Struck-by Checklist for Design Engineers and Resident Engineers - Roadway Work Zones

[FINAL DRAFT SDCHOI]

Use this checklist to prevent-through-design many common struck-by exposures during the construction and maintenance of roadways. *Prevention through Design (PtD) recognizes that design/resident engineers have the ability to proactively "design out" potential hazards to eliminate or minimize risk and improve workers' safety and health. Hence, this checklist, during the planning and design phase and beyond, should help design/resident engineers identify and eliminate commonly found hazards in roadway construction and maintenance.*

Design Engineer Codes: CE = Civil, TE = Traffic, SE = Structural, PE = Project

Component	Design Risk	PtD Controls	Resident Engineer	Design Engineer
Pedestrian worker	Walking adjacent to motor vehicle traffic and to operating construction equipment and vehicles causes an increased risk of workers being struck by passing vehicles and equipment.	• Specify physical barriers to separate and protect workers from motorist traffic - Ensure positive protection is specified to isolate workers from passing motorists	✓	PE, TE
		• Schedule work activities at different times to reduce work crew exposure to passing construction vehicles and equipment	✓	PE
		• Design separate work zone entry and exit points for pedestrian workers and vehicles	✓	PE, TE
		• Design pedestrian worker crossing points so that drivers and pedestrians can see each other clearly - Specify signs and lighting at the crossing points	✓	PE, TE
		• Determine safe movements for workers to/from and within each operation and specify them on site drawings - Design safe access and movement within the general work zone	✓	PE
		• Identify "pedestrian-free zone" on the site plan in high construction traffic areas such as access/egress points	✓	PE, TE
Vehicle and heavy equipment	Construction vehicle movement and activities can lead to struck-by hazards for workers.	• Design access/egress to minimize construction and motorist traffic conflicts	✓	PE, TE
		• Design the order of work completion to minimize backing	✓	PE, TE
		• Design the order of work to minimize pedestrian worker and equipment conflicts	✓	PE, TE
Motorist traffic	Highway and roadway motorist traffic can enter construction zones and strike construction workers.	• Specify physical barriers to protect workers in construction zones from passing motor vehicle traffic	✓	TE, PE
		• Design lateral buffers to increase space between pedestrian workers and passing vehicles where positive protective barriers are not feasible	✓	PE, TE

		• Specify truck-mounted attenuators into traffic control plans to provide additional protection for motorists	✓	PE, TE
		• Specify adequate lighting during night operations - Install in a manner that minimizes glare and potential blinding of oncoming motorists	✓	PE, TE
Vehicles striking objects	Low overhead objects such as bridges and powerlines can lead to struck-by hazards for vehicles and workers.	• Specify protective measures and warning signs in all situations which have significant potential of being struck by vehicles	✓	CE, PE, SE, TE
		• Specify overhead powerlines on site plans - Design appropriate powerline height if vehicles must pass beneath	✓	CE, PE, TE
		• Design traffic flow around any potential overhead obstructions	✓	CE, PE, TE
		• Specify warning signage & messaging on approach to bridges and overpasses	✓	CE, PE, TE
		• Specify bridge covering treatment of retro-reflective material	✓	CE, PE, TE
Vehicle tip over (grading and roads)	Grading and roads should be designed in order to prevent overturns.	• Design temporary roads with adequate drainage and good access to provide stable mobility for all vehicle and equipment types	-	CE, PE
		• Design dump locations with flat and solid surfaces for dumping operations and with the edge protected by a berm at least mid-axle height	-	CE, PE
Project planning	Creating conditions that decrease preventable general hazards/built-in risks.	• Schedule multiple projects in a manner that prevents conflicts between separate operations	✓	CE, TE, PE
		• Plan construction under closed road conditions using compressed time schedules	-	PE
		• Plan for emergency vehicle access and locate emergency access points on project plans	✓	PE, TE
		• Plan to develop Internal Traffic Control Plans with “pedestrian-free zones” and equipment paths throughout the construction process	✓	PE, TE

Sources/References

This checklist was in-part adapted from J. Timmerman’s Prevention-Through-Design-Checklist (spread sheets), and subsequently modified and revised by Professor Sang D. Choi, PhD, MPH, MS, CSP, CPE (2023).

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