

Lifting and hoisting activities

Scope: RWE Generation NL
Prepared by GES-M Safety Central
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Document information

| Version | Version date | Authorisation | | |
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| Changes compared to previous version | | | | |
| <ul style="list-style-type: none"> Addition under general, that a minimum distance of 2 metres from the load is always maintained during lifting operations Amendments to/ and clarification of certificates ABvL and VVL-H | | | | |
| Purpose instruction | | | | |
| The uniform and safe execution of lifting operations and deployment of lifting equipment and lifting devices in compliance with prescribed measures so that the risks in vertical transport are controlled. | | | | |
| Target | | | | |
| All employees involved in the planning or execution of vertical transport. | | | | |
| Related documents | | | | |
| Type of document | Title | | | Code |
| Process | Managing HSE risks | | | P053 |
| Process | Operate and monitor | | | P033 |
| Process | Maintain installations | | | P080 |
| | | | | |
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Terminology and abbreviations

| Term or abbreviation | Description |
|--|--|
| HS | High-voltage (Hoogspanning) |
| ABvL (SOG) | Certificate Hook up and guide loads. Correctly, safely and responsibly hooking up, moving and guiding loads and making proper preparations for this, in consultation with the operator. |
| VVL-H (SOG) | Certificate Moving loads with hand-held tools. Correctly, safely and responsibly tackling, transferring, moving loads and making proper preparations for this. |
| TCVT | Supervision Certification Vertical Transport |
| Client | The person who commissions lifting operations. Client and contractor may be the same person if the work is carried out in-house. |
| Contractor | The one who performs the lifting work (certified contractor or own employee) and thus receives all information (TOS) from the client. Contractor puts together the job package. |
| Terrain manager | Terrain manager should be someone with knowledge of the site in general form. He should have knowledge of underground structures and permissible ground pressure. He is appointed by the Plant Manager for this purpose. |
| Overhead or gantry crane | Fixed crane in workshops or production facilities for lifting and moving loads. |
| Lifting agent | Tool for slinging or hoisting loads. |
| Telehandler | An implement used to move loads, it may be used for lifting if the machine is equipped with a Load Moment Barrier (LMB, Safety Device) and the lifting data of the telescopic handler must be followed. Lifting block and telescopic handler must be geared to each other. If the load moment exceeds 10 ton metres, the crane operator must hold the Dutch TCVT certificate. No lifting bins/workboxes for persons may be attached to a telehandler at RWE Generation. See also Instruction I111 - working at height . |
| Forklift | An implement used to move loads, it may be used for lifting if the machine is fitted with a Load Moment Barrier (LMB) and the lifting data of the forklift must be followed. |
| Earthmover | An earth-moving machine is used to move soil; no load may be lifted using a lifting hook. If the machine is equipped with a load moment safety device (LMB), work according to the lifting data of the earth-moving machine. |
| Rigger (Lifting assistant/ supervisor) | A Rigger is used for hoisting work, as an assistant to a crane operator in relation to communication, as an assistant to the operator when assembling a crane and for hoisting loads. |
| Crane operator | Is the person who operates the crane. The crane operator (machinist) is responsible for the actual lifting work. |

| Term or abbreviation | Description |
|-----------------------------|--|
| Lifting sketch | A lifting sketch indicates the tonnage, mast length, flight, weight to be lifted, outrigger pressures (in tonnes) and bottom pressures under the bulkheads (in tonnes/m ²) of the crane. |
| Lifting plan | A lifting plan gives the details of a lifting sketch, supplemented by an overhead and side view of the work location, the lifting movement and textually the measures/assumptions to be taken. |
| Flight | The distance from the centre of the slewing ring to the centre of the load. For implements with no possibility of slewing, the centre between the front and rear tilt lines of the implement and the load is taken. |
| Workload | The working load means the maximum permissible load that may be applied. That is, the working load is the maximum permissible mass of the payload. The working load should be designated in the unit kilograms (kg) or tonnes (t). The working load is also called operating load. Similarly, the term WLL is used to denote the working load. WLL is the abbreviation for Working Load Limit. |
| IV | Electrical Installation manager, often E-engineer, who is responsible for the E-installation of relevant site. The IV'er will examine internal rules as well as external rules from e.g. Tennet and set requirements for the lifting job. |
| Accessibility | Accessibility means the ability to reach a place, to get there. That is, a mobile crane must be able to reach the area properly so that it causes the least disruption to the (residential) environment during the construction process. |
| Hoisting | Moving freely suspended loads vertically and horizontally, such as with a crane. |
| Lifting | Moving guided loads vertically and horizontally, such as with a fork carriage on a forklift, telehandler or shovel. |

Safety, health & environment



Hazard

Crushing and entrapment hazard due to falling hoisting load, entrapment hazard of limbs between hoisting load, hoisting equipment and surrounding objects. Tilting, toppling crane on unstable, non-load-bearing ground. Falling of the load due to faulty, untested lifting equipment. Hitting objects in the vicinity, electricity transference when set up near live parts (e.g. HS lines).



Warning

Lifting operations fall under increased risk, so a task risk analysis should always be carried out. Setting up mobile cranes requires permission from the terrain manager. Before lifting work, always check the lifting equipment for defects and whether it is still under a valid inspection.

Life Saving Rules



Ik werk met een
geldige
werkvergunning



Ik plaats mezelf nooit
onder een
hangende last



Ik installeer
en respecteer
afzettingen. Ik blijf
uit de 'line of fire'



Ik gebruik de additioneel
voorgeschreven
persoonlijke
beschermingsmiddelen



Ik hou me aan de
elektrische
veiligheidsregels

General

- Lifting equipment should only be operated by competent and authorised persons;
- The operator is ultimately responsible for working safely with a hoisting or lifting equipment and the lifting job;
- A TCVT certificate or registration is compulsory for all operators operating a crane of ≥ 10 ton-metres. See also table 1 under "Training requirements and certificates";
- The lifting area, including the area of flight of the load, should be widely cordoned off so that unauthorised persons cannot enter the area. Also consider underlying floors so that no one can be under the load at any time;
- Always be alert for underground pipe tracks and basements, including when temporarily placing heavy loads. It is mandatory to lay driving plates when setting up on or driving over gravel beds;
- All hoisting and lifting equipment must be checked for defects before work starts and have a valid inspection certificate. Certificates must be present;
- Stamping on outrigger pads is mandatory for all outriggers. The permitted ground pressure must be determined by the **Terrain manager**. The guideline for disturbed soil on our sites is that the maximum occurring ground pressure should never exceed 200 kN/m² (2 kg/cm² or 20 tonnes/m² respectively);
- Good communication between the operator and lifting supervisors/riggers is necessary;
- During lifting operations, everyone should maintain a minimum distance from the load of **2 metres** to avoid the risk of entrapment between the load and other objects (due to swinging out). If this is not possible due to circumstances, the risks and protective measures should be named in a risk assessment.

Working method

Lifting operations must never start before a valid work permit has been issued. Instruction **I-001 work permits should be** followed in this regard. Exceptions include the use of an overhead crane in a workshop and stationary unloading cranes for the purpose of fuel and residue transport.

Carrying out lifting operations with mobile hoisting equipment always falls into the category of high-risk work. A TRA should therefore always be drawn up before carrying out these activities, in accordance with Instruction **I002- Performing task risk analysis**.

Before starting work, one should ask who is responsible for carrying out the lifting work. There is a clear distinction between work on a time and expense base and contracted work.

Accepted or contracted work means that the owning employer accepts a job for which it provides a crane and a crane operator. The employer assigns the operator directly and is responsible for safe work assignment and instruction and a safe working environment. He draws up a lifting plan and discusses it with the operator prior to lifting operations.

The client and the crane operator's employer have a joint responsibility to achieve a safe working environment for the crane operator. The employer shall ensure a technically in good condition and safe, approved crane with lifting equipment and guarantee the competence of the crane operator.

Working on a time and expense base involves the employer lending its operator (possibly with crane) to a client. The principal gives executive orders directly to the worker. The crane operator is a hired worker.

The hiring employer is responsible for a safe work order and instruction (possibly consisting of a lifting plan). The client is responsible for creating a safe working environment and the employer for a technically sound and safe, approved crane with lifting equipment and guarantees the expertise of the operator. The employer may also provide its own crane (overhead crane, gantry crane) and hire an operator.

If the crane operator encounters an unsafe work situation, he reports it to the client's foreman. Together, a solution is sought. If the work situation remains unsafe, the driver contacts his employer immediately. His employer consults with the principal. There is no difference between contracted work and work on a time and expense base.

Before and, if necessary, during lifting operations, consultation will have to take place between the crane operator, the supervisor at work and the workers involved on planning and safe execution.

When the machine arrives at work, it is important that the workplace is easily accessible and that the access road is suitable for the heavy load. The machines are based on balance and therefore have to carry a lot of ballast. This results in a high load on the road. To this end, the load-bearing capacity of the ground must be known, taking into account the expected tyre or track pressure. The ground pressure is determined by a number of factors, including soil type, moisture content and whether or not the soil has been disturbed. The presence of underground pipes is very important and should be known in advance.

Therefore, due to the above at RWE sites, lifting operations must have been discussed in advance with the **Terrain Manager** of the site and have his approval with regard to set-up, in connection with the permitted ground pressure, presence of cables, pipes, cellars, etc.

Upon arrival on the day of the work, the driver of the (mobile) lifting equipment reports to the gate/security service. The latter alerts the RWE contact/permit holder.

The contact person/permit holder checks together with the crane operator in a secure environment (preferably outside the gate) that the crane book, the certificates belonging to the lifting equipment and the crane operator's certificates are present and valid (see **RWE checklist mobile**

lifting equipment) and that a lifting plan has been drawn up for the relevant lifting job. If valid and complete documentation is not met, the crane cannot be admitted to the site by the security service. The **contact person** and the **crane operator** are responsible for this and can prove it with the above documents and the checklist.

A foreign crane operator must also hold a valid Dutch **TCVT certificate** to operate the applicable hoisting or lifting machine (≥ 10 ton metres).

Duties and responsibilities Principal (RWE)

In order for lifting operations to be carried out as efficiently and safely as possible, the following information must be provided by the **client**, among others:

- a) The mass of the loads to be moved;
- b) The shape and maximum dimensions of the loads;
- c) Floor plan showing the distances between the places where the loads are to be struck, the places where the loads are to be put down and the place where the machine can or should be set up (with correct stamping);
- d) The height above ground level where loads are to be placed;
- e) Environmental factors that the load might encounter in its path or that might limit the crane's reach or function;
- f) The presence of high-voltage power lines or installations within the working and turning range (for info and approval, consult the RWE **installation manager (IV)**);
- g) The prescribed lifting methods by the supplier of the load or object (in the context of CE marking, this is an obligation for the supplier of machinery);
- h) The presence of suitable lifting equipment in and at the load;
- i) With what kind of lifting equipment, such as chains and clamps etc., the loads are to be moved;
- j) The possible necessity of special lifting tools such as lifting beams and clamps, among others;
- k) Terrain condition, subsoil on which the machine is to be brought and to operate, stating the maximum permissible ground pressure at the lifting location. This requires info and approval from the **Terrain Manager** at the RWE site;
- l) The presence of third parties (in connection with cordoning off the work);
- m) Clarity on who takes care of the fencing when setting up the crane and during lifting operations (according to RWE **instruction I112 Fencing, marking and lining**) to prevent unauthorised persons from entering the working area;
- n) The presence of a safe workplace at height (fall protection and the like);
- o) For indoor installation, data on maximum floor load (for info, consult the Terrain manager or local expert from the maintenance department (E&M));

Client should have a contact person/permit holder appointed to a lifting job.

Additional tasks Contractor

The **vertical transport company (contractor)** must deploy a machine with capacity and functionality appropriate to the work and supplied data, as well as a competent operator.

For safe and efficient work, there are still a number of tasks to be arranged by the contractor:

- Complete the **RWE mobile crane checklist** together with the contact person (see forms Annex 1);
- Preparation of a lifting sketch and/or lifting plan;
- Complete any checklist of persons lifting bin if used (Annex 2);

Furthermore, the contractor shall ensure that:

- A **HSE work plan** is prepared with a draft **Task Risk Analysis (TRA)**;
- Crane operator and hoist supervisor/ rigger speak **the same language**;
- Hats are provided and worn, colour green with text "**Crane operator**" and orange with text "**Rigger**" (see Figure 1 below as an example).



Figure 1 Crane operator and rigger safety vests

Before -and if necessary during- the lifting operations, consultation will have to take place between the crane operator, the supervisor at work and the workers involved on planning and safe execution.

During lifting operations

- There must be no persons under the load and unauthorised persons must not enter the work area;
- **A minimum distance of 2 metres** from the hoisting load should be maintained by everyone during hoisting. If this is not possible due to circumstances, the risks and protective measures should be named in a risk assessment. The crane operator and riggers monitor this;
- Permitted operating load of the hoisting equipment must not be exceeded;
- No persons may be lifted with the load;
- The crane operator must always be present at the operating site as long as all loads suspended in the crane are detached from the fixed surface;
- In case of changing weather conditions (thunderstorms, strong winds, precipitation) stop work and consult contact person or work permit holder/provider;
- During lifting operations, only the lifting supervisor/rigger may give instructions to the operator;
- The crane operator always decides whether a load can be lifted safely and must not be overruled in this respect.

Risky situations - Multiple cranes in each other's turning range

What effective measures should be taken to avoid collision between cranes and/or loads:

- Prior to the work, consultations between crane operators take place and agreements are made and recorded;
- Communication between crane operators must be arranged;
- Supervision by a competent person should be arranged;
- Communication between crane operators and the expert supervisor must be arranged;
- A lifting plan must have been made;
- The turning range (if possible) of each crane is limited.

Risky situations - hoisting over buildings

The following measures should be taken when lifting loads over buildings:

A load can be lifted over a building only if the following conditions are met:

- No persons are present in the building;
- No hazardous work processes take place in the building;
- There are no hazardous installations in the building;
- The presence of persons in a building over which a load is being lifted is prevented by evacuating the building or choosing a different time for lifting operations (e.g. after working hours). If this is not possible, lifting can only take place if the following measures are taken:
 - Pay extra attention to the stability of the load.
 - Ensure minimum dwell time of the load above the building.
 - Ensure minimum drop height of the load.
 - If there is a risk that the strength of the roof structure cannot cope with a possible fall of the load and therefore the load may fall through the roof, either the roof is temporarily reinforced or the building is temporarily evacuated.
 - Alerting those in the building at the start and stop of operations.

If dangerous work processes or hazardous installations are present in the building, the load must be moved by other means.

Risky situations - hoisting in the vicinity of poles, wind turbines and high-voltage lines

The following measures will be taken:

- In contact with the manager/expert, the danger zone (b) is identified. The danger zone is the area where no persons or materials should be located;
- The danger zone (b) is respected;
- Work within the danger zone takes place in consultation with the manager.

This includes the following concerns:

- The load is not lifted over the danger zone;
- Measures are taken to avoid entering the danger zone when slewing the crane (capping, etc.);
- The lifting crane will be earthed according to the operating instructions of the lifting crane, or according to the instructions of RWE personnel. In some cases, earthing with an earth pin will be required.

Lifting operations in the vicinity of electrical equipment and high-voltage lines should therefore be notified in advance to the **RWE installation manager (IV) in connection with** minimum distances to be observed (see figure 2). Permission from this expert is necessary and they can determine whether the installation can be de-energised, which is preferable, or whether additional, specific measures must be taken.

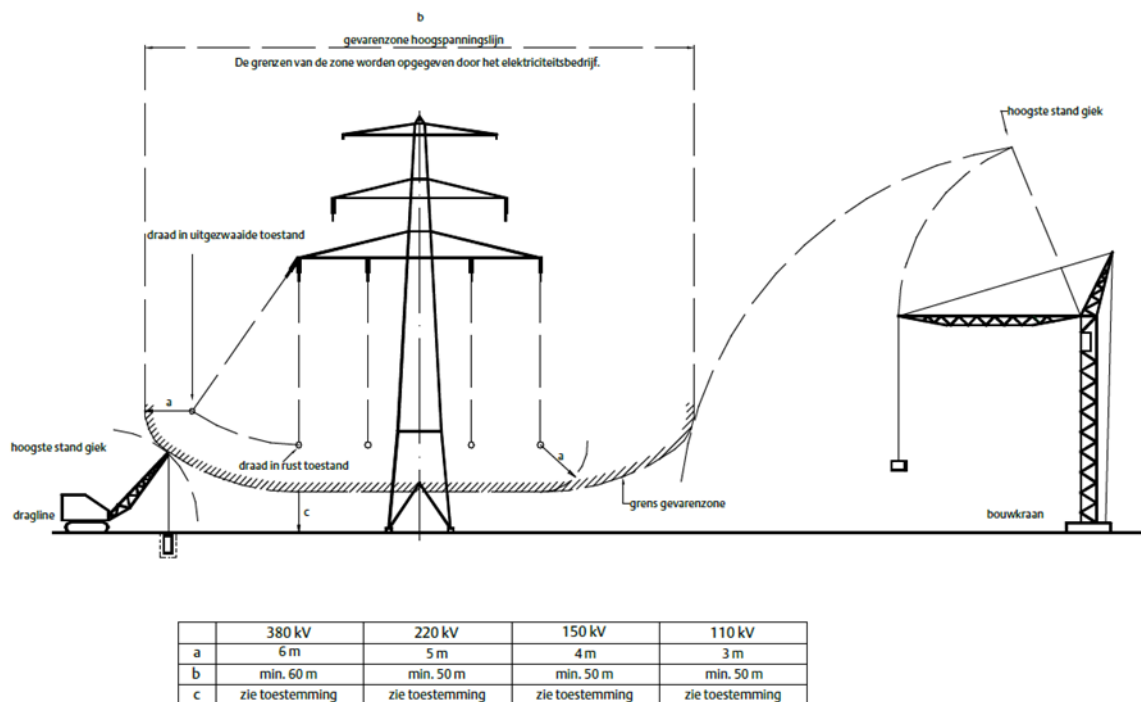


Figure 2 Hazard zone and boundaries at HV lines

| | | |
|------------|---|----------------------|
| RWE | I032 Lifting and hoisting operations | Instruction |
| | | Doc no: 2006-0041981 |

Training requirements and certificates

For being allowed to operate (mobile) lifting equipment, RWE Generation sets the following requirements for crane operators or operators of lifting equipment and supervisors (riggers)

Table 1 List of personal certificates and requirements for operating lifting equipment and hoisting, moving and guiding loads

| Hoist/means | Operation of hoist/crane | Rigger/ Employee docking, guiding and moving loads |
|--|--|---|
| Mobile lifting equipment (≥ 10 tonne metres, see also under "operator expertise" below) | TCVT certificate/registration and user instruction of the hoisting equipment | ABvL |
| Hall cranes, fixed powered lifting equipment | ABvL and received demonstrable instruction in operating the hoisting equipment | ABvL |
| Hand-held tools and hoisting and guiding loads | VVL-H | VVL-H/ ABvL |

Operator expertise

Crane operators carrying out lifting operations in the Netherlands on a construction site (which includes the RWE factory sites) with an operating load moment of 10 tonne metres or more must hold a **TCVT person's certificate** for the relevant machine. Possession of the TCVT certificate ensures that only machine operators who are competent are allowed to carry out the (lifting) work.

These are the following certificates:

- Mobile crane operator;
- Tower crane operator;
- Loader crane operator with a device for lifting operations;
- Earth-moving machine operator with equipment for lifting operations;
- Mobile tower crane operator;
- Telehandler operator with equipment for lifting operations;

In addition to the training required by law, specific instruction for each crane is also important. The operator should be aware of the specific aspects for operating the crane he is working with. These are contained in the operating instructions and should be present on each crane. The final attainment levels of crane operator training indicate that a crane operator is automatically competent to operate a forklift, aerial work platform or telehandler.

Annexes

Annex 1: [F032-006 Checklist mobile cranes](#)

Annex 2: [F032-005 Operator checklist when using personnel hoist in mobile crane](#)