

## M2-EN.5 MEANS OF TRANSPORT

M2-EN.5.1 Introduction

M2-EN.5.2 Means of Transport in General

M2-EN.5.3 Cranes

M2-EN.5.4 Lifts

M2-EN.5.5 Machines used in Construction



### M2-EN.5.1 Introduction

In this chapter, the typical risk factors when working with means of transport on a construction site are described. The aim of this chapter is to:

- Identify the most common risk factors
- Describe the constitution of the risk
- Provide suggestions on how to reduce these risk factors

The driver or the user of the mean of transport is in charge of the daily inspection and the necessary tightening-up in conformity with the instructions. The driver or the user must pay attention to any kind of irregularities in the operation of the means and immediately notify his supervisor. The supervisor carries the responsibility of repairing the means immediately before the work is resumed. Specially trained personnel must carry out all repairs, including the annual inspection.

Inspection and maintenance of the means are supposed to secure that the means are kept in order. The annual inspection must among other things include all mechanical parts, hydraulic components, pneumatics, electrical equipment and safety equipment. When examining the load-bearing parts one must observe signs of cracks,

deformations and loose or damaged construction joints. If the paint peels off it might be a sign of damage or overload of the means.

All means of transport must be equipped with a logbook documenting authorisations, continuous inspection and repairs if any. Furthermore, operator's manual and repair instructions must be kept in or near the means.

### **M2-EN.5.2 Means of Transport in General (M2.5.1.jpg, M2.5.2.jpg)**

The driver's cabin in trucks, cranes etc. must be organized in a way that gives the driver a good view on the street and the working area. It must be possible to heat and ventilate the cabin and it must be isolated from noise and vibrations. Driver's seat and control lever must be ergonomic, and there must be enough room for the legs. (M2.5.3.jpg) The access to the cab or seat must be unhindered and safe.

#### **Risk Factors**

- Collision
- Faulty operation
- Cold, din and vibrations
- Heavy work

#### **Impact on Human Health**

- Collision or faulty operation of the means may lead to severe injuries of persons or damages of property. Crashing burdens or construction units may furthermore cause injuries which in the worst case may lead to disablement or death
- Cold, din and vibrations are tiring and cause stress which increases the risk of faulty operation or inadvertence. Impact during a long period of time may lead to muscular rheumatism, illness and injuries on body and hearing
- Inconveniently designed handles and buttons increase the risk of faulty operation and are hard for the back and the limbs of the driver

#### **Safety Measures**

- Make sure that the cabin is clean and tidy so that the wheel, handles and buttons are easy to operate. Clean windows increases the vision considerably
- Use a signalman if the view on the road and the cargo is obstructed
- Make sure that buttons and handles are easy to identify and operate
- Use large operation handles for work that requires a lot of power and smaller handles or buttons for precision work. Buttons and handles must not require power and precision simultaneously
- Buttons and handles on cranes must fall into neutral position when not in operation

### **M2-EN.5.3 Cranes**

There are particular requirements concerning the safety of cranes. When rising new cranes or cranes after rebuilding, repair or re-arrangement, load tests must be carried

out in conformity with the current rules. The purpose of the load test is to examine the strength and the security of the load-bearing parts, including means of bearing, crane girder, spinnaker boom, driving track or rail and the security of cantilevers, rotary rims etc. Since certain safety devices have to be switched off while testing, only particular experts are allowed to do the tests. The driver should if possible be present when testing. (M2.5.4.jpg - M2.5.6.jpg)

For most types of cranes there are several requirements concerning the training and certification of the driver to use and operate the crane. Crane driver certificates cannot be issued to workers under the age of 18.

Everyone who attaches or releases cargo from a crane hook is called ground assistant. The ground assistant must be accordingly trained and has to be of at least 18 years old.

The ground assistant and the crane driver have the right and an obligation to refuse to carry out a job that they feel that does not comply with the necessary safety requirements.

The ground assistant must:

- Keep in touch with the driver during the work
- Stop the work if there is any doubt concerning safety matters
- No one is allowed to stand upon cargo which is attached and lifted from the ground
- Always wear a helmet, feet protection and suitable protective gloves
- Always use the right ground tools and discard defected or imperfect tools
- Check before every lifting that the hook is vertical to the centre of gravity of the cargo, that the burden is in balance, that all slings are correctly attached and that the cargo is not stuck to the ground

### **Risk Factors**

- Cranes might sink into the ground or skid and tip over
- The wind might tip the crane or make its cargo swing
- Cranes might break down because of faulty erection or operation
- Crane might collide with people, buildings, goods or construction units

### **Impact on Human Health**

- Falling or swinging cargo may cause injuries
- The burden might tip when put down
- Fault at the ground material – or overload
- Worn out or faulty ground tools

### **Safety Measures**

- Tower cranes must always be erected by specially trained personnel
- Make sure that the foundation is appropriate

- Keep a safety distance – at least half a metre – from buildings, goods or construction units
- Keep the slewing area and if necessary the driving area securely barred
- Always make sure that safety appliances are correctly adjusted in conformity with the specifications
- When erecting the crane it is important to check that high-level stop, stop at traffic end and the signal instruments etc. are functioning correctly
- If more than one crane is erected at site, make sure that cranes cannot collide with each other
- Always leave tower cranes with a loose slewing brake so that the crane may turn with the wind
- Do observe the wind when working with both heavy and light cargo. No matter the strength and stability of the crane, it might be necessary to postpone the work even at light wind
- At mobile cranes always use supporting legs in conformity with the specifications

#### **M2-EN.5.4 Lifts**

When designing the construction site it must be assessed whether to choose a lift for persons or a front lift only for material. Erecting, dismantling and changing the lifts whether they are for persons or material only, must only be carried out by specially trained personnel. (M2.5.7.jpg – M2.5.9.jpg)

#### **Risk Factors**

- Overloading of the lift
- Unintended start of the lift
- An inclining lift may slip or tip over
- The wind

#### **Impact on Human Health**

- Injuries caused by fall or crushing

#### **Safety Measures**

- Make sure that the loading dock is effectively barred
- Establish an emergency brake on each storey
- Avoid covering the lift car with a wind-tight material
- Never exceed the maximum load
- Make sure that the load cannot fall off
- At the end of the day the lift car must be driven into the lowest position and the power supply must be switched off with a lockable main switch

- An inclining lift must be erected on solid ground and attached to fixed construction units

### **M2-EN.5.5 Machines used in constructions**

Machines in constructions must only be used for transportation of persons if they are built to do so. Machines driving on public roads must be adjusted according to the Road Traffic Act. Machines driving on the site should meet the same demands.

Several types of machines in the construction sector must have a driver protection against overturning and/or falling objects. The driver must at least have a licence for a tractor.

#### **Risk Factors**

- Risk of bumping into people – for certain types of machines there is also a risk that the driver himself may get hit
- Risk of cutting gas conduits and electricity cables when digging
- Risk of skidding and overturning
- Frost burst of the caterpillar treads

#### **Impact on Human Health**

- Bumping into people may cause severe injuries
- Cutting gas conduits and electricity cables when digging may result in poisoning or severe electric shock
- Frost burst of the caterpillar treads may cause severe injuries

#### **Safety Measures**

- Keep a safe distance to people and avoid swinging above people
- Machines with a walking driver must be equipped with operating equipment which makes it impossible for the driver to be crushed between the machine and fixed units. The machine must stop when the driver leaves the operating equipment
- Keep a safe distance to electricity cables and gas conduits, fixed units and steep slopes
- Avoid overloading
- The bucket or other parts to lift must be held low when driving and dropped before the machine is left
- The machine must be cleaned on a daily basis. In periods of frost the caterpillar treads must be cleaned very carefully