LIFTING DEVICES

STANDARD

To have a program that provides an inventory of lifting devices used in the workplace, as well as requirements for operator competency training and the examination and preventive maintenance of the lifting devices.

INTRODUCTION

Ontario's Regulations for Industrial Establishments (RIE) defines a lifting device as "*a device that is used to raise or lower any material or object and includes its rail and other supports but does not include a device to which the Elevating Devices Act applies*". This definition covers a wide range of equipment used in forestry, including all lifting attachments on mobile equipment, log loaders, booms, hoists, blocks and tackles, winches, jacks, overhead cranes, forklifts and scissor lifts, as well as rigging accessories such as slings, chains and wire ropes.

Because the definition of "lifting device" in the RIE is so broad, numerous pieces of equipment technically fit the definition. This module focuses on the above-listed equipment.

The type of lifting device used depends on the kind of load being handled and what needs to be done with the load. But a number of basic legal requirements apply to all such equipment:

- the maximum rated load of the lifting device must be confirmed by a competent person and marked on it, and the maximum rated load must not be exceeded;
- the lifting device must be thoroughly examined by a competent person to determine its ability to handle its maximum rated load before its first use, as often as necessary and at least once annually;
- the operator of the lifting device must be trained and competent.

For a review of the special requirements related to a device that lifts personnel, see the "Program Elements" section.

The Occupational Health and Safety Act defines a "competent person" as one who "*is qualified because of knowledge, training and experience to organize the work and its performance, is familiar with this Act and the regulations that apply to the work, and has knowledge of any potential or actual danger to health or safety in the workplace.*"

FUNDAMENTALS

The operation of lifting devices inevitably involves hazards. That's why a thorough knowledge of the device's operation, maximum load capacity and individual characteristics, combined with regular maintenance and inspection by a competent person, are important. According to the WSIB, inadequate inspections and improper maintenance of lifting devices are the direct causes of critical and fatal injuries every year.

Common hazards associated with lifting devices involve one or more of the following:

- loads that exceed the device's maximum rated capacity
- worn or defective equipment
- operator incompetence
- dangerous operating practices
- improper rigging
- contact of the lifting device with an obstruction (electrical lines, other equipment, debris, etc.)
- high winds
- shock loading
- unstable loads
- extended load centre
- unbalanced centre of gravity
- poor visibility
- unstable or uneven surfaces
- tip-overs and roll-overs.

In a number of recent cases, the turntable bearings on knuckleboom loaders have broken away, causing the boom, the raised platform and the operator control seat to fall to the ground. In a recent incident, a maintenance worker suffered a fractured pelvis when the rolling safety ladder he was standing on toppled after being struck by the sudden shifting of a load suspended from an overhead crane.

Operation of a powered lift truck brings a number of hazards into play related to the characteristics of the load, the height of the lifting required and potential obstacles in the path and overhead. Almost half of all critical injuries involving lift trucks in Ontario are caused by collisions. A study by the Ontario Ministry of Labour (MOL) found that between 1990 and 1995, lift trucks were involved in 136 critical injuries, affecting 143 persons and resulting in 18 worker deaths. As a result, the MOL developed a *Guideline for the Safe Operation and Maintenance of Powered Lift Trucks* that establishes detailed industry standards that could be applied by MOL inspectors to a broader range of lifting devices. (For more information on the Guideline, see Appendix A, B and C of this module.)

Control measures such as general and machine-specific operator training, a preventive maintenance program based on the manufacturer's recommendations and appropriate supervision help to eliminate the risk factors associated with lifting devices.

LEGISLATION

Legislative requirements pertaining to lifting devices can be found in the Occupational Health and Safety Act (OHSA) and Regulations for Industrial Establishments (RIE). This table highlights some of the major duties related to lifting devices, with brief descriptions of some of the key sections.

SECTION	SUMMARY
7 – RIE	Pre-Start Health and Safety Review required for any new, added or modified apparatus, structure or protective element.
45 – RIE	Lifting, carrying, moving and storing to be done in a safe manner.
46 – RIE	Machinery, equipment or material that may tip or fall to be secured.
51 – RIE	Lifting device to be examined by competent person, maximum rated load to be plainly marked, device to be adequately constructed and guarded, safely operated, and permanent record to be kept of examinations.
52 – RIE	Requirements for lifting device used to support, raise or lower workers.
53 – RIE	Requirements for crane travelling on rails.
54 – RIE	Mobile equipment requirements: Adequate lighting and guarding, sufficient number of seats for operator and passenger(s), equipment to be operated by competent person only.
56 – RIE	Competent signaller required if operator doesn't have full view of intended path of load or machine.
57, 58 – RIE	Unattended vehicle to be immobilized and secured against movement and all attachments lowered or solidly supported.
59 – RIE	Maximum rated load not to be surpassed except for purpose of test.
60 – RIE	Minimum distances from electrical power lines (based on voltage).

Note: Because of the nature of the work, some aspects of forestry operations are covered by the Regulations for Construction Projects rather than the Regulations for Industrial Establishments. As a result, these operations may be subject to more specific and detailed legal requirements. Please refer to the appropriate regulations for guidance.

PROGRAM ELEMENTS

ROLES & RESPONSIBILITIES

Employer

The employer will ensure that:

- An inventory of lifting devices is created and it identifies which lifting devices are approved for supporting, raising or lowering personnel.
- Appropriate lifting devices are provided and they are kept in a safe operating condition.
- A schedule for safety examinations by a competent person is developed. Examinations must be at least annual or more frequent if dictated by the manufacturer or by the conditions of use. Permanent records are kept of all examinations and maintenance of lifting devices.
- All lifting devices are included in a written preventive maintenance program as specified by the manufacturer.
- A training plan, including specific safe operating procedures for each lifting device, is in place to ensure the competency of operators and supervisors. A list is maintained of workers who are trained to operate or supervise the operation of specific lifting devices.
- The maximum rated load of a lifting device is plainly marked on it.

Supervisor

The supervisor will ensure that:

- Only competent persons operate lifting devices.
- Lifting devices are appropriate for the work and are operated safely as specified in the safe operating procedures.
- Operators perform circle checks prior to use.
- Lifting devices in disrepair are tagged out of service and not used.

Operator

The operator will ensure that:

- Circle check of lifting devices is performed prior to use.
- Lifting devices are operated as specified by the employer.
- Any unsafe act or hazardous condition is reported to a supervisor.

JHSC or Worker H&S Rep

The Joint Health and Safety Committee or the worker Health and Safety Representative will monitor the effectiveness of the lifting devices program through:

- Review of documents (records of training, equipment examinations, circle checks where required, maintenance records and safe operating procedures)
- Monthly inspections
- Assistance with hazard assessment, safe operating and tagout procedures development
- Recommendations for improvements and follow-up to ensure concerns have been adequately addressed.

HAZARD IDENTIFICATION/ASSESSMENT

Section 25(2)(d) of the Occupational Health and Safety Act requires the employer to "*acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent".* In order to comply with this requirement, the following steps, as a minimum, must be taken:

- All potential and actual hazards to workers who operate or work around each lifting device are to be identified. Factors to be considered in the identification process are the equipment that will be used, the jobs to be done and the environment in which the work will take place.
- All potential sources of harm or injury that have been identified are to be listed in writing. The identified hazards will be included in the safe operating procedures.

Workers and supervisors should be involved in the hazard identification/assessment process, in association with the JHSC or Health and Safety Rep. The hazard assessment should include a review of information provided by the manufacturer of the lifting device.

COMPETENCY TRAINING

The company training plan for lifting devices should consist of both general and device-specific components. The general component of the training plan should cover the fundamental principles of lifting devices, the impact of environmental conditions on their operation, and the legislative requirements and industry best practices that apply to them. The device-specific component should consist of practice sessions under the supervision of a qualified trainer covering load-handling, manoeuvring, travelling and stopping/starting, as per the safe operating procedures developed for the lifting device.

Operators

The specific training required for operators of lifting devices depends on the type of lifting device being used. But the training must be adequate to ensure that the operator meets the OHSA definition of "competent" and is able to comply with all safety requirements related to the lifting device.

The operator must understand:

- The technical functions and operations of the lifting device;
- The sections of the OHSA and Regulations that apply to the work;
- The hazards associated with the work, including activities, conditions and environmental factors that pose actual or potential danger;
- The specific company procedures in place to ensure safe operation of the lifting device.

The operator must also be able to perform the following:

- circle check of the lifting device;
- general operation;
- selection and security of loads;
- pick-up and placement of load;
- maintenance when appropriate.

Supervisors

The employer must appoint a competent person as a supervisor. It is important for supervisors to have an understanding of the knowledge and skills covered in operator training. Supervisors should know, through training and experience, the hazards associated with the type of lifting device being operated, the loads being handled and the circumstances in which the device will be operated. A competent supervisor must also be able to identify unsafe acts and conditions and implement corrective measures.

The employer should encourage supervisors to be vigilant in identifying hazardous situations, correcting them immediately when they are detected and applying disciplinary measures as dictated by company policy.

Maintenance technicians

To maintain and repair lifting devices, maintenance technicians must possess the following minimum qualifications:

- knowledge of personal safety practices necessary to perform routine and periodic inspections of the lifting device;
- ability to read and understand lifting device manuals, manufacturer's specifications, drawings and parts lists;
- knowledge of the purpose and function of all components, devices and accessories commonly employed on the lifting device, and how to carry out an inspection to determine that they are functioning properly;
- working knowledge of electrical and electronic control circuit principles as they apply to operation of the lifting device;
- working knowledge of mechanical and pneumatic principles as they apply to the lifting device.

In its *Guideline for the Safe Operation and Maintenance of Powered Lift Trucks,* the Ontario Ministry of Labour normally considers the above qualifications to be achieved through five years experience in field service work related to lifting devices.

EXAMINATIONS AND INSPECTIONS

For the purposes of this module, "examination" refers to the legally required full-scale review of lifting devices to be performed by a competent maintenance technician before their first use and at least once annually, with a permanent record kept of the examination. "Inspection" refers to the following four types of review:

- circle checks carried out by the operator
- monthly inspections carried out by the JHSC or Health and Safety Rep
- supervisor inspections
- maintenance inspections

For purposes of due diligence, written records should be kept of all examinations and inspections.

Examinations

Section 51(1)(b)(i) and (ii) of the RIE requires that a lifting device "*be thoroughly examined by a competent person to determine its capability of handling the maximum load as rated prior to being used for the first time, and thereafter as often as necessary but not less frequently than recommended by the manufacturer and in any case, at least once a year".* This requirement is generally met through examinations carried out after every 2,000 hours of use based on 12 months of operation on single shifts for mobile equipment. If a

vehicle is used more frequently, for example on double shifts, a corresponding increase of the inspection frequency should be established.

Other factors that could require more frequent examinations include severe environmental conditions such as hot or corrosive environments and the type of loads being handled. Any modification that could affect a lifting device's load-handling characteristics must undergo a Pre-Start Review (PSR) by the manufacturer or a professional engineer, as per section 7 of the RIE. The PSR must then be followed by a full-scale examination by a competent maintenance technician. For examinations of lift trucks, see Appendix C, "Ontario Ministry of Labour Lift Truck Maintenance Checklist".

Inspections

Inspections should include a review of all moving parts and safety features for any defects or signs of wear that could affect the device's safe handling of a load. All cables, ropes, chains and slings should be inspected before each use for any signs of kinking, crushing or other damage. Any other fitting used with a lifting device should also be inspected and should be replaced if it is bent, cracked or cannot be properly attached. Cranes and hoists are designed for vertical lifts only. Sideways or inward lifting must be avoided, as they can damage both the lifting device and the rigging.

If there are any doubts about a lifting device's ability to be operated safely, it must not be used. The device should be taken out of service, locked and/or tagged until it can be further inspected or repaired.

MAINTENANCE

A comprehensive company maintenance policy on lifting devices will address the three main considerations associated with their safe ongoing use:

- general preventive maintenance as a result of examinations and inspections;
- a thorough examination of the lifting device whenever a modification is made to it;
- an inspection of all new or different attachments used in conjunction with the lifting device.

Key areas to focus on for the maintenance of lifting devices are:

- Safety components (back-up beeper, horn, check flow valve, FOPS, safety catches, etc.)
- Critical parts (welds, joints and other key stress points)
- Structural and support components (beams, posts, frames, outriggers)
- Load-handling components (forks, hooks, sheaves, slings)
- Propulsion system (motor, transmission, wheels, tracks, rails, brakes, steering)

All maintenance work on lifting devices must be performed according to the manufacturer's specifications. A good practice to support the yearly examination of lifting devices is to keep permanent records of all maintenance on each lifting device.

OPERATION

A number of safety principles apply to all lifting devices and should be included in company safe operating procedures:

- The operator must be appropriately trained to operate the lifting device.
- The operator must wear appropriate personal protective equipment.
- The lifting device's maximum rated load must never be exceeded.
- Loads must be carried as close to the ground as circumstances allow.
- A load must never pass over other workers or any part of the operator's body.
- When a load is in the raised position, the controls must be attended by an operator.
- If the operator does not have a clear view of the intended path of the raised load, a signaller must be present to direct the operator.
- If there is a risk of collision of the lifting device with workers on foot, barriers, warning signs, designated walkways or other safeguards must be provided.
- All lifting devices must be operated on level ground unless they have been specifically designed for operation on uneven surfaces.
- If for any reason the operator has to leave the controls unattended, the load and attachments such as forks, buckets, clams and blades must first be lowered to the ground or solidly supported and mobile equipment secured.
- A lifting device that appears worn, defective or has been tagged out of service must not be operated.
- The company safe operating procedure for each lifting device must be reviewed with operators annually or more often if necessary.

Because of the inherent danger whenever large and heavy objects are lifted, carried or lowered in a busy work setting, safe operating procedures for lifting devices should also include the following:

- A company-wide danger-zone policy regarding the operation of lifting devices when other workers are nearby.
- Good housekeeping to ensure orderly and unobstructed operation of the lifting device.
- Company speed limits for the operation of mobile or automatic lifting devices.
- A lockout/tag procedure that prevents a lifting device from being activated or operated during maintenance, repairs of any other interruption of the work routine.

LIFTING DEVICES USED TO LIFT PERSONNEL

Section 52 of the RIE contains a number of special requirements related to lifting devices that are used to support, raise or lower personnel. The employer/supervisor must ensure that the following specific hazard controls, as well as any additional precautions reasonable in the circumstances, are in place:

- The platform is specifically designed to lift persons.
- If the lifting device is not specifically designed to lift persons, the load applied is less than half the rated load capacity.
- The platform is secured to a mast or boom that is equipped with a safety device that will prevent free fall of the platform in the event of a pressure line failure.
- The person being lifted is attached to a separate lifeline suspended from the boom or protected by a fixed support (guardrail and toe-board) capable of supporting at least four times the weight of the person.
- Operation of the platform is tested before anyone is allowed on it.
- The operator remains at the controls at all times while a person is on the platform unless controls are also available to the person on the platform.
- The platform is lowered when travel is necessary.
- No additional devices (stepladders, etc.) are used to extend the platform. The person's feet must remain on the platform at all times.

A safe operating procedure for supporting, raising or lowering personnel should be developed for each lifting device that might be used for that purpose. (For more information, see "Ontario Ministry of Labour Training Objectives—Skills" in Appendix A.)

EXPECTED OUTCOMES/POLICY GUIDE

(This checklist represents the minimum requirements for a company-specific procedure that ensures the establishment of a lifting devices program. Naturally, each firm is encouraged to customize this checklist to best meet their needs.)

REQUIREMENT	RESPONSIBILITY (WHO)
General	
❑ An individual or department has been made responsible for administration of the company's lifting devices program.	
❑ An inventory of lifting devices has been developed, including identification of devices designated for supporting, raising or lowering personnel.	
❑ Safe operating procedures for all lifting devices have been developed and are current.	
❑ Safe operating procedures for lifting devices used to support, raise or lower personnel have been developed.	
Training	
❑ A documented training plan has been established, including hands-on performance evaluation.	
❑ Operators of lifting devices have been trained appropriately to ensure that they meet the Occupational Health and Safety Act definition of "competent" and are able to comply with all safety requirements related to the lifting device.	
❑ Supervisors have been trained in the safe operation of lifting devices.	
❑ Any supervisor or worker whose duties include the inspection of lifting devices has been trained to a level of specific competency in those duties.	
❑ A list is maintained of workers who have been trained to operate or supervise the operation of specific lifting devices.	
Inspection and Maintenance	
❑ A written hazard assessment has been compiled in association with the Joint Health and Safety Committee or Health and Safety Representative and is available.	
❑ Lifting devices have been thoroughly examined and certified safe by a competent person at least once annually. A permanent record is kept of examinations.	
❑ Preventive maintenance and operator circle checks are being performed.	
❑ A procedure is in place to ensure that defective devices are tagged out of service and not used.	
Monitoring	
❑ Records show that the JHSC or worker Health and Safety Rep monitors the company lifting device program.	

APPENDICES

A. SAMPLE SAFE OPERATING PROCEDURES FOR MOBILE EQUIPMENT OPERATORS
B. ONTARIO MINISTRY OF LABOUR TRAINING OBJECTIVES—KNOWLEDGE
C. ONTARIO MINISTRY OF LABOUR LIFT TRUCK MAINTENANCE CHECKLIST
D. REFERENCES AND RESOURCES

APPENDIX A
SAMPLE SAFE OPERATING PROCEDURES FOR MOBILE EQUIPMENT OPERATORS

MOBILE EQUIPMENT OPERATOR

Personal Protective Equipment

CSA-approved head protection
CSA-approved foot protection
CSA-approved eye protection
Hearing protection
Hand protection

Operating Procedures

The Ontario Ministry of Labour (MOL) *Guideline for the Safe Operation and Maintenance of Powered Lift Trucks* Guideline is an excellent tool that can be used to assist in the development of company-specific safe operating procedures for mobile equipment. The following list should be expanded as required to meet internal circumstances.

TRAINING OBJECTIVES–SKILLS TO BE ACQUIRED		
Procedure	**Tasks to be Assessed**	**Final Outcomes for Operator Competence**
General Operation	Pre-operational Check (circle check)	Before operating a lift truck, a competent operator: • carries out a visual inspection of the truck and its attachments to ensure that all are in good operating condition, using a checklist provided by the employer • follows recommended procedures for daily inspections of oil and water levels
	Start Up	A competent operator: • uses the correct mounting procedure • assumes the appropriate driving position • ensures transmission/directional control lever in "Neutral" • ensures parking brakes applied • activates start button/ switch • ensures warning system operating
	Starting, Stopping and Turning	A competent operator: • starts and stops safely with and without a load • allows sufficient room for turning corners • operates at low speed when turning • uses appropriate steering techniques when turning in confined and limited spaces
	Shut Down/ Parking	A competent operator: • brings the truck to a complete stop, sets the parking brake, returns transmission/directional control lever to "Neutral" • lowers forks to the ground, tilts them forward • uses appropriate shut down procedures and turns off power supply • chocks wheels if risk of truck moving

General Operation	Forward and Reverse Driving on Level Ground	• keeps all parts of the body inside the operator's compartment at all times • ensures clear visibility in the intended direction of travel • if visibility is restricted, drives the truck in reverse or asks to be guided • keeps the load-engaging means or the load itself low (usually within 10 cm of the floor) and tilted backward • keeps safe operating distance from other lifting devices, pedestrians, machinery • observes traffic management rules established by the employer • drives at an appropriate speed, taking into consideration the type of device, the load, the pedestrian traffic along the path of the travel route, any obstructions and the condition of the driving surface • adjusts fork arms and/or attachments appropriately to maintain stability • observes weight restrictions for floors and elevators • takes appropriate action when meeting restrictions such as overhead equipment and/or other obstructing stationary structures
	Forward and Reverse Driving on Inclines, Ramps or Uneven Terrain	A competent operator: • when not carrying a load, travels forward down an incline and travels in reverse up an incline • when carrying a load, travels in reverse down an incline and travels forward up an incline • ensures that there is sufficient clearance for the lift truck, operator and load prior to travelling on an incline or uneven terrain • does not turn the truck around on a ramp or incline • drives at an appropriate speed taking into consideration the effects of gradient on the truck and on load security • approaches the grade straight and not at an angle • operates in gear • ensures visibility is clear in the direction of travel • verifies that the incline does not exceed the maximum permissible slope
	Operating Around Personnel	A competent operator: • always faces in the direction of travel • when turning, ensures no personnel within the truck's danger zone • observes employer's guidelines for ensuring the safety of pedestrians • if stopped at intersection, does not move until eye contact made with any personnel at intersection • maintains safe distance from pedestrians

Load Handling	Selection of Loads	Before picking up a load, a competent operator: • assesses the weight distribution of the load and identifies limitations of the structures where the load has to be placed • ensures that load is within the rated capacity for the device, taking into account the job to be done • checks forks/attachments to ensure that they are safe to use with respect to capacity rating
	Load Pick Up and Placement	A competent operator: • checks overhead clearance • ensures truck safe distance from any live power lines • engages at least 2/3 of the load length to be lifted and centres load evenly on forks • adjusts the tilting angle of the mast, height of fork arms and reach extension to stabilize load • ensures no loose articles lying on top of the load • does not drag the forks when inserting or withdrawing them from a load • does not raise or lower loads while truck is in motion
	Load Security and Integrity	A competent operator: • observes the limits for freestanding stack height • makes sure load is secure and balanced before lifting
	Stacking and Destacking	A competent operator: • is able to stack safely the particular types of loads encountered in the workplace • ensures that pallets or skids are safe to be moved and stored; for example, ensures no broken runners or legs
	Personnel Lifting, Lowering and Supporting	• ensures lift truck meets prescribed requirements • uses only a platform specifically designed for the purpose and having a guardrail • ensures that the platform is secured to the mast as prescribed • raises and lowers the platform to test its operation before allowing anyone on it • ensures that the person on the platform is secured as prescribed • keeps the upright in a vertical position • remains at the controls at all times while a person is on the platform • does not travel with personnel on the platform • ensures the safety of pedestrians in the area
	Loading Trucks and Railway Cars	Before driving into any truck, trailer or railway boxcar, with or without a load, a competent operator: • ensures that the vehicle being loaded is adequately restrained to prevent movement • inspects floors for stability and integrity • ensures adequate lighting • ensures that the dock/bridge plate is one designed to support the mass of the loaded lift truck • ensures that the dock/bridge plate is firmly in position • ensures the trailer is properly supported by a jackstand where appropriate (e.g., when not connected to the tractor
	Transporting Loads in Elevators	A competent operator: • ensures the elevator is capable of supporting the loaded lift truck • before entering, makes sure the elevator floor is level with the building floor • if applicable, waits for the signal from the elevator operator before entering • ensures that no other person remains on the elevator with a truck and load on board • sets the brakes “on”, lowers the load to the floor, places controls in neutral, shuts off the power and gets off the truck

Loading and Unloading	Unloading	A competent operator: • verifies that the structure where the load has to be placed is able to carry the weight of the load • when stacking loads, does not block access to fire extinguishers, exits or stairways • ensures the load at the bottom is secure and levelled • tilts load forward • exits with forks level
Operational Maintenance	Refuelling and Recharging	A competent operator who will perform routine maintenance and has been trained to do so safely: • follows the manufacturer's requirements and employer's procedures for safe refuelling and recharging of lift trucks including: - wearing the appropriate personal protective equipment, including eye protection - properly positioning and securing vehicle - observing workplace precautions with respect to fires

Other points that should be included in safe operating procedures are:

- When piling material, never exceed company standards.
- No person shall use or operate any piece of equipment on which they have not received proper training.
- Jewellery and clothing that is loose or dangling must not be worn. Long hair must be suitably confined to prevent entanglement in any rotating shaft, gear, sprocket, chain, etc.
- Lift with your legs, not your back. Avoid excessive strain by requesting help when it is required.
- Be sure no one is on the opposite side of the load, out of sight. Logs, lumber or material can easily be pushed or dropped over the sides, crushing anything on the ground in its path.
- When the machine is not operating or when leaving the cab, the boom and attachment must be lowered to the ground. If it's necessary to work on the machine with the boom lifted, it must be securely supported.
- Relieve pressure before unhooking hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles that eject fluid under high pressure. Use a piece of cardboard to search for leaks.
- Replace any safety decals that are faded, torn, missing or illegible.
- An unstable machine can cause death, severe injury or property damage. Do not operate machine without lowering stabilizers on firm, level ground.
- Hot and pressurized fluid can cause severe burns. Let the system cool before removing any caps, then remove caps slowly.
- Make sure that all walking and climbing surfaces of the machine are free of dirt, debris, water, grease, oil and snow.
- Loose or over-torqued bolts can cause death, serious injury or property damage. Maintain proper bolt torque. Check torque every 50 hours. (See "Recommended Service Schedule".)

Circle check

Inspect the loader before each shift or daily for items in the following checklist:

- ❑ Proper hydraulic oil level
- ❑ Hydraulic reservoir shut-off valves open
- ❑ Hydraulic valves, fittings, cylinders, hoses checked for leaks
- ❑ Cab and platform (steps, floor, handrails, controls) free or debris, dirt, and grease
- ❑ Guards and shrouding correctly installed, secure and clean
- ❑ Safety warnings and decals clean, legible and in proper place
- ❑ Grease fittings lubricated
- ❑ Bolts/nuts checked for wear or damage
- ❑ Gearbox checked for proper fluid levels, leaks
- ❑ General damage: missing components, loose parts, cracks, vandalism, etc.

Recommended Service Schedule

The following is a sample service schedule. Be sure to check your loader's operator's manual for any special service requirements.

Every 8 hours/daily

- ❑ Hydraulic reservoir: Check level and quality of oil.
- ❑ Hoses, connections, cylinders: Inspect for leaks and damage. Tighten, repair or replace parts if necessary.
- ❑ Operator's platform: Clean area of debris, tools, rags, water, ice and snow.
- ❑ Fittings: Lubricate with multi-purpose grease.
- ❑ Bolts/nuts: Visually inspect for wear and damage.
- ❑ Swing motor gearbox: Check fluid level.

Every 50 hours/weekly

- ❑ Hydraulic oil filter: On new machines the filter element should be replaced first at 50 hours and then at 400 hours (2 months) thereafter.
- ❑ Hydraulic oil reservoir: On new machines the oil must be changed after the first 50 hours, and then every 1,000 hours (6 months) thereafter.
- ❑ Bolts/nuts: Check for proper torque every 50 hours. Retorque if necessary.**
- ❑ Control lever linkage: Lubricate.

Every 200 hours/monthly

- ❑ Accumulators: Check pressure and maintain at 900 PSI.
- ❑ Hydraulic oil reservoir breather: Replace.

Every 400 hours/2 months

- ❑ Hydraulic oil filter: Replace elements every 400 hours after first change at 50 hours on a new machine.
- ❑ Swing motor gearbox: Replace fluid.

Every 1,000 hours/6 months

- ❑ Hydraulic reservoir: Replace oil and clean suction screens.
- ❑ Entire loader: Steam-clean, inspect for stress, wear, cracks, damage, loose parts.

Note: Use the above service intervals when operating in normal conditions. Service the machine at shorter intervals when operating in very hot, cold, dusty or humid conditions.

** Your operator's manual contains precise torque specifications for the swing motor mounting bolts, swing motor gearbox mounting bolts, turntable bearing bolts and loader mounting studs and nuts. These items should be checked and retorqued, if necessary, every 50 hours. Also check torque specifications for grapple bearing bolts and grapple motor mounting bolts.

APPENDIX B
ONTARIO MINISTRY OF LABOUR
TRAINING OBJECTIVES—KNOWLEDGE

Knowledge to be Acquired–Training Objectives		
	Instructional Objectives	Final Outcomes for Operator Competence
Applicable Legislation	Applicable sections of the Occupational Health and Safety Act (the Act)	A competent operator knows/understands: • a worker's duties • a worker's right to refuse work where health or safety is in danger • an employer's duties to protect workers
	Applicable sections of Regulations made under the Act	• how to ensure the • safety of other workers in the area • requirements for lifting devices, material handling, motor vehicles, • traffic control • requirements related to the handling of loads • requirements for protective equipment
Features of the Lift Truck	Lift Truck Operating Principles of Operation and Features	• lift truck classification and designations • lift truck stability triangle and trapezoid • what is meant by load centres • centre of gravity of load • longitudinal and lateral stability • "centre of gravity" of lift truck • the effects of speed, acceleration, sharp cornering, height, attachment, grade/ ramps and load security • operator blind spots associated with the design of the lift truck (components, permanent equipment, attachment) • the main components of the lift truck with emphasis on the lifting/handling systems and their basic functions • the factors affecting stability, reach/ retract, counterbalance principles, tilt • the location of the capacity plate and the information outlined on the plate--model/ serial number, capacity rating at a given load centre at a given height, maximum lifting height of forks/ attachment, truck weight and minimum battery weight
	Manufacturer's Specifications	A competent operator knows/understands: • where to access the Operator Manual • the operating information outlined in the Manual • the pre-operational and maintenance tasks described in the Operator Manual

Hazards in the Workplace	Dangerous Activities	A competent operator understands the dangers of: • operating with restricted visibility (blind spots, corners, intersections) • parking a vehicle on an incline • not stopping before entering an incline • travelling over railway tracks • allowing riders unless there is an approved passenger seat • permitting anyone to stand/walk under loads or ride on loads • not keeping all parts of the body inside the operator's compartment at all times • travelling with the load lifted more than 10 cm above the floor • dragging the forks when inserting or withdrawing them from a load • increasing the capacity of the truck or overloading the truck • stunt driving and horseplay • allowing anyone to stand on the forks or climb on the upright assembly • driving up to someone in front of a fixed object--e.g., wall, bench • moving a load with someone steadying it • jumping from the lift truck in the event of a tip over • uneven surfaces • mast not tilted back far enough to stabilize the load

APPENDIX C
ONTARIO MINISTRY OF LABOUR
LIFT TRUCK MAINTENANCE CHECKLISTS

The general safety inspection (to meet clause 25(1)(b) of the Occupational Health and Safety Act (OHSA) and the examination to evaluate a lift truck's maximum load capability (to comply with clause 51(1)(b) of O. Reg. 851) should be carried out in accordance with the truck manufacturer's specifications. These examinations should cover, but not necessarily be limited to, all the items in the checklists, which follow. Items that should be included in the evaluation of the lift truck's maximum load capability are in Checklists A, B and C. The general safety inspection should cover the items in Checklist D as well.

This Guideline refers only to what should be checked in carrying out a safety inspection of a powered lift truck. No attempt has been made to say how such an examination should be carried out. Instead the Guideline details the qualifications that the competent person doing the examination should have. It is assumed that this competent person will know how to apply the manufacturer's specifications, the principles of good engineering practice and the criteria in applicable standards to determine, for each point on the checklists, whether an item passes or fails. Reliance is also placed on the competence of the maintenance technician to know whether an operational test, visual inspection or more intrusive examination is required.

Every effort should be made to obtain the manufacturer's specifications for the powered lift truck. The examination of the items listed in the following checklists should be carried out in accordance with directions in the specifications.

CHECKLIST A - LOAD-HANDLING DEVICE

Manufacturer's Specification Plates

- ❑ truck plate
- ❑ attachment plate
- ❑ information shown on the capacity plate matches the truck, mast and currently installed attachments

Forks

- ❑ record fork length, width and thickness
- ❑ in accordance with manufacturer's specifications (note any unauthorized cutting, cracks and heel wear)
- ❑ straightness of blade and shank
- ❑ fork angle
- ❑ fork tip height and condition
- ❑ tube condition
- ❑ welded areas
- ❑ blade and heel
- ❑ hook mount forks
- ❑ shaft mount forks
- ❑ special forks
- ❑ attachments to forks
- ❑ latch pins (where originally provided)

Attachments

- ❑ visual and operational check
- ❑ in accordance with manufacturer's specifications
- ❑ attachment mounting
- ❑ load bearing arms (straightness & twists)
- ❑ pivot points and hinges
- ❑ hanger brackets
- ❑ latch pins
- ❑ stops
- ❑ load backrest condition

Movement

- ❑ carriage free and unobstructed
- ❑ anchors
- ❑ stub shafts
- ❑ bearings
- ❑ weldments/forkbars

CHECKLIST B - ELEVATING SECTION

Lift Chains

- ❑ anchors
- ❑ guards
- ❑ elongation
- ❑ wear (with wear gauge)
- ❑ adjustment (as per manufacturer's specifications)

Mast

- ❑ visual and operational check of mast operation
- ❑ mast mounting, bushings and pivots
- ❑ rails
- ❑ straightness
- ❑ wear
- ❑ cross bracing
- ❑ pins
- ❑ chain guiderollers
- ❑ wear strips and guides
- ❑ hoses, pulleys and fittings
- ❑ latches - stops

Hydraulic System

- ❑ lift cylinders
  - o anchors
  - o piston head guides
  - o lines
  - o leaks
  - o drift test
- ❑ tilt cylinders
  - o anchors
  - o racking
  - o rod end retainer
  - o tilt angle (degrees) Forward _____ Back _____
  - o lines
  - o leaks
  - o drift test
- ❑ set hydraulic pressure relief valves
- ❑ lift/lower levers - identified and in good condition

Welds and Fasteners

CHECKLIST C - PROPULSION SYSTEM

Brakes

- ❑ test operation
- ❑ wheel cylinders
- ❑ master cylinder
- ❑ brake lines

Tires

- ❑ check tire pressure for load-rating capacity
- ❑ check for damage, wear and missing hardware

Battery

- ❑ minimum allowable weight from manufacturer's specifications
- ❑ Manufacturer _____ Model _____ Serial No. _____
- ❑ battery weight
- ❑ battery position
- ❑ battery restraining devices
- ❑ leaks

Counterweight

- ❑ mounting
- ❑ unauthorized additions or missing weights
- ❑ cracks

CHECKLIST D - GENERAL SAFETY

Transmission

Tires

- ❑ driving and steering characteristics
- ❑ bonding

Steering

- ❑ check steering wheel for physical damage
- ❑ check steer axles and box
- ❑ operational check of wheel bearings

Overhead Guard

- ❑ secured
- ❑ breaks or cracks
- ❑ missing pieces
- ❑ modifications

Propane Equipment

- ❑ fuel tank mounting system secure
- ❑ fuel tank position pin intact
- ❑ check propane relief valves
- ❑ check hose condition

Other

- ❑ check failsafe components of electrical controls
- ❑ warning devices (lights, bells, whistles)
- ❑ engine operation and emissions
- ❑ seat (secure, belts)
- ❑ seat and handle switches
- ❑ fuel leaks
- ❑ carbon monoxide (CO) emission test

APPENDIX D
REFERENCES AND RESOURCES

Guideline for the Safe Operation and Maintenance of Powered Lift Trucks
Ontario Ministry of Labour Publications Section, 1999. 1-800-268-8013 (ext. 6-7731)
Website: http://www.gov.on.ca/LAB/english/hs/guidelines/lifttrucks/index.html

CSA Standard B335-94, Industrial Lift Truck Operator Training
Available from Canadian Standards Association, 1-800-463-6727.
Website: http://www.csa-intl.org/onlinestore/GetCatalogItemDetails.asp?mat=000000000002004451
For a general outline of the standard, visit the website below:
Website: http://regulation.healthandsafetycentre.org/s/GuidelinePart16.asp#SectionNumber:G16.7(j)

OFSWA Yard Loader Safety Training Program
Available from the Ontario Forestry Safe Workplace Association. (705)474-7233.
Website: http://store.ofswa.on.ca/cgi/ofswa/KCMA0200.html

CSAO Hoisting Hand Signals
Available from the Construction Safety Association of Ontario as a card, sticker or seven-minute video. 1-800-781-CSAO (2726)
Website: http://www.csao.org/s.sectors/e.newworker/products.cfm.

S-A-F-E Lift: Safety Awareness for Fork Lift Equipment
17-minute video on forklift-pedestrian safety produced by Liftow. Available from Lift Truck Training, (519) 755-0071.

Fork Lift Truck Safety
Canadian Centre for Occupational Health and Safety.
Website: http://www.ccohs.ca/headlines/text16.html

Overhead Crane Safety Training
Safety 1st, 1-877-251-1172.
Website: http://www.angelfire.com/on3/safety1st/crane.html

Overhead Crane Operation
Canadian Centre for Occupational Health and Safety.
Website: http://www.ccohs.ca/oshanswers/safety_haz/materials_handling/crane_op.html

OFSWA Industry Alerts Archive
More than 100 reports on forest industry incidents, with recommendations for prevention.
Website: http://www.ofswa.on.ca/inalert/archintro.html

Health and Safety Legislation
Ontario Ministry of Labour
Website: http://www.gov.on.ca/LAB/english/about/leg/hs_leg.html