Skid Resistance Policy

Appendix 2

Contents

Revision History

Revision No.	**Amendments**	**Published to Website**
1.0	First version	

1.0 Introduction

1.1 The purpose of this document is to define the skidding resistance process and procedures for Gateshead Council and how the level of skid resistance on the road network will be managed. This Policy and Procedure also states how the measurements of skid resistance are to be carried out and interpreted to identify and programme surfacing works to rectify sites that are deemed to be deficient.

1.2 As the Highway Authority, Gateshead Council has a duty under the Highways Act 1980 to maintain the highway in a condition that is safe and fit for purpose. It is Gateshead Council's policy to manage the resurfacing programme so that the risk of wet skidding accidents is kept to a minimum.

1.2 Research by Transport Research Laboratory (TRL) into the link between accidents and low skid resistance on wet roads has resulted in the Highway Agency publishing a new skidding resistance standard HD28/15, which now replaces the previous HD28/04, http://www.standardsforhighways.co.uk/dmrb/vol7/section3/hd2815.pdf.
The HA standards are referred to in the new code of practice for highway maintenance management: "Well-Maintained Highways.", July 2005. http://www.ukroadsliaisongroup.org/pdfs/p03_well_maintained_highways.pdf
The County Surveyors Society (CSS) has also published a guidance note and summarises actions for implementation by Highway Authorities.

1.3 The strategy states the requirements for managing slippery road warning signs on deficient sites; signs are no longer required for new negative textured surfacing. http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian49_13.pdf. The strategy also responds to the concerns of the British Horse Society relating to horse traffic on highway surfacing.

1.5 Wearing of road surface materials caused by weathering and commercial vehicle damage can significantly reduce the skid resistance performance when the road is wet or even damp. The purpose of a skid resistance strategy is to manage the risk of skidding accidents in wet conditions so that the risk is equalised across the road network. This is achieved by providing a level of skid resistance to a section of road based on a risk analysis using accident statistics, road layout and engineering experience.

1.6 The national standards for the minimum levels of skidding resistance for use on the Trunk and Motorway network which are published in HD28. The number of commercial vehicles on the Trunk and Motorway network are significantly higher than the Gateshead Council road network, therefore there have been some modifications (local variation) applied based on a review of accident statistics, reactive maintenance records, road geometry, road layout and engineering experience.

1.7 The Policy provides advice and guidance to assist the engineer in determining an appropriate level of skid resistance required for a specific site, it states the procedure to be adopted for measuring the skid resistance and provides a process diagram for assessing sites and if required, remedial works.

2. Background Information

2.1 Introduction

Dry clean road surfaces achieve a high and generally consistent skid resistant level whereas the same surface when wet or damp can produce a significantly lower skid resistance level. For this reason measurements of skid resistance are made on wetted road surfaces.

Research conducted by TRL indicates that if the wet skidding resistance of a road surface (the available friction between the road surface and tyre) falls below a desirable minimum, it can result in an increase in accidents.

The national standards (HD28/15) produced by the Highways Agency for the Trunk Road and Motorway network define the skid resistance available to road users. However, the standards have been designed for networks that carry substantially higher volumes of commercial vehicles compared to the Gateshead Council road network. Therefore Gateshead Council have undertaken a risk assessment to determine the appropriate skidding resistance levels to meet the needs of the road users and network.

2.2 Road surface parameters

The level of skid resistance is dependent on two road surface parameters: the microtexture which is the surface roughness of the aggregate in the road and the macro texture which is the surface texture. The microtexture is the main contributor to skid resistance at low speeds (less than 50 km/h) whilst the macrotexture generates friction by deforming the tyre and providing a drainage route between tyre and road surface helping to prevent aquaplaning. The macrotexture has a greater influence at high speeds (greater than 90 km/h).

2.3 Seasonal variation of skid resistance

The skid resistance will fluctuate through seasonal weathering and polishing cycles. In the winter (October – March) the roads are generally wet for the most of the time. The road detritus is gritty, this roughens the microtexture and the skid resistance rises. In the summer period (April – September) the roads are generally dry and the detritus is mainly dusty, so the road surface becomes polished and the skid resistance falls. In practice the minimum skid resistance will vary from year to year depending on the weather conditions.

As the skid resistance varies during the year, a measurement strategy has to be developed to allow for this effect. See section 4.

2.4 Relationship to accident risk

Within normal ranges, low skid resistance does not cause accidents on its own although, depending on the particular circumstances, it may be a significant contributory factor. The level of skid resistance, even on a polished surface, will generally be adequate to achieve normal acceleration, deceleration and cornering manoeuvres on sound surfaces that are wet but free from other contamination. However, higher skid resistance can allow manoeuvres that demand higher friction to be completed, e.g. to shorten stopping distance or to turn sharp corners. Higher skid resistance can therefore reduce accidents in cases where drivers need to complete a more demanding manoeuvre in order to avoid an accident.

Accident analyses have shown that there are relationships between measured skid resistance and accident risk. These relationships are not precise; the influence of skid resistance on

accident risk is significantly different for roads with different characteristics. For this reason site categories have been defined to group roads with similar characteristics.

For some site categories the relationship between accident and skid resistance is weak. For these sites the level of skid resistance can be lower. For other site categories progressively more accidents are observed as the skid resistance falls. For these categories there are clear benefits in maintaining a high level of skid resistance.

The national standard states that not all sites within a single category are equivalent in terms of their accident risk. Judgement of the relative accident risk and appropriate level of skid resistance for different sites within the same category forms a key part of the effective operation strategy. Guidance in determining site categories and allocating Investigatory Levels (IL) are given in section 5.

2.5 Economic Benefits

Skid resistance can be improved at relatively low cost by surface dressing, retexturing etc.

The monetary value of road crashes has been estimated by the Department of Transport and is updated annually. The values take into account medical costs, police and administration costs, damage costs and lost output; they also include a value for the human costs (pain, grief and suffering).

Various studies have shown that expenditure on compliance with skid resistance standards has been cost effective.

2.6 Target Network for Routing Skid Measurements

Analysis from the 2011-2015 wet skidding injury road traffic incident data shows that 97% of wet accidents occur on the Principal road network. See Annex A for accident anlysis detail by road class, road type and environment.

As a result Gateshead Council will only undertake a routine annual survey of the skid resistance on the Principal Road network. Gateshead Council are able to add additional roads to the survey list if its deemed necessary.

The target network for routine survey will be reviewed on a 3 year cycle with major network changes updated annually.

3 Operational Procedures

This section summarises the key procedures for providing and interpreting skid resistance measurements on the Gateshead Council's target network.

3.2 An annual SCRIM survey will be undertaken by Gateshead Council on the Principal Road Network and the survey will follow the survey cycle below:

Table 3.1 – SCRIM Survey Cycle

Financial Year	SCRIM Season	Dates
2016/17	Late	16th August to 30th September
2017/18	Early	1st May to 15th June
2018/19	Mid	16th June to 15th August

3.3 Annual measurements of skid resistance are to be processed in accordance with HD28 Annex 3 paragraph A3.22.

The Characteristic SCRIM Coefficient (CSC) value will be taken to represent the state of the polish of the road surface and the CSC value shall be compared with the predetermined Investigatory Levels.

3.4 Each year the location of skid resistance sites below investigatory level and wet accidents over a 3 year period on the target network are plotted from the Gateshead Council Asset Management System, Horizons. The skid deficient sites are marked and plotted in the mapping.

3.5 The decision on whether any action is necessary is unlikely to be clear cut and will require professional engineering judgement. A site investigation may be conducted if the site is deficient and a wet skid has occurred on the site with in the three previous years. If site investigations show that treatment is not warranted then consideration should be given to lowering the Investigatory Level. All site investigations are to be recorded as per Section 9.

3.6 As part of the annual review the wet accident analysis is carried out on the target network. Where higher than statistically expected wet accidents have occurred and the CSC value is above the IL, the IL level is re-assessed.

4. Measurement of Skid Resistance

4.1 Measuring equipment

Various types of equipment are available for measuring skid resistance. In different ways, all measure the force developed on a rubber tyre or slider passing over a wetted road surface and derive a value that is related to the coefficient of friction and the state of polish of the road surface.

Currently the results from the different devices are not directly interchangeable. For this reason, where practical, one device should be used for regularly monitoring the skid resistance.

Historically Gateshead Council have commissioned Grip Tester surveys annually, with no correction factor applied for seasonal variation.

The definitive measurement of skid resistance in the UK is the Sideways-Force Coefficient Routine Investigation Machine, SCRIM. The HD 28 standards recommend skid resistance levels that have been based on research carried out by TRL using SCRIM as the measurement of skid resistance; however Gateshead Council has undertaken a local risk analysis and adjusted the resistance levels to meet local requirements.

SCRIM uses the Sideways-force principle to measure skid resistance. A freely rotating wheel fitted with a smooth rubber tyre, mounted mid-machine in line with the nearside wheel track and angled at 20° to the direction of travel of the vehicle, is applied to the road surface under a known vertical load. A controlled flow of water wets the road surface immediately in front of the test wheel so that, when the vehicle moves forward, the test wheel slides in the forward direction along the wetted surface.

4.2 Skid resistance measurement

Sideways-force Coefficient Routine Investigation Machine (SCRIM)

The force generated by the resistance to the sliding is related to the wet road skid resistance. Measurement of the sideways component allows the Sideway-Force Coefficient (SFC) to be calculated. SFC is the sideway force divided by the vertical load. Measurements are recorded as SCRIM Readings (SR). A SCRIM Reading is the average SFC multiplied by 100 for a 10m length of road.

The Characteristic SCRIM Coefficient (CSC) is an estimate of the skid resistance once the effect of seasonal and yearly variations has been taken into account. Because the skid resistance varies continuously, various strategies have been developed to provide a measurement that characterised the state of polish of the micro-texture. The adopted survey strategy and processing procedures are designed to reduce the effect of the variations within a year and between successive years so that sites with low skid resistance can be identified more accurately.

Gateshead Council survey strategy will be to use SCRIM under controlled conditions to minimise these effects by:

- single annual survey method as defined in HD28 Annex 3 using survey cycle shown in Table 3.1 above.
- averaging the survey over 3 years
- specifying a standard test speed of 50 km/h
- limiting the testing season defined as 1st May to 30th September

- measurements to be carried out with the test wheel in the nearside wheel path
- unless otherwise specified by the engineer the leftmost lane will be tested in both directions of travel as this lane carries most traffic and is therefore subject to most surface wear.
- measurements shall not be undertaken where the air temperature is below 5ºC
- contamination of road surface must be recorded by the SCRIM operators
- test line to be followed at roundabouts shall be agreed by the SCRIM operator and the engineer

Grip Tester

For means of consistency for the remaining network, routine skid resistance surveys will not be carried out; however individual site assessments will be carried out when requested by the maintenance engineer.

For individual site investigations other equipment such as the GripTester, Micro-Griptester and the Pendulum test may be considered appropriate. The SCRIM Investigatory levels can be converted into the respective test measurements.

The correlation between the Mark 2 GripTester data or Micro-Griptester and SCRIM is

GripNumber = SCRIM Investigatory Level/0.89

The correlation between Pendulum data and SCRIM is

SRV = (SCRIM Investigatory Level - 0.05)*100 (SRV: Skid Resistance Value)

The correlation factors are based on specific field trials and may not be applicable to the individual sites being tested. It is the responsibility of the maintenance engineer to ensure that the converted Investigatory Levels are valid for the individual site under investigation.

It is not recommended for Griptester or Pendulum test results to be converted in equivalent SCRIM; it is recommended to convert the Investigatory Levels are converted to equivalent Grip Number or SVR Investigatory Levels for analysis.

All testing must be undertaken by a company with UKAS accreditation for the testing and must be undertaken by experienced technician and all equipment must have valid calibration certificates and service documents in accordance to manufacturers' specification.

5. Setting the Investigatory levels

5.1 The objective of setting the Investigatory Level is to broadly achieve the same risk of wet skidding accidents across the network. The Investigatory Levels are based on the guidance given in the national Skidding Resistance Standard HD28. Since these categories and ranges have been developed for trunk roads, not all the categories are applicable to local authority roads.

5.2 Local variations to HD 28/15: a separate site category of H1 for high risk non-events where desktop study or site investigation has deemed the nature of the site to be high risk. Site Category code H2 for high risk G2, K or Q sites, where desktop study or site investigation has deemed the nature of the site to be high risk. Standard Risk Roundabout (RS) and High Risk Roundabout (RH) where previous wet skid accident have occurred. Site Category S3 for Bend Radius <100m where current HD 28/15 states all bend radius <100m should be applied at all speed limits.

5.3 HD 28/15 Annex 5 must be used to assist in allocating Site Categories.

5.4 The site category most appropriate to the layout of the site will be selected from the list in Table 5.1. A single site category is assessed in multiples of nominal 50m except for roundabouts (R) which is 10m. Residual lengths less than 50% of a complete averaging length may be attached to the penultimate full averaging length.

5.5 After selecting the site category the appropriate Investigatory Level is assigned. Roads within the site category with no exceptional risk of skidding accidents will be assigned the lowest Investigatory Level.

5.6 The following guidance can be used to influence the choice of a higher investigatory level:

- Conflict between road users that have severe consequences e.g. head on or side impact at speed.
- Road geometry substandard.
- Approach to minor or major junctions that have poor visibility or high approach speed.
- Two or more site categories in close proximity, e.g. junctions on gradient.
- Above average accident history, particularly in wet conditions.

5.7 The investigatory Level on the target network are reviewed over a 3 year cycle so that:

- Changes in the network are identified and taken into account
- Results from wet accident analysis are applied
- Consistency is maintained on the network particularly on single carriageway roads.

5.8 A list of officers authorised to set or approve Investigatory Levels are identified in Section 9.

Table 5.1 – Site categories and investigatory level

Site Category and definition		Investigatory Level at 50km/h							
Site Category Code		30	35	40	45	50	55	60	65
B	Dual carriageway non-event								
C	Single carriageway non-event								
H1	High risk non-event								
H2	High risk G2, K or Q site categories.								
Q	Approaches to and across minor and major junctions; approaches to roundabouts.								
K	Approaches to pedestrian crossings and other high risk situations.								
RS	Roundabout. Standard Risk								
RH	Roundabout. High Risk								
G1S	Gradient 5-10% longer than 50m. Standard Risk.								
G1H	Gradient 5-10% longer than 50m. High Risk.								
G2	Gradient >10% longer than 50m.								
S1	Bend Radius <250m - Dual Carriageway >=50mph. Min. 50m								
S2	Bend Radius <250m - Single Carriageway >=50mph. Min. 50m.								
S3	Bend Radius <100m								
A	*Motorway*								

LOW RISK	
STANDARD RISK	
HIGH RISK	

Notes applicable to all:

1. The IL should be compared with the mean CSC, calculated for the appropriate averaging length.
2. The averaging length is normally 50m or the length of a feature if it is shorter, except for roundabouts, where the averaging length is 10m.
3. Residual lengths less than 50% of a complete averaging length may be attached to the penultimate full averaging length, providing that the Site Category is the same.
4. As part of site investigation, individual values within each averaging length should be examined and the significance of any values that are substantially lower than the mean value assessed.

Notes applicable to specific site categories:

1. ILs for site categories Q and K are based on the 50m approach to the feature and, in the case of approach to junctions, through to the extent of the junction. The approach length shall be extended when justified by local site characteristics.
2. Categories G1 and G2 should not be applied to uphill gradients on carriageways with one-way traffic.
3. Categories S1 and S2 should be applied only to bends with a speed limit of 40 mph or above, except if the radius of the bend is S3 (<100m) shall be applied at all speeds.

6. Identification and Prioritisation of Skid Deficient Sites

6.1 The processed survey data producing the CSC values will be compared with the predetermined Investigatory Levels to identify lengths of road where the skid resistance is at or below the Investigatory Level. The sites are colour coded according to severity and displayed on the Gateshead Council Horizons System.

6.2 Skid deficient sites are identified manually in 50m averaging lengths according to the following criteria:

1. CSC is 0.05 units below the Investigatory Level and has one or more wet skid injury road traffic collision

2. CSC is 0.20 units or more below the Investigatory Level.

3. CSC is 0.10 units below the Investigatory Level and the Texture Depth < 0.6mm (HD29 DMRB 7.3.2).

6.4 SCRIM Site investigations should be prioritised depending on the number of wet skid accidents over the last three years followed by the amount the SCRIM is below Investigatory Level.

6.4 Gateshead Council will investigate sites that have 2 or more wet skid injury road traffic collisions over a 50m length of road.

7. Site Investigation

7.1 All sites that meet the criteria specified in paragraph 6.2 of this document will be investigated by the Gateshead Council Highway Maintenance Engineer or an appointed person deemed to have the appropriate experience and knowledge to undertake the investigation.

7.2 The SCRIM Site Investigation Form has been designed with reference to HD28/15 Annex 6. The form provides a holistic overview of all the relevant data for each Site requiring a SCRIM Investigation, allowing the Maintenance and Road Safety sections to review the data and determine the appropriate actions.

7.3 Before undertaking the SCRIM Site investigation, as much of the SCRIM Site Investigation form should be completed as possible as part of a desktop exercise.

7.4 During the SCRIM Site Investigation, the person conducting the SCRIM Site investigation should complete the site aspects of the form and also compare if the survey data (i.e. SCRIM and SCANNER) is consistent with observations made on site. Photographs of the site should be taken of the general location, showing the geometry of the road, visibility, etc. Additionally, photographs of the Road Surface, defects and other important feature which could contribute to determining the action taken must be taken. If possible, a camera with geo-referencing should be used.

7.5 Once completed, the appointed staff in the Maintenance and Road Safety sections will review each site and agree an action. The following options are possible recommended actions after completion and review of the SCRIM Site Investigation form:

- Resurfacing Works
- Other Actions, such as cleaning/replacing signs, increase routine verge maintenance, etc.
- Review Site after next survey
- Reduce/Increase Risk Rating
- No further action required

Please note that the above list is not exhaustive and other type of actions may be considered.

7.6 Any sites that require Resurfacing Works must be added to the Works Programme and Slippery Road Warning Signs should be erected along the extent of the location and immediately remove once works are completed, in accordance with HD 28/15 – Volume 7, section 3.

7.7 Any Resurfacing works must be designed with reference to HD37 and HD38, plus should use aggregate or chippings that meet the requirements of Tables 8.1 and 8.2 in this policy.

7.8 All copies of the SCRIM Deficiency Plans and SCRIM Site Investigations Forms must be retained and archived. Additionally, a copy of any works completed due to the SCRIM Site Investigations will need to be archived along with the related SCRIM Site Investigation forms.

8. Aggregate Specification for Pavement Surfacing

8.1 Choosing the correct aggregate for road surfacing works is vital in the role of providing safe roads, meeting road users' needs, reducing the environmental impact and providing value for money.

8.2 HD37 and HD38 provides a summary of the different types of bituminous and concrete surfacing materials and techniques, providing advice and recommendations regarding the appropriate material for each situation. It is recommended that Gateshead Council Highway Engineers utilise the guidance from these documents when designing schemes.

8.3 Aggregate is graded depending on size and Polish Stone Vale (PSV); an aggregate with a low PSV is will polish quicker when compared to an aggregate with a higher PSV. PSV testing must be carried out in accordance with BS EN 1097-8:2000.

8.4 Due to the nature and risk of the Gateshead Council road network, different PSV aggregates can be used in different locations; tables 2 and 3 below are based on guidance from HD36 and IAN156. Tables 8.1 and 8.2 are the minimum PSV requirements depending on the Site Category/Risk Factor and Daily Traffic Flows.

Table 8.1 – Minimum PSV for chippings or aggregate in bituminous surfacing (excluding hot applied thin surface course systems).

Site Category	Site Description	IL	Minimum PSV required for given IL, traffic level and type of site				
			Traffic (cv/lane/day) at design life				
			0-250	251-500	501-750	751-1000	1001-2000
B	Dual carriageway non-event	0.35	50	50	50	50	50
		0.40	50	50	50	55	60
C	Single carriageway non-event	0.40	55	50	50	55	55
		0.45	60	60	60	65	65
G1S/G1H/G2	Gradient 5% or greater and longer than 50m	0.45	55	60	60	65	65
		0.50	60	68+	68+	68+	68+
K/H1/H2	Approaches to pedestrian crossings and other high risk situations	0.50	65	65	65	68+	68+
		0.45	68+	68+	68+	68+	68+
Q	Approaches to and across minor and major junctions; approaches to roundabouts (where speed limit is 40mph or below)	0.45	60	65	65	68+	68+
		0.50	65	65	65	68+	68+
Q	Approaches to roundabouts (where speed limit is 50mph or above)	0.50	65	65	65	68+	68+
		0.55	68+	68+	68+	68+	68+

Site Category	Site Description	IL	Minimum PSV required for given IL, traffic level and type of site				
			Traffic (cv/lane/day) at design life				
			0-250	251-500	501-750	751-1000	1001-2000
RS/RH	Roundabout (where speed limit is 40mph or below)	0.45	50	55	60	60	65
		0.50	68+	68+	68+	68+	68+
RS/RH	Roundabout (where speed limit is 50mph or above)	0.50	68+	68+	68+	68+	68+
		0.55	68+	68+	68+	68+	68+
S1/S2/S3	Bend Radius <250m (where speed limit is 50mph or above)	0.50	68+	68+	68+	68+	68+
		0.55	68+	68+	68+	68+	68+

Table 8.2 – Minimum PSV for coarse aggregate in hot applied thin surface course systems.

Site Category	Site Description	IL	Minimum PSV required for given IL, traffic level and type of site				
			Traffic (cv/lane/day) at design life				
			0-250	251-500	501-750	751-1000	1001-2000
B	Dual carriageway non-event	0.35	50	50	50	50	50
		0.40	50	50	50	55	55
C	Single carriageway non-event	0.40	50	53	53	58	58
		0.45	53	53	58	58	63
G1S/G1H	Gradient 5% or greater and longer than 50m	0.45	55	60	60	65	65
		0.50	60	68+	68+	68+	68+
K/H1/H2	Approaches to pedestrian crossings and other high risk situations	0.50	60	68+	68+	68+	68+
		0.45	68+	68+	68+	68+	68+
Q	Approaches to and across minor and major junctions; approaches to roundabouts (where speed limit is 40mph or below)	0.45	60	65	65	68+	68+
		0.50	65	65	65	68+	68+
Q	Approaches to roundabouts (where speed limit is 50mph or above)	0.50	65	65	65	68+	68+
		0.55	68+	68+	68+	68+	68+
RS/RH	Roundabout (where speed limit is 40mph or below)	0.45	50	55	60	60	65
		0.50	68+	68+	68+	68+	68+

RS/RH	Roundabout (where speed limit is 50mph or above)	0.50	68+	68+	68+	68+	68+
		0.55	68+	68+	68+	68+	68+
S1/S2/S3	Bend Radius <250m (where speed limit is 50mph or above)	0.50	68+	68+	68+	68+	68+
		0.55	68+	68+	68+	68+	68+

Notes:

1. Site categories are grouped according to their general character and traffic behaviour. The Investigatory Levels (IL) for specific categories of site are defined in Section 5, table 5.1. The IL to be used here must be that which has been allocated to the specific site on which the material is to be laid, as determined by following the procedures in Section 5.

2. Dual carriageway slip roads may fit in a number of groups depending on their layout. For example, a free flowing section close to the main line would be in Group 1 whereas the end of an off-slip approaching a give way line or the point at which a queue develops would be in Group 3. Some slip roads with gradients may be in Group 4. Use the most appropriate Group depending upon the Site Category from Section 5 that was used to determine the IL.

3. Where ’68+’ material is listed in this Table, none of the three most recent results from consecutive PSV tests relating to the aggregate to be supplied must fall below 68. See HD 29 paragraph 3.21.

4. Local variation includes the removal of High Friction Surface due to financial constraints and poor lifespan. High Friction Surfacing will only be applied where deemed necessary following site investigation.

5. For site categories G, S and R/RR any PSV in the range given for each traffic level may be used for any IL and should be chosen on the basis of local experience of material performance. In the absence of this information, the values given for the appropriate IL and traffic level must be used.

6. Where designers are knowledgeable or have other experience of particular site conditions, an alternative PSV value can be specified.

7. Site categories K and Q/QR should not be applied to the circulatory parts of a roundabout.

9.0 Early Life Skidding Resistance

9.1 After much publicity regarding the early life dry skidding resistance of Thin Surfacing materials, the Highways Agency published IAN49/03 Use of Warning Signs for New Asphalt Road Surfaces. IAN49/03 was introduced to address concerns of potential increase skidding risk on new Thin Surfaces, pending finding from further research.

9.2 IAN49/03 has been superseded by IAN49/13 which is guidance based on further research, which concluded that the increases in accident risks effects all new asphalt surfaces and not just Thin Surfaces. Additionally, the overall increase in accident numbers over the initial six months is also accompanied by a significant decrease in the number of fatal incidents.

9.3 IAN49/13 indicates that the increase in risk tends to occur on low-risk sites, not high-risk areas as had previously been envisaged.

9.4 Based on the national guidance provided by IAN49/13, Slippery Road Warnings Signs (Diagram 557, Traffic Signs Manual, Chapter 4) will no longer be required along the length of new Thin Surfacing sites.

10. Horses and Highway Surfacing

10.1 The CSS and British Horse Society have published a guidance note for highway authorities ENG 03/05.

10.2 Routine skid resistance measurements are unlikely to identify problem areas for horses. Gateshead Council will follow up all reported incidences with a site investigation.

11.0 Responsibilities

11.1 Gateshead Council have overall responsibility for ensuring the implementation of this Policy.

11.2 Table 1 provides an overview of operational responsibility.

Table 11.3 : Operational responsibility for the skid resistance procedures

Operation	**Responsibility**
Organising surveys and reporting results	LO HM / Provider
Setting site categories	LO HM / Provider
Setting, approving and reviewing Investigatory levels	LO HM / Provider
Accident investigation	LO TM&RS
Assessment of Accident Data	LO TM&RS
Risk rating sites	LO HM / Provider
Leading site investigations	LO HM
Identification and programming of treatments	LO HM / LO TM&RS
Organising erection & removal of warning signs	LO HM / LO TM&RS

LO HM = Lead Officer – Highways Maintenance

LO TM&RS = Lead Officer – Traffic Management & Road Safety

Provider = Skidding Resistance Survey Provider

Annex A – Accident Analysis Review

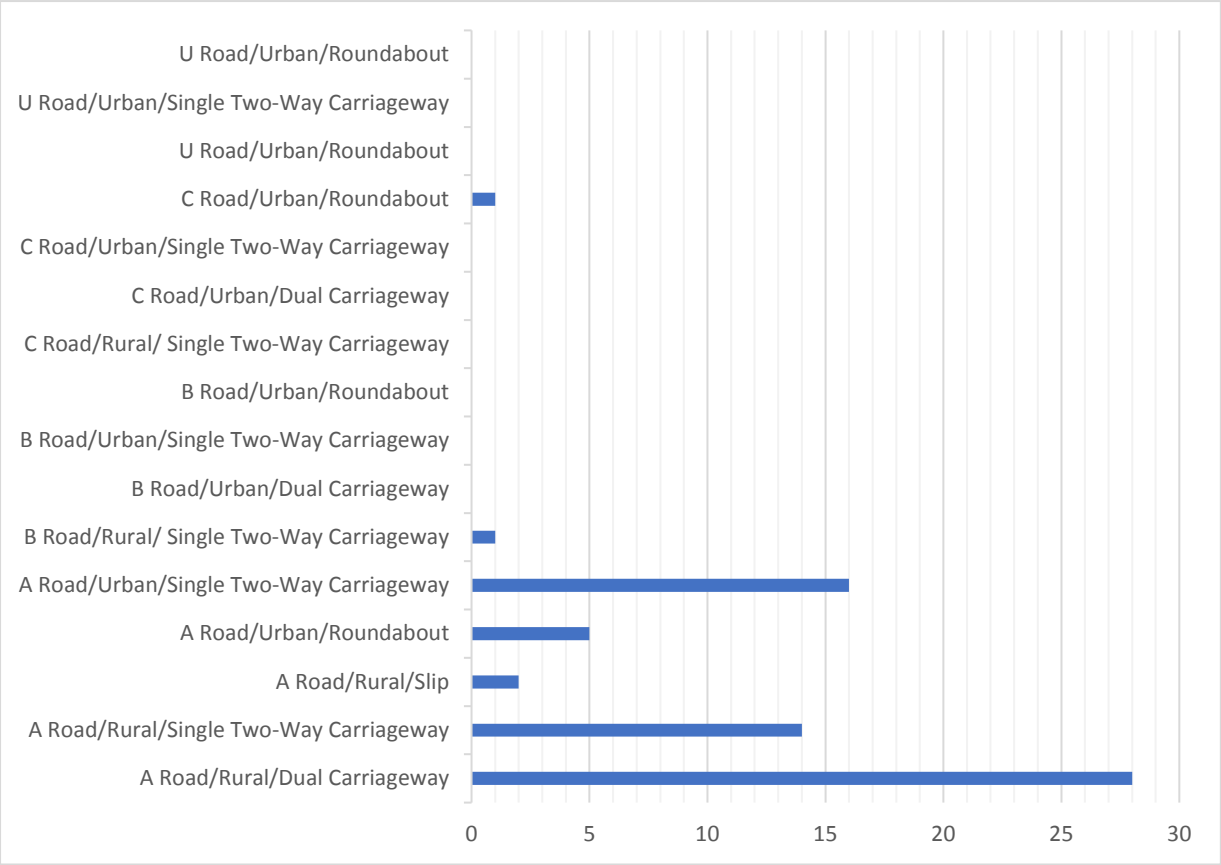
2011 – 2015 Wet Skid Accident data provided by Gateshead Council; this data was analysed against the Gateshead Council UKPMS Network to determine the higher risk locations on the network.

Table A.1 – 2011 – 2015 Number of accidents per Road Class/Environment/Road Type

Road Class/Environment/Road Type	Number of Wet Skid Accidents	% of Accidents	KMs per wet Skid
A Road Sub-Total	**66**	97.1%	1.3
A Road/Rural/Dual Carriageway	28	41.2%	1.3
A Road/Rural/Single Two-Way Carriageway	14	20.6%	1.5
A Road/Rural/Slip	2	2.9%	0.6
A Road/Urban/Roundabout	5	7.4%	0.9
A Road/Urban/Single Two-Way Carriageway	16	23.5%	1.2
B Road Sub-Total	**1**	**1.5%**	**45.0**
B Road/Rural/ Single Two-Way Carriageway	1	1.0%	5.9
B Road/Urban/Dual Carriageway	0	0%	-
B Road/Urban/Single Two-Way Carriageway	0	0%	-
B Road/Urban/Roundabout	0	0%	-
C Road Sub-Total	**1**	**1.5%**	**100.1**
C Road/Rural/ Single Two-Way Carriageway	0	0%	-
C Road/Urban/Dual Carriageway	0	0%	-
C Road/Urban/Single Two-Way Carriageway	0	0%	-
C Road/Urban/Roundabout	1	1.5%	1.0
U Road Sub-Total	**0**	**0%**	**-**
U Road/Urban/Roundabout	0	0%	-
U Road/Urban/Single Two-Way Carriageway	0	0%	-
U Road/Urban/Roundabout	0	0%	-
Grand Total	**68**	**100.0%**	**13.4**

Table A.1 indicates that 98.5% of wet skid injury accidents occurred on the Principal (A Roads) network, with the majority of the incidents occurring on rural Dual Carriageways (Speed Limit greater than 40 mph).

Figure A.2 – 2011 – 2015 Number of accidents per Road Class/Environment/Road Type



With Gateshead Councils limited resources, it is recommended to only undertake a Skidding Resistance Survey on the Principle network only to provide best value for money; the probability of an accident occurring on the Principal network per carriageway kilometre is significantly higher than all other road classifications.

Annex B – SCRIM Site Investigation Forms (HD 28/15, Annex 6)

Figure B.1 – Site Investigation Report

Skid Site Investigation Report			**Survey year:**
Unit	**Route**	**Site ID**	**Location**
Name of Managing Organisation and Overseeing Organisation's Area/Region designation	Road Code	Reference no.	Section(s)/ Chainage
Site Location and Use			
Location and Nature of Site:			
State the limits of and nature of the site including speed limit and environment. List hazards e.g. junctions, lay-bys, other accesses, crossings, bends or steep gradients.			
Current Site Category and IL:			
State current Site Category and Investigatory Level. Are these consistent with current guidance?			
Pavement Condition Data			
Skid resistance and texture depth:			
Attach plot or spread sheet showing the skid resistance, texture depth and other data if relevant. State here if low skid resistance or texture depth occurs where road users need to stop or manoeuvre.			
Other aspects of pavement condition:			
Note if there any extreme values of rut depth or longitudinal profile variance that could affect vehicle handling or drainage of water from the carriageway. Attach data if relevant.			

Are junctions appropriate for turning manoeuvres?		Note if junction sizes are appropriate for all vehicle movements and right turning vehicles are adequately catered for. Note whether traffic signals are operating correctly and are clearly visible.
Markings Signs and Visibility		
Are markings and signs clear and effective in all conditions?		Sometimes old pavement markings have not been removed properly or there are redundant signs that could cause confusion.
Roadside objects protected from vehicle impact?		
Clear sight lines/visibility of queues/ vegetation		Consider sight lines through junction/accesses. Is the end of likely vehicle queues visible? Will vegetation growth affect visibility or obscure signage?
Additional Information and Other Observations		
Please indicate if any:		Are any other sources of information available, such as reports or visual evidence of damage only crashes, or reports from the Police?
Recommendation		
Is treatment required?	Y / N	State why treatment is justified
What type of treatment?	Y / N	State if surface treatment is required or if any other treatment/actions can be applied instead to mitigate the existing risk.
Change IL?	Y / N	State reasons for changing IL.
Other action required?	Y / N	State what other action should be considered and why.
Approval		
Print name:	Signature:	Date:

Crash Data						
Period		**Number of crashes**			**Analysis length**	
From:	To:	Total:	Wet:	Wet skid:	Length (km):	Traffic (AADT):

	Site Data	Control data		
		Similar sites	Route data	National data
Crashes/year				
Crashes/year/100km				
Crashes/10^8 veh-km				

Crashes linked to surface condition?	Y / N	Does the position of wet or wet-skid crashes coincide with the lengths with low skid resistance?

Other comments on crash data:

Site Investigation		
Date:	Inspected by:	Method:
	Name	On site/desk study

Visual Assessment	
Type and condition of surfacing:	Consider variations across whole carriageway width.
Any inconsistencies with survey data:	
Presence of debris or other contamination:	Consider likely route taken by different road users.
Local defects (potholes, fatting-up etc.):	Indicate position, extent and severity of defects.
Is drainage adequate?	List any indications that road does not drain adequately.

Road Users	
Volume and type of traffic:	Consider heavy vehicles and vulnerable road users.
Traffic speeds in relation to road layout:	Consider peak, day time and night time.
Type of manoeuvres and consequences of driver error:	Evidence of crash damage or near miss e.g. tyre tracks in the verge.

Road Layout	
Does it appear to meet current design specification?	Note unusual or confusing layouts.
Is layout appropriate for vulnerable road users?	Consider volume and type of vulnerable road users expected.

Annex C – Skidding Resistance Policy Procedure for Identification and Prioritisation of Sites