

## **Lessons from 3 reviews of how skid strategies are implemented**

**Mark Stephenson**  
*W.D.M. limited*

### **ABSTRACT**

A typical skid strategy sets out a number of actions that are required for the strategy to be implemented, often involving a diverse number of staff from both within the highway authority and external partners and contractors. In the case of a police investigation or civil claim it is often how these actions have been undertaken that comes under detailed scrutiny.

A number of Highway Authorities have recognised this and commissioned reviews of how the policy has been implemented. This paper considers 3 case studies where different polices, and organisational structures are in place.

Somerset County Council prioritises sites and undertakes site investigations 'in house' through head office and area based team. In order to achieve some consistency a Skid Policy implementation team has been established to manage the implementation of the policy and identify improvements.

Transport Scotland have developed a 'Guidance Document for implementing the skid policy' however the delivery is largely undertaken by 4 Operating Companies. A series of reviews including site inspections have been undertaken over a number of years and different improvements identified.

In London there are 33 separate Borough Councils with responsibility for implementing the skid policy. A pan London project board oversees policy development and tries to achieve consistency across the city. Four boroughs with different approaches are considered.

The paper will identify key themes and issues from the reviews and identify different approaches to resolving common concerns.

## **1. BACKGROUND**

W.D.M. limited has assisted a number of Highway Authorities in implementing their skid resistance policy. This work has involved analysis, drafting policy and guidance documents. For the purposes of this paper the following terminology will be used.

**Skid Resistance Policy:** A document setting out the headline elements for the management of skid resistance. In local authorities these would typically be approved by the council members.

**Skid Resistance Strategy:** A document (or set of documents) that set out the practical arrangements in place to manage skid resistance. This could include, but not be limited to defining survey network, survey technique, seasonal correction, investigatory levels, prioritisation of sites etc.

**Skid Resistance Procedures:** A set of working procedures detailing how elements of the policy are implemented. This could include Data Management, setting site categories, investigation protocols etc.

A number of authorities have commissioned WDM to undertake a review of their skid resistance policies, and in particular how they have been implemented. Since 2012 these have included 4 London Boroughs under the umbrella of the London skid policy, Somerset County Council and Transport Scotland. From these reviews it is possible to get an overview of how different authorities have approached the management of skid resistance, to identify common issues and recognise best practice.

## **2. 4 LONDON BOROUGHS**

The London skid policy was developed in 2009 under the direction of the London Technical Advisors Group (LOTAG). The objective was to achieve a common standard in the management of skid resistance on the principal (A) road network in London. This involves 33 separate borough councils and Transport for London. A skid resistance policy template has been provided for boroughs to adopt, and each individual borough is invited to document their working arrangements in terms of prioritisation and investigations. A detailed guidance document provides advice on implementing the policy, and annual prioritised site listings are provided to assist with this process. The four boroughs involved were 1 outer and 3 inner boroughs.

### **2.1 BOROUGH A**

The first borough is an outer borough with a principal road network of 80 lane km. The borough has around 40% (2012) of its network below the Investigatory Level which is typical in London. The skid resistance policy is managed by the Assistant Head of Highways and Traffic and there is a well-structured team supporting the policy, including accident monitoring, highway maintenance and delivery teams. At the time of the review the policy has not been formally adopted; although a draft policy was in place.

The Borough uses the prioritised site listing and undertakes a number of analysis to determine the investigation strategy. Investigations are undertaken by experienced staff

and a good understanding of skid resistance was demonstrated. The borough has demonstrated an innovative approach to funding skid resistance improvements from outside of the conventional maintenance funding sources. It would appear this is a direct benefit from the integration of the accident and maintenance teams.

## **2.2 BOROUGH B**

The second borough is an inner borough with a principal road network of 45 lane km. The borough has around 55% (2012) of its network below the Investigatory Level which amongst the higher recorded levels in London. At the time of the review the skid resistance policy was managed by the Highway Maintenance Manager with very little support, and there was no engagement with the safety teams.

The borough has a policy to use only principal road funds from TfL grants for principal road maintenance, and as such there may be a presumption against recommending treatments as a result of the skid resistance policy. A desktop review of sites identified in the 2009 listing had been undertaken, and concluded that the cost benefit returns would not warrant the expenditure on the sites identified; however the costs and benefits used were not disclosed. Following the review better engagement with the traffic and safety team was initiated, with more sharing of data. There was a concern during the review that the Highway Maintenance Manager was undertaking all the roles in implementing the skid strategy and there would be benefits in some form of peer review. A fundamental concern about funding was identified, with there being no obvious source of funding to undertake recommendations from the policy. It was considered that this may be influencing the approach adopted in borough B with a presumption to 'do nothing' in most cases.

## **2.3 BOROUGH C**

The third borough is also inner borough with a principal road network of 28 lane km. The borough has around 50% (2012) of its network below the Investigatory Level which amongst the higher recorded levels in London. 75% of the network in the borough is categorised as either approaches to crossings or junctions with the associated high IL's, with over 60% of these site categories being below Investigatory Level. At the time of the review there was not a clear strategy to manage skid resistance and one of the objectives was to establish working procedures to implement the policy.

The borough has applied 'default' Investigatory levels; however on some roads there is clear evidence that due to road layout and traffic speed there is scope to lower the IL's within approved bands. The borough maintenance engineer has made some changes to their material specification, with the use of 'high PSV' aggregate as a standard for all principal roads. Early evidence suggests this is having the anticipated impact on recently treated roads. The borough has an allocated budget for High Friction Surfacing; however the management of this appeared to be divided between the maintenance and safety staff.

The review was used to indicate the current status of the skid policy and to make recommendations for improvement. Following the initial stages of the review process it was noted that data was beginning to be shared, and the safety teams were taking an active role in investigations. The borough was prepared to allocate additional funding to implementing the skid policy and the tools provided, if properly applied would enable

better targeting of planned works.

## **2.4 BOROUGH D**

The fourth borough is also an inner borough with a principal road network of 75 lane km. The borough has around 44% (2012) of its network below the Investigatory Level which is typical in London. The characteristics of the road network in the borough are similar to many of the outer boroughs. At the time of the review the borough had gone through a period of significant change with the result that the skid policy had been neglected for a period of time. The newly appointed Highway Asset Group manager brings extensive experience of implementing policies and is keen to implement the skid policy, but acknowledges that the borough presents a number of challenges. There is some fragmentation of the safety and road maintenance teams. There is an approved skid policy; however this is not been implemented, and the aim is to update the Highway Maintenance Management plan, incorporating the skid resistance policy and strategy.

The safety team had identified a number of trends in accidents that are of relevance to the skid strategy, including an increase in the number of collisions at pedestrian crossings. Similar to borough B funding is a serious concern. Use of the HMEP lifecycle planning tool has indicated that current funding is around 20% of that required. This places the boroughs in an unenviable position with respect to SCRIM data on principal roads, in that there may be sites that are in need of treatment to improve skidding resistance; however these sites are unlikely to receive specific funding unless they are also in poor structural condition.

The Highway Asset Group Manager is confident that the skills exist in the borough to implement the policy, and that the scale of investigations required are manageable.

## **3 SOMERSET COUNTY COUNCIL**

Somerset County Council is a large rural 'shire' county in the southwest of England. The road network is 6600km and the skid policy applies to 1200 km of roads defined by maintenance hierarchy. The skid strategy was approved in 2008 and has been implemented though an annual investigation cycle since this date. The skid resistance is largely implemented by 'in house' teams with the design and construction provided by their term maintenance contractor. The Highway Information Team receive and analyse condition and accident data to develop a prioritised site listing on an annual basis which is the provided to 'area' teams to undertake investigations. There is an annual cycle for the preparation of the programme of work, and at times the skid policy work is not fully synchronised with this activity. This appears primarily to be due to the 'batch' processing approach adopted and a regular delay in receiving validated accidents.

Somerset has 5 area teams, and in each there is a designated Technician who undertakes the skid policy role. From the reviews it is evident that there are different levels of experience amongst the staff, and whilst they follow the established guidelines there is evidence of a different interpretation of the data relevant to the skid policy. In an attempt to address this a Skid Policy Implementation team has been established which meets twice a year. The purpose of this team is to share experience, develop best practice and to provide a forum to engage with colleagues in other disciplines regarding skid resistance.

During the review completed in 2012 it became evident that the guidance, interpreted from HD28 regarding the use of low/ medium and high IL bands for each site category were not used. Due to the prioritisation methodology adopted the sites that may warrant a revision of IL within the approved bands were unlikely to be subject to any detailed scrutiny. The subsequent revision of the guidance, planned for adoption in 2014 has simplified the IL table significantly.

The Area Technicians undertake the investigations, and recommend treatments that eventually form an input into the structural maintenance project. Scheme briefs are provided to the term contractor who uses the available information to develop a design. There is a clear distinction between preparing the design brief, and carrying out the design, but it was apparent that the term contractor was not always provided with relevant design data; for example the SCRIM survey results. Whilst materials guidance is in place on the selection of aggregates and materials there is a need to develop a more robust way of transferring condition data.

In 2012/13 there were a number of incidents involving accidents at sites that had not been investigated. On examining the site data in detail it became apparent that the prioritisation methodology only considered sites with an accident history, and there were a number of 'high deficiency' sites that were not being investigated. The 2014 update to the methodology includes a review of high deficiency sites as a separate exercise to the main investigation programme. Figure 1 is an extract from <http://www.bbc.co.uk/news/uk-england-somerset-21627603>.



**Figure 1: Accident reporting**

## **4. TRANSPORT SCOTLAND**

Transport Scotland is an Executive Agency of the Scottish Government with a wide ranging responsibility for Transport in Scotland. The review considers their role as the Trunk road authority, with specific reference to the management of skid resistance. Transport Scotland act as the client for the trunk road network, with the operation of the network delivered through term contracts by Operating Companies. Scotland has 4 operational areas, which are responsible for different geographic area in Scotland. The trunk road networks in each area are quite distinctive. This paper considers the OC's in place until March 2013. 2 of the OC's changed in 2013, and the remaining 2 contracts are scheduled to commence in 2014.

Transport Scotland has adopted HD28/04 as their skid resistance standard, but developed a methodology document that applies the standard to the Scottish Trunk road network. Key difference involves the adoption of a prioritisation methodology to determine which sites require investigation, and the adoption of a two stage investigation protocol. It is understood that the draft revision to HD28 includes these provisions. A significant objective for Transport Scotland is to gain confidence that the OC's are applying the skid resistance guidance appropriately and that the experience of the OC's is used to develop the working practices adopted. Annual reviews have been undertaken since 2009/10 on all 4 OC's. These reviews have identified concerns common to all reviews, but also noted significant improvements over this time.

A significant difference observed is the approach to investigations adopted. It has been considered that some OC's have viewed the process as a means for promoting structural maintenance schemes, and that the 'investigation' element is seen as a means to an end. Another OC has taken a more purist approach and applied the principle that the HD28 process is about assessing the risk of skidding accidents at the identified sites, not to assess general pavement condition with a view to developing a programme of works. The OC's also adopt a different approach to managing risk. During one review it was observed that if a site was high on the ranked listing a site investigation would take place, irrespective of the initial investigation, on the premise that the OC wanted to be seen to manage the implied risks. It is believed that this may be a reflection of the corporate culture within the OC.

The Transport Scotland skid policy relies upon good network data concerning site categories and Investigatory levels. It has been observed during recent reviews that this is not being applied as envisaged. Errors have been identified in the site category definitions, with 'event categories often missed, or wrongly assigned. The use of different IL's within the approved bands is poor, which can distort the annual deficiency listing. The guidance document is based on the principles in IAN98/07; however some of the guidance is a little ambiguous.

The OC's manage the construction programme to address identified sites, either through a value management process, or for smaller sites through delegated budgets. It is clear that the OC's apply different approaches to undertaking works; however it is hoped that the new contracts will achieve some consistency.

## **5 COMMON THEMES**

The review process described has given an insight into how different authorities have implemented skid resistance strategies. A number of common themes emerge.

### **5.1 STAFFING**

The authorities have adopted different approaches to undertaking the reviews. By virtue of size the London boroughs typically have a small team (often an individual) undertaking the skid strategy work. In the extreme case in borough B this individual was responsible for all the roles involved, including setting and prioritising the budget. In Somerset they have opted for an area based approach, with support from head office. Whilst this ensures 'local knowledge' is applied on site, there is a risk that this local knowledge is subject to a number of influences and local prejudices. The Transport Scotland model relies upon the performance of the 4 OC's, and the resources allocated. There is a designated role of skid manager (subject to Transport Scotland approval). One OC has applied a practice of using summer vacation students to undertake site investigations, which are then subject to a rigorous review. Despite reservations about this approach the evidence from the reviews suggest this has been an effective strategy.

### **5.2 USE OF DATA**

The access to and use of data varies between the 3 authorities. Transport Scotland requires all records to be kept in their information system, which effectively sets out the data requirements from investigations. One area of inconsistency between the OC's is the use of accident data to assist both initial and site investigation. This is discussed further in 5.3 The London boroughs are largely reliant on information provided by a third party, and typically do not have ready access to supporting information such as accident details, 10m SCRIM data or other condition data. In Somerset the Highway Information Team provide the data in a prescribed format that is fairly comprehensive, with GIS and other systems providing further background on individual sites.

From the reviews it is evident that good quality data supports the investigatory process, both at desktop level, and on site. The use of Data Capture Devices' and tablet computers on site, whilst not common, appears to provide the best means of providing a comprehensive background to the site. Currently this appears to be the exception to the rule, and authorities are encouraged to adopt smarter working.

### **5.3 INTERPRETATION OF ACCIDENT DATA**

Accident data is collected by the police and provided to highway authorities in a format (STATS19). The authorities reviewed all use accident data as part of their prioritisation process, so it therefore follows that examination of accidents should be a part of the investigation process. The use of the term 'skid resistance' to describe the activities to implement HD28/04 can influence the attitudes and judgements made by those charged with managing policies. It is accepted that skidding is underreported in accident data, and wet accidents are often used in prioritisation models. STATS19 does include a 'skidding' flag in the vehicle record. From the reviews undertaken it appears that there is a tendency to consider this as the primary consideration when viewing accidents. Decisions for 'no further action' are often largely based on the use of this flag.

Another theme identified is that the accident details are reviewed and subjective decisions made; for example that a young driver travelling 'too fast' is attributable to driver error and not considered relevant to the skid policy. As a general rule WDM have advocated that the presumption is that all accidents are valid unless there is clear evidence that there are other mitigating circumstances. Examples of accidents that could be considered invalid from an accident database are included below:

- V1 (LORRY-CAS1) TALKING ON HANDS FREE PHONE FAILED TO NOTICE THE BRIDGE HEIGHT IN TIME, COLLIDING WITH IT HEAD ON.
- INTOXICATED DRV V1 DROVE OVER PED'S FOOT AFTER EARLIER DOMESTIC INCIDENT
- PASSENGER ALIGHTING FROM BUS V1 MISJUDGES STEP AND FALLS.
- VEH 1 (QUAD BIKE) WAS CARRYING A CALF FROM ONE FIELD TO ANOTHER. THE CALF KICKED OUT AND HIT THE THROTTLE, CAUSING THE BIKE TO LOSE CONTROL.
- VEH 1 (CAR), HEADING NORTH ALONG BATH ROAD, PASSED TOO CLOSE AND CLIPPED A DUSTMAN ON HIS BACK WITH THE OFFSIDE WING MIRROR.

It is understood that the draft HD28 contains a prioritisation option that relies upon accident data. From the experience of undertaking reviews it is considered that a consistent approach needs to be adopted in interpreting accident data.

#### **5.4 INVESTIGATION versus DESIGN**

For the 3 authorities reviewed the staff undertaking investigations has a roll in the design process. In Somerset the design is undertaken by the term contractor; however the Area Technicians have an influence on the material used. An observation from the reviews is that the point where investigation stops, and design commences is often blurred. As a general principle it is recommended that the investigation recommends a generic solution (surface treatment/ safety treatment/ routine maintenance etc) which is subsequently developed into a design solution taking account of other design inputs. Whilst this may appear to be fine distinction, following the investigation there may be a further review process, and a process of prioritising schemes against a budget. It is considered having a record recommending a particular treatment may be unhelpful in the case of investigations relating to claims etc.

It is also considered that the investigation requires a different skill set to design, and whilst the activities may be undertaken by the same team, the investigation is best seen as a process of gathering information that forms part of the design data.

#### **5.5 ACHIEVING CONSISTENCY**

From the reviews it is clear that authorities struggle to achieve a consistent approach to implementing a skid strategy, and that much of the work in developing procedures is an



attempt to address this. In London the inconsistency is due to the large number of authorities involved in managing the network and the different funding constraints they operate under. In Somerset the challenge is ensuring different area offices apply the skid strategy in a consistent manner. For Transport Scotland the challenge is ensuring that 4 OC's, with a number of staff involved apply the guidance in a consistent manner. The different commercial environments in transport Scotland influence the approach adopted by individual OC's.

## **5.6 USE OF HIGH FRICTION SURFACING**

All three authorities recognise the benefits of High Friction Surfacing (HFS) on high risk sites, but demonstrate a different approach to its use. The London boroughs have expressed concern about the lifecycle cost of HFS and are actively looking to reduce the use of HFS in the city. Somerset has similar concerns but as a principle advocate the use of HFS on approaches to crossings. On the Transport Scotland network there are extensive lengths of HFS used on rural bends etc. It is believed that some OC's have seen the use of HFS as an easily delivered solution to low skid resistance sites, and it is thought there may be some commercial benefits to the OC's in its use. As a consequence Transport Scotland are challenging the OC's where HFS is specified to justify its provision.

## **6 THE COST OF MANAGING A SKID STRATEGY**

The 3 highway authorities have adopted different approaches to meeting the costs of implementing the skid strategy in terms of staff time to prioritise and undertake investigations. Transport Scotland deliver their policy through the 4 operating companies and the costs are included in the contract payment made to the respective companies. In determining the amount of work to be undertaken Transport Scotland have endeavoured to balance the costs incurred against a network safety objective. Transport Scotland have identified the need to evaluate the benefits derived from the operation of the skid policy as an exercise in 2014. It is of note that in future OC contracts the operation of the skid strategy will be defined as 'lump sum' duties and the OC's will make commercial decisions about the resource level required to meet the contract requirements.

In Somerset the management of the skid strategy is delegated to the area offices who balance a number of competing objectives in determining how staff time is utilised. The prioritisation model applied has the effect of managing the resource implications. To the authors knowledge the application of this prioritisation model has not been subject to scrutiny as part of any litigation; however the publicity referred to in section 3 has ensured that the number and types of sites identified for investigation are being reviewed in the updated skid strategy for 2014.

The London boroughs manage the skid strategy through their asset management teams, as one of a number of roles. Two of the boroughs had identified that they were minded to not spend 'borough resources' on the principal road network; however they are prepared to spend time undertaking the investigations.

## **7 CONCLUSION**

Undertaking reviews has been a rewarding exercise, and provided an insight into the challenges faced by a number of authorities in implementing a skid strategy. The staff involved show a commitment to the process and over a period of time it has been reassuring to see people develop the skills required. A general concern has been the availability of funding, and the perception of how each authority manages its risks.

Ensuring that staff involved in implementing skid policies have suitable experience and training is essential; however it has been observed that this is not always the case. The OC's in Transport Scotland have demonstrated through mentoring and coaching this can be addressed; but there is a concern that current working patterns don't always afford time for this type of mentoring.

The implementation of a skid strategy provides an evidence based approach of assessing the risk of collisions due to road surface condition, and can provide a defence against civil and criminal claims. SA poorly implemented strategy can expose authorities and those implementing the strategy exposed to expensive claims.

### **Author Biography**

Mark Stephenson is a Chartered Civil Engineer and Head of Consultancy Services with W.D.M. Limited a post he has held since 2008. He is responsible for a range of projects undertaken for UK and overseas clients. These have involved the interpretation of highway condition surveys together with the development of tools and analysis to achieve cost-effective maintenance programmes. His current areas of interest include the measurement and management of skid resistance, Highway Asset Management, including lifecycle plans, scheme identification and prioritisation and policy implementation for clients.

He worked for twenty years at the Cornwall County Council where he was responsible for highway maintenance and construction. He represented the council on a number of national working groups and chaired the Highway Condition Assessment Group which reports to the UK Roads Board.