

# Lighting and Marking Code of Practice for Abnormal Load Self Escorting Vehicles: *Consultation*

Lighting and Marking Code of Practice



# Summary of Consultation

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## Scope of the consultation

Topic of this consultation:	The consultation is aimed at improving road safety by developing and agreeing on the code of practice for self escorting and abnormal load lighting and marking.
Scope of this consultation:	The consultation gives an opportunity to present the background on work already done. It also gives the opportunity for you to comment on and help to decide on specifics regarding abnormal load lighting and marking and steer future change to the code of practice.
Geographical scope:	National
Impact Assessment:	The impact assessment can be found at ANNEX A. When responding to the consultation, please comment on the analysis of costs and benefits, giving supporting evidence where possible.

## Basic Information

To:	The consultation is aimed at Abnormal Load Hauliers, Self Escort Companies, Road Safety Groups, Police and the general public.
Body/bodies responsible for the consultation:	The Highways Agency
Duration:	The consultation will start on 11 October 2010 and run for 12 weeks until 31 December 2010. Please ensure responses arrive no later than that date.
Enquiries:	Sheila Hills Direct Line: 0121 687 2504 Fax: 0121 678 8569 Email: sheila.hills@highways.gsi.gov.uk
How to respond:	<p>Please send your response using the "Consultation Response Form" at ANNEX B to:</p> <p>Sheila Hills Lighting and marking for Self Escort Vehicle Consultation Abnormal Loads and Network Management Team Highways Agency 9th Floor, The Cube 199 Wharfside Street Birmingham B1 1RN</p> <p>Or you can respond to the consultation by email</p> <p><b>abnormalloads@highways.gsi.gov.uk</b></p> <p>When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation please make it clear who the organisation represents, and where applicable how the views of its members were assembled.</p>

Additional ways to become involved:	<p>As this is a largely technical issue with specialist interests following discussions with those affected, this will be a purely written exercise. The Highways Agency website will include a copy of this consultation pack which will be available to the general public.</p> <p>The website address is at <a href="http://www.highways.gov.uk/consultations">http://www.highways.gov.uk/consultations</a></p>
After the consultation:	<p>Once the consultation is complete a summary of responses will be published on the Highways Agency's website. The Highways Agency will then take the outcomes of the consultation and draft the code of practice documents. This will be agreed with and endorsed by the key stakeholder organisations in industry, the police and central government.</p> <p>Where changes to legislation are required all efforts will be made to complete these in time for the publication of the code of practice. However, legislative changes will not unduly delay the publication of documents and where required will appear in subsequent versions.</p>
Compliance with the Code of Practice on Consultation:	The consultation complies with the Government's Code of Practice on Consultation.

## Background

Getting to this stage:	<p>Prior to this consultation the Highways Agency Abnormal Loads Team worked with stakeholder organisations in industry, the police and central government to improve safety and reduce the congestion caused by abnormal loads.</p> <p>This has included the introduction of Self Escorting of abnormal loads to reduce the burden on the police and improve the operation of moves. To accompany the introduction best practice guidance was produced to help standardise the new industry.</p> <p>The Highways Agency has investigated the congestion and safety impact of abnormal loads, specifically investigating issues with moving at night.</p> <p>In 2008 a fatality with a driver and an abnormal load has focused industry, the police and central government to look at the lighting and marking of abnormal loads and escort vehicles. The aim of this work is to produce code of practice documents to provide standardisation and clarity for all.</p> <p>The Highways Agency led a project to investigate the lighting and marking of abnormal loads and escort vehicles. The project considered the views of key stakeholders, researched available literature and presented recommendations as a holistic approach to abnormal load lighting and marking. These recommendations are now reflected in this consultation.</p>
Previous engagement:	Key stakeholders from industry, the police and central government have been included in the initial investigations and review of recommendations.

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## Chapter 1: Executive summary

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This consultation document seeks your views on a draft code of practice for the lighting and marking of Abnormal Indivisible Loads (AIL) escort vehicles; based on section 3 'Vehicle Requirements' of the current 'Code of Practice Self Escorting of Abnormal Loads and Abnormal Vehicles'.

AILs can take up a number of lanes, travel slowly and be exceptionally long. These characteristics present particular hazards for approaching drivers for whom the appropriate action to take may not be immediately obvious.

Work has been carried out to determine what information an oncoming driver needs to be able to take the correct action when approaching an AIL vehicle. This has resulted in the 'Conspicuity Approach'. From this the best lighting and marking for AIL vehicles and their Escort vehicles has been determined and views are now being sought on the options in sections 1 to 9 including to:

- The application date of the code of practice.
- Escorting` vehicle colour, markings and lighting.
- Specific escort signs – including wording, lettering and positioning.

The consultation document follows the format of the code of practice document which will be produced on completion of this consultation. However, there are still areas where best practice has not been finalised and we are seeking your views on proposed options for these. We are also asking for general feedback to ensure we produce the most user friendly document we can.

In order to ensure that the returned views are specific to each of the three areas there are separate consultation documents for Special Order (SO) and VR1 loads, STGO and C&U loads and the Escort vehicles.

The impact assessment can be found at ANNEX A. When responding to the consultation, please comment on the analysis of costs and benefits, giving supporting evidence where possible

A response form to return to the Highways Agency (HA) is also provided at ANNEX B; the options are reproduced as they arise in this consultation document. It is recommended that the form is completed while reading through this document.

The response form contains space for additional comments after each section and a space for general comments at the end. The sections are not exhaustive and if you feel we have overlooked a crucial element, or you wish to raise additional points, please include this in your response.

The consultation period will run for 12 weeks ending on 31 December 2010.

## Chapter 2: Background

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### **Abnormal Indivisible Loads**

Abnormal loads are those load and vehicle combinations that, because of their size and weight, exceed the regulations controlling general heavy goods vehicles. These loads have increasing controls as the impact on road safety, structure capacity and congestion increases. The largest of these loads are referred to as Special Order loads (SOs) which require authorisation from the Secretary of State to move.

SO loads are the heaviest, widest or longest loads; any abnormal load over 150 tonnes gross vehicle weight, over 6.1m width or over 30.0m in total length is classified as a SO. Hauliers are required to give 10 weeks notice to the HA's AIL team, 5 days notice to Highway Authorities and 5 days notice to the police. Applications and notifications can be made through ESDAL (Electronic Service Delivery for Abnormal Loads) or through the BE16 form.

STGO legislation allows the carriage of loads that cannot be carried on vehicle or vehicle combination that comply in all respects with the C&U Regulations and the Authorised Weight Regulations (AWR). The dimensions of loads in this category are in excess of the gross and axle weight limits for C&U and AWR, wider than 3m, longer than 18.75m (rigid length) or overhanging the side of the vehicle by more than 305mm. There are three additional categories dividing the vehicles depending on gross weight and axle weight and this determines the maximum permitted speed on different road types. Notification is made to Highway Authorities and/or police forces.

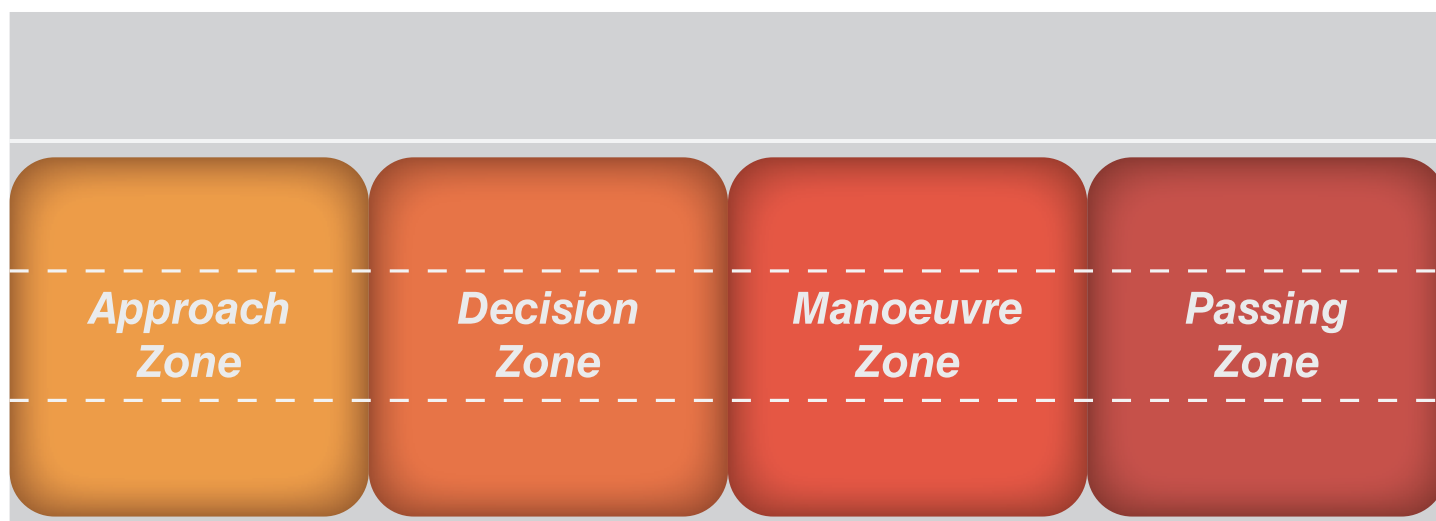
A further category is used for loads over 5.0m wide where 2 weeks notice must be given to the HA's AIL team; this notification is made through ESDAL or using a VR1 form. C&U are loads that are not in the STGO category, but which do not qualify under normal Heavy Goods Vehicle (HGV) movements because of their size (width, length or overhang). Notification for these types of loads is made through ESDAL or directly to each police force on the route.

### **Conspicuity Approach**

Conspicuous objects communicate a clear and consistent message, either of what the object is, or how the driver should respond to a situation.

The Conspicuity Approach uses principles developed to maximise the conspicuity of AIL vehicles and AIL escort vehicles by providing drivers with information which is clear, easy to comprehend and intuitive to follow. Consistency between the escort vehicle markings and the AIL vehicle markings, as well as between different types of AIL vehicles, has also been emphasised. Attention has been given to the speed differential between approaching drivers and the AIL vehicle, where for increasing speed differentials, information to drivers becomes progressively more instructive.

The desired driver behaviour, as drivers approach an AIL vehicle, has been divided into "zones", as seen in Figure 1.



**Figure 1: Driver behaviour “zones”**

Conspicuity requirements have been developed for each “zone” as follows:

- Approach -** Amber flashing lights should be visible to inform the approaching driver to exercise caution.
- Decision -** Drivers need to be able to see an instruction to be able to follow it. This could take the form of a warning triangle, a short text description in large fonts or an arrow indicating that a lane change is required.
- Manoeuvre –** Extremities and dimensions of load need to be made clear through red and white marker plates and outline making of the rear of the load. To minimise the effect of glare from flashing beacons these should be mounted above the driver’s eye line.
- Passing –** To ensure the driver can see the load as they pass, side marker lamps and marking should provide adequate conspicuity.

## Chapter 3: Consultation

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### Section 1: Application of Code of Practice

The code of practice can be applied in a number of ways which will have implications on the costs for Hauliers; it can be applied to all new vehicles from when the code of practice is published or to all vehicles from a set date.

Applying the code of practice to all vehicles from the date of publication will quickly improve road safety. However, this will impose a significant burden on industry.

Applying the code of practice only to new vehicles and trailers will significantly reduce the burden on industry but will allow all existing vehicles to run with current specification. Tractors and trailers will operate for many years and the time to renew the vehicles on the road will significantly reduce the impact on road safety of the work.

A combined approach with the code of practice being applied to new vehicles and then to all vehicles after a set time will ensure industry has time to prepare for the change and the code of practice will be applied in full from a set date.

A response form to return to the HA is provided at ANNEX B for you to indicate your preference on when the code of practice should be applied and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 1: Application of Code of practice</b>
1. Applying the code of practice from the date of publication to all vehicles
2. Applying the code of practice only to new vehicles and trailers
3. Code of practice applied to new vehicles and all vehicles after 1 year
4. Code of practice applied to new vehicles and all vehicles after 2 years
5. Code of practice applied to new vehicles and all vehicles after 3 years
6. Code of practice applied to new vehicles and all vehicles after 5 years
7. Code of practice applied to new vehicles and all vehicles after 7 years

## Section 2: Legislation and Guidance on materials and markings

The marking of vehicles and signs shall be simplified through the code of practice. The code of practice will also clarify the designs and standards for lighting, markings and sign materials to ensure they conform to:

- United Nations Economic Commission for Europe (UNECE) Regulations;
- The Road Vehicles Lighting Regulations (RVLR) 1989;
- Road Vehicles (Construction & Use (C&U)) Regulations 1986;
- The Road Vehicles (Authorised Weight) Regulations 1998;
- The Road Vehicles (Authorisation of Special Types) (General) Order 2003 (STGO);
- Traffic Signs Regulations and General Directions 2002 (TSRGD);
- British Standards (BS).

### Materials

**Retro-reflective materials** return light back towards its source and are therefore more conspicuous to drivers in dark conditions than other materials when illuminated by the headlamps of their vehicles. Microprismatic materials are particularly effective, although they are more directional than other retro-reflective materials; when the viewing angle is high, they become less effective. Retro-reflective materials do not improve conspicuity in daylight when no illumination is directed at them.

**Fluorescent materials** re-emit some of the light falling on them; this makes them appear brighter than other materials in daylight and is particularly effective in conditions of low ambient light, for example in poor weather or at twilight. At night, they offer no advantage over normal materials. However, these have been used as a standard for vehicle marking through UNECE70.01 and are generally cheaper than the retro-reflective alternatives.

Some retro-reflective materials are also fluorescent, giving enhanced conspicuity in all conditions.

### United Nations Economic Commission for Europe (UNECE) 48

UNECE48 sets out requirements for the lighting and marking of all vehicles subject to European Whole Vehicle Type Approval, including the fitment of retro-reflective conspicuity marking tape approved to UNECE104 and the following requirements on the position and design of all retro-reflective conspicuity marking materials:

- Markings will be at least 50mm wide.
- As close as practicable to be parallel to the ground.
- As close as practicable to be at the edge of the vehicle.
- As close as practicable to be at the ends of the vehicle.
- As close as practicable to be horizontal and vertical, compatible with the shape, structure, design and operational requirements of the vehicle.
- For all goods vehicles over 7.5 tonnes (with the exception of chassis-cabs, incomplete vehicles and tractors for semi-trailers) and trailers over 3.5 tonnes it is mandatory that:
  - they have full contour marking to the rear if their width exceeds 2,100mm (generally at least 80%); and
  - they have partial contour marking to the side if their length exceeds 6,000mm which reaches to within 600mm of each end of the vehicle and makes up at least 80% of the total length.

However, where the shape, structure, design or operational requirements make it impossible to install the mandatory contour marking, a line marking may be installed.

- It is optional on all other categories of goods vehicles, including the cab of tractor units for semi-trailers and the cab of chassis-cabs.
- Partial or full contour marking may be applied instead of mandatory line markings, and full contour marking may be applied instead of mandatory partial contour marking.
- For continuous marking; the distance between adjacent elements are as small as possible (do not exceed 50% of the shortest adjacent element length).
- For partial contour marking; each upper corner shall be described by two lines at 90° to each other and each at least 250mm in length.
- Conspicuity markings should be fitted more than 200mm away from each mandatory stop lamp.
- Lower elements must be as low as practicable within the range 250mm - 1,500mm above the ground. However, a maximum mounting height of 2,100mm may be accepted where technical conditions prevent compliance with the maximum value of 1,500mm.
- Upper elements must be as high as practicable, but within 400mm of the upper extremity of the vehicle.
- At least 80 % of the illuminating surface of the marking must be visible when viewed by an observer positioned at any point on the observation planes shown in Figure 2 and Figure 3 within the horizontal range of 1m and 3.0m above the ground.

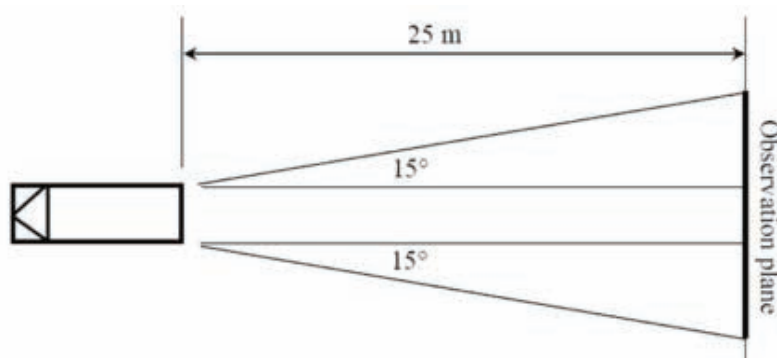


Figure 2

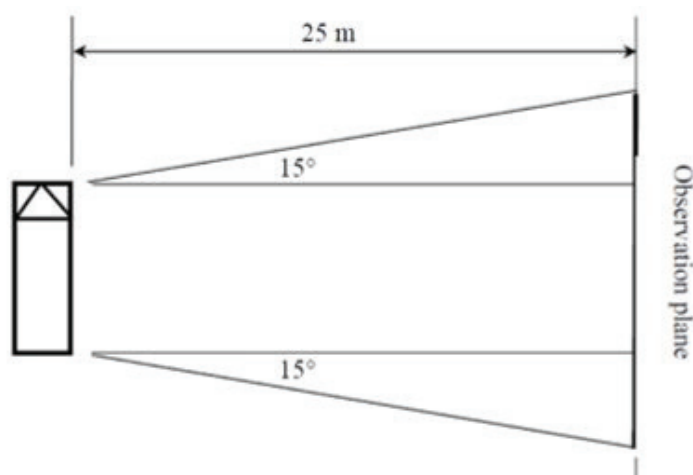


Figure 3

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**UNECE 70.01 (NB installation requirements are based on Schedule 19 of the Road Vehicle Lighting Regulations)**

The plates shall be rectangular in shape for mounting at the rear of vehicles.

The minimum total summarized length of a set of rear marking plates consisting only of one, two or four marking plates with retro-reflective and fluorescent materials shall be 1,130 mm, the maximum total length shall be 2,300 mm.

The length of each rear marking plate in a set consisting of two plates for trucks and tractors, as illustrated in Figure 4 and Figure 5, may be reduced, to a minimum of 130 mm, provided that the width is increased such that the area of each marking is at least 735 cm<sup>2</sup>, does not exceed 1,725 cm<sup>2</sup> and the marking plates are rectangular.

For mounting on vehicles up to 13m in length or trailers forming a combination up to 11 meters in length, the plates shall be of the chevron type with alternate, oblique stripes of yellow retro-reflective and red fluorescent materials or devices (Class 1).

Class 1: Rear marking plates for heavy vehicles with red fluorescent and yellow retro-reflective alternative stripes.

- The width of a rear marking plate shall be 140 ± 10 mm.
- The slope of the oblique stripes of the chevron band shall be 45° ± 5°. The width of the stripes shall be 100 mm ± 2.5 mm.

For mounting on vehicles exceeding 13m in length or trailers forming a combination exceeding 13 m in length, the plates shall have a yellow retro-reflective background with a red fluorescent (Class 2).

Class 2: Rear marking plates for long vehicles with red fluorescent border and yellow retro-reflective centre.

- The width of a rear marking plate shall be 140 +10 mm.
- The width of the red fluorescent border of the rear marking plates for trailers and semi-trailers shall be 40 mm ± 1 mm.

Rear marking plates for heavy vehicles and trailers shall be composed of yellow retro-reflective and red fluorescent materials or devices.

Vehicle combinations between 11 and 13 metres may use either.

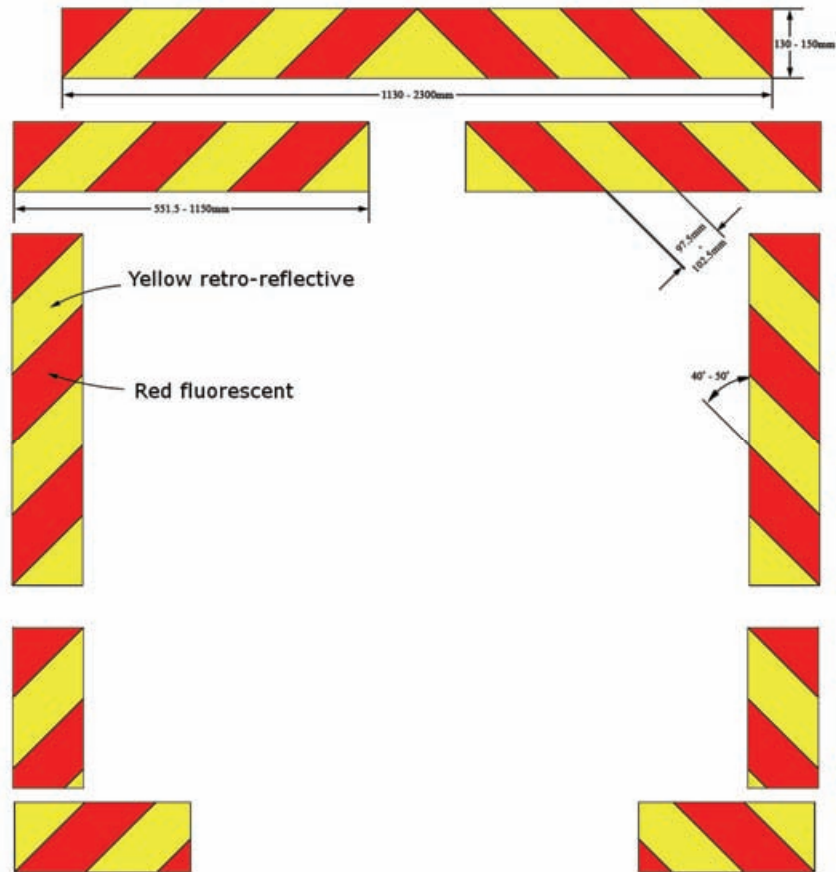


Figure 4: UNECE70.01 marking plates Class 1

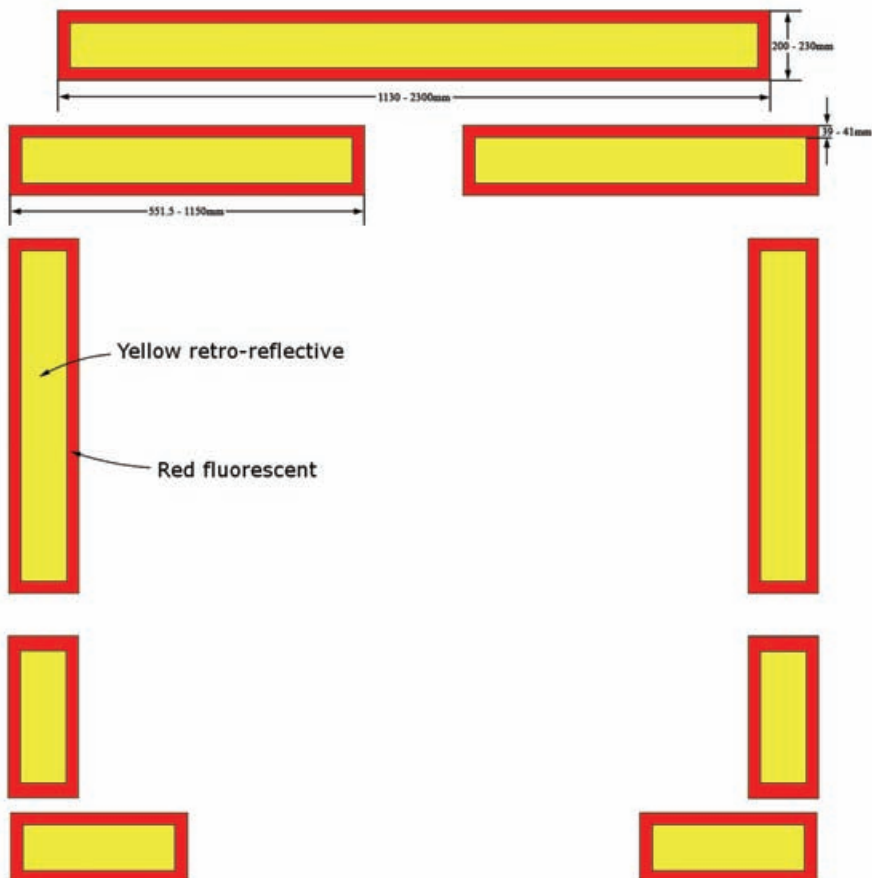


Figure 5: UNECE70.01 marking plates Class 2

**UNECE104**

New European regulations have been introduced which require the marking of the rear and side of freight vehicles with retro-reflective conspicuity markings. The retro-reflective material used for these markings must be marked to show approval to UNECE104. These requirements will apply in the UK to all applicable vehicles registered from the 10 July 2011 but may also be applied to any other vehicles at the owners discretion. Earlier dates will apply to vehicles that require EC Whole Vehicle Type Approval.

**The Road Vehicles Lighting Regulations (RVLR) 1989**

RVLR covers the Regulations governing the fitting, maintenance and use of Lamps, Reflectors, Rear Markings and Devices and includes information on obligatory warning beacons.

**Traffic Signs Regulations and General Directions 2002 (TSRGD)**

Some of the subject areas covered in this consultation include the option of using traffic signs on the rear of the trailer and in other cases it may be advantageous to use the material standard for traffic signs.

TSRGD Regulation 19 states that where retroreflecting material is used on any part of a sign, all other parts of that sign shall also be reflectorised; and no retroreflecting material shall be applied to any part of a sign coloured black;

**Road Vehicles (Construction & Use (C&U)) Regulations 1986 and The Road Vehicles (Authorisation of Special Types) (General) Order (STGO) 2003**

C&U and STGO regulations cover the specific requirements for these classes of abnormal loads. The specific lighting and marking requirements cover length and width projection markings and the requirements for warning beacons.

Category 1, 2 and 3 Abnormal Load carrying vehicles (manufactured after 29 July 1983) must display a sign at the front to aid identification and state the relevant category. The sign (shown in Figure 6) has white lettering on a black background and measures 400mm x 250mm (this may vary up or down by a margin of 5 per cent).

The number on the plate will be 1, 2 or 3 depending on the category of the vehicle.



Figure 6: STGO plate

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STGO trailers must have a manufacturer's plate giving the maximum weight for the speeds at which the vehicle is allowed to travel. Vehicles in categories 2 and 3 must display a plate marked (in letters and figures not less than 40mm high) with the operational weights which, in the manufacturer's opinion, should not be exceeded when the vehicle is travelling at a speed not exceeding:

- 20mph;
- 25mph;
- 30mph;
- 35mph; and
- 40mph.

The weights to be displayed are:

1. in the case of motor vehicles; such as a Self Propelled Modular Trailer (SPMT):
  - a. maximum gross weight;
  - b. maximum axle weight for each axle; and
  - c. maximum train weight.
2. in the case of a load imposed on the towing vehicle should also be displayed on plates fitted to ALL vehicles that are trailers; such as a drawbar or articulated trailer:
  - a. maximum gross weight; and
  - b. maximum axle weight for each axle.

### Vehicle Classifications

Vehicles have different classifications based on weight, width and length. These classifications can be included in the code of practice in the form of the following paragraphs or in the form of Table 1.

**C&U** vehicles have varying gross vehicle weights dependant on the number of axles they have:

- vehicles with 2 axles must not exceed 18,000kgs;
- vehicles with 3 axles must not exceed 26,000kgs;
- vehicles with 4 axles (rigid) must not exceed 32,000kgs;
- vehicles with 4 axles (2+2 artic) must not exceed 36,000kgs;
- vehicles with 5 axles must not exceed 40,000kgs; and
- vehicles with more than 5 axles must not exceed 44,000kgs.

**STGO Category 1** vehicles must have at least 5 axles and not exceed 46,000kgs. However, this limit can be increased to 50,000kgs if the vehicle has 6 or more axles.

**STGO Category 2** vehicles must have at least 6 axles and not exceed 80,000kgs.

**STGO Category 3** vehicles must have at least 6 axles and not exceed 150,000kgs.

**VR1** vehicles are any vehicles under 150,000kgs with a width between 5m and 6.1m.

**Special Order (SO)** vehicles are any vehicles that are over 150,000kgs, over 6.1m wide or over 30m long.

Classification	Axles	Gross Weight	Axle Weight	Width	Length
C&U	2	≤18,000 kgs	AWR Limits	≤5m	≤18.77m
	3	≤26,000 kgs			
	4 (rigid)	≤32,000 kgs			
	4 (2+2 artic)	≤36,000 kgs			
	5	≤40,000 kgs			
	Other	≤44,000 kgs			
STGO Category 1	5	≤46,000 kgs	AWR Limits	≤5m	≤18.77m
	6+	≤50,000 kgs			
STGO Category 2	6+	≤80,000 kgs	>12,000kgs	≤5m	≤18.77m
STGO Category 3	6+	≤150,000 kgs	>16,500kgs	≤5m	≤18.77m
VR1		≤150,000 kgs		5m<W≤6.1m	
Special Order (SO)		≤150,000 kgs		>6.1m	
		≤150,000 kgs			>30m
		>150,000 kgs	>16,500kgs		

Table 1: STGO categories by gross vehicle weights and axle weights

## Required Notification

The classification of vehicles affects how much notice a haulier is required to give to Police, Road and Bridge Authorities; and in the case of VR1 and SO vehicles, the HA. These notification requirements can be included in the code of practice in the form of the following paragraphs or in the form of Table 2 or Table 3.

### Weight

Gross weight of vehicle carrying the load exceeding C&U limits up to 80,000kgs – 2 clear days notice with indemnity to Road and Bridge Authorities.

Gross weight of vehicles carrying the load exceeding 80,000kgs up to 150,000kgs – 2 clear days notice to Police and 5 clear days with indemnity to Road and Bridge Authorities.

Gross weight of vehicle carrying the load exceeding 150,000kgs – Special Order application to HA 10 weeks prior to the move plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.

### Width

C&U loads; width exceeding 2.9m up to 4.3m – 2 clear days notice to Police.

STGO loads; width exceeding 3m up to 5m – 2 clear days notice to Police.

Width exceeding 5m up to 6.1m – VR1 application to HA 2 weeks prior to move plus 2 days notice to Police.

Width exceeding 6.1m – Special Order application to HA 10 weeks prior to move plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.

### Length

C&U loads; length exceeding 18.65m up to 27.4m; see C&U Regulations 1986 for definition of length – 2 clear days notice to Police.

STGO loads; length exceeding 18.75m; see part 2, article 12 of Road Vehicles (Authorisation of Special Types) (General) Order 2003 (STGO) for definition of length – 2 clear days notice to Police.

Overall length of a part 2 vehicle-combination exceeding 25.9m – 2 clear days notice to Police.

Maximum length exceeding 30m; see STGO Schedule 1, part 4, paragraph 25 for definition of maximum length 1m – Special Order application to HA 10 weeks prior to move plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.

Gross vehicle weight	Axle weight	Width ≤2.9m Length ≤18.65m	W>2.9m L>18.65 m	W>3m L>18.75m Vehicle combination L>25.9m	W>5m, VR1	W>6.1m L>30m, SO
≤18,000kgs (2-axle) ≤26,000kgs (3-axle) ≤32,000kgs (4-axle rigid) ≤36,000kgs (2+2 axle artic) ≤40,000kgs (5-axle) ≤44,000kgs (others)	C&U AWR Limits	N/A	Police: 2days	Police: 2days	HA AIL team: 2weeks Police: 2days	HA AIL team: 10weeks Police: 5days RBA: 5days
Exceeding above limits or ≤ 50,000kgs, STGO Cat 1	AWR Limits	Road and Bridge Authorities (RBA): 2days	Police: 2days RBA: 2days	HA AIL team: 2weeks Police: 2days RBA: 2days		
>50,000kgs, STGO Cat 2	>12,000kgs					
>80,000kgs, STGO Cat 3	>16,500kgs	Police: 2days RBA: 5days	Police: 2days RBA: 5days	HA AIL team: 2weeks Police: 2days RBA: 5days		
>150,000kgs, Special Order, (SO)	>16,500kgs	HA AIL team: 10w Police: 5days RBA: 5days				

Table 2: Abnormal Indivisible Load Categories and Notifications

<b>C&amp;U</b> <ul style="list-style-type: none"> <li>Loads in excess of 2.9m wide or 18.65m long: 2 clear days notice to Police.</li> </ul>	<b>STGO</b> <ul style="list-style-type: none"> <li>Loads greater than 50,000kgs or C&amp;U limits and less than 80,000kgs: 2 clear days notice to Police and RBA notification with indemnity</li> <li>Loads over 80,000kgs: 2 clear days notice to Police and 5 clear days RBA notification with indemnity</li> </ul>
<b>STGO VR1</b> <ul style="list-style-type: none"> <li><b>Application to HA 2 weeks prior to proposed date of movement</b></li> <li>Loads greater than 50,000kgs or C&amp;U limits and less than 80,000kgs: 2 clear days notice to Police and RBA notification with indemnity</li> <li>Loads over 80,000kgs: 2 clear days notice to Police and 5 clear days RBA notification with indemnity</li> </ul>	<b>Special Order (SO)</b> <ul style="list-style-type: none"> <li><b>Application to HA 10 weeks prior to move</b></li> <li>5 clear days notice to Police and RBA notification with indemnity</li> </ul>

Table 3: Key to classifications

Note: There are other factors, e.g. rigid length and overhangs that also affect the notification requirements. There are also Authorised Weight Regulations (AWR) that may apply.

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A response form to return to the HA is provided at ANNEX B for you to provide your preference on the inclusion of legislation and code of practice on materials and markings and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 2: Legislation and Guidance on Materials and Markings</b>
1. Summarised guidance on current legislation.
2. Vehicle classification as detailed in the paragraphs under Vehicle Classifications on page 14.
3. Vehicle classification as detailed in Table 1.
4. Notification requirements as detailed in the paragraphs under required Notification on page 16.
5. Notification requirements as detailed in Table 2.
6. Notification requirements as detailed in Table 3.

### Section 3: Vehicle Requirements

The primary role of any escort vehicle is to alert other road users and pedestrians of the presence of an abnormal load or abnormal vehicle. The escort person in the vehicle shall also act as the contact point with others while escorting the load or vehicle.

The escort vehicle and its occupants shall assist the abnormal load or abnormal vehicle in safely negotiating the transport route.

#### Size and Type

An escort motor vehicle shall have a minimum of four wheels and be of sufficient size to carry the safety equipment; this effectively discounts the use of motorcycles. Due to the nature of the work it is not viewed by the HA as safe to escort loads with a motorcycle.

The escort vehicle must afford the driver good visibility; to facilitate this to the rear and side, the vehicle shall be fitted with exterior mirrors on both sides. In addition, it is preferable that the vehicles have rear windows at the back and to the sides to aid driver visibility.

Vehicles with open cargo space are not permitted as lighting and marking requirements dictate that warning beacons and signs must be at the rear of the vehicle. The vehicle types that are therefore appropriate are 4x4s, estates and some vans. The nature of escort work does differ and so all may be appropriate.

The escort vehicle shall not form any part of the units carrying or hauling the abnormal load or the abnormal vehicle.

#### Escort Vehicle Colour

To be conspicuous to other road users and pedestrians the escort vehicle should be the most conspicuous colour available; research has shown that to be yellow, this is the standard colour in France and Belgium. To set a standard lemon yellow (to BS 381 C: 1996 Table 1, colour No. 355) should be used. However, other yellows and oranges have no negative effects and although white is less conspicuous than these it could still be used. Dark colours will reduce the visibility of the vehicle and it has been found that silver vehicles are more likely to be involved in incidents.

Imposing a single colour for escort vehicles will increase the recognition of them as a distinctive vehicle type. However, this will impose a cost burden on industry.

A response form to return to the HA is provided at ANNEX B for you to provide your preference on side markings and reproduces the option listed here. It is recommended that the form is completed while reading through this document.

<b>Section 3: Vehicle Requirements</b>
1. Only lemon yellow to BS 381 C: 1996 Table 1, colour No. 355 or equivalent
2. Only yellow (any)
3. Preference for yellow but orange and white permitted too.
4. White, yellow or orange
5. Any colour

## Section 4: Side Markings

The current side marking for Escort vehicles consists of a 200mm wide horizontal strip of reflective material along the length of the vehicle. At the rear of the vehicle there is a 300mm wide vertical chevron strip of retro-reflective yellow and non-reflective red.

The options for modifying the design of the side marking would be to keep the existing marking requirements, have a single strip of material, outline with strips or block fill the side of the vehicle.

UNEC104 specifies freight vehicles should have retro-reflective strips (50-60mm wide) along the length of the vehicle. This could be reproduced on the escort to increase conformity between the escort vehicle and the load. However, the strips' current width of 200mm should be maintained.

An outline marking design would consist of yellow retro-reflective strip approximately 50-60mm wide. This would mark the side profiles of the escort vehicle, including the wheel arches.

Alternatively the side of the vehicle could be marked with a block of reflective material to give the maximum impact to driver approaching from the side. fluorescent reflective material has advantages over retro-reflective material due to the increased viewing angle and reduction in glare as well as the material being less expensive.

The appropriateness of vehicle size for marking types may also have a bearing relating to the available space on the rear of the vehicle. Increased space increases the impact of options but also increases the cost burden.

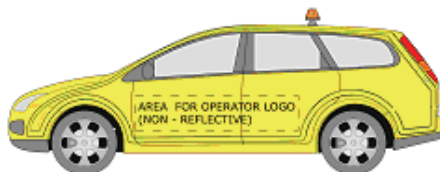


Figure 7: Examples of side marking options

### Operator Logos

The name of the vehicle operator and/or owner may be displayed upon the side of the vehicle in the area specified in Figure 8. The name and any logos shall not be retro-reflective or reflective. No company livery shall be displayed on the front or rear of the vehicle. Additionally the following 3 rules shall be followed:

- The number of the letters/characters is less than 15;
- The height of the letters/characters is between 300 mm and 1,000 mm;
- No long conceptions as e.g. addresses and phone numbers are used.



**Figure 8: Examples of side marking options**

A response form to return to the HA is provided at ANNEX B for you to provide your preference on side markings and reproduces the option listed here. It is recommended that the form is completed while reading through this document.

<b>Section 4: Side Markings</b>	
1.	Existing marking scheme with 200mm horizontal reflective strip and 300mm vertical chevron strip of retro-reflective yellow and non-reflective red
2.	Retro-reflective 200mm horizontal strip
3.	Retro-reflective Outline – Small escort vehicle
4.	Retro-reflective Outline – Medium escort vehicle
5.	Retro-reflective Outline – Large escort vehicle
6.	Reflective Block filled – Small escort vehicle
7.	Reflective Block filled – Medium escort vehicle
8.	Reflective Block filled – Large escort vehicle

## Section 5: Front Markings

The front of the escort vehicle currently has no required retro-reflective markings. This can have an impact for oncoming traffic not correctly determining the correct action to take. However, the intention to include an abnormal load sign, included in the 'Signs' section, should improve the recognition and therefore purpose of the vehicle. The only retro-reflective colours acceptable to be shown to the front would be white and yellow. Red may be used in the design but this may only be a non-reflective material. For cars (estates and 4x4s) where the bonnet is not perpendicular to the road the effect of the retro-reflective materials may be compromised and fluorescent materials may be more appropriate.

The three design options are chevrons, outline marking and block filled. The chevron design would be the same as is currently applied to the rear except the red would be non reflective and the yellow would be retro-reflective or fluorescent. The outline marking would have maximum effect if it was white retro-reflective; again this may not be appropriate for cars which may need to use fluorescent materials. The block fill could either be yellow or white retro-reflective; however, large areas of white or yellow retro-reflective material, mounted low, are undesirable as they receive a high amount of incident light and are liable to dazzle oncoming drivers therefore, fluorescent materials may be more suitable.

The appropriateness of vehicle size for marking types may also have a bearing relating to the available space on the front of the vehicle. Increased space increases the impact of options but also increases the cost burden.

A response form to return to the HA is provided at ANNEX B for you to provide your preference on front markings and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 5: Front Markings</b>
1. No front markings
2. Chevrons – Small (estate) escort vehicle
3. Chevrons – Medium (4X4) escort vehicle
4. Chevrons – Large (van) escort vehicle
5. Outline – Small escort vehicle
6. Outline – Medium escort vehicle
7. Outline – Large escort vehicle
8. Yellow Block filled – Small escort vehicle
9. Yellow Block filled – Medium escort vehicle
10. Yellow Block filled – Large escort vehicle
11. White Block filled – Small escort vehicle
12. White Block filled – Medium escort vehicle
13. White Block filled – Large escort vehicle
14. Fluorescent materials – Small escort vehicles
15. Fluorescent materials – Medium escort vehicles
16. Fluorescent materials – Large escort vehicles
17. Retro-reflective materials – Small escort vehicles
18. Retro-reflective materials – Medium escort vehicles
19. Retro-reflective materials – Large escort vehicles

## Section 6: Rear Markings

Currently the standard for the rear marking for escort vehicles is retro-reflective red, non-reflective yellow chevrons pointing towards the top centre of the vehicle. The chevrons were at 60° to the horizontal plane and were 150mm - 250mm wide.

The reasoning for this pattern is unknown and there is evidence that such strip markings can reduce overall conspicuity by breaking up the shape of the vehicle. This pattern is used by all highway service vehicles which leads to escort vehicles frequently being mistaken for other vehicles and can cause the driver to take the wrong course of action when approaching the vehicle.

To increase recognition between the escort vehicle and the abnormal load the UNECE104 style red retro-reflective outline marking could be replicated on the rear of the escort vehicle in 50-60mm strips. To mark vehicles in this manner will be significantly cheaper than the current requirement. However, this may not be suitable for smaller vehicles where there is not sufficient space for this to be effective and even on van type vehicles this may not provide enough conspicuity.

According to conspicuity theory a primary aim when lighting and marking an obstruction is to make it look like what it is. This allows others to recognise and understand what it is and then take appropriate action. Outlining vehicles and loads is a prime example of this but it is also possible to 'block fill' areas. The option to fill the entire rear surface of an escort vehicle with red retro-reflective material fits with the conspicuity approach taken but this may result in a higher cost for Escorters. For this reason it may be more appropriate to use fluorescent material instead of the retro-reflective material.

The appropriateness of vehicle size for marking types may also have a bearing relating to the available space on the rear of the vehicle. Increased space increases the impact of options but also increases the cost burden.



Figure 9: Examples of rear marking options

When the rear doors of a self-escort vehicle are opened a 25mm–50mm wide red retro-reflective strip of material shall be fitted along the rear facing edge of the doors, along the open roof edge and along the floor sill. In the case of a self-escort car the 25mm–50mm wide red retro-reflective strip of material shall be fitted to the rear facing edge of the boot lid or tailgate.

If a piece of equipment is fitted or attached to the rear of the escort vehicle and obscures the markings (e.g. a crash cushion in the upright position), the markings shall be replicated on the equipment so the design continues to be visible.

A response form to return to the HA is provided at ANNEX B for you to provide your preference on rear markings and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 6: Rear Markings</b>
1. Retro-reflective Chevrons– Small (estate) escort vehicle
2. Retro-reflective Chevrons – Medium (4X4) escort vehicle
3. Retro-reflective Chevrons – Large (van) escort vehicle
4. Retro-reflective Outline – Small escort vehicle
5. Retro-reflective Outline – Medium escort vehicle
6. Retro-reflective Outline – Large escort vehicle
7. Retro-reflective Block filled – Small escort vehicle
8. Retro-reflective Block filled – Medium escort vehicle
9. Retro-reflective Block filled – Large escort vehicle
10. Fluorescent Block filled – Small escort vehicle
11. Fluorescent Block filled – Medium escort vehicle
12. Fluorescent Block filled – Large escort vehicle

## Section 7: Signing

### Specific escort sign

The load and the escort vehicle should be fitted with a sign to the front and rear of the vehicle to inform approaching drivers of what is ahead so they can make decisions on the best course of action. The sign may be removable, fixed or incorporated into the markings of the vehicle. However, the sign should only be displayed when the vehicle is actively engaged in escorting an abnormal load or vehicle.

### Sign wording

Currently escort vehicles are required to have 'ABNORMAL LOAD' sign. The 'ABNORMAL LOAD' wording was previously decided on because it could apply to all movements. However, a lack of understanding by the public combined with the length of the word abnormal and the small font size required mean that it is not effective in informing drivers of what actions to take.

'OVERSIZE' may also be considered as another alternative and may be easier to understand than 'ABNORMAL LOAD'.

'WIDE LOAD' offers a greater understanding to the public that there is an obstruction ahead that will require particular care in passing and applies to the majority of loads. Additionally, when long loads are turning they require more roadspace and similar cautions when passing as a wide load so in some cases 'LONG LOAD' may be more appropriate. It would be appropriate to use 'LONG LOAD' where it is important for the public to be particularly aware of these load characteristics. However, 'WIDE LOAD' would be acceptable in all cases as the standard sign.

In the majority of abnormal loads in Europe are required to carry the sign 'Convoi Exceptionnel'. Applying this to the UK Escort vehicles and Abnormal Loads would increase conformity with the Continent.

Labelling the Escort Vehicle with the Sign 'WIDE LOAD' may confuse drivers as the Escort is not a wide load. It may therefore be more clear to have the sign say 'WIDE LOAD AHEAD' or 'WIDE LOAD ESCORT'

### Sign Lettering

Upper and lowercase lettering are observed differently by the reader. Lowercase is read more quickly where as uppercase has a bigger impact.

**Wide load    WIDE LOAD**

### Front sign positioning

This sign shall be mounted such that the sign face is perpendicular to the road surface and the text is horizontal. The sign shall be mounted either on the roof of the escort vehicle or preferably below the front grille, ensuring that the front number plate is still legible and does not affect the operation of the vehicle. If this sign is roof mounted, it must not obscure the roof mounted flashing amber warning beacon.

The sign should have black lettering on a yellow retro-reflective background. The height of the lettering shall be a minimum height of 100mm.

If this sign is mounted below the front grille of the escort vehicle, the retro-reflective material used shall be to a minimum standard of Class RA1 or equivalent. If this sign is mounted on the roof of the escort vehicle, the retro-reflective material used shall be to a minimum standard of Class RA2 or equivalent.

## WIDE LOAD

Figure 10: Basic sign

### Front marker boards design

In order to increase conformity between the Escort vehicle and the abnormal load marker boards can be fitted to both ends of the sign. In the UK these boards are triangular and are described in The Road Vehicles (Construction and Use) Regulations 1986. However, in Europe square marker boards are used and as part of the consultation on abnormal load marking a change to this type is being considered. The marker boards will have a diagonal red non-reflective / white retro-reflective striped design. However, it is worth noting that retro-reflective materials become less effective when there the viewing angle is increased and therefore fluorescent materials may be more appropriate in situations where there is an increased viewing angle.

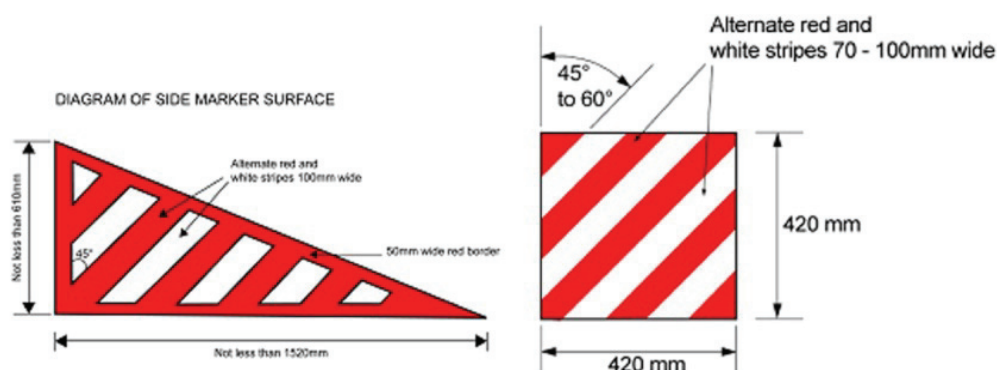


Figure 11: UK and European style board markers

The width of the marker board and associated plates shall be the same as the width of the vehicle (typically 1.8m for a car).

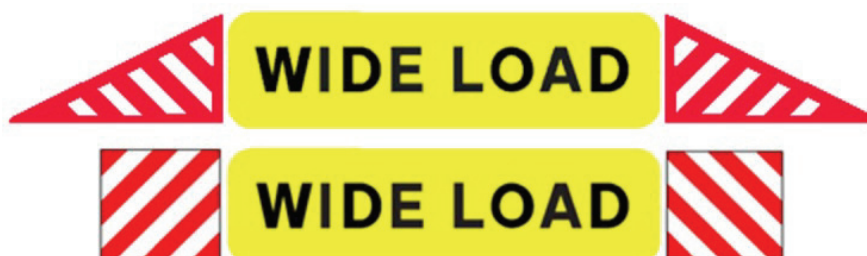


Figure 12: Signs with UK and European style board markers

### Official traffic sign for rear sign

A vehicle identification sign, similar to the sign mounted on the front of the vehicle shall be mounted on the rear of the escort vehicle, preferably below the rear number plate. This sign shall display the same legend as the front mounted sign with the yellow part being retro-reflective to Class RA1 or equivalent. In addition, diagonal striped marker boards, red retro-reflective / white non-reflective, shall be fitted to both ends of the rear sign. The retro-reflective parts of these plates shall be to the same standard as the main body of the sign. However, it is worth noting that retro-reflective materials become less effective when the viewing angle is increased and therefore fluorescent materials may be more appropriate in situations where there is an increased viewing angle.

The width of this sign and associated plates shall be the same as the width of vehicle (typically 1.8m for a car).



Figure 13: Rear signs with European style board markers

A response form to return to the HA is provided at ANNEX B for you to provide your preference on signage and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 7: Signage</b>
1. Specific escort sign
2. Need for the sign to be removable
3. Wide load (only)
4. Wide load as standard with slow load or long load as options
5. Abnormal load
6. Convoi Exceptionnel
7. Add 'Ahead' to sign word
8. Add 'Escort' to sign word
9. Escort
10. Escort vehicle
11. Uppercase lettering
12. Mixed lettering
13. Not specified
14. No marker boards
15. UK style marker boards
16. European style marker boards
17. No rear sign
18. A Sign with a retro-reflective red border
19. A Sign with no retro-reflective red border

---

## Section 8: Lighting

In order to ensure the vehicle lights and warning beacons do not conflict with the marking materials a gap of 200mm must be left between any retro-reflective or reflective material and any non warning light source such as indicators or rear lights.

In addition to the obligatory vehicle lighting requirements as specified in the Road Vehicles Lighting Regulations (RVLR) (1989) (Referring to headlights, indicators, etc), the escort vehicle shall be fitted with warning beacons as follows.

Flashing warning beacons (defined as visible around 360°) shall be fitted to the roof of the escort vehicle to warn other road users and pedestrians to the presence of an abnormal load or abnormal vehicle. This shall be a full width light bar with amber lights at each end. These light bars may be demountable. Warning beacons shall conform to both RVLR requirements and Economic Commission for Europe (ECE) Regulation 65 on Special Warning Lamps.

Flash rates over 10Hz have been shown to increase glare and can also increase the risk of an epileptic response. Alternating beacons (right and then left) at 1-3Hz increases the conspicuity of the vehicle without an increase in glare or increasing the risk of an epileptic response.

The intensity of the beacons need to be balanced between getting the attention of the driver and not creating too much glare which will effectively hide the load and present a safety risk. Beam cut-off has an effect on glare and so it is recommended that the intensity at night with beam cut-off is 325-425cd and without beam cut-off it is 150-200cd. It is important not to place beacons at the eye level of drivers as this can increase the safety risk from glare.

### Flashing Lights above 25mph

The RVLR were amended in 2005 to allow the use of these lights on an escort vehicle travelling at more than 25 mph. As part of the review of the implementation the view of industry is being sought to determine if the change was useful to industry.

### Dipped Beam Headlights

To help alert other road users approaching the escort vehicle from the front, during the day the vehicle may use continuously illuminated dipped beam headlamps when escorting the abnormal load or abnormal vehicle.

### Warning Beacons Colour

DfT have been approached on the subject of red and other coloured warning beacons and the position they have given is that red lights should be restricted to emergency vehicles and vehicles used by HA Traffic Officers that may need to stop in the live traffic lane for this reason they are not suitable for the operation of an abnormal load movement. Amber flashing beacons are a warning message that is understood by the public, other colours create confusion as the message is not clear. For these reasons only amber will be permitted.

---

### Flashing Grille Lights

These cannot be considered to be warning beacons as these must be mounted higher than 1200mm, if they were to be used they would require dispensation from the DfT for their use. Further to this there is concern that the amber flashing grille lights could cause confusion with the vehicle amber indicator lights. For these reasons the use of grille lights is not being pursued.

### Automated Alternating Flashing Headlights

These are currently restricted to emergency vehicles and any proposal to extend their use to abnormal loads would need the agreement of the emergency services. The police are not willing to extend the use as they see them as a way of letting drivers know that their vehicles are trying to make progress through the traffic. However, it is still permissible to manually flash headlight to let other road users know that you are there.

A response form to return to the HA is provided at ANNEX B for you to provide your preference on lighting and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 8: Lighting</b>
----------------------------

- |   |
|---|
| 1. Has the use of flashing amber beacons above 25mph been useful to industry? |
|---|

## Section 9: Additional requirements for slow moving loads

For all loads but especially those travelling below 40mph additional signage may be provided. This may be in the form of a fixed sign or a Variable Message Sign (VMS) and will require authorisation from DfT.

### Traffic signs

If an escort vehicle has a traffic sign attached, it shall be a red triangular warning sign showing the legend 'Other danger ahead', as specified in diagram 562 of The Traffic Signs Regulations and General Directions (TSRGD), 2002. The height of this triangular warning sign shall be at least 600mm, preferably larger.

In addition to this sign, a supplementary sign plate is required as specified in diagram 563 of TSRGD, 2002. It is also proposed that this sign plate shall display the legend 'Wide load'. The legends 'Long load' or 'Slow load' may be used alternatively as required and must match the specific escort sign.



Figure 14: Warning Sign

These signs shall only be used during the movement of an abnormal load and shall be covered up or removed when the escort vehicle is not escorting an abnormal load.

Permission to use these signs will be through the application of a Special Order from DfT. This will place an additional burden on the Escorter, DfT and the HA.

A response form to return to the HA is provided at ANNEX B for you to provide your preference on lighting and reproduces the options listed here. It is recommended that the form is completed while reading through this document.

<b>Section 9: Additional requirements for slow moving loads</b>
---

- |                                       |
|---------------------------------------|
| 1. Fixed sign as an optional addition |
|---------------------------------------|

## Chapter 4: Escort Vehicle Illustrations

Figure 15 shows an option for lighting, signing and marking for car-based escort vehicles.

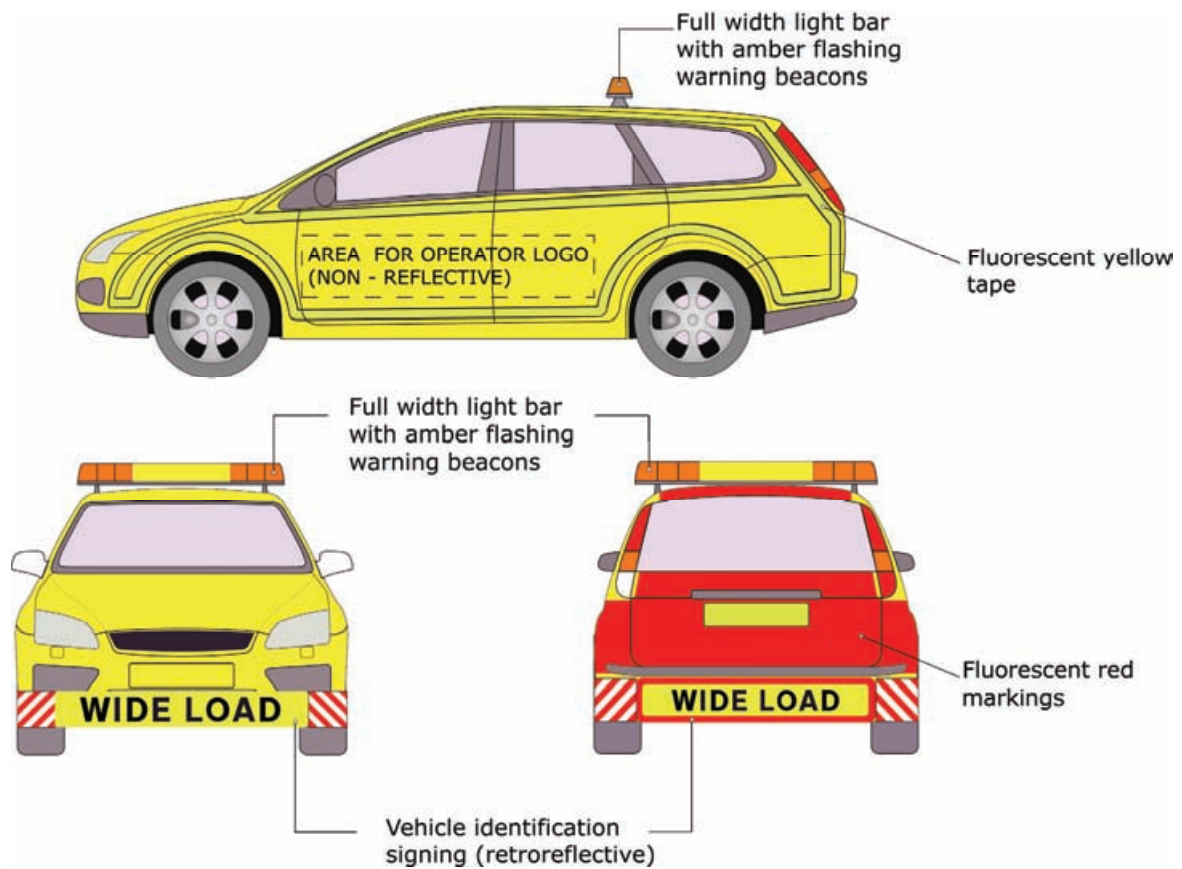


Figure 15: Example of an estate type Escort vehicle

Figure 16 shows an option for lighting, signing and marking for van-based escort vehicle.

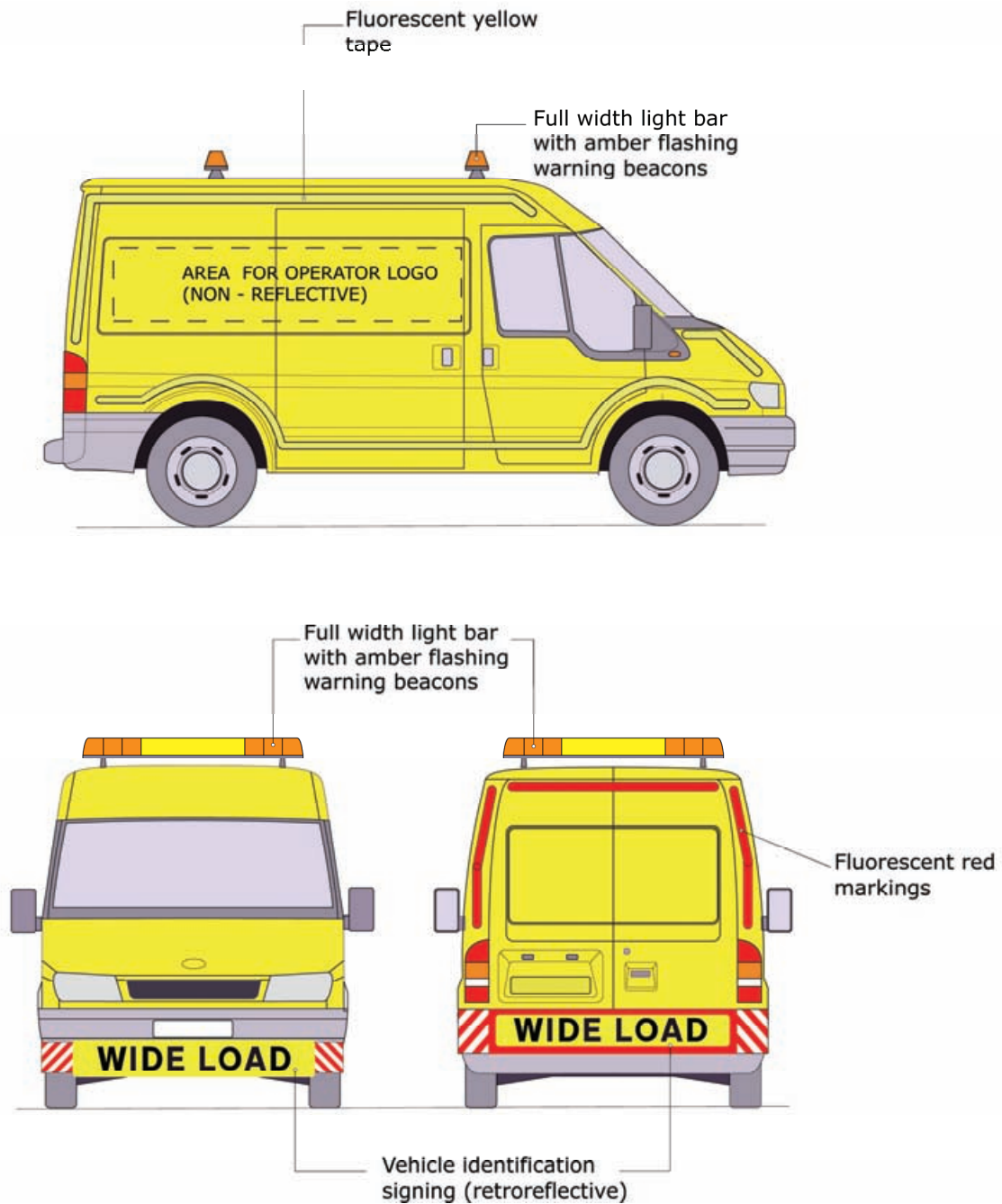


Figure 16: Example of van type Escort vehicle

# Annex A: Impact Assessment

Summary: Intervention & Options		
Department /Agency: Highways Agency	Title: Impact Assessment of Consulting on Guidance on the Lighting Marking and Signage for Abnormal Loads and Escorts Vehicles	
Stage: Final	Version: 1 ANNEX A	Date: 17 December 2009
Related Publications:		

Available to view or download at:

<http://www.highways.gov.uk>

Contact for enquiries:

Telephone:

What is the problem under consideration? Why is government intervention necessary?

The lighting and marking of abnormal loads and their escort vehicles must be improved to increase road safety. The current legislation and guidance is focused on load attributes such as overhang and does not consider the load and its escort as a whole. This leads to difficulty in deciphering best practice for the lighting and marking of loads and escort vehicles which a Coroners report cited as a contributory factor in a fatality in Dorset in 2008. The Highways Agency is best placed to coordinate views on a best practice guidance document and drive any resulting legislative changes.

What are the policy objectives and the intended effects?

The objective is tailored best practice guidance for abnormal loads and escort vehicles. Investigatory work has been carried out and there is scope to consult. At this point the detail of the investigatory work needs to be presented so it can be understood and where there is scope for change the options need to be presented.

This approach should increase stakeholder buy in to the final guidance by giving industry a sense of ownership and ensuring it is economical and practical. This will in turn drive the primary motivation for the work which is an improvement to road safety.

What policy options have been considered? Please justify any preferred option.

1. Do nothing
2. Consultation on Best Practice Guidance for Abnormal Loads and Escort Vehicles

Option 2 will improve road safety and take onboard Coroners and Independent Police Complaints Commission (IPCC) report recommendations following the fatality in Dorset in 2008.

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects?

1 year from implementation

**Ministerial Sign-off** For final proposal/implementation stage Impact Assessments:

*I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) the benefits justify the costs.*

Signed by the responsible Minister:

.....Date:

Summary: Analysis & Evidence					
Policy Option: 2		Description: 2. ANNEX A: Consulting on Guidance on the Lighting Marking and Signage for Abnormal Loads and Escorts Vehicles			
COSTS	<b>ANNUAL COSTS</b>		Description and scale of <b>key monetised costs</b> by 'main affected groups' There are no monetised costs to this change at this stage. The consultation may result in legislation changes or best practice which requires new or additional equipment. However, these will not be significant burdens and the implementation should allow industry to update vehicles markings through natural wear and tear.		
	<b>One-off</b> (Transition)	Yrs			
	<b>Average Annual Cost</b> (excluding one-off)				
	<b>Total Cost (PV)</b>				<b>£ Nil</b>
£ Nil					
£ Nil					
Other <b>key non-monetised costs</b> by 'main affected groups' There are no other non-monetised costs to business					
BENEFITS	<b>ANNUAL BENEFITS</b>		Description and scale of <b>key monetised benefits</b> by 'main affected groups' The guidance should improve road safety, provide clear guidance and reduce congestion. There is difficulty in determining the effects especially in terms of safety where there are 25 incidents/yr. However, changes would allow an estimated 7% more loads to move safely at night and up to £5.5 million/yr in congestion savings.		
	<b>One-off</b>	Yrs			
	<b>Average Annual Benefit</b> (excluding one-off)				
	<b>Total Benefit (PV)</b>				<b>£ 5.5 million</b>
£ N/A					
£ 5.5 million					
Other <b>key non-monetised benefits</b> by 'main affected groups' Road users: Improved road safety. Highways Agency: Reputation increase. Industry: Clear best practice					
Key Assumptions/Sensitivities/Risks The investigatory work has been developed with industry and current escorts guidance is widely accepted. Due to the approach to involve industry, and their appetite for guidance, it is expected new guidance will be welcomed. However, this is sensitive to industry's opinion of the guidance.					
Price Base Year 2009	Time Period Years 1	<b>Net Benefit Range (NPV)</b> £ N/A	<b>NET BENEFIT (NPV Best estimate)</b> £ 5.5 million		
What is the geographic coverage of the policy/option?			GB		
On what date will the policy be implemented?			2011		
Which organisation(s) will enforce the policy?			Police, Courts		
What is the total annual cost of enforcement for these organisations?			£ No Change		
Does enforcement comply with Hampton principles?			Yes		
Will implementation go beyond minimum EU requirements?			Yes		
What is the value of the proposed offsetting measure per year?			£ N/A		
What is the value of changes in greenhouse gas emissions?			£ Unknown benefit		
Will the proposal have a significant impact on competition?			No		
Annual cost (£-£) per organisation (excluding one-off)		Micro Nil	Small Nil	Medium Nil	Large Nil
Are any of these organisations exempt?		No	No	N/A	N/A
<b>Impact on Admin Burdens Baseline</b> (2005 Prices) <span style="float: right;">(Increase - Decrease)</span>					
Increase of	£ Nil	Decrease of	£ Nil	<b>Net Impact</b>	£ Nil
Key: <span style="background-color: #ffffcc;">Annual costs and benefits: Constant Prices</span> <span style="background-color: #d9ead3;">(Net) Present Value</span>					

## Evidence Base (for summary sheets)

[Use this space (with a recommended maximum of 30 pages) to set out the evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Ensure that the information is organised in such a way as to explain clearly the summary information on the preceding pages of this form.]

### **ANNEX A: Consulting on Guidance on the Lighting Marking and Signage for Abnormal Loads and Escorts Vehicles**

#### **Abnormal Loads**

- Abnormal loads are those load and vehicle combinations that, because of their size and weight, exceed the regulations controlling general heavy goods vehicles. These loads have increasing controls as the impact on road safety, structure capacity and congestion increases. The largest of these loads are referred to as Special Order loads (SOs) which require authorisation from the Secretary of State to move.

#### **Congestion**

- The congestion of abnormal loads can be measured in terms of the cost to the UK economy and the Public Service Agreement indicator. The PSA1 (Public Service Agreement indicator) impact is the worst delay to vehicles in the daytime on key roads. The PSA indicator calculation process focuses on the impact of the worst congestion and so reducing the impact increases journey time reliability.
- The two characteristics that have the greatest impact are the number of lanes a vehicle occupies and the speed it travels. The amount of traffic and the number of lanes available are the largest secondary impacts.
- The congestion impact of abnormal loads is very small, around 1% to 2%, but unlike weather or incidents the impact can be managed through route planning, technology improvements, operational practices and policy.

#### **Types of Abnormal Loads**

- SO, the heaviest, widest or longest loads. Any abnormal load over 150 tonnes gross vehicle weight or over 6.1m width or over 30.0m in total length is classified as a SO. The main requirements for hauliers are to give 10 weeks notice to the HA's AIL team, 5 days notice to Highway Authorities and 5 days notice to the police. Form BE16 is used by the haulier to make the notification, though this, as with all notifications, can be made through ESDAL (Electronic Service Delivery for Abnormal Loads).
- Special Type General Order (STGO) for loads not in the SO category, but which are over the weight limit for the number of axles, wider than 3m or longer than 18.65m. There are further divisions into three categories depending on gross weight and axle weight and this determines the maximum permitted speed on different road types. Notification is made to Highway Authorities and/or police forces. A further category is used for loads over 5.0m wide where 2 weeks notice must be given to the HA's AIL team; this notification is made using a VR1 form.
- Construction and Use (C&U) are loads that are not in the STGO category, but which do not qualify under normal Heavy Goods Vehicle (HGV) movements because of their size (width, length or overhang). Notification for these types of loads is made to the police forces.

**Abnormal Load Volumes**

Category	No. of Lanes taken	Speed of Load	Total annual miles travelled on HATRIS Network in Daytime	Total miles	Percentage of Total miles	Total miles by Category	Percentage of Total miles by Category	Percentage of Total Category Road miles
SO and VR1	1	4mph	43miles	37,057,563miles	0.000116%	181,687miles	0.49%	0.024%
	2	4mph	527miles		0.001422%			0.290%
	1	12mph	559miles		0.001508%			0.308%
	2	12mph	1,235miles		0.003333%			0.680%
	3	12mph	421miles		0.001136%			0.232%
	1	25mph	62,716miles		0.169239%			34.519%
	2	25mph	48,594miles		0.131131%			26.746%
	1	40mph	31,586miles		0.085235%			17.385%
STGO & C&U	2	40mph	36,006miles	0.097162%	19.818%			
	2	40mph	958,773miles	2.587253%	2.600%			
	2	50mph	1,659,414miles	4.477936%	4.500%			
	2	60mph	147,504miles	0.398040%	0.400%			
	1	40mph	11,800,280miles	31.843109%	32.000%			
	1	50mph	20,466,111miles	55.227892%	55.500%			
	1	60mph	1,843,794miles	4.975486%	5.000%			
						36,875,876miles	99.51%	

**Abnormal Load Congestion Cost**

Total Abnormal Load Congestion Cost ('04/'05)	Category	Abnormal Load Congestion Cost	Percentage of Total of Group Abnormal Load Congestion Cost
£80,086,704.00	SO and VR1	£ 23,566,704.00	29.426%
	STGO & C&U	£ 56,520,000.00	70.574%

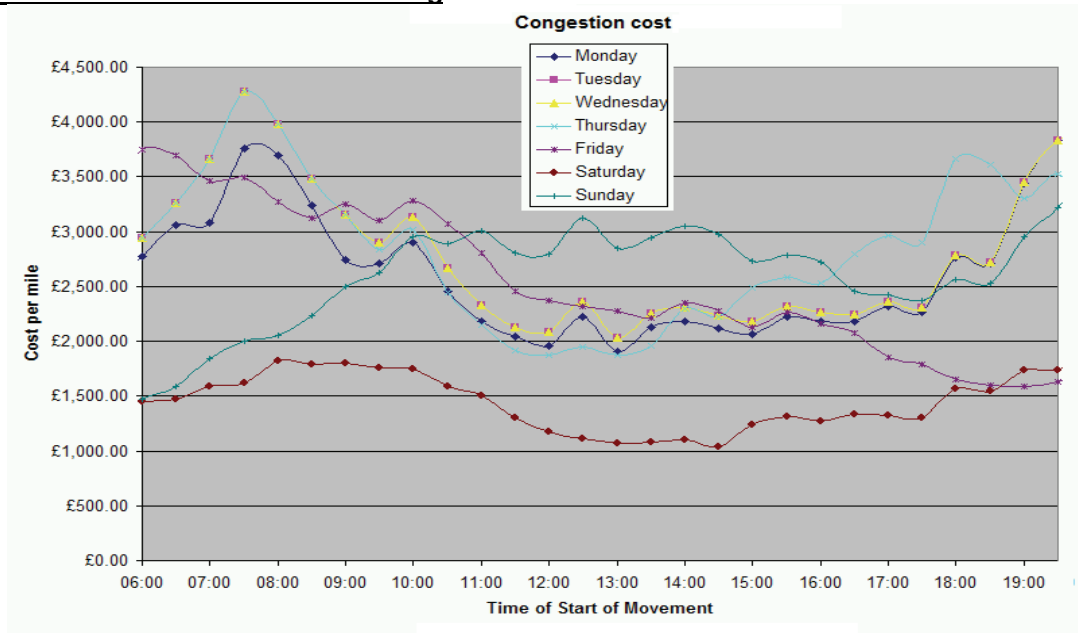
- The Congestion Cost difference between 'SO and VR1' and 'STGO & C&U' can be attributed to the higher volume of the second group of loads.

**Abnormal Load PSA indicator**

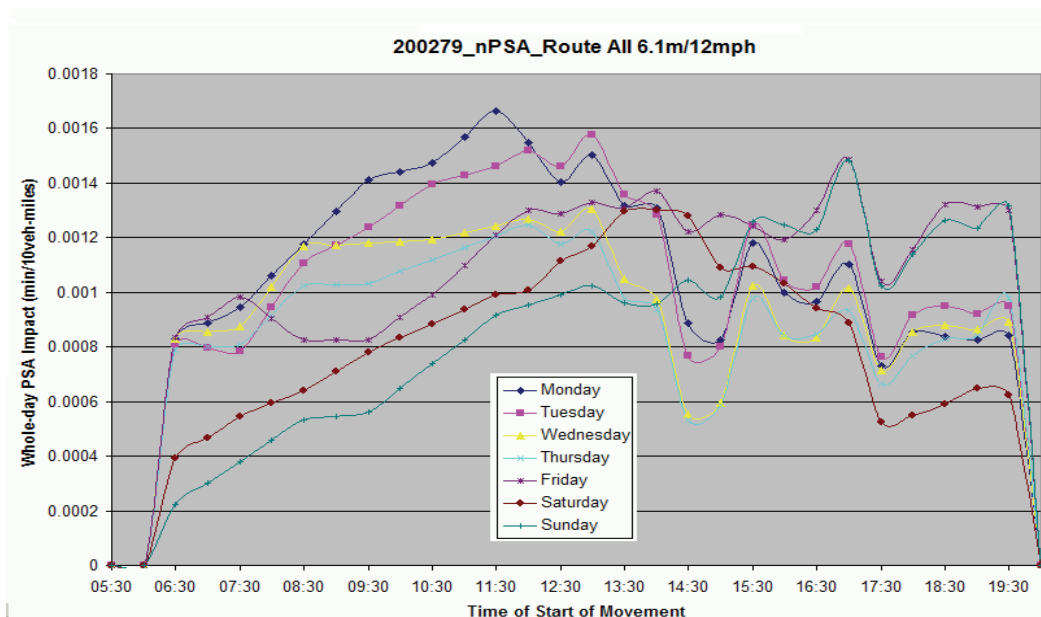
Network Baseline ('04/'05)	Abnormal Load PSA indicator Impact	Percentage of Baseline of Total PSA Impact	Category	Impact on PSA value	Percentage of Baseline of Group PSA Impact
3.78 min/10 vmiles '04/'05	0.0149 min/10 vmiles '04/'05	1.49%	SO and VR1	0.04692	1.24%
			STGO & C&U	0.009525	0.25%

- The Impact of 'SO and VR1' is five times greater than 'STGO & C&U' due to the very high impact of a few loads.

**The Effect of Abnormal Load Timing**



- Breaking the congestion cost down hour by hour for a 6.1m wide 12mph vehicle for a specific PSA link reveals detail about the peak times.



- The PSA indicator Impact for a link similarly shows more detailed results and it can be seen how the measure only operates between 6am to 8pm.

**Peak (6am-10am and 5pm-8pm)**

- Peak times are often locally determined but for the Agency anything outside of the PSA reliability measure period (6am - 8pm) would not be considered peak. Additionally the Midday Off-Peak period (10am – 5pm) would also be excluded from the description.
- As an Abnormal Loads congestion effect can be described as exponential to traffic volume, the impact at these times is most likely to cause traffic flow breakdown (where traffic will come to a full halt). However, these periods commonly experience flow breakdown and it could be argued that the additional traffic of an Abnormal Load at these times would have no effect.

**Off-Peak (10am-5pm)**

- This is described as being outside of commuting times (10am – 5pm).
- There will be some congestion impact at these times but traffic flow breakdown is unlikely.

**Night (Dark or 8pm – 6am)**

- Night can be described in two ways, the first is the obvious description of when it is dark, and this is important for safety reasons. The second is outside of the PSA reliability measure period (8pm – 6am), and this can be more important for congestion impacts as the congestion cost is minimal and PSA reliability measure Congestion impact of the movement of abnormal loads at night is zero.

**Current Management of Abnormal Load Timing**

- To reduce the impact of loads when the traffic volume is high SOs are often issued under the condition that they travel at certain times. The peak travel times are seen as Monday to Friday morning and evening rush hours and bank holidays. Other timings may be inserted to avoid events such as football matches.

**Night, Police Position**

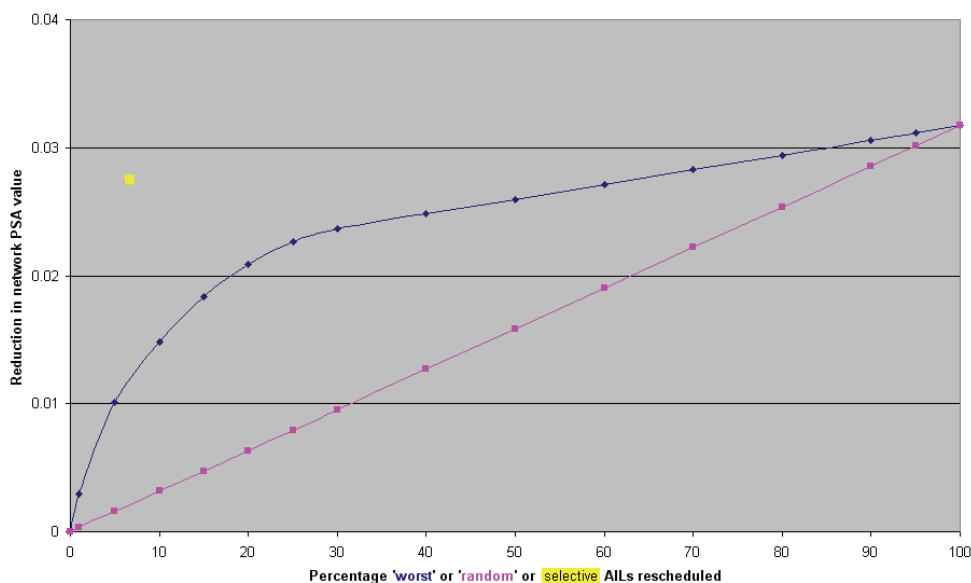
- The general police position across the country is that night-time abnormal load movements can take place on motorways and linking dual carriageways, but not on the local road network due to the higher accident risk on these roads. As a result of such necessary restrictions loads may have to wait at network entry / exit points which creates significant logistical challenges. Some exceptions to this are possible, for example some police areas will allow it and indeed the Metropolitan Police insist that some movements take place at night-time in London to minimise congestion. Some other sections of routes are also mandatory at night (e.g. departure from Sheffield or Rotherham).
- Stakeholders (Police and Hauliers) have no outright objection to moving AILs at night in principle, indeed where possible this often already happens due to the reduced congestion at night. However, there are obstacles with road safety, roadworks, visibility, logistics and infrastructure.

**Roadworks**

- Currently roadworks information is insufficient for planning purposes. However, when requested, road works firms are often very accommodating in moving their workforce to safety as an abnormal load passes through. On the other hand, notifications made by hauliers can also be very imprecise in terms of dates and numbers of movements, particularly as they often have to respond at short notice to customer requirements and start times can be unpredictable. This makes it difficult to co-ordinate and plan roadworks. Poor communication throughout the process is therefore the predominant problem. The hauliers' requirements for roadworks information are: accurate dates for roadworks, information as to remaining road capacity and contact numbers for the roadworks operators.
- Work is being carried out to produce guidance to improve the movement of abnormal loads through roadworks which is intended to alleviate the issues of moving loads at night.

**Opportunities for Load Timing through increased moves at Night**

- The ability to move abnormal loads at night instead of during the day-time may have a direct impact on the Agency’s targets. The HA wishes to encourage the practice to minimise disruption and danger to other traffic in line with its objectives of safe roads, reliable journeys and informed travellers.
- The impact of abnormal loads on congestion and the PSA target value has been estimated by modelling a range of load speeds and widths on a sample of routes, with a range of possible start times and days. It is assumed that a small proportion of moves currently travel at night, and that these have a negligible impact on congestion and the PSA value and those that travel during the day have been assumed to take overnight breaks.
- Drivers will not be used to encountering abnormal loads at night and may make false assumptions about their likely speed, size and behaviour. At night during off-peak hours, drivers generally expect to proceed without congestion or other obstructions.
- Selective rescheduling of just 7% of AILs can reduce the overall impact of AILs by 78%, compared to about 28% if all types of AIL are rescheduled equally, and a mere 7% if moves are rescheduled randomly.



**Potential PSA value benefit as function of percentage of AILs rescheduled**

Category	Lanes taken	Speed (mph)	Percentage Traffic at Night (Congestion Model Presumptions)	Proposed Percentage Traffic at Night (7% increase)	New Impact on PSA value	New Impact on PSA value	New Abnormal Load PSArm Impact	Network Baseline	New Percentage of Baseline of Total PSA Impact	New Percentage Difference
SO and VR1	1	4mph	15%	22%	0.00047	0.0436 min/10vm	0.0525 min/10 vmiles '04/'05	3.78 min/10 vmiles '04/'05	1.389%	7.0%
	2	4mph	15%	22%	0.02159					
	1	12mph	15%	22%	0.00042					
	2	12mph	15%	22%	0.00477					
	3	12mph	15%	22%	0.00337					
	1	25mph	5%	12%	0.00277					
	2	25mph	5%	12%	0.01012					
	1	40mph	5%	12%	0					
STGO and C&U	2	40mph	5%	12%	0.00012	0.0089 min/10vm				
	2	40mph	5%	12%	0.00526					
	2	50mph	5%	12%	0.00015					
	2	60mph	5%	12%	9.3E-07					
	1	40mph	5%	12%	0.00311					
	1	50mph	5%	12%	0.00034					
1	60mph	5%	12%	3.7E-06						

PSA impact of a 7% shift of loads to moving at night

Category	Lanes taken	Speed (mph)	Percentage Traffic at Night (Congestion Model Presumptions)	Proposed Percentage Traffic at Night (7% increase)	New Impact on Congestion Cost	New Impact on Congestion Cost	New Abnormal Load Cost	Old Abnormal Load Cost	Abnormal Load Cost Saving	New Percentage of Baseline of Total Congestion Cost
SO and VR1	1	4mph	15%	22%	£164,236.14	£21,917,034.72	£74,480,634.72	£80,086,704.00	£5,606,069.28	7.0%
	2	4mph	15%	22%	£6,123,086.52					
	1	12mph	15%	22%	£258,948.27					
	2	12mph	15%	22%	£1,777,450.41					
	3	12mph	15%	22%	£1,072,381.14					
	1	25mph	5%	12%	£3,100,022.94					
	2	25mph	5%	12%	£8,573,286.84					
	1	40mph	5%	12%	£90,675.93					
STGO & C&U	2	40mph	5%	12%	£756,946.53	£52,563,600.00				
	2	40mph	5%	12%	£15,848,110.47					
	2	50mph	5%	12%	£5,955,544.23					
	2	60mph	5%	12%	£402,408.21					
	1	40mph	5%	12%	£29,283,550.77					
1	50mph	5%	12%	£1,046,761.50						
1	60mph	5%	12%	£27,224.82						

Congestion cost impact of a 7% shift of loads to moving at night

- The Agency does not intend to impose a compulsory policy on operators requiring AILs to be transported at night; it is hoped that by considering all the issues hauliers will be able to choose to move safely at night.
- The main conclusion (of the Movement of AILs at night project) is that rescheduling just a few of the loads (SO & VR1) can lead to a disproportionate reduction in the PSA indicator impact of abnormal loads, provided that moves are rescheduled selectively rather than randomly: the impact of rescheduling is considerably improved by selecting the moves that have the worst delays.
- From the hauliers' point of view the main problem with night-time movements is the practical logistics. Assuming that night-time movements are not allowed on local roads the load would need to be transported to the entry / exit points of the network during daylight hours in order for the movement to be continued at night. This may create serious planning challenges and more significantly will require infrastructure at these entry / exits points to allow abnormal loads to park up. Requiring drivers to sit and wait at these points would lead to extended working hours, which may have serious implications for the Working Time directive. Drivers' hours legislation dictates rest periods and means that shifting drivers between day-time and night-time movements results in loss of productivity. Staffing levels may also need to be higher at night for safety and security reasons. The overall time to do a job would be extended, requiring more staff, probably at higher rates, and increasing the cost of the job as a whole (moving by night was estimated to be 43% higher than during the day). For these reasons the choice is to be left to the haulier and based on the opportunities of a route, the operation of a particular business and the requirements of their customers.

## **The Effect of Abnormal Load Incidents**

### **Accident Rate**

- There is very limited information available about the accident risk of abnormal loads. The Police incident data, Stats19, does not specifically record abnormal loads, so accidents involving AILs were identified where 'slow moving vehicle' had been recorded as a contributory factor and where certain journey types (e.g. commuting) were excluded. In the two-year period studied there were 73 accidents involving 74 vehicles, 20 of which were HGVs. From this number and the estimated number of vehicle kilometres travelled by abnormal loads, the accident rate was estimated as 6 per 100 million AIL vehicle (veh) km.
- Accident Rate is a very blunt tool and needs to be broken down by accident severity and time of accident to make the results more meaningful.
- Analysis of accident characteristics for all vehicles showed some differences between day and night-time. Accidents at night-time were more severe than during the day; the proportion of accidents resulting in fatal or serious injuries involving HGVs or vehicles classified in Stats19 as other motor vehicles was 27% at night, compared with 13% during the day. This increase in accident severity may be an effect of different traffic conditions, e.g. reduced congestion leading to higher driving speeds. Other differences, such as relatively higher proportions of accidents at night involving parked vehicles or at road works, are likely to be due to different exposure levels. Driver impairments, such as fatigue and alcohol were more common at night-time than during the day.
- Accidents at night-time in England were roughly the same severity as those during the day (0600 – 2000 hours) with just under 15% of accidents in both time periods involving a fatal or serious injury.
- Comparison of the accident rates by time of day showed that the accident rate at night is about 30% greater than during the day on motorways, and about 50% greater than during the day on A-roads. Furthermore, for both motorways and A-roads, the early hours of the morning have the greatest risk, with about twice the risk between 01:00 and 04:00 hours compared to during the day.

Abnormal Load Accident Rate	Category	No. of Lanes taken	Speed (mph)	Total annual km travelled on HATRIS Network in Daytime	Estimated Total annual km travelled on HATRIS Network at Night	Number of Accidents a Year	Number of Accidents a Year by Category (presuming load categories have equal risk)	Number of Accidents a Year by Load Type (presuming all load types have equal risk)
6 Accdnts/100mill vkm	SO and VRI	1	4mph	69km	10km	3.75724391	0.01844781	0.0000043
		2	4mph	848km	127km			0.0000522
		1	12mph	900km	135km			0.0000553
		2	12mph	1,988km	298km			0.0001222
		3	12mph	678km	102km			0.0000417
		1	25mph	100,932km	5,046km			0.0061064
		2	25mph	78,204km	3,910km			0.0047314
		1	40mph	50,833km	2,541km			0.0030754
	STGO & C&U	2	40mph	57,946km	2,897km		0.0035057	
		2	40mph	1,542,996km	77,150km		0.0933512	
		2	50mph	2,670,568km	133,528km		0.1615694	
		2	60mph	237,385km	11,869km		0.0143618	
		1	40mph	18,990,710km	949,535km		1.1489379	
		1	50mph	32,937,013km	1,646,851km		1.9926893	
		1	60mph	2,967,299km	148,365km		0.1795216	
							3.73879610	

#### Accident data by abnormal load type

- With the accident rate at 6 per 100 million AIL veh km it is possible to extrapolate this with abnormal load mileage to determine the expected number of annual accident attributed to abnormal loads, this can be broken down by load type and load category.
- The 6 per 100 million AIL veh km results in an expected 3.8 accident per year after 60 million veh km. The majority of the accidents (almost 2) can be expected to come from 1 lane wide 50mph loads due to the very high mileage.
- This does assume equal accident rate risk for all load types, in reality it would be expected that the slower wider loads may have a higher individual accident rate though conversely these loads would have escorts and be more professionally managed which would provide a risk reduction. Without further investigation into this area the equal accident risk rate would appear to be a fair assumption.

Accident severity	All accidents			Accidents involving HGV/OMV		
	Day	Night	% during night	Day	Night	% during night
Fatal	4,817	2,675	36%	945	307	25%
Serious	50,176	16,740	25%	4,292	827	16%
Slight	375,083	78,606	17%	29,112	3,329	10%
Total	430,076	98,021	19%	34,349	4,463	11%
Severity ratio	13%	20%	-	15%	25%	-

Severity ratio =(Fatal +Serious)/Total

#### Accidents in England by severity by day and night, 2004-2006

Category	No. of Lanes taken	Speed (mph)	% Fatal Accidents involving HGV/OMV during day	% Fatal Accidents involving HGV/OMV during night	% Serious Accidents involving HGV/OMV during day	% Serious Accidents involving HGV/OMV % during night	% Slight Accidents involving HGV/OMV during day	% Slight Accidents involving HGV/OMV during night
SO and VR1	1	4mph	2.0%	1.4%	8.9%	3.3%	71.9%	12.5%
	2	4mph						
	1	12mph						
	2	12mph						
	3	12mph						
	1	25mph						
	2	25mph						
	1	40mph						
STGO & C&U	2	40mph	2.0%	1.4%	8.9%	3.3%	71.9%	12.5%
	2	50mph						
	2	60mph						
	1	40mph						
	1	50mph						
	1	60mph						

- From analysis of accidents in England by severity by day and night, 2004-2006 the percentage of accident by severity and time of day can be calculated for HGVs and OMVs (Other Motor Vehicles). The limited accident data means that this group best mirrors the probable breakdown of abnormal load accident occurrence.

#### **Affect of a 7% shift of loads moving at night on abnormal load incidents**

- Rescheduling 7% of the loads to move to night may have an impact on accident rates, the impact of this can be estimated if the percentage of loads travelling at different times is known. An exercise was carried out by TRL to determine some approximate values, these were 15% of loads travelling at 4pmh to 12 mph and 5% for all others
- Using the previously determined number of accidents, by severity and night/day, it is now possible to reduce the accidents in the day by 7% and increase it at night by 7% for each severity type.
- Increasing the number of moves at night by 7% results in a likely additional 0.65 accidents per year, of this 0.06 would be fatal. For SO and VR1 loads, where the majority of the congestion benefits are, there is an additional 0.02 accidents per year.
- Although the accident data is based on a number of assumptions and generalisations, modifying the individual assumptions in turn does not generate any unexpected growth in accidents as most relationships are linear. Furthermore, the impact of 7% more loads at night is expected to have such a low impact on the number of annual accidents that the effect is negligible and even possibly beneficial.
- Forecasting cannot predict actual results and it will be unknown if moving a load at night will create an accident or if another load moved at night would have had an accident in day. The accident data indicates that the additional accidents from moving at night are 0.65/yr of which 0.06/yr (1 every 16.7 years) would be fatal. This change would also result in a reduction in the number of incidents in the day and it is reasonable for loads to move at night as long as the risk of moving is mitigated which is true for movements at any time.
- It is critical to reiterate that the Highways Agency is not imposing this 7% increase as a policy but is trying to enable night moves. The figures given here are based on current lighting and marking on vehicles and through the improved lighting and marking guidance any negative impact would be negated.

## Dorset Incident

### **Extract from Independent Police Complaints Commission Lessons Learnt Report**

- A haulage company wanted to transport a large dockside crane across the country. They notified the abnormal loads office of the local Force, which decided a police escort was needed for the beginning of the journey, with a private escort taking over after that. The load was classified as abnormal under the relevant legislation and it was illegal for it to travel without being properly marked and lit. Force policy on the authorisation and movement of abnormal loads was sparse, however. It did not refer to the legislation or the nature of the road network in the county, nor did it allocate ownership of roles and responsibilities or include any guidelines on night time movements within the county. When authorising the load, the abnormal loads office relied upon the information provided to them by the haulier and no discussion took place on how the load should be lit and marked.
- Before dawn a few days later, transport of the load on a truck began. The Force had not ensured that all traffic patrol officers had attended the relevant training course before undertaking abnormal load escort duties. Accordingly, the traffic officers escorting the load were aware of their powers but were unaware of the legal requirement to place reflective markers on the extremities of the load. Indeed, there was no knowledge within the Force traffic department as to what made an abnormal load illegal; nor did any one person or department within the Force have ownership of this particular aspect of abnormal load movement, which was the case nationally as well as for this Force.
- While the load was travelling along a main road after the private escort had taken over, a man driving to work collided with the offside of the crane. He died of his injuries. When police officers arrived at the scene they found that the required reflective markers were in the cab of the truck and not on the extremities of the load as required by law.

### **IPCC National Level Recommendations**

- The incident gave rise to recommendations to national bodies – the first by the IPCC to ACPO and the remainder by the Coroner to the Department of Transport:
  - ACPO should issue guidance to address the issue of signage and lighting of abnormal loads at a national level. **(NB: This is being taken forward by this consultation and resulting guidance)**
  - Projection markings should be made of a reflective material so they would be perceived at a greater distance in the hours of darkness. **(NB: This is being taken forward by this consultation and resulting guidance)**
  - Consider whether fitting amber warning beacons to a vehicle carrying an abnormal load should be made compulsory. **(NB: This is being taken forward by this consultation and resulting guidance)**
  - Strengthen the Highway Code to advise an oncoming driver seeing an escort vehicle operating amber lights to slow down and move to the nearside as safely as possible or, where the abnormal load vehicle is in view, to consider the need to stop to await its arrival, or proceed very slowly as it may occupy considerably more road width than other vehicles. **(NB: The Highways Agency has raised the issue with the Driving Standards Agency as an issue to be taken forward in the next review and offered assistance in the drafting of changes)**
- The Department of Transport (Highways Agency) is reviewing the need for further legislation and will look at strengthening the Highway Code when the next opportunity arises.

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## **Abnormal Load Marking and Lighting**

### **Conspicuity**

- Vehicle conspicuity is the ability of a vehicle to draw attention to its presence, even when other road users are not actively looking at it. Vehicle visibility is the ability of a vehicle to be clearly seen from a particular distance. Hence, a “visible” vehicle can be seen but does not necessarily attract the attention where a “conspicuous” vehicle does attract the attention.
- The primary physical parameters influencing the conspicuity of targets are size, luminance and contrast. Luminance is the intensity of the light emitted by the object and contrast is the difference in visual properties than makes an object distinguishable from other objects or the background.

### **Cognitive conspicuity**

- In order for drivers to respond appropriately to any type of hazard, they need to not only see it (i.e. for it to be physically conspicuous), they also need to recognise it and interpret it to the extent that allows them to understand what to do. Abnormal loads may suffer from a lack of cognitive conspicuity, especially in dark conditions, because they are unfamiliar. At night, the available information about vehicles is degraded. In unlit conditions, vehicles appear as a pattern of lights and reflections, because these objects are familiar, drivers can mentally “fill in” other details about the vehicle such as the length, width, depth and likely speed. Abnormal loads are rarely experienced by drivers and have no standard characteristics drivers can use to form expectations about them based on previous experience.

### **Self Escort Vehicles**

- The escorting Code of Practice gives recommendations about signs, beacons and markings fitted to escort vehicles. It is not mandatory and evidence suggests it may not always be followed with respect to escort vehicle livery. Escort operators may make assumptions about what livery they feel is most conspicuous and these assumptions may not be based on evidence. They may also mimic other conspicuous vehicles (e.g. police vehicles), which over the long term could degrade the meaning and conspicuity of these markings. In addition, it does not contain specific guidance about the movement of abnormal loads at night to 40 mile/h on motorways, 35 mile/h on dual carriageways and 30 mile/h on other roads.

### TRL Report Executive Summary on Lighting and Marking of Abnormal Loads and Escort Vehicles

- The Highways Agency (HA) is responsible for authorising, on behalf of the Secretary of State for Transport, the movement by road of Abnormal Indivisible Loads (AILs) over a certain size and weight. The HA wishes to encourage the practice of moving AILs at night in line with its objectives of safe roads, reliable journeys and informed travellers. The movement of AILs at night has the potential to reduce Average Vehicle Delay (AVD) generated by the AILs on the HA strategic road network. Previous work by Bourne et al. (2008) identified issues and benefits concerning the movement of AILs at night. In reviewing relevant accident studies, lack of conspicuity (how easily drivers can detect and recognise potential hazards) emerged as a key factor in causing accidents.
- This report describes a study carried out by TRL on behalf of the HA to generate a specification for improved lighting, marking, signing and safety equipment of AILs and escort vehicles that increases the conspicuity of AILs and escort vehicles. These specifications form the basis of draft best practice documents that will be targeted at industry (both hauliers and Escorters), providing information on how to improve AIL and escort vehicle conspicuity.
- Conspicuous objects communicate a clear and consistent message, either of what the object is, or how the driver should respond to a situation. To maximise AIL and escort vehicle conspicuity, conspicuity principles have been developed where information given to drivers is clear, easy to comprehend and intuitive to follow. Consistency between the escort vehicle markings and the AIL markings, as well as between different types of AIL, has also been emphasised.
- Attention has been given to the speed differential between approaching drivers and the AIL, where for increasing speed differentials, information to drivers becomes progressively more instructive. Consideration has been made of vehicles approaching the load from both the front and the rear.
- The desired driver behaviour, as drivers approach an AIL, has been formed in terms of “zones”, as seen in the diagram below:

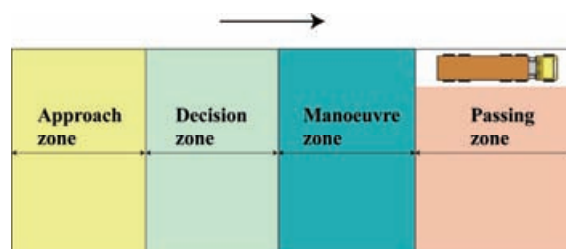


Figure 1 – Driver behaviour “zones”

- Conspicuity requirements have been developed for each “zone” as follows:
  - Approach - Amber flashing lights on a full width lighting bar should be visible.
  - Decision - Drivers need to be able to see an instruction to be able to follow it. This could take the form of a fixed warning triangle as its shape is easily resolved, or a VMS light arrow indicating that a lane change is required.
  - Manoeuvre - No new information is required to perform the manoeuvre as this would increase the cognitive workload of the driver. To minimise the effect of glare from flashing beacons, these should be mounted above the driver's eye line.
  - Passing - As signing disappears, additional information needs to replace it to “hand” the driver over from one source of information to the next. The new information requirements include the need to see the load dimensions and outline. Red and white marker plates at the extremities of the load including attached side marker lamps would provide adequate conspicuity. This could also be augmented by floodlighting of the load, where care should be taken to make white light visible only to the front.

- By defining the conspicuity requirements for each driver behaviour “zone”, the driver’s cognitive workload should be minimised and the information they receive should be consistent with their location relative to the load and escort vehicle.
- This “zone” approach has led to a set of recommendations that include a set of options which should provide Escorters with flexibility in choosing the type of escort vehicle required and the type of lighting, marking and signing relevant to the AIL and proposed route. A selection of these options are illustrated below:



Examples of escort vehicle liveries



Examples abnormal load liveries



Requirements for end and side projection markers for a forward and rearward projecting load

## Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

**Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.**

Type of testing undertaken	<i>Results in Evidence Base?</i>	<i>Results annexed?</i>
Competition Assessment	No	No
Small Firms Impact Test	No	No
Legal Aid	No	No
Sustainable Development	No	No
Carbon Assessment	No	No
Other Environment	No	No
Health Impact Assessment	No	No
Race Equality	No	No
Disability Equality	No	No
Gender Equality	No	No
Human Rights	No	No
Rural Proofing	No	No

## Annex C: list of Consultees

Associated British Ports	Government Office for the South West
Association of Electricity Producers (AEP)	Government Office for the West Midlands
Association of Inland Navigation Authorities	Government Office for the Yorkshire and Humber
Association of Inland Shipping Operators (UK) Ltd	Heavy Transport Association
British Industrial Truck Association	Inland Waterways Amenity Advisory Council
British International Freight Association	Inland Waterways Association
British Marine Federation	Institution of Highways and Transportation
British Ports Association	International Chamber of Shipping
British Constructional Steelwork Association Limited	International Maritime Industries Forum
British Waterways	International Support Vessel Owners' Association
Chamber of Shipping	Local Government Association
Chartered Institute of Logistics and Transport	London Ship-owners and River Users Society
Coastlink	Maritime and Coastguard Agency
Commercial Boat Operator's Association	National Grid
Commission for Integrated Transport	North East Assembly
Construction & Plant-Hire Association	Planning Officers' Society
County Surveyors Society	Power Station Owners (via AEP)
Department for Environment, Food & Rural Affairs	Road Haulage Association Ltd
Department for Transport	Road Operators' Safety Council
Department of Trade and Industry	Robert Wynn & Sons Ltd
Environment Agency	Royal Society for the Prevention of Accidents
Environmental Transport Association	Scottish Environment Protection Agency
Freight Transport Association	Scottish Executive
Government Office for London	Sea and Water
Government Office for the East Midlands	National Assembly for Wales
Government Office for the East of England	Transport for London
Government Office for the North East	Transport Research Laboratory Ltd
Government Office for the North West	Transport Scotland
Government Office for the South East	United Kingdom Permanent Representation to the European Union (UKRep)
	Vehicle and Operator Services Agency
	Welsh Local Government Association

