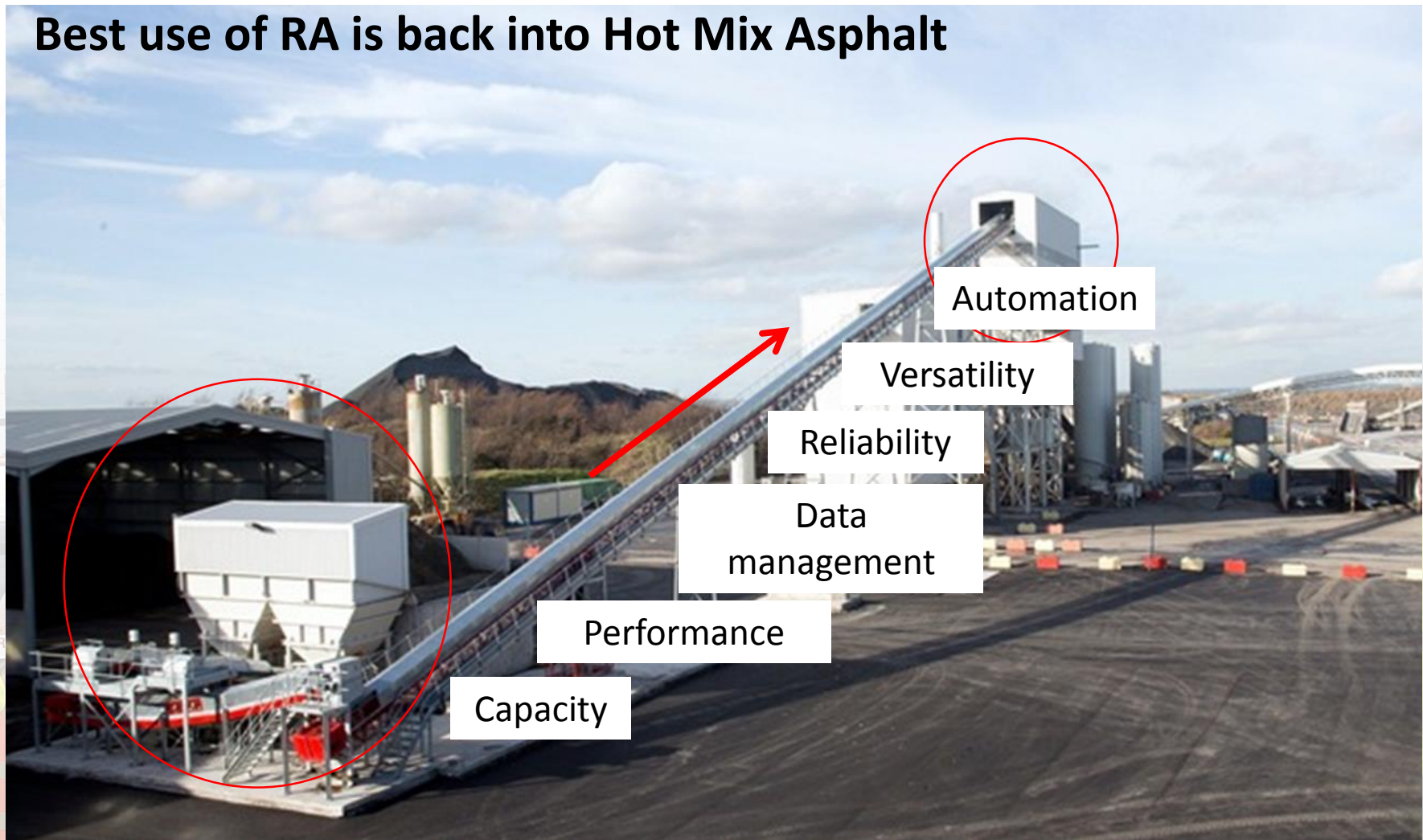
Asphalt Development

- Specifications
- Recycled Asphalt
 - Including surface course
- Self Healing Asphalt
 - Use of steel fibres and induction heating
 - Dr. Amir Tabakovich -TU Dublin
- Porous Asphalt
 - SUDS developments
- Heavy Duty Surfacing
 - Mix design & bitumen technology
 - SMA- Eapa
- Warm Mix Asphalt
 - New technology?



Recycling Asphalt

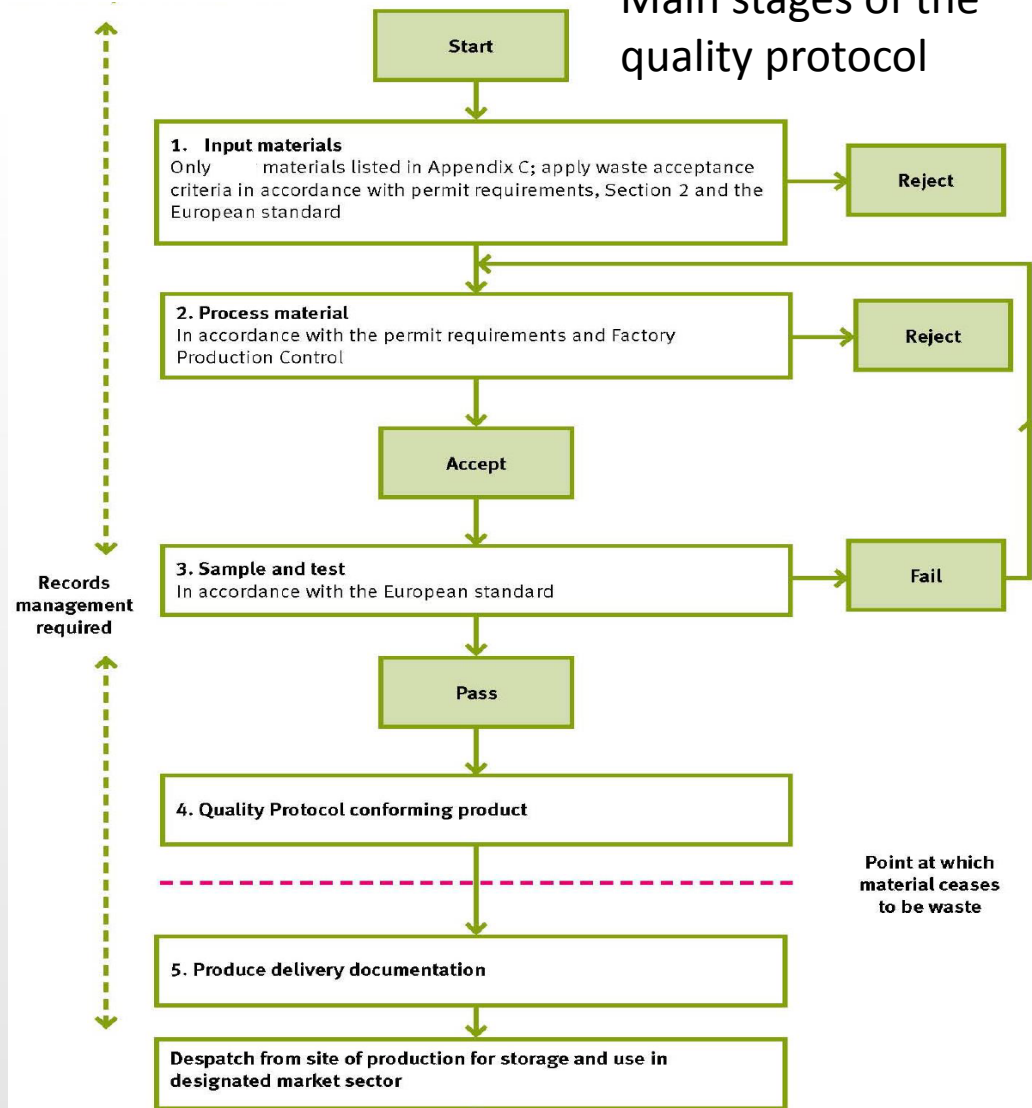
Best use of RA is back into Hot Mix Asphalt



Waste Directive

- Article 27
- End of Waste

Main stages of the quality protocol



EAPA -Asphalt in Figures 2017

RECYCLING

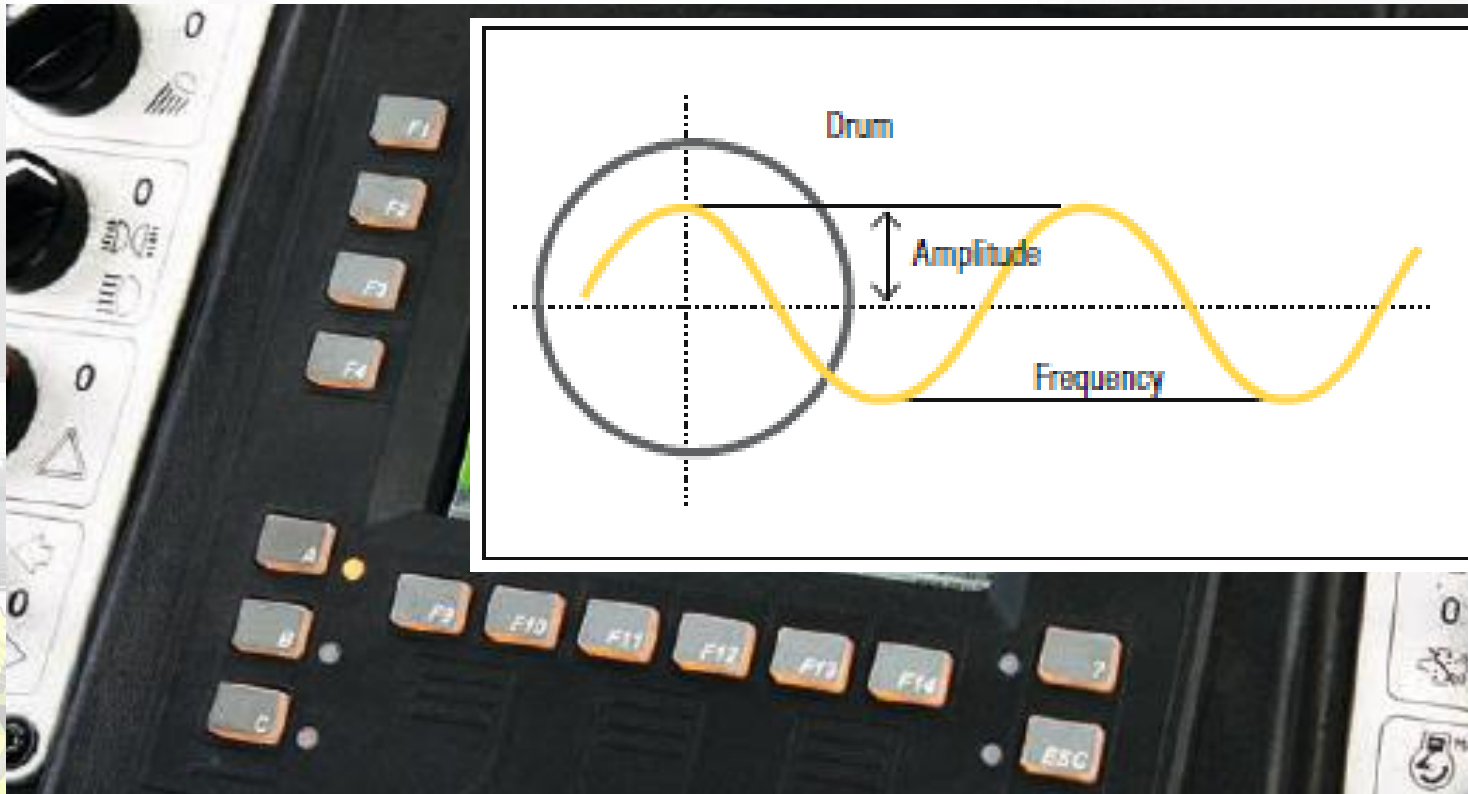
REUSE AND RECYCLING OF RECLAIMED ASPHALT IN 2017

Country	All available Reclaimed Asphalt in 2017 in tonnes	% of available reclaimed asphalt used in						Applied area in m ² of hot reuse of existing asphalt pavement material in-situ / on the road (Remixing, Repaving, Reshaping, Road Train etc.)	The amount of "only" reheated (reused) asphalt material in-situ / on the road (Remixing, Repaving, Reshaping, Road Train etc.) in metric tonnes
		Hot and Warm Mix Asphalt Production	Half Warm Mix Asphalt Production	Cold Recycling**	Unbound Road Layers	Other Civil Engineering Applications	Put to Landfill /Other Applications/ Unknown		
Austria	1.650.000	60	no data	no data	no data	no data	no data	no data	no data
Belgium	1.030	95	no data	no data	no data	no data	no data	no data	no data
Czech Republic	2.600.000	14	0	30	20	10	26	381.280	418.000
Denmark	1.165.000	66	0	0	8	0	26	no data	no data
Finland	1.200.000	100	0	0	0	0	0	12.000.000	no data
France	6.400.000	70	no data	no data	no data	no data	no data	1.097.614	197.478
Germany	13.000.000	84	0	0	16	0	0	no data	no data
Great Britain	3.400.000		90		0	0	0	no data	no data
Hungary	120.000	95	0	0	0	4	1	no data	no data
Italy	9.000.000	23	no data	no data	no data	no data	no data	no data	no data
Netherlands	4.500.000	71	0	11	0	0	18	no data	no data
Norway	1.101.000	30	0	1	69	0	0	no data	no data
Slovakia	50.000	96	0	2	1	1	0	130.000	16.000
Slovenia	84.000	24	0	6	10	0	60	no data	no data
Spain	494.000	83	0	0	14	0	3	no data	no data
Turkey	2.570.589	9	0	6	85	0	0	no data	no data
USA	72.500.000	96	0	0	4	0	0	no data	no data

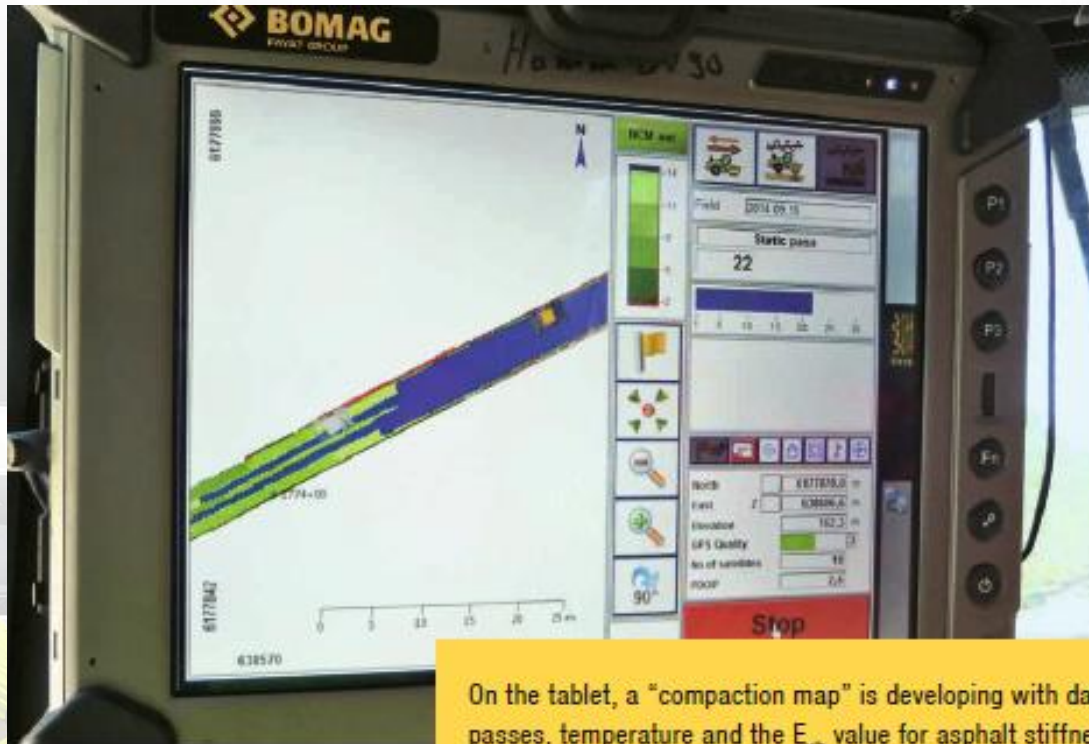
Intelligent Compaction



Intelligent Compaction



Intelligent Compaction



Temperature Sensors

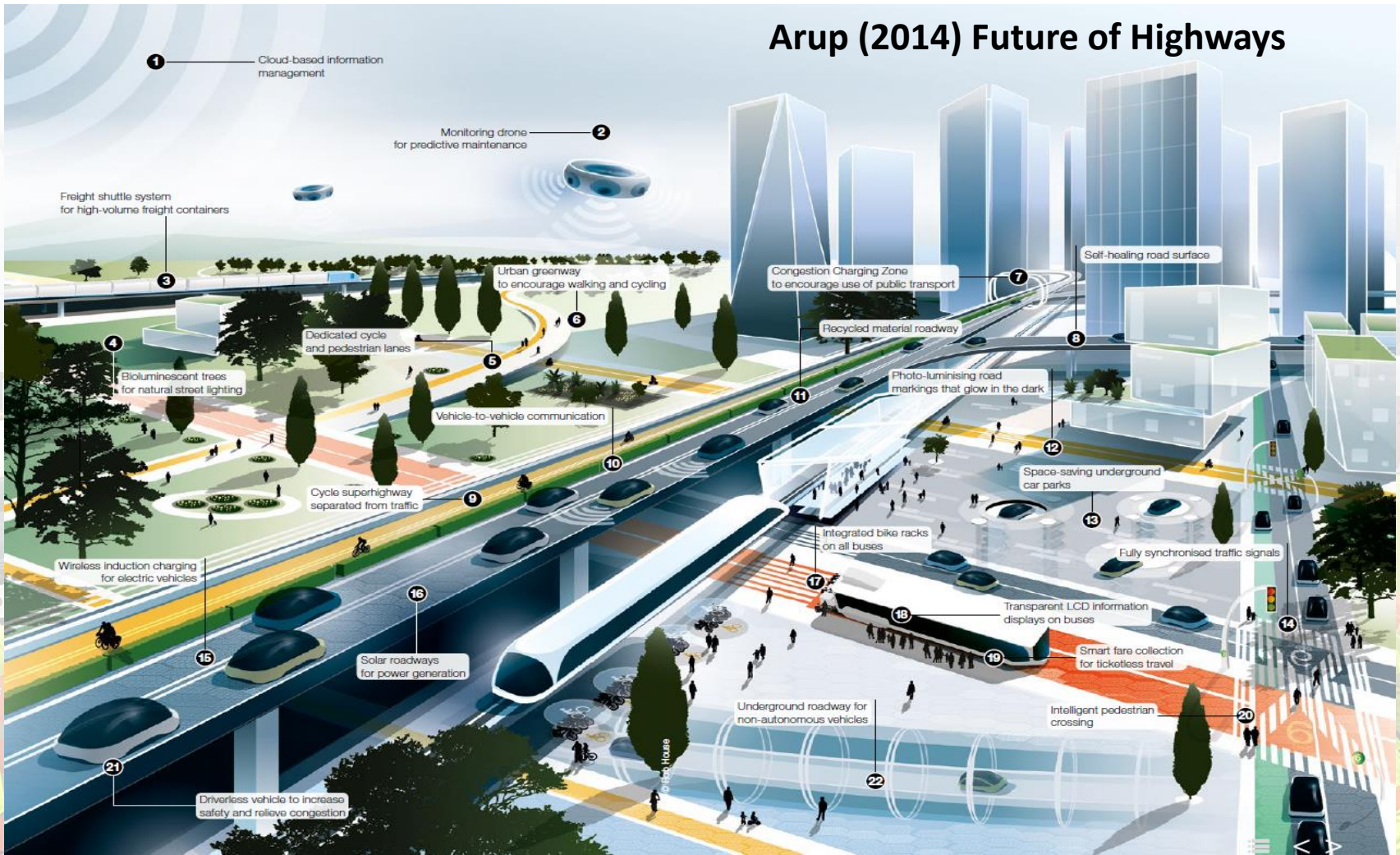


- High-precision GPS receiver integrated in the scanner for recording exact position
- Recording of influencing parameters for important analysis data, such as the base temperature before paving and weather data
- Data downloads to USB stick or VIA cloud with “paving package”

Back to the Future

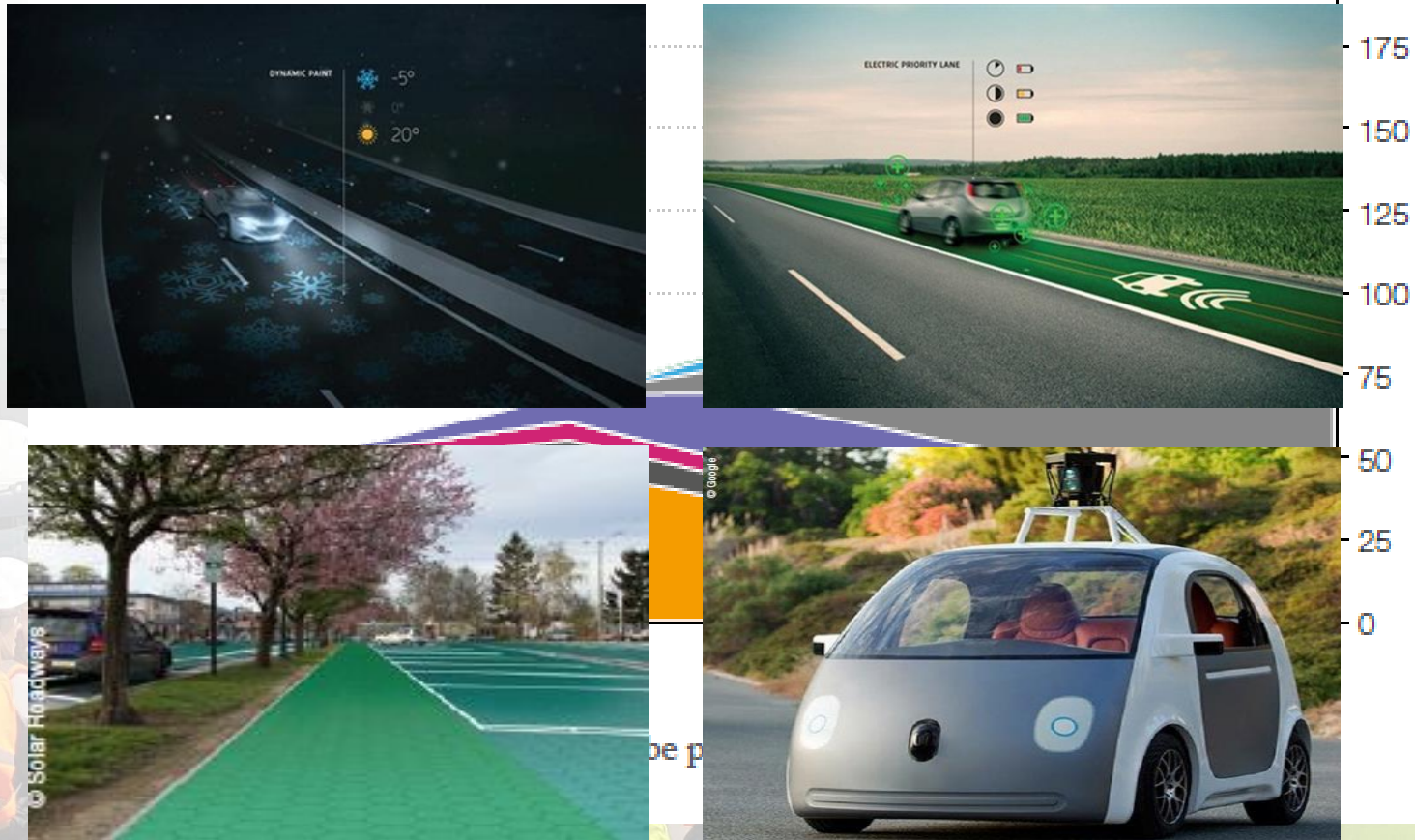
"Where we're going we don't need roads"

Arup (2014) Future of Highways



Back to the Future

Light-vehicle sales by technology type, units m



Arup (2014) Future of Highways

In Conclusion

- Asphalt is still developing
- Specifications becoming more onerous
- Asphalt mix design, manufacture and installation will continue to evolve
- Industry will need to embrace future trends

“The challenge is to stay cool enough to handle the pressure in the moment so that you can succeed in the future”

Jurgen Klopp

References

- **Re-Road** (<http://re-road.fehrl.org/>)
- Extensive research on the use of RA
- Enell et al, (2017), *Environmental Performance of Reclaimed Asphalt (RA)*, Re-Road.
- Waymann et al, (2013), Life Cycle Assessment of Recycled Asphalt, Re-Road.
- Kalman et al (2017), Re-Road Summary Report
- Focus mainly on RA in surface course
- The use of RA within bound asphalt compacted mixes presents no increased environmental risk in terms of leaching
- Significant LCA advantages to recycling to a bound material rather than unbound
- **Self Healing Asphalt-Dr. Amir Tabaković**, Strategic Research Proposal Coordinator
amir.tabakovic@dit.ie
- Arup, (2015), Future of Highways
- www.Eapa.org

