Safe System for Universities

Module 2 Project

Identifying and managing risk in a road transportation system

Revision	Date	By	Revisions
1.0	01 Jul 2020	C Stokes	First release

Introduction:

Safety risk is an everyday part of our lives. In many situations in our personal lives, we intuitively deal with risk. In an organisational structure, such as in the engineering industry, risk can be more complex, owing to the nature of the risk and the number of stakeholders involved, and requires a structured approach to its management. In the project for Module 1, we looked at risk associated with everyday activities. In this project for Module 2, you will learn to apply risk tools to identify and manage risks associated with the road transportation system, from the perspective of a system manager.

Instructions:

Students should undertake this project while reviewing Module 2 of Safe System for Universities. This project can be undertaken individually or in small groups.

Select a typical mode of harm that occurs within the road transportation system. Three typical modes of harm are:

- Harm from lane departure crashes
- Harm from crashes at intersections
- Harm to vulnerable road users (e.g. pedestrians or cyclists)

These three modes of harm are covered in detail in the Austroads *Towards Safe System Infrastructure* report[1]. You may choose one of these modes, or any other for which you can find a detailed description of failure modes.

Steps:

1. For your selected mode of harm, list the stakeholders that are involved in the activity. Make sure to differentiate between managers and users.

   Tips: Managers are those who oversee the activity and its outcomes, but are generally not involved in the activity itself. Users are those who undertake the activity, and who run the risk of personal harm through the activity. Examples of managers and users could be teachers and students; company managers and company employees; or road designers and road users.

[1] https://austroads.com.au/publications/road-safety/ap-r560-18

2. For your selected mode of harm, consider the events that could lead from normal road use, to a failure that causes harm. List under each event the steps that would need to occur for harm to result.

   Tips: An event could be when a car drifts over the centreline of a road and into the oncoming traffic lane, or when a pedestrian steps from the footpath to cross a road. A failure that causes harm could be when two cars collide head-on, or when a pedestrian is struck by a vehicle.

3. For you selected mode of harm, deconstruct the risk into the three base elements of risk: exposure, likelihood and severity.

   Tips: Each mode of harm will incorporate each of the three elements of risk. Identifying these will make it easier to identify treatments that can either prevent failure from occurring, or mitigate the effects of failure so that harm does not result. As an example, a head-on crash involves the elements of exposure (e.g. exposure to oncoming traffic), likelihood (e.g. likelihood that the driver will drift into the oncoming lane), and severity (e.g. speed of the impact between oncoming vehicles).

4. For each step in the mode of harm, identify, by using Reason's model of failure trajectory, the barriers to failure and harm and where gaps could occur in each barrier.

   Tips: There are five barriers in Reason's model of risk trajectory, which are explained in Snippet 3. When undertaking this step in the project, it could help to draw out the model of failure trajectory and list barriers to failure and associated gaps below each barrier. An example of the barriers to failure and associated gaps for falling while travelling on a bus could be: the fleet purchasing policies of the bus company, and whether to buy buses that have more seating and less standing room (system decision makers barrier); the capability of the bus driver to safely operate the bus and not undertake sudden stops (preconditions barrier); and the safety equipment in the bus to help protect passengers from falling in a sudden stop, such as seats, seatbelts, and handles for those people who are standing (defences).

5. For each step in the activity, develop, using the Hierarchy of Controls, controls that can be used to reduce the risk of failure.

   Tips: There are five levels to Hierarchy of Controls, which is explained in Snippet 4. Controls are ranked in order of preference, based on their effectiveness to successfully protect people from harm. For our example of walking to the bus stop, controls to prevent or mitigate harm from being hit by a car could be: working at home instead of travelling to work (exposure); finding a safer mode of travel to work (substitution); installing physical barriers to prevent interactions with cars (engineering controls); travelling to work when there are less cars on the road (administrative controls); or wearing high-visibility clothing to make yourself more visible to car drivers (PPE).