The Safe System in Practice – a sector-wide training programme

Climo, H. Dugdale, M. Rossiter, L.

New Zealand Transport Agency

Abstract

Safer Journeys, New Zealand's road safety strategy to 2020, adopted the Safe System approach. *The Safe System in Practice* training course was designed in 2011-12 to improve understanding of the approach, and build the skills, confidence and relationships across the sector to implement it.

The course, aimed at planners, engineers, roading operations and maintenance managers, educators, enforcers, and other system designers who influence road safety, outlines the Safe System approach and principles, and best practice treatments to strengthen every element of the system. The cross-disciplinary content is developed and presented by experts and is reinforced by an action learning approach using New Zealand case studies that are worked on by small groups.

In the first 12 months the course has been delivered to more than 500 people, and initial evaluations show it has been extremely successful. The course designers aim to train 500 more over the next year. This intensive programme gives the sector the best chance of changing the road safety conversation, and developing a shared understanding of how to reduce deaths and serious injuries, in the shortest possible time.

The paper outlines the course design, results and lessons learned, with particular reference to how the course could be replicated elsewhere.

Keywords

Safe System, capability, training.

Introduction and context

Safer Journeys, New Zealand's road safety strategy to 2020, was published in 2010 and adopted the vision of "A safe road system increasingly free of death and serious injury" (Ministry of Transport, 2010, p.3). Adopting the Safe System approach, to create a more forgiving system that reduces the price paid for human error, was recognised and explained in the strategy as being a "a significant shift in the way we think about and manage road safety," from blaming the road user for causing a crash, to acknowledging that even responsible people sometimes make mistakes that result in crashes. (Ministry of Transport, 2010, p.10).

At the time of the strategy's launch, however, the Safe System vision, approach and principles were not well understood by many road safety professionals across the New Zealand road transport sector. Some believed it was an updated version of the "three Es", education, engineering and enforcement, which formed the basis of the previous *Road Safety Strategy to 2010.* (Ministry of Transport, 2009) and did not understand the level of ambition to reduce deaths and serious injuries in adopting the approach. There were cultural barriers too: existing organisational processes, systems and manuals required safety activities to address the causes

of *previous* crashes, rather than proactively identifying the highest risks and working across the entire system to reduce them and thus aim to reduce further crashes. Knowledge of the Safe System approach was not widespread enough to address these cultural barriers at the time. This was recognised in the first *Safer Journeys Action Plan 2011-12 (*Ministry of Transport*,* 2011, pp.7-8) and embedding the Safe System approach into New Zealand's general road safety culture and raising the capability to do this, became an important set of tasks or "workstream" in its own right in the action plan. Embedding the Safe System approach also became one of the New Zealand Transport Agency's five strategic priorities and provided the basis of its internal Road Safety Strategic Plan in 2011.

Most early effort within this workstream aimed to clarify, communicate and raise awareness of the approach, both within the Transport Agency and across the transport sector, through conversations, presentations and workshops. A consistent theme coming through in the early feedback was that staff across the road transport sector wanted to know more detail about what the approach meant in practice, and what they needed to do differently to apply the Safe System principles in their own roles. While they often understood their own part of the system well, and were willing to change, they did not know what they needed to change, what others were doing, and how to work together with sector partners to create a forgiving road system.

The *Safer Journeys* capability work to address these questions began in 2011. While the Safe System approach was already incorporated into existing training for engineers, the *Safe System in Practice* training programme was designed for a broader audience, and to create a widespread and rapid, rather than incremental, change in skills, knowledge and relationships across the sector – often described as a "step change".

Objectives

The training objectives are to increase road transport sector capability to apply the Safe System approach by developing, piloting and delivering a core training module for road transport professionals that will yield:

- an increase in knowledge about the approach and principles
- an understanding of all four pillars of the Safe System and how improvements in each can reduce the likelihood and improve the outcomes of crashes
- understanding and direction on how to practically apply it in their own role.

Broader benefits are also sought: to support the *Safer Journeys* goals of embedding the approach into the planning and delivery of road safety activity, a change to road safety communication within the sector and ultimately a change in road safety culture. The training is expected to enable the change in communication because, with a shared language and deeper understanding of the approach, people can communicate more confidently and consistently about creating a safe road system. (Ministry of Transport, 2011, p.6).

The expected long term benefits for road safety are that deaths and serious injuries on the roads will reduce because all factors influencing crash trauma are more likely to be identified and addressed at the analysis and planning phase and the most effective interventions will be chosen. Road safety planning and delivery should also become more integrated, eliminating duplication of effort and increasing efficiency. For a more detailed discussion of this thesis,

and the rationale and evidence for it, see chapter 5 of *Towards Zero* (OECD/International Transport Forum, 2008).

These are ambitious goals. The outcomes sought at different levels (individual learning, organisational/sector unity, cultural change, better road safety results) have influenced the way the programme has developed, the way it is designed and delivered, and the way it is evaluated.

Designing the training to achieve the outcomes

The method adopted to achieve these broad outcomes is to train the participants together in cross-functional groups within their own regions, and taking an action learning case study based approach using actual road safety issues (see below). This involves a two-day workshop comprising seven lecture-style presentations interspersed with small group work (five to seven people) on an assigned case study highlighting various road safety issues and requiring a Safe System problem solving approach.

The content is designed to be generic (aimed at multiple roles) rather than role specific, to support a whole-of-system road safety analysis and planning model, and contribute to building an understanding of the road safety system as a whole. As outlined below, it covers all elements of the system as defined in *Safer Journeys* (p.11): use, speed, roads and roadsides, and vehicles, and the interrelationships between them. It also links to existing New Zealand systems, such as Road Safety Action Planning, which involves local government, Police, Accident Compensation Corporation and Transport Agency representatives in planning and coordinating road safety initiatives at a regional level.

The training incorporates and showcases new and developing Safe System tools in New Zealand such as the *High Risk Rural Roads Guide* (New Zealand Transport Agency, 2011a) and *High Risk Intersection Guide* (New Zealand Transport Agency, 2013), and will continue to evolve as new tools are developed. All of these training design features increase the relevance of the training, and thus its effectiveness and the likelihood that it will later be applied on the job (Stone, 1995).

A concentrated programme to train at least 500 people in groups of about 50 over an 18-month period was initially proposed, to build momentum, provide opportunities for group learning, and so improve the chance of knowledge transfer back into the workplace. The methodology also builds on the model of training a large number of road safety professionals in a relatively short period of time employed in the Queensland Safe System Engineering Training (Harrison, Cruise, Edgar, and Dillies, 2011). A sustainable training programme that would be low cost for attendees was desired, but a programme of this scope and scale was outside the Transport Agency's capacity to develop internally. The Transport Agency entered into a contract with the New Zealand Institute of Highway Technology (NZIHT) to project manage the development of course materials and delivery, including logistics such as venues, enrolments and training administration. In turn NZIHT contracted Traffic Engineering Research New Zealand (TERNZ) to develop the training course content, the coursebook and provide training design expertise. TERNZ sought input from the University of Auckland education faculty to ensure the soundness of the educational approach.

In practice, TERNZ and appropriately qualified sector subject matter experts in the Transport Agency, the New Zealand Police and other National Road Safety Management Group

agencies worked in partnership to develop the course materials and to deliver the content. Using subject matter experts meant that the course was able to keep current with, and be a communication vehicle for, the rapidly expanding body of learning about the Safe System approach, and the tools being developed as part of the wider implementation of *Safer Journeys.*

A governance structure was established jointly with National Road Safety Management Group Agencies (Ministry of Transport, NZ Police Accident Compensation Corporation, Local Government New Zealand and Department of Labour). A communications plan was also developed to promote the availability of the course across the sector nationwide. The plan involved the use of existing networks and no commercial advertising was involved.

Learning outcomes

Learning outcomes (what participants should be able to do after the course) were developed early and carried through into how the programme was developed and is now evaluated.

The eight learning outcomes are that, after the training, participants should be able to:

1. understand and talk about the Safe System principles using real world examples
2. understand and talk about the "human factors" approach to error and the limits of human performance
3. understand and talk about what we are aiming to achieve in improving each area of the Safe System
4. understand and talk about interrelationships across the road system
5. have contributed to a group Safe System case study, identifying the contributions that all Safe System pillars make to reducing road trauma for a road safety issue
6. apply the above in their own role (i.e. identify roles and responsibilities across the sector and know who to work with and why)
7. identify effective road safety interventions across all pillars
8. report back on one change they have made in their own work (action learning approach).

A two-day course was proposed as being the minimum time required to achieve these.

Training needs analysis

The question was raised as to whether a single Safe System training course would meet the requirements of a range of organisations and roles. A training needs analysis (TNA) was therefore undertaken. The TNA identified which roles needed to complete the training, the desired levels of knowledge and skill, and the current levels of knowledge and skill by role. It also provided useful information about training gaps, broader training requirements useful for long term planning, and the extent to which a single course could meet them.

Across all organisations surveyed, a total of 95 roles were identified and it was estimated that approximately 1900 to 2000 staff worked in these roles across New Zealand. Two potential audiences for the training were identified:

- staff in roles that were able to effect change and drive the implementation of the Safe System approach within their organisation
- all staff that need to incorporate the Safe System approach in their day-to-day work.

The types of roles varied from senior to front line, ranging from transport planners, transport officers, road safety engineers, roading managers, road safety educators, road safety coordinators, Police and communications staff. Other roles that would benefit from the training were identified, including investment managers, asset managers, policy staff and maintenance contractors – anyone whose decisions impact on the forgivingness of the system by introducing hazards (for example roadside utility poles) or failing to maintain safety treatments such as rumble strips.

The TNA identified that the current levels of knowledge and skill were variable across these groups and that the greatest weakness was in identifying the most effective interventions across Safe System pillars, or even within a pillar. The TNA validated the need for the proposed course and the scale of the intervention. It also developed shared understanding across partner organisations about the course objectives and the roles that would benefit most from the training. It was recognised that the estimate of numbers could only be approximate. Nearly 18 months later, over 600 people have now been trained and demand is strong for a further 200 places in 2013 alone, indicating the scope and scale of the analysis was reasonable.

Course content

The curriculum is designed for personnel who have had some prior exposure to the Safe System approach and covers the following modules:

- Safe System overview
- human factors and the Safe System approach
- Safe System approach to speed
- Safe System approach to roads and roadsides
- Safe System approach to vehicles
- Safe System approach to safe use
- communicating the Safe System approach
- case study presentations
- bringing it all together – personal action plan
- Safe System data and information (reference material in course book)
- international context (reference material in course book).

The sessions are presented by experts with relevant qualifications and many years of experience in their fields, and linked together by a course facilitator who has a deep knowledge and passion for road safety. As the course has developed, been tested internally at the Transport Agency, and then piloted, other sessions have been trialed – for example, a session on the international context during the pilot phase. In early evaluations, the participants asked for more time on the case studies, and as a result the extended material on the international context is no longer covered through a presentation but is covered in the course book.

A feature of the curriculum is the early session on the human factors approach to error, which is carried through and applied in all sections. As Reason (2000) states:

> "The basic premise in the system approach is that humans are fallible and errors are to be expected, even in the best organisations. Errors are seen as consequences rather

> than causes, having their origins not so much in the perversity of human nature as in 'upstream' systemic factors."

Each module challenges road safety designers to recognise the upstream causes of human error that they can affect, and to reduce the probability of error through good design. For example, this can be done through inclusion of ergonomic thinking into vehicle design, speed management, road design, designing self-explaining roads, or understanding how business practices contribute to driver error. This emphasis on understanding the root causes of errors, and aiming to reduce them, is in addition to making the system more forgiving and, therefore, less likely to result in death or serious injury when errors do occur. The same thinking is carried through into the "Safer Use" session, which does not focus purely on education or enforcement, as might be expected, but on interventions to promote safer use designed around the psychology of driving and preventing different types of error, whether unintentional or intentional. (Theeuwes, van der Horst, Kuiken, 2012).

The "human factors" content has been developed by TERNZ, which has specific expertise in this discipline. The sections on strengthening the elements of the system (roads and roadsides, speed, vehicles and use) were developed by subject matter experts within the Transport Agency and NZ Police. They showcase and explain tools such as KiwiRAP, guides for improving safety for high rural roads, high risk intersections and motorcycling, *Safer Journeys* long term objectives for speed, ANCAP and Rightcar, and the evolving approaches to advertising, education, and enforcement.

The course concludes with a section on communicating the Safe System approach, recognising that many of the participants have important communication roles. This content is based on *Communicating the Safe System approach: A manual for system designers*, (New Zealand Transport Agency, 2011b) and includes both a suite of key messages relevant to different audiences and practical examples of how and where to deploy them to support the changed conversation about road safety.

Action learning - using the case study approach

Genuine engagement with the Safe System approach was desired, rather than an "information dump" that would have little lasting effect. The approach taken was to give participants the opportunity to apply the content to a set of case studies throughout the course.

The case study topics are representative of generic issues and include pedestrian and cyclist safety, mixed use urban arterials, a high risk peri-urban intersection, a high risk rural intersection, a high risk rural road, older drivers, overseas visitors, commercial operators and motorcyclists. After each presentation, participants work out how the new content applies to their case study, and how it could be applied to reduce error and make the system more forgiving for their assigned topic.

The case study approach uses action learning principles. Action learning evolved in the 1940s at Cambridge University where Professor R. Revans pioneered the approach of bringing together cross-disciplinary groups to work on difficult issues that could not be solved by each discipline working alone (Revans, 1982; Dilworth, 1998). Since then the approach has spread from the sciences to many different fields.

The case study component includes these specific features:

- The case study scenarios are real life New Zealand locations and road safety issues or exemplify areas of concern identified in *Safer Journeys*.
- Rich and complex information is provided (e.g. Crash Analysis System data, Traffic Crash Reports, maps, aerial photos, diagrams, engineering reports, relevant research summaries and media reports where relevant).
- Participants must use a collaborative, problem-solving approach based on the four principles of the Safe System and consider interventions under all four elements of the system.
- Realistic recommendations for the short, medium and long term must be developed and presented back in the plenary session on the final afternoon of the course.

Participation in the process therefore provides an experience of, and models how, the Safe System approach could and should work "back on the job". When participants are working on the case studies, levels of energy and commitment are very high, and this aspect is regarded as one of the success factors of the course. The following verbatim comments illustrate participant reactions:

> *"The case study kept my attention to each speaker. The team were highlighting key aspects of our case study as the speakers presented them. The case study was the highlight for me."* (Transport planner, city council)

> *"Was great to work as a team. Sometimes went off track and pulling the correct information from members to put presentation together was a struggle and very effective exercise."* (Community education team leader)

> *"Great for teambuilding - discipline understanding and negotiating positive outcomes."* (Transport Agency investment manager).

While the above comments reflect the preponderance of opinion, some participants did find the process frustrating and would have preferred more time on presentations. As the course has evolved, minor changes have been made to improve the guidelines and templates for the groups, as well as increasing the number of case studies and diversity of scenarios. The currency of the case studies also needs to be maintained. This will be achieved through annual review and updating as needed.

Testing, piloting and delivery

Draft course content was initially tested by way of a "dummy run" on a group of 15 participants (Transport Agency staff, Police and local government representatives) in July 2012, which gave the designers a chance to refine the content and the case studies. This was followed by the pilot programme of four courses delivered to a further 203 people in groups of approximately 50 in Wellington, Auckland, Christchurch and Rotorua late in 2012. Across the four courses, attendees comprised 78 from local government (38%), 62 from the Transport Agency (31%), 52 from Police (26%) and 11 from the Ministry of Transport and ACC (5%).

In 2013 the content has been further improved following the evaluations from the pilot, and the number of participants on each course expanded to around 60 to meet high demand. In 2013 ten courses have been scheduled nationwide: Auckland (twice), Palmerston North,

Christchurch, Hamilton, Wellington (twice), Tauranga, Dunedin, and Napier. The cohort of presenters has also been expanded to provide for future needs.

Results

The evaluation process has been constant, and comprises formal course evaluations against the eight learning objectives (see page 4), post-course evaluations of whether the course learnings are being applied three months later, and "lessons learned" sessions involving the presenters, facilitators and course designers.

The 2012 pilot results – learning outcomes

Participants in the four pilot courses were asked at the end of the course whether the eight learning outcomes (specified on page 4) had been met, according to the scale in figure 1.

Ratings for learning outcomes	
Unable to meet this learning outcomes	1
Able to meet a few aspects of this learning outcomes	2
Able to partially meet this learning outcomes	3
Able to meet most aspects of this learning outcomes	4
Able to meet all aspects of this learning outcomes	5

Figure 1: *Learning outcome rating scale*

Most participants reported that the learning outcomes were fully or mostly achieved, with the mean outcome score at 4.20 and a standard deviation of 0.7.

How people rated the pilot course

Ratings are also important because the enjoyment and attractiveness of a course influences learning (Warr and Bunce, 1995), (Stone, 1995). The most frequent rating was "excellent", and all save one rated it good or better. The ratings of excellent or very good were slightly more likely to come from the target audience and this was reinforced in the comments.

This course was aimed at people who had a little prior exposure to the Safe System approach and the main predictor of success during the pilot was the knowledge the person brought in at the start. Participants were asked about their prior knowledge at the start of the course. Those few who came in knowing "very little" (nine people) gained a partial but not full understanding of the approach. Those who came in with some knowledge were more likely to rate the course as excellent and generally became very confident that they could apply the approach in their own role. This is shown in Figure 2 below.

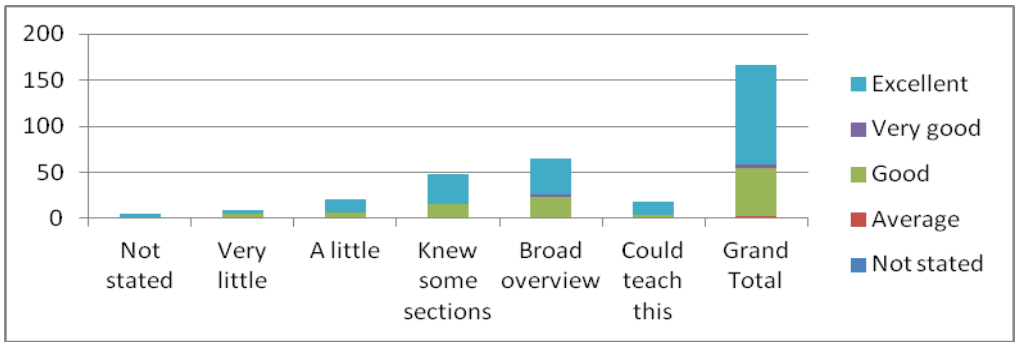

Figure 2: *Summary of pilot course evaluations showing the link between prior knowledge and satisfaction ratings*.

On average, learning outcomes were best for staff from the larger councils (around 4.5 or higher) and less than 4 for some of the small remote councils. The Transport Agency and NZ Police, who supplied 57% of attendees, were in the middle with scores more closely reflecting the mean. The selection of verbatim comments below is typical of those who rated the course as excellent:

> *"Very worthwhile course. Great resources which I will refer back to in future."* (Road safety coordinator, district council)
>
> *"Excellent days enjoyed the process and met very interesting people - A great opportunity."* (Programme manager, Accident Compensation Corporation)
>
> *"Excellent mixing people up in various groups. Discussion on the roles of various professionals, i.e. what does a Council engineer, road safety co-coordinator, police officer do under safe systems and how all can work together to improve road safety*." (Senior Sergeant, road policing).

Follow up survey of pilot participants

All pilot participants were followed up as to how they were applying the content in their jobs through a survey run by the Transport Agency via Survey Monkey in December 2012 to January 2013. A total of 72 responses were received. This is artificially low because the 52 Police respondents did not receive the survey due to system security requirements (this deficiency was not realized until after the survey had closed). In these self-reports the most visible change at that stage was in internal communications, and in their own work as shown in Figure 3 below.

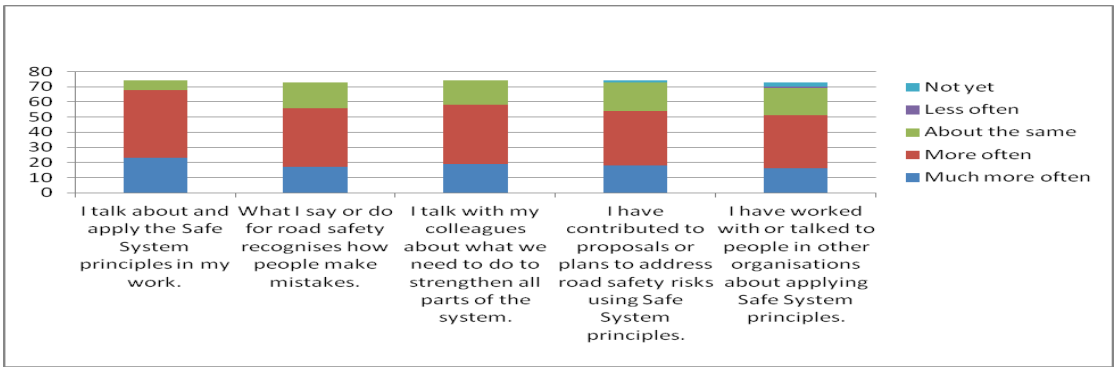

Figure 3: *Self-reported on the job behaviour changes after attending the course.*

Other comments indicated how attendees were applying their learning back on the job, indicating sustained influence from the course:

> *"I have given a presentation to Council about the Safe System principles and they have made a formal resolution to integrate Safer Journeys and the Safe System approach in all Council activities where appropriate."*
>
> *"Other colleagues who attended the same course now understand the safe system so we can now all go in the same direction when discussing road safety problems."*
>
> *"A much greater awareness of how the new road safety strategy is going to be delivered - in my mind it moved from being concepts based to a reality."*

(Note: comments were recorded anonymously by Survey Monkey, so further identification is not possible, although it clear that the first is from a local government official).

Lessons learned post-implementation review

In October 2012 the experience of running the pilot and the evaluation results were formally reviewed by the Transport Agency in consultation with partner agencies. The facilitator and presenters also contributed their own assessments of what had worked or not worked so well on the pilot programme. Various adjustments were then made to the course for 2013: these included a review of the curriculum, and improvements to individual modules.

From the above, it is clear that the learning outcomes for individual participants are being met overall, and the course is developing a prestige reputation. It is still a little too early to judge whether the broader benefits and cultural objectives such as the goal of embedding the approach into the planning and delivery of road safety, and a changed road safety conversation and culture, are being achieved fully.

Post pilot course outcomes

Seven courses have been held in 2013 at the date of writing. Evaluation results have so far been broadly consistent with the 2012 results. Approximately half the participants rate the course as excellent, with a further 40% ranking the course as good. More detailed analysis of the 2013 results, including results from a planned follow-up survey will be provided at the Conference.

Discussion

Stone (1995) and Ramsey, Franklin, and Ramsey (2000) outline generic success factors for training. There are several factors that we believe have contributed to the success of the course that are consistent with Stone's success factors.

A focus on meeting the learning outcomes and broader course objectives outlined above: Clear learning outcomes were specified at the start, carried through into the design, and evaluated at the end of each course. This has kept the curriculum and design of the course true to the learning outcomes and broader objectives and helped to maintain course quality.

Commitment to quality: The course's success stands on a strong commitment to quality and continuous improvement. This includes the quality of the coursebook and presentation materials, and the calibre and credibility of the presenters, who are subject matter experts in

their fields. The Transport Agency has required facilitators to be highly professional and credible in the road safety field and has ensured venues and catering are conducive to learning. After every course, the evaluations are scrutinised and improvements feed into the next course.

The cross-functional action learning approach using New Zealand case studies: The use of case studies has helped keep the course relevant, particularly to regional staff, both in keeping the content practical, and in building a model of how the content can be applied on the job and with one's colleagues – for example, during Road Safety Action Planning. Participants have repeatedly said, (as reported in the quotes above) that they value the opportunity for networking and relationship building and that informal learning is equally important.

The attractiveness of the course: Every effort has been made to make the course accessible to attendees from all organisations. The pilot courses were free, and the first four courses were full. After this, interest grew by word of mouth. Course costs are still kept low at NZ$200 per person, because of a substantial grant from the Accident Compensation Corporation and contribution of project management and administration from the Transport Agency. The fee just covers the remaining direct costs of materials, venues and logistics, with most presenter time being provided gratis. The course fits into professional development frameworks and over time, will be a prerequisite for the annual NZ Road Safety Engineering Course (recently renamed Safe System Engineering Workshop). This increases its attractiveness to engineers.

Strategic alignment and sector leadership: Raising capability to apply the approach was included in the *Safer Journeys* Action plan 2011-12. Strong leadership from the National Road Safety Management Group and the Transport Agency's road safety governance group helped secure organisational support and seed funding in the early stages. Delivering and attending the training was then incorporated into the Transport Agency's Statement of Intent as a performance measure. The sector has retained full responsibility for the training and its future direction, which has fostered a strong sense of commitment and pride.

Future challenges

One challenge is keeping the course fresh and current, especially for the facilitators and presenters. This is partly being met by widening the circle of facilitators and presenters. However, that presents different challenges, as there is a risk of loss of speaker credibility as more people are brought on board. This risk is managed by careful selection of subject matter experts and professional training to polish presentation and training skills where needed.

A second challenge, noted earlier, is that it has been difficult to achieve the target of ensuring senior organisational leaders attend the course. To meet this challenge, a shorter more intense programme targeted at their needs is proposed for development in late 2013 and early 2014 with a pilot and subsequent delivery in 2014.

A third is that the current case study approach demonstrates how the approach can be applied to road safety issues in the regions. This may be less relevant for central policy makers and a follow-up session on how the approach can best be translated into policy direction could be worthwhile in the future.

Finally, individual change needs to be accompanied by systemic change. In the follow-up survey, while 55% said they had not experienced barriers to implementing the approach, 45% did. The barriers encountered included lack of alignment of funding principles and processes with the Safe System, lack of understanding among colleagues, managers or elected officials, and reluctance to let go of "blame the driver" mindsets. This supports the need to develop a more tightly focused programme for senior leaders and elected officials who have the decision making authority to address the barriers.

Conclusion

The paradigm shift in adopting the Safe System approach requires both the willingness and ability to change. We cannot expect people to change without building both. An effective course that empowers them to challenge the status quo and pursue the *Safer Journeys* vision is an essential part of driving strategy into action.

The course is designed on best practice principles, and the reputation and credibility of the course and the presenters are important factors in building the willingness to adopt the change. The practical approach builds the ability to apply the learnings back on the job. Together they empower people to approach the task of reducing death and serious injuries on the road differently. The *Safe System in Practice* course gives practitioners the vocabulary, the tools and the mandate to use the Safe System approach. The effectiveness of the course is demonstrated by the course evaluations and the post-course follow up survey, indicating that most attendees achieve most of the learning outcomes and change their behaviour when back in the workforce. Another indicator is that many of pilot course attendees are sending their colleagues to the course this year. The course has been designed to be transferable, and the course materials are open source: there is no charge for using them although an acknowledgement is required.

It is our recommendation that other jurisdictions consider using and adapting the materials and methods in the broader interests of furthering the adoption of the Safe System approach, and in the interests of contributing to the goals of the United Nations Global Decade of Action for Road Safety.

Acknowledgements

The authors are grateful to all those who have contributed to the design, development and delivery of the course.

References

Dilworth, R. (1998). Action learning in a nutshell, *Performance Improvement Quarterly,* 1998, Volume 11, Number 1, pp. 28-43. http://www.itapintl.com/facultyandresources/articlelibrarymain/action-learning-in-a-nutshell.html

Harrison, S., Cruise, B., Edgar, N., and Dillies, M. (2011). Increasing Safe System Awareness in Queensland Road Authorities, *ACRS Conference 2011*. http://acrs.org.au/wp-content/uploads/Harrison-et-al-Safe-System-Awareness-Paper.pdf

Ministry of Transport. (2009). *Road Safety Progress since 2000.* Wellington: New Zealand Government. http://www.saferjourneys.govt.nz/assets/Uploads/Road-Safety-Progress-since-2000.pdf

Ministry of Transport. (2010). *Safer Journeys: New Zealand's Road Safety Strategy: 2010-2020.* Wellington: New Zealand Government. http://www.saferjourneys.govt.nz/assets/Uploads/SaferJourneyStrategy.pdf

Ministry of Transport. (2011). *Safer Journeys Action Plan 2011-12.* Wellington: New Zealand Government. http://www.saferjourneys.govt.nz/assets/Uploads/Safer-Journeys-Action-plan-2011.pdf

New Zealand Transport Agency. (2011a). *High Risk Rural Roads Guide*. Wellington: New Zealand Government. http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/

New Zealand Transport Agency. (2011b). *Communicating the Safe System approach: A manual for system designers.* Wellington: New Zealand Government. http://www.saferjourneys.govt.nz/resources

New Zealand Transport Agency. (2013). *High Risk Intersections Guide*. Wellington: New Zealand Government. http://www.nzta.govt.nz/resources/high-risk-intersections-guide/docs/high-risk-intersections-guide.pdf

OECD/International Transport Forum. (2008). *Towards Zero: Ambitious Road Safety Targets and the Safe System Approach*. OECD Publishing, Paris. doi: 10.1787/9789282101964-en

Ramsey, P. Franklin, T. & Ramsey, D. (2000). *On-the-Job Learning*. Palmerston North: Dunmore Press.

Reason, J. (2000). Human error: models and management, *BMJ*, 2000. March 18; 320(7237): 768–770. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1117770

Revans, R. (1982). *The origins and growth of action learning*. Lund, Sweden: Student Litteratur.

Stone, R. (1995). Systematic Approach to Learning and Development, *Human Resource Management* (2/e), Milton, Queensland: John Wiley, 223-237.

Theeuwes, J., van der Horst, A., Kuiken, M. (2012). *Designing Safe Road Systems: A Human Factors Perspective*. London: Ashgate Publishing.

Warr, P., Bunce, D. (1995). Trainee characteristics and the outcomes of open learning, *Personnel Psychology,* vol. 48, no. 2; 347-375.