Improving Road Safety Strategy in Africa

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Abstract

Achieving the ambitious goals of the United Nations Global Plan for the Decade of Action for Road Safety is particularly challenging. African countries currently have the highest road fatality rates in the world. Further, African countries are not well resourced with the skills, institutional structures and financial resources to tackle these immense problems. Many are also hampered with a fatalistic culture and weak legislative base and political commitment for road safety action. The advantage that African countries do have is that they can benefit from knowledge gained through the mistakes and successes of other countries that have pursued road safety objectives for many decades. Moreover, there are a number of readily accessible guidance tools that may assist them. This paper explores ways and avenues for improving road safety strategy in Africa.

Introduction

The United Nations General Assembly has passed a series of road safety resolutions since the World Report on Road Traffic Injuries was released in 2004 and has declared the years 2011-2020 a Decade of Action for Road Safety. The goal of this Decade is to save 5 million lives that otherwise would have been lost due to road crash injuries. See Figure 1. It is expected that many of these lives will be saved in Asian nations where the numbers are extremely high. But it is hoped that the road fatality rates in Africa – currently the highest in the world – will come down dramatically through concerted actions to implement effective road safety solutions.

Figure 1 – Projected lives saved in the Decade of Action

The Global Plan, prepared by the United Nations Road Safety Collaboration, proposes international and national actions under five pillars: road safety management, safer road infrastructure and mobility, safer vehicles, safer road users, and improved post crash response. The Conference, Road Safety in Africa: the Next 25 Years, structured its technical program along the lines of the five pillars. Organised by the Nigerian Federal Road Safety Corps (FRSC), this Conference also marks the 25th anniversary of the FRSC, celebrating its achievements and advancing its action plan for the next 25 years.
This paper aims to contribute to the Conference objectives by discussing possible improvements to road safety strategy for Africa.

**The Global Plan and Safe System Approach**

The Global Plan for the Decade of Action for Road Safety is underpinned by the Safe System approach. The concept of the safe system approach evolves from the Swedish Vision Zero and Dutch Sustainable Safety concepts that were introduced in the mid-1990s. These policies were founded on the ethical principles that *no one should die as a result of the mistakes they make in the road traffic environment* and *roads should never be designed and built such that fatal injuries to their users can be predicted*. The Safe System approach, developed and adopted in Australia holds that the design parameter of a safe road traffic system is the biomechanical limitations to the human body to survive crash types up to certain impact speeds. Physical vulnerability is a fundamental aspect of the *human factor* that needs to be considered when designing and managing a Safe System of road transport.

To illustrate what this means, especially in Africa where it is estimated that between 46 and 80% of all road fatalities are pedestrian fatalities\(^2\), the fatality risk for a car/pedestrian crash is estimated in Figure 2.

![Figure 2 – Car/pedestrian collision and risk of fatality\(^3\)](image)

The safe system approach takes into account the likelihood of a fatality or serious injury occurring in various crash types and acts to prevent the kind of harmful forces that may result in these levels of trauma. For example, driving a vehicle at 40 km/h and colliding with a pedestrian will result in a less than 20% chance of killing the pedestrian. The risk of a pedestrian fatality increases dramatically when the vehicle speed rises above 40 km/h. If a pedestrian is hit by a car travelling at 70 km/h there is greater than a 90% chance that the pedestrian will die.

Similarly, biomechanical limits of the crash impacts with the human body as vehicle occupants have been calculated. Figure 3 shows the risk of serious injuries and fatalities for car occupants in offset frontal crashes with comparisons of those wearing seat belts and those not wearing seat belts in cars traveling at increments of speed.
Figure 3 – Vehicle occupant injury & death risk in frontal offset crashes

Again, the risk of being seriously injured in a crash rises steeply between 40-60 km/h. This again highlights the pivotal role of velocity in vehicle crashes as well as the physical vulnerability of road users.

Wilde argues that instead of avoiding or minimising risk, the human tendency is to target risk to achieve optimal benefits from the risk behaviour. This presents a problem for road safety as attempts to improve safety through, for example, improved driving skills have been found to achieve no, or negative, safety outcome benefits. This is due to a phenomenon called risk compensation or risk homeostasis. In the case of driver skills training, the driver with new skills re-targets his/her driving speed commensurate with the new confidence gained with perceived greater skills.

Another example of risk homeostasis is the upgrading of a road, resulting in higher motorist speeds travelled. Unfortunately, there are many instances of this occurring particularly in Asia and in Africa.

Road safety success factors

As indicated above the safe system approach is premised on an ethical position that people shouldn’t be killed nor maimed just because they made a mistake while using the road. Further it recognises that people are prone to making mistakes and they have physical limitations to kinetic impact forces involved in road crashes.

There are three key success factors involved in managing road safety: motivation, science and resources. These success factors have a number of specific aspects and opportunities.

Motivation

Motivation for road safety means creating a community demand for road safety. The non-government sector has an important role to play in this and the new alliance of NGOs for road safety provides an excellent opportunity for stimulating Africa-wide motivation for road safety.
Campaigns to advocate for effective road safety policies such as Make Roads Safe and the Zenani Mandela Campaign have potential to boost public attention and commitment to road safety goals. Political commitment at the highest levels is necessary but insufficient. This commitment must percolate right through the various agencies and bureaucratic levels to really make a practical difference. Political leaders must be encouraged to take strong actions, like supporting strict regulation, enforcement & penalties, encourage bi-partisan support for sustained commitment. The public must also hold governments to account for safe road infrastructure and vehicle regulation.

African culture is characterized as superstitious and fatalistic\textsuperscript{10}. This culture conceptually works against the Safe System principle of shared responsibility. Believing that being injured in the road is a matter of fate is diametrically in opposition to the notion that people can choose to prevent injury through their actions. Promoting a safety culture necessitates a sense of human admission of the ability to choose – to choose safety over actions that disregard safety, placing priority on other objectives.

A safety culture involves making behaviours such as speeding and drink driving socially unacceptable. It places safety first and for ALL road users.

\textit{Science}

It is important for countries to develop research and analysis capacity to identify road injury factors. Road safety authorities can engage with universities, providing them with data and funding for analysis of crashes. Or alternatively establish a crash injury analysis unit that is attached to a government agency or is independent. Data collection is poor in Africa, so there is a need to improve data collection and reporting.

A scientific approach uses evidence-based solutions. This means adopting and adapting road safety interventions that have been shown to be effective. This approach avoids implementing popular, but ineffective solutions, eg children’s traffic education parks, post license driver training.

Importantly, the knowledge/skill base of road safety analysts and practitioners needs to be continually improved as more experience and technology becomes available.

\textit{Delivery tools}

A fundamental requirement for the delivery of safe system road safety is institutional strength and coordination\textsuperscript{11}. The establishment of a lead agency and consultation with other agencies to deliver within their responsibilities is vital to optimise successful implementation of road safety strategies. This enables the lead agency to analyse, plan and implement road safety programs in partnership between agencies.

Legislation, not only regulate the behaviour of road users, but to establish delivery mechanisms will assist to ensure a sustained commitment to road safety resourcing. For example, Vision Zero was passed into law by the Swedish Parliament\textsuperscript{12}. And the establishment of MIROS\textsuperscript{13}, the road safety research centre in Malaysia was set up by statute.

Moreover, countries can ensure a funding stream for road safety through wise decision-making, eg 10% of road development budget can be earmarked for road safety. Or traffic fines revenue and/or insurance levies can provide an ongoing source of funding for road safety.

\textbf{The Safe System}

The safe system approach places human vulnerability and propensity of human error at the centre of road safety policy. The system manager – and indeed all who have an influence on road safety outcomes – are responsible for putting in place a system of regulation for the use of the system, provision of roads that are forgiving of human error and that assist crash and injury avoidance, provide for access of vehicles that optimise the safety of human occupants and other road users, and addresses the pivotal role of speed.
management within the road traffic environment. Figure 5 is a diagrammatic description of the safe system.

This system recognizes that the current road traffic environments are intrinsically hazardous to human road users. But it aspires to make the road traffic system intrinsically safe in the long term. It's vision is that road users will not face death or serious injury when using the road.

To realize this vision it requires:

- A high level commitment & coordination;
- An understanding of human limitations – error prone and physically vulnerable;
- An understanding of interactions of road, vehicle and human factors in road injury causation; and
- A shared safety responsibility between users and road providers.

Political commitment is needed to make this happen. Coordination between agencies, the private sector and civil society is necessary. Odero et al advised that the reasons for the failure of the National Road Safety Council of Kenya to achieve its road safety objectives in the years 1983-1993 included "lack of coordination mechanisms, limited authority and responsibility, lack of resources, qualified personnel and logistical support, and limited capacity for research, monitoring and evaluation of interventions." It is also necessary to move beyond the notion that road users who don't use the road in the way intended by the system designers are solely responsible for their injuries from road traffic conflict. Moreover, the safe system begs for a more complex understanding of the road crash and trauma process. Road injury involves an interaction of a variety of factors and the understanding of the mechanisms and processes of road injury are needed. Finally, the safe system recognizes that there is a shared responsibility by all of those who play a part in road system use – eg the road providers and managers, vehicle and equipment providers, employers, and individual road users.

**Strategy Development Process**

Road safety strategy development and implementation is not very different from designing and implementing any strategy. It begins with a definition of the problem to be addressed and ends in an evaluation of efforts to meet the specific objectives of the strategy. Diagram 6 summarizes this process.
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Investigate Evidence-based Solutions

After defining the problem, it is best to look for measures that have been successfully applied in the past to similar problems. Over the past few decades there have been many examples of effective road safety programs. Some of these have been evaluated\(^\text{18, 19}\) and can be sourced from the scientific\(^\text{20}\) and grey literature\(^\text{21}\). There is no need to repeat the mistakes of the past if the research is examined prior to action.

Noting that there may be an engineering solution to a behavioural problem that may be more sustainable over time. For example, audio-tactile line marking can be an effective solution to a problem of driver drowsiness on rural roads.

There are now a number of tools and guidance documents available on the internet and through various international road safety organisations, such as the international Road Assessment Program (iRAP)\(^\text{22}\), the New Car Assessment Program\(^\text{23}\), International Center for Alcohol Policies (ICAP)\(^\text{24}\), and Good Practice Manuals produced by leading members of the United Nations Road Safety Collaboration\(^\text{13}\).

After examining the possible interventions, an assessment of resources will identify the capacity to implement these solutions. This includes an assessment of financial resources as well as human in interagency resources. Where there is an intention to collaborate with other people and agencies it is best to consult with them early in the planning stages so that they will feel some ownership and commitment to the project. Interventions are often most effective if there is a partnership between two or more groups with differing skill sets\(^\text{25}\).

Establishing outcome targets, eg lives saved, is a good way of keeping the focus on the main goal of road safety. Then a set of project objectives and output targets at the beginning assists with evaluation of the initiative. For example, an objective to change a 2-star rated road to a 4-start rated road under the iRAP safety rating criteria. Using the iRAP toolkit, in this instance can assist to decide what things should be implemented (based on optimal effects on the problem).

After determining what to do, a baseline assessment should be done in order to measure the effectiveness of the intervention after implementation.

Figure 8 is an example of road safety project implementation phases. This example is an initiative to reduce speed related road deaths and injuries. It involves collaboration between a government media campaign and a special focus on speed enforcement by police.

**Figure 8 – Stages of implementing a speed enforcement campaign**

Prior to the actions being carried out, targets for the number of injury crashes or fatalities are set. Specific interim targets are established as well, eg reduction in mean speeds in the targeted area and a shift in...
community awareness and acceptance of speed enforcement. The intervention is implemented and data is collected after the intervention to determine whether the objects were met.

**Summary and conclusions**

In road safety there is ample opportunity to learn from the mistakes and achievements of countries that have been actively pursuing road safety objectives for many decades. There is literature and tools available to access. There are organisations that are established to promote good practices.

Focus on speed management as a priority, as this is a pivotal issue in road safety and offers the best short-term safety benefits for Africa.

Define and address the problems using the best available data, working in collaboration with others that have similar goals. Using evidence-based methods achieves optimal safety outcomes. Moreover, adopting a safe system approach requires an understanding that humans have limitations that road system designers and managers need to accommodate. It also requires concerted effort by leaders and agencies who can influence road safety, and sufficient funding, skills and authority to act.

**References**


Mooren, Lori, *Improving Road Safety in Africa* 8
Invited paper presented at the International Conference to mark the 25th Anniversary of Federal Road Safety Corps in Nigeria: “Road Safety in Africa – the next 25 years”, 18 February, Transcorp Hilton Hotel, Abuja, Nigeria


17 See http://www.who.int/roadsafety/publications/en/


22 See http://toolkit.irap.org/

23 See http://www.globalncap.org

24 See http://www.icap.org/PolicyIssues/DrinkingandDriving


26 For example, there is a membership based organization called, the International Safe System Institute for Road Safety http://issiroadsafety.org/_html/mission.html