



HGV Evaluation

New vehicle research



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Background

Between 2008 and 2013, 55% of cycling fatalities involved an HGV

HGVs were disproportionately represented in road fatalities within London. TfL's investigations found that some HGVs have larger blind spots than others, construction vehicles in particular. TfL commissioned the Construction Logistics and Cyclist Safety (CLOCS) report to find out why. One of the key findings was that blind spots on these vehicles could be 50% greater than on general haulage vehicles.

TfL is working with vehicle manufacturers and HGV operators to explore how to improve driver vision and lower the cab height to encourage a safer design.

- Leading vehicle manufacturers have created over 14 vehicles which form part of a fully operational safer urban vehicle 'demonstration fleet'. These were designed in accordance with TfL's Safer Lorry Scheme and Work Related Road Risk (WRRR) requirements
- The 'demonstration fleet' have additional safety features such as increased window size, additional windows in passenger doors, lowered cabs and side guards

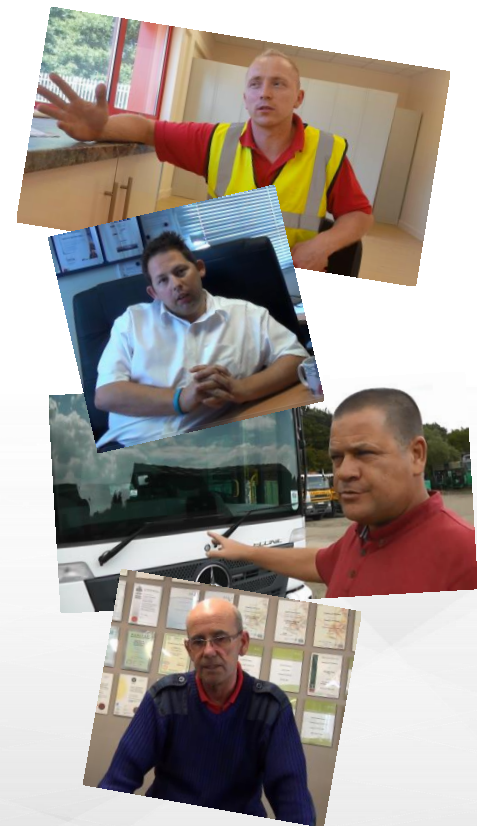


Research objectives

The purpose of this research is to evaluate the new HGVs in operation across London. The evaluation will compare the new vehicles with the existing ones that drivers and operators are familiar with.

Specifically this research, and evaluation of the safer urban vehicle 'demonstration fleet', aims to:

- Understand the **differences across the categories** of vehicle in terms of direct driver vision (including understanding the impact of the size of **direct vision** feature i.e. size of window in door), gathering the views of **drivers, operator's transport managers and senior management**
- Understand how other factors, such as **age, experience, company size, level of training**, can impact the views of the drivers, operator's transport managers and senior management towards the vehicles
- Investigate the **advantages** and **disadvantages** of the **safety features of the 'demonstration fleet'**, understanding how they affect the operational capability of the vehicles
- Explore how each of the categories of vehicle could be **best positioned to drivers, fleet operators transport managers and senior management** to facilitate acceptance





The HGV evaluation utilised a mixed methodology

A multi-staged qualitative and quantitative research design was employed



Before vehicle arrives



Pre-trial

30-45min tele depth:

Exploring expectations of the upcoming trial, and thoughts on their current vehicle



Once vehicle arrives



Mid Trial

1hr – 1hr 15 interview at depot: Critiquing the vehicle and their experience
10 minute questionnaire: Quantifying reactions to the trial vehicles



After the trial ends/after purchase



Post Trial

30min tele depth:

Reflecting on their overall experience with the new vehicle and how their old vehicle compares

10 drivers / managers took part in a Go-Pro task – wearing the camera during an urban drive in the new vehicle

* Please note for this report we have 50 responses; 32 for Category C and 18 for Category D so results shown by vehicle type should be used as indicative only

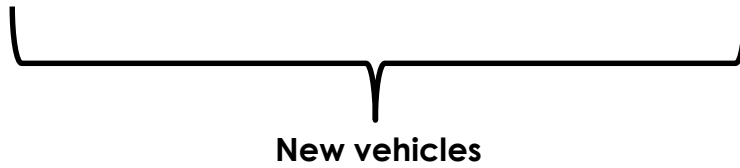




These new vehicles being evaluated are all category C or D

There are four categories of HGV that will need to be considered during this research, these can be categorised as:

Comparator	Existing HGVs		New specification HGVs: 'demonstration fleet'	
Category Ref.	A	B	C	D
Description	Off-road (A1) or on-road (A2) HGVs without retrofit safety equipment	Off-road (B1) or on-road (B2) HGVs with retrofit WRRR safety equipment e.g. cameras, sensors	HGVs with lowered cab heights and increased direct vision through glass in the passenger door Note: Fitted with all Cat B features	HGVs with low entry cabs and panoramic Note: Fitted with all Cat B features



Summary findings



1

Drivers are initially sceptical about the new vehicles, particularly category Ds, based on how they look. There is concern about how the new vehicles will perform operationally and how safe they will be

2

The combination of lowered cab, 'extra glass' and high spec safety features mean that drivers feel more aware of Vulnerable Road Users (VRUs) in these new vehicles

3

In urban settings these new vehicles are felt to be the best there are by managers. Performance on sites were good provided they were 'hard standing'. Sites with more rugged terrains could cause issues operationally

4

'Giving it a go' is felt to be the best way to convince drivers and managers of the benefits of the vehicles

All vehicles, regardless of category were felt to be an improvement in terms of increasing driver awareness of VRUs

Current vehicles performance with VRUs and expectations of the vehicle



Pre-trial

We spoke to drivers before they got their demonstration vehicles...

We asked them about their current vehicles and what their expectations are for the upcoming vehicle trial

Drivers are familiar with the set up of their current vehicles

A good vehicle is comfortable and enables them to carry out their work

High
position

Reliable

Comfortable

Lets you
do your
job

Drivers' Must Haves:

Ease of Access
Transmission Type
Mirror Placement
Storage Radio Rough Terrain Performance
Aesthetics **Driving Comfort** Air Con
Seat Comfort Power Height
In Cab Tech Ease of Cleaning



My old vehicle had a cool box that you could keep your lunch in, it makes all the difference when you're in a hot cab all day

Driver



Drivers generally feel that their current vehicles are performing well in terms of visibility of vulnerable road users



“ If you have your mirrors set up right and check them enough you can see everything. I don't see how you could improve it really
Driver ”

There have been so many recent improvements in HGVs in terms of visibility that drivers can't envisage how this can be improved.

The introduction of cameras, additional mirrors, drivers feel enable them to get good all round vision.

Drivers feel that training and current safety features mean that they have good visibility of VRUs.



Managers in contrast have more business focused needs from vehicles

For managers, it's **all about the business**; they want vehicles that will **do the job as well**, and as **cost effectively**, as possible

Safety

Managers want vehicles to adhere to industry safety standards to help from a business perspective as well as protect VRUs and drivers

Cost

Vehicles must be cost effective. They must be fuel efficient, reliable and durable

Corporate image

The vehicles must be able to function within urban areas safely and incurring minimal complaints

Driver performance/ functionality

They want drivers to feel they can do their job well. Vehicles must be able to operate both in urban and on site settings



CLOCs vehicles are appealing for managers

Improved safety can give an edge when tendering for work

Operators with previous experiences of near misses or fatalities want to safeguard for the future

Safety perceptions / fitting with 'safe' brand image. Looking safer can lesson complaints received



Want to have the latest technology

Protect VRUs on the roads

Hopes that extra precautions will lower insurance costs

Feel they need to adapt to the rapid growth of London and the pressure on the road network

Driver concerns can be grouped broadly under 3 headings

Driver safety

1



Functionality

2



Appearance

3





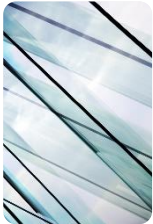
Before they see the vehicle the idea of being lower with more glass leaves drivers doubtful

Height



- They feel their current vehicle gives them better vision over the top of other vehicles, they can see dangers ahead of them
- Lower vehicles make them feel more vulnerable. They feel that in the event of a collision a lower vehicle will come off worse than a higher vehicle.

Glass



- Glass is not seen as a strong material if a crash were to happen; they feel more secure having solid metal instead, even though the glass is reinforced
- Extra glass makes them feel exposed and out in the open



Please note that concerns around glass and height are felt most strongly in the Class D vehicles (Mercedes and Dennis Eagle). For other vehicle classes this is much less of a concern



Drivers are concerned that these new vehicles will not allow them to do their jobs as effectively as their original vehicles

Clearance



- Drivers worry that having a LEC might limit on site use. Sites often have large rubble and piles of bricks laying around, which their current vehicles would clear
- Concern that damage to the undercarriage could be a regular occurrence

Power



- Many have heard that to lower cabs the engine has to be downsized. Some worry that the vehicle will be underpowered, struggling on steep slopes and soft ground

Visibility



- Some equate being lower with seeing less, especially when looking straight ahead. Subsequently they worry that the new vehicles will actually limit their vision

Sensory overload



- Some have perceptions that the new vehicles will have even more sensors and cameras for them to be checking. They worry that their attention will be stretched too far



Drivers have a very set idea of how an HGV 'should' look and feel and the new vehicles challenge this

Traditional design



- HGVs designs have remained largely unchanged for years
- The idea of being lower seems 'unnatural' and totally different to what they are used to
- Many drivers are of the opinion that HGVs are designed the way they are for a reason. Consequently they have low expectations for the new vehicles which look so unlike traditional HGVs, they don't believe they will work like a typical vehicle

Dustcart/ municipal



- Category D vehicles are compared to refuse (dustcarts) and municipal vehicles. These are not considered good looking vehicles and there is an element of embarrassment at being seen in a 'dustcart'



Initially there is a lack of confidence in the new design

Belief in current design

- Many drivers struggle when asked what they think could be changed in their current vehicles to protect VRUs
- Most believe their current visibility can't be improved

Low expectations of new vehicle

- Expectations of specific features, like glass panels or lowered cabs, are low; drivers are doubtful about the difference these can make to visibility or how well it will perform operationally

No need for change

- Many have huge faith in their existing/current mirror/camera set up they don't always see the need for improvement

Unfamiliarity

- Drivers and managers would feel more comfortable if these new vehicles had a higher presence on the road. Concern they will be a 'phase' that will not catch on, and as such be a waste of money



Drivers **feel like** they are **already doing as much as can be done**. They have up to 6 mirrors, a camera monitor, audible sensors and many other features to be aware of. All of this has made their **job increasingly complex**, they wonder **what more they can do**.

The highest resistance tends to come from those that have been driving longer

Current vehicles visibility of VRUs is good, as such there are low expectations for the new vehicles to better this

1 Drivers feel their current vehicles are performing well in terms of seeing VRUs

2 Drivers have some apprehensions about the demo vehicles before they arrive



3 Managers are drawn to trialling these vehicles for a variety of reasons

Arrived at the depot: First impressions before driving



Mid-trial

We asked drivers what they thought when they first saw the vehicle at the depot...

They gave us their initial thoughts on the vehicle before they actually drove it

Initial impressions: Based on its appearance some drivers are sceptical...

Managers talk of hearing some drivers referring to new Category D vehicles in a dismissive manner

Immediate associations are primarily with the **'dustcart'**

There is a **lack of buzz or excitement** around driving a vehicle with such a strong association with refuse collection

The vehicle **gets a fair amount of attention on the depot floor** for **looking different**

This negative pre-conception **is more apparent in the older drivers/ longer serving drivers** (50+). Younger, newer drivers are more positive. They are more open to new innovations, technology and safety features.



I hear the drivers referring to it as the Dustcart. There is a bit of a stigma around it
Transport Manager



...leading to low expectations around driving experience

Drivers are less sceptical about the Category C vehicles when they first see them

This is due to them looking more traditional in terms of their design

As such drivers don't feel as though there will be a huge difference between this and their current vehicle.

Concerns about the vehicle are limited to the lowered height and how that may impact their work performance and ability to see the road ahead. However, this is not felt to the same extent as with the category D vehicles.



“

It looks a bit lower, but other than that it looks like a typical truck

Transport Manager

”

Initial questions from drivers are mostly about potential operational issues...



Will I be able to get onto landfill sites?



Will it be as powerful as my normal vehicle?



Will it work on virgin sites?



Will I get a good view of the road ahead like in my old vehicle?



In more rural areas will I be able to see over hedges?



Impact of the demonstration vehicles: Vehicle design impact



Mid-trial

We went to visit operators during their trial to understand their experience of the vehicle...

**Drivers had been using the demonstration vehicles
in place of their typical vehicles**

There are a number of things to consider when viewing findings from the mid trials



Previous vehicle/safety equipment:

Drivers are all coming from different starting points in terms of the safety equipment and vehicles they are familiar with



No two drivers are the same:

All have different levels of experience, training and varying ages



Different vehicles have different needs:

Typical journeys vary hugely for different types of operator and vehicle types. The needs of a tipper differ from a mixer





The new vehicles were built with additional safety features

Key Differences



VOLVO

SCANIA

Category C

MAN

DAF

Higher visibility door / windows

Redesigned A pillars

Low Entry Cab

Standard Features include:

- Close proximity mirrors: V/VI
- Side Guards
- Left turn audible warnings
- VRU warning signage

Varying specifications across manufacturers:

- Cameras
- Side scanners/sensors
- Lane Departure Warning
- Rain Sense
- ADAS (assisted breaking)



Mercedes-Benz

Category D

DENNIS EAGLE

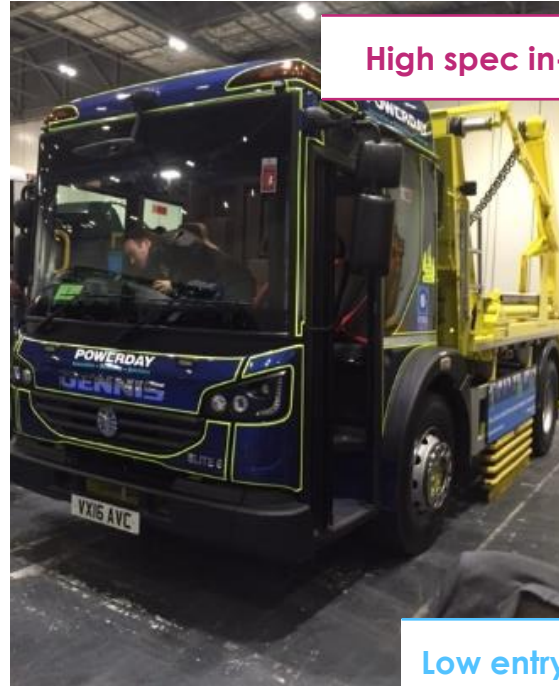
RosRoca

Mercedes Econic



Bus style doors

Dennis Eagle



High spec in-cab safety features

Low entry cab

On road: Visibility is excellent

These vehicles are thought to give great all round vision

The bus style doors and increased glass combined with a low entry cab offer vast, panoramic views when driving enabling VRUs to be easily seen



“

I wouldn't want to go back in another tipper, I'd much rather be this low down. I can't see why all lorries aren't like this

Driver

”

On site: Some operational issues on softer grounded sites



We are happy to purchase more of these (Econics) but we won't be doing that until site conditions can be guaranteed and we aren't happy to do this at our expense

Transport Manager



On road there is no doubt that both of these vehicles increase visibility of VRUs and give best all round vision.

These vehicles work well on roads and on sites with 'hard standing', and some claim that the added visibility actually enables them to see obstacles on the ground better.

However, on more rugged sites these vehicles can have some operational issues. There were instances of vehicles getting stuck and the underside of the vehicle getting scratched and damaged.

Whilst the body of the vehicle raises up the axles remain in the same place and are still susceptible to damage. Raising the body can give a false sense of ground clearance.

Landfill sites, quarries etc. in particular are difficult for the category D vehicles to manoeuvre.

Positives



- Significantly improved vision, you can see a child walking past your vehicle, and cyclists by the passenger door
- Can see ground obstructions on site
- Enables easy, direct eye contact with VRUs
- Makes drivers more accessible. It creates a more 'human' interaction between HGV and VRUs
- Drivers prefer doing left hand turns in these vehicles, due to the extra visibility on the nearside
- Additional window behind driver gives increased visibility

Very good all round visibility and comfortable driving position
Driver

Very easy to drive with good all round visibility but it needs modification for construction industry
Driver

Negatives



- Operational issues on certain sites
- When it gets sunny it gets very hot in the cab due to all the extra glass. **This could be fixed with some window tinting**
- Issue with ventilation as the loss of window in passenger door means a loss of through draft. Can cause steaming issues when driving and taking breaks
- Cleaning poses a problem. Bus style door requires frequent cleaning, particularly when going on site. The top glass is difficult to reach, most drivers require a ladder of some sort
- Parts are an issue, a long wait for them (3-5 week waiting list) and very expensive to get them fast tracked

“

Driver's door too small and the driver's window too small
Driver

”

“

I don't have a better visibility on left corner
Driver

”

Q8. If you have had any issues with the trial vehicle, what have they been? Base: Category D drivers (18)

Category D vehicles offer great all round vision and excel in the urban environment

1 Vision is considered an improvement among all drivers

2 Vehicles are felt to be high spec and all features aid visibility of VRUs



3 The lowered height can cause some issues on site when there are particularly poor surface conditions

Category C vehicles: Overview

Varying window size and height meant that feedback varied across the manufacturers



Volvo



Scania



MAN*



DAF



Renault

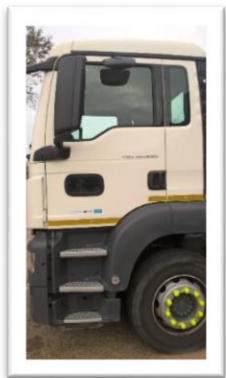
Window in nearside door panel

High spec in-cab safety features

Low entry cab

*Please note the MAN nearside door window size increased in 2016

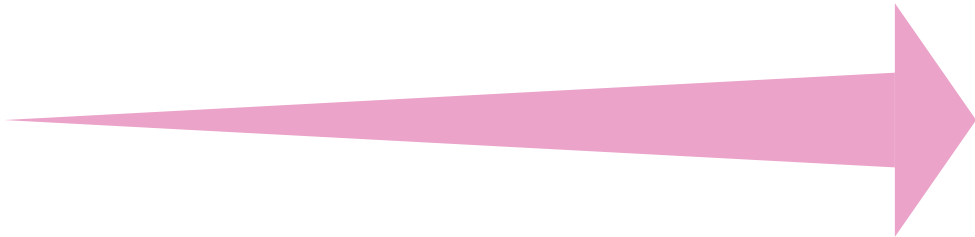
Window size: The larger the side window the better for drivers in terms of VRU visibility



Original window on MAN

Least beneficial for seeing VRUs

Most beneficial for seeing VRUs



DAF



Having a larger window means less chance of the window becoming obstructed by items or passengers in the cab. It also brings the window more into the drivers 'sweep' of vision, improving ease of use

On road: Combined with the lower entry cab the extra visibility provided by clear doors helped drivers spot VRUs



Door panel



Bus style door

- ✓ Combined with a lower entry cab glass door panels enabled drivers to make **direct eye contact**
- ✓ All drivers all felt that the addition of the window panel **positively impacted their vision** and **awareness of VRUs**



Those driving the window panel vehicles mention that it can potentially be obstructed by coats, passengers etc. In general those in **door panel vehicles make less use of the window**

There is felt to be less of a dramatic change to their previous vehicle visibility compared with bus style door vehicles



On site: Performance on site varied depending on the function of the vehicle

- ✓ On road all vehicles perform well and increase visibility of VRUs
- ✓ Some feel that the added glass and lowered height enable them to see obstacles on the site



As with category 'D', vehicles work well on sites with 'hard standing', but there are operational issues for those required to visit rougher sites such as quarries or landfill. Drivers report frequent issues on harsher terrains, which either results in them not going on to the site or becoming stuck.

Tipping vehicles in particular appeared to have issues as many required the body to be lowered before tipping. The underrun bars acted as anchors in the tipped material and uneven ground, and residual tipping materials became stuck underneath the vehicle.





Positives

- Useful aid for seeing VRUs in traffic
- Great aid for turning left
- Can allow direct vision
- Easy to use at a glance
- Looks more like a traditional HGV
- Generally more able to work on more rugged terrains
- Looks more like a traditional HGV, drivers have less cynicism about this design

“

I have improved vision, and feel safe and more confident

Driver

”

“

Everyone keeps saying “its got the window in the door” I don't think it changes much. Its all the other features I that I think help you see VRUs.

Driver

”

“

The vehicle was a joy to drive and because of all the safety features and cameras made me feel very confident in driving in London.

Well done TfL!

Driver

”

Q14. How likely are you to recommend the trial vehicle to other driver? Q15. Why do you say that? Base: Category C drivers (32)

Negatives



- Small windows (1st MAN vehicle) give little visual benefit to drivers
- It can difficult to get in the habit of checking the window, alongside all of the other checks
- Easy to obscure the view, with a coat, passenger, hard hat
- Window cannot be opened; this can cause steam build which can obscure mirrors; restrict through draft; make it difficult to hear traffic

If I put anything on the passenger seat the window is blocked

Driver

The window is too small to be helpful. You can't see anything through it

Driver (1st MAN)

Category C vehicles offer improved vision on traditional HGVs, the larger the window the better

1 Vision is considered an improvement across vehicles

2 The larger the window the more improved the drivers ability to see VRUs becomes



3 On site the lowered height can cause issues, particularly for tipping vehicles

Impact of the demonstration vehicles: Driver experience



Mid-trial

We asked drivers to tell us about their experience of driving the vehicle...

We asked them to tell us what it was like when they first got behind the wheel

Once drivers get behind the wheel of these vehicles their opinions change for the better

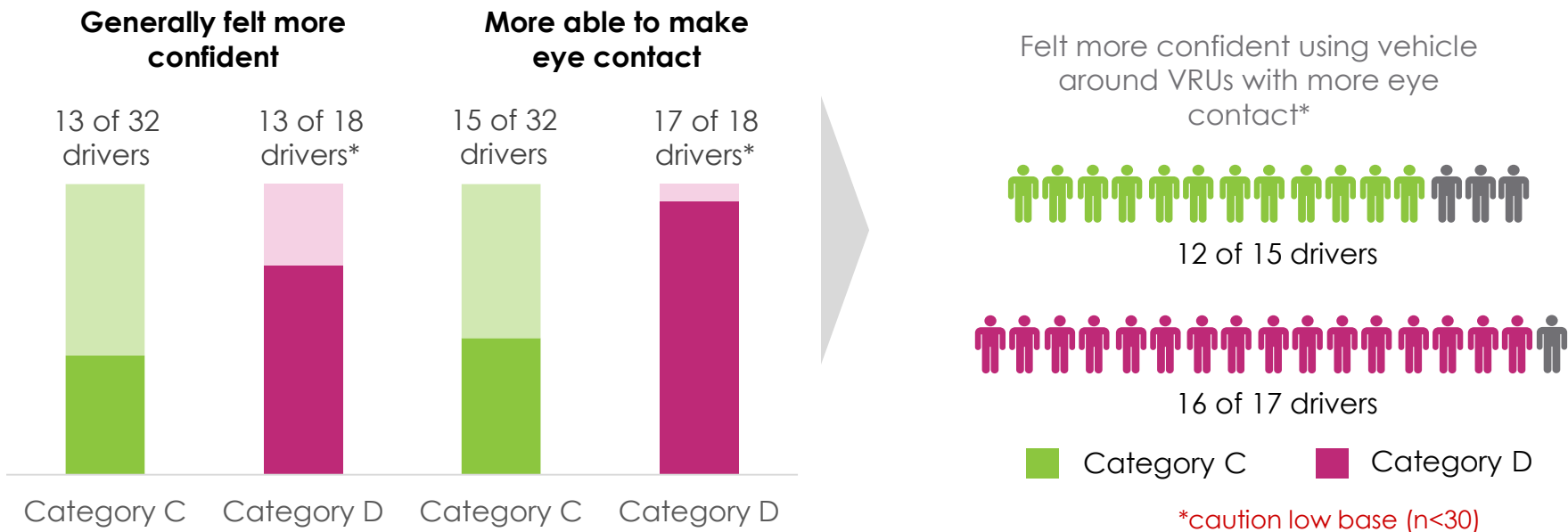
The improved visibility and safety features are an eye opener

- Before getting in the vehicle many drivers believed their current vehicles visibility could not be improved, however **ALL drivers sing the praises of the increased vision** provided by the new vehicles
- Lowering the height of the vehicle has a positive impact on visibility. This is **noted across all vehicle functions** (Tipper, Skip loader, Mixer) when in urban environments
- A great asset of the new vehicle is the improved **direct vision with VRUs**



Improved visibility and confidence with VRUs was stronger with the Category D vehicles

Feelings of confidence with VRUs*



Q11. Generally, are you more confident driving near cyclists, pedestrians or motorcyclists in the trial vehicle, compared to your normal vehicle? Base: Category C (32), Category D (18), Q12a. Do you feel you can make eye contact with cyclists, pedestrians and motorcyclists more easily in the trial vehicle? Base: Category C (32), Category D (18) Q12b. Do you find this increased eye contact with cyclists, pedestrians and motorcyclists makes the vehicle safer to use around cyclists, pedestrians and motorcyclists? Base: those who found it easier to make eye contact Category C (15) Category D (17)

Drivers view

Category D

Mercedes Econic – Go Pro Footage



The lowered cab and increased glass is a great tool in protecting VRUs

- Whilst many had reservations about the lowered cab and were concerned about **losing their view of the road ahead**, it was acknowledged that the loss was minimal. The **positives of being lower outweighed the negatives**
- Being lower helped drivers see in front of the cab and through the nearside door, areas which they couldn't previously see - vital for **increasing awareness of VRUs**
- The ability to make **direct eye contact** with vulnerable road users makes a huge difference not only in awareness but also in how the cyclists and drivers interact



The lower cab didn't bother me, in fact it was quite helpful on some sites to help you judge how close obstacles were

Driver



Only having one drive axle can be an issue for drivers

Being low combined with only one drive axle caused problems getting on site



To get these lower vehicles on site, it is felt that having more than one drive axle is a benefit.

The Econic was praised for having two, to enable it to get onto sites.

Additionally rear-axle steering is felt to be a benefit for getting into tight spaces, cramped sites and driving in urban areas

Driver experiences in these vehicles were generally positive, particularly in urban areas

1 Drivers are initially concerned about the operational ability of these new vehicles, particularly Category D

2 Once drivers get behind the wheel they are won over by the extra vision

3 Direct eye contact with VRUs is increased in these vehicles, which is a valuable asset for drivers



Impact of the demonstration vehicles: Safety features



Mid-trial

We gathered feedback on both existing and new demo features...



We asked drivers and transport managers to evaluate their standard vehicle compared with the features / specifications of new vehicles...

Sensors Cameras Additional Windows Mirrors Side Guards ADAS Lane Departure Warnings



Most issues with new safety features, such as the height and the added glass, were experienced on construction sites

Environments where drivers experienced issues with the new safety features

Category C
(32)

Category D
(18)



Off road construction sites



Congestion charging zone in London



Outside congestion charging zone in London



Other urban areas



Long distance journeys



The main safety features drivers did not have on their current vehicle were the lower cab height and the additional glass in the cab

Q7. Compared to the vehicle you normally drive, have the safety features on the trial vehicle caused any issues on any of the following environments?
Base: Category C (32), Category D (18)



Cameras: high spec cameras hugely aid driver awareness

40 out of 50 drivers rated blind spot cameras as good or excellent for safety

- **While direct vision is mostly preferred**, drivers could not imagine driving without the aid of cameras– even the older drivers who have begun to rely on them more
- The **intelligent switching of cameras increase their ease of use**, for example switching to the reverse view when moving into reverse gear, or near side when indicating left
- Drivers also like the option **to select their own camera view** when driving. Those in more **urban environments tend to prefer** a default **near side view**, while those who spend more time on **motorways will often opt for rear view**
- **Important for the screen to be within eye line** to avoid having to take eyes off the road. For some the screen is too low and means you need to take your eyes off the road. As such they tend to depend on the mirrors
- **Mirrors narrowly edge out cameras** for usefulness when driving, however both are seen as essential and cameras play a huge role in manoeuvring



Camera monitors incorporated into the dashboard as in the Eonic are preferred as they do not create a blind spot but are still easily within drivers field of vision

Q13. Blind spot cameras (How would you rate each of following safety features of the trial vehicle in terms of safety, where 1 is poor and 5 is excellent?)
Base: All drivers(50)

Mirrors (V and VI): Being lower and having added glass makes blind spots smaller but these mirrors are still useful

37 out of 50 drivers rated close proximity mirrors as good or excellent for safety

- The Class V and VI mirrors are helpful in **minimising blind spots**
- Some believe that these mirrors would benefit from being larger, particularly the class V which could span the length of the door
- **Sun blinds cover the class VI cyclops mirrors when pulled down.** Mounting these mirrors towards the near side avoids this, and many drivers believe this placement better reduces blind spots in that problem area (the front near side corner)

Drivers tend to have a **particular set up of mirrors** that they feel most confident with. If their vehicle doesn't work for them they will customise the mirrors to a more familiar set up



Q13. Close proximity mirrors (How would you rate each of following safety features of the trial vehicle in terms of safety, where 1 is poor and 5 is excellent?) Base: All drivers (50)

Side Guards: Drivers appreciate the addition of side guards



- Side guards are felt to be useful in **covering a key incident area** with VRUs
 - The middle of the vehicle is a high risk area for cyclists
- Having these guards is reassuring for drivers
- However, in the Volvo (retrofit), to the left, it was felt the **lower hanging guards were a cause for concern** as they may be damaged when on rougher terrain



Dennis Eagle's side guard with bristles are liked. They add an element of reassurance that VRUs cannot be swept under the vehicle.

There are **concerns over installation cost and lifespan**, as well as **usability** issues such as whether drivers will remember/have the time to raise and lower them



“

It's the middle of the vehicle that is my biggest worry with VRUs. Having these here does affect how the vehicle drives but gives you more peace of mind

Driver

”

Audible left turn

- This safety feature had mixed reviews but no drivers were negatively impacted by its addition
- Some felt it was valuable in warning VRUs about a left turn
- Others claim that it doesn't impact cyclist behaviour as many wear headphones or simply ignore



I once had the left turn warning on, stuck my head out the window and saw a cyclist leaning on my vehicle! They don't listen!

Driver



- Felt to be more effective in conjunction with cycle specific turn warning lights (as on the Dennis Eagle skip loader)

VRU warning signage

- Limited but valuable impact
 - Signage on the sides and rear of the vehicles aimed at warning cyclists not to pull along the near side when a vehicle is turning
 - Most drivers feel these are largely ignored by cyclists but believe that even if only a small number take notice of them they are worth having
- Illuminated signage is thought to be an improvement, for example the light up cyclist signage on the Dennis Eagle as it feels more targeted



Lane departure warning

- This is seen as a nice addition but is not entirely trusted
 - Drivers like knowing this is there 'just in case' but are careful not to become dependent on it. This is not something that should have to be used regularly
 - Would be more applicable to long distance hauliers on motorways
- Seen as something for outside of London for those doing larger distances on motor ways where concentration is more likely to wane

“

Keeping the vehicle in lane... that's what I'm here for!

Driver

”



ADAS breaking

- Has to be set up properly
 - Some drivers initially complained that they couldn't crawl forwards in traffic without the brakes cutting in. However this turned out to be a settings issue which was resolved
 - Parked cars on the road caused problems, pulling out and around them triggered the breaking
- Drivers expect it to be more sensitive
 - Many were disappointed with the ADAS inability to register cyclists or motor bikes. They felt these were the road users it would benefit the most

“

I know my lorry had this but to be honest I didn't really use it. It came on without me realising and almost stopped the lorry dead!

Driver

”



Side sensors: An extra line of defence in VRU awareness

31 out of 50 drivers rated side sensors as good or excellent for safety

- The warning sensors take some getting used to as **initially they can be overwhelming**
- However after a couple of drives checking mirrors when hearing **sensor warning becomes second nature** and is thought to be a benefit and great tool for increasing awareness of VRUs
- Whilst drivers **are happy to do a preventative check** multiple false alarms can cause driver desensitisation. It is important that inanimate objects (e.g. rails, bollards) do not regularly cause alerts

Some drivers say that they would prefer having different alert tones for each side of the vehicle, making follow up visual checks faster. However, this could risk overloading driver concentration

“

If a beep goes off you check your mirrors and see what's there. Even with the extra sensors on my vehicle it wasn't a problem its good to know what's around you and have a look

Driver

”

“

There is no harm in giving your mirrors an extra check

Driver

”

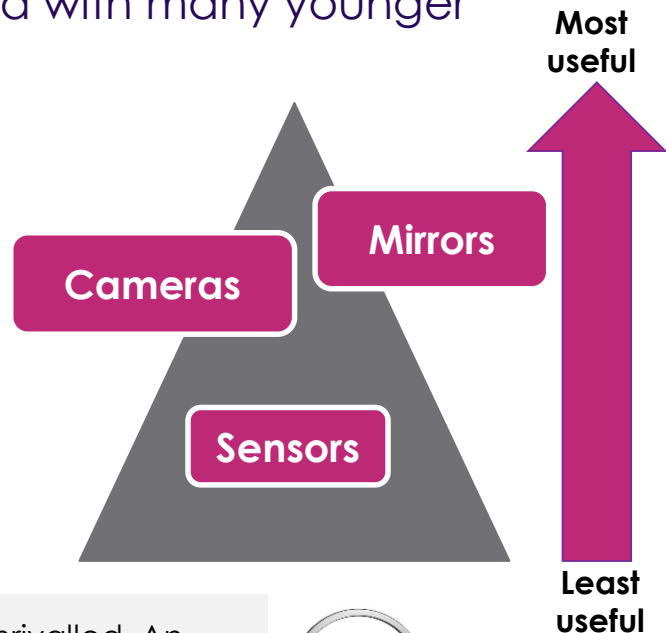


Q13. Side sensors/ scanners (How would you rate each of following safety features of the trial vehicle in terms of safety, where 1 is poor and 5 is excellent? Base: All drivers (50))

Which is the most useful feature for detecting VRUs?

Mirrors are the most ingrained and relied upon feature for all round awareness, however the near side camera comes a close second with many younger drivers actually beginning to favour cameras

- **Standard mirrors supported by the class V provide primary around vehicle awareness.** All other features play a secondary role filling gaps and enhancing views for driver ease
- **The near side and rear view camera help to fill gaps in driver visibility and enhance views of VRUs,** and as familiarity with class 5 increases so does reliance
- **Sensors are useful as an extra check,** however drivers do not rely on these due to them being unreliable on occasion and oversensitive



For close up detection, the 360 degree cameras on the MAN tipper are unrivalled. An ideal system for slow moving traffic. However their field is too narrow for advance warning





Most drivers felt more confident in their ability to see VRUs with the additional safety features

Mean score

2.88

2.77

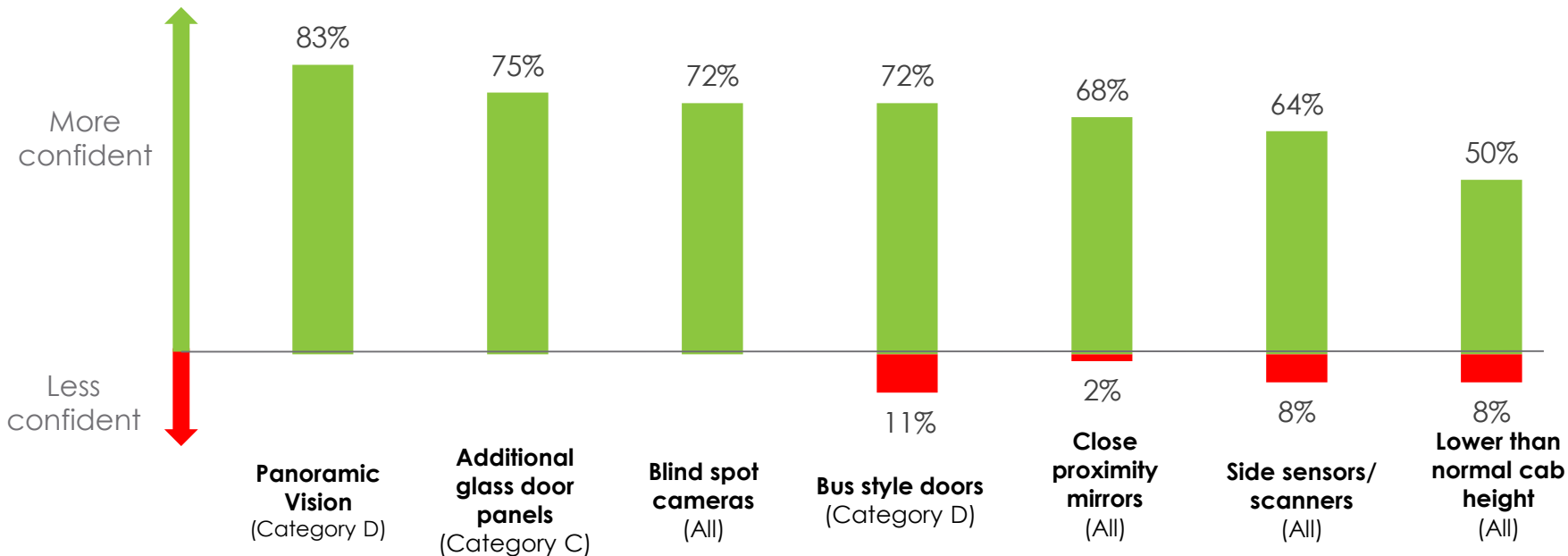
2.75

2.65

2.66

2.56

2.53



Q10. Do the safety features on your vehicle make you feel more confident or less confident that you can see pedestrians, cyclists or motorcyclists around the vehicle? Base: All respondents (50), Category C (32), Category D (18)



Safety features greatly enhance driver awareness of VRUs

1 Whilst direct vision is a valued asset for drivers mirrors and cameras are essential for detecting VRUs

2 Although there was initial concern that multiple safety features may cause driver overload, all claimed to adjust to the alerts



3 Any safety feature that could potentially detect a VRU was felt to be useful by drivers – however, they remain more sceptical of ‘driving aids’ e.g. ADAS breaking and Lane Departure warning

Purchasing considerations



Post Trial



Once their trial with the vehicle had ended we spoke to operators, asking them to summarise their experiences



Once drivers were back in their normal vehicles we asked them to retrospectively tell us about the highlights and lowlights of their trial

Overall, managers felt positively about the trial...

- The new vehicles were felt to increase visibility and awareness of vulnerable road users
- Managers saw the combination of the lower cab, higher vision and high spec safety features as an important step for manufacturers to improve safety
- Acknowledgement that for London driving, these vehicles are the way forward for operators
- These new vehicles also help clearly position operators as being at the cutting edge of safer driving and therefore improve relationships with local residents
- For some managers, this is enough to motivate investment in a vehicle



...Some were more resistant to purchase due to driver and operational concerns

There are some key questions that managers would like to know before they consider purchasing a vehicle

Knowing the answers to these questions before hand would reassure them

“
How will this vehicle work in the winter?
”

“
Do other operators use them?
”

“
Dual purpose vehicles, can it carry a variety of materials?
”

“
How high does the body rise? (To reassure that it can operate on rougher terrains)
”

“
Can it cope in urban and on-site settings?
”

“
How long will it last? What about resale?
”

Managers and drivers acknowledge that if site standards were improved then operational issues would be less of a concern



“

If site conditions were improved, I would happily buy a whole fleet of these
Transport Manager

”



TfL are conducting research into site standards, which looks to grade sites. This could help ensure that lower vehicles can avoid lower standard sites



Overall, there are a few key issues for drivers...

Practical issues with new windows/doors



Storage space and size of cab



Off road performance on harsher terrain



Too low



Driver issues: in detail

Practical issues with new windows/doors

- Drivers dislike the lack of working passenger window. In particular they miss the through draught for ventilation
- Near-side windows are also opened typically for communication purposes and hearing the road
- Additionally there are concerns around keeping the extra glass clean, particularly category D

Storage space and size of cab

- Drivers can have specific needs for their cabs. Some vehicles cabs (e.g. Dennis Eagle) can feel too wide and make manoeuvring difficult
- Driver storage needs also need to be taken into consideration. Having somewhere to store, coats, bags, hard hats, paperwork, cleaning materials is important. Some drivers felt that some of these new vehicles did not have adequate storage space

Off road performance on harsher terrain

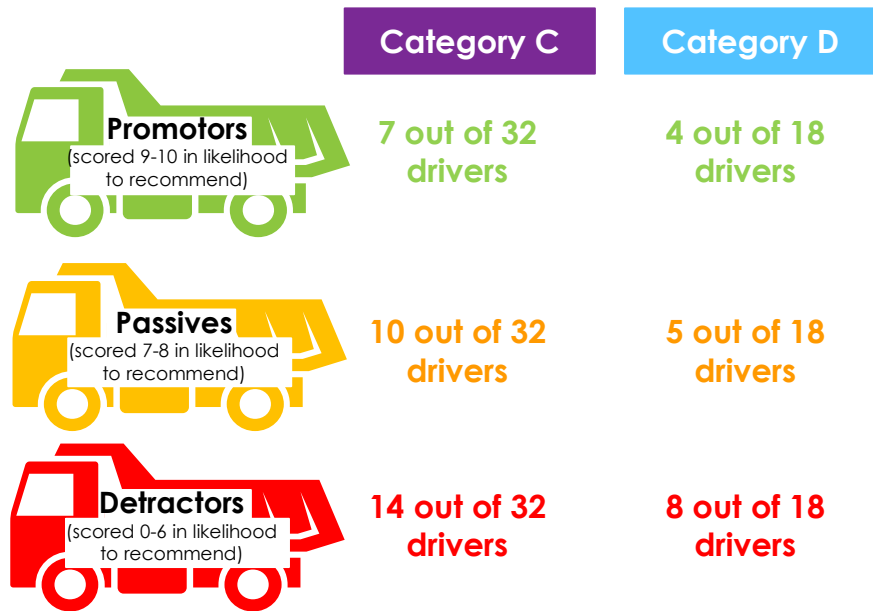
- Drivers feel that whilst on road and hard standing the vehicles perform well. Off these surfaces there is greater uncertainty for drivers due to the lower clearance. There are incidences of vehicles getting stuck on soft ground, in particular land fills and quarries
- Whilst the vehicles bodies can be raised up when on these terrains, the axle remains in the same place and can still get stuck
- Tipping vehicles, also can get stuck under their own 'tip'

Too low

- Some drivers disliked the driving position, feeling they were too low to see over traffic and plan for any upcoming obstacles or to see over and hedges etc
- There was also a sense that being high is how HGVs should be and feels more natural

Concerns about site conditions drove low recommendation score among drivers

Likelihood to recommend



“

The vehicle is too low for construction site work. The safety features it has (excluding the glass door panel) are the same as on the vehicles we already use

Driver, likelihood to recommend score: 5, Category C vehicle

”

“

It depends what kind of sites they go to, not that manoeuvrable for tight space sites

Driver, likelihood to recommend score: 6, Category D vehicle

”

*caution based on low sample size (n<30)

Q14. How likely are you to recommend the trial vehicle to other drivers or companies within the construction and other logistics industries? Q15. Why do you say that? Base: Category C (32) Category D (18)

Experiences of these vehicles were generally positive, particularly in urban areas

1

Managers generally feel positively about the new vehicles, although there are some operational issues due to site conditions

2

As these new types of vehicle roll out managers want reassurance about longevity and resale



3

Driver concerns and operational issues can be too much of a barrier for managers, resulting in them not feeling the vehicle is right for their business

Conclusions and recommendations



All vehicles trialled were felt to be a significant improvement in visibility and increasing awareness of VRUs

Regardless of category, even the most sceptical of drivers felt that the vehicles were a huge aid when driving on London roads

- ✓ Even though there was some scepticism, particularly around the category D vehicles, once driven in an urban setting there is a unanimous agreement that visibility improved.
- ✓ Whilst there may be some initial teething problems operationally, improved site standards would alleviate this issue.



The visibility on this vehicle is so good, I wouldn't want to go back to an old style vehicle

Driver



Drivers and managers agree that the best way to convince sceptics of new vehicles is to “give it a go”

Getting drivers in the cabs and on the roads tackles the 4 issues we identified prior to the trial

Driver Pre-trial concerns

Post trial conclusions

Belief in current design

- Once inside the vehicle they are shown that this new design may be different but it can work

Low expectations of new vehicle

- The vehicle shows it can still meet the demands placed upon it

No need for change

- They realise just how much more direct vision can be available to them and as such protect VRUs

Unfamiliarity

- Getting to experience the vehicle and seeing more of these vehicles on the road, acts as reassurance to drivers and managers that it can do the job

“

I'd just say give it a go, it's opened my eyes I didn't see how it could be improved before

Driver

”

“

You just need to sit in one of the old cabs then get in the new one and you realise how important this change is

Senior Manager

”



Appendix

Objective: Understand the differences across categories of vehicle in terms of direct driver vision

Gathering the views of **drivers, operator's transport managers and senior management**

- Direct vision is felt to be a valuable asset on the roads and on site

Category D

- Category 'D' vehicles **provide the most direct vision**. Their lowered cabs bring drivers onto similar plane to VRUs, **increasing driver's confidence in the likelihood of detection** all around the cab

Category C

- Category 'C' vehicles offer drivers less direct vision than a 'D'. However, the vision available is thought to be in the most useful areas for drivers (the near side)
- Depending on the size of the additional window, 'C' vehicles **are felt to offer the better part of a 'D's improved vision whilst limiting the functional drawbacks**
- With a large enough near side window, and a forward sloping dash board many drivers feel they can as easily safeguard VRUs as in a category 'D' vehicle

Objective: Understand how other factors, such as age, experience, company size, level of training, can impact the views towards the vehicles

- ✓ HGV community now following a more structured programme of training
 - ✓ Training viewed as essential in current times
 - ✓ DCPC still the focal point for majority
- ✓ Larger operators most likely to invest resources in safety and training
 - ✓ Feel more obliged to maintain high standards due to contracts with large clients
 - ✓ More resources at disposal to invest in vehicles and driver training



Impact of training is to increase driver awareness of risks to cyclists. Generally training makes drivers more open to vehicle changes and improvements as they see the need and advantage

Transport Managers

- Pro-active approach
- **Acceptance that HGV world is changing**
- Keen to 'get on board' and steer company / staff towards greater professionalism
- Some go beyond standard requirements – in desire to demonstrate their commitment

HGV Drivers

- Younger drivers (20s-40s) **more positive towards new vehicles**
- Older drivers (50s+) less positive, nearing end of career
- Less comfortable with change overall



Objective: Investigate the advantages and disadvantages of the safety features of the 'demonstration fleet', understanding how they affect the operational capability of the vehicles

Being lower allowed drivers **better visibility of VRUs** in urban areas.

More glass offers **better direct vision** helping both drivers and cyclists have more awareness of each other.

The high spec safety features are all great assets in terms of urban VRU detection. While new equipment can take some getting used to, **no driver complained of sensory overload.**

Operationally there were some issues on sites that were not hard standing, improved site conditions could prevent this in future

Objective: Explore how each of the categories of vehicle could be best positioned to drivers, fleet operators transport managers and senior management to facilitate acceptance

HGV Drivers

- The most impactful way to show the benefit was felt to be 'giving it a go'
- Once drivers got in the cab all of them acknowledged that they had greater visibility which was felt to be a huge asset in urban areas
- Improving site standards would decrease the risk of damage and reassure them of the vehicles operational capability

Transport Managers

- Managers like the positive brand image that owning new vehicles brings, so continued good publicity associated with these vehicles is motivating
- Managers want reassurance that the vehicle improves visibility but also performs operationally
- The financial implications of the vehicle should be communicated to managers e.g. resale and life expectancy of the vehicle

✓ **Additional window behind driver:** increased visibility for viewing road behind

✓ **Visibility:** panoramic vision, bus style door, lowered height of cab which puts driver on a level with cyclists

✗ **Power:** felt underpowered, drivers felt they were hanging over junctions

✗ **A pillar on drivers side:** it is hard to see past the A pillar due to current seating position

✓ **Rear axle steer:** good manoeuvrability - for tight spaces and turning circle

✓ **Easy to exit:** rear side a viable option for exiting

✗ **Class 6 mirror:** good addition - however, easily blocked by sun blind

✗ **Cab:** less comfortable, less storage space provided

✗ **Windscreen:** vision above can be overwhelming and feel unnecessary

✗ **A pillars:** felt cluttered, mirrors too spread out creating multiple blind spots. Some prefer a more condensed mirror set up giving just one blind spot

✓ **High spec of safety features:** inside vehicle, cameras in particular were an asset

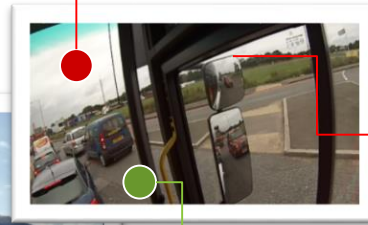
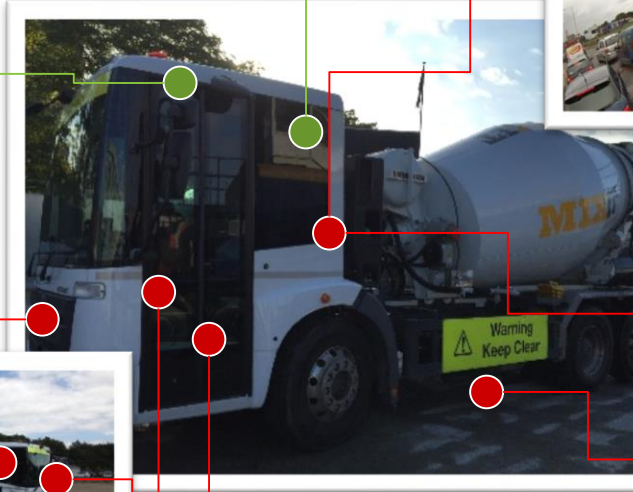
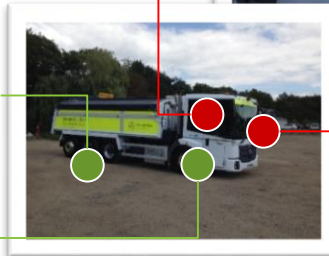
✗ **Radical change in design:** completely new style of HGV which can create initial scepticism

✗ **Lowered height:** usage on rougher terrain can be difficult, drivers less aware of road situation ahead when in traffic/rural areas

✗ **Bus style doors:** unable to open the window, speak to people on site, hear traffic, take breaks

✓ **2 drive axles:** useful for getting onto sites

✗ **Extra glass:** hard to keep the windows clean



✗ **Windscreen** : too much vision from above, can be considered overwhelming

✓ **Additional window behind driver**: increased visibility for viewing road behind

✓ **Indicator cycle light**: helpful tool, tailored to cyclists, making them more likely to take notice

✗ **Bus style doors**: unable to open the window, speak to people on site, hear traffic, take breaks

✗ **Dust cart heritage**: meant it lacked social credibility amongst drivers



✗ **Radical change in design**: completely new style of HGV which can create initial scepticism

✓ **Visibility**: great in urban areas, panoramic vision, bus style doors and lowered cab provide great all around vision

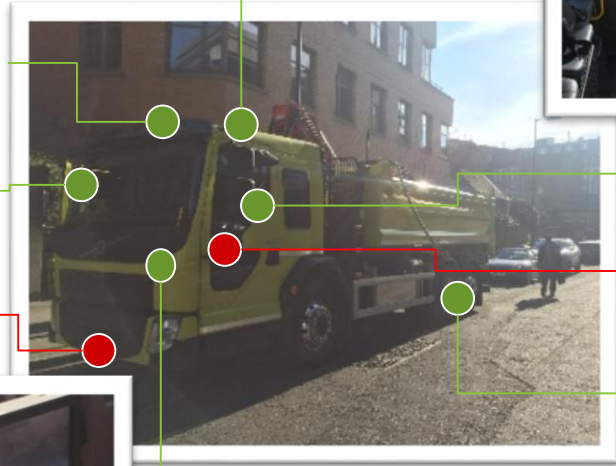
✓ **Safety features**: high spec inside the cab

✓ **Side guard**: reassuring for drivers to know people can't get dragged underneath when they were driving

✗ **Original dust cart cab**: drivers felt it needed to be more tailored to construction industry

✗ **Large cab**: drivers felt it was unnecessarily large, too deep, making shallower would increase manoeuvrability by shortening vehicle

- ✓ **Traditional design:** drivers felt they were in 'normal' vehicle, feeling safe due to ride height, also having good forward visibility and could still perform typical work (as yet untested on site)
- ✓ **Height:** struck a nice balance between being low enough for improved visibility, high enough for drivers to feel out of harms way on site/road
- ✓ **Driver comfort:** high, comfortable seating position and automatic drive
- ✗ **Front bumper:** front bumper protrudes a long way, concerns it may hit the floor on uneven ground causing damage or beaching
- ✗ **Camera:** does not keep a near side view when driving, which would be helpful to drivers



✓ **Nearside door window panel:** good size, see the head and shoulders of VRUs around the vehicle

✓ **Uncluttered sweeping view:** close positioning of the mirrors and the thin A pillars made for an unobstructed view

✗ **Camera:** splits into too many screens, hard to see clearly what is going on in each of them (6 way)

✓ **Rear axle steer:** good for tight corners

✓ **Slanted dashboard :** combined with high seating position allowed drivers a better view immediately in front of the vehicle – direct vision

✗ **Camera:** switch between viewing modes is not straight forward, would prefer easier process

✓ **Traditional design:** still feels like a 'normal truck'

✓ **Sloping dashboard:** allows better direct vision in front of the vehicle

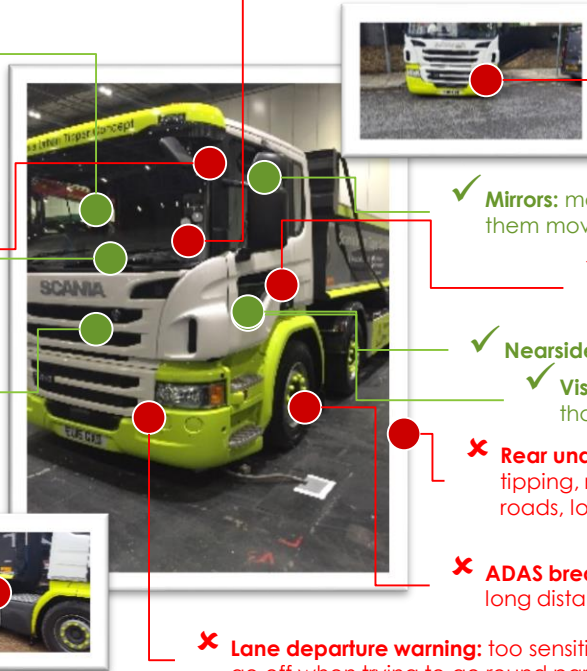
✗ **Near side window:** prefer if it could open - aiding communication/ventilation

✓ **Quiet vehicle:** less noise complaints to operators in urban areas from residents

✗ **Lower cab height:** vehicle lacks adequate clearance, especially when suspension lowered to tip, vehicle often becomes stuck post tip

✗ **1 drive axle:** made it difficult to access sites

✗ **Mud guards:** should be attached to body enabling them to raise up with rest of the vehicle allowing tyre checks



✗ **Height adjustments:** takes quite a long time, multiple buttons need to be pressed

✓ **Mirrors:** mounted slightly lower, can see over and around them move easily, which prevents them creating a blind spot

✗ **Window size:** opportunity to increase to further improve visibility

✓ **Nearside window panel:** great aid for seeing VRUs

✓ **Visibility:** Great performance in urban areas thanks to large side panel window

✗ **Rear under run bar:** often gets in the way of load when tipping, requires more cleaning so no material is transferred to roads, load can even push the vehicle with the handbrake on

✗ **ADAS breaking:** too sensitive, feels more designed for long distance driving (aka motorway heavy journeys)

✗ **Lane departure warning:** too sensitive, can go off when trying to go round parked cars

✗ **Nearside window:** pillar in window can obscure the view a little, would prefer it wasn't there

✓ **Mirrors:** robust and well sized and positioned

✗ **Nearside window:** prefer it to be operable, for air flow, hearing road around them, and for communication with banksmen

✗ **Camera:** switches too slowly between views, distracting and dangerous

✓ **Power:** felt well powered compared to typical vehicle

✓ **Height:** higher than other demo vehicles drivers prefer as it allows a further reaching view of the road

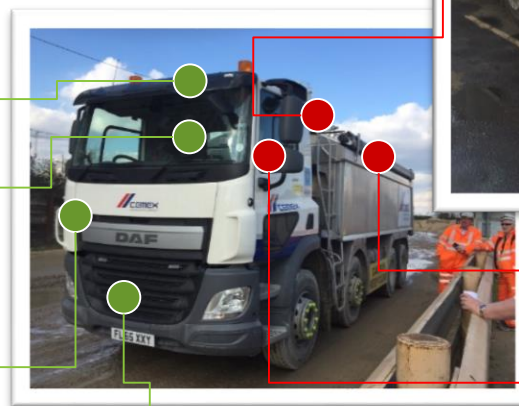
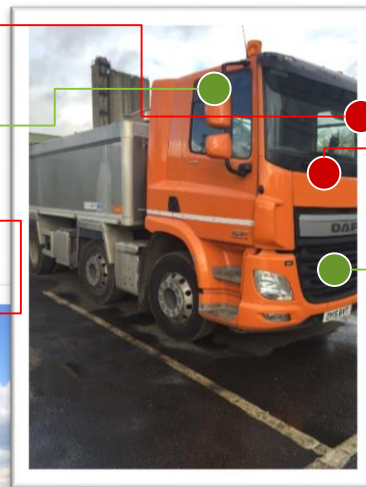
✓ **Rear window:** useful for manoeuvring and checking on load

✓ **Traditional design:** rugged vehicle, performs like typical vehicles

✓ **Safety features:** felt like it had the latest safety features

✗ **Sheet:** drivers would have preferred it to be attached (with a powered arm)

✗ **Interior:** feels a bit plastically and therefore fragile



The logo for Future Thinking is set against a magenta background. It features a large white arrow pointing right, partially overlapping the text. The word "future" is in a lowercase, sans-serif font, with the 'f' being significantly larger and more stylized. Below it, the word "thinking" is in a smaller, lowercase, sans-serif font.

future thinking

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