DRIVERcpc

Driver Certificate of Professional Competence

RSA

DRIVER CERTIFICATE OF PROFESSIONAL COMPETENCE

THE PROFESSIONAL BUS DRIVER

An tÚdaras um Shábháilteacht ar Bhóithre.
Road Safety Authority.

DRIVER CPC MODULE NUMBER

6.3

COPYRIGHT NOTICE AND DISCLAIMER

All applications for permission to make use of the material under copyright should be addressed to The Manager, Driver Education Section, Road Safety Authority, Moy Valley Business Park, Primrose Hill, Dublin Road, Ballina, Co Mayo, Ireland.

It is the absolute obligation of the holder of the Certificate of Professional Competence to be familiar with and comply with all aspects of the law relating to the Certificate of Professional Competence and in particular the obligation to obtain and maintain the level of training and instruction required for the Certificate of Professional Competence.

The training process has been designed and developed by the Road Safety Authority for the express purpose of facilitating the training of all classes of drivers required to acquire and hold the Certificate of Professional Competence.

The Road Safety Authority does not accept any obligation and/or responsibility arising out of the use of and/or the application of the materials, whether directly and/or indirectly, and the information used in the training of drivers is not intended to replace knowledge of the laws and regulations relating to the Certificate of Professional Competence.

The contents of this manual are expressed in general terms and are not intended to be a detailed analysis of the law. It is based on the assumption that readers are familiar with many of the technical terms used when referring to HGV and PSV vehicles. This guide does not, and is not intended to provide legal advice or to represent a legal interpretation of the law.

It is the primary obligation of the driver to know the laws and regulations relating to their profession.

RSA Head Office

Údarás Um Shábháilteacht Ar Bhóithre
Road Safety Authority

Páirc Ghnó Ghleann na Muaidhe, Cnoc an tSabhaircín, Bóthar Bhaile Átha Cliath, Béal an Átha, Co. Mhaigh Eo.
Moy Valley Business Park, Primrose Hill, Dublin Road, Ballina, Co. Mayo.

locall: 1890 40 60 40 fax: (096) 25 252 email: info@rsa.ie website: www.rsa.ie

For information relating to the tachograph, drivers hours, vehicle standards and CVRT contact the
Road Safety Authority, Clonfert House, Bride Street, Loughrea, Co. Galway.
Phone: (091) 872 600 Email: enforcement@rsa.ie

FOREWORD FROM THE RSA CHIEF EXECUTIVE OFFICER

This Driver Certificate of Professional Competence (Driver CPC) syllabus has been developed by the RSA with the assistance of the transport industry and experienced training organisations.

The information contained in this manual (No. 6.3. The Professional Bus Driver) together with the information provided in Manuals 1, 2, 3, 4 and 5 combines to become an excellent resource for use by professional drivers. Drivers are encouraged to keep all of the manuals together in a safe place and to refer to them from time to time whenever they want some clarification or guidance on how to approach a particular issue.

The next few pages set out what the programme has to offer those attending, whether you are already working as a professional truck or bus driver, or you are new to the profession and want to become a qualified driver with a view to working in the transport industry. By following the guidance provided and adhering to 'best practice' outlined in this manual, you will significantly reduce the likelihood of being involved in a serious incident. These incidents could ultimately involve financial penalties, loss of business and a risk of being involved in a serious injury or fatal collision.

The course is broken down into modules covering a wide range of areas outlined in the Driver CPC EU Directive and Irish National legislation, which will be of interest to all professional bus and truck drivers and all good employers. Some areas may be new to you, in other parts it may simply be a case of refreshing your skills or knowledge – in either case I am certain that you will find the programme challenging, yet enjoyable.

Driver CPC covers key aspects such as the Health and Safety of professional drivers as well as the rational use of fuel and important road safety related matters. As such you will possibly have encountered some or many of these topics before. However these topics have such a significant impact on the safe movement of passengers and goods that key messages are repeated and/or reinforced.

The Board of the RSA considers Driver CPC to be a key step in our common aim to reduce death and serious injuries on our roads. There will also be benefits to the transport industry through improved safety, enhanced eco-driving, lower insurance costs and a highly trained resource of professional drivers. By participating in Driver CPC training you will be developing and refreshing the knowledge and skills required for your profession. It will help you not only keep on top of your profession but also to remain a safe and socially responsible driver.

By taking this training at an RSA approved training centre you can be confident that the provider has met all the quality assurance targets required of an RSA registered training provider and is committed to helping you achieve your own personal objectives from this course.

Please be prepared to ask questions of your trainer and the group and to share your own experiences. By actively joining in with each training session you will be initiating and contributing to debate among your group of peers. Sharing your experiences and listening to others will help to benefit everyone and may in itself make an important contribution to Irish road safety.

Once you have completed any of the training you will be able to view your Driver CPC training record by logging onto the RSA website and visiting 'MY CPC' (see the guide at the back of this manual).

From there you can print off your record and if required, you can provide a copy to your employer to prove your status as a professional driver or use it to support a job application when applying for work as a professional truck or bus driver.

May I take this opportunity to wish you well with the course and I look forward to your contribution in the ever-increasing demand for quality drivers.

Yours sincerely

Moyagh Murdock
CEO

IMPORTANT

The RSA endeavours to provide you with the latest information but please be aware that Road Traffic and other applicable legislation is continuously changing. As a consequence the information contained in this manual or provided via any of the related PowerPoint presentations is also subject to change. The RSA will continue to add up-dates or refresh the material from time to time but can in no way guarantee that this version contains the very latest information available. If you have any doubts about the validity of information contained within this manual or any of the presentation slides, please seek clarification from either your trainer, your employer or transport manager (as appropriate).

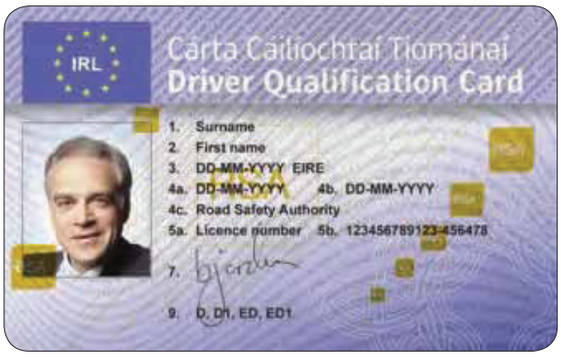
If necessary you may also wish to obtain independent legal opinion.

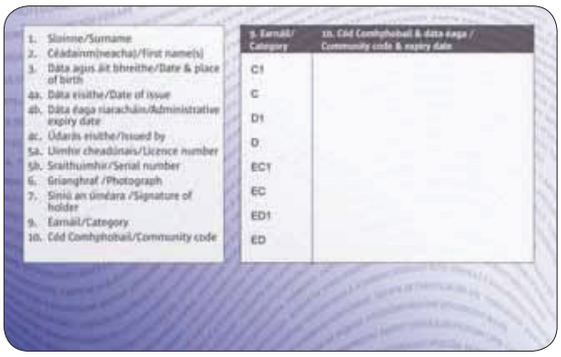
To ensure you have the latest version of this module, check our website for details, just click on the Driver CPC section of www.rsa.ie.

While every effort is made to ensure that the material in this manual is accurate at the time of going to press, it remains the responsibility of drivers to ensure they are informed of and familiar with all regulations, conditions and requirements relating to all aspects of their profession.

Sample CPC Card

Once you have completed your Initial Driver CPC training you can apply for your Drivers Qualification Card.





When driving a truck or a bus in a professional capacity, a driver must carry a

- CPC card for the category
- Driving licence for the category
- Tachograph card or tachograph charts

INTRODUCTION

The following information is provided for persons who wish to become professional truck or bus drivers, and for those who are already qualified in the profession. It outlines the steps to be taken in order to obtain Initial Qualification and to maintain their CPC entitlement (Periodic Qualification).

Welcome to the Road Safety Authority`s Approved Training Programme for the Drivers Certificate of Professional Competence. (CPC).

Driver CPC is a Certificate of Professional Competence issued to drivers who are entitled to hold one. It was first introduced across the EU in 2008 for professional bus drivers and 2009 for professional truck drivers.

The E. U. requires its member states to provide better training for professional drivers. Many professional drivers in the E. U. are working without the benefit of training or the opportunity to regularly refresh their skills. As a result, the E. U. introduced Directive 2003/59/EC, as amended by Directive (EU) 2018/645, which makes it compulsory for member states to have a driver CPC programme in place for professional drivers.

In Ireland, this is given effect by S. I. (Statutory Instrument) 359 of 2008.

This course fulfils part of the requirements for CPC driver training under Directive 2003/59/EC.

For CPC purposes, a professional driver is someone who drives a truck or a bus, whether as self-employed, for a salary, on own account or for hire or reward, and who holds one or more of the following categories of driving licence; C1, C1E, C, CE, (trucks) or D1, D1E, D, DE. (buses). A driver who does not wish to drive a truck or a bus in a professional capacity (and therefore does not need a CPC qualification) must be at least 21 years of age (trucks) and 24 years of age (buses) before they can obtain the relevant licence.

Drivers of vehicles which can be driven by the holder of a Category B licence – cars and light commercial vehicles with a MAM (Maximum Authorised Mass) not exceeding 3,500 kg., and vehicles with passenger accommodation for not more than 8 persons - are not required to undergo CPC training. (The MAM of category B vehicles which are powered by batteries or gas will increase to 4,250 kg from 23 May 2020 to allow solely for the increased weight of those propulsion systems).

IMPORTANT – A Driver CPC Qualification Card is not a driving licence. In order to drive a truck or bus you must:

- be the holder of a current valid driving licence for the category of vehicle you are driving, and
- be the holder of a current valid driver's CPC card for the category of vehicle you are driving professionally.

Once you are fully CPC qualified you can apply for and receive your Drivers CPC card. Both your driving licence and Drivers CPC card must be carried by you whenever you are driving your truck or bus professionally. You must also carry a digital tachograph card if your vehicle is fitted with a digital tachograph. The driver of an eligible vehicle must insert their tachograph card/chart into the vehicle tachograph head/unit and operate it as legislation requires.

Key aims

The key aims of the Driver CPC programme are

- Ensuring all professional bus and truck drivers have high standards of driving and of road safety practices and that those standards are maintained throughout their driving careers
- Ensuring high standards of their personal health and safety
- Ensuring high standards in relation to fuel efficiency and reduced pollution
- Creating a common standard for the training and testing of drivers throughout the E. U.
- Reducing fatalities and serious injuries on the roads. The RSA's target is for Ireland to have one of the lowest casualty rates in Europe.

The Driver CPC

Professional drivers fall into two categories from a Driver CPC perspective:

- those who were already working as professional drivers when the scheme was put in place, and
- those who are new to the profession.

'Acquired rights' to Driver CPC

Acquired rights to a Drivers CPC qualification applies to those drivers who were already working as professional drivers when the scheme was put in place. If you got your bus licence on or before the 9 September 2008, or your truck licence on or before 9 September 2009, you are automatically entitled to a Driver CPC qualification, known as 'acquired rights'.

To keep your Driver CPC, you must then undergo 35 hours of periodic training over the next five years, and in each subsequent five year period throughout your professional driving career.

Training is on a one-day-per-year basis (minimum of 7 training hours each day).

If you are maintaining both a bus and a truck CPC entitlement you must complete 42 hours of training over each five year period. The RSA strongly recommends that dual licence holders undergo the vehicle specific modules in the same CPC year.

Periodic training is compulsory and is designed to help you be:

- A better safer and socially responsible professional driver
- A more environmentally aware, fuel efficient and cost conscious driver
- Physically healthier

In Ireland CPC Periodic refresher training is only provided by RSA approved trainers at RSA approved training centres. When booking training check to make sure your trainer and centre are approved by the RSA. Unapproved training will not count towards your Drivers CPC.

If you don't qualify for 'acquired rights' for Driver CPC

If you obtain your bus licence on or after 10 September 2008 or your truck licence on or after 10 September 2009 you don't qualify for acquired rights and must obtain your 'Initial CPC' qualification.

There are four steps in this process.

To become a professional bus or truck driver and obtain your 'Initial CPC' qualification you first must pass:

- Step 1 – The new truck, the new bus or the new Combined Truck and Bus theory test as appropriate. (This new theory test also permits successful candidates to apply for their learner permit).
- Step 2 – A two-hour case study theory test
- Step 3 – The standard 90-minute driving test.
- Step 4 – A 30-minute practical knowledge test.

Before applying for a bus or truck learner permit you must hold a Category B licence, and also pass a medical exam.

Please note: If you obtained your bus or truck learner permit before 30th September 2014 you will need to complete the CPC Step 1 theory test (set out at No 1 above).

In addition, you must then maintain your Driver CPC by completing the Periodic refresher training of at least 35 hours of training over each subsequent five year period as mentioned above. If you are maintaining both a bus and a truck CPC you must complete 42 hours of training over each five year period.

Test locations

The Driver CPC bus/truck test and practical test can be carried out in any existing bus/truck test location, but not every type of vehicle can be tested at all centres. You should enquire beforehand as to which type of vehicle can be tested in each test centre.

Theory tests

The Driver CPC theory tests are part of the Driver CPC process, which is mandatory for all new professional drivers.

- Step 1: Drivers must first pass the relevant theory test and obtain their learner permit
- Step 2: Drivers then must take and pass their CPC Case study theory test/s.

CPC Step 1:

You have a number of options depending on what licences you want to get and what tests you have already completed. Option 1 – applies for either a bus or truck theory test. This test consists of 100 multiple choice questions - you must correctly answer at least 74 of them to pass either the bus or the truck exam. Option 2 – applies for a combined bus and truck theory test. This test consists of 140 multiple choice questions. If you want to drive buses and trucks, you may opt to take the combined bus and truck exam which costs €84. You must correctly answer at least 104 questions to pass this combined bus and truck exam. If you have already passed either one of the new bus or truck theory tests since 30th September 2014 - you may then choose to add the alternate category by passing the bus module or truck module test (as appropriate). The cost of the Module test is €45. These Module tests consist of 40 questions. To pass you must correctly answer at least 30.

CPC Step 2:

Step 2 consists of three case studies which are short scenarios that describe various situations a driver might face in a typical driving day. There are 15 questions in each case study (45 in total). To pass, you must correctly answer 28 of the 45 questions, with a minimum of 5 questions correctly answered on each case study.

To prepare for any of these theory tests

Study material including advice on how to prepare for both the new exams and the CPC case study tests is available from Prometric Ireland. Visit www.theorytest.ie.

CPC Step 3:

The CPC standard driving test

When successfully completed, the standard driving test, which lasts for approx. 90 minutes, entitles a driver to apply for their driving licence in the relevant category

CPC Step 4:

This test is also conducted by the driver tester in the driving test centre and is usually taken directly after the standard driving test and using the same vehicle.

A vehicle must be available for the test, which is a practical knowledge test lasting approx. 30 minutes. It covers areas such as

- safety
- passenger comfort
- legal matters relating to driving
- vehicle loading and stability
- ability to deal with an emergency
- physical risks involved in driving

Booking a test

Driver CPC theory test: Lo-call: 1890 60 61 06 or go to www.theorytest.ie.

Driver CPC standard driving and practical knowledge test: Lo-call: 1890 50 60 80 or go the RSA's online booking facility. If you wish, you can attend training in RSA-approved training centres to help you prepare for your Driver CPC examination.

Proof of certification

Drivers with acquired rights – applying for a CPC Qualification Card

For drivers who held 'acquired rights' - your licence will have an issue date before the September deadlines in the relevant category as proof of your acquired rights. When you complete your periodic training and apply for one, you will be issued with your CPC qualification card. Check this carefully as if you did not already hold a licence before the start dates you do not hold a drivers CPC qualification and any periodic refresher training completed will not count – you must obtain the correct Drivers CPC first.

New drivers – applying for a CPC Qualification Card

When you have passed your Driver theory test, the case study tests and the two driving tests, you will be issued with an application form by your driver tester. Complete and return the form to the Driver Education Section, RSA, Primrose Hill, Ballina, Co Mayo. You can generally expect to receive your card within 10 working days.

Exemptions

Driver CPC certification is not required for drivers of vehicles used:

For non-commercial purposes, e.g., driving as a volunteer; drivers of emergency or rescue vehicles e.g., Gardai, Defence forces, Ambulance and Irish Prison service.

For registered RSA approved Driving Instructors who are giving driving instruction.

In the course of someone's work, provided that driving the vehicle is not the driver's principal occupation, e.g., a plumber using a light truck to transport their plumbing materials.

Vehicles with a maximum speed not exceeding 45 km/h

See Appendix 10 for the complete list of exemptions.

There is no exemption to the requirement for a CPC qualification for drivers wishing to take out a learner permit/ full licence for category C or CE when under the age of 21, or for category D or DE when under the age of 24.

If you have any queries about whether your driving duties require you to hold a drivers CPC card check with your Transport Manager, with your legal advisor, with your Insurance Company, or consult the RSA. Where a doubt exists, the RSA recommends that you undergo the CPC training. However, clarification may ultimately be decided by the Courts.

More information on Driver CPC is available from:

Driver Education Section

Road Safety Authority
Moy Valley Business Park
Primrose Hill
Ballina
Co Mayo
Email: cpc@rsa.ie
Tel: 096 25015

It is recognised that many people who will participate in this training may be owner/operators, while others will work for transport organisations. Please note, any time the text mentions 'company' or 'your employer', those who are owner/operators should consider this to refer to them. This training material will contain references to best practice in relation to specific areas which all professional drivers should follow. Local arrangements or manufacturers guidelines for your vehicle may differ, and should be followed. In areas where the term 'must' refers to legislation, this should be read as absolute.

Penalties for non-compliance with Driver CPC Regulations.

Possible Fines for the Driver	Euro
Driving while not the holder of a valid CPC Card	€2,000
Driving while not carrying a valid CPC Card	€1,000
Failing to produce a valid CPC Card to a Garda or an RSA Transport Officer	€1,000
Driving with fraudulent documentation	€5,000
Possible Fines for the Employer/Operator	
Allowing a non-compliant person to drive a vehicle	€5,000

OVERALL OBJECTIVES OF THE DRIVER CPC PROGRAMME

The purpose of the CPC training programme is to confirm and expand on the existing knowledge and skills of each driver, ensuring professional drivers continue to be safe, courteous and fuel-efficient drivers who drive from a road-sharing perspective.

The purpose of the CPC training module is also to equip bus drivers with the skills to provide customers with a universally designed public transport service.

Universal Design is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability.

(Synopsis from the Irish Disability Act 2005)

A universally designed service is one that can be used by everyone regardless of age, size, ability and disability. Sections E and Sections F of this session focus on providing a service that takes into account other road users including older people, persons with different disabilities, and children. These modules will provide you with an awareness of these other road users and the skills to provide them with appropriate supports they may require to use the bus service.

The Centre for Excellence in Universal Design in the National Disability Authority provides information about Universal Design and advice and guidance on providing universally designed products and services. For more information on Universal Design see: http://universaldesign.ie/

It is intended that the development of a defensive driving style - anticipating danger, making allowance for other road users – together with rational fuel consumption, will have a positive impact both on society and on the road transport sector itself.

In particular, it is designed to ensure that drivers know

- the characteristics of the transmission system in order to make the best possible use of it
- the technical characteristics and operation of the safety controls in order to control the vehicle, minimize wear and tear and prevent disfunctioning
- how to load the vehicle (goods) with due regard for safety rules and proper vehicle use
- how to load the vehicle (passenger) with due regard for safety rules and proper vehicle use
- how to ensure passenger comfort and safety
- the regulations governing the carriage of goods
- the social environment of road transport and the rules governing it
- the regulations governing the carriage of passengers
- the risks of the road and of accidents at work
- how to prevent criminality and trafficking in illegal immigrants
- how to prevent physical risks
- their responsibility as a driver for managing their own health and only to drive when medically fit to do so
- the importance of physical and mental ability
- how to assess emergency situations
- how to adopt behaviour to help enhance the image of the company
- the economic environment of road haulage and the organisation of the market
- the economic environment of the carriage of passengers by road and the organisation of the market
- how to optimise fuel consumption

Typical Driver CPC Training Arrangements

The RSA sets down standards for the CPC Training Organisations to follow. If you are not satisfied with any of the training room arrangements, please raise the matter with your CPC Trainer in the first instance. If it is not possible to resolve the issue, please refer to the CPC Training organisation. Finally, if you remain dissatisfied, please bring the matter to the attention of The Manager, Driver Education Section, RSA, by emailing cpc@rsa.ie

PERSONAL OBJECTIVES

The Road Safety Authority provides the material for drivers who attend the Driver CPC courses. However, it is important that you reflect on what you would like to get from the course yourself .

Q1. What do I hope to get out of this training?

Your response

Q2. What would I like to see happening during the training that would help me in my day-to-day working arrangements?

Your response

Q3. What could happen during the training that could prevent me being able to benefit from it?

Your response

GROUP GROUND RULES

The course trainer will facilitate a discussion aimed at agreeing a set of `Ground Rules` by which the class agrees to abide.

By abiding by these rules the class will;

- Cover the required material
- Finish on time
- Not have people disrupting the training
- Be able to concentrate
- Not be distracting each other

By agreeing a set of rules together we all have an opportunity to clearly understand what is expected of ourselves and others.

By obeying your agreed rules, drivers can be confident that they will be able to avoid issues like those listed above. The day will be more enjoyable and easier to follow if we all observe the set of agreed ground rules.

Please consider what sort of things can or should be included and contribute to the discussion.

You may wish to note what has been agreed by the group in the box below.

Agreed Ground Rules

Outline of a typical training day.

The trainer will firstly carry out a registration session, gathering each participants details, including name, driver number and PPS Number. Drivers should produce their Driving Licence to the trainer.

If a driver should inadvertently attend the wrong training module, additional significant costs will be incurred by him or her to complete a further training day to correct the error.

The trainer will then carry out a short briefing session outlining the days agenda and informing drivers on typical housekeeping arrangements such as break times, emergency procedures, no smoking rules, no phone calls, etc.

The trainer will then carry out introductions during which he/she and all course participants will give a short introduction of themselves and a brief description of their driving career to date. These introductions will help the trainer to plan the delivery of the days training. During the course, the trainer will seek to engage each participant and draw on their driving experiences to date, good or bad.

The table below sets out the training aims for this CPC Module 6.$_3$ along with an indication of the E.U. Directive requirements being covered.

MODULE 6.$_3$ OBJECTIVES

Directive text

1.5. Ability to ensure passenger safety and comfort.

Adjusting longitudinal and sideways movements, road sharing, position on the road, smooth braking, overhang operation, using specific infrastructures (public areas, dedicated lanes), managing conflicts between safe driving and other roles as a driver, interacting with passengers, provide a universally designed service for passengers.

1.6. Ability to load the vehicle with due regard for safety rules and proper vehicle use.

Forces affecting vehicles in motion, use of gearbox ratios according to vehicle load and road profile, calculation of payload of vehicle or assembly, load distribution, consequences of overloading the axle, vehicle stability and centre of gravity.

2.3. To know the Regulations governing the carriage of passengers.

Carriage of specific groups of passengers, safety equipment on board buses, safety belts, vehicle load.

3.6. Ability to adopt behaviour to help enhance the company image.

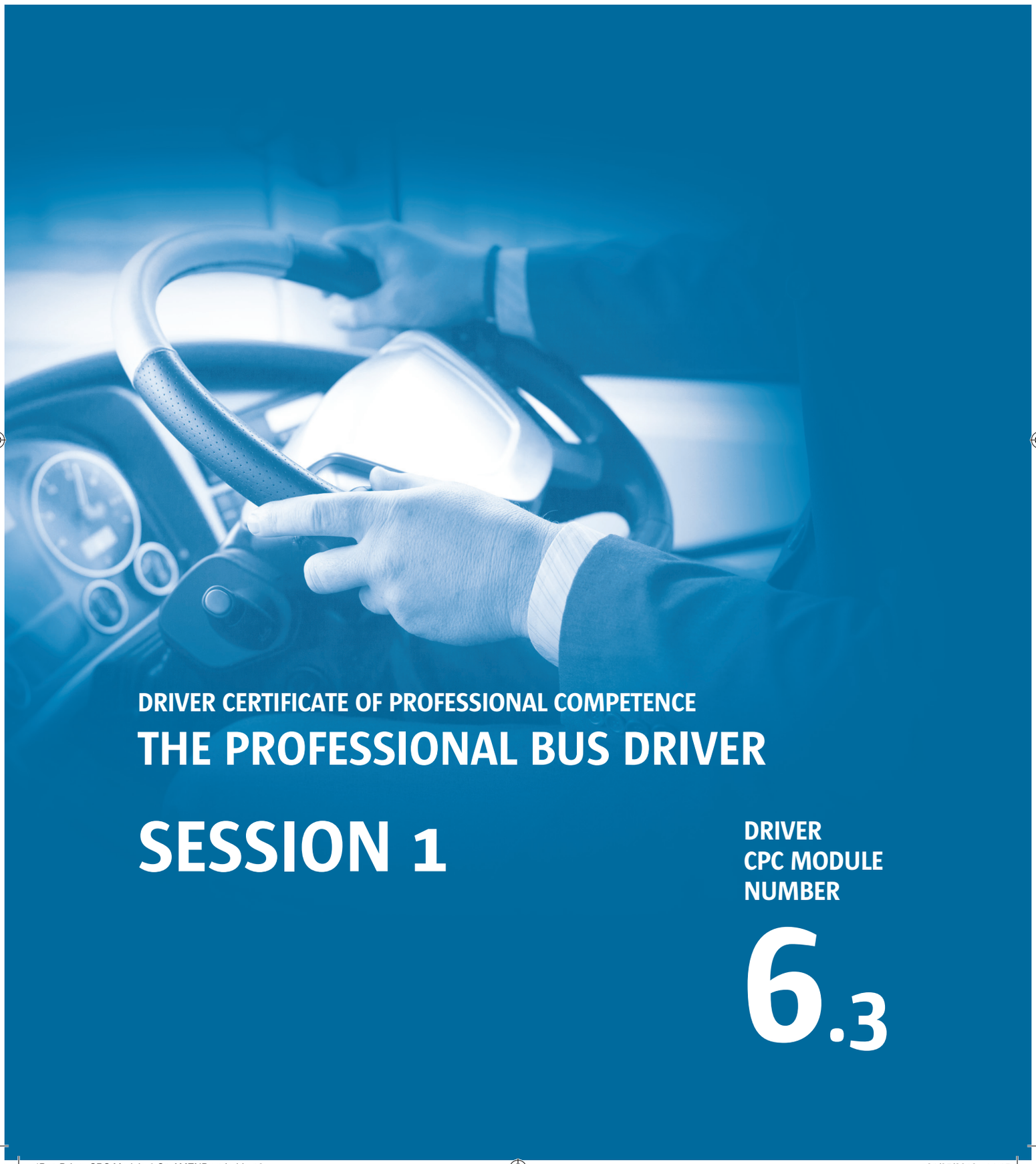
Behaviour of the driver and company image, importance for the company of the standard of service provided by the driver, people with whom the driver will be dealing, vehicle maintenance, work organisation, commercial and financial effects of a dispute.

3.8. To Know the economic environment of the carriage of passengers by road and the organisation of the market.

Carriage of passengers by road in relation to other modes of passenger transport (rail, private car), different activities involving the carriage of passengers by road, crossing borders (international transport), organisation of the main types of companies for the carriage of passengers by road.

DRIVERcpc RSA

Driver Certificate of Professional Competence



DRIVER CERTIFICATE OF PROFESSIONAL COMPETENCE

THE PROFESSIONAL BUS DRIVER

SESSION 1

DRIVER CPC MODULE NUMBER

6.3

SESSION 1 CONTENTS

SECTION A – ROAD SAFETY QUESTIONNAIRE

The following questions are based on road safety issues. Please tick the box opposite whatever answer you think is correct.

1. When travelling at a speed of over 50 km/h what is the recommended minimum clearance that a bus should give to a cyclist?

a)	0.5 Metre	
b)	1.0 Metre	
c)	1.5 Metres	

2. When approaching a school you can see children on the footpath. You should

a)	Sound the horn to warn them of your approach.	
b)	Maintain your speed as you have the right of way.	
c)	Reduce speed and be alert for children running across the road.	

3. What lights should a vehicle show at dusk?

a)	Full headlights	
b)	Dipped headlights	
c)	No lights necessary	

4. What is the maximum authorised mass (MAM) of a trailer that the holder of a Category 'D' licence can legally tow?

a)	750 kg	
b)	1,500 kg	
c)	3,500 kg	

5. What is the maximum permitted speed on a motorway of a single-decker bus or minibus (having passenger accommodation for more than 8 persons) and which is not designed to carry standing passengers?

a)	80 km/h	
b)	90 km/h	
c)	100 km/h	

6. What is the maximum permitted speed on a motorway of a single-decker bus or minibus (having passenger accommodation for more than 8 persons) and which is designed to carry standing passengers?

a)	65 km/h	
b)	80 km/h	
c)	100 km/h	

7. What safety equipment must be carried on a bus or minibus?

a)	A first aid kit and a public address system.	
b)	A fire extinguisher and a wi-fi system.	
c)	An in-date fire extinguisher and first aid kit.	

8. When driving in snowy or icy conditions the stopping distance between your vehicle and the vehicle in front can be up to

a)	10 times the normal distance	
b)	5 times the normal distance	
c)	2 times the normal distance	

9. Is the holder of a Category D or D1 learner Permit entitled to carry passengers on their bus?

a)	Yes, when there are less than 8 passengers	
b)	Yes, when driving within a 50 km radius of their base	
c)	No	

10. A passenger with a white stick and a guide dog is waiting at a bus stop. You should

a)	Wait for another passenger to offer assistance.	
b)	Tell the passenger the bus number and destination.	
c)	Ask the passenger if they want to board the bus.	

11. Subject to the speed limit, what is the 'safest' speed to drive at?

a)	The speed of other road users	
b)	The speed that will enable the driver to stop the vehicle safely within the distance that they can see to be clear	
c)	The speed of the slowest vehicle on the road	

12. A driver using a mobile phone is how many times more likely to have an accident?

a)	Twice	
b)	Three times	
c)	Four times	

13. On 'conviction' how many penalty points will a driver receive for holding a mobile phone while driving'?

a)	2	
b)	3	
c)	5	

14. When joining a motorway from a slip road, what should a driver do?

a)	Drive on the hard shoulder for a distance until a suitable gap appears in the traffic	
b)	Adjust speed to match that of the motorway traffic, and merge into a suitable gap	
c)	Use the size of the vehicle to assert its position on the motorway	

15. What should a driver do if the traffic light changes to green while pedestrians are still crossing at traffic lights or at a pelican crossing?

a)	Beckon them to cross as quickly as possible	
b)	Sound the horn as a warning and proceed with care	
c)	Wait patiently and let them cross at ease	

16. If tired, how long of a nap could a driver consider taking to enable him/her to drive for another hour?

a)	10 minutes	
b)	15 minutes	
c)	30 minutes	

17. A cyclist up ahead is approaching a parked car on their left. You should

a)	Accelerate in order to pass both hazards quickly.	
b)	Pass the parked car allowing normal clearance but check the left hand mirror.	
c)	Allow extra clearance to the cyclist as they pass the car.	

18. When driving on motorways, which of the following is true?

a)	Lower speed and volume of traffic mean that conditions can change more quickly	
b)	Higher speed and volume of traffic mean that conditions can change more quickly	
c)	The risk of multiple-vehicle pile ups is less likely to happen	

19. What are the penalties for a professional driver whose blood alcohol level is above 20 mg per 100 ml of blood?

a)	Automatic disqualification from driving.	
b)	5 Penalty Points on the driving licence.	
c)	5 Penalty Points and automatic disqualification from driving.	

20. What is the minimum tyre tread depth for a bus or coach?

a)	1.0 mm	
b)	1.6 mm	
c)	2.0 mm	

SECTION B – ADJUSTING LONGITUDINAL AND LATERAL MOVEMENTS

As a Professional Driver, you must always consider the safety and comfort of your passengers and make allowance for other road users. You should adopt a positive approach to driving by ensuring that you are fit to carry out your driving duties, by planning your journeys safely and by obeying occupational health and safety and road traffic rules while driving. You also need to understand and follow your employers policies, procedures and rules for driving for work.

Inertia and momentum

A stationary bus/coach may weigh up to 26 tonnes when fully loaded. It requires a great deal of energy to make it begin to move, even on a level surface, but it takes relatively little power to keep it rolling at a constant speed once it has started to move. Resistance to movement is called inertia and the force that keeps the vehicle rolling is called momentum. Modern buses and coaches have engines with a high power output to:

- Provide good acceleration;
- Overcome inertia.

Passengers are also affected by these forces, especially standing passengers. A passenger's inertia has to be overcome in much the same way as the vehicle's. Acceleration will push passengers back into their seats, while braking will tend to move their weight forward due to momentum.

All acceleration, braking and turning should be smooth, controlled and as progressive as possible. Your passengers comfort and safety should be your top priority.

Gravity: When a vehicle is stationary on level ground the only force acting upon it is the downward pull of gravity.

Centre of gravity: The vehicle's centre of gravity is the point around which all its weight is balanced. Harsh steering, acceleration or braking moves the centre of gravity and places excessive forces on the vehicle's tyres and suspension as well as on the passengers. Steering should be smooth, controlled and timely. A 'push-and-pull' steering method should be used which will enable better control of the vehicle into corners.

On an uphill gradient the effect of gravity will be much greater so that:

- Much more power is needed from the engine to move the vehicle forward and upward;
- Less braking effort is needed and the vehicle will pull up in a shorter distance.

On a downhill gradient the effects of gravity will tend to:

- Increase the vehicle's speed;
- Require more braking effort;
- Increase stopping distances.

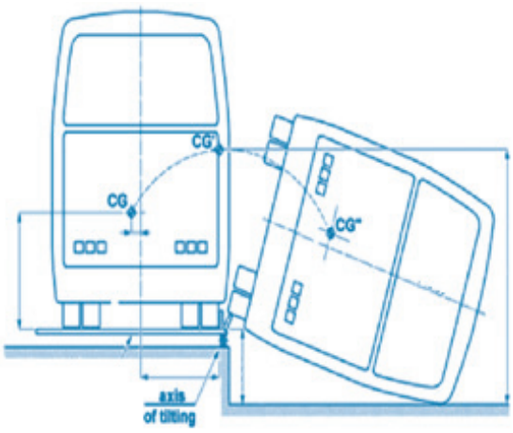
Example of centrifugal force on a bus.

Overturning

One of the factors that may cause a vehicle to overturn is the height of the centre of gravity. Overturning occurs when a vehicle's centre of gravity moves outside its wheelbase. The risks are increased by the speed of travel, angle of the bend, steepness of the slope, height and stability of the load, increased load on tyres, wind, and weight distribution in upper decks.

Tipping Edge. This is the point at which the vehicle will try to overturn as a result of a change to the location of its centre of gravity. The point at which a vehicle will reach the actual rollover threshold will be determined by:

- Speed relating to road and traffic conditions
- Vehicle design characteristics;
- Passenger numbers and distribution;
- Roadway design characteristics;
- Driver handling of the vehicle;
- Weather conditions;
- Distribution of the luggage.



Heavy braking while cornering can bring components very close to their design limits and will be uncomfortable for passengers.

Centrifugal force: This is the force that pulls outward from the centre of rotation. When a vehicle takes a turn through a curve, centrifugal force acts to pull your vehicle away from the direction in which you are turning.

When the vehicle takes a curved path at a bend, the forces acting upon it tend to cause it to continue on the original straight course.

At normal speeds this is overcome by the grip between the tyres and the road surface. If a bus or coach takes a bend too fast, centrifugal force will cause the passengers and any luggage to be thrown towards the outside of the bend.

Loss of Control

Under operating conditions, a variety of factors act on the moving vehicle and can contribute to the development of forces on the vehicle's centre of gravity. If you ask too much of your tyres by turning and braking at the same time, you will lose some of the available power and grip. If the tyres slide or lift, you will no longer be in full control of the vehicle.

Factors that can affect control:

- Lateral (side) wind gusts;
- Passenger load changes;
- Harsh accelerations and decelerations;
- Sudden steering and braking;
- Road camber;
- Incorrect tyre pressures;
- Defective vehicle.

Other factors that contribute to a vehicle's stability are the vehicle's wheelbase, track, and height and the vehicles weight distribution. A vehicle's "track" is the distance between the wheels on the same axle of the bus and the vehicle's wheelbase is the distance between the centreline of the vehicles front and rear wheels.

Stability test

A single deck vehicle must be capable of passing through a lateral gradient of 35 degrees from a horizontal plane without tipping over.

A double deck vehicle must be capable of passing through a lateral gradient of 28 degrees without tipping over.

A double deck vehicle with the top deck loaded with passengers will tend to lean more on bends and corners then when empty.

Example of bus stability test.

Lateral stability: Factors that affect the vehicle's lateral stability include the passengers placement on the bus, the placement of any luggage, the height of the deck(s) above the surface on which the vehicle is operating, and the vehicle's degree of lean.

Dynamic stability: We also need to consider the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer and the resultant shift in the centre of gravity due to the dynamic forces created when the vehicle is moving, braking, cornering, tilting, etc., are important stability considerations. When determining how a vehicle should be safely handled, the driver should exercise extra caution when dealing with passenger loads that cause the vehicle to approach its maximum design characteristics.

Kinetic energy: The energy that's stored up in the vehicle and its passengers and load when travelling along is known as kinetic energy. This is converted into heat at the brake shoes and drums when braking occurs.

Road camber: Many roads have a camber to help with drainage. On roads with a steep camber the top of a bus can lean up to 300 mm from the vertical. This can increase on bends. Bus stops, lamp-posts, shelters, awnings, trees, etc., can be affected and can cause damage to buses if they are hit. Caution should be exercised when pulling into bus stops.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. What is vehicle momentum?

Your Response

Q2. What is vehicle inertia?

Your Response

Q3. What is centrifugal force?

Your Response

Q4. What is a vehicles tipping edge?

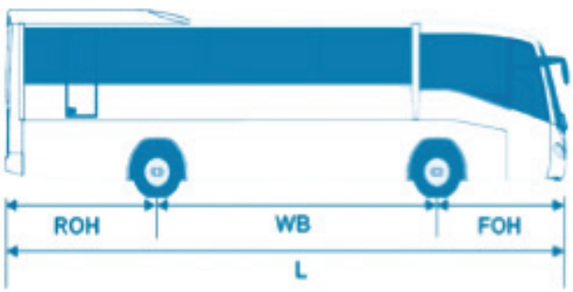
Your Response

Q5. What affects the stability of a bus?

Your Response

SECTION C – ROAD SHARING

In general, many road users have very little idea of the problems a bus or coach driver faces when driving such a large vehicle on roads which in many cases were not designed with the larger vehicle in mind. As such it is important that you are aware of the fact that you are required to share the road with other road users who may not be aware of the manoeuvring space needed for your vehicle. You must ensure that you are familiar with the overall dimensions of the vehicle you are driving, particularly if it is a vehicle which is different from the one you are used to.



L	**Length**
H	**Height**
W	**Width**
FOH	**Front Overhang**
ROH	**Rear Overhang**
WB	**Wheelbase**

Length, width and height

You need to know the length, width and height of your vehicle, so that you can judge the space you need on the road. You'll also need to know these dimensions to comply with regulations that affect your vehicle. Other than "traffic calmed" zones, places where there are restrictions on vehicle length and width and height are comparatively rare. However, some examples are:

- Road tunnels
- Level crossings
- Ferries
- Residential estates
- Bridges
  - The maximum length of a 2-axle bus or coach is 13.5 metres.
  - The maximum length of a 3-axle bus or coach is 15 metres.
  - The maximum length of an articulated bus is 18.75 metres.
  - The maximum width of a bus or coach is 2.55 metres
  - The maximum height of a single-deck bus or coach is 3.8 metres.
  - The maximum height of a double-deck bus or coach is 4.57 metres.
  - The maximum permitted rear overhang is 60% of the wheelbase.

At some level crossings, you may need to phone for permission to cross. Drivers of long or wide vehicles must be careful when:

- Turning left or right;
- Negotiating roundabouts
- Emerging from premises or exits;
- Overtaking;
- Parking, especially in lay-bys;
- Driving on narrow roads where there are few passing places;
- Negotiating level crossings.

Be aware of the amount of space you need to turn (the 'turning circle') and the way that your vehicle overhangs kerbs and verges. You must be particularly aware of the risk of grounding, for example, on a hump-back bridge or a speed control ramp and you should look out for appropriate traffic warning signs. Use the ferry-lift (where fitted) if necessary to prevent grounding.

Example of vehicle overall height warning sticker.

Front Overhang – FOH

The front overhang is the overall distance between the centre line of the front axle and the front edge of the vehicle. When the front overhang is large, the actual turning radius of the vehicle within a walled circle will be more than its rated minimum turning radius.

Rear Overhang – ROH

The rear overhang is the distance between the centre line of the rear axle and the rear end of the vehicle. If a vehicle with a long rear overhang is loaded excessively at the rear then the load on the rear axle may become excessive. This can cause the front tyres to lose their grip on the road and render steering difficult. It can also adversely affect the vehicles braking ability. Consequently, some countries limit the permissible extent of the rear overhang to less than one-half of the wheelbase.

Wheel Base – WB

The wheelbase is the distance between the centres of the front and rear axles.

- **Short wheelbase vehicles:** These vehicles will bounce more noticeably than some long-wheel vehicles when empty, This can have an effect on braking efficiency and overall control. These vehicles shouldn't be driven into bends or corners at higher speeds simply because they appear easier to drive.
- **Long wheelbase rigid vehicles:** These vehicles require additional room in which to manoeuvre, especially when turning left or right, negotiating roundabouts and when entering or exiting premises.

Width

You must always be aware of the road space your vehicle occupies. This is particularly important where road width is restricted because of parked or oncoming vehicles, or in narrow roads. Many local authorities now use "traffic calming" measures, which often include road width restrictions including bollards and kerbing. Watch out for these. If you know roads with such restrictions, try to avoid them, unless you're following a scheduled service route. The majority of buses and coaches are 2.5 metres wide but the legal maximum width is 2.55 metres.

Mirrors and exterior trim can also add to a vehicle's width. Where space is limited, take particular care when meeting other large vehicles. If necessary, stop first and, only if you're certain there's enough space, manoeuvre past slowly. Keep a lookout all around and especially watch out for mirrors hitting each other or hitting lamp-posts, branches of trees, etc. A broken mirror may mean that your vehicle is not roadworthy if the reflecting surface has deteriorated or is broken to such an extent that it seriously impairs the driver's view. It could also cause injury to yourself or others.

For further information on maximum permitted large vehicle dimensions follow the link www.rsa/vehiclestandards/weightsanddimensions

Tail Swing, including Tri-Axle and Rear Steer coaches

Tail swing is when the rear of the vehicle pivots in the opposite direction to the direction in which you are turning. It is measured from the centre of the drive axle on a rear wheel drive vehicle. It is measured from the centre of the rear axle on a front wheel drive vehicle. In the case of tri-axle rear steer vehicles it is important for the driver to be aware of the handling characteristics in relation to the tail swing which on some vehicles may be more acute. Correct use of mirrors and road positioning is vital to avoid the dangers of tail swing, which can lead to damage, serious injury and fatality. Some rear steer vehicles are fitted with a locking mechanism which locks the rear steer axle into a straight line position above a given speed. (Always check the manufacturers handbook for information). Very low speed is advisable when the steering is on full lock in order to minimise any scrubbing effect on the rearmost tyres.

Drivers should be aware of the handling characteristics of different types of vehicles including Tri –Axle vehicles fitted with a rear steer axle. The handling characteristics of Tri-Axle vehicles are not greatly different from vehicles with two axles, except that punctures and blow-outs are sometimes more difficult to detect, frequent tyre checks are advised, and they may have a different tail swing.

The advantages of rear axle steering are:

- Improved straight line stability
- Increased manoeuvrability
- Reduced tyre wear
- Passenger comfort and improved load distribution

Articulated buses

Articulated buses (also known as bendy-buses) which may be up to 18 metres in length, are made up of a prime mover lead unit coupled to a single axle rear unit by means of a floor mounted pivot mechanism. It is possible for passengers to move between the units and to stand in the coupled area if necessary. Drivers should be aware that the rear section may take a shorter path than the front section on a bend or corner. They should also be aware of the additional length when stopping at or leaving bus stops. Intending passengers may not always be visible in the mirrors when the bus is not in a straight line. Reversing an articulated bus requires the same skills as reversing a vehicle and trailer and should be carefully practiced. Drivers should normally only reverse when reversing camera equipment is available or a competent person is available to guide them.

Articulated bus

Articulated bus pivot mechanism

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. Name three places that you would find restrictions on vehicle length.

Your Response

Q2. What is the maximum regulation length of a 2-axle bus or coach?

Your Response

Q3. What is the maximum regulation length of a 3–axle bus or coach?

Your Response

Q4. What should you be aware of in relation to the width of your bus?

Your Response

Q5. What should you be aware of in relation to the front overhang?

Your Response

Q6. How does driving a short wheel base vehicle differ from driving a long wheelbase vehicle?

Your Response

Q7. What should you be aware of when driving a vehicle with rear axle steering?

Your Response

Q8. What are the advantages of rear axle steering?

Your Response

Q9. What road features should you be aware of in relation to the height of your vehicle?

Your Response

Q10. What are the difficulties when reversing a vehicle with a rear steer axle?

Your Response

SECTION D – CALCULATION OF PAYLOAD AND LOAD DISTRIBUTION

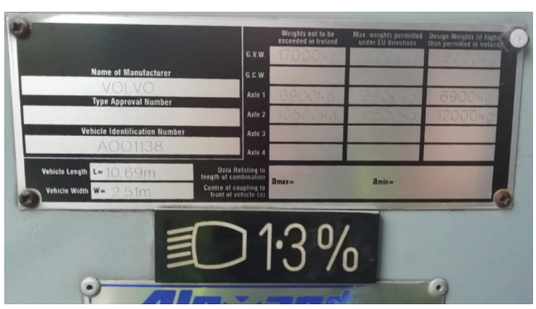
As a professional driver you should know the maximum weights that are allowed for your vehicle. When driving, try to be considerate towards local residents and the environment. You should be aware of, and understand, the weight limits relating to any vehicle you drive and remember that different makes and models will have different limits.

Maximum Authorised Mass (MAM)

This is the weight of a vehicle or trailer including the maximum load it can carry in accordance with the manufacturer's design specifications. It is also known as Design Gross Vehicle Weight (DGVW).

You should:

- Know the maximum permitted axle weight and Maximum Authorised Mass (MAM) of your vehicle. These can be found on 'plates' which must be fitted to all vehicles and trailers. This could be a manufacturer's plate which is usually located in the vehicle cab, under the bonnet or on the chassis of trailers, or in the manufacturer's documentation supplied with the vehicle;
- Be careful not to mix up the Maximum Authorised Mass (MAM) with the Gross Train Weight (GTW). The MAM is the maximum permitted weight of the vehicle (plus any load it is carrying), while the GTW is the maximum permitted weight of the vehicle plus any trailer being towed (plus any load being carried in the vehicle and trailer);
- Remember that the MAM includes the weight of the vehicle, the passengers, the driver, the luggage and the fuel.



Weight limits

Weight limits are imposed on roads and bridges for two reasons:

- The structure may not be capable of carrying greater loads;
- To divert larger vehicles to more suitable routes.

Sometimes buses and coaches are exempt from the notified limits by means of a plate beneath the weight limit sign.

You should make sure that you know what your vehicle weighs. In many cases, weight limits apply to the Maximum Authorised Mass (MAM). To arrive at this figure add about 1 tonne per 15 passengers to the unladen weight shown on your vehicle, plus an allowance for any luggage you may be carrying.

For example:

75-seat double deck coach	19.0 tonnes
75 passengers	5.0 tonnes
75 cases	1.5 tonnes
500 litres fuel	0.5 tonnes

The weight difference between a laden and an unladen coach may be as much as 7 tonnes. The loading and distribution of large amounts of luggage can affect axle weights and stability.

If you are towing a trailer which has a MAM of 750kg or more, you must hold a DE or a D1E (minibus) driving licence. The trailer must be fitted with a braking system.

As a driver, you are responsible for ensuring that the maximum permitted vehicle or axle weights are not exceeded.

Load distribution

When loading passengers and their luggage you should distribute the load appropriately to avoid overloading axles. After any drop-offs, re-check the distribution of the remaining passengers and luggage as load shifting could cause an axle overload.

Luggage

Luggage must not block or partially block any emergency exit.

Care should be taken when loading passengers' luggage - this ensures a safer trip for you and your passengers and also ensures that the luggage will arrive at the destination in good condition. You should not allow passengers to leave luggage in the aisle or let luggage protrude into the aisle.

Luggage must be stored, lodged or secured so that it cannot move about; this protects the passengers from injury if carry-on's or objects shift when the bus brakes or accelerates, or in the event of a collision.

Consequences of overloading

An overloaded vehicle not only causes damage to roads and to the vehicle itself but it also puts you and other road users at risk. Vehicles react differently when the maximum weights that they are designed to carry are exceeded and the consequences can be fatal. Overloading can place a strain on the vehicles tyres. It can also make the vehicle less stable, difficult to steer, and increase stopping distances.

Many bus and coach drivers believe that the likelihood of overloading buses, coaches or minibuses is much less than for other types of vehicle, nevertheless overloading offences do occur. Buses mainly become overloaded due to the amount of luggage being carried - for example on coaches that pick up holidaymakers taking lots of luggage on holiday.

How do you know the weight that is allowed?

You need to ensure that you are aware of the total weight allowed (see previous section for how to calculate the maximum weight for your bus).

Danger of overloaded vehicles

Overloading a vehicle:

- Can cause the tyres to overheat and wear rapidly which increases the chance of premature, dangerous and expensive failure (such as blow-outs);
- Is illegal and therefore insurance cover can be void if the vehicle is involved in an incident;
- Can cause excessive wear and damage to roads, bridges, and pavements. This imposes additional expense on the taxpayer;
- Is unfair on other operators. Exceeding weight limits is unfair competition.
- Increases fuel consumption. This will increase your costs and produce more air pollution.
- Increases maintenance costs.

What can a driver do to ensure that the vehicle is not overloaded

- Know the weight limits which apply to your vehicle.
- Find out the purpose of the trip. The purpose of the trip can tell you a lot about the luggage that passengers are likely to be carrying or plan to pick up on route. For example, if your passengers are going mountain climbing or golfing, or somewhere else where they need lots of heavy equipment the load weight will be high. Consider having your vehicle weighed at a weighbridge if one is available.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. Where will you find the MAM (Maximum Authorised Mass) of your vehicle?

Your Response

Q2. How should luggage be distributed in a vehicle?

Your Response

Q3. What could be the consequences of driving an overloaded vehicle if involved in an incident?

Your Response

Q4. What effect does overloading have on fuel consumption and the environment?

Your Response

Q5. Who is responsible for the safe loading of your vehicle?

Your Response

SECTION E – OTHER ROAD USERS

The sheer size, noise and appearance of a bus can be intimidating to cyclists, motorcyclists, pedestrians and even car drivers. Never use the size of your vehicle in an aggressive way. A bus driver should create the best possible image by setting a good example to other road users. Driving large vehicles can be very enjoyable – even more so when you can be proud that you are doing it well. You should always have an idea of how other road users see you. They may not realise why you are adopting a certain position on the road and that you need that space to negotiate and complete a manoeuvre. Becoming impatient with other road users won't make your working life easier. Remaining calm will lead to a safer and more pleasant working environment for you.

As a bus driver it is important that you provide a universally designed service.

Universal Design is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability.

(Synopsis from the Irish Disability Act 2005)

You are therefore responsible for being aware of other road users including older people, persons with disabilities and children and providing them with the necessary and appropriate supports that will help them to use the bus services.

The Centre for Excellence in Universal Design in the National Disability Authority provides information about Universal Design and advice and guidance on providing universally designed products and services. For more information on Universal Design see: http://universaldesign.ie/

Many road users tend to see the bus or coach driver either as:

- A skilful professional who manoeuvres a large vehicle in difficult spaces and delivers passengers safely to their destination, or
- A person determined to make other road users move out of their way.

Responsibility

Being involved in a collision with another vehicle can have serious and far-reaching consequences for you and other persons involved. Be aware you are responsible for driving your vehicle safely at all times.

Other road users

As a driver of a large vehicle you must be aware of the effect your vehicle has on other road users. For example, your vehicle creates air turbulence when travelling along, and will have an effect on other road users when you pass them. It may greatly affect:

- Cyclists
- Pedestrians
- Motorcycles
- Horse riders
- Older people
- Children
- Persons with a disability
- Mobility scooters
- Wheelchairs
- Caravans
- Cars
- Other buses and trucks

At all times, be aware of the dangers which your rear-view mirrors can pose for those road users.

Cyclists

Cyclists are among the most vulnerable of road users.

They have no protection, and in the event of a collision the consequences can be very serious.

Bus drivers are likely to interact with cyclists many times during the course of a journey, especially in urban areas, and should be extra vigilant once they observe them in the distance or in the vicinity of their vehicle.

At night time cyclists can be hard to see in the distance, and equally hard to track in your mirrors.

For this reason bus drivers must constantly anticipate what cyclists may do, as they may be obscured from view and may suddenly reappear at a time when your attention could be elsewhere.

The following are some key points to remember when encountering cyclists.

- Before moving off check your mirrors for overtaking cyclists - remember your blind spots.
- Always check your nearside mirror before turning left, or where the rear of your bus might enter a Cycle Lane.
- Remember how close your nearside mirror may be to the head strike zone of cyclists.
- Give cyclists plenty of room. They may need to avoid drain covers or other hazards and can easily be blown off course by wind or rain. Allow additional space where available.
- Moderate your speed when overtaking – be extra careful when they are cycling uphill or when approaching parked vehicles.
- Buses displace a lot of air, and turbulence can cause a cyclist to wobble. Make sure you're well past them before moving back to the left.
- Where a Bus Lane is not wide enough to safely overtake a cyclist, either wait until it is wide enough or move to the adjacent lane if it's clear and safe to do so.
- Don't travel too close when following a cyclist, it could make them nervous and it's possible that they may feel intimidated and stop suddenly and you may not be able to stop in time, or may have to brake so harshly it may be a danger to your passengers.
- Be aware where cycle lanes merge and diverge with mainstream traffic lanes and ensure you check for cyclists before you let passengers alight from your bus.
- Be patient. Never forget how vulnerable a cyclist can be.
- Be aware that cyclists may come up on your nearside or offside.
- In speed zones of up to 50 km/h try to keep a distance of at least 1 metre. In speed zones of over 50km/h try to keep a distance of at least 1.5 metres. Always give cyclists space to ride safely.

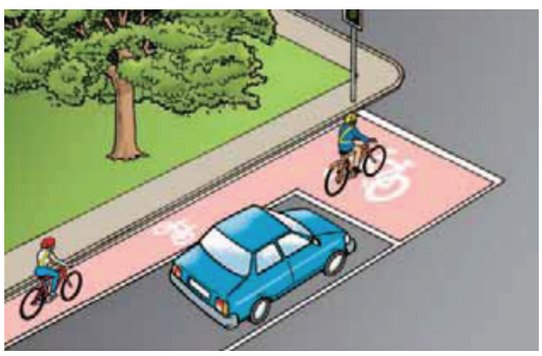
Example of recommended cycle clearance.

Look for clues. Take extra care when:

- Crossing cycle lanes;
- You can see a cyclist near the rear of your vehicle;
- Moving up along the nearside as you're about to turn left;
- Approaching any children on cycles if there are gusty wind conditions.

Many junctions now have an advanced Stop Line for cyclists. These allow the cyclists to stop ahead of traffic so that they may be more easily seen by drivers.

Advance Stop Line for cyclists.



Motorcyclists

Motorcyclists are also a vulnerable group of road users. Expect to see motorcyclists sometimes appearing suddenly or making sudden movements, especially in windy or adverse weather conditions and on poor road surfaces. Always signal before you change course including at roundabouts and every time you pass a motorcyclist. Watch for motorcyclists on the nearside when you turn left. Watch out for motorcyclists attempting to pass on your offside, as you turn right. Give motorcyclists space - at least equivalent to half a car's width - and never force your way past them. Be patient - a few seconds for a motorcyclist will not affect your total journey time. Right-turning motorcyclists need space and time. Expect speed from a motorcyclist.

It is often difficult to see motorcyclists particularly when:

- They are approaching from behind your vehicle.
- They are emerging from junctions, roundabouts, overtaking or filtering through traffic.
- You emerge from a junction; they could be approaching at a greater speed than you anticipate.
- You are turning right across a line of slow-moving or stationary traffic, look out for motorcyclists on the inside of the traffic you are crossing.
- Using bus lanes and bus priority routes, as motorcyclists often use the road space in bus lanes.
- Be especially careful when turning, and when changing direction or lane. Be sure to check mirrors and blind spots carefully.

Pedestrians, older people, children and people with disabilities

These are also among some of the most vulnerable road users. You must watch the actions of pedestrians as they approach kerbs and cross the road. Older people, persons with disabilities and children sometimes change direction suddenly, step out or even turn back.

Sometimes it may take these road users more time to cross the road. It is important that you wait in a calm and professional manner until they have crossed the road. It is important that you do not get impatient with them and that you extend them the same courtesy as you would other road users.

Pedestrians

You must always yield to pedestrians:

- already crossing at a junction;
- on a zebra crossing;
- on a pelican crossing when the amber light is flashing, and
- when you are moving off from a stationary position.

To avoid doubt and in the interest of road safety a driver should always yield to pedestrians. A driver should not beckon to pedestrians to cross the road.

Older People

Be aware that their reactions may not be as fast as younger people. They may

- have mobility difficulties
- be hard of hearing
- be visually impaired
- have dementia

People with disabilities

People with a disability may

- have mobility issues
- use a mobility aid or wheelchair
- be hard of hearing
- be visually impaired
- have an intellectual disability
- have an acquired brain injury
- have a guide dog or assistance dog
- have a hidden disability that is not immediately obvious, for example, epilepsy, or mental health difficulties or autism spectrum disorder. Autism is a lifelong condition that may affect how a person communicates with, and relates to, other people. It may also affect how a person makes sense of the world around them. People with autism may also have difficulties with understanding and processing language.

Children

By their nature, children are impetuous and have less experience than other people in using the roads, so you should make extra allowances for their behaviour.

Take extra care when you are:

- driving beside footpaths where there are young children
- coming out from junctions
- driving near schools and play areas

- reversing - you cannot see a small child behind your vehicle through your mirror. If in doubt, get out and check
- driving towards children who are walking or cycling behind accompanying adults.

Children First Act 2015

The Act places a number of statutory obligations on specific groups of professionals and on particular organisations providing services to children, including transport providers and 'any work or activity as a driver, assistant to a driver, conductor or supervisor of children on a vehicle where children travel unaccompanied by a parent or guardian'.

This has implications for e. g., school bus drivers, drivers of buses taking unaccompanied children to educational events, sporting events, scouting events, concerts, holiday resorts, medical facilities, etc.

Through the provisions of the Act, it is intended to:

- Raise awareness of child abuse and neglect
- Provide for mandatory reporting by key professionals
- Improve child safeguarding arrangements in organisations providing services to children
- Provide for cooperation and information-sharing between agencies when Tusla – the Child and Family Agency - is undertaking child protection

A provider must, among other things, undertake a child risk assessment and prepare a written Child Safeguarding Statement which must include provisions for identifying any risk, managing staff, reporting any concerns to TUSLA and appointing a 'relevant person' for dealing with reports.

The Child and Family Agency (TUSLA) is the body responsible for the implementation of the Act. TUSLA has developed a Children First e-learning programme which some employers now require their drivers to complete in order to continue transporting children.

In the TUSLA Guidance, 'a child' means a person under the age of 18 years, who is not or has not been married.

See www.tusla.ie for further information.

Horse riders

Drivers should watch out for people riding or leading horses. These animals can be nervous around traffic. The noise from engines, exhausts, horns, sirens and air brakes can startle them and cause them to bolt suddenly. Headlights or flashing lights can also cause them to panic. Allow them as much clearance as possible. Where necessary, a driver should stop and allow the horse and rider to proceed.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. How are other road users likely to be affected by air turbulence from your vehicle.

Your Response

Q2. Name four types of road users who are particularly vulnerable on the roads.

Your Response

Q3. What should you watch out for when driving near a school?

Your Response

Q4. How can windy weather affect motorcyclists?

Your Response

Q5. What problems can older people experience on the roads?

Your Response

SECTION F – PROVIDING A UNIVERSALLY DESIGNED SERVICE FOR PASSENGERS

Passenger transport providers are committed to providing safe, reliable, punctual and universally designed services that can be used by everyone regardless of age, size, ability or disability to all their customers. Drivers have a major part to play in ensuring that the needs of all their passengers are met. The Equal Status Acts of 2000 and 2004 and the Disability Act of 2005 requires drivers to do all that is reasonable to accommodate the needs of persons with disabilities to ensure they have the same access to passenger services as other customers. A disability is defined as a substantial restriction in the capacity of the person to carry on a profession, business or occupation, or to participate in the social or cultural life of the state by reason of an enduring physical, sensory, mental health or intellectual impairment. Drivers should recognise the diversity of their customers and be conscious of the challenges which they may face when using their bus service. It is vitally important that drivers provide a service that is supportive and understanding of persons with disabilities.

Discrimination

The Equal Status Acts, 2000 to 2004 protect the general public when buying goods, using services or obtaining accommodation, whether the service is paid for or not.

Discrimination occurs when someone is treated less favourably purely on the basis of his/her gender, family status, marital status, age, disability, race, religion, sexual orientation and membership of the Traveller community. See Dept. of Justice and Equality for further information.

At all times, drivers should treat all their customers with the utmost courtesy, dignity, patience and respect. This is particularly important when dealing with passengers who may have any form of disability.

Interacting with customers with disabilities

Persons with disabilities are the experts in the type of supports that they may or may not need. If a person with a physical disability, for example a person using a wheelchair or a person with a sensory disability or a person with a vision impairment is getting on or off a bus the first step is to ask them if they require assistance. The person will let you know if they need assistance or not and the type of assistance that they require. Never assume that you know the type of assistance a person with a disability or any other passenger may require.

Just ask the person first.

It is also important to remember to ask people with children, people with lots of shopping and/or luggage if they require assistance.

Remember

- If a wheelchair user or any other person with a disability requests assistance, you should provide assistance as appropriate, considering the dignity, safety and welfare of the customer.
- Persons with disabilities are not all the same, so assumptions and generalisations should not be made.
- Drivers should be patient, considerate and always respect a customers wishes.
- A customer may tell you that they can manage, but be prepared to offer help if they need it.
- Ask the customer what kind of help they might need – it's important to look directly at the customer as you speak to them.
- Listen actively, and if you do not understand the request, say so.
- Give the customer time to be properly seated before moving off.
- Use positive and appropriate language when speaking about someone with a disability.
- People with a disability have the right to use buses and to a quality customer service.

Some passengers may have a disability which is not obvious:

- Blind or partially sighted
- Deaf or hard of hearing
- Some physical disability e. g., multiple sclerosis
- Learning disability
- Autism Spectrum Disorder
- Mental health difficulties
- Epilepsy

Vision impaired passengers and the use of Assistance Dogs

In recent years the use of dogs to assist people with a variety of special needs has increased, and bus operators must be able to accommodate these animals on their vehicles. The Equal Status Acts 2000–2008 provides additional information.

Drivers should be aware of the following types of dogs that could be used by people with special needs.

- A person with a white stick or carrying a long white cane, or accompanied by a guide dog, is visually impaired. If the stick has red rings painted on it the person also has impaired hearing.
- Remember that many people who have impaired vision do not have a guide dog or use a white cane.
- Drivers must be observant of customers at bus stops.
- If you notice a person at a bus stop with a guide dog or a white cane, you must stop and determine if this person wishes to travel on your bus by telling them the bus service and destination.
- A person who uses a white cane or a guide dog may have some useful vision – they may be able to see ahead but may have limited peripheral vision, and may not be able to see a step or a kerb. They may find it difficult to read a destination display or a timetable.
- A driver should make an announcement of all stops in order to facilitate visually impaired customers.
- Tell the customer that you are the driver and the bus number/destination.
- A driver should ensure there is no obstruction blocking the way on or off the bus. If there is something blocking the way, the customer should be warned, and the blockage removed.

Example of Irish Guide dogs for the blind.

Guide Dogs and Assistance Dogs

All guide dog owners carry identification cards and the dog will have a tag on it's lead which will read 'Irish Guide Dog for the Blind'.

Assistance dogs are used by some prople with different types of disabilities such as autism, deafness or balance problems – Stability Dogs. An assistance dog will always be wearing a blue coat marked 'Assistance Dog'. A parent or guardian who is accompanying a child with an assistance dog will also be carrying an identity card for the dog.

Guide dogs accompanying passengers who hold a Registered Blind Persons Pass should normally be carried free of charge. Guide dogs and assistance dogs of all types who are accompanying passengers are normally permitted to travel without restriction.

Some passengers are visually impaired. Only small proportions are totally blind, but you may not be able to tell by their appearance. Most partially sighted people find it hard to read a bus number, destination display, or timetable.

Often visually impaired people depend on their bus service for all their transport needs.

- Tell the customer the bus number if they ask. Even if they have some vision, it might be distorted or blurred.
- When speaking to a customer, tell them that you are the driver or a member of staff.
- Speak directly and clearly to the customer.
- Tell the customer if there is anything blocking their way as they get on or off the bus.
- Do not pet or play, or feed anything to a customer's guide dog. This risks distracting the dog while it is working.
- Remember that not all people who are visually impaired have a guide dog or use a cane.

Note: if a cane is painted with red rings, the customer may also have a hearing impairment.

Irish Therapy Dogs

All Irish Therapy Dogs wear a yellow coat with their logo on it. Their owner also has an ID card with a photograph of the dog and the owner.

Irish Autism Dogs

All Irish Autism Dogs wear a red coat with their logo on it. Their owners may not carry ID.

Service Dogs Europe

Service Dogs Europe provide working dogs for autism, diabetes, seizure, allergy, hearing, mobility, Down Syndrome, and psychiatric needs. All their dogs wear a royal blue coat with Service Dogs Europe and their logo printed on it. The dogs also have a badge on their collar with the dogs name, breed, microchip number and a validity date. Their owners may not carry ID.

Example of Service Dog Europe.

Deaf and hearing impaired passengers

It is common courtesy to look at people when you speak to them. Just doing that will allow most deaf or people who are hard of hearing to understand you. Good communication saves time.

- Make sure the customer is looking at you before you start speaking.
- Talk directly to the customer, not to an interpreter that might be with them.
- If the person is lip reading, speak clearly and at normal speed.
- If you write something down, be concise and clear.
- Check that the customer has understood what you have said by asking “Is that ok?”

Passengers with reduced mobility

People with arthritis, stiff joints, artificial limbs or conditions such as multiple sclerosis often put up with discomfort rather than ask for extra consideration on a bus. For them courtesy, patience and a smooth journey is important.

- Always let down the ramp when it is clear that a customer needs it.
- Even if a customer’s disability is not visible, always let down the ramp when asked.
- If the ramp is not working, report it to the maintenance department.
- Give people time to get to their seats before you leave the bus stop.

Passengers with learning or intellectual disabilities

Customers with learning disabilities may also appear fit and active, but they may find bus/coach travel a special problem and challenge. It may be hard for them to understand other people or to make themselves understood. Any unexpected problems can produce a sense of panic. People with learning disabilities are increasingly being encouraged to go out to work, to go shopping or visit friends. With patience and understanding you can contribute towards their confidence and sense of achievement.

- Talk directly to the customer.
- Speak clearly and use short simple sentences.
- Be patient and explain more than once if the customer needs this.
- Don’t shout

Be on the lookout for passengers. Those waiting might not be able to see or hear the bus coming.

Eliminate gaps from the kerb. Many passengers find it difficult to board or get off the bus if it pulls up too far away from the kerb. Stop well in to the kerb to help them.

Look directly at each passenger when you speak.

Give passengers time to get seated before you move off. A few extra seconds at this point will add very little to journey times but demonstrates good customer care.

Dementia/Alzheimers Disease

Dementia is an umbrella term used to describe a variety of illnesses, which have different causes but produce similar symptoms. The symptoms of Alzheimer’s disease may happen in a slow gradual way- the person may have good and bad days, whereas symptoms associated with Vascular Dementia may occur much more rapidly.

Broadly speaking, the early symptoms of dementia include difficulties with short-term memory,

impaired language and reasoning, disorientation, and sometimes mood and personality change. In the early stages some people are also likely to present with behavioural and psychological symptoms such as apathy, anxiety, aggression, delusions and hallucinations.

No two people with dementia will ever present with exactly the same symptoms and the uniqueness of the illness must therefore always be recognised. By far the most common type of dementia is caused by Alzheimer's disease, which accounts for about two thirds of all cases. In the early stages many people with this illness will retain good insight and may be conscious of their difficulties. Consequently, they may feel embarrassed and frustrated, aware they are no longer able to do things that caused no difficulty in the past.

Passengers with hidden disabilities

Persons with hidden disabilities include persons with mental health difficulties such as anxiety or depression, persons with autism spectrum disorder, persons with acquired brain injury and persons with epilepsy.

- Don't assume: A person with mental health difficulties may appear nervous/ agitated, or they may slur their words due to the medication they may be on.
- A person with an acquired brain injury may also have difficulty speaking and/ or walking.
- A person with autism spectrum disorder may have difficulty making eye contact and/or communicating directly.
- It is important that the driver does not assume that the passenger is drunk or that they have taken drugs.

Use short sentences. Only ask one question at a time. Wait for the answer.

If someone has difficulty speaking and you don't understand them, don't pretend to. Repeat back what you think they meant and ask if this is correct. If needed, try other ways to communicate with them such as gestures or writing something down.

Ask 'Yes' / 'No' questions if necessary.

- **Moving off:** passengers may have difficulties with weakness, balance, coordination, or a fear of falling, that you cannot see. So, it is especially important that you let passengers sit down before moving off. Also, check your mirrors and cameras to make sure there is no one still on the bus who wants to get off.
- **Stopping:** A passenger with a hidden disability may need you to stop before they can stand up safely. When the bell is pressed, stop the bus even if no-one is standing up. Stopping and being alert to your passengers movements can make all the difference to them.

The National Disability Authority (NDA) has a list of organisations that provide services for persons with different disabilities. You may find it useful to contact the NDA or review their website to increase your awareness of persons with different types of disabilities and the types of supports they may require when using public transport services. See www.nda.ie for further information.

Kneeling type vehicles – wheelchair accessible with lifts or ramps

Some buses/coaches are equipped with air or hydraulic systems which allow the step level to be raised and lowered. This is helpful to passengers with disabilities and older passengers. During vehicle familiarisation you should be trained in the use of such systems and be aware of the principles of safe operation.

Wheelchair users

Where a bus or coach is wheelchair accessible, it has been designed to accommodate a "reference wheelchair". This is a wheelchair of a size large enough to represent the majority currently in use. The floor space allowed is normally 1,200 mm (length) and 700 mm (width). A driver must allow a wheelchair up to the size of a reference wheelchair to be carried. Electric wheelchairs should be treated the same way as any other wheelchair but buses or coaches are not designed to carry mobility scooters or any other wheelchairs that cannot be safely carried in the wheelchair space/docking area. When the wheelchair space/docking area is occupied with standing passengers or baggage, these passengers should be asked to move and the owners of the baggage asked to relocate it when a passenger who is a wheelchair user wishes to board your vehicle and use that space.

Wheelchair accessible vehicles are fitted with a lift or a ramp (powered and manual), stowed in a convenient place on the vehicle. A driver must be familiar with the method of operation and must always ensure that a lift/ramp is returned to its correct stowage position and is secure in that position before the vehicle is driven away. When a wheelchair user wants to board or alight from your vehicle you must safely deploy the lift or ramp.

- Position the vehicle as close as possible to the kerb so that the ramp or lift can be deployed onto the pavement (where there is one).
- Positioning and operating the device and safety systems associated with it correctly is the responsibility of the driver.
- Ensure that any handrails are in place (on a lift), and that safety devices such as lift roll-off stops are operating.
- Monitor the movement of a power-operated lift or ramp to minimise the risk of injury to passengers or other members of the public.
- Never force the lift or ramp into or out of position.
- Ensure safe and secure storage of clamps/ straps and equipment.

Safety of wheelchair users

If a wheelchair user needs to travel seated in his/ her wheelchair, s/he must only be carried in a wheelchair space/docking area in an appropriate vehicle and facing either forwards or rearwards according to the type of vehicle. Buses will usually be constructed with a backrest to enable a wheelchair to travel facing rearwards. Coaches are likely to be designed for a forward-facing wheelchair. You must also ensure that a wheelchair user can get in to and out of a wheelchair space/ docking area. Depending on the design of the vehicle this may mean that seats are folded or removed out of the way or any device such as a retractable rail (a folding arm) alongside the wheelchair space/docking area is moved out of the way. Once the wheelchair user is in the wheelchair space/docking area any retractable rail must be in position to limit the movement of the wheelchair before the vehicle is driven. You should be prepared to offer assistance with such equipment.

Where a wheelchair space/docking area is designed for forward facing wheelchairs it will be provided with a wheelchair restraint system. You must ensure that a wheelchair restraint system is correctly attached in accordance with the type of vehicle before it is driven. This may be a system comprising webbing straps or clamps that attach to the wheelchair frame.

The system incorporates floor mounted hooks and belts that are secured to the wheelchair using a ratcheting mechanism and an incorporated seat belt mechanism for the wheelchair user to wear like other passengers.

It is of the utmost importance that the wheelchair user is secured in the wheelchair with the appropriate vehicle seat belt. Some coaches may be provided with seats in the wheelchair space/docking area that can be quickly dismantled or removed when the space is needed for a wheelchair user. If, when removed, a seat is stowed on the vehicle it must be in a locker; when a seat is returned to the wheelchair space/docking area it must be securely attached in position whether or not it is going to be used so as not to be a danger to passengers.

The safety arm must be lowered when a wheelchair or a buggy is in the wheelchair space.

Where a wheelchair space is provided on InterCity services, it should have a clamping system in place.

Blue painted wheelchair areas are generally found on City Service vehicles.

A disabled person may be accompanied by an assistant who normally travels free of charge.

Example of wheelchair clamping system on an InterCity service.

Example of Wheelchair space on a City service.

Specific Passenger Rights Under EC Regulation 181 / 2011.

Disabled Persons and Persons with Reduced Mobility.

These passengers have the same rights to travel as other passengers and should be able to travel without difficulties and at no extra cost. Carriers, travel agents and tour operators can only refuse to sell a ticket or take a passenger on board if it's physically impossible given the design of the vehicle, the bus stop or the terminal building or where doing so would breach health and safety requirements.

For long distance regular services of more than 250km, carriers and bus terminal managers must provide assistance free of charge at the designated bus terminals and on board coaches and buses. Alternatively, they can accept a person accompanying the passenger on board free of charge.

If the passenger requires assistance, they should notify the carrier at least 36 hours before the intended journey.

If a passengers mobility equipment is lost or damaged due to the fault of the carrier or terminal manager, they must receive full compensation.

See www.nationaltransportauthority.ie for further information.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. List four types of disabilities which some passengers may have.

Your Response

Q2. What can you do to assist visually impaired passengers?

Your Response

Q3. How can you make the journey more comfortable for passengers with a disability?

Your Response

Q4. What may be in place to allow the step level of your bus to be raised and lowered?

Your Response

Q5. What colour coat would a guide dog for the blind normally wear?

Your Response

Q6. Who is entitled to accompany a child with an assistance dog?

Your Response

Q7. What does a white cane with red rings mean?

Your Response

Q8. If a customer is lip-reading, how should you speak?

Your Response

Q9. Should a person with a guide dog be allowed to board your bus?

Your Response

Q10. Name four symptoms of dementia.

Your Response

SECTION G – DEFENSIVE DRIVING

As a professional driver you have a major role to play in ensuring that accidents are prevented. You must demonstrate a high degree of skill and expertise and drive your vehicle in a safe and responsible manner at all times. You must adopt a responsible attitude towards all road users as well as to your passengers, and ensure that your bus is always travelling at the correct speed, is always in the correct position on the road and that you are always ready for the next manoeuvre.

Safe Driving Practices

A professional bus driver must always apply safe driving practices which should include the following:

- Looking after yourself (health, fitness, diet, proper rest, etc.);
- Looking after your vehicle (completing checks, maintenance, security, fares, documentation, etc.);
- Looking after your passengers (ensuring their safety and comfort);
- Planning journeys well ahead (considering Routes in advance);
- Practising good observation (near, middle, far distance, mirrors, blind spots, being alert);be aware of the potential dangers of tailswing
- Maintaining control;
- Eco-driving (reducing fuel consumption and wear and tear, looking after the environment).

Defensive Driving – Planning and Observing

Because you share the road with other drivers, you need to be aware of other road users all the time to know what other traffic is doing.

You need to know the size of your vehicle and how it handles so you can always have enough space between your vehicle and others that can accelerate and brake more quickly than you can.

Lane markings are set up to leave plenty of room for smaller vehicles. For bigger vehicles, space can be restricted. Special skill is required to share the road safely.

You need to be observant and to constantly scan the near, middle and far distance.

Check in all directions around your lane. Failure to do so is a major cause of collisions.

We all look ahead on the road as we drive, but some drivers do not look far enough ahead. Large passenger vehicle drivers need to look further ahead because stopping, changing lanes and turning takes more time in a large vehicle.

You need more time to get ready to stop or move left or right. You need to look well ahead to be ready to make these moves safely.

Looking well ahead also gives you better fuel economy by enabling you to maintain a steady speed. You will be able to plan when to change lanes to avoid slow traffic and broken down vehicles. Even when you cannot change lanes you can ease off the accelerator. This puts less wear and tear on you and your vehicle. Harsh braking is hard on you, your passengers and your vehicle.

How far ahead you should look

Because large vehicles take a longer time to slow down and stop, you should know what is on the road ahead. On the open road you should plan to meet road and traffic situations 1km in front of you if possible.

If you are not planning that far ahead you may have to stop quickly or change lanes suddenly.

You have to notice things closer to you, on each side and behind you. Check both sides, in your mirrors and near and far ahead of your vehicle all the time.

In a large passenger vehicle you have the advantage of being higher, so you can see further down the road than the driver of a smaller vehicle. You can also see over the top of the vehicle in front of you. However, the height of your vehicle can also be a problem. Know how high your vehicle is and watch for low bridges, telephone and electricity wires.

Hazard Identification

Driver error is a feature of nearly all collisions on the road. The following three skills are essential for hazard recognition and negotiation:

Strategic – taking into account personal factors, attitudes and the goals of the journey that might influence your driving

Tactical – scanning the environment, recognizing, anticipating and prioritizing hazards and forming an achievable driving plan

Operational – translating intentions and thoughts into physical action – manoeuvring your vehicle accurately and smoothly

Stationary hazards include:

- Junctions
- Low bridges
- Low cables
- Railway crossings
- Road surface/works
- Temporary traffic lights
- Traffic islands
- Road signs
- Tram crossings and tram infrastructure
- Street furniture, e. g., lamp-posts, bins, bollards
- Pedestrian/zebra crossings
- Tunnels
- Speed humps, pinch points

Moving hazards include:

- Rear-view mirrors (striking pedestrians)
- Pedestrians
- Cyclists
- Motor cyclists
- Other vehicles
- Animals

Environmental hazards include:

- Low sun
- Rain
- Snow/Ice
- Glare
- Shadows
- Hedges
- Road surface conditions – floods, oil slick, potholes, mud, leaves, chippings, gravel.

Traffic

Watch for vehicles entering the road in front of you. Watch out for vehicles ahead changing lane or turning. Look for other vehicles' indicators, brake lights or movements. By checking these things you can anticipate and adjust your speed or change lanes to avoid hazards.

You should always drive at a speed which will enable you to stop safely within the distance you can see to be clear.

Road conditions

Watch for hills, curves or merging lanes. Watch for vehicles ahead, changes of width in the road and other situations for which you may need to slow down or change lanes.

Unpredictable surfaces

The risk of losing control of a vehicle can increase as a result of deterioration in the road such as potholes, wheel ruts or grooves, slippery surfaces and loose gravel. Always try to be aware of the road surface conditions and if necessary adjust your driving technique according to the conditions.

Check for road signs and traffic signals

Be aware of advance warning signs, temporary signs and electronic messages.

If a traffic light has been green for some time as you approach, prepare to stop in case it changes to red before you get to it. Beware of vehicles moving off too soon on the intersecting road.

If a light has been red for some time, slow down on the approach. It could turn green before you get there and then you may not have to stop, but beware of vehicles running the red light on the intersecting road.

Where there are parked vehicles, keep a special lookout for:

- Vehicles leaving the kerb;
- Vehicles leaving driveways;
- Pedestrians crossing from between parked vehicles;
- Children – who are smaller, harder to see and may be less cautious than adults.
- Vehicle doors opening
- Brake lights extinguishing on a stopped vehicle

Other road users do not know how long it takes you to stop. They can misjudge your speed, so you have to make allowances for other drivers' mistakes. Good professional drivers recognise hazards, understand how to expect them and then act in time to avoid any danger.

Regular mirror checks

Use all mirrors to monitor traffic beside and behind you. It requires practice to use mirrors well. Check in your mirrors often in order to know what is on each side and following behind you. However, when you are looking in your mirror you are not looking ahead. When you are travelling at 60km/h, you will have travelled nearly 17 metres in 1 second. Make sure that you understand what you see in your mirrors. Do not go from one mirror to another without first placing your eyes back on the road. Check your mirrors before moving off. At bus stops, ensure that your rear-view mirrors do not strike pedestrians.

You must also check your mirrors when you change lanes, turn, merge into traffic and go through tight spaces.

Changing lanes: Before you change lanes, check your mirrors and blind spots to make sure no one is behind you, or is about to overtake you.

Check to be sure that:

- There is enough space;
- Your path is clear.

Then look, signal and look again just before you change.

Turns: As you make a right turn, check your mirrors to make sure you will not hit any stationary vehicles parked or stopped close to the corner of the street you are turning into. Remember to allow space for the tail-swing of your vehicle, especially if it is a triaxle or rear steer vehicle.

As you make a left turn, use your left mirrors in particular, but not exclusively. Other mirrors should also be used. Check that your rear wheels do not mount the kerb, strike a post or hit a parked vehicle. Also be very careful to check that a car, pedestrian, cyclist, or motorcyclist is not trying to overtake you on the left side. **Be aware of the vehicle tail-swing when turning**.

Merge: When you are about to merge, use your mirrors to check that there is enough room for you to enter your new lane safely. Traffic behind may have increased speed or changed lanes, reducing the gap so that there is less room for your manoeuvre.

Blind spots

A blind spot is an area that a driver or other road user cannot see directly or with their mirrors. This requires them to turn or look sideways to see other road users.

You should check your mirrors frequently and keep a lookout for overtaking vehicles, but there are some blind spots where the mirrors cannot help you. There are also other areas beyond the range of your mirrors. Smaller vehicles behind you and level with you are hard to see. If you check your mirrors regularly you may see them before they move into the blind spots.

Reversing

Because you cannot see what is directly behind, reversing is potentially dangerous - avoid reversing if possible. Always try to park so that you can drive away forwards.

If you have to reverse make sure you do the following:

- Use a competent person if one is available to help guide you. You cannot see directly behind your vehicle and there are other blind spots to the sides. The guiding person should stand where s/he gets the clearest view of your vehicle and can signal to you. You probably will not be able to hear your guide properly, so work out some hand signals for communication before you start. Some companies do not allow a driver to reverse a vehicle on their own, so you must check your company's policy on this issue.
- Inspect your path. Check your line of travel before you begin. Get out and walk around your vehicle.
- Check your clearance including for grounding, and use the ferry lift if necessary. Make sure the road or surface will support the vehicle.
- Check for overhead wires and air conditioners in windows.
- Reverse slowly. This way you can easily correct steering errors and stop quickly.
- Where you have a choice, reverse and turn to the driver's side. Because you see more in the right mirror than the left mirror, it is safer to reverse to the right. When reversing towards the driver's side, you can watch the rear of your vehicle out the side window and in the right mirror. You cannot see as much in the left mirror.
- Instead of reversing to the left, you may be able to drive to a roundabout a short distance away to turn around and approach the same location so you can reverse into it from the right.

Audible reversing alarms should be used appropriately. They are often quite loud and can prevent the driver from hearing ambient sounds. The horn should not be used as pedestrians may have hearing difficulties and children may not understand the dangers.

They should be used only at permissible times.

Turn off the entertainment system and open the cab window to enable you to hear warnings or approaching traffic more clearly.

If reversing cameras are fitted, you should use them but do not rely on them as they can have blind spots.

Driving at night

When driving at night, it is important to use your headlights correctly to avoid dazzling other road users – dip your headlights when there is oncoming traffic.

Ensure your lights are in a serviceable condition, give yourself time to adjust to dark conditions and remember it is more difficult to judge speed and distances at night and in dark conditions.

If you are dazzled, slow down and stop if necessary. If the dazzle is from an oncoming vehicle, avoid it by looking towards the verge (edge of your side of the road) until the vehicle has passed. If the dazzle is from a vehicle behind you and reflected in your mirror, try to avert your eyes from the mirror.

Always watch for pedestrians or cyclists on your side of the road who may not have lights or reflective clothing. Also watch for any oncoming vehicle which may have only one headlight working.

How to make space around your vehicle

When driving, you need space all around your vehicle. Space gives you time to stop. Space gives you time to check your mirror and make a lane change. Manage your space all the time That way you will have space around you should things go wrong. All drivers should do this, but it is more important for drivers of large vehicles. These vehicles take up more space to start with and need more space to stop and turn.

It is essential that your vehicle is under control at all times.

You must drive it skilfully and plan ahead, so that your vehicle is always travelling at the correct speed, and you are ready for your next manoeuvre. You should never have to do anything at the last minute.

Space in front

You need enough space in front so you can always stop safely. You need enough space so you don't collide into the vehicle in front of you and so you can slow down to gradually leave enough space so that a vehicle behind you does not collide into the back of your vehicle.

The following Speed - to - Space ratios are recommended, particularly when driving coaches and buses.

Speed km/h	Seconds behind vehicle in front
25	3.0 sec
40	3.5 sec
60	4.5 sec
75	5.0 sec
90	5.5 sec
100	6.0-7.0 sec

You should always drive at a speed which will enable you to stop safely within the distance you can see to be clear.

Stopping distance should take the following into account

- Perception time, reaction time, vehicle reaction time, vehicle stopping ability
- Tyres and brakes
- Road conditions
- Weather conditions
- Speed
- Vehicle laden or unladen

Remember:

If the road is wet, traffic is heavy, or vision is restricted, double the gap between your vehicle and the one in front. In icy or slippery conditions leave a much larger gap.

Space behind your vehicle

You cannot force other vehicles to stay a safe distance behind you but you can make sure that you do the best you can in managing space around your vehicle. Large passenger vehicles are often tailgated when they cannot go as fast as other traffic, for example when going up a hill (tailgating is when

another vehicle drives too closely behind you). In this situation, stay as far left as you can. Use slow vehicle lanes and do not overtake other vehicles unless you can do so quickly without hindering other traffic. On multi-lane roads you must stay left unless you can safely overtake.

Handle tailgaters safely

Tailgating means following dangerously close behind another vehicle at speed, perhaps just a few metres apart.

It often happens on motorways. Not only are tailgating and driving in close convoy with other buses bad driving habits, but they often have serious consequences. If you are tailgating, your view of the road ahead is seriously restricted and you have an impossible stopping distance. If a vehicle in front brakes heavily you need time to react and move your foot to the brake pedal. At 80 km/h you'll have travelled 22 metres before you start to brake. During that time the vehicle in front could have reduced its speed significantly. Always maintain your safety margins. Considerate drivers also allow the drivers following them ample time to react.

When being tailgated, follow this advice:

- Slow gradually, this will encourage other drivers to overtake, and to do so more quickly.
- Avoid quick changes of speed, and signal early.
- Increase your following distance (the distance between yourself and the vehicle you are following). Opening up more room in front of you reduces the risk of having to make sudden changes to speed and direction.
- Do not speed up. Tailgaters will tend to stay behind you when you do this.
- Do not turn on tail lights or flash your brake lights. It will cause confusion.

Remember you are the professional driver, so don't let the tailgater draw you into behaving unprofessionally.

Space around the sides of your vehicle

The wider a vehicle is the more space it needs on either side. Lanes on some roads are wide enough for cars but may not be so for heavy vehicles.

To keep a margin of safety on both sides, drive in the centre of your lane.

You may have to adjust your lane position to accommodate other road users whenever

- Another vehicle is approaching;
- Another vehicle is overtaking you;
- You are overtaking another vehicle.

Only move to the left of the lane to allow a vehicle approaching from the other direction more room if you are sure it is safe.

Travelling beside other vehicles

If you are travelling beside other vehicles keep in mind that:

- Another vehicle could change lanes suddenly and sideswipe your vehicle;
- You could be trapped in a lane when you need to change to another lane;
- The other drivers may not be able to see you in their mirrors. Be aware of their blind spots.
- When travelling in a bus lane, be aware that other drivers may encroach on the lane without warning.

When travelling in a bus lane a safe and considerate speed must be observed for the safety of the public and other road users.

The best way to avoid these problems is to drive in the open and not in a group of vehicles. If traffic is too heavy to find an open space, try and keep as much space as possible between you and other vehicles. Drop back or pull forward to make sure that other drivers know that you are there. When it is safe to do so, stay in the left lane. Watch out for merging cycle lanes.

Space above your vehicle

Colliding with overhead objects causes damage to vehicles. It can cause collisions involving other vehicles. You should always familiarise yourself with the specific overall height of the vehicle you are driving. Be cautious when going under trees, bridges, overhead signs, traffic lights, power lines and other wires. If you are not sure your vehicle will fit, stop and check.

When driving remember:

- The driver should always be aware of the overall dimensions and weight of the vehicle they are driving.
- Check the height of wires and cables.
- Your vehicle might tilt to the left, because of the road's camber (slope) or different levels of surfacing. Be careful of trees, signposts and electrical power- lines along the side of the road. You may have to drive closer to the centre of the road to clear them.
- Before reversing, get out and look for obstructions, including overhead.

Space below your vehicle

Do not forget the space beneath your vehicle. When a passenger vehicle is full, especially a deep frame type, there is not much clearance underneath. So watch out for:

- Railway tracks: They are sometimes raised above the road surface, Your wheels may get stuck in the gaps between the rails.
- Soft surfaces: Make sure that a soft surface will support the weight of your vehicle.
- Traffic calming ramps. Drivers should be aware of the potentially damaging effects of road ramps on passenger safety and comfort, as well as on the vehicle itself.
- Manhole covers. These can come loose and tilt upwards.
- Shopping-centre parking areas. These are sometimes constructed for light vehicles only. Always get out and check. Ask the management if you are not sure.
- Unpaved roads and parking areas. These could be rubble spots, especially after rain. Be very wary of grass and gravel surfaces.
- Construction areas are often dug up to connect services beneath the surface. Loose earth may be covered by planks that will not support your vehicle. Take care in these places.
- Be aware that parking a vehicle on grass or other combustible surfaces may cause a fire due to high exhaust temperatures, especially during the regeneration of the diesel particulate filter. (DPF).

Space for turns

Space around a large passenger vehicle is very important for turns. Because of cutting in, large vehicles can sideswipe other vehicles and objects during turns.

Left turns

Road markings are often too tight for large vehicles. It is likely that you will have to approach the turn wide to make a left turn.

Try to place your vehicle so that others behind you cannot overtake on your left. Make sure you have the best view possible of the road you are turning into. Turn as wide as you need so your vehicle safely enters the left lane of the road you are turning into. Large vehicle drivers need to start a left turn further into a junction than a car. This way, the back wheels do not run over the kerb. The longer your vehicle is, the further into the junction you have to drive before you start turning.

Remember your vehicle's length

Be careful of oncoming traffic in the street you are turning into. Watch the cut in of the back of your vehicle. Use your left mirror to check that you will clear poles and parked vehicles on your left, and use your right mirror to check your vehicles tailswing.

Right turns

Make sure your vehicle is close enough to the middle of the junction before you start to turn, to allow for the rear of your vehicle to cut in. The back of your vehicle could hit cars waiting at the junction. The longer your vehicle, the more you have to allow for cut in. Avoid swan-necking. Check your vehicles tailswing in your left mirror.

Leaving space when crossing or merging

You need to allow for the size and width of your vehicle when you cross or enter traffic lanes.

Remember:

- Your acceleration is slower and you need a large amount of space.
- You must have a large gap in traffic to get across intersections or turn into a new street.
- If your vehicle is full, it will be slower than when it is empty.
- You need to judge a gap in the traffic that is big enough for you. You need to get all of your vehicle safely through the corner or junction.

Changing lanes

If you want to return to your lane after overtaking another vehicle, the extra length of your passenger vehicle makes it hard to judge whether you can change lanes safely. You should;

- When in doubt leave plenty of space and time, especially when it is a multi-lane road and there is no need to change in a hurry.
- Do not trust other drivers' signals that it is safe to change lanes. Always be sure yourself and make your own decisions.
- Use your mirrors to check that you can see the vehicle beside you and that you have safe clearance before moving back into your original lane. Be aware of your blind spots – see paragraph on blind spots on page 46.

Driving in mainland Europe

In countries that drive on the right-hand side of the road, you must be extra vigilant on roads you are unsure of. With your steering wheel on the right-hand side of the vehicle, it is difficult to see out from behind a large vehicle when you want to overtake. Stay back more than you normally would, check your mirrors and put your indicators on as soon as you are sure it is safe to move out. When you are sure it is safe to do so move out smoothly.

When you are being overtaken, do not speed up, reduce speed if necessary, and allow the overtaking vehicle space to move in. Negotiating roundabouts will also be very different to you. Remember, traffic will be coming from your left (not your right!) in an anticlockwise direction.

The rules for negotiating junctions and roundabouts can vary from country to country so you must make yourself aware of the correct procedure before you enter the country.

In countries where they do drive on the right hand side, the general rule is to give way to the left, but you should fully research a country's "Right of Way" regulations before you attempt to drive on its roads, as poor knowledge of road procedures and regulations may cause accidents.

Eco-driving

Eco-driving addresses personal driving style and encourages people to drive in a way that delivers benefits in terms of road safety and savings in fuel consumption. Eco-driving essentially means smooth and safe driving at lower engine revolutions. Many studies have shown a strong relationship between eco-driving, improved fuel economy and reductions in emissions.

By increasing your hazard perception and forward planning skills, you can make maximum use of the vehicles momentum and engine braking. By doing this, you will avoid late braking and harsh acceleration.

When driving away, avoid over-revving the engine and try to pull away smoothly. Use the accelerator smoothly and progressively.

It is not always necessary to use each gear. Drivers should block-change whenever possible, and this reduces the amount of time spent accelerating which in turn reduces fuel consumption.

You should use the highest gear possible without making the engine labour.

Fuel consumption should be checked regularly and any increase could mean that the vehicle needs to be serviced or there could be some other reason such as a leak, or a different driving style being used.

To maximise fuel economy, think `high gear-low revs` and always try to keep the tachometer/rev-counter in the green band.

Running of engines at bus stands or bus terminus

Engines should be switched off at bus stands, in bus stations, at turning points and in open parking areas, so that nuisance and air pollution is minimised. Unnecessary revving of engines should be avoided. This also saves on fuel consumption.

Bus stations/depots/terminus

Buses in service must not be left unattended. Before leaving a bus, you must always apply the handbrake, engage neutral gear and stop the engine. In an emergency, the fuel supply should be turned off if it is safe to do so.

When leaving a vehicle always remember to set any anti-theft devices where fitted.

Before switching off the main switch and the battery isolator switch (if applicable), on a vehicle, you should allow time for all systems to shut down correctly.

Do not walk through bus/coach manoeuvring areas. Always use designated walkways where provided.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. Name 3 stationary hazards on the road.

Your Response

Q2. Name 3 moving hazards on the road.

Your Response

Q3. Name 3 environmental hazards on the road.

Your Response

Q4. What are your vehicle blind spots?

Your Response

Q5. What should you ensure when driving at night?

Your Response

Q6. Complete the sentence `You should always drive at a speed...?`

Your Response

Q7. What should you ensure when reversing?

Your Response

Q8. How can traffic calming ramps affect your vehicle?

Your Response

Q9. What could be the consequences of tailgating?

Your Response

Q10. What should you do when leaving a vehicle?

Your Response

SECTION H – USE OF GEARBOX RATIOS AND SMOOTH BRAKING

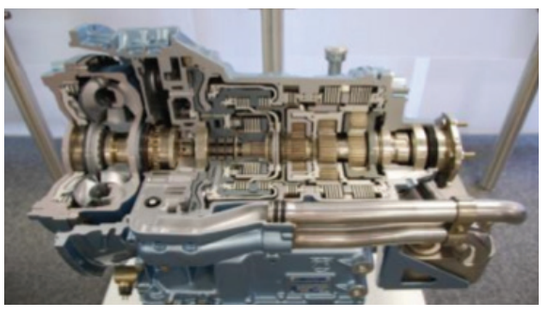
The gears contained in the gearbox allow the driver to vary the speed of the road wheels corresponding to any particular engine speed. This also results in varying the tractive effort, which is applied through the tyres to the road, to overcome the resistance to the movement of the vehicle during moving off from rest, accelerating and hill climbing.

Automatic gearboxes

There is widespread use of automated and automatic transmissions in passenger transport vehicles. These greatly assist the driver and improve vehicle performance. The picture below illustrates an example of this type of layout in a bus cab.

Example of ZF automatic transmission.

In many systems there is no need for a normal clutch pedal. Vehicle movement from rest is achieved in response to movement of the accelerator pedal. Gear changing may be controlled by the driver (semi-automatic), controlled hydraulically or, increasingly, by the use of electronic systems, to change gear according to the requirements of the vehicle use situation.



Example of a cutaway automatic gearbox.

Synchromesh Gearboxes

The vast majority of manual transmissions fitted to heavy vehicles are described as Synchromesh Gearbox.

The transmission uses a small hub device, which contains a 'baulk ring' and a 'cone'. This device synchronises two gears that are rotating at different speeds.

When the gear speeds are synchronised to the same speed, gear selection is effortless. All ratios in a synchromesh transmission will have a synchromesh hub attached to aid gear selection, with the exception of reverse gear. This should only be selected when the vehicle is stationary.

It is recommended the driver use a 'Single-Clutch' action when selecting gears, as would be normal in a passenger car. Always try to keep within the green zone on the tachometer. Always shift gear at the optimum torque. Do not labour or over-rev the engine.

The gearshift layout may vary according to the make or model of the vehicle, and you are advised to carefully read the vehicle manual for guidance on the gear layout. When the vehicle is cold you may have difficulty selecting a gear on a synchronised box, but once the box has had a chance to reach normal operating temperature, gear changing will be easier. When changing gear with a synchronised box you do not have to double declutch.

Example of cutaway synchromesh gearbox.

Electronic Gear Selection

Since the mid-to late 1980's some manufacturers' enhanced gear selection through the application of computer technology, making the selection of appropriate ratios more precise, and demanding less effort from the driver.

Depending on the vehicle make, to change gear the driver simply moved a gear selector to activate an 'Electronic Control Unit' (ECU). This ECU would then send a signal to the transmission to select a ratio higher or lower, suitable to the speed of the vehicle or the driving environment at the time. The system protected the transmission, and would only allow ratios to be selected that were suitable for the speed of the vehicle.

Gear selection was improved, as there was no need for a gear linkage assembly. This also allowed the electronic switchgear to be located somewhere other than the cab floor. It is important to note that the early versions fitted to vehicles still required the use of a clutch pedal when changing gear. In fact, the primary components used are exactly the same as an ordinary manual transmission system, and they operate in the same manner.

The main difference being as the title electronic gear selection suggests, that the gear selected by the driver is changed electronically.

Automated Manual Transmission (AMT)

The popularity of AMT's has increased dramatically in recent years. On a European wide basis, in excess of 90% of all new heavy vehicles sold are now fitted with an Automated Manual Transmission and the percentage is increasing.

While each manufacturer will apply a different brand name to their version, in principle all AMT's operate in the same manner. As with Electronic Gear Selection, the title AMT best describes what an AMT is.

"An Automated Manual Transmission is: A manual transmission where the process of gear selection is automated"

It is most important to note that an AMT is not an 'Automatic Transmission', and that it is only the changing of gear ratios that is automated. This is achieved via an electro mechanical system controlled by an ECU.

An Automated Manual Transmission fitted to a heavy vehicle is in effect 'exactly the same' as the Standard Manual Transmission alternative – fitted to the same vehicle.

AMT's offer the driver many benefits and relieve the stresses associated with continuous gear changing. This is of particular benefit for those engaged in city or urban driving where dealing with high traffic volumes and pedestrians pose constant hazards.

Depending on vehicle specification, the driver selects the 'Drive Mode' and the ECU ensures that the correct ratio is selected at any time during the journey. A separate 'Manoeuvring Mode' should be selected for low speed driving either forward or when reversing.

At anytime during the journey the driver can override the automated system and select a ratio manually, or hold a lower gear if approaching a hill.

The majority of AMT's do not have a clutch pedal and as such are often referred to as 'two pedal' systems.

Manufacturers will recommend that when stationary for any extended period of time, or when holding the vehicle on a hill, that the driver applies the Parking Brake and selects 'Neutral', or uses the Hill Holding device - as would be the case with manual transmission.

This is recommended because most AMT's are fitted with the same clutch disc and pressure plate arrangement as the manual versions, and to leave "in gear" for prolonged periods may cause the clutch disc to overheat resulting in excessive wear.

Since their introduction, AMT's have proven to be very reliable, improve fuel economy, and reduce driver stress and fatigue. The rate at which they are being improved and enhanced by manufacturers is ever increasing.

Automatic Transmission

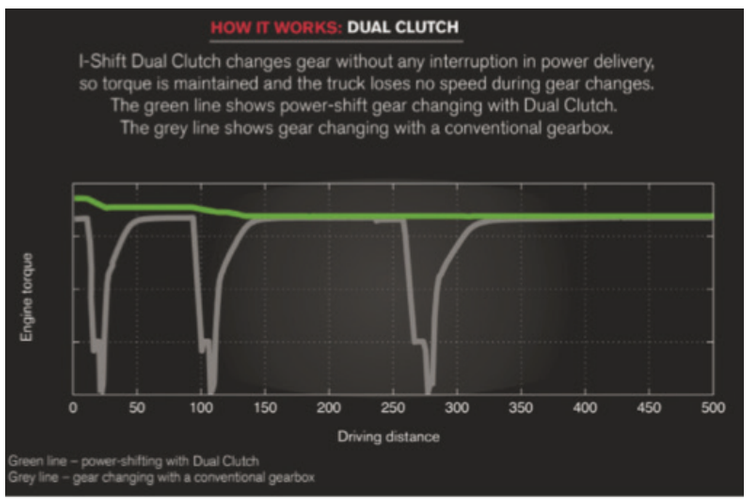
A full Automatic Transmission in a heavy vehicle operates in the same manner as one fitted to a passenger car, using a hydraulic fluid (ATF) to change ratios. In a fully Automatic Transmission the clutch pressure plate and disc is replaced by a 'Torque Converter'. As the engine speed increases, the Torque Converter also increases in speed, and moves hydraulic fluid from one side to the other. This movement operates a series of clutch bands, which multiply the torque in the transmission.

Automatic Transmissions are well suited to multi stop- start operations such as city centre passenger services. Another benefit of the torque converter is it's ability to absorb large amounts of stress acting as a damper or impact absorber for the driveline. This ability makes the fully automatic transmission well suited to various applications.

Dual Clutch Transmissions

A Dual Clutch Transmission (DCT) is a method of running two gearboxes in parallel, with all the odd number gears in one gearbox and the even number gears in the other. This allows the next gear ratio to be preselected and then engaged instantly when required. Being able to preselect means that there is almost no interruption in the transfer of torque through the driveline to the road wheels.

This results in reduced driveline wear and an improved ability to climb hills. The technology behind Dual Clutch Transmissions (DCT) is not new. In the passenger car sector DCTs have been available for many years and their popularity is increasing. However, the fitting of DCT systems to heavy vehicles has previously posed some engineering problems. Currently, some Dual Clutch Powershifting only works for sequential gear changes. This means that the transmission will only change from e. g., 7th to 8th to 9th, etc. in sequence. However, when driving conditions allow the vehicle to skip gears – for example when moving off – the transmission may shift from 2nd to 4th to 6th. In this case the transmission behaves as a normal AMT. Also, when changing range from 6th to 7th or using the kick-down function, (if fitted) a Powershift does not take place. When operating in Powershift mode the gear changes are hardly noticeable unless you are watching the rev counter. The DCT system delivers particular benefits for certain transport applications, an example being when running laden on twisting roads or over hilly terrain. Some vehicle producers believe that within ten years, DCT's will be the standard transmission function.



Example of DCT unbroken torque.

Effects of acceleration, braking and cornering on passengers

The forces acting on passengers increase with the rate of deceleration. So, when the vehicle is braked, the passengers will tend to continue to move in the vehicle's original direction. The harder you brake, the more the passengers are affected. Unrestrained passengers are particularly vulnerable to these forces.

It requires much more force to stop a passenger who has started moving than it does to prevent movement in the first place. This effect increases rapidly with the increase in distance through which the passenger moves relative to the vehicle. It is essential therefore that you drive in such a way that movement of passengers on the vehicle is minimised.

Forward planning and anticipation is essential in order to avoid the need for harsh braking. Much more effort is needed to stop a fully laden bus than an ordinary car travelling at a similar speed. It is important to avoid having to brake hard, which has the effect of propelling your passengers forward.

Sudden acceleration or braking can lead to loss of friction between the tyre tread and the road surface. Under these conditions the vehicle may:

- Lose traction (wheel spin);
- Break away on a turn (skid);
- Not stop safely (skid);
- Overturn.

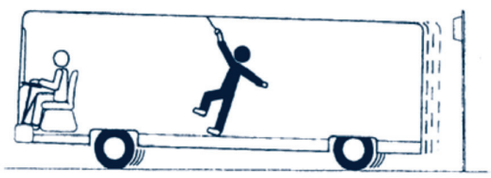
The same will happen when changing into a lower gear if travelling too fast, or if the clutch is suddenly released, because the braking effect will only be applied to the driven wheels. The most common causes of skidding are:

- Excessive speed for the circumstances;
- Harsh steering in relation to a speed which is not itself excessive;
- Harsh acceleration;
- Sudden or excessive braking.

If you brake hard in wet or slippery conditions it is likely that your road wheels will lock and you will lose directional control. Your vehicle will skid in a virtual straight line and could collide with something before the skid ends. When a skid develops, the driver should immediately remove the cause. Once the initial cause is removed your next action may depend on the exact circumstances.

For instance: on a slippery road, if your vehicle is not fitted with an anti-lock braking system (ABS) or in the unlikely event of the ABS system not working, you may need to pump the brakes rhythmically while steering to avoid a collision.(Cadence braking)

You should develop a `vehicle sympathy` style of driving which gets the best return from the vehicle while reducing wear and tear.



Acceleration

Acceleration

Braking

Cornering

Brake Fade: Continuous use of the brakes results in them becoming over-heated and losing their effectiveness (especially on long downhill gradients). This effect is known as Brake Fade. It's important, therefore, to avoid prolonged or harsh braking in order to reduce the effects of Brake Fade.

Smooth braking

Smooth braking leads to;

- Improved passenger safety and comfort
- Reduced risks of accidents
- Reduced environmental pollution
- Reduced wear and tear on tyres and components
- Passenger confidence in the driver
- Improved fuel consumption

Endurance braking systems (Retarders)

These systems provide a way of controlling the vehicle's speed without using the wheel-mounted brakes (service brakes/footbrake). They operate by applying resistance, via the transmission, to the rotation of the vehicle's driven wheels; this may be achieved by:

- Increased engine braking;
- Exhaust braking;
- Transmission-mounted electromagnetic or hydraulic devices.

Retarders can be particularly useful on the descent of long hills, when the vehicle's speed can be stabilised without using the service brakes. The system is sometimes designed to operate either with the service brake (integrated) or by using a separate hand control (independent).

Always follow the manufacturer's instructions in the use of any type of endurance braking system.

Antilock Braking System (ABS)

The following information relates to ABS (Antilock Braking Systems) in general. For vehicle specific operating instructions, always refer to the manufacturers recommendations.

The original idea for an Antilock Braking System (ABS) dates back to the mid 1930's. However, at the time the cost of components and manufacturing restricted its application mainly to the aircraft industry. It was not until the late 1970's that materials and production techniques developed sufficiently, allowing for a more widespread application to motor vehicles. Initially fitted as standard equipment to luxury saloon cars, the ABS is now fitted to in excess of 90% of vehicles in the EU.

It is arguably one of the most valuable safety systems fitted to motor vehicles in recent years, and one often misunderstood by the average driver. The reason for this may stem from the systems title of 'Antilock Braking'; this infers that because the system prevents the wheels from locking that an ABS shortens stopping distance.

The primary function of an ABS is to maintain control of the vehicle's steering when braking on slippery or icy road surfaces. It achieves this function by preventing the road wheels from locking thereby allowing the vehicle to be steered around or away from a hazard.

The Antilock Braking System does not shorten stopping distances.

There are three main components of the ABS

- A Rotational Speed Sensor
- An Electronic Control Unit (ECU)
- A Brake Pressure Modulator

The rotational speed sensor registers a change in the wheel's speed of rotation as the wheel decelerates under braking. It senses that the wheel has slowed too much and is about to stop rotating completely - i.e. lock up.

The information gathered by the wheel sensor is fed back to the ECU, which assesses the data. If the wheel speed is ok, no action is taken.

If the ECU finds that the wheel speed is too slow, it sends a signal to the brake pressure modulator to release pressure in the braking system and allow the wheel to rotate freely again.

If the speed sensor informs the ECU that the wheel is rotating too fast, the ECU instructs the brake modulator to increase pressure again. If the rotating wheel now being braked shows signs of excessive deceleration, the pressure is again released.

Depending on vehicle make and type of ABS employed, this cycle of pressure increases and decreases may occur up to 50 times per second.

The ABS electronically performs a driving technique known as 'Cadence Braking'.

Correct use of ABS

The onus is on the driver to firmly establish if any vehicle and or trailer they are operating is equipped with ABS.

If a vehicle is fitted with an ABS, a warning lamp will be illuminated when the ignition is switched to the `on` position. After a short period of time or on some vehicles, once the vehicle is driven to a speed of 5 to 10 Km/h, the lamp should go out. If this does not happen the system is registering a fault, which should be reported to an appropriate person.

Under heavy braking or braking on slippery surfaces, if the ABS is activated, the driver may feel a 'pulsing' sensation in the brake pedal or hear air being exhausted, depending on the type of system fitted to the vehicle. This pulsing is the result of the brake modulator increasing and decreasing pressure in the system. If this pulsing sensation is felt, it is important that the driver keeps the brake pedal fully depressed. Keeping the brake pedal fully depressed will ensure that maximum braking effort is applied to the road wheels.

- The primary function of an ABS is to maintain directional control of the vehicle.
- In normal conditions, the ABS should not engage if the vehicle is being driven correctly.
- It will only activate in adverse road conditions or under emergency braking.
- An ABS will not shorten stopping distances.
- A vehicle fitted with an ABS should not be driven faster or braked harder. It is a driver aid, and it does not take away the drivers responsibility to drive carefully and safely.
- If the ABS is activated, keep the brake pedal fully depressed.

Electronically (controlled) Braking System (EBS)

The EBS integrates with and enhances the ABS in a vehicle. As the title suggests it controls the braking function electronically. With the EBS, the brake pedal in effect becomes an electric switch, which transmits a signal to the EBS Electronic Control Unit.

This ECU then assesses the signal received from the pedal actuation, and instructs a brake modulator to apportion braking pressure to all wheels individually.

Braking pressure is also controlled and apportioned to any trailer fitted with EBS being drawn at the time.

As the EBS fully integrates an ABS facility, it performs the same functions in respect of steering control as detailed in the previous paragraph. In addition to an ABS function, EBS also provides monitoring of brake lining wear, and automatically balances the distribution of braking effort between axles depending on the load on that axle.

Because the EBS is electrically operated, the 'activation time' from the driver pressing the brake pedal to the wheels decelerating is greatly reduced. Conversely, the brakes are also released faster and in a more even fashion, helping to reduce drag when moving away from a stop.

Some advantages of EBS

- Faster response times for brake activation
- Even brake force application to individual road wheels
- Balanced braking effort across axles
- Constant monitoring of brake lining wear rates
- Quick release of brakes to reduce drag when moving off
- Controlled uniform braking reduces lining wear rates, and therefore downtime
- Integrated ABS to enhance directional control
- Automatic coach and trailer compatibility.

Depending on vehicle type and specifications, Electronic Braking Systems can incorporate other driver assistance technologies. Traction Control programmes such as ATC and ASR can be easily integrated. Moreover, EBS can be combined to work in conjunction with most engine brakes and retarders.

Correct use of these devices helps to enhance both road safety and reduce operational costs.

Other Driver Assistance Technologies

The following section will describe in brief some of the driver assistance technologies available. It is not an exhaustive list and can only provide information in a general sense. There are variations between different manufacturers and the specifications of any given vehicle. For this reason, it is important to adhere to the manufacturer's recommendations for any particular vehicle you may operate.

Vehicle manufacturers often use different names to describe what are essentially, the same system/s fitted to their product range, e. g., 'Lane Changing Support (LCS)' and 'Lane Changing Assist' (LCA), while not identical systems, perform similar functions.

Vehicle safety and driver assistance programmes have become commonplace in modern motor vehicles of all classes. Since the initial introduction of the ABS, further advancements in vehicle safety have been made possible through the application of electronics. The primary reason that has allowed this to take place is the now common use of a CAN-bus interface.

The term CAN means 'Controller Area Network'. What the CAN allows is similar to a computer network within a building. It enables all the computers to send information back and forward to each other through a server. In a motor vehicle, the CAN allows a multitude of sensors performing different monitoring functions to relay information to and from the Electronic Control Unit (ECU).

Because the flow of information is carried electronically, it is instantaneous. Therefore, processing the information and reacting to alter vehicle dynamics is immediate. This is what enables an ABS to cycle the brake pressure up to 50 times per second. The use of a CAN-bus allows driver assistance systems to be added or altered by simply re-programming the ECU.

Anti Skid Control (ASR)

When driving in slippery conditions or when too much engine power is applied by the driver, the ASR programme is activated to prevent the drive wheels from spinning and losing traction with the road. In a situation where only one of the drive wheels is spinning, the ASR intervenes to brake the spinning wheel until an equal traction effort is achieved across the drive axle.

Adaptive Cruise Control (ACC)

Using an integrated radar system ACC regulates the distance between a vehicle and the vehicle in front if the system determines that the set distance is too short for the cruising speed selected and the driver does not take corrective action. The ACC will engage the wheel brakes to slow the vehicle and increase the available stopping distance.

Example of Adaptive cruise control.

Cornering Headlight Control

Cornering headlights operate at slow vehicle speeds and will direct vehicle lighting at an angle to the vehicle. Adaptive lighting illuminates the area into which the vehicle is turning. Activation normally occurs when the driver switches on an indicator. The adaptive lights are then directed to that side. The system provides a high level of safety especially in urban or city driving.

Adaptive Headlight Control

Adaptive headlight control can switch on the headlights automatically when the ambient lighting fades or becomes dull. A number of versions will also automatically dip headlights when meeting oncoming traffic.

Daytime running lights (DRLs)

Daytime running lights (DRL) make your vehicle more conspicuous in daylight hours and less likely to be involved in daytime collisions. Drivers should be aware that many DRLs which come on automatically only operate on the front of the vehicle, i. e., the taillights do not illuminate. This means that following traffic may have difficulty seeing your vehicle.

DRLs may come in three forms:

- A vehicle's dipped headlights may be hardwired to come on automatically when the vehicle's ignition is switched on.

- A more common form of DRL involves drivers manually switching on their dipped headlights before starting a journey.
- A more energy efficient alternative is to fit dedicated daytime running lights that come on automatically with your vehicle's ignition and use a more fuel efficient LED technology.

An increasing number of vehicles already on the road have dedicated DRL fitted as standard, and it has become mandatory for the manufacturers of cars and small vans to fit them to any new vehicle model that they have been producing since February 2011 and which was granted type approval in accordance with EC Directive 2008/89/ EC. All other new types of road vehicles (including trucks and buses, but excluding motorcycles and agricultural tractors) require them to be fitted from August 2012 onwards.

Anti Rolling Brake (ARB)

Typically, ARB devices are activated by a dash mounted control switch. Once switched on, the system remains passive until the vehicle is brought to a stop. When the vehicle is stopped, the brakes remain on, until the driver presses the accelerator pedal and the drive is taken up. As the vehicle begins to move forward the brakes are released. Up to a certain speed the ARB may engage again once the accelerator pedal is released - without the brake pedal being applied. After that speed the ARB is fully disengaged until the footbrake is applied again.

Some systems may have a predetermined time limit on how long the ARB remains on, after which an audible warning informs the driver that the brake will be released. The control switch can be used to switch the system off when manoeuvring.

It must be noted that an ARB is not a parking brake, and should never be used as such.

Bus Halt Brake

Some passenger vehicles may have a 'Bus Halt Brake' facility fitted. This applies a braking force to the drive wheels of the bus when the doors are open. During the open door period the accelerator pedal is locked, and cannot be depressed again until the doors have been closed. Once the accelerator is pressed the Bus Halt Brake is released and the vehicle can move away. The system is also engaged automatically when the vehicle is 'kneeled', and will be unable to accelerate until the vehicle returns to the correct driving height.

It must be noted that this device is not a parking brake.

The main isolator switch and the ignition switch must be in the 'on' position for the system to operate.

The handbrake must be applied at all times before the driver leaves the seat.

Collision Warning Systems (CWS)

CWS provides the driver with advance warning of an impending impact, which can include pedestrians, in urban, rural or city driving situations.

Electronic Stability Programme (ESP)

ESP monitors the vehicle's momentum and dynamics on the road. It receives information from sensors monitoring wheel speeds, steering angle, and the load on each individual wheel. It will engage when it senses that a wheel or set of wheels may begin to lift off the road. In this case, it will apply a braking force to specific wheels to decrease road speed and or reduce engine power to bring the vehicle under control. While the ESP system greatly assists the driver in emergency situations, it is not designed to handle a deliberate dangerous action by the driver.

Lane Changing Assistance (LCA)

LCA provides the driver with assistance when changing lanes to the passenger or driver side by using a proximity sensor to establish if another vehicle is within the 'blind spot'. It will alert the driver with an audible signal, a warning light or a visual display. The system may also be activated when the driver uses the indicator stalk, signalling their intention to change lanes.

Lane Departure Warning (LDW)

In some ways similar to the LCA system - Lane Departure Warning uses a small camera to monitor the driving style. If the vehicle is wandering out of its traffic lane, it will warn the driver by a haptic (seat or steering vibration), visual and audible warning. When performing manoeuvres such as overtaking where the driver intends to change lanes, the LDW is de-activated once the indicator is switched on.

Cyclist Detection System (CDT)

A CDT works by alerting the driver to the proximity of cyclists on both sides of the vehicle by a visual and audible warning system.

Example of cyclist proximity warning system.

Night Vision Assistance

NVA assists the driver at night by employing an infrared camera to survey the road ahead and displays the image in the information cluster. The range of infrared is greater that of standard vehicle lighting systems. In addition, it performs this function without dazzling oncoming drivers.

Predictive Cruise Control (PCC)

A programme of continuous development by vehicle manufacturers has significantly reduced fuel consumption - in some cases by up to 12% over the last four to five years. One system contributing to the savings has been the development of Predictive Cruise Control (PCC). While different manufacturers call Predictive Cruise Control different names, in essence they all work in a similar fashion. Using GPS to determine exactly where the truck or bus is located, PCC is able to read the topography of the road ahead for approximately two to five kilometres and knows where the inclines and declines begin and end. It therefore can increase or reduce engine power as required. This can allow the vehicle to roll in a controlled manner in order to save fuel. The systems are highly accurate and work whether the driver is familiar with the road or not. PCC works equally as well in daytime or night time, and in all weather conditions including heavy rain or fog. In achieving a fuel reduction of up to 12% the importance of PCC should not be underestimated. Some vehicle manufacturers report a 70% uptake of PCC across Europe with no individual country recording an uptake figure of less than 50%.

Additional Driver Assistance Technologies

The following are some driver assistance technologies which are also being developed and introduced by manufacturers

- Advanced emergency braking assist
- Hi-Intensity flashing emergency brake lights
- Alcohol interlock
- Drowsiness and attention detection
- Distraction recognition
- Event (crash) data recorder
- Voice activated controls
- Improved seat belts
- Intelligent speed assistance
- Reversing cameras and proximity sensors
- Mirror cams
- Vulnerable road user detection and warning on front and side of vehicle
- Vulnerable road user improved direct vision from drivers position
- Road sign recognition
- Next Stop and Final Destination audio and visual announcements
- Ticketing integration systems

Tyre Pressure Monitoring System (TPMS)

TPMS helps to inform the driver if the vehicles tyres are not operating at the correct pressures. Correct tyre pressures help to reduce fuel consumption and will increase the lifespan of the tyres.

The TPMS may need to be recalibrated after a change of tyre or puncture repair.

Tyres

All tyres must have a minimum tread depth of 1.6 mm.

The grip which the tyres have on the road surface transmits the driving force (traction) which is essential when:

- Moving away or accelerating;
- Turning/ changing direction;
- Braking/slowing down.

The amount of grip will depend on the weight of the vehicle, the speed of the vehicle, the condition of the tyre tread and whether the tyre is under inflated or over inflated.

It will also depend on:

The type and condition of the road surface:

- Smooth;
- Anti-skid;

Environmental conditions;

- Fine and dry;
- Wet;
- Ice or snow.
- Wet leaves;
- Cobblestones;

Any other material present:

- Mud;
- Oil spillage;
- Other slippery spillages;
- Inset metal rails;
- Loose road surfaces;
- Whether the vehicle is braking or steering sharply;
- The condition of steering and suspension components.

All tyres must be suitable for the vehicle and the tyre construction must conform with the European E-mark requirements.

All tyre pressures should be checked regularly. An under-inflated tyre can pose particular dangers when the vehicle is cornering or braking.

If your vehicle suffers a tyre blowout

- Your vehicle will tend to weave about on the road, especially at higher speeds;
- Hold the steering wheel firmly, release the accelerator and let the vehicle slow down without using the foot brake;
- Your immediate instinct might be to brake, but if the vehicle is starting to move sideways, braking will make matters worse and the vehicle could skid out of control;
- Sudden braking is the single worst thing that you can do if a tyre blows out;
- Keep looking ahead and adjust your steering wheel to keep in a straight line;
- A front tyre blowout will cause the vehicle to pull heavily to the side of the blowout;
- Steer firmly to correct the pull;
- Avoid braking if there is space in front, concentrate on steering and allow the vehicle to lose speed gradually;
- Any use of the footbrake should be very light
- Remember that extra effort will be required for steering.

The instrument shown above is a RFID (Radio Frequency Identification Disc) scanner, which can check the tyre location, pressure and tread wear.

Keeping control of your vehicle

When driving:

- You cannot alter the severity of a bend;
- You cannot change the weight of the vehicle and its passengers;
- You cannot alter the design and performance characteristics of your vehicle and its components;
- Be aware of the limitations of your vehicle.

You do have control over the speed of your vehicle and the forces acting upon it. If you ask too much of your tyres by turning and braking at the same time, you will lose some of the available power and grip. If the tyres slide or lift, you will no longer be in full control of the vehicle.

In order to maintain control of the vehicle all actions must be considered before they are completed. Prevention of a problem is better than having to rectify it later. Therefore, you must ensure that all braking is:

- Done in good time
- Controlled
- Made when travelling in a straight line where possible

Reduce speed and, where necessary, select the appropriate gear before negotiating:

- Bends
- Roundabouts
- Corners

Avoid braking and turning at the same time (unless manoeuvring at low speeds)

- Reduce speed first
- Look well ahead to assess and plan your action.

Most of the forces described act on a vehicle in motion. If you disregard them you will probably lose control. Allow for them in your driving.

Summary

The driver assistance technologies described above are a sample of the ever-increasing number of active and passive safety systems currently available. Manufacturers are constantly updating and improving vehicle safety, and it is important for a driver to keep informed of developments in the automotive industry.

It is also important for drivers to familiarise themselves with the systems fitted to any vehicle which they may operate. Studies have shown that they can provide immense benefits to road safety.

One such study conducted in Germany showed that "serious rear-end collisions on motorways would drop by more than 70%" if all German trucks were fitted with Adaptive Cruise Control. In addition, the fitment of Lane Departure warning systems could reduce inadvertent lane departure accidents by 49%.*

*Source: Joint study by Allianz Centre for Technology & MAN Nutzfharzeuge (MAN Commercial Vehicles).

Drivers should always refer to the manufacturers handbook for information relating to the vehicle which they are driving.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. What does the gearbox allow the driver to do?

Your Response

Q2. What have automatic and semi-automatic transmissions done away with?

Your Response

Q3. What effect does harsh acceleration and cornering have on passengers?

Your Response

Q4. What is the purpose of an endurance brake?

Your Response

Q5. How should you brake in an emergency if the ABS system is not working?

Your Response

SECTION I – USING SPECIFIC INFRASTRUCTURE

There are various types of road systems and infrastructure which are being continually developed and improved to facilitate the effective movement of traffic through busy areas. Drivers should be familiar with the operation of these systems in order to take full advantage of them and to negotiate them in complete safety.

Quality Bus Corridor (QBC)

The primary purpose of QBCs is to facilitate and promote bus-based public transport. Existing regulations generally limit the use of bus lanes to buses and, in the case of with-flow bus lanes, to cyclists, taxis and emergency vehicles.

Bus lanes

Bus lanes are marked on roads to assist the flow of public transport. There are two types of bus lane:

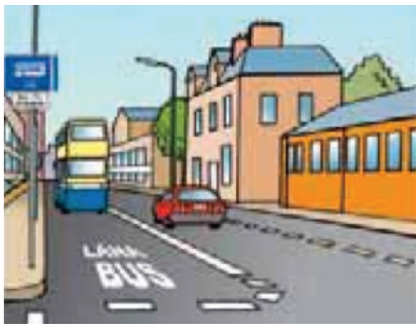
- With-flow
- Contra-flow

A with-flow near side bus lane runs in the same direction as the traffic beside it. It can be used by bicycles, taxis and emergency vehicles as well as buses, and is normally reserved during the periods shown on the information signs at the start of the lane.

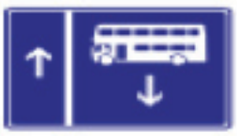
A contra-flow bus lane runs in the opposite direction to the traffic beside it. It is reserved only for buses and emergency vehicles, which means that no other traffic may use it, day or night. Use them sensibly and don't be tempted to speed just because the lane is clear ahead. You may be driving along the inside of stationary or slow moving traffic where pedestrians could be tempted to cross the road. They may not be prepared for you moving faster along the bus lane. Where the lane has been obstructed, be patient. Indicate in good time when you're ready to move out and then wait for an opportunity to proceed. Be prepared to yield to other traffic at the end of the lane where traffic or cyclists may be merging or changing position.

Drivers should be aware of bus priority Traffic Lights and road markings and familiarise themselves with their operation.

Drivers should also be aware of the interaction with the LUAS and DART passenger transport systems, and should be familiar with the regulatory signs for tram tracks.



With flow bus lane on left



Contra-flow bus lane

Tram lane on left

Tram lane on right

Drivers should see the most recent edition of the Rules of the Road for the complete list of road signs and markings.

Route planning

Plan your route carefully. It's never advisable to take short cuts through residential or narrow streets to try to avoid traffic congestion.

In some towns, weight, size and other vehicle restrictions prohibit you from leaving the main through-routes and ring roads.

Clearways

These are roads where stopping is not allowed for any purpose (except for traffic reasons) or an area of road that must be kept clear for moving traffic during certain times of the day (usually busy periods).The times when stopping or parking is prohibited are shown on an information plate under the Clearway sign. Other vehicles may stop during these times only if they are waiting in a line of traffic, but they are not allowed to park, even if disc or metered parking is normally available.

Buses are allowed to stop to pick up or set down passengers at designated bus stops.

Roundabouts

When approaching a roundabout, decide as early as possible which exit you need to take. Take note of and act on all the information available to you from traffic signs, traffic lights and road markings that direct you into the correct lane for your intended exit. When negotiating roundabouts, follow the normal procedure of yielding right of way to the traffic already on the roundabout and traffic coming from the right. Be sure before you enter a roundabout that the traffic ahead of you has moved on so that you can enter the roundabout fully without blocking the flow of traffic from another road. Remember your vehicle is much longer and will need extra clearance to fit onto a roundabout safely.

Not every roundabout is the same.

They are different shapes and sizes and can have different numbers of exits. Some are controlled by traffic lights. Regardless of the size of roundabouts, the general rules below must be applied.

The purpose of a roundabout is to:

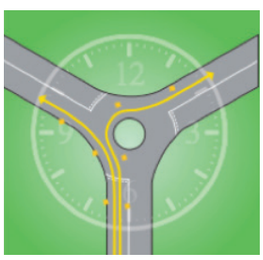
- reduce delays – traffic flows smoothly compared to the stop and go traffic at normal intersections such as at traffic lights;
- significantly reduce the risk of collisions;
- reduce pollution – emissions from vehicles on roundabouts are less than they would be at traffic light junctions.

Golden rule

This 'golden rule' should help motorists to drive safely at any roundabout regardless of the number of exits: Think of the roundabout as a clock.

- If taking any exit from the 6 o'clock to the 12 o'clock position, motorists should generally approach in the left-hand lane.
- If taking any exit between the 12 o'clock to the 6 o'clock positions, motorists should generally approach in the right-hand lane.
- If there are road markings showing you what lane you should be in, follow those directions. Traffic conditions might sometimes mean you have to take a different approach but, in the main, the 'golden rule' will help you to drive safely on almost any roundabout.

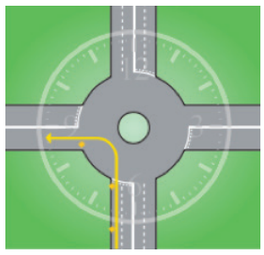
Approaching a roundabout



- Conditions at roundabouts may vary. When you are coming up to a roundabout, look for directional arrows, road markings or signs which might be indicating which lane you should use for the exit you're taking.
- Move into the correct lane in good time. Use the 12 o'clock 'golden rule' to help you plan a safe course of action unless road signs or road markings indicate otherwise.

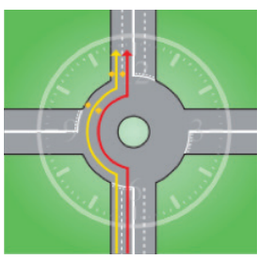
- Treat the roundabout as a junction. You must yield to traffic coming from the right or already on the roundabout, but keep moving if the way is clear.
- Mini roundabouts must be regarded the same way as larger roundabouts.

Making a left turn



- Approach in the left-hand lane, indicate 'left' as you approach, and continue until you have taken the left exit.

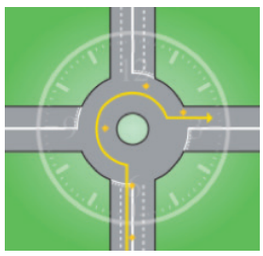
Going straight ahead (any exit between 6 o'clock and the 12 o'clock position)



Approach in the left-hand lane (unless road markings say otherwise) but do not indicate 'left' until you have passed the exit before the one you intend to take.

Where traffic conditions dictate otherwise, for example a long line of traffic in the left lane signalling left or roadworks in the left lane, you may follow the course shown by the red line in the diagram. When leaving the roundabout take extra care at all exits, checking for other road users – for example, cyclists and motorcyclists who may be continuing on the roundabout.

Taking any later exits (those from 12 o'clock to the 6 o'clock position)



Approach in the right-hand lane (unless road markings say otherwise), indicate 'right' on your approach and leave your indicator on until you have passed the exit before the one you intend to take. Then change to the 'left' turn indicator. Move over towards the left on the roundabout and continue signalling left to leave.

In all cases watch out for and give plenty of room to:

- pedestrians who may be crossing the approach and exit roads
- traffic crossing in front of you on the roundabout, especially vehicles intending to leave by the next exit
- traffic that may be straddling lanes or positioned incorrectly
- motorcyclists, cyclists and horse riders who may stay in the left-hand lane and signal right if they intend to continue round the roundabout
- long vehicles (including those towing trailers), which might have to take a different course approaching or on the roundabout because of their length. Watch out for their signals.

Remember;

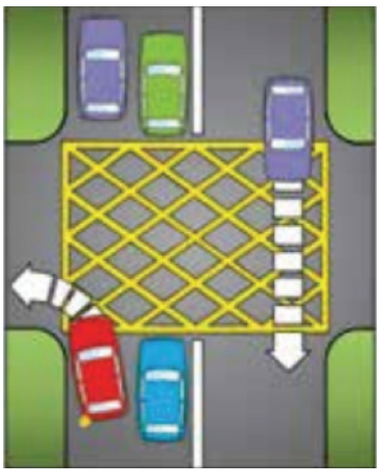
Conditions at roundabouts may vary. Exercise caution at all times. In particular, be aware of traffic signs, traffic lights, road markings and traffic coming from your right when approaching roundabouts.

Yellow box junctions.

You must not enter a yellow box junction unless you can clear it without stopping.

An exception may be when you are turning right when you may enter it while waiting for a gap in traffic coming from the opposite direction.

Yellow box junctions can also be found at railway level crossings and at tramway crossings.



Motorway driving

Accident records show that, statistically, motorways are the safest roads.

However, motorway accidents often involve several fast-moving vehicles and consequently result in more serious injuries and damage than accidents on other roads. Because of the high numbers of large vehicles using motorways many of these accidents involve trucks and, occasionally, coaches and minibuses.

There's often little room for error when driving at speed on a motorway. The generally higher speeds and the volume of traffic mean that conditions can change much more quickly on motorways than on other roads. Because of this you need to be:

- Totally alert
- Physically fit
- Concentrating fully
- Assessing well ahead.

If you aren't, you may fail to react quickly enough to any sudden change in traffic conditions.

Joining a Motorway

Before joining the motorway try to assess the traffic conditions on the motorway itself. You may be able to do this as you approach from a distance or, if not, just before joining it. Get as much advance information as you can to help you to plan your speed on the slip road before reaching the acceleration lane. You must give way to traffic already on the main carriageway. Plan your approach so that you don't have to stop at the end of the acceleration lane. Never use the size or speed of your vehicle to force your way onto the motorway. You must maintain all-round observation to ensure that you correctly assess the speed of any approaching traffic.

When entering the motorway, exercise care and attention, and yield to traffic already on the motorway. Use the mirror/signal/manoeuvre/position/speed and look routine. A quick sideways glance might be necessary to verify the position of other vehicles.

You must follow the steps below when joining a motorway.

- Use the acceleration lane to build up your speed before merging into traffic on the motorway.
- Use your mirrors and signal early to other motorists that you intend to merge.
- As you approach on the slip road, check in your mirrors and your blind spots for a safe gap in traffic on the motorway.
- Obey road signs and road markings.
- Do not drive on hatch markings before merging into traffic on the motorway.
- Give way to traffic already on the motorway.
- Adjust your speed as you join the motorway so you match, as near as possible, the general speed of traffic in that lane.
- Treat each lane change as a separate manoeuvre.
- Stay in the left-hand lane long enough to adjust to the speed of traffic before attempting to overtake.

You must not;

- Pull out into the path of traffic in lane 1 if this would cause it to slow down or swerve.
- Drive along the hard shoulder to "filter" into lane 1.
- Stop on a Motorway.
- Use the hard shoulder to stop except in case of emergency.
- Use a red warning triangle on a Motorway.

Motorway/Dual-Carriageway Speed Limits

Speed Limits in the Republic of Ireland.

With effect from 1st February 2009 new regulations came into force which have changed the maximum speed limits for Buses and Coaches when they are travelling on a Motorway or Dual-Carriageway.

The main points to be aware of are;

1. Single deck or double deck buses travelling on a Motorway or Dual Carriageway can now travel at a maximum permitted speed of 100 km/h. **Where such vehicles are designed or adapted to carry standing passengers their maximum permitted speed is 65 km/h regardless of whether they have passengers on board or not. (Speed Limits. S. I. 546 of 2008).** Buses are permitted to travel in the right hand lane of a Motorway (except those limited to 65 km/h).
2. Where a Bus or Coach is travelling on a normal road (not Motorway or Dual-Carriageway) the maximum permitted speed they can travel at remains at 80 km/h, or the posted speed limit.

Using lanes properly

It is very important that you understand the purpose of each lane on a motorway. To help explain how and when to move from one lane to another, each lane is given a number. The diagram below shows that Lane 1 is the lane nearest the auxiliary lane or hard shoulder. (This is also known as the 'inside lane'). On a two-lane motorway, the lane nearest the central median is Lane 2 (also called the 'outside lane'). On a three-lane motorway, this lane is Lane 3.

Lane 1

The normal 'keep left' rule applies. Stay in this lane unless you are overtaking.

Lane 2

On a two-lane motorway, use this for overtaking only and move back into Lane 1 when you have finished. You may also use this lane to accommodate traffic merging from the left.

On a three-lane motorway, you may stay in this centre lane while there is slower moving traffic in Lane 1.

Lane 3

If you are travelling on a three-lane motorway, you must use this lane only if traffic in lanes 1 and 2 is moving in queues and you need to overtake or accommodate merging traffic. Once you've finished overtaking, move back to your left and allow faster traffic coming from behind to pass by.

You must not use the lane nearest the central median, that is, the outside lane (Lane 2 or Lane 3, depending on the number of lanes), if you are driving:

- a goods vehicle with a maximum authorised mass of more than 3,500 kilograms, such as a lorry or heavy goods vehicle;
- a vehicle towing a trailer, horsebox or caravan;
- a single or double deck bus or coach that is designed for carrying standing passengers.

It is a fixed-charge offence of up to €120 and 3 penalty points for a vehicle listed above to drive on the outside lane of a motorway (which may be Lane 2 or Lane 3, depending on the number of lanes). You may use it, however, in exceptional circumstances when you cannot proceed in the inner lane because of an obstruction ahead.

An obstruction is not slow (or slower) moving traffic.

A single or double-deck bus or coach that is not designed for carrying standing passengers may travel in the outside lane of a motorway and a driver of such a vehicle will not be guilty of an offence if they do so.

Auxiliary lane

These are normally identified by a broken white line to the right of the auxiliary lane, with markings that are shorter, closer and wider than the broken white lines normally seen in lane 1, 2 or 3. When joining the motorway, you may use this lane to adjust your speed before entering (Lane 1), or you may stay in this lane if you intend to exit the motorway at the next exit. If you do not intend to take the next exit off the motorway, you should join the main section of the motorway (Lane 1) to continue your journey. If you are already driving on the motorway (Lane 1) and you intend to take the next exit off the motorway, you may then enter the auxiliary lane (Lane A). If you are already driving on the main section of motorway (Lane 1, 2 or 3), you should not enter (Lane A) if your intention is not to leave the motorway at the next exit (unless instructed to do so by the Gardaí or Emergency Service personnel).

Emergency closure of sections on the Motorway.

The signs shown below are widely and successfully used on the motorway network throughout Europe and are strategically placed to inform motorists of an emergency or alternative diversion route for motorways. There are four shapes — square, triangle, circle and diamond — but each can be shown filled or in outline, making eight distinct symbols. Close to motorway junctions, and on roads near to or following the line of a motorway, they are commonly placed on direction signs. If a motorway is closed, e. g., because of a collision, the Gardaí will close the road at the previous junction and compel traffic to leave the motorway. These signs instruct motorists to follow a particular symbol in order to re-join the motorway at the next junction. Diversion routes are carefully chosen to follow roads of a suitable standard and width to carry all motorway traffic, and may make detours to avoid low bridges or other obstructions.

Assigning of Diversion Symbols;

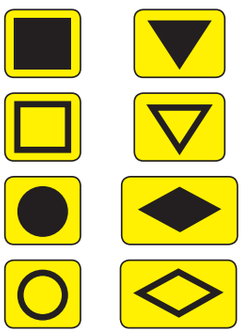
As the diversion route will generally be travelled in both directions a different symbol will be assigned to each direction of the diversion route to reduce the possibility of driver confusion at junctions along the route. Typically the solid symbols will be used in preference to the hollow symbols due to visibility and for use on Variable Message Signs (VMS). However, this will not always be achievable where multiple diversion routes interface at shared locations.

As a bus or coach driver, you must always be aware of your speed and judge the appropriate speed for your vehicle, taking into account the driving conditions, other users of the road, current weather conditions, all possible hazards and speed limits.

If you are driving outside the country, different speed limits may apply. You must ensure that you are familiar with the national speed limits for your vehicle type.

Speed limiters are fitted to buses/coaches restricting their maximum speed to 100km/h.

The breaking of speed limits can attract penalty points on your driving licence, and a fine.



Example of Motorway diversion signs.

Bridge strikes and Railway Bridges

High vehicles can pose serious risks to all bridges, including railway bridges.

A bridge strike is an incident in which a vehicle, or its load or equipment, collides with a bridge.

Every year, bridges are hit by vehicles that are too high to pass underneath. The damage done to the bridges is not always obvious but can be serious.

The Iarnród Éireann rail network covers the country and includes no less than 400 bridges that cross the public highways. If your vehicle should collide with a railway bridge or if you witness a vehicle striking a bridge, **ALWAYS** inform the Gardai **IMMEDIATELY** and call Iarnrod Eireann on 01)8555454 to report it. You could prevent a further more serious accident.

On average there are 186 railway bridge strikes each year - that's more than one bridge strike every 2 days. If the driver of the vehicle acts with due care and attention all bridge strikes are preventable. It is ultimately the driver of the vehicle that can prevent bridge strikes and the associated serious risks to people and property that result from them.

Most bridge strikes occur where roads pass under railway bridges. However bridge strikes also occur where the road passes over the railway and these can also have serious consequences.

Each headroom-restricted bridge has a unique number displayed on a rectangular yellow plate, This number helps identify the bridge by location when you call.

A railway under-bridge carries the railway over the roadway, river or other feature. Strikes to railway under- bridges can cause damage to the bridge and/ or the track. In the worst- case scenario it could cause a derailment which could result in multiple fatalities.

Where arch bridges are concerned, the signed height is available only within the goalposts which are shown on the bridge.

A railway over bridge carries the roadway or other feature over the railway. A strike from any type of vehicle can result in material obstructing the railway line from either the vehicle or its load or parapet displacement.

The causes of bridge strikes involving passenger transport vehicles include:

- Drivers going off route, including while on a traffic diversion
- Drivers operating 'not in service', and taking a short cut
- Staff with insufficient route knowledge returning a vehicle to the depot for maintenance
- Drivers who normally drive a single deck vehicle taking a double deck vehicle on a single deck route

Bridge strikes can result in:

- Death or serious injury to the driver and passengers;
- Death or serious injury to other road users;
- A serious incident resulting in a train being derailed and possible fatalities;
- Damage to vehicles and the bridge structure;
- Delay and disruption to transport services as well as to other road users.

Drivers of high vehicles should know the height of their vehicle and drive under railway bridges with care. Bridges with a height restriction are identified by regulatory signage on the bridge and a warning sign on the approaches.

As defined in the Railway Safety Act, it is an offence punishable by a fine and/or imprisonment to drive or attempt to drive a vehicle, including its load, of greater height under such bridges.

Know the height of your vehicle and the height restrictions on your route before you start your journey – it's your duty to act responsibly when in charge of a vehicle and to be aware of any route restrictions.

Example of bus bridge strike.

Iarnród Éireann maintains a list of bridges with restrictions. For details of bridges with height restrictions a map is available on application to the following email address bridgemaps@irishrail.ie.

This map is also available online through Iarnród Éireann's website www.irishrail.ie.

Example of a railway bridge strike.

Always check:

- Your vehicle height;
- Railway Bridge Map/Iarnród Éireann.

Remember – as the driver, you can prevent bridge strikes! The height of a Motorway bridge is 5.03 metres unless otherwise indicated.

The height of the Luas cables is 5.5 metres unless otherwise indicated. However, the safe headway is less than that.

Railway level crossings.

There are different types of railway level crossings

- Unattended railway level crossings with gates.
- Attended railway crossings with gates.
- Automated railway crossings protected by road traffic lights only.
- Automated railway crossings with barriers and flashing red lights.

You should never stop a vehicle on the railway tracks.

Road blocked

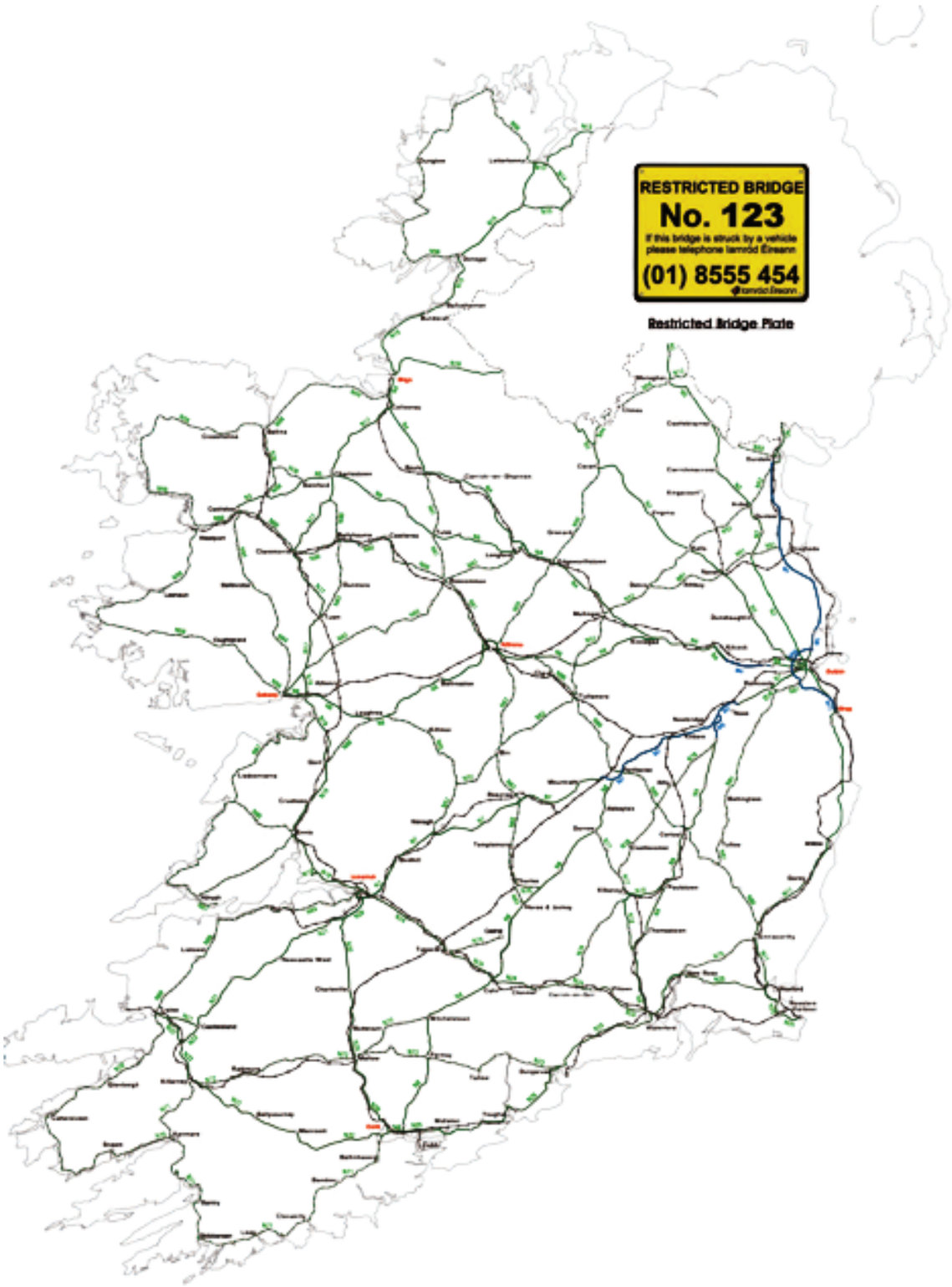
- Bring the vehicle to a stop a safe distance from the obstruction.
- Tell the passengers to remain calm and to stay on the vehicle.
- Attempt to ascertain the nature of the incident.
- Ring the Emergency Services if they are not on the scene already.
- Follow the instructions given by any State Authorities at the scene.
- Follow any suitable diversionary route, either signposted or known.

Traffic Diversion

You should be particularly wary of diverting on to unknown roads or routes in the event of a diversion, due to e. g., road works, accident, or other hold-up.

Always ensure that the diversion route does not include a bridge which is too low, too weak, too narrow, or which includes a humpback bridge which your vehicle can not safely negotiate.

Be aware also that trees, power lines, poles and rock faces can also be a hazard on a diversion.



Map of railway bridges in Ireland.

Flood Water

- Never drive through flood water when you cannot see the road under the water
- If water enters the air intake, the engine will be severely damaged
- On some vehicles the fuseboard is fitted low down in a side locker. If water enters this it may cause damage and stop the vehicle.
- If the water is deep enough, the vehicle can be swept away by the current
- There is a danger of driving into a ditch or a river when you can't see the edges of the road
- Should driving through flood waters be unavoidable then drive through at the road's highest point - usually the middle - taking extra care to ensure that nothing is coming in the opposite direction
- Control your speed; the ideal situation is to have a small bow wave in front of the vehicle
- Keep your speed constant, stay in a low gear and don't lift off the accelerator as this helps to prevents water from entering the exhaust
- Do not enter a flood if you can't see the way out on the other side
- Do not enter a flood if this may cause water damage to your passengers luggage.

SELF-ASSESSMENT OF KNOWLEDGE

Please complete the following questions to help assess your understanding of the module so far:

Q1. What road users other than buses and cyclists may use a bus lane?

Your Response

Q2. List 3 places where you may not park your vehicle.

Your Response

Q3. What do double yellow lines mean?

Your Response

Q4. What is the purpose of a clearway?

Your Response

Q5. What is the maximum speed limit for a bus or coach which has been designed to carry standing passengers.

Your Response

Q6. What must you do when joining a motorway.

Your Response

Q7. What should you be aware of if you are diverted from your normal route?

Your Response

Q8. Where would you find the number to call if you witness a bridge strike?

Your Response

Q9. How should you drive through flood water?

Your Response

Q10.What is the maximum permitted speed of a bus on a motorway?

Your Response

NOTES

NOTES