AHEAD OF THE CURVE[™]

Work zone Safety & TMAs Presented by Phil Bigley



What temporary situation on our roads can create one of the most hazardous areas for motorists?





Road Work Site Statistics in US in 2007

- 835 deaths
- 40,000 injuries
- 12% of deaths are Construction Workers
- Most Frequent Accident: Rear End Collision





Road workers have the 16th most hazardous occupation in Great Britain, higher even than military personnel.



Latest figures show that in the UK alone, there are 22 deaths and over 800 serious accidents every year at road works, mainly because drivers drive too fast.





What steps can be taken to improve safety at road works?





Practical actions to improve safety:

SEE

SEPARATE

SLOW

SHIELD







Use clear signage and early warnings for motorists of approaching road works



Workers should use high visibility clothing and wear hard hats, where appropriate









Use temporary barrier to separate work zone area

















Apply and enforce speed restrictions through road works









SHIELD ...





Shield temporary barrier ends with energy-absorbing terminals or crash cushions



Shield warning vehicles with mobile crash cushions





Using arrows and a portable crash cushion on rear of shadow trucks positioned behind stationary or slow moving road works will alert and protect motorists





It offers protection for:



the motorist



the truck driver



and the truck



There are several different TMA manufacturers and designs





BN#988 HT





ALPHA TMA range



SafeStop 90







SafeStop 90











Vorteq TMA Trailer











ALPHA



SafeStop – large vehicle impact







SafeStop





Vorteq





MPS 350







Extracts from UK legislation for use of TMAs



Extract from Swedish legislation for use of TMAs



Extract from Dutch legislation for use of TMAs





What fool would drive into a truck?







TESTING & LEGISLATION

U.S.A

NCHRP 230, then NCHRP 350, then MASH

UK

Design Manual for Roads & Bridges TD49/07

EUROPE

EN 1317 (but this only covers permanent crash cushions, not TMAs)

New European legislation for TMAs is currently being compiled by the TG4 Working Group



TESTING & LEGISLATION

As TMA legislation progresses, testing requirements become more demanding



= **Q** 18005 = **Q** 45005

NCHRP 230 TEST MATRIX TMA'S

3 compulsory tests at 72 km/h

HIGHWAY RESEARCH PROGRAM REPORT 230

RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY APPURTENANCES

> TRUCK IN SECOND GEAR BRAKES LOCKED





TRUCK IN SECOND GEAR BRAKES LOCKED





0-3 FT. TRUCK IN SECOND GEAR BRAKES LOCKED TIMA

TEST 54 4500S/45 MPH/0-3 FT OFFSET/@ 10'-15' C,D,E,F,(G), H,J







DESIGN MANUAL FOR ROADS & BRIDGES Volume 8 Section 4 Part 7 TD 49/07

4 compulsory tests at either 80 km/h or 110 km/h or all NCHRP tests + one additional compulsory test at either 80 km/h or 110 km/h

	Test Designation		Car			
UK Velocity Class			Total Test Mass (kg)	Impact Speed (km/h)	Approach angle and location of impact point, see Figure 2-1	
		2-50.UK	900C	80	head-on, centre	
80	TL2.UK	2-51.UK	1,500C	80		
		2-52.UK	1,500C	80	head-on, 1/3 vehicle offset	
		2-53.UK	1,500C	80	nose ¼ offset, at 10°	

Note: C = car

Table 2-2: Test Matrix - TL2.UK

	Test Designation		Car			
UK Velocity Class			Total Test Mass (kg)	Impact Speed (km/h)	Approach angle and location of impact point, see Figure 2-1	
		3-50.UK	900C	100	head-on, centre	
110	TL3.UK	3-51.UK	1,500C	110		
		3-52.UK	1,500C	110	head-on, 1/3 vehicle offset	
		3-53.UK	1,500C	110	nose ¼ offset, at 10°	

Note: C = car

Table 2-3: Test Matrix - TL3.UK

	Test Designation		Car			
UK Velocity Class			Total Test Mass (kg)	Impact Speed (km/h)	Approach angle and location of impact point, see Figure 2-1	
	Additional Test	2-51.UK	1,500C	80	head-on, centre	
80	TL2		All tests in NCHRP's current TMA test matrix (contained within NCHRP 350) must be completed. This includes any optional tests for which the test vehicle is defined as a 'pick up'. If the current TMA test matrix includes a 1,500kg vehicle test, the additional 2-51.UK test stated above is no longer required.			

Note: C = car

Table 2-4: Test Matrix - TL2 NCHRP (USA)

			Car			
UK Velocity Class	Test Designation		Total Test Mass (kg)	Impact Speed (km/h)	Approach angle and location of impact point, see Figure 2-1	
	Additional Test	3-51.UK	1,500C	110	head-on, centre	
110	TL3		All tests in NCHRP's current TMA test matrix (contained within NCHRP 350) must be completed. This includes any optional tests for which the test vehicle is defined as a 'pick up'. If the current TMA test matrix includes a 1,500kg vehicle test, the additional 3-51.UK test stated above is no longer required.			

Note: C = car

Table 2-5: Test Matrix - TL3 NCHRP (USA)



New European TMA Legislation from TG4....





Some similarities and differences between European and US testing criteria

Performance speed level

<u>EN 1317</u>

- 50 km/h
- 80 km/h
- 100 km/h
- 110 km/h

NCHRP 350 & MASH

- 50 km/h
- 70 km/h
- 100 km/h



Vehicle weight

MASH



1100 kg (2425 lbs)



1500 kg (3307 lbs)



2270 kg (5004 lbs)

NCHRP 350



820 kg (1807 lbs)





900 kg (1984 lbs)



1300 kg (2866 lbs)



1500 kg (3307 lbs)



2000kg (4409 lbs)

TG4 – Developing European testing criteria for TMAs

Impacting vehicle weight



900 kg (1984 lbs)



1500 kg (3307 lbs)



2000kg (4409 lbs)



Performance speed level

- 50 km/h
- 80 km/h
- 100 km/h
- 110 km/h



Energy Abso<u>rption Systems. Inc.</u> A linkola Sompany

Truck Mounted Attenuators vs. Unprotected Trucks



These products do get hit and have already helped to save hundreds of lives around the world.











Thank you for listening

