THE IRAP ROAD SAFETY TOOLKIT – A WEBSITE-BASED APPROACH TO ADDRESSING ROAD SAFETY PROBLEMS

Blair TURNER
Principal Research Scientist, Safe Systems Division
ARRB Group Ltd
500 Burwood Highway, Vermont South, Victoria 3133, Australia
blair.turner@arrb.com.au

Greg SMITH
Project and Communications Manager, iRAP
PO Box 4041, Canberra ACT 2603, Australia
greg.smith@irap.net

ABSTRACT

The World Report on Traffic Injury Prevention (issued jointly by the World Health Organisation and the World Bank) drew attention to the urgent need for action to reduce road traffic injuries globally. Its key conclusion was that, in order to achieve safer roads, a ‘Safe System’ approach was needed. This means that a road system should be designed to accommodate, and compensate for, human vulnerability and frailty. An essential element of the Safe Systems approach is accurate and accessible information on the causes of crashes and possible solutions to the identified road safety problems.

This paper presents an overview of the Road Safety Toolkit, which was developed by ARRB for iRAP (the International Road Assessment Programme) in association with the Global Transport Knowledge Partnership (gTKP). It is a free on-line tool that is designed to assist in the analysis of crashes, or issues relating to specific road user groups, and in the selecting of the most appropriate road safety engineering treatments. Where appropriate, the Toolkit also identifies non-engineering solutions, such as enforcement and road user education programs. Plans for future refinements in the Toolkit are also discussed.

1. INTRODUCTION

Worldwide, deaths and injuries from road traffic crashes are a major and growing public health epidemic. Each year, 1.3 million people die and up to 50 million are injured or permanently disabled in road crashes [1]. This equates to over 3,000 deaths per day. For developing countries, where almost nine out of ten road deaths and injuries occur, road trauma represents a serious and rapidly worsening public health crisis with road traffic injuries expected to increase substantially by 2020 unless some form of action is taken [2].

In addition to the human cost of bereavement, research shows that road crashes are often the factor responsible for tipping a household into financial distress. The loss of a breadwinner due to death or disability can be disastrous, leading to lower living standards and poverty [2].

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The Safe System approach (see for example [3]) provides a holistic view of the combined factors involved in road safety. The approach acknowledges that road users are likely to make errors. It also recognises that there is a limit to the physical forces that can be withstood by road users (for instance during the rapid deceleration experienced during a crash). The Safe System approach seeks to protect responsible road users from death and serious injury by taking human error and frailty into account. It requires that roads need to be designed in a way that prevents crashes from occurring, or that in the event of a crash, that serious and fatal outcomes do not result. The Safe System approach also encourages a better understanding of the interaction between the key elements of the road system: road users, vehicles, roads and roadsides, and travel speeds.

In order to achieve Safe System outcomes, better knowledge is required by those involved in road infrastructure management and delivery of road safety programs. iRAP, the International Road Assessment Program, recognises the difficulties faced by those involved in delivering safety in low-income and middle-income countries. iRAP has been active in raising the profile of road safety in these countries, by identifying high risk locations and in providing effective road safety engineering based solutions. iRAP is active in more than 50 countries and more than 300,000km have now been assessed by Road Assessment Programmes. For further information on iRAP see [3] and www.irap.org.

It was recognised by iRAP that in order to deliver effective road safety outcomes to low-income and middle-income countries, an information tool is required. Together with ARRB Group and gTKP (the Global Transport Knowledge Partnership), a Road Safety Toolkit has been developed by iRAP to meet this objective.

2. THE iRAP ROAD SAFETY TOOLKIT

The Road Safety Toolkit is a free website (www.irap.net/toolkit) that provides information on measures that can be taken to improve safety on the road. It is designed to assist in providing solutions to specific types of crashes, or in response to collisions involving specific road user groups. The title screen for the toolkit can be seen in Figure 1.

Figure 1. Title screen from Road Safety Toolkit
The Toolkit allows users to search for information on specific types of crashes, or road users using the search screen (see Figure 2). If users are already aware of possible treatments that might be used, they can also select these directly from this same screen.

Crash types have been grouped into the following major categories:

- head-on
- intersections
- lane change
- manoeuvring
- rear end
- run off road
- vehicle – cyclist
- vehicle – pedestrian.

Safety issues relating to the following road user groups can also be selected:

- car occupants
- cyclists
- heavy vehicles
- motorcyclists
- pedestrians
- public transport vehicles.

When a crash type or road user type is selected, information is displayed about that specific issue (see Figure 3). This information includes details about the major causes of that crash type as well as the types of treatments that can be used to address that problem.

Currently, the Road Safety Toolkit includes detailed information about the road engineering measures that might be used to address the problem. These correspond with the countermeasures used in iRAP projects (see [4] for more information). Links to further information for non-engineering measures is also provided (e.g. enforcement, education, publicity).
Each engineering measure that could be used to treat that crash type is listed in order from lowest cost to highest cost. Information is also provided on the expected effectiveness in terms of crash reduction (i.e. the expected percentage reduction in casualty crashes). This information is based on an extensive review of research by Austroads [5].

From the available list, users are able to select specific road engineering treatments. A full list of currently available treatments is provided in Table 1, while Figure 4 provides an example of a treatment page (pedestrian refuge islands).

Table 1. Current Road Safety Engineering Treatments in Toolkit

| Additional lane (includes overtaking lane) | Pedestrian refuge island |
| Bicycle facilities (on- and off-road) | Pedestrian crossing – unsignalised |
| Central hatching | Pedestrian crossing – signalised |
| Central turning lane full length | Pedestrian footpath |
| Delineation | Railway crossing |
| Duplication | Realignment – horizontal |
| Intersection – delineation | Realignment – vertical |
| Intersection – grade separation | Regulate roadside commercial activity |
| Intersection – right turn lanes (signalised) | Restrict/combine direct access points |
| Intersection – right turn lanes (unsignalised) | Road surface upgrade |
| Intersection – roundabout | Roadside safety – barriers |
| Intersection – signalise | Roadside safety – hazard removal |
| Lane widening | Rumble strip / flexi-post |
| Median barrier | Service road |
| Motorcycle lanes | Shoulder treatment |
| One way network | Speed management |
| Parking improvements | Traffic calming |
| Pedestrian crossing – grade separation | |

![Figure 4. Information on pedestrian refuge islands](image-url)
Each treatment page describes the treatment, including information on the benefits of that treatment and any implementation issues. A summary is provided on the cost of the treatment, the treatment life (i.e. how long the treatment can be expected to continue providing a safety benefit before it will need to be renewed), and its effectiveness in terms of casualty reduction. Photos are provided showing examples of the treatment (see Figure 5), and links provided so that more detailed information can be obtained from external technical sources and manuals.

Data underpinning the Toolkit is derived from numerous sources:

- Information on crash reduction factors is primarily based on extensive research by Austroads [5], but also supplemented by other robust research, including the Handbook of Road Safety Measures [6] and Safer Roads: A Guide to Road Safety Engineering [7].

- Extensive use has been made of various manuals, including:
  - Towards Safer Roads [8]
  - The Austroads series of Guides [9]

3. FUTURE DEVELOPMENTS

To date, the Road Safety Toolkit has been accessed by practitioners in more than 90 countries. It is hoped that with further refinement and additional promotion, the website will be accessed by an even greater number of users.

The information currently provided in the Toolkit is focused on road engineering based solutions although, where appropriate, the Toolkit also identifies non-engineering solutions (such as enforcement and road user education programs). In line with the holistic Safe System approach, the website will soon be enhanced to provide detailed information on road safety solutions relating to people, vehicles and roads, in the context of travel speeds. It is also hoped to include material on a broader range of issues, for example road safety management and data systems.

The Toolkit currently has provision for the submission of case studies. This feature has not been well utilised to date, and so future efforts will be made to provide case studies of relevance to low and middle income country users. Given that a great proportion of the world’s population does not speak English, it is also hoped to provide translations into other languages.
4. SUMMARY

The Road Safety Toolkit has been developed to provide comprehensive, accessible information on road safety treatments to practitioners. It is a free web-based tool that acts as a source of information on ways to improve safety specifically in developing and middle income countries. It is a ‘living’ document that can be easily updated in light of new treatments and methods, or to broaden the range of issues covered. Future improvements are planned for the website, and it is hoped that these, combined with increases promotion will see an increase in the usage of this important resource.

REFERENCES