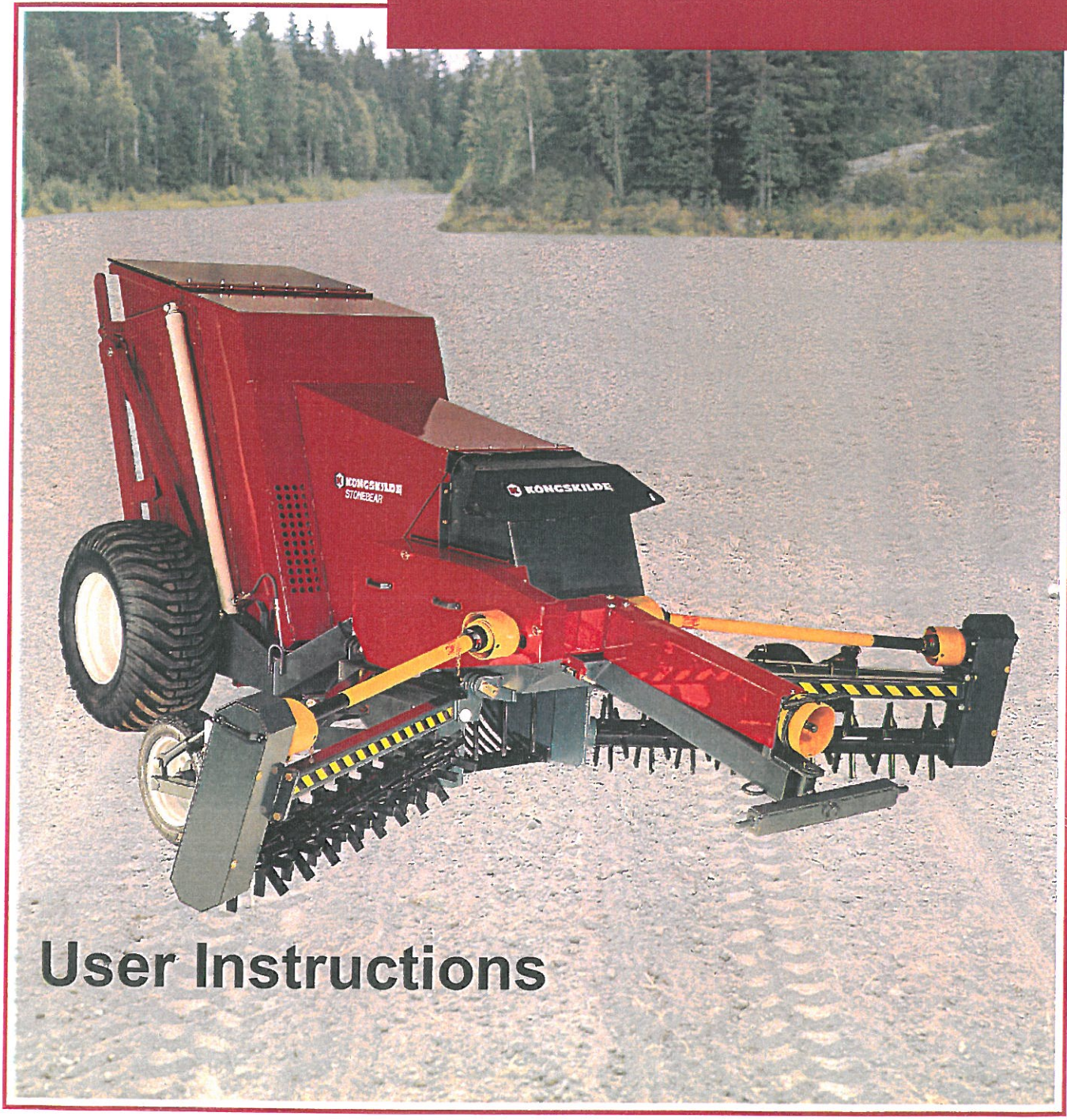
KONGSKILDE

Upto 2003!

Juko Stonebear



User Instructions

CONTENTS

1. FOREWORD AND MANUFACTURER'S PLATE

OY KONGSKILDE JUKO LTD. is a Finnish manufacturer of agricultural machinery belonging to the international KONGSKILDE Group. The Juko product range consists of the following agricultural equipment:

1. grain seeders and seeder/fertilizers
2. potato planters
3. potato harvesters
4. sugarbeet harvesters
5. stone harvesters

While we thank you for your trust in choosing a high-quality Juko product, we ask that you carefully read this users manual before using the Stonebear. The users manual and spare parts catalogue are classified in the table of contents in such a way that simplifies the location of information. The inspection and maintenance procedures outlined in the manual are of vital importance to the fault-free operation of the Stonebear as well as the validity of the guarantee.

All operation-related suggestions, warnings, and prohibitions, made expressly with user-safety and equipment durability in mind, must be carefully observed. All items of particular importance will be printed in bold text to aid in reading.

If you should have any questions or comments regarding your Juko Stonebear, please contact your dealer or the manufacturer. For maintenance or spare parts needs, please contact the retailer or the factory at: OY KONGSKILDE JUKO LTD. tel: +358 (0)2 439 3200 or fax: +358 (0)2 439 3210.

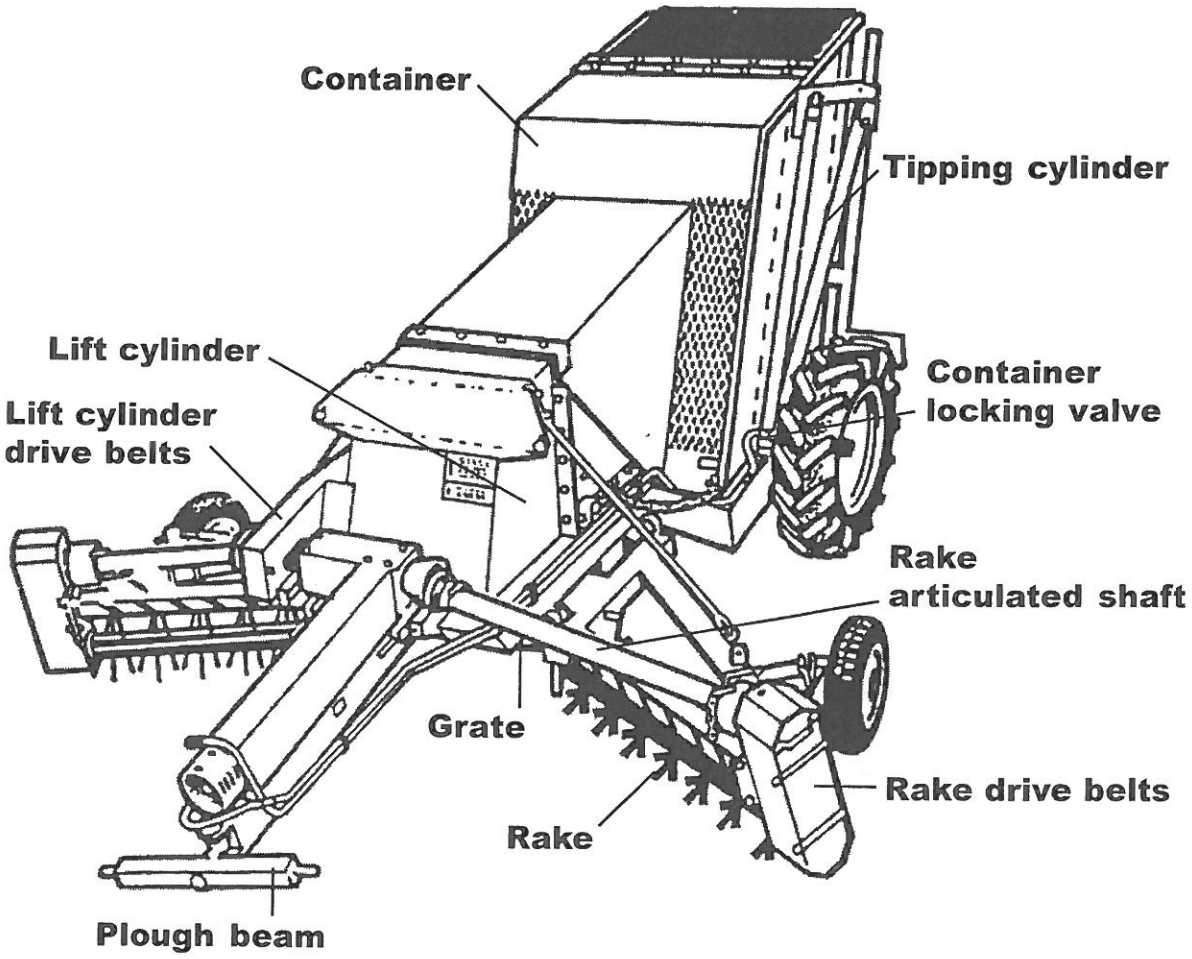
Immediately upon purchase of this equipment, fill in the following manufacturer's plate mock-up with the same information as found on the manufacturer's plate. When dealing with the JUKO sales agent, provide the type and serial number of the Stonebear so as to avoid any unnecessary misunderstandings or delays.
We sincerely hope that your purchase of JUKO agricultural equipment fulfils your expectations and provides you with years of reliable service.

2. GENERAL PRESENTATION OF THE STONEBEAR

Today's farming and harvesting methods require a particularly even and stone-free topsoil. In all phases of work, stones in the cultivated topsoil layer make operation difficult and can cause excessive wear and equipment damage.

The Juko Stonebear is a unique machine which harvests stones within a 4-meter operational width in only one pass. The Stonebear comes with a two-piece ridging apparatus and a movable lift cylinder which feeds the stones into the container.
The rake operates as follows:

The rake axles, equipped with wear-resistant pins, rotate against the direction of travel and their plows, angled towards the Stonebear, direct stones to the centerline of the machine.
When the stones have reached the centerline, they are lifted by ground resistance onto the grate scraper. Then, they are conveyed along the grate into the container by the lift cylinder. When the container is full, it tips its contents hydraulically.
When transporting the Stonebear, the rakes are raised and locked in an upright position. Thus, the machine's overall width is made suitable for driving on public roads.



KONGSKILDE

TECHNICAL SPECIFICATIONS

Work output	0,4 - 0,7 ha / h
Operational width	400 cm
Working depth	0 - 15 cm
Driving speed	1 - 6 km / h
Stone size	3 - 30 cm
Grates, standard	40 mm
Other sizes	35 and 50 mm
Container capacity	2,5 m^3
Tipping height	230 cm
Length	520 cm
Transport width	240 - 260 cm
Weight	2500 kg
Tyres	500 / 60 - 22,5" and 175 / 70R14

ACCESSORIES

The following accessories are available for the Juko Stonebear direct from the factory:

Item:	Code:
Rake hydraulic lifts	7201
35 mm grate	ZS01 (or 68366)
40 mm grate	ZS02 (or 68604)
50 mm grate	ZS03 (or 68368)
Primary articulated shaft (Bond.105.086.f.007.007)	68811

3. SAFETY INSTRUCTIONS

Know and observe all specified safety distances when operating the Stonebear.

The Stonebear operator is fully responsible for any injuries caused to bystanders.

When preparing to move, ensure that there is no one within the Stonebear operational area.

Exercise caution when operating on sloping terrain or other difficult conditions. Always try to drive at the correct angle to the slope.

Avoid making sudden moves when operating the Stonebear.

While operating the Stonebear, carefully monitor its function at all times so that, in the event of error or danger, the machine can be stopped as quickly as possible.

In emergency situations, stop the tractor and Stonebear immediately in order to avoid causing additional damage which could result in an accident.

Removal of guards and safety equipment during operation is strictly forbidden.

Turn off the tractor and the Stonebear during maintenance and cleaning.

The Stonebear may not be adjusted, serviced, or have other procedures performed on it while the machine or any part of it is unsupported.

Perform all maintenance tasks on a firm, even surface so that the Stonebear will not tip or move.

If necessary, use front counterweights on the tractor.

NEVER GO UNDER AN UNSUPPORTED MACHINE!

Ensure that there is adequate lighting when servicing the Stonebear.

SAFETY GUIDELINES FOR THE STONEBEAR USER

When operating the Stonebear, stones may be thrown from the grate slots or the stone catcher tipping hatch. This is why personnel standing near the machine must be warned of flying stones. The minimum safe distance is 20 m.

Always empty the container on a firm and even surface. Avoid making sudden moves while the container is raised.

Always close the stone container safety valves when going under the container. Remember to reopen them before lowering the container.

Do not move the Stonebear when the container is raised or, if it is being lowered, before it is completely down.

WARNINGS AND PROHIBITIONS

Riding on the Stonebear during transport is expressly forbidden.

Do not go under an unsupported machine.

The Stonebear container may not be emptied on a sloping surface.

Do not use the Stonebear for anything other than its intended purpose.

The Juko Stonebeara may not be used for harvesting stones with a diameter greater than 30 cm. These stones must be removed from the soil prior to using the Stonebear.

The rotational velocity of the tractor's power take-off axle may not exceed 440 r/min.

Dismantling of a clogged lift cylinder while the drive power take-off is switched on while reversing the tractor is expressly forbidden.

Extra-width tyres may not be mounted on the Juko Stonebear. If a greater load-bearing capacity is desired, use 500/60–22.5" tires.

Maximum speed while container is full: 20 km/h.

Drive belts must not be excessively tensioned.

NOTICE ON RIM USE

The manufacturer of rims used on JUKO machinery have provided the following guidelines for their products:

1. Wheel rims

The rims are vital to the safety and driveability of the vehicle. The rims must be approved and free from defect for both the vehicle and tire.

IMPORTANT! Never make any alterations or repairs to the rim.

Several different factors affect safety.
Liability for alterations or repairs made to the product after purchase, and not performed in accordance with manufacturer guidelines, is that of the individual responsible for making them.

2. Tyre mounting and removal

Mounting of tyres on the rim may only be performed by an authorized "tyre professional" who possesses the necessary training, experience, and tools. Mounting performed by inexperienced personnel may result in a safety risk and/or actual damage.

3. Retightening

The rim retention nuts and screws must generally be retightened, when the vehicle has been used for a period of time following attachment of the rim. Observe the guidelines provided by the vehicle manufacturer.

4. Tyre repair

The tyre may not be repaired while still mounted on the rim, as it will be impossible to inspect the interior of the tyre and, in addition, the pressurized tyre may explode.

4. TRANSPORT AND LIFTING OF STONEBEAR

Driving on public roads

Check the headlights and condition of reflectors before setting out.

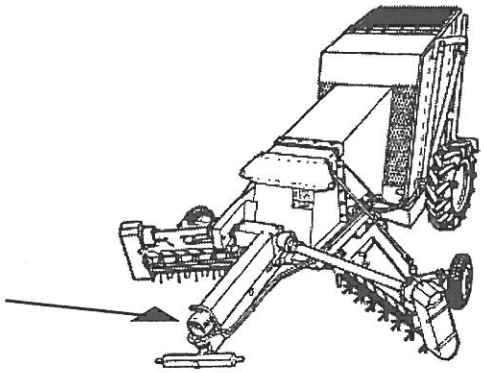
Ensure that the slow vehicle triangle and reflectors are plainly visible.

The Stonebear should be completely empty and free from riding personnel when being transported on public roads.

When being transported on public roads, the Stonebear transmission must be switched off.

When transporting or moving the Stonebear by equipment other than a tractor, the following guidelines must be observed:

The Stonebear may only be lifted at the specified lifting points (marked). The Stonebear lifting points consist of three welded loops: two at the center point on both sides of the machine and one on the front of the draw barrier.
The lifting points are marked with lift hooks in the figure.



Lifting chains or straps must be of an adequate length in order to avoid abrading or otherwise damaging the Stonebear.

Only approved and completely intact lifting equipment may be used in lifting the Stonebear. The lifting equipment must be rated to handle at least twice the weight listed on the manufacturer's plate.

The individual performing the lifting must be absolutely sure that there are no personnel under the machine at any time.

When placing the Stonebear on a flatbed trailer, all traffic regulations must be observed. The load's overall height and fastening must be carefully checked.

When using a forklift or similar lifting device, use extreme caution!
(The abovementioned lifting method is not recommended.)

When transporting the Juko Stonebear on public roads, the rakes must be locked in their upright position.

Before setting out, ensure that there are no stones left in the grate or on the beams which may fall out during transport. The container must be lowered during transport. Ensure that the lift cables are not hanging too low.

5. IMPLEMENTATION OF STONEBEAR

First, carefully read the Stonebear safety and user instructions – the Stonebear should not be used before the user is familiar with all instructions!

Implementation of a new Stonebear:

The Stonebear has been factory tested and preset by Juko for average usage – any extraordinary conditional adjustments should be made by the operator themselves in order to achieve optimal results upon implementation.

Although the nut torque is set during machine assembly, it will take a few hours before the parts on a new Stonebear settle into place. This is the reason that all nuts, screws, and chain tensions must be checked after 1-2 operational hours.

CHECK:

- wheel and grate mounting screw tensions
- lift cylinder spring mounts – rubber disc compression should be 1.5-2 mm
- drive belt tension – adjust if necessary
- angle transmission screw tension
- bearings mounting screw tension
- belt pulley conical sleeve mounting screw (Allen-head screw) tension

There are always 1-2 unused holes in the conical sleeve (threads on the sleeve side), which are only intended for removal of the sleeves. Under no circumstances should any screws be inserted in these holes while the sleeve is mounted. The mounting hole threads are located on the belt pulley side.

Torque figures are listed in section 7.4.

Implementation of a used Stonebear for a new season:

CHECK:

- tyre pressure
- condition of bearings – replace those in poor condition
- angle transmission oil level – refill if necessary
- screw, nut, and chain tensions
- condition of hydraulic lines and connections
- machine lubrication
- condition and tension of nostomaton and drive wheels – replace those worn
- adjust lift cylinder drive belts
- adjust rake belts

If necessary, replace broken parts.
Place spare parts orders in plenty of time for the pending season.
When ordering spare parts, remember to give your Stonebear model and serial number.

6. USER INSTRUCTIONS

The Stonebear must be used in accordance with these instructions in order to maintain safety.

When using the Stonebear, the operator must take the immediate operating conditions (temperature, soil moisture, etc.) into consideration and adjust accordingly. Complete these procedures before beginning operation.

More detailed information on the respective operating instructions are contained in this section.

6.1. Hitching the Stonebear to the tractor

The Juko Stonebear is hitched to the tractor draw barriers with a plow beam. The plow beam has two elevations. The elevation is set by turning the withdrawal sleeve on the plow beam 180°. Before turning the withdrawal sleeve the mounting bolt on the plow beam must be removed, thus releasing the draw bar end – now the sleeve can be turned.

6.2. Articulated shaft

The Stonebear primary articulated shaft is not standard equipment (factory order no.: 68811). Appropriate primary articulated shafts are the Bondioli 105 or Walterscheid 2400 or 2300. The tractor draw barriers are lowered when mounting the articulated shaft. Connect the articulated shaft to the tractor's power take-off axle.

If you are required to stretch the articulated shaft 15 cm over its shortest position, the shaft is too short. If the articulated shaft needs to be shortened, file down the edges, remove the filings, and lubricate the telescopic tube.

Set the working height of the tractor draw barriers so that the draw bar is not touching the articulated shaft. Also ensure that the lift bars are not raised too far, which would prevent moving in reverse.

6.3. Hydraulics

The Stonebear container ejecting cylinder line is connected to the tractor's single-function hydraulic valve. When connecting, inspect the cleanliness of the quick-release coupler. There are no special requirements concerning the grade of hydraulic oil to be used in the Stonebear hydraulic system.

If the Stonebear is being used by more than one operator, mixing of the oil when switching tractors must be monitored. Approximately 2.5 liters of oil will remain in the lines under the container.

6.4. Rake control

Whenever raising the rakes into their transport position, first release the articulated shafts from the machine-side ends and connect them to the mounting pins on the rake frame.

The rakes should never be raised when the articulated shafts are in position.

6.4.1. Rake control (w/ cable)

The rakes are lowered into their working position with cables attached to the front of the container.

When lowering the rakes, the lift cables must be attached to the container mounting brackets. Ensure that the cables are well situated on the sheaves. Raise the container carefully until the cables are taut.

Remove the rake cotter pins and carefully lower the container, and the rakes will also lower. **Move the lift chain from the container mounting bracket to the rakes**. Leave some slack in the chain. Connect the rake articulated shafts to the angle transmission.

Never go under rakes only supported by cables.

6.4.2. Hydraulic rake control

Hydraulic rake lifts are available as optional equipment on the Juko Stonebear. These can also be installed at a later time.

Connect the hydraulic line leading to the cross-over valve to the tractor's single-function valve quick-release coupler (to which the tipping cylinder line is normally connected).

Ball taps in the cross-over valve are only used for selecting a function - the actual operation and tipping are made with the tractor's valves. When raising the stone container, the rake ball taps must be closed.

6.5. Drive belt transmission

The Juko Stonebear transmission is designed to endure impact with stones on its own. However, in order to avoid potential damages caused by overload, the transmission is also well-protected.

When the lift cylinders and rakes are rotating among stones, the transmission will be subject to short, irregular load peaks. In order to reduce their effects, the entire Stonebear transmission is driven by drive belts, which also reduces the load peaks affecting the tractor's power take-off axle.

In potential overload situations, the drive belts slip and thus even out the stresses being placed on the transmission. **But keep in mind that over-tensioning the belts will not increase power** - instead another point in the transmission will be placed under strain in place of the protective equipment.

During long storage periods, the belt grooves may be subject to rust; this could increase the slip limit by nearly three times the norm. As a result, begin operating the machine slowly and allow the belt grooves to become polished. The rust can also be removed using sandpaper while the Stonebear is turned off.

The slip limit may suddenly drop, if the belts are muddy or wet. If this happens, do not increase tension - simply clean and dry the belts.

6.5.1. Rake transmission

A belt transmission (5 cogged belts) serves as a rake overload protector. Belt tension is set by changing the center distance.

When the rake transmission is placed under too great a load, the belts will begin to slip, according to their tension. Possible causes for overload are: oversize or lodged stones, excessive working depth, or a high moisture content in the topsoil. If the belts begin to slip, the Stonebear must either be raised off the ground or stopped immediately.

The belts do not necessarily have to be tensioned. Instead, in order to protect the transmission and avoid further slippage, perform the following:

- the field must be well cultivated prior to stone harvesting
- guide large stones (20-25 cm) to the center of the lift cylinder
- operate at a shallower working depth, such as 5 cm
- allow the field to dry before stone harvesting
- reduce speed

Only when the belts are slipping repeatedly and the abovementioned guidelines have been followed, can the belt tension be set according to the following instructions.

6.5.2. Setting rake drive belts

If necessary, the rake drive belt tension can be set as follows:

- open the rake box cover
- loosen the mounting screws on the upper axle bearing (4 pcs)
- tighten the vertically-running belts to the correct tension using the bolt (illustration)
- tighten the axle bearing mounting nuts
- when tightening the belts, also check the conical sleeve tension (see instructions)
- close cover

6.6. Lift cylinder transmission

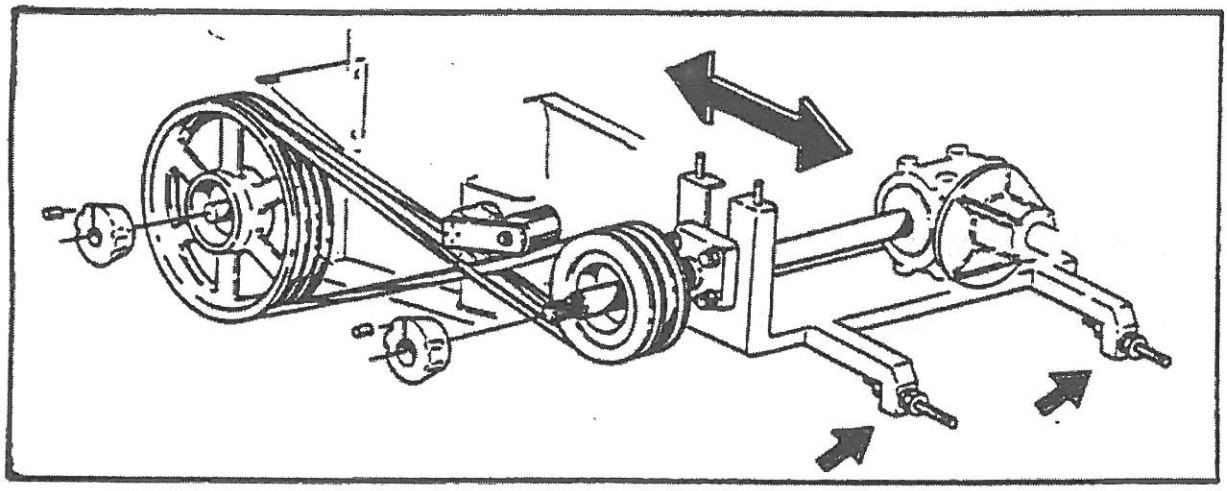
The Juko Stonebear lift cylinder also operates on a drive belt transmission, which also functions as an overload protector. C-belts (2 pcs) transfer the rotation from the angle transmission to the lift cylinder via the auxiliary shaft and belt pulleys.

If the lift cylinder should become clogged or is otherwise overloaded, the belts will begin to slip from the larger belt pulleys. **The Stonebear must be immediately stopped in order to avoid wearing the belts down**. Lift cylinder clogging and removal of oversize stones is explained in sections 6.7.7. and 6.7.8. Setting of the lift cylinder belts is as follows:

6.6.1. Setting lift cylinder drive belts

The lift cylinder drive belt tension is set by moving the angle transmission mounting plate. Then, perform the following:

- remove the belt guard
- tighten the lift cylinder belts with the adjustment bars (2 pcs) in front of the angle transmission and the bar nuts (24 mm wrench)
- when tightening the belts, **check the belt pulley alignment**
- finally, set the tension roller to 20°
- when using the above settings, the belt will slip from the large belt pulley when overloaded
- after setting, tighten the adjustment container locking nuts
- also check the conical sleeve tension when tightening the belts (see conical sleeve installation instructions)



When replacing belts, ensure that they are in the correct position. **Belts running to the foremost belt pulley must always run inwards** (see illustration). Upon initial application, the new belts will fall into place. This is why **driving on new belts must be started carefully and the belt tension must be initially checked** at regular hourly intervals.

When tightening the lift cylinder belts, they are to be set at such a tension that they can be manually moved using a wrench.

6.7. Practical driving instructions

Whenever harvesting stones, the operator should avoid placing any unnecessary strain on the Stonebear. Operation of the Juko Stonebear demands caution, as the tractor usually has much more power than is required for stone harvesting.

6.7.1. Factors improving effectiveness of stone harvesting

The Juko Stonebear is designed to remove stones from the topsoil cultivation layer to a depth of 0-13 cm. It is here that the Juko Stonebearn is proven to be much more effective than any other similar equipment available on the market.

Stone harvesting and its effectiveness can be further improved by adhering to the following guidelines:

- stones larger than 25 cm are removed from the soil prior to using the Stonebear
- **the topsoil must be well cultivated** – the soil is even and stones are loose in the aerated surface layer
- the topsoil surface layer has been allowed to dry before harvesting
- have several places for unloading – in fields with a great amount of stones, the container may be full after only 50 m
- the most effective method is to remove the stones harvested by the Juko Stonebear with the tractor trailer
- there is little or no base stone in the field
- there are no root clods, tree roots, or quitch grass in the field
- stones are only harvested to a working depth of 7 cm

6.7.2. Stonebear rotational velocity and driving speed

The Juko Stonebear transmission is geared so that the recommended power take-off is 300-400 r/min. Thus, the engine rotational velocity is, depending on the tractor, 1000-1400 r/min.

Under no circumstances should the rotational velocity of the tractor power take-off axle exceed 400 r/min.

An excessively high rotational velocity usually indicates that the rakes are beginning to throw stones backwards as the Stonebear passes over them. An excessive amount of soil may also be gathering at the machine's center and an exceptionally high driving speed may damage the tines.

Depending on the stone content and conditions of the field, the driving speed can be from 1-6 km/h. If there is a high base stone content or 15-22 cm stones, the driving speed should be minimal (1-2 km/h).

In fields without base stone and a general stone size of 4-10 cm, the driving speed can be from 3-6 km/h.

One should always begin at an adequately slow driving speed.

6.7.3. Working depth

The working depth of the Juko Stonebear can be set at 0-13 cm. A structural factor limiting the working depth of the Stonebear is the length of the rake tines. However, only in specific circumstances can the full working depth be employed.

The practical working depth is limited by field stone content, soil type, and soil moisture content. Because the working depth otherwise affects the practical driving speed and work performance, it is generally not recommended to harvest stones at a working depth of greater than 7 cm.

The most highly recommended method of harvesting stones is surface harvesting, which only occurs at a depth of 0-7 cm. The grate is also designed to function at an optimal level while in this operating position.
Setting the Stonebear working depth is performed as follows:

The Stonebear working depth is controlled by adjusting the height of the tractor draw barriers. Based on the working depth, the grate and rake depth are set at the same level. The rake working depth is set by altering the height of the traversing wheels (using the adjuster screws). **The working depth must be constantly monitored.**

Taking the conditions into account, an excessive working depth means that the Stonebear will not be able to move stones and earth to the center of the machine rakes quickly enough, and will instead push them in front of the grate. The amount of soil entering the container along with the stones will also increase considerably.

The rakes can also be set pointing downwards from the horizontal plane to follow the contours of the field. There are adjuster screws located on the outer side of the rake frame, with which the amount of rake downward flex can be limited.

6.7.4. Selection of grate size

The Juko Stonebear grate is selected according to the desired harvest and field stone content. The purpose of the grate is to sift out as much soil being pulled up by the lift cylinder as possible. The grate is comprised of longitudinally arched, welded steel bars, between which the lift cylinder spring tines rotate. The bar spacing determines the degree of harvest, and can be, depending on the various grate sizes, 35, 40, or 50 mm.

The 40 mm grate is most often included as standard equipment on the Stonebear, as it is well suited to a wide variety of conditions. When clearing land and on grain fields, a grate with 50 mm bar spacing can be used. For replanting lawns and on beet fields, a 40 mm grate is ideal. The tightest bar spacing of the 35 mm grate is primarily used for potato crops, basic parkland maintenance, and on road construction sites.

6.7.5. When to harvest stones

Stones are usually harvested from grain fields prior to seeding. In this case, the field must be allowed to dry for cultivation before using the Stonebear. This will decrease the amount of soil compaction caused by the Stonebear as well as making stone harvesting quicker and more effective. Excessive soil moisture content will also increase the amount of soil harvested with the stones as well as causing soil to gather at the center of the machine, thus resulting in an uneven track.

In practice, the soil must be cultivated at least once prior to stone harvesting. Driving directly on headlands is not recommended. Cultivation of the field before stone harvesting loosens stones in the cultivation layer, levels the topsoil, and speeds drying. Thus, the actual performance of stone harvesting is made significantly easier. A cultivated field must be allowed to dry before commencing stone harvesting with the Stonebear.

Another possibility for removal of stones from the topsoil surface layer is to harvest stones just after seeding, and prior to germination. As a result, the working depth must be set lower than the seeding depth (nearly at the surface of the topsoil), so that the seeds will not be removed from their moist seed beds. This is advantageous in that there are no delays in seeding times and stone harvesting can be performed more quickly as the stone content is small. Moisture is also preserved for seed germination. The disadvantage to this method is the degree of accuracy it requires as well as the disturbance of seeding by stones in the cultivation layer.

In other cases, such as on fallow fields and in the clearing of virgin land, stone harvesting can be performed in the summer, as there are more daylight hours and the conditions for harvesting are generally better. Furthermore, the operational hours of the Stonebear can be maximized.

6.7.6. Miscellaneous driving instructions

When driving on sloping terrain, the direction of travel should be either uphill or at an angle towards the peak of the slope. If required to drive downhill, one should begin with an empty container. Should the container be full, the stones will not fall out but will instead rotate in the lift cylinder and cause unnecessary damage.

When clearing new land or in the thorough renovation of fallow fields, stone harvesting and cultivation should be performed several times in alternation. Thus, the Juko Stonebear will harvest only the topsoil surface and the stones are loosened using a rake or cultivator. Old stone deposits are to be dispersed over a wide area prior to mechanical stone harvesting.

6.7.7. Stone deposit effect on handling

Although the lift cylinder can handle approximately 30 cm stones, the largest recommended stones should be 20-25 cm. There are two reasons for this. First, stones being passed along the grate will move unhindered with a wider, more open passage.

Second, the size of the stone also affects wear on the lift cylinder spring tines. For this reason, it is recommended that the lift cylinder rotational speed be reduced, should the stone size selected be 20-25 cm.

Single large stones having a maximum diameter of 30 cm, are to be harvested as follows: stop the lift cylinder, move the leading edge of the grate under the stone, and carefully turn the transmission back on. However, avoid harvesting oversize stones as they will become lodged in the machine.

Single large stones are not to be guided to the grate with the rakes – instead, the grate must be guided directly behind them, according to the above instruction.

6.7.8. Clogging of lift cylinder

The lift cylinder function must be monitored during operation. **If the cylinder stops, turn off the power take-off immediately**. If the lift cylinder is clogged with oversize stones or earth clods, reverse slightly while turning the transmission quickly on and off. This shaking out of the clog is the best method to use, as the constant slippage of the drive belts wears them down unnecessarily.

Also check that the container is not too full. If the level of stones exceeds the grate's trailing edge by 20 cm, empty the container.

If the cylinder repeatedly stops due to clogging, reduce the working depth and/or driving speed. Check to see if stones have become lodged in the grate bar spaces - this may occasionally stop the lift cylinder. Also check the tightness of the lift cylinder drive belts.

6.7.9. Removal of lodged stones

The lift cylinder may occasionally stop due to oversized stones or stones which are lodged between the grate and spring tines. Reverse slightly and raise the grate off the ground (max 10 cm). Carefully turn the transmission on and off to try and dislodge the stone or move it gradually past the grate's halfway point, which is the tightest point in the lift cylinder.

The lift cylinder can also be rotated manually using an iron bar or similar, whereupon the stone will usually be dislodged. Ensure that the grate's catch board is not bent. Stones can usually be broken using a hammer; use protective eyewear to prevent eye injury from flying stone chips.

If the stone is so large that it extends over the leading edge of the grate, lower the Stone-bear against the ground and move forward and backward to loosen the stone.

6.7.10. Emptying the container

When the Stonebear container is full, the lift cylinder will no longer deposit stones into it, instead returning them to the grate.

When the container is full and the Stonebear is being reversed, the tractor lifting apparatus must be lowered to its lowest position. This will ensure that the tractor draw barriers do not rise suddenly into their upright position if the Stonebear tires encounter an obstacle.

The Juko Stonebear container is emptied from the rear by tipping into a trailer or directly onto a tip near the field. When emptying into a trailer, ensure that there is no strain placed on the trailer from a sudden or heavy load.

The container must always be emptied on a stable and level surface. **Moving the Stone-bear while the container is raised is expressly forbidden.**

7. MAINTENANCE

A well-performed maintenance program ensures problem-free operation for busy working times.

1. Check the tension of all screws and nuts before beginning work. The inspection and tightening of new Stonebear machines in particular must be performed within a few hours after implementation.

2. Tyre pressure must be checked, according to technical specifications.

3. The screw tightness of the rims must be regularly checked (see the "Notice on Rim Use" in section 3).

4. Regular inspection and lubrication of all bearings.

   Regular inspection, tensioning, and lubrication of all chains.

   Regular inspection, tightening, and lubrication of all pulleys as well as a belt inspection.

   Lubrication points and the need for lubrication are outlined in detail in section 7.1.

   Only high-grade lubricants and oils may be used in lubricating the Stonebear; all recommendations and regulations concerning their use must be observed.

5. A visual inspection of the Stonebear frame and other structures prior to use eliminates the possibility of damaged or broken parts inflicting further damage during operation.

6. A thorough cleaning of the Stonebear of all loose dirt and debris after every use increases its operational reliability and service life. Cleaning can be performed with a pressurized water jet while taking care when directing the jet at certain machine parts (i.e., bearings).

7. After cleaning, applying a light coating of oil to all rust-sensitive parts is recommended. Idling the Stonebear to spread lubricant throughout the machine as well as discharge any water is also recommended.

8. Touch-up painting of worn, painted metal parts.

9. When performing maintenance tasks on the Stonebear, ensure that no lubricant or other substances pollute the environment.

10. Keep lubricant out of contact with rubber parts.

7.1. LUBRICATION AND MAINTENANCE

The Stonebear lubrication chart explains which points are to be lubricated and how often. High-grade, multipurpose petroleum jellies are best suited for lubrication. When lubricating, check that feed gun nozzle and lubrication ports are clean. Clogged ports should be cleared or replaced. The lubricant is injected into the port until its overflow (clean) is visible at the edges of the bearing, bushing, or other.
Any excess lubricant must be wiped off.

The following guidelines concern the maintenance of the Stonebear roller chains:

The chains are lubricated with a pure mineral oil, with a viscosity of SAE 20 - lubricants which cannot penetrate the chain links. After each season of use, the chains are to be removed and cleaned of all pitchy lubricant and dirt using gasoline or petroleum. Following this, the chain is lubricated by dipping it completely in melted graphite vaseline. The best results are achieved by letting the chain sit in the graphite vaseline for approximately 1 hour. If this method is employed, the chain will not require further lubrication for the duration of the season.

IMPORTANT! AVOID CONTACTING RUBBER PARTS WITH LUBRICANT!

The countless impacts that the Juko Stonebear endures during operation as well as those parts in constant contact with the stones result in extremely abrasive equipment wear. This is why the following maintenance procedures are essential to the proper working order of the Stonebear. Maintenance performed according to these guidelines is also a condition for the guarantee.

At the conclusion of stone harvesting, completely empty the container of all remaining stones and soil. Wash the Stonebear thoroughly of all dirt and debris and then perform a general equipment lubrication according to the abovementioned instructions. Those parts worn down to the bare metal must be protected from rust with a light coating of petroleum jelly or oil.

Some of the Juko Stonebear joints and bearings are equipped with lubrication ports, and are to be lubricated regularly, according to the following table:

Location:	No.:	Frequency:
Draw bar pivot	2	daily
Container sliding surfaces	2	daily
Articulated shaft joints	6	daily
Articulated shaft telescopic tubes	3	daily
Rake reversal links	4	daily
Rake height adjuster	4	daily
Rake inner bearing	2	daily*
Rake outer bearing	2	weekly*
Drive shaft bearing	1	weekly
Lift cylinder bearing	2	weekly
Rake drive shaft bearing	2	weekly

* generous lubrication

Lubrication of the bearing units in the rakes must be performed with extreme caution so that the bearing seals are not breached.

Daily Maintenance

During the season, the following maintenance procedures are to be performed on a daily basis, in addition to the abovementioned lubrication:

- clear the rakes of any tangled roots, baling wire, or the like
- **remove any stones or wood pieces lodged in the grate (as soon as noticed)**
- check the tightness of the lift cylinder springs and tighten if necessary
- check the tension of the lift cylinder belts and tighten if necessary
- check the tightness of the conical sleeves and tighten if necessary

The lift cylinder springs are not to be removed from their mounting points –the rubber disc should be evenly compressed 1.5-2 mm.

Weekly Maintenance

During the season, the following maintenance procedures are to be performed on a weekly basis, in addition to the abovementioned lubrication:

- check that there are no oil leaks from the angle transmission
- check that there are no oil leaks from the hydraulic equipment
- check the tightness of all screws and nuts
- check for lift cylinder spring and grate wear

From an operational standpoint, it is absolutely required that the springs reach the grate bar spaces. Rotate the lift cylinder - if the springs do not reach the halfway point of the grate, they will need to be extended. (See section 7.5)

7.2. Transmission case

For new Stonebear machines, the transmission fluid will require changing after approximately 20 operational hours and then, after every 100 operational hours. The fluid level must be checked daily by opening the check screw located on the side of the transmission case. If the fluid level is visible through the hole or fluid leaks out when open, then the level is sufficient; otherwise, fluid must be added. The fluid capacity of the transmission case is approximately 1.75 liters. A high-grade transmission fluid (SAE 90) is recommended for use.

7.3. Lubrication of articulated shaft

Under conditions of normal use, the lubrication points are to be lubricated according to the frequency outlined in the instructions. Axles laying idle for an extended period of time must be cleaned and re-lubricated. Overload switches should be tested following extended periods of down-time. The inside of the outer form pipe must be lubricated. The above maintenance instructions concern all articulated shafts on the Stonebear.

7.4. Torque

Unless otherwise mentioned, use the enclosed torque measurements when tightening screws. The torque depends on the diameter and hardness of the screw (the hardness is listed on the screw head).

Torque **Nm**

Diameter mm	hardness 8.8	10.9
5 mm	6	9
6 mm	11	17
8 mm	28	40
10 mm	55	80
12 mm	95	140
16 mm	235	350
20 mm	475	675
24 mm	825	1170
30 mm	1630	2320

7.5. Repair guidelines

Juko Stonebear parts extremely susceptible to wear are the rake tines, grate, and lift cylinder spring tines, all of which are made of specialized metals, specifically designed for their respective purposes. The grate and lift cylinder spring tines are designed as disposable parts, to be replaced as necessary. The rake tines can also be extended by welding.

7.5.1. Rake tine

If the annual use is under 100 hours, 2-3 hard metal runs should be welded to the rake tine tips once every year.

Under extremely demanding conditions, the rake tine service life can be extended by welding an extension piece onto the tine. Replacement pieces made of specialized metal are available as spare parts (spare part no. 68213-03).

7.5.2. Lift cylinder spring tine

The lift cylinder tines are made especially for the Juko Stonebear. Broken springs cannot be repaired by welding, but must be replaced. Only original Stonebear s-springs are suitable for the intended purpose in regards to the model and their durability.

The lift cylinder tines shorten with wear. The spring should be replaced when it no longer reaches the halfway point of the grate.

7.6. Conical sleeve and belt pulley installation instructions

The Juko Stonebear belt pulleys are mounted on the axles by means of conical sleeves. When installing and inspecting the belt pulleys and conical sleeves, the following guidelines should be followed.

7.6.1. Removal of conical sleeve

1. Remove the mounting screws and screw one or two of them into the extraction hole(s). The extraction hole threads are facing the conical sleeve.
   Important: under no circumstances can the screws be inserted in the extraction holes if any of the mounting screws are still in place.

2. Tighten the extraction screws evenly, until the sleeve releases from its boss.

3. Remove the belt pulley from its axle.

7.6.2. Mounting of conical sleeve

1. Carefully remove the protective lubricant from the new sleeve and belt pulley boss. Place the sleeve on the belt pulley boss and align the holes.

2. Lubricate the mounting screws and screw them gently into place, with the mounting holes facing the belt pulleys. The mounting screws are not to be screwed into the extraction holes.

3. Clean the axle and mount the belt pulley and conical sleeve into place. When mounting the belt pulley remember that first, the sleeve is attached to the axle and then the pulley is moved slightly towards the sleeve.

4. Tighten the screws with the key until sufficiently tight.

5. Tap the sleeve lightly and re-tighten the screws. Repeat this several times to ensure that the sleeve is tightly in place.

6. Check the screw tightness regularly.

7. Fill the extraction holes with, for example, lubricant in order to prevent dirt or debris from entering.

7.7. TROUBLESHOOTING:

Problem:	Troubleshooting:	Cause:	Action:
Stones left on the field.	Check working depth, grate size and condition.	1. Shallow working depth 2. Grate bar spacing too wide 3. Grate bars damaged 4. Rotational velocity too high	1. Slightly increase working depth 2. Replace w/ narrower grate 3. Fix, or replace if necessary 4. Reduce rotational velocity
Stones not entering Stonebear.	Check working depth and condition of lift cylinder tines as well as field conditions.	1. Working depth too shallow 2. Lift cylinder tines missing 3. Lift cylinder tines bent 4. Low stone content	1. Slightly increase working depth 2. Replace missing s-tines 3. Replace w/ new tines 4. Slightly increase driving speed
Soil taken in w/ stones.	Check field conditions, working depth, and the condition of rake axle pins.	1. Working depth too deep 2. Soil moisture content too high 3. Excessively worn pins 4. Grate bar spacing too narrow 5. Rotational velocity too high	1. Reduce working depth 2. Allow soil to dry 3. Weld extensions onto pins 4. Replace w/ wider grate 5. Reduce driving speed
Rakes stop during operation.	Check if: the soil moisture content is too high, the drive belts are too slack, the axles are turning freely, the working depth is correct, and the belt pulleys are oily or worn.	1. Soil moisture content too high 2. Drive belts are too slack 3. Bearings are damaged 4. Encrustation between axle and frame 5. Working depth too deep 6. Drive belt broken 7. Oil on belt pulleys 8. Belt pulleys or belts worn	1. Allow soil to dry 2. Slightly tension and test 3. Replace bearings w/ new 4. Clean between axle and frame 5. Reduce working depth 6. Replace **all** belts 7. Remove and clean belt pulleys 8. Replace w/ new
Rake drive belts are breaking.	Check if there are foreign objects in the end boxes, the belt tension, and whether the belt lengths are correct.	1. Impurities in the boxes 2. Drive belts too tight 3. Belts incorrect length	1. Clean end boxes 2. Loosen drive belts 3. Replace **all** belts
Lift cylinder stops.	Check condition of drive belts, stone conditions, and the position of the belt tension roller (Rosta).	1. Belts too slack 2. Belts are broken 3. Too many stones on the grate 4. Tension roller too slack	1. Tension belts 2. Replace both 3. Reduce driving speed 4. Adjust roller until tight
Lift cylinder belts are breaking.	Check their tension, monitor rotational velocity and that the belts slip if necessary.	1. Belts too tight 2. Small stones caught in between belts and pulleys 3. Stones lodged in grate	1. Slacken belts 2. Reduce rotational velocity 3. Reduce rotational velocity and driving speed
Lift cylinder belts rotating backwards in belt pulley grooves.	Check belt tension and condition.	1. Belts too slack 2. Belts worn	1. Replace w/ new and check tension 2. Replace **both** belts w/ new
Container lowers slowly or is stuck when being lowered.	Check condition of quick-release couplers and tractor, as well as the condition of hydraulic lines and line valves. Also check the condition of sliding surfaces.	1. Quick-release coupler buttons worn 2. Hydraulic pipes/lines pinched 3. Line system valves broken/clogged 4. Line system valves close too easily 5. Sliding surfaces dry	1. Replace both couplers 2. Replace pinched lines 3. Clean/replace line system valves 4. Replace w/ new line system valve 5. Lubricate sliding surfaces
Lights do not work.	Check leads, bulbs and connections.	1. Bulb burned out 2. Contact problem in connection or lamp. 3. Breaks in the lead 4. Electrical problem in tractor	1. Replace bulb 2. Open and clean connections 3. Replace w/ new lead 4. Repair tractor electrical system

8. STORAGE INSTRUCTIONS

WAREHOUSING AND STORAGE

When being placed into storage, the Stonebear must be cleaned of all dirt and debris, lubricated, and carefully adjusted, according to the guidelines presented in this manual.

Release tension from all equipment springs.

Cleaning may be performed using a pressure washer, but exercise extreme caution and do not direct the water jet at bearings or other machine parts susceptible to damage. All joints, drive chains, articulated shafts, etc. must be serviced and lubricated.

Unpainted, exposed, or worn metal parts must be given a light coating of oil for winter storage.

The Stonebear must be kept indoors, free from moisture and dirt. If there are no such facilities available, cover the Stonebear with a tarpaulin.

Any repairs, replacement of worn parts, or spare parts orders must be made in good time before the following season so that the Stonebear is ready for service when work begins.

DISPOSAL, SALVAGE, AND RECYCLING

1. The disposal of lines, oils, and rubber and plastic parts is to be performed in accordance with current regulations.

2. The disposal of metal parts does not require any special procedure.

3. The recycling of all materials and parts is recommended.