



Ethiopian TVET-System



Basic Leather Garments and Goods Production Operations LEVEL I

Based on May 2012 Occupational Standards

May, 2020



Module Title: Minor Maintenance

TTLM Code: IND BLG1 TTLM 0919V1

This module includes the following Learning Guides

LG27: Prepare for Minor Maintenance

LG Code: IND BLG1 M07 LO1-LO 27

LG28: Carryout Minor Maintenance Activities

LG Code: IND BLG1 M07 LO2-LG 28

LG29: Complete Minor Maintenance

LG Code: IND BLG1 M07 LO3-LG 29

Instruction Sheet	LG27: Prepare for Minor Maintenance
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Identifying selecting providing tools, Supplies and Materials to carry out maintenance
- Minor maintenance
- Checking regular pre operational machinery
- Identification and segregation of Faulty or unsafe machinery for replacements
- Identification of OHS hazards in the workplace

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Tools, supplies and materials required to carry out minor maintenance are identified, selected and provided on site according to supervisor's instructions.

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- Regular operational checks of machinery and equipment are carried out and adjustments made according to manufacturer's specifications and/or enterprise procedures.
- Faulty or unsafe machinery and equipment are identified and segregated for repair or replacement according to enterprise requirements.
- OHS hazards in the workplace are identified and reported to the supervisor.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 24.
3. Read the information written in the "Information Sheets 1". Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
4. Accomplish the "Self-check 1" in page 13.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to "Operation Sheet 1". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction#3.
7. Do the "LAP test in page 20" (if you are ready). Request your teacher to evaluate your performance and outputs. Your teacher will give you feedback and the evaluation will be either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advise you on additional work. But if satisfactory you can proceed to Information sheet 2.
8. Read the information written in the "Information Sheet 2". Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
9. Accomplish the "Self-check 2" in page 23.
10. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).

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11. If you earned a satisfactory evaluation proceed to “information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction#9.
12. Read the information written in the “Information Sheets 3”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
13. Accomplish the “Self-check 3” in page 35.
14. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks 3).
15. If you earned a satisfactory evaluation proceed to “information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction#13.
16. Read the information written in the “Information Sheets 4”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
17. Accomplish the “Self-check 4” in page 41.
18. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks 4).
19. If you earned a satisfactory evaluation proceed to “information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction#17.
20. Read the information written in the “Information Sheets 5”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
21. Accomplish the “Self-check 5” in page 53.
22. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks 5).
23. If you earned a satisfactory evaluation proceed to “information Sheet 5”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction#21. But if satisfactory you can proceed to Learning Guide #28.

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24. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Identifying selecting providing tools, Supplies and Materials to carry out maintenance
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MAINTENANC OF EQUIPMENTS AND MACHINERY

1.1 Maintenance Hand tool

1. Screwdrivers

Screwdrivers are used to drive screws. The two most commonly used types of screws are:

a) Slotted and Phillips head. Slotted screws are driven with standard screwdriver which is fitted with screwdriver-blade to fit screw slots closely to avoid slipping and screw-head damage. Phillips head screws are driven by Phillips screwdrivers. Phillips screwdrivers are made in several numbered sizes, including No.1 and No.2. The lower numbered screwdrivers are designed to be used with small screws, while the higher-numbered ones are used for larger screws. Matching screwdrivers to screw-head sizes helps to prevent damaging screw heads. Screwdrivers are available in lengths ranging from 2 to 18 inches. Short screwdrivers are used with small screws or where working space is limited. Long screwdrivers are used with large screws or when screws are difficult to drive. Additional length adds leverage to drive screws easier. There are a number of other patented screw-driving systems viz. Reed & Prince head, Torx drive, Allen head, Clutch head, etc. for specific works. Suitable screwdrivers of different sizes are used for fixing fittings in leather goods and other machine repair works

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Fig.: Screwdrivers

b) Small screwdrivers with a range of handle sizes will get into the small areas necessary for sewing machine repair. The Tools for Self Reliance website suggests 2 mm, 3 mm, 4 mm and 5mm size are useful sizes for sewing machine repair. There may be an occasional sewing machine that needs a Phillips-head screwdriver in a small size, as shown in one of the kits available at White Sewing Center website.

2. Wrenches

The most commonly used wrenches for various repairs and maintenance works are open-end wrenches, box-end wrenches and adjustable open-end wrenches. Open-end wrenches are made of chrome-vanadium steel and are machined to accurate tolerances for a proper fit. They are used to tighten or loose bolts and nuts. Box-end wrenches surround a nut or bolt and apply pressure to all its corners. They are less likely to ruin a fastener than an open-end wrench, which bears on only two corners. Adjustable open-end wrench is a general-purpose tool and it will fit nuts and bolts up to the maximum opening of its jaws.



Fig: Wrenches

3. Portable-electric hand drill:

Portable electric hand drills are the most commonly used power tools. Variable speed and reversible drills allow the tool to be used for driving and removing screws and other low-speed jobs. A power drill is a versatile tool that can drill holes in metal, wood, plastics, etc. and can take dozens of accessories for sanding, grinding, shaping, stripping, buffing, etc. It is easier to hold steady and it operates more

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rapidly. It is used for a wide range of works in leather goods and garment manufacturing.



Fig: Portable electric hand drill

4. Oil stone

A sharpening oilstone consists of thousands of tiny, harder than steel sharp-edged points with spaces in between. As the knife is pushed over the stone under pressure, these points grind off particles of steel. On the coarse side of the stone, the points are relatively large and far apart. The initial grinding removes metal rapidly but leaves the surface and more particularly the edge rough and ragged. At this stage, the knife may feel sharp and indeed for a time may cut better than it did before. However, such an edge produces a cut that is more chewed than sliced and will soon break down again. It is the job of the fine side of the stone to grind away enough more metal to eliminate scratches and ridges from the bevel and to cut down the ragged metal along the cutting edge.

Sharpening consists of three basic operations:

- 1) Coarse grinding to remove any nicks and to reshape the bevel;
- 2) Fine grinding to smooth and bring the bevel to a sharp edge; and
- 3) Honing to refine the edge.

Oilstones are used to sharpen cutting and skiving knives in fabricating leather goods.



Fig: Oilstone

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5. Oilcan:

Oilcan is used to lubricate various leather goods tools, equipment and machines with suitable machine oils.



Fig: Oilcan

Brushes

Many sewing machine problems are often the result of thread and lint build-up in the area between the face plate and the bobbin. A flat artist's paintbrush in 1/2-inch size is useful, and a soft blush or makeup brush with a short, stubby handle is also effective. The long, soft bristles of the makeup brush clean without damage and hold lint well.

Needle Theaters and Small Flashlights

In order to repair a sewing machine, you will need to thread the needle and check the stitching. Save time by keeping a few needle threaders on hand, along with some miniature flashlights. The electric sewing machines often have to be unplugged to work on internal parts for safety, so the lighting provided by the machine is not available. Have easy lighting available, even if it is a key chain flashlight.

Other Useful Tools

Long-handled tweezers are handy for working on a sewing machine, and the ones with the angled pinchers are best. A flat magnet is good for holding or retrieving tiny pieces and parts when working on the sewing machine. Scissors are helpful for the sewing machines that do not have a built-in thread cutter (or if you don't know where it is). The instruction book for the model you are working on is an essential tool, and some of these are available online.

1.2 Personal Protective Equipment (PPE)

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- PPE is defined in the Personal Protective Equipment at Work Regulations as: 'All equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work which protects them against one or more risks to their health and safety'.
- PPE includes equipment such as safety footwear, hard hats, high visibility waistcoats, goggles, life jackets, respirators and safety harnesses.
- Waterproof, weatherproof, or insulated clothing is subject to the Regulations only if its use is necessary to protect employees against adverse climatic conditions that could otherwise affect their health and safety.

1.3 Hand held power tools

Pliers:

Three types of pliers' viz. nose pliers, diagonal cutting pliers and lineman's pliers are very useful in a leather products manufacturing workshop for cutting and bending, pulling small fittings and holding metal fittings that are to be filed or hammered. Nose pliers are used for cutting and bending thin wires and small fittings. Diagonal cutting pliers are sometimes called as wire cutters. It has scooped jaws, which make them ideal for extracting small nails, or damaged fittings. Lineman's pliers are sometimes called engineer's pliers. They are very useful for bending, gripping and manipulating sheet, metal and wire. Their wide, heavy, checked jaws and long handles provide leverage and nonslip hold necessary to turn the head of a bolt, the nut or stubborn screw whose slot is too chewed up to be removed with a screwdriver. These pliers are used in fabricating leather goods, repair works and maintenance of machinery.



Fig: Linesman's pliers Diagonal cutting pliers Nose pliers

Pincer:

Pincer pulls out nails that a claw hammer cannot (for example a wire nail without head). It is used for short pulls. The fine claw at the end of pincer handles slips well into the well-driven nails or rivets.

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Fig: Pincer

Bench grinder

Bench grinder has two grinding wheels. One is coarse and the other is fine. The grinding wheels are provided with guards and tool rest. The tool rest must be 3mm away from the wheel at the required angle. This prevents the tool from being dragged into the wheel. A bowl of cold water is kept by the side of the machine so that cooling of the work can be done periodically. Bench grinder is used to sharpen clicking and skiving knives. While sharpening the knife, the following steps are to be followed:

- i. Adjust the angle of the knife to be ground,
- ii. Use the hand to hold the knife steady while moving it across the grinding wheel from side to side and
- iii. Keep the surface being ground as cool as possible by dipping the knife in water bath. When the bevel has been removed, the knife is ready for whetting.



Fig: Bench grinder

1.4 Grease gun

A **grease gun** is a common workshop and garage tool used for lubrication. The purpose of the grease gun is to apply lubricant through an aperture to a specific point, usually on a grease fitting. The channels behind the grease nipple lead to where the lubrication is needed. The aperture may be of a type that fits closely with a receiving aperture on any number of mechanical devices. The close fitting of the apertures ensures that lubricant is applied only where needed.

There are three types of grease gun:

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1. **Hand-powered**, where the grease is forced from the aperture by back-pressure built up by hand cranking the trigger mechanism of the gun, which applies pressure to a spring mechanism behind the lubricant, thus forcing grease through the aperture.



2. Hand-powered, where there is no trigger mechanism, and the grease is forced through the aperture by the back-pressure built up by pushing on the butt of the grease gun, which slides a piston through the body of the tool, pumping grease out of the aperture.
3. Air-powered (pneumatic), where compressed air is directed to the gun by hoses, the air pressure serving to force the grease through the aperture. Russell Gray, inventor of the air-powered grease gun, founded Graco based on this invention.

The grease gun is charged or loaded with any of the various types of lubricants, but usually a thicker heavier type of grease is used.

1.5 Grease

Grease is the common term for animal fats and vegetable oils. Animal fats and vegetable oils are lipids. Lipids are organic molecules essential to animal life for the production of hormones and energy storage. If a lipid is liquid at room temperature, it is usually referred to as "oil". If it is solid at room temperature, the lipid is referred to as "fat" or "grease". Animal fats and vegetable oils are 8-12% lighter than water and do not mix with water, preferring to form a separate layer on water. This floating, but separates from water property enables free-floating fats and oils to be easily separated by grease traps and grease separators.

1.6 Fuel

Fuel is any material that is capable of releasing energy when its chemical or physical structure is altered. Fuel releases its energy either through chemical means, such as

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burning, or nuclear means, such as nuclear fission or nuclear fusion. An important property of a useful fuel is that its energy can be stored to be released only when needed, and that the release is controlled in such a way that the energy can be harnessed to produce work.

Classification of fuel

On the basis of occurrence, fuels can be classified as of two types, **primary (natural fuel)** and **secondary (artificial fuel)**.

Primary fuels are of three types, *solid* (wood, coal, peat, lignite, cowdung, etc) *liquid* (crude oil) and *gaseous* (natural gas). Secondary fuels are also of three types, solid (coke, charcoal, petroleum), liquid (diesel, petrol, tar, kerosene, LPG) and gaseous (water gas, blast furnace gas, coal gas, coke oven gas, CNG).

Oil

Sewing machine oil is the best tool that you can have in order to maintain your sewing machine. Sewing machine oil is clear white oil. It is something which is used only for sewing machines & no other appliance. There are certain spots in the sewing machine where oil is to be applied. You may refer to your owner's manual to locate the right spots to oil. A few of the old sewing machine models may have these spots clearly marked out.

The most important thing to do before applying sewing machine oil is to unplug your machine. This way you will be able to ensure your safety. Once oiling of your sewing machine is done, run some stitches on a bit of scrap fabric. This way the oil will escape on to the scraps. It will not spill over on the project that you will be working on. Usually people think that oiling the sewing machine is done to lubricate your moving parts. But this is not true. Sewing machine oil is used to prevent wear as well as to reduce the risk of rust. Rust is formed with the humidity which is present in the air. This rust can create excess wear of your sewing machine.

Another advantage of oiling your sewing machine is that you will be able to tighten any loose screws which you may find. Watch out for any signs of wear & tear on wires while oiling your machine. There may be abrasions on the plastic coating of the wire or there may be some damage done by a pet. It is important to choose the proper sewing machine oil for your sewing machine. Some of the new machines nowadays

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come with a small bottle of sewing machine oil. Never use any other kind of oil like cooking oil or automotive oil for your machine. Three-in-one oil can be purchased at the local hardware store & is a good choice. Specially formulated oil is available at the sewing machine dealer as well as at fabric stores. Before oiling your sewing machine, clean off the sewing table. Next step is to keep the tools handy. These would include a small screw driver, a paper towel besides some cotton swabs, scrap fabric and the sewing machine manual.

The manual is very important as each sewing machine has slightly different attributes. Some sewing machines have front loading bobbins, while the others have top loading bobbins. There are some machines which require a drop of **sewing machine oil** in a hole which is on the top of the machine, while the others do not. It is important to oil the machine only at those points where the manual directs.



Self-Check 1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the use grease gun? (3 point)

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2. Write at least three techniques to avoid needle breakage? (5 points)
3. Write at least three cause skipped stitch (5 points)
4. What type of oil used for sewing oil machine? Explain it (2 points)
5. What is PPE? (5 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

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Short Answer Questions

1. _____

2. _____

3. _____

4. _____



5.

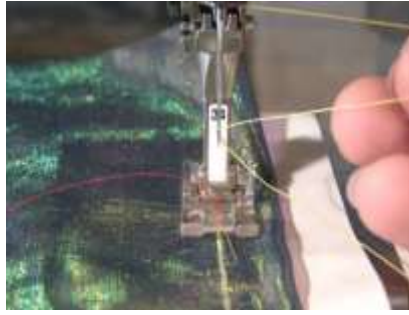
Operation Sheet 1	Minor maintenance
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Removing and fitting of simple parts

Procedure of needle inserting/fixing/

1. Move the power foot control away to prevent accidentally pressing it while changing the needle. Turn the hand wheel that is located on the upper right side of the sewing machine. Watch the needle while you are turning the wheel and stop when the needle is as high as it can go. If the thread is still inserted into the needle ,pull it out

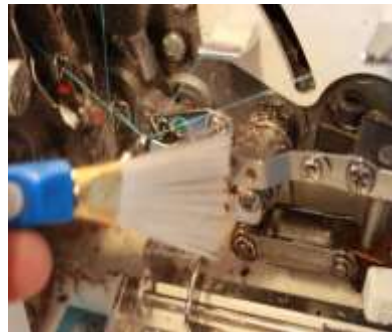
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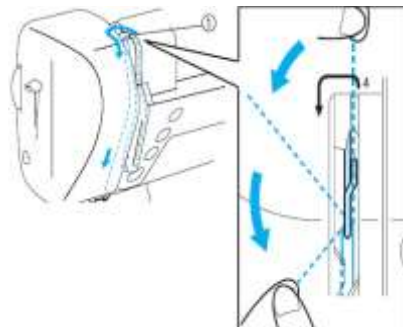
2. Remove bobbin case from hook assembly



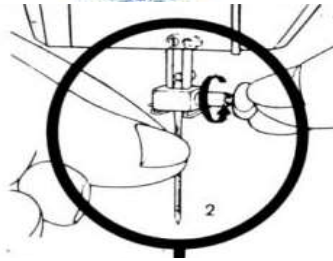
3. Using cleaning brush, clean any thread debris or lint from hook area



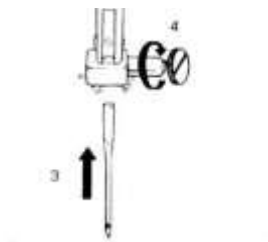
4. While standing in front of training sewing head, rotate gang's hat until take-up levers are in up position, this is called color change position



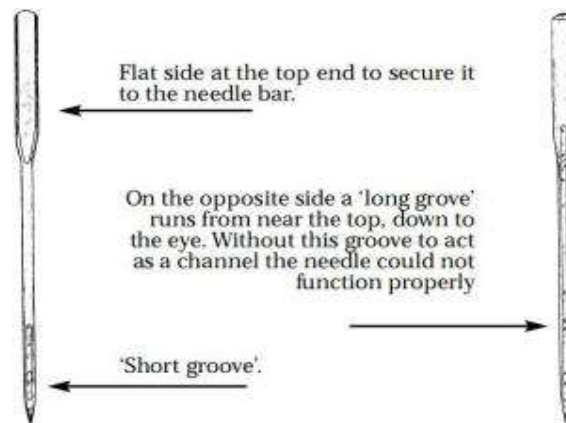
5. Using needle screwdriver, loosen needle set screw.



6. Remove and discard old needle.



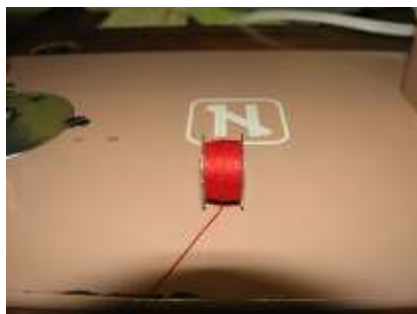
7. Insert new needle correctly. (Groove facing front and scarfz)



1.2 Tightening

Procedure to insert bobbin in to shuttle

1. Hold the bobbin between the thumb and fore finger of your right hand and pull off about 15cm (6 inches) of thread.





2. Hold the bobbin case in your left hand as shown and place the filled bobbin inside



3. Pull the thread in to the slot in the edge of the bobbin case



4. Now pull the thread under the tension spring and in to the thread eyelet

To insert the bobbin case in the bobbin



5. Insure that about 15(6 inches) of thread extends out of bobbin. Hold the bobbin case so that long finger on case points up. Open the latch of bobbin case. Slip the bobbin case over the center pin of hook and press in place until long finger of the bobbin case inters notch. Release latch and press down

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LAP Test 1	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, workshop, tools and materials you are required to perform the following tasks within 3 hours.

Task 1: Insert sewing needle according to the procedures.

Task 2: wind the bobbin according to the procedures.

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Information Sheet 2	Minor maintenance
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2.1 Minor adjustments and repairs

Minor maintenance means inspection, cleaning of by-pass devices at such manner as to ensure proper operation of by-pass device.

A term used to capture all routine maintenance activities, particularly the preventive maintenance tasks which meet the following criteria:

- Occur at interval of less than year (e.g. weekly, monthly)
- Are of relatively low cost.

2.2 Inspection

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Action to assess and determine the actual state of the technical means of a system.

Actions included are :-

- Plan the inspection work knowing specific requirements of the respective plant.
- The plan can be prepared in the form of table and this plan shall contain details like :-

* Place :Where the machine is found, if machines are located in different mills or floors of a multistory factory.

* Date : Specific date of the inspection.

* Equipment : type or nomenclature of the equipment of interest, specially when we are dealing with different machines in a mill

* method of inspection.:- using instrument or sense organ. Eg. Observation, measuring, sensing, hearing etc

* Characteristics to be considered.:- machines and machine parts are inspected for different parameters or characteristics. For example; temperature, geometrical dimensions, sound etc.

Preventive maintenance covers all programmed maintenance which is carried out in order to prevent the occurrence of failures or to detect failures before they develop to a break-down or other disturbances in production.

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Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page.

1. What does it mean inspection and its criteria? (10 points)



Note: Satisfactory rating - 10 points

Unsatisfactory - below 10 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____



Information Sheet 3	Checking regular pre-operational machinery
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Pre-start checks and preparatory procedures

Cleaning supplies/Equipment:

- Screw Driver
- Small adjustable wrench
- Small oil can with oil or cleaning fluid (check your machine booklet for recommendations)
- Cleaning brush (soft nylon brush or narrow painted brush)
- Pointed instruments like needle/small crochet hook/tweezers
- Cleaning cloth
- Newspaper
- Plastic wraps
- Magnifying glass/flashlight (if required)

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- Gloves to cover your hands while cleaning

Never use gasoline since it is highly flammable. Never use carbon tetrachloride since it is very poisonous.



Pre-cleaning:

- Unplug your machine and keep it in a well-lit area before you start
- Protect your floor & table top
- Cover the motor and wire well to protect from oil

Taking care of all parts of the machine

- Remove each part to be cleaned one by one and make a note of the place and position to be able to fit it back in after cleaning
- When screwing or unscrewing with a screw driver, do not put pressure on the twist. Keep the pressure only on the push
- Remove the bolts using wrench and not pliers
- The essential parts like needle, slide plate, presser foot, throat plate, bobbin case and face plate need to be removed from the machine and soaked in a tray filled with cleaning fluids

Cleaning the sewing machine

- Run the machine with your hand by turning the hand wheel. As you are doing this, spray some cleaning fluid into all oil holes and places which require lubrication

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- If the machine seems to run hard, it may be caused by lint and dirt built up inside a bearing. As you are lubricating the machine tip the head and flush the parts underneath the machine. Run the machine by hand wheel again until it functions smoothly
- Scrub off the remaining dirt in other parts of the machine with a cloth or brush dipped in cleaning fluid. Use pointed instruments where necessary, to ensure that
- Check the lower tension of the bobbin case and discuss by pulling a thread soaked in cleaning fluid between the two. Repeat this process with a dry cloth to ensure that there is no lint left
- Dry all the parts and assemble accordingly
- Ensure that the machine is not plugged until all parts are completely dry

Clean the surface of your machine

Dust the outside of your machine with a soft cloth. Use a damp cloth on any stains. Never spray any liquid directly on your machine. Use a brush or cotton swab to clean out the thread guides and the various nooks and crannies.

Clean between the tension disks

Raise your pressure foot mechanism to loosen the tension springs. Clean between the tensions disks with a clean cloth. Or blow the lint out using a can of compressed air*.

Clean the bobbin area and under the needle plate

Remove the needle plate (also called the *throat plate*). Refer to your manual if you don't know how to remove it – some snap out and others have to be unscrewed. Open the slide plate to expose the bobbin area. Clean out any lint with a small brush, cleaning the bobbin area and around and under the feed dogs. Or use a can of compressed

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air* or vacuum the lint out. Use a pair of tweezers to pick out any stubborn lint. Remove your bobbin case (consult your manual) and clean away any lint.

Inspect your needle plate

Before putting your needle plate back, check it for nicks or burrs. Smooth out any you find with an emery cloth.

Lubricating the sewing machine

Oiling lubricates the moving parts of your machine and helps prevent rust. Some machines need to be oiled, some do not. Consult your manual to see if your particular machine needs to be oiled and if so, which parts to oil.

Oil your machine every few months or as instructed by your manual.

Get your machine professionally serviced

Get your machine serviced (the tension balanced and the machine thoroughly cleaned and oiled) about every two years or as instructed by your manual.

Tips for preventing sewing machine problems

Use a new, sharp needle for every project or change your needle after eight hours of continuous sewing.

- Use the right needle for your type of fabric and thread Don't over wind your bobbin with too much thread.
- Use a good quality, brand name thread.
- Use the correct pressure foot for your type of fabric.
- Don't sew over pins.
- Don't pull your fabric as you sew.
- Before you start to sew a seam, grasp the thread tails from the upper and bobbin threads. Hold them back and out of the way for your first couple of stitches. This will keep the threads from getting caught in your machine.

Basic repair and adjustment

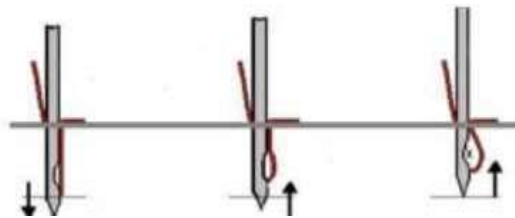
Stitch Formation

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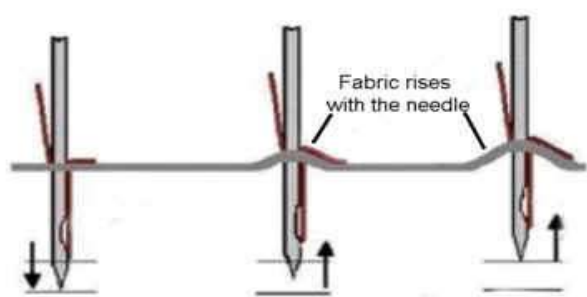


The first step in producing a stitch on a sewing machine is the formation of the needle thread loop. This step is the same regardless of the type of stitching being produced, or the nature of the machine being used. Failure to generate a good loop will cause many different problems such as skipping, breaking thread, loose stitches, threading bunching up, etc...

Proper formation of this loop depends on the tendency of the thread to bulge away from the needle as it is drawn upward after reaching the lowest point of its stroke - due to inertia and friction against the material through which it passes.



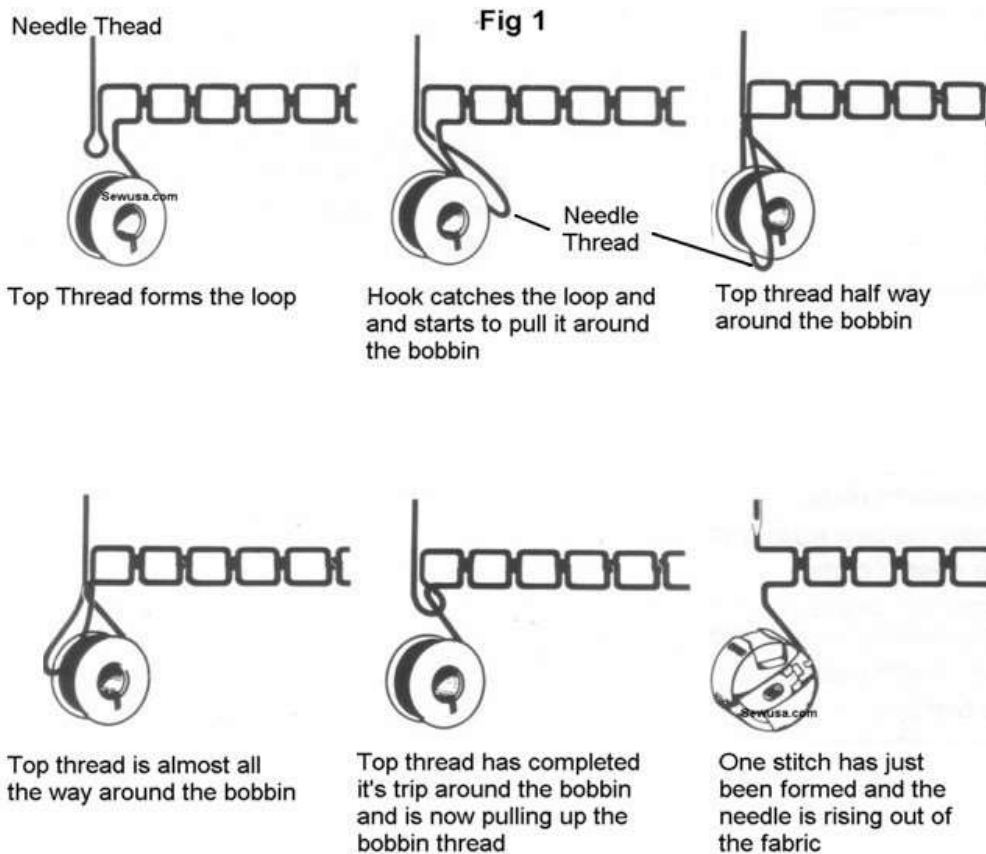
Any interference with the formation of the needle thread loop will result in faulty stitch formation. One of the most common conditions is that the material stitched is not held firmly by the presser foot at the point where the needle passes through, allowing the material to flag, or move up with the needle as it rises. Either no loop is formed at all, or the loop is formed too late. This will result in skipped or broken stitches. You should always refer to the needle, fabric and thread chart to make sure the right size needle is being used. A quick visual inspection of the foot and throat plate is also recommended.



The thread tends to form an equal loop on each side of the needle, a guard is used to push the loop through to the side from which the thread is taken by the shuttle, hook or looped. Correct setting of this guard is necessary for good loop formation.

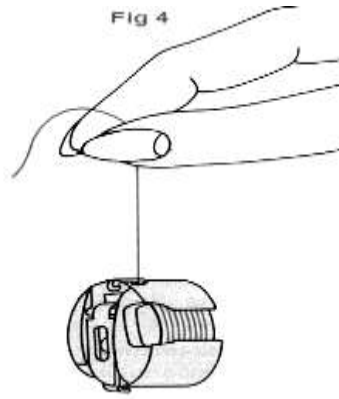
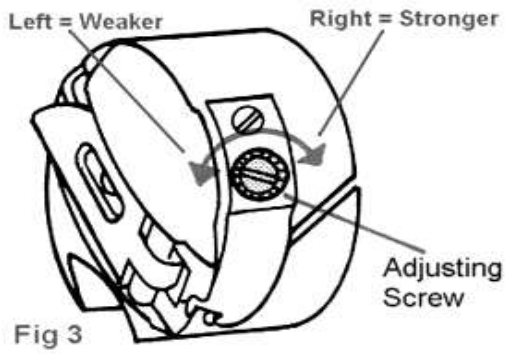
Step two is getting the top thread to go round the bobbin. This is done by the hook coming across at the right time and catching the top thread and pulling it around the bobbin case and bobbin. This process is shown in figure 1 & 2. Figure 1 is without the hook, bobbin case and bobbin. Figure 2 is with the hook, bobbin case and fabric.

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Tension Settings

Bobbin thread: the bobbin thread is adjusted by the adjustable leaf spring tension (Fig 2) on the bobbin case. Turn the tiny screw on the leaf spring (Fig 3) no more than a 1/2 of a turn at a time to get the desired setting. This adjustment doesn't need to be done often, but something as simple as switching to lighter, heavier or a different thread can cause the adjustment to be off. You can quickly check the bobbin thread tension by holding the bobbin thread in your fingers (Fig 4) and pull it up in a swift motion. The bobbin case should slightly move downwards. If it doesn't move at all then most likely the tension is too strong. If the bobbin case moves downward by just holding the thread, then the tension is too weak.

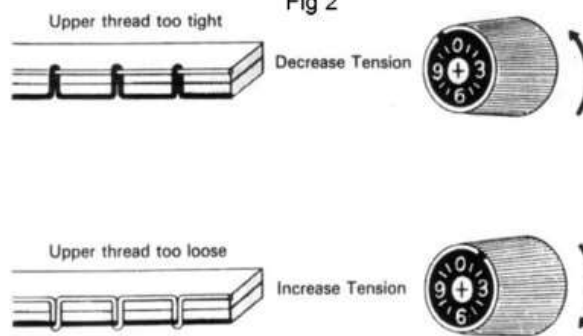


Top tread to check the top thread tension, make sure the presser foot is down and pull a few inches of thread through by hand. You should be able to feel the tension on the thread as you pull it through. The thread should pull through nice and smooth with no snags or tight spots. Now sew a few stitches on a test fabric and compare it to the diagrams below. Adjust the tension as needed.

Fig 1

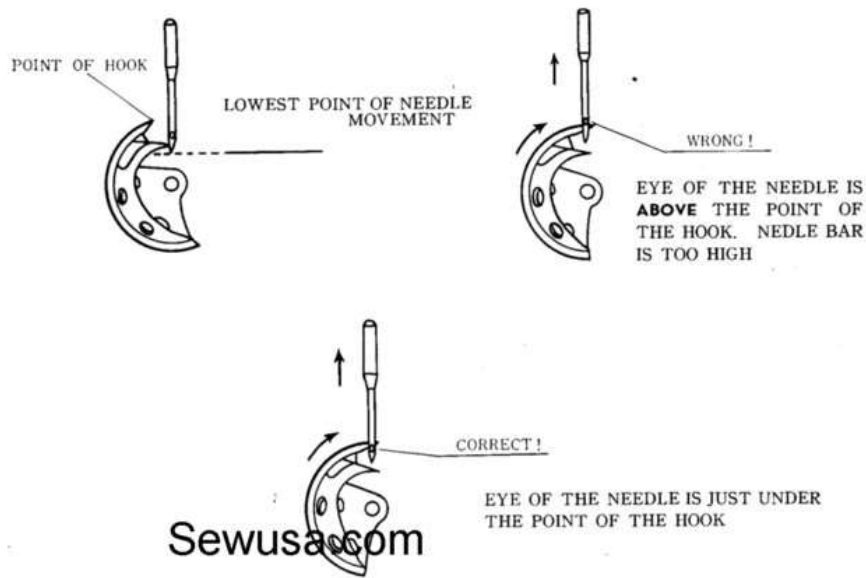


Fig 2



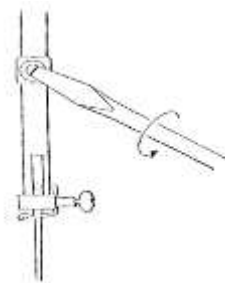


THE TIMING OF HOOK AND NEEDLE



Adjust Needle Bar Height

How do you adjust the needle bar height on your sewing machine? This is an important sewing machine repair. Needle bar height is critical and must be adjusted properly for your sewing machine to function properly.



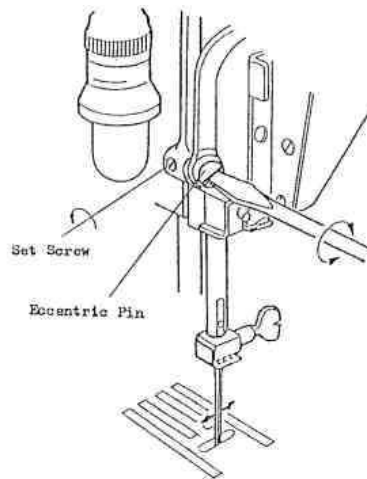
Look at your sewing machine as you read through the following observations. You may want to remove the needle bar cover to see well. Your machine may or may not allow you to do so conveniently. You may also want to remove the screws holding your needle plate in place.

Now observe, as you take hold of the hand wheel with your right hand. Always turn toward you. As you turn the hand wheel, a shaft across the upper part of the machine

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turns. In turn a set of short pivoting offset levers work together to produce an up and down motion. See the needle bar raise and lower. If the needle bar height is not properly adjusted, it will not work.



✓If you look closely, you can see the needle bar with a sleeve around it. It is held in place by a set screw. This is where you will adjust the needle bar height. This is like a hand extended from an arm. The precise position of the hand is set on the bar. It determines how far down the needle will go and how far up too. This needle bar height positioning is crucial. Even a fraction of an inch too low, and the needle will collide with the bobbin carrier. A slight bit too high, and no stitch will form. This sewing machine repair is vital. Adjust the needle bar height properly.

✓To adjust the needle bar height, raise the needle bar to its highest position. Loosen the set screw. Slide the bar down until the slash mark aligns with the casing appropriately. Roll the needle bar to its lowest setting. The needle bar slash mark should be just visible above the casing. Depending on the model, this sewing machine repair may require slight variations. The goal is to properly adjust the needle bar height.

✓Another way to adjust the height of the needle bar is to lower the needle to its lowest position. Raise the bar until the point of the hook aligns with the needle within the needle scarf. This sewing machine repair technique works best on oscillating hook sewing machines. It can also be done on other sewing machines.



Loosen the set screw in the needle bar. Adjust the bar up or down as needed. Test to make sure the needle bar does not strike anything in its lowest or highest swing. Also make sure the point of the hook moves behind the needle in proper time just above the eye of the needle.

Self-Check 3	Written Test
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Instructions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers. Write your answers in the sheet provided in the next page.

- 1) What is the procedure of per-cleaning sewing machine? (3 point)
- 2) Write two techniques to tension setting? (5 points)
- 3) What mechanism use to adjust needle bar higher? (5 points)
- 4) What type of oil used for sewing oil machine? Explain it (2 points)
- 5) What is PPE? (5 points)

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points
You can ask you teacher for the copy of the correct answers.

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Answer Sheet



Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

5. _____



Information Sheet 4

Identification and segregation of Faulty or unsafe machinery for replacements

Definition

Standard operating procedures (SOP) are a detailed explanation of how a policy is to be implemented. The SOP may appear on the same form as a policy or it may appear in a separate document. The main difference between a SOP and a policy are details. An effective SOP communicates who will perform the task, what materials are necessary, where the task will take place, when the task shall be performed, and how the person will execute the task. Is SOP necessary? What benefit do they have to my operation? The details in an SOP standardize the process and provide step-by-step how-to instructions that enable anyone within your operation to perform the task in a consistent manner. The SOP document serves as an instructional resource that allows employees to act without asking for directions, reassurance, or guidance. The step-by-step written procedure can also help hold employees accountable because employee expectations are documented and their actions can be measured against the SOP. Communicating procedures that anyone in the operation can follow with consistent results will ensure your operation continually provides high quality products and services.

Purpose of SOP

- Serve as framework for organizational policy – provide direction and structure
- Written documentation of best practice
- Tells what, how, when, why, and who
- Provide foundation for:
 - job descriptions,
 - employee training
 - corrective action and discipline, and
 - Performance review.

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Developing SOP for your operation:

- Operation specific SOP can be created by modifying one of these examples or by simply writing down the steps taken when performing specific tasks in your operation and following the template of the examples.
- Assess areas in your operation in which standard procedures are necessary, start with those in which you are currently communicating most often (i.e hand washing).
- Review available resources (see links above) to use as a template, or start fresh using these elements.

Elements of an SOP:

- Rationale for SOP
- Detailed description of procedure – based on best practice/standards
- Monitoring actions
- Accountability
- Corrective Actions
- Date of last review or revision date

SOPs Implementation

- Have available for employees to review
- Conduct an employee in-service to present the information; post one set in a common area
- Use to train new employees
- Use them for corrective action/refresher training for all employees
- Incorporate into written job descriptions and performance reviews so there is alignment
- Review and update as needed (i.e new equipment item or employee job changes); at minimum review annually

What is a Material Safety Data Sheet (MSDS)?

A material safety data sheet is a technical document which provides detailed and comprehensive information on a controlled product related to:

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- health effects of exposure to the product
- hazard evaluation related to the product's handling, storage or use
- measure to protect workers at risk of exposure
- Emergency procedures.

The data sheet may be written, printed or otherwise expressed, and must meet the availability, design and content requirements of WHMIS legislation. The legislation provides for flexibility of design and wording but requires that a minimum number of categories of information be completed and that all hazardous ingredients meeting certain criteria be listed subject to exemptions granted under the Hazardous Materials Information Review Act.

The Purpose of the Data Sheet

The data sheet is the second element of the WHMIS information delivery system and is intended to supplement the alert information provided on labels. The third element of the system is the education of employees in hazard information on controlled products, including instruction in the content and significance of information on the MSDS.

Responsibilities Related to the MSDS

Suppliers

1. Develop or obtain a MSDS for each controlled product imported or sold for use in a workplace.
2. Ensure the MSDS for the controlled product:
 - Discloses information that is current at the time of sale or importation of the product
 - Was prepared and dated not more than three years before the date of sale or importation
 - Is available in both official languages
3. Ensure the purchaser of the controlled product has a copy of the current MSDS at the time of or prior to the purchaser receiving the controlled product
4. Make available any information that is considered confidential (trade secret) information and therefore exempt from disclosure to any physician or nurse who

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requests that information for the diagnosis or providing medical

purpose or making a medical treatment

Employer

1. Ensures that an up-to-date supplier MSDS is obtained from the supplier the first time a controlled product is received in the workplace
2. Evaluates the data sheet received to determine its date of production. The data sheet must be dated within 3 years of current date
3. Maintains up-to-date MSDSs:
 - As soon as practical but no later than 90 days after new hazard information becomes available to the employer
 - At least every three years
4. Ensures a copy of all data sheets which are required for the workplace are made readily available at the worksite to:
 - Workers who may be exposed to the controlled product
 - The occupational health committee (OHC)

Note: The MSDSs may be made available on a computer if the employer takes all reasonable steps to keep the terminal in working order, makes the data sheets readily available to the employee and provides training in accessing the computer stored data to the employee.

5. Ensure that the employee who works with a controlled product or in proximity to a controlled product is instructed in:
 - The content required on the MSDS
 - The purpose and significance of information contained in it

Instruction must ensure that employees know procedures for the safe use, storage, handling and disposal of controlled products including procedures in the event of an emergency involving a controlled product.

6. Provide confidential (trade secret) information to a doctor or nurse who request this information for purposes of making a medical diagnosis or rendering medical treatment in an emergency
7. The employer can produce data sheets in order to provide additional information or alter the format used as long as there is no less information provided than the original supplier MSDS contained

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Self-Check 4

Written Test

Instructions: Perform the following tasks. Write your answers in the answer sheet provided:

1. What is a Material Safety Data Sheet (MSDS)? (5 points)
2. What is the purpose of SOPs? (5 points)
3. Explain element of SOPs. (5 points)



Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____



Information Sheet 5

Identification of OHS hazards in the workplace

Definitions

Hazard: a situation at the workplace capable of causing harm (ie capable of causing personal injury, occupationally related disease or death). A hazard is a source or potential source of human injury, ill health or disease. Anything which might cause injury or ill health to anyone at or near a workplace is a hazard. While some hazards are fairly obvious and easy to identify, others are not - for example exposure to noise, chemicals or radiation.

Risk: the chance of a hazard actually causing injury or disease. It is measured in terms of consequences and likelihood.

Risk Management: the overall process of risk identification, risk analysis, control of risks and risk evaluation.

Risk Control: that part of risk management which involves the implementation of policies, standards, procedures and physical changes to eliminate or minimize adverse risks.

Identify and reporting hazards

Hazard identification

The first step in reducing the likelihood of an accident is hazard identification. Hazard identification is identifying all situations or events that could cause injury or illness. Eliminating or minimizing workplace hazards needs a systematic approach. It is essential to try and anticipate all possible hazards at the workplace - known as the 'what if?' approach.

Classes of hazard

Hazards are classified into five different types. They are:

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- physical - includes floors, stairs, work platforms, steps, ladders, fire, falling objects, slippery surfaces, manual handling (lifting, pushing, pulling), excessively loud and prolonged noise, vibration, heat and cold, radiation, poor lighting, ventilation, air quality
- Mechanical and/or electrical - includes electricity, machinery, equipment, pressure vessels, dangerous goods, forklifts, cranes, hoists
- chemical - includes chemical substances such as acids or poisons and those that could lead to fire or explosion, cleaning agents, dusts and fumes from various processes such as welding
- Biological - includes bacteria, viruses, mould, mildew, insects, vermin, animals
- Psychosocial environment - includes workplace stressors arising from a variety of sources.

Note that some physical and chemical hazards can lead to fire, explosion and other safety hazards.

Methods for identifying hazards

The first step in control of a hazard is to identify and list them. There are many methods which are useful for identifying hazards, including

- Injury and illness records - review your workers' compensation data and check the incidence, mechanism and agency of injury, and the cost to the organization. These statistics can be analyzed to alert the organization to the presence of hazards
- staying informed on trends and developments in workplace health and safety, for example via the internet or OHS publications
- reviewing the potential impact of new work practices or equipment introduced into the workplace in line with legislative requirements
- doing walk-through surveys, inspections or safety audits in the workplace to evaluate the organization's health and safety system
- considering OHS implications when analyzing work processes
- investigating workplace incidents and 'near hits' reports - in some cases there may be more than one hazard contributing to an incident
- getting feedback from employees can often provide valuable information about hazards, because they have hands-on experience in their work area

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- consulting with employees, and OHS Committee health and safety representatives members
- Benchmarking against or liaising with similar workplaces.

Hazard Reporting

All identified hazards that have not caused personal injury must be reported to the ASM / Town-based Line Manager using the WHS Hazard Report Form. If a hazard results in an injury or incident, the RHB Incident Reporting Form must be completed, as appropriate. See Incident Reporting for further information.

The risks of manual handling

More than a third of all reportable injuries of over three days involve manual handling, and around 10% of major injuries are linked to manual handling. It has a major impact on all workplaces, and costs the economy hundreds of millions of pounds every year.

In the UK, 1.1m people reported that they suffered from musculoskeletal disorders (MSDs) caused, or made worse, by work. It is estimated 12.3m working days are lost annually due to work-related MSDs.

Anyone involved in the moving and handling of goods and people could be at risk. Injuries and suffering can be linked to any work involving handling of loads. There are risks in handling even light loads if a repetitive task is being carried out in poor conditions. Poor ergonomics and workplace layout are a factor in many hazardous manual handling tasks.

Risks can be found in all work sectors, but healthcare, agriculture and construction are recognised as high-risk industries due to the number and nature of the manual handling activities.

Legal duties and obligations around manual handling

The Manual Handling Operations Regulations

These Regulations state that employers should adopt a hierarchy of control measures:

- 1) to avoid hazardous Manual Handling Operations so far as is reasonably practicable

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- 2) to assess any hazardous Operation that cannot be avoided
- 3) to reduce the risk of injury so far as is reasonably practicable.
- Manual Handling

Assessing manual handling risks

One way to assess manual handling activities is to look at four specific areas – Task, Individual, Load and Environment (easily remembered by the acronym TILE). As with any assessment, the workforce should be involved in the process, and use should be made of any relevant guidance available for particular industries.

Key factors to consider in each element are:

1. The Task

Does the activity involve twisting, stooping, bending, excessive travel, pushing, pulling or precise positioning of the load, sudden movement, inadequate rest or recovery periods, team handling or seated work?

2. The Individual

Does the individual require unusual strength or height for the activity, are they pregnant, disabled or suffering from a health problem. Is specialist knowledge or training required?

3. The Load

Is the load heavy, unwieldy, difficult to grasp, sharp, hot, cold, difficult to grip, are the contents likely to move or shift?

4. The Environment

Are there space constraints, uneven, slippery or unstable floors, variations in floor levels, extremely hot, cold or humid conditions, poor lighting, poor ventilation, gusty winds, clothing or Personal Protective Equipment that restricts movement?

Controlling risk from manual handling

As with any other risk, if you can eliminate or avoid the risks from manual handling, this is by far the best option. You should try to remove as many of the constraints as possible to reduce the risks to as low a level as reasonably practicable.

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An ergonomic approach is recommended – look at how the task can be fitted to the individual. Consider whether mechanical handling aids could be used, this could range from a simple trolley or sack truck to more sophisticated aids such as conveyors or fork lift trucks. If you cannot eliminate or mechanize the manual handling tasks, you must carry out a risk assessment where the task could present a risk of injury. You need to look at ways to reduce the risks to as low a level as reasonably practicable.

Basic principle of manual handling

There are some basic principles that everyone should observe prior to carrying out a manual handling operation:

- ensure that the object is light enough to lift, is stable and unlikely to shift or move
- heavy or awkward loads should be moved using a handling aid
- make sure the route is clear of obstructions
- make sure there is somewhere to put the load down wherever it is to be moved to
- stand as close to the load as possible, and spread your feet to shoulder width
- bend your knees and try and keep the back's natural, upright posture
- grasp the load firmly as close to the body as you can
- use the legs to lift the load in a smooth motion as this offers more leverage reducing the strain on your back
- carry the load close to the body with the elbows tucked into the body
- Avoid twisting the body as much as possible by turning your feet to position yourself with the load.

Safe lifting, carrying and manual handling

Proper methods of lifting and handling protect against injury. Proper lifting makes work easier. You need to "think" about what you are going to do before bending to pick up an object. Over time, safe lifting technique should become a habit.

Following are the basics steps of safe lifting and handling.

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1. Size up the load and check the lift by yourself if the load overall conditions. Don't attempt the lift by yourself if the load appears to be too heavy or awkward. Check that there is enough space for movement, and that the footing is good. "Good housekeeping" ensures that you won't trip or stumble over an obstacle.
2. Make certain that your balance is good. Feet should be shoulder width apart, with one foot beside and the other foot behind the object that is to be lifted.
3. Bend (he knees; don't stop. Keep the back straight, but not vertical. (There is a difference. Tucking in the chin straightens the back.)
4. Grip the load with the palms of your hands and your fingers. The palm grip is much more secure. Tuck in the chin again to make certain your back is straight before starting to lift.
5. Use your body weight to start the load moving, then lift by pushing up with the legs. This makes full use of the strongest set of muscles.
6. Keep the arms and elbows close to the body while lifting.
7. Carry the load close to the body. Don't twist your body while carrying the load. To change direction, shift your foot position and turn your whole body.
8. Watch where you are going!
9. To lower the object, bend the knees. Don't stop. To deposit the load on a bench or shelf, place it on the edge and push it into position. Make sure your hands and feet are clear when placing the load.

Make it a habit to follow the above steps when lifting anything-even a relatively light object.

Team lifting must be coordinated

- If the weight, shape, or size of an object makes the job too much for one person, ask for help.
- Ideally, workers should be of approximately the same size for team lifting.
- One individual needs to be responsible for control of the action to ensure proper coordination. If one worker lifts too soon, shifts the load, or lowers it improperly, either they or the person working with them may be injured.
- Walk out of step

Lifting heavy objects

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- Safe lifting of heavy items requires training and practice. For example, we've probably all seen a small person move heavy feed sacks with apparent ease.
- The secret lies in taking the proper stance and grip.
- When equipment is available, it should be used to lift and carry heavy objects.
- Loaders, forklifts, hoists, etc. are made for this purpose.

Do's" and "Don'ts" of Safe Lifting and Carrying

Do

- Tuck in the chin to keep the back as straight as possible while lifting.
- Lift with the strong leg muscles.
- Ask for help with the heavy, awkward items.
- When possible, use mechanical equipment to move heavy items.

Don't

- Use your back muscles to do lifting.
- Try to lift an item that is too heavy or awkward.
- Twist your body while carrying an object.
- Attempt team lifting without proper coordination.

The appropriate Use, maintenance and Storage of PPE

Use of PPE

PPE should only be used for its intended purpose and not for any task that has not been

approved by the manufacturer. If there is any doubt about the suitability of the PPE for a task, the Work Environment Group, should be consulted.

PPE means precisely what it says; it is personal protective equipment or clothing that is intended for an individual's use. Wherever practicable, PPE should be issued on a personal basis, and adequately marked so that each user can readily identify their own equipment. In most cases, the individual can then be the one primarily responsible for the day-to-day use, handling, storage, care and maintenance of their equipment.

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Storage of PPE

PPE should be stored in its original packaging prior to use. Apart from keeping the items clean, this may extend the life of the item. For example, plastic wrapping around some respirator cartridges can prevent cartridge from being activated prematurely. This will also ensure an economical, in-service life span of the item. Atmospheric contaminants such as dust or organic vapors may considerably reduce the life span of some items.

When not in use, PPE should be stored in accordance with the manufacturer's recommendations. Generally this means that the PPE should be:

- cleaned;
- checked for faults;
- Otherwise maintained;
- placed in an appropriate, clean container; and
- stored in a convenient, uncontaminated environment.

PPE should never be left in the work area where it is worn, as it may be exposed to workplace contaminants such as dust, chemicals and insects. This can severely reduce the effectiveness and lifetime of the equipment.

Maintenance of PPE

PPE needs to be maintained and cared for according to the manufacturer's instructions. This includes cleaning and storage of PPE, and replacement of components when recommended (e.g. cartridges in respirators). If usage is high, consideration should be given to keeping a supply of replacement parts, or replacement units of PPE, to minimize delays in obtaining components.

The budget unit should ensure appropriate maintenance of PPE is being conducted. Where maintenance is required, a responsible person should be designated to coordinate a maintenance program, provide advice and training, and keep records of all maintenance that is conducted Care should be taken to avoid actions that may,

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albeit unintentionally, alter the effectiveness of the PPE. For example, the use of incompatible cleaning agents can reduce the effectiveness of some PPE.

effectiveness of the PPE. For incompatible cleaning agents can reduce the effectiveness of some PPE.

Records / Logs of PPE Use and Maintenance

Records of usage and maintenance of certain types of personal protective equipment are important, so as to monitor the effectiveness of such equipment. For example, records of maintenance and use can be used to assess the expected effectiveness of a filter cartridge in a respirator. Conversely, if there are no records, the effectiveness of the filter cannot be assessed and the wearer may be exposed to the hazards that are present, because they used ineffective PPE.

Working in confined space

Definitions of confined space

A confined space is a place that is substantially (although not always entirely) enclosed where there is a risk of death or serious injury from hazardous substances or dangerous conditions (e.g. lack of oxygen).

Very often, injuries and deaths occur as a result of work being carried out such as welding, painting, flame cutting, use of chemicals.

The protection of people of working in confined space

Every year, a number of people are killed and others seriously injured working in confined spaces across a wide range of industries in the UK, from those involving complex plant to simple storage vessels. Those killed include not only people working in confined spaces but those who try to rescue them without proper training and equipment.

Dangers can arise in confined spaces because of:

- lack of oxygen
- poisonous gas, fume or vapour
- liquids and solids suddenly filling the confined space, or releasing gases into it when disturbed
- fire and explosions

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- residues left behind which can give off gas, fume or vapour
- dust
- Hot working conditions.

Reducing risks from working in confined space

The Confined Spaces Regulations 1997 contain the following key duties:

1. Avoid entry to confined spaces

Ask yourself if the work is really necessary, or if it can be done in some other way that avoids the need to enter the confined space?

2. If entry to a confined space is unavoidable, follow a safe system of work

The results of your risk assessment should help to identify the necessary precautions to reduce the risk of injury, depending on the type of confined space, the associated risk and the work involved. The safe system of work should be implemented and everyone involved should be trained and instructed.

3. Put in place adequate emergency arrangements before the work starts

The preparation of suitable and sufficient measures to be taken to ensure the safe rescue of a person in an emergency are required before a person enters a confined space. These arrangements should also consider the safety of rescuers, procedures and liaison with emergency services.

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Self-Check 5

Written Test

Instructions: Perform the following tasks. Write your answers in the answer sheet provided:

1. What are the risks of working in confined space? (5 points)
2. What is the methods for identifying hazards (5 points)
3. What are basic principles of manual handling?(5 points)
4. What is controlling risk from manual handling? (2 points)
5. Write at least three types of hazard? (3 points)



Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

5. _____



- Regular adjustments and repairs are made to machinery and equipment according to operators' manual/manufacturers' specifications and supervisors instructions.
- Work is conducted according to OHS requirements and supervisor's requirements.

Learning Instructions:

25. Read the specific objectives of this Learning Guide.
26. Follow the instructions described in number 3 to 14.
27. Read the information written in the "Information Sheets 1". Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
28. Accomplish the "Self-check 1" in page 9.
29. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
30. If you earned a satisfactory evaluation proceed to "Information Sheet 2". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #3.
31. Submit your accomplished Self-check. This will form part of your training portfolio.
32. Read the information written in the "Information Sheet 2". Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
33. Accomplish the "Self-check 2" in page 21.
34. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).

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35. Read the information written in the “Information Sheets 3 and 4”. Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
36. Accomplish the “Self-check 3& 4” in pages 35 & 40.
37. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 3 & 4).
38. If you earned a satisfactory evaluation proceed to Learning Guide#29. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #11.

Information Sheet-1	Selecting using suitable personal protective equipment
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Personal Protective Equipment (PPE)

PPE is defined in the Personal Protective Equipment at Work Regulations as: ‘All equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work which protects them against one or more risks to their health and safety’. PPE includes equipment such as safety footwear, hard hats, high visibility waistcoats, goggles, life jackets, respirators and safety harnesses. Waterproof, weatherproof, or insulated clothing is subject to the Regulations only if its use is necessary to protect employees against adverse climatic conditions that could otherwise affect their health and safety.

When to use PPE

PPE must always be regarded as a ‘last resort’ to protect against risks to safety and health. Engineering controls and safe systems of work must always be considered first. For example, it may be possible to do the job using methods that will not require the use of PPE. If this is not possible, more effective safeguards should be put in place. For example, fixed screens could be provided rather than individual eye protection.

There are a number of reasons why PPE must be considered as a ‘last resort’:

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- PPE only protects the person wearing it, whereas measures controlling the risk at source protect everyone in the workplace
- Theoretical maximum levels of protection are difficult to achieve and the actual level of protection is difficult to assess. Effective protection is only achieved by selecting suitable PPE and if it is correctly fitted, maintained and used
- PPE may restrict the wearer to some extent by limiting mobility or visibility, or by requiring additional weight to be carried. Thus creating additional hazards.

Suitability of PPE

To be able to choose the right type of PPE, the hazards involved in the task or work environment must be considered carefully. PPE must also meet the needs of the individual.

The following factors should be considered when assessing the suitability of PPE:

- Is the PPE appropriate for the risk involved and conditions at the place where exposure may occur? e.g. goggles are not suitable when full-face protection is required
- Does the PPE prevent or adequately control the risks involved without increasing the overall risk? e.g. gloves should not be worn when using a pillar drill, due to the increased risk of entanglement
- Can the PPE be adjusted to fit the wearer correctly? e.g. if a person wears glasses, ear defenders may not provide a proper seal to protect against noise hazards
- Has the state of health of those using it been taken into account?
- What are the needs of the job and the demands it places on the wearer? How long will the PPE need to be worn? What are the requirements for visibility and communication?

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- If more than one item of PPE is being worn, are they compatible? For example, does a particular type of respirator make it difficult for eye protection to fit properly?

Information, instruction and training on PPE use

Where PPE is provided, employees must be provided with adequate information, instruction and/or training on its use. The extent of information, instruction and/or training will vary with the complexity and performance of the kit. For example, a full Breathing Apparatus kit will require more training to use properly than a disposable face mask.

Information and instruction should cover:

- the risk(s) present and why the PPE is needed
- the operation (including demonstration), performance and limitations of the equipment
- use and storage (including how to put it on, how to adjust and remove it)
- any testing requirements before use
- any user maintenance that can be carried out (e.g. hygiene/cleaning procedures)
- factors that can affect the performance of the equipment (e.g. working conditions, personal factors, defects and damage)
- how to recognize defects in PPE, and arrangements for reporting them
- where to obtain replacement PPE,

In addition to initial training, refresher training may be required from time to time. Supervisor checks on the use of PPE may help determine when refresher training is required.

Maintaining PPE

An effective system of maintenance of PPE is essential to make sure the equipment continues to provide the degree of protection for which it is designed. Therefore, the manufacturer's maintenance schedule (including recommended replacement periods and shelf lives) must always be followed. Maintenance may include; cleaning, examination, replacement, repair and testing. The wearer may be able carry out simple

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maintenance (e.g. cleaning), only be carried out by

but more intricate repairs must competent personnel. The costs associated with the maintenance of PPE are the responsibility of the employer.

Storage for PPE

Where PPE is provided, adequate storage facilities for PPE must be provided for when it is not in use, unless the employee may take PPE away from the workplace (e.g. footwear or clothing). Accommodation may be simple (e.g. pegs for waterproof clothing or safety helmets) and it need not be fixed (e.g. a case for safety glasses or a container in a vehicle). Storage should be adequate to protect the PPE from contamination, loss, damage, damp or sunlight. Where PPE may become contaminated during use, storage should be separate from any storage provided for ordinary clothing.

Duties of employees regarding PPE

The Personal Protective Equipment at Work Regulations place duties on employees to take reasonable steps to ensure that PPE provided is properly used.

The Regulations also place the following duties on employees:

- PPE must be worn and used in accordance with the instructions provided to them
- employees must take all reasonable steps to ensure that PPE is returned to the accommodation provided for it after it has been used (unless the employee may take PPE away from the workplace e.g. footwear or clothing)
- PPE must be examined before use
- any loss or obvious defect must be immediately reported to their supervisor
- Employees must take reasonable care for any PPE provided to them and not carry out any maintenance unless trained and authorized.

Self-employment and PPE

The self-employed also have a duty to obtain and use the appropriate PPE wherever there is a risk to their health and safety that cannot be adequately controlled by alternative measures. The only exception to this is for those who are classified as self-

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employed for tax reasons, but employee-employer for the employer to provide suitable PPE.

who otherwise work in an relationship. In this case it will be

Types of PP

Foot protection

There are a number of types of safety footwear:

- Safety boots or shoes. Normally have steel toe-caps but can have other safety features (e.g. steel mid-soles, slip resistant soles, insulation against heat and cold)
- Wellington boots, which can be supplied with steel toe-caps
- Anti-static and conductive footwear. These protect against the build-up of static electricity.

Body protection

Types of body protection include:

- overalls, aprons and coveralls (protection against hazardous substances)
- clothing for cold, heat and bad weather
- clothing to protect against machinery, e.g. chainsaws
- high visibility clothing (e.g. jackets, vests)
- harnesses
- back supports
- Life jackets.

Tasks where body protection may be required include: work with hazardous substances, work next to the highway or other areas with moving transport or vehicles (e.g. construction sites), outdoor work, forestry and grounds maintenance work.

Hand and arm protection

Hand and arm protection comes in a variety of forms, including:

- Gloves and gauntlets (leather, nitrile, latex, plastic coated, chain mail, etc.)
- wrist cuffs and armllets, e.g. used in glass cutting and handling

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- Barrier cream may sometimes be used, where gloves cannot practicably be used.

Tasks where hand and arm protection may be required include: the manual handling of abrasive, sharp or pointed objects, work with vibrating equipment such as pneumatic drills and chainsaws, construction and outdoor work, work with chemicals and other hazardous substances (e.g. bodily fluids) and work with hot or cold materials. In order to eliminate the risk of ill health through exposure to latex, a number of organisations have phased out the use of latex gloves replacing them with nitrile.

Eye protection

There are several types of eye protection:

- Safety spectacles: these are similar to regular glasses but have a tougher lens. They can include side shields for additional protection.
 - eye shields: a frame-less one piece moulded lens, often worn over normal prescription glasses
 - safety goggles: these are made with flexible plastic frames and an elastic headband
 - Face shields: heavier and bulkier than other type of eye protector, face shields protect the face, but do not fully enclose the eyes so do not protect against dusts, mists or gases.
- Tasks where eye protection may be required include:
- handling hazardous substances where there is a risk of splashing
 - work with power driven tools where materials are likely to be propelled
 - welding operations
 - work with lasers
 - Using any gas or vapour under pressure.

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Self-Check 1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

6. What is Duties of employees regarding PPE? (5 point)
7. What is PPE? (5 points)
8. Write at least four types of PPE? (5 points)

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**Note: Satisfactory rating - 15
below 15 points**

points

Unsatisfactory -

You can ask your teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

6. _____

7. _____

8. _____



Information Sheet-2

Greasing, lubrication and other basic servicing of machinery and equipment

Sewing Machine

A well-made sewing machine—traditional or singer, new or old, used often or only occasionally—will sew perfectly for many years if it is given proper care. It may need to be adjusted or a part may need to be replaced, but a sewing machine that is given proper maintenance and cleaned regularly seldom actually “wears out.”

Sewing machines generally require the basic maintenance of cleaning, oiling, and lubricating. These procedures are recommended in the use and care booklet that comes with the machine. It is the best reference for the specific care required by your machine. Some machines are designed to be oil-and lubricant free so follow the directions in that booklet carefully. If you do not have an instruction booklet for your sewing machine, contact your local sewing machine center to obtain one. If they do not have one in stock, write to the manufacturer of the machine to obtain one. Be sure to give the machine name, model, serial number and the approximate age of the machine.

SUPPLIES AND EQUIPMENT

You need the following equipment and supplies for the job:

- Pie or cake pan for soaking parts in cleaning fluid
- Small screw driver
- Large screw driver
- Small adjustable wrench
- Hammer (optional)
- Small oil can (clean) for cleaning fluid
- Cleaning brush (narrow, nylon)
- Paring knife (or pocket knife)
- Long needle or small crochet hook
- Tweezers
- Cleaning cloths

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- Fabric to test stitching
- Can of sewing machine oil (check your machine instruction booklet for the type recommended)
- Tube of sewing machine lubricant (check your machine instruction booklet for the type recommended)
- Small bottle or can of cleaning solvent that will not flash flame at temperatures below 1200 F. It is usually available at gasoline stations or cleaning establishments. Never use gasoline; it is highly flammable. Never use carbon tetrachloride; it is very poisonous.
- Newspapers
- Plastic wraps (household type)
- Rubber gloves
- Magnifying glass (optional)
- Flashlight (optional)

After assembling all supplies and equipment, unplug and move the machine to a cleaning area that is well lighted. Protect the floor and table top with newspapers. A good floor or table lamp to light the work area from over your left shoulder will be helpful. A flashlight is also helpful in adding light in hard to see areas.

CLEANING

As you clean the machine, it is best to clean one area at a time. Remove only the parts that are involved and be sure to note where each part is from, its position, and which side is top.



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When removing parts, right is tight” on practically all

remember that, “left is loose and screws and bolts. When using a screw driver, put the pressure on the push, not on the twist. If a screw will not loosen easily, soak it with cleaning fluid. Then set the screw driver in the slot and tap sharply with a hammer before attempting to loosen. The screwdriver blade should be as wide as the slot in the screw is long. Always use a wrench—not pliers—on bolts.

First, remove the needle, presser foot, slide plate, throat plate, bobbin case, and the face plate (if it comes off). Put them in the pan and cover with cleaning fluid. Set aside to soak while cleaning other areas. Next, wrap the motor (if necessary) and wire with plastic wrap to protect them from oil and cleaning solvent. Be sure the machine has been unplugged!

Now, it is time to begin work to clean the machine head. With a sharp pointed tool, clean out all oil holes. Then, with your hand, turn the hand wheel to run the machine. At the same time, squirt cleaning fluid into all the oil holes, on all bearings and on all other places where one part rubs against or turns within another.



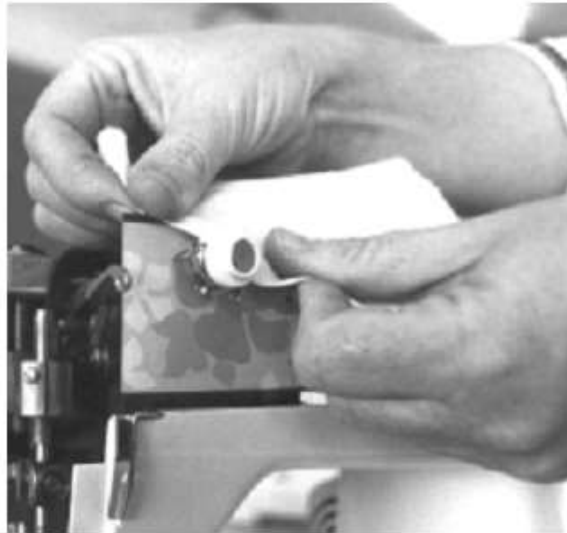
If the machine begins to run hard, it is a sign that dirt or lint has jammed inside a bearing. Continue running the machine and flushing with cleaning fluid until the dirt and gummed oil are washed from the bearing. When the machine runs easily again, tip the

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head and flush the parts
holes, bearing and places that
Continue running the machine by hand until it functions smoothly.

underneath the machine—all oil
rub against or within another.



To remove any remaining dirt and oil, dip a cloth or brush in cleaning fluid and scrub all parts of machine that can be reached. Use a needle, knife or other pointed instrument to dig or scrap away any remaining gummed dirt or lint in the feed dog, around the bobbin case, and in other areas. Check the lower tension of the bobbin case and the upper thread tension discs. Pull a thread under the tension of the bobbin to remove dirt. Pull a piece of cloth soaked in cleaning fluid back and forth between the disc of the upper tension. Repeat with a dry cloth to be sure no lint or thread is caught between them.

AREAS NEEDING ATTENTION

In addition to general cleaning, three areas need special attention. They include the hand wheel bearing and the clutch assembly, the needle-bar and presser foot, and the hook and bobbin areas assembly. When the hand wheel assembly gets gummy and dirty, it must be cleaned for the clutch to work properly. The clutch disengages the needle-bar when winding a bobbin.

Some new sewing machines refill the bobbin in its regular position and a clutch is not necessary. In such machines, it is not often necessary to remove the hand wheel to clean this area.

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Bobbin and Hook Area

Lint is the primary offender in this area. The bobbin case can be removed on all makes of machines. Use a dry brush to clean out all lint. Remove any thread that may be wound up around the hook shaft. On many machines, the hook assembly can also be removed for more complete cleaning. Place one drop of oil on the exterior perimeter of the hook and the bobbin race to lubricate if after cleaning



Face Plate Area

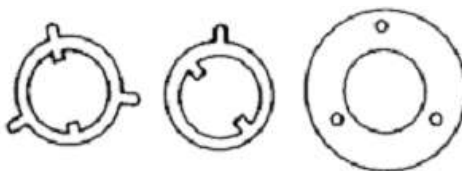
The face plate on most machines is held in place with one or two screws. By removing these, the plate can be easily removed for cleaning of the needle-bar and presser foot bar. On some of the newer machines, the face plate is a part of a housing that is mounted on hinges, which makes it easy to move the entire housing away from the bars and mechanisms behind it. No other parts need to be removed for cleaning in this area. First use a dry brush to clean out all lint and other foreign material. A small piece of cloth with a little solvent on it can be used to clean the needle-bar and presser bar of any gummy grease. After thoroughly cleaning, place a drop or two of oil on each shaft where it slides through the housing. Oil all other moving parts according to your instruction book before replacing face plate.

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Hand wheel Area

To remove the clutch and hand wheel, loosen the small screw in the face of the locknut (the locknut is the part that is turned to the left to release the clutch for operating the bobbin winder). Next, unscrew the locknut, and remove the washer and hand wheel. Most machines will have a washer that looks like one of the three shown. Some makes will be slightly different. Notice the position of the washer so you can put it back in the same position. You may want to make a small scratch to identify the side that goes “out”. The hand wheel should slide off the shaft easily. If the machine is driven by an external belt, this belt will have to be removed before the hand wheel will come off. (If the machine has an internal drive belt or the hand wheel.



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Replace the parts you have removed and skip this area.) Gear driven machines will have a gear on the inside of the hand wheel.



Clean the hand wheel, washer, and shaft. Lubricate the shaft with two drops of oil and place a small amount of grease on all gears. Reassemble the hand wheel and clutch. If the clutch fails to operate, either because it will not hold or fails to release, remove the locknut again and turn the washer one half turn (180°) and reassemble. The clutch should then work properly. After thoroughly cleaning these areas, reassemble the machine and run it by hand. It should run smoothly if all parts have been replaced correctly. Do not plug the machine in until all the cleaning fluid is dry.

OILING AND LUBRICATING THE MACHINE

Allow the machine to stand overnight so excess cleaning fluid can evaporate before oiling and lubricating it. Check your machine instruction booklet to determine the type of oil lubricant to use and where to use them. Some machines have bearings that are nylon or graphite-impregnated bronze and do not require oil or lubricant. Also, some machines do not need oiling because they are designed with oil impregnated in the bearing castings. If your machine does not require oil, do not use.

Do not oil the tension discs, the hand wheel release or the belts and rubber rings on any machine.

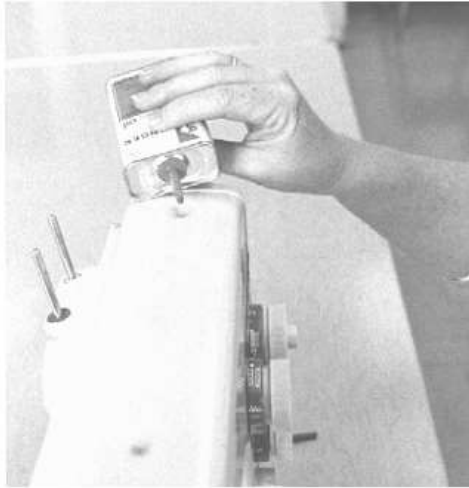
In the holes designated, and on all parts that rub against or within another, squirt a little oil. Run the machine by hand to distribute the oil into all the bearings. Use oil freely

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because all oil has been removed in the cleaning process. If there are any wool or felt pads are well-oiled.

removed in the cleaning process. If that feed oil to parts, be sure they



For later oiling, one drop of oil on each bearing and in each oil hole is enough. It is a good practice to oil the machine after each day's work or after 8 to 10 hours of use. Even if you do not use your machine often, oil it occasionally to keep the oil from drying and gumming.

If the machine requires a lubricant, lubricate the areas suggested. Use the lubricant recommended for your machine for best results. After oiling and lubricating the machine, wipe away excess oil and reassemble the machine. As you replace the parts that have been soaking in the pan, do not force screws or parts into place. Check to be sure it is in the correct location.

CARE OF THE MOTOR

Lubricate the electric motor of your sewing machine according to the manufacturer's directions. Several newer machines have electric motors with sealed bearings that never need oiling. Lubricate motors that require oil or grease once a year. One or two drops per bearing are sufficient; over-oiling may ruin the motor. Sewing machine company oil or good quality light oil is satisfactory to use. If you select lightweight household oil, be sure it says "non-gum forming" and "non-corrosive" on the container. On a grease-fitted bearing, fill the grease cups once a year.

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Check to see that all electric and motor are tight. If the cord connections to the motor control covering is not in good condition, tape it with good quality electric tape or replace the cord. The belt that connects the motor to the hand wheel should have just enough tension to keep it from slipping. On some machines, the belt can be adjusted by slightly shifting the position of the motor. Take good care of the rubber driving ring or wheel on motors that drive machines by friction contact with the hand wheel. If this driving ring or wheel has become flat-sided or unevenly worn, causing excessive vibration, replace it with a new one. Keep the hand wheel clean and dry and the driving ring adjusted firmly to the hand wheel and in line, so the machine will run with a minimum of vibration

Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of oiling and lubricating the machine? (5 point)

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3. Write at five sewing points)

machine maintenances tools? (5

4. What type of oil used for

sewing oil machine? (5 points)

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

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1. _____
—

2. _____
—

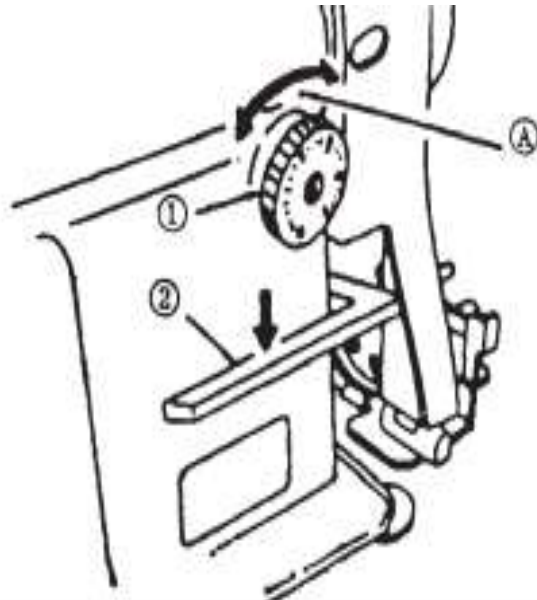
3. _____
—

Information Sheet-3	Repairing and adjusting machine regularly
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Adjusting the Stitch Length

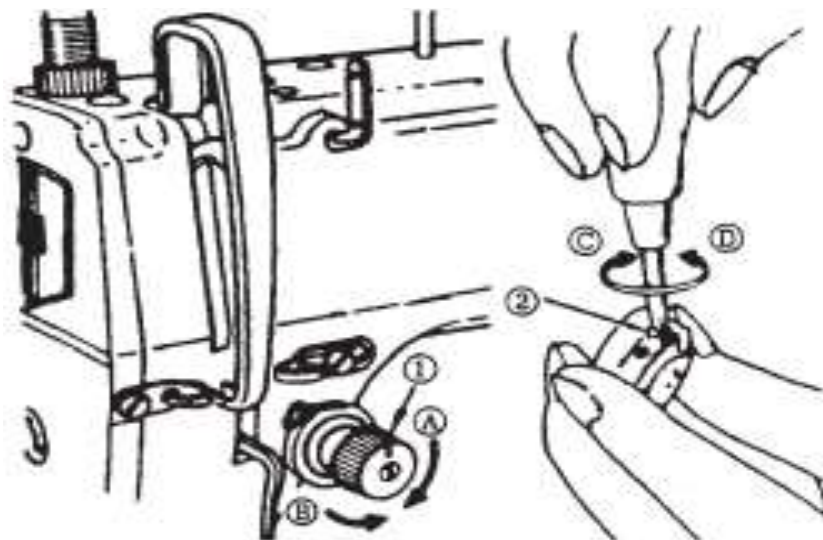


1. To increase the stitch length, turn the Stitch Length Dial (1) to the desired number (in scale dot (A) on the machine).
2. To decrease the stitch length, turn the Stitch Length Dial (1), while pressing the Feed Lever (2).



Adjusting the Needle Thread Tension

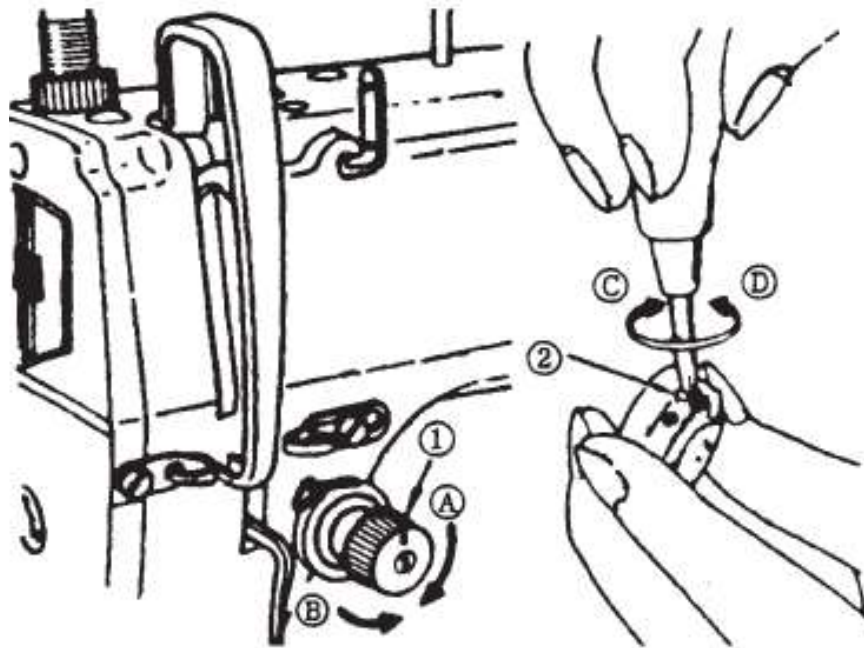
1. Turn Tension Adjustment Knob (1) clockwise (A) to increase thread tension.
2. Turn Tension Adjustment Knob (1) counterclockwise (B) to decrease thread tension.





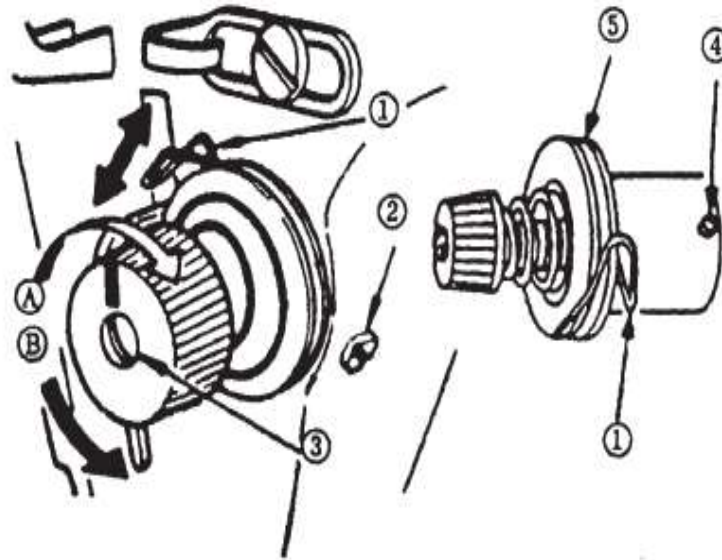
Adjusting the Bobbin Thread Tension

1. Turn the Tension Adjustment Screw (2) clockwise (A) to increase bobbin tension.
2. Turn the Tension Adjustment screw (2) counterclockwise (B) to decrease bobbin tension.



Changing the Thread Take-up Spring Stroke and Pressure

1. Loosen Set Screw (2).
2. To increase the stroke, turn the Tension Knob Screw (3) clockwise (A).
3. To decrease the stroke, turn the Tension Knob Screw (3) counterclockwise (B).
4. Loosen Set Screw (2) and pull out the Tension Arm (5).
5. Loosen Set Screw (4) and remove the Tension Knob Screw (3).
6. Turn the Tension Knob Screw (3) clockwise (A) to increase pressure; or turn counterclockwise (B) to decrease pressure.
7. Replace Tension Knob Screw (3), tighten Set Screw (4), and replace the assembly.

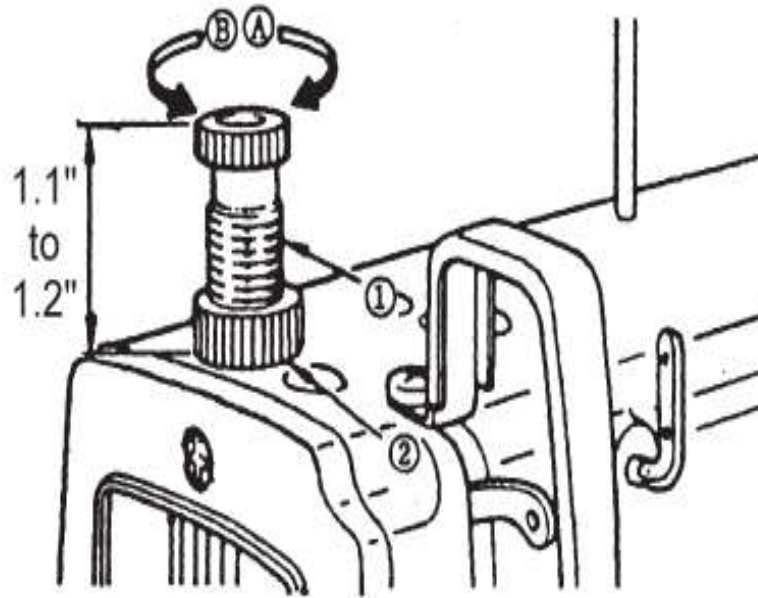


Setting the Hand Lifter

1. To stop the machine with its Presser Foot up, turn the Hand Lifter (1) up (A). The Presser Foot will go up about 1/4 inch and stop.
2. To set the Presser Foot to its original position, turn the Hand Lifter (1) down (B). Using the Knee Lifter, you can get the standard Presser Foot lift of about 1/2 inch.

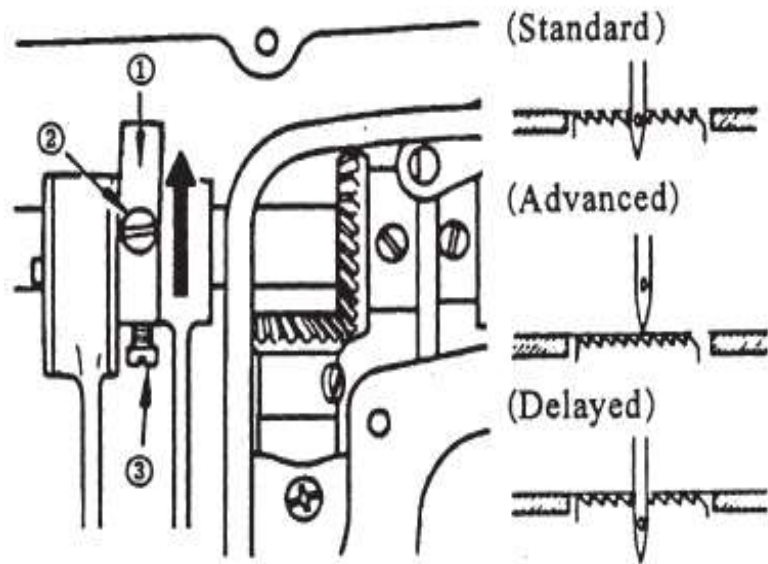
Setting the Presser Foot Pressure

1. Loosen Nut (2), and turn the Presser Spring Regulator (1) clockwise (A) to increase Presser Foot pressure.
2. To decrease Presser Foot pressure, turn the Presser Spring Regulator (1) counterclockwise.
3. After adjustment, tighten Nut (2).



Adjusting the Feed Timing

1. Loosen Set Screws (2) and (3) on the Feed Eccentric Cam (1) and properly position the Eccentric Cam. Retighten the Set Screws.
2. To advance the feed timing in order to prevent uneven material feed, move the Feed Eccentric Cam up (clockwise).
3. To delay the feed timing in order to increase stitch tightness, move the Feed Eccentric Cam down (counterclockwise).

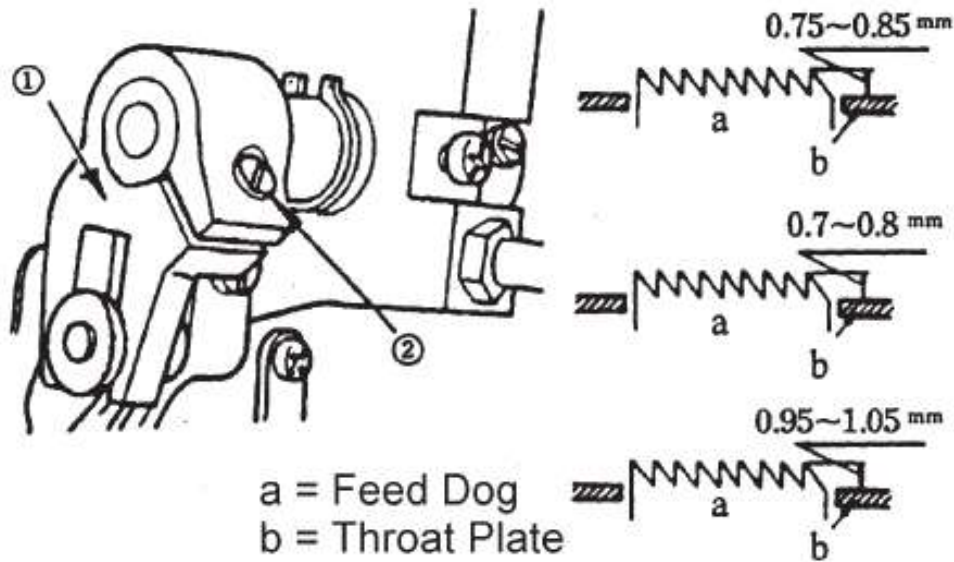


Adjusting the Height of the Feed Dog

The Feed Dog is factory adjusted so that it juts out from the Throat Plate surface 0.8 mm to 0.9 mm. If the Feed Dog juts out too much, puckering may result when sewing lightweight materials.

To adjust the height of the Feed Dog:

1. Loosen Screw (2) of Crank (1).
2. Move the Feed Bar up or down to make the adjustment.
3. Tighten Screw (2), being careful not to over-tighten.



Adjusting Needle-to-hook Timing

(See figure next page)

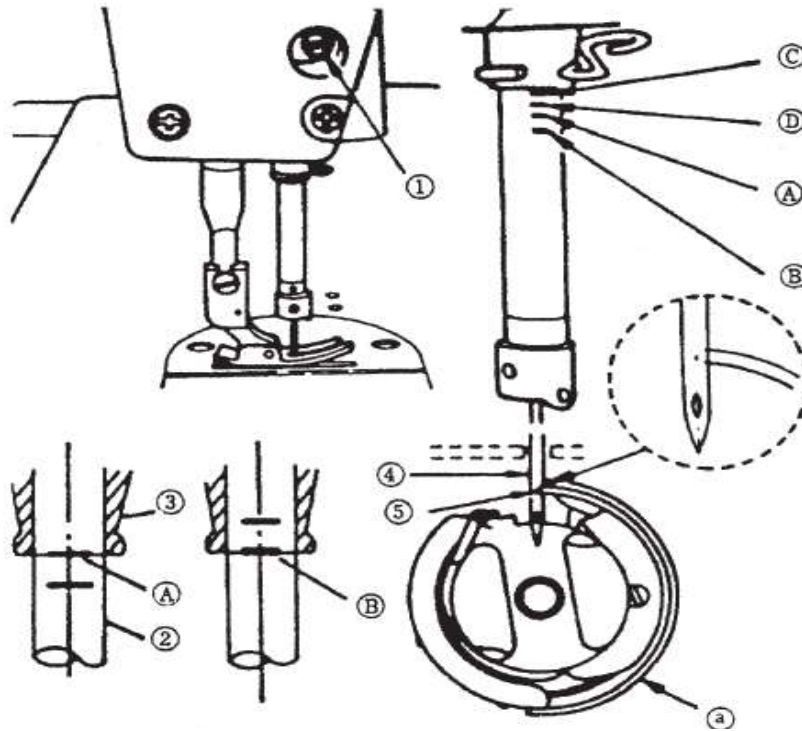
1. Turn the Hand Wheel to bring the needle bar down to the lowest point of its stroke.
2. Loosen Set Screw (1).
3. When using a DBX1 needle, align to marker line “A” on the needle bar (2) with the bottom end of the needle bar lower bushing (3), then tighten Set Screw (1). When using a DAX1 needle, align to marker line “B” on the needle bar (2) with the bottom end of the needle bar lower bushing (3), and then tighten Set Screw (1).
4. When using a DBX1 needle, loosen three Hook Set Screws, turn the Hand Wheel, and align the marker line “B” on the needle bar (2) with the bottom end of the needle bar lower bushing (3). When using a DAX1 needle, align the marker line “D” on the needle bar (2) with the bottom end of the needle bar lower bushing (3).
5. After making the adjustments in steps 3 and 4, align the Hook Blade point (5) with the center of the needle (4). Provide a clearance of .001” to .004” (0.04 to 0.1 mm) between the needle and the hook. This clearance is less than 1/64” (almost

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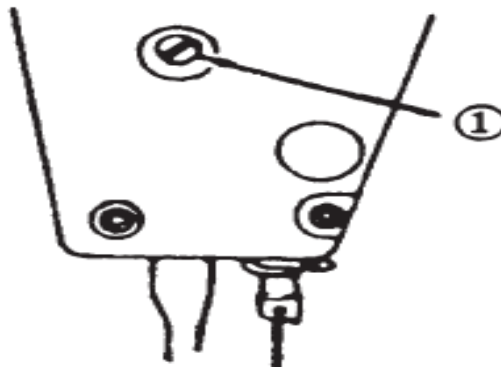
touching). Securely tighten clearance is too small, the tip too large, it will lead to skip over.

the three Set Screws. If the of the hook will be abraded. If it is



Adjusting the Presser bar Height

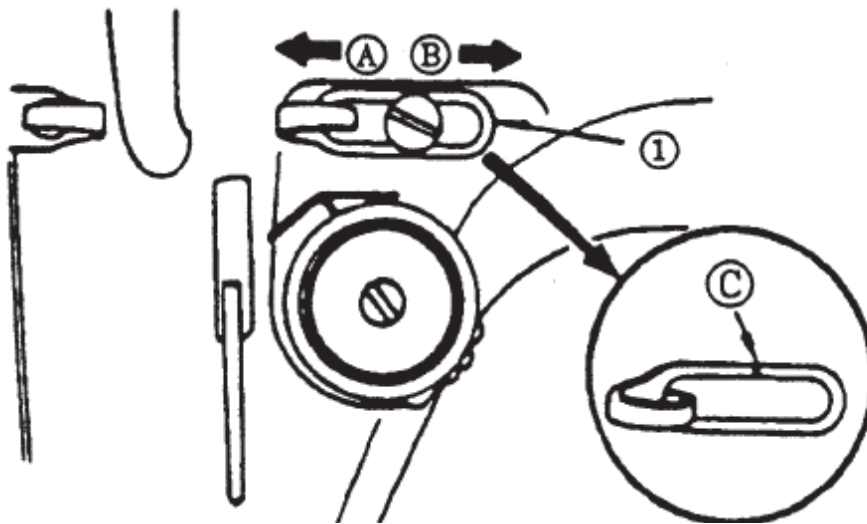
1. Loosen Set Screw (1) and manually adjust the Presser Bar height, and the angle of the Presser Foot.
2. After adjusting, securely tighten the Set Screw (1).





Adjusting the Thread Take-up Stroke

1. When sewing heavy weight materials, move the Thread Guide (1) to the left (A) to increase the length of thread pulled out by the Thread Take-up.
2. When sewing lightweight materials, move the Thread Guide (1) to the right (B) to decrease the length of thread pulled out by the Thread Take-up.
3. The normal setting is when the marker line "C" on the Thread Guide (1) is aligned with the center of the screw.

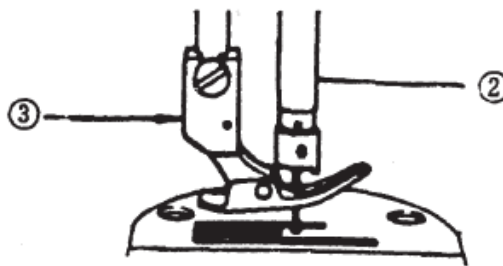
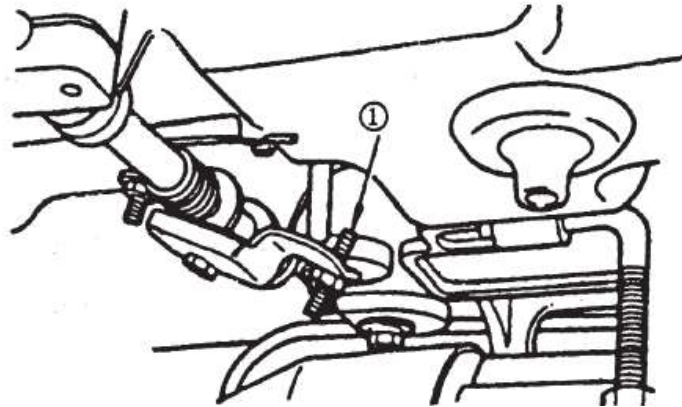


Adjusting the Height of the Knee Lifter

The standard height of the Presser Foot lifted using the Knee Lifter is 0.39 inch (10 mm).

1. To adjust the Presser Foot lift up to 0.5 inch (13 mm), adjust the Screw (1).
2. When the Presser Foot lift is adjusted over 0.39 inch (10 mm), be sure that the bottom end of the Needle Bar (2) does not hit the Presser Foot (3). This can be manually checked by turning the Hand Wheel.

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Adjusting Thread Tension

Upper and lower tension must be balanced to produce a perfect stitch. The upper tension is located differently on different machines. It may be on the face plate, on the face of the needle-bar housing, on the front of the needle-bar housing, or on the upper arm of the machine head. The lower tension, located on the shuttle or bobbin case, is adjusted by a screw. If two screws fasten the lower tension spring to the bobbin case, adjust by turning the screw nearest the center of the spring— not the screw on the end.

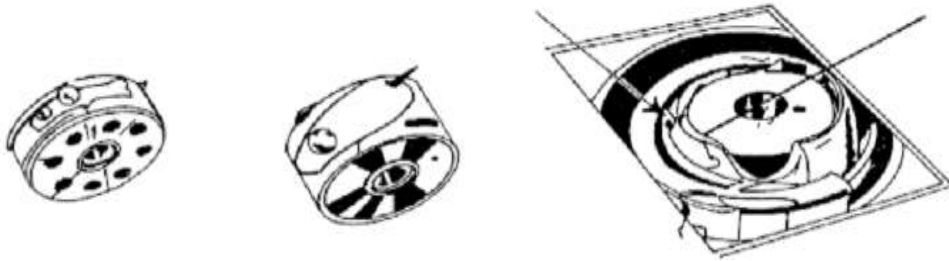
If, during the cleaning, the lower tension spring has been removed or its adjustment changed, the adjusting procedure is the same as in the ordinary use of the machine.

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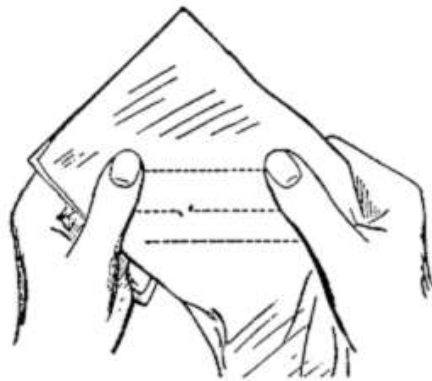


That is, assume the lower tension to be correct until proved wrong. Make all adjustments on

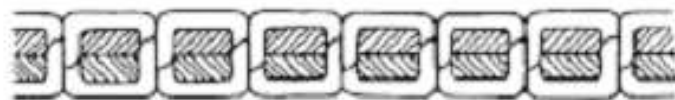
tension to be correct until proved the upper tension.



If the lower tension has been disturbed, set both lower and upper tensions so there will be a slight drag on each thread. Use the same size thread on both bobbin and spool. Now, adjust the tension, take a look at the stitching the machine makes. To help you to see the stitches clearly, use contrasting colors of thread on the top and in the bobbin. Set stitch-length control for a medium length of stitch. Fold a 6- to 8-inch square of sheeting or average weight cloth and stitch diagonally across it at an angle of about 45°



Now inspect the stitching. In a perfect stitch, threads are locked in the center, midway between the two layers of cloth, with no loops on the top or bottom of the seam and no puckers in the cloth.



Perfectly Locked Stitch

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If loops of the bobbin thread and the top thread is straight, the lower. In this case, loosen the top tension.

show on the top side of the seam the upper tension is tighter than



Upper Tension Too Tight

If loops of the spool thread show on the underside of the seam and the lower thread is straight, the upper tension is looser than the lower and should be tightened.



Upper Tension Too Loose

NB:

1. Machine adjustments should only be performed by a qualified technician.
2. Check the oil level weekly when the machine is used daily. Add sewing machine oil as required to the high level marking.
3. Clean the machine with a clean, damp cloth. Do not use solvents or thinners.
4. When not in use, cover the machine and store in a clean and dry location.

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Self-Check 3

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. How to replace if the sewing machine needle bent by using the necessary steps? (5 points)
2. What mechanism follows to set the needle bar height? Explain in brief? (5 points)
3. How do adjust thread tension? (5pts)



Note: Satisfactory rating - 15 points Unsatisfactory - below 15points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

1. _____

2. _____

3. _____

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Information Sheet-4	Applying maintenance according to OHS
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Managing Occupational Health and Safety

Occupational Health and Safety (OHS) management is a process of planning, organizing, leading and controlling, and where relevant, staffing, to enable the integration of safety into every part of an organization's processes. Managerial authority, responsibility and accountability for occupational health and safety, as for other activities, should be clearly defined throughout an organization, and matched by appropriate training and availability of resources and funds. The aim of managing OHS successfully is to create a safe working environment whilst achieving organizational goals in the conduct of the day to day business of the organization. Planning for, implementing and reviewing safety measures become part of the everyday processes of the organization.

The ownership of OHS strategies usually originates with management's commitment to safety. Devolved strategies may then be formed at each level of the organization in order to achieve organizational goals. These goals can then be evaluated and new strategies developed to maximize performance in occupational health and safety.

OHS Management Systems

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The OHS Management Systems model will enable an organization to establish a prevention system to safeguard the working environment. Establishing an effective and pro-active prevention program encourages an emphasis on prevention rather than merely responding to problems as they arise. There are several comprehensive management systems and tools available to employers. The decision as to which is most appropriate depends on several factors. These factors include the organization size, structure, complexity and product or service delivery.

OHS information manual for supervisors in the NSW construction industry

The Six Step Approach to OHS management promoted by Work Cover NSW can be applied to all hazards and consists of the following:

1. Develop an OHS policy and programs
2. Methods of consultation
3. Set up a training strategy
4. Set up a hazard identification and workplace assessment process
5. Develop and implement risk control strategies
6. Promote, maintain and improve strategies.

Organizational Policy and Programs in OHS

An organization's Occupational Health and Safety policy is a public statement signed by senior management expressing its commitment and intent to manage its OHS responsibilities. In publishing the policy the organization is sending a clear message that it has a vision and commitment to OHS management that is to be applied throughout the whole organization.

MANAGING OCCUPATIONAL HEALTH AND SAFETY

Proactive OHS Policy

Characteristics of a pro-active OHS policy would include:

- An OHS policy which is on public display

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- A joint approach to resolving OHS issues
- Adequate OHS training for staff
- Hazard identification and workplace assessment
- Implementation of hazard controls
- Promoting, maintaining and improvement of all OHS systems
- Active OHS programs
- implemented safe work plans
- Adequate supervision
- Formation and operation of a workplace OHS committee.

This type of policy is designed to demonstrate the employer’s commitment to OHS. Participation and support from all employees is required through effective leadership, communication, delegation and appropriate resource allocation. The employer continues to redefine the policy and program in consultation with employees and employee representatives. Once developed, they should be made available to employees and form part of any induction, information and training sessions.

Self-Check 4	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is managing occupational health and safety? (5 points)
2. What are the Characteristics of a pro-active OHS policy? (5 points)
3. Write at the six step approach to OHS management? (5 points)

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

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1. _____

2. _____

Instruction Sheet	LG29: Complete Minor Maintenance
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Cleaning tools, set in order of manufacturing specification

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- Following environmental procedures
- Cleaning and maintaining work area
- Reporting mal-function fault or damage to supervisor

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Tools are cleaned, returned to operating order and stored according to manufacturers’ specifications and enterprise requirements.
- Environmental procedures are followed and waste from maintenance activities is collected, treated and disposed or recycled according to enterprise requirements.
- Work area is cleaned and maintained according to OHS and enterprise requirements.
- Malfunctions, faults, wear or damage of tools are reported to the supervisor according to enterprise requirements

Learning Instructions:

39. Read the specific objectives of this Learning Guide.
40. Follow the instructions described in number 3 to 18.
41. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
42. Accomplish the “Self-check 1” in page 8.
43. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
44. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #3.
45. Read the information written in the “Information Sheet 2”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
46. Accomplish the “Self-check 2” in page 22.

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47. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).
48. If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #7.
49. Read the information written in the “Information Sheets 3”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
50. Accomplish the “Self-check 3” in page 34.
51. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 3).
52. If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #11.
53. Read the information written in the “Information Sheets 4”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
54. Accomplish the “Self-check 4” in page 41.
55. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 4).
56. If you earned a satisfactory evaluation, that will be the end of this competency so proceed to learning guide 30. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Instruction #15.



Information Sheet-1	Cleaning tools, set in order of manufacturing specification
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1. Screw Drivers

Screwdrivers come in flathead or Phillips head design, and they come in a wide variety of lengths, sizes and materials. Flathead screwdrivers have single-slot tips that usually range from 3/32 to 1/2 inch. There are larger sizes, but you only use those for very heavy-duty tasks. Phillips head screwdrivers feature cross-slotted tips; they come in sizes ranging from 0 to 4. Screwdriver handles come in several types of wood or a variety of plastic resins and rubber to accommodate all needs.

Cleaning and Storing Screw Drivers

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Maintain the screwdriver's shank surface and tip by wiping them down after use with an oil-

dampened rag to prevent rust.

Avoid rubbing oil onto the screwdriver's handle because this makes the surface too slippery to handle. Remove caked-on debris by rubbing the area with a medium-grit sandpaper or steel wool.

Store the screwdriver in a carrying case, tool box or storage container that is free of moisture. Keep the case, box or container in a dry location. Place the tip of the screwdriver in a downward direction when carrying it in a carpentry bag pocket to avoid scraping or stabbing yourself on the tip.

2. Pliers

Cleaning and Storing Pliers

Remove dirt and grease with a clean rag and apply a light coat of oil after each use. Store pliers in a tool box or hang on racks when not in use. Do not remove insulation on handles or oil handles which are insulated.

3. Wrenches

Cleaning wrenches

The following are required for the cleaning process:

- Wire scrub brush
- Commercial cleaner (Pine Sol, Spic 'n Span, Lestoil, etc)
- Large bucket
- Hot water
- Several old towels
- Heavy duty rubber gloves
- Steel wool
- Household oil
- Soft rag

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The Cleaning Process:

1. Fill a large bucket with a measured amount of hot water (usually about a gallon or two, depending on the number of tools you are washing) and add the amount of commercial cleaner indicated on the product instructions for the amount of water.
2. Place tools in the bucket of cleaning solution, and let soak for at least 30 minutes.
3. While wearing rubber gloves, use the wire brush to scrub the tools, removing dirt and grease.
4. Remove the tools from the cleaning solution and dry each one thoroughly.
5. If any of your tools have rust on them, use the steel wool to rub the rust off.
6. Many of today's hand tools are rust resistant, but if any of your tools are susceptible to rust, it is recommended that about once every 6 months, you coat them with a thin coat of household oil (such as WD 40® or 3-in-1® Household Oil, available at most home improvement and hardware stores) by pouring some on a soft rag and wiping them down. This will help prevent a buildup of rust.

Storing Wrenches

Wrenches that come in sets should be returned to their cases after use. When storing the micrometer-type torque wrenches or beam-type torque wrenches, check to make sure they are returned to zero before storing. For the rest of the torque wrenches (unless your local SOP states differently) zero them before you store them. This takes the pressure off the spring, and the wrenches will last longer and give better service. Apply a thin film of oil to the metal parts of all wrenches before storing them. Remove oil before use to prevent injury or damage.

For long-term storage, the wrenches should be covered with a rust-preventive compound and carefully stored in a dry place.

4. Power Tools (*Jigsaws, drills, chain saws, etc.*)

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Cleaning Power Tools

The following are required for

the cleaning process:

- Heavy duty working gloves
- Can of compressed air (available at most home improvement stores)
- Cleaning rags
- Bucket
- Hot water
- Commercial cleaner (Pine Sol, Spic 'n Span, Lestoil, etc)
- Old towels
- Steel wool
- Toothbrush

The Cleaning Process

1. Make sure you wear heavy duty gloves when handling power tools, especially power tools with sharp cutting edges.
2. ALWAYS check the manufacturer's directions and recommendations for proper cleaning and maintenance of your power tool(s), and follow any such instructions carefully.
3. DISCONNECT all power cords from the tool being cleaned.
4. If you are cleaning a chainsaw, jigsaw, or any other such type of power tool that tends to collect sawdust, using the compressed air, spray out any sawdust and dirt accumulated within the grooves and crevices.
5. Fill a large bucket with a measured amount of hot water (usually about a gallon or two, depending on the number of tools you are washing) and add the amount of commercial cleaner indicated on the product instructions for the amount of water.

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6. Wet a cleaning rag with the cleaning solution and wring out thoroughly so that it is just damp, not wet or dripping. Wipe down the surface of the tool. Avoid getting water in or around the power cables or motor casings.
7. Dry thoroughly with an old towel.
8. With a toothbrush, clean around any switches or toggles, making sure to remove any debris or dust that may interfere with the proper operation of any of those switches.
9. With a DRY rag, wipe down the power cord, checking it carefully for any nicks, cuts, fraying or damage. If you do find the cord to be damaged in any way, it should be REPLACED before using the power tool again.
10. Check any exposed metal parts of the tool for rust. If there is any rust, remove it by rubbing briskly with the steel wool.

Self-Check 1	Written Test
---------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

9. How do you clean and store screw drivers? (5 point)
10. How do you clean and store pliers? (5 points)
11. How do you clean and store power tools? (5 points)
12. How do you clean and store wrenches? (5points)

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Note: Satisfactory rating – 20 points Unsatisfactory - below 20 points

You can ask your teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

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2. _____

—

3. _____

—

4. _____

Information Sheet-2

Following Environmental procedures

Measures to reduce excessive noise of machine

Noise in the workplace can be highly distracting, limit communication, affect safety as well as reduce work performance and productivity. Noise can be a problem in factories, vehicles, open plan office environments or building and construction sites. Because of excess noise, instructions can sometimes be misheard or announcements not heard at all which may compromise both productivity and safety. Open plan office environments where multiple distractions and conversations occur can reduce concentration levels, alter train of thought or reduce the ability to focus attention, again potentially impacting negatively on work performance and productivity. Excessive

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noise within the workplace can hearing loss of employees.

also contribute to the permanent Evidence suggests that

continuous exposure to noise levels that exceed 85 decibels during a normal 8 hour working day can pose an unacceptable risk to the hearing of those exposed. Therefore methods of suppressing or eliminating workplace noise can have great benefits.

Workplace solutions and adjustments

The Code of Practice for managing noise within workplaces has specific guidelines regarding recommended noise levels for work environments as a means of reducing the risk of noise induced hearing loss. It also recommends ways of reducing noise within the work environment.

Within workplaces sources of noise may be loud or just annoying and limit clarity of hearing, for instance a rattling door or window on a vehicle. When workplace noise is identified the following should be considered:

- removing or replacing the source of noise with plant or equipment with lower noise emissions
- ensuring all plant and equipment is installed correctly to ensure low noise emissions
- treating vibration sources within a machine or engine
- using noise damping products to reduce metal to metal contact
- providing effective maintenance procedures to eliminate noise from insufficient lubrication, rubbing machine parts, faulty seals or worn bearings
- thinking about elements of a machine rather than the whole machine, for instance using anti vibration mountings, mufflers or silencers
- whether work undertaken or equipment used can be changed to reduce noise emissions
- using sound absorbing materials on floors, walls and ceilings to limit transmission of sound
- placing sound barriers or enclosures around noisy equipment to minimise emissions:
- sound absorption panels
- installing partitions or cubicles within open plan offices or factories:

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- cubicle walls and doors
- if noise cannot be eliminated, changing work methods to ensure restricted periods of time are spent by employees in these environments, or only operate particular noisy equipment when the least amount of staff are exposed.
- Ensuring the appropriate personal protective equipment (ear plugs or muffs) is used by employees in noisy work environments.

Noise damping products such as noise and vibration suppression materials and noise suppressing paint are available to assist with reducing the level of noise in the workplace. Generally a noise assessment is likely to be required in a workplace if raised voices are required to speak with a person about 1 meter away. Please refer to the Code of Practice link below for extensive detail.

Noise levels can affect various aspects of a person's work performance and productivity.

- concentrating
- Hearing
- focusing attention

Control of Noise Processes

Some of the noise control measures which can be implemented to reduce employees' exposure to excessive noise include:

- Specify low noise machineries and equipment during purchase. Perform periodic maintenance of the machineries and equipment, including replacement of worn parts, adjustment of loose parts and lubrication of moving parts.
- Relocate noisy machineries and processes to a lesser or non-occupied area.
- Locate noise sources away from hard reflective surfaces, and from the corner of a room.
- Minimize the number of noisy machineries running at any one time.
- Provide and ensure usage of hearing protectors to reduce noise exposure before engineering and administrative controls are administered, or when controls are not feasible.

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In addition, the following control measures are recommended for the common noisy processes:

measures are recommended for the common noisy processes:

Grinding

- Use low noise, flexible grinding discs.
- Use grinding machines with an automatic balancing system.
- Operate the grinding tool at an optimal speed recommended by the manufacturer.
- Select the correct grinding disc for the intended usage.

Economic use of materials

Generally, economic instruments introduce more flexibility, efficiency and cost effectiveness into solid waste management measures. Furthermore, they can stimulate development of pollution control technology and expertise in the private sector; provide government with a source of revenue to support waste management programmes; and eliminate a government's requirements for larger amounts of detailed information needed to determine the feasible and appropriate level of control for each plant or product.

Specifically, in solid waste management, EIs can be used as a tool to:

- reduce the amount of waste generated
- reduce the proportion of hazardous waste in the waste generated
- segregate hazardous waste for special handling and disposal
- encourage recovery, reuse and recycling of wastes
- support cost-effective solid waste collection, transport, treatment and disposal systems
- minimize adverse environmental impacts related to solid waste collection, transport, treatment and disposal systems, and
- Generate revenues to cover costs. (IDB, 2003)

Proper Waste Disposal

With increasing population and industrialization, waste management is becoming a severe problem around the world. Proper means of waste disposal is crucial to public

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health and the environment.
environment and reduces the

This helps maintain a cleaner
chances of spreading diseases.

Proper waste disposal also reduces the probability of contamination of the soil and groundwater. There are several alternatives available for disposing of waste in a suitable manner

TSDF

With some exceptions, a TSDF is a facility engaged in one or more of the following activities:

Treatment – Any method, technique, or process designed to physically, chemically, or biologically change the nature of a hazardous waste

Storage – Holding hazardous waste for a temporary period, after which the hazardous waste is treated, disposed of, or stored elsewhere

Disposal – The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid or hazardous waste on or in the land or water. A disposal facility is any site where hazardous waste is intentionally placed and where the waste will remain after a TSDF stops operation.

Recyclable Materials

RCRA provides separate, reduced regulations for TSDFs recycling certain materials. These recycling facilities are generally exempt from the TSDF standards, but may be required to comply with streamlined hazardous waste management requirements. These reduced provisions apply to facilities recycling:

- Precious metals
- Lead-acid batteries
- Used oil
- Hazardous waste burned in boilers and industrial furnaces.

For other recyclable materials, there are no special requirements. For example, facilities recycling the following materials are exempt from all TSDF standards:

- Industrial ethyl alcohol
- Used batteries returned to the manufacturer for regeneration

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- Scrap metal
- Fuels produced from reining oil-bearing hazardous wastes
- Oil reclaimed from hazardous waste

HAZARDOUS WASTE DEFINED

In order for a material to be classified as a hazardous waste, it must first be a “solid waste”. RCRA defines a solid waste as garbage, refuse, sludge, industrial waste, or other discarded materials. The term “solid waste” is very broad and includes both non-hazardous and hazardous waste but is not limited to wastes that are physically solid. Many solid wastes are liquid, semisolid, or gas.

A hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. There are two criteria to determine if the solid waste is hazardous waste. First, determine if the waste exhibits certain characteristics that can cause death, injury, or illness in humans or lead to ecological damage. Second, determine if the waste is a listed hazardous waste. Wastes may be hazardous if they are specifically listed by the Environmental Protection Agency (EPA). There are four EPA lists for hazardous waste: the F list, the P list, the K list, and the U list.

The F list includes wastes from nonspecific sources. At Purdue, the most common F listed waste is waste generated from the use of solvents. This includes waste mixtures of solvents, waste solvents, and media mixed with solvents, such as rags for cleaning. The F list is codified in the regulations at 40 CFR 261.31.

The K list includes wastes generated from specific industrial process. The K list is found at 40 CFR 261.32. The P list and the U list include pure or commercial grade formulations of specific unused chemicals. Chemicals are included on the P list if they are acutely toxic. The U list is generally comprised of chemicals that are toxic, but also includes chemicals that display other characteristics, such as ignitability, corrosively, or reactivity. Both the P list and U list are codified at 40 CFR 261.33.

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Waste may also be hazardous if it exhibits a particular hazardous characteristic. The four hazardous characteristics are ignitability, corrosivity, reactivity, and toxicity. The ignitability characteristic identifies wastes that can readily catch fire and sustain combustion. Ignitable wastes carry the waste code D001. The corrosivity characteristic (D002) identifies wastes that are acidic or alkaline (basic) and can readily corrode or dissolve flesh, metal, or other materials

GENERAL SAFETY GUIDELINES FOR HAZARDOUS WASTE MANAGEMENT

- Determine if you generate a hazardous waste.
- Designate one member of your group to be responsible for hazardous waste management.
- Establish and identify an area to accumulate hazardous waste near the point of generation.
- Identify and separate the hazardous waste by hazard class.
- Do not mix waste streams.
- Select an appropriate container for the waste.
- Label all the hazardous waste containers with the words “HAZARDOUS WASTE” and the chemical name and percent composition of each constituent.
- The chemical waste containers must be tightly capped at all times, except when adding waste.
- Segregate containers according to compatibility.
- For the removal of the chemical waste, send to REM a complete Hazardous Material Pickup Request form (HMM-001).
- Include the chemical name or description of each constituent in the waste with the percent composition.
- With the exception of the compounds listed by EPA as D004 through D043 (Table V), that must be included even in trace amounts, only the most abundant 5-10 species need to be listed for mixtures of numerous components
- If the pickup request includes trade products, include the product MSDS with the Hazardous Material Pickup Request form.

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HAZARDOUS WASTE STORAGE*

The following section describes the requirements for accumulation and storage of hazardous waste in your area.

I. CONTAINERS

A. All waste must be in containers.

Select an appropriate and compatible container for the waste. Usually the original container of the main component of the waste can be used. However, do not use metal containers for corrosive waste or glass containers for waste containing hydrofluoric acid. For liquid waste, use a container designed for liquids.

B. Generators must supply their own containers.

C. Cap and close containers at all times.

The chemical waste container **MUST** be tightly capped at all times except when adding waste

Open containers allow evaporation, invite spills, and are an improper means of storage.

D. All containers must be in good condition and not leaking.

Containers must be clean, without chemical residue on the outside, leak proof, and have an appropriate lid to secure the contents of the container. If a container holding hazardous waste is not in good condition, or if it begins to leak, the generator must transfer the hazardous waste to a container that is in good condition. Alternatively, over pack the container that is leaking or in poor condition into a larger compatible container with a tight fitting lid. If leaks or spills occur, all evidence of leakage and all spilled material must be immediately and properly cleaned-up. Collect all spilled materials and debris used for clean up as a hazardous waste.

E. All containers must be under the control of the generator and stored in a manner that will not cause them to spill or leak.

Close all containers with an appropriate lid, cap, or other suitable device that is compatible with and that will contain the waste during normal handling and storage. Store containers upright and place securely on a shelf, floor, or countertop. Do not place containers in areas such as hallways, doorways, sinks, or next to moving

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equipment where the chance of spills is likely. Never locate containers in public areas such as hallways, classrooms, or reception areas.

spills is likely. Never locate as hallways, classrooms, or

F. All containers must be stored in a manner that readily allows for inspection.

II. LABEL ALL CONTAINERS CONTAINING HAZARDOUS WASTE

A. Label all hazardous waste containers with the words “HAZARDOUS WASTE” and the chemical name and percent composition of the compounds. HAZARDOUS WASTE labels

(Figure 1) are available by calling 40121.

B. When the waste container is full, or when removal is desired, a label containing the percent composition of all constituents must be affixed. For mixtures with numerous constituents, only the most abundant 5-10 species need to be listed unless the mixture contains one of the compounds listed by EPA as D004 through D043 (Table V). These constituents must be included even in trace amount.

The official version of this information will only be maintained in an on-line web format. Review the material on-line prior to placing reliance on a dated printed version.

C. The manufacture’s label is sufficient for discarded or unwanted pure chemicals and trade products in their original container.

III. SEGREGATE WASTE ACCORDING TO COMPATIBILITY

Chemicals should be segregated according to compatibility for laboratory storage (Table I). For example, segregate acids from bases and segregate oxidizers from fuels, solvents, and other organics. Carefully read the manufacturer's label and MSDS sheet for information on safe storage and incompatibilities. Storage of materials by hazard grouping reduces the risk of fire or explosive reactions.

* EPA conducts an unannounced annual inspection of Purdue labs and work areas. Central to this inspection is proper storage and labeling of accumulation containers. Violation of RCRA Regulations is punishable by fines of up to \$31,250 per day per violation. The official version of this information will only be maintained in an on-line

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web format. Review the reliance on a dated printed



material on-line prior to placing version.

SATELLITE ACCUMULATION AREA

I. DEFINITION

A satellite accumulation area (SAA) is a designated area within the laboratory or shop, which will store the hazardous waste until it is sent out for processing. The SAA must be at or near the point of generation. Waste within the SAA must be capped, labeled, and under the control of the generator. General access to your waste must be restricted: this means waste cannot be stored in hallways, walkways, or common areas.

II. WHY DOES PURDUE USE SAA'S FOR HAZARDOUS WASTE MANAGEMENT?

Purdue University uses SAA's to manage waste in laboratories and shops because it provides a safe and effective means to accumulate hazardous waste before removal to the University's TSD. Additionally, SAA's are the least restrictive regulatory option for accumulation and storage of waste at or near the point of generation.

III. HOW TO DESIGN YOUR SAA

A. Location must be at or near the point of generation.

Establish an area to accumulate hazardous waste. This area can be a bench top, a fume hood, or a previously empty cabinet. The SAA must be at or near the point of generation and under the control of the operator generating the waste. Separate SAA's may be used for each waste stream. If multiple SAA's are used in the area, they must be clearly identified by boundaries and signage indicating the waste stream.

B. Regulations applicable to SAA:

Hazardous waste management at the University is regulated by the Indiana Department of Environmental Management (IDEM) and by the U.S. Environmental Protection Agency (EPA).

State and federal regulations mandate the following regarding chemical waste:

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1. Waste in SAA's must be kept in containers.
2. Containers must be in good condition.
3. Containers must be labeled or clearly marked with the words "HAZARDOUS WASTE" and with the contents of the container from the start of accumulation.
4. Containers must be compatible with the waste and suitable for transportation.
5. Containers must be properly capped at all times except when adding to or pouring off waste material.
6. Handle containers to avoid rupture or leakage.
7. SAA's must never exceed 55 gallons of chemical waste or one quart of acutely toxic chemical waste.
8. All spills and leaks must be cleaned-up immediately.
9. All persons using the SAA must be familiar with the emergency procedures. Call 911 in the event of an emergency (Emergency Response Procedures, p.17).
10. Make a good faith effort to minimize waste.

C. Segregation by chemical compatibility

Collect waste streams in separate containers. Acids, bases, heavy metals, carcinogens, oxidizers, cyanides, sulfides, pesticides, halogenated organic solvents, non-halogenated organic solvents and especially mercury materials should be separated. Mixing chemical waste streams negatively impacts environmentally sound disposal options, and greatly increases disposal costs. Radioactive wastes must be kept separate. Call 40121, if you have any question about accumulating hazardous waste.

D. Submit frequent pick up requests.

This will reduce the amount of waste in your area and provide a safer work environment.

E. Designate a person to be directly responsible for the SAA.

The researcher or director of the facility must designate at least one member of their group to be responsible for hazardous waste management. This person must ensure

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all personnel follow the guideline and know the exact that it contains.

procedures described in this location of the SAA and the waste

II. RECYCLING

The second most desirable approach is waste minimization through recycling. Waste materials are recycled when they are used for another purpose, treated and reused in the same process, or reclaimed for another process.

A. Used oil, batteries, mercury, fluorescent tubes, precious metals, and computer monitors are managed for off-site recycling by REM. Call 40121 for more details on these processes.

B. Recover, redistill, and reuse organic solvents: Distill and reuse solvents for classroom experiments or as cleaning agents where ultra pure solvent is not required.

III. TREATMENT

“Treat” material to remove the characteristic of ignitability, corrosively, reactivity, or toxicity. A common laboratory treatment is elementary neutralization. Perform treatments only if you are familiar with the chemical reaction and the associated products

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Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of hazardous waste storage? (3 point)
2. What is TDSF? (5 points)
3. What is the benefit of economic instrument in solid waste management? (5 points)
4. What type of oil used for sewing oil machine? Explain it (2 points)



Note: Satisfactory rating - 15 points

Unsatisfactory - below 15points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

9. _____

10. _____

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11.

12.



Information Sheet-3

Cleaning and maintaining work area

Definition of OHS

Every worker has the right to a safe workplace. When they go to work each day, they should fully expect to return home uninjured and in the same state of health as they left. Occupational health and safety is the issue of complete physical, mental and social well-being within a workplace. The enjoyment of these standards at the highest levels is a basic human right that should be accessible by each and every individual. What this means for workers is that regardless of the nature of their work they should have be able to carry out their responsibilities in a safe and secure environment free from danger, stress and bullying. These rights are outlined in legislation to ensure that employers are clear about the obligations and the consequences for neglecting them.

Occupational health and safety (OH&S) program

A health and safety program is a definite plan of action designed to prevent accidents and occupational diseases. Some form of a program is required under occupational health and safety legislation in most Canadian jurisdictions. A health and safety program must include the elements required by the health and safety legislation as a minimum.

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Because organizations differ, a organization cannot necessarily

program developed for one be expected to meet the needs of

another. This document summarizes the general elements of a health and safety program. This should help smaller organizations to develop programs to deal with their specific needs. Because many small and medium-sized enterprises (SMEs) lack the resources of larger organizations, it is even more vital that SMEs involve all employees in health and safety activities. The more comprehensive the program is, the more employee involvement can be expected.

What is a policy statement?

An organization's occupational health and safety policy is a statement of principles and general rules that serve as guides for action. Senior management must be committed to ensuring that the policy is carried out with no exceptions. The health and safety policy should have the same importance as the other policies of the organization.

The policy statement can be brief, but it should mention management's commitment to protect the safety and health of employees. The objectives of the program is the organization's basic health and safety philosophy who is accountable for occupational health and safety programs the general responsibilities of all employees that health and safety shall not be sacrificed for expediency that unacceptable performance of health and safety duties will not be tolerated.

The policy should be:

- stated in clear, unambiguous, and unequivocal terms
- signed by the incumbent Chief Executive Officer
- kept up-to-date
- communicated to each employee
- adhered to in all work activities

Individual OH&S responsibilities

Health and safety is the joint responsibility of management and workers. Management is accountable for non-compliance to health and safety legislation. All health and safety

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activities are based on specific which can be found in the often these duties are not well known. This situation can be improved by including details of specific individual responsibilities in the safety program.

individual responsibilities, most of pertinent legislation. However,

Responsibility may be defined as an individual's obligation to carry out assigned duties. Authority implies the right to make decisions and the power to direct others. Responsibility and authority can be delegated to subordinates, giving them the right to act for superiors. It is important to note that, while some responsibilities can be delegated, the superior remains accountable for seeing that they are carried out.

Individual responsibilities apply to every employee in the workplace, including the Chief Executive Officer. When a safety coordinator has been appointed, it is best to spell out his/her responsibilities as well. All employees will then know exactly what is expected of each individual in health and safety terms.

To fulfill their individual responsibilities, the people must:

- ✓ know what these responsibilities are (communication required)
- ✓ have sufficient authority to carry them out (organizational issue)
- ✓ have the required ability and competence (training or certification required)

Examples of responsibilities of workers include:

- using personal protection and safety equipment as required by the employer
- following safe work procedures
- knowing and complying with all regulations
- reporting any injury or illness immediately
- reporting unsafe acts and unsafe conditions
- participating in joint health and safety committees

Examples of responsibilities of first-line supervisors include:

- instructing workers to follow safe work practices

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- enforcing health and safety regulations
- correcting unsafe acts and unsafe conditions
- ensuring that only authorized, adequately trained workers operate equipment
- reporting and investigating all accidents/incidents
- inspecting own area and taking remedial action to minimize or eliminate hazards
- ensuring equipment is properly maintained
- promoting safety awareness in workers

Examples of responsibilities of management include:

- providing a safe and healthful workplace
- establishing and maintaining a health and safety program
- ensuring workers are trained or certified, as required
- reporting accidents and cases of occupational disease to the appropriate authority
- providing medical and first aid facilities
- ensuring personal protective equipment is available
- providing workers with health and safety information
- supporting supervisors in their health and safety activities
- evaluating health and safety performance of supervisors

Purpose of workplace health and safety committee

An effective safety program needs the cooperative involvement of all employees. An occupational health and safety committee is a forum for cooperative involvement of employees representing both labor and management. Such committees are statutory requirements for organizations of a specified minimum size in most Canadian jurisdictions. The responsibilities of members are generally spelled out in the health and safety legislation across Canada.

A joint health and safety committee brings together labor's in-depth, practical knowledge of specific jobs and management's larger overview of job interrelationships, general company policies and procedures. This team can be more effective in solving health and safety problems than a single individual.

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To function properly, the committee needs an appropriate structure, a clear statement of purpose and duties, and standard procedures for meetings. An employer does this by establishing terms of reference for the committee and by allocating adequate resources.

Essentially, any documentation that helps establish a joint health and safety committee and its role in an organization can be considered a "terms of reference". The employer must establish a committee is organized and operates in compliance with the law, is effective, involves the widest range of employees, and provides resources (e.g., time, money, meeting rooms) so the committee can do its work. These requirements are known as "terms of reference". Common terms of reference include:

- Stating senior management's commitment to act on the committee's recommendations
- Defining how long a person will serve on the committee (if not specified by legislation)
- Establishing how a committee member will be chosen, etc.

Correct work procedures established

Governmental health and safety regulations represent minimum requirements. In almost all cases, organizations will have to augment these regulations with specific rules. These rules must be followed to achieve a healthful and safe workplace.

We need rules to protect the health and safety of workers--but there are dangers in having either too few or too many rules. Too few rules may be interpreted as a sign that health and safety are not important, or that common sense is all that is required to achieve them. Too many rules may be seen as not treating employees as thinking adults and makes enforcement of all rules less likely.

Following are some guidelines for establishing rules:

- rules should be specific to health safety concerns in the workplace

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- the joint occupational health and safety committee should participate in their formulation
- rules should be stated in clearly understandable terms
- rules are best stated in positive terms ("employees shall" not "employees shall not")
- the reasons for the rule should be explained
- rules must be enforceable, since disregard for one rule will lead to disregard for others
- rules should be available to all employees in written form, in the languages of communication of employees
- rules should be periodically reviewed to evaluate effectiveness and to make changes for improved effectiveness

Compliance with health and safety rules should be considered a condition of employment. Rules must be explained to new employees when they start work or if they are transferred or retrained. After a suitable interval, these employees should be briefed to ensure they understand the rules applicable to their work.

The employer must establish procedures for dealing with repeat rule violators. Supervisors are responsible for correcting unsafe acts, such as a breach of rules, and they must be supported in this duty. Points that should be considered in establishing procedures on this issue are:

- ensure that employees are aware of the rule
- ensure that employees are not encouraged, coerced, or forced to disregard the rule by fellow employees
- all rules are to be observed
- no violation will be disregarded
- the role of discipline is that of education, not punishment
- action is taken promptly
- while having guidelines for penalties for the first offence or infractions may be desirable, some flexibility is required when applying the guidelines since each case will vary in its circumstances

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- Action is taken in private, and recorded.

Establish correct work procedures

Correct work procedures are the safest way of doing a job, job instruction, monitoring performance, and accident investigation. Job safety analysis (JSA), also known as "job hazard analysis", is the first step in developing the correct procedure. In this analysis, each task of a specific job is examined to identify hazards and to determine the safest way to do the job. Job safety analysis involves the following steps:

1. Select the job
2. Break down the job into a sequence of steps
3. Identify the hazards
4. Define preventive measures

The analysis should be conducted on all critical tasks or jobs as a first priority. Critical jobs include:

- those where frequent accidents and injuries occur
- those where severe accidents and injuries occur
- those with a potential for severe injuries
- new or modified jobs
- infrequently performed jobs, such as maintenance

Workplace inspections

Workplace inspections help to identify existing hazards so that appropriate corrective action can be taken. Health and safety legislation requires workplace inspections as a proactive action to ensure workplace health and safety. Some jurisdictions provide guidelines for doing regular workplace inspections. Supervisors and workers are responsible for reporting and taking action on unsafe conditions and acts as they are encountered. The frequency of planned formal inspections may be set out in legislation. Records of previous accidents and the potential for serious accidents and injuries are factors to be included when determining if more frequent inspections are needed.

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Joint health and safety choices of personnel to carry out formal inspections, especially if they have received training or certification.

committee members are obvious out formal inspections, especially if

Other criteria for selecting the inspection team are:

- knowledge of regulations and procedures
- knowledge of the hazards in the workplace
- experience with work processes involved

Pre-planning any inspection is always worthwhile. Documents, such as previous inspections, accident investigations, maintenance reports, and safety committee minutes, should be consulted. If a checklist is to be used, it should be reviewed and changed to meet specific needs of the workplace. Checklists are useful aids in that they help ensure that no items are overlooked in an inspection. One type of checklist is the "critical parts inventory". This inventory itemizes parts and items that may result in a serious accident if they fail. While many ready-made checklists are available in safety literature, it is best to adapt these to local conditions. The joint health and safety committee should participate in the preparation of these tailor-made checklists.

Clearances

- (1) In any passageway that is regularly travelled by motorized or manual materials handling equipment, the employer shall ensure that
- (a) an overhead clearance is at least 150 mm above
 - (i) that part of the materials handling equipment or its load that is the highest when the materials handling equipment is in its highest normal operating position at the point of clearance, and
 - (ii) the top of the head of the operator or any other employee required to ride on the materials handling equipment when occupying the highest normal position for the operator or employee at the point of clearance; and
 - (b) A side clearance is sufficiently wide to permit the motorized or manual materials handling equipment and its load to be maneuvered safely by an operator, but in no

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case less than 150 mm on each projecting part of the equipment being operated in a normal manner.

side measured from the furthest or its load, when the equipment is

(2) Where an overhead clearance measured in accordance with subparagraph (l)(a)(i) or (ii) is less than 300 mm, the employer shall cause

(a) The top of the doorway or object that restricts the clearance to be marked with a distinguishing color or mark; and

(b) The height of the passageway in meters to be shown near the top of the passageway in letters that are not less than 50 mm in height and are on a contrasting background.

(3) Subparagraph (l)(a)(i) and subsection (2) do not apply in respect of

(a) Motorized materials handling equipment whose course of travel is controlled by fixed rails or guides;

(b) that portion of the route of any motorized or manual materials handling equipment that is inside a railway car, truck or trailer truck, including the warehouse doorway leading directly to it; or

(c) A load the nature of which precludes compliance with that subparagraph or subsection if precautions are taken to prevent contact with objects that may restrict the movement of the equipment.

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Self-Check 3

Written Test

Instructions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers. Write your answers in the sheet provided in the next page.

1. What are individual OH&S responsibilities? (3 point)
2. What is the purpose of workplace health and safety committee?(5 points)
3. How do you establish correct work procedures?? (5 points)
4. What is work place inspection? Explain it (2 points)

Note: Satisfactory rating - 15 points Unsatisfactory - below 15 points
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

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Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____

4. _____

Information Sheet-4	Reporting mal-function fault or damage to supervisor
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Report and investigate in case an accident occurs

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Occupational health and safety jurisdictions requires that accidents must be reported. There may be minimum legal requirements for their investigation. Realizing the value in so doing, many organizations investigate lesser accidents (where damage did not involve injuries) and "near misses." The health and safety program should specify:

legislation in all Canadian injuries and certain categories of

- what is to be reported
- to whom it will be reported
- how it is reported
- which incidents are investigated
- who will investigate them
- what forms are used
- what training investigators will receive
- what records are to be kept
- what summaries and statistics are to be developed
- how often reports are prepared

Accidents and incidents are investigated so that measures can be taken to prevent a recurrence of similar events. Investigation represents an "after-the-fact" response for any particular mishap. However, a thorough investigation may uncover hazards or problems that can be eliminated "before-the-fact" for the future. After causes have been determined, prompt follow-up action is required to achieve the purpose of the investigation.

Emergency procedures and they established

Emergency procedures are plans for dealing with emergencies such as fires, explosions, major releases of hazardous materials, violent occurrences, or natural hazards. When such events occur, the urgent need for rapid decisions, shortage of time, lack of resources, and trained personnel can lead to chaos. The objective of the plan is to prevent or minimize fatalities, injuries, and damage. The organization and

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procedures for handling these must be clearly defined.

sudden and unexpected situations

The development of the plan follows a logical sequence.

Compile a list of the hazards (for example: fires, explosions, floods).

Identify the possible major consequences of each (for example: casualties, damage).

Determine the required countermeasures (for example: evacuation, rescue and firefighting).

Inventory the resources needed to carry out the planned actions (for example: medical supplies, rescue equipment, training personnel).

Based on these considerations, establish the necessary emergency organization and procedures.

Communication, training, and periodic drills are required to ensure adequate performance when the plan must be implemented.

Establish medical aid and first aid programs

First aid facilities and the provision of medical aid is generally prescribed under health and safety legislation or workers' compensation legislation. The OSH program must include the following information:

- location of first aid stations and medical facilities
- identification of first aid attendants
- identification of other staff trained in first aid
- policy on pre-employment and follow-up medical examinations
- procedures for transporting injured employees to outside medical facilities
- provision of first aid training
- procedure for recording injuries and illnesses

A policy on return to work after a lost-time accident might appropriately be included in this section of the program. The fact that "light duties" or "modified work" is a controversial issue is all the more reason for the organization to agree on a clear policy

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that is known by all employees.
work rules are covered by

In some jurisdictions, modified
legislation.

In general, if injured workers are offered alternative employment:

- The work must be suitable and productive.
- The worker's physician must agree that such employment will not harm the worker or slow down the recovery.
- The worker will pose no threat to other workers.
- The policy is applied to off-the-job injuries as well.

Under no circumstances should the reduction of severity ratings be a reason for initiating a "modified work" program.

Promote employee involvement in health and safety programs

Once the health and safety program has been set in place and the program appears to be running smoothly, effort is still required to maintain enthusiasm and interest. Studies have shown that the effectiveness of health and safety educational techniques depends largely on how much importance management is seen to place on health and safety. Where management, by its actions, has shown that they are sincerely concerned, interest in the program can be maintained at a high level. Accountability for individual performance is a key motivator.

Safety awareness can be enhanced by:

- the setting of realistic goals and monitoring progress
- distribution of all pertinent information
- individual recognition for superior performance
- general meetings, tailgate talks, and one-on-one coaching
- well-designed incentive programs

The safety incentive program is probably the most controversial. Most incentive programs are based on the rationale that anything that raises safety awareness is worthwhile. However, there are those who do not share this viewpoint. They maintain that these programs lead to under-reporting of accidents and promoting of the "walking wounded" syndrome. Programs must not encourage workers to remain at work when

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doing so is unsafe for them due to their physical condition. Therefore, when an incentive program is launched, strict controls must be maintained to prevent this from happening. The joint health and safety committee can play a leading role in activities designed to promote the program and participation of all employees.

The elements of OH&S programs discussed so far apply to all basic health and safety programs. In addition, specific items may be needed to address workplace specific activities. Examples of such items are:

Workplace Hazardous Materials Information System (WHMIS)

- lock out procedures
- hot-work permits
- material handling rules
- plant maintenance
- fire safeguards
- off-the-job safety
- working alone guidelines
- personal protective equipment requirements
- purchasing standards
- preventive maintenance

Implement occupational health and safety programs

A good health and safety program provides a clear set of guidelines for activities that, if followed rigorously, will reduce accidents and cases of occupational disease. The key to success is the manner in which the program is implemented and maintained.

Senior management must demonstrate commitment and support the program by:

- ✓ providing resources such as time, money, and personnel
- ✓ ensuring that employees receive training or certification as required

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- ✓ making all applicable health and safety information available to all employees entitled to receive it
- ✓ including health and safety performance as part of employee performances appraisals at all levels
- ✓ attending health and safety meetings

The program must be communicated to all employees. Special emphasis should be given to new workers, newly appointed supervisors, and new members of the joint health and safety committee. Revisions to policies and procedures should be publicized. The program should be available in a single written document. However, if separate manuals have been developed for various elements, such as accident investigation procedures, their use should be referred to in the main document.

Self-Check 4	Written Test
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Instructions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers. Write your answers in the sheet provided in the next page.

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1. What are individual OH&S responsibilities? (5 points)
2. What is the purpose of workplace health and safety committee? (5 points)
3. How do you establish correct work procedures? (5 points)
4. How do you implement occupational health and safety programs? (5 points)

Note: Satisfactory rating - 20 points Unsatisfactory - below 20 points

You can ask your teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

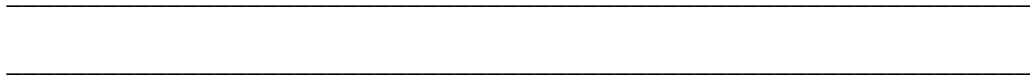
Name: _____

Date: _____

Short Answer Questions

1. _____

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Reference

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