CIHT
UAE

Bulletin:
Road Safety Audit: TR-540 Manual Update & Common RSA Problems

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About the Speaker

David George, IEng FIHE MCIHT FSoRSA RegRSA (IHE) is a seasoned road safety engineer currently leading road safety initiatives for the Al Ain Region in Abu Dhabi, UAE. With experience in both public and private sectors since 1996, he specializes in collision investigation, prevention, and Road Safety Audits meeting international standards. David has investigated diverse accident locations worldwide and led audit teams on various projects, including major schemes in the Middle East and Europe. He has developed IHE-approved road safety training courses and spoken at national conferences and put forward his experiences to update the Emirate of Abu Dhabi Road Safety Audit Manual, TR-540, integrating the safe System Approach. David's expertise extends to expert witness services, collision research, and advisory roles, making him a valuable asset in advancing road safety globally.

Key Takeaways

- **Integration of the Safe Systems Approach into TR-540:** The upcoming update to the Emirate of Abu Dhabi's Road Safety Audit Manual (TR-540) will formally incorporate the Safe Systems Approach, aligning with global best practices and Vision Zero objectives to eliminate road fatalities and serious injuries.
- **Strategic Road Safety Reforms by the ITC:** The Integrated Transport Center (ITC) is actively revising standards and conducting studies to support a safer transport environment, demonstrating a strong commitment to road safety and sustainability across Abu Dhabi.
- **Addressing Common RSA Issues in Design:** The session highlighted frequent problems identified in road safety audits and provided guidance on how to avoid them through better design practices and targeted solutions, enhancing the effectiveness of future infrastructure projects.

Webinar Summary

In his opening address, David warmly welcomed attendees and detailed the critical role of Road Safety Audits (RSAs) and the implementation of a 'Safe Systems Approach'. This approach aims to reduce fatalities and serious injuries by proactively addressing human errors during road design and planning. George stressed the importance of conducting RSAs throughout all project phases, dispelling misconceptions about the necessity of audits on smaller projects, and previewed upcoming changes to standards such as TR-540, including team-based auditor approvals and risk assessments based on human crash tolerance. Real-world examples from UAE projects demonstrated the need for reduction of speeds at certain section of the road and safety updates. The discussion also covered common pitfalls in RSAs and improved communication protocols between auditors and designers.

The webinar addressed significant design and infrastructure challenges in the Al Ain and Abu Dhabi region, where pedestrian and drivers' safety could be compromised through misaligned pathways, inadequate signage, unclear road markings, and other hazards in the pedestrian realm. David emphasized the misalignment between designated paths and actual pedestrian behavior, emphasizing a need for updated road designs that accommodate for expected human behavior.

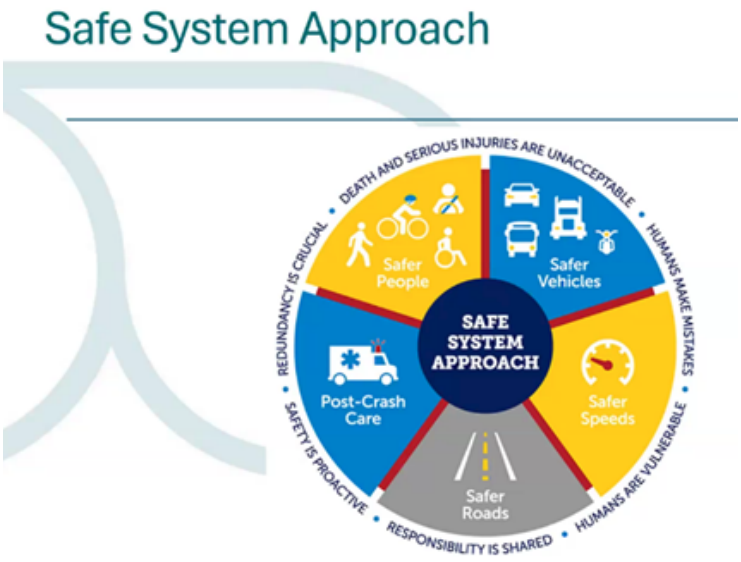
Proactive implementation of safe speeds and correction of landscaping issues blocking sightlines were also advised.

The session highlighted deficiencies in temporary traffic management and the necessity of integrating Road Safety Audits in all traffic studies to uphold a zero-tolerance policy toward road safety risks. The key insights and updates to TR-540 proposed were:

- **Stages and Scope of Road Safety Audit in Abu Dhabi:** Road Safety Audits cover all project stages from concept to post-construction monitoring, ensuring safety is embedded throughout the project lifespan. Misconceptions, such as audits being needed only for large projects or done too late in planning, affect effective safety interventions. Early audits, even for smaller schemes, are essential to address issues before construction proactively.

- **Safe System Approach Transforms Road Safety**: The traditional RSAs aimed to identify all safety issues. With the introduction of the 'Safe Systems Approach,' RSAs will target eliminating fatal and major serious injuries by also accounting for human error, providing a chance of survival even if road users make mistakes. This approach requires engineers and planners to accept that human errors will occur and to design forgiving systems to prevent fatalities accordingly.

- **Quantitative Risk Assessment in Audits**: The introduction of a structured risk matrix assessing exposure, likelihood, and severity provides a uniform way to prioritize interventions based on human injury tolerance. This risk-based methodology brings clarity to safety prioritization but comes with the challenges of accurately predicting crash frequency in several situations, which will require expert judgment and experiences.



- **Speed Management as a Central Safety Factor:** David strongly emphasized the direct correlation of speed with severity of crashes, particularly in side impacts and pedestrian collisions. The prevailing high-speed limits on many UAE roads conflict with the Safe Systems Approach, which would lead to expected audit conflicts. Managing and reducing speeds, through design (e.g., traffic calming, raised crossings) and enforcement, will be critical but challenging due to fast driving behavior on UAE roads.

- **Design and Infrastructure Improvements**: Common weaknesses that should be remediated include ineffective signs/markings, pedestrian facilities that are not aligned with natural movement of pedestrians (desire lines), hazardous landscaping, and unsafe road restraint systems, including inadequately designed crash barriers and terminals.

- **Challenges in Temporary Traffic Management:** Temporary traffic management (TTM) schemes are often inadequately audited in the Emirates which may pose significant safety risks to road users. Given the extensive use of TTM in the Emirates and its associated hazards, improving audit coverage and integration with audits at different stages of project is crucial for comprehensive risk management.

- **Human Behaviour is Key to Safety Design**: Drivers and pedestrians often behave irrationally, ignoring signage (e.g., stop signs, zebra crossings) or avoiding designed paths if inconvenient. Designing thinking behaviour, such as desire lines and driver tendencies to shortcut, improves roadway safety, emphasizing the importance of behavioural insights within engineering.

- **Vision Zero and Regional Implementation Outlook:** The move towards a Vision Zero mindset in the UAE requires not just technical changes but a transformation focused on zero tolerance for road fatalities. It will take a few years to evaluate the effectiveness of these initiatives such as the Safe Systems Approach fully, and it should be combined with continuous professional education towards improving road safety and stakeholder collaboration.

- **Integration of Traffic Calming Measures:** The discussion highlighted the need for consistent and visible traffic calming elements, such as raised pedestrian crossings combined with speed humps, to be incorporated carefully without creating any new hazards. Excessive use of road sign and markings can also be replaced with simple guided signs to improve safety.

- **Lead-lag Signal Issues:** Lead-lag traffic signal phasing, used at a few junctions in Abu Dhabi, can cause driver confusion and accidents due to traffic movements that may be new to drivers. Increased familiarity with these signals and driver education may reduce these risks, but junction and signal design improvements are needed to mitigate inadvertent collisions.

- **Lighting and Nighttime Safety:** The use of LED lighting offers energy efficiency and colour accuracy, but poor coverage and the placement of lighting poles at road edges compromise safety. Coordination between lighting and roadside infrastructure teams is highly necessary to ensure that lighting installations do not create new hazards or fail to provide adequate illumination.

- **Landscape Planning as a Safety Factor:** Landscape planning must be integrated at early stages of the project and thoroughly assessed to avoid visibility obstacles and conflicts with road safety elements. Unregulated growth of leaves at the roadside may compromise critical sight distance and signpost visibility, increasing the risk to road users.

		Severity*				
		Insignificant	Minor	Moderate	Serious	Fatal
		Property damage	Minor first aid	Major first aid and/or presents to hospital (not admitted)	Admitted to hospital	Death within 30 days of crash
Almost Certain	One per quarter	Medium	High	High	Extreme (FSI)	Extreme (FSI)
Likely	Quarter to 1 year	Medium	Medium	High	Extreme (FSI)	Extreme (FSI)
Possible	1 to 3 years	Low	Medium	High	High (FSI)	Extreme (FSI)
Unlikely	3 to 7 years	Negligible	Low	Medium	High (FSI)	Extreme (FSI)
Rare	7 years +	Negligible	Negligible	Low	Medium (FSI)	High (FSI)
					Safe System crash outcome threshold	

Questions

Based on your experience in UAE, how effective is the Safe Systems Approach in achieving zero tolerance targets for fatal crashes and injuries?

We don't know yet because we haven't started its application. We are starting to move ahead with the Safe System Approach. We've got a lot of projects based on Safe Systems and Vision Zero in the pipeline. New standards for road safety audits will bring this in, but currently what's on the road isn't complying with Safe Systems and Vision Zero and we have to change that.

As you have shown, the safe speed for a pedestrian based on Safe Systems is 30km or below which means any pedestrian crossing, signalized or otherwise, on roads above 30 km/h will be high risk at best (rare/fatal). So, do you think auditors should raise such crossings as a safety issue?

The answer is yes. Under the new Road Safety Audit standard, risk is assessed based on the Safe Systems and if a pedestrian can be hit at 30 kph or above it is a problem. As I alluded to earlier, pedestrians, junctions and roads at our high-speed limits do not comply with the Safe Systems Approach. This is going cause a big conflict. This is going to be very interesting when the policies start rolling out and we start talking about this. The Road Safety Audit on the 80kph road with a signalized crossing will not comply with Safe Systems. So, if you are auditing a pedestrian crossing on a 60-80 kph road, you will need to recommend measures to bring that speed down so that it's survivable and that may cause a lot of conflict. We need to understand how we're going to manage that.

If the aim is to reduce serious and fatal collisions, should we not focus on the severity only, as the frequency can be difficult to predict as you pointed out? Also, a split-second difference can sometimes be the difference between a minor and a serious collision. Should not the aim of Vision Zero be eliminating all fatal accidents regardless of the frequency?

According to the risk assessment, anything fatal or serious is above the tolerance level. If the risk predicted for a fatal or serious accident due to speeds means it's likely, then that has to be dealt with as per Safe Systems. It is very difficult to predict crash occurrence. We can say yes this is going to happen, but we can't predict when. So yes, you have to use your judgment, and this is where your experience in crash investigation and road safety engineering comes in to provide mitigation measures (e.g. safety barriers) beforehand.

Do we have RSAs related Work Zone/Temporary Traffic Management?

No and that is a significant problem. I drive through a lot of TTMs in Al Ain and greater Abu Dhabi region which have not had a TTM audit and they don't comply with TR-531 (Temporary Traffic Management Manual-Abu Dhabi). They are unsafe and require a Road Safety Audit. It's something we need to focus on and make sure that the large complex temporal traffic management undergo the Road Safety Audits because they're not getting the attention at the minute.

We've seen 30-40 km/hr zones rolled out in cities across Europe and even parts of Australia as part of Safe Systems implementation, especially in areas with high pedestrian activity. Is that something being considered here in Abu Dhabi or Dubai? Or are we still relying mainly on signalized crossings, even when speeds remain above 50-60km/hr? Curious to know if there's room locally to push for speed environment changes as part of RSA recommendations or even an area wide traffic management strategy?

Well, 30 kph or 20 miles/hr zones in the UK are massively effective in residential areas. We have seen 33% to 60% reduction in all casualties and up to 80% reduction in child casualties. But what you need to implement for a self-enforcing 20 miles/hr zone is that no part of the road should be more than 50 meters away from a traffic calming feature. And that's a lot of traffic calming and these tend to be very unpopular with drivers. This creates a lot of resistance putting them in the roads. If we are going for Vision Zero, we need to start looking at speed because speed kills. And that is going to be the biggest challenge over the next 15 years as we look to achieve Vision Zero with reduced speed because nobody wants to drive slowly.

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