

Discussion paper of Cieca Working Group 1

MINIMUM DRIVING COMPETENCE STANDARDS

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A. PREAMBLE: BASIC UNDERSTANDING OF MINIMUM DRIVING STANDARDS

Different countries have different systems of training, education testing and driving license. Educational systems have been historically developed and follow country-specific legal and infrastructural logics but all have one main goal: to educate safe and responsible drivers. Knowing this it is necessary to create a common cross-national driving competence framework by defining minimum driving standards. This requires a general understanding of competence and competency which are not only focused on a test but on a general safe and responsible behaviour in traffic which should be taught during driver training.

So the standard sets the frame for driving competences and individual driving related competencies. Adapted to observable results it means that after completing driver training a novice driver is able to possess the necessary competence to drive a car in a safe manner, has the knowledge and skills, self-knowledge and understanding of risk required to drive in a manner which:

- is safe on the road,
- provides proper interaction,
- promotes traffic flow,
- shows consideration for health, environment and the needs of others,
- is in compliance with the regulation in force.

A.1 Competences, competencies and standards

Minimum driving standards are framed by driving competences which require individual competencies which ensure a safe, responsible and eco-friendly driving.

While competences describe a set of trainable and testable skills, knowledge and understanding which are required to perform an agreed standard successfully, competencies refer to characteristics or attributes of individuals, such as abilities or attitudes. So they enable a person on those basic of skills, knowledge and understanding to act motivationally, willingly and effectively in a specific traffic situation and might support competences. Competencies are only trainable but not testable (because they can be faked in a test).

So defining minimum driving standards they always have to be achieved through driving competences which are understood as cognitive abilities, skills and strategies processed by or which are able to be learned by individuals enabling them to solve particular problems in a specific traffic situation, as well as the motivational, volitional and social readiness and ability (subject-specific knowledge and practice-related experience) to utilise the solutions successfully and responsible in variable driving situations (adapted by Weinert 2001: 27). So competent drivers master specific situations appropriately in knowing, understanding and adapting minimum competence standards. This includes that they use their acquired cognitive or motoric proficiencies attitudinal, self-motivated, volitionally and deliberately.

Which aspects include safe, responsible and eco-friendly driving?

Minimum driving standards always need to include aspects of safety, responsibility and eco-friendly driving, which are connected with

- aspects of knowledge, rules and skills,
- individual physical, mental and social aspects,
- behavioural and motivational aspects

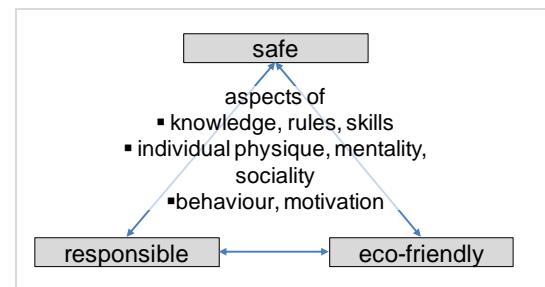


Figure 1: Triangle of minimum driver standards

Minimum driving standards as minimum driving competences have to specifically state what appropriate decisions a driver has to take, what information and rules he or she needs, and how they will be used *in any situation and under any condition*.

Under any situation we understand different geographic areas like urban, suburban or rural; traffic jams and empty roads as well as crowded places and streets. But we also focus on situations in the inner of a vehicle which can be stressful or aggressive as well as a ride under time pressure. Under any condition we understand weather, road and daytime conditions, which mean a driver has to correctly master situations within sunny, foggy or rainy weather as well as on icy or broken roads at any day- and nighttimes.

A person is competent if he or she not only has the proper knowledge, skills and attitudes, but also is capable to use knowledge, skills and attitudes in any traffic situation and any circumstances in such a way that he himself or she herself and other traffic participants are not exposed to risks. If risks can't be avoided he or she will know how to act in a way that consequences of the risks are minimized as best as possible. Even if there is a difference between the performance level of novice and experienced drivers both have to apply to the same basic competences. So to us the only differences are that experienced drivers have a higher performance level and are higher skilled but are not understood as the better drivers.

Minimum driving standards should be initially valid for all European Countries but also contain looking-forward statements for all drivers around the world. These standards are understood as core competences and the highest common denominator of all national approaches and national perspective of driving standards. A minimum driving standard has to focus on both – training and testing. Even if only observable (hard) driving competences can be tested in a driving test, soft competencies like a willingful and self-reflected control of temper or a 'respectful-to-others-driving style' can intensively and self-reflected be taught.

Of course driver education will not radically change a person's life goals or his or her personal background, but education should make a person conscious of those of his or her personal tendencies that also effect driving behaviour. So defining a standard it has to be kept in mind that attitudes and motivation always matter and make the difference between a safe, responsible and skilled driver and just a driver.

A.2 Structure of document

Overall metagoal

Driving minimum competences lead to a metagoal of drivers' education: safe, responsible and eco-friendly drivers (see central bar in Figure 2).

Relevant competencies (Chapter B)

Safe, responsible and eco-friendly driving may be demonstrated by a corresponding driving behaviour. This behaviour is strongly influenced by personality traits. They are very different among people and hardly changeable by teaching. Therefore, we cannot describe a standard of these traits with minimum or ideal specifications of these traits. However they strongly affect driving competences as well as aspects of lifelong-learning. Therefore a safe and responsible driver should be aware of those personality traits to ensure a self-reflected participation in traffic. Chapter B gives an overview of relevant traits.

Minimum driving competence standards (Chapter C)

Chapter C describes the knowledge (as explicit or declarative knowledge) and skills (combination out of explicit and implicit knowledge) we expect from a driver as an actual competence standard. The scope of the standard of minimum driving competences includes all types of vehicle covered by category B ...

- manual and automatic vehicles,
- on any class of road,
- at any time,
- in any weather conditions,
- with any number of passengers,
- with any load (subject to legal requirements and the manufacturer's specification),
- for private use and for commercial purposes (subject to legislation) and
- sustainable in the future (as far as we can foresee it)

For description purposes our paper structures these competences into different components (e. g. traffic observation or communication). So the standard will be easier to understand. These components are to some extent artificial and do not at all imply an order of training.

The standard does not reflect country-compliant requirements but additionally implies that drivers' adapt and gain knowledge and skills as competences in accordance with country-compliant requirements.

Illustration of interplay of all components in an example situation (Chapter D)

In real traffic situations all competence components described separately in the chapters B and C have to interplay together to result in safe, responsible and eco-friendly driving. Thus, they cannot be separated anymore. Chapter D describes an example of this interplay in an example situation.

Life-long-learning (Chapter E)

In addition what safe, responsible and eco-friendly driving is may change over time. Therefore, drivers need to keep their competences up to date. This is seen as another aspect of a minimum driving standard which is reflected in Chapter E.

Implications for teaching and testing (Chapter F)

This document is supposed to describe what competences are expected from a safe, responsible and eco-friendly driver without explaining how these competences may be acquired. However, the description of the necessary competences and competencies for safe, responsible and eco-friendly driving require answers of some questions on teaching and testing which are discussed in chapter F.

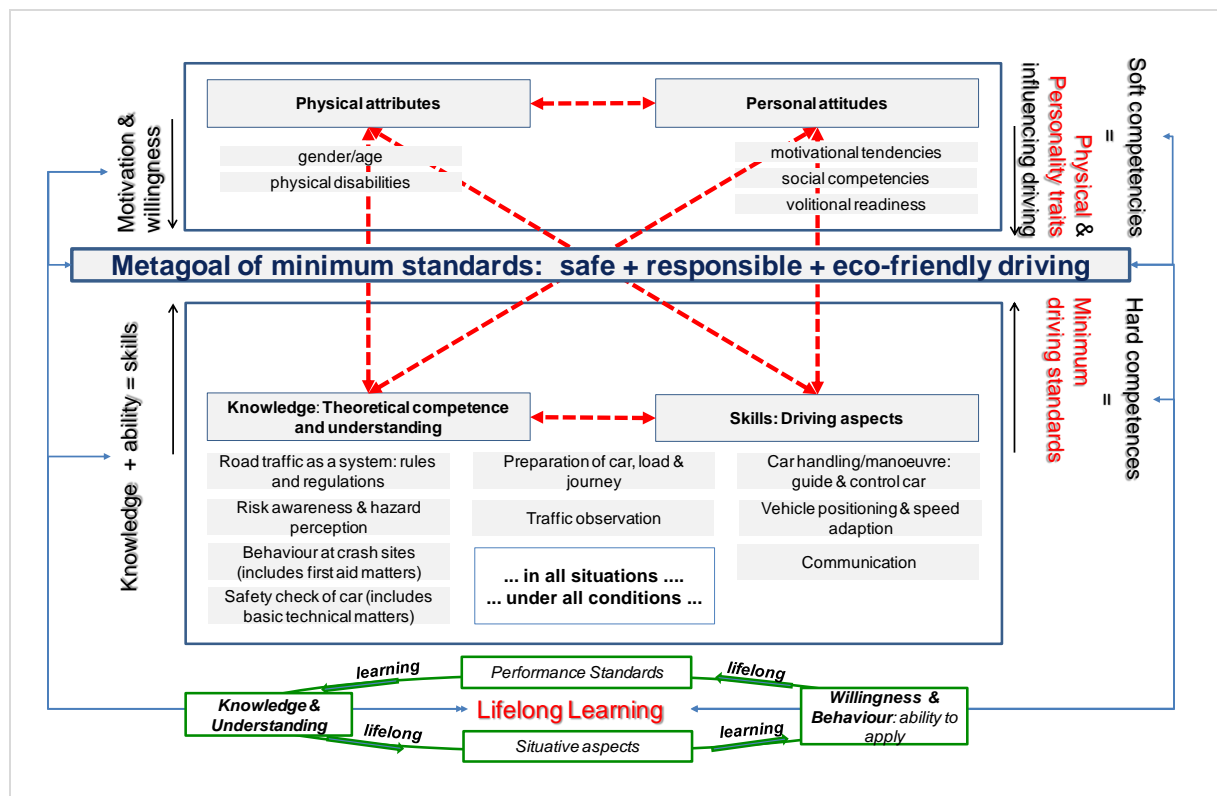


Figure 2: Approach 'minimum driver competence standards'

B. SOFT COMPETENCIES: PHYSICAL AND PERSONALITY TRAITS

If we define factors of a minimum standard we have to approach to different perspectives and different time frames. First of all and in principle a driver has to be 'physically and mentally fit to drive' by having the ability to develop skills and acquire knowledge (aptitude). So we differentiate between so called hard competences and soft competencies. With our work we basically focus and conceptualise hard competences (ability and knowledge see chapter C). They are measurable, visible, (quantitatively) analyzable and closely connected with driving. So called soft competencies are competencies which are directly connected to persons and their social and cultural backgrounds (see Figure 3). Even if aspects as mentality, willingness or motivation have a more distant connection to driving, different personalities, social and cultural norms can make a significant difference. They can have positive or negative effects, influences and impacts on driving behaviour, risk awareness or the motivation and willingness of learning, understanding and adapting competences into *real* driving situations (see chapter D).

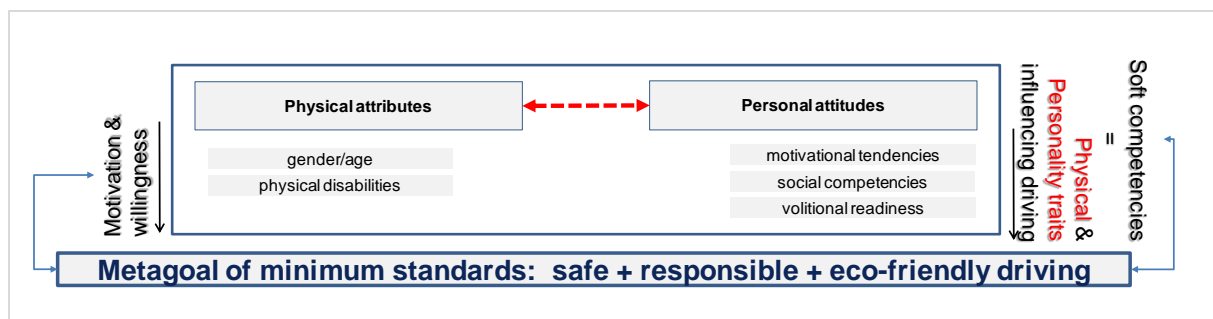


Figure 3: Physical attributes and social competencies

B.1 Physical attributes

Even everyone is equal before the law every driver differs in his or her physical attributes: in age, in gender or in suffering on physical disabilities like missing limbs, weak eyesight, multiple-sclerosis, paraplegia, any motor or mental disorders like epilepsy, depression, attention deficits or schizophrenic disorder makes every driver special. To be a safe and responsible driver the minimum standards of physical and mental fitness for driving always have to be guaranteed (see Directive 2006/126/EC of the European Parliament and of the Council of 20 December 2006 on driving licences, ANNEX III drivers of vehicles of category B). A driver has to ensure that he or she is authorised by or supported by medical opinion and/or regular medical check-ups appropriate to his or her individual case and necessities.

So it further has to generally recognize that every driver will have differing levels of aptitude and ability, good or poor coordination or retention of information or learning difficulties.

Technical aids and medical treatment can enable most people to drive a car safely and responsively. So for instance every driver has to have adequate eyesight or specific aids for their specific disease/disability for a motorized travel on the road.

Beyond that physical requirements are actually defined through the minimum standards. Disabled or impaired people should not be prohibited from driving as long as they are able to fulfill this standard – if necessary with technical aids. But it should also be ensured that certain diseases that cannot provide a safe transport option can be excluded.

B.2 Personal attitudes as motivation and willingness

Before people get taught a minimum driving competence they run through a long-term socialisation process beginning within their earliest childhood which also includes matters of driving. Thereby socialisation describes a process of forming and developing a human personality in mutual dependence of and in conflict with the historically mediated social and rematerial living conditions. So every individual and every driver is the producer of his or her own development and surrounding.

Every driver

- has a very specific social, economic, cultural or ethnic background, which means that drivers from different cultures e. g. may have a totally different way of looking at problem-solving, risk taking and perceiving hazards,
- has in this way specific personal attitudes, different personal goals and future expectations, personal beliefs, assessments and values,
- has personal traits as his or her personal characteristics and every day changing mental states. Traits like politeness, aggression, assertiveness or carefulness describe stable attitudes and behaviours which are independent of a specific situation. States are situational factors that occur at a specific moment as bad mood, excitement or happiness.
- has different social and soft competencies, which are the combined product of competences as skills, knowledge and understanding and on the other hand personal motivation and willingness which enables a person to act reflected and effectively (e. g. being courteous, appreciative or dependable). Soft competencies are manifested in aspects as self-esteem, self-reflection, self-motivation or self-confidence.

All aspects lead to different volitional readiness and motivational tendencies because every decision-making and responsibility bases on self-perception and identity which leads to observable actions as consciously controllable, directed towards targets and individual planned behaviour. Even if shared backgrounds, world views and prior interactions can shift the pattern of behaviour all aspects are stable influencing factors towards driving style.

So based on the general considerations we always have to keep these soft competencies – on the whole aspects of motivation and willingness – in mind and mentally connect them with individual driving related task fields of 'hard competences'. So one principle is a safe and responsible and eco friendly driver has the motivation and willingful determination to behave as such.

- The will to drive safely is more decisive and important as the ability to drive safely. While a lack of ability can often be compensated by caution or even waiver. However, a lack of will almost always increases the risk and lowers a personal risk assessment.
- The will can only be slightly influenced during or by driver training. This phase of life is just a small part of the entire experience of life. Is there no personal will, desired and sustainable effects of training will fail.
- Willingness to drive safe, responsible and eco friendly is easy to fake. Probably the main individual motivation is it to first quickly obtain a driver's license. However, challenging driving situations can easily be affected and influenced by other motives.

- Willingness cannot really be observed or measured. Therefore it cannot be part of the minimum driving standard. Nevertheless, by seeking every opportunity in novice drivers' training a teacher or mentor should try to positively influence the will to drive safely, responsibly and eco friendly after testing.

C. STANDARD: ABILITY AND KNOWLEDGE AS HARD DRIVING COMPETENCE

Approaching the issue which are the minimum standard competences of driving one single question has to be answered:

Which specific knowledge and understanding as well as abilities and driving skills are necessary to be able to drive a vehicle safely, responsibly and eco-friendly in all situations and conditions of road traffic?

This question about minimum competences has two aspects:

- **Regulative elements** pertain to formal and binding rules, regulations or procedures. They are documented, easy to observe, explicit respected and reference to specific measures and learning aspects.
- **Normative elements** are similarly prescriptive and evaluative. Interpersonal expectations, common values and norms are contained within this category. When normative elements are adhered to, systems function and the impact of each individual road user is maximized (e. g. eco-friendliness, assumption of responsibility etc.).

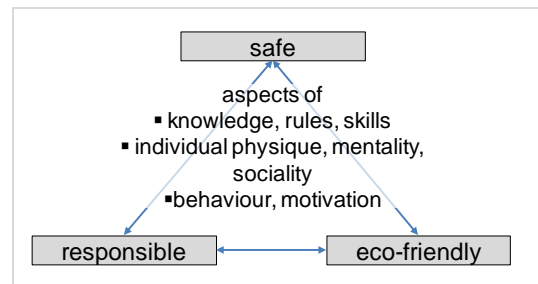


Figure 4: Causal link between knowledge/understanding and skills

In practice, there are no clear demarcations. All categories and elements are mutual influential and result in complex unstable combinations. All components have to interact with each other.

So in answer to that question of minimum competences it is recommended to work with a deductive methodical approach (from general to detailed information):

- Starting with general aspects: every competence component is defined by an main aim (general issues),
- Moving down to specific aspects: every main aim can be subdivided in behavioural aspects (e. g. safety, responsible, eco, operations, rules, conditions, control, ...),
- Ensuring that fundamental principles are respected at every level: examples of specific situations for illustration

By defining knowledge, understanding and skills and their sub-components it is possible to clarified and create a binding minimum driver competences toolbox. In this way (Sturzbecher/ Rüdel et al. 2012) argument, that

- each operationalisation of a competence refer to a specific main goal and binding principles, specific sub-aims and specific classes of demand situations,
- ☐ the scope of demand situations should mirror a broad performance spectrum (situative aspects as examples)

All aspects include the aim of a raising awareness of a safe, responsible and eco-friendly driving which composes also risk awareness as well as self-evaluation skills. The more competent a person is, the less he can be negatively influenced by environmental or situative conditions.

In the following descriptions we distinguish between **Knowledge**: Rules, theory and understanding (conditional knowledge base) and **Skills**: Driving aspects (driving competences) (see Figure 5). So the first competence components are that drivers have to know and to understand. Competence components in connection with driving skills of course drivers also have to know and to understand but here we assume that they **know and understand** the facts and so they **are able to** perceive, assess, decide and act by handling and manoeuvring their vehicle safely, eco-friendly and responsibly. 'Preparation of car, load & journey' as well as 'Traffic observation' combines aspects of theoretical knowledge and practical skills.

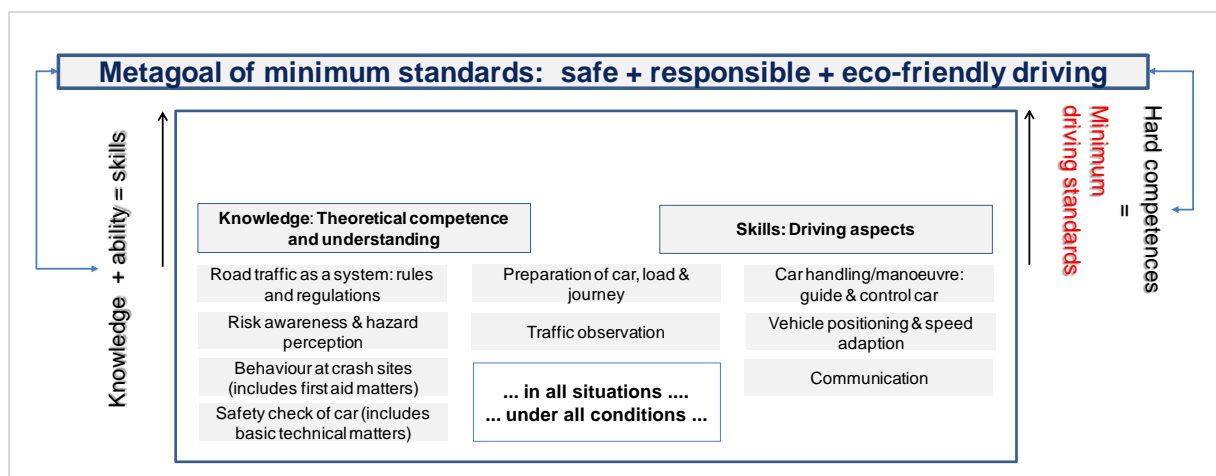


Figure 5: Minimum driving competences

C.1 Knowledge: Rules, theory and understanding (conditional knowledge base)

C.1.1 Road traffic as a system: rules and regulations

Main goal: Drivers know about the legal framework of the national road traffic system. They know and are able to internalise rules and regulations of the road traffic system which enable and protect every road user to become safe and responsible with legal regards and respect for each other and their environment.

Knowledge and understanding:

1. Drivers know about and understand the system and logic of traffic and so about the legal framework of the national traffic system.
- They know about the content and the rules of national highway code, rights of way and speed limits as interpreted in the country in which they are driving
 - o They know about and understand the purpose of rules of the road (e. g. motorway/highway rules)
 - o They know about and understand the operation of controlled and automatic train and tram crossings
 - o They know and understand the rules that apply to different sorts of junctions e. g. which vehicles have priority
 - o They know and understand how to use road signs and road markings to understand who has priority at particular junctions
 - o They know about and understand key terms or concepts (e. g. one-way-streets, roundabouts, tunnels, bends, ...)
- They know and understand that the highway code, rules of the road and regulatory framework may vary between countries
- They know and understand that every road user has the same rights and obligations
- They know about and understand the purpose of traffic signs
 - o the various shapes and colours of signs and their meanings
 - o the meaning of individual road signs
 - o the differentiation of signs which are mandatory and which are advisory
- They know about and understand the purpose and operation of various types of traffic signals, their meanings and their sequences including traffic lights, road markings, pedestrian crossings, level crossings, school crossings and all other signals
- They know about different types of vehicle
- They know and understand the regulations relating to the carriage of warning triangles, high-visibility jackets etc. in the country in which they are driving
- They know and understand the rules relating to the carriage and use of spare light bulbs, tow ropes, spare tyres, run-flat tyres etc. in the country in which they are driving
- They know and understand the rules which apply to the use of warning devices in the country in which they are driving
- They know and understand the rules relating to the use of specialist tyres e. g. snow or cold weather tyres in the country in which they are driving

2. Drivers know and understand the theory of driving.
 - They know about and understand safety margins and braking/stopping distances
 - They know about and understand alertness, attitude and vulnerable road users
 - They know about and understand aspects and risks of drinking, taking substances and driving
3. Drivers know and understand the legal framework of their vehicle.
 - They know and understand that vehicle complies with all legal requirements according to the jurisdiction – knowledge about vehicle registering, insurance matters
 - They know the category of vehicles they are entitled to drive
 - They know and understand the rules which apply to towing trailers or caravans with Category B vehicles
 - They know and understand the possible implications of towing a trailer or caravan on insurance and licencing requirements
4. Drivers know and understand they take responsibility for life and health, environment and property of themselves and others.
 - They know about and understand the 'human risk factors', specificities of other road users and vehicles like public traffic, busses and school buses, taxis, larger and heavier road vehicles, motorcyclists, cyclists, pedestrians, children, elderly people or disabled persons
 - They know and understand what the law says about the use of alcohol, legal or illegal drugs when driving
 - They know and understand where to go to get support and guidance to allow them to maintain and improve their competence.
 - o They know and understand that their skills, knowledge and understanding may deteriorate, become out of date or be affected by their changing physical condition
 - o They know and understand that their skill, knowledge and understanding can always be improved
 - o They know and understand that their skills, knowledge and understanding always have to meet the minimum requirements to be safe and responsible.

C.1.2 Risk awareness and hazard perception

Main goal: Drivers know and are able to reflect the principles of how risks and road hazards can arise and how they can respond to them with an appropriate behaviour based on risk awareness and hazard perception.

Knowledge and understanding:

1. Drivers know and understand the importance of recognizing and predicting the behaviour of other road users and of recognizing and anticipating road-based hazards and risk.
 - They know and understand defensive driving techniques

- They know about the importance of reflected and forward-thinking decision-making and decision-taking (e. g. own individual reaction time)
 - o They know about and understand the ability and the necessity of self-monitoring and self-reflection
 - o They know, understand and are sensibilised for driving risk factors related to various weather and road conditions in day and night time and their awareness
 - o They know about and understand the importance of safety margins and braking distances by various changes in road surface, traffic, weather conditions, lighting or other factors such as their own fatigue or road conditions
 - o They know and understand why a skid may occur, how to avoid skids and how to correct them
 - o They know and understand how stress, fatigue or emotional states may affect their ability to drive safely and responsibly
 - They know about aspects of emotional states (anger, joy...) and their affecting ability of driving
 - They know and understand that particular groups of road users e. g. pedestrians – especially children or animals – elderly people, those with diminished hearing or eyesight, cyclists, riders may require special consideration
2. Drivers know and understand that there is a relationship between perceiving, assessing, deciding and acting in connection with risk awareness and hazard perception
- They know and understand that risk factors may change with different weather and road conditions and at different times of day e. g.
 - o braking distances will increase in icy or wet conditions
 - o some road users will be less visible under artificial lighting
 - o driver's concentration and reaction times may deteriorate at night
 - o perception of speed can vary at night
 - They know and understand every choice has a consequence
 - They know and understand where it is particularly dangerous to overtake and where rules and regulations forbid overtaking
 - They know and understand that the performance of the vehicle they are driving will have an impact on their ability to overtake safely
3. Drivers know and understand that alcohol and drugs are an important risk factors
- They know and understand about the risks of alcohol and drugs relating to traffic and driving aspects
 - They know and understand how alcohol, legal and illegal drugs will affect their ability to drive safely and responsibly
 - They know and understand that the use of alcohol and drugs in combination, including some that do not usually have any negative effect when taken alone, can have a serious impact on their ability to drive safely and responsibly
 - They know and understand that passengers who are drunk or under the influence of drugs may create distractions or get in the way of their ability drive or to scan their environment effectively

4. Drivers know and understand that their risk awareness in unknown areas even has to be higher than in familiar areas
 - They know and understand that the layout of roads, junctions etc. in other countries may be slightly different and that hazard prioritisation and planning will have to be adjusted to take account of these variations
 - They know and understand the behaviour of other road-users is not always predictable particularly (e. g. they may use different informal signals to other road users) if they are driving in a country with which they are not familiar
 - They know and understand how and why to adjust their driving behaviour to take into account any variations in driving practice in different countries

C.1.3 Behaviour at and near crash sites (includes first aid matters)

Main goal: Drivers know about behaviour and theoretical first aid matters at a crash site. They are able to internalise rules and regulations of first aid aspects to enable and protect themselves and any other road user safely and responsibly.

Knowledge and understanding:

1. In case of emergency drivers know that personal safety always comes first – everyone can become a victim of a crash.
 - They know and understand that in many crash situations there is a high likelihood of other road users also becoming casualties
 - They know and understand the importance of making sure that no further injury or damaged is caused
 - They know about and understand hazard awareness near or at the crash site:
 - o At the road near the crashsite they know to slow down and pull off the road, they form with other drivers a rescue alley and contribute to emergency relief
 - o They know about and understand emergency measures
 - a. When appropriate They know and are able to stop their vehicles and turning off the engine at a safe place and distance from the scene of crash
 - b. They secure the accident site and is able to ensure adequate warning to other road users (e. g. immediately turning on the hazard warning lights, position a warning triangle,...)
 - c. If needed they rescue everyone from the danger zone. They are able to secure themselves and others in wearing and tightening a safety vest and depositing warning triangle in a proper distance in front of the accident site.
2. In case of emergency drivers know about theoretical principles of first aid. Their basic knowledge allows them to effectively respond in event of any crash situation.
 - They know how to contact the emergency services in the country in which they are driving
 - They know and understand the danger of moving casualties e. g. where there is a possibility of spinal injuries, unless there is an absolute need e. g. danger of fire
 - They know and understand that they should not try to remove a crash helmet from a motorcyclist unless there is a compelling reason to do so, but know the best way to remove a crash helmet if it is necessary to do so

First aid matters at the crash site:

- every minute counts: Drivers know and understand that there is an inverse relationship between the time it takes for a casualty to receive appropriate medical care and their chances of survival
 - They know and understand the principles of first aid e. g. how to:
 - check for a response
 - check and clear the airway
 - apply CPR to maintain circulation and breathing
 - how to apply the same procedures to infants
 - deal with unconscious casualties
 - reduce bleeding
 - deal with shock
 - They know and understand why to talk to crash victims and never leave them alone until the rescuers arrive
 - They know and understand the vital importance of providing ambulance and medical services with accurate information about the status of casualties – calling the emergency number and the police and knowing about
 - Where did it happen?
 - What has happened?
 - Which injuries?
 - How many injured people?
 - Wait.
 - Trained first aiders first check the vital functions of the accident victim
3. Drivers who are involved themselves in a crash and are not badly injured know about measures to prevent that it does not come to secondary accidents:
- If the vehicle is roadworthy, they remove it from the hazard zone
 - If the vehicle is not roadworthy they turn on the warning lights and set up a warning triangle
4. Drivers enhance their skills lifelong.
- They independently and adequately refresh simple first aid rules

C.1.4 Safety check of car (includes basic technical matters)

Main goal: Drivers are able to ensure their vehicle is ~~technical~~ roadworthy and technically works in a way that they themselves, their passengers and their loads are safe. They know and understand how and when to use – if required – technical assistance systems. They know and appropriately estimate the necessity for checking their car by an expert.

Knowledge and understanding:

1. Drivers know and understand how to access guidance on the best way to carry out routine vehicle checks either through the vehicle's handbook or through on-board or on-line electronic systems.
- They know and understand the impact of failure to carry out appropriate checks, and take remedial action, will have on the ability to drive safely and responsibly

- They know and understand how to interpret the information provided by on-board electronic systems and analogue displays e. g. oil pressure or water temperature gauges
 - They know and understand the meaning of on-board warning lights and audible alarms and how to respond to them
2. Drivers know about and understand mechanical aspects with a bearing on road safety. They familiarise themselves with their vehicle and know how to use or respond to any in car assistance systems.
- They know and understand how to use the manufacturer's handbook/webpage/app etc.
 - They are able to familiarise themselves with the systems on their vehicle which allow them to respond to specific situations safely and quickly
 - They are able to monitor the performance of in-car systems
 - They are able to operate the systems installed on their vehicle and understand that different vehicles may have different systems
 - They know how and understand why to check the fluid levels, engine oil, engine coolant, brake fluid, windscreen washer fluid, fuel, the correct use and care of tyres and how to replenish them when needed
 - They know about and understand the correct use and care of tyres, the tyre pressure recommendations and their impact of secure car handling and environmental aspects
 - If embedded in the national legislation they know about the legal order to carry first aid kit, safety triangle and safety vest and the benefits of carrying a spare wheel and any other equipment as basic tools, set of light bulbs and other legally required equipment
3. Drivers know about effects of physical forces during driving.
- They know and understand about technical basics of fundamental working principles in the context of the vehicle system
 - They know about and understand mechanical aspects with a bearing on road safety as friction, rolling resistance, effects of different charges, in ascending and descending slopes aerodynamic resistance, cornering force, centrifugal force and breakdown torque
4. Drivers know about the meaning of technical assistance systems and dashboard warning lights and alarms.
- They know and understand to effectively use (intelligent) technical assistance systems (e. g. cruise control systems, reversing camera systems, proximity sensors, etc.) for their own and others safety
 - They know and understand how aids such as ABS can help in safe and effective braking and know and understand when to use them
 - They are prepared to have a competent person check out any alarms or warnings when necessary

5. Drivers recognize facts about technical standards, their understanding and correct use/application as a basic module of a lifelong-learning-process
 - They know and understand where and which publications with which new and required content to use to help and keep up with specific information and understanding
 - They know and understand that vehicle technologies are evolving all the time and they may change between models

C.2 Skills: Driving aspects (driving competences)

C.2.1 Preparation of car, load and journey

Main goal: Before they start driving drivers are able to ensure that they and their passenger(s) and/or load and their vehicle itself are fit to drive. Drivers are able to consider all facts to make their journey safe.

Skills and behaviour:

1. Drivers are able to meet all volitionally legal aspects of load and journey.
 - They are able to ensure their vehicle meets all legal requirements, is roadworthy and in a good working order to be safe on the road
2. Drivers are able to ensure to use their vehicle legally by knowing vehicle manufacturers specifications about carrying loads
 - They are able to anticipate that different vehicles may have very different monitoring and information systems and that they must familiarise themselves with each new type of vehicle that they drive
 - If they use a trailer/caravan they are able to reflect all legal requirements and insurance aspects as well as driving licence regulations on towing trailers or caravans. They are able to ensure it is suitable and legal for use on the road
 - They are able to safely and correctly couple and uncouple a trailer/caravan to the vehicle
3. Drivers are able to take responsibility for the safety of their passengers and their load
 - They are able to make routine checks of their vehicle and are able to detect problems with the vehicles suspension and braking systems, tyres, lights and direction indicators, reflectors, interior and exterior mirrors, windscreen and wipers, the exhaust system, seat-belts and the audible and visible warning device
 - They are able to pack loads safely
 - They are able to ensure that any animals are carried securely and with appropriate restraints
 - They are able to ensure that any loads are carried securely and in compliance with the vehicle manufacturers specifications and that the insurance for the vehicle covers any proposed carriage of passengers or loads
 - They are able to **seat** themselves to enable them to use controls correctly and reach an optimum of traffic observation and safety.
 - They are able to reflect the importance of legal requirements for wearing seat belts and appropriate seating for all passengers, but especially for babies and young passengers (baby carriers or 'booster seat') for whom airbags etc. have to be switched off if appropriate

- They are able to reflect the necessity of adjusting the seat position for a safe driving and are able to anticipate why and where to adjust head restraint and seat to position to be correctly, comfortably and maximum protected seated
 - They are able to ensure the completeness of the security equipment in their vehicle, are able to ensure that the expiry date of the security equipment has not been exceeded
 - They are able to use mandatory safety and emergency equipment correctly
 - They are able to make all recommended basic vehicle safety checks in ensuring that windows and interior and exterior mirrors are clean, all lights (e. g. front and rear fog lights) and reflectors (e. g. dipped and full reflectors) are working and carried out prior to their journey
 - They are able to take care that they and their passengers enter and exit the vehicle safely by taking precautions as consciously opening and closing the doors
 - If using a trailer/caravan they are able to anticipate height or width restrictions on their route before starting
4. Drivers are able to deliberate and self-organized respond to their own and other passengers physical, mental and emotional state at the start of the journey (fitness to travel)
- They are able to plan an appropriate route taking into account their level of experience and their knowledge of road and weather conditions
 - They are able to estimate to only use their vehicle if they feel fit enough or feel capable for a safe and responsible driving
 - They are able to make alternative arrangements where their ability to drive safely and responsibly is impaired by any factor
 - They are able to ensure that all occupants are fit to travel prior to their journey and know about the effects passengers may have on their ability to drive
 - They are able to except the legal limits on alcohol and that some medical treatment can cause drowsiness, impair judgement and can change the self-assessment of driving skills
 - They are able to reflect about changes in driving behaviour due to the influence of alcohol, drugs and medicinal products, state of mind and fatigue
 - They are able to assess whether their ability of safe and responsible driving is affected by the use of alcohol, drugs and medicinal products
5. Drivers are able to effectively plan their route at the start of their journey. They always choose an appropriate, safe and convenient route.
- They are able to remove any unnecessary items from the vehicle to reduce weight
 - They are able to decide the need to use their vehicle and estimates environmental impacts of driving
 - They inform themselves (via internet, TV, radio etc.) before taking off and during journey by listening local traffic updates for early warning of incidents, road closures or any other information which could influence the planned journey
 - They are able to calculate enough time for traveling to avoid pressure of time, stress, precipitance or hazards. They are able to avoid speeding through forward-thinking planning

- They are able to calculate time required for the journey in ideal conditions but also are able to anticipate needed breaks for refuelling gas or taking refreshments as well as additional time for adverse travel conditions
- They are able to choose roads with suitable road conditions which are not adversely impacted by traffic or weather conditions

C.2.2 Car handling/manoeuvre: Guide and control car

Maingoal: Drivers have profound knowledge and technical driving skills of maneuvering the vehicle. They reliably and exactly know which operation and observing instruments they have to use to guide and to control their vehicle correctly. Controlling and manoeuvring the vehicle has to be graduated as an automatism: Practical handlings are routined and reflected. They pay attention to environmental aspects as well as to the safety of other road users and themselves. They are able to critically monitor and estimate their own driving performance and driving skills. They are willing to increase driving skills if needed.

Skills and behaviour:

1. Drivers are able to **get in** and **leave** the car safely and appropriately.
 - They are able to check for oncoming cyclists, pedestrians and other road user before opening their door and entering/leaving the vehicle and are able to remind their passengers to do so, too.
 - They are able to secure their vehicle against thefts by locking doors, trunk compartment, locking the steering wheel and keeping baggage out of sight
 - They are able to consider the rules in the Highway Code that apply when leaving their vehicle on different roads and in different lighting and weather conditions
 - They are able to set the position of the steering wheel and brakes and to select a gear to increase vehicles security
2. Drivers are able to **start** and **stop** the vehicle safely and appropriately
 - They are able to capably and successfully master basic driving skills (starting, accelerating, steering, breaking, stopping)
 - They are able to handle a correct starting procedure by starting the engine
 - o starting the engine correctly by knowing the correct starting procedure,
 - o make progress smoothly and progressively,
 - o stopping the vehicle safely,
 - o steering and coordinating the use of controls attentively
 - They are aware of the importance of using a safe and systematic routine to move off safely and smoothly in any situation; they are able to coordinate the use of controls, know why to observe and appropriate signal and only moves off when it is save and hazard margins to other road users are moderate
 - In the event of a stall drivers are able to recover quickly and effectively
 - They are able to apply to a safe, systematic approach when stopping and are able to estimate their stopping distance at different speeds and respects speed limits
 - They are able to coordinate the use of gears with braking, acceleration and to assist safe parking
 - Drivers are always able to stop within the distance they can see clearly
 - If moving on a road, which is so narrow that oncoming vehicles can be endangered, they slow down to be able to stop at minimum of half of the over sighted distance.

- They are able to start and stop safely in any inclined – uphill or downhill – position in all weather conditions and in forward and reverse gear
 - If using a trailer/caravan they are able to anticipate that the way they need to handle a vehicle will change and they are able to deal with those changes
3. Drivers are able to show and use the different and graduated **functions, locations** and are able to operate consciously, safely and correctly to all the **onboard hand and foot controls** and switches (brakes, steering, gear lever/selector, indicators, wipers, lights, demisters, accelerator, horn, clutch safely, technical assistance systems).
- They are able to show where all the switches, lights and windscreen wipers are and to handle their various settings as well as to switch these on and off if appropriate or needed
 - They are able to read, understand, check and respond correctly to on-board and measurement instrumentation to ensure to monitor operations and performances of their vehicle safely and appropriately
 - They are able to posit their feet to operate the foot controls correctly
 - They are able to locate the gear selector and are able to select gears and block change; in an automatic vehicle they are able to select park, drive, reverse and neutral
 - They are able to select the correct direction indicator in the safest way
4. Drivers are able to position the vehicle correctly to carry out manoeuvres safely. They are able to interact appropriately with any driving, stability or braking aids, e. g. lane control, intelligent speed adaptation, automatic braking systems, ESP, traction control
- Drivers are able to reflect on their own overall ability to drive safely and responsibly. They are able to identify and implement appropriate strategies to master any problem or deficiencies which they identify
 - They are able to **manoeuvre** their vehicle safe, responsible and in an eco-friendly driving style by coordinated use of gear, accelerator, brakes and steering.
 - They are able to change gear smoothly and in good time and are able to reflect the benefit of timely gear selection when ascending and descending gradients, particularly when loaded
 - They are able to select the most suitable gear for the speed of the vehicle and can coordinate it with using the clutch and accelerator smoothly as well as brakes correctly to achieve and maintain a suitable speed in any given road and traffic condition/situation
 - They are able to coordinate the use of gears – forward and reverse gears – , with braking and acceleration in a convenient and eco-friendly procedure
 - They are able to position the vehicle correctly to carry out manoeuvres safely
 - They are able to reflect the effects of sudden use of the accelerator, brakes or steering whilst manoeuvring
 - They are able to choose the safest method of steering a steady course and to show where and how to hold the steering wheel without drifting while operating other controls in all road and traffic conditions
 - They are able to reflect the effect that the vehicle's turning circle has on steering the vehicle accurately and safely

- They are able to use the accelerator smoothly and progressively to achieve and maintain a suitable speed
 - They are able to brake efficiently with a good deceleration sense using appropriate braking techniques to minimise fuel consumption
 - If using a trailer/caravan they are able to reverse and steer the vehicle with the trailer/caravan attached
5. Drivers are able to reflect the importance and different usage situations of interior and exterior **mirrors** for a safe and responsible driving and always are aware of blind spot aspects.
- They are able to adjust and correctly set as well as to always use the different mirrors of the vehicle appropriately for a safety check at any specific situation
 - They are able to anticipate where the blind spots are and are able to check them proactively

C.2.3 Traffic observation

Maingoal: Drivers are able to scan their surrounding area, any circumstances and other road users of possible hazards to ensure their own life and vehicle are safe. A responsible traffic observation enables them to act and react proactively in anticipating and responding to other road users' behaviours and driving skills.

Skills and behaviour:

1. Drivers are able to alleviate hazardous situations by being aware of them as soon as possible. They can plan sooner to act by scanning their '360-degree visible surrounding'.
 - They are able to use a safe and systematic routine e. g. mirror-signal-manoeuve, including blind-spot checks, at all times when carrying out any manoeuvre in traffic
 - They are able to decide which information and observation aspects are important and what are not or less important to identify precursors or clues to hazards and prioritise hazards correctly
 - They are able to respond to hazards by using effective scanning techniques in all driving conditions and at all times of the day and night
 - They are able to maintain attention when faced with distractions
 - They are able to judge distances by assessing speed and distance of traffic
2. Drivers always are aware of (vulnerable) road users and drive defensively
 - They are able to identify other road users (pedestrians especially children and elderly people, buses, trams, animals/pets, bicyclists etc.) to take their perspective into account and to anticipate their behaviour
 - They are able to reflect the importance of scanning the road ahead for reasons to change their position, such as roadworks and taking timely action to reposition themselves
 - They are able to anticipate that their own driving will affect traffic behind them. So they are always aware what is going on behind and which mirrors to use for their intended actions

- They are able to reflect that use of reversing aids does not replace the need to manoeuvre well and do a all-round and effective observation
- They are able to anticipate the dangers and risks of night driving and makes adjustments to their driving behaviour accordingly
- If using a trailer/caravan they are able to anticipate that a trailer/caravan may increase the number of blind spots so they may need to use aids to better observe, such as extra mirrors

C.2.4 Vehicle positioning and speed adaption

- a) Speed adaption
- b) Safety margins
- c) Hazard avoidance
- d) Eco-driving

Maingol: Drivers are able to drive safely, responsibly and eco-friendly. They apply to and master adequately demanded skills-based maneuvering as well as rule-based and strategic-based requirements in any specific traffic situation no matter which road conditions are given. Drivers always are aware of hazards and act accordingly in responsively manoeuvring their car by changing speed or direction. They master driving with the help of routine sufficiently in advance and have enough reaction time for needed or planned manoeuvres.

Skills and behaviour:

1. Drivers are able to make a safe, responsible and eco-friendly maneuvering of their vehicle which requires a safe and systematic routine of any possible movement.
 - They are able to plan their driving to ensure that they are in the appropriate gear, travelling at the appropriate speed and are in the best position on the road to be able to respond to hazards and when they emerge in any road, traffic, lighting or weather conditions and at any time of the day or night
 - They are able to comply with traffic rules and regulations
 - They are able to estimate the own vehicle dimensions
 - They are able to negotiate all types of junctions, roundabouts, pedestrian crossings, train or tram crossings safely
 - They are able to join and leave motorways, dual carriage ways or other high-speed, multi-lane roads safely if it is legal to do so
- They are able to apply to a safe systematic routine when negotiating all types of **junctions**. At junctions they are able to adapt to the rules as they go left, right and ahead, emerge into traffic flow as well as cross the path of oncoming traffic safely and responsibly
 - o They are able to acknowledge that an junction approaches and they are able to apply to the right of way rule
 - o They are able to apply to not to switch lanes when in the middle of a junction
 - o They are able to apply to learned aspects of priorities at all junctions and how to position their vehicle correctly on the approach
 - o They are able to apply to decide when and how to signal their intention of manoeuvring to other road users in signal turnings

- They are able to react and are aware of other road users who may not be positioned or signalling correctly and are prepared to make allowances for them
 - They are able to perceive, to assess and to decide how to turn left or right safely from a major road to a minor road
 - They are able to perceive, to assess and to decide how to emerge left or right safely from a minor road to a major road
 - They are able to perceive, to assess and to decide how to approach and emerge safely at crossroads, staggered crossroads and roundabouts when going, ahead, left and right and he uses the safest method when both vehicles are turning
 - They are able to perceive, to look for and to read road markings and lane destination markings and adhere to them
 - If using a trailer/caravan they are able to anticipate that it may be necessary to take up a different position on the road when dealing with junctions or roundabouts
2. Drivers are able to join and to leave a **motorway**, a **dual carriageway**, a highway or a Autobahn safely
- They are able to join or to leave a dual carriageway or a motorway safely from the left or the right and can change lanes safely
 - They are able to anticipate and respond safely to other road users joining a motorway or dual carriageway
3. Drivers are able to reflect and to perceive about the **importance of speed**.
- They are able to drive defensively and internalized the interrelationship between speed, distance and stopping distance
 - They are able to reflect that a vehicle's overall stopping distance consists of two parts: a first thinking distance when they decide to stop and a second braking distance during which they start to brake and finally stop the vehicle
 - They are able to estimate the stopping distance at different speeds and accepts speed limits
 - They are able to get stopped their vehicle in the distance they can see to be clear and in doing so they are able to judge a safe separation distance
 - They are able to avoid getting into skids or losing control of the vehicle, but is able to respond appropriately if their vehicle does skid
 - They are able to permanently control their speed adapting to traffic, road and weather conditions as well as visibility
 - They are able to position their vehicle to avoid hazards on the road and always creates and maintains a safe driving space
 - They are able to identify and respond to changes in road surfaces and all road, traffic and weather conditions to ensure a secure stop
 - They are able to keep a safe distance from the vehicle ahead which is corresponding to their speed and dry, wet or slippery weather conditions
 - They are able to create and maintain a safe driving space
 - They are able to normally accelerate, to gently brake and to always drive defensively
 - When necessary they are able to smoothly and on time perform speed adjustments as brake and shift operations

- They are able to perceive how and when to switch operations and engage gears to adjust speed in specific traffic situations. They are able to carry out the process with smooth steering movements
 - They are able to carry out operations smoothly without any haste to avoid negative environmental impacts and for other road user unforeseen situations
 - They are able to perceive the relationship between speed and emissions and choose environmentally friendly speeds
 - They are able to realistically self-assess their own speed behaviour and know about thrill of speed
 - To avoid any hazard they are able to always judge speed and distance correctly and effectively
 - If using a trailer/caravan they are able to anticipate that driving a trailer/caravan needs more time and earlier braking when slowing down or stopping
4. Drivers are able to perceive that they always have to maintain **safety margins** (forward and to the side) to other road users, to obstacles and possibly to animals that are located on or adjacent to the roadway or to the kerbside.
- They are able to maintain an increased safety distance (use of a 3 second buffer distance) before coming to a foreseeable stop (e. g. at a junction or at a red traffic light) without using the gas and without changing to a lower gear and make early use of the vehicle's momentum and allow the vehicle to coast (disengaged, without gear, with gear)
 - They are able to always identify a suitable place for manoeuvring in positioning their vehicle correctly and safely
 - If using a trailer/caravan they are able to anticipate that driving a trailer/caravan needs more distance and time to overtake safely
 - They are able to decide to use a permitted lane for their movement
 - o On the road they are able to drive stably within their lane (lane discipline) by taking into account the national rules of driving (driving on the left or right) and maintaining a safe position within their lane
 - o They are able to choose the correct position for the route they are going to take
 - o They are able to choose the correct lane in good time for the direction they intend to go
 - They are able to perceive that a change of lanes and an overtaking have to be done safely, quickly and smoothly in taking a position centered at a target lane. They are able to anticipate and respond safely to other road users
 - They are able to perceive how a performance and handling of their vehicle will affect their ability to overtake safely and responsibly. If they pass, they allow the overtaking vehicles to reeve into their lane
 - They are able to always keep safety margins and are able to perceive where they may and may not overtake. When overtaking of single-track vehicles (e. g. cyclists) they are able to choose an even larger safety distance
 - Their vehicle positioning and speed adaption go along with a 'look around' and the awareness of 'blind spots'
 - They are able to negotiate safely in bends. They are able to stay in their lane and reflect that a started overtaking has to be completed ahead of the curve in good time.

They are able to select a safe position, speed and appropriate gear to enter and exit curves.

- They are able to and know to assess bends correctly on approach in selecting a safe position and speed to enter and exit a bend.
- They are able to perceive to position the vehicle that there is a sufficient distance from the right edge of the road and oncoming traffic.
- They are able to always keep a safety margin to the vehicle ahead and to maintain a safe speed and position throughout the bend
- They are able to always be aware of occurring unforeseen circumstances as uneven or slippery surfaces, adverse camber, other road users etc.
- In situations when there is oncoming traffic and insufficient space for passing they are able to anticipate not to speed up but to patiently stop in front of the constriction until the oncoming traffic is driven through

5. Drivers are able to reflect facts of **hazard avoidance**

- They are able to always plan ahead and are aware of their surroundings and perceive how to prioritise hazards
- They are able to adjust their driving behaviour to take into account changes to the road surface, traffic, weather conditions, lighting or other factors
- They are able to always look out for more vulnerable road users at any time in all traffic situation
- They are able to position themselves in the optimum defensive position on the road
- They know how to identify a suitable place for own manoeuvring and how to allow for vulnerable road users when carrying out a manoeuvre
- They are able to perceive all relevant elements of a (traffic) situation
- They are able to interpret all observed elements
- They are able to predict possible dynamic developments of situations

6. Drivers are able to perceive, assess, decide and act to follow the principles of **eco-friendly** and **responsible driving**

- They are able to reflect the environmental and economic implications of their travelling by car
- They are able to drive in a style that contributes to road safety while also reducing fuel consumption and emissions
 - in increasing their hazard perception
 - through driving with high care and anticipation
 - through planning skills to maximise their vehicles momentum and to be able to avoid unnecessary braking and accelerating
 - when accelerating they avoid unnecessarily high engine speeds
 - through engine braking and engine torque as well as through avoiding unnecessary weight
 - in perceiving to use the highest gear possible and in turning engine off, when appropriate
 - in maintaining an appropriate speed
- They are able to make early use of the vehicle's momentum and allow the vehicle to coast without accelerating and without changing to a lower gear in case of delays/speed variations in the flow of traffic (e. g. traffic ahead slowing down or traffic restrictions),

- They are able to generally keep their vehicle in the highest practical gear to reduce fuel consumption and the production of pollutants
- They are able to make early use of the vehicle's momentum and allow the vehicle to coast (disengaged, without gear, with gear)
- They are able to use vehicle's momentum in stop-start situations

C.2.5 Communication

Main goal: Drivers always signals their aims of maneuvering in advance to other relevant road users to prevent misunderstandings or conflicts. With the same purpose, drivers read signals of other road users.

Skills and behaviour:

1. Drivers are able to pay attention and to effectively communicate with other road users. They are able to give correct and well timed signals by using the appropriate means (e. g. using indicators, arm signals, the horn if necessary, lights if necessary)
 - They are able to anticipate actions of other road users by using all available information
 - They are able to give signals clearly, appropriately in time and correctly according to the Highway Code so other road users can anticipate any of their intentions of driving and manoeuvring in good time
 - o If needed they always are able to be ready and to show by clear eye contact or other appropriate signals that they have perceived other road users
 - o They are able to monitor and manage own reaction to other road users in giving unmistakeable signals to show their intention as well as being able to show awareness and anticipation for other road users
 - o Not only in difficult and ambiguous traffic situations they are able to communicate with other road users
 - They are able to consider and interpret any signals of other road users as optical or acoustic warning signals (e. g. brake light of a vehicle travelling in front, headlight flasher, hazard warning light at the end of a traffic jam, horn), their driving behaviour and other environmental stimuli in an appropriate manner.
 - o They are able to behave in accordance with other road users
 - o They are able to allow for others' mistakes
 - o They are able to give other road users time to perform manoeuvres. E. g. they are able to examine whether and how quickly other road users and vehicles approaching, passing, turning, wanting to step onto the road etc.
 - o They are able to interpret hand signals and body language of other – especially vulnerable – road users as cyclists, children or elderly people and eye contacts them when required
2. Drivers are able and aware of observing the area in front, in the back and beside of them. They are able to use their mirrors appropriately if necessary and well before manoeuvrings as signalling, changing speed or directions, hazards, ...

D. EXAMPLE OF INTERPLAY OF ALL COMPONENTS – CHANGING LANES

All competences with their specific principles and aspects were put in chapters C.1 *Knowledge: Rules, theory and understanding (conditional knowledge base)* and C.2 *Skills: Driving aspects (driving competences)* in an artificial order to make clear there is a concrete standard which can be defined in simple words. Of course real traffic situations are much more complex but culminate in one point: controlling and handling a vehicle has to be on an automatism level combined with a willingful safe and responsible behaviour. By reaching this level drivers have enough time and attention to interact and communicate with other road users – a main aspect for a safe and responsible behaviour. So a driver has to bring all aspects in an appropriate order and manner together. Only if he or she is able to manoeuvre his or her vehicle safely he or she can master traffic situations responsibly, is able to interact and communicate with other road users. The combination of knowledge, skills, self-reflection, risk awareness and the understanding of ‘perceiving, deciding and acting’ makes a driver to a responsible one. Responsibility is related to safety, ecological driving and a willingness to assess one's own actions and the impacts of those actions to others.

Based on the example of ‘changing lanes’ you easily can see how all aspects of knowledge and understanding as well as basic skills and will of a responsible driver are related to each other.

Before describing the example of ‘changing lanes’ please image yourself in following driving situation:

It is Monday morning. You left your home much later than you usually do and of course too late for a convenient ride. You took your partners car, because yours is for maintenance at the garage. You brought your son to daycare and he did not want to stay there. You are still tired, you have not slept enough, you are in a bad mood and on to every dodge because your meeting starts at 9.00 o'clock. You normally need a 60 minute ride at work and still have 40 minutes left... Your radio plays annoying songs, you forgot your CDs at home.

In front of you a long line of trucks is driving with maybe swifiting vehicles behind it. You cannot correctly identify whether any truck will start to overtake the line or not. Then a speeder with 200 km/h comes from behind (you are on a high speed road). You cannot really estimate if he recognizes you in time or maybe even ascends with intention. You drive the vehicle of your girlfriend; you know it actually must be sent for repair. Do you really care if brakes still work well? Do you know how the car accelerates? The road is dry and you are in a hurry because of your next appointment. So flasher out and accelerate....

Before describing the example of ‘changing lanes’ some preliminary considerations should be made:

Selected competences are defined by cross-situational qualities, some competences not. Selected aspects that cross over situations and that demand universal applicability are referred to as principles or minimum standards here. Thus aspects such as ‘*Road traffic as a system: rules and regulations*’, or ‘*Risk awareness and hazard perception*’ are important competences that can be understood as a prerequisite for the entire ride and thus also the individual situation (lane change). They are important basic knowledge aspects for all driving situations and all conditions. They are not necessarily in direct relation to a specific road or driving situation.

Describing the example of 'changing lanes' you have to keep in mind that an ideal situation gets described. It going to show how all driving competences and individual competencies are connected with each other.

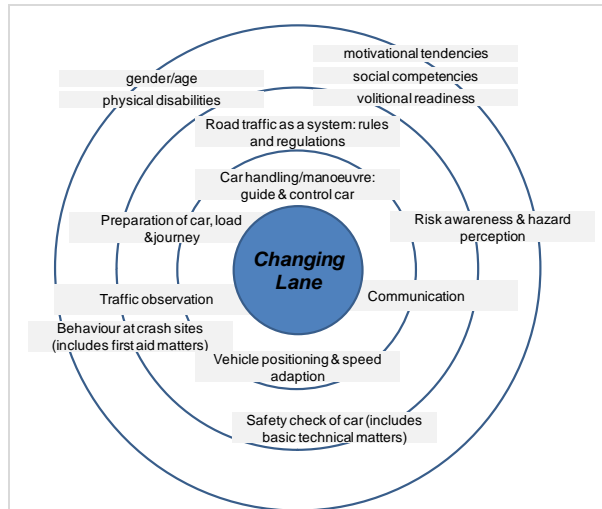


Figure 6: Complex manoeuvre 'changing lanes' and driving competences in points of contact

Making a lane change is frequently necessary, is very complex (see Figure 6) and can be quite dangerous...because you never drive alone.

Only if a driver knows about **rules and regulations** regarding to traffic he is permitted to drive a vehicle himself. So he has to ensure he is able to appropriate master traffic situations and interact with other road users. Before starting his journey he reflects the need of his ride. He self-reflects his environmental impact through driving and ensures himself that he and his passengers are fit to drive.

He is able to make all recommended **basic vehicle safety checks** in ensuring that windows and mirrors are clean, all lights and reflectors are working and carried out prior to his journey. In doing so he ensures that his vehicle is safe and technical and legal roadworthy. In case of technical problems or technical failure he knows where and is able to activate help and assistance to get his car fixed. His knowledge about principles of first aid matters and **behaviour at or near a crash site** make himself to a safe driver as well as a careful and self-critical first aider. The driver knows about the legal limits on alcohol and consequence of taking medical treatment or other drugs. He and his passengers buckle up and the driver chooses an appropriate route without hurry before taking off.

Car handling: If speed adjustments are necessary braking and shifting operations are executed on time and smoothly. The driver performs the lane changing through skilled manoeuvring and steering movements. He chooses basically the gear which allows him an adequate and eco-friendly acceleration.

Traffic observation: First the driver checks whether a lane changing is allowed and appropriate. He makes sure it is safe to change lanes and there are no pedestrians, vehicles, bicycles or other obstacles in his planned path of travel. So before changing lanes the driver observes and monitors the specific traffic situation by using his mirrors multiple times to see his adjacent and rear surroundings and always is aware of two typical blind spots. He also observes distances. He anticipates that

- when changing lanes into a target lane, which can be switched to by both sides, it is particularly important to be aware of road users, who also could move off and switch into the target lane (in the targeted 'gap') at the same time,
- he has to give response triggered by the recognition of any surprising and/or dangerous driving maneuvers of other road users,
- he has to notice and react of road signs, markings or devices

Communication: The driver turns on his signal in time according to the intended direction of travel. He wants other vehicles around him to be aware that he plans on changing lanes. He re-checks his surroundings by using his side and rearview mirrors. He determines the gap he will move into and ensures nothing is in the way or disrupt the flow of traffic. He always is aware that other vehicles should not have to slow down, speed up, or change lanes because he entered their lane. So he communicates with other and does not simply flick his turn signal so that it flashes once or twice, but leaves his turn signal on throughout the entire lane change process. He performs the lane changing smoothly and quickly through, and he takes a position centered at a target lane. The entire maneuver time he takes into consideration signals (optical or acoustic warning signs, driving behaviour) of other road users in an appropriate manner. After he is in his new lane, he turns off his turn signal. He readjusts his speed to keep with the flow of traffic in his new lane and checks his mirrors to reacquaint himself with the new conditions behind and beside him.

Vehicle positioning/speed adaption: The driver sufficiently holds distance from other road users, the built environment and obstacles. The driver executes the lane change fluently and speedy and takes a position in the middle of the objective lane. He knows that a shortening of safety distance may be allowed, for example, in dense or slow-moving traffic, a visibility through the vehicle ahead as well as an unlock for the purpose of overtaking. On the other side an increase in safety margin is necessary, for example, in poor visibility, weather or road conditions. So he adaptes his driving style to concrete and situative aspects in compliance to speed limits. He also ensures not to hinder other road users by excessively slow driving.

Risk awareness/hazard perception: The driver is able to perceive how and when to use technical assistance systems to support his manoeuvring. The driver knows about three basic hazard perception skills in connection with changing lanes.

- Keep a safe distance from other vehicles, road users and your surroundings. This allows him to have more time to detect and respond to hazards.
- Select safe gaps when changing lanes. He knows that this will enable him to change lanes or overtake without being involved in a crash.
- Identify hazards ahead, behind and to the side. He knows that this scanning is one important skill that helps him to avoid crashes.

His risk awareness allows him to drive safely and responsibly in all situations and in all road or weather conditions. He learned about specific performance standards and is willing to use them. He knows that for this manoeuvre 'changing lanes' there are many appropriate reasons:

- plan to turn at an upcoming intersection that requires to be in another lane,
- approaching hazards or obstacles in his lane,
- a vehicle in front is driving slower than the speed limit and he wants to pass safely,
- end of lane or
- etc.

But the driver not only has to know about risk factors and reasonable grounds for changing lanes. In a concrete situation he also has to decide whether his motivation to change lanes (e. g. slowing down) will be worth the risk (e. g. collision by speeding following vehicles on the left lane of the highway) and whether he is willingly and reflected able to minimize the risk through

- adequate traffic monitoring with adequate assessment of physical and temporal distances,
- adequate communication with other road users (timely, compliant flashing) and see those intentions (e. g. stop changing lane when suddenly speeder coming from behind),
- safe acceleration and steering (thereby rely on the ideally tested safety of the vehicle before driving).

Conclusion

It has become clear very quickly that each individual competence itself does not lead to a safe and responsible driving style. Exclusively through interaction of the individual hard competences and driving skills, the driver's personality and his soft competencies and his motivation and will every single competence leads to a safe and responsible ride or lane change.

E. LIFELONG LEARNING

Lifelong learning (see Figure 7) includes all forms of formal, non-formal and informal learning during a person's entire life.

Learning in this way is understood as a constructive process of improving knowledge, skills, qualifications, competences and competencies through self-awareness, self-monitoring and self-management as well as using individual and special techniques of learning. It is based on different learning conditions, environments, needs and occasions. So aspects of a self-controlled learning include not only a self-organised learning but also the use of externally-organised learning courses.

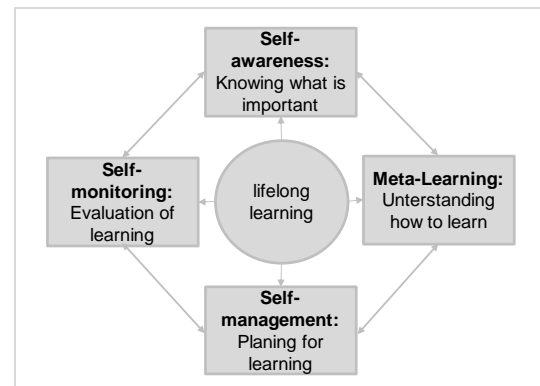


Figure 7: Aspects of lifelong-learning

Source: virtualinstitute.fti.unige.ch, adapted

Especially those courses have to be open and easy accessible for everyone e. g. through suitable and transparent offers of coaching and mentoring for learning.

Aspects of lifelong-learning in connection with the claims of the five levels of GDE-Matrix and an individual maintaining and developing of driving competences plays a very important roll for a safe and responsible driving over lifetime (see Figure 8).

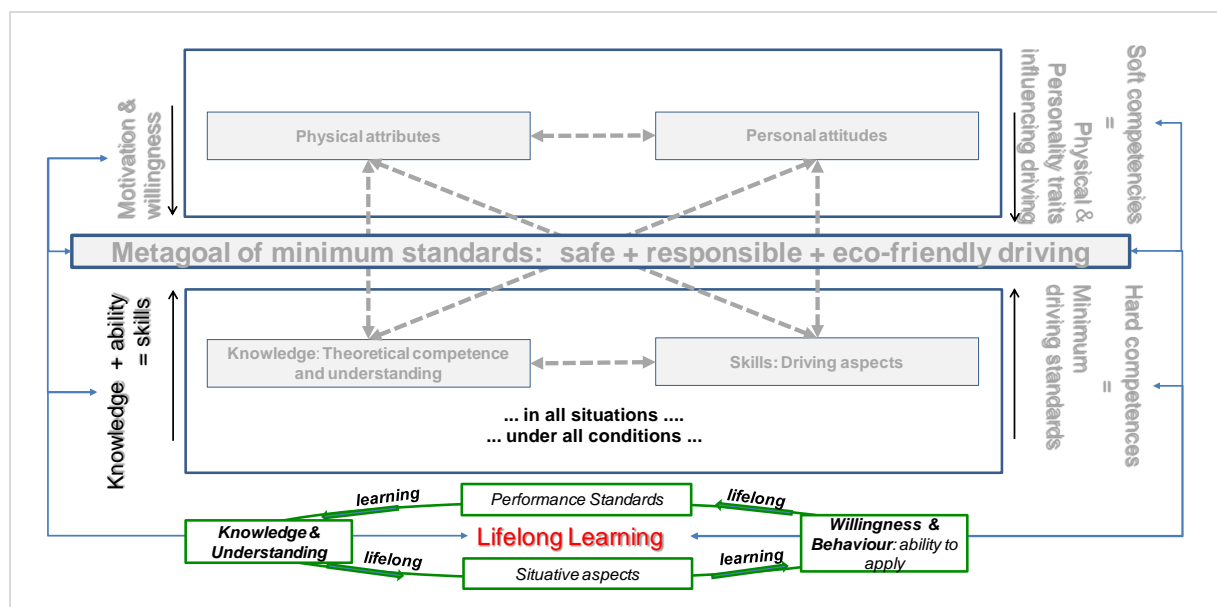


Figure 8: Lifelong learning and improving of competencies and driving competences

So driving schools and driving instructors should not only offer driving training and education for novice drivers. Even more they should have additional emphasis on offers:

- containing renewed educational contents and methods for a modular and lifelong learning process (e. g. refresher training to maintain a high level of performance)

- encourage individual lifelong learning to enable every driver to motivationally acquire new skills and knowledge which are of benefit both to the drivers themselves and to the safety aspects of traffic

Aspects of lifelong-learning are an ambitious standard for which drivers have to be sensitized from the beginning of driving. Minimum driver competences have also be understood as a goal to have the choice of keeping up to date with knowledge and understanding concerning driving as well as motivation of learning. An independent opening up of currently needed knowledge through targeted work on and use of relevant knowledge is increasingly important for every driver. From the angle of minimum driving competences an effective and urgent needed lifelong learning means to strengthen the will of every driver to keep connected with every single matter of a safe and responsible driving. This includes core standards and competences as well as dynamic knowledge-based information of technical assistance systems or common first aid matters or self-reflection of individual physical and mental fitness.

Idealistically lifelong learning in connection with minimum driving standards means that every single driver always

- keeps his or her knowledge and understanding up to date,
- is able to respond quickly to changing needs, latest traffic related trends,
- is motivated and willing to behave properly, safely and responsible in all situations and to all conditions no matter which performance standards or situative aspects of driving is needed,
- is able to self-reflect his or her knowledge, abilities and driving skills and
- is always equipped to tackle new situations with his or her knowledge and understanding

F. IMPLICATIONS FOR LEARNING AND TESTING

F.1 Recognition of the GDE-Matrix

The ‘Goals for Driver Education-Matrix’ (GDE-Matrix) and its five hierarchical levels of individual behaviour (see Figure 9 below) contains all aspects of what a competent driver should be able to and to self-reflect. These levels do not only include driving tasks and driving behaviour – which our standard is about. Levels are also concerned with more lasting individual characteristics of a driver such as personality or social and cultural competencies. Those characteristics can have an influence on the practical drivers’ driving behaviour and at least have to be taken into account by defining a catalogue of driving standards.

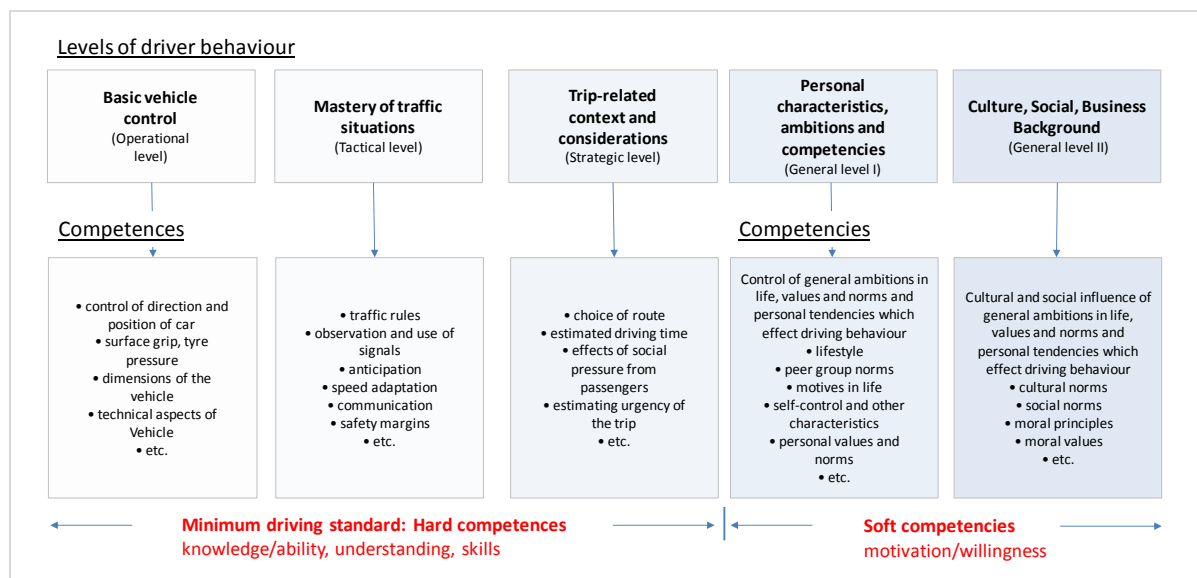


Figure 9: Adapted GDE-Matrix

F.2 Learning and testing: client-centered approach to transfer knowledge and skills of driving and to sensibelize

Regarding to Grattenthaler et al. (2009) driving competence can be described as procedural knowledge. This driving competence can be divided into three forms of knowledge: explicit knowledge, implicit knowledge and process knowledge.

Explicit knowledge describes expertise ('declarative knowledge') as a long-term knowledge. It includes semantic or abstract knowledge to concepts, objects, facts, facts or rules or situation dependent knowledge (bends).

Implicite ('tacit knowledge') describes procedural components of long-term knowledge. Knowledge is acquired in the form of motor schemas and further refined by feedback loops of action effect, environmental perception (mainly visual, but also social) and proprioception. Tacit knowledge cannot be solely acquired through instruction and teaching. It requires a more or less intense exercise, a distribution of knowledge and skills in connection with an individual input toward understanding and raising awareness of own individual competencies but also individual deficiencies (client-centered approach) under changing conditions of action.

The 'process knowledge' eventually integrated explicit and implicit knowledge information: In order to cope successfully with different traffic situations, driving related knowledge (expertise) has to be adapted to these different situations. It has to be associated with psychomotor skills and requires an appropriate resource management and self-evaluation (see Sturzbecher et al. 2012).

Anticipating these facts it is not useful to only define minimum driving competences as driving competences but also add an individual perspective of a 'skilled social and responsible acting' driver, too. We think a learning process is not only never completed (see chapter E), but also has from the beginning on always to include an individual sensibilisation process of individual and specific shortcomings, deficiencies related to driving and competencies of a driver.

We recommend a teaching standard in a client-centered, modular and spirally-constructive learning process to raise sustainable awareness and building up individual responsibility (see Figure 10).

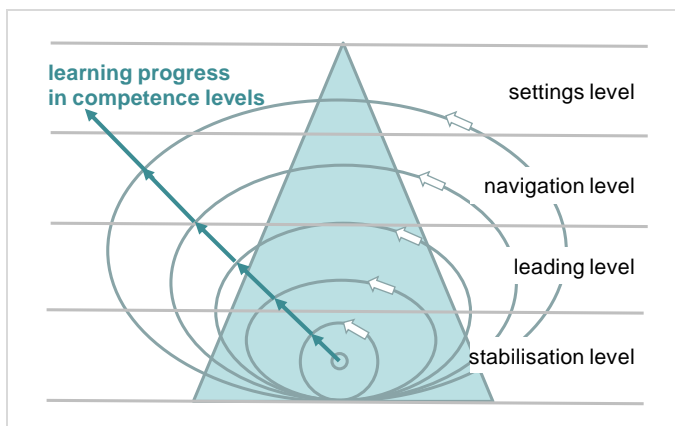


Figure 10: Spiral course of learning process

Source: Grattenthaler et al. 2009, 89