



BEEKEEPING Level-II

Learning Guide-01

Unit of Competence: Assist in
Construct and Repairing of Beehives
Module Title: Assisting in Constructing
and Repairing of Beehives

LG Code: AGR BKGII M07LO1-LG-o7

TTLM Code: AGR BKGI M07sTTLM 0919v1

LO 1: Prepare to construct or repair
beehives



Instruction Sheet	Learning Guide #12
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics-

- Identifying required **materials and equipment** according to lists provided and/or supervisor instructions.
- *Checking beehive components* for assembly or use in repairs.
- Replacing Faulty or incorrect components are returned to store room.
- Conducting Checks and reporting all other materials and equipment and insufficient or faulty items
- Selecting and checking Suitable PPE are prior to use.
- Identifying and reporting Occupational health and safety hazards.

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 –

- Identifies required **materials and equipment** according to lists provided and/or supervisor instructions.
- *Checks beehive components* for assembly or use in repairs.
- Replaces Faulty or incorrect components are returned to store room.
- Conducts Checks and reporting all other materials and equipment and insufficient or faulty items
- Selects and checking Suitable PPE are prior to use.
- Identifying and reporting Occupational health and safety hazards.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. 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.
4. Accomplish the “Self-check 1” in page **6**.
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 “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.



7. Submit your accomplished Self-check. This will form part of your training portfolio.
8. 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.
9. Accomplish the “Self-check 2” in page 11.
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).
11. 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.
12. Accomplish the “Self-check 3” in page 14.
13. 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).
14. If you earned a satisfactory evaluation proceed to “self.
15. Conducting Checks and reporting all other materials and equipment and insufficient or faulty items
16. Identifying and reporting Occupational health and safety hazards.
17. Self check 4”page 27. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
18. Read the “self check 4” and try to understand the procedures discussed.
19. If you earned a satisfactory evaluation proceed to “self check 6 in page 26. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
20. Read the “Operation Sheet 2” and try to understand the procedures discussed.
21. If you earned a satisfactory evaluation proceed to “Operation Sheet 2” in page 27. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
22. Read the “Operation Sheet 3” and try to understand the procedures discussed.
23. Do the “LAP test” in page 27 (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 advice you on additional work.



Information Sheet-1	Identify required <i>materials and equipment</i>
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1. Tools and Materials required for hive construction

Thicknesses machine for adjusting thinness and surface smoothing Circular **saw** for cutting wood

Jointer machine for smoothing edges and creating side bar shoulders

Measuring tape Measuring tape

Digital calliper

Framing square or drywall

T-square

Table saw

Sabre saw (sword with a slightly curved blade that is sharp on one edge)

Putty knife or chisel

Hammer

Clamps

Power Drill-drill with bits Jigsaw Chop saw Sanding block Carpenters square (or a frame jig)

Carbide-tip blade

1.2 Materials

Waterproof wood glue

19 mm thick Waterproof plywood

5 mm thick Waterproof plywood

5 and 8 cm galvanized nails

3 cm hardened trim nails (small nails)

Cigar box nails (16 mm shoe nail)

Timber for frames

Timber for entrance block/reducer

Lumber of thickness 20 mm after finished the following are the images listed below look the diagrams for detail



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Self-Check -1	Written Test
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Directions: write short answer

1, list at least 4 tools equipment for hive construction (4point)

2, List at least 4 equipment for hive construction (4point)

Note: Satisfactory rating – 4 points

Unsatisfactory - below 4 and 4 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Information Sheet-2	<i>Check beehive components for assembly</i>
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2.1 introduction

The word modern beehive in this manual is used to describe an artificial, man-made box structure to nest or house a honeybee colony of *A. mellifera* or *A. cerana* species. It is made of stackable boxes that held frames in which honeybees will make their honey combs. The hive needs to sock the balance between the requirements of the colony and ease and convenience for the work of beekeepers. The interchangeability of similar parts of the beehive like frames, outer covers, bottom board, and inner covers shall be important for modern beekeeping. The difference between traditional and modern beehives is that



traditional hives simply provide an enclosure for the bee colony and no internal structures for the bees to build honeycombs and no convenience for the work of beekeepers. Honeybees construct their own honeycombs fixed on the hive wall. This makes honey harvesting very difficult or totally impossible without destroying the combs. But in modern beehive, bees construct their honeycombs in frame for easy removal without colony disturbance and extraction of the honey for re-use of the combs. In using modern hives, there is a possibility to expand the size of the beehive by stacking boxes (supers), so that the hive can grow with the colony. The total hive system consists of a bottom board with an entrance for the bees, boxes which containing frames for brood and honey and inner and external covers for weather protection. There are different hive types (Lang stroth, Zander, Foam, Dadant and Modified Zander etc.) almost all of which are similar in having boxes arranged bottom up for easy manipulations. The bottom or lower box is used for the queen to lay eggs, and the above boxes (supers) to serve as honey storing room for the bees. In each box, there are vertically hanging frames on which bees build their combs. Between the frames and other parts are specific spaces, called bee space for the movement of individual bee for comb construction, brood rearing, and storing foods. In order to understand the process of hive construction, it is necessary to define some terminologies related to different hive parts.

2.2 Different parts of a beehive and their definitions

For the purpose of easy understanding of some parts in the process of beehive Construction, the following definitions were adopted.

Bee space is path or corridor bees need to move between the combs and around the nest, a vital path to allow bees walk freely. In Modern frame hives, bee space is the distance between the outside end of each frame and inner hive wall opposite to it, between adjacent surface of completed and sealed worker brood combs, and between the top of frames in the lower box and the bottom of the frames in the upper box

Frame spacing in a modern box hive is the distance between the adjacent comb midribs or sheets of foundation in the frames. It is determined by the bee space, which in turn is determined by the size of bee races under consideration.

Brood chamber



Brood chamber is a four-sided wooden box of rectangular cross-section without a top or a bottom, in which the brood frames are placed. It holds 10 frames in which foundation sheet fixed on which bees build wax onto for various purposes.

Based on the top bar size, the bottom bar shall be 20 mm wide, 10 mm thick and 440 mm long. It shall be made of well-seasoned wood as well. To fit perfectly to the side bars, cutting notch of 2.5 mm deep on the two sides at 15 mm from the two ends is important to fit the bottom bars into the side bars. Then the ends of the bottom bars shall be joined into the side bars by these notches

Honey chambers/supers

Honey chambers are four-sided wooden box of rectangular cross-section without a top or a bottom in which the frames of similar size are placed. It is similar to the brood chamber but placed above it when in use. It holds 10 similar frames with that of brood chamber where the bees will store honey. One can stack as many honey supers on top of the hive as needed but at least two for one hive.

Frame A frame

is a structure made up of a top bar, a bottom bar and two sidebars in which the bees develop comb to rear brood, store pollen, nectar and/or honey. Frames are constructed in such a way that a series of them may be placed in a vertical position in the brood chamber or the honey chambers/supers so as to leave space (=bee space) in between themselves and hive body for bees to move freely.

Frame and its dimension

Based on the study result for bee space, cell depth and comb thickness from traditional hives from the local bee colonies

Bottom board and Mite floor



Bottom board is a four-sided wooden box of rectangular cross-section screened with 3 x 3 mm wire greed at the middle and with perfectly sealed bottom, on which all hive parts placed to keep bees for all the required activities. It has ledge around three sides that raises the hive parts leaving an open slit in the front, which is primary covered by the entrance block (Fig 10). Mite floor is a four-sided rectangular board for different pest management. It is prepared from waterproof plywood, on which sticky glue will be placed to trap particularly small pests like Varro mites and larvae of small hive beetle that crawling out intended for pupation process in the soil as part of protecting bees from re-infestation of the pests.

Entrance reducer is a small piece of wood block at the hive entrance usually provided with slot of suitable size for bees to enter and leave the hive for foraging and other activities. It fits between the bottom board and the first super (brood chamber) and to protect bees against bigger pests and robbers.

Outer cover

Outside lid is a wooden plate with four sides covered by smooth metal sheet of 0.5 mm and always placed on the last upper hive chamber (brood or super). The outside cover/ roof lid is wider than the rest of the hive chambers with an overhang of 65 mm so that water drips beside the hive rather than running down the side of the hive chambers or possibly into the hive.

Inner/inside cover

Inside cover is a four-sided box of rectangular cross-section without a top and bottom with a water proof plywood separator screen at the middle with a passage hole for the bees to visit upper part of the inner cover. The inner cover will serve as a feeder to supply bees with sugar syrup or pollen patty during dearth period and also for various beekeeping activities. The size of the passage hole can be with a dimension of 50 mm x 80, but can be of different size.

Top bar

From the different workshops the average length of top bars is almost 480 mm. To determine the width of a top bar, considering the comb thickness is a logical decision. From Table 1,



average comb thickness is about 25 mm and this can be considered as the width of top bar. So the top bar shall be 20 mm thick, 25 mm wide and 480 mm long. It shall be made of well-seasoned wood to prevent swelling and shrinking. Cutting notch of 5 mm deep on the two sides and 10 mm deep on the bottom at 35 mm from the two ends to fit the top bars into the side bars (Figure 2). Then the ends of the top bars shall be joined into the side bars by these notches for facilitating hang for the frames. It is important to use grooved top bar frames to facilitate fixing of foundation, which otherwise warp if not inserted into the 5 mm deep groove.

Bottom bars

Based on the top bar size, the bottom bar shall be 20 mm wide, 10 mm thick and 440 mm long. It shall be made of well-seasoned wood as well. To fit perfectly to the side bars, cutting notch of 2.5 mm deep on the two sides at 15 mm from the two ends is important to fit the bottom bars into the side bars (see Figure 2). Then the ends of the bottom bars shall be joined into the side bars by these notches

Side bars

The side bars are important parts of the frame to determine the bee space in the hive. So the side bars should be of shoulder type. It shall be 15 mm thick 36 mm wide at the top and 27 mm wide at the bottom to provide the required bee space. This space is in similar range for honeybees' natural comb spacing result (Table 1). It should have a total length of 230 mm having four holes for wire reinforcement at 57.5 mm. The hole shall be made at the center of the two side bars. This will give the holes at 37.5 mm away from the top bar and 47.5 mm away from bottom bar while the remaining holes shall be at distance of 57.5 mm from each other. To facilitate the fitting of top and bottom bars with the side bars, cut two 10 mm deep at 15 mm wide from the center and remove the cut from the center by leaving of two forks on the side

A complete assembled beehive looks like the following sketch.



Self-Check -2	Written and demonstrate Test
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Directions: write short answer

1, list hive components of hive which are assemble and disassemble (2point)

2, How many bars are required for one modern hive (2point) _____

Note: Satisfactory rating – 4 points

Unsatisfactory - below 4 and

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Information Sheet-3	Replace Faulty or incorrect components of bee hive
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3. 1 care and hive replacement of component

The beekeeping industry is riddled with problems, not least of which is the high attrition rate of beehives. Beekeepers regularly have to replace or fix their hives due to damage or loss



caused by, among other things, weathering, fires, theft, vandalism, pests, animals and floods. The standard wooden beehives have also created hurdles for small scale, rural beekeepers who lack equipment and skills to produce and maintain the equipment. There are a variety of materials that can be used to make beehives, some of which have properties that may solve the various problems. The goal of this study was to either confirm or disprove wood as the best material. By identifying certain categorical requirements of a beehive on the material it is made of, I was then able to test 18 different materials and categorically determine their suitability to the application. Through comparatively analysing the results, lightweight concrete and regular, dense concrete emerged as more suitable materials than wood, leading to the development of the Begin appropriate beekeeping technology. replace faulty material and burn them to prevent bee diseases.



3.2. Advantage of hive component repiaring.

- Reduce cost by increasing shelf life of hive
- To avoid total damage of hive
- Used to manipulating easily
- To prevent diseases which are live in injured part of hives
- To prevent predators etc.



Self-Check -3	Written and demonstrate Test
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Directions: write short answer

1, write advantage of hive component maintenance? (point)

2, write of hive component replacement (2points)

Note: Satisfactory rating – 2 points

Unsatisfactory - below 2 and

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Information Sheet-4	Conduct Checks all other materials and equipment and report
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4.1. Check the following tool and equipment in working area

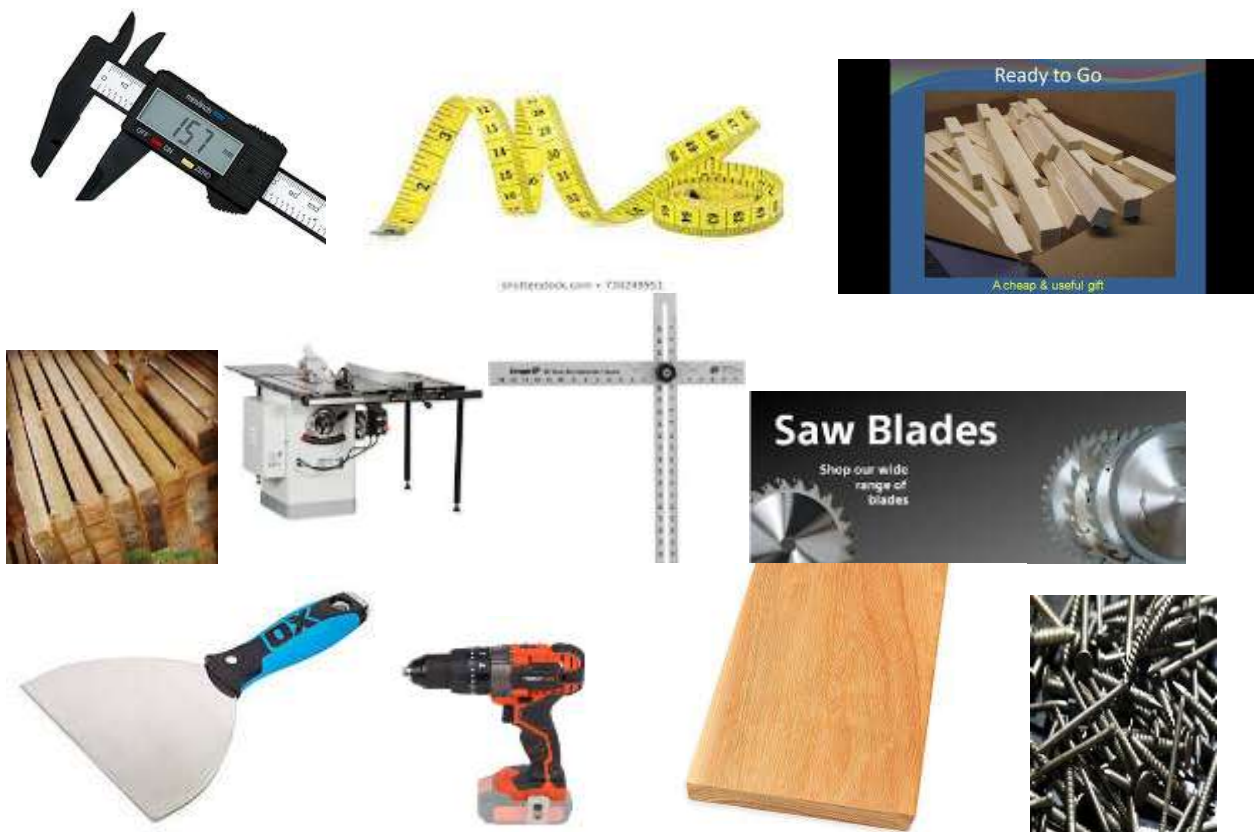
MATERIALS

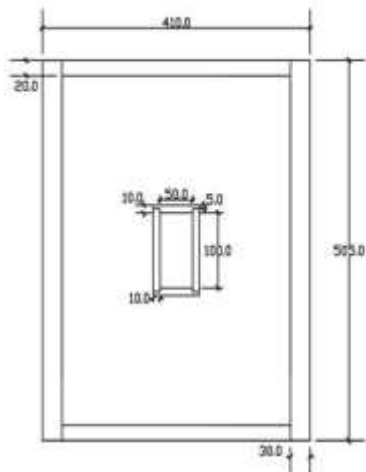


In industry (industrial) materials are inputs into production processes. A material is a chemical substance or combination of substances that can be constituted to form an object (design). There are thousands of materials that can be used in the production of objects, so to begin with I narrowed the focus down to those materials most commonly used for products of this nature (feasibility study excluded). The materials are separated into 4 main categories.

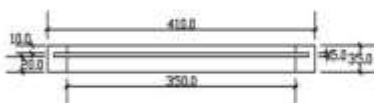
- **METAL** -aluminum sheet, cast iron and mild steel metal
- **WOOD-pin** ,poly wood, marine poly wood and paper and cardboard
- **POLYMERS**-Foam - polystyrene ,Foam – polyurethane, Rotation molded plastic (ABS, HDPE, LDPE, PP, PET, HIPS) Injection molded plastic (ABS, HDPE, LDPE, PP, PET, HIPS) Composite (fiber-glass & polyurethane resin)
- **SAND AND STONE**- Clay, (unfired) ,Clay (fired) Stone Brick & mortar Concrete and Lightweight Concrete

To be prepare beehive hive the trainer must collect and check the materials and tools in his work shop showing below but the material is not limited simply available resource can use as listed in the above.

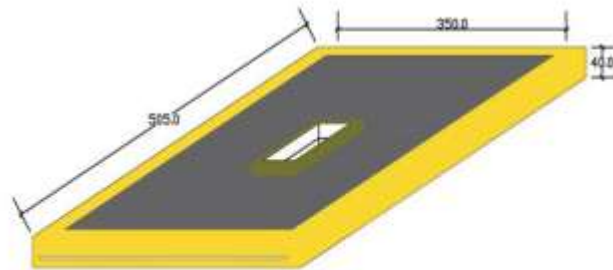




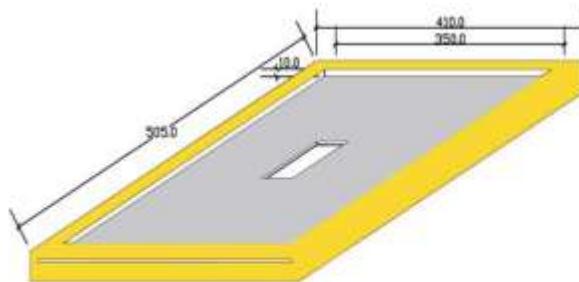
Top View



Front View



Top View



Bottom View

10 frame for each hive and other materials will be check



This category deals with the ergonomic properties of the material. Beekeeping (specifically the field activities of inspections and harvesting) is laborious muscle work. The components of a beehive are each lifted and put down several times per hive. The hive also contains honey and brood that can add 20kgs to each chamber. The work is also done wearing a heavy protective suit, gloves, boots and a veil, adding complexity. Beekeepers do have systems and practices for avoiding injuries, mistakes and extra strain. Like pairing up, using the frame-by-frame method of harvesting, using leaf blowers and operating small forklifts. However, at a small-scale it is often a single person working on their own, with no added equipment.

You may think, 'lighter = better' for the purposes of the beekeeper. However lighter weight also produces a negative consequence – the beehive becomes easier to steal. There are other benefits to heavy weight, like protection from winds, but with light hives natural threats are easily overcome with a clever stand. With human threats there is no solution outside of making it harder for the person to steal or vandalizes your hive. If someone really wants to steal or destroy a light beehive, as much as you try to secure it, there will be tools to unsecure it.

With weight it is possible to deter a lot of theft, simply by making the beehive a little too heavy to carry away.

So, for this category the scoring was more complicated. A heavier material would get both a good and bad score. Obviously, all the scores would level out at 5/10. So, in this category, I decided to focus on the lighter = better argument. Then at the end, when compiling the results, I weighted this section slightly lower than other sections to account for the benefit/drawback issue. To prevent such activity apply 3s first level in your working area.



Self-Check -4	Written Test
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Directions: write short answer

1, one of the following **not** used to make bee hive

A, metal

B, wood-pin

C, polymers

D, Sand and stone

E, none

2, list the material 4categories that used for hive contraction_____

Note: Satisfactory rating – 4 points

Unsatisfactory - below 4 and

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Information Sheet-5	Select and check Suitable PPE are prior to use.
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5.1 Personal Protective Equipment (PPE)

Personnel participating in beekeeping activities should, at a minimum, wear a beekeeping hat and veil, elbow length gloves that are leather or nitrile, and closed-toe/closed-heel shoes.



Before entering the beekeeping area, personnel shall wear clean protective clothing/personal protective equipment. The protective clothing should be without holes to prevent bees from entry.

5.2. Beekeeping hat and veil



- The ventilated hat should keep its shape and be firm enough to support the veils that fit over them and provide space that keeps the veil away from the face.
- Veils are required when working closely with the bees. A folding wire veil should be fitted to the hat to ensure good separation between the beekeeper's face and the bees outside the veil.

Dark felt hats and floppy hats should be avoided

5.3. Beekeeping gloves



- Gloves need to be strong, but pliable;
- Elbow length cloth sleeves attached to the gloves should be worn when gaining access to the inside of the hive; or
- A band of elastic should be sewn into the cloth sleeve at the elbow end to make it bee-resistant.

5.4. Footwear/boot/



Closed-toe and closed-heel shoes should be worn. boot

5.5. Bee sting first aid



Reactions to bee stings

- Normal reaction includes: some pain, redness, itching, and swelling at the site
- Mild to moderate reaction includes: persistent or spreading pain, itching or swelling, large or uncomfortable areas of pain, redness, itching or swelling, ongoing symptoms over several days.
- Severe (Anaphylactic) reaction includes: Abdominal pain or vomiting, difficult or noisy breathing, swelling of the tongue, swelling or tightness of the throat, wheezing or persistent cough, difficulty talking or swallowing and/or hoarse voice, persistent dizziness or collapse.

What to do if you are stung

- Remove yourself from the vicinity of the hive.
- Remove the stinger by scraping the sting as soon as possible. Personnel shall not delay the removal of the sting, regardless of the method used to remove it, as it increases the amount of venom injected into the body.
- Oral antihistamines may assist with persistent itching.
- If you have an adrenaline auto-injector, such as an EpiPen, you should locate it in case your symptoms worsen or call 911.
- Be aware that antihistamines will not prevent or treat anaphylaxis, the most severe form of allergy. The only pre-hospital treatment for anaphylaxis is adrenaline.

Reporting injuries and stings

- Employees must notify their supervisor and/or the head beekeeper immediately if an injury or illness occurs.
- If the person stung is an employee, within 24 hours, the supervisor (or designee) must fill out and submit an injury/illness form. More information regarding injury reporting can be found at
- If the person stung is a student or other non-employee, they or the head beekeeper should fill out the form provided within 24 hours.
- A beekeeper shall be on site and equipped with supplies to remove bee stings. Personnel should know and understand how to use the first aid kit in the event of a sting.



- IU Police Department for the respective campus shall immediately be contacted if an individual starts to experience a mild to severe reaction bee sting.

Training and recordkeeping

Training

- First aid training should be completed by the head beekeepers.
- Fire extinguisher training should be completed by anyone who may be expected to use a fire extinguisher. Training is required annually.

Recordkeeping

- The department or organization sponsoring the beekeeping shall retain completed liability release forms for all participants for at least three years after the last beekeeping activity by each individual.
- The department supplying the training shall maintain training documentation.

Self-Check -5	Written and demonstrate Test
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Directions: write short answer

1, List PPE for beekeeping (2point)_____

Note: Satisfactory rating – 2 points
points

Unsatisfactory - below 2 and

-
- **Answer Sheet**

Name: _____

Date:

Score = _____
Rating: _____



Information Sheet-6	Identify and report Occupational health and safety hazards
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6.1. Identifying and participating in manual handling hazards

To begin the risk management process we firstly need to have the ability to identify tasks that have the potential to cause manual handling injuries. Under the OHS Regulation, hazard identification must be conducted by employers:

- before using any premises as a place of work
- before and during installation, erection, or alteration of plant
- before changes to work practices and systems of work are introduced
- whilst work is being carried out
- when new or additional health and safety information becomes available.

Management's responsibility is to ensure that hazard identification takes place at all stages of product service or delivery, from design to manufacture, supply and product use. Supervisors should support this process by involving all employees in the hazard identification process to ensure success.

Manual handling can include any of the following:

- application of force
- repetitive or sustained application of force
- repetitive or sustained awkward posture
- repetitive or sustained movement
- exposure to sustained vibration
- handling live people or animals
- Handling loads that are unstable, unbalanced or difficult to hold.

6.2. Fire fighting and first aid equipments

Fire is one of the most serious hazards on a beekeeping farm. It is usually caused by carelessness. Most fires start from electrical equipments, heaters, or careless smoking. Other causes of fires are lighting, arson, and spontaneous combustion. High level of moisture and ammonia in livestock confinement is also another cause of fires.



First aids kits should present at all work area with proper medical supplies.

Items in first aid kits include;

Various Size of sterile bandages

Roller bandages

Triangular bandages

Cotton balls

List of names and phone numbers of nearest doctor, ambulance, and paramedic services, and poison control centers etc.

6.3 Ways to get and keep people involved in maintaining health and safety

A safe workplace requires the active involvement of all people who work in the business or organization. The important thing is that all employees must have a way to have their OHS concerns brought to the attention of 'management' and that employees are consulted about how risks will be managed in the workplace.

Better outcomes are achieved when there is a wide range of ideas about health and safety issues on the farm and how to fix them. Hence, there is usually greater commitment to decisions because everyone is involved in reaching them.

Ways to get and keep people involved

- Work directly with the people who do the jobs in each part of the farm to identify hazards, assess risks and come up with solutions.
- Set regular times to discuss health and safety, such as at weekly job planning meetings, and ensure time is allocated specifically to health and safety matters. Some businesses have occupational, health and safety committees that keep minutes and actions from their meetings.
- Provide a good role model and insist that the farm safety protocols you have established are followed.
- A record of consultation is good practice and may help demonstrate compliance.

6.4. Incorporating OHS in to a work place



Simply having a written OH&S policy is not enough to meet obligations regarding workplace health and safety. To ensure the OH&S policy is effective, there should be a plan for putting the words into meaningful actions. Some ways of doing this include:

- ❖ providing health and safety orientation for new staff;
- ❖ providing health and safety orientation for current staff who start new job tasks, move to new locations, or use new tools, equipment or work processes;
- ❖ providing health and safety training on an on-going basis; including health and safety responsibilities and performance objectives when hiring and evaluating staff;
- ❖ recognizing, evaluating and controlling hazards;
- ❖ conducting regularly scheduled workplace inspections;
- ❖ establishing procedures for reporting and investigating accidents/incidents;
- ❖ documenting and recording health and safety related activities; and
- ❖ Monitoring management and staff to ensure they are carrying out their health and safety responsibilities.

Ensuring success

Part of a successful OH&S policy is ensuring that all workers are aware of its contents. This can be accomplished through:

- ✓ OH&S training;
- ✓ distributing a copy to all workers;
- ✓ including it in policy and procedure manuals;
- ✓ postings on notice board(s);
- ✓ safety talks and meetings; and

A positive example set by management (i.e. how they respond to safety issues, how they carry out their roles and responsibilities, how they enforce the OH&S policy). Maintaining an OH&S policy is as important as developing and implementing it and is necessary for its effectiveness.

Health and safety is not something to be entered into and then forgotten. It is an ongoing process that requires continuous attention of employers, workers, and the WH&S representative/OH&S committee members. These individuals must keep up-to-date with changes in legislation and other areas that affect workplace health and safety. An OH&S policy should be reviewed yearly and revised as required to ensure it continues to effectively reflect the specific needs of the workplace.



Self-Check -7	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. insuring success without risk is accomplished by (4 points)
- a-----
 - b-----
 - c-----
 - d-----

2, What are manual handling risks?. (3 points)

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4points

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

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions



LAP Test	Practical Demonstration
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Name: _____

_____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within **8-12** hours.

Task 1: demonstrate all equipment and tool that are used to hive contraction.(5point)

Task 2: Identify bee colony equipments are normal to work .(5point)

List of Reference Materials

- Deliverable: Manual on Beehive Construction and Operation University of Kassel (UNI KASSEL)Date:15-June 2018
- BEEGIN BEEHIVE MATERIALS RESEARCH SUMMARY Ivan Leroy Brown M Tech Industrial Design November 2018
- ADVANCED BEEKEEPING MANUAL Ethiopian beekeeper association JUNE 2011