Steelbro

MK5 Service and Operators Manual

1993

APPENDIX 1

STEELBRO WARRANTY

(AUSTRALIA)

Providing the terms of payment are promptly complied with by the customer, we undertake to remedy with reasonable despatch any original defects arising from faulty workmanship in any goods manufactured by us which under proper and normal conditions of use, are revealed within TWELVE (12) calendar months of not more than eight hours per day operation, or SIX (6) calendar months of more than eight hours per day operation, from the date of delivery. Any goods supplied, or work done in remedying such defects, shall not extend our liability under this Warranty beyond the time stipulated above. At the expiration of such time, all further liability on our part shall cease. In no case shall we be liable for the cost of fitting of defective goods unless otherwise agreed in writing and goods replaced shall become our property. No responsibility will be accepted for any defect unless a written complaint is first received by us, and we have been given first priority and ample opportunity to rectify the defect. Liability for consequential damage or loss arising from defects, faulty material, omissions, or negligence of workmanship in any goods supplied by us is specifically excluded.

In the case of items furnished by Steelbro but manufactured by others the Warranty on these items will be in accordance with industry norms unless otherwise advised. For example the tyres are warranted in accordance with normal tyre wear conditions.

SAFETY INSTRUCTIONS

* Before operating the Sidelifter, a basic knowledge of the operation and safety measures must be acquired.

* Sidelifters should never be operated unless a tractor unit is coupled to it for stability purposes.

* Always apply the vehicle park brake before operating the Sidelifter.

* The stabiliser legs should always be used when the Sidelifter is in operation. Check that the legs have something firm to stand on. This may mean supporting the legs on heavy timber Packing, to Spread the load or to Level up the sidelifter when working on uneven ground.The stabiliser legs must never be operated when the Sidelifter cranes are under load.

* During operations unauthorised personnel should keep out of the working area of the Sidelifter.

* Loading or unloading below or in the vicinity of any kind of electric cables or wires is highly dangerous and must never be permitted.

* Never exceed the maximum capacity stated on the lift capacity plate. The tare weight of the container must not be forgotten.

* Never drag a container along on the ground, first lift it clear of the ground.

* Never walk or stand below a suspended load.

* Never drive with a suspended load.

* Always park the stabiliser legs and lifting cranes in the transport position. The driver must check that these mechanisms are stowed within the width of the vehicle before driving.

* No welding may be carried out on structural parts or lifting attachments without written authority from STEELBRO (N.Z.) Ltd.

Safety Procedures Cont.

* Do not lift 20' or 10' containers from the top lifting points without the use of an approved top lifting frame.

* In an EMERGENCY, to Stop the Engine: Hold in the engine "STOP" Button on the Remote Control Box, until the engine has stopped. Then turn off the engine Key Switch on the Main Control Panel.
Operators must familiarise themselves with these Emergency Stop Proceedures, and the Stop Controls should be Tested Daily to ensure they operate properly.

* Lifting lugs are left hand and right hand and must be used in their correct positions.

* Damaged or broken lifting lugs can cause accidents. Check lug condition before lifting.

* Always ensure the twistlocks are unlocked prior to commencing lifting operations.

* When transferring containers to or from other vehicles the operator must not stand between those vehicles. He should operate from the end of the companion vehicle,or if it has excess deck length, from on top of the companion vehicle behind the loading area.

* When Steam Cleaning the sidelifter DO NOT direct the steam cleaning jet onto the chrome shafts of the hydraulic cylinders, nor onto any electrical junction boxes or switches. While the latter are waterproof, they are not designed to resist the heat and force of a steaming cleaning nozzle.

Many of these safety matters are covered in more detail in the Operating and Maintenance Sections of this manual.

STEEBRO "LOWLINE" CONTAINER SIDELIFTERS

MODELS MK V

Description

The "Lowline" Sidelifter is a semi trailer equipped with lifting arms designed to lift standard ISO containers. The unit is completely self contained with its own engine power pack and hydraulic equipment. Thus, the Sidelifter can be towed by any conventional road tractor unit of suitable dimensions and weight, and equipped with semi trailer towing gear to international standards.

Fully loaded or empty ISO containers can be loaded from the following situations with the Sidelifter.

a) Ground level to deck of the trailer.

b) From the deck of a truck or trailer parked alongside the Sidelifter to the deck of another truck or trailer.

c) From the deck of a trailer to stack two high on the ground.

This latter operation requires a very simple alteration to the chains which can be done quickly without the use of tools.

With the aid of an optional spreader bar, smaller containers or a variety of goods can be safely lifted and transported or transferred to other vehicles.

The Sidelifter loads from the road side of the trailer which enables the driver to accurately judge the position of the container in relation to the side of the trailer and lifting arms, when he is positioning the sidelifter.

The controls are installed at the rear road side of the semi trailer, and each movement can be operated individually or front and rear functions together..

The stabiliser legs of the Sidelifter are designed to move closer to the trailer than the maximum load position, when it is necessary to load containers onto eight wheel vehicles, or in other situations when the legs would meet an obstruction.

In this position, the stabiliser leg automatically trips a micro switch which causes a pair of lights on the control panel to flash continuously. Either or both legs coming inside the maximum lift position will cause the lights to operate. The lower lifting capacity shown on theload chart should then be used.

The Stabiliser legs are also able to be placed on the deck of a transfer vehicle.

High tensile chains are used for loading the container, and these are connected to the container with quick release couplings.

The chains, when not in use, store tidily in trays provided for the purpose.

Sidelifters must not be used to lift other than loads equipped with ISO container corner fittings in the standard 20'.0 or 40'.0 configuration, unless a top lifting frame is used. It is recommended that you consult your Steelbro Dealer regarding any non-standard lifting problems.

Lifting Arms:

These are constructed from high tensile steel plate and are continuously welded into box sections.

NOTE THAT THESE ARMS ARE DESIGNED ESPECIALLY TO LIFT CONTAINERS AND SHOULD NOT BE USED TO DRAG CONTAINERS ALONG THE GROUND OR HAVE ANY LOAD IN A DIRECTION PARALLEL TO THE CENTRE LINE OF THE VEHICLE CHASSIS APPLIED TO THEM. THE OPTIONAL SPREADER BAR MUST BE USED FOR ALL LOADS WHICH ARE OTHER THAN THE STANDARD ISO CONTAINER.

The pins in the arms are machined from high tensile steel, and the members are mounted in replaceable lubricated glacier bearings.

Power Pack:

The engine is a Kubota diesel engine Model V2203 B.

This engine develops approximately 40 Horsepower at 2700 RPM and the motor speed is governed to the required pump speed of 2800 R.P.M.

The electric start switch is situated on the control panel. For units equipped with protection systems, a Green Button which must be pushed to over-ride the protection system when starting the engine, is provided on the control panel.

Hydraulics:

A tandem pump, directly coupled to the Kubota engine, supplies oil in two individual circuits - one to the front lifting equipment and one to the rear lifting equipment. The flow in each of these circuits is the same and is 35 litres per minute in each circuit.

Two four bank control valves (one for each end of the unit) are used. These have built in pressure relief valves to provide protection against overload of the machine,

Each of these control valves is mounted on the lift arm support structure carrying the arms and stabiliser legs it is supplying. The control valve is operated by electric switches mounted on the contol panel. These switches operate solenoid valves which activate small hydraulic servo pistons which in turn move the main valve spools. This gives a smooth operation of all functions. The lift arm switches are on a remote control cable which allows the operator to move up to 5 metres from the machine to get a good view of all operations.

In the event of an electrical fault, the control valves are equipped with handles and labels for manual operation. This enables the sidelifter to complete its cycle of loading or unloading and move to a place for repair.

All hydraulic rams are fitted with anti-drop fail safe check valves to prevent collapse in the event of hose failure, and the main lifting arms are fitted with over centre protection valves which also incorporate these check valves.

To 'Stop' the Engine and the Sidelifter from operating it is necessary to HOLD IN THE STOP BUTTON UNTIL THE ENGINE STOPS. Releasing it before the engine stops will only restore the engine to its previous running speed.

The EMERGENCY stop on the Engine Casing should be pushed and held in also when operated.

On Machines delivered after June 1990 the "STOP" BUTTON is of the 'FAILSAFE" type and need only be pushed once to shut the engine down.

The rams are contructed from honed, cold drawn seamless tubing with hard-chrome plated shafts. Poly pack seals are fitted in all rams and some cylinders are of "Compression Clip" type, others have screwed piston mountings. Hydraulic pipelines are seamless hydraulic tubing and the hydraulic fittings used throughout are SWAGELOK. A list of the dealers for this equipment, internationally, is attached to this booklet.

One hydraulic reservoir complete with a filtered air type breather, is fitted to supply both circuits, and a ten micron return line oil filter is fitted externally which also serves both circuits. The total oil capacity of the ciruits is 190 litres. A hydraulic sight level glass and integral temperature gauge is fitted as standard equipment.

For the MK V Model, the main line hydraulic pressure is 27.5 MPA (4000 PSI) with the overcenter relief valves set at 34.3 MPA (5000 PSI).

NOTE

While these relief valves protect the rams from Hydraulic overload, they cannot give any protection to the rams or structure when the rams are extended at speed, to the stage where the piston hits the end cap.

OPERATORS MUST AVOID DOING THIS OR THE LIFE OF THE CYLINDER COMPONENTS WILL BE SEVERELY SHORTENED.

No adjustments to these pressures or any other parts of the sidelifter can be made without written permission from the manufacturers.

STARTING THE ENGINE

1. a) Place the key in the keyswitch and turn the key clockwise to the on position only - DO NOT CRANK THE ENGINE AT THIS STAGE.

b) Adjust the speed control position so that the speed setting is a little above the slow run position. i.e. Move the speed control switch to slow until it reaches its limit. Then move it to the fast direction for about 1 second.

c. Turn the Key Switch as far as it will go in the anti-clockwise direction to Pre-Heat and hold in this position for 12 to 15 seconds.

d. Then immediately turn the key clockwise as far as it will go to cranking position. When the engine fires release key.
DO NOT TURN IT BACK TO THE CENTRAL POSITION, or the power supply to the control valves will be cut off.

NOTE 1. For units with engine "Fail Safe" protection equipment fitted it is necessary to hold'in' the green button on the control panel while cranking the engine.

NOTE 2. Pre-Heating the engine (c) should only be necessary when the engine is cold.

TO LIFT I.S.O. CONTAINERS

MK V Maximum Load - 27.32 Tonnes
MK V Maximum Load - 23.25 Tonnes (Double Stacking)

2) To lift normal ISO container from the ground to the deck of the Sidelifter and reverse. Having positioned the sidelifter alonside the container.

a) Attach chains to the lifting pin on Lifting Arms, taking care to ensure the chains are correctly located on the respective pins. (See page 16 for details).

b) Extend the stabiliser arm to the maximum stroke of the extension cylinder. Then tilt the stabiliser to the ground.

c) If at the point beyond ideal tilt of the stabilizers, which is indicated when the flasing lights on the control panel start to operate, the foot is still not on the ground, it may be necessary to lift the foot slighty and place a timber packer underneath it. Any such packing should have the longest dimension of the packing at right angles to the angle of the Sidelifter centre line.

NOTE: LIFTING SHOULD NOT NORMALLY BE CARRIED OUT WITH THE STABILISER WARNING LIGHTS FLASHING. IF THIS IS DONE THE LIFTING CAPACITY IS REDUCED AS IS SHOWN ON THE LOAD CHART.

The loading at the stabiliser foot can exceed 25 Tonne and care should be taken that the ground on which the stabiliser is to be placed is capable of taking this loading. If in doubt place timber dunnage under the feet to spread the load.

d) Hook the lifting lugs at the end of the chains into the container corner fitting pockets and take an initial strain on the chains with the Sidelifter mechanism. At this stage, check that the lifting lugs are properly in position and that there is no twisting of the chains, before the container is lifted from the ground.

e) Ensure that the twistlocks on the sidelifter are in the raised position and UNLOCKED.

f) Transfer the container onto the Sidelifter deck.

g) Carefully lower the lifting arms to their lowest position, ensuring that the lifting chains do not catch or tighten on the container while doing this. It is not necessary to detach the lifting lugs from the container unless the container is going to be lifted off by other means. i.e. crane or forklift.

h) Lock the 4 twistlocks onto the container,

(i) Lift up and park the stabiliser legs.

3) To lift the container off the deck of the sidelifter, the reverse procedure should be applied.

4) To lift normal ISO containers from the deck of a truck, trailer or railway car parked alongside:

This operation will depend considerably on the length of the vehicle concerned.

The stabiliser leg can be extended across the Top of the vehicle deck, and then the load on the stabiliser applied on the deck of the vehicle. Again ensure that the deck or chassis of the vehicle is adequate to carry the Stabiliser load. The distance between the sidelifter and the truck should be such to ensure that the stabiliser foot is over a chassis beam or similar, when the foot is at least 1.5 metres out from the side of the sidelifter.

The other leg of the Sidelifter may be on the ground or also on the deck of the truck or trailer from where the load is being transferred.

5) To transfer containers from truck decks or rail wagons it may be necessary to place the stabiliser between the two vehicles. With Mk5 models it is important to ensure that this is done with the leg extension fully extended. This allows the greatest amount of stability for the sidelifter to act as a counterweight and the lift to occur at full outreach.

6) To stack containers two high from the deck of the Sidelifter:

a) Position the Sidelifter alongside the bottom container with about 300 mm clearance between the side of the Sidelifter and the container.

b) Position the Stabilisers as for operation (1).

c) Shorten the slings by using the chain adjuster hooks as per drawing AK50.6 - 3373

d) Transfer the container from the deck of the Sidelifter to the top of the container situated slongside.

NOTE: In some conditions it may be necessary to use a slight extra tilting of the stabiliser legs to gain the necessary height required for two high stacking.

6. STOPPING THE ENGINE

.a) Press the Emergency Stop Button on the remote control panel.

7. EMERGENCY STOP

Should an emergency stop be required i.e. a valve jams or a switch sticks -

a) Push Emergency Stop Buttonand hold in.
b) Turn off Key Switch.

These operations must be carried out in the above order. In case of failure of the Emergency Stop Button a Manual Stop control is fitted to the Radiator End of the Engine.

c) Sidelifters delivered after June 1990 have the Stop button wired differently. It is only necessary to push the Emergency Stop Button to shut down the engine and the Sidelifter.

WARNING:

Owners and operators of Steel Bros. Sidelifters are cautioned to watch the operation of the units on uneven or soft ground. In extreme situations, it is possible for the Sidelifter to be parked with a considerable twist or flex in its frame, or for the stabiliser legs to be put down unevenly, or in a situation where a flexing of the frame can be caused by loads placed upon them.

In extreme cases, the flexing of the Sidelifter frame in these situations can cause jamming of the twistlocks in the container pockets of the container which the Sidelifter is carrying, even though the container twistlocks have been released. This consequently puts a great strain on the container lifting gear when it is operated to lift the container, and can have serious consequences.

The Sidelifter is designed solely for the lifting of 20 ft ISO containers or 20/40' containers on Trombone units.

Shorter containers or loads can be lifted, but must be done with the use of a spreader bar which is designed for this purpose.

Steel bros. supply, on request, a spreader bar for handling USSCO Seafreighter containers, 30ft or 10 ft ISO containers. The lifting mechanism of the Sidelifter is designed solely for this purpose and will not tolerate any sideways loading being applied to it.

The Sidelifter should not be used to pull containers across the ground, nor to lift shorter length loads by any other means other than by the properly designed spreader bar.

The lifting chains should not be shortened such that the lifting lugs are then fitted to the top of a container. This places a dangerous sideways load on the lifting mechanism.

LIFTING LUGS:

Two pairs of container lifting lugs are provided with each Sidelifter on the end of the lifting chains.

LIFTING CHAINS:

These are made up so that when the top ring of the lifting chain is placed on the lifting pin correctly, the chains hang naturally with the lifting lugs facing the container and the right way round.

The Lifting Lugs are of a Left Hand and Right Hand configuration and lifting lugs can only be used in the container corner casting on the side for which the lifting lug is designed.

WARNING

RIGHT HAND LIFTING LUGS MUST NOT BE USED IN LEFT HAND CONTAINER POCKETS. WHEN IN THEIR CORRECT POCKET, THE PORTION OF THE LIFTING LUG WHICH IS INSIDE THE CORNER CASTING, WILL BE IN THE HORIZONTAL POSITION WHEN THE LIFTING CHAIN IS IN TENSION ON THE LIFTING LUG.

LIFTING LUGS WITH LOCKING PINS:

The left and right hand condition for lifting lugs as set out above also applies to those container lifting lugs which are provided with locking pins and should damage occur to locking pins or their mounting on these lugs, the lugs should be immediately replaced or reconditioned by a competent repair shop.

DAMAGED OR BROKEN LIFTING LUGS CAN CAUSE ACCIDENTS. CHECK LUG CONDIDTION BEFORE LIFTING CONTINUES. CHAINS MUST NOT BE HEATED, WELDED OR OTHERWISE INTERFERED WITH OTHER THAN BY PROPERLY QUALIFIED PEOPLE.

Lifting Chains should be inspected regularly and at least once a year tested for stretch and freedom of movement of the Hammerlocks etc.

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LANDING LEGS:

Operators and owners are warned that the landing legs on a Sidelifter, while capable of carrying the Sidelifter plus a fully loaded container in a stationary situation are only fitted for that purpose.

THE SIDELIFTER SHOULD NOT BE OPERATED UNLESS A ROAD TRACTOR UNIT OF AT LEAST 8 TONNE TARE WEIGHT IS CONNECTED TO IT.

CONTROLS:

The control Levers and Switches on Sidelifters are designed for manual operation of the Sidelifter and should not be restrained in any direction by ties, blocks or other means.

The operator should not leave the machine while it's engine is running nor leave the machine unattended with the key in the key switch. The operator should always take the key with him.

OPERATIONS

Extension and Positioning of Trombone Sideloaders.

To position a Trombone Sidelifter alongside a 40.0' container the sidelifter should be driven alongside the container and stopped with the rear twistlock in line with the rear container corner castings of the container.

Apply the emergency brake on the sidelifter. On some models the brake lines have to be uncoupled at the Trombone gooseneck before the trombone is extended, and reconnected to a different point once the sidelifter is in the 40.0' position. Uncoupling the air lines automatically applies the sidelifter emergency brakes on these units.

Models with Manual chassis locks. It is necessary to get down from the cab and pull out the locking pin on each side of the chassis, by turning the lock handles through 180 degrees, which leaves the locks in the withdrawn position.

Drive the tractor unit forward about 2 metres.

Set the Trombone chassis locks to the "return" position by turning the Chassis Lock handles back as far as they will go. This resets the chassis locks so that they will automatically relocate in their correct positions when the trombone reaches the 40.0' container length.

Return to the tractor and drive slowly forward (with the sidelifter emergency brakes applied) until the locking pins are heard to engage. Care should be taken to keep the sidelifter in a straight line to facilitate an even action on the chassis locks.

Models with air operated locks.
It is necessary to get down from the cab and disengage the locking pins with the switch adjacent to the lock on the driver's side.

This switch (which can be supplied with Key-Lock operation) when turned clockwise activates the lock pin withdrawing mechanism. The switch can be returned (on the key with drawning) to the central position at this stage as the proceedure is automatic after that.

The lock pin may not withdraw immediately the switch is operated, as it may be jammed due to the position the sidelifter is standing, however it will usually release if the sidelifter is moved slightly.

Once the pin is released, drive the sidelifter slowly forward to open it to the 40.0' position. As they move along the inner chassis the locking pins are triggered by a switch into the locking mode and will automatically go into the 40.0' pin holes when they are in position.

To close the sidelifter the Reverse Preceedure should operate.

NOTE

1. The locking pins should physically be inspected by the driver before he moves the sidelifter after altering the length to ensure that they have gone fully into the locking position.
2. Turning the control switch anticlockwise will reset the locking pins into the 'Lock' Mode. This should not be necessary in normal operation but is available in case of unintentional operation of unlocking function, fault in the system.

Never move the Trombone Sidelifter without ensuring that the chassis locking pins are fully engaged and the brakes are connected and working.

At no stage in any Sidelifter operation is it necessary to uncouple the Sidelifter from the Tractor unit which is towing it during any operating lengthening, or shortening process. This should never be done, as severe damage could be done to a Sidelifter if it is used without a tractor attached.

W A R N I N G

On Sliding Arm Models. Module Movement.

Lifting arms and stabilisers must be fully stowed before moving the lift modules!

Modules should be moved at engine idle speed only.

Lifting may only be done with the lift modules in the designed lift positions only!

NOTE: ENSURE THAT YOUR SIDELIFTER OPERATOR READS AND UNDERSTANDS THIS MANUAL AND IS PROPERLY TRAINED TO OPERATE THE MACHINE.

TOP LIFTING FRAME

Steel bro Sidelifters can be used to lift containers where access to the bottom corners of the containers is obstructed or when containers are stacked closely together by the fitting of a TOP LIFTING FRAME.

The types of Top Lift Frame are available as follows.

MANUAL FRAME

This frame fits over the lifting pins on the sidelifter top arms and is locked into this position by a 'snappin' pin fitted underneath the pin.

THIS PIN MUST BE IN POSITION AT ALL TIMES.

The Top Lift Frame chains are fitted with lifting Lugs designed to fit into the outside hole in the top corner castings of the ISO containers.

THE LIFTING LUGS ON THIS FRAME MUST NOT BE USED ANYWHERE ELSE ON THE SIDELIFTER AS THEY ARE MADE WITH THE LOCKING MECHANISM AT A DIFFERENT ANGLE TO THE LUGS ON THE SIDELIFTER MAIN CHAINS.

When using the Top Lift Frame it is essential that the lifting arms at each end of the sidelifter are moved in unison to avoid strain on the top frame and the pins in the lifting arms.

The Top Lift Frame can be carried on the top of a container being transported.

The Top Lift Frame cannot be used when double stacking containers.

HYDRAULICALLY OPERATED TOP LIFT FRAME 20.'0

This frame is hung by short chains from the lift pins on the sidelifter top arms. It is operated by solenoid controls from the Sidelifter Control Panel and is designed to meet International Safety codes. These include interlocks into the sidelifter controls to prevent lifting in the case of improper locking of all, or any one of the lifting locks and indicators signal when locking or unlocking can take place.

Operation:

To retract from 40.0' to 20.0' and 30.0' to 20.0' (NB:It is not possible to retract from 40' to 30')

- With lift frame still on Container,

1. Select Hyd system to Aux and select Twist locks to 'Unlock' (Red light will show).
2. Select Hyd system to 'Main' and raise frame 200mm off container. Select 'Aux' and select twistlocks to "lock" (Green light will show)

Select system to "Main" and lower the Bottom Arms completely. Position Top Arms till the buffer pins align with the buffer pads. Select "Aux" and select the twistlocks to 'Unlock' The Red Light Must Be On to indicate that the Buffer Pins are extended.

3. Unlock Trombone Chassis Locks and slowly close up the trombone chassis to 20.0'. Lock the chassis locks. Select 'Aux' system and select 'lock' (Green light on.)

Select "Main" and raise Top Arms completely. Fit the restraining links and chain, then lower Top Arms slowly to the travel position.

NB: The twistlocks on lift frame must always be in the lock position whenever the Top or Bottom arms are to be moved and when the machine is in Travel Mode.

To retract the Frame from 40.0' to 30.0' it is necessary to close the Lift Frame up to the 20.0' position, then to open it back out to the 30.0' position, following the above proceedures.

SIDELIFTER MAINTENANCE

1. Engine Power Pack

Enclosed with this manual is one copy of Service Instructions and Spare Parts Manual for the Kubota engine and to ensure longlife of the engine, these instructions should be closely adhered to.

2. Lifting Arms and Stabiliser

Grease all pivot points and arms and ram pin bearings at least once a week or more frequently as may be thought necessary.

Regularly check all chains, shackles and lifting lugs for wear, and replace these where necessary.

3. Hydraulic Circuit

The hydraulic reservoir should only be topped up when the lifting rams and stabiliser rams are in their closed up or travelling position. The hydraulic oil reservoir should in that position show half way up the oil level gauge.

Replace the return line filter element after approximately 50 hours use and thereafter at 100 hour intervals or as required. Check all hydraulic lines, valves and control units for leaks.

4. Maintenance

Maintenance of the braking, suspension and axle equipment on the Sidelifter is found in the Steelbro Trailer Manual which is also forwarded with the Maintenance Manual for the Sidelifter.

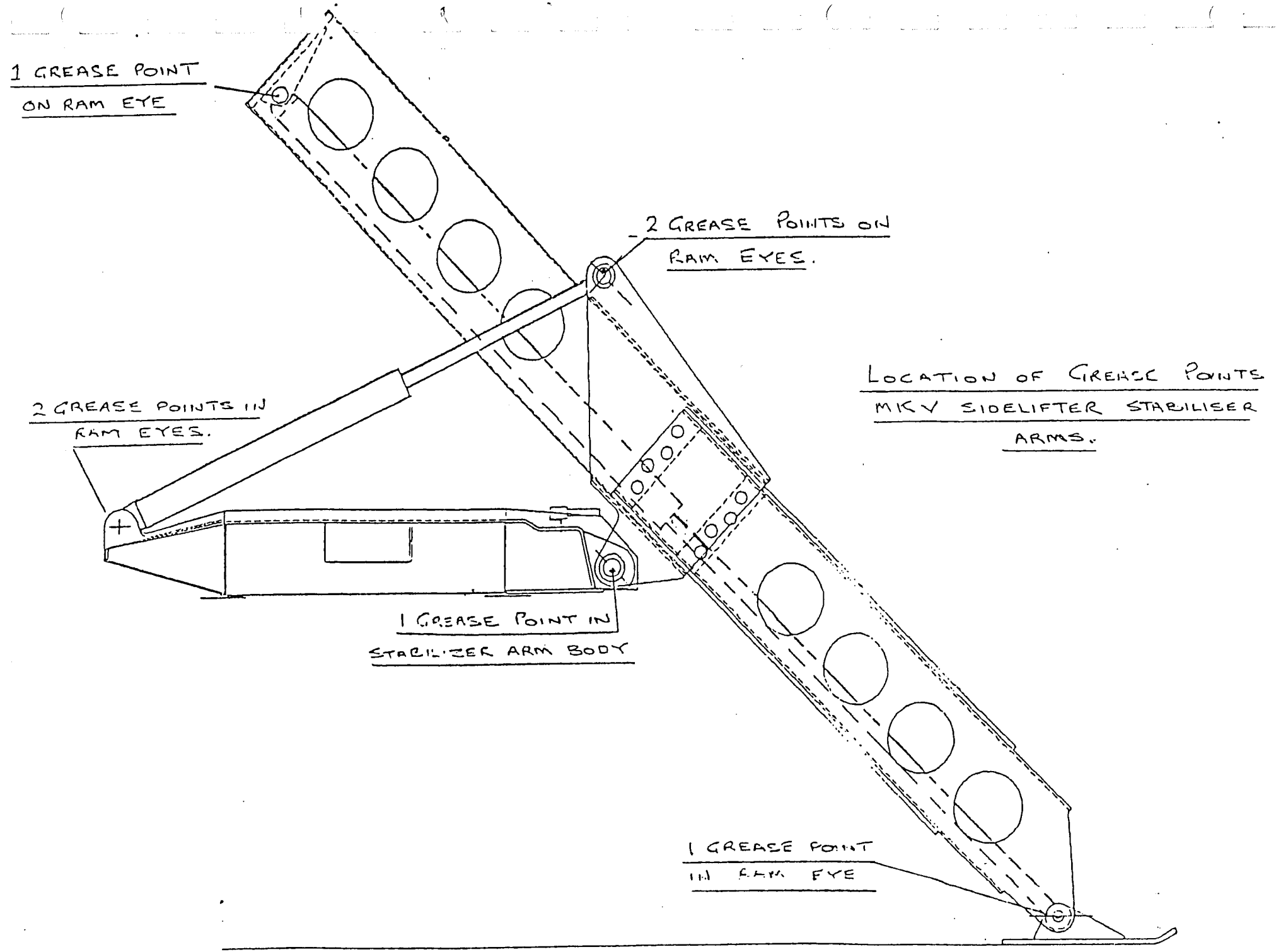
DO NOT USE STEAM CLEANERS ON OR NEAR HYDRAULIC CYLINDER SHAFTS as this can cause damage to the Chromed Surface on these rods.

The breather element in the oil tank filler should be removed and cleaned at every hydraulic oil change.

The Hydraulic Oil should be changed at least once a year. Always ensure that clean containers and filling equipment is used for handling Hydraulic Oil, and that the filler cap and it's surroundings are cleaned down prior to oil changing taking place.

Clean Hydraulic Oil in the system is essential for trouble free operation.

Hydraulic Oil should be: Shell Tellus 46
Mobil
Caltex



LOCATION OF GREASE POINTS
MKV SIDELIFTER STABILISER
ARMS.