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Safety Manual

**HMF**

HMF 99650





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## Introduction

This Safety Manual is meant for the user of the loader and must be considered as a supplement to the Instruction Manual for the individual loader series as well as for the Service Booklet.

With this manual HMF wishes to point out how the loader is operated in the best way as regards safety. Examples are given of hazards which might occur when operating the loader and of how dangerous situations can be avoided. Furthermore the manual contains information on the fields of application which should be avoided.

According to the EC Directive no. 89/391/EEC, the employer shall take the measures necessary to ensure that the operator is familiar with the safety requirements which are attached to using the loader as work equipment.

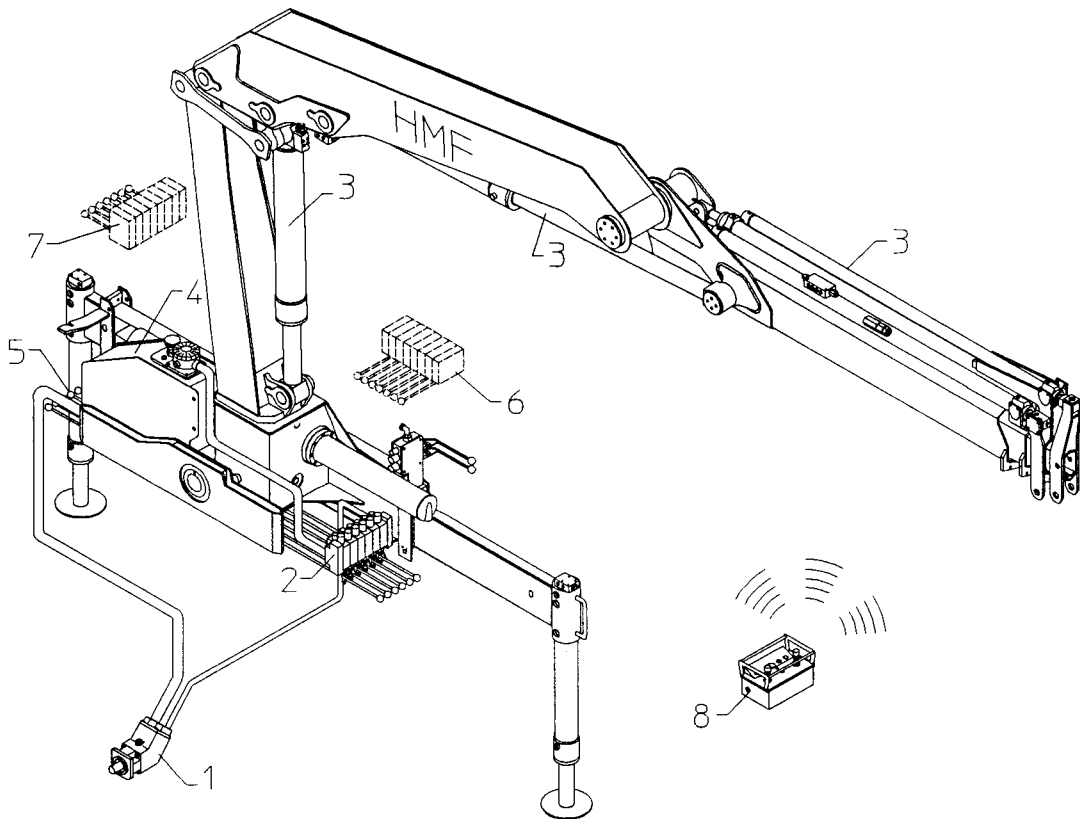
HMF insists on the operator applying the loader in accordance with the safety requirements mentioned in this Manual.

HMF is not responsible for any use of the loader violating the recommendations and warnings mentioned in this Safety Manual, the Instruction Manual as well as the Service Booklet.

Please note that the drawings which have been used are only for general illustrative purposes which means that they do not necessarily look like the loader in question.



## Description of the Loader:



SM001

The loader can be constructed as shown in SM001 , i.e. hydraulically operated. The pump (1) is connected to hydraulic cylinders (3) via the control valve (2). The pump builds up a hydraulic pressure which corresponds to the loading of the loader.

When operating the control valve, the cylinders are activated as well as the motion speed can be regulated. The oil flows in a closed system where the pump and the control valve are connected to a hydraulic oil tank (4).

A standard loader is operated from the control valve (2) or from dual control levers (5) on the opposite side.

Alternatively, the operator may operate the loader standing on the base (stand-up controls) (6), sitting on the side of the column (top seat) (7), or from a distance by cable or radio remote controls (8).



### The prescribed Application of the Loader:

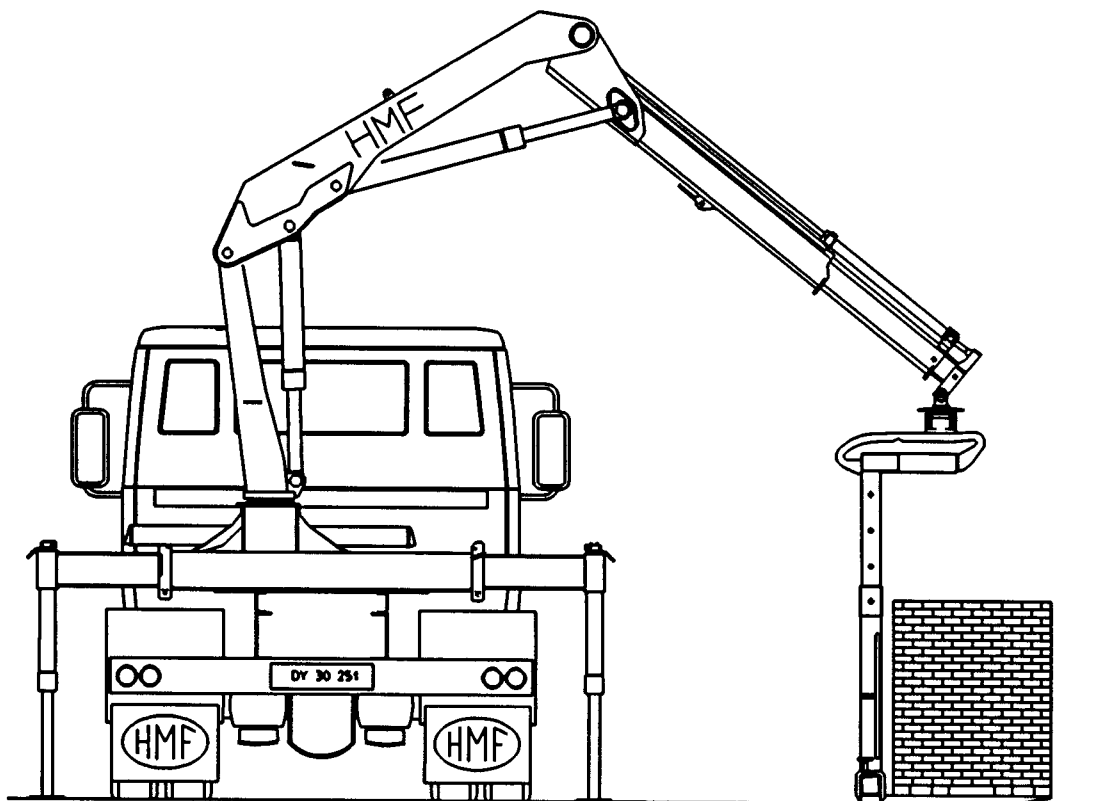
A truck mounted loader is a piece of equipment piece of which is primarily used for the handling of general cargo.

By means of a sling, the goods are lifted up on the truck body, then transported to the destination and unloaded.

### Other application possibilities:

The loader can be delivered together with different optional extras by means of which the application possibilities increase. Some of the most important possibilities are as follows:

#### Pallet Fork/Stone Clamp



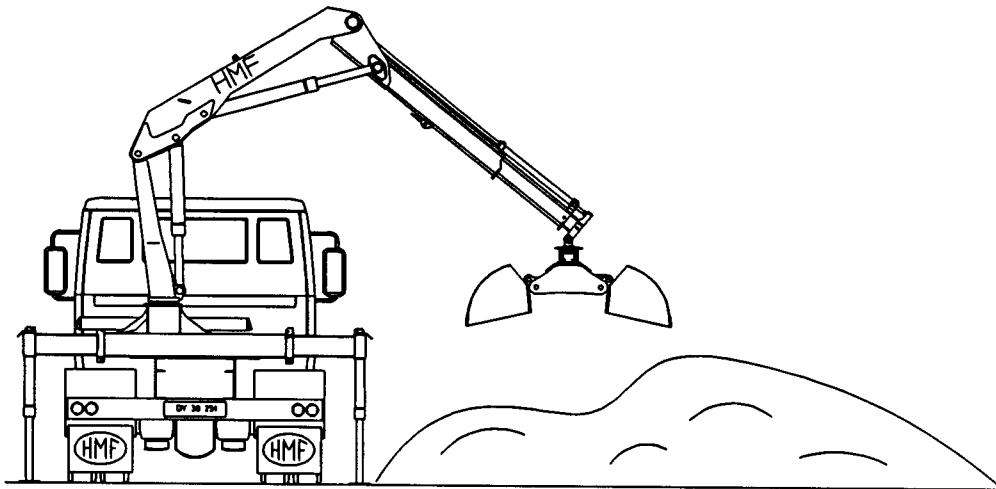
SM002

As auxiliary equipment, a pallet fork or a stone clamp may be mounted on the hook suspension for handling of stones or other building materials.

A rotator may be mounted between the hook suspension and the pallet fork/stone clamp, in order to permit that the load can be hydraulically rotated to the desired position.



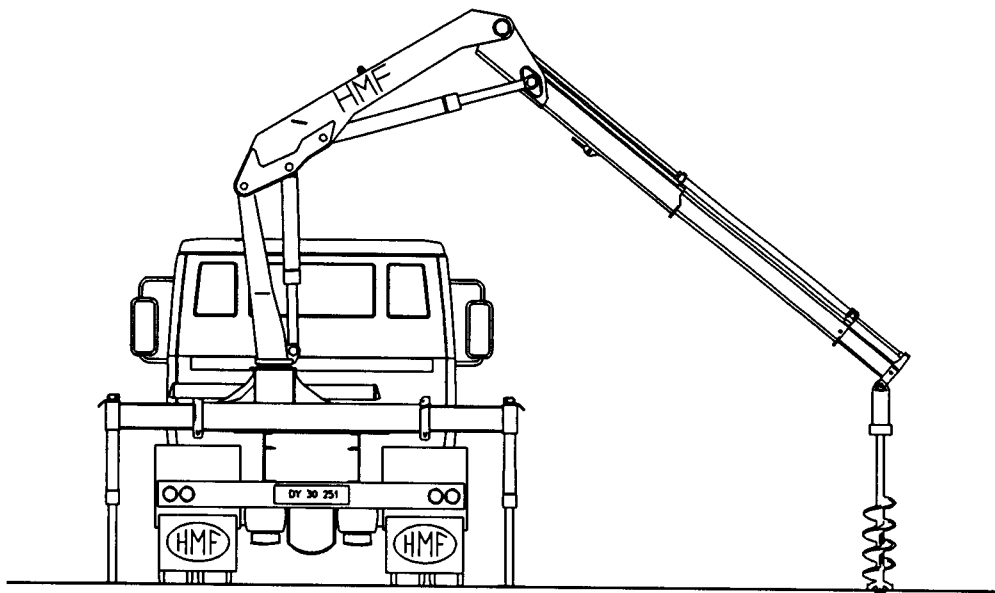
## Sand Bucket



SM003

With a sand bucket mounted on the hook suspension, the loader is able to load excavated soil or sand on the truck body. After the transport the sand can then be unloaded by means of the bucket.

## Auger

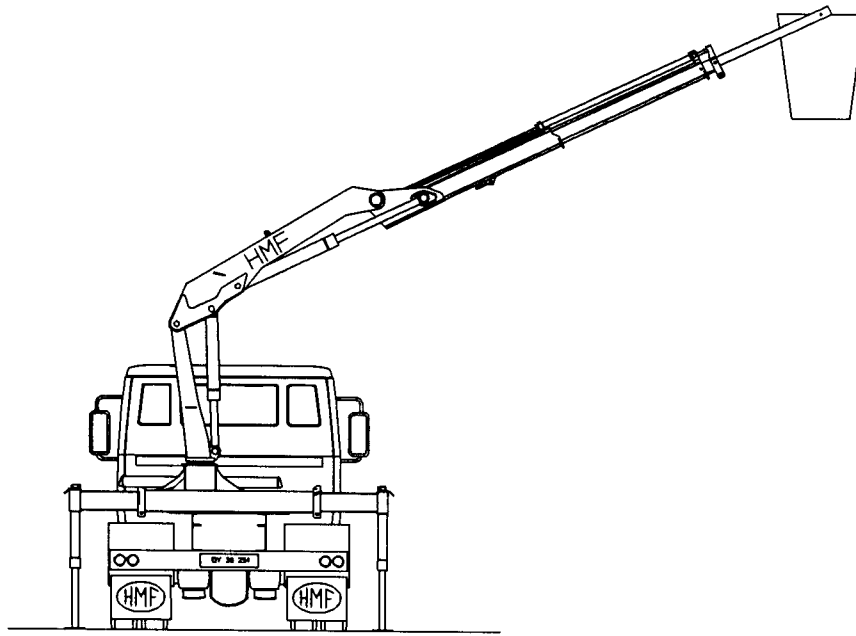


SM004

With a hydraulic auger mounted on the hook suspension, holes can be drilled into the ground e.g. for stakes or poles.



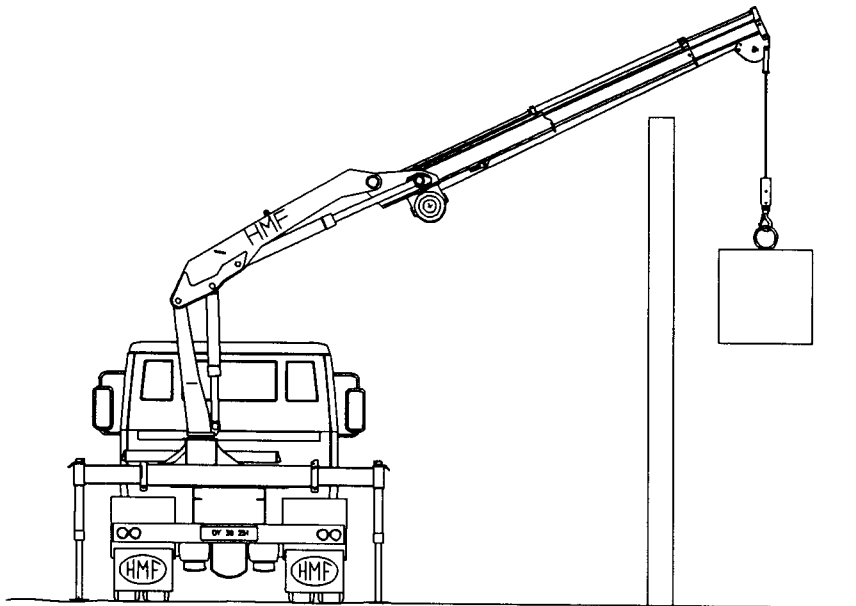
## Personnel Basket



SM005

When working high above the ground, an erecting engineer can be lifted up by means of a personnel basket mounted on the loader.

## Hydraulic Winch



SM006

If the loader is mounted with a hydraulic winch, loads may be lifted to for instance the other side of a wall.



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## Safe Operation of the Loader

A truck-mounted loader is a lifting tool for handling of heavy loads. This means that the operator handles considerable forces by means of small smooth-running control levers. Operation of the loader in an irresponsible way increases therefore the risk of accidents.

To ensure safe operation of the loader the following basic rules should be observed:

1. The control valves must be operated in a calm and considerate way.
2. The movements of the loader must be operated in a manner which ensures that the load is moved with sliding movements. Oscillation of the load should be avoided.
3. In particular the slewing function must be operated carefully, especially when it comes to handling the load with a long boom system.

## Built-in Safety in the Loader Structure

To minimize risks, safety has already been taken care of in the construction phase.

The strength of the HMF loaders is calculated according to the EN-standards which ensures that the bearing parts of the loader are constructed for a life span as laid down in the standards.

In the prototype stage the loader is put through a long-term test where the stresses which the structure is exposed to corresponds as much as possible to what the loader will be exposed to during actual operation.

HMF's ISO-9000 Quality Control System ensures that all loaders are as identical as possible during the batch production so that they all live up to the demands which were the basis for the calculation and the test. In other words it is certain that every single batch produced loader fulfill the requested demands during its lifetime.

## Built-in Safety in the Control Circuits

As a precautionary measure against other risks, a number of safety devices are built into the loader's electrohydraulic control circuit.

1. An adjustable main-relief valve is fitted in the inlet section of the valve block. The main relief valve is pre-set from the factory at a max. pressure so that the loader's lifting capacity is limited to the max. permissible load. The pressure setting must not exceed the max. permissible load and should always be sealed.





2. Port-relief valves are fitted in the control valve sections of the individual circuits. The purpose of these port-relief valves is to limit the hydraulic pressure to the individual cylinders. Furthermore the port-relief valves minimize impacts on the loader structure which might occur from sudden movements.
3. The boom, jib, and extension cylinders are fitted with load holding valves with the following main functions:
  - If the loader is overloaded and the pressure in the cylinders is too high, the load holding valve will open in order to let the cylinder be relieved.
  - In case of hose rupture, the load holding valve blocks the oil so that it cannot flow out of the cylinder, i.e. the boom is maintained in position so that the load does not fall down.
  - The load holding valves ensure that for instance during mounting, the load is maintained in position for some length of time, even if the control valve is worn.
  - The load holding valves maintain the boom system in position if the operator tries to lower the boom system while the loader stands still and the hydraulic pump is stopped.
4. A piloted check-valve is fitted to each stabilizer leg and its purpose is to maintain the stabilizer cylinder in position in case of hose rupture. This device ensures against overturning of the vehicle.
5. The hydraulic system forms part of a load moment limitation system (LMB) which ensures that the permissible load moment is never exceeded, irrespective of the operator's actions.  
For further information, please see the Instruction Manual for the individual loader.
6. An emergency stop button is placed near each control spot.
7. The operator is warned by means of a red light indicating when the stress on the loader has reached 90% of the max. permissible load.
8. It is clearly shown on the stabilizer beams at which point they are fully extended.
9. All control spots are ensured against unintentional operation of the control levers by means of safety guards etc.



10. If a load is moved into an area (for instance over the driver's cab) where the vehicle becomes unstable the slewing movement is interrupted either mechanically or by means of an extended load moment limitation system. An extended load moment limitation system ensures that the loader can only be loaded with a limited load moment in this unstable area, so that the vehicle's stability is maintained. When working in this area with a reduced load moment the operator is warned by means of a yellow light.
11. If the loader is equipped with stand-up controls where the operator operates the loader standing on the base, a safety system automatically interrupts the slewing movement, so that the boom system cannot be moved over the operator.
12. A lot of the movable parts are shielded in order to avoid that the operator being hurt.
13. If the loader is operated from a top seat (mounted on the column), the slewing system is equipped with a double load holding valve as security in case of hose rupture.

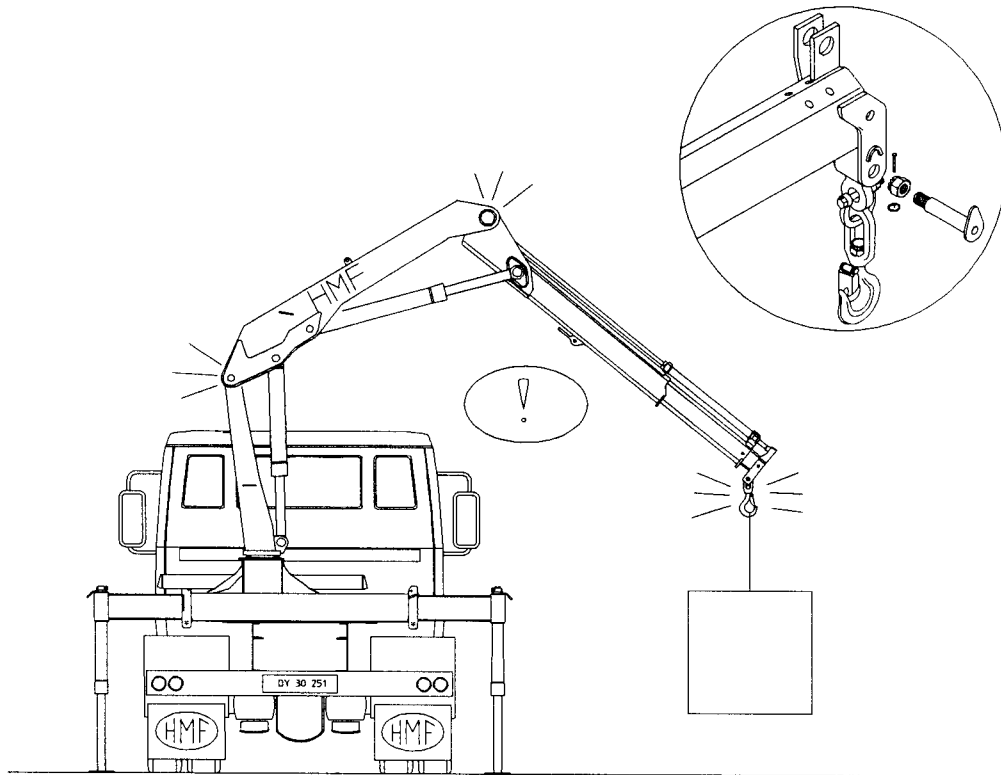
### **Examples of how other dangerous situations can be avoided**

Even though the HMF-loader has been carefully prepared and is well-equipped also as regards safety, there are still some precautionary measures which the operator must remember during daily work with the loader.

In the following paragraphs there will be given examples of how the operator can avoid other dangerous situations.

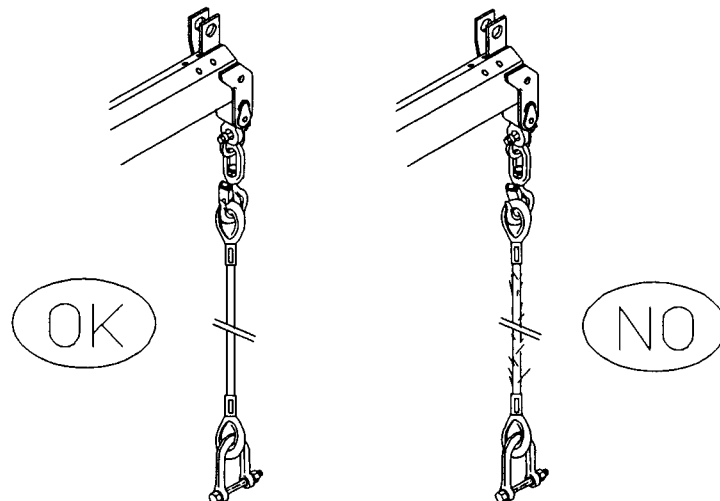
### **In order to avoid dangerous situations the operator must take the following precautionary measures before starting up:**

- The operator should be familiar with the directions in the Instruction Manual as well as in this Safety Manual.
- The operator must walk round the vehicle to ensure that there are no obstacles in the loader's surroundings which may hinder loader operation. Furthermore he must check that the equipment is safe and that no oil leakage can be noticed.
- Make sure that all connecting pins between the loader's movable parts, the pin for hook suspension as well as the pins for lifting equipment are locked with the securing split pins especially adapted for the purpose.



SM007

- Check that hook, slings, wires and chains are in order and approved for the load. Safety catch and spring should not be damaged. Never use equipment which is defective or has been repaired.
- The lifting gear must be attached to the hook in a manner which ensures that the safety catch is able to turn into locked position and that it is not damaged.



SM008

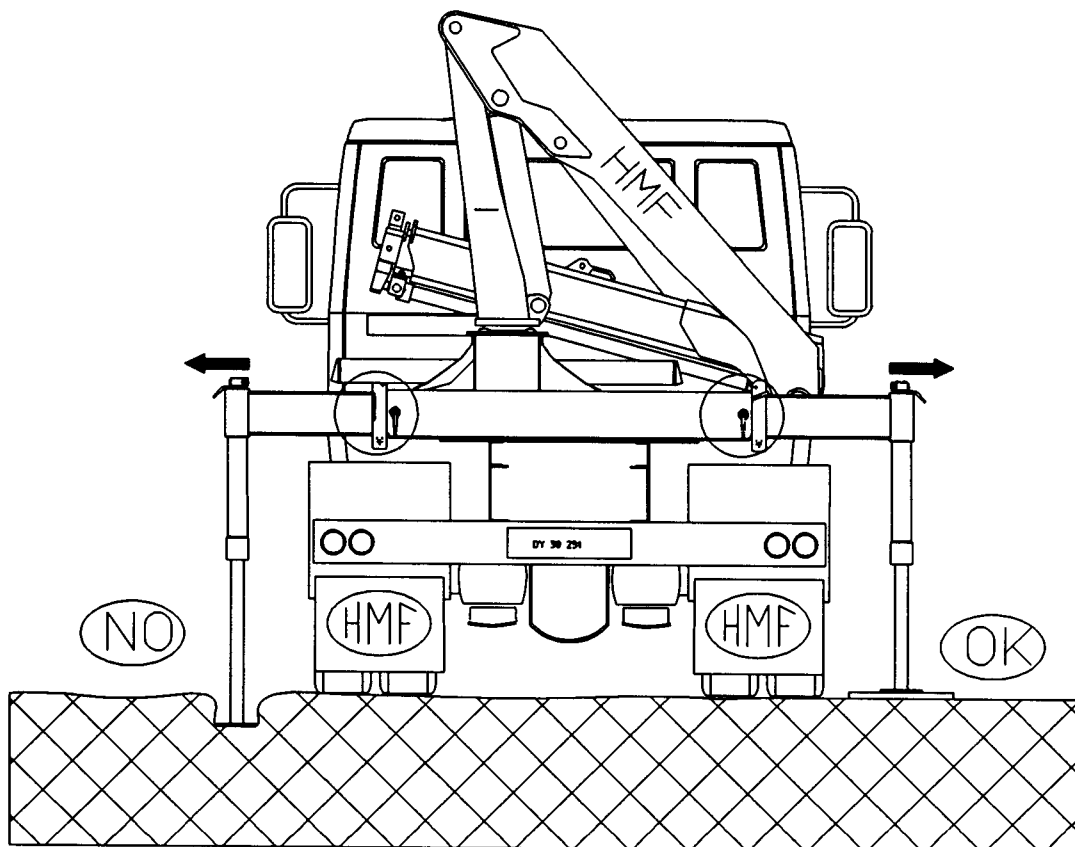


- The surface where loader operation takes place must be sufficiently firm to absorb the pressure from the stabilizer legs. Be careful that the stabilizer legs do not break through for instance a frozen layer on the ground.

If the ground is not safe, e.g. iron plates must be put under the foot plates.

Before unfolding the boom system, all the stabilizer beams must be completely extended and the swivel locks must be engaged. The stability of the vehicle depends on the stabilizer beams being fully extended.

Care should be taken with traffic and obstacles near the loader when the stabilizer beams are extended.



SM009

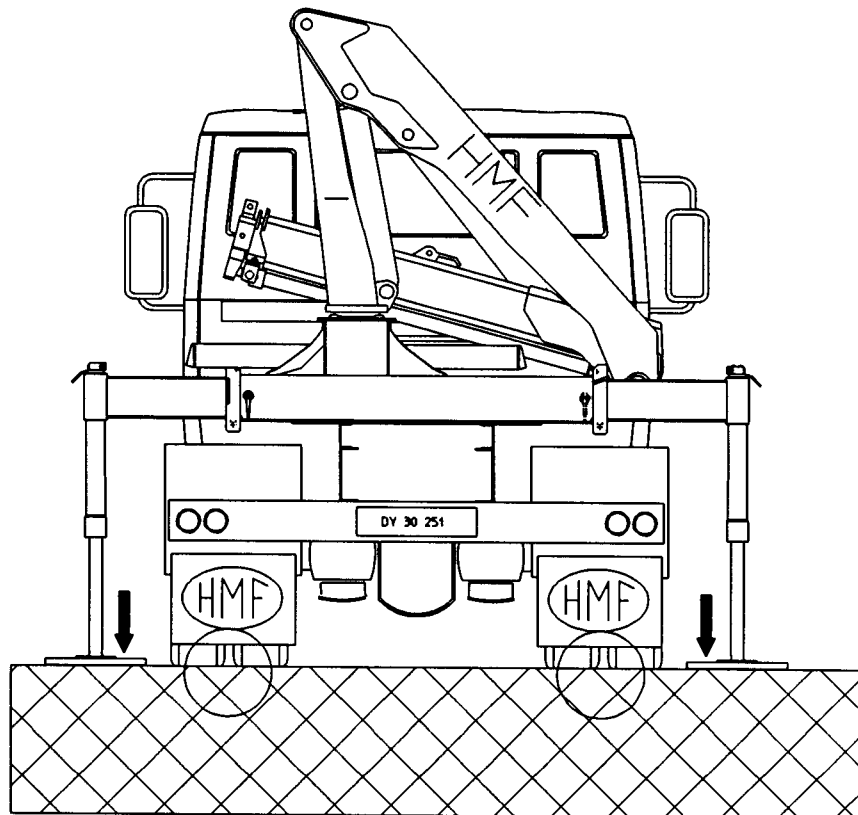


- The stabilizer legs are lowered until the vehicle's chassis has been lifted max. 3-4 cm. Never lift the vehicle to a point where the wheels loose contact with the ground, because then the stabilizers would have to absorb both the total weight of the vehicle and the load. If the wheels which must be blocked by pulling the parking brake do not have sufficient contact with the ground, the vehicle will easily skid during loader operation. The vehicle's movements will then cause radial load on the stabilizers and they will consequently be damaged.

Please note that during loading, the stabilizers have to be adjusted a little from time to time in order to let the weight of the load be absorbed by the vehicle's suspensions. The stabilizers are not designed to support this excessive load.

Make sure that the ground is not slippery to avoid skidding of the vehicle and the loader during loader operation. Chocks/stop blocks can be used in front of and behind the wheels, if necessary.

The loader operates in the best way when positioned as close to level as possible. Therefore the vehicle must be brought into level as much as possible if the ground is inclining.



SM010



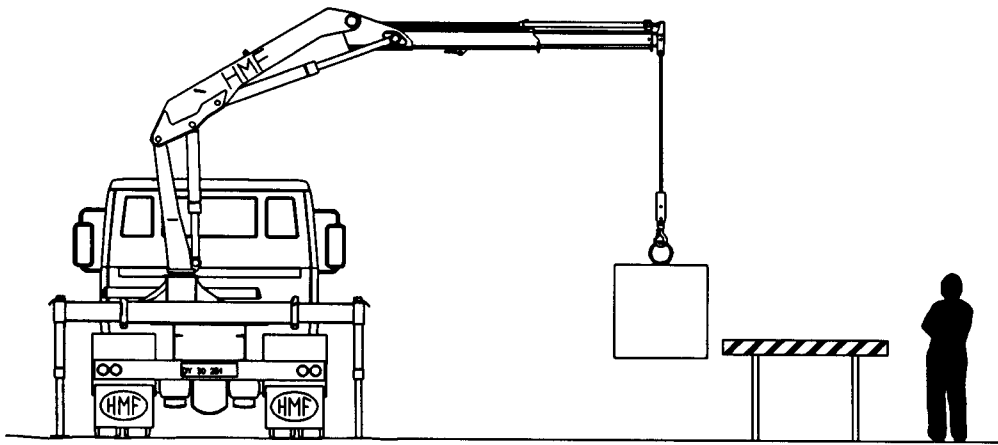
**In order to avoid dangerous situations the operator must take the following precautionary measures during loader operation:**

- The operator must constantly make sure that he has a complete view of the working area and that there are no obstacles within the working radius of the loader.

Make sure that no unauthorized persons enter into the working area.

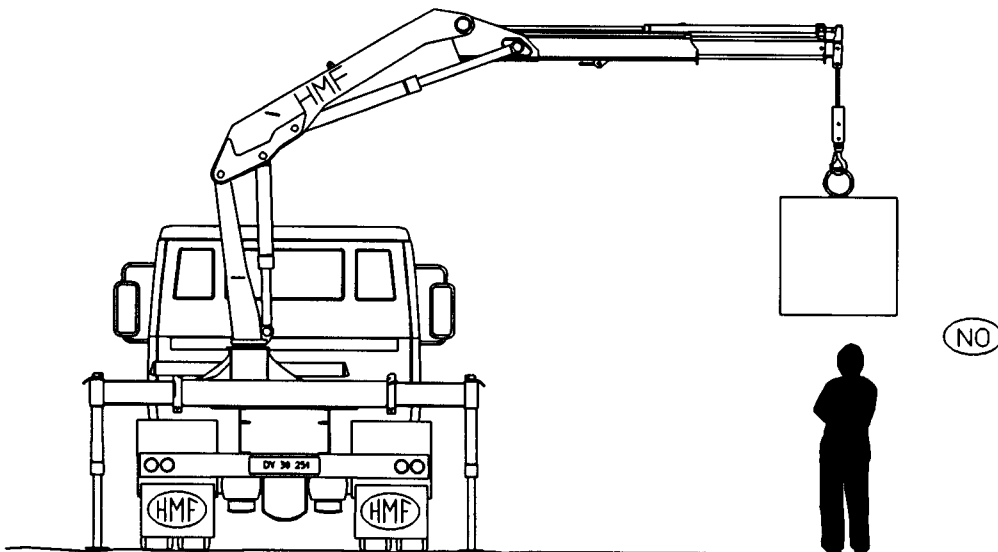
Make sure that no person unacquainted with loader operation is working with the loader.

Do not leave the loader when it is loaded.



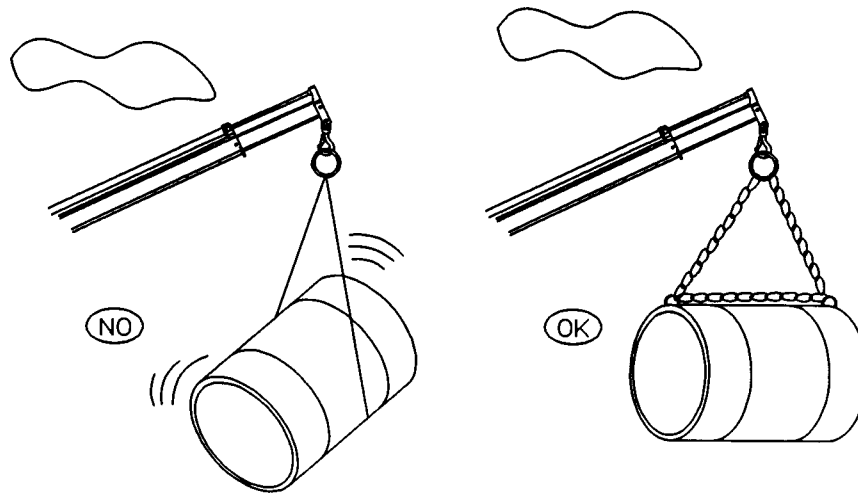
SM011

- Never walk under a suspended load. Failure may occur.



SM012

- Carefully attach the lifting gear to the load so that there is no risk of it falling off. When lifting, the load must be well balanced. Use a yoke when necessary.



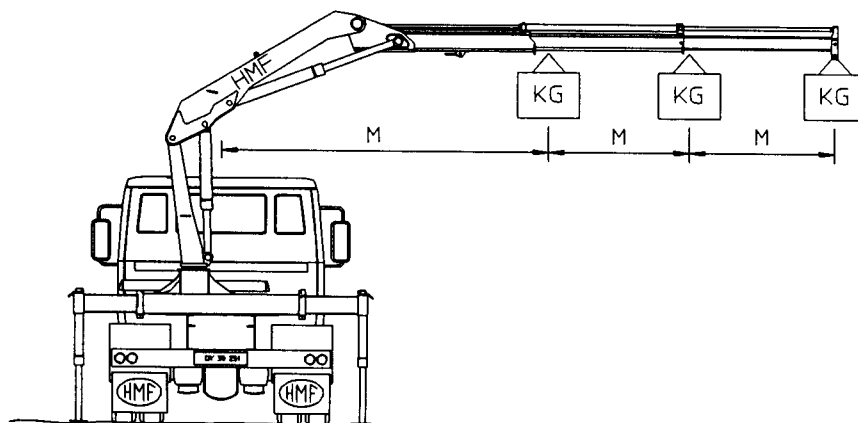
#### SM013

- Always drive as close to the load as possible. Make sure that the weight of the load in proportion to the distance does not exceed the max. permissible load indicated on the lifting capacity diagram. This is very important to remember if a load is lifted near the vehicle and afterwards is to be moved as far away as possible.

Do not trust the loader's safety systems blindly. The valve system may need adjustment or have failed (it is important that this work is carried out at an authorized HMF service point.).

The loader's lifting capacity must never be exceeded.

The load moment is highest, when the boom is a little beyond horizontal as indicated on the lifting capacity diagram.



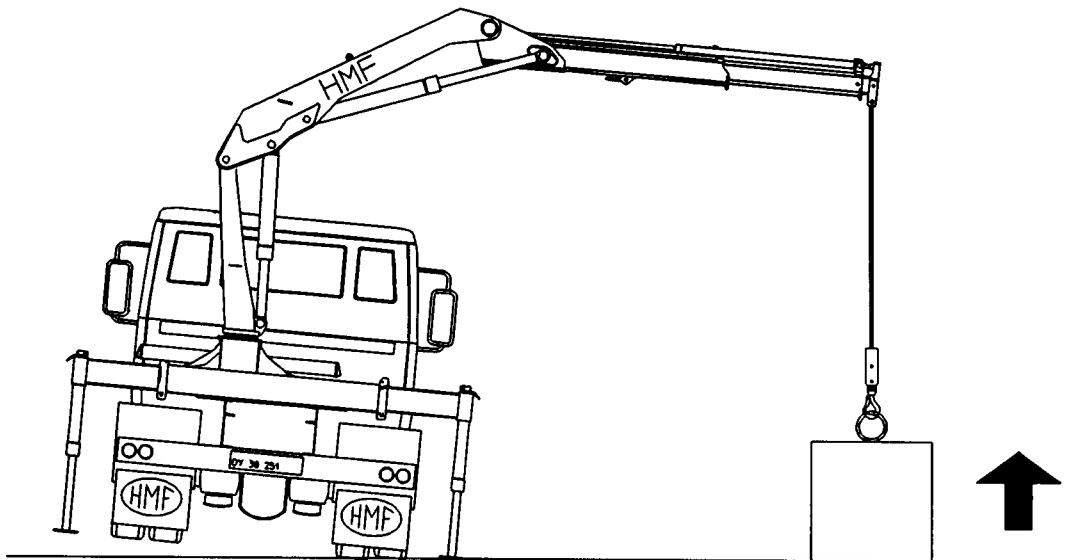
#### SM014



- Do not start a lifting movement without caution. Carefully lift the load a few centimeters above the ground and check whether the vehicle is still stable.

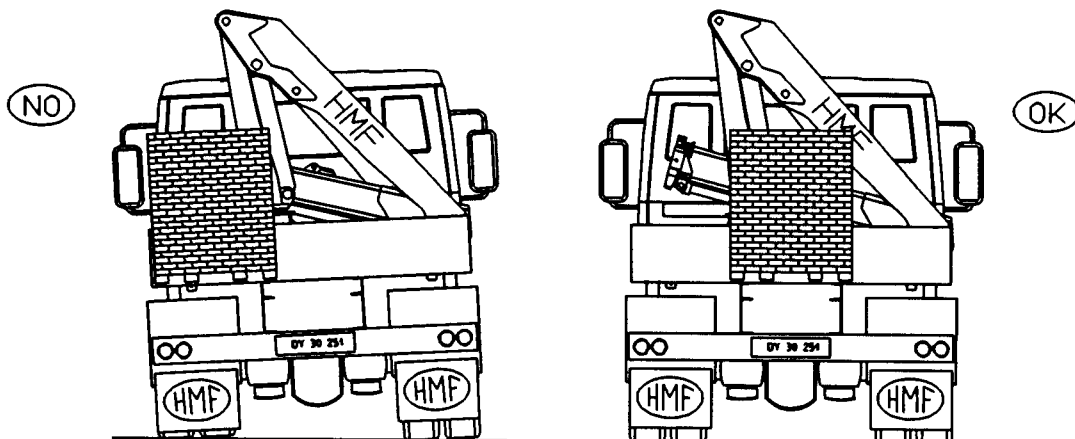
The inclination of the loader must not exceed 5° when operating at full capacity, otherwise the vehicle's stability is considerably reduced.

Be careful when moving a load into an area where the vehicle's stability is reduced (for instance over the driver's cab.).



SM015

The vehicle must be loaded so that it remains balanced.



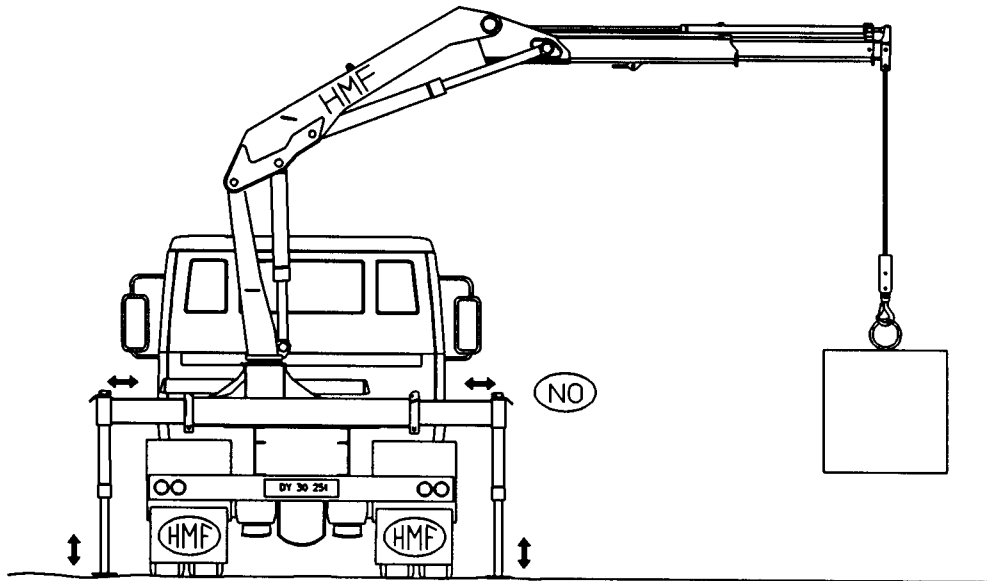
SM016

- Do not work too close to electric wires and especially high-voltage wires (for further information, please see the Instruction Manual). The loader is not insulated. There is direct earth connection - through the operator!!!





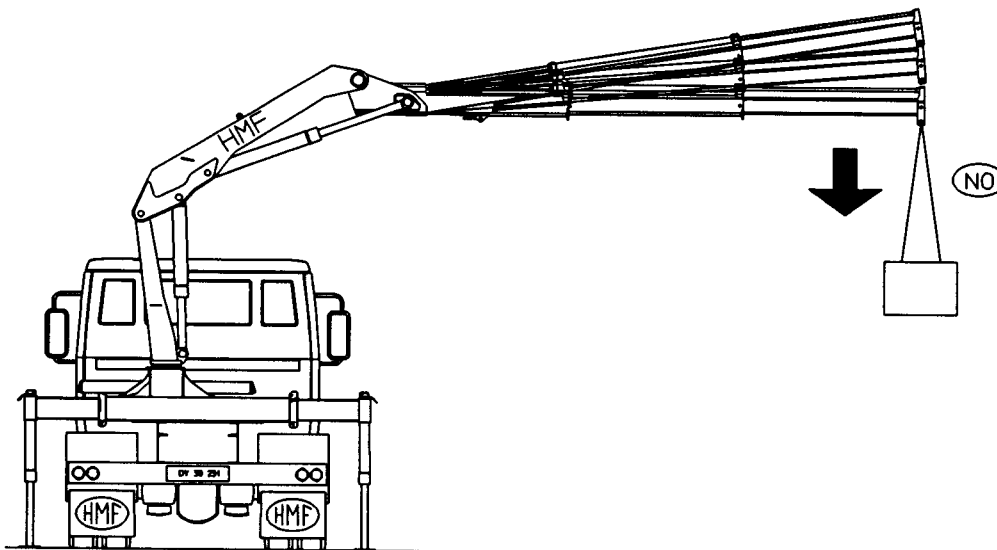
- Stabilizer legs and extensible beams must under no circumstances be activated when the loader is loaded. Be careful that the stabilizer legs are not operated by mistake during loader operation.



SM017

- When a cylinder is in extreme position, the control valve lever must immediately be put back into neutral position. Thus preventing unnecessary overheating of the oil.

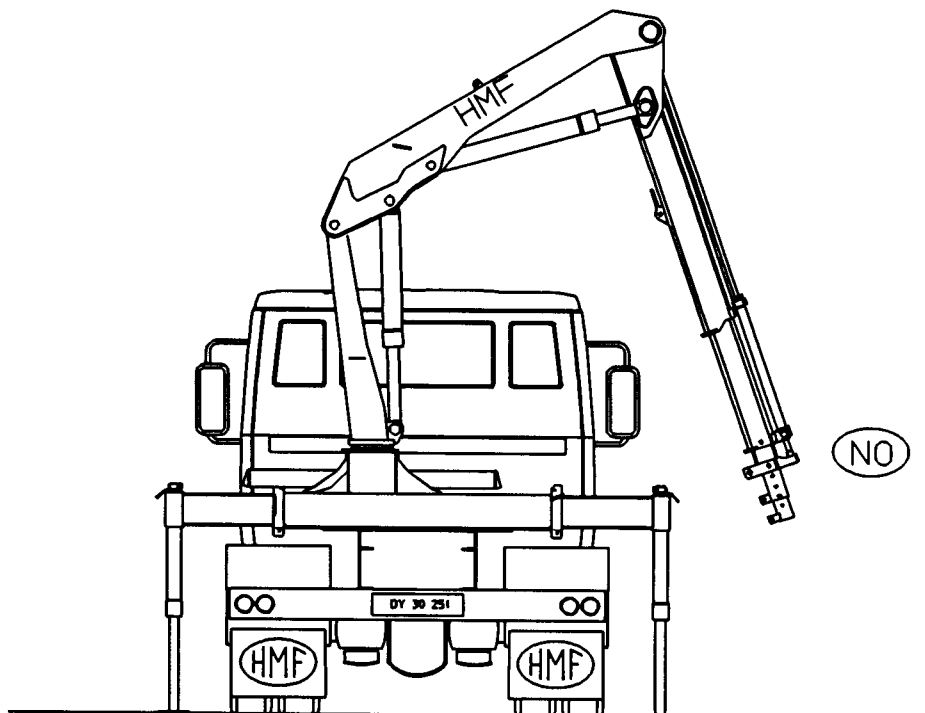
Sudden operational movement or oscillation of the boom system should be avoided when a load is suspended. Oscillation during loading increases the stress on the loader in an unnecessary high degree and it might entail damage.



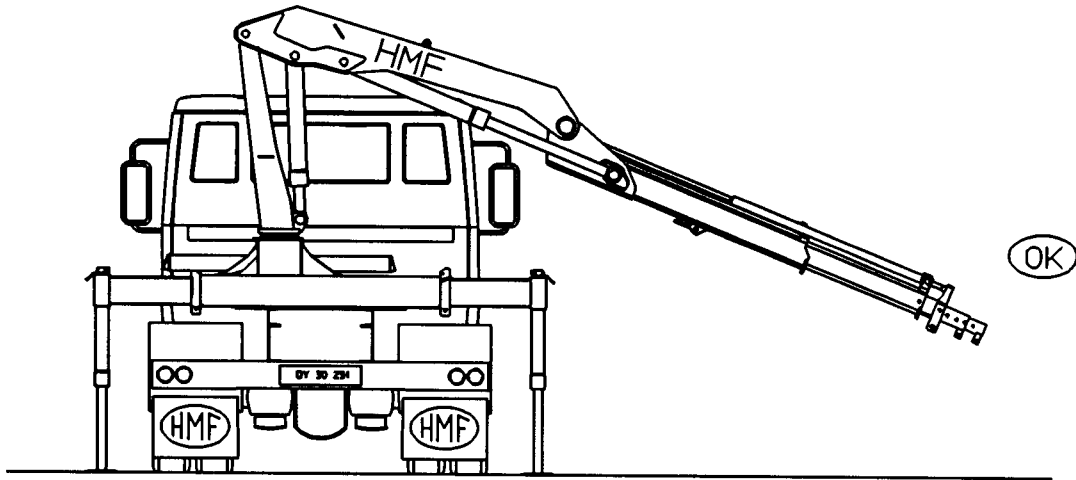
SM018



- When working with manual extensions please note the following safety rules:
  - 1) In general the load limits indicated for manual extensions on the load capacity diagram must never be exceeded.
  - 2) The manual extensions are only protected by the loader's safety system when all the loader's hydraulic extensions are extended to their maximum reach.
  - 3) When lifting by means of the extended manual extensions at the same time as the loader's hydraulic extensions are not completely extended, the weight of the load must not exceed the max. permissible load which is indicated for the extension in question.
  - 4) If not all extensions are required for a certain job, the extension/s with the largest box profile should be used before lifting.
  - 5) The loader's lifting capacity is reduced by the weight of the manual extensions.
  - 6) Manual extensions should only be pulled out when the jib is as close to horizontal as possible. If the boom, to which the manual extensions are mounted, is pointing downwards when the lock bolt is removed, the extensions will drop out at an uncontrollable speed which again may ruin the extension stop.



SM032



SM033

- 7) Remember to engage the lock pins for the manual extensions. The load must under no circumstances be suspended in the extension stops only.
- The max. permissible load indicated on the lifting capacity diagram is reduced by the weight of any kind of accessory.
  - When using a fly-jib the max. permissible load on the lifting capacity diagram must not be exceeded. When lifting by means of manual extensions mounted on the fly-jib, the same safety rules are valid as for the manual extensions mounted on the boom.

Every time the fly-jib is to be mounted on the boom, the hydraulic quick-release couplings are carefully connected and in the mutually correct way in order to avoid too high pressure in the cylinders as well as wrong and dangerous movements.



**In order to avoid dangerous situations the operator must take the following precautionary measures after loader operation:**

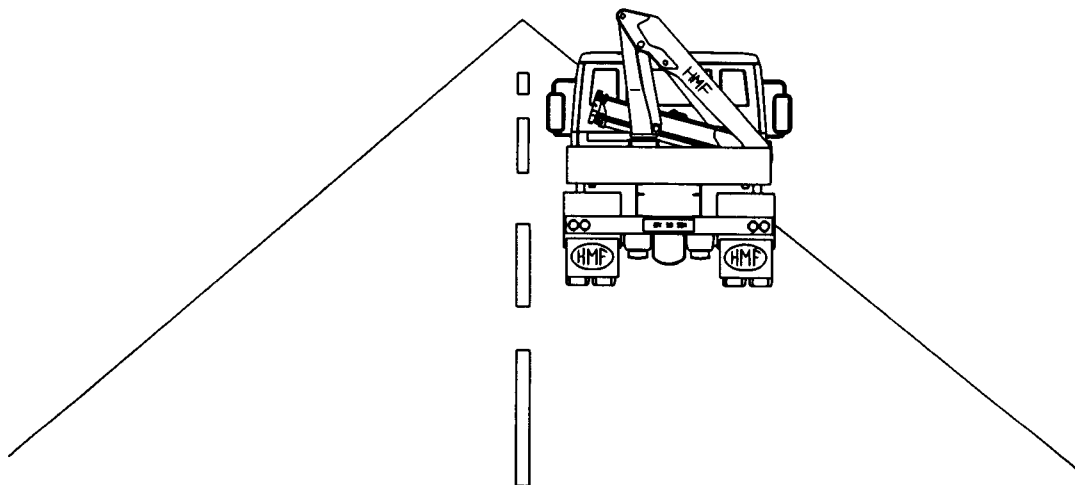
- After loader operation, all stabilizer legs must be completely raised and the stabilizer beams must be completely retracted.

It is important that the stabilizer beams are secured with the mounted locking devices to prevent them from sliding out during transport (especially on bends) thus creating highly dangerous situations.

Check that the loader is correctly folded. If the boom is parked on the truck body it must be stowed in a bracket to prevent it from moving from side to side during transport.

Check that the loader does not exceed the max. permissible outer dimensions. When the boom is parked on the truck platform it is important that it is completely lowered so that the max. height is not exceeded.

Before driving, the PTO/the pump must be disengaged.



SM019



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## Useful Safety Information

As earlier mentioned the loader is constructed for a certain life span, i.e. a certain amount of loads according to the approved calculation standards. How many loads the loader can stand is completely depending on the stress collective (the size of the individual loads and the number of these) which the loader is exposed to.

A correct pressure setting of the valves is crucial for the loader's life span. If the hydraulic pressure is increased (and with that the lifting capacity) marginally beyond the permitted setting, the life span is reduced considerably. Therefore:

- Do not alter the pressure settings.
- Check regularly that the lead seals are in order and undamaged.

Pressure setting and sealing must only be executed at an authorized HMF service point.

As the loader has a calculated life span, the loader will be "worn out" at some point within that life span. But if the loader has been overloaded it is difficult to estimate at what point in its life span it actually occurs.

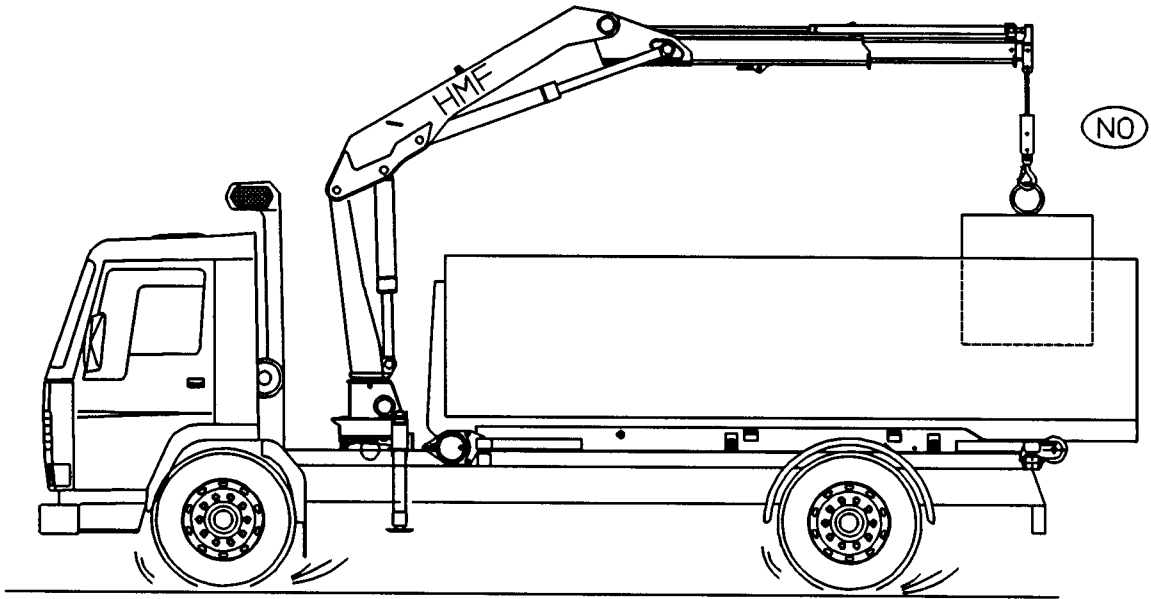
The most simple way to examine the loader is to check the bearing parts of the loader for crack formations that may arise.

This check is made during the annual service overhaul but the operator must regularly make this check in order to prevent dangerous damage/breakdown of the loader.



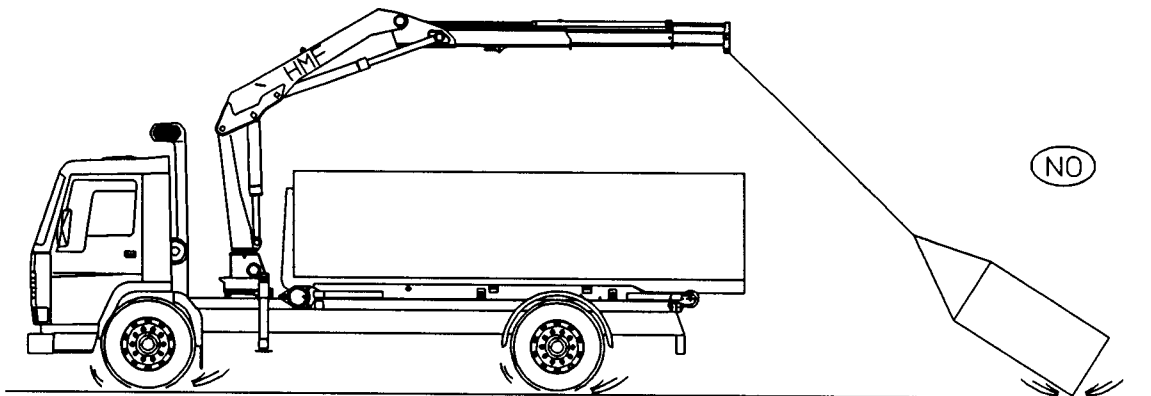
**Fields of Application which should be avoided (limitation of use)**

- Driving the vehicle while a load is suspended is not permitted.



SM020

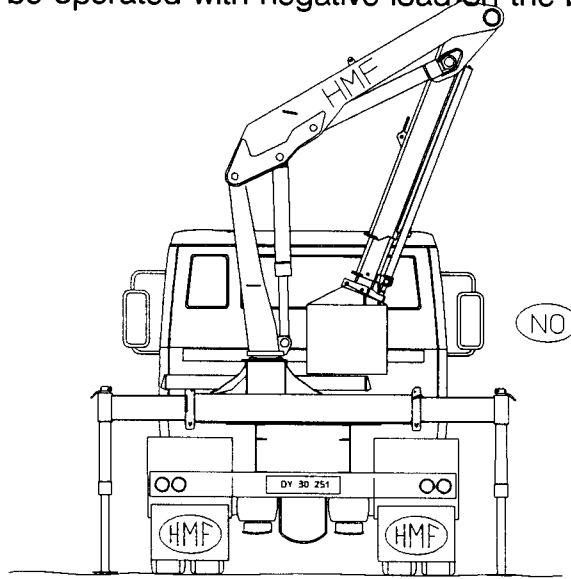
- Loads attached to the loader must not be dragged after the vehicle.



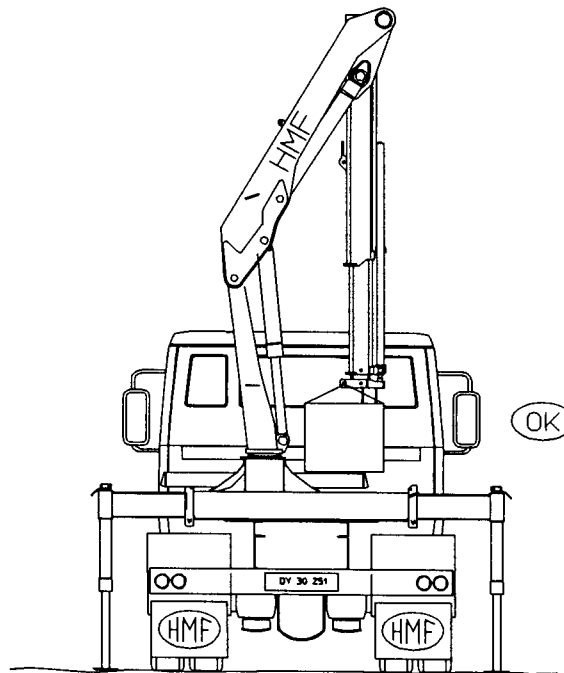
SM021



- The loader is constructed as a lifting tool and diagonal stresses should be avoided. The boom system must not be pressed into the ground and the loader should not be operated with negative load on the booms.



SM022



SM034

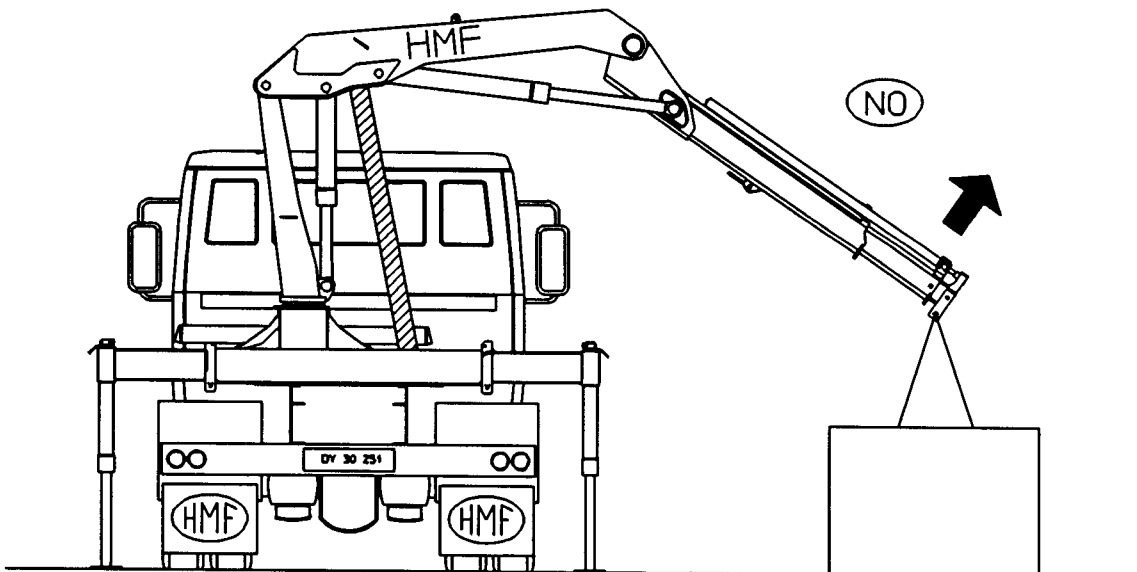
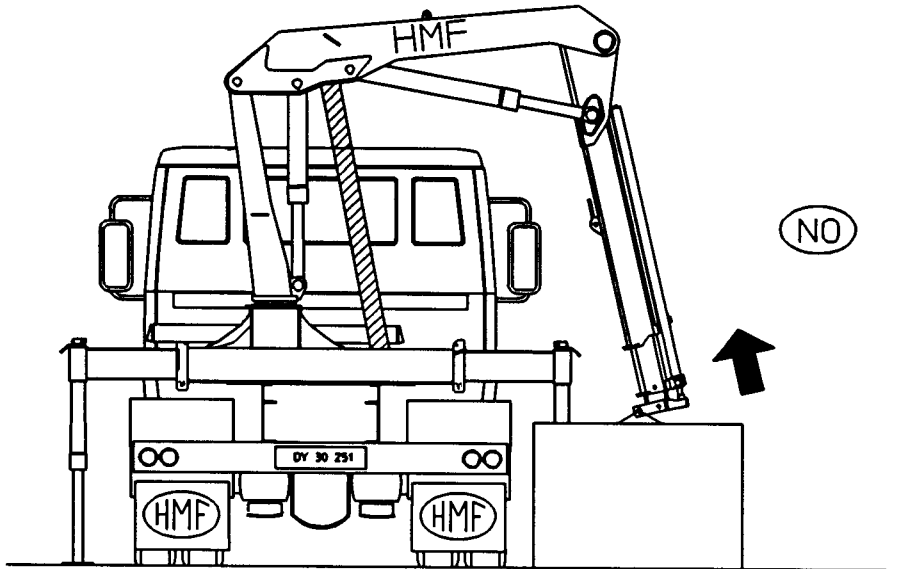
The loader must not be used for pressing for instance scrap together on the truck body.

The loader must not be used as a pile driver for knocking stakes or other items into the ground.

The loader must not be used as lever or crowbar.



- The boom system or the cylinders must under no circumstances be supported so that the lifting capacity is abnormally high.

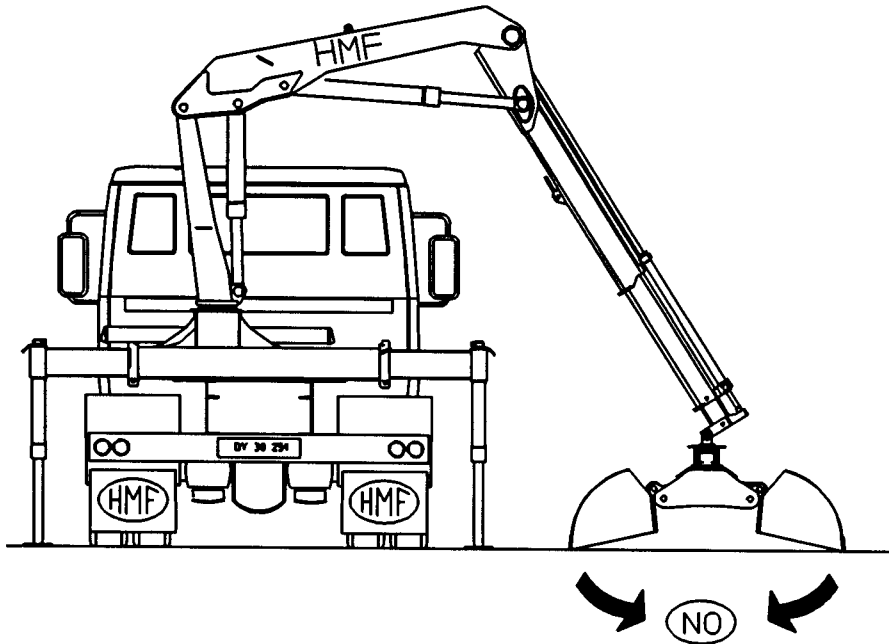


SM023





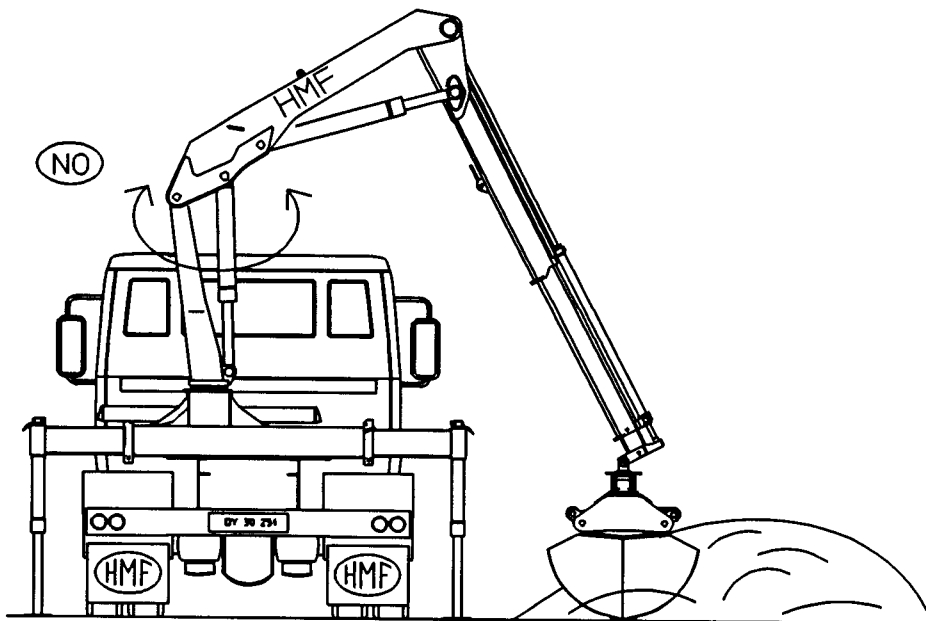
- If the grab rests in open condition against any kind of firm surface it must not be closed without moving the boom system up at the same time either by raising the boom or retracting the telescopic jib.



SM024

- Dragging of loads across the ground using the extension cylinder or the slewing system is not permitted. These functions should only be activated once the load is clear of the ground.

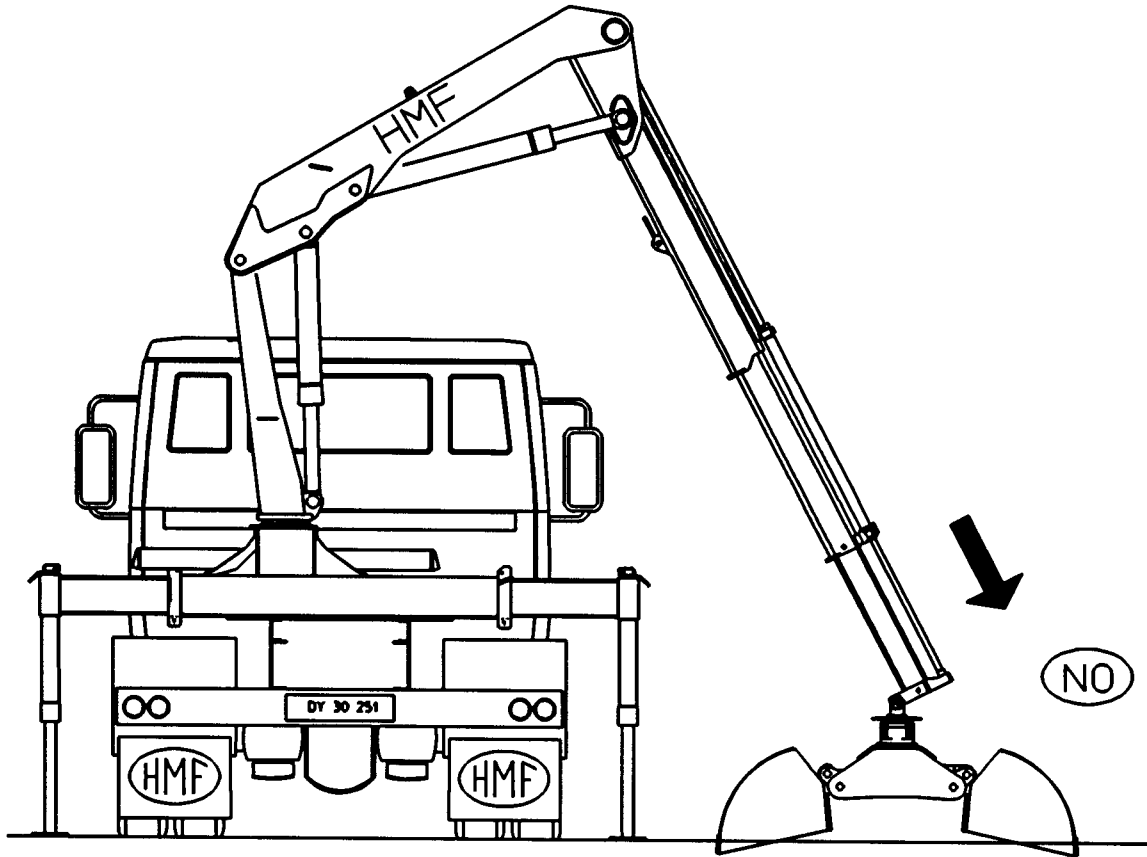
The loader must not be used for scooping up for instance soil or manure.



SM025



- Never use the hydraulic extensions for pressing the grab down into for instance soil, sand or manure.



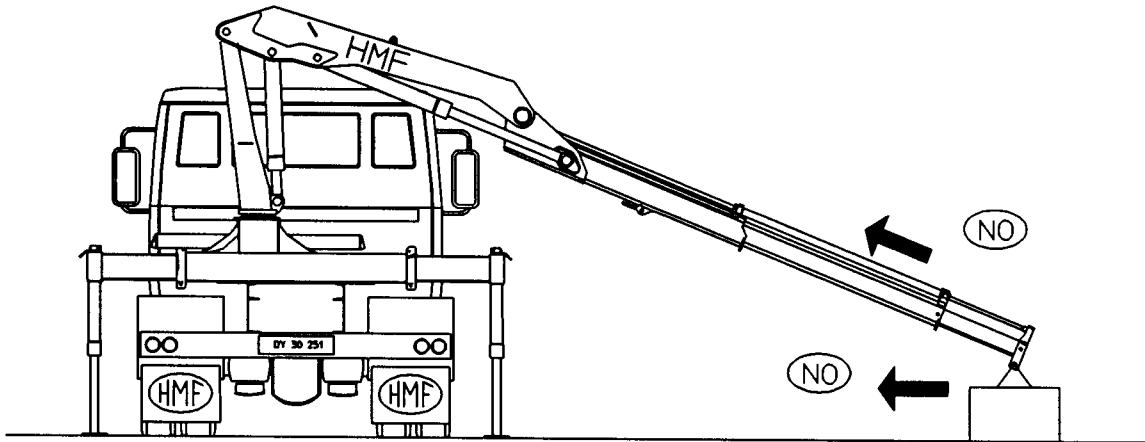
SM026



- If the load is so heavy that the loader will not be able to lift it from the ground, dragging of the load across the ground (while lifting) until it reaches a position where the loader is able to lift the load is not permitted.

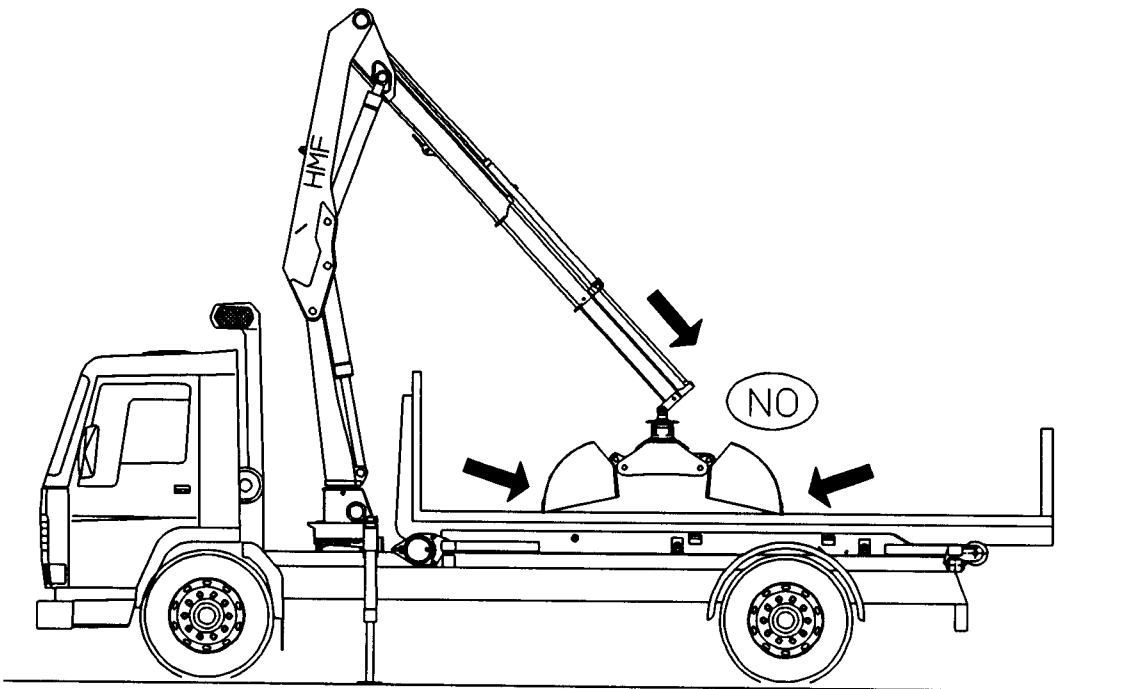
If lifting with a grab, some of its contents must be emptied. If the load consists of a solid unity the vehicle must approach the load.

The total weight (grab, rotator, and sand/contents) must not exceed the loader's lifting capacity at max. reach.



SM027

- The telescopic jib must not be extended and the grab must not be closed when the boom is in its top position.

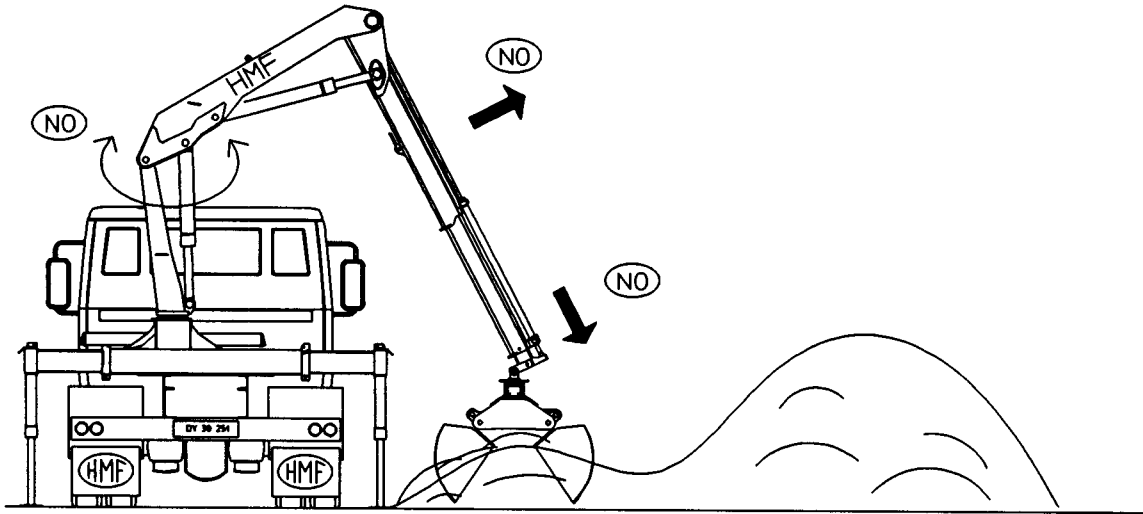


SM028



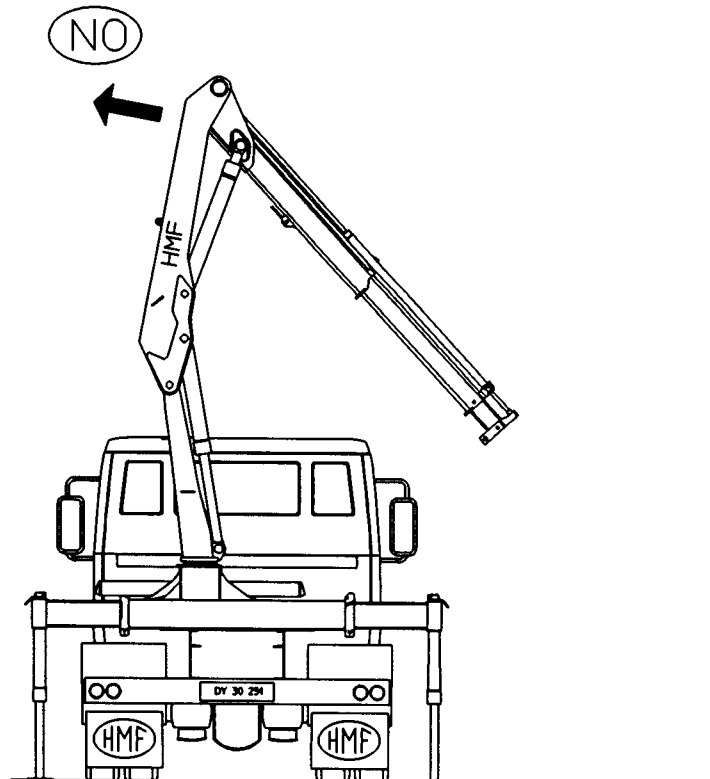
- If the grab in one way or another is stuck, the different loader functions must not be used for "shaking it free".

Some of the contents of the grab must be emptied instead.



SM029

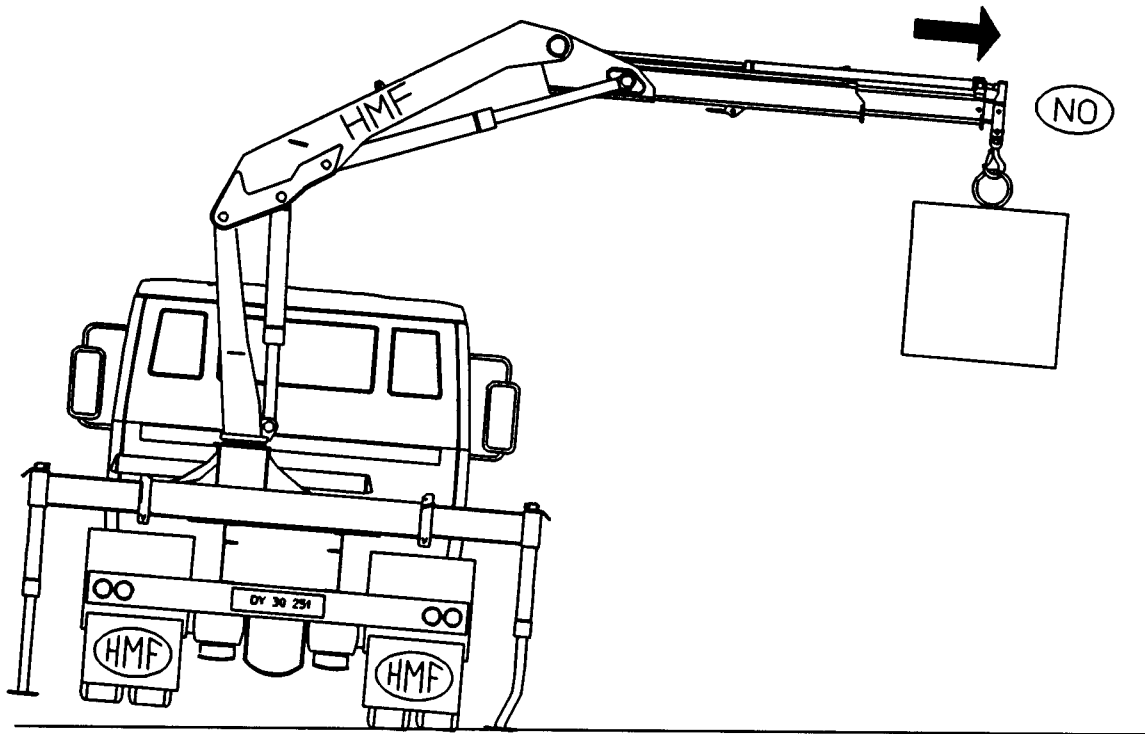
- Do not move the boom at high speed into top position (the boom cylinder into its extreme position).



SM030



- Do not extend a heavy load in a way which overloads the loader and thereby makes the vehicle unstable. The load moment limitation system may be out of order by mistake.



SM031

## Conclusion

With this Safety Manual HMF has aimed at pointing out the necessary safety requirements in connection with loader operation in the light of experience gained through many years.

We hope that we have contributed to ensuring safe loader operation.