



THE INCREASING IMPORTANCE OF ROAD SAFETY MARKINGS

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SCOPE

- Reviewing road markings through the prism of the new highways code
- Using marking to assist in mitigating risks and make roads safer
- Developments in road markings and the needs of autonomous vehicles



REVIEWING ROAD MARKINGS THROUGH THE PRISM OF THE NEW HIGHWAYS CODE



REVIEWING ROAD MARKINGS THROUGH THE PRISM OF THE NEW HIGHWAYS CODE

- OR

WHY YOU SHOULD USE NATIONAL HIGHWAYS
SECTOR SCHEME #7 CERTIFIED CONTRACTORS



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- The code removed standards for maintenance intervention and recommends: 'A risk-based approach should be adopted for all aspects of highway infrastructure maintenance, including setting levels of service, inspections, responses, resilience, priorities and programmes.'
- 'The intention of this code is that authorities will develop their own levels of service and the code therefore provides guidance for authorities to consider when developing their approach in accordance with local needs, priorities and affordability.'



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- A Claimants' lawyers will ask for evidence of highways professionals' training, qualifications and competencies
- Local Authorities will be asked to produce evidence to demonstrate the people they are employing are competent in what they do. It is important they can evidence the rationale behind all their decisions relating to highways asset management
- Despite it being specifically mentioned in the new code, Affordability is no defence. The Court of Appeal holds that money is not a relevant consideration in defending a claim.



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- NHSS #7 is one of a series of bespoke integrated management schemes
- Sits within an ISO 9001 framework
- Provides particular requirements and applications to infrastructure related activity within the UK
- It is overseen by a Sector Scheme Advisory Committee
- The SSAC determines the ISO specification in relation to the requirements of their activity
- Defines standards of workmanship, services, products, testing, training and competency



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- Provides an industry benchmark
- Identifies risks and opportunities
- Ensures that all processes are planned
- Provides a basis for continual improvement
- Focuses on quality as an objective
- Reduces cost for clients
- Provides for a trained, qualified workforce
- Promotes confidence in quality management
- Provides a basis of technical knowledge to be examined by UKAS auditors



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- Three elements:
 - Specialist Applied Skills Programme (SAP)
 - NVQ Level 2
 - Operatives Refresher & Assessment Scheme (ORAS)



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- Specialist Applied Skills Programme (SAP)
 - Employers register all new operatives with no previous road marking experience to the SAP. The SAP (the Road Marking Apprenticeship until the changes brought about by the creation of 'Trailblazers') is an 18 month course comprising 4 weeks of in-house training at the RSMA and 'on the job' training undertaken by the candidate's employer



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- NVQ Level 2
 - Operatives with previous road marking experience are required to obtain an NVQ (Level 2) relevant to their area of activity within three years of commencement of employment; failure to obtain the relevant NVQ renders the operative unqualified for the activity and not conforming to the requirements of the NHSS #7



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- Operatives Refresher & Assessment Scheme (ORAS)
 - All operatives are required to complete ORAS prior to the fourth anniversary of achieving NVQ (Level 2) in road marking and road studding. All operatives are subsequently required to complete ORAS on a four year cycle in order to demonstrate the currency and validity of their core competencies



WHY YOU SHOULD USE NATIONAL HIGHWAYS SECTOR SCHEME #7 CERTIFIED CONTRACTORS

- Make decisions on 'value for money' and not 'cost'

**EMPLOY A ROAD MARKING
CONTRACTOR THAT IS NHSS #7
CERTIFIED BY A UKAS ACCREDITED BODY**



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

- There were 1,793 reported road deaths in 2017
- There were 39% fewer fatalities in 2017 compared with 2007
- The trend in the number of fatalities has been broadly flat since 2010
- Between 2006 and 2010 the general trend was for fatalities to fall



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

ANNUAL AVERAGE NUMBER OF FATAL AND SERIOUS CRASHES ON DIFFERENT NETWORK TYPES IN EACH COUNTRY OF GREAT BRITAIN (2015-2017)			
NETWORK	ENGLAND	SCOTLAND	WALES
Strategic motorways & A-roads*	3833	276	236
	(43%)	(36%)	(46%)
Local Authority A-roads and motorways**	5102	529	315
	(57%)	(64%)	(57%)***

* INCLUDES SRN & MRN

** EXCLUDES MRN

*** DATA % ERROR



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

- There are still over 800km of persistently higher risk local roads in Great Britain
- The cost of reported injury crashes on these roads was £1,008m between 2015-17
- The estimated investment needed to implement remedial treatment on these higher risk roads is less than £120m
- and could prevent over 3,000 KSIs over 20 years



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

- The safety the British road network can be tackled with packages of investment along whole routes identified by modern safety engineering tools
- These generate very high economic returns (not least benefitting regional health and long term care budgets)
- Through the iRAP Star Ratings, road authorities are provided with the likelihood of a road crash occurring and its severity



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

- The focus is on identifying and recording the road attributes which influence the most common and severe types of crash
- The level of road user risk on a particular road section or network can be defined without the need for detailed crash data
- Research shows that a person's risk of death or serious injury is highest on a one-star road and lowest on a five star road
- Improved road markings are amongst the most cost-effective methods to help improve a road's star rating



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

SCENARIO	CASUALTY REDUCTION	COST
REDUCING RUN-OFF CRASHES		
Delineation	10-25%	Low
Crosshatching	10-25%	Low
'Rumble Strips'	10-25%	Low
REDUCING JUNCTION CRASHES		
Delineation	10-25%	Low
Turn Lane	25-40%	Medium
REDUCING HEAD-ON CRASHES		
Delineation	10-25%	Low
Crosshatching	10-25%	Low
'Rumble Strips'	10-25%	Low



USING MARKING TO ASSIST IN MITIGATING RISKS AND MAKE ROADS SAFER

- Road markings, professionally applied and maintained to a high standard form a key component of any safe and effective network. Road markings are safety critical infrastructure and are low in cost compared to other road safety alterations; when local authority budgets continue to be stretched, and local highways funding continues to not be ring-fenced, the low-cost, simple white line, can and will play a big role in improving the safety of any road. A road is not a safe road until it has road safety markings applied to it.



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES

- The 5 (6) levels towards fully autonomous vehicles
 - Level 0: Driver performs all tasks
 - Level 1: Technology assists driver (augment brake press)
 - Level 2: Vehicle can undertake some operations (LKA)
 - Level 3: Vehicle can drive itself (Driver able to regain)
 - Level 4: Vehicle drives automatically (No input required from driver but limited by infrastructure)
 - Level 5: Complete A-B autonomy (I'll be long dead)
- Currently level 2/3
- The vehicles will be capable without the infrastructure to support them
- Human driver must be accommodated in transition



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES

- Clearly visible road markings support the human driver and vehicles to navigate today and into the future. (30-50 years to level 5 if ever)
- Camera sensors reading road markings are integral to ensuring semi-autonomous vehicles can operate
- Only road marking within the visual range is specified by standards
- Innovation could lead to road markings outside the visual range being utilised
- Infrastructure and standards must be adapted for the digital age



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES

'We really need better lane markings in California'

Elon Musk

'But like the human eye, the technology cannot work effectively if it cannot see the roadmarkings, if they are worn out or hidden, or if they are confusing'

EuroRAP, EuroNCAP

'We need to increase the durability, weather range, time, and distance that a machine or camera could 'see' the pavement markings even further'

Tom Headblom, 3M



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES

- Failsafe detection of road markings at distance is pivotal to success
- Vehicle systems and road markings can innovate
- This can be affected by:
 - Rain
 - Snow
 - Fog
 - Sun
 - Dirt
 - Poor contrast
- **Poor quality and poor maintenance**



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES

- Wet/night road marking visibility improvements
- Dirt resistant road markings
- Radar reflective road markings
- Appropriate application, monitoring and maintenance
- 150x150x35!!!!!!!!!!



DEVELOPMENTS IN ROAD MARKINGS AND THE NEEDS OF AUTONOMOUS VEHICLES



