

LOSS CONTROL GUIDE



PRIMARY MANUFACTURING STANDARDS

PENNSYLVANIA LUMBERMENS MUTUAL INSURANCE COMPANY
INDIANA LUMBERMENS MUTUAL INSURANCE COMPANY



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Housekeeping Plan

Consistent and thorough housekeeping is important because combustible dust that accumulates on surfaces can cause a deflagration, other fires, or an explosion.

- At least daily cleaning, or more if needed, should be done at all work stations and under all equipment surfaces (including under the green chain for all sawmill operations).
- Ensure that all dust collection equipment is secure and no leaking is occurring. Make repairs as needed.
- Bins under enclosure-less dust collection systems should be emptied daily
- Locations for dust removal/housekeeping:
 - Vertical surfaces if the dust is adhering to them
 - Horizontal surfaces including overhead beams, joists, and the tops of equipment
 - Concealed spaces
 - Electrical panels and motor control boxes
 - Motors – especially in the area of the dust collection system
 - Chipper Room
 - Under elevated mill – not only floor surfaces but also on the cross beams, around base of supports, and on hydraulic pumps/lines
- Procedures for dust removal:
 - Make sure all ignition sources are turned off or removed during dust removal
 - Blow down with less than 15 psi air pressure or vacuum using an approved vacuum
- How often is the cleaning needed? (PLM recommend at least semi-annual cleaning of the entire building.)
- Documentation:
 - Develop a written program to address each of the above areas including the names of persons responsible for the housekeeping in specific areas
 - Complete a housekeeping checklist
 - Retain for at least one year

In addition, the outside housekeeping is important. Maintain sawdust piles at least 100' away from the building. If sawdust and chips are being blown into trailers, make sure the area is maintained in a cleanly fashion. Keep in mind that if motors are encased in dust, it can decrease the life expectancy of the component by half.



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Housekeeping Checklist

| | YES | NO | COMMENTS |
|--|-----|----|----------|
| General Items | | | |
| Are work areas clean, sanitary and orderly? | | | |
| Is your housekeeping schedule adequate for each area | | | |
| Are aisles kept clean and free from obstacles? | | | |
| Are fire aisles, access to stairways and fire equipment kept clear? | | | |
| Are exits kept free from obstacles? | | | |
| Are spilled materials or liquids cleaned up immediately | | | |
| Have all soiled rags been disposed of nightly? | | | |
| Have all smoking receptacles been emptied with the contents being soaked in water before discarding in dumpster? | | | |

Electricals

| | | | |
|--|--|--|--|
| Has all excess dust been removed from electrical panels, boxes, or motor control boxes | | | |
|--|--|--|--|

Employee Workstation

| | | | |
|---|--|--|--|
| Is general clean up adequate in employee work area? | | | |
| Is housekeeping being addressed in and around machinery cabinet/casing? | | | |
| Is housekeeping adequate around machinery motors? | | | |

Non-employee Work Areas

| | | | |
|--|--|--|--|
| Is housekeeping in and around the chipper done on a daily basis? | | | |
| Is area under the mill/equipment cleaned on a daily basis? | | | |
| Is air compressor room clean as part of your daily housekeeping program? | | | |

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| Structural Surfaces | YES | NO | COMMENTS |
|--|-----|----|----------|
| Are accumulations of combustible dusts routinely removed from elevated surfaces? - top of control rooms, top of equipment, offices, etc. | | | |
| Is an adequate schedule in place for controlling dust on vertical and horizontal surfaces? | | | |
| Is overhead blow pipe and/or ground level shaker conveyors maintained to prevent leaks and the accumulation of dust/scrap? | | | |

Responsible Employee Signature: _____

Date: _____



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Electrical Preventive Maintenance

Electrical systems, if installed by a licensed electrician, are usually well designed and properly installed. However, as soon as an electrical system is installed it begins to deteriorate. Lack of maintenance can accelerate the deterioration and reduce the life expectancy of the equipment and lead to malfunction, or complete failure.

A preventive electrical maintenance program is designed to prevent anticipated failures. By completing routine inspections, testing and servicing equipment regularly, identifying replacement intervals, and scheduling downtime to perform maintenance and/or replacement, you can reduce your risk of electrical hazards.

Electrical Preventive Maintenance Program

Several factors can influence the scope of your program:

- Size of building(s) – 10,000 square feet vs 100,000 square feet
- Operation within each building – warehouse, light manufacturing vs. heavy manufacturing
- Type of equipment in building(s) – light fixtures, light machinery vs. large, heavy manufacturing machinery
- Age of electrical equipment
- Consequences of a failure – minor inconvenience vs. high economic loss or downtime

Does your present program:

- Repair or replace in response to a breakdown – Crisis/ Unscheduled Maintenance / Reactive Maintenance
- Repair or replace in response to irregular visual inspection – Ordinary Maintenance
- Repair or replace in response to a regularly scheduled inspection to check every detail likely to cause trouble – Preventive Maintenance.

Crisis/Unscheduled/Reactive maintenance is the least preferred, but many times the most common practice used. Preventive maintenance takes time and money to implement but the cost of an effective preventive maintenance program is small compared to the cost of repairing or replacing damaged equipment.

Developing a Program

The program should focus on safety, reducing equipment downtime, failure or potential for causing a loss.

1. The program should:
 - a. Compile a list of electrical equipment in the facility
 - b. Determine which equipment is most important (critical) to the operation
 - c. Determine the staff and expertise needed to perform routine preventive maintenance.
2. The program should include:
 - a. Regular scheduled inspections by a licensed electrician
 - b. Thermal Imaging of electrical systems
 - c. Periodic testing and servicing of equipment
 - d. Documented record keeping
3. Areas to focus on:
 - a. Enclosure
 - i. Sealed and maintained to keep loose dirt, dust, or debris out.
 - ii. Cleaned of dust and dirt using a vacuum
 - iii. Vents and fan grill cleaned and free of dust/dirt build-up

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- b. Switchgears, Breakers, Motor Control Boxes
 - i. Inspect for signs of cracking or physical damage
 - ii. Examine for moisture
 - iii. Examine for signs of arcing or overheating and repair if needed
 - iv. Examine all bolts and connectors for corrosion or overheating and ensure they are tightened to manufacturer's specs.
 - v. Contacts – clean, smooth, proper alignment, and tightened to manufacturer's specs
 - vi. Inspect for loose, broken, worn or missing parts
- c. Cables and Bus Duct
 - i. Inspect for physical damage, sharp bends, excessive tension, wear at entrance point
 - ii. Check for proper supports and covers where applicable
- d. Motors
 - i. Lubrication
 - ii. Bearings
 - iii. Rotor/stator
 - iv. Brush/commutator on DC motors
 - v. Belt
 - vi. Motor mount

Basic elements of a preventive maintenance program

- 1) **Keep it clean:** Dust is part of our industry but it needs to be removed from electrical equipment as it can cause overheating and increase electrical resistance
- 2) **Keep it dry:** Electric equipment works best in a dry, corrosive-free environment
- 3) **Keep it tight:** Vibration and high speed movement can loosen connections
- 4) **Keep it friction free:** Misalignment of machinery, excessive wear, and failure to lubricate can increase friction
- 5) **Inspect frequently and document inspection:** All equipment should be inspected on a regular documented schedule, with critical equipment receiving the most frequent inspections and testing. All inspections and testing should be logged/documentated.
- 6) **Always follow manufacturer's recommendations for maintenance and use a trained/certified electrician to perform work**



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Electrical Safety Checklist

| | YES | NO | COMMENTS |
|---|-----|----|----------|
| General Items | | | |
| Any obvious hazard to life or property observed in connection with electrical equipment, exposed wire or energized lines? | | | |
| Are portable electrical tools and equipment grounded? | | | |
| Have exposed wiring and cords with frayed or deteriorated insulation been repaired or replaced? | | | |
| Are all cord, cable and connections intact and secure? | | | |
| Are flexible cords and cables free of splices or taps? | | | |

Enclosure/Boxes

| | | | |
|--|--|--|--|
| Is each electrical enclosure such as a switch, receptacle, junction box, breaker panel, etc provided with a tight-fitting cover or plate to seal and keep debris out? | | | |
| Are all unused openings (including knockout plug, missing breakers, etc) in electrical enclosures and fittings closed/sealed with appropriate covers, plugs or plates? | | | |
| Are all disconnecting switches and circuit breakers labeled to indicate their use or equipment served? | | | |
| Are all vents and fan grill cleaned and free of debris? | | | |
| Have all electrical boxes been vacuumed to remove dust particles - at least semi-annually? | | | |

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| Switchgears, Breakers, Motor Control Boxes | YES | NO | COMMENTS |
|---|-----|----|----------|
| Any signs of damage or cracking - loose, broken, worn, or missing parts? | | | |
| Any signs of moisture? | | | |
| Any signs of arcing or overheating? | | | |
| Examine all bolts and connectors for corrosion and overheating. Ensure that they are tightened to manufacturer's specs. | | | |
| Ensure contacts are clean, smooth, properly aligned and tightened to manufacturer's specs. | | | |
| Motors - <i>this can be part of your machinery maintenance program</i> | | | |
| Maintained to the manufacturer's specs - lubricated etc.? | | | |
| Are bearings, rotor, stator inspected? | | | |
| Are motor mount, shaft and pulleys inspected for alignment? | | | |
| Are belts inspected and replaced as needed or per the manufacturer's specs? | | | |
| Do you have electrical installations in the hazardous dust or vapor areas? | | | |
| If so, do they meet the NEC (National Electrical Code) for hazardous locations? | | | |
| Do you have a certified Electrician on staff or use an electrical contractor for all major electrical work? | | | |
| Is Thermographic imaging done at least annually on all electrical systems? | | | |

Signature: _____

Date: _____

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Machinery Preventive Maintenance

"The work of keeping something in proper condition; upkeep" – that is how the dictionary defines maintenance; many think of maintenance as repair after it is broken. No machinery lasts forever; all equipment has a predefined operating life, whether it is designed to operate for 10,000 hours or go through 25,000 start/stop cycles. Preventative maintenance is what is needed to keep the equipment running at the manufacturers' specifications and hopefully beyond its useful life. Proper preventative maintenance is a key to preventing downtime and reducing your potential for a loss.

Whether you already have a preventative maintenance plan in place or need to develop a new one, certain items need to be addressed so that you are getting the most out of your machinery, reducing downtime, and maximizing your profits.

Developing a Program

Getting Started

- 1) Identify/list each piece of equipment and assign an identification/tracking number or name to each item.
- 2) Do you have operator manuals for maintenance and service requirements/schedules for each piece of equipment?
- 3) Is the equipment operating per the manufacturer's specifications and to your expectations?
- 4) Determine if the equipment is a critical item. For example, is your headsaw critical, or is it an old gang rip saw used as a backup if needed.
- 5) Do you track breakdowns for each piece of machinery noting if the downtime is electrical, mechanical, or do you just make the repairs and get back to product? Do you track downtime due to supporting equipment or lack of material? This can help to identify bottlenecks within your operation.
 - a. If you are not tracking downtime create a log for each piece of equipment to do so. Keep them simple enough so that your machine operators will use them and you can capture the cause of the downtime.
- 6) Have a system in place for your machine operators to request maintenance before the equipment has a breakdown - example: the equipment may still work with a small hydraulic cylinder leak, but the leak needs to be repaired before it creates a major issue.

Next Step

- 1) Review the operating manual for scheduled maintenance. Is it being followed, is it being documented? If the manual calls for daily lubrication, is it being done? Do you log this and log all scheduled maintenance being done on each piece of machinery? If it's not documented how do you know it is being done? A log book (documentation) is key to tracking all maintenance, preventive or otherwise, for each piece of equipment.
- 2) Review the information you gathered above on each piece of machinery. Start with your critical machinery and determine maintenance needs.
 - a. What is needed to keep this equipment operating at the manufacturer's specification or your expectations?
 - b. What is needed to keep this equipment from breaking down and possibly causing a loss?
 - c. Are you completing the necessary preventive maintenance to reduce the potential for a loss or eliminate downtime?
 - d. Do you have the parts in inventory to minimize downtime?

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Employees Training

Training your employees is the only way to insure that your employees understand what is expected of them and how to use the program you have in place.

- 1) Train machinery operators, not only in machine operation and safety items (guards, lockout/tag-out, etc.), but also on:
 - a. Manufacturer's recommended maintenance items i.e., daily lubrications if required, changing blades, etc.
 - b. How to inspect machine and identify issues that may lead to breakdowns/downtime
 - c. How and when to clean the machine and the area around the machine - do you just sweep up around the machine or do you need to blow out or vacuum out the interior housing of the machine?
- 2) Maintenance staff:
 - a. Do they have the competence to perform mechanical as well as electrical maintenance or do they specialize in one over the other?
 - b. Do they know where to find or how to look up operating or maintenance manuals or schematics on each machine?
 - c. Do they understand how to lockout/tagout a machine -not only the electrical, but also hydraulics if applicable?
 - d. Do they have and use the proper personal protective equipment?

Implement the plan for each machine

- 1) Set aside time prior to start up for daily ongoing maintenance, i.e. lubrication and inspection
- 2) Set aside time for cleanup at the end of the shift and during the shift if needed
- 3) Set a documented **PM (preventative maintenance)** schedule for each machine and each component
 - a. Electrical - check each electrical connection, inspect for wear and damage, etc.
 - b. Mechanical -belts, shafts, pulleys, seals, bearing, motors, etc.



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Emergency Plan

No one wants to have a loss, but prior planning can reduce the effect of the loss on your operation. Emergency pre-planning includes not only notification and evacuation of your employees and notification of emergency services, but also the planning and communication with your emergency services (Fire Department) prior to the loss.

Before you can develop a plan you must first answer the following questions:

- 1) Who is the first response/primary fire department?
 - a. If you are located on the border of 2 towns or outside of the town limits, who do you call first?
- 2) How do you contact your fire department?
 - a. Dial 911
 - b. Dial a direct number to a local dispatcher

Pre-planning with Fire Department

Has the fire department visited and conducted a complete tour of your operation? A tour should be done annually or when there is a change in your operation -new building or new operation.

- Do they know the layout of your operation?
 - Operation/occupancy in each building
 - Location of electrical disconnects for each building
 - Location of gas meters
 - Location of hazardous material (flammable or combustible material)
- Do they know have a detailed map showing the entire property including all buildings, location of hazardous material and all fire protection equipment (sprinkler system, fire pumps, fire hydrants, ponds, etc.)?
- Do they have easy access to your property and know how to access your property - keys to gates/locks etc.?
- Do they have copies of MSDS/SDS for all chemicals you use? Do you have a system in place to provide them with updated information?
- Do they have the needed extinguishing agents and personal protective equipment as outlined on the MSDS/SDS?
- Do they know about all hazardous or unusual operation on your property (dry kilns, dust bags, silos, etc.) and do they know how to fight a fire within one of these operations?
- Do they have a formal documented mutual aid agreement in place with other fire departments in the area?

Ask yourself - Do they know my operation and the hazards within my operation? Do they have a plan laid out on how they will fight a fire within my operation before they arrive at my facility? If not, then you still have some work to do with developing a pre-plan with your fire department.

Pre-Planning in House

- 1) Is someone responsible for notifying the fire department? Who should contact the fire department?
Remember - **CALL THE FIRE DEPARTMENT FIRST, FIGHT THE FIRE SECOND.**
 - a. Are emergency numbers current and posted?
- 2) Are employees trained in the use of fire extinguishers?

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- 3) How do you communicate an emergency to all employees? Will this operate if the power is out?
- 4) Do you have an evacuation plan in place?
 - a. Are all exits clearly marked?
 - b. Do you have escape routes and designated meeting location established? Are maps posted?
 - c. Do you have employee (preferably supervisor) assigned to oversee the evacuation of the building and accounting for employees at the designated meeting area?

Critical Plant Operation

Designate employees to maintain and/or shut down the following;

- Fire protection systems
 - Close fire doors
 - Maintain fire pump
 - Monitor sprinkler system
- Main Electrical Feeds
- Natural Gas Feed (check with utility companies to determine their policy)

Training

- Does fire department tour operation at least annually?
- Do all employees know about your plan and their responsibilities within the plan?
- Is plan reviewed and updated at least annually and when changes take place within your operation (new building, new operation, etc.)?
- Do you conduct periodic fire drills?



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Hot Work Video Training for PLM/ILM Customers

As an enhancement to the hot work permit program, we have developed an educational video which discusses the requirements and responsibilities during hot work operations. After the video, a quiz will test the knowledge of the individuals and complete the course work on this important topic.

The hot work training video is now available on the mastery training website (please see link below). It is required that any employee involved in hot work procedures view the video and take the related quiz in order to be certified with PLM/ILM compliance with the requirements of the program.

<http://zurich.mnlms.net/mnet/hlms/pennsylvanialumbermens/tsvr/assignments/CourseList>

Once you have entered the web address into your internet browser you will login to the system. The recommendation is imperative and all employees involved in hot work procedures must comply.

The system will track who has completed the program for your company and will serve as proof that the coursework has been completed.

Contact



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