3 – OPERATOR'S HANDBOOK

3.1 – INFORMATION AND TRAINING

Before using the crane, the operator should have red and understood the instructions of this handbook. If necessary, he has to ask for explanations and in case for a special training.

3.2 – INSPECTIONS TO BE MADE BEFORE EVERY SHIFT

Check that:

- The crane is rightly ballasted.
- The cable of supply is not damaged.
- The machine is correctly set in level, especially after rain.
- The machine responds correctly to the controls given by the button control box or by the radiocontrol.
- The functioning of the moment limiter and maximum load limiter, the hoisting, slewing and travelling limit-switches is correct.
- The winding of the hoisting rope on the drum is correct and be sure that there are ***at least 3 runs***.
- The calibration of the brakes is correct.
- The security distances between the crane and the obstacles around are observed.

3.3 – PRELIMINARIES

3.3.1 – Operator's position

In case the controls are given by means of the button control box, the position of the operator should be safe and chosen so that he has a complete vision of the crane's range of action.
In case the controls are given from the signal box and the operator hasn't a complete vision of the crane's range of action, he must always be assisted by the slinger and sometimes also by a signaller, who will give him instructions by means of walkie-talkie or the manual signs provided by the current regulations.
On demand, the signal box can be endowed with additional devices that indicate the distance of the load from the tower and the weight of the uplifted load.

3.3.2 – Hoisting devices

The hoisting devices such as grabs, forks, baskets, chains, bands, ropes, etc. must:

- Be suitable to guarantee the load stability.
- Be provided of a sure barycentric hook.
- They shouldn't cause dynamic stress such as the suddenly release of the load.

The load must be placed in such a way to avoid the accidental fall of one of its parts.
In case a load is lifted by means of metal ties, bands, chains, yoke, all these devices must be of the suitable size and certified for the load to lift.
The load must be correctly slinged and lifted horinzontally in order to avoid the accidental fall of the load or of one of its parts.
The addition of the hoisting devices' weight and the one of the load should never exceed the maximum charge of the crane.
The load can be hanged only to the turning hook with which the crane is endowed.
Do not use magnets or other devices that can cause the suddenly fall of the load.

3.3.3 – Switch on electric board

This switch, shown in ***Fig. 3.1***, is placed outside the electric board mounted on the jib section with winches (see ***fig. 1.18 part 11***). The position "**0**" takes the the tension away and allow the opening of the electrical equipment door in case of maintenance operations.
The switch is also an emergency block and so it has to be used only in case of danger.
The crane has tension only when the switch is positioned on "1" and the door is closed.

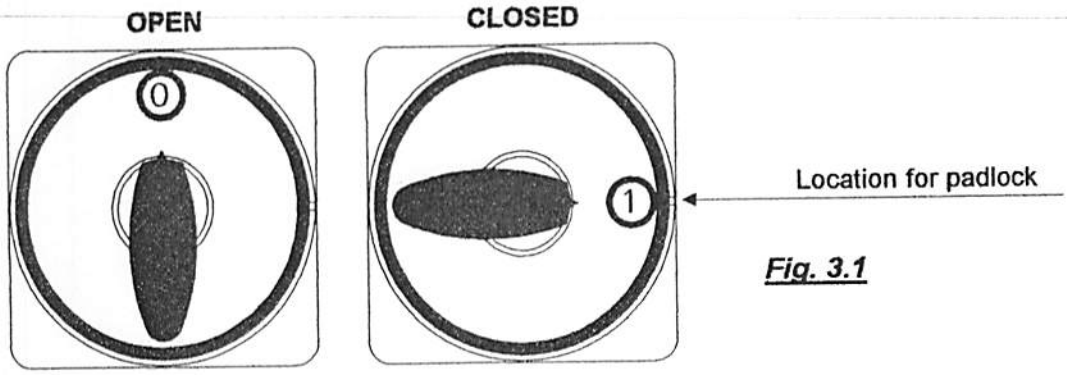


Fig. 3.1

3.3.4 – Switch on 1st tower basement

This switch, shown in ***Fig. 3.2***, is placed on the special plate linked to the ***1st tower*** basement (***or booster*** when it is present). To this switch is linked the power supply coming from the yard board.

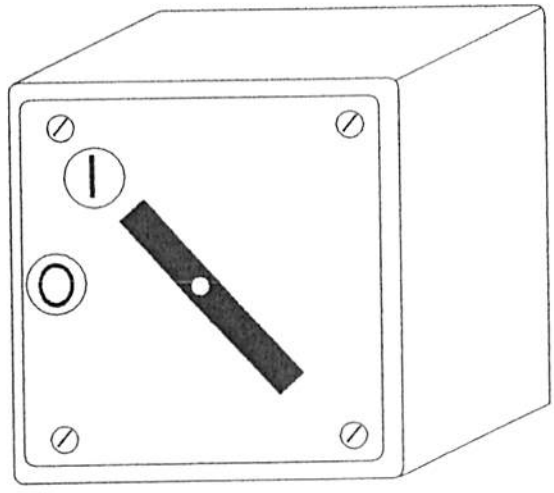


Fig. 3.2

SWITCH WITH A POWER OF 63 AMPERE

A special cable brings the power supply to the electric cabinet of the crane, as shown at § ***2.2.3.*** In the section speaking about the daily use of the crane there is a reference to this switch, used to energize the machine at the beginning of the work (switch positioned on "1"), or to take the tension away (switch positioned on "0") and leave the machine inactive during the night.
This switch also acts as an emergency block and so it has to be used only in case of danger.
The switch is equipped separately but in any case from the electric cabinet comes out the cable ***4 x 16 mm²*** of enough lenght to reach the tower basement.
It will be the assembler care to make the right connections to the threephase net, following the instructions listed here below.
Opening the door of the switch you find a socket, indicated in ***Fig. 3.3.***
Connect the 3 net cables **BLUE, BROWN** and **BLACK** coloured, belonging to the cable coming from the electric cabinet, to the terminals "L1", "L2" and "L3". The earth wire **YELLOW-GREEN** coloured is clamped to a terminal placed inside the switch while the terminal "N" is left empty.
On the other side of the socket, connect the 3 net cables coming from the electric board of the yard. You don't use the earth wire YELLOW-GREEN inside the cable of the yard. At the output of the terminal placed inside the switch, use a part of the YELLOW-GREEN cable in order to connect to the other end of the **GROUNDING** terminal positioned on the basement of the crane.

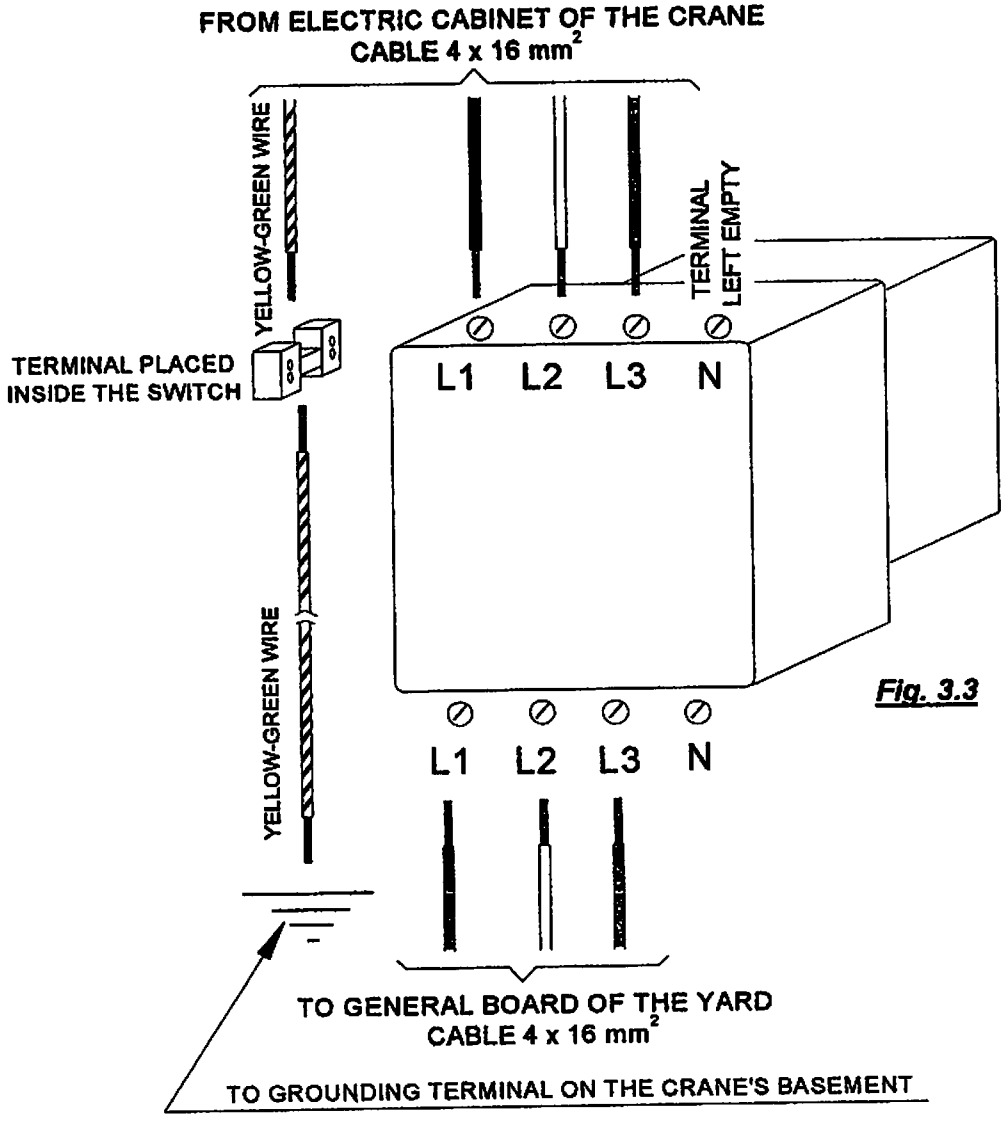


Fig. 3.3

N.B.! **Energize the machine and then check the correspondence of the movements in relation to the controls of the button box or the manipulator. For example, pushing UP the hook should move upwards. Otherwise, change one of the operations of the connection of the cable coming from the yard board (for example "L1" with "L2").**

3.4 – LOADING AND UNLOADING OF THE MATERIAL

The load can have an exposure to wind of ***0,8 m.***
Leaving the load to the ground, keep the rope in tension with the pulley block in order to avoid an anomalous wiring of the rope on the drum.
In case of static electricity, handle the load with isolating gloves and shoes or take the load with isolating accessories or else leave hook and load to the ground.

3.5 – MOVING THE MATERIAL

3.5.1 – View of the load during the movement

The operator should have a complete view of the load, the slinger and the turning parts of the crane from the moment he takes the load from the ground till he leaves it to the ground again.

In case the operator cannot see the load, it is necessary the presence of a signaller that passes on the instructions of the slinger.
The operator, with the help of the signaller or the slinger, must pay attention to the ropes: they shouldn't hit against the crane frame and they have to be always in a vertical position.

3.5.2 – Rational use of the controls

3.5.2.1 – Hoisting: UP-DOWN

- The load has to be lifted from a flat surface at 1st speed gradually and without wrenches, so that the frame and the hoisting devices are under a progressive tension.
- The passage between the 1st speed and the others shouldn't be immediate.
- In order to invert the movement, wait that the dynamic effect of the previous operation is over.
- Do not give too close controls in order to reduce the swinging.
- Lift the load at 1st speed when the limit-switch is about to intervene.
- Carry out the descent movement at 1st speed when the load is about to reach the point of rest.

3.5.2.2 - Travel: NEAR-FAR

The start and stop of the trolley can make the load swing in proportion to the height of the load itself from the ground.
Particulary, when the load is near to the ground, the swing is so wide that the trolley should be stopped and then started again so to limit these oscillations.

- Wait the load finishes to swing before carrying out operations of trolley travel.
- The operator has to move the load in such a way to keep it always in level with the jib.

3.5.2.3 - Slewing: RIGHT-LEFT

The slewing is controlled by a frequency variation device (***INVERTER***) that rules the acceleration and deceleration phases.

- The right adjustment permits to avoid, or at least reduces, the swinging of the load; the device is adjusted by the manufacturer at the final testing of the crane.
- ***No work may be carried out on this device unless by specialized technicians. The manufacturer is not responsible for any damage caused by any modification of the original adjustment.***
- Wait the load finishes to swing before carrying out operations of trolley travel.
- The operator has to move the load in such a way to keep it always in level with the jib.
- Avoid turning the crane always to the same side or the supply cable and the multiple cable of the button control box can be damaged. In any case, there is a limit-switch that limits the numbers of the turning (maximum three) to the same side.

3.5.3 – Start and how to brake the movements

3.5.3.1 - Description

Button control box with multiple cable and plug placed in the embedded connection under the electric equipment of the crane. The box is made of shockproof plastics.
The buttons are embedded in order to avoid the accidental activation.
On each button there are the symbols describing the control.
The button control box is of active-command type: the movements are carried out only by means of a pressure of the buttons.
The buttons are endowed with mechanical block.
The stop button quickly switches the controls off.
On demand, the control device can be made up with radiocontrol, composed by transmitter with button control box and receiving local plant.
The receiving local plant should be fixed to the tower at a **maximum height of 6 m**, and connected to the electric equipment by means of the multiple cable and the plug, which should be inserted in place of the cable button control box.
The button control box is endowed with a start key and a light signalling the charge.

3.5.3.2 – How to stop the movements

During the work, the movements can be stopped in the following ways:

- ***UP-DOWN*** movement at ***1st speed***:
  - Releasing the button the movement stops gradually. This depends on the adjustment of the calibration springs of the electric brake of the hoisting gear.
- ***UP-DOWN*** movement at ***2nd or 3rd speed***:
  - Releasing the button the movement stops after having automatically changed down. The load stops thanks to the work of the electric brake of the hoisting gear.
- ***TROLLEY TRAVEL*** movement:
  - Releasing the button the movement stops gradually. This depends on the adjustment of the calibration springs of the electric brake of the trolley travel gear.
    In case the trolley stops in 2nd gear, the movements stops after having changed down in il 1st speed automatically.
- ***SLEWING*** movement:
  - Releasing the button, the slewing movement stops gradually after a deceleration due to the adjustment of the frequency variation device (***INVERTER***) placed inside the electric equipment. The electric brake placed on the slewing gear intervenes at the end of the deceleration and acts only as emergency brake.

3.5.4 – Concurrent movements

During the work you may carry out at the same time the three movements the crane can make (hoisting, trolley, slewing) on condition to brake or accelerate only one movement.

N.B! Do not carry out any countermanoeuvre.

3.5.5 – How to use the emergency devices

In case of emergency the crane can be stopped:

1. – By means of the stop button on the button control box.
2. – By means of the switch placed on the crane's electric equipment (see § *3.3.3*).
3. – By means of the switch placed on the ***1st tower*** basement (***or booster*** when it's present) (see § *3.3.4*).
4. – By means of the general net switch.

NOTICE: consequences of an emergency stop:

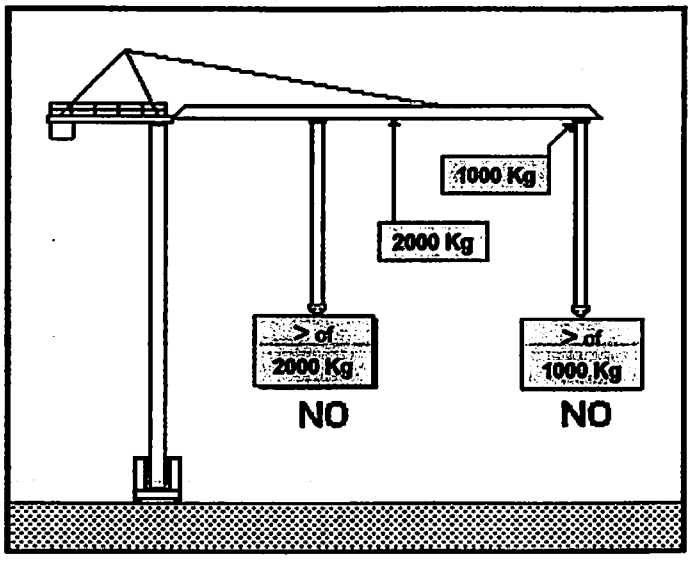
- The deceleration during the ***SLEWING*** is not controlled by the frequency variation device (***INVERTER***).
- During the ***UP or DOWN*** movement the crane doesn't carry out the automatic changing down.

3.5.6 – Not allowed operations

- Do NOT use the stop button to STOP the normal movement of the crane.
- Do NOT carry out operations on demand of unauthorized person.
- Do NOT carry out operations not provided by the current REGULATIONS.
- Do NOT insist raising loads very near to the maximum allowable, if this causes too frequent triggering of the LIMITERS.
- Do NOT leave the use of the crane to unqualified personnel.
- Do NOT move DANGEROUS loads.
- Do NOT move the crane if you haven't FOREWARNED with the special horn.
- Do NOT force the limit-switches and the saferty devices.
- Do NOT use the crane before having TESTED the efficiency of the safety and braking devices.
- Do NOT carry out ascent or descent operations in case of risk of collision with OBSTACLES of any type.
- Do NOT make the crane work before having controlled there are no obstacles on the track rail.
- Do NOT erect or use the crane if there are no GOOD CONDITIONS.
- Avoid rubbing the rope on corners or obstacles (masonry, scaffolding, etc.).
- Avoid jerks of the rope.

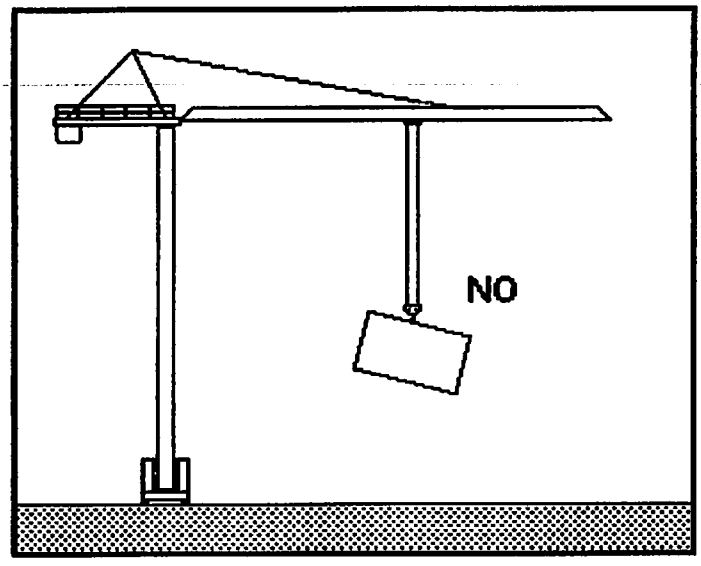
* *DO NOT USE THE SAFETY DEVICES OF THE CRANE TO STOP THE NORMAL MOVEMENT.*

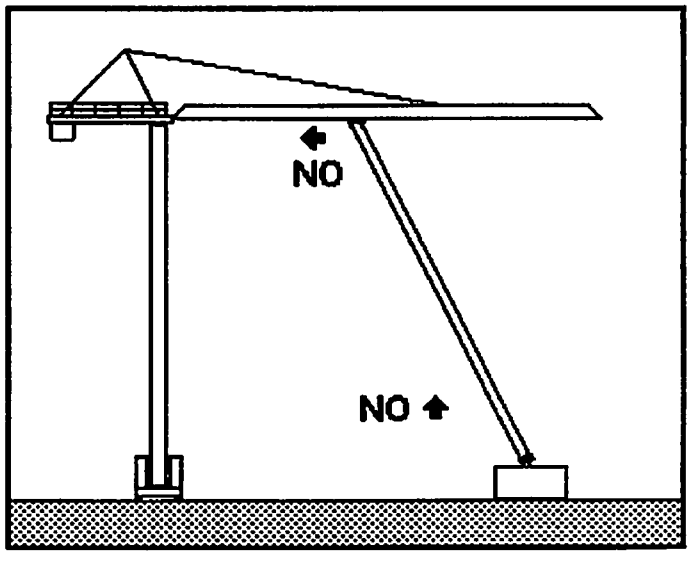
In the following pages (from page 3-8 to page 3-17) you will find pictures explaining the foreseeable unallowable usages of the crane.



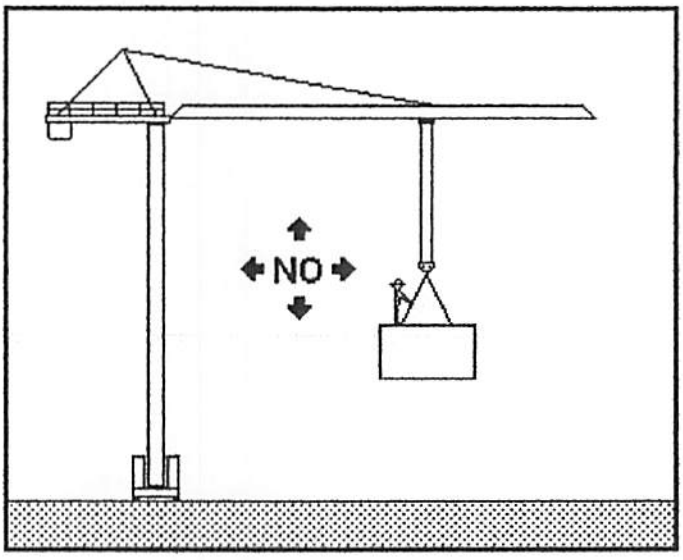
DO NOT LIFT LOADS WHICH EXCEED THE CARRYING CAPACITY OF THE CRANE

DO NOT LIFT LOADS HOOKED OUT OF THEIR CENTER OF GRAVITY, IF THEY MAY CAPSIZE OR OSCILLATE GREATLY



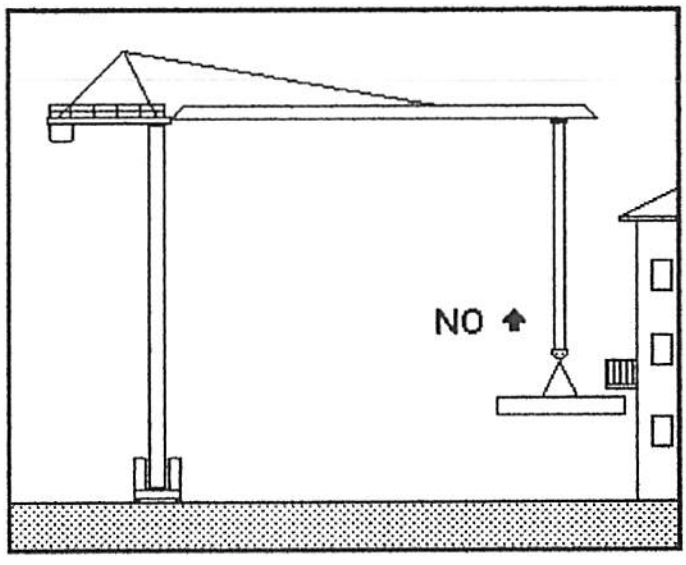


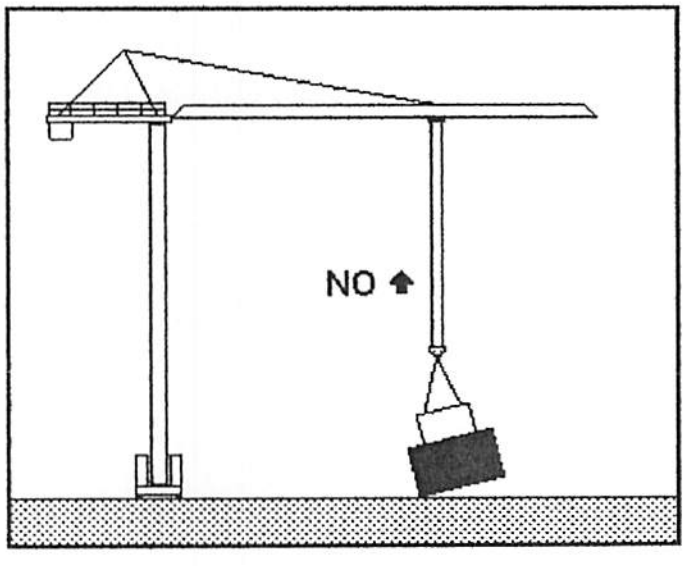
DO NOT PULL WITH SLANTING HOISTING ROPE OR PULL THE LOAD



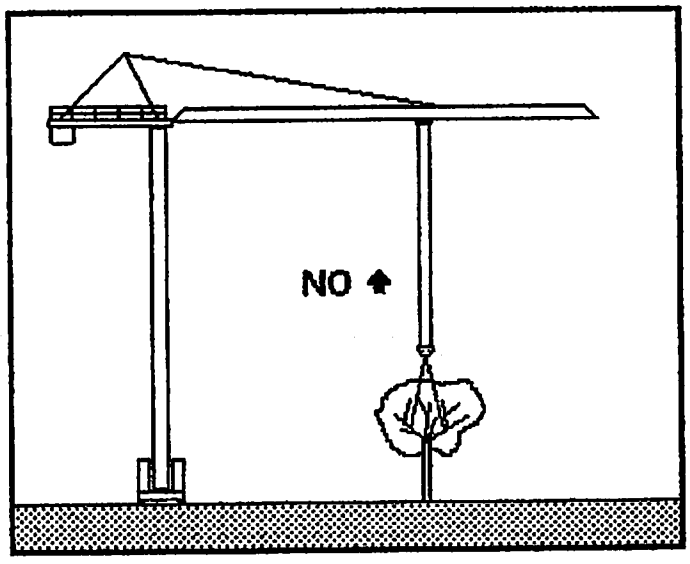
DO NOT LIFT PEOPLE

DO NOT CARRY OUT ASCENT OR DESCENT OPERATIONS IN CASE OF RISK OF COLLISION WITH OBSTACLES OF ANY TYPE



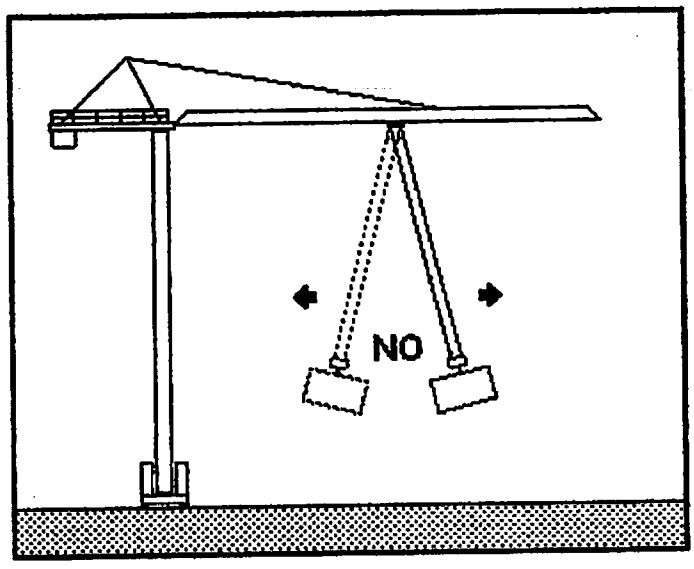


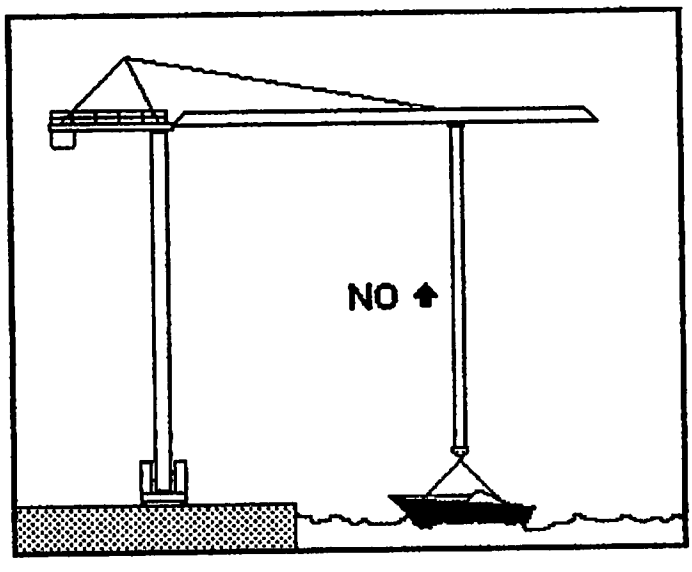
DO NOT LIFT THE LOAD FROM UNSTABLE SURFACES (SHAKY SCAFFOLDING, SHIPS, ETC.)



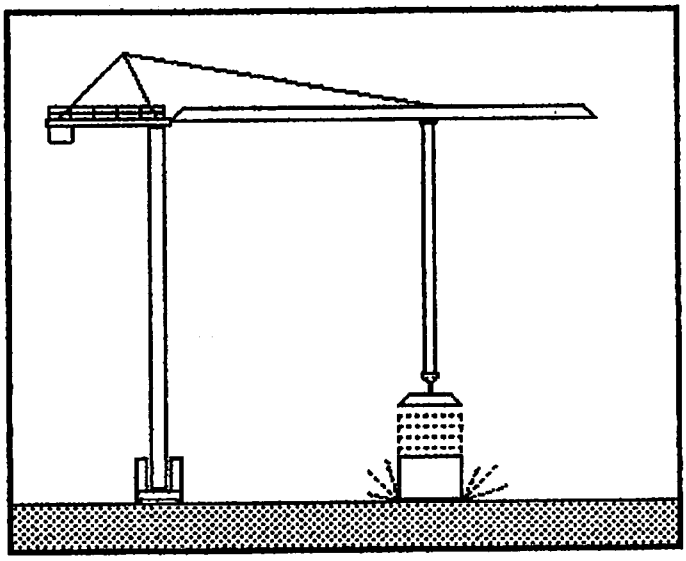
DO NOT LIFT ANY LOAD TIED TO THE GROUND (ROOTING OUT TREES, PILES, PILE SHOES, DEMOLITION WORK, ETC.)

DO NOT LET THE HING LOAD SWING IN ORDER TO REACH A POINT OUT OF THE RANGE OF THE CRANE



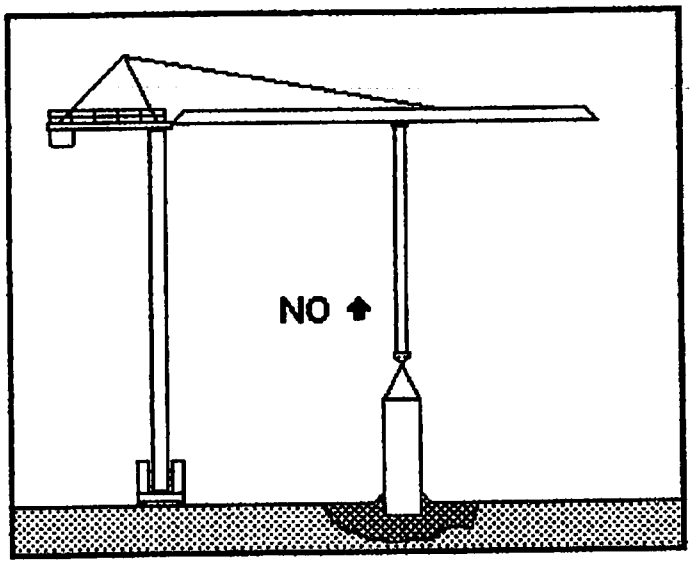


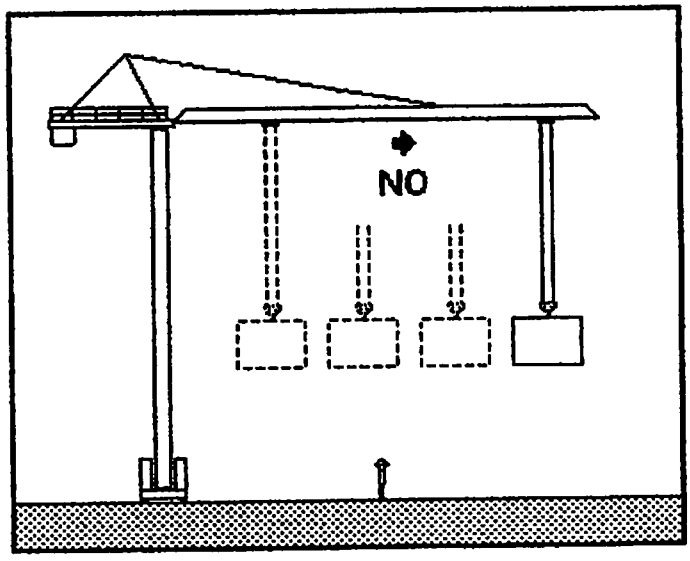
DO NOT LIFT BOATS



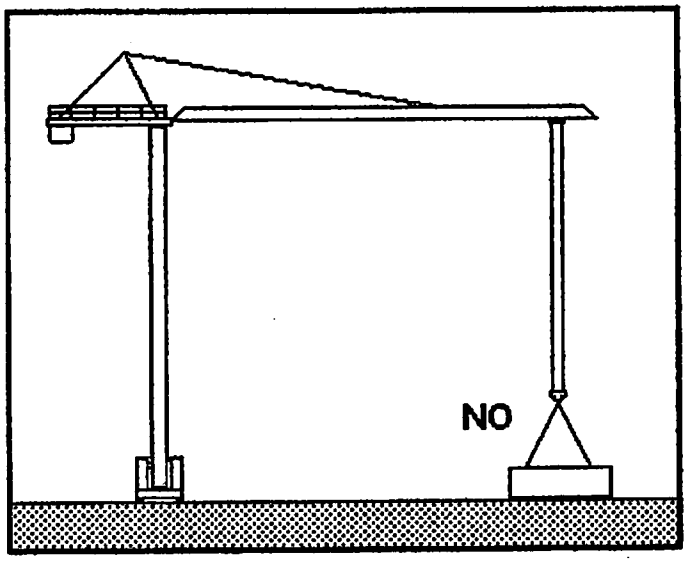
DO NOT RELEASE THE LOAD SUDDENLY, DO NOT USE DEVICES WITH ALLOW SUDDEN RELEASE OF THE LOAD. THE SLINGS OF THE LOAD MAY NOT BE CUT WHILE THE ROPE IS TIGHT

DO NOT LIFT LOADS TIED TO THE GROUND BY FROST OR ICE



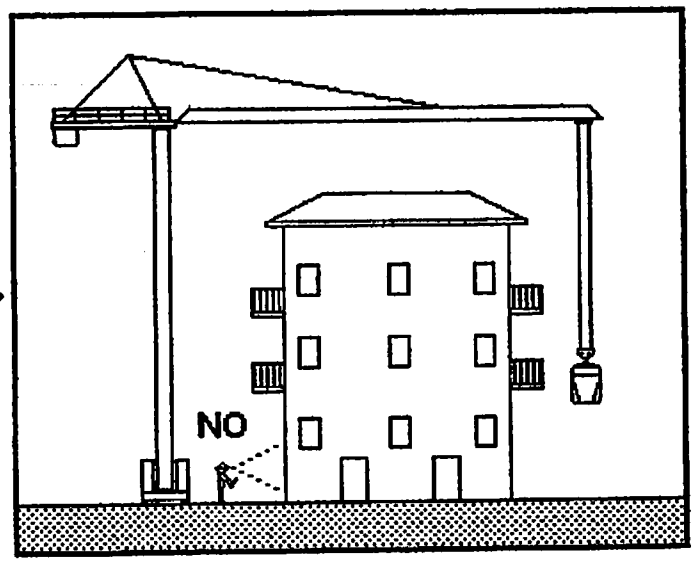


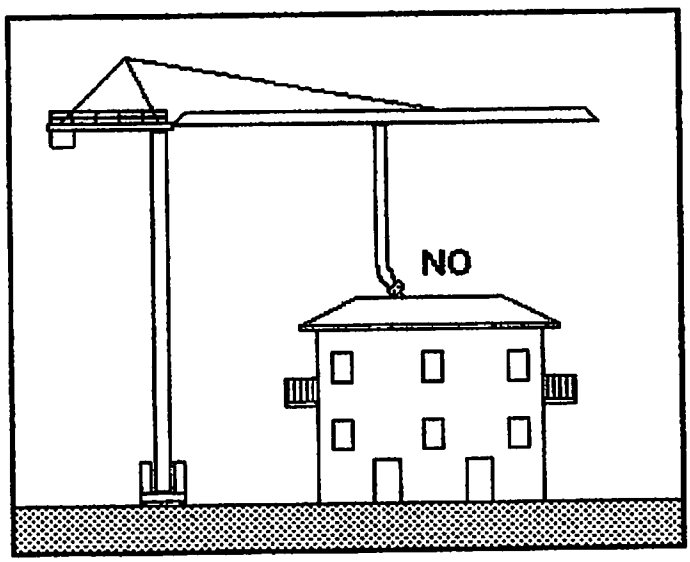
DO NOT LET THE LOAD MOVE OVER PEOPLE



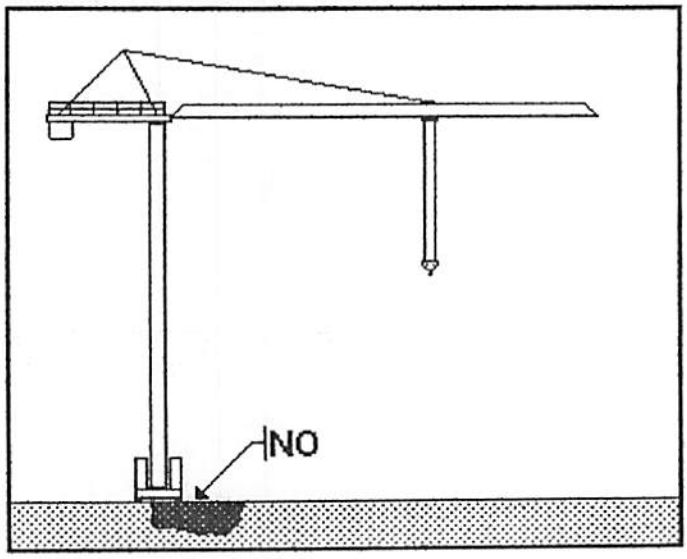
DO NOT LET ANY LOAD HUNG (IF NOT EXPRESSLY EXPECTED) WHEN THE CRANE IS OUT OF SERVICE

DO NOT CARRY OUT ANY OPERATION, IF THE LOAD IS IN A NON VISIBLE POSITION



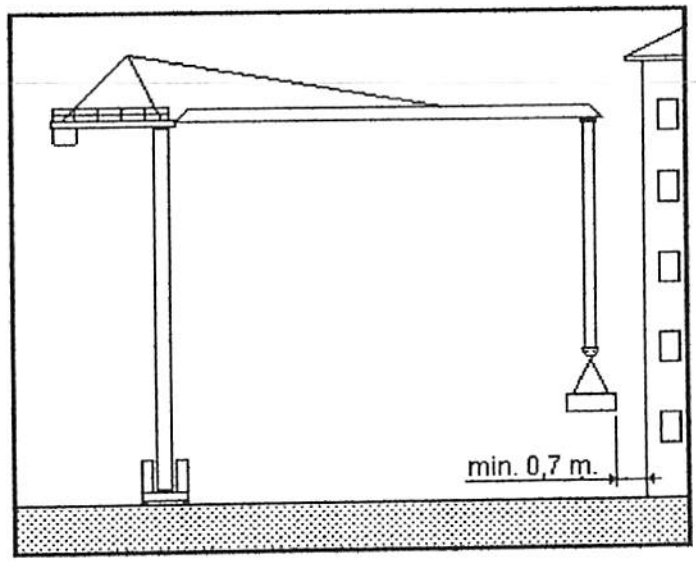


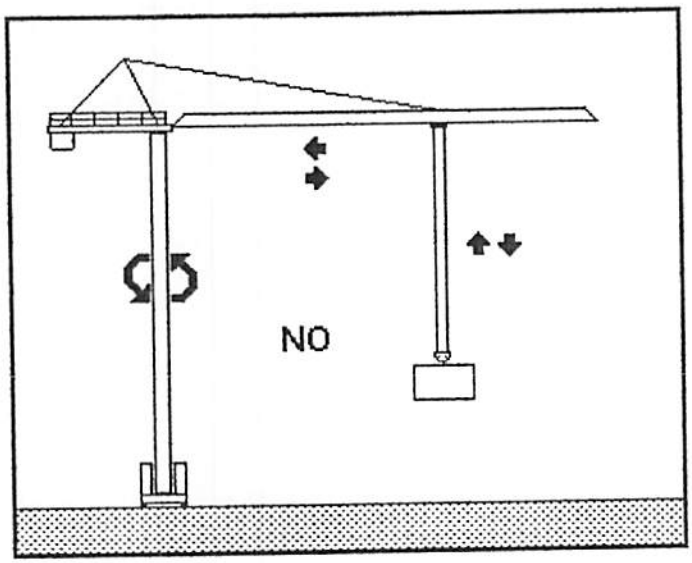
DO NOT LAY THE HOISTING BLOCK ONTO THE GROUND



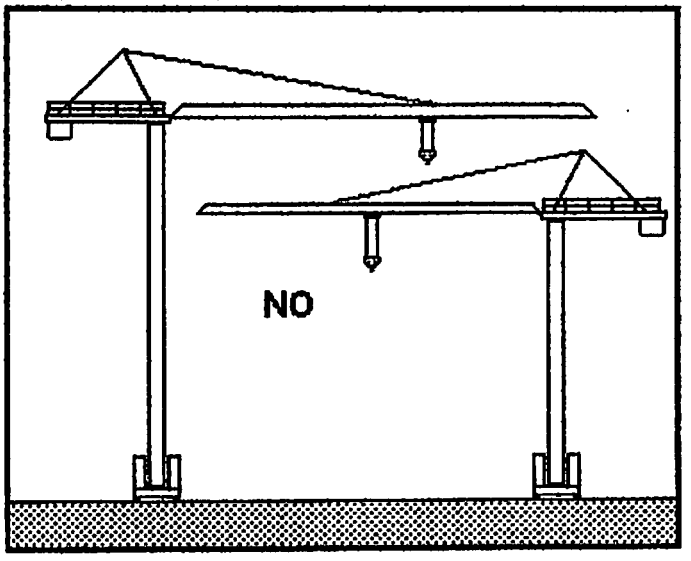
DO NOT USE THE CRANE ON NOT UNIFORM GROUNDS (VERIFY THE GROUND RESISTANCE)

DO NOT INSTALL THE CRANE IF THERE ARE NOT THE SAFETY DISTANCES FROM CONSTRUCTION, WORKS AND VEGETATION



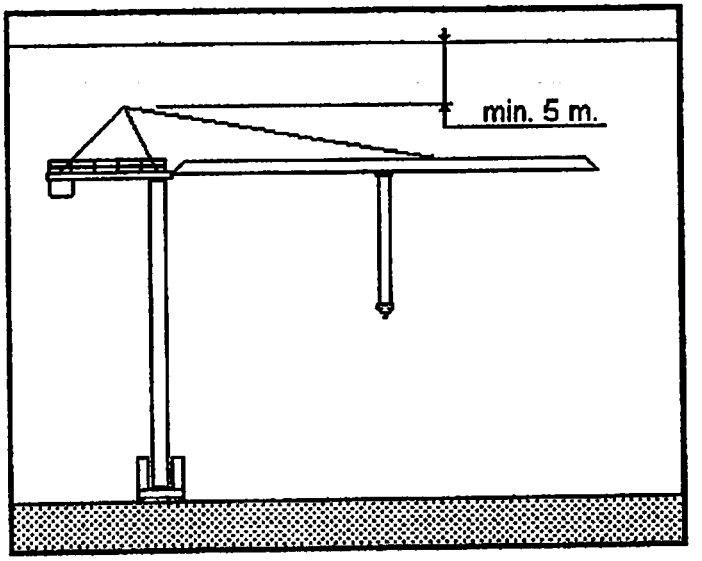


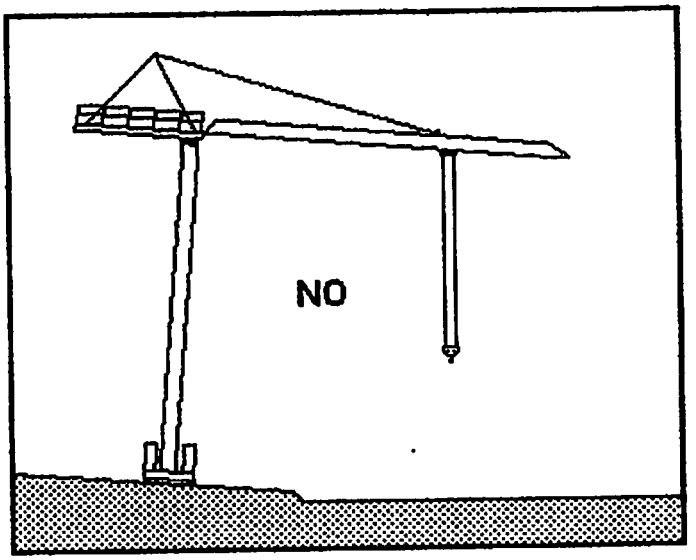
DO NEVER CARRY OUT COUNTERMANOEUVRES



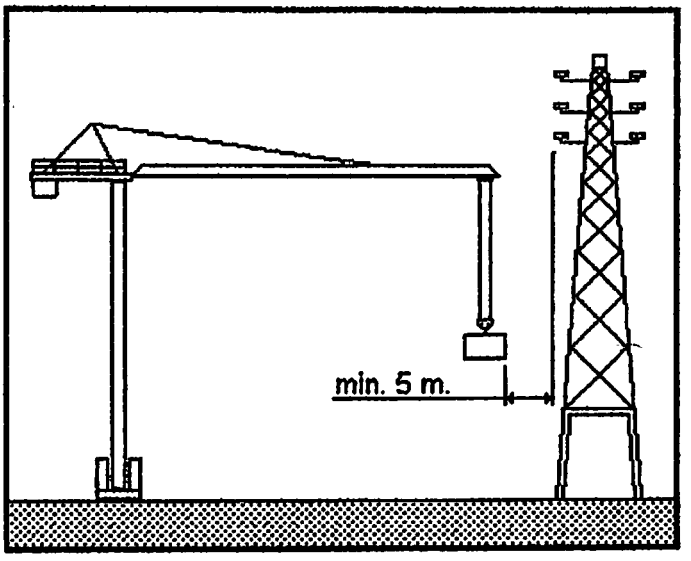
DO NOT USE THE CRANE WITH RISK OF INTERFERENCE WITH OTHER CRANES OR PARTS OF THEM (LOADS INCLUDED)

DO NOT INSTALL THE CRANE IF THERE ARE NOT THE SAFETY DISTANCES FROM HIGH-TENSION LINES



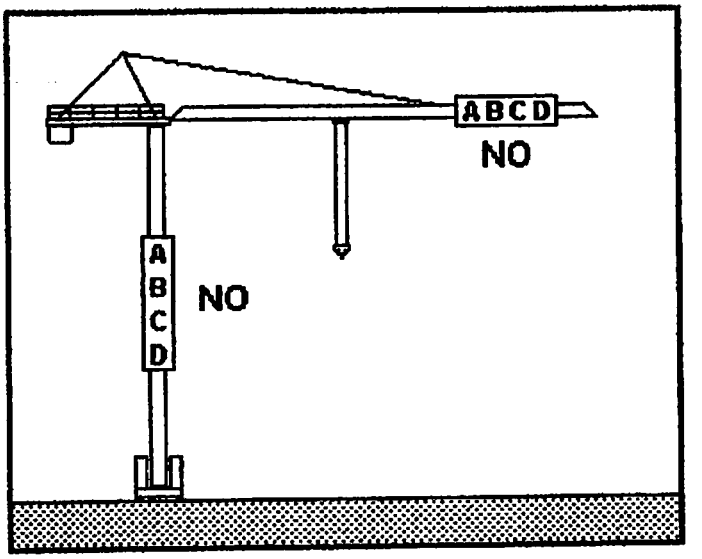


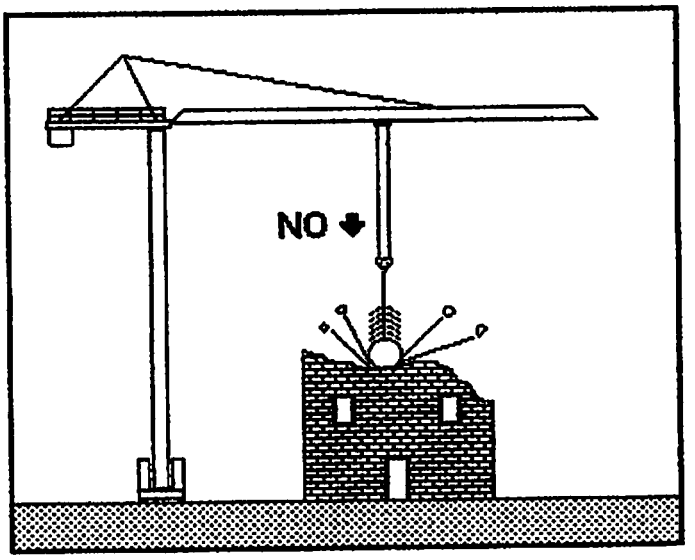
DO NOT USE THE CRANE IF NOT PERFECTLY LEVELLED



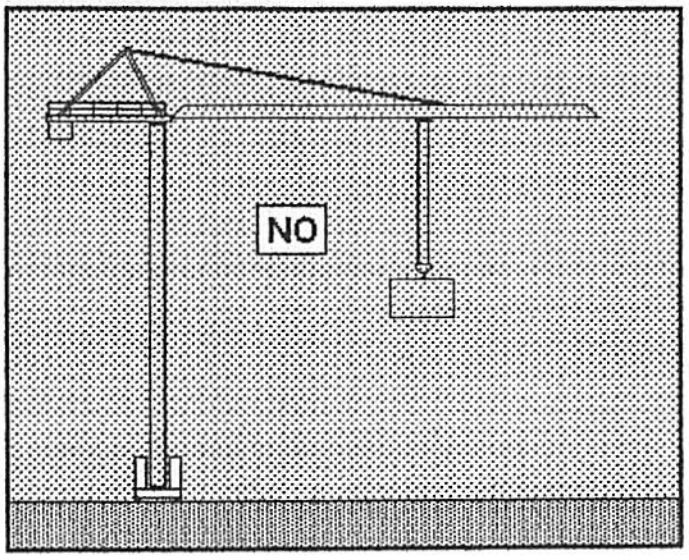
DO NOT INSTALL THE CRANE IF THERE ARE NOT THE SAFETY DISTANCES FROM HIGH-TENSION LINES

DO NOT AFFIX TO THE EQUIPMENT ANY SIGN, PLACARD OR ANY OTHER UNEXPECTED OBJECT, WHICH WOULD INCREASE THE SURFACE UNDER THE WIND



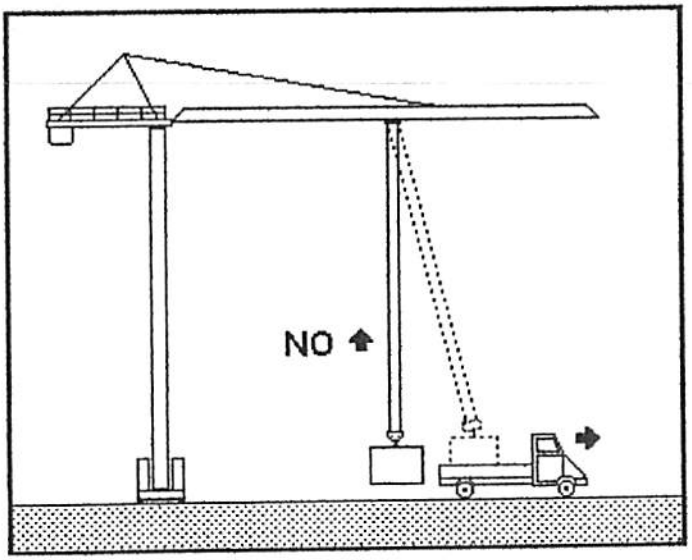


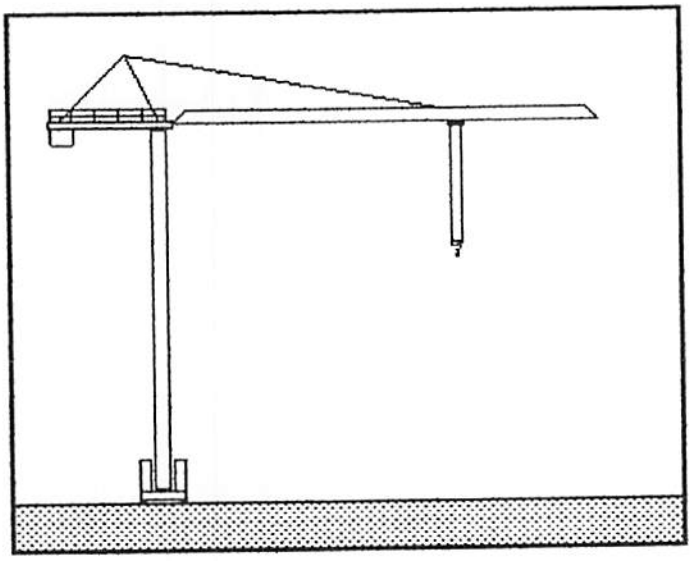
DO NOT USE THE CRANE TO CARRY OUT DEMOLITIONS



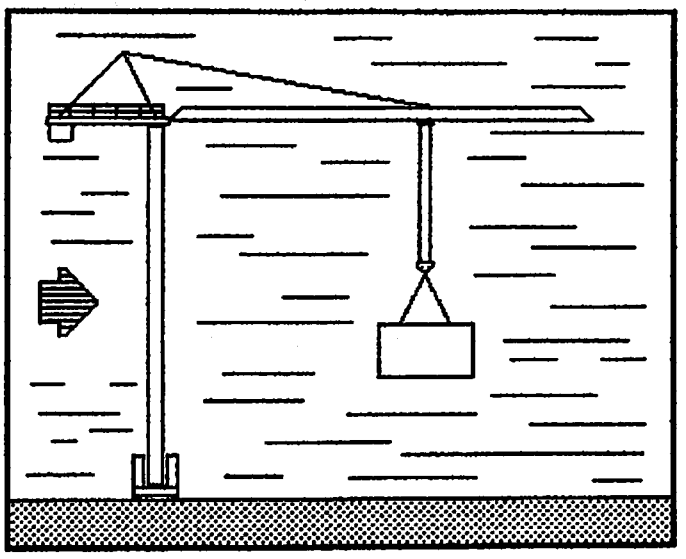
DO NOT USE THE CRANE IF THE NATURAL LIGHT IS NOT SUFFICIENT

DO NOT UNLOAD WEIGHTS FROM MOVING MOTOR VEHICLES





WITH CRANE OUT OF SERVICE BRING THE HOOK (WITHOUT LOAD) NEAR THE JIB-TIP AND NEAR THE TROLLEY



DO NOT USE THE CRANE WITH WIND EXCEEDING 72 Km/h

3.6 – HOW TO PUT THE CRANE OUT OF SERVICE

At the end of every workshift, for the maintenance, or when you forsee the wind will reach a speed exceeding the maximum allowed, the crane has to be put out of service.

3.6.1 – Position of the trolley and the pulley block

Bring the trolley to the maximum straddle (near the jib end).
Bring the pulley block near the limit-switch.

3.6.2 – Anchorage and guy

If you forsee the wind will reach a speed exceeding the maximum allowed (***more than 130 km/h***), see to the guy by means of the application of the special guys as suggested at *§ 1.3.2.*

3.6.3 – Unlock of the slewing brake

As already said at *§ 1.7.3.2,* on the brake of the slewing engine is placed a box for the electric control of unlocking brake when the crane is left out of service.
The unlock is controlled by a ***control box*** fixed to the **base of the 1st tower** (***or booster*** when it's present) during the assembling of the crane.
The distinguishing elements of the unlocking system and their position on the crane are shown in the following ***fig. 3.4.***
Here below is described the procedure the operator has to follow in order to obtain the unlock of the slewing brake, in all the possible conditions:

ELECTRIC UNLOCK

- Push on the button control box or on the manipulator (see *§ 1.8) RIGHT* or *LEFT SLEWING*, the brake opens.
- Push the ***button 1*** on the control box for unlocking the brake (see *fig. 3.4*).
  The remote-control switch *SFR* in the electric cabinet (see *§ 4.8*) is excited and so keeps the brake open.
- The ***warning light 2*** lights up: this means the unlock is on. If the light doesn't go on, repete the operation.
  Be sure the slewing frame is able to turn freely under the wind's action.
- Cut the electricity off by means of the switch placed on the base of the ***1st tower*** (***or booster*** when it's present) (see *§ 3.3.4*) in order to leave the crane inactive during the night.
  The ***warning light 2*** goes out, the unlock is still on and the crane turns freely under wind, out of service.

"MANUAL MECHANICAL UNLOCK"

This operation is necessary for the brake unlock in case of lacking of the power supply. You have to act manually on the box placed on the cover of the slewing motor (see ***fig. 3.4***).

- Lift ***lever A*** (run 0,5 ÷ 0,8 mm).
- Push ***lever B***.
- By pushing ***lever B***, at the same time leave ***lever A***.

B.B! **The unlocking mechanism whether it is electrically or manually switched on, needn't to be deactivate. In fact, this mechanism becomes automatically unlocked during the first slewing operation (RIGHT or LEFT).**

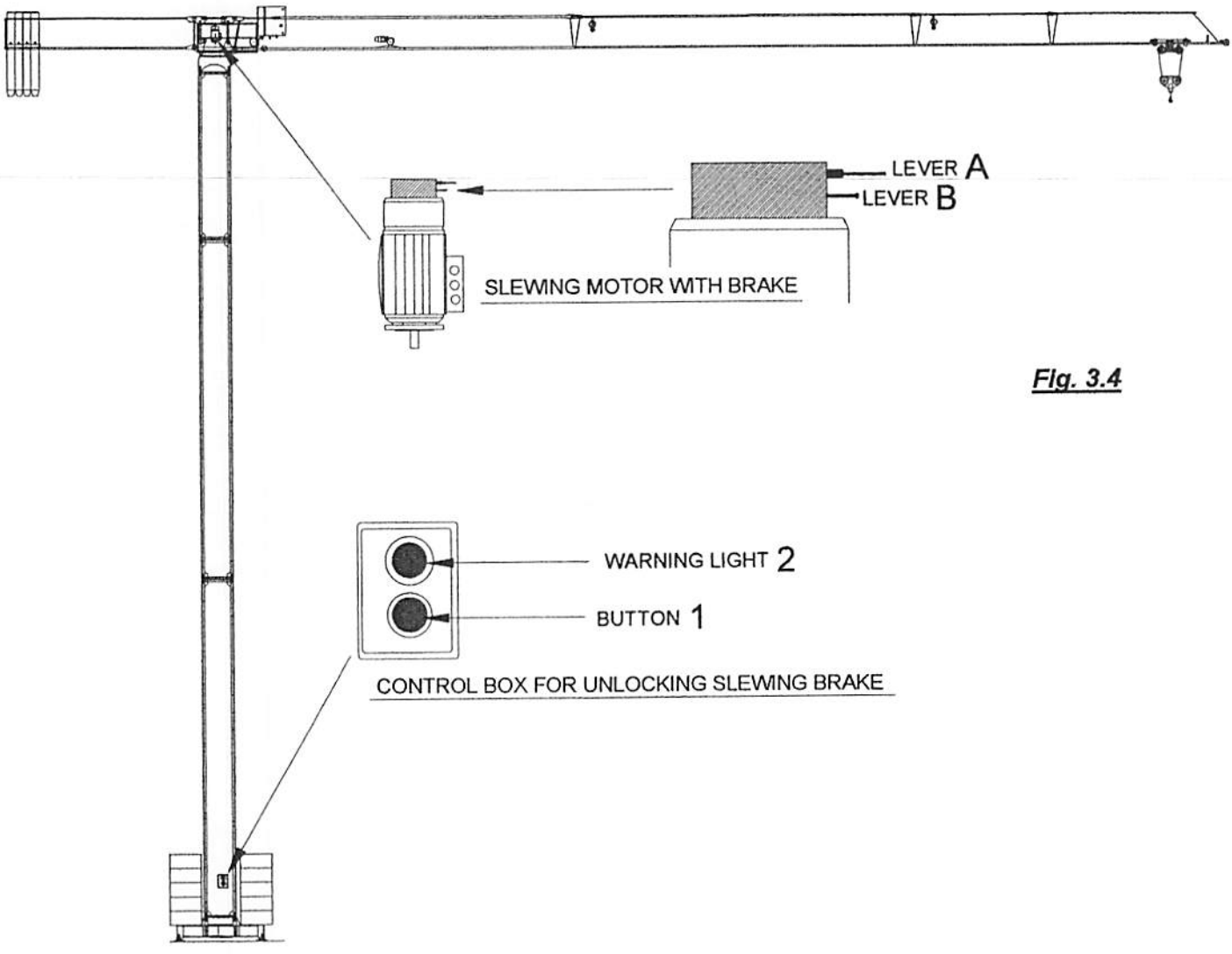


Fig. 3.4

3.6.4 – How to take the power supply away

Disconnect the general switch of the crane.
Disconnect the controls.