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TRAINING MATERIAL FOR ASSESSING THE RISK IN LAND TRANSPORT



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INTRODUCTION

This module aims at assessing employee safety and health in a typical workplace in land transportation sector. The module covers the following topics:

- General overview of land transportation sector, pointing out the typology of workplaces and work equipment used in this sector, types of hazards present in a typical workplace of land transportation sector and the issue of occupational risk assessment;
- More detailed analysis of risk factors present in a typical workplace of land transportation sector is given with safety measures to prevent this risk;
- Risk management in land transportation sector introduces preventive measures and accident prevention along with examples of good practice and analysis of occupational illnesses and accident cases. Benefits of risk management are pointed out;
- Safety tips, requirements for personal protective equipment and recommended safety and health protection labels and signs are presented.

The module is arranged in such a manner that it might be used by a lecturer in class and for self-studies by any person interested in the topic. Knowledge obtained during lectures will make the participants aware of the types of hazards that an employee in a typical workplace in a land transportation company may encounter, enable to perform risk assessment in a specific job and help understand the principles of risk management.

M5-EN.1. GENERAL DESCRIPTION OF LAND TRANSPORTATION SECTOR

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M5.1.1.jpg

Short description of the section:

This section presents the typology of land transportation workplaces and work equipment, points out hazards inherent to a typical workplace in this sector (vehicle driver's job) **##G19##** and illustrates the benefits of risk assessment **##G26##**.

The goals of this section are:

- Present the typology of workplaces and work equipment in land transportation sector;
- Identify a typical workplace in this sector from the safety approach;
- Identify types of hazards characteristic of a typical workplace in this sector;
- Generalize effects of these hazards on human being;
- Present the benefits of occupational risk assessment.

The material of this section will help the employee, the employer or the company owner to get a general view of hazards characteristic of this typical workplace, understand the complexity of the effect these hazards produce on human beings and the benefit of occupational risk assessment.

M5-EN.1.1. Typology of land transportation workplaces

Before identifying the hazards typical of the companies of land transportation sector we have to look at workplaces and work equipment characteristic to the companies of this sector.

Employees in land transportation sector may be divided into **two main categories**:

1. The **drivers** - employees who spend most of their time not in the company but in mobile workstations. These may be local and long-distance heavy vehicle drivers, truck drivers, bus drivers etc.

2. Employees working inside the company – **administration officers, maintenance personnel and mechanics.**

Table1. Typology of workplaces in land transportation sector, depending on the type of employee activity

Type of activity	Workplace
Administration officers	Administration premises, vehicle cabin
Drivers	Heavy vehicle cabin; Truck cabin; Bus cabin and the like.
Vehicle service technicians	Vehicle maintenance and service shops
Service personnel	Administration premises, vehicle maintenance and service shops

M5-EN.1.2. Typology of work equipment

Depending on the job type the following work equipment used by employees in this sector may be distinguished (see Table 2).

Table2. Typology of work equipment in land transportation sector depending on the type of a workplace

Workplace	Work equipment
Administration premises	Computer, office equipment, electrical appliances
Vehicle cabin	Vehicle
Heavy vehicle cabin	Heavy vehicle
Truck cabin	Truck
Bus cabin	Bus
Other	Other
Vehicle maintenance and service shop:	Portable power tools, forklifts, welding equipment, painting and drying chambers

In companies of land transportation sector most of work places are different type vehicles; therefore workplace safety is mainly influenced by the state of the vehicle. To meet the stringent employee safety and health requirements companies started purchasing new and safe vehicles or modifying the available vehicles provided their technical specifications enable such modernization.

Nevertheless, land transportation sector exhibits one of the highest rates of occupational incidents and professional illnesses.

M5-EN.1.3. Hazards

M5-EN.1.3.1. Notion of hazard

Hazard ##G19## is the source of potential injury or health impairment. The word “hazard” is most commonly used along with the words describing the type of potential injury or health impairment: electrical hazard, crushing hazards, cutting hazards, intoxication hazard, fall hazard, burn hazard, explosion hazard etc.

Often **hazard** is confounded with **risk ##G22##**, although these two things can neither be confounded nor be used alternatively. The difference between **hazard and risk** is explained in the following way:

Hazard is the intrinsic characteristic of a material or a system (e.g. petrol is hazardous because it can inflame), whereas **risk is an external feature** (e.g. an upturned petrol truck poses high risk).

Sometimes it may seem that it is easier to protect from hazards than to manage risk situations. Sources of hazard are most often eliminated by **technical** decisions. In risk management in addition to technical decisions there are (especially) **organizational** and **human (personal)** decisions. Employee’s activities shall be arranged in such a manner that conditions of taking dangerous actions and offering inadequate variants of problem solution are eliminated.

M5-EN.1.3.2. Classification of hazards

A driver works in a typical workplace in land transportation sector. Thus hazards faced by a driver in a typical workplace are presented here and analyzed in more detail.

These hazards are divided into the following groups:

1. Mechanical hazards;
2. Electricity related hazards;
3. Hazardous substances;
4. Biological hazards;
5. Fire and explosion hazards;
6. Thermal hazards;
7. Hazards related with multiform physical effect;
8. Hazards related with working environment;
9. Physical loads / difficulty or work;
10. Awareness and ability to adapt;
11. Other hazards/loads;
12. Mental loads;
13. Organization.

When typical hazards of operations in land transportation sector are determined, it is easier to identify and assess the risk in a specific workplace of a land transportation company. Thus every employer or a company owner may easily accomplish risk assessment of a specific workplace on the basis of the types of hazards presented above.

M5-EN.1.3.3. Effect of hazards on human beings

The effect of each above-listed type of hazard on human health in a typical workplace of a land transportation company shall be determined.

A general conclusion is that a driver holding a job in a land transportation company (working in a typical workplace) may experience body injuries of different seriousness including fatal. The scope of harm and injuries first of all depends on the type of hazard concerned. Exposure to different types of hazard may result in mechanical damage of all body parts, different degrees of burns, breathing disorders, blood vessel obstruction, uncontrolled movements, intoxication, loss of consciousness etc.

Some types of hazard more often lead to occupational illness. For instance, vibration and noise in transportation sector are hazards causing the most frequent occupational illnesses (Vibration White Finger and deafness) among employees in this sector.

M5-EN.1.4. Occupational risk assessment

M5-EN.1.4.1. Purpose and benefits

The goal of occupational risk assessment in land transportation sector is:

- To analyze the present and potential occupational risk at workplace; and
- Estimate preventive measures in order to protect employees from occupational risk or to mitigate the risk as much as possible to improve prevention of accidents and occupational illnesses.

Risk assessment reveals the real view of work safety and working conditions. The findings of risk assessment help to improve working conditions which consequently advance the effectiveness of the company's operations and protection of employee health and safety. Risk assessment assists in monitoring the situation and avoiding accidents and incidents at work in land transportation sector;

Good and healthy working conditions guarantee better working capacity and performance of employees.

It should be noted that failure to implement safety measures sooner or later would result in accidents and injured employees in the event of hazards or **hazardous situations ##G17##**. However the employers or company owners must be aware that low rate of accidents at work, light type or absence of accidents should not lead to the assumption that the company is a low-risk company and the should not stop assessing the risk.

Absolute safety is an unattainable goal, therefore the purpose is to achieve the **highest possible level of safety**.

Without assessing risk to employee health and safety it is impossible to control it.

M5-EN.1.4.2. Employer's interest

Head of any company in land transportation sector should be concerned about evaluating occupational risk in a specific workplace (in this case – the driver's) for the following reasons:

- Lower costs related with accidents and occupational illnesses; a bigger part of profit can be allocated to enhance the company's competitiveness.
- Better working conditions encourage higher performance and ensure quality of work.
- Good risk management and fewer crises lead to better dialogue with employees and their representatives.
- No fatal or serious accidents guarantee good image of the company.
- Good risk assessment management saves time that otherwise is wasted in evaluating risk according to "ad hoc" principle.

M5-EN.1.5. Self-study assignment

Evaluate your comprehension of the material analysed in this section by performing a self-assessment test **##D1##**. Check your answers against the key **##D2##**.

M5-EN.2. MECHANICAL RISK FACTORS

M5-EN.2.1. Mechanical risk factors in land transportation sector

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M5-EN.2.7.2. Safety measures

M5-EN.2.8. Self-study assignment

Short description of the section:

In this section examples of typical **mechanical risk factors** **##G13##** that a driver employed in a land transportation company (working in a typical workplace of this sector) is subject to are presented and analyzed.

The **goal** of this section is:

- Identify the most characteristic types of risk factors that vehicle drivers are subject to;
- Present examples and descriptions of these risk factors;
- Identify negative impact of risk factors on human health; and

- Give recommendations for work safety measures.

The material presented in this section will assist the employee, the employer and the company owner to adjusting recommendations for identifying risk factors, ways of prevention and safety measures in his workplace and his company.

M5-EN.2.1. Mechanical risk factors in land transportation sector

Drivers working in land transportation companies (in a typical workplace) encounter a number of mechanical risk factors. (M5.2.1.jpg) These risk factors may be divided into the following groups:

- Unguarded moving parts of machinery;
- Parts with hazardous surface;
- Moving vehicles and work equipment;
- Objects moving without control;
- Falls on flat surfaces, slips and trips, instable step;
- Falls

Accidents caused by mechanical risk factors usually occur when inexperienced, unauthorized and incompetent drivers do mechanical repair work by infringing work safety requirements; when vehicles are not properly prepared for work; when vehicle technical inspection terms are not complied with; when load distribution plan is ignored while loading the cargo; when unsafe steps or ladders are used or access to them is encumbered; when safe distance is not maintained; when the driver suddenly changes the driving direction or applies the brakes abruptly; when personal protective equipment is not used; when driving or access roads are narrow, obstructed and unsafe for walking; when walkways are polluted with oil or lubricants, slippery, unstable, sloping etc.; when jumping on or off elevated surfaces is not prevented.

M5-EN.2.2. Unguarded moving parts of machinery

M5-EN.2.2.1. Risk factors

Unguarded moving parts of machinery present one type of mechanical risk factors that a driver of a land transportation company may be subject to.

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**:

- Are moving parts of mechanisms in the vehicle or in close proximity of the vehicle (e.g., winches, including drives, mechanisms of V-belt and fan including drives, electric window winder) guarded to prevent the risk of entanglement?
- Are safety guard (e.g. covers) installed at wheels, hub covers, boot cap (spur geared pinion, belt mechanisms, spindles), main propeller shaft and axels, and are they in proper condition?

- Are warning signs that mark hazardous areas clear and visible?

A properly operating company usually ensures that safety guards and lock-out systems are in place. However the **risk of hazard still exists**:

- With the increase of movement distance,
- In the event of failure (e.g., malfunctioning of lock-out or breaking device),
- When safety guards are removed, overridden, damaged etc.

Most often safety guards are not used or not operated because they are insufficient, damaged, inconvenient or simply removed for time saving reasons.

M5-EN.2.2.2. Impact on human health

Body traumas of vehicle drivers caused by unguarded moving parts of machinery may be very different, from not severe injuries and cuts to fatal injuries. The scope of injuries first of all depends on the energy of action. The following factors may also have influence:

- The surface of moving parts (corners, edges, sharp bulges, blades, roughness);
- Unsafe distance;
- Direction or zone of action of the moving part;
- Injured part of the body and its resistance to external impact.

All parts of the body may be injured, most often hands, feet, legs, head, chest, arms (listed according to the incidence of traumas).

M5-EN.2.2.3. Safety measures

There are always two possibilities of protection from hazardous spots:

- Limit the hazard down to not hazardous parameters;
- Eliminate the influence of a hazardous spot by applying preventive measures, especially safety guards.

Therefore, the following safety measures can be recommended for unguarded moving parts of machinery:

- Use safe equipment in new installations;
- Maintain safe distances (LST EN 294 standard);
- Avoid narrow spaces (Standard LST EN 349, Parts 1-3 of Standard LST EN 547 and Standard LST EN 811);
- Select safety guard properly (subject to the hazardous spot activity zone, possibility to get into this zone and frequency of work in that zone):
 - **Dismantled safety guard**: hazardous crushing, cutting and entanglement spots in the area are safeguarded in such a manner that people could not reach them, e.g., covered with lids, meshes, caps etc.

- **Obstructing safety guard:** a physical obstacle blocking full reach of the hazardous zone, e.g., finger protection panel at the spindle, bows etc.
- **Not dismantled (immovable) safety guard:** the guard alone or together with dismantled safety guard eliminates or mitigates the hazard (most often operation function is also applied), e.g. locked equipment, forced position switches, safety equipment that become activated when approached.
- Inspection by a competent person (at least once per year);
- Labelling of hazardous spots.

M5-EN.2.3. Parts with hazardous surface (M5.2.3.1.jpg)

M5-EN.2.3.1. Risk factors, impact on human health

Hazardous surfaces are:

- Corners and edges,
- Pointed bulges, blades,
- Rough surfaces

encountered in fixed equipment, supports or moving parts such as vehicles, instruments, spare parts etc.

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**:

- Is contact with sharp-edged, pointed or abrasive elements in the vehicle or close to the vehicle (e.g. protruding door handles or tyre treads) prevented?

Impact on human health. The form and dimensions of hazardous surface influence the scope of injury. Hazardous surfaces may:

- jab, prick or cut
- scratch or tear
- stick or seize

Incidents are related to the intensiveness of body movements; injured part of the body and its specific ability to resist; failure to estimate the hazardous surface due to bad visibility; insufficient lighting; not sharp enough contrast; unexpected appearance of hazardous surfaces; inconvenient for movement space; inadequate movement trajectory (possibility of contact with hazardous surfaces); too little space for standing etc.

M5-EN.2.3.2. Safety measures

The most effective way of protection is to avoid hazardous surfaces.

If that is impossible to achieve, the following is recommended:

- To mitigate hazardous impact to not dangerous limits (e.g., round or take away corners, polish the roughness, cover blades and edges with soft material etc.) making the surfaces that have to be contacted as big and/or as soft as possible.
- Organize the work and arrange spaces in such a manner that the possibility for a person moving in all directions of contacting the hazardous surface would be minimized. Use of safeguards serves this purpose.
- Ensure good visibility of hazardous surfaces (lighting).
- Use instruments with hazardous surfaces with great care (e.g., keep them in safe places and boxes).
- Don't carry sharp and pointed instruments and things in pockets; do not keep them inside the vehicle.
- Provide employees with **personal protective equipment** and control that the equipment is used:
 - Head protection (safety helmet),
 - Feet protection (safety footwear with puncture resistant soles),
 - Body protection (gloves, cut and puncture resistant clothing).

M5-EN.2.4. Moving vehicles and work equipment (M5.2.4.1.jpg)

M5-EN.2.4.1. Risk factors, impact on human health

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**:

- Is casual or unauthorized use of moving vehicles or working equipment prevented?
- Do moving vehicles and working equipment comply with the task (without obvious limitations, e.g. loading of extra size loads when appropriate and sufficient loading safety is required)?
- Are periodic inspections by a competent person ensured?
- Are adequate and sufficient safety measures used while working with moving vehicles and work equipment (e.g. is overloading etc. prevented)?
- Are moving vehicles and work equipment regularly inspected by a competent person?
- Is the vehicle in safe condition for use?
- Is reverse driving avoided as much as possible?
- Is a signaller appointed to guide during reverse driving?
- Are vehicles parked only when the driver has a clear view of the driving zone?
- Is there awareness of specific hazards of coupling trailers and are measures taken to avoid them?

- Are closed heel and toe shoes worn while driving?
- Is protective footwear worn while loading and unloading?
- Is cargo distribution plan prepared for all vehicles?
- Are passenger vehicles not overcrowded?
- Are vehicles prepared for winter in a timely manner?

After the inspection decisions are made if additional actions or measures are required, safety goals are defined, hazard elimination measures are selected and the need for additional consultations of specialists is identified.

The impact of accidents caused by moving vehicles **on human health** may be very painful and result in injuries of different seriousness or even death.

M5-EN.2.4.2. Safety measures

The following work safety measures are recommended for protection from the risk caused by moving vehicles and working equipment:

- Use **safe vehicles** and **auxiliary working equipment** (vehicle superstructures; load securing devices; tanks; local movement restriction (loading restriction, emergency braking etc.) equipment; warning and signalling equipment; equipment to protect space behind the vehicle; alarm systems restricting the leaning angle of the vehicle, loading momentum or driving speed etc.);
- Prevent unauthorized use of vehicles and equipment;
- Periodically inspect the safety of vehicle use;
- Comply with vehicle maintenance terms;
- Have vehicles and working equipment inspected by a competent person;
- Prepare a cargo distribution plan;
- Specify the allowable number of passengers in the vehicle;
- Prepare the vehicle for winter use in time;
- Steps and ladders must be safe and within easy reach.

M5-EN.2.5. Objects moving without control (M5.2.5.1.jpg)

M5-EN.2.5.1. Risk factors, impact on human health

Objects moving out of control are those that may:

- fall or sway
- roll or slide
- fall
- loosen, scatter or spread around

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**:

- Are things in the vehicle loaded in such a manner that they would not fall or tumble (e.g., cargo, suitcases, bags, and bottles)?
- Is rolling down avoided?
- Is air and power supply to the trailer in proper order (applicable to cargo vehicles)?
- Are loading sites (platforms), vehicle's body (trunk, covers, and tent) and loading equipment in proper order (applicable to cargo vehicles)?
- Do side boards and loading door open on the same and safe side (for stepping off or loading) (applicable to cargo vehicles)?

Impact on human health. Depending on the size, weight and form of the object moving out of control and the body part hit by the object people may suffer from different injuries, including fatal.

M5-EN.2.5.2. Safety measures to prevent exposure to falling or swaying objects

The following work safety measures are recommended **to protect from objects that may fall or sway**:

- Avoid forces generated by acceleration, i.e. sudden change of direction, sudden braking or start-up, towing sideways if the cargo may sway;
- Avoid load force acting in one direction, i.e. sinking into soil, holes, cavities, driving uphill etc.;
- Arrange, load and unload cargo in a safe manner (comply with load distribution plan, allowable height of stacks etc.);
- Distribute the load evenly;
- Keep things carried in the cabin or passenger vehicle (packages, bottles, cans etc.) in a safe and specially arranged place;
- Ensure safe distance from moving objects is maintained (Standard LST EN 294:1997);
- Use head and feet **protective equipment**.
- When these measures are not effective, stability can be ensured by **additional fall protection measures** (e.g., side fastening equipment, stretch equipment, blocking equipment; vertical fastening equipment, support anchors; floor fixed platforms increasing the support surface etc.).

M5-EN.2.5.3. Safety measures to prevent exposure to rolling, sliding, falling, loosened, scattered or spread around objects

The following work safety measures are recommended to protect from **rolling and sliding objects** (that due to small weight or weak adhesion with the base or potential

impact of external forces are characterized as objects of insufficient state or position stability):

- Additional roll protection measures:
 - Cones and barriers;
 - Props, supports, poles, frames, side walls;
 - Tension cables and belts; safely strapped stacks, pyramid type of loading, in-between trays, stoppers are used;
- When these measures are not effective, objects that may roll or slide should be levelled or intercepted. This can be done using:
 - Levelling supports, deflecting grooves;
 - Interception nets, canvas, baskets, fences;
 - Lids, covers, enclosures.
- **Safe distance** to vehicles shall be maintained (Standard LST EN 294:1997);

The following work safety measures are recommended **to prevent the exposure to falling objects**

- Things in the cabin or passenger vehicles must be safely fastened using detaining bands etc.
- The form and dimensions of shelves shall prevent objects from falling.
- Supporting parts of warehouse equipment shall be installed in a safe manner and allowable loads shall be indicated.
- Avoid standing under suspended loads, mark and fence dangerous zones.

The following work safety measures are recommended **to prevent the exposure to loosened, scattered or spread around objects:**

- Avoid external dynamic forces (e.g., impact, pressing);
- Control fasteners and holders etc.;
- Limit pressure in hydraulic or air driven equipment in the event of danger that broken hoses may produce knocks, sprinkle or spray liquids;
- Use retention equipment (e.g., protective walls);
- In all the aforementioned cases when objects move out of control the following safety measures shall be used:
 - Head and feet **protective equipment**.
- Regular control whether the loading platform and the vehicle are in proper condition.

M5-EN.2.6. Falls on flat surfaces, slips and trips, unstable step (M5.2.6.1.jpg)

M5-EN.2.6.1. Risk factors

Hazards of fall:

- slipping
- tripping
- stumbling
- unstable step on a slippery surface

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**:

- Are roads and walkways safe for walking, not narrow and unobstructed?

Risk of slipping is caused by:

- Oily surfaces;
- Wet supporting surfaces;
- Polished supporting surfaces;
- Icy or frosted surfaces;
- Unstable supporting surfaces (leaves, powdery material), unfixed surfaces (carpets, slabs);
- Supporting surfaces lined with materials of different slipping resistance;
- Sloping supporting surfaces (ramps etc.).

Risk of tripping, stumbling and unstable step is caused by:

- Uneven surface (steps, slopes, holes, dents);
- Chipped or protruding edges of the lining;
- Hold-ups where the toe or the whole shoe is entrapped (e.g., extended wire);
- Scattered things;
- Supporting surfaces of inadequate form, size and stability.

M5-EN.2.6.2. Safety measures

The following safety measures are recommended to **protect from falling on flat surfaces, slipping, tripping, stumbling, and unstable step**:

- Build roads and walkways so that safe traffic (walking) is ensured.
- Keep roads and walkways clean in all weather conditions to avoid slipping.

- Avoid supporting surfaces made of materials with different slipping resistance.
- Ensure that steps are of even height (prepare the surface respectively).
- Ensure that supporting surfaces are easily cleaned; prevent oil getting onto supporting surfaces by erecting adequate barriers.
- Apply additional chemical or mechanical treatment to give extra roughness to supporting surfaces.
- When flat surfaces become slippery, immediately apply measures to reduce the skidding (e.g., sawdust, ice melting mixes, sand);
- Install handrails, handles or other supports on flat surfaces inconvenient for walking;
- Wear adequate footwear.
- Protect places posing the hazard of falling into (e.g., by using dismantled fencing).

M5-EN.2.7. Falls (M5.2.7.1.jpg)

M5-EN.2.7.1. Risk factors, impact on human health, safety measures

Fall hazard arises while working on high or elevated surfaces.

In the assessment of the manifestation of this risk factor the following shall be **inspected and identified**

- Is safe reaching of the workplace (driver's cabin, loading surface) by steps, stairs or ladders ensured?
- Is unauthorized jumping on and off prevented?
- Is safety while cleaning the windshield ensured?
- Is safe walking and loading site exiting, safe position while putting on or taking off the tent or covering the cargo in other manner ensured?

Effect of falls on human health depends on the fall height and the surface hit when falling. For instance, even falls from low height may cause severe or fatal injuries if the surface hit while falling is hard or sharp edged.

M5-EN.2.7.2. Safety measures

The following safety measures are recommended for **fall protection**:

- Acquire proper vehicles and auxiliary equipment and control their condition;
- Instruct employees about correct boarding and landing as well as safe driving;
- Perform work, if possible, from the floor or other safe standing position;
- Use working equipment (ladders, pallets) correctly;
- Park the vehicle safely at the ramp during loading and unloading.

M5-EN.2.8. Self-study assignment

On the basis of information presented in this section draw a list of **mechanical risk factors** present in a typical driver's workplace in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 3. You may use the template **##D3##**.

Table 3

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.3. ELECTRICITY RELATED RISK FACTORS

M5-EN.3.1. The notion of electrical tools and electrical safety

M5-EN.3.2. Safety labelling

M5-EN.3.3. Hazardous currents (current dangerous to human health)

M5-EN.3.3.1. Risk factors, impact on human health

M5-EN.3.3.2. Safety measures

M5-EN.3.4. Electric arc

M5-EN.3.4.1. Risk factors, impact on human health

M5-EN.3.4.2. Safety measures

M5-EN.3.5. Self-study assignment

Short description of the section:

In this section examples of typical **electricity related risk factors** ##G29## that a driver of a land transportation company is subject to are presented and analyzed.

The goal of this section is:

- Present the notions of electric tools and electrical safety;
- Distinguish the most characteristic types of electricity related risk factors that vehicle drivers of a land transportation company are subject to;
- Present examples and describe manifestation of this risk;
- Distinguish negative effect of risk factors on human health; and
- Give recommendations for work safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for identifying electricity related risk factors, ways of prevention and safety measures for himself or his company.

M5.3.1.jpg

M5-EN.3.1. The notion of electric tools and electrical safety

Notion “**electrical tools**” is used as defined in the International Electrotechnical Glossary of internationally recognized International Electrotechnical Commission (IEC):

Every element used for electricity production, conversion, transmission, distribution or use, for instance:

- machines,
- transformers,
- apparatus,
- metering instruments,

- safeguarding gear,
- installation materials,
- instruments.

“**Electrical safety**” first of all means measures helping to avoid:

- Flow of electrical current through the human body (protection from hazardous power flow through human body) or
- Effect of electrical arc.

Besides, this notion encompasses electrotechnical effect posing **indirect hazard**, such as

- Fires or explosions; or
- Hazard resulting from insufficiently safe operation.

M5-EN.3.2. Safety labelling

Electric switches and electric currents fuses shall be clearly labelled with sign warning about potential hazards and giving instructions what actions to take. Here are some labelling examples:



M5-EN.3.3. Hazardous electrical currents (current dangerous to human health)

M5-EN.3.3.1. Risk factors, impact on human health

Electrical current may harm human health if it flows through the body (when the voltage of the current flowing through the body increases to a dangerous level). It may happen

- Getting into direct contact with parts having different potential voltage;
- Coming close to high voltage zone with primary electric arc in the air passage between the human being and the voltage.

Therefore, while assessing manifestation of this risk factor the following **must be inspected and identified**:

- Is sufficient safeguarding from direct contact installed (insulation, shielding of positive terminal, safe distance)?
- Is it ensured that the jumpstart cable is used as directed?
- Ar tvarkingi kasos aparato prijungimo elektros laidai? Ar nepažeista, neprasitrynus izoliacija
- Are electric appliances used on the trip (cable, portable drill, coffee maker, portable TV set and connecting cable) free of defects?

Hazardous current may have the following **effect on human being**:

- Traces in places of contact with electric current;
- Burns of different degree;
- Breathing arrest;
- Blood vessel damage;
- Ventricular fibrillation;
- Uncontrolled movements;
- Unconsciousness;
- Sudden death.

M5-EN.3.3.2. Safety measures

The following **work safety measures** are recommended to avoid the **effect of hazardous currents**:

- Ensure the use of safety guards from direct contact;
- Ensure the use of safety guards from indirect contact;
- Use safety locks;
- Use only faultless and inspected appliances;
- Comply with general rules of using electric appliances and equipment;
- Maintain safe distances;
- Inspect electric appliances before use;
- Regularly check and monitor the status of electric equipment;
- Arrange employee training and instructing;
- Introduce employees to electric equipment operation and maintenance instructions (pointing out jumpstart cable use instruction);
- Label hazardous spots with warning signs.

M5-EN.3.4. Electric arc

M5-EN.3.4.1. Risk factors, impact on human health

While assessing manifestation of this risk factor the following **must be inspected and identified**:

- Is the use of jumpstart cable as instructed ensured?
- Is safe distance from power and compressed air lines maintained in loading sites?

Effect of electric arc on human health. Thermal, dynamic and toxic effect of electric arc on human beings may cause the following injuries:

- Thermal effect: burns of different degrees.
- Dynamic effect: Injuries of moving parts when partitions and walls are broken by pressure in closed premises.
- Toxic effect: Intoxication with gas or CO.
- Lighting effect: Blinding.

Electrical arc may have indirect effect on human body in the event of:

- Fire caused by excess heat.
- Explosions caused by sparkles.

Therefore, the outcome of electrical arc may be different injuries, including fatal.

M5-EN.3.4.2. Electric arc - work safety measures

The following work safety measures are recommended to avoid negative effect of **electric arc**:

- Use safety guards from direct contact;
- Use safety guards from indirect contact;
- Use safety locks;
- Use appropriate appliances;
- Comply with general rules of using electric appliances and equipment;
- Maintain safe distances;
- Inspect electric appliances before use;
- Regularly check and monitor the status of electric equipment;
- Arrange employee training and instructing;
- Introduce employees to electric equipment operation and maintenance instructions (pointing out jumpstart cable use instruction, correct connection of the engine start-up accelerating device);
- Label hazardous spots with warning signs.

M5-EN.3.5. Self-study assignment

On the basis of information presented in this section draw a list of **electricity related risk factors** present in a typical driver's job in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 4. You may use the **template ##D4##**.

Table 4

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.4. HAZARDOUS SUBSTANCES

M5-EN.4.1. Classification of hazardous substances

M5-EN.4.2. Labelling of hazardous substances

M5-EN.4.3. Major factors having influence on employees' health

M5-EN.4.4. Gas, safety measures

M5-EN.4.5. Vapour, safety measures

M5-EN.4.6. Aerosols, liquids, safety measures

M5-EN.4.7. Personal protective equipment

 M5-EN.4.7.1.Types of personal protective equipment

 M5-EN.4.7.2. Protective clothing

M5-EN.4.8. Delivery of hazardous cargo

M5-EN.4.9. Labelling of vehicles carrying hazardous cargo

M5-EN.4.10.Self-study assignment

Short description of the section:

In this section examples of typical **hazardous substances** **##G16##** that a driver of a land transportation company is subject to are presented and analyzed.

The **goal** of this section is:

- Present classification of hazardous substances;
- Distinguish factors that may have effect on human health;
- Distinguish the most specific types of hazardous substances that a driver of a land transportation company is subject to;
- Present examples and descriptions of these risk factors;
- Give recommendations for work safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for determining hazardous substances, selecting ways of prevention and safety measures for himself and his company.

M5.4.1.jpg

M5-EN.4.1. Classification of hazardous substances

Hazardous chemical substances and preparations are classified on the basis of physical and chemical features and fall into one of the following categories:

- Explosive;




- Oxidizing ;
- Highly flammable;
- Flammable;
- Combustible.





Hazardous chemical substances may also be classified by harm to human health and to environment:

- Very toxic;
- Toxic;
- Harmful;
- Corrosive;
- Irritant;
- Sensitizing;
- Carcinogenic;
- Mutagenic;
- Toxic to reproduction;
- Harmful to environment;
- Harmful to ozone layer.

M5-EN.4.2. Labelling of hazardous substances

Containers of hazardous substances carry the following labels:

		Very toxic or toxic
		Corrosive (mordant)
		Harmful to environment

		Explosive
		Flammable or highly flammable
		Irritating or harmful
		Oxidizing

M5-EN.4.3. Major risk factors having influence on employee health

The following factors related with chemical substances can have an adverse effect on employee health

- **Harmfulness** of chemical substances identified by chemical characteristics;
- **Amount** of hazardous substances in ambient air which may be inhaled or get onto the skin or into the eyes;
- **Dustiness and volatility** of hazardous chemical substances.

Danger to human beings arises when:

- Hazardous substances are inhaled or get in contact with the skin;
- The skin or mucous is in direct contact with hazardous substance;
- During accidents (fire, explosion) when hazardous substances are released.

Hazardous chemical substances may have different adverse **effect on human beings**. Some of them cause cancer; others have negative effect on reproduction or cause foetus development defects. Other substances may affect brain activity, nervous system, eyesight, lungs, cause asthma and skin illnesses. Both short-time contact and long-time accumulation of hazardous substances in human body may be harmful to health.

M5-EN.4.4. Gas, safety measures

In the assessment of the manifestation of gas as a risk factor the following shall be **inspected and identified**:

- Is inhalation of toxic gas (e.g. CO) prevented?
- Are solids (e.g. diesel scum) suspended?
- Is negative impact of smoking inside the cabin eliminated?
- Are hazardous substances removed from the new vehicle's cabin interior materials?
- Are hazardous substances transported in a safe manner (e.g. reserve containers or gas cylinders)?
- Are rules of driving with the rear door closed (in box-van trucks) always observed?

Impact on human health. Poisoning with carbon black (CO), resulting from incomplete burning of fuel such as gasoline, kerosene, oil, propane, coal, or wood, first of all affect the central nervous system. Initial symptoms of CO poisoning may include headache, fatigue, dizziness, drowsiness, or nausea. During prolonged or high exposures, symptoms may worsen and include vomiting, confusion, and collapse in addition to loss of consciousness and muscle weakness, the face becomes pink and the person loses consciousness and suffocates.

The following **safety measures** are recommended to avoid negative effect of gas:

- Give instructions;
- Prevent penetration of toxic gas (e.g. sensor operated valve);
- Install active carbon filters, mechanical blocking and switches in circulating air input;
- Regulate smoking inside the cabin;
- Install proper transportation equipment or auxiliary means;
- Supply the driver with hauling documents;
- Drive with the loading door closed;
- Use **personal protective equipment**.

M5-EN.4.5. Vapour, safety measures

In the assessment of the manifestation of **vapour** as risk factor the following shall be **inspected and identified**:

- Is inhalation of poisonous fume prevented?
- Is formation of vapour from cooling liquids, fuel or washing liquids prevented?
- Are hazardous substances removed from the new vehicle's cabin interior materials?
- Are hazardous substances transported in a safe manner?
- Are rules of driving with the rear door closed (in box-van trucks) always observed?

Impact on human health. Small concentrations of petrol vapour irritate eyes and respiratory system, cause drowsiness and dizziness.

The following **safety measures** are recommended to avoid negative effect of vapour on human health:

- Identify hazardous substances;
- Suck the vapour in the place where it is generated;
- Prepare working instruction;
- Install active carbon filters, mechanical blocking and switches in circulating air input;
- Supply the driver with hauling documents;
- Install proper transportation equipment or auxiliary means;
- Drive with the rear loading door closed;
- Protect respiratory system and skin with **personal protective equipment**:

M5-EN.4.6. Aerosols, liquids, safety measures

In the assessment of the manifestation of **aerosols and liquids** as risk factors the following shall be **inspected and identified**:

- Is inhalation of poisonous aerosols prevented?
- Is exhaust gas emission prevented?
- Are acids and alkali kept in crushproof containers?
- Is safe charging of batteries ensured?
- Is skin contact with fuel, washing liquid or battery acid prevented
- Are hazardous substances transported in a safe manner?
- Are rules of driving with the rear door closed (in box-van trucks) always observed

Impact on human health. Acids and alkali may cause chemical burns. Contact with liquid fuel irritates skin and eyes.

The following **safety measures** are recommended to avoid negative effect of aerosols and liquids on human health:

- Prepare working instruction;
- Install solid substances' filters in the vehicle's ventilation/air conditioning system;
- Install proper transportation equipment or auxiliary means;
- Supply the driver with hauling documents;
- Keep the loading door closed;
- Use appropriate **personal protective equipment** and eye washers;

M5-EN.4.7. Personal protective equipment

M5-EN.4.7.1. Types of personal protective equipment

Personal protective equipment (PPE) is the last barrier between the hazardous substance and the employee. PPE is used in the following cases:

- When collective and organizational preventive and safety measures are not sufficient or technically inefficient.
- When appropriate collective and organizational preventive and safety measures cannot be implemented immediately, then PPE serve as a temporary solution.
- In single cases or in such cases when the installation of permanent safety measures is not feasible, provided that the use of PPE guarantee the same level of safety as permanent safety measure would provide.
- In emergency, rescue or saving situations.

Types of personal protective equipment:

- Equipment protecting respiratory system (filtering visor, half-mask, full face-piece, self-contained breathing apparatus) ;
- Eye protecting equipment (face-shield, goggles, safety glasses);
- Skin protecting equipment (gloves, chemical-resistant suits or coveralls)

M5-EN.4.7.2. Protective clothing

Hazardous substances pose spontaneous inflaming or explosion hazard, therefore protective clothing should be worn to prevent the risk of inflaming of explosive mixture present in the ambient air caused by sparkles generated by electric arc, static discharge or impact. In such cases special Electro Static Discharge (ESD) protection clothing is required. Such clothing prevents from generating ESD sparkles which may cause spontaneous inflaming or explosion.

However, it should be noted that ESD protection clothing will not give full protection if regular clothes, such as coats, vests etc. are worn on top. The type of clothes worn under ESD protection clothing is not very important, however the mandatory requirement is that ESD protection clothing shall have full contact with the skin in the neck and wrists area. Flame retardant clothing (resistant to short-term contact with flame) is required while working in the environment with potential exposure to hazardous substances.

However, it should be noted that not only the fabrics but also the models is important for this type of clothing. If the model of your apparel does not meet the requirements for this category of protective clothing, such clothes will not give full protection against potential hazards.



Anti-static clothing shall carry a CE sign and an icon with respective EN numbering: LST EN 1149-1
Flame retardant clothing shall carry a CE sign and an icon with respective EN

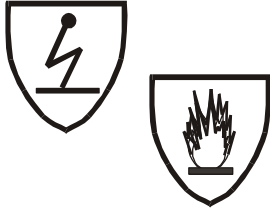


numbering:

LST EN 531 A or at least one of the three: B1, C1, D1, E1

LST EN 470-1

Anti-static and flame retardant clothing shall carry a CE sign and an icon with respective



EN numbering: LST EN 1149-1, LST EN 531 A and at least one of the three: B1, C1, D1, E1 LST EN 470-1

M5-EN.4.8. Delivery of hazardous cargo

Carriage of dangerous goods by road is regulated by the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) signed in Geneva in 1957. At present 40 countries are parties of this Agreement.

In general meaning dangerous goods are dangerous articles and substances that may cause harm to people, the environment or property.

The carrier shall ensure that the drivers delivering dangerous goods hold a certificate confirming that they have the required qualifications and skills to carry dangerous goods as per ADR requirements, shall be liable for the suitability of the vehicle and equipment necessary to carry dangerous goods, shall provide the driver with information on routes along which carrying of dangerous goods is forbidden or recommended. The driver shall check if the consignor of dangerous goods has submitted all documents, namely shipping documents, sender's declaration, written instruction (or instructions in case of international carriage). The carrier is also responsible for vehicle labelling, safety of equipment in the vehicle and for the construction and testing of packaging.

M5-EN.4.9. Labelling of vehicles carrying hazardous goods

Vehicles are marked with:

- orange-coloured plates
- orange-coloured plates with numbers
- big hazard warning diamonds
- other hazard warning signs

Orange-coloured plate and affixing of the plate:

- orange-coloured
- reflective
- dimensions at least 40x30 cm (may be reduced down to 30x12 cm)
- black-bordered, rim width up to 15 mm
- affixed on at the front and the other at the rear of a transport unit

Orange-coloured plate with numbers:

- orange-coloured



- reflective
- dimensions at least 40x30 cm
- black-bordered, rim width up to 15 mm
- black figures, 10 cm-high
- hazard identification number inscribed at the top of the plate
- prescribed UN number inscribed at the bottom of the plate
- After 15-minute engulfment in fire hazard identification number and UN number shall remain legible.
- affixed on both sides of the tank vehicles, battery vehicles or transport units having one or more tanks carrying dangerous goods; on both sides of each tank containing dangerous solid bulk substances; they may also be affixed one at the front and the other at the rear of a transport unit.

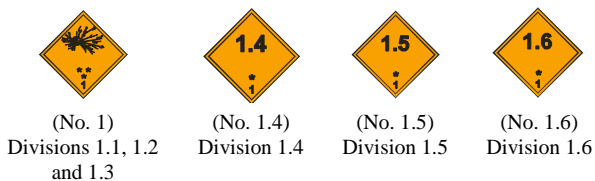
The hazard identification number consists of two or three figures. In general, the figures indicate the following hazards:

- 2 Emission of gas due to pressure or to chemical reaction
- 3 Flammability of liquids (vapours) and gases or self-heating liquid
- 4 Flammability of solids or self-heating solid
- 5 Oxidizing (fire-intensifying) effect
- 6 Toxicity or risk of infection
- 7 Radioactivity
- 8 Corrosivity
- 9 Risk of spontaneous violent reaction (including the potential risk following from the nature of a substance of a risk of explosion, disintegration and polymerization reaction following the release of considerable heat or flammable and/or toxic gases).

Doubling of a figure indicates an intensification of that particular hazard. Where the hazard associated with a substance can be adequately indicated by a single figure, this is followed by a zero. If a hazard identification number is prefixed by the letter "X", this indicates that the substance will react dangerously with water. For such substances, water may only be used by approval of experts.

Specimen labels:

CLASS 1 HAZARD Explosive substances or articles



CLASS 2 HAZARD Gas



(No. 2.1)
Flammable gases

(No. 2.2)
Non-flammable,
non-toxic gases

(No. 2.3)
Toxic gases

CLASS 3 HAZARD
Flammable liquids



(No. 3)

CLASS 4.1 HAZARD
**Flammable solids, self-reactive
substances and desensitized explosives**



(No. 4.1)

CLASS 4.2 HAZARD
**Substances liable to
spontaneous combustion**



(No. 4.2)

CLASS 4.3 HAZARD
**Substances which, in contact with
water, emit flammable gases**



(No. 4.3)

CLASS 5.1 HAZARD
Oxidizing substances



(No. 5.1)

CLASS 5.2 HAZARD
Organic peroxides



(No. 5.2)

CLASS 6.1 HAZARD
Toxic substances



(Nr. 6.1)

CLASS 6.1 HAZARD
Infectious substances



(Nr. 6.2)

CLASS 7 HAZARD
Radioactive material



(Nr. 7A)

Category I-White



(Nr. 7B)

Category II-Yellow



(Nr. 7C)

Category III-Yellow



(Nr. 7D)



(Nr. 7E)

Class 7 fissile material

CLASS 8 HAZARD
Corrosive substances



(Nr. 8)

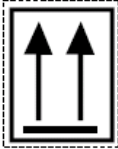
CLASS 9 HAZARD
Miscellaneous dangerous substances and articles



(Nr. 9)

Other hazard or warning signs:

Sign No. 11



Sign No. 11 shall be fixed on both opposite sides of the following packaging except for packaging of class 1 and class 7 substances:

- liquids in containers with lids invisible from outside;
- containers with ventilation vents or containers with ventilation vents without packaging;
- quenched liquefied gas.

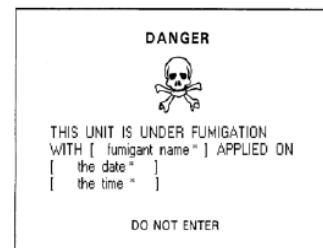
Substances carried under elevated temperature



Sign pursuant to IMDG code

Sea polluting substance

Fumigation warning sign



M5-EN.4.10. Self-study assignment

On the basis of information presented in this section draw a list of **hazardous substances** present in a typical driver's job in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 5. You may use the template **##D5##**.

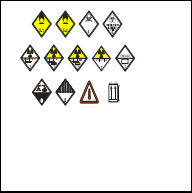


Table 5

Company:

_____ **Person in charge:**

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.5. BIOLOGICAL, FIRE, EXPLOSION AND THERMAL RISK FACTORS

M5-EN.5.1. Biological risk factors and safety measures

M5-EN.5.2. Fire and explosion hazards

M5-EN.5.2.1. Risk factors

M5-EN.5.2.2. Safety measures

M5-EN.5.3. Thermal risk factors

M5-EN.5.3.1. Contact with hot substances

M5-EN.5.3.2. Safety measures

M5-EN.5.3.3. Contact with cold materials, safety measures

M5-EN.5.4. Self-study assignment

M5.jpg

Short description of the section:

In this section examples of typical **biological ##G2##**, **fire ##G11##** and **explosion ##G27##** and **thermal ##G30##** risk factors that a driver of a land transportation company is subject to are presented and analyzed.

The **goal** of this section is:

- Distinguish the most specific types of biological, fire and explosion risk factors that a driver of a land transportation company is subject to;
- Present forms of manifestation of these risk factors and describe them;
- Give recommendations for safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for determining biological, fire and explosion risk factors, ways of prevention and safety measures for himself and his company.

M5-EN.5.1. Biological risk factors and safety measures

Biological risk factor encountered in a typical driver's workplace in land transportation sector is a hazard of infection caused by micro organisms and viruses.

Therefore in the assessment of the manifestation of **biological risk factor** the following shall be **inspected and identified**:

- Is accumulation of spores and fungi in air conditioning equipment prevented?
- Are air-conditioning equipment used as designated?

The following **safety measures** are recommended to avoid adverse effect of biological risk factors:

- Regular maintenance of filtration equipment (cleaning and replacing);
- Compliance with the owner's manual supplied by the vehicle's manufacturer;
- Washing with disinfectants when ripe smell is released from heat circulation system

M5-EN.5.2. Fire and explosion hazard (M5.5.2.1.jpg)

M5-EN.5.2.1. Risk factors

In the assessment of the manifestation of **fire and explosion risk factor** the following shall be **inspected and identified**:

- Is absence of the source of ignition guaranteed when the vehicle enters fire or explosion hazardous zones?
- Is there awareness that a very explosive oxygen and hydrogen mixture is released during battery charging?
- Are operation requirements for gas driven vehicles observed?
- Is oily mud removed from the vehicle's engine or crankcase?
- Are standby (reserve) containers safely fixed?
- Is the allowed number of standby (reserve) containers carried along?
- Are containers with flammable liquids and gas transported in a safe manner?
- Is the engine switched off and are other sources of flame removed while refuelling the vehicle?
- Is smoking prohibition while refuelling the vehicle observed (also while filling diesel fuel in winter)?
- Are cloths used for oil and fuel mopping discarded or kept away from the engine?
- Is fuel contaminated clothing changed immediately?
- Are electric appliances taken on the trip (e.g. cable spools, drills, coffee-makers, portable TV sets) not used in explosive environment?
- Is there electric shock hazard?

M5-EN.5.2.2. Safety measures

The following **safety measures** are recommended to avoid negative effect of **fire and explosion risk factor**:

- Coordinate operation in fire or explosion hazardous zones;
- Park the vehicle only above ground;
- Maintain adequate distances from inspection pits;
- Park only in garages with adequate ventilation (with draught);
- Supply with gas extinguishes and control their validity time;
- Keep the vehicle's engine and crankcase clean of oily dirt;

- Standby (reserve) containers are allowed; if possible, standby containers should be abandoned;
- Ensure loading safety;
- Ensure sufficient ventilation or use warning signs;
- Observe limitations of container amounts;
- Comply with vehicle refuelling safety rules;
- Keep cloths used for oil and fuel mopping away from the engine;
- Monitor or prohibit the use of electric appliances in explosive environment;
- In the event of electric shock hazard eliminate the difference between potentials.

M5-EN.5.3. Thermal risk factors

M5-EN.5.3.1. Contact with hot substances (M5.5.3.1.jpg)

In the assessment of the manifestation of contact with hot substances the following shall be **inspected and identified**:

- Is prevention of any contact with hot surface of metal parts (e.g. engine, exhaust system) or liquids (e.g. cooling liquids), during service or inspection ensured?

Effect on human health. Contact with hot solid, liquid or gaseous substances may cause burns or scalds. The degree of burns or scalds depends on the surface temperature of hot substances, duration of the contact, type of surface layer of the substance, part of the human body that is exposed to the hazard, area of affected body surface, suitability of used personal protective equipment.

The allowable levels of contact with hot substances are defined in the standard LST EN 563 + AC + A1 2000: Machinery safety, temperature of contacted surfaces, and ergonomic data for determining limit values of hot surfaces temperature.

M5-EN.5.3.2. Safety measures

The following **safety measures** are recommended to avoid or reduce the adverse effect of **contact with hot substances**:

- Reduce surface temperature (e.g. by cooling components of the drive), insulate;
- Fence and enclose hazardous zones;
- Lessen contact while working on the surface;
- Use adequate working tools and equipment (e.g. by choosing handles);
- Mark out hazardous zones by installing warning labels, optical and acoustic warning signals;
- Prepare instruction and regulations, train the staff;
- Use personal protective equipment (e.g. safety gloves);

- If possible, use special mechanical shops.

M5-EN.5.3.3. Contact with cold substances, safety measures (M5.5.3.3.1.jpg)

In the assessment of the manifestation of contact with cold substances the following shall be **inspected and identified**:

- Is prevention of any contact with cold surfaces (products, liquids etc.) ensured?

The **adverse effect** of contact with cold substances is frozen skin in contact area. The degree of chill depends on the surface temperature of cold substances, duration of the contact, type of surface layer of the substance, part of the human body that is exposed to the hazard, area of affected body surface, suitability of used personal protective equipment.

The following **safety measures** are recommended to avoid or reduce the adverse effect of **contact with cold substances**:

- Install heat insulating flooring, workplaces and drivers' seats;
- Fence and enclose hazardous zones;
- Put thermal layer on surfaces for sitting and standing, handles of equipment and tools;
- Use auxiliary measures for loading and transportation of cold products;
- Use appropriate personal protective equipment (Standards LST EN 340: 2004 - 06: Protective clothing. General requirements; LST EN 511: 1995 Cold protection gloves);
- Mark out hazardous zones;
- Install premises for warming up and changing:
 - Pursuant to workplace arrangement regulations temperature in premises must be at least 21 C;
 - Observe the recommended maximal duration of exposure and minimal warming up time.

M5-EN.5.4. Self-study assignment

On the basis of information presented in this section draw a list of biological, fire, explosion and thermal risk factors present in a typical driver's job in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 6. You may use the template **##D6##**.

Table 6

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.6. RISK FACTORS RELATED WITH MULTIFORM PHYSICAL EFFECT

M5-EN.6.1. Types of risk factors producing multiform physical effect

M5-EN.6.2. Noise

M5-EN.6.2.1. Risk factors

M5-EN.6.2.2. Impact on human health

M5-EN.6.2.3. Safety measures

M5-EN.6.3. Whole-body vibration

M5-EN.6.3.1. Risk factors

M5-EN.6.3.2. Safety measures

M5-EN.6.4. Self study assignment

Short description of the section:

In this section examples of typical risk factors producing multiform physical effect on a driver of a land transportation company are presented and analyzed.

The **goal** of this section is:

- Distinguish the types of risk factors producing multiform physical effect;
- Analyze in more detail the types of risk factors producing multiform physical effect on a driver of a land transportation company;
- Present forms of manifestation of these risk factors and describe them;
- Give recommendations for work safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for identifying risk factors that have a multiform physical effect, ways of prevention and safety measures for himself and his company.

M5-EN.6.1. Types of risk factors producing multiform physical (M5.6.1.jpg)

The following **types of risk factors producing multiform physical effect** are typical of the driver's workplace in a land transportation company:

- Noise ;
- Whole-body vibration;
- Hand vibration;
- Ultrasound;
- Non-ionizing radiation;
- Ionizing radiation;
- Electromagnetic fields;
- Work under low or high pressure;
- Hazard of drowning.

We will analyze the most typical risk factors producing multiform physical effect on a driver working in land transportation sector in more detail.

M5-EN.6.2. Noise (M5.6.2.1.jpg)

M5-EN.6.2.1. Risk factors

Noise is one of the most workplace risk factors in land transportation sector. Noise may be the reason of accidents, cause stress at work and, along with other workplace hazards, may have a negative effect on human health.

The degree of noise pathology first of all depends on noise intensiveness and duration.

The allowable limit values of acoustic noise in living and working environment are regulated by the hygiene norm HN 33-1:2003.

Noise levels in living and working environment are measured and the results are compared with respective allowable limit values.

In the assessment of **noise ##G31##** manifestation the following shall be **inspected and identified**:

- Is the driver exposed to noise having adverse effect on hearing (the measured level is above 87 dB(A)?
- What is the duration of work in average noise (80 dB(A)?
- Is work performed in noisy zones (measured level exceeds 85 dB(A)?
- Are noise abatement measures controlled?
- Are regular health checkups performed?

M5-EN.6.2.2. Impact on human health

High levels of noise have negative impact on human health and performance efficiency. If noise levels are not controlled or if the employee does not use hearing protection equipment his health may be adversely affected, first of all hearing and also other health problems not related with hearing.

Adverse effect on hearing:

- Hearing impairment results from exposure to noise of sufficient duration and may become chronic and irreversible health damage (may be acknowledged as occupational illness);
- Acute hearing impairment resulting from high impulses of sound (in short-time exposure to noise over 140 dB).

Effect not related with hearing:

- Increased accident risk resulting from failure to hear warning signals, startled reaction;
- Poor performance, especially in jobs requiring mental abilities such as concentration, attention, memory;

- Verbal communication hindrances;
- Stress (anger, short-temper);
 - Noise of 90-100dB impairs eye-sight, changes the breathing rhythm, pulse, increases blood pressure.

The allowable level of noise in Lithuania is regulated by Hygiene Norm HN 33-1: 2003 “Acoustic Noise”. Allowable levels in residential and working environment. General requirements for measuring methods approved by the o No.V-520 of September 3, 2003.

M5-EN.6.2.3. Safety measures

The following **work safety measures** are recommended to avoid or reduce the adverse effect of noise on human health:

- Choose noiseless working equipment (use quieter vehicles) and processes (emission of noise, noise data sheet);
- Reduce sound distribution in premises by using sound absorbing coating or lining;
- Use technical protective equipment at the key sources of noise, in noise spreading areas and workplaces, e.g. capsules, mufflers, partitions, noise-abatement booths;
- Prepare and implement noise abatement programs in the company;
- Use personal protective equipment and hearing conservation measures;
- Perform hearing check-ups (regular health checkups);
- Label noisy areas;
- Enforce the procedure of acoustic signals, warning signs and emergency notification; improve the alarming procedure.

M5-EN.6.3. Whole-body vibration (M5.6.3.1.jpg)

M5-EN.6.3.1. Risk factors

Whole-body vibration is usually experienced in vehicles and while working with mobile working equipment (excavators etc.). It is caused by rough roads and unbalanced engine operation.

In the assessment of manifestation of **whole-body vibration** **##G32##** the following shall be **inspected and identified**:

- Is potentially low dose of vibration considered in vehicle selection and design?

The adverse effect of **whole-body vibration** on **human health** is expressed by:

- Poor health, back-bone load;
- Intensive long-term vertical exposure may cause occupational illness;
- Potential adverse effect on digestion organs or pregnancy;

- Burdening of employee activities and negative influence on work requiring high concentration.

The allowable values of vibration in Lithuania are regulated by Hygiene Norm HN 51:2003 Whole-body vibration: allowable maximal values and measuring requirements in workplaces approved by the Decree No. V-585 of 15 June, 2005

M5-EN.6.3.2. Safety measures

The following **work safety measures** are recommended in workplaces in land transportation sector to reduce the adverse impact of whole-body vibration on human health:

- Reduce or remove road roughness;
- Use vehicles with allowable vibration value;
- Provide for vibration protected seats and cabins of the vehicle;
- Repair the vehicle's suspension, seat's shock absorbers and springs;
- Arrange the work in such a manner that the day's exposure to vibration would last less than recommended (e.g. rotate the drivers).

M5-EN.6.4. Self study assignment

On the basis of information presented in this section draw a list of risk factors **producing multiform physical effect** on a driver in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 7. You may use the template **##D7##**.

Table 7

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.7. RISK FACTORS RELATED WITH WORKING ENVIRONMENT

M5-EN.7.1. Microclimate

M5-EN.7.1.1. Notion

M5-EN.7.1.2. Risk factors

M5-EN.7.1.3. Safety measures during exposure to cold

M5-EN.7.1.4. Safety measures during exposure to heat

M5-EN.7.2. Lighting

M5-EN.7.2.1. Risk factors

M5-EN.7.2.2. Safety measures

M5-EN.7.3. Need of space, traffic routes

M5-EN.7.3.1. Risk factors

M5-EN.7.3.2. Safety measures

M5-EN.7.4. Self-study assignment

Short description of the section:

In this section examples of typical risk factors present in the working environment of a driver of a land transportation company are presented and analyzed.

The **goal** of this section is:

- Present the notion of **microclimate** **##G14##**;
- Distinguish the types of risk factors present in the working environment of a driver of a land transportation company;
- Present forms of manifestation of these risk factors and describe them;
- Distinguish the adverse effect of risk factors on human health; and
- Give recommendations for work safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for determining risk factors related with working environment, ways of prevention and safety measures for himself and his company.

M5-EN.7.1. Microclimate (M5.7.1.1.jpg)

M5-EN.7.1.1. Notion

Microclimate of working environment can be classified into the following areas:

- Cold area;
- Thermally neutral microclimate, comfortable, endurable area;
- Warm and hot area.

Microclimate in premises is defined and assessed on the basis of the following four **parameters of thermal effect**:

- Air temperature;
- Relative humidity;

- Air flow velocity;
- Thermal radiation.

However, every individual workplace should be analyzed according to work intensity/activity, clothing, acclimatization, health status etc.

These four microclimate parameters of different intensity each separately and in complex influence human beings. The following **levels of climate sensation** can be distinguished:

- Comfortable level;
- Endurable level;
- Unbearable level.

In the comfortable level all parameters are balanced; human beings do not face any climate related difficulties or hazards.

In the endurable level a human being must fill the gaps to reach the thermal balance (internal heat production, extended welding processes). These internal body adjustment actions are related with more intensive metabolism and increased consumption of energy; they can be bearable without any adverse outcome only to some extent. Therefore, every now and then breaks should be made for cooling or warming-up or for supplying with personal protective equipment.

M5-EN.7.1.2. Risk factors

In the assessment of **microclimate** manifestation in the workplace the following shall be **inspected and identified**:

- Is it possible to regulate the temperature of the driver's passengers' space within thermal comfort range?

When microclimate balances on the level of unbearable cold the adverse effect on human being manifests in the following ways:

- Hood health condition deteriorates;
- Mobility, sensibility and agility becomes limited due to slower blood circulation in the exposure to cold and the risk of incidents increases respectively;
- Body tissues are damaged (frostbites of different degrees);
- General freezing of the body, in extreme cases the body temperature falls dramatically to the state of unconsciousness.

When microclimate balances on the level of unbearable heat (cold):

- The productivity is lower;
- The number of mistakes goes up;
- Features of distress and fatigue are felt;
- Risk of incidents increase.

Exposure to high temperature influences heart and blood circulation system, breathing disorders and disturbed water and electrolytes balance. In extreme cases heat caused illnesses may manifest (heat twists and heat strokes).

Microclimate parameters in working environment are laid down in Hygiene Norm HN 69: 2003 “Thermal comfort and adequate thermal environment in working premises”. The limit values of parameters and measuring requirements are approved by the Decree No.V-770 of 24 December 2003.

M5-EN.7.1.3. Safety measures during the exposure to cold

The following **work safety measures** are recommended in **the exposure to cold**:

- Reduce cold loads; ambient air temperature cannot be lower than required by the technological process;
- Avoid draughts; the air flow velocity shall be maintained as low as possible;
- Install sources of heat (use air-conditioned vehicles);
- Limit frequent changes of workplace microclimate (heated driver cabins);
- Comply with the recommended duration of heat and cold exposure;
- Comply with recommended length of cold and heat exposure;
- Wear appropriate clothing;
- Arrange premises for changing and warming up (21 C, dry, without draughts);
- Provide for warming up breaks;
- Supply with cold resistant clothing and arrange drying facilities.

M5-EN.7.1.4. Safety measures during the exposure to heat

The following **work safety measures** are recommended in **the exposure to heat**:

- Provide for measures to protect from direct sunshine (blinds, light absorbing glazing);
- Install natural ventilation (fans, air showers) in the event of excessive air rotation or high air flow velocity;
- Install air-cooling systems (use air-conditioned vehicles);
- Reduce thermal radiation (covers, safeguarding shields, screen etc.);
- Reduce the amount of work involving groups of bigger muscles (arms, legs and carcass muscles);
- Provide for cooling breaks ;
- Supply personal protective equipment to employees.

M5-EN.7.2. Lighting (M5.7.2.1.jpg)

M5-EN.7.2.1. Risk factors

Adequate **lighting** **##G1##** in the workplace ensures good work results and enables to recognize and avoid risk in a timely manner.

The quality of lighting equipment in the workplace is defined by the **level of lighting**, i.e. by:

- Nominal intensity of lighting subject to type of activity and other features:
 - Evenness of place and time;
 - Distribution of light density and blinding limitations;
 - Light direction and shadows;
 - Light colour and colour reproduction;
 - Amount of day/natural light.

In the assessment of **lighting** the following must be **inspected and identified**:

- Is the vehicle equipped with required lights (fog lights, parking lights)?
- Is lighting equipment regularly maintained?
- Are dimensions of the vehicle clearly discerned in the darkness?
- Is the workplace in the vehicle and at the vehicle sufficiently illuminated (not too dark, no sources of dazzling)?
- Do all indicators function?
- Are all necessary indicators installed?
- Are indicators sufficiently bright, not blinking or dazzling?
- Are figures on the panel of appropriate size, contrast and brightness?

M5-EN.7.2.2. Safety measures

The following **work safety measures** are recommended to ensure proper **lighting**:

- Use high quality lighting system;
- Install additional high and low beam lights and fog lamps;
- Provide regular maintenance;
- Mark the vehicle's contour with contrast or reflective film;
- Ensure sufficient natural illumination and survey;
- Provide for effective protection from direct sunlight, blazing and heat radiation;
- Supply with additional "working lamps" (e.g. for reading of maps);
- Supply with appropriate navigation panels, replace inadequate panels.

Limit values of workplace lighting are regulated by hygiene norm HN 98:2000 “Natural and artificial workplace lighting”. Limit values of radiation and general measuring requirements approved by the Decree No.277 of 24 May, 2000:

M5-EN.7.3. Need of space and traffic routes (M5.7.3.1.jpg)

M5-EN.7.3.1. Risk factors

In the assessment of **need of space and traffic routes** the following must be **inspected and identified**:

- Do vehicles drive only on the roads and in the areas where safe driving conditions are ensured and which have the adequate load capacity?
- Are vehicles driven on slopes (downhill and uphill) only under safe conditions to avoid sliding and turning over?
- Are vehicles parked at pits, ditches and edges within safe distance?
- Are vehicles exposed to danger of moving, falling or turning over in places of dumping or unloading?

M5-EN.7.3.2. Safety measures

The following **work safety measures** are recommended to **satisfy the need of space and ensure traffic route safety**:

- Plan the route so that safe driving conditions are ensured;
- Maintain safe distance from pits, slopes and edges;
- Provide for and use appropriate size trailers for cargo trucks.

M5-EN.7.4. Self-study assignment

On the basis of information presented in this section draw a list of **risk factors related with working environment** in the typical driver’s workplace in your company **producing multiform physical effect** on a driver in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g., pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 8. You may use the template **##D8##**.

Table 8

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.8. PHYSICAL LOADS, WORK DIFFICULTY, AWARENESS AND ABILITY TO ADAPT

M5-EN.8.1. Hard dynamic work

M5-EN.8.1.1. Risk factors

M5-EN.8.1.2. Safety measures

M5-EN.8.2. Monotonous dynamic work, safety measures

M5-EN.8.3. Working position, work in one position, safety measures

M5-EN.8.4. Combined static and dynamic work, safety measures

M5-EN.8.5. Awareness and ability to adapt, safety measures

M5-EN.8.6. Self-study assignment

Short description of the section:

In this section examples of typical physical loads, awareness and ability to adapt in the driver's workplace in a land transportation company are presented and analyzed.

The **goal** of this section is:

- Distinguish types of typical physical loads that a driver of a land transportation company is subject to;
- Present examples of manifestation of physical loads, awareness and ability to adapt and describe them;
- Distinguish the adverse effect of risk factors on human health; and
- Give recommendations for work safety measures.

Material of this section will assist the employee, the employer and the company owner in adjusting recommendations for determining physical loads, awareness and ability to adapt, methods of risk prevention and safety measures for himself and his company.

M5-EN.8.1. Hard dynamic work (M5.8.1.1.jpg)

M5-EN.8.1.1. Risk factors

Hard dynamic work ##G10## may be described as any load handling, lifting or lowering, pushing, pulling, carrying or moving with the use of human force :

In load handling the hazard arises due to prolonged and/or frequent use of physical force.

In the assessment of **hard dynamic work** the following shall be **examined and identified**:

- Is loading and unloading of heavy objects, including passenger luggage, the driver's job task?
- Are heavy objects lifted and carried?
- Are pallets often handled with manual lift?
- Is cargo handled within big height difference?

Adverse effect on human health. Prolonged or frequent hard dynamic work may not only overload the heart and blood circulation system but also distort the body support and movement system. The load experienced by the back while working with weights may result in the following illnesses:

- Acute pain caused by short-term inadequate mechanical loads and obvious limitation of movements (e.g. muscle strain resulting from load lifting, bone fractures in the event of fall while carrying the load across uneven surface, backbone disk displacement caused by load lifting);
- Chronic illnesses caused by prolonged inadequate mechanical loads (ruptured disks, ligament strains, ligament inflammation, muscle split).

These illnesses are most common in transportation sector.

M5-EN.8.1.2. Safety measures

There are always **two possibilities to protect** employees from hard dynamic work

- Avoid manual labour with loads because it puts their health at risk;
- If manual labour is impossible to avoid, the employer shall implement adequate measures to reduce the adverse effect on human health.

This may be achieved with the following **work safety measures**:

1. Use mechanical lifting and handling equipment (e.g. lifting tables);
2. Plan the work (e.g. avoid transitional storage);
3. Delegate loading jobs to adequately trained support staff (not the driver);
4. Properly arrange workplaces and working environment:
 - Ensure that the object is possible to grip and to carry close to the body (enough room for feet and legs, load are taken from shelves);
 - Provide for ergonomically comfortable height for gripping and placing of objects between 70 and 80 cm above ground;
 - Leave sufficient room to manoeuvre with heavy objects;
 - Avoid uneven, slippery or shaky floors;
 - Avoid thresholds, elevations, stairs and ramps;
 - Wear adequate safety footwear;
 - Avoid bad visibility, extreme temperature and humidity.
5. Arrange the loads (e.g. reduce the load, avoid hazardous characteristics of the load, avoid inconvenient and protruding loads; convenient form for gripping; easy to reach load gripping spots; provide for the spots where to attach the object for lifting).
6. Label heavy loads that are impossible to reduce (e.g. indicate the weight, centre of gravity, mark coupling points and places of gripping).
7. Have supportive working means ready (e.g. body belts for carrying heavy objects, soft shoulder pads, handles, lifting platforms, lifting nips, barrows for handling sacks).

8. Reduce the pace of work.
9. Re-sequence activities (tiresome activities interchanged with activities that relieve the tiredness).
10. Provide for sufficient rest-breaks.
11. Give instructions about correct handling of heavy objects.
12. Take care of employees:
 - If they have to work with weights and experience increased physical load, they must have a health check-up by the company's physician and employee's physical data must be examined.
 - If necessary, the company's physician shall regularly examine employees' health and give explanations about proper handling of loads (repeated training etc.).

M5-EN.8.2. Monotonous dynamic work, safety measures

Monotonous dynamic work is such type of work that involves repeated movements using arm, leg, shoulder and back muscles. Monotony of work has a great influence on stress. While doing such work a human being suppresses his emotional and mental activity. Prolonged work under such conditions evokes hatred to the work itself. **(M5.8.2.1.jpg)**

In the assessment of **monotonous dynamic work** manifestation the following must be **examined and identified**:

- Do certain muscle groups (e.g. arms, legs) have a repetitive load (e.g. frequent driving on city streets, in traffic jams, changing lanes without automatic transmission, without gear switching power unit in mechanical transmission or without power steering)?

The following **work safety measures** are recommended to reduce the load of **monotonous dynamic work**:

- Use power steering or automatic transmission etc.

M5-EN.8.3. Working position, work in one position, safety measures

In this case a compulsory **working position ##G5##** and **duration of work in one position** are assessed. The following must be **examined and identified**:

- Is there a possibility to change the working position, i.e. to interchange between standing and sitting?
- Working position:
 - Are there long periods of work in forced body positions (e.g. prolonged sitting without breaks or without facilitating means)?
 - Can the seat be adjusted so that the shoulder bone experiences fewer loads (e.g. armrests, and adjustable seat back for the lumbar area)?

- Work in one position:
 - Do certain muscle groups experience extended periods of load without change of loads (e.g. long driving along straight streets, on highways, etc. without any change of direction)?

The following **work safety measures** are recommended to reduce the adverse effect of **working position and work in one position** on human health:

- Provide for possibilities to change the body position;
- Interchange driving with other activities;
- Auxiliary measures;
- Limited working time;
- Regular breaks;
- Compensating physical exercises;
- Armrests;

M5-EN.8.4. Combined static and dynamic work - work safety measures

In the assessment of **static ##G28## and dynamic work combination** the following must be **examined and identified**:

- Is loading and unloading of heavy objects, including passenger luggage, the driver's job task?
- Does the driver have to put on and remove the tent?
- Are heavy objects lifted and carried?
- Are heavy objects carried with elements attached to their sides?
- Are heavy objects lifted within significant difference of heights?
- Is cargo hauled with considerable inclination (e.g. in the trunk of a car)?
- Etc.

The following **work safety measures** are recommended to reduce the adverse effect of **combined static and dynamic work** on human health:

- Use mechanical lifting and handling equipment (e.g. cranes, lifting tables);
- Delegate loading jobs to adequately trained support staff (not the driver);
- Appoint additional personnel;
- Provide sufficient time for loading and unloading work;
- Train the staff and control compliance with safe load handling requirements;
- Use immobilizing waist band.

M5-EN.8.5. Awareness and ability to adapt, safety measures (M5.8.5.1.jpg)

In the assessment of absorbed scope of information and ability to adapt the following must be **examined and identified**:

- Is abundance of information and auxiliary work (using telephone or fax machine, reading maps etc.) prevented while driving?
- Can the driver be aware of special and warning signals while using the radio or telephone?
- Are the driver's cogitation and intellectual skills suitable for driving in the traffic?
- Is the driver informed about special watchfulness while driving when medication is used?
- Etc.

To avoid safety at work in the event of big flow of information the following **work safety measures** are recommended:

- Not to do any auxiliary work while driving;
- Have navigation systems installed in the vehicles;
- Have regular health checkups;
- The driver shall hold the driver's license;
- Get information from the physician on the therapeutic results and side-effects of medication used.

M5-EN.8.6. Self-study assignment

On the basis of information presented in this section draw a list of **risk factors related with physical loads, work difficulty, awareness and ability to adapt** in the typical driver's workplace in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal)** for **elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g. pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 9. You may use the template **##D9##**.

Table 9

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.9. MENTAL LOADS, PLANNING AND OTHER HAZARDS

M5-EN.9.1. Mental loads

M5-EN.9.1.1. Activities, social conditions, safety measures

M5-EN.9.1.2. Work planning

M5-EN.9.1.3. Safety measures

M5-EN.9.2. Planning

M5-EN.9.2.1. Risk factors

M5-EN.9.2.2. Safety measures

M5-EN.9.3. Other risk factors

M5-EN.9.3.1. Personal protective equipment and other risk factors

M5-EN.9.3.2. Technical condition of the vehicle

M5-EN.9.4. Self study assignment

Short description of the section:

In this section examples of typical **mental loads** **##G23##**, work planning and other risk factors that a driver of a land transportation company is subject to are presented and analyzed.

The **goal** of this section is:

- Distinguish types of typical mental loads, work planning and other risk factors that a driver of a land transportation company is subject to;
- Present examples of manifestation of these risk factors and describe them;
- Give recommendations for safety measures.

Material of this section will assist the employer and company owner in adjusting recommendations for determining mental loads, work planning and other risk factors, methods of risk prevention and safety measures for his company

M5-EN.9.1. Mental loads (M5.9.1.1.jpg)

M5-EN.9.1.1. Activities, social conditions, safety measures

In the assessment of **activity and social conditions as mental load** the following shall be **examined and identified**:

- Is the driver able to drive (and has other cogitation skills) in the road traffic?
- Does the driver have sufficient information about his job and is he regularly informed about potential hazards?
- Are relations and communication with co-workers good?
- Are there conflicts between employees?
- Are morbidity and employee turnover rates high?

The following **safety measures** are recommended to reduce the adverse effect of **activity and social conditions as mental load**:

- Regular health checkups;
- Informing drivers on a regular basis;
- Instructing;
- Safe driving training;
- Regular discussions encouraging cooperation between co-workers;
- Face-to-face conversations to avoid ungrounded discontent or conflicts;
- Planning, consideration of work arrangement and methods of performing the work.

M5-EN.9.1.2. Work planning

In the assessment of **work planning as mental load** the following shall be **examined and identified**:

- Does the driver often drive in peak traffic?
- Does the driver often drive long distances?
- Does the driver often have to face obstacles on the road (e.g. traffic jams) and abide to strict delivery terms?
- Does the driver often go alone to an unknown destination?
- Does the driver have to make quick decisions (e.g. accept or refuse unexpected transportation order) instead of the employer?
- Does the driver often drive under difficult conditions (e.g. rain, snow, slippery road, fog or darkness)?
- Does the driver often drive under extreme weather conditions (e.g. heat in the summer)?
- Is the driver regularly informed about the relevant provisions of legal acts?
- Is there an internal vehicle's inspection and maintenance plan the compliance of which is controlled?
- Do employees participate in the drawing of the transportation (hauling) task?
- Is accident analysis presented and discussed with employees?
- Do employees have a possibility to submit proposals on the arrangement and safety of work?
- Are employees informed that the vehicle's suitability for driving and safety has to be inspected before every trip?

M5-EN.9.1.3. Safety measures

The following **safety measures** are recommended to reduce the adverse effect of **work planning as mental load**:

- Prevent fatigue caused by prolonged concentration of attention (e.g. provide for sufficient rest-breaks, choose the working time properly; shorten distances covered per day etc.);
- Reduce or eliminate aggressive driving styles that may cause accidents, reduce psycho emotional load (e.g. mobile phone to inform about delayed arrival to the destination place, provide sufficient time for the trip; autogenic training or other methods of relaxation and stress management);
- Reduce hazards caused by lateral or personal activities, increase attentiveness to traffic events (e.g. navigation system with hands-free speaking options etc.);
- Avoid conflicts arising from incompetent decisions (e.g. possibility to discuss things with the employer on a mobile phone etc.);
- Reduce potential hazard caused by weather conditions, personal errands, fatigue (e.g. provide with sufficient time for the trip; use adequate tyres according to weather conditions; air-conditioning system in the vehicle, driving breaks etc.);
- Training;
- Appoint persons in charge of the vehicle's inspection and maintenance;
- Involve employees in the planning process;
- Discussions with employees, submission of proposals, on-going quality improvement process;
- Instructing.

M5-EN.9.2. Planning (M5.9.2.1.jpg)

M5-EN.9.2.1. Risk factors

In the assessment of **work planning** risk factors we have to **consider** the following:

- Progress of work;
- Time of work;
- Qualification;
- Instructing; and
- Responsibility.

In the assessment of the manifestation of **work planning risk factors** the following shall be **examined and identified**:

- Is other type of work in addition to driving performed (e.g. selling tickets to passengers, loading, and vehicle maintenance)?
- Is specified work schedule complied with?

- Is driving regimen complied with?
- Does the driver comply with the break and rest time requirements?
- Are all persons who independently operate (drive) moving vehicles or working equipment (e.g. buses, forklifts) are authorized, have adequate skills for this job, are trained (driver's license) and instructed?
- Must the driver hold a permit for carrying passengers?
- Are employees instructed before employment and regularly during employment period about potential hazards (e.g. hazardous cargo) as well as measures to avoid them?
- Are employees acquainted with the type of the vehicle?
- Are employees instructed how to unhook the trailer and prevent it from moving?
- Is the driver instructed about his actions in the event of vehicle failure?
- Do employees understand their liability?

M5-EN.9.2.2. Safety measures

The following **safety measures** are recommended to reduce the adverse effect of **work planning**:

- Organize the work in an expedient manner to avoid side work not within the driver's job description;
- Ensure strict compliance with work schedule;
- Comply with the driving regimen and break and rest time requirements;
- Training and instructing (e.g. safety training);
- Regular permit control (driving permit, permit to transport hazardous cargo, to carry passengers etc.);
- Ensure safety by instructing (e.g. instructing questionnaires etc.);
- Have and use reflective vests, warning lights and emergency triangle;
- In the event of failure notify the contact person of the company;
- First aid instructions;
- Explain the employees about their liability in order to avoid accidents and injuries (e.g. clear competence requirements, control etc.).

M5-EN.9.3. Other risk factors (M5.9.3.1.jpg)

M5-EN.9.3.1. Personal protective equipment and other risk factors

There other potential risk factors that may be faced by the drivers of a land transportation company:

- Personal protective equipment;

- Technical condition of the vehicle;
- Adverse effect on skin;
- Hazards related with other persons;
- Animals;
- Plants and vegetable products

For example, in the assessment of personal protective equipment the following shall be **examined and identified**:

- Is personal protective equipment adequate and efficient?

To avoid unnecessary loads in using personal protective equipment, the following safety measure is recommended:

- Carefully select personal protective equipment in accordance with the type of work and normative requirements.

M5-EN.9.3.2. Technical condition of the vehicle (M5.9.3.2.mpg)

Inappropriate technical condition of the vehicle may endanger people's safety, human health and environment; therefore before using the vehicle the driver shall assess its technical condition. Although the responsibility to arrange regular technical inspection of vehicles lies with the head of the company or his duly authorized person, however the driver shall additionally check up the following things before using the vehicle:

- Is the vehicle's body faultless; are there no leakages of fuel, brake cooling and shock absorbers fluid, are gas tanks and valves airtight in gas driven vehicles systems;
- Are licence plates, windshield, windows and all lights free of dirt (clean, if necessary)?
- Is the vehicle's lighting system in good order with properly functioning headlights (high beam lights, low beam lights, fog lights) and tail lights and parking lights?
- Do turn and lane-change signals function properly?
- Are hazard warning lights in proper order?
- Is truck and trailer coupling device faultless?
- Are door and bonnet locks faultless?
- Is there enough oil in the crankcase (refill, if necessary)?
- Is there enough fluid in the radiator, brake system, hydraulic gear of the clutch, electrolyte in the battery and fuel in the tank?
- Are all systems of the vehicle airtight and do not leak fluid or fuel?
- Do windscreen wipers and washers function properly?
- Does the free movement of clutch and brake pedals comply with that specified in the vehicle's manual; does the parking brake function properly?
- What is the of the steering wheel free movement?
- What is the air pressure in the tyres, are the wheels fixed properly?
- Is the tool kit complete, are all tool in good order?

- Is the vehicle equipped with a first-aid kit, a fire extinguisher, a towing line, safety belts?
- Is there heating in the cabin during winter time?

Safety measures. All technical faults of the vehicle shall be immediately reported and repaired; otherwise operation of the vehicle is dangerous and prohibited.

M5-EN.9.4. Self study assignment

On the basis of information presented in this section draw a list of **mental load, work planning and other risk factors** in the typical driver’s workplace in your company.

If the risk factor is defined by standard parameters, name the **regulations** related with the risk factor and **instructions** that have to be complied with.

Choose appropriate **measures (technical, organizational, personal) for elimination of risk factors** and determine whether **additional consultation of specialists** is required. If statutory acts provide for such (e.g. pursuant to legal acts on accident prevention), point that out.

Specify **who is responsible** for implementation of selected measures and when they must be implemented.

Fill in Table 10. You may use the template **##D10##**.

Table 10

Company:

Person in charge:

Job:

Date:

Type of work, work equipment, workplace	Risk factors/ shortcomings/ loads (factor)	Factor related explanations and references	Regulations and working instructions	Measures: Technical, Organizational, Personal	Implementation (who) (when)

M5-EN.10. RISK MANAGEMENT IN LAND TRANSPORTATION SECTOR

M5-EN.10.1. Preventive measures

M5-EN.10.2. Prevention of emergencies

M5-EN.10.3. Benefit of risk management

M5-EN.10.4. Examples of good practice

M5-EN.10.5. Analysis of accidents and occupational illnesses

Short description of the section:

This chapter presents risk elimination or mitigation priorities and explains the benefit of emergencies prevention and risk management in land transportation companies. It also presents examples of good practice in land transportation sector and gives analysis of accidents and occupational illnesses.

The purpose of this section is to:

- Present risk elimination or mitigation priorities;
- Introduce prevention of emergencies;
- Show the benefit of risk management in land transportation companies;
- Give examples of good practice in land transportation sector; and
- Analyze cases of accidents and occupational illnesses.

Understanding the benefit of risk management and the analysis of good practice examples will help to apply this material during the implementation of risk management process in a land transportation company.

M5-EN.10.1. Preventive measures

Careful selection of preventive measures is of major importance in risk management process. **The importance of the vehicle driver's behaviour, safety of the vehicle and cargo and environment protection** shall be assessed for proper selection of safety measures and elimination or mitigation of inherent risk in the driver's workplace analysis of accidents and occupational illnesses.

Preventive measures shall be implemented following the sequence of priorities and recommendations for safety measures dealing with certain risk factors presented in the previous sections of this study material:

- Identified hazards and the risk imposed by them shall be eliminated;
- Identified hazards and the risk imposed by them shall be controlled by organizational and technical measures;
- In cases where residual hazards and the risk imposed by them cannot be eliminated by collective protective equipment, the employer shall supply the employee with personal protective equipment and ensure they are

properly maintained and used. Refer to the model procedure of distributing and collecting personal protective equipment **##D11##**.

Hazard prevention and control procedures and measures in a land transportation company should be:

- Adjusted according to identified hazards and the risk imposed by them;
- Regularly reviewed and improved, if necessary;
- Prepared pursuant to the requirements of health and safety legislation and good practice;
- Prepared in accordance with the collected data.

M5-EN.10.2. Prevention of emergencies

An important area in risk management process is **prevention, alert and response** to emergencies likely to occur in land transportation companies:

- A land transportation company should develop and implement emergency prevention, alert and response measures and procedures to identify the probability of emergencies, response actions and their scope and preventive measures to eliminate the risk. These measures and procedures shall ensure:
 - The supply of the necessary information inside the company and to external emergency services and coordination of actions during emergency situation to protect all people present in that place. Refer to the model fire emergency plan **##D12##** ;
 - Prompt first aid, fire-fighting and evacuation actions. Refer to the model instruction on providing first-aid **##D13##**;
 - Appropriate training and information delivery to all employees of the company at all levels including regular drills on emergency prevention, alert and response procedures.
- Employees of the company shall be aware of emergency prevention, response and evacuation plans.

M5-EN.10.3. Benefit of risk management

Risk management in companies of land transportation sector have obvious benefit. Firstly, it helps to control costs, insurance fees, claims of employees and third parties. It also helps to make reasonable decisions on such matters as drivers' training and vehicle procurement and gives the ideas how to improve health and safety situation in the company. According to Zurich Risk Services, the potential benefits from risk management are:

- Less time is lost due to accidents at work;
- Reduced risk of occupational illnesses;
- Reduced stress and raised morale;
- Reduced need of investigation and paperwork;
- Less time is lost due to suspension of operations;
- Less vehicle end up in garages in the most inopportune time;
- Reduced vehicle operation costs because the drivers are trained how to operate modern vehicles;

- Less orders are lost, the company keeps to its credit and has better business opportunities ;
- Fewer chances that key drivers will be deprived of their driving licence.

M5-EN.10.4. Examples of good practice

During risk assessment and arranging risk management in a specific workplace of your company refer to the following examples of good practice:

- Safety and health in land transportation operations **##W14##**;
- Fall prevention **##W13##**;
- Whole body vibration **##W19##**;
- Safe operation of vehicles in a workplace **##W17##**;
- Reverse driving **##W18##**;
- Safe unloading of steel **##W15##**;
- Safe carriage of paper **##W16##**;
- Safe parking of big-size trucks **##W12##**.

M5-EN.10.5. Analysis of accidents and occupational illnesses (M5.10.5.jpg)

We present the analysis of incidents and occupational illness cases in land transportation sector. We hope these actual examples will help you to become aware of potential hazards leading to an incident as well as causes of occupational illnesses and encourage you to take preventive measures prior to an incident or irreparable harm to employee health. **##D14##**

M5-EN.11. SAFETY TIPS, HEALTH AND SAFETY LABELS IN WORKPLACES

M5-EN.11.1. Safety tips for the employer

M5-EN.11.2. Safety tips for the driver

M5-EN.11.3. Personal protective equipment (PPE)

M5-EN.11.3.1. Mandatory requirements

M5-EN.11.3.2. Employer's obligations

M5-EN.11.3.3. Driver's obligations

M5-EN.11.4. Safety and health signs and labels

M5-EN.11.4.1. Need and type of labels

M5-EN.11.4.2. Prohibitive and warning signs

M5-EN.11.4.3. Obligatory, evacuation and first aid signs

M5-EN.11.4.4. Fire-fighting equipment and other signs

Short description of the section:

This section presents safety tips for the employer and the driver (including the use of personal protective equipment) and introduces the requirements for using safety and health signs and labels.

Goals of the section:

- Give advice to the employer on safety and health matters (including the use of personal protective equipment); and
- Present the requirements for using safety and health signs and labels.

The material of this section and safety tips presented herein will assist in arranging safe workplaces in land transportation sector and understand the benefits and rules of using safety and health signs and labels.

M5-EN.11.1. Safety tips for the employer

It is the responsibility of the employer to ensure safe and healthy working conditions in a land transportation company. The following safety tips will help the employer to bear his responsibility for health and safety in the workplace:

- Operate safe vehicles equipped with safety belts for drivers and passengers, air-bags, ABS systems, anti-blinding filters etc;
- Plan delivery schedules so that speeding and traffic jams were avoided. Install speed limitation devices in the vehicles and control that is used where installed;
- Consider weather and road conditions while planning the schedules and routes. Choose the best and safest roads;
- Observe and control driving and rest time by using the measures provided for in speed control legislation;
- Loading and unloading tasks result in extra workload for the drivers therefore provide for additional rest time to the drivers who are involved in loading and unloading operations.
- Allocate work to the drivers in accordance with their qualifications;

- Organize continuous training of the drivers on safe driving, vehicle safety inspection, use of modern loading and unloading equipment. Arrange such training and seminars on regular basis;
- Implement alcohol drinking control measures;
- Implement all kinds of safety codes in harmony with local conditions. Comply with other local traffic safety codes and take part in the development of such codes;
- While entering into employment contracts with the drivers encourage them to abide to safety rules and to use safety equipment, to enhance safe driving skills, experience etc. The standard driver's safety and health procedure is presented in **##D16##**.

M5-EN.11.2. Safety tips for the driver

Land transportation companies employ professional drivers. Their experience may be an important positive factor making personal decisions related with safety and health matters. However the drivers shall assume personal responsibility for safe driving. The following safety tips will help to ensure workplace safety and health:

- Use safety belts, choose safe speed according to road and weather conditions;
- Comply with local traffic rules and abide to local requirements;
- Arrange you seat so that it is convenient and safe and prevents muscle strain and injuries (especially neck) in the event of accident;
- Know your vehicle's control systems and ensure that they are in good shape: perfectly operating brakes, windshield without cracks, well adjusted and functioning lights etc;
- Do not drive under the influence of alcohol or tranquilizers, follow your doctor's recommendations ;
- Avoid smoking while driving because tobacco is only a short-term energizer. Cigarette smoke may cause drowsiness because carbon dioxide displaces oxygen from the cabin and this may result in higher level of CO in the driver's blood;
- Do not use heating or water boiling appliances able to generate carbon monoxide in the cabin;
- Use safe climbing equipment and be extremely careful in bad visibility conditions or when your feet are weary;
- Ensure safe positioning of cargo in your vehicle; be careful during loading and unloading;
- Keep things in your vehicle safely attached so that they do not hit people in the vehicle during sudden braking;
- Buckle up in the bunk bed if you sleep while your partner is driving.

M5-EN.11.3. Personal protective equipment (M5.11.3.1.jpg)

M5-EN.11.3.1. Mandatory requirements

Personal protective equipment is used when risk inherent in the working environment is impossible to avoid or to prevent by collective protective equipment, organizational

measures or other means and methods. Examples of such risk are thermal hazards, hazardous substances, mechanical dangers etc.

In land transportation sector personal protective equipment is given to drivers free of charge pursuant to the risk factors present in the workplace. The following personal protective equipment is mandatory:

- Work suit;
- Work footwear;
- Cap or hat;
- Work gloves.

Personal protective equipment shall:

- Protect from potential dangers and hazards present in the driver's working environment without posing any risk to employee's safety and health;
- Comply with ergonomic requirements and the driver's health condition;
- Fit (be adjusted) to the driver.

M5-EN.11.3.2. Employer's obligations

The employer shall:

- If necessary, give more personal protective equipment to the driver free of charge than provided for in PPE list;
- Check whether personal protective equipment given to drivers carry a conformance mark or have a certificate proving that they comply with applicable regulatory requirements for health and safety;
- Give washing and deactivating substances to the drivers doing the work where dangerous substances can affect their skin;
- Ensure that personal protective equipment is stored, used, cleaned and maintained, if necessary – disinfected, supplied with required spare parts in accordance with the manufacturer's instructions;
- Replace personal protective equipment during cleaning, laundering, repair or disinfection of the equipment;
- Control the compliance with respective hygiene requirements if in certain circumstances the same personal protective equipment is shared by several person;
- Assess the working conditions and determine the life-cycle of personal protective equipment in accordance of manufacturers' instructions.

M5-EN.11.3.3. Driver's obligations

The driver shall:

- Each time before using personal protective equipment check if it is not faulty, damaged, dirty and if the validity time stated on the seal has not expired;
- Use provided personal protective equipment;
- Take care of personal protective equipment and use it for intended purpose; notify your immediate supervisor about the wearing out, contamination, unfitness and expiration term of the equipment in a timely manner;

- Compensate the damage as provided for by the law if personal protective equipment given to the employee is lost or damaged at his fault.

Personal protective equipment shall not be used if the validity terms or testing terms are expired.

Personal protective equipment is employer's property thus before quitting job or changing jobs in the same company the employee shall return the equipment to the employer. Worn out equipment shall be replaced with a new one.

M5-EN.11.4. Safety and health signs and labels (M5.11.4.1.jpg)

M5-EN.11.4.1. Need and type of labels

Safety and health protection signs shall be posted in those places where it is impossible to avoid or prevent risk inherent in the working environment by collective protective equipment, organizational measures or other means and methods. These signs are mandatory because they serve as initial warning about potentially dangerous situations which may result in severe or lethal injuries.

Employers shall provide induction training to employees and acquaint them with the meaning of safety and health signs used in the company, i.e. explain the actions to be taken in the areas marked by a certain sign.

Safety and health signs and labels give information or instructions expressed by an icon, colour, illumination, sound, verbal announcement or hand signals in regard to a specific object, activity, situation, safety and health requirements.

There are certain requirements how information should be conveyed in these signs.

M5-EN.11.4.2. Prohibitive and warning signs

Features of **prohibitive signs** (prohibiting actions that may cause danger):

Form of a circle, black icon against white background, red rim and red diagonal line.

Here are some examples of such signs:



No smoking



No entrance to pedestrians

Features of **warning signs** (warning about potential risk or hazard):

Form of a triangle, black icon against yellow background, black rim.

Here are some examples of such signs:



Warning about toxic substance company



Warning about plant and machinery used in the

Warning about electric current

If these signs have to stand out of traffic signs, they may have a square form and orange background. Examples of such signs:



Warning about inflammable substance



Warning about explosive substance

M5-EN.11.4.3. Regulatory, evacuation and first aid signs

Features of **regulatory signs** (defining mandatory behaviour):

Form of a circle, white icon against blue background (blue colour shall cover at least 50% of the sign's surface).

Examples of such signs:



Eye protection is mandatory



Head protection is mandatory



Hearing protection is mandatory



Visor is mandatory



Safety footwear is mandatory

Features of **evacuation and first aid signs** (showing direction to evacuation exits or providing information on first-aid or rescue means):

Rectangular or square form, white icon against green background.

Examples of such signs:



Evacuation way, evacuation exit

M5-EN.11.4.4. Fire-fighting equipment and other signs

Features of **directive signs** indicating the location of fire-fighting equipment:

Rectangular or square form, white icon against red background.

Examples of such signs:



Fire and rescue emergency telephone



Fire extinguisher

Fire signal – fixed acoustic signal produced and transmitted by a certain device without using or imitating human voice.

Verbal announcement – a fixed message delivered verbally using or imitating human voice.

Hand signals – fixed movement and/or position of arms and/or hands giving instructions to employees who perform manoeuvring actions involving risk or hazard.

Hazardous places (e.g. places where people slip, fall, stumble etc.) in working environment shall be marked with appropriate safety and health signs and labels. Roads and walkways shall be marked as well. Hazardous zones are marked by this sign:



M5-EN.12 RISK ASSESSMENT TOOL FOR THE LAND TRANSPORT SECTOR

Hazard		Who (type of worker)	Harm	Required Safety Measures
Source	Hazard description			
Unguarded moving parts of vehicles	Contact with moving parts (e.g., wheels, main propeller shaft and axels etc.) of vehicles	Drivers and employees	Injuries (most often hands, feet, legs, head, chest, arms) sometimes fatal	<ul style="list-style-type: none"> - Use intrinsically safe equipment in new installations; - Observe safe distances; - Avoid narrow spaces; - Properly select protective equipment in places of potential crushing, cutting and gripping: takedown safety guards (e.g. covers and shields), stationary safety guards (e.g. forced position switches) or limiting safety guards (e.g. rims); - Have the vehicles inspected by a competent person (at least once a year); - Label hazardous places.
Parts with hazardous surfaces	Contact with sharp-edged, pointed or abrasive elements in the vehicle or close to the vehicle (e.g. protruding door handles or tyre treads)	Drivers and employees	Injuries due to bad visibility, insufficient lighting, not sharp enough contrast, unexpected appearance of hazardous surfaces, inconvenient for movement space, inadequate movement trajectory, too little space for standing etc.	<ul style="list-style-type: none"> -Mitigate hazardous impact to not dangerous limits (e.g., round or take away corners, polish the roughness, cover blades and edges with soft material etc.) making the surfaces that have to be contacted as big and/or as soft as possible; - Use covers or safeguards; - Replace maintenance and operation levers; - Organize the work and arrange spaces in such a manner that the possibility for a person moving in all directions of contacting the

				<p>hazardous surface would be minimized;</p> <ul style="list-style-type: none"> - Ensure good visibility of hazardous surfaces (illumination); - Provide employees with personal protective equipment (head protection, safety footwear with pierce proof sole, gloves, cut and pierce proof clothing) and control that the equipment is used.
Moving vehicles and working equipment	Accidents where moving vehicles and working equipment are involved	Driver and other traffic participants	Injuries of different seriousness, sometimes fatal	<ul style="list-style-type: none"> - Prevent unauthorized use of vehicles and equipment; - Use safe vehicles and auxiliary working equipment (vehicle superstructures; load securing devices; tanks; local movement restriction (loading restriction, emergency braking etc.) equipment; warning and signalling equipment; equipment to protect space behind the vehicle; alarm systems restricting the leaning angle of the vehicle, loading momentum or driving speed etc.); - Comply with vehicle maintenance terms; - Ensure periodic inspections by a competent person; - Appoint a signalling person for reverse driving; - Periodically inspect vehicle using safety; - Prepare the cargo distribution plan; - Prepare the vehicle for winter use in time. - Steps and ladders must be safe and within easy reach;
Objects moving out of	Contact with falling, swaying, rolling down, sliding, spreading	Driver and any other employees /	Injuries of different seriousness,	<ul style="list-style-type: none"> - Avoid forces generated by acceleration, i.e. sudden change of direction, sudden braking or

<p>control</p>	<p>objects</p>	<p>people, especially those who are involved in loading or tipping cargo</p>	<p>sometimes fatal</p>	<p>start-up, towing sideways if the cargo may sway;</p> <ul style="list-style-type: none"> - Avoid load force acting in one direction, i.e. sinking into soil, holes, cavities, driving uphill etc.; - Arrange, load and unload cargo in a safe manner (comply with load distribution plan, allowable height of stacks etc.); - Distribute the load evenly; - Keep things carried in the cabin or passenger vehicle (packages, bottles, cans etc.) in a safe and specially arranged place; - Ensure safe distance from moving objects is maintained; - Use additional roll protection measures (cones and barriers; props, supports, poles, frames, side walls; tension cables and belts; safely strapped stacks, pyramid type of loading, in-between trays, stoppers are used); - When these measures are not effective, objects that may roll or slide should be levelled or intercepted by levelling supports, deflecting grooves; interception nets, canvas, baskets, fences; lids, covers, enclosures; - Install supporting parts of warehouse equipment in a safe manner and indicate the allowable loads; - Avoid standing under suspended loads, mark and fence dangerous zones; - Avoid external dynamic forces (e.g., impact,
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				pressing); - Control fasteners and holders; - Limit pressure in hydraulic or air driven equipment in the event of danger that broken hoses may produce knocks, sprinkle or spray liquids; - Use retention equipment (e.g., protective walls); - Regularly control whether the loading platform and the vehicle are in proper condition; - Use head and feet protective equipment.
Falling on flat surface, slipping, stumbling, tripping, unstable step	Slipping, tripping, stumbling, unstable step on a slippery surface	Employees and visitors	Injuries of different seriousness	- Ensure safe driving and walking on service roads; - Keep the roads and walkways clean in all weather conditions; - Avoid supporting surfaces with different surfaces that have different skidding resistance; - Ensure that the step height is even (surface may be prepared adequately); - Ensure easy cleaning of supporting surfaces and protect them from contact with oil (e.g. by providing appropriate guards); - Apply additional chemical or mechanical treatment to give extra roughness to surfaces; - When surfaces become slippery, immediately apply measures to reduce the skidding (e.g., sawdust, ice melting mixes, sand); - Install handrails, handles or other supports on surfaces inconvenient for walking;

				<ul style="list-style-type: none"> - Wear appropriate footwear; - Protect places posing the hazard of falling into (e.g., by using dismantled fencing)
Falls	Falls from height	Drivers and employees	Severe or fatal injuries	<ul style="list-style-type: none"> - Acquire proper vehicles and supporting equipment; - Instruct employees about correct boarding and landing as well safe driving; - Perform work, if possible, from the floor or other safe standing position (e.g. rolling scaffold); - Regularly inspect the ladder and use it correctly; - Regularly inspect the status of loading pallets and correct use of bridges; - Park the vehicle safely at the ramp during loading and unloading.

M5-EN.14 GLOSSARY

Item	Term	Definition of the term
1.	Lighting	Distribution of light energy in the work place to ensure work safety and influence employee health.
2.	Biological risk factor	Risk factor based on substances of biological origin, micro organisms, including genetically modified, cell cultures and endoparasites.
3.	Employer	Head of a company, enterprise, organization or corporation.
4.	Working environment	Space around the work place that may contain hazardous and harmful risk factors to employee health.
5.	Working position	Position of neck, arms, back, hips and legs during working time; work is usually performed in a standing or sitting position.
6.	Work equipment	Machinery, equipment, apparatus, instruments, tools, devices and other means used in the working process.
7.	Work place	A place where a person performs the work agreed upon in the employment contract or performs functions of public administration.
8.	Employee	Natural person working under employment contract for a salary.
9.	Employee safety and health conditions	Working environment, type of work, on-duty and off-duty periods and other circumstances having direct influence on employee condition, efficiency, safety and health.
10.	Dynamic work	Muscle contractions using energy during movements while manually handling heavy materials which require multiple stoops and walking and involve arm, leg and back muscles.
11.	Fire risk factor	Risk factor arising under uncontrolled spread of fire caused by an unexpected source.
12.	Hazardous factor	Risk factor in the working environment which may cause illness or occupational disease and have negative health consequences by affecting the body of an employee.
13.	Mechanical risk factor	Risk factor comprising dangerous factors of working environment (unshielded moving parts of machinery, parts with dangerous surfaces, moving vehicles and work equipment etc.).
14.	Microclimate	Combination of temperature, relative air humidity, air movement velocity, partition surface temperature and heat radiation in premises.
15.	Incidents at work place	Incident at work, including a traffic accident during work time, which is investigated in the appropriate procedure and acknowledged as an incident at work place, the result of which is the employee's injury (light, serious, fatal).
16.	Hazardous substance	Harmful chemical element or compound, pure or in a mixture, existing naturally or produced, used or released, including waste, during any process of work and produced with a purpose or without, supplied to the market or not.
17.	Hazardous situation	Any situation where a person is exposed to danger or dangers.

18.	Hazard identification	A risk assessment stage during which dangers are identified, places where employees may be exposed to risk factors are identified and objects for risk assessment are listed.
19.	Danger	A dangerous factor in the working environment which may cause acute health disorder or death of an employee.
20.	Preventive measure	Measure that eliminates or reduces risk.
21.	Occupational illness	Acute or systemic health disorder caused by one or several hazardous and/or harmful factors in the working environment and acknowledged as occupational illness under the established procedure.
22.	Occupational risk (risk)	Injuries or possibility of other employee health disorders due to harmful and/or hazardous factor (factors) in the working environment.
23.	Mental load	The load that causes mental stress to an employee due to working conditions, job requirements, work arrangement, job contents, employee or employer's and employee's relationship.
24.	Risk analysis	Risk assessment stage during which actual values of risk factors, duration of impact, the basis causing the manifestation of factors and the number of employees exposed or possibly exposed to risk are established.
25.	Risk factor	Chemical, physical, biological, ergonomic, psychosocial or other natural factor.
26.	Risk assessment	Current or potential risk factor assessment process during which the current or potential risk is identified, risk analysis is performed, risk is determined and decision is made whether the risk is acceptable or not acceptable.
27.	Explosion risk factor	Risk factor in the environment where concentration of substances mixed with air (i.e. sufficient amount of oxygen) is within the limits of explosion and the source of flame is present in the work space.
28.	Static work	Muscle contractions requiring energy without any movements when the body position remains unchanged, the load is supported by both hands involving the muscles of arms, back and legs. .
29.	Electricity related risk factors	One type of physical risk factors based on electricity related hazardous factors of the working environment (electric current, electric arc).
30.	Thermal risk factors	Risk factors based on the impact of thermal environment parameters to human health.
31.	Noise	Perceptible sound (e.g. noise of machinery) that may influence human health, i.e. physical and mental condition.
32.	Whole body vibration	Vibration transferred through the support surface of a standing, sitting or lying human body to the entire body and affecting the whole body system.
33.	Harm	A result caused by the hazard and at the same time describing the hazard that may be not acceptable without appropriate safety precautions.

M5-EN.15 INTERNET REFERENCES

No	Internet links	Short description of the website
1.	http://www.vdi.lt/risk/sm/mechanik/mech.doc	Summary of seminar material “Mechanical loads”, Occupational Risk Management and Assessment Guide.
2.	http://www.vdi.lt/risk/annex_1.html	Summary of seminar material “Electricity risk”, Occupational Risk Management and Assessment Guide.
3.	http://osha.vdi.lt/PDF/Topics/chemija/vezimosauga.pdf	“Hazardous substances carriage safety”, G. Aukštuolienė, LR Ministry of Communication.
4.	http://www.vdi.lt/risk/annex_1.html	“Hazardous substances”, Management of hazardous substances used at work from German specialists’ point of view, Occupational Risk Management and Assessment Guide.
5.	http://osha.vdi.lt/PDF/Topics/chemija/faktai33.pdf	European Agency for Safety and Health at Work, Hazardous substances in workplaces, Introduction
6.	http://www.vdi.lt/risk/annex_1.html	Physical risk, cold and hot substances/surfaces, microclimate, lighting, noise and vibration; Occupational Risk Management and Assessment Guide.
7.	http://www.vdi.lt/risk/docs/qlists/Pavojai_automobiliu_vairu_otojams.htm	A catalogue of loads and harms drawn on the basis of intrinsic risks in drivers’ work, Occupational Risk Management and Assessment Guide.
8.	https://www.infobalt.lt/docs/04_Rizika_pranes..ppt	Occupational risk and safe work, Head of Technical Department of State Labour Inspectorate V. Duoba, 2003
9.	http://www.vdi.lt/risk/2_4_steps.html	Occupational Risk Management and Assessment Guide, Recommendations for risk management stages
10.	http://www.vdi.lt/risk/2_1_1_aspect.html	Occupational Risk Management and Assessment Guide, General aspects of occupational risk assessment
11.	http://www.zurich.co.uk/RiskServices/latestnews/articles/2005/Managing_work_related_road_safety_are_business_drivers_insured_and_safe_to_drive.htm	Information announced in Zurich Risk Services News section on road safety management while driving for work.
12.	http://www.hse.gov.uk/pubns/indg312.pdf	Example of good practice in safe parking of large goods vehicles
13.	http://www.hse.gov.uk/pubns/indg395.pdf http://www.hse.gov.uk/pubns/indg395.pdf	Example of good practice in fall protection matters
14.	http://www.hse.gov.uk/pubns/indg379.pdf	Example of good practice in health and safety in road haulage
15.	http://www.hse.gov.uk/pubns/indg313.pdf	Example of good practice in safe unloading of steel products
16.	http://www.hse.gov.uk/pubns/indg396.pdf	Example of good practice in safe transporting of paper products
17.	http://www.hse.gov.uk/pubns/indg199.pdf	Example of good practice in workplace transport safety
18.	http://www.hse.gov.uk/pubns/indg148.pdf	Example of good practice in reversing vehicles
19.	http://www.hse.gov.uk/pubns/indg242.pdf	Example of good practice in control of whole body vibration at work

20.	http://www.vkti.lt/aktai/MOK050719_2.doc	Leaflet on transporting hazardous cargo
21.	http://www.safetyshop.com/products/productcategory.asp?topgroupcode=SA	Safety Signs and Signals
22.	http://www.hse.gov.uk/pubns/indg184.htm	Health & Safety Executive, Safety Signs and Signals
23.	http://www.hse.gov.uk/pubns/indg382.pdf#search='managing%20at%20work%20for%20drivers'	Driving at work, Managing work- related road safety
24.	http://www.ogp.org.uk/pubs/365.pdf	Land transportation safety recommended practice
25.	http://www.zurich.co.uk/RiskServices/latestnews/articles/2005/Managing_work_related_road_safety_are_business_drivers_insured_and_safe_to_drive.htm	Zurich Risk Services, Managing Work Related Road Safety – are business drivers insured and safe to drive?
26.	http://www.gpmu.org.uk/hs/health/msg00014.html	Diesel exhaust fumes
27.	http://www.hse.gov.uk/pubns/indg286.htm	Diesel engine exhaust emissions
28.	http://www.mastercrafttires.com/us/en/safety/tireSafetyInstructions.asp#item8	Safety tips and optimum performance of tires
29.	http://www.hse.gov.uk/pubns/indg362.pdf	Noise at work
30.	http://www.hse.gov.uk/pubns/indg363.pdf	Protect your hearing or lose it
31.	http://www.hse.gov.uk/pubns/indg387.pdf	Safe working with LPG fuelled motor vehicles