Basic Textile Operations

Level -I

Learning Guide -31

Unit of Competence: - Operate Cotton Ginning Machines and Control Bale Press Operations

Module Title: - Operating Cotton Ginning Machines And Controlling Bale Press Operations

LG Code: IND BTO1 M09 LO4-LG-31

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LO 4: Carry out operator Maintenance

Instruction Sheet	Learning Guide 31

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Identifying and reporting minor running problems
- Reporting major machinery or product faults
- Performing minor maintenance and cleaning

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 –**

- Identify and report minor running problems
- Report major machinery or product faults
- Perform minor maintenance and cleaning

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 -.**
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.

Information Sheet-1	Identifying and reporting minor running problems

1. Identifying and reporting minor running problems

Defects in Ginning Process:

Some common faults of ginning process are mentioned in the following:

1 Gin-cut fiber
2 Neps formation,
3 Crushed seeds,
4 A lot of **wastage**.

Causes of running problem

1. Not reading the operator's manual.

"Some farmers have never even opened the owner's manual," Bates says. "Most of what they need to know is in there."

Owner's manuals cover everything from maintenance checklists to calibration instructions. Most issues are addressed in the troubleshooting section so farmers can fix the problems themselves without having to wait for a technician.

2. Improper maintenance.

Skipping daily maintenance is another mistake that can cause downtime. Bates says it is important to grease all lube points daily and check engine oil and fluids such as transmission fluid and urea or diesel exhaust fluid."

"With the new Tier 4 engines, we run into issues with people who use a cheaper urea or diesel exhaust fluid, and that can cause problems with the exhaust and after treatment systems," Bates says.

Farmers also should regularly replace fuel filters and check chains, gearboxes and belts for wear and replace when wear is excessive. On gravity wagons, wheels should be checked for tightness and alignment before going to the field

3. Poor electrical connections.

This problem is hard to prevent and is becoming more commonplace as more machinery is electronically controlled, Bates says. However, cleaning away dust and dirt around the connectors can help. When cleaning, use compressed air instead of water to keep moisture away from the wires.

4. Overrunning machines.

Constantly pushing machines to run at maximum performance or at the top of the engineering curve can strain joints and cause equipment to die prematurely. "We have some operators out there that push the machines too hard for too long and try and force them to do things they weren't designed for," Bates says. He advises farmers to run machines just under their intended maximum performance level at most times to avoid undue stress and prevent premature wear.

5. Not replacing worn parts.

When a part on a machine breaks, some customers will replace only that part and not check or replace other parts that may have caused the initial failure. Examples include replacing a drive chain when the sprocket was shot or replacing a belt when the pulley was bad.

Replacing only the parts that are broken is a temporary fix that can cost money in downtime. "When customers don't replace all the things we recommend need replacing, nine times out of 10 they will come back with bigger problems we'll end up having to fix," Bates says.

6. Misaligned tighteners.

Tighteners that are not tracking straight with the belt or chain in relation to the main drives can put tension on the belt or chain, causing it to break or wear excessively. It's important to replace worn bushings in the tightener pivot that may be pushing the belt or chain sideways.

"On combines, for example, you want to make sure that belts are running straight and that chains and belts are at the proper tension so that they don't slip or break," Bates says. "Also make sure that the shafts are running at the right speed

7. Improper storage.

Combines and planters can build up dust and debris, which attract rodents. Rodents gnaw on wires and the dust itself can interfere with electrical connections.

"You'll see periods where mice and rats get into machinery," Bates says. "It's not rodent proof.

Once they eat up the debris they will chew on wires and seals, and you'll end up spending money on electrical harnesses and that sort of thing."

Bates recommends storing machinery inside and cleaning around all electrical connections and other areas of buildup before parking it inside. Compressed air is better and safer than water for cleanup.

8. Weather-related issues.

Operating in wet, muddy conditions can put strain on equipment, Bates says. For example, running wet, tough material through a combine can break shafts or plug up the machine, which then puts strain on everything from feeder house chains to shafts to bearings and pulleys. In tractors, mud packed in between dual wheels can result in premature wear on the tire sidewalls once the mud hardens.

While it's difficult to avoid these conditions, understanding the weather-related issues can alert you to problems to look for.

9. Ignoring warning signals.

Warning lights on screens are there for a reason, often signaling issues that need to be addressed, such as low hydraulic pressure, high engine temperature or a shaft that isn't turning. However, too often those signals are ignored, resulting in machinery failure.

That's exactly right," Bates says, "especially when it's a hired hand who's told to get the work done. Sometimes you can make it another an hour, and sometimes you can't."

The bottom line is get it checked.

10. Untrained operators.

As farms get larger, farm owners are having to hire outside help that may not be trained to operate machinery. Lack of training can result in abused machinery and costly breakdowns.

"We see that fairly often," Bates says. Time invested in training can make your machinery last longer.

Bates says these 10 problems account for close to 50% of the breakdowns he sees at the dealership. However, taking some simple precautions can go a long way in preventing these issues.

"Times are tougher financially than what they were five years ago, and farmers are not updating equipment as often," Bates says. "So, it is extremely important to pay special attention to regular maintenance and preseason checks to make sure their equipment makes it through the season."

Self-Check -1	**Written Test**

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

1. List down the major faults of ginning. (2 pts.)
2. Mention causes of ginning faults. (8pts.)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

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Information Sheet-2	Reporting major machinery or product faults

2 Reporting major machinery or product faults

2.1 Literature Search and Screening

A literature search was performed to collect pertinent emissions data for operations associated with cotton ginning. This search included documents obtained from EPAs Office of Air Quality Planning and Standards (OAQPS), reports from the U.S. Department of Agriculture Library, documents listed in Dialog information Services, source tests on record with the Fresno County Air Pollution Control District, and data base searches on the Cross Air Toxic Emission Factors Data Base Management System (XATEF), the VOClPM Speciation Data Base Management System (SPECIATE), and the Air Chief CD-ROM. During the review of each document, the following criteria were used to determine the acceptability of reference documents for emission factor development:

1. The report must be a primary reference:

a. Source testing must be from a referenced study that does not reiterate information from previous studies.

b. The document must constitute the original source of test data.

2. The referenced study must contain test results based on more than one test run.

3. The report must contain sufficient data to evaluate the testing procedures and source operating conditions.

4.2.2 Data Quality Rating System'

Based on OAQPS guidelines, the following data are always excluded from consideration in developing AP-42 emission factors:

1. Test series averages reported in units that cannot be converted to the selected reporting units;

2. Test series representing incompatible test methods; and

3. Test series in which the production and control processes are not clearly identified and described.

If there is no reason to exclude a particular data set, data are assigned a quality rating based on an A to D scale specified by OAQPS as follows:

A-This rating requires that multiple tests be performed on the same source using sound methodology and reported in enough detail for adequate validation. Tests do not necessarily have to conform to the methodology specified by EPA reference test methods, although such methods are used as guides.

B-This rating is given to tests performed by a generally sound methodology

C-This rating is given to tests that are based on an untested or new

D-This rating is given to tests that are based on a generally unacceptable

But lacking enough detail for adequate validation.

Methodology or that lack a significant amount of background data.

Method but may provide an order-of-magnitude value for the source.

The following are the OAQPS criteria used to evaluate source test reports for sound methodology and adequate detail:

1. **Source operation**. The manner in which the source was operated should be well documented in the report, and the source should be operating within typical parameters during the test.

2. **Sampling procedures**. The sampling procedures should conform to a generally accepted methodology. If actual procedures deviate from accepted methods, the deviations must be well documented. When this occurs, an evaluation should be made of how such alternative procedures could influence the test results.

3. **Sampling and Process data**. Adequate sampling and process data should be documented in the report. Many variations can occur without warning.

During testing and sometimes without being noticed. Such variations can induce wide deviations in sampling results. If a large spread between test results cannot be explained by information contained in the test report, the data are suspect and are given a lower rating.

4. **Analysis and calculations**. The test reports should contain original raw data sheets. The nomenclature and equations used are compared to those specified by EPA (if any) to establish equivalency. The depth of review of the calculations is dictated by the reviewer's confidence in the ability and conscientiousness of the tester, which in turn is based on factors such as consistency of results and completeness of other areas of the test report.

4.2.3 Emission Factor Quality Rating System'

EPA guidelines specify that the quality of the emission factors developed from analysis of the test data be rated utilizing the following general criteria:

A-Excellent: The emission factor was developed only from A-rated test data taken from many randomly chosen facilities in the industry population. The source category was specific enough to minimize variability within the source category population.

B-Above average: The emission factor was developed only from A-rated test data from a reasonable number of facilities. Although no specific bias was evident, it was not clear if the facilities tested represented a random sample of the industries. As in the A-rating, the source category was specific enough to minimize variability within the source category population.

C-Average: The emission factor was developed only from A- and B-rated test data from a reasonable number of facilities. Although no specific bias was evident, it was not clear if the facilities tested represented a random sample of the industry. As in the A-rating, the source category was specific enough to minimize variability within the source category population.

D-Below average: The emission factor was developed only from A- and B-rated test data from a small number of facilities, and there was reason to suspect that these facilities did not represent a random sample of the industry. There also may be evidence of variability within the source category population. Limitations on the use of the emission factor are footnoted in the emission factor table.

E-Poor: The emission factor was developed from C- and D-rated test data, and there was reason to suspect that the facilities tested did not represent a random

Source category: A category in the emission factor table for which an emission factor has been calculated.

Self-Check -2	**Written Test**

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

1. Explain briefly how to report machine and product faults. (8 pts.)
2. How can you grade product quality? (4 pts.)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

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Information Sheet-3	Performing minor maintenance and cleaning

3. Performing minor maintenance and cleaning

The success and profitability of a ginning operation is determined by the effectiveness of its machinery maintenance program. A comprehensive gin maintenance program impacts safety, fiber quality, daily and annual volume, downtime, energy costs, and maintenance costs (material and labor).

A good gin maintenance program involves continual documentation, communication, and planning. Each employee must communicate the needs and benefits of the program. The office worker compiling the repair and downtime data, the gin crew performing the preventive maintenance and cleaning the gin, the ginner troubleshooting problems and operating the gin, the superintendent troubleshooting problems and planning repairs, and the gin manager overseeing the entire operation while satisfying the customers' needs of timely, quality ginning, all must become part of the gin repair process.

A comprehensive gin maintenance program has four basic components:

1. A sound maintenance philosophy
2. Problem and repair documentation and guidelines
3. A dormant season repair program
4. A preventive maintenance and in-season repair program.

Sound Maintenance Philosophy

For a comprehensive effective repair program, management must adopt and communicate to all employees a sound, year-round philosophy. That philosophy is simply that in order to reduce seasonal downtime, a gin must be repaired properly the first time.

Repair Documentation and Guidelines

The repair, downtime, and preventive maintenance history must be tracked and used in planning the needed dormant season repairs and justifying machinery modifications. The maintenance reports provided in the next three sections are only for illustrative purposes and may be useful in a maintenance program. The most important thing is documentation of the gin's performance, the individual machinery problems, and the t3^e of gin repairs. Written guidelines should emphasize management's commitment to quality repair and should direct activities of seasonal employees who are unfamiliar with the operation of a gin. Guidelines for a sound repair program during the ginning season include the following:

1. Keep the gin clean and safe.
2. Perform inspections by competent employees trained in detecting problems before they cause lengthy shutdowns.
3. Perform preventive maintenance (P.M.) on a routine basis.
4. Shut down the gin (if possible) before making repairs.
5. Take time to think about how to do the repair safely.
6. Have the crew perform P.M. work elsewhere if the gin is shut down for a repair.
7. Have an adequate supply of parts on hand for repairs.
8. Repair machinery properly the first time.
9. Maintain a log of downtime for all repairs) and a log of maintenance performed. A dormant

Guidelines for a repair program during the dormant season include the following:

1. Keep the gin clean and safe (lock out power to a machine before working on it).
2. Follow the manufacturer's specifications when repairing machinery.
3. Spend the money to make repairs properly so that seasonal downtime is reduced.
4. Repair machinery that might otherwise not make it through the season.
5. Plan ahead to have repair tools and parts on hand.

Dormant Season Repairs

A dormant season repair program should enable the ginner to make repairs in an organized and thorough manner, thus minimizing seasonal downtime. A team consisting of the ginner, superintendent, and manager should be involved in planning repairs. All information from the P.M. reports and downtime reports can be compiled and used to determine trouble spots within the systems.

The team should have guidelines for checking each machine and a list for all the parts that may be needed for repairing each machine. The team should start at one end of the gin and systematically work their way through the gin, inspecting each machine one by one. After inspection, the team can determine the cost of the repairs and should determine if the repairs indicated on the repair checklist will solve the problems identified on the downtime report. Repair checklists will allow the ginner to obtain, in one purchase, all the parts needed for the machines requiring repair. With these parts in hand, the ginner can concentrate on repairing one or two machines at a time without waiting for delivery of repair parts.

In making any repair, particular care should be taken to ensure that speeds and adjustments are set according to the manufacturer's recommendations. Manufacturer's parts instructions and maintenance books provide all the information necessary to make the proper adjustments.

Preventive Maintenance (P.M.)

The success of a ginning operation is determined by how efficiently the cotton is ginned. The gin should be properly repaired and ready to operate at maximum efficiency with minimum downtime. The basic principle of P.M. is the reduction of downtime through the scheduling of routine maintenance and repairs. Preventive maintenance will reduce repair costs while increasing daily production. Repair costs are reduced by doing small repairs on the machinery before larger problems occur as other components are impacted. The larger problems require more downtime and cause more expensive repairs.

Preventive maintenance should be scheduled once during each operating shift. If a gin is operating 12 hr/shift, 1 hr should be devoted to preventive maintenance. All members of the crew must participate and have certain machinery for which they are always responsible.

After all machinery is safely locked out and proper safety instructions are given, the ginner should assign each employee to certain machinery, give each of them a preventive maintenance checklist (fig. 7-6), and train each in what to look for. After the initial training period, the ginner will be able to concentrate on specific repair problems needing specialized attention. If a problem is discovered during the P.M. period, the problem should be corrected immediately. If the parts or necessary pieces of equipment are not available to repair the machinery immediately, the parts should be ordered and the repair scheduled for the next P.M. period.

P.M. is an ongoing process, and the procedures to be followed depend partly on the period of gin operation. The three periods and the procedures for each period are as follows:

1. after initial break-in period (72 hr):

a. Lock out all equipment.

b. Check condition and alignment of pulleys, belts, sprockets, and chains. Check the tension On belts and chains. Tighten all set screws and bolts used in obtaining and holding the Proper alignment on sprockets and sheaves.

c. Check for adequate or excessive lubrication.

d. Check general appearance and condition of parts; tighten and adjust as necessary.

e. Check entire system for excessive wear and tagging that could check for evidence of loose connections or leaks in the duct system.

f. Check electrical wiring for evidence of arcing and insulation break- down.

g. Check interiors of all machines for chokes or cotton accumulations.

2. during each production run:

a. Observe the entire gin for a smooth, orderly flow of cotton with even distribution across the machinery.

b. Listen for excessive noise or vibration.

c. Listen for chattering of gears, shafts, chains, and motors.

d. Check for evidence of worn bearings.

e. Observe chains and sprockets for proper alignment, and check tension on chains.

f. Check for visible signs of over-lubrication.

g. Observe belt and pulley movement for proper alignment and tension.

h. Check idler sprockets and pulleys for proper tension and alignment,

i. Check air handling systems for leaks or loose connections,

j. Check trash for excessive cotton (both seed cotton and lint cleaner trash),

k. Check hydraulic systems for leaks, overheating, or choked filters.

1. Check seed for excessive lint and for damage,

m. Check final lint sample for evidence of poor machine conditions (poor preparation, excess Trash, seed coat fragments and neps).

3. between production runs:

a. Lock out all equipment.

b. Check interiors of receiving condensers for choking conditions.

c. Check the inlets, outlets, trash discharge, and interiors of all equipment for tags, trash Accumulations, and worn or damaged parts that could result in choking, loss of cotton, or Reduced efficiency.

d. Check equipment for dirt and excessive lubrication.

e. Check moving parts for evidence of excessive wear, such as grooving, chafing, and Binding.

f. Check the condition and tension of pulleys, belts, chains, and sprockets.

g. Check for bent or missing grid bars.

h. Check for missing or bent spikes on cylinder cleaners,

i. Check vacuum wheel and condenser flashing.

During the P.M. process the ginner must have a method of documenting the amount of Work needed on each machine. The report in figure 7-2 may be used for this purpose. The Information in the P.M. reports may help determine which dormant season repairs and Machinery modifications are necessary.

Self-Check –3	Written Test

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

1. Write a comprehensive gin maintenance program components. (2 pts.)
2. Which of the following is a comprehensive gin maintenance program's components
   A) A sound maintenance philosophy
   B) Problem and repair documentation and guidelines
   C) A dormant season repair program
   D) A preventive maintenance and in-season repair program
   E) All of the above

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
   _____.
2. _____

1-