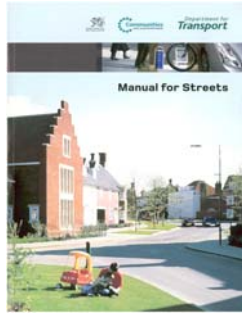


MfS vs DMRB

IHIE & UDG

20th January 2009

Steve Proctor



MfS.....some concerns expressed.....

Steve Proctor,
Director, TMS Consultancy

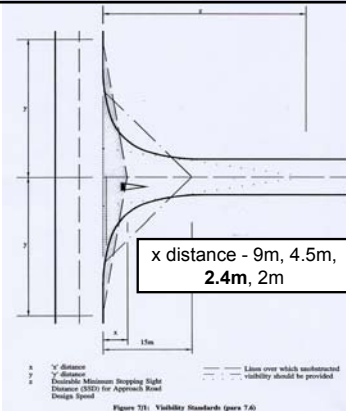


Topics for discussion

- X distance - Is 2.4m enough?
- Y distance - Whose reactions times are they?
- SSD – “Safety” or “comfort” margin?
- Beyond streets – Does the science still apply?
- TRL research – Is it consistent & representative?
- Collisions – is there a problem anyway?
- Shared use – are we breaking the law?
- Quality Audit – Road Safety role diminished?



X distance - Is 2.4m enough?



2.4m X distance

- MfS: “the distance between the driver and the front of the vehicle is typically 2.4m”
- Tesco’s CP, Canley, Coventry, Jan 09:
 - Kia Sedona 2.5m
 - BMW Z3 2.6m
 - Nissan 350Z 2.6m



- 0.4m range on BMW 5 series driver seat

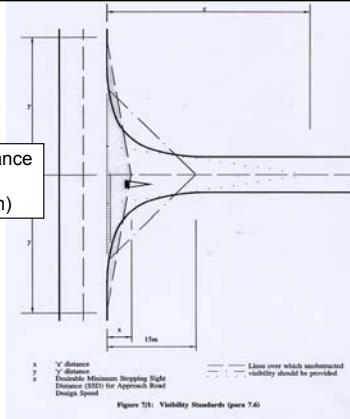


Y distance - Whose reactions times are they?



TMS

y distance
45m
(50kph)



TMS

SSD formula

- ❑ $SSD = vt + v^2/2d$
 - ❑ v (speed) = metres/ second
 - ❑ t (perception/ reaction time) = seconds
 - ❑ d (deceleration) = m/s^2
- ❑ Highway Code reaction time = 0.67 secs
- ❑ MFS reaction time = 1.5 secs
- ❑ DMRB reaction time = 2 secs
- ❑ Simulator reaction time = 0.9 secs (TRL 332)

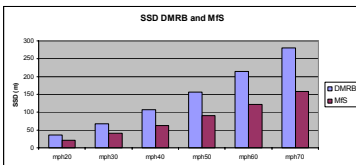
TMS

Driver's reaction times

- ❑ Experienced?
- ❑ Learner/ new driver?
- ❑ Elderly?
- ❑ Distracted?
- ❑ Drunk/ reckless?
- ❑ At night?
- ❑ In rain?
- ❑ In snow?
- ❑ In fog?



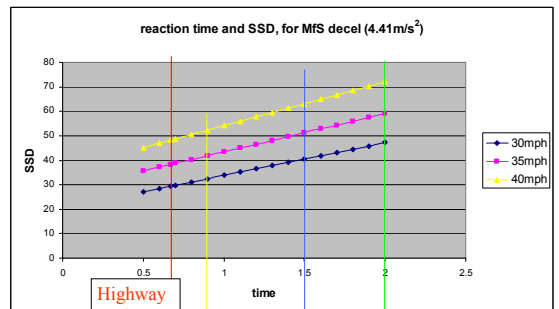
MFS - new visibility distances



Speed	16	20	24	25	30	32	40	45	48	50	60
Kilometres per hour	10	12	15	16	19	20	25	28	30	31	27
Miles per hour	9	12	15	16	20	22	31	36	40	42	56
SSD (metres)	11	14	17	18	23	25	33	39	43	45	59

Additional features will be needed to achieve low speeds

reaction time and SSD, for MFS decel (4.41m/s²)



Highway Code

Simulator

MFS

DMRB

TMS

SSD and reaction time

- The longer the reaction time, the greater the SSD needed
- Many drivers “fail to cope with the road environment” (definition of a collision?)
- Greater risk for “slower” drivers on faster roads in poor conditions?



SSD – “Safety” or “comfort” margin?



Driver task on right turn

- Look right
- Look left
- Look right again
- Move away?
- Check left again?

- Where is vehicle arriving from left during this process, is there a “blind zone” for the right turner?



Time taken to turn right

- Normal – 2 seconds
- Dark, uphill side road, poor visibility to right, 4.33 seconds
- Inexperienced driver, daylight – 4.31 secs

- 30% of this time could be in the “blind zone”
 - 0.6 secs for experienced driver in normal sit
 - 1.3 secs for inexperienced driver/ difficult sit



“Blind zone” distance and SSD

	30mph	40mph
0.6secs	8.1m	10.7m
1.3secs	17.4m	23.3m
MfS SSD	43m	66m
Effective SSD (MfS-BZ)	35-26m	56-43m
Highway Code SSD	22.67m	36.31m



Beyond streets – Does the science still apply?



How far should we apply MfS?

- ❑ “MfS comprises technical guidance and does not set out any new policy or legal requirements”
- ❑ MfS focuses on lightly trafficked residential streets, but **many of its key principles may be applicable to other types of street....**”
- ❑ “it is the responsibility of users... to ensure that its application to the design of streets not specifically covered is appropriate”
- ❑ “MfS does not apply to trunk roads”
- ❑ “MfS only applies formally in England and Wales”



Inspectors' decision – Coral Mill, Rochdale

- ❑ residential development (39 houses, 48 apartments) off an A road
- ❑ permission refused (unsafe access)
- ❑ appeal
- ❑ inspector allowed the appeal
- ❑ “the classification of Shaw Road has no bearing on a driver’s ability to stop if necessary, and I see no reason why in this location a “Y” distance of the SSD (in Table 7.1 MfS) should not be adopted”
- ❑ “this discussion is not dependent on the classification of the main road and an X distance of 2.4m is as applicable to this situation as to any street”

Decision appears to be based on the principle that the research in MfS has a universal application



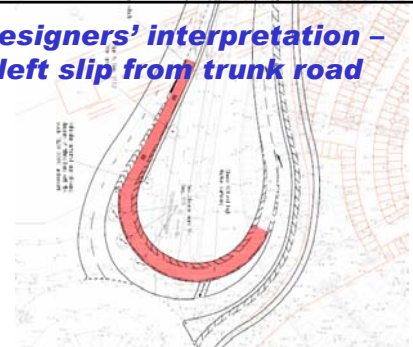
Inspectors' decision – Fishing Ponds, West Lancs

- ❑ Farm with existing use for agriculture, owner opens up lakes within property for fishing and issues permits to local fishermen
- ❑ Local authority claim owner should have sought planning permission for change of use
- ❑ Owner applies for planning permission
- ❑ Permission turned down, enforcement order obtained to prevent fishing – on the grounds of poor visibility at access
- ❑ Owner appeals on “MfS visibility grounds”
- ❑ De-restricted? narrow rural road with substandard visib
- ❑ Appeal allowed with some restriction on use

Decision appears to be based on the principle that the research in MfS has a universal application



Designers' interpretation – left slip from trunk road



Please also note that 33m is the stopping sight distance advised under the latest research included within Manual for Streets for 40 kph (25mph). For roundabout circulatory traffic this could be considered to be a reasonable assessment of 85% speed.

The laws of physics.....

- ❑ Science is science, so does MfS apply to higher speed limits?
- ❑ $SSD = vt + v^2/2d$
- ❑but t is a perception/ reaction time with a strong human element
- ❑ If MfS has universal application we might anticipate a similar degree of compliance with all speed limits



Vehicle speeds in GB 2005

Speed limit	% drivers over limit
30	50%
40	26%
60	11%
70	49%
Mways	56%

Source: DfT Transport Stats Bulletin



Hampshire CC internal note

- ❑ *“Application of MfS criteria in relation to other aspects of junction design or new accesses with the existing network continues to be formulated. Until HCC issues new policy, non-compliance with DMRB will be deemed a departure from standard”*



TRL research for MfS – Is it consistent & representative?



TRL 661 – research for MfS

- ❑ Y distance visibility effect on speed
 - ❑ 110m reduced to 20m reduces speed by 5 - 11mph
 - ❑ 5mph – manual counts
 - ❑ 11mph – automatic counts
- ❑ *Important part of the re-assurance for the reduced Y distance*



How can this be....?

- ❑ Does the TRL research on forward visibility to junctions imply that the reduction in visibility (and therefore speed) will be caused by a twisty horizontal alignment?
 - ❑ If so, this result is not a function of visibility
- ❑ Or does the research imply that the reduction in speed occurs because the drivers are familiar with the layout and therefore slow down at “bad” junctions
 - ❑ If so, this result may not be representative, certainly not of busier 30mph and 40 mph roads where there are less local drivers



TRL 661 research for MfS

- ❑ Speed /flow data based on observations through GB urban areas
- ❑ “the results can be considered to be relevant for developments such as shown in Fig 4.4, and NOT for those with GRID layouts such as Belgravia (see Fig 4.5) with wide roads and larger visibilities”

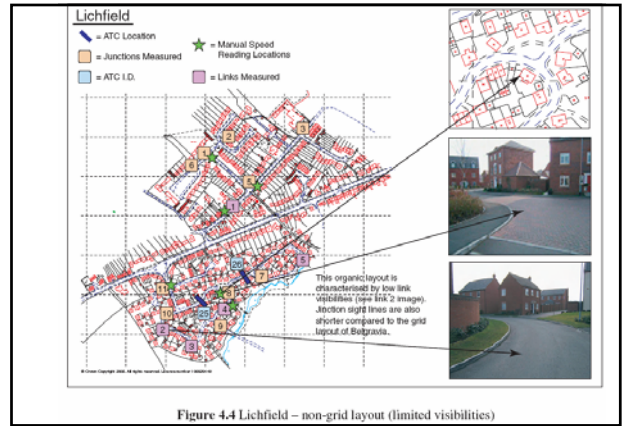


Figure 4.4 Lichfield – non-grid layout (limited visibilities)

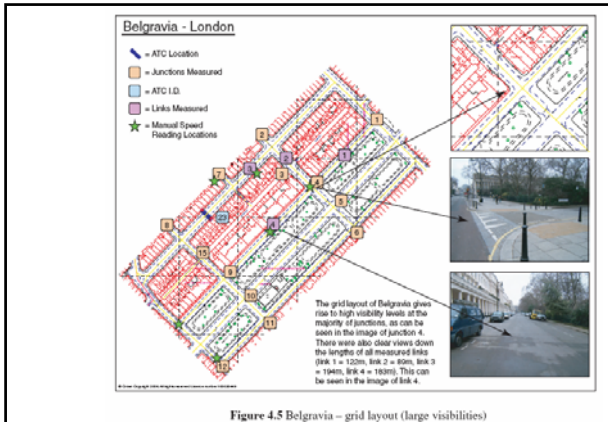


Figure 4.5 Belgravia – grid layout (large visibilities)

TRL 661 research for MfS

- ❑ “Belgravia was anomalous....had a GRID layout which resulted in large visibilities on the links and at junctions....wide roads resulting in high vehicle speeds”
- ❑ “it is not surprising that Belgravia also has anomalous accident data....of the 131 accidents occurring on all 19 sites, 65 occurred within Belgravia”
- ❑ Consequently, Belgravia was excluded from the analysis

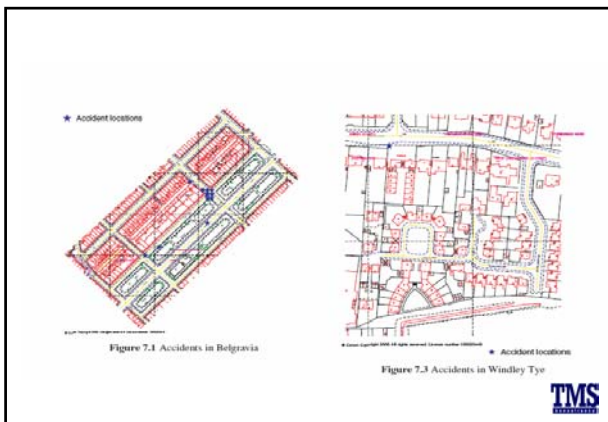
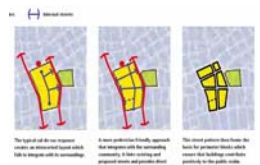


Figure 7.1 Accidents in Belgravia

Figure 7.3 Accidents in Windley Tye

MfS Guidance

- ❑ “street networks should be permeable....research (TRL661) shows that there is no significant difference in collision risk attributable to more permeable street layouts”



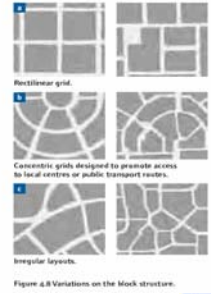
MfS Guidance

- “ areas....should be more evenly distributed....so that the overall layout encourages access by walking and cycling....(Fig 4.4)”



MfS Guidance

- “ the layouts in Fig 4.8, and variations on them,are recommended when planning residential and mixed use neighbourhoods”



MfS Guidance

- “ a distinctive feature of the Hulme development is the adherence to a linear GRID form. Raised tables at junctions reduce speed....”
- But many LHAs now under pressure to remove road humps



Collisions – is there a problem anyway?



Pull-out collisions at junctions

- TRL 661: “of the sites studied in the preparation of this manual, no relationship was found between SSDs and casualties” (NB Belgravia excluded and all but 1 of sites had ave speeds of <20mph and less than 1500vpd)
- Are they representative?

Pull-out collisions in Warwickshire

- How many 30mph urban T and X road junctions are there?
- How many have crashes?
- How many crashes relate to poor visibility?
- Is this level of risk a problem?
- * WCC has 9 bends with 1or more loss of control crash per yr

	No. Junctions
>1 pull out collision each year*	2
4 pull out collisions in 5 years	0
3 pull out collisions in 5 years	12
2 pull out collisions in 5 years	28
1 pull out collisions in 5 years	228

Streetscape – are we breaking the law?



TMS

MfS is pro-streetscape

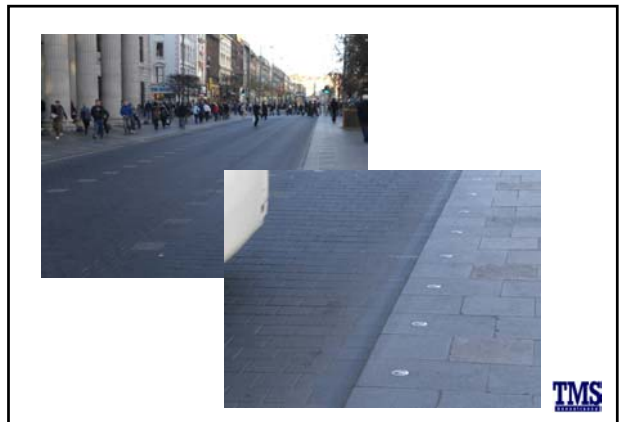
- ❑ MfS: "Safety Auditors encourage designs thatperform poorly in terms of streetscape quality"...(by segregating vulnerable road users from road traffic)
- ❑ Guide Dogs for Blind Assoc: "shared surfaces discriminate against disabled people, effectively excluding them from the street environment"

TMS

Streetscape issue?

- ❑ 2005 DDA
 - ❑ "Unlawful to treat someone less favourably than others because they have an impairment"
 - ❑ This Act Applies discrimination legislation to the exercise of public functions e.g. planning and highway

TMS



TMS

Quality Audit – Road Safety role diminished?

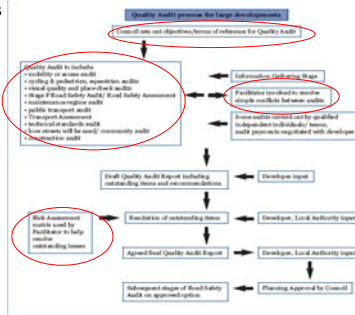


MfS (draft) attitude to RSA

- ❑ “RSA should be replaced by more broadly based QAs that assess how well a design meets the objectives that have been set”
- ❑ “Many designers expressed concern over the present approach to RSA...there have been a number of problems with the process in the context of streets”

Quality Audit

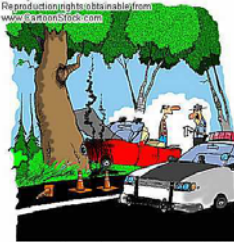
- ❑ Quality Audit is a series of assessments including RSA
- ❑ managed by LA in conjunction with developer
- ❑ facilitated by consultant?
- ❑ to include comparative assessments of risk?



(IHT RSA Guidelines)

Summing up....

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"I was sending an email to a client from my laptop when I spilled the coffee I was drinking, while I was on my cell phone, so you see, either, it won't be fun."

Summary

- ❑ X distance - Is 2.4m enough?
 - ❑ At the margins, for some vehicles, NO its not
- ❑ Y distance - Whose reactions times are they?
 - ❑ Averages for all drivers, beyond those found in simulation scenarios, but may not account for all real world situations
- ❑ SSD – “Safety” or “comfort” margin?
 - ❑ Some situations push the wide comfort margin close to emergency braking
- ❑ Beyond streets – Does the science still apply?
 - ❑ Some concerns due to human factors in reaction time

Summary

- ❑ TRL research – Is it consistent & representative?
 - ❑ Issues in both respects
- ❑ Collisions – is there a problem anyway?
 - ❑ Not as much as some think....but there could be more “sub-standard” junctions in the future
- ❑ Shared use – are we breaking the law?
 - ❑ Possibly, particularly if consultation inadequate
- ❑ Quality Audit – Road Safety role diminished?
 - ❑ Client role is revised, not that of RS Auditor. Less emphasis on safety in some situations