Maintaining cycling facilities

Purpose

This note assists local government planners, engineers and their consultants to establish and operate an appropriate maintenance program for bicycle facilities.

Introduction

The maintenance of cycling facilities is a crucial element to improving and maintaining facility patronage. It may also be a tool to reduce the risk of potential legal cases being brought against a public authority held liable in litigation due to negligence.

While it is important to have well developed and documented maintenance audit and assessment programs, it is essential not to lose sight of the fact that proactive maintenance programs are more effective than reactive ones. The use of the Cycle Note A1 -*Total quality management for cycling* is recommended to establish an optimal maintenance identification and management program.

The following discussion lays out the need for maintenance monitoring and possible risk assessment methods.

Aim

This series of notes aims to assist planners and engineers to provide for cycling in their local area.

The Cycle Notes should be read in conjunction with:

- Guide to Traffic Engineering Practice, Part 14 – Bicycles (Austroads, 1999)
- Queensland Manual of Uniform Traffic Control Devices, Part 9 Bicycle Facilities
- Road Planning and Design Manual (Queensland Department of Main Roads).

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Legal issues

Recent legal cases highlight the need for local authorities to be forthright in their approach to hazard identification and assessment in relation to public infrastructure.

The latest rulings adopt the commonsense approach that pedestrians are expected to exercise sufficient care. However, the courts have not diminished responsibility on the part of the local or road authority in relation to maintenance. In fact, these authorities now have a heightened duty of care to the general public. They need to ensure inspections of the road network are conducted, including all elements of the road reserve (i.e. footpaths, bike paths, carriageways etc).

The critical issue is how the authority identifies, assesses and prioritises the works required in relation to maintaining its public infrastructure (including footpaths and bicycle facilities).

A risk assessment system uses identification of hazards (either by the public or by employees), assesses the risk, costs the works and prioritises them within the authority's own program. This would be considered reasonable and responsible. However, it does not guarantee immunity from liability.

Objectives of a good maintenance program

There are a number of objectives for good maintenance of bicycle infrastructure. They include:

- ensuring the bicycle facility is located to maximise passive security opportunities, thereby reducing the need for fixed security monitoring
- maximising the investment made in an existing asset (e.g. maximum value for money, maximise use and life of facility)
- ensuring that passive security is not compromised (e.g. pruning vegetation to maintain sightlines)

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- increasing bike use through visibility to the general and motoring public of a well-maintained, accessible and convenient mode of travel
- possible reduction in the effect and likelihood of crashes or incidents that result in injuries on the bicycle facility.

Risk assessment

A risk assessment program (or bicycle facility audit program) should contain the following elements to ensure compliance not only with established procedures, but also to prove that an appropriate maintenance program was in place should there be an incident that brings about legal action in the tort of negligence. These elements include:

1. Regular monitoring of bicycle facilities to determine the volumes of bicycles using the facility. This could be achieved through the use of manual counts, temporary tube counters or permanent detector loops in the pavement of the facility.
2. A regular recorded program of bicycle facilities auditing (results of these audits should be documented). This program should conform to the requirements listed in Appendix A of *Road Safety Audit 2nd Edition*, Austroads (2002). As a minimum, it should address the list of issues described in the proceeding section.
3. A system that allows the community to report hazards to authority staff, traces where the information is recorded and has the hazard investigated as part of the regular auditing of bicycle facilities, (most authorities have such systems in place in relation to road maintenance).
4. Assessment of the problems identified from the audit. This involves a series of steps that include:
   - assessment of the probability that an identified problem will cause an injury and/or does not comply with relevant design standards
   - costing of remedial works
   - inclusion within the budgeted maintenance program based on a prioritisation of works.

   A suggested approach for prioritisation of problems identified in the audit is as follows:
   - assessment of the likely effect that the issue will cause using the rank system as proposed in Table 1
   - assessment of the probability of that effect occurring based on the volumes of cyclists using certain parts of the facility in question (as proposed in Table 2)
   - multiply the effect rank value by the probability rank value to obtain a weighting of the risk for each identified issue requiring maintenance attendance
   - for each item determine whether it would be covered under routine maintenance (e.g. mowing, edge trimming or crack sealing) or if it should be covered under a small project (e.g. bridge deck replacement or balustrade replacement etc). Use the listing from Table 3 to determine the rank maintenance value for the proposed treatment mechanism
   - multiply the risk weighting from the third procedure by the rank maintenance value from Table 3 to give a priority ranking
   - based on the priority ranking score determine what projects should be addressed (first under special maintenance and then routine maintenance).
5. Program the works based on resources (time, money, personnel) documenting the basis on which the prioritisation was made.

Table 1: Effect impact rank

Effect	Rank effect value
Negligible	1
Rough ride	2
Loss of control of bicycle	3

Table 2: Probability impact rank

Probability of event occurring	Rank probability value
Low	1
Medium	2
High	3

Table 3: Maintenance implementation rank

Style of maintenance required	Rank maintenance value
No maintenance - monitor	1
Regular maintenance	2
Special maintenance program	3

Items/hazards to be addressed during an audit/risk assessment

The following items or hazards should be addressed as a minimum during an audit and risk assessment process:

- **Bike lanes on roadways**
  - surface smoothness, particularly in relation to the tolerances (see Table 4)
  - any level difference between the road pavement surface, gutter channels and gully pits, access covers etc
  - amount of refuse and debris deposited by general traffic (e.g. oil, stones, rubber etc). The amount of debris present (excluding oil) can be minimised by regular street sweeping
  - spills from trucks or other vehicles (e.g. concrete, fill, paint etc)
  - pavement condition adjacent to any rail crossings
  - configuration and condition of pavement markings
  - configuration and condition of signage
  - any gaps between gully pits/access covers and bike lanes (placing reinforced concrete collars around gully pits/access covers can rectify this)
  - grates on gully pits and drainways should be cycle-friendly
  - condition of road markings for bike lanes, particularly thermoplastic line markings for visibility at night.
- **Bike paths**
  - identification of cracks that will require filling
  - surface flows across the path may cause aquaplaning and/or deposit debris
  - off-road cycle facilities, surface smoothness, particularly in relation to the tolerances given in Table 4
  - identification of path displacements that produce hazards at joints
  - identification of grass/vegetation intrusion onto the path or that intrudes on the operating envelope of the facility (i.e. trim overhanging vegetation)
  - identification of debris or refuse close to or on the path
  - configuration and condition of pavement markings
  - configuration and condition of signage
  - adequate sight distances around vegetation along the paths. Vegetation may need to be trimmed to ensure sight distances are maintained
  - identification of areas where there are problems with drainage across the path. Good drainage is essential to reduce the likelihood and impact of inundation during rain events
  - identification of potential obstacles on or near a bicycle path (e.g. bollards or poles).
- **Timber bridges**
  - identify where there are gaps between any longitudinal planks and fill the gaps. Also consider an asphalt overlay over the deck for 1.0m at either end of the bridge
  - identify those bridges which are located in wet/shady areas and apply a non-slip finish to these surfaces
  - apply non-slip surface treatments on those bridges located in wet or shady environments.

- **Other considerations**
  - provision for bicycles at roadworks – delineation firstly in accordance with the *Manual of Uniform Traffic Control Devices (MUTCD)* and secondly, Appendix B, *Guide to Traffic Engineering Practice Part 14* (Austroads, 1999)
  - it is desirable in low speed environments (i.e. 60 km/h speed limit) for asphalt to be a 10mm nominal stone mix or less. Similarly, if a spay seal surface is used in low speed environments, a maximum stone chip size of 7mm is desirable. In high speed environments, greater sizes may be required.

Table 4: Tolerances (Source: Table 8.1 *Austroads Guide to Traffic Engineering Practice, Part 14)*

Situation (excluding tacile ground surface indicators)	Not to exceed	
	Width of groove (mm)	Height of step (mm)
Parallel to the direction of travel	12	10
Perpendicular to the direction of travel	-	20
Diagonal to the direction of travel	12	10

For more information on hazards to be addressed during an audit/risk assessment, see Cycle Note B1 – *Cycle audit and review.*

A generic guide for managing risk is provided in the AS/NZS 4360:2004 *Risk Management Standard*.

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Phone: (07) 3253 4437
Fax: (07) 3253 5858
Email: cycles@transport.qld.gov.au
Website: www.transport.qld.gov.au/cycling

Postal Address
PO Box 673
Fortitude Valley Q 4006

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