Engineering Policy 177

Managing the risk of objects thrown from overpasses onto roads

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1 Context

There have been a number of incidents reported in recent years where objects have been deliberately thrown or dropped from overpasses (and other overhead structures) in Queensland onto vehicles passing below. Evidence suggests these incidents are rare, but when they do occur they have the potential to result in serious outcomes. Incidents have caused serious injuries and death to motorists in some other jurisdictions.

Road infrastructure improvements through the planning, design, operation and maintenance of individual structures on or over a state-controlled road can contribute to managing this risk across the entire road network.

The types of structures involved with these incidents include grade-separated roads (with and without pedestrian footway facilities) and dedicated pedestrian footbridges. Embankments and retaining walls may also pose a risk and should be considered in a similar context.

Other incidents with potentially similar outcomes at these locations are considered 'self-harm.' This can pose a risk to other road users below the overpass and can also be mitigated through the use of protection screens (see AS 5100.1 *Bridge Design, Part 1: Scope and general principles* for a definition of and guidance on protection screens).

Within the broad objectives of Transport and Main Roads, this engineering policy considers the potential impact on the safety of all road users during these incidents (the risk) and sets out a methodology for managing the risk. For existing overpasses, a risk assessment methodology is the basis for identifying priority sites for development of countermeasure proposals.

For the planning and design of new overpasses, the risk can be proactively managed by specifying protection screens. They are the most effective infrastructure measure to managing the risk.

This engineering policy should be read in conjunction with the Transport and Main Roads technical guideline, *Treatment of overpass structures – objects thrown or dropped*[1].

2 Objective

Transport and Main Roads takes a risk management approach to assessing and prioritising measures to reduce, and eliminate where possible, the safety risk associated with objects thrown from overpass structures onto road users below. This will contribute to a safer state-controlled road network for all Queenslanders while, at the same time, ensuring funds are used in a cost-effective way.

Protection screens are the most effective infrastructure treatment to mitigate the risk. However, this is usually significantly more expensive than other treatments and can impact the everyday experience for day-to-day users. Where the cost of installing protection screens on an existing overpass is prohibitive, Transport and Main Roads shall consider other lower cost measures that partially reduce the risk so that it does not remain untreated. And they should be carefully designed to minimise any negative impacts.

Generally, it is preferable to incorporate protection screens on a new overpass than to retrofit later. This is a proactive approach to risk management and usually delivers better value for money.

A relatively high level of interest that individual incidents sometimes receive from the community is a feature of this risk. This is despite the risk being very small when compared to other road safety risks (roadside hazards or filter right turns, for example) at a network level. To illustrate, in a recent investigation[2] into this risk by the Australian Road Research Board, no record of injuries resulting from objects thrown from overpasses in the last five years could be found in Queensland crash reports. The only evidence available of any incidents occurring is from media reports, and these resulted in no or very minor injuries. However, deaths have resulted from this type of incident in other countries, so every incident has the potential for extremely severe consequences.

Community interest may lead to expectations of investment in infrastructure improvements that cannot be justified on a value-for-money basis. In this instance, the appropriate action is likely to be minor, low-cost infrastructure improvements and/or providing information to the community to encourage improvements in behaviour and greater understanding of the issue.

3 Policy statement

The purpose of this engineering policy is to assess and manage the risk effectively and consistently across the state-controlled road network.

A deliberate act of throwing projectiles from an overpass onto high-speed traffic below has the potential to cause serious injury or death. Some sites will be riskier than others and provide the greatest opportunities to reduce the risk associated with these incidents. This engineering policy sets out how the risk should be assessed at individual sites and across the network to inform the development of proposed infrastructure improvements for funding consideration.

4 Scope

4.1 Pre-amble

This engineering policy aims to manage road design, construction and operation activities that reduce the safety risk associated with objects being thrown or dropped onto road users passing below. It considers both the management of existing overpasses and the design of proposed and new overpasses. The technical guidelines associated with this policy shall be used to guide these activities.

This engineering policy applies to overpasses that carry:

- a state-controlled road over a public road, busway or railway, or
- a road, footpath or cycle path over a state-controlled road.

This engineering policy does not apply to overpasses that:

- carry local roads over local roads (these are the responsibility of the local council), or
- carry railway lines (it is the rail company's responsibility to manage access and safety relating to these structures), or
- span pedestrian footpaths, cycle paths and waterways.

Managing the risk of self-harm at road overpasses is covered by this policy but is limited to the sites specified and the treatments specified in this policy and the supporting technical guidelines. This is because this policy is primarily about the throwing or dropping of objects onto traffic, but there may be an opportunity to include self-harm incidents in the assessment and treatment of a site.

This policy and the associated guidelines are not applicable where the primary objective is to manage the risk of self-harm; a risk assessment and treatment options should be considered on a case-by-case basis with due engineering judgement applied.

4.2 Existing Overpasses

Transport and Main Roads (Program Delivery and Operations) shall assess the risk at each existing overpass using the risk methodology described in the technical guidelines.

An existing overpass shall be assessed:

- following a report of a throwing incident, or
- following a report of a self-harm incident, or
- following a change to infrastructure, land use or conditions at or near the site that may significantly increase the risk level (see the technical guidelines), and in any case
- no more than four years after the date of the last assessment.

Transport and Main Roads (Program Delivery and Operations) shall keep an up-to-date list of overpasses, prioritised by their relative risk scores.

Transport and Main Roads (Program Delivery and Operations) shall investigate the existing overpasses with the higher risk scores to identify opportunities to reduce the risk. Where risk can be reduced through stewardship and capability activities, this shall be programmed. Where specific funding is required, Transport and Main Roads (Targeted Road Safety Program) shall consider funding risk-reduction proposals, noting that these proposals will have to compete for funding with other project proposals through existing funding processes.

4.3 New Overpasses

Planning and design of road infrastructure projects that include new overpasses as defined in Clause 4.1 shall include a risk assessment to inform the department’s project customer's decision on whether protection screens should be in or out of scope. As an absolute minimum, every new overpass shall be constructed so that protection screens can be installed in the future with no modifications needed to existing infrastructure.

4.4 Consultation and Engagement

When requested, TMR shall provide stakeholders with the available evidence-based information on the relative risk present at overpasses and any activities undertaken to manage and reduce the risk.

Transport and Main Roads (Customer Service Branch) shall provide support where appropriate to other agencies (Queensland Police Service or local councils for example) that undertake education and enforcement activities to manage and/or reduce the risk.

4.5 Out of Scope

Any other risks associated with the presence or use of overpasses is not covered by this engineering policy.

This engineering policy does not cover the legal and statutory responsibilities of other agencies, such as the Queensland Police Service's role in dealing with crime, other than acknowledgement that Transport and Main Roads shall provide support to these agencies as appropriate.

Managing the risk of self-harm at other structures, such as bridges over waterways.

5 Benefits

Implementation of this engineering policy will result in a better understanding of the relative risk at each existing overpass so that sites can be prioritised for investigation and treatment. There will be an improvement in safety at individual sites that are treated and at the network level as more sites are treated.

The number of existing sites that will be treated, and the types of treatment implemented, are likely to be limited by the funding available. The Targeted Road Safety Program (TRSP) is the most likely source of funding, through Road Safety Minor Works (district/ region discretionary allocations), Safer Roads Sooner (nomination process for central funding) or Targeted Safety Interventions sub-programs. However, the TRSP program management protocols[3] require that funding is allocated so that the program benefits (reduced serious injuries and deaths from road crashes) are maximised. Funding of overpass treatments could be limited by the relatively low value (this type of incident is very rare) when compared to other road safety proposals.

The most effective treatment is to install protection screens on the sides of an overpass to prevent objects being thrown onto the road below. These screens are relatively expensive to retrofit to an existing overpass, particularly when structural modifications are needed to support the weight of the new screens. Incorporating protection screens into the design and construction of a new overpass is preferable as the additional cost at this stage is generally lower than a later retrofit. All work associated with a new overpass shall be funded by the capital program funding the project. Including protection screens on new overpasses delivers road safety improvements, reduces whole of life costs and results in more TRSP funding being available for other road safety proposals.

6 Review

This engineering policy will be reviewed every five years by the Director (Safer Roads).

7 References

1. *Treatment of overhead structures – objects thrown or dropped,* Transport and Main Roads.
2. *Overpass Safety: Review of Guidelines and Assessment and Prioritisation of Existing Overpasses,* Australian Road Research Board ARRB) 2021.
3. *Program Management Documents,* Targeted Road Safety Program, Transport and Main Roads.