‘DATA LED, EXPERIENCE TUNED’ – DEVELOPING AN EFFECTIVE LOCAL SKID RESISTANCE MANAGEMENT STRATEGY

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ABSTRACT

This paper will share the author's experience in helping a number of road authorities around the world to develop a skid resistance management strategy that is effective, commensurate with best and good practice, reflects available resources, and consistently achievable. The paper and the accompanying presentation will examine the advantages of adopting an approach where data collection and its analysis are complemented by vital local knowledge and experience, to ensure an effective strategy results and importantly, practitioner buy-in.

INTRODUCTION

In Australia, there is no mandatory requirement for road authorities to manage skid resistance on a network level, with this responsibility broadly falling under the authority’s generic duty of care to the travelling public and its key stakeholders. Notwithstanding, the potential road safety benefits that can be accrued by effectively managing skid resistance are obvious and have been broadly recognised for some time now.

National guidance concerning the management of road network skid resistance was first introduced by Austroads (Austroads, 2005). The guidance encourages all road authorities to develop a strategy to manage skid resistance on their local network and introduces a framework of sixteen key building blocks to be considered. An important part of the strategy development process is collecting and analysing available data and marrying this successfully with local knowledge and experience. This approach has been reinforced within further, more recent national guidance (Austroads, 2009) and the output of research project AT 1131 which will be published shortly (Austroads, 2011). In short, a ‘data led, experience tuned’ approach is advocated.

THE VALUE OF DATA

Engineering practitioners are very comfortable with the concept of securing and analysing data to help inform and finalise many of the decisions that they make every single day of their working lives. In many cases this can go as far as a reliance solely on data to make decisions, which are then evaluated on an on-going basis.

The term ‘data mining’ is often used to describe such an approach where the available data on a situation or the performance of an activity (or function) is analysed and converted into known facts or absolute knowledge that can then be relied upon to enable sound decisions to be made and ultimately, reliable forward planning to take place.

The ‘value’ of data is well illustrated within a business model from the UK known to the author as the Organisational Governance Model (OGM), whose key elements are shown in Figure 1.

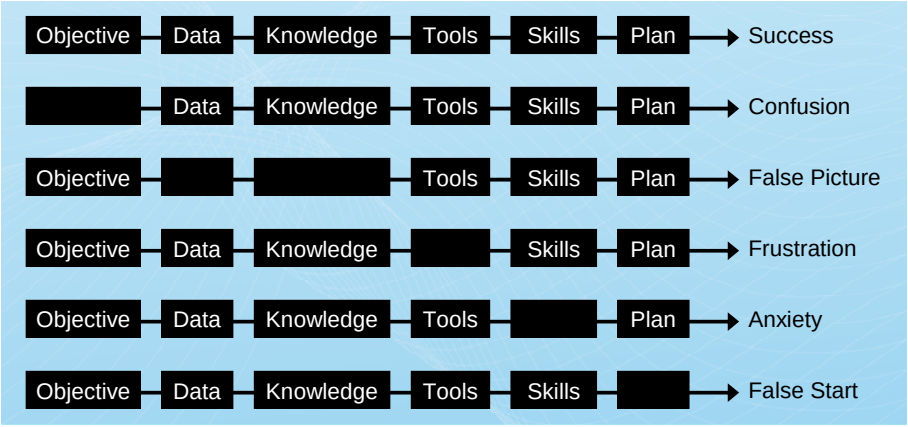

Figure 1: The six key elements and outcomes of the Organisational Governance Model (author from an historical UK source)

The model shows that if all of the six key elements are in place then success is likely to be achieved. If any of the key elements are not in place, the outcome is less certain, e.g. the lack of an overall objective is likely to result in confusion, whereas failure to provide employees with the tools to do their job is likely to lead to frustration and so on.

The model highlights the value of data by considering what might occur if it is not available, suggesting that a lack of data about a situation, function or an activity will in turn reduce the level of knowledge (i.e. hard, reliable facts) that can be gleaned about it, with the combined end result likely to be a 'false picture'. This can in turn impact on future decision making, planning and more practical issues like the setting of less than ideal (and in many cases, downright poor and/or unachievable) policies and standards or the inappropriate allocation of valuable (and often limited) resources.

However, it is important to recognise that the above model is generic and needs to be applied to the specific industry or function being considered, e.g. in highway network management we know that valuable knowledge can also be gleaned through collating personal experience in the field, often gained away from the corporate centre at a local (or regional) office environment.

THE USE OF DATA IN SKID RESISTANCE MANAGEMENT

Figure 2 has been developed by the author to help illustrate to his clients how developing an effective strategy for managing skid resistance using the recognised Austroads framework is akin to successfully assembling a jigsaw puzzle. All of the pieces need to be in place (or at the very least, planned to be in place) and brought together, with the outcome (the strategy) being stronger than the individual components and with a good resemblance of the original picture (i.e. the Austroads framework)!

Figure 2: The sixteen key building blocks (and their five main headings) of a skid resistance management strategy from Austroads (2005), illustrated as jigsaw pieces

It can be readily seen that while available data (e.g. network condition data, crash data) will be an extremely useful resource throughout the strategy development process, its usage will be most prevalent when:

- determining the objectives for the strategy (i.e. establishing where 'we' are now and where 'we' want to get to, and how we are going to achieve this)
- setting Investigatory Levels [for Austroads (2005) predominantly based on what other jurisdictions have used]
- establishing a testing regime
- establishing a protocol for identifying sites for investigation (and conducting such investigations)
- establishing a policy for the use of warning signage.

Austroads project AT 1131 (Austroads, 2011) further guides the use of data in establishing a local strategy to manage skid resistance (or in reviewing an existing strategy), with a focus being on the following:

- determining the boundary of zones of similar skid resistance demand
- determining the applicable type, and minimum level, of testing
- setting Investigatory Levels (from first principles using crash data)

- how to review and update Investigatory Levels in the future
- establishing a protocol for identifying and prioritising sites for investigation (and conducting such investigations).

As well as using available data to develop a local strategy, consideration must also be given to the on-going collection and usage of data by the road authority as part of its routine evaluation. It is also suggested that road authorities specifically consider the release of skid resistance data to third parties in the event of any crashes that might lead to legal proceedings.

It is not proposed within this paper to provide any detail on exactly which data is used, and how, in framing a local strategy as detailed guidance is already contained within the pertinent Austroads documents (Austroads 2005, 2009, 2011).

THE GENERIC LIMITATIONS OF DATA

In addition to the worst case scenario of not collecting or having available any historical data to use, all of the following scenarios have the potential to limit how useful (i.e. how representative of the current situation) a particularly data set is:

- it was collected some time ago and/or before a significant change in network or operational conditions
- it was collected by a machine or process that was not in calibration or maintenance at that time
- it was collected by a machine or process that has been since superseded
- the data appears (or is obviously) erroneous, skewed in some way or is unrepresentative of the network
- there are obvious processing and/or collation and display errors
- the data coverage (or area of data capture) is not extensive enough to be significant or to allow patterns and trends to be identified with any confidence
- data appears to be missing, or there are significant gaps in the data
- data has previously been partially processed or filtered
- data is not accessible with current technology, is not readily accessible, or is in a difficult or undesirable format.

The above should certainly *not* dissuade practitioners from using data, it is merely provided to highlight how important it is to carefully consider the desirability and precise requirements of a data collection regime that has been established to inform a new strategy, or to monitor / evaluate a new strategy. The old adage ‘if you put rubbish in, you get rubbish out’ is considered to be very true.

It must also be remembered that the collection of data is typically an expensive, long-term commitment and the best possible return must be sought for the outlay through planning and judicious regular usage. It is also important that the advantages of having data routinely available be actively demonstrated to stave of any possible future temptation to cut a local data collection budget heading.

LIMITATIONS OF DATA IN MANAGING SKID RESISTANCE

While the author of this paper would *always* advocate using available data to support any operational or policy decision, the specific limitations of data in managing skid resistance need to be remembered. Indeed, Austroads (2011) highlights *‘…..one should never lose sight of the fact that the management of skid resistance is not a precise science’.*

The author of this paper believes this to be an important and entirely valid statement, based on two fundamental (often forgotten or misunderstood) principles concerning skid resistance, which have been recognised for some time and are explained in detail in Austroads (2005):

- the results (measurements) from any skid resistance measurement device (e.g. SCRIM, GripTester, British Pendulum, RoAR) are only truly 'snap shots in time', i.e. the result only applies to the exact position on the road surface that the test wheel or slider has traversed, at the time and ambient conditions it was traversed, with the test device in its current state of calibration and maintenance.
- crashes where the road surface is the only true causation factor are (fortunately) extremely rare. Numbers of skidding related crashes on a road network are typically low and the contributory factors in such crashes are notoriously hard to identify with any great certainty. This often makes it hard for a road authority to define or describe a 'local skid resistance site' in terms of its geometry, operating characteristics etc. from crash data alone, with local knowledge and observation becoming increasingly important in that regard.

LOCAL EXPERIENCE AS A VITAL FINE TUNING TOOL

(The presentation that accompanies this paper will provide real life case studies to illustrate the discussion points and opinions provided in this section)

The author's warning for highway management strategy and policy makers is to ignore the considerable technical knowledge and experience of local area (field or regional) staff at your peril.

The technical knowledge typically gained through involving such people has been found to be invaluable in determining whether a proposed strategy or policy developed using data analysis (and with due regard to best practice guidance) will ultimately be beneficial and consistently and demonstrably achievable within available resources.

Active consultation and involvement in strategy / policy development stage (often as part of carefully selected working group), and due consideration in dissemination (roll out) and training, are also likely to pay dividend with respect to the level of buy-in and ultimately, whether the strategy or policy 'flies' or becomes a failure. There are too many examples of strategy and policy documentation sitting on a shelf gathering dust and the road authority having an increased level of vulnerability resulting from not knowing whether a strategy or policy set at head office has been implemented in part, or even worse still, not implemented at all.

The author has also found that where an active dialogue is taking place between head office and regional offices, regional staff tend to be more understanding of the strategic framework and higher level objectives that the authority has to achieve and that regional performance contributes towards, and vice versa, i.e. head office staff can become much more aware of, and sympathetic to, the very real day to day challenges of managing and maintaining a local road network, often with limited resources.

The author has assisted a number of national and state road authorities in raising their staff's awareness of skid resistance principles and issues and in the development of a realistic, fit for purpose, local management strategy. Taking into account the findings and opinions expressed within this section of this paper, the following standard process is typically adopted:

- commissioning and delivery of a knowledge transfer workshop covering the key principles of skid resistance and surface texture, followed by a workshop identifying pertinent local issues and introducing the Austroads approach to developing a local management strategy
- road authority identifies a working group consisting of carefully identified / selected head office and regional staff
- working group collates and provides background documentation and data in response to a standard listing of items provided
- fact finding meetings are conducted across a range of management and operational staff (at head office and regional offices) to identify any pertinent issues and assess whether current documented strategies and policies are actually being implemented in practice

- diagnosis – the undertaking of a gap analysis against Austroads guidance and other best practice, followed by the development of an action plan (identifying medium and long-term actions) and draft local strategy to then be fine tuned through comment rounds
- completion of strategy to be rolled out
- dissemination / roll out workshops across the road authority
- 6 or 12 month "health check" to determine the impact of the new strategy and progress against the action plan.

CONCLUSIONS

Developing an effective skid resistance strategy that recognises and is responsive to local network issues; has due regard to good and best practice; is demonstrable; and is consistently achievable and within local resource levels is a considerable undertaking.

In the development of any highway management related strategy or policy it is always useful to have operational, performance and network condition data to help lead and inform the process.

However, experience shows that data should not be seen as the be all and end all, and needs to be used with forethought and care. Actively engaging and securing local network knowledge and experience is strongly recommended to help supplement and fine tune the strategy or policy developed to ensure that it is effective as it can be, as well as helping to secure buy-in and longevity.

Experience shows that in the development of a skid resistance management strategy it really is a case of 'data led, experience tuned'.

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AUTHOR BIOGRAPHY

Paul Hillier is ARRB Group's National Technical Leader in Incident Investigation and Strategic Reviews. He has some 21 years experience in road safety and highway management and maintenance fields. He has been with ARRB for 6 years, and prior to that gained experience with TRL (in both Australia and UK) and a large UK road authority. He is experienced in investigating and reporting upon highway provision and maintenance related legal cases, and has led or been part of a number of recent Austroads projects on skid resistance. He has assisted a number of road authorities in Australia and overseas with the development of strategy and practice in this technical area. Paul has presented, & had papers published, on highway management, skid resistance & risk related (legal liability) issues throughout the world & regularly provides training in these fields.

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