

# Road Markings: An endangered species?

Safety, Standards, Performance and  
Measuring Reality



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# Road Safety Markings Association

- Some background

- RSMA is the largest specialist trade association in highways sector
- Represents 90%+ of the sector by volume
- Develops industry product and contractor standards
- Research & Project Management Environment, Health & Safety etc.
- Road Safety Surfacing Association
- Large highways sector wide training organisation – [National Highways Academy](#)



# Road Markings: An endangered species?

## A QUICK REVIEW OF:

- Safety – What do the stats say about markings?
- Standards – How do we define what is needed in materials and performance?
- Performance – What is happening on our roads?
- Measuring Reality – How, what, where, when and why?



# Road Markings: Safety

Placing in context the positive impact of an effective road marking network.

- Extensive research in UK and US
  - Markings & LA Accident Reduction Schemes
  - Use of wet night product for lane lines
  - Use of wet night product for junctions
  - Use of audible markings
  - The impact of edge lines on rural roads



# Road Markings: Safety

## MARKINGS & LA ACCIDENT REDUCTION SCHEMES

### ROSPA & TRL Research

- TRL:  
Average reduction in accidents for road marking schemes 32%
- ROSPA analysis  
Marking schemes reduce accidents by 34%  
Markings & Signs schemes reduce accidents by 41%



# Road Markings: Safety

## Use of wet night product for lane lines (Cheshire)

- Serious Accidents down from 2 to 0
- Slight Accidents down from 14 to 6
- Wet night accidents down from 4 to 0

## Use of wet night product for junctions (Durham)

- 50% reduction in accidents associated with improved marking layouts
- Reduction in speed in the 85<sup>th</sup> percentile
- An average 1<sup>st</sup> year rate of return of 1,868%

# Road Markings: Safety

## USE OF AUDIBLE MARKINGS

3 fold road safety benefits

- Clear definition of edge line, sensory vibration and warning noise.
- Data indicates accident reduction of 70% in month one and up to 50% long term



# Road Markings: Safety

## USE OF EDGE LINES ON RURAL ROADS

### Analysis of data from English Counties

- Accident reduction of up to 30% overall
- Night time accident reduction of up to 68%





# Road Markings: Safety

## Road Safety Foundation 2012 Report

- 9 out of 10 most improved roads had road marking improvements
- Fatal & Serious Accidents dropped from 469 to 181 - a drop of 62%

## Most improved road Improvements list

- Dragon teeth road markings at urban gateways
- Self explaining routes with clear signing and lining
- Straight sections with clear lining
- Introduction of signalised filter lane to regulate right turns



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by Ageas



EuroRAP  
EUROPEAN ROAD ASSESSMENT PROGRAMME  
EuroRAP 2012 Results

# Road Markings: Standards

## Specifying Markings

### Setting Standards - European Norms

- ENs are a range of output standards measured by performance of various variables.
- Established under Public Procurement Directive
- Created to remove barriers to trade between EU states
- Places road user and not client as the customer
- Compliance measured by output monitoring i.e. the performance of the product



# Road Markings: Standards

## Specifying Markings

### Setting Standards - European Norms

- EN 1436 – Road Marking Performance for Road Users
- EN 1463 –1 & 2: Retro-reflecting Road Studs
- EN 1790 – Preformed Road Markings
- EN 1824 – Road Trials
- EN 1871 – Physical Properties



# Road Markings: Standards

## Performance of markings - What performance?

- Performance criteria are specified in accordance with EN 1436 allowing for a range of values to be called up
- Retro reflectivity values range from 100mcd through to 300mcd for dry markings
- Skid Resistance values range from 45srt to 65srt
- Performance variables are also defined for wet markings (wet night visibility)





# Road Markings: Performance

## PERFORMANCE OF MARKINGS – MONITORING REQUIREMENTS

- National Highways Authority standard for road marking maintenance
- Regular Monitoring
- 80<sub>mcd</sub> 'Immediate' replacement
- 100<sub>mcd</sub> Programmed replacement (short timescale, typically 6 months)
- No direct Local Authority equivalent

DESIGN MANUAL FOR ROADS AND BRIDGES

TD 26/07  
Volume 8, Section 2,  
Part 2



THE HIGHWAYS AGENCY



TRANSPORT SCOTLAND



WELSH ASSEMBLY GOVERNMENT  
LLYWODRAETH CYNULLIAD CYMRU



DRD  
Department for  
Regional Development  
Northern Ireland

THE DEPARTMENT FOR REGIONAL DEVELOPMENT  
NORTHERN IRELAND

### Inspection and Maintenance of Road Markings and Road Studs on Motorways and All-Purpose Trunk Roads

Summary: This Standard sets out the inspection and maintenance requirements and recommendations for road markings and road studs on motorways and all-purpose trunk roads. It supersedes TD26/05. This edition contains a revised Annex H – Correlation Between High Speed Monitor and Handheld Retroreflectometer Readings.



# Road Markings: Performance

## DELTA LTL-M DYNAMIC (MOBILE) MONITORING EQUIPMENT



CONTINUOUS MEASUREMENT OF NIGHT VISIBILITY (RL) OF ROAD MARKINGS AT DRIVING SPEED

AUTOMATIC COMPENSATION FOR VEHICLE MOVEMENTS

MEASURES DAYLIGHT CONTRAST AND LINE GEOMETRY

MEASURES PRESENCE OF ROAD STUDS

MEASURES ALL TYPES OF PLAIN AND PROFILED MARKINGS

MEASURES WHITE AND YELLOW MARKINGS  
MEASURES DRY MARKINGS

MEASURES PROFILES UP TO 25 MM / 1 IN  
STOP AND MARK FUNCTION DURING OPERATION

MEASURED DATA AUTOMATICALLY STORED  
CAN BE OPERATED BY ONE PERSON

SOFTWARE FOR REPORTING AND  
TRANSFER OF DATA TO EXCEL  
DATA PRESENTATION ON GOOGLE EARTH



# Road Markings: Performance

- Night (RL) and daytime (Qd) visibility measurement
- Ergonomic and easy-to-use lightweight design.
- Single handed operated and user-friendly
- Air humidity and temperature recorded
- Safeguarded for the future with seamless connection to any system running, such as PCs and PDAs
- Measures plain texture and profiled markings up to 5 mm
- Measures dry and wet markings
- Measurement statistics
- ID functions (road, operator, line type, colour)
- Data storage and communication
- Software for PC downloads
- Stray light compensated

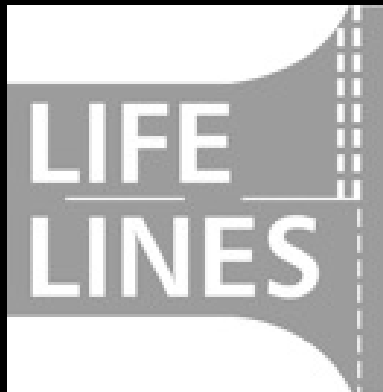


## DELTA LTL-X (STATIC) MONITORING EQUIPMENT





# LIFELINES



## ROAD MARKINGS AND ROAD SAFETY - MEASURING THE REALITY ON UK ROADS



## Background

- RSMA have undertaken ten 'national' surveys utilising mobile retro-reflectometers
- 2012 survey was fifth since publication of revised HA Document TD26 – Inspection and Maintenance of Road markings & Road Studs on Motorways and All Purpose Trunk Roads
- 2012 survey covered a total of 7,250km
- 2013 survey underway and will cover circa 10,000km across the UK

## The context of the 2012 survey

- 2008 a benchmark survey reflecting
  - Investment in marking infrastructure
  - Consistent implementation of TD26
  - Improved specifications
- Results were impressive
  - %age of markings below 100mcd dropped from 49% to 15% between 2005 and 2008
  - %age of markings below 80mcd dropped from 21% to 5% between 2005 and 2008



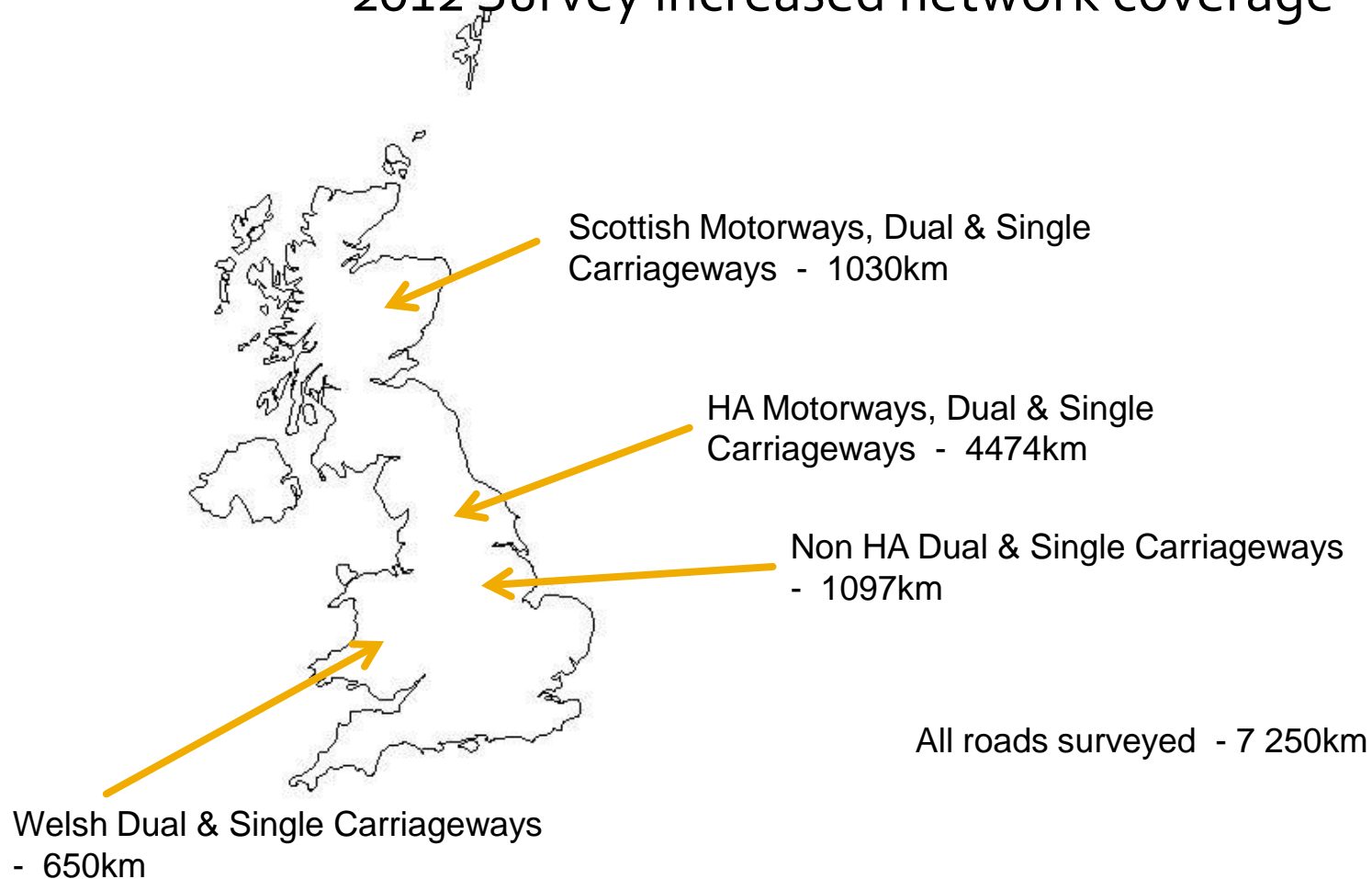
## The context of the 2012 survey

- 2010 survey identified worrying results
  - Apparent declining investment in marking infrastructure
  - Inconsistent implementation of TD26
  - Lack of HA/Client monitoring
- Results were of concern
  - %age of markings below 100mcd increased from 15% to 24% between 2008 and 2010
  - %age of markings below 80mcd increased from 5% to 10% between 2008 and 2010



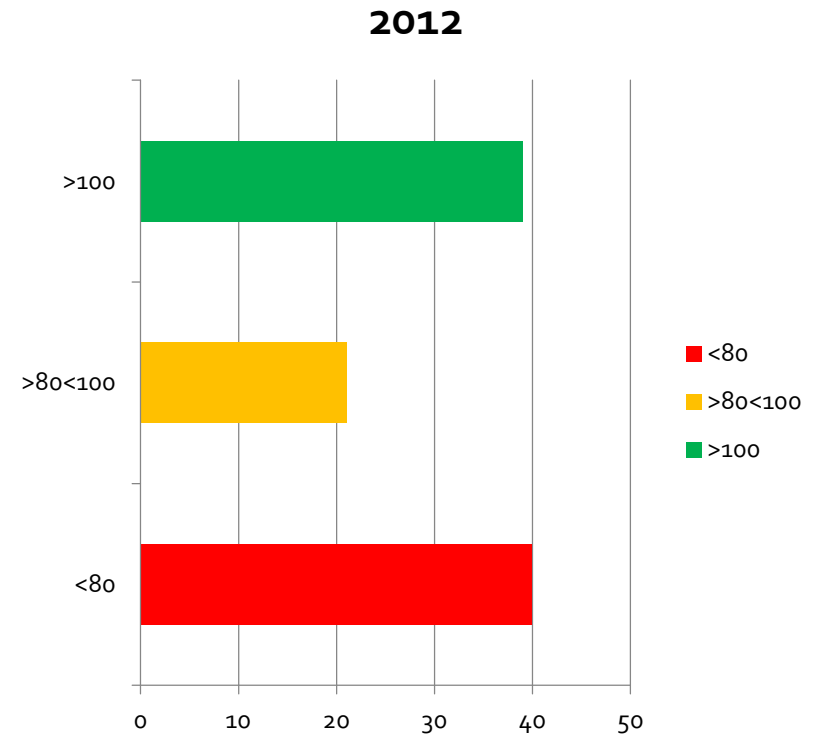
# LIFELINES MEASURING THE REALITY ON UK ROADS

2012 Survey increased network coverage



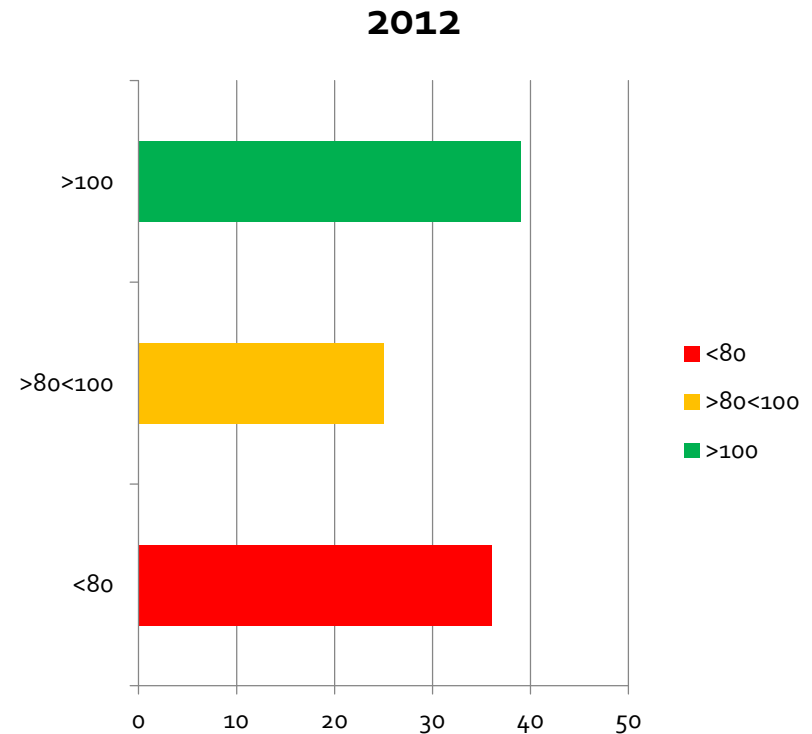
# LIFELINES – Scotland 2012

- Motorway & Duals results
- 40% below 80mcd
- 21% > 80mcd < 100mcd
- 39% above 100mcd
- No direct comparison with 2010 survey



# LIFELINES – Scotland 2012

- Single Carriageway results
- 36% below 80mcd
- 25% > 80mcd < 100mcd
- 39% above 100mcd
- No direct comparison with 2010 survey.



# LIFELINES – Scotland 2012

## What did these results mean? – Scotland

Public perception – Satisfaction with marking visibility?  
- 25% dissatisfied



Base: All who had used trunk roads in the past year (2,001)

Ipsos MORI

**NE – BEAR - 2 ★** Slow replacement of road markings..... an NNC was issued

**SE - BEAR - 2 ★** There were issues with .....renewal of worn line markings and replacement of road markings

**NW - Scotland TranServ - 2 ★** An NNC was issued as a result of this poor performance. (Road marking activity)

**SW – Amey - 2 ★** Performance deteriorated to poor. An NNC was issued for reinstatement of road markings,..... worn road markings

Auditors Comments (★ out of 5)

Scottish Government perception

Signing, signals, road markings and studs

Transport Scotland recognises there has been a deficit in funding for road markings





# LIFELINES – Scotland 2012

## What response to the 2012 survey in Scotland

- Significant safety issue for drivers in Scotland
- Problem recognised – Additional investment committed
- Transport Scotland signed up to TD26 – need to ensure that principal contractors comply with requirements
- Local Authority commitment unclear – further investigation in 2013 and 2014
- Long term investment likely to be required, along with clear action plan to deliver continuous and sustained improvement



# LIFELINES 2012

## In conclusion:

- Road marking network going backward
- Major safety issues developing across the UK
- National Standards not being enforced
- Bodies charged with obtaining value for money and ensuring safety are failing to deliver
- White Lines Save Lives
- Poor Markings Cost Lives(?)
- Governments & Specifiers need to urgently take action:
  - **Monitor .....Maintain.....Renew**



# LIFELINES

*"Without exaggeration, it is true to say that a simple pot of paint can save lives. In particular, highly visible markings at the edge and centre of the road - that can be seen on a wet night, are enormously cost-effective in saving lives"*

■ Paul Watters, AA Head of Roads Policy





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**Road Marking 2013**  
Eastwood Hall, Nottingham  
**13<sup>th</sup> -15<sup>th</sup> November**