

**Spearhead Machinery**  
**Operator Instruction Manual For**  
**TRISAW/QUADSAW**  
**1.50m, 2.00m and 2.50m cut width**

Vegetation control hydraulic drive saw blade attachment

**8999146EN v1.1**

# IMPORTANT

## Verification Of Warranty Registration

### Dealer Warranty Information & Registration Verification

It is imperative that the selling dealer registers this machine with Spearhead before delivery to the end user.

**Failure to do so may affect the validity of the machine warranty.**

To register machines go to the Spearhead Machinery Limited web site at:

<https://my.spearheadmachinery.com/warranty/machine-registration/>

Should you experience any problems registering a machine in this manner please contact the Spearhead Service Department on 01789 491860.

Confirm to the customer that the machine has been registered in the section below.

### Registration Verification

<b>Model Type:</b>		<b>Trisaw/Quadsaw</b>
<b>Model Number:</b>		<b>955</b> _____
<b>Serial Numbers:</b>	<b>Machine:</b>	<b>S</b> _____
	<b>Cutting Implement:</b>	<b>S</b> _____
	<b>Other:</b>	
<b>Name Of Owner:</b>		
<b>Name Of Installing Dealer:</b>		
<b>Dealer Address:</b>		
<b>Dealer Signature:</b>		
<b>Date Of Delivery / Installation:</b>		
<b>Date Of Warranty Registration:</b>		

#### IMPORTANT

At the point of transfer of ownership record the above information. Note the serial number of your machine and always quote it in any communication with us or your dealer. (The serial number plate is located on the machine mainframe.) This is particularly important when ordering spares. Remember to include all numbers and letters.

The information given throughout this manual is correct at the time of publication. However, in the course of constant development of Spearhead machines, changes in specification are inevitable. Should you find the information given in this book to be at variance with the machine in your possession, you are advised to contact the Spearhead Service department where up-to-date information will be provided.

The manual can contain standard and optional features and is not to be used as a machine specification. The machine has been tested and is considered safe if carefully used. Ensure your operator is properly trained in its use and maintenance.

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## Trisaw/Quadsaw

Spearhead heavy-duty Trisaw and Quadsaws are hydraulic boom mounted sawblade attachments for the cutting of trees and branches. Available in three working widths, the 1.5m Trisaw is the smallest machine in the range equipped with three belt-driven tungsten carbide tipped sawblades capable of cutting materials up to 150mm diameter. The larger 2.0m & 2.5m Quadsaw machines are equipped with additional sawblade offering the same capabilities as the smaller model machine.

Designed for use on larger model Twiga reach arms and Twiga Carrier loader arms, Trisaw/Quadsaw is the ideal machine for farmers, forestry teams and contractors alike.

**IMPORTANT:** This machine must only be used to perform the tasks for which it was designed, use for any other purpose may be dangerous to persons and damaging to the machine.

### IMPORTANT

This operator's manual should be regarded as part of the machine. Suppliers of both new and second-hand machines are advised to retain documentary evidence that this manual was provided with the machine.

This machine is designed solely for ground vegetation control and must not be used for any other purpose. Use in any other way is considered as contrary to the intended use. Compliance with, and strict adherence to, the conditions of operation, service, and repair, as specified by the manufacturer, also constitute essential elements of the intended use.

This machine should be operated, serviced, and repaired only by persons who are familiar with its characteristics and who are acquainted with the relevant safety procedures.

Accident prevention regulations, all other generally recognised regulations on safety and occupational medicine, and all road traffic regulations must always be observed.

Any arbitrary modifications carried out to this machine may relieve the manufacturer of liability for any resulting damage or injury.

It is potentially hazardous to fit or use any parts other than genuine **Spearhead** parts.

The company disclaims all liability for the consequences of such use which, in addition, voids the machine warranty.

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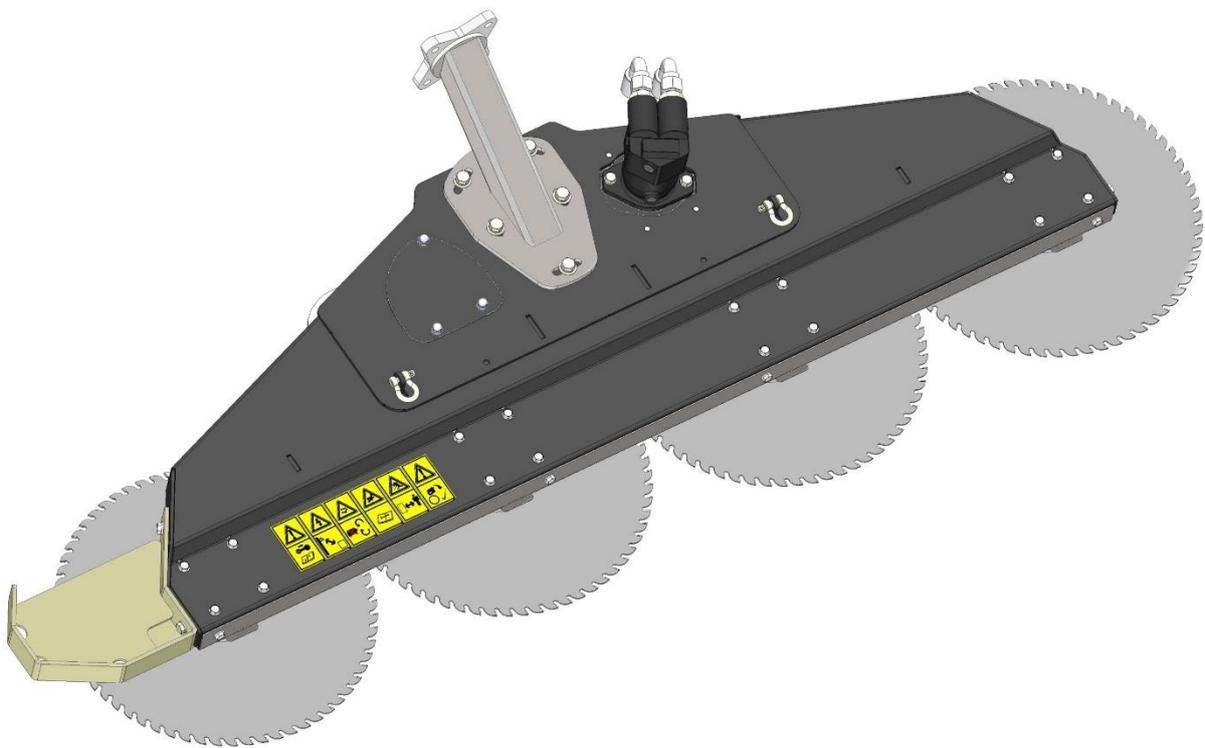
# 1 Machine Description

## 1.1 Intended Usage

Spearhead heavy-duty Trisaw and Quadsaws are hydraulic boom mounted sawblade attachments for the cutting of trees and branches. Available in three working widths, the 1.5m Trisaw is the smallest machine in the range equipped with three belt-driven tungsten carbide tipped sawblades capable of cutting materials up to 150mm diameter. The larger 2.0m & 2.5m Quadsaw machines are equipped with additional sawblade offering the same capabilities as the smaller model machine.

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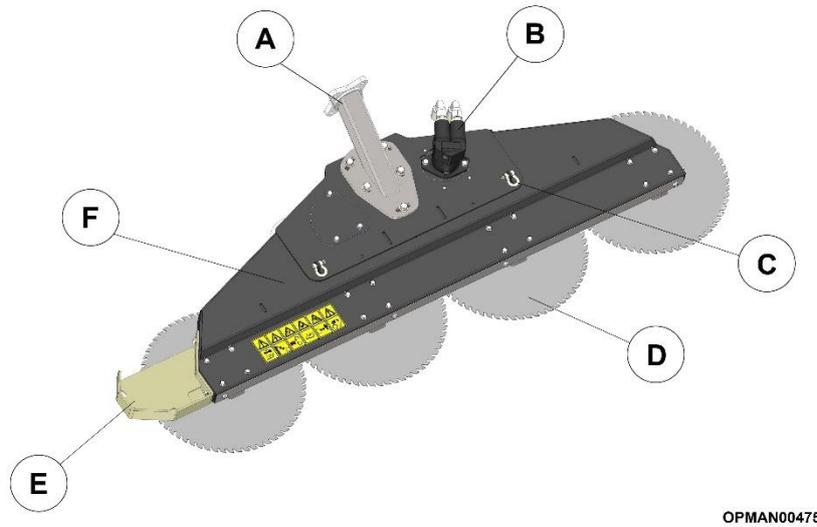


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**Figure 1.1 Trisaw/Quadsaw**  
(SP25 Quadsaw model illustrated)

## 1.2 General Arrangement

The layout and naming convention used throughout this manual are shown in Figure 1.2 below



Item No	Description
A	Reach Arm Mount
B	Motor
C	Lifting Point
D	Sawblade
E	Skid
F	Cowl

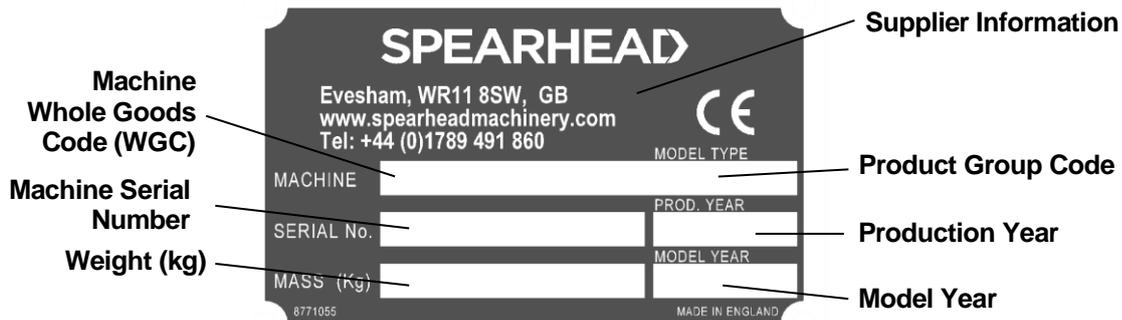
**Figure 1.2**

(SP25 Quadsaw model illustrated)

## 1.3 Machine Identification

Each machine is equipped with a serial plate; see Figure 1.3 that includes the following data in this order:

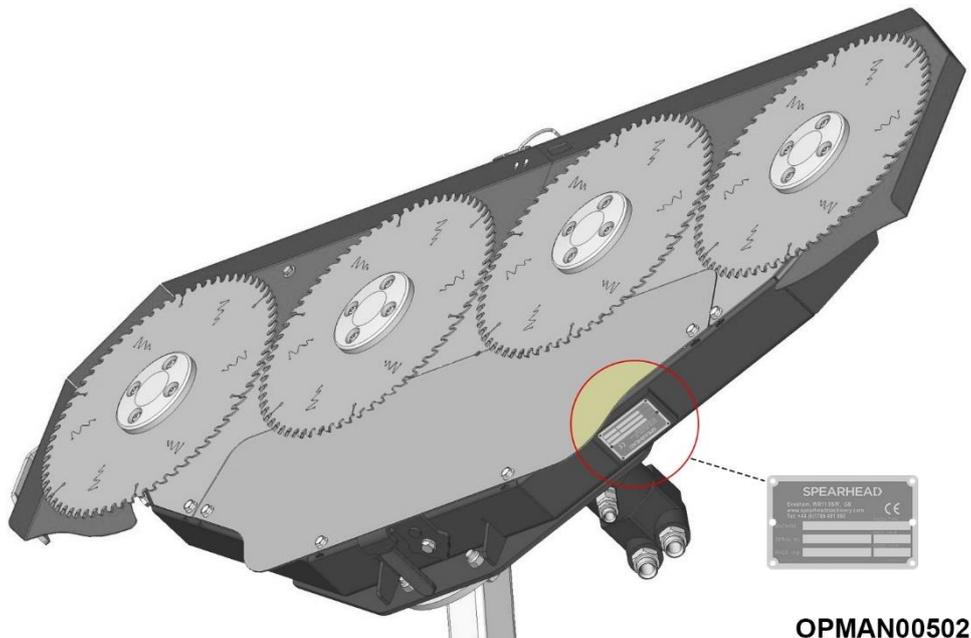
- EC Marking.
- Manufacturer marking.
- Name and address of the manufacturer.
- Machine Whole Goods Code (WGC).
- Machine Product Group Code.
- Serial number of the machine.
- Production Year (year of construction).
- Mass in kg.
- Model year.



**Figure 1.3 – Serial Plate**

Data on the Spearhead manufacturer's plate should always be referred to when requesting assistance and/or requiring replacement spare parts.

This data can identify the machine and its characteristics and specification for its particular time of manufacture, certifying that it responds to current regulations. For this reason the plate should never therefore be removed nor be used for other purposes; if the machine is dismantled, it should be destroyed to prevent any form of abuse.



**Figure 1.4 – Serial Plate Location**  
(SP25 Quadsaw model illustrated)

## 1.4 Machine General Specification.

Model		SP15 Trisaw	SP20 Quadsaw	SP25 Quadsaw
Working Width (2)		1.50m	2.00m	2.50m
Number Blades		3	4	4
Blade Diameter		490mm (19¼")	490mm (19¼")	620mm (24½")
Blade Material		Tungsten Carbide Tipped	Tungsten Carbide Tipped	Tungsten Carbide Tipped
Blade Speed (2)		3000 RPM	3000 RPM	3000 RPM
Blade Tip Speed (2)		76.9 m/s	76.9 m/s	97.3 m/s
Motor		Hydraulic 40.6cc	Hydraulic 40.6cc	Hydraulic 40.6cc
Flow Rate	Twiga Reach Arm	84-87 l/min @ 210 bar	84-87 l/min @ 210 bar	84-87 l/min @ 210 bar
	Twiga Carrier	45 l/min @ 210 bar	45 l/min @ 210 bar	45 l/min @ 210 bar
Drive		V-belt	V-belt	V-belt
Cutting Capacity (1) (2)		150mm (6")	150mm (6")	150mm (6")
Main Application		Vertical Cutting	Vertical Cutting	Vertical Cutting
Forward Operating Speed		5km/h (3mph)	5km/h (3mph)	5km/h (3mph)
Weight (2)		180kg (397lbs)	220kg (485lbs)	255kg (562lbs)

**Table 1.1**

**Notes:**

- (1) Spearhead constantly reviews and improves product designs and reserve the right to change this information. Actual machines may vary from the above specification. Contact your Spearhead Sales representative if you have any queries.
- (2) All dimensions are determined from computer models, so actual measurements may vary slightly.

## 2 Safety

### 2.1 Safety Warnings

The operator must read, understand and follow all of the Safety instructions. Serious injury or death may occur unless care is taken to follow the warnings and instructions provided. The level of safety is indicated in three levels and the following notation is used throughout this operator instruction book;



**DANGER!** Level 1; alerts for imminent death or critical injury.



**WARNING!** Level 2; warns of serious injury or possible death.



**CAUTION!** Level 3; indicates possible injury.

Never operate the tractor or machinery until you have read and completely understand this manual and the tractor operators manual and each of the safety messages found in the manuals and those displayed on the tractor and machine attachment.



**DANGER!** **DO NOT** attempt any maintenance of or adjustment to the machine while it is running. Before carrying out any work on the machine follow the three safety instructions below:

1. Lower the sawblade on to the ground
2. Put the PTO out of gear
3. Stop the tractor engine, remove and pocket the starting key.



**DANGER!** Keep a careful watch for passers-by who may inadvertently get in the way of cut material being thrown from the machine. This equipment is capable under adverse conditions of throwing objects great distances at high velocity. Stop the equipment until all people are well clear.



**DANGER!** **AVOID WIRE.** It can be extremely dangerous if wire gets caught up in the machine attachment, and every care must be taken to ensure this will not happen. Inspect the working area before commencing. Remove all loose wire and obstructions and clearly mark those that are fixed so that you can avoid them. Any unusual noise from the machine indicates that the blades may have been fouled by an obstruction. A visual indication that wire is in contact with the blades may be a sudden movement of the vegetation ahead of the machine. In any such event **STOP** the tractor engine **INSTANTLY**. On no account move the machine until the rotor has completely stopped. **NEVER UNDER ANY CIRCUMSTANCES** reverse the cutting operation to 'clear itself'. When the blades have stopped, inspect it and remove any obstruction that may be present. If working under a raised machine ensure that it is safely supported. Before working on the machine stop the tractor engine and remove the ignition key.



**DANGER!** This equipment is capable under adverse conditions of throwing objects great distances at high velocity. **CHECK** the blades for wear and the mounting bolts for tightness every day during work. A few moments; whenever the machine is stopped (e.g. whenever removing obstructions); will help reduce wear or loss.



**DANGER!** Ensure blades and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.



**DANGER!** Never attempt to use a machine on materials in excess of its capability.



**DANGER!** Never use a machine to perform a task it has not been designed to do.



**DANGER!** Keep your forward speed to a level appropriate to the operating conditions. High-speed manoeuvres with the arms stretched out are very dangerous, particularly on uneven ground where there is risk of overturning.



**DANGER!** To avoid fatalities due to electrocution the operator must pay particular attention when working near overhead power lines. Some machines have vertical reaches in excess of 8m which exceeds the 5.2m minimum legal height for 33,000 volt power lines. Be aware of the maximum reach of your machine. Be aware that you do not have to touch a power line to receive a discharge. Flashovers can occur due to proximity. See Section 2.4 'Dangers due to overhead power lines'.



**DANGER!** A wire mesh cab guard must be fitted on the outside of the cab window, between the operator and the machine attachment, in such a position as to give the operator maximum protection.



**DANGER!** Where a hedge cutter is used in conjunction with tractors not fitted with a glazed safety cab, a clear polycarbonate safety screen together with a mesh guard must be fitted to the tractor between the operator and the machine attachment. A polycarbonate safety screen must be used on cabs where windows are likely to be left open for ventilation purposes. It is essential that cab windows on the operating side; through which the machine attachment is observed; are intact, clean and closed, or a clear polycarbonate safety screen must be fitted where hedge cutting and grass trimming operations are carried out. When hedge cutting, a mesh guard must also be fitted.



**WARNING!** Do not operate machinery with guards missing. Ensure that the correct guards are properly fitted to the machine and tractor at all times and that they are in good condition. Refer to Section 2.6 to ensure you have the correct guards fitted for the type of operation being performed.



**WARNING!** While the tractor is running all personnel should keep well clear of the area around the machine as there are numerous crushing, shearing, impact dangers caused by the machine operation.



**WARNING!** Direct the cut material away from the tractor. It is important that while operating the cut material is not directed towards the operator



**WARNING!** Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before cutting. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop cutting immediately if the blades strike a foreign object. Repair all damage before restarting work.



**WARNING!** Transport the machine only at safe speeds. Serious accidents and injuries can result from operating or transporting this equipment at unsafe speeds.



**WARNING!** Failure to have sufficient stability ballast mounted or to drive at inappropriate speeds on undulating terrain may result in a loss of directional control.

## 2.2 Emergency Stop

In an emergency bringing the machine to a stop requires familiarity with the controls fitted to the machine.

Refer to chapter on 'Operator controls overview' for information regarding controls fitted to Spearhead machines, and then refer to the relevant control overview for whichever is fitted to your specific machine. Make sure the operator reads and understands the relevant controls chapter paying particular attention to the instructions for how to stop the machine quickly in an emergency.

## 2.3 Safe Maintenance



**WARNING!** It is mandatory to switch the combustion engine off and disengage PTO, lower the machine, ensure that the machine has completely stopped, remove the ignition key from the

dashboard of the tractor and engage the parking brake before leaving the driver's seat and engaging in maintenance operations.

**IMPORTANT:** Maintenance on the machine should be performed by only skilled and specialized personnel, in strict compliance with the instructions in this manual, and any worn or damaged parts should be replaced.

**IMPORTANT:** Always use genuine Spearhead parts when carrying out repairs and maintenance with thoughts to longevity and reliability of the machine and personnel safety.

**IMPORTANT:** Store the machine in a safe place which is protected from the elements, when the work is completed to ensure its wellbeing and protection from damage to components.



**CAUTION!** Relieve hydraulic pressure before disconnecting lines or working on the machine. This can be done by pushing and pulling/pushing the selected tractor lever/button. Only once this has been completed can the hydraulic hoses be removed from the machine.



**CAUTION!** When working with/checking the hydraulic system on the reach arm or machine always wear safety glasses and impenetrable gloves. Use paper or cardboard to search for leaks and not hands or any other body parts.



**CAUTION!** Keep hands and body away from pin holes and nozzles ejecting hydraulic fluid. Ingested or penetrated hydraulic fluid in the body can become gangrenous. Removal must be carried out by a medical professional.



**CAUTION!** Ensure all hydraulic hoses, lines and connections in good condition and tight before applying pressure.

**IMPORTANT:** Do not change any factory-set hydraulic settings to avoid component failures.

**IMPORTANT:** Do not modify or alter machine functions or components.



**DANGER!** Do not weld or repair rotating blade components. They may cause vibrations and component failures being thrown from the machine.



**DANGER!** Replace bent, damaged, cracked or broken blades immediately with new blades.

Do not attempt to straighten, weld or weld hard-facing blades to avoid blade failures and throw broken blades from the machine.



**CAUTION!** Always wear protective gloves when handling blades, knives, cuttings edges or worn components with sharp edges.



**CAUTION!** The motor can become hot when in work. Ensure that the motor is sufficiently cool before going anywhere near these components for maintenance. As a precaution though wear gloves when servicing these potentially hot items.



**DANGER!** If the machine is required to be worked on ensure that the ground is level, sturdy and solid.



**DANGER!** Do not run the tractor engine inside. Only run the tractor in open outdoor spaces.

Engine exhaust fumes and some of their constituents and certain vehicle components contain or emit chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. See Section 2.17 with regards to Proposition 65.



**CAUTION!** Ensure maintenance personnel wear suitable PPE clothing when maintaining the machine to ensure a reduced risk of impact or skin injuries. Frequent or prolonged contact with hydraulic oil may cause dermatitis and other skin disorders including (more rarely) skin cancer when not wearing impenetrable gloves. Worn parts may have sharp edges.

Follow the guidance of the lubricant manufacturer with regards to handling oils, solvents, cleansers and other chemical agents.

**IMPORTANT:** Always replace guards that have been removed for service or maintenance and ensure they are fit for use, give complete protection and work as intended. If not, replace them before proceeding to use the machine.

**IMPORTANT:** Comply with the laws in force in the country of installation on the use and disposal of products used for cleaning and performing maintenance on the machine, considering the recommendations of the manufacturer and local guidelines on the given products.

**IMPORTANT:** Before returning the machine back to work ensure the machine has been thoroughly checked over using the Machine Inspection Record; see Section 5.6.

Ensure that when the machine inspection is carried out that the machine is stationary and not running.

Where parts are broken, damaged and deemed not fit for use; replace with genuine Spearhead parts using the online Interactive Parts facility at:

<https://my.spearheadmachinery.com/parts/public-interactive-parts-database/>

You will require the machine serial number. Assistance to its location can be found in Section 1.3.

## 2.4 Dangers Due To Overhead Power Lines

There are significant dangers involved when working in the vicinity of Overhead Power Lines (OHPL's). Be aware that some Spearhead machines are capable of reaches in excess of 8 metres (26') and have the potential to well exceed; (by possibly 3 metres (9' 9")); the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines, see Figure 2.1.



**DANGER!** All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPL's).



**WARNING!** Fatal electrocution can occur without contacting a power line. Due to the high electrical potential between the conductors and the ground a flash over can occur from the power line to any conducting medium within range. Steel cutting machines are ideal conductors.

Wherever possible the safest option is always to avoid working in areas close to OHPL's. Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work, see Section 2.4.1 below.

All operators should perform a risk assessment before operating any reach arm mower within 10m horizontal distance of any OHPL's. If you are unsure do not work in the area. Never put yourself or others at risk.

### 2.4.1 Risk Assessment

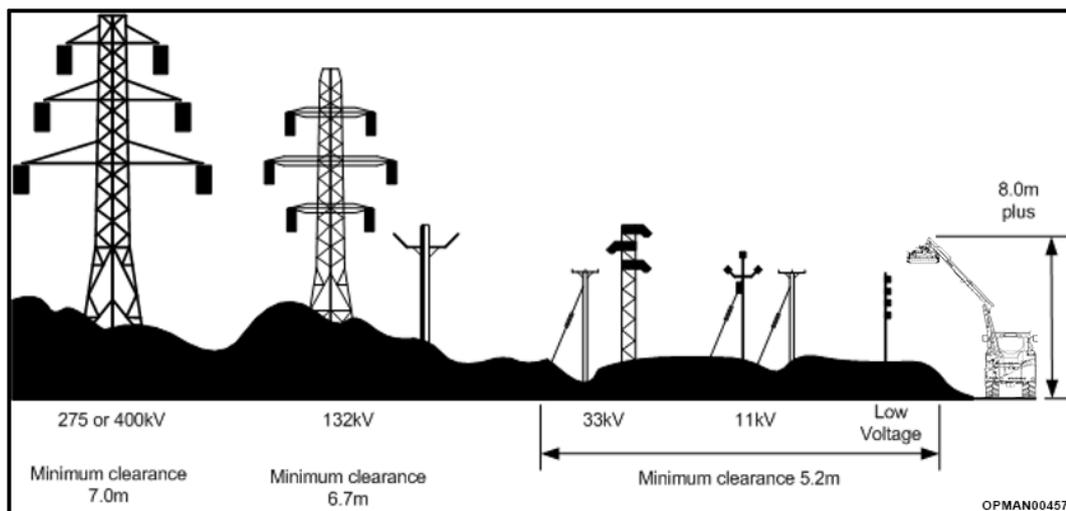
Before starting to work near OHPL's you should always assess the risks. The following points should be observed;

- **Know** the risks of contacting OHPLs and the risk of flashover.
- Always **find out** the maximum reach height for your machine mounted on the tractor.
- Always **find out** the location and route of all Power Lines within the work area.
- Always **find out** the operating voltage of all Power Lines within the work area.
- Always **contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, exclusion zones, the minimum safe working distance and any additional precautions required.
- **Never** attempt to operate the machine within an exclusion zone.
- Always **work with extreme caution and plan your work ahead** to avoid high risk areas.
- **If doubt exists** do not work in the area – never risk the safety of yourself or others

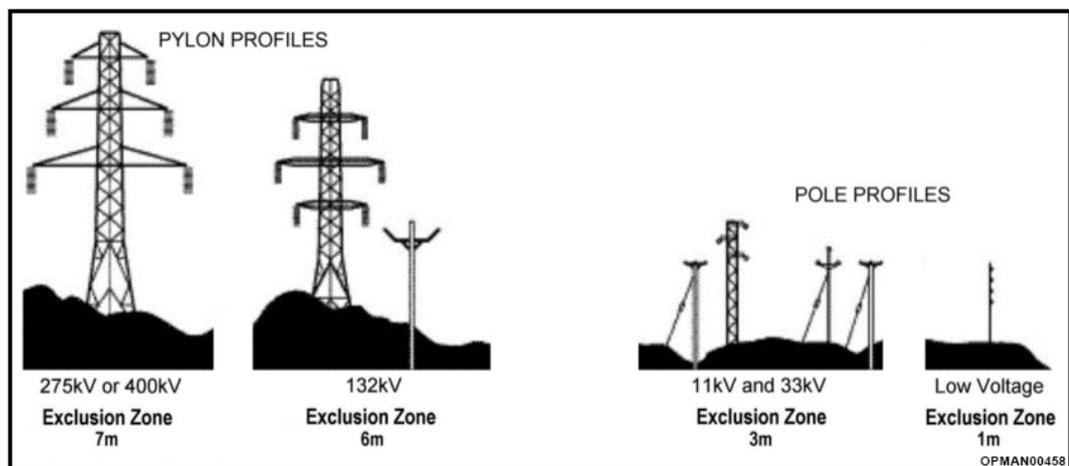
Further information and leaflets on this and other agricultural safety subjects are available on the 'Health & Safety Executive' website at the following address: [www.hse.gov.uk/pubns/agindex.htm](http://www.hse.gov.uk/pubns/agindex.htm)

## 2.4.2 Emergency Action for Accidents Involving Electricity

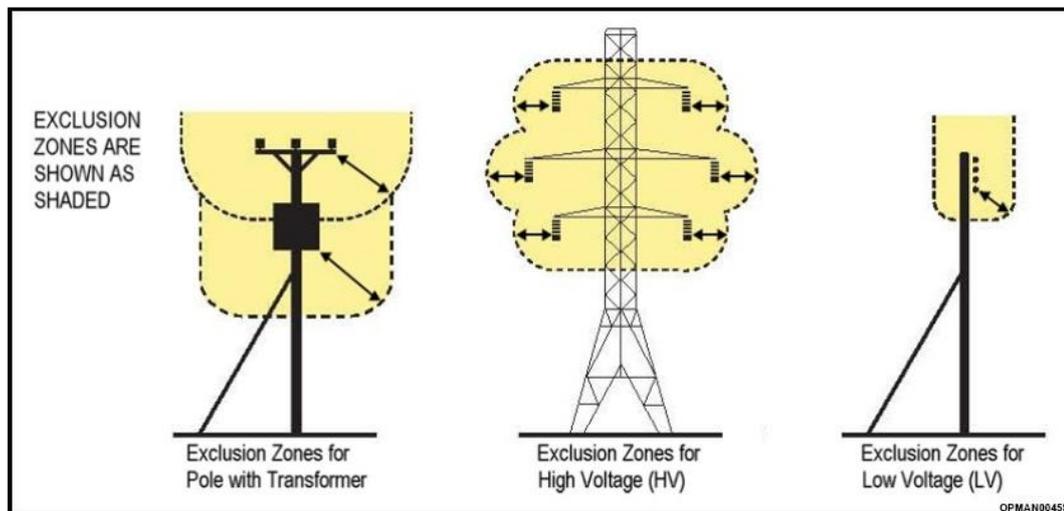
- Never touch an overhead line - even if it has been brought down by machinery, or has fallen. Never assume lines are dead.
- When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground. Stay in the machine and lower any raised parts in contact or drive the machine out of the lines if you can.
- If you need to get out to summon help or because of fire, jump out as far as you can without touching any wires or the machine keep upright and away.
- Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect



**Figure 2.1 - Minimum Heights For Overhead Power Lines**



**Figure 2.2 - Absolute Minimum Exclusion Zones For Specific Overhead Power Lines**

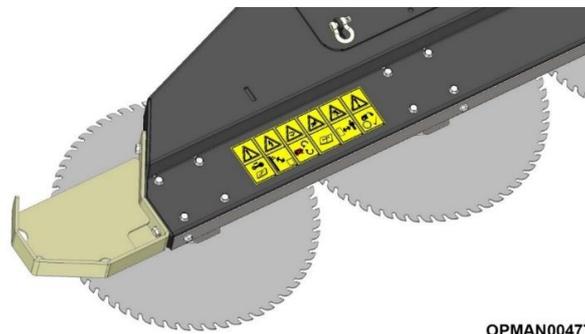


**Figure 2.3 - Definitions Of Exclusion Zones**

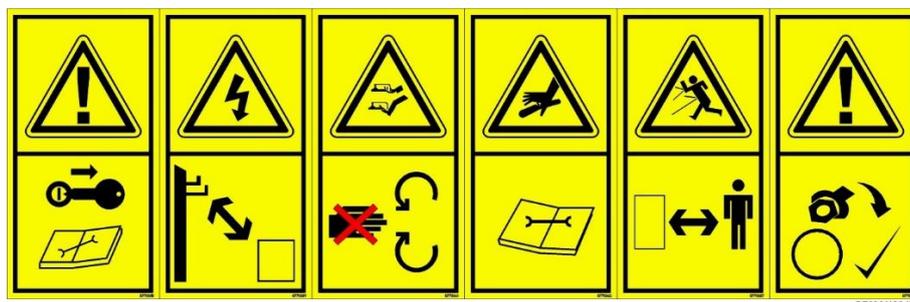
## 2.5 Safety Decals

Safety decals are located in various points on the machine; see Figure 2.4. They can be identified in yellow with the upper panel depicting the hazard, and the lower panel indicating means of avoidance or precautions to be taken. These decals have no text. It is essential that all operators and personnel associated with the machine fully understand their meanings.

Safety decals should be kept clean and legible at all times. Any safety decals which are found to be missing or illegible should be replaced.



**Figure 2.4**



**Figure 2.5**

- 1 Stop engine and remove key before performing maintenance or repair work.
- 2 Danger: keep clear of overhead power lines. Where doubt exists contact your local power company for advice.
- 3 Danger: keep clear of rotating blades.
- 4 Pressurised oil, beware of leaks. Consult technical manual for service procedures.
- 5 Danger: flying objects. Keep a safe distance from the machine when the engine is running.
- 6 Check tightness of bolts every 8 hours – retighten if required.

## 2.6 Guarding



**DANGER!** For safe operation it is essential that that all guards must be kept in position on the machine whenever the machine is running. Spearhead Machinery disclaim all responsibility for any damage or injury arising as a result of guards being removed, or of guards other than of Spearhead manufacture having been fitted, or of operation of the machine other than in accordance with these instructions.



**DANGER!** When hedge cutting a mesh guard must be fitted to the side window of the tractor cab. Cabs without laminated or toughened glass must also be fitted with a laminated glass or polycarbonate shield in addition to the welded mesh guard.



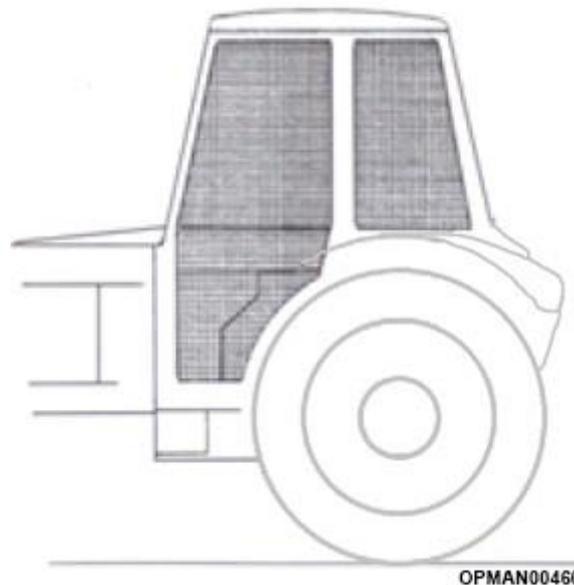
**WARNING!** Inspect guards twice daily or immediately damage is suspected.

Always replace guards that have damage or wear which could impair their performance

The sawblade itself is a unique way to cut compared to the rest of the Spearhead range. The sawblades run in the cowl with very little guarding due to the way the discs are designed to operate.

It is important that the belt guard is in position when the machine is in work. When the machine is out of work in storage or during transit, it is important to reinstall the sawblade guard provided with the machine in order to ensure bystanders do not get injured along with ensuring the sawblades remain intact and undamaged when not in use. See Section 4.3.1.

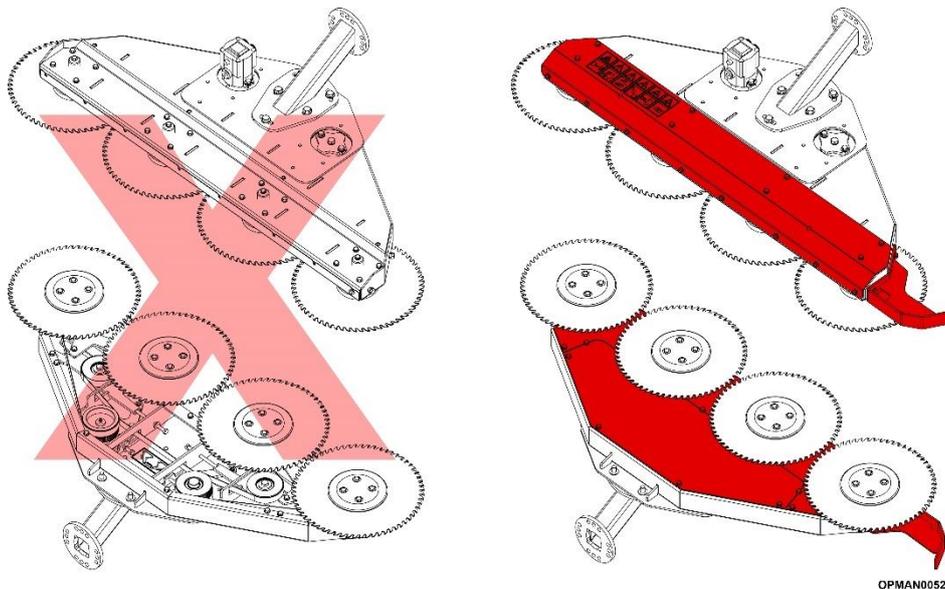
When using the machine on a loader frame or a forward reach reach arm, the machine attachment is in front and above the driver's cab. This makes it necessary to always work with guarding fixed around the front and side of the cab, a typical installation is shown below.



**Figure 2.6**

The machine features an end skid to protect the end sawblade from accidentally coming in contact with the ground. Do not let the sawblades touch the ground for any reason. Ensure that the skid is fitted to the machine at all times and mounted on the correct side for the configuration in which the machine is built. Allowing a sawblade to hit the ground may cause it to break and be ejected from the machine at great speeds resulting in serious damage and injury or even death to operator or bystanders. hydraulic opening front hood.

A sawblade guard is provided with the machine to protect bystanders and operating personnel from coming accidentally in contact with the blades. This guard should be fitted at all times when the machine is being transported or stored.



**Figure 2.7 - Operation Guarding**  
(RH SP20 Quadsaw shown)

<b>Blade guard</b>	Distorted or insecure. *To be fitted during non-operating, transport and storage periods
<b>Upper cowl guard</b>	Distorted or insecure.
<b>Underside cowl &amp; belt guard</b>	Distorted or insecure.
<b>End skids</b>	Distorted or insecure. Ensure it's orientated for the configuration in which the sawblade is built

**Table 2.1 – Permanent Protection Guard Damages**

Ensure that all parts are replaced if required with genuine Spearhead parts.

## 2.7 Noise

The equivalent daily personal noise exposure from this machine, measured at the operator's ear, is 90dB when used in conditions where the load fluctuates between zero and maximum. This applies when the machine is attached to a tractor fitted with a quiet cab and used in accordance with the operating instructions in a generally open environment. At equivalent daily noise exposure levels of between 85 and 90dB, suitable ear protectors are recommended.

## 2.8 Personal Protective Equipment

Operators should be wearing sufficient personal protection equipment (PPE) to protect them from hearing, respiratory and impact damages.

When working in an unsealed cab or where windows and apertures are open to the environment, operators are advised to wear suitable eye and ear protection, a facemask (depending on conditions) and eye protection.

When handling cutting surfaces or hydraulic equipment, operators are advised to wear suitable gloves.

When clearing blockages, clearing wire, or working with pressurised hydraulic components, operators are advised to wear suitable eye protection and suitable gloves.

Ensure that non-baggy clothing is worn to reduce the chance of entanglement and snagging on components.



**Figure 2.8 - PPE Items**

When working at the work site, but off the tractor unit, operators are advised to wear a 'high-viz' garment.

## 2.9 Stability

Due to the design of the reach arm and a and the work they undertake, it is essential to ensure that the tractor is stable during work and transport in order to eliminate any risk of loss of directional control, imbalance or overturning.

Before work, extend the arms to full reach slowly and ensure that at full reach the rear wheel on the opposite side to the extended arms is still on the ground. It is advisable to have a helper to check this. Check that the tyre shows evidence of bearing some load.

If the tyre lifts then add ballast in the form of wheel weights to the rear wheel of the tractor opposite to the extended arms until the tyre shows evidence of bearing some load.

Before driving in transport, place the reach arm in the transport position and again check that all wheels of the tractor are both on the ground. Again, it is advisable to have a helper to check this. Check that the tyre shows evidence of bearing load. This is especially important to ensure forward directional control at speed on an undulating terrain.

If the front tyres lift add ballast weights to the front of the tractor.



**WARNING!** Failure to have sufficient load over the front axle or to drive at inappropriate speeds on undulating terrain may result in a loss of directional control.

If ballast weights have been added to the tractor, check that the plated tractor axle loads have not been exceeded.

**IMPORTANT:** When transporting on the highway, it is the responsibility of the operator to obey all relevant local highway laws.

## 2.10 Working On Inclined Ground

The ballast instructions in Section 2.9 are sufficient for level ground operation.

Be aware that when working on inclined ground changes in the tractor centre of gravity can adversely affect the overall stability. As the attachment is extended with the reach arm deployed downhill additional ballast will be required on the rear offside wheel to compensate.

There is naturally a limit to a safe amount of ballast compensation that can be applied for a given tractor unit and a given incline. If compensating ballast is applied and the compensated axle must be driven on the public highway to reach the work site the operator should ensure that the plated axle load is not exceeded.

Remember, a reach arm with machine attachment represents a significant mass which can generate a significant amount of inertia when moved at speed. Stopping this inertia suddenly can induce overturning reactions.



**DANGER!** When working on inclined ground avoid high speed hydraulic movements which could cause overturning.

## 2.11 Working On Embankments

Sudden potholes at speed can quickly cause the tractor to change direction. At the same time the weight of the attachments may try to lift the front axle. This is a potentially lethal combination when working along narrow embankments or dykes and can lead to overturning and potential drowning.

When working on top of embankments it is very important to have sufficient forward stability to ensure rapid steering control. Spearhead recommend 20% forward stability. This means that at least 20% of the total vehicle weight is acting on the steering axle under normal level conditions.



**DANGER!** When working on raised embankments ensure sufficient weight is on the steering wheels.

## 2.12 Attachment And Removal From The Reach Arm



**DANGER!** Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.



**DANGER!** Always disengage the machine, kill the tractor engine, remove and pocket the key before dismantling for any reason.



**DANGER!** Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props provided and secured.



**DANGER!** Never operate the tractor or machine controls from any position other than from the driving seat.



**DANGER!** Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.



**DANGER!** Never leave a tractor with the key in or the engine running.



**DANGER!** Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.

## 2.13 Working In Public Places

When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.



**DANGER!** Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.



**DANGER!** Never use a machine that is poorly maintained.



**DANGER!** Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).



**DANGER!** Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing. **WARNING:** Some cutting heads may continue to 'freewheel' for up to 40 seconds or more after being stopped.



**DANGER!** Never allow children near to, or play on, a tractor or machine under any circumstances.



**DANGER!** Never use a machine on which the hydraulic system shows signs of wear or damage.



**DANGER!** Always clear up all debris left at the work area, it may cause hazard to others.



**DANGER!** Never allow any bystanders within a 90 metre radius of the machine when operating. Stop the machine immediately if this safety area is entered and do not restart the machine until the bystanders have escaped the area sufficiently.

## 2.14 Safety Distances

Never allow any bystanders within a 90 metre radius of the machine when operating. Stop the machine immediately if this safety area is entered and do not restart the machine until the bystanders have escaped the area sufficiently and the working area has been reassessed.

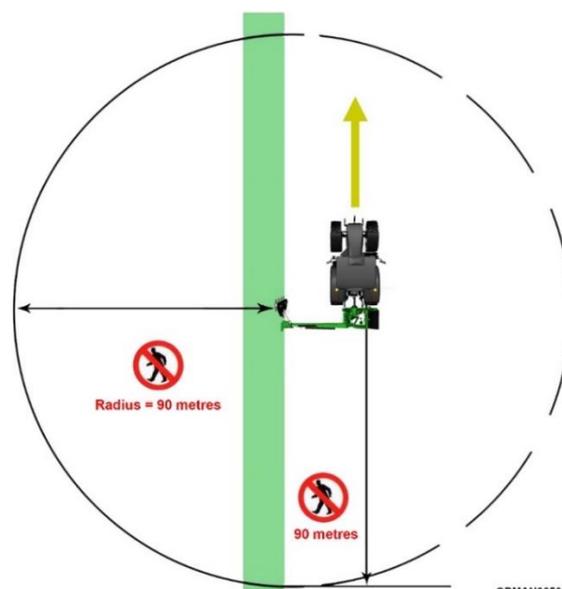


Figure 2.9

## 2.15 Warning Signs

It is advisable that any working area be covered by suitable warning signs in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – ‘Non-authorized placement of road signs may create offences under the Highways Act’.

### 2.15.1 Suggested Warning Signs Required

The reach arm machine must be fitted with a white on blue, 600mm diameter ‘Keep Left’ (\*) direction arrow. A white with red border ‘Hedge Cutting’ warning triangle of at least 750mm tall must be placed at no greater distance than 500m from the tractor at any time. These hedge cutting signs should also be placed at key restricted view areas such as bridges and sharp bends.

\*NOTE – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow depend on the country of use and the Local Highway Authorities regulations in the locality.

### 2.15.2 Use of Warning Signs

- On two-way roads, one set of signs is required to be facing in each direction.
- Work should be carried out within 500m of the signs. The signs will then be required to be moved.
- Work only when visibility is good and at times of flow e.g. NOT during ‘rush-hour’.
- Vehicles should have at least one 360° visible amber flashing beacon (preferably two) or a light bar comprising at least two independent light sources which are clean.
- Ideally, vehicles should be clean and conspicuously coloured with high visibility rear markings.
- Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.
- Collect all road signs promptly when the job is complete.



Figure 2.10

OPMAN00476

## 2.16 The Machine & The Environment

Below are the minimum provisions to be followed in order to reduce the risk of environmental impact connected to the use of the machine according to European directives related to the Eco-compatibility of products connected to power (Directive 2009/125/EC) and Restrictions in the use of dangerous substances in electrical and electronic equipment (Directive 2011/65/EU):

- If the Country where the machine is used foresees specific sound emission limits, it is best to adapt to the provisions in these standards, if necessary, being supplied with suitable protective equipment (earplugs, muffs, etc.).
- **It is mandatory** to respect current legislation of the Country where the attachment is used, related to use and disposal of lubricants and products used for machine cleaning and maintenance, observing the recommendations of the manufacturer of those products.
- If replacing worn parts or during demolition, one must follow anti-pollution laws foreseen in the country where the attachment is used.
- **It is prohibited** to pour products used for cleaning or polluting substances into the sewerage drain, on the ground, in watercourses, or into the environment.
- **It is mandatory** to collect products used for cleaning and polluting substances in appropriate containers, store them and deliver them to companies authorised for their disposal.

### 2.16.1 Disposal

When Spearhead equipment reaches the end of its economic working life it should be disposed of responsibly, either through an approved recycling centre or by compliance with all regulations in force in the destination territory.

In most instances Spearhead machines can be broken into its constituent parts with the use of basic workshop equipment. Table contains a typical list of constituent materials, together with disposal guidelines.

When undertaking a machine breakdown, take care to ensure that heavy parts are always adequately supported to avoid injury.

To avoid environmental contamination, take containment precautions to retain control of liquids in order.

It is the owner's responsibility to ensure the machine is disposed of in accordance with all applicable regulations.

Material	Typically found in;	Disposal guideline
Steel	Structural components, fixed guards, fasteners and driveline	Can be dismantled and recycled. Take care when handling heavy and/or sharp objects
Aluminium	Pump and gearbox housings, serial number plates	Can be dismantled and recycled. Take care when handling heavy and/or sharp objects. Take appropriate actions for oil contaminated products
Copper	Wiring, electrical components	Can be recycled using appropriate recovery procedures.
Hydraulic oil	Tank, hydraulic components	Dispose of in accordance with all applicable regulations
Rubber	Hoses, flexible guards, seals, 'O' rings	Dispose of in accordance with all applicable regulations
Plastics	Clips, caps, cable ties, decals, filter housings, document holders, bushes, electrical components, plugs, connectors, wire insulation	Dispose of in accordance with all applicable regulations
Filter element	Filter housings	Dispose of in accordance with all applicable regulations
Cork / paper	Gaskets	Dispose of in accordance with all applicable regulations

**Table 2.2 – Machine Breakdown Component Disposal**

## 2.17 Proposition 65



**Figure 2.11**

Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm.

To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves and wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.

## 3 Machine Preparation

### 3.1 Lifting The Machine

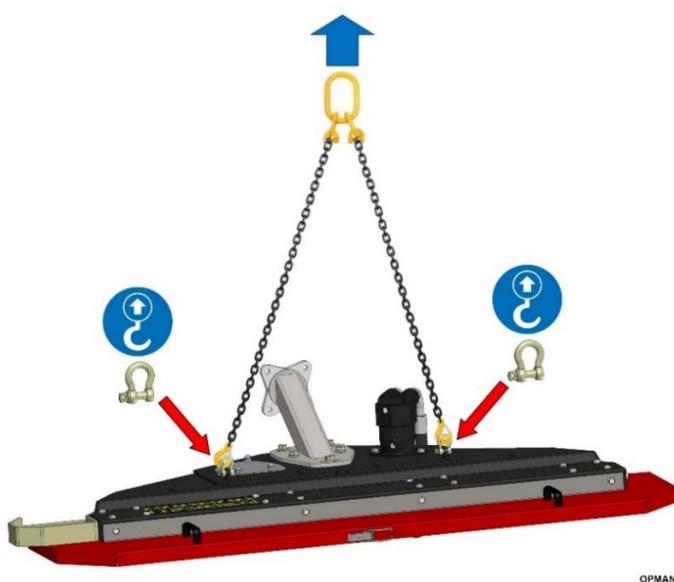
#### 3.1.1 Lifting Equipment

Suitable overhead lifting equipment with a minimum Safe Working Load (SWL) in excess of the machine's overall weight should be used for handling the machine. Ensure the machine is kept balanced and level at all times during the lifting procedure. All operatives and bystanders must remain at a safe distance from the raised machine.

#### 3.1.2 Lifting Points

Machines are equipped with 2 lifting points fitted with shackles.

Lifting gear must be evenly attached to both lifting points to ensure machine is balanced and stable during lifting. Keep clear of the raised machine at all times.



#### Model Weights

SP15 Trisaw	180kg (397lbs)
SP20 Quadsaw	220kg (485lbs)
SP25 Quadsaw	255kg (562lbs)

Figure 3.1



**DANGER!** Lifting of the machine should only be performed on a firm level site.



**DANGER!** Keep all persons at a safe distance from the raised machine.

## **3.2 Post-delivery/First Use Inspection**

### **3.2.1 Tractor Requirements**

Before fitting the machine to the tractor ensure that specification of the tractor meets the requirements listed below.

### **3.2.2 Tractor Checks**

- 3.2.2.1 Availability of tractor hydraulic service where the available flow is. 84-87 litres per minute at 210 bar for Twiga reach arms. 45 litres per minute at 210 bar for Twiga Carrier arms.
- 3.2.2.2 A suitable mounting interface to the tractor is available.
- 3.2.2.3 Once the attachment is mounted to the reach arm and the tractor is correctly ballasted ensure that the maximum axle loads for the tractor have not been exceeded. Failure to meet this requirement may render the operator liable for infringement of public highway regulations.
- 3.2.2.4 Ensure that the tyres fitted to the tractor are correctly rated for the total working weight. NOTE: When the attachment is deployed in work at the furthest reach the load on the rear tyre on the cutting side increases significantly.
- 3.2.2.5 Spearhead does not endorse the use of water ballast within tyres as this can have adverse effects on fore aft stability at speed.

### **3.2.3 Machine Adjustment**

The head when received from Spearhead is virtually complete and components are set correctly, requiring minimum time to ready the machine for use. Spearhead machines are tested after manufacture.

It is important to assess the machine to ensure that it is of the correct specification ordered from Spearhead or local Spearhead dealer. Information with regards to the specification of the machine can be found on the serial plate. Guidance to the location of the serial plate can be found in Section 1.3.

Before use it is important to inspect the head following the guidance in this operators manual to ensure it is correctly set-up and is suitable for the attaching reach arm and tractor using the inspection guidance sheet in Section 5.6.

## 4 Usage Instruction

### 4.1 Operator Requirements



**IMPORTANT:** Read, understand and follow the safety messages stated throughout this section and the rest of this operator's manual. Serious injury or death may occur unless care is taken to follow the warnings.

Safe operation of the machine and accompanying reach arm is down to the responsibility of the qualified operator. A qualified operator has thoroughly read and understood the machine, reach arm and attaching tractor operator's manuals and is experienced in the correct and safe operation of all machines and all associated safety guidance. In addition to the safety information contained in this manual, warning and operational decals are fixed around the machine; see Section 2.5. The connecting tractor and reach arm will also have them as well with information given in the operator's manual.

If any part of the operation safe use of the machine is not completely understood, consult a local Spearhead dealer or Spearhead for complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices and operating instructions to the operator.

#### 4.1.1 Personal Protection Equipment (PPE)

See Figure 4.1

- Always wear safety glasses
- Hard hat
- Steel toe safety footwear
- Gloves
- Hearing protection
- Close fitting clothing
- Respiration or filter mask (depending on working conditions)



OPMAN00161

Figure 4.1 - PPE Items



**DANGER!** Do not use drugs or alcohol immediately before or while operating the tractor and accompanying machine attachments. Drugs and alcohol will affect an operator's alertness and concentration and ability to operate the collective machinery safely.

Before operating the collective machinery, a machine operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the equipment safely.

Supervisors must **never** allow anyone to operate the collective machinery when it is known that their alertness or coordination is impaired. Serious injury or death could occur to the operator and/or bystanders if the operator is under the influence of drugs or alcohol.



OPMAN00162

Figure 4.2 – Do Not Use Drugs Or Alcohol

## 4.2 Controls Overview

Your Spearhead machine will be supplied without a control system and will rely on the auxiliary controls available with the tractor and reach arm. The operator must make sure he is familiar with the use of the tractor and reach arm auxiliary controls. Refer to each of the relevant operator manuals for guidance.

## 4.3 Machine Attachment



**WARNING!** Attachment of the machine must be performed on a firm level site.

Care should be adopted at all times when handling or manoeuvring the machine during the attachment procedure; ensure all persons remain clear of the sawblades which possess the potential to cause injury even when stationary. For reasons of safety the blade guard should be fitted to machine at all times and only removed for machine operation.

### 4.3.1 Blade Guard Removal

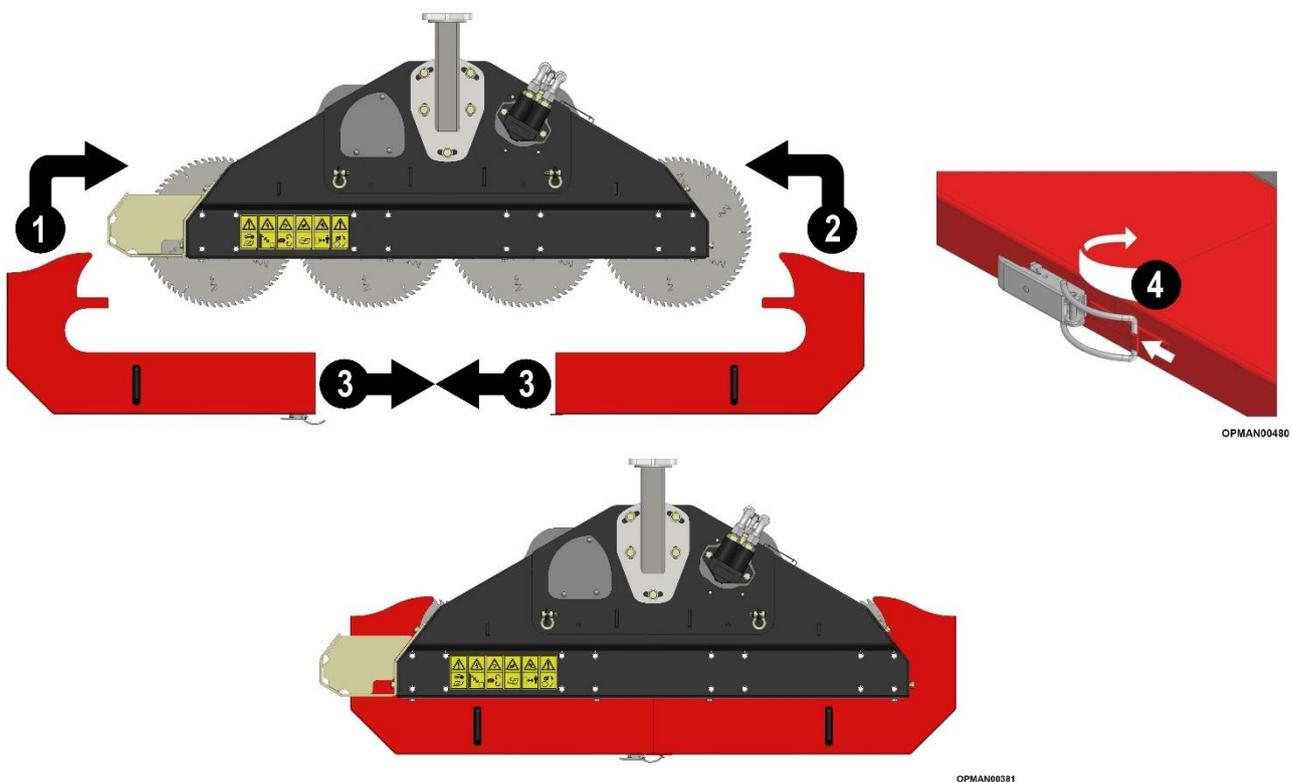


Figure 4.3



**DANGER!** Blade guard must always be fitted when attaching, transporting or storing the machine.

### 4.3.2 Attaching To The Reach Arm

	<b>Equipment Required</b>
	• 24mm spanner
	• 24mm socket
	• Torque wrench

The sawblade attaches to the pivot flange of the reach arm and is secured with four bolts and locknuts; torque locknuts evenly to 203Nm (150 ft.lb).

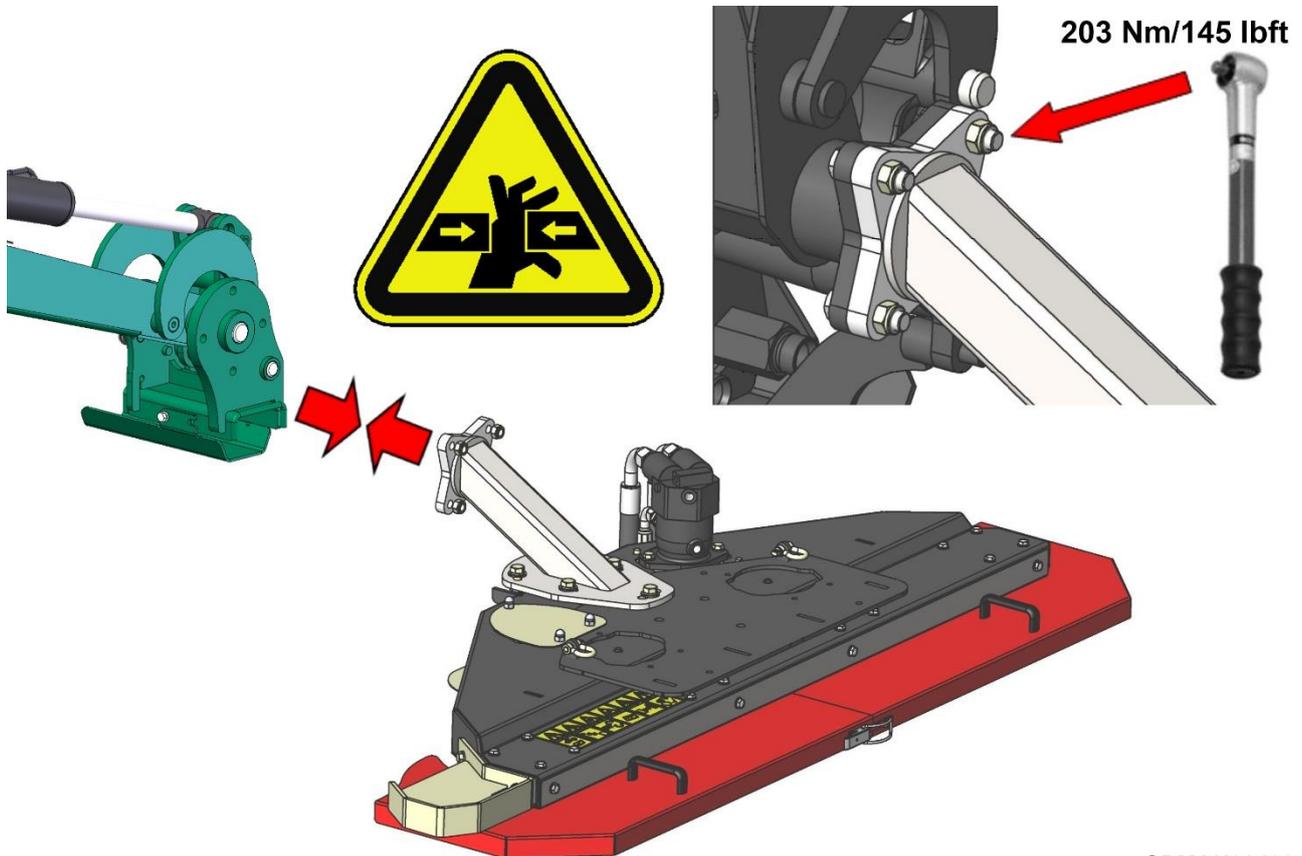


Figure 4.4

OPMAN00482

With the sawblade located on a firm level site, operate the reach arm to position the pivot flange adjacent to the mounting flange of the sawblade; adjust angle to align the holes.

Fit the 4 bolts and locknuts.

Torque locknuts to 203Nm.

**IMPORTANT:** Check blades are correctly mounted; the blades **MUST** be mounted in a downward cut rotation in relation to the tractors driving direction, see Section 4.4.

## 4.4 Blade Cutting Direction

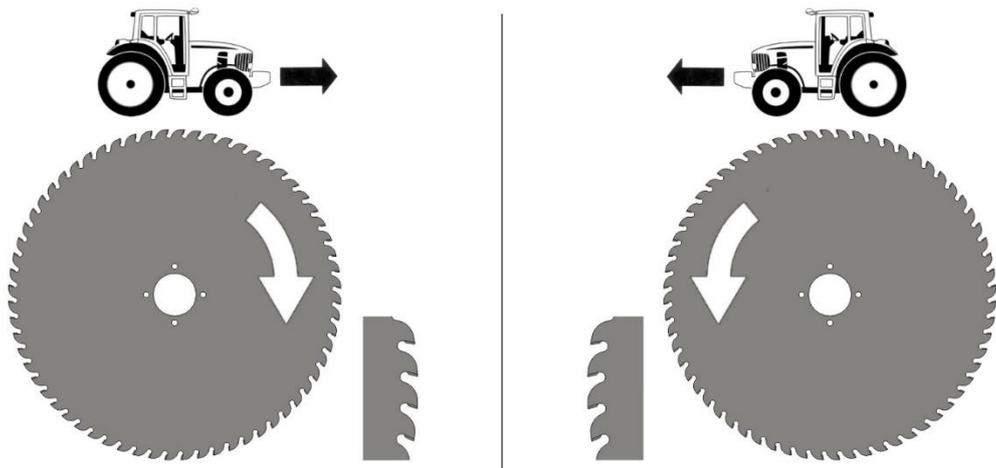


Figure 4.5



**WARNING!** Blades must cut downwards on the leading edge in the direction of tractor travel

## 4.5 Hydraulic Installation



**CAUTION!** Relieve hydraulic pressure before disconnecting lines or working on the system. This can be done by pushing and pulling the selected tractor lever/button. Only once this has been completed and suitable safety glasses and impenetrable gloves have been put on can the hydraulic hoses be removed from the tractor.

### Connecting

Manoeuvre the reach arm attachment watching for bystanders and potential dangers in the vicinity to line up the machine for attachment. With the tractor switched off and secured in position on level ground, relieve the hydraulic pressure from the tractor by moving the hydraulic control levers/buttons back and forth several times.

Trisaw/Quadsaw machines are detachable and when disconnected it is important to keep the ends free of contamination and dirt. Utilise blanking plugs on the open adaptor ends in order to ensure no dirt or contaminants enter the motor. Never disconnect a hydraulic hoses and leave ends exposed.

Install and connect hydraulic hoses ensuring the correct cutting direction is achieved. The drain line hose (max. 1.5 bar) must be connected directly back to the oil reservoir.

**IMPORTANT:** Ensure that all the hydraulic hoses are collated together and placed through any hydraulic hose guide on the reach arm. This is to ensure that they do not get pinched or caught in use.

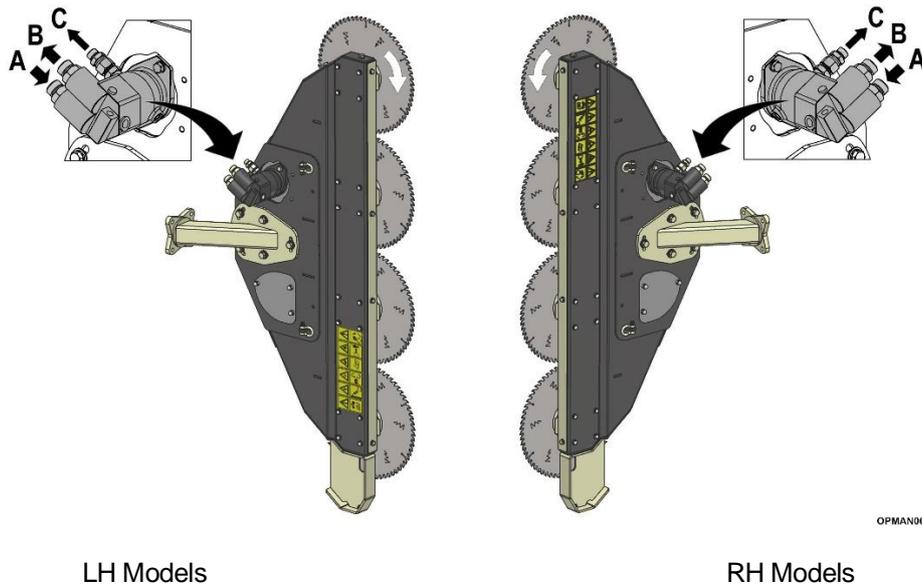


Figure 4.6

No.	Hose
A	Pressure
B	Return
C	Drain Line

Run the machine to confirm that the blade rotation direction is correct.  
Switch machine off and inspect the hoses and connections for signs of leaks.  
Check belt tension before using the machine for work, refer to belt tensioning section.

### **Disconnecting**

**IMPORTANT:** The machine should be secure at all times when left unattended so it doesn't move. Ensure that the machine is stored off the ground, preferably in a dry location to preserve its condition; for example on a pallet.

Manoeuvre the reach arm attachment watching for bystanders and potential dangers in the vicinity to place the machine in a suitable location for detachment. With the tractor switched off and secured in position on level ground, relieve the hydraulic pressure from the tractor by moving the hydraulic control levers/buttons back and forth several times.

When disconnecting the hoses to the tractor it is important to keep the hoses, and end couplings free of contamination and dirt. Never disconnect a hydraulic hose and leave the coupling end exposed. Utilise blanking plugs to keep them contaminant free. If any component is deemed dirty ensure that it is cleaned with some clean rag.

## **4.6 Hydraulic Hose Checks**

It is important that hoses are fitted correctly. Always check all hoses to ensure that there are no kinks or sharp bends, and that the hoses do not chafe against sharp edges. The following guidelines should be used when checking the hosing of the machine prior to work;

### **4.6.1 Twists**

Hoses should never be twisted or kinked. On most hoses there is a line which runs the full length of the hose acting as a useful guide. If a visual check reveals that no guideline is present along a hose, refer to Figure 4.7 and conduct the following check;

- 4.6.1.1 Loosen any clamps.
- 4.6.1.2 Attach one end of the hose to its coupling, but do not tighten.
- 4.6.1.3 Place the hose in its required position.
- 4.6.1.4 Connect the other end loosely to its union.
- 4.6.1.5 Tighten the end of any angled fittings first ensuring it is in the right position for its intended run.
- 4.6.1.6 Now tighten the straight end. It is possible that as the nut is tightened the hose may twist slightly.
- 4.6.1.7 If this happens, slacken off the nut and turn the hose in the opposite direction to that caused by tightening. Then, re-tighten the nut bringing the hose back to the central position.
- 4.6.1.8 Otherwise tighten the fitting fully. Torque settings for both BSP and Metric hose fittings are shown in Section 5.5.2.
- 4.6.1.9 Tighten any clamps.
- 4.6.1.10 Finally re-bleed the rams and operate the arms in all positions whilst carefully checking for any twists and obstructions.

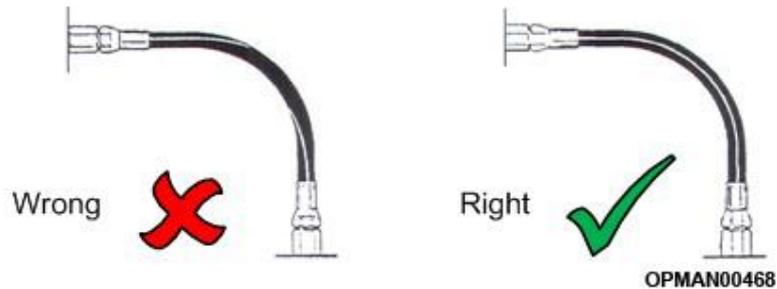


Figure 4.7

#### 4.6.2 Sharp Bends

Hoses should always be fitted to allow enough hose radius for free movement, see Figure 4.8. It is also important to avoid sharp bends in hoses. As a general guideline hoses should not be bent round a radius smaller than ten times the hose diameter. This will vary with hose construction and any queries about specific hoses should be addressed to the Spearhead Machinery service department.

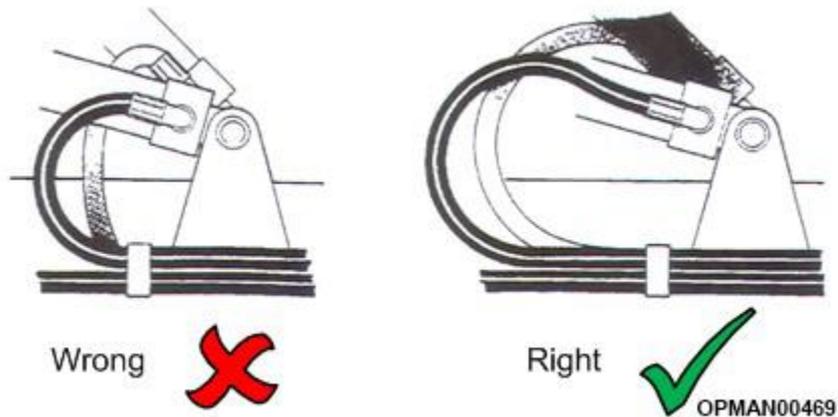


Figure 4.8

### 4.6.3 Chafing Hoses

It is important that hoses are fitted and clamped so that hose chafing is avoided. Always give plenty of clearance around sharp edges see Figure 4.9.



Figure 4.9

BSP SWIVEL FEMALE TORQUE VALUES				
Thread Diameter (inch)	Metric (Nm)		Imperial (lbf.ft)	
	nominal	Min - max	nominal	Min - max
1/4	20	15 - 25	14.75	11.06 - 18.44
3/8	34	27 - 41	25.07	19.91 - 30.24
1/2	60	42 - 76	44.25	30.97 - 56.05
5/8	69	44 - 94	50.88	32.45 - 69.32
3/4	115	95 - 135	84.81	70.06 - 99.56
1	140	115 - 165	103.24	84.81 - 121.68
1 1/4	210	140 - 280	154.87	103.24 - 206.49
1 1/2	290	215 - 365	213.86	158.55 - 269.17

METRIC SWIVEL FEMALE TORQUE VALUES				
Thread Diameter (mm x pitch)	Metric (Nm)		Imperial (lbf.ft)	
	nominal	Min - max	nominal	Min - max
M 16x1.5	26	25 - 28	19.18	18.44 - 20.65
M 18x1.5	37	35 - 39	27.29	25.81 - 28.76
M 22x1.5	47	45 - 50	34.67	33.19 - 36.88
M 26x1.5	89	85 - 94	65.64	62.69 - 69.33
M 30x2.0	116	110 - 121	85.56	81.13 - 89.25
M 36x2.0	137	130 - 143	101.05	95.88 - 105.47
M 45x2.0	226	215 - 237	166.69	158.58 - 174.80
M 16x1.5	42	40 - 44	30.98	29.50 - 32.45
M 18x1.5	53	50 - 55	39.09	36.88 - 40.57
M 20x1.5	63	60 - 66	46.47	44.25 - 48.68
M 22x1.5	79	75 - 83	58.27	55.32 - 61.22
M 24x1.5	84	80 - 88	61.99	59.00 - 64.91
M 30x2.0	126	120 - 132	92.93	88.51 - 97.36
M 36x2.0	179	170 - 187	132.02	125.39 - 137.92
M 42x2.0	263	250 - 275	193.98	184.39 - 202.83

Table 3.1

## 4.7 Work Site Assessment

### 4.7.1 Foreign Debris Hazards

The destined work site to use the machine should be thoroughly checked and familiarised following the guidance given in Section 2.1 to assess the working area for hazards; removable and fixed.

Items should be assessed, removed or clearly marked (e.g. if too heavy to move) before cutting:

- Items and ground characteristics which could cause a reduction in the tractors stability and traction and operator safety and ease of control in operation
- Insufficient lighting
- Foreign objects which could be picked up and then flung by the machine damaging and causing risk to bystanders, operator, tractor or the nearby environment. Items seen on the surface and buried deeply in the material. For example rocks, tree stumps and metal girders
- Foreign objects which could be picked up and then damage the machine; for example wire.
- Items which could create a fire risk

In overgrown areas which could potentially hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height and then re-inspected closely with any remaining debris being removed. Then mow at the desired final height. This will also bring benefits to operations with reduced power requirements to mow, reduce wear and tear on the machine, leave less cut debris and give a better overall finish.

Always wear your seat belt securely fastened and only operate the tractor and reach arm with the Roll-over Protection Structure (ROPS) in the raised position. If the tractor or reach arm hits a solid item, a sudden movement could throw you off of the seat and under the tractor and machine. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over. Cab guarding should be mandatory fitted to the tractor.

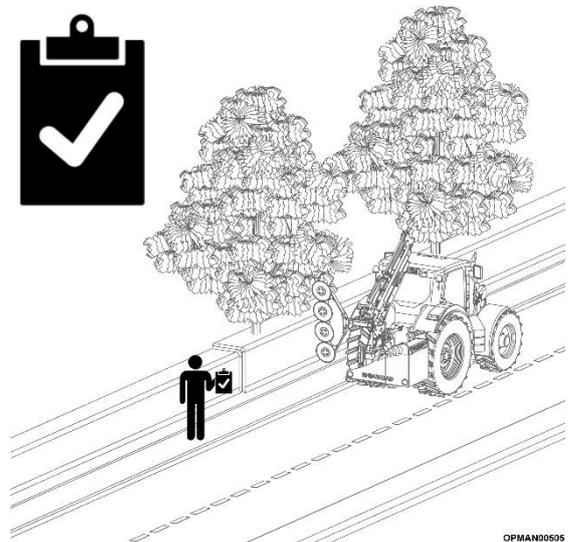


Figure 4.10 – Inspect The Work Site

It is important to inspect the reach arm and attachment to ensure all mandatory fixed and removable guarding is in position and in correct working order before proceeding to begin work.



**WARNING!** Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before cutting. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop cutting immediately if blades strike a foreign object.

**IMPORTANT:** Repair all damage and make certain rotor or blade carrier is balanced before resuming cutting.



**WARNING!** Many varied objects, such as wire, cable, rope, or chains, can become entangled in the machine. These items can swing outside the confines of the safe cutting area of the machine at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before cutting. Remove any like object from the site. Never allow the cutting blades to contact such items.

## 4.7.2 Bystanders



**DANGER!** Sawblades are capable under adverse conditions of throwing objects for great distances 90m (300 ft) or more and causing serious injury or death. Follow safety messages carefully.

It is of utmost importance that the tractor and reach arm and attachments are stopped immediately if a bystander comes within 90m (300 ft) while operating. The engine should be idled and the PTO disengaged. Do not restart work until the bystander is well past the 90m (300 ft) and the work zone has been reassessed to ensure there are no external risks.



Figure 4.11 –Bystanders Out Of Working Area

## 4.7.3 Weather

**Mow only in conditions where you have clear visibility** in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see **at least 90m (300 feet)** in front and to the sides of the tractor and reach arm. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects.

If you are unable to clearly see these type of items do not begin cutting.

## 4.7.4 Fire

Follow the following guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the machine:

- Ensure the **tractor is equipped with a fire extinguisher** in an easy to access location
- **Do not** operate the reach arm and machine on a tractor with an underframe exhaust
- **Do not** smoke or have an open flame near the machine
- **Do not** drive into burning debris or freshly burnt areas
- Never allow clippings or debris to collect on top of the machine
- Periodically shut down the tractor and machine and clean clippings and collected debris from the cowl

## 4.8 Using The Sawblade

### 4.8.1 Pre-start Checks

Only operate the reach arm with sawblade attachment from the tractor operator's seat with the seatbelt securely fastened. The tractor must be equipped with a ROPS cab and cab guarding.



**WARNING!** Do not let the sawblades touch the ground for any reason. Ensure that the skid is fitted to the machine at all times and mounted on the correct side for the configuration in which the machine is built. Allowing a sawblade to hit the ground may cause it to break and be ejected from the machine at great speeds resulting in serious damage and injury or even death to operator or bystanders.



**WARNING!** Do not put hands or feet near any of the sawblades during operation or when the machine is static. Blade contact can result in serious injury or even death. Stay away until all motion has stopped and the hydraulic pressure in the system has been successfully relieved.



**WARNING!** Never run the machine without belt cover mounted.



**WARNING!** Never use the machine with broken or missing sawblades.

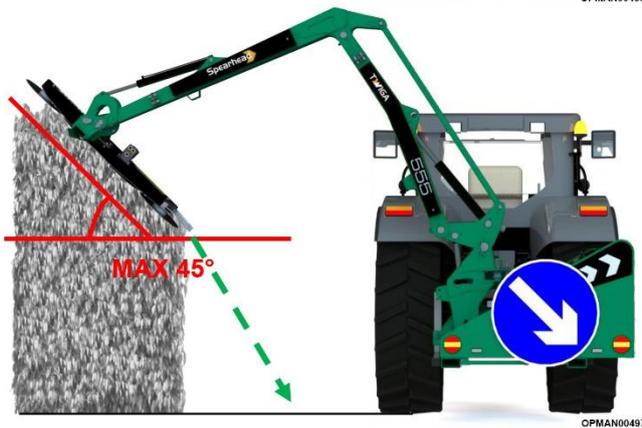


**WARNING!** Great care must be taken when attempting to clear debris from the blade and/or belt area of the machine; sharp components and numerous pinch risk points exist in these locations. Safety gloves and safety eyewear should be worn and wherever possible the use of a suitable tool should be used to remove any debris to ensure hands and fingers are kept clear of any risk areas.

Ensure you wear all Personal Protection Equipment (PPE) as stated in Section 4.1.1

4.8.1.1 Remove the blade safeguard following the guidance in Section 4.3.1 and turn the reach arm into work position.

4.8.1.2 The machine is designed to work vertically but can be angled to work at a maximum angle of 45°. The position should be considered in order to make sure debris doesn't hit the tractor along with preventing the blades from distorting and breaking. When cutting hedges always start from the bottom vertically.



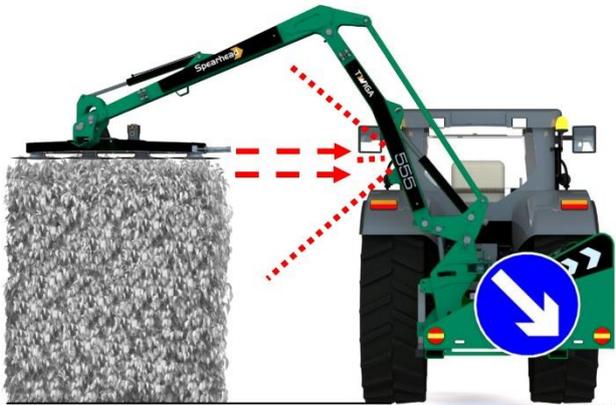
**Figure 4.12**

4.8.1.3 When working on trees ensure that the tractor is of suitable distance from the tree to ensure the safety of you and the tractor from falling, cut branches.



OPMAN00498  
**Figure 4.13**

4.8.1.4 The machine should NEVER cut horizontally. Debris and items will get thrown towards the tractor.



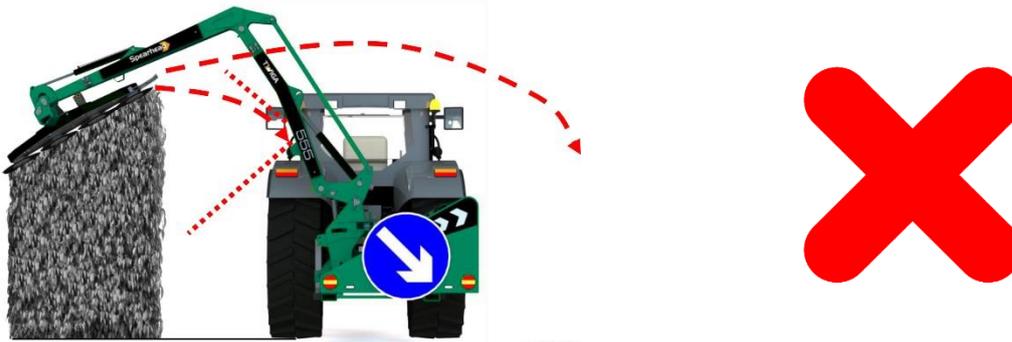
OPMAN00499  
**Figure 4.14**

4.8.1.5 The machine should NEVER be used to cut grass.



OPMAN00500  
**Figure 4.15**

- 4.8.1.6 The machine should NEVER be used at angles which could cause debris to get thrown towards the tractor or other bystanders, vehicles or buildings.



OPMAN00501  
**Figure 4.16**

**IMPORTANT:** Starting the machine should only be carried out once the machine and work site has been inspected and deemed safe and all other safety cautions have been adhered to.

At every opportunity and before getting into the cab and starting the engine perform the following inspections;

- 4.8.1.7 Check that the attachment is free from obstructions especially pieces of wire.
- 4.8.1.8 Check that all blades are in good condition and securely attached.
- 4.8.1.9 Check that all fixed guards are in their correct place and in good condition.
- 4.8.1.10 Check that the tractor is equipped to deliver the correct hydraulic flow and pressure for the attachment. Refer to the operator manuals for the tractor and reach arm.

## 4.8.2 Starting The Sawblade

Once pre-start checks have been carried out, the machine is can then be started.

- 4.8.2.1 Start the machine at low oil flow (low rpm). If the machine is starting from cold, warm the machine up for approximately 15 minutes to heat up the oil.

Ensure that the machine is never started in material where it will have to work under load.

- 4.8.2.2 Slowly increase rpm until the correct oil amount is reached.
- 4.8.2.3 Operate and adjust the cowl angling ram or adjuster to the required working angle. The ram may be operated during work to make minor angling adjustments, but is recommended to stop work before making major adjustments to the cutting angle.
- 4.8.2.4 Never attempt to restart the attachment if there is something strained/wedged in the machine. Stop the machine and the vehicle engine. Relieve hydraulic pressure before inspecting or trying to address the problem. Remove the ignition key and engage the handbrake. Only then it is safe to remove the wedged in material. Always wear safety glasses and work gloves.

## 4.8.3 Stopping The Sawblade

- 4.8.3.1 Reduce engine RPM gradually to idle and stop the machine.
- 4.8.3.2 Never increase or reduce the oil amount too fast. This will damage the hydraulic system on a long-term basis.
- 4.8.3.3 When you are finished working, stop the engine, remove the ignition key and engage the handbrake, leaving the machine in a safe and secure position. Always wear safety glasses and work gloves. Refit safeguard. Beware of sharp cutting parts!
- 4.8.3.4 Always show consideration for other road users during transportation.

## 4.8.4 Stopping The Machine In An Emergency



**DANGER!** If the machine hits an object, becomes jammed, suddenly develops vibration or any other potentially harmful change happens to the machine.

**Stop the machine immediately!**

If you hit a solid object or foreign debris:

- 4.8.4.1 Return the tractor to idle engine speed immediately.
- 4.8.4.2 Disengage the PTO.
- 4.8.4.3 Wait for the blades to stop rotating, then raise the reach arm and move the tractor off the object if safe to do so.
- 4.8.4.4 Relieve hydraulic pressure in the system. This can be done by pulling/pushing the selected tractor lever/button.
- 4.8.4.5 Press the emergency stop bottom on the reach arm controls to stop any potential movements whilst inspecting the machine. Stop the tractor.
- 4.8.4.6 With extreme caution, if a blocked foreign component has caused the machine to suddenly operate incorrectly or altogether ensure that all the correct levels of Personal Protection Equipment (PPE) is worn for safety purposes. Consider gaining extra personnel for assistance.
- 4.8.4.7 If the cause of sudden incorrect running of the machine is due to the machine colliding or hitting a foreign object, inspect the area and remove, or mark the location of the debris so it's not hit again.
- 4.8.4.8 Inspect the condition of the machine, reach arm and tractor and make any needed repairs before proceeding to use the machine again. Make sure the blades are not damaged or broken and the machine is intact and undamaged before resuming operation. If in doubt; do not restart.



**DANGER!** Never attempt to disentangle the machine by inverting the direction of the blades and starting up the head!

## 4.9 General Cutting Hints

- 4.9.1.1 **DO NOT** angle the attachment in such a way as to throw cut material towards the tractor.
- 4.9.1.2 Avoid rushing into the work and maintain an even, steady speed to ensure a clean cut.
- 4.9.1.3 Always give the blades enough material to 'bite' into, particularly when a hedge has a lot of leaf and very flexible thin stems.

### 4.9.2 Hedge Cutting Hints

- 4.9.2.1 Consider how the job should be done before commencing work, as every hedge has a different height, width, thickness and density of growth. Hedges that have previously been cut by machine tend to have denser growth, and although they can be cut to any desired shape, it is advisable to trim to the same shape and height as before.
- 4.9.2.2 Cutting causes the new growth to 'tiller' (spread out) and thicken up the hedge. Therefore it is advisable to cut the hedge side at a slight angle rather than straight, otherwise the hedge may eventually die at the bottom due to lack of light. The following information gives a few hints on how to tackle a hedge.
- 4.9.2.3 First trim the top down to the height of the previous year's trim in one cut, but do not cut into it as the old growth will be very thick and strong and can cause premature wear to the blades.
- 4.9.2.4 Stalling the blades in heavy growth is likely to cause damage to the machine.
- 4.9.2.5 Next trim the sides to the previous trim but not into it.

## 4.10 Transporting The Sawblade

In order to safely transport the reach arm mower and attachment when not in work with the tractor requires the operator to have a thorough knowledge and experience of the tractor they're using and safety precautions they should take.



**Figure 4.17**

After finishing work, the arm with the attached sawblade needs to be pulled close to the vehicle where it takes up the least room.

Once the reach arm is placed in the transport position:

- 4.10.1.1 Close the outer arm in fully to the inner arm and slew the arm from work position into transport position.
- 4.10.1.2 The inner arm needs to be lifted until the transportation stop is met or close to the vehicle.
- 4.10.1.3 Angle the attachment in order to take up the least amount of space.
- 4.10.1.4 For Spearhead machines with slewing ability the reach arm should be slewed behind the tractor. Be mindful, if the reach arm is lifted to the transportation stop that it doesn't hit the cab of the vehicle or will hit the cab during transportation.
- 4.10.1.5 All hoses are sufficiently clear of the tyres to prevent contact during bounce and sway on braking, turning and undulating ground.
- 4.10.1.6 It is an essential requirement that when the machine is in the transport position all the isolator valves are closed.

Otherwise:

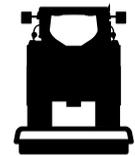
- 4.10.1.7 Ensure the tractor has been properly serviced and maintained. Do not operate the tractor with weak/faulty brakes or worn tyres.
- 4.10.1.8 Ensure the tractor has the capacity to handle the weight of the reach arm and attachment.

Failure to have at least 20% sufficient load over the front axle or to drive at inappropriate speeds on undulating terrain may result in a loss of directional control.

- 4.10.1.9 Ensure the tractor operating and reach arm controls are set for safe transport. Consult the tractor and reach arm manufacturers operators manual.



**WARNING!** Transport only at speeds where the reach arm and attachment and tractor can be maintained in control. Drive **conservatively**. Serious accidents and injuries can result from operating this equipment at high speeds.



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4.10.1.10 Before using the tractor and reach arm and attachment ensure that the machine is only operated at safe speeds; on and off road (including work).



**DANGER!** Steering should be taken at slow speeds to maintain machine stability. Violently changing direction will greatly reduce machine stability resulting in loss of steering control, potentially turning over the machine and/or tractor causing serious injury, or even death

4.10.1.11 The operator should start at slow speeds and familiarise themselves of the operating and handling characteristics of the tractor in combination with the reach arm and attachment off road before proceeding to drive the machine onto the public highway. Gentle steering and braking should be adhered to maintain control and overall stability

4.10.1.12 Tractor independent brakes should be locked together and the differential lock should be disengaged.

4.10.1.13 Before transporting the tractor and reach arm and attachment, determine the legal maximum transport speeds for the equipment conforming to local jurisdictions and comfortable transport speeds for the operator. Only increase speeds safely when conditions allow or the operator is comfortable to do so.

**Figure 4.18 – Follow Safe Driving Practices**

Transport the machine only at safe speeds which allow you to properly control the machine and at a **maximum** speed of 20 mph (32 kph). Drive for the conditions and reduce speed if required. Increasing speeds, operating down a hill or on wet or rain slick roads; increases stopping distances.

4.10.1.14 Make certain that the local jurisdiction legal safety requirement items are fitted. For example a “Slow Moving Vehicle” (SMV) sign is installed and tractor flashing warning lights. Check the local jurisdiction to determine whether the flashing warning beacons are required to be switched on when the machine is working.

Make sure all these safety awareness items are clearly visible and legible and follow all local traffic regulations. If the item is in anyway not working correctly or is faded; replace.



**DANGER!** The reach arm may be taller and wider than the tractor. Be careful when operating or transporting the reach arm and attachment to prevent the machine from running into or striking sign posts, barriers, walls, cars or any other solid objects. Such an impact could cause the tractor and reach arm to violently change direction or balance resulting in loss of steering control, serious injury, or even death.

4.10.1.15 Be aware of other road users and bystanders and make the machine aware to other users. Check your side view mirrors frequently and remember vehicles will approach quickly because of the tractor's slower speed. Gain eye contact with other people to gauge they've seen the tractors presence.

4.10.1.16 When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your local jurisdiction for agricultural tractors. Always stay alert when transporting the tractor and reach arm on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area.

4.10.1.17 Make sure all tractor and reach arm lighting are functioning correctly. Older tractors may not feature as many/bright lights as modern tractors. Consider upgrading the lights by consulting your authorized tractor dealer to ensure that the tractor and machine presence is seen.

4.10.1.18 It is of utmost importance that safety decals are kept clean and replaced if they are no longer legible, damaged or lost completely. Safety decals can be purchased readily from a local Spearhead dealer.

4.10.1.19 After work and all debris is swept away from footpaths and highways ensure that the work site is tidied. The operator is liable for any resulting damage or injury.

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## 5 Maintenance



**WARNING!** Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 2.3 “Safe Maintenance” with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself.

### 5.1 Periodic Maintenance

Perform service, repairs, lubrication and maintenance procedures outlined throughout Section 5 to ensure the longevity and reliability of the sawblade.

In general:

- 5.1.1.1 Inspect for loose or missing fasteners, worn or broken parts, leaky or loose fittings, worn bushes and any other moving parts which are worn or missing.
- 5.1.1.2 Replace any worn or broken parts with genuine Spearhead parts under the guidance of the specific section stated in Section 5.
- 5.1.1.3 Lubricate the sawblade specified by the lubrication schedule.
- 5.1.1.4 Never lubricate, adjust or remove material while it is running or in motion.
- 5.1.1.5 Torque all bolts and nuts to the settings specified.
- 5.1.1.6 Tension all drive belts to the settings specified.

### 5.2 Belts



**WARNING!** Checking or replacement of belt components should only be carried out with the tractors engine switched off, starting key removed and the PTO shaft disconnected. Do not restart the machine until all personnel and bystanders have escaped the 90m exclusion area sufficiently and the working area has been reassessed



**WARNING!** Avoid personal injury. Never work under the rotary head without fixed supports to ensure that the head does not fall. This applies if the rotary head is attached to the reach arm or is detached.

#### 5.2.1 Access

Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 “Maintenance” and Section 2.3 “Safe Maintenance with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself

Access to the belts for checking and/or adjustment requires removal of the lower belt cover.

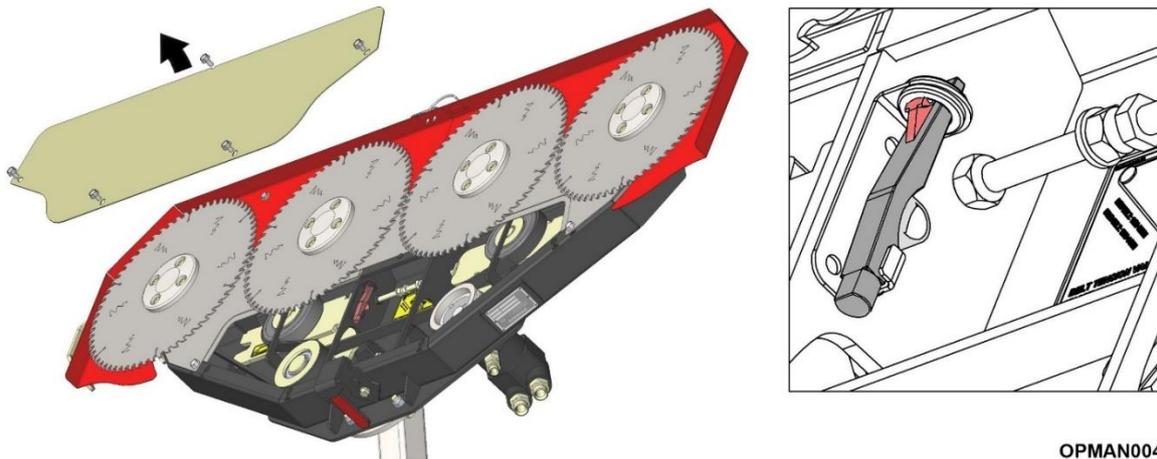


#### Equipment Required

- 17mm spanner or socket
- Belt tension gauge



**WARNING!** Avoid contact with blade teeth when accessing belts and adjusters; the edges of blades are dangerous even when stationary.

**Figure 5.1**

A belt tension gauge is supplied with the machine, this can be found beneath the belt cover in the centre cavity adjacent to belt adjusters. Ensure the gauge is replaced securely in the storage bracket when not in use.

Check the condition of the belts, if there is any sign of melting, wear or cracking; replace with new. Do not attempt to use the machine with damaged belts.

### 5.2.2 Tensioning



#### Equipment Required

- 19mm spanner or socket
- Belt tension gauge or sonic meter

Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 “Maintenance” and Section 2.3 “Safe Maintenance with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself

Trisaw/Quadsaw machines transfer power from the motor to each of the three or four blade rotors through a series of belts and pulleys.

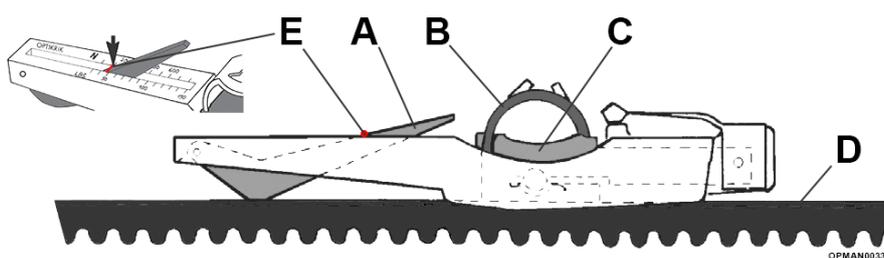
It is important for both optimal machine performance and long-lasting belt life that belts are correctly tensioned at all times. The belts must be tensioned manually and should be re-checked periodically.

Spearhead Machinery recommends using a belt tension gauge as an easy way to measure the correct belt tensions on sawblade machines.

The Optikrik III belt tension gauge is supplied with the machine to easily carry out the tensioning of the belts.



**WARNING!** Checking of belts and drive components should only be carried out with the tractors engine switched off, starting key removed and the PTO shaft disconnected. Never attempt to run the machine with the belt guard removed – Replace the guard after tensioning before starting the machine.

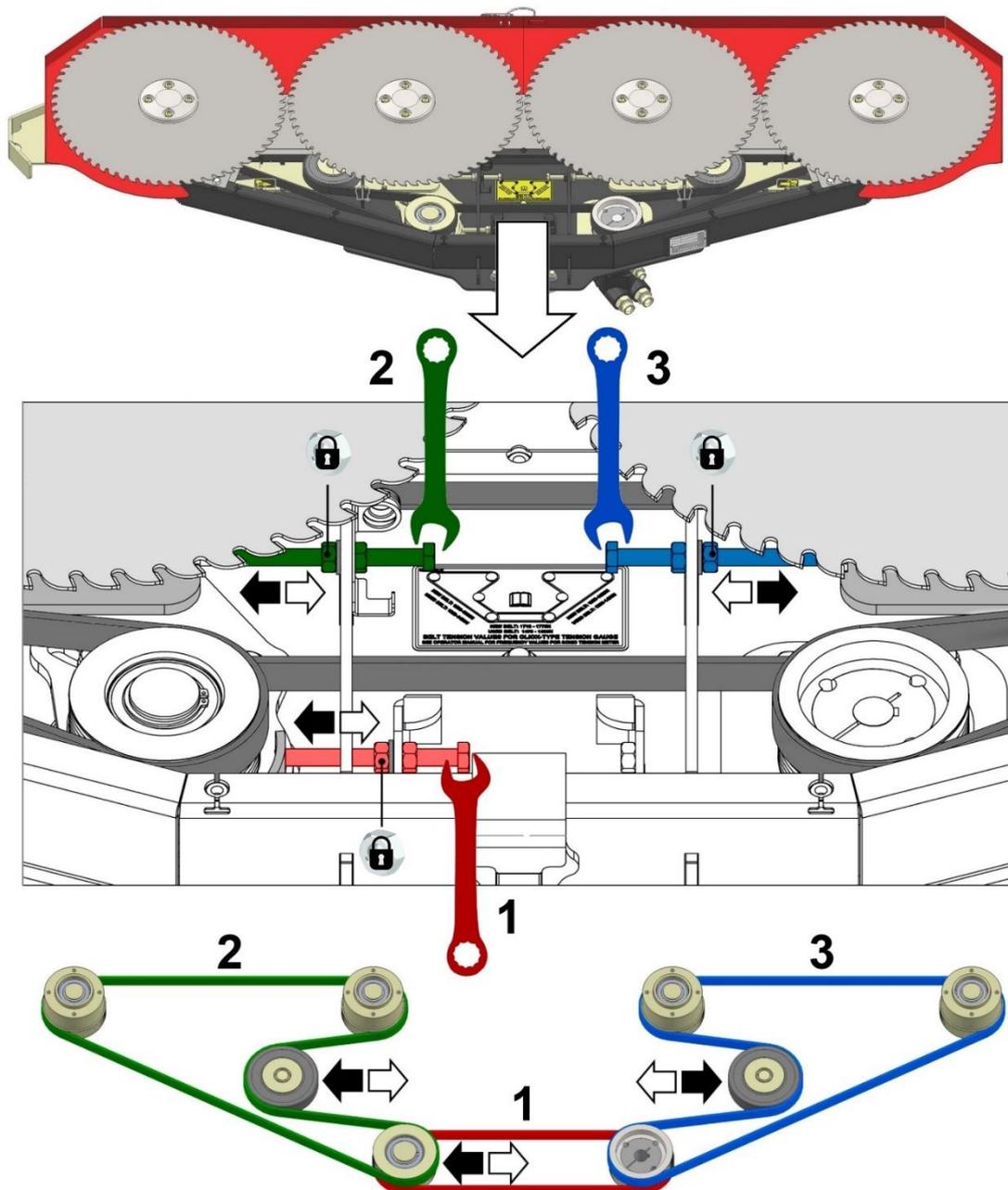


Item.	Description.
A	Indicator Arm
B	Rubber Finger Loop
C	Pressure Pad
D	V-Belt
E	Belt Tension Measurement Point

**Figure 5.2 – Optikrik Belt Tension Gauge & Components**

To correctly tension belts using the Optikrik III:

- 5.2.2.1 Position the Optikrik in the middle of the longest belt runs on each of the belt circuits. Take care to ensure that the indicator arm (A) is pushed down into the gauge body. Align the gauge so that its body is parallel with the sides of the belt.
- 5.2.2.2 Push down on the pressure pad (C) slowly and firmly with one finger. When a “click” is heard/felt, stop immediately and remove the gauge carefully to avoid disturbing the indicator arm.
- 5.2.2.3 Read and turn the gauge sideways if required, to ascertain the exact point where the top surface of the indicator arm (A) crosses the scale (E). This is the given belt tension.
- 5.2.2.4 Tighten or slacken the belts as necessary following the guidance below and repeat the process again on the other two belt circuits.



OPMAN00486

Figure 5.3

With reference to Figure 5.3:

To tension a belt: release the adjuster locknut and rotate adjuster bolt clockwise to increase tension or anti-clockwise to decrease tension. Re-tighten the adjuster locknut when the belt tension is correct – refer to Figure 5.4 to 5.9 for correct belt tension settings.

5.2.2.5 Belt Tension Settings – SP15 Trisaw – LH Build

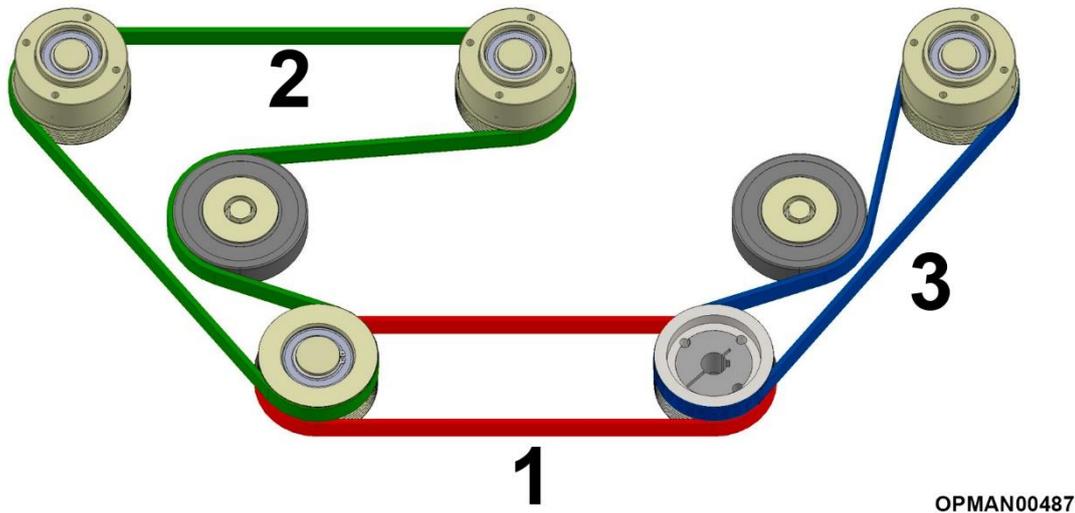


Figure 5.4

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
<b>Belt 1</b>	24159.03	1720 - 1850 N	1480 - 1600 N	105.0 - 108.0 Hz	97.4 - 101.0 Hz
<b>Belt 2</b>	182423	1420 - 1520 N	1220 - 1320 N	91.1 - 94.3 Hz	84.3 - 87.8 Hz
<b>Belt 3</b>	182412	1540 - 1650 N	1320 - 1430 N	94.4 - 97.7 Hz	87.4 - 90.9 Hz

5.2.2.6 Belt Tension Settings – SP15 Trisaw – RH Build

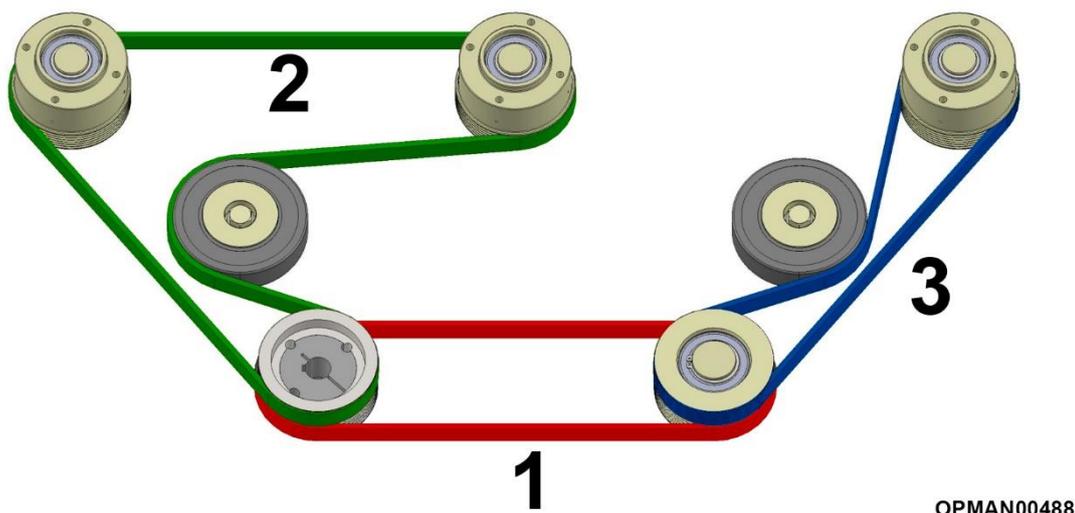


Figure 5.5

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
<b>Belt 1</b>	24159.03	1720 - 1850 N	1480 - 1600 N	105.0 - 108.0 Hz	97.4 - 101.0 Hz
<b>Belt 2</b>	182423	1690 - 1810 N	1450 - 1570 N	99.3 - 102.0 Hz	92.0 - 95.7 Hz
<b>Belt 3</b>	182412	1580 - 1700 N	1360 - 1470 N	95.6 - 99.0 Hz	88.5 - 92.1 Hz

5.2.2.7 Belt Tension Settings – SP20 Quadsaw – LH Build

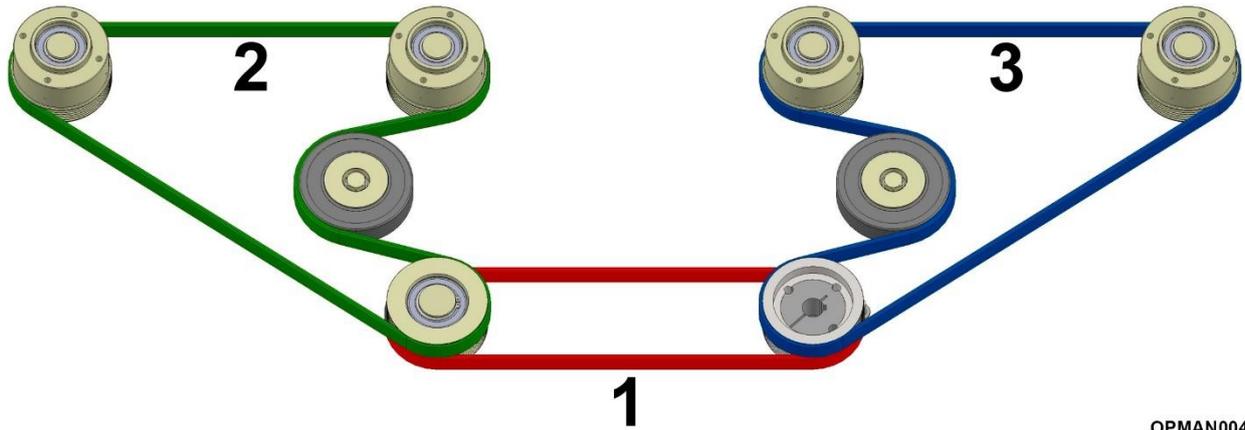


Figure 5.6

OPMAN00489

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
<b>Belt 1</b>	182187	1710 - 1775 N	1470 - 1530 N	91.3 - 94.5 Hz	84.5 - 88.0 Hz
<b>Belt 2</b>	24159.01	1580 - 1620 N	1350 - 1400 N	70.4 - 72.8 Hz	65.1 - 67.8 Hz
<b>Belt 3</b>	24159.01	1580 - 1620 N	1350 - 1400 N	69.8 - 72.2 Hz	64.6 - 67.2 Hz

5.2.2.8 Belt Tension Settings – SP20 Quadsaw – RH Build

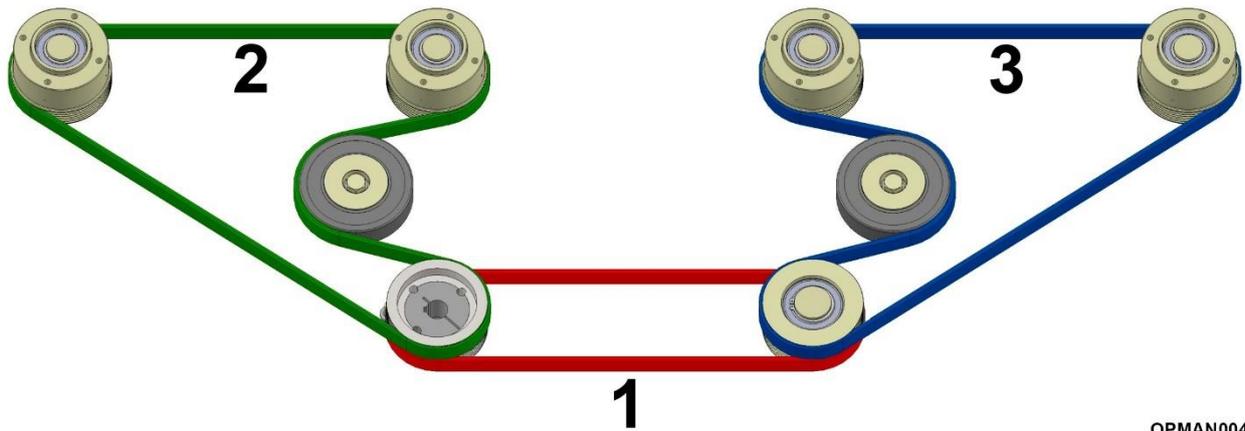


Figure 5.7

OPMAN00490

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
<b>Belt 1</b>	182187	1710 - 1775 N	1470 - 1530 N	91.3 - 94.5 Hz	84.5 - 88.0 Hz
<b>Belt 2</b>	24159.01	1580 - 1620 N	1350 - 1400 N	69.8 - 72.2 Hz	64.6 - 67.2 Hz
<b>Belt 3</b>	24159.01	1580 - 1620 N	1350 - 1400 N	70.4 - 72.8 Hz	65.1 - 67.8 Hz

## 5.2.2.9 Belt Tension Settings – SP25 Quadsaw – LH Build

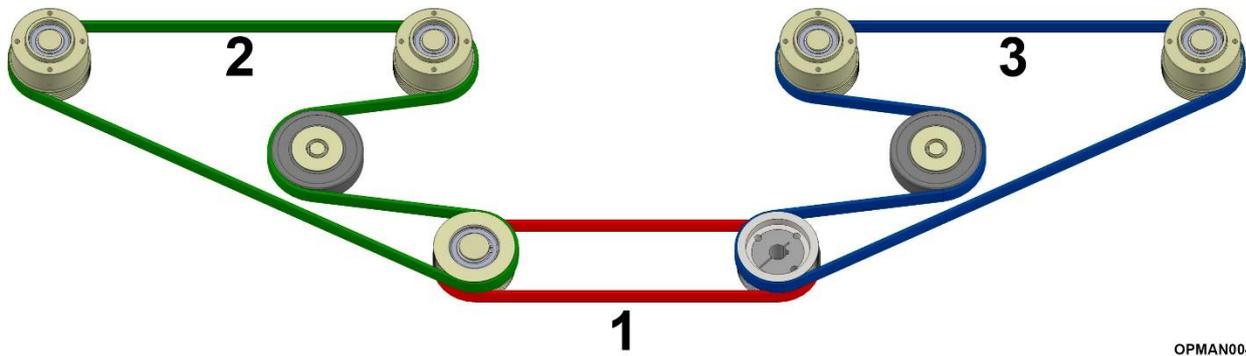


Figure 5.8

OPMAN00491

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
Belt 1	182187	1710 - 1775 N	1470 - 1530 N	91.3 - 94.5 Hz	84.5 - 88.0 Hz
Belt 2	24159.02	1580 - 1620 N	1350 - 1400 N	56.3 - 58.2 Hz	52.1 - 54.2 Hz
Belt 3	24159.02	1580 - 1620 N	1350 - 1400 N	54.3 - 56.2 Hz	50.3 - 52.3 Hz

## 5.2.2.10 Belt Tension Settings – SP25 Quadsaw – RH Build

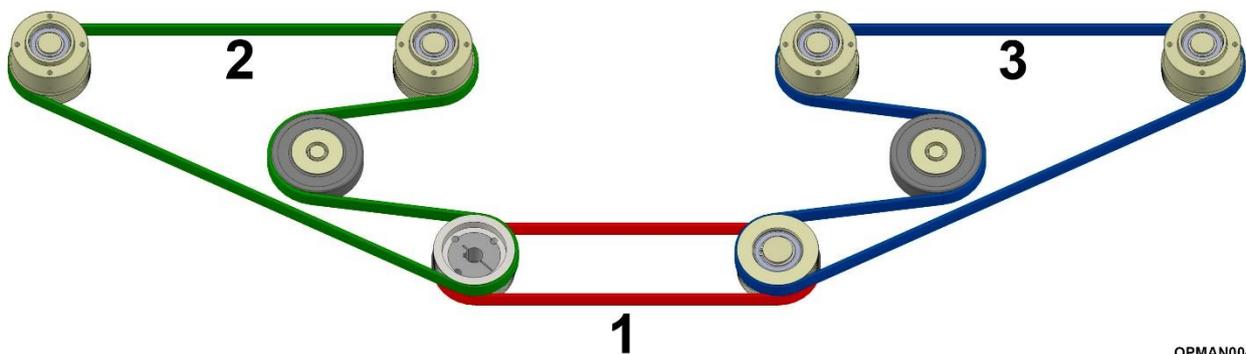


Figure 5.9

OPMAN00492

Reference	Part Number	Belt Gauge Tension Setting		Sonic Tension Meter Setting	
		New Belt	Used Belt	New Belt	Used Belt
Belt 1	182187	1710 - 1775 N	1470 - 1530 N	91.3 - 94.5 Hz	84.5 - 88.0 Hz
Belt 2	24159.02	1580 - 1620 N	1350 - 1400 N	54.3 - 56.2 Hz	50.3 - 52.3 Hz
Belt 3	24159.02	1580 - 1620 N	1350 - 1400 N	56.3 - 58.2 Hz	52.1 - 54.2 Hz

## 5.3 Blades



**WARNING!** Checking of blade or chain components should only be carried out with the tractors engine switched off, starting key removed and the PTO shaft disconnected. Do not restart the machine until all personnel and bystanders have escaped the 90m exclusion area sufficiently and the working area has been reassessed.



**WARNING!** Avoid personal injury. Never work under the sawblade without fixed supports to ensure that the head does not fall. This applies if the sawblade is attached to the reach arm or is detached.

## 5.3.1 Inspection

Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 “Maintenance” and Section 2.3 “Safe Maintenance with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing

on the maintenance personnel as well as the machine itself.

Blades should be replaced if they have:

- Distortion
- Cracks
- Teeth missing

For safety and performance only use genuine Spearhead blades. When replacing blades it is recommended that new blade bolts (Part No. 9300185) are fitted.

Inspect the blades before each use to determine that they are properly installed, secure and in good condition. Blades that are bent, excessively nicked, worn or have any other damage should be replaced. Failure to replace such abnormally damaged blades may lead to catastrophic failure of the blade and ejection of the broken part which may cause bodily injury or death.

### 5.3.2 Blade Removal & Replacement



Before proceeding to carry out any maintenance on the machine, ensure that you have thoroughly read and understand Section 5 “Maintenance” and Section 2.3 “Safe Maintenance” with regards to the correct and safe maintenance procedures of looking after the machine. This section gives safe guidance to ensure the wellbeing on the maintenance personnel as well as the machine itself.



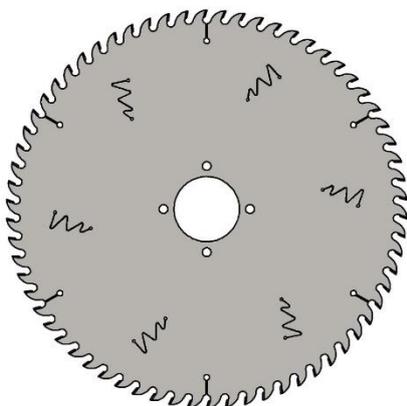
**WARNING!** Always check tightness of blade bolts prior to using the machine.



**WARNING!** Blades must be mounted to cut in a downward direction only.

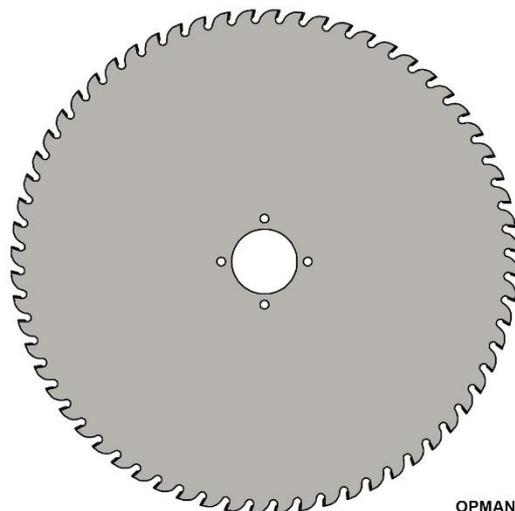
Depending on the Trisaw/Quadsaw model purchased there are varying quantities of blades and two different blade types.

#### Trisaw/Quadsaw SP15/20



490mm Trisaw/Quadsaw Blade  
**(182160)**

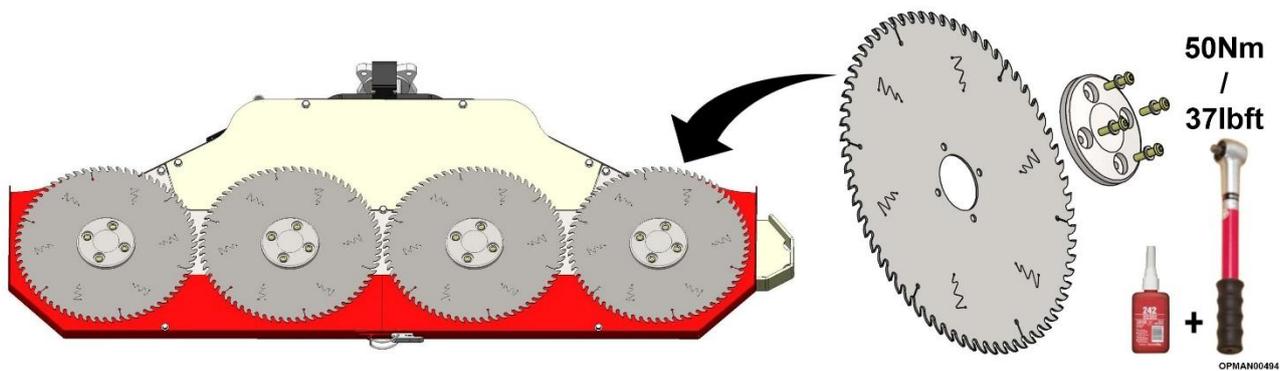
#### Quadsaw SP25



620mm Quadsaw Blade  
**(182407)**

OPMAN00493

**Figure 5.10**



**Figure 5.11**

In order to remove the blades:

- 5.3.2.1 Ensure that the machine is disconnected from the tractor and reach arm hydraulic supply to ensure that the blades do not move during maintenance.
- 5.3.2.2 Place a block of wood between a pair of blades in order to lock the belt drive system and allow you to remove a blade.
- 5.3.2.3 Undo the four securing bolts on blade fixing plate
- 5.3.2.4 Remove and replace with new blade ensuring the blade is mounted in the correct cutting direction for the machine build; see Figure 4.5. Blades should be orientated to cut downwards.
- 5.3.2.5 Install new blade bolts using a medium strength thread-locking adhesive (Loctite 242 or equivalent) on the threads and torque to 50Nm (36.9 ft-lb).
- 5.3.2.6 Repeat procedure on the other remaining blades, including moving the block of wood if required.

## 5.4 Hydraulic Components

Before proceeding to carry out any maintenance requirements on the hydraulic system, ensure that you have thoroughly read and understood Section 2.3 on how to safely go about carrying out maintenance requirements to the head, including how to approach the hydraulic system and its components. Section 2.1 should also be read to understand how to safely operate and use the machine in general.



**CAUTION!** Relieve hydraulic pressure before disconnecting the hydraulic hoses or working on the system. This can be done by pulling/pushing the selected tractor lever/button. Only once this has been completed and then suitable safety glasses and impenetrable gloves have been put on can the hydraulic hoses be removed from the tractor.



**CAUTION!** When working with/checking the hydraulic system on the sawblade or reach arm always wear safety glasses and impenetrable gloves. This also applies when working with motor and motor oil. Use paper or cardboard to search for leaks and not hands or any other body parts.



**CAUTION!** Keep hands and body away from pin holes and nozzles ejecting hydraulic fluid. Ingested or penetrated hydraulic fluid in the body can become gangrenous. Removal must be carried out professionally by a suitable Doctor.



**CAUTION!** Ensure all hydraulic hoses, lines and connections in good condition and tight before applying pressure.



**CAUTION! Do not** change any factory-set hydraulic settings to avoid component or equipment failures.



**CAUTION!** Ensure maintenance personnel wear suitable PPE clothing when maintaining the machine to ensure risk of impact or skin injuries. Suitable footwear and gloves are an example. For example frequent or prolonged contact with hydraulic oil may cause dermatitis and other skin disorders including (more rarely) skin cancer when not wear impenetrable gloves. Worn parts may have sharp edges.



**CAUTION!** Follow the guidance of the lubricant manufacturer with regards to handling oils, solvents, cleansers and other chemical agents.

## 5.4.1 Hoses



**WARNING!** Relieve hydraulic pressure before disconnecting lines or working on the machine. This can be done by pulling/pushing the selected tractor lever/button.

It is false economy to try and make a damaged hose last a bit longer, because a failure can spill a lot of oil on the road endangering traffic, the environment and costing money. To reduce the risk of this happening and ensure a long life from the hoses, follow the guidelines below. On a weekly basis:

- 5.4.1.1 Check that all hoses and their connections are in good condition and that there are no leaks or damage. Replace any hose that is leaking or damaged.
- 5.4.1.2 Check to see that hoses are not and have not been chafing against sharp edges. If evidence of chafing is found then inspect for damage and if found replace. Re-route any hose that has been chafing using the guidance given in Section 4.6.3.
- 5.4.1.3 Check to ensure that hoses are fitted without kinks or sharp bends using the guidance given in Section 4.6.
- 5.4.1.4 If in doubt about the condition of any hose replace. When replacing hoses, be sure to tighten to the correct torque setting, see Section 5.5.2.

## 5.5 Torque Settings

### 5.5.1 Nuts & Bolts

#### Specific Fastener Requirements

On Trisaw/Quadsaw sawblades, there are some special fasteners/components which require specific torque settings to ensure they operate safely.

Use	Machine	Size	Grade	Torque Setting	
				Nm	Ft-lb
Blade Bolts	All	M10	10.9	50 (1)	37 (1)
Blade Axle Mounting	All	M10	8.8	50 (1)	37 (1)
Motor Pulley Screw	All	M6	12.9	20 (1)	15 (1)
Belt Tensioner Centre Bolt	All	M16	8.8	240 (1)	177 (1)
Pulley Tensioner Adjustment Bolt	All	M12	8.8	80 (1)	59 (1)

**Table 5.1 – Trisaw/Quadsaw Specific Fastener Torque Settings**

- (1) A medium strength thread-locking adhesive (Loctite 242 or equivalent) on the threads should be applied in addition.

#### Non-specific Fastener Requirements

The below tables give reference to the **maximum** recommended tightening torques for standard, zinc plated finished bolts on Spearhead machines. **These settings can be applied to hex, socket countersunk and socket button screws.**

Size	Grade					
	8.8		10.9		12.9	
	Nm	Ft-lb	Nm	Ft-lb	Nm	Ft-lb
M5	5	3	7	5	8	6
M6	14	10	12	9	14	10
M8	34	25	29	21	34	25
M10	68	50	57	42	68	50
M12	119	88	99	73	119	88
M14	189	139	158	116	189	139

M16	295	218	246	181	295	218
M18	406	299	338	249	406	299
M20	576	424	480	354	576	424
M22	783	577	652	481	783	577
M24	995	734	829	612	995	734
M30	1977	1458	1647	1215	1977	1458

**Table 5.2 – Standard Fastener Torque Settings**

## 5.5.2 Hydraulic Fittings

Throughout all Trisaw/Quadsaw sawblades, BSP adaptors and hoses are used. See the relevant headings for adaptors and hoses.

### Port Adaptors With Bonded Seals

The below tables give reference to the **maximum** recommended tightening torques for standard, BSP port adaptors found on Trisaw/Quadsaw sawblades.

Size	Thread	Torque Setting		Spanner Size
		Nm	Ft-lb	
3/4"	BSP	149	110	32mm

**Table 5.3 – Trisaw/Quadsaw Adaptor Torque Settings**

### Hydraulic Hoses

The below tables give reference to the **maximum** recommended tightening torques for standard, hydraulic hoses on Trisaw/Quadsaw sawblades.

Size	Thread	Torque Setting		Spanner Size
		Nm	Ft-lb	
3/8"	BSP	31	23	22mm
3/4"	BSP	80	59	32mm

**Table 5.4 – Trisaw/Quadsaw Hydraulic Hose Torque Settings**

## 5.6 Machine Inspection Record

	<b>MACHINE INSPECTION RECORD</b> <b>(For Trisaw/Quadsaw)</b>	Pre-delivery inspection:	Select
		Installation inspection:	Select
		Daily pre-work inspection:	Select
Model:	Serial No:		
Inspector name (print):	Inspection date:		
Company/Position:			
Inspector signature:			
Visual Checks		Comments	OK
Check that an operator's instruction manual in the correct language for the working territory is in the machine document holder.			
Check that the serial number printed on the parts manual supplied with the machine matches the serial number of the machine.			
Warning decals are present, clean and in good order			
Check cowl mainframe for any structural problems or excessive damage			
Look for any evidence of motor oil leaks			
View the blades for any damage or distortion to the cutting teeth			
View the blades to ensure they are orientated correctly to cut downwards for the configuration in which the machine is set up			
Review all the operational guards fitted to the machine and tractor, check with the instruction book if unsure.			
Review the transport blade guards fitted to the machine, check with the instruction book if unsure.			
Review the skid to ensure it is fitted correctly for the type of use i.e. left-hand or right-hand build			
Check hoses for damage, kinks, twists, chafing or weeping.			
Check that the tractor is equipped to supply the correct hydraulic flow and pressure			
Ensure that all safety decals are located on the machine and are clean and readable			
Mechanical Checks		Comments	OK
All mounting fasteners to between attachment and reach arm need to be checked for tightness and integrity.			
Check sawblade fasteners for tightness			
Check the security of any hose fittings for tightness			
Check and adjust machine belt tensions. See instruction book.			
Running Checks		Comments	OK
Once you are happy with the above start the tractor and run through the operational checks below.			
Ensure that the controls respond as intended with regards to powering the machine			
Run the blades up to operating speed and check for vibration. If vibrating check with the instruction book for reasons.			
Other comments:			

Other comments continued:

*Disclaimer: All guidance and maintenance advise to be carried out on the sawblade as written in this inspection record is deemed on the provision that the operator/maintenance operative has fully read and understood the specific operators manual for the given model of machine and follows the guidance and safety precautions described within it.*

*Spearhead claims no responsibility to any machine and/or physical harm caused by anything other than the practice guidelines stated in its specific machine model operators manual.*

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## 5.7 Machine Storage

Follow the following sections for guidance to correctly storing Trisaw/Quadsaw machines out of working use and preparing back into correct working condition.

### 5.7.1 Preparing The Machine For Storage & Reintroduction Into Work

Following seasonal use it is important to prepare the machine for storage, thinking of the preservation of parts condition and ease of reintroduction when bringing the machine back into work after periods of no use.

Follow the following points:

- 5.7.1.1 Thoroughly wash the machine removing all traces of grass and dirt.

Great care should be taken when using pressure washers. **Do not** hold the pressure washer lance close to the paintwork and items containing seals as this can cause damage and discolouration.

Spearhead does not recommend using steam cleaners.

- 5.7.1.2 Liberally place oil on each of the blades to prevent corrosion.

- 5.7.1.3 Tighten all fasteners to the recommended torque.

- 5.7.1.4 Plug all open ended hydraulic hoses to keep the ends free of contamination and dirt.

- 5.7.1.5 Use touch up paint available from Spearhead where necessary to preserve the appearance of the machine.

- 5.7.1.6 Ideally store the machine in the dry indoors, on a firm surface or a on a pallet, away from the elements. This will greatly preserve the machines physical appearance and condition.

It is also best practice to inspect the machine for worn/damaged items which will be required to be replaced before entering work again in the new season. Consult the maintenance schedule for the machine (Section 5.6) as well as other specific maintenance task sections to see what could be required to be done to the machine.

Ordering replacement parts at the beginning of this period with plenty of time will potentially reduce the delays of reintroduction into work with out of stock items. Many other local operators will be carrying out the same procedure at the same time.



**Figure 5.12 – Prepare For Storage**

Where parts are broken, damaged and deemed not fit for use; replace with genuine Spearhead parts using the online Interactive Parts facility at:

<https://my.spearheadmachinery.com/parts/public-interactive-parts-database/>

You will require the machine serial number. Assistance to its location can be found in Section 1.3.

Spearhead sawblade machines are designed to withstand the most rigorous conditions and with a little care and attention will give many years of trouble free service. So as not to invalidate the warranty and to avoid problem, use only genuine Spearhead parts and make sure the machine is not driven at excess speed (3 mph/5 kmh).

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## 6 Troubleshooting

Problem	Cause	Solution
<b>Motor leak</b>	Too high return oil pressure	Check oil pressure. Free to tank. Change washer.
	Too high leak oil pressure	Check oil pressure. Free to tank. Change washer.
	Return hose not correctly mounted or has fallen off	Install correctly or reinstall. Change seals and/or lid on the valve.
<b>Overheating</b>	Incorrect machine speed	Test RPM on machine.
	Wrong oil level	Check oil level.
	Wrong oil type	Empty the tank and refill with correct oil type.
	Blockage of blades	Remove cuttings/debris.
	Air temperature is too high	Install a hydraulic oil cooler. Reduce operating speed.
<b>Hydraulic failure</b>	Oil level too low	Refill with oil to the correct level.
	Oil leak in pressure hose	Check machine for leaks.
	Oil pump filter is blocked	Replace the filter element.
<b>Branches get "frayed"</b>	Larger branches than recommended	Never exceed the recommended maximum branch sizes of the hedge cutter.
	Working during winter time	Work during growth season.
<b>Cutting result skewed/hacked</b>	Defective rotor bearings	Change bearings.
	Rotor or blade damaged/bent	Change rotor/blade and only work on suitable material.
	Forward drive too fast	Adjust speed.
<b>Machine is shaking</b>	Blade damaged/bent	Change blade.
	A blade is stuck	Loosen the blade.
	A blade is broken	Replace the blade.
<b>Cuttings are thrown towards the cab</b>	Attachment is angled so the blades are facing the cab	Only operate as recommended by Spearhead Machinery.
<b>A rotor stops</b>	Belt tension incorrect	Adjust to correct tension.

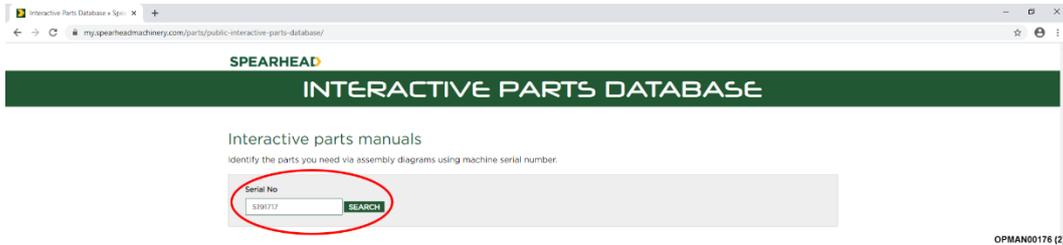
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## 7 Spare Parts

### 7.1 How To Obtain The Correct Spare Part Numbers

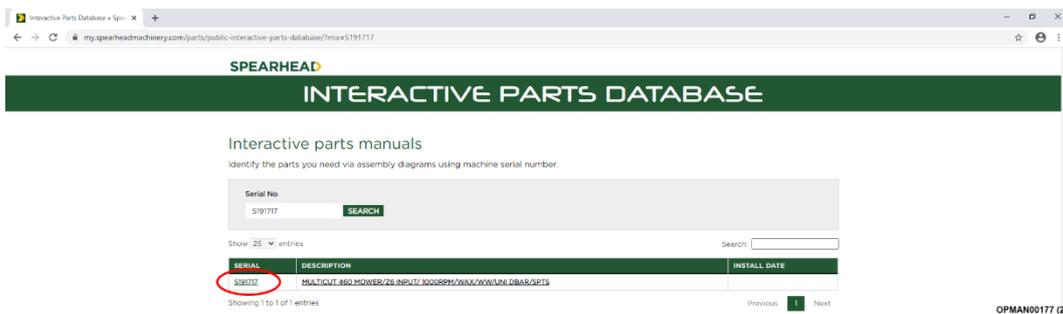
For correct part numbers; use the Spearhead interactive online parts books. These are available at <https://my.spearheadmachinery.com/parts/public-interactive-parts-database/>. You will need to enter the machine serial number; see Figure 1.7.

#### 7.1.1.1 Enter the serial number.



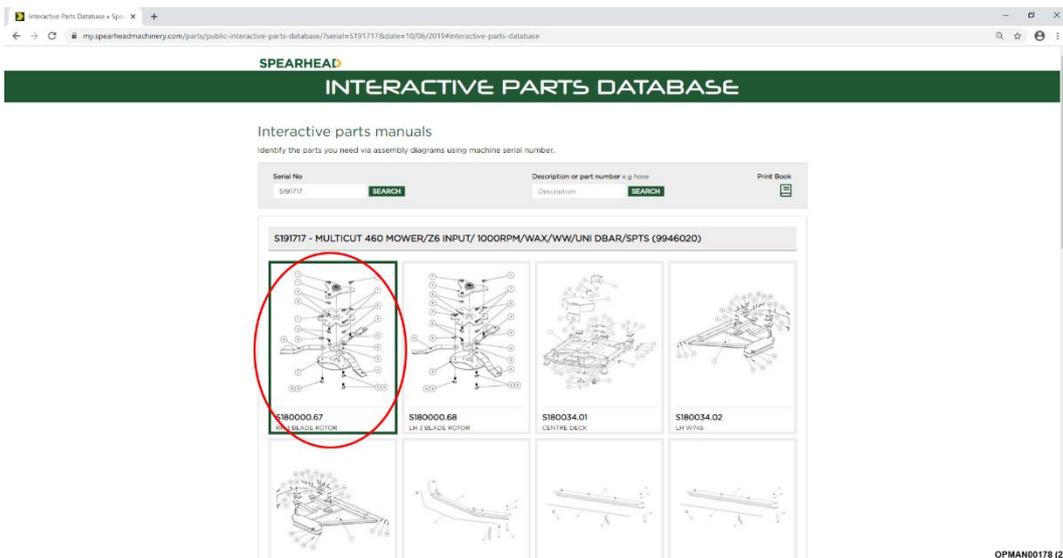
**Figure 7.1 – Type In Serial Number**

#### 7.1.1.2 After entering the serial number a specification for the machine will appear. Click on the serial number; see Figure 7.2.



**Figure 7.2 – Click On Serial Number**

#### 7.1.1.3 After clicking on the serial number a full parts breakdown, specific to the machine serial number will appear showing the various parts and assemblies of the machine. Click on the specific assembly picture required; see Figure 7.3.



**Figure 7.3 – Click On Assembly**

- 7.1.1.4 You will finally be presented with a full exploded parts breakdown for that particular assembly, giving part numbers and the quantities required; see Figure 7.4.

The screenshot displays the 'INTERACTIVE PARTS DATABASE' interface. It features a search bar with 'Serial No' and 'Description or part number' fields. Below the search bar is a table titled 'Print Part List and diagram' with the following data:

Ref	Part No	Description	QTY
1	1770602-342	CHIM BLADE CARRIER UPPER (100)	1
2	1770609	LOWER BLADE CARRIER (100)	1
3	1770604-3	SPACER	1
4	7770700	BLADE - RH C/W PIN 25	3
5	277045	BOLT	6
6	7770707	BLADE BUSH	6
7	277044	NUT	6
8	046053	CARRIER	1
9	2770464	WASHER	2

To the right of the table is an exploded view diagram of the assembly, with numbered callouts (1-9) corresponding to the parts in the table. The diagram shows a central carrier assembly with multiple blades and associated hardware.

Figure 7.4 – Exploded Parts Breakdown With Bill Of Materials

## 7.2 Spare Parts Ordering

It is important to note that when it comes to ordering replacement parts, that this can **only** be carried out through a Spearhead dealer. **Spearhead does not accept direct customer parts orders over email, fax or telephone.**

For guidance on finding your local Spearhead dealer; see Section 7.3.

## 7.3 Dealer Network

Spearhead has an extensive dealer network which can offer genuine replacement parts.

In order to make it easier to find your local Spearhead dealer, the Spearhead website has a Dealer Locator facility.

<http://www.spearheadmachinery.com/dealer-locator/>

To find your local Spearhead dealer enter your location or postcode into the “Your location” box and then press “Search”; see Figure 7.5.

The screenshot shows the 'DEALER LOCATOR' page on the Spearhead website. The search bar contains 'Evesham' and the search radius is set to '25 mi'. The results show 23 dealers. A map of the United Kingdom is displayed, with a green circle indicating the search radius centered on Evesham, Worcestershire. The map also shows other major cities and countries in Europe.

Figure 7.5 – Dealer Locator

# Notes

# Notes