

# **White Lines Save Lives**

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# White Lines Save Lives



DO THEY ?

# White Lines Save Lives

- Over the next 20 minutes I intend to demonstrate that they do save lives
- That they are a vital road safety horizontal sign

# White Lines Save Lives

## ■ Markings - When & Why

In the UK, markings introduced in 1920's, Minister of ,  
Transport expressed

- “the opinion that the experience tends to show that the White Line is calculated not only to reduce the number of accidents, but also to assist materially in the control of traffic by the police”

# White Lines Save Lives



**90 years later we need  
more improved  
standards of guidance  
on our roads**

## **Specifying Markings - Setting Standards – European Norms**

- ENs are a range of output standards measured by performance of a number of 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

# White Lines Save Lives

## 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

# White Lines Save Lives

Specifying Markings

Setting Standards - European Norms

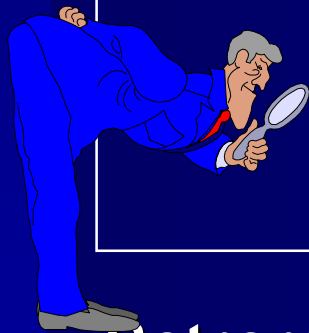
- Materials are trialled over one climatic cycle or by turntable
- Materials are measured for Performance variables such as Retro reflectivity, Skid Resistance and Luminance (whiteness) against a range of 'wheel over' classes.



# Classes of Performance ENI 436

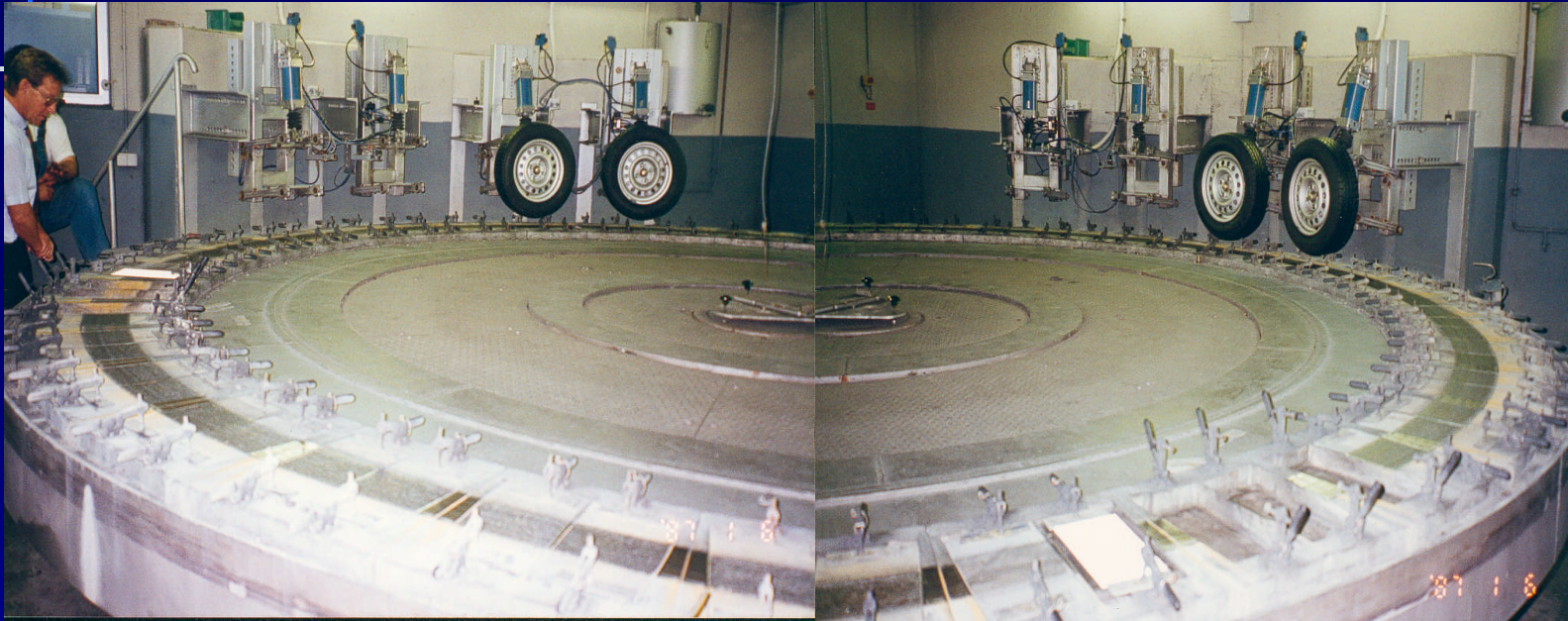


<b>RL</b>	<b>RW</b>	<b>LUM</b>	<b>SR</b>
RO NIL	RW NIL	Qd0 nil	SO NIL
R2 100	RW1 25	Qd2 100	S1 45
R4 200	RW2 35	Qd3 130	S2 50
R5 300	RW3 50	Qd4 160	S3 55
			S4 60
			S5 65



**Retroreflection, Luminance coefficient daytime ,  
Skid Resistance**

# Bast Turntable



100,000 to 4,000,000 rollovers for Classes

# French Road test site



# White Lines Save Lives

Maintenance of markings –  
Defining maintenance

- Maintenance now based on performance of in situ markings
- In UK TD26/07 Highways Agency Maintenance Standard
- Clients are required to monitor their network to identify maintenance need

# White Lines Save Lives

## Maintenance

- Two methods of monitoring retro reflectivity



# Road Markings Save Lives



# Various Studies Show The Benefits

- Many dating back to 1970's
- Not generally known or referred to
- Several recent studies show exceptional results and vindicate quality maintained markings

# Cheshire Study 2007

**A556 23,000 vehicles p/d 2002 – 2003 WNV product**  
**2002 - 2003 cost of accidents before treatment £ 1.4m**

Status	Total Accidents	Serious Accidents	Slight Accidents	Wet Dark Accidents
Before	16	2	14	4
After	6	0	6	0

**Cheshire prioritise schemes on basis 200% return on investment**



# Cheshire Scheme

Achieved 550% return in first year

Further WNV scheme in 2005 - 2007 on 50% of A class roads resulted in 14.3% reduction in accidents and saving the equivalent of £8.4m in costs to the community

# Wet Night Visibility Markings



# Durham CC 2003 – 2006 Junction Improvements

- 50% reduction in accidents
- A reduction of speed in the 85<sup>th</sup> percental
- Reduction in vehicle breaking the speed limit
- An average first year rate of return 1,868%

# **1995-2006 TRL Molasses Data Base ( LA Accident reduction schemes)**

- 600 schemes using improved markings
- Average reduction in accidents 32%

# Berkshire 1986 Raised Rib Marking M4 Study

- Three Benefits:-
  - Sensory vibration when driven on
  - Warning noise to drivers and occupants
  - Clear definition of edge line in dry and wet conditions

# Raised Rib Edgeline



# USA - Rib Line to prevent "Run Offs"



# US Raised Audible Edgeline Studies

- 2001 study concluded 60 – 70% reduction in run offs
- Further survey of 34 States identified a 20 - 50% reduction in run offs



# **RMIG Rural Edge Line Surveys East Sussex and South Yorkshire 1979- 1985**



**Total Accident Reduction 18% and 30 %  
respectively**

**Darkness Reductions 43% and 68%  
respectively**

# Current Marking Maintenance

- *Some evidence that maintenance has improved since introduction of RSMA Annual Survey*
- However 2006 survey showed
- 30% of motorways
- 11% of Dual "A" roads
- 29% of single "A" roads
- Below 100mcd maintenance level

**Markings should be maintained to a high standard**



# Lets look at Accident Facts

- Past record of reduction in accidents impressive
- Still meeting Government targets
- However, currently lagging behind other EU countries by 50% of their figures

# EU % Accident Reduction

Nation	UK	Germany	Holland	France	EU 15 average
% reduction in accidents 2001 – 2004	7.0	9.5	15.0	26.8	15.5

# 2005 UK Road Casualties

- Total casualties 271,017
- 42 % , 108,000 occurred between 5pm and 6 am
- Primarily the hours of darkness

# The importance of well maintained markings at night



# Cost of Injury Accidents

- 2005 total cost was £12.80 billion
- EURORAP UK sets this in terms of UK GDP at 1.2% which is £15.0 billion
- Adopting the 32% accident reduction from Molasses Data this would amount to saving of £4.0 billion annually due to markings



# **1999 Markings & Driver Behaviour Research Project Cost 331**

## **Main findings:-**

**Position of vehicle on road improved with better markings**

**Speed increased slightly but with the added benefit of driver comfort through clearer markings**

**Reaction time varied with width and quality of the markings**

**A maximum reaction time of 1.8 -2.0 seconds was considered safe for the motorist**

# Cost 331 Impact on Europe

- Road marking definition key factor in driver reaction time
- 100mcd is absolute minimum to achieve 2.0 second reaction time
- 30% of population is over 50 and increasing, lower reaction than young people
- Only 50% of road marking is focused on by the eye, wider markings have more impact

# Congestion Costs



# Markings and Congestion

- Reducing congestion key Government objective
- Paper by Ted R Miller identified that well marked highways resulted in time savings and reduced congestion
- The benefits were shown as a cost ratio of 76 : 1

# White Lines "Do" Save Lives

So that's all the irrefutable evidence

Where do we go from here ?

# Our Objectives

- To create an awareness of the benefits of well maintained markings
- To secure continuous sufficient investment to maintain markings at acceptable levels to achieve maximum performance and benefits to GDP and economy

# Maintenance of Markings

- Too many markings are not maintained to a suitable standard
- This needs to be improved

# White Lines Save Lives

## Maintenance of markings – Defining maintenance

- Maintenance now based on performance of in situ markings
- In UK TD26/07 Highways Agency Maintenance Standard
- Clients are required to monitor their network to identify maintenance need
- Evidence of performance provided



# The Necessary Action

- The UK asset value is £300,000,000 and should be maintained to a high standard. The total EC marking network in the region 2,000,000,000 Euros
- Minimum retro reflective standards should be increased to 150 mcd/lux/m<sup>2</sup>
- Minimum Maintenance Standard should be increased to 100mcd/lux/m<sup>2</sup>
- Throughout Europe the Maintenance of markings should become a priority

# **White Lines Save Lives**

**But only if they are  
maintained to the correct  
standard**



Thank you for listening









# WNV Markings in the wet





# Wet Night Visibility Markings



# Wet Night Visibility Markings

