

FORKLIFT

Health & Safety

Best
Practices
Guideline



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This document may be applicable to assist in establishing a forklift health and safety program at your worksite. However, it is critical that you evaluate your own unique circumstances to ensure that an appropriate program is established for your work site. It is strongly recommended that you consult relevant professionals (including, but not limited to, lawyers and health and safety specialists) to assist in the development of your own program. Further, this document does not replace the need for employers to ensure their workers are trained and competent in the safe use of forklift trucks.

It is important to note that adherence to this document does not absolve you from potential liability under the legislation in cases where you are determined to be in non-compliance with the legislation. In case of any inconsistency between this document and the Occupational Health and Safety Act, Regulation or Code, the legislation will always prevail.

This document is current to December 1, 2010. The law changes from time to time with new legislation, amendments to existing legislation, and decisions from the courts. It is important that you keep up with these changes and keep yourself informed of the current law.

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FORKLIFT

Health & Safety

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Alberta Construction Safety Association

Alberta Employment and Immigration

Alberta Federation of Labour

Health and Safety Association Network

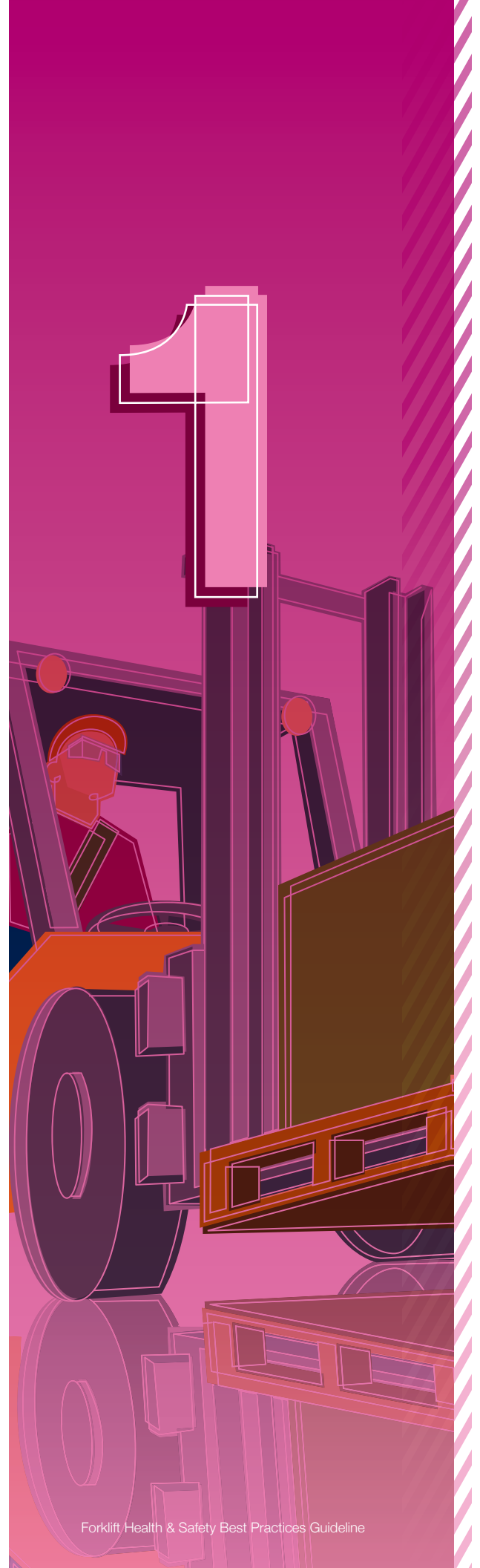
International Union of Painters & Allied Trades

Manufacturers' Health & Safety Association

Oil Sands Safety Association

Wajax Industries

Alberta Employment and Immigration wishes to acknowledge and thank the Ontario Ministry of Labour for permission to adapt its *Guideline for Safe Operation of Powered Lift Trucks*, July 1999 and Manitoba Labour and Immigration for permission to adapt its *Code of Practice For the Safe Operation of Powered Lift Trucks*, November 2006.



Introduction

Forklift trucks (forklifts) can pose significant risks to workers who operate or work around them. To demonstrate some of the potential dangers of operating forklifts, the following are examples of forklift related fatalities that have occurred:

"A worker was **struck by a chain** that dislodged from a pickup truck during an attempt to tow a forklift."

"A worker was **crushed by steel beams** that were dislodged from a forklift while being unloaded from a trailer."

"A worker was **crushed by a forklift** that fell off a jack stand during forklift maintenance."

"A worker was **crushed between a tank** that was being moved by a forklift **and another object**."

"A worker was **overcome by carbon monoxide gas** from a propane-powered forklift that was operating inside a bay with closed doors."

"A worker was **crushed by lumber** that fell while being lifted by a forklift."

"A worker was **crushed by a forklift** that tipped over on top of him."

"A worker was **struck by equipment** attached to a compressed gas cylinder that ruptured when a forklift was unloading the equipment from a truck."

"A worker was **struck by a piece of equipment** that slipped while pressure was being applied to it by a forklift—a task the forklift was not designed for."

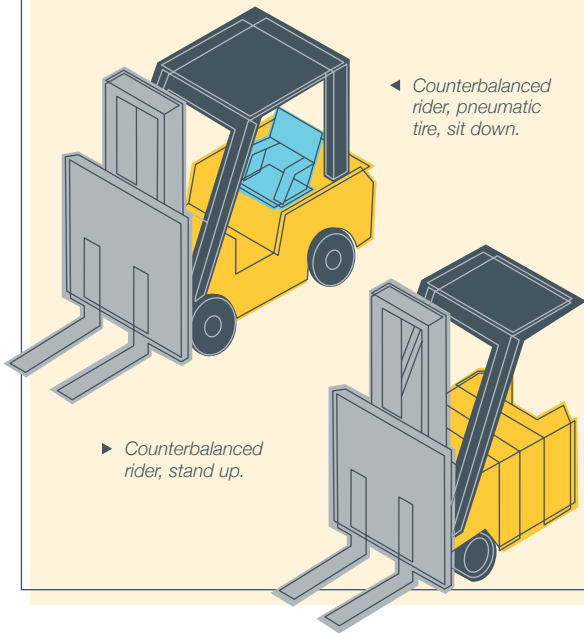
"A worker was **crushed between a forklift** that rolled forward **and a trailer** while loading concrete blocks."

A review of these and other scenarios involving forklift incidents showed a variety of causes for injuries to workers, and that such incidents could have been prevented if safer practices had been followed.

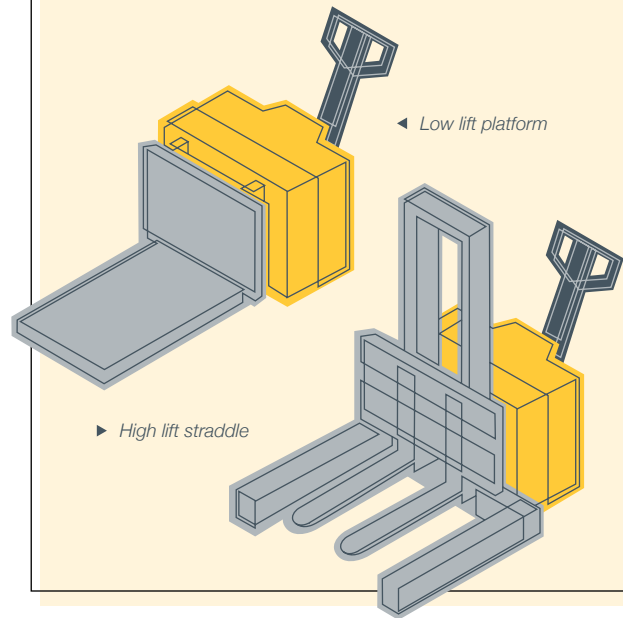
This best practices guideline provides practical guidance to help employers fulfill their obligations to protect the health and safety of workers who operate or work around forklifts.

Powered forklifts covered in this guideline include self-propelled vehicles of Class 1 to 7 as defined by the Industrial Truck Association:

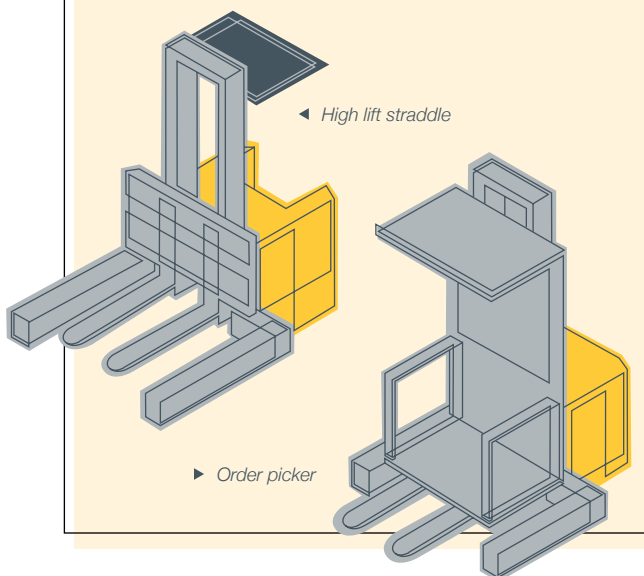
CLASS 1: Electric motor rider trucks



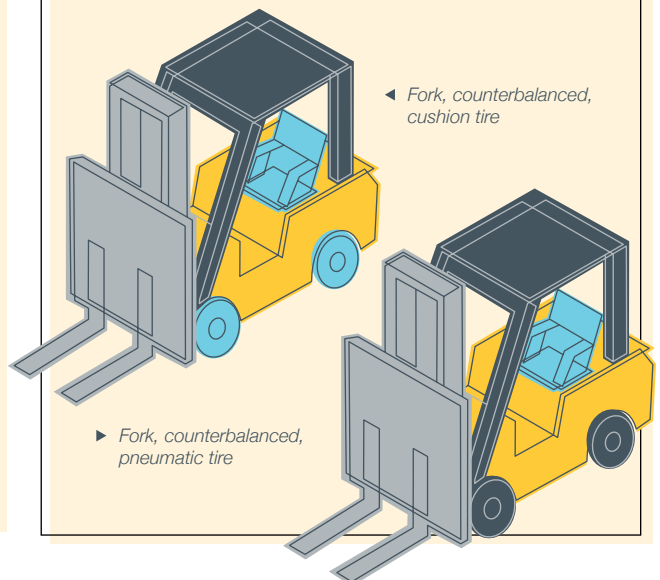
CLASS 3: Electric motor driven hand trucks



CLASS 2: Electric motor narrow aisle trucks



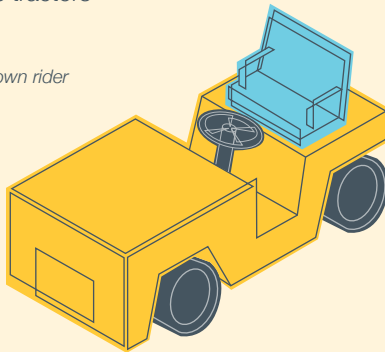
CLASS 4 and 5: Internal combustion engine lift trucks, cushion or pneumatic tires



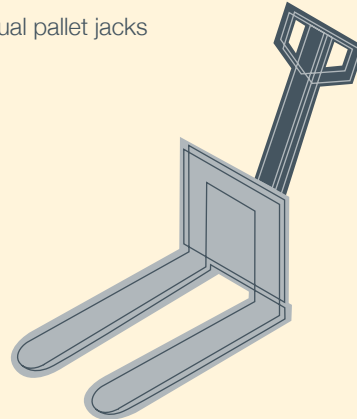
Non-powered forklifts covered in this guideline include:

CLASS 6: Electric and internal combustion engine tractors

► *Sit down rider*

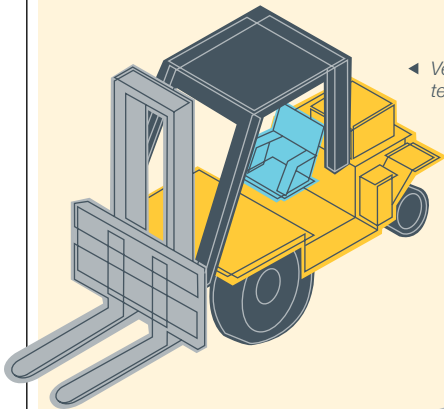


Manual pallet jacks

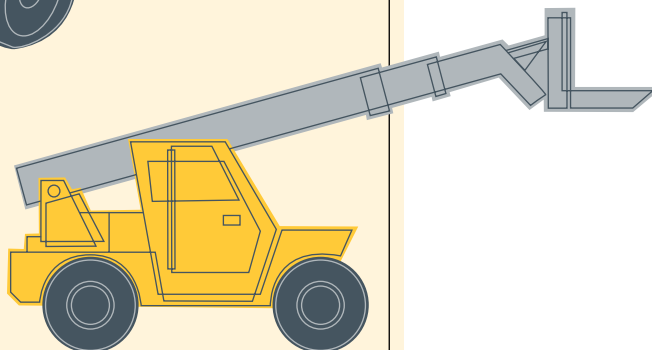


CLASS 7: Rough-terrain lift trucks

◄ *Vertical mast rough terrain fork lift truck*



► *Variable reach rough terrain fork lift truck*





Legislation

Alberta's *Occupational Health and Safety (OHS) Act*, Regulation and Code have general and specific requirements related to the operation of forklifts.

In many instances the legislation sets out requirements for the safe use of “equipment” or “powered mobile equipment.” All forklifts meet the definition of “equipment” and all powered forklifts meet the definition of “powered mobile equipment.” Hence, requirements relating to “equipment” and “powered mobile equipment” apply to forklifts.

Some sections of the legislation applicable to forklifts are simplified and generalized below. For ease of understanding, the word “forklift” has been substituted for “equipment” where applicable. Refer to the actual legislation for the complete rules. The legislation can be viewed online at worksafe.alberta.ca or ordered from the Alberta Queen's Printer at qp.alberta.ca.

The *OHS Act* sets out general duties for employers, workers and suppliers:

- **Employers** must ensure the health and safety of all workers at a work site. *OHS ACT, SECTION 2*
- **Workers** must take reasonable care and cooperate with their employer to protect their health and safety, and the health and safety of other workers at a work site. *OHS ACT, SECTION 2*
- **Suppliers** must ensure that forklifts supplied are in safe operating condition. *OHS ACT, SECTION 2*

OHS Regulation

In accordance with the OHS Regulation:

- **Manufacturer's specifications** Employers must ensure that forklift manufacturer's specifications (which include forklift operation and maintenance manuals) are followed and available to workers, and workers must be familiar with the specifications. **OHS REGULATION, SECTION 7**
- **Equipment** Forklifts must be maintained in a condition that will not compromise the health and safety of workers, and safely perform the functions for which they are intended. **OHS REGULATION, SECTION 12**
- **Training** Employers must ensure that workers are trained in the safe operation of forklifts that workers are required to operate, and workers must participate in and apply the training. Employers must inform workers of any health hazards from harmful substances (such as carbon monoxide from internal combustion engine forklifts) that workers may be exposed to and the employer's procedures to protect workers' health. Employers must also ensure that workers apply the training. **OHS REGULATION, SECTION 15**

OHS Code

In accordance with the OHS Code:

- **Assessing hazards** Employers must assess their work sites to identify existing and potential hazards before work begins, and must eliminate or control the identified hazards. **OHS CODE, SECTION 7**
- **Appropriate equipment** Employers must ensure that forklifts used in the workplace are of sufficient size, strength and design to perform the function for which they are intended. **OHS CODE, SECTION 12**
- **Manufacturer's specifications** Employers must ensure that forklifts are operated and maintained in accordance with manufacturer's specifications, and that any modifications are done in accordance with manufacturer's specifications or specifications certified by a professional engineer. **OHS CODE, SECTION 12**
- **Danger from movement and securing of materials** Employers must ensure that workers are protected from any danger related to the movement of a powered forklift or the movement or dislodgement of a load on or near a forklift. If a worker could be injured by dislodged materials, or movement of an elevated forklift undergoing repairs, for example, reasonable steps must be taken to ensure the material, or forklift, is restrained to eliminate the potential danger. **OHS CODE, SECTIONS 189 & 258**
- **Pedestrian traffic** Employers must ensure that workers on foot are protected from powered forklift traffic. An employer must ensure pedestrians wear a piece of highly visible clothing, that walkways are designated to separate pedestrian traffic from areas where powered forklifts are operating and that workers use the designated walkways. Where designated walkways are not practicable, employers must ensure that safe work procedures are used to protect workers. **OHS CODE, SECTIONS 194 & 259**
- **Lifting and handling loads** Employers must provide, where reasonably practicable, appropriate equipment for lifting, lowering, carrying, handling or transporting heavy or awkward loads. **OHS CODE, SECTION 208**
- **Training and competence** Workers must not operate powered forklifts unless they are trained and have demonstrated competence to safely operate the forklift, or are under the direct supervision of a competent worker. Employers must also ensure that workers who may be exposed to the possibility of musculoskeletal injury are trained in specific measures to eliminate or reduce that possibility. **OHS CODE, SECTIONS 211.1 & 256**
- **Seat belts and control** Where powered forklifts are equipped with a seat belt, employers must ensure that the seat belt is present and in useable condition, and workers must wear the seat belt. Workers must operate forklifts safely and maintain full control of the forklift at all times, which includes keeping the cab, floor and deck of powered forklifts free of materials, tools or other objects that could interfere with the operation or create other hazards. **OHS CODE, SECTIONS 256 & 284**

- **Visual inspection** Forklift operators must complete a visual inspection of a powered forklift and the surrounding area to ensure that the forklift is in safe operating condition and that no worker, including the operator, is endangered when the forklift is started up. OHS CODE, SECTION 257
- **Equipment inspection** Employers must ensure that powered forklifts are inspected by a competent worker for defects and conditions that are hazardous or may create a hazard. If an inspection indicates that a forklift is hazardous or potentially hazardous, an employer must ensure that the health and safety of a worker who may be exposed to the hazard is protected immediately and the forklift is not operated until the defect is repaired or the condition is corrected. Alternatively, if the forklift is potentially hazardous but can be operated safely temporarily, an employer must ensure that the operator is made aware of the potential hazard and the defect or condition is repaired as soon as reasonably practicable. OHS CODE, SECTION 260
- **Unattended controls** Workers operating a powered forklift must not leave the controls of the forklift unattended unless the forklift is secured against unintentional movement by an effective method of immobilizing the forklift. OHS CODE, SECTION 263
- **Lighting** Employers must ensure that powered forklifts used in poorly lit areas are equipped with lighting that illuminates the working area around the forklift as well as the forklift's control panel. OHS CODE, SECTION 264
- **Windows** Employers must ensure that windows and windshields used as part of the enclosure for a cab, canopy or protective structure on a powered forklift are of safety glass or another non-shattering material, that broken or cracked glazing that obstructs an operator's view is replaced as soon as reasonably practicable, and that a windshield has windshield wipers of sufficient size and capacity to clean matter that obstructs the operator's view from the windshield. OHS CODE, SECTION 265
- **Warning signal** Employers must ensure that, if a forklift operator's view of a powered forklift's path of travel is obstructed or cannot be seen directly or indirectly in a direction, the forklift has an automatic audible warning device that is audible above the ambient noise level. Alternatively, another warning device or method appropriate to the hazards of the work site can be used. OHS CODE, SECTION 267
- **Falling objects protective structures** If the hazard assessment identifies that a forklift operator may be exposed to falling objects, the employer must ensure that the forklift is equipped with a falling objects protective structure. OHS CODE, SECTION 272
- **Load rating chart** Employers must ensure that forklifts have a durable and legible load rating chart (capacity plate) that is readily available to the operator. OHS CODE, SECTION 283
- **Aerial fork-mounted work platform** Employers must ensure that work platforms (or cages) mounted on a powered forklift's forks are securely attached to the forklift, and that a work platform used to support a worker is commercially manufactured or designed and certified by a professional engineer. Employers must also ensure that workers on a forklift's fork-mounted work platform use a personal fall arrest system connected to an anchor specified by the manufacturer of the work platform or forklift, and if practical, the lanyard is short enough to prevent the worker from being ejected from the work platform. Forklift operators must remain at the forklift's controls while a worker is on a fork-mounted elevated work platform, and may not move the forklift horizontally when a worker is on the work platform. OHS CODE, SECTIONS 156 & 349
- **Chemical hazards** Employers must ensure that a worker's exposure to any harmful substance (e.g., carbon monoxide or carbon dioxide produced by a powered forklift's internal combustion engine) is kept as low as reasonably achievable and does not exceed its occupational exposure limit. OHS CODE, SECTION 16

- **Workplace Hazardous Materials Information System (WHMIS)** Employers must ensure that controlled products (e.g., propane or natural gas used to fuel a powered forklift's internal combustion engine) are used, stored, and handled in accordance with Part 29 of the OHS Code. Workers who refuel forklifts must be trained in WHMIS, including the theory plus practical aspects of refueling. "Generic" WHMIS training, on its own, might not be sufficient to meet the full training requirement because generic training might not include the practical worksite-specific component.

These additional pieces of legislation are mentioned for informational purposes and are not covered in this guideline.

In the event of an injury, an employer must comply with section 18 the *OHS Act* regarding the reporting and investigation of injuries and accidents. For more information, refer to the bulletin *Reporting and Investigating Injuries and Incidents* (LI016) available at **worksafe.alberta.ca**.

The above is a simplified summary of some parts of the relevant OHS legislation that pertains to forklifts and is not the legislation itself. Refer to the actual legislation for the actual and complete rules.

For further information

In addition to complying with OHS legislation:

- In the event of an injury, an employer must comply with the *Workers' Compensation Act*. More information is available at **wcb.ab.ca** or by phoning **1-866-922-9221**.
- If a powered forklift is operated on a public roadway, the vehicle and operator must comply with *Alberta's Traffic Safety Act*. More information is available at **transportation.alberta.ca** or by phoning **780-427-2731** (310-0000 toll free in Alberta).
- If a forklift operator is handling, offering for transport or transporting dangerous goods, the operator must comply with the federal *Transportation of Dangerous Goods Act* and Regulations, which include training requirements. More information is available at **transportation.alberta.ca** or by phoning **1-800-272-9600** (or 780-422-9600 in Edmonton).

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Key elements of a health and safety program for forklifts

Employers whose work involves the use of forklifts are encouraged to implement a comprehensive forklift health and safety program, which includes the following key elements:

- Hazard assessment;
- Training and information;
- Management, supervision and internal responsibility (includes forklift selection);
- Safe operating procedures;
- Forklift maintenance and modification;
- Facility design; and
- Preventing injuries to muscles, joints and bones.

TIP CAN-CSA B335-04, *Safety standard for lift trucks*, available from the Canadian Standards Association, is a useful resource for any Alberta workplace implementing a forklift safety program.

TIP If you require more information and assistance on implementing an effective health and safety management system for your organization, contact a Partnerships in Health and Safety Program Certifying Partner. A list of Certifying Partners is available at worksafe.alberta.ca or by calling 1-866-415-8690.

Hazard assessment

Hazards should be identified and assessed so that appropriate controls can be put in place to prevent workers from being harmed by forklifts.

Section 4 of this best practices guideline provides a description of considerations for the assessment of hazards related to forklifts.

Training and information

Providing training and information for forklift operators and those who work near forklifts about the hazards associated with the work and how to protect themselves and others is a critical step in ensuring safety.

Section 5 of this guideline provides a description of considerations for training.

Management, supervision and internal responsibility

Effective management and supervision begins by appointing competent managers and supervisors.

Section 6 of this guideline provides a description of considerations for effective management, supervision and internal responsibility. Forklift selection is also covered in this section.

Safe operating procedures

Employers should establish safe work practices for all work involving forklifts, including pre-use inspections and refueling.

Section 7 of this guideline provides a description of considerations for safe operating procedures.

Forklift maintenance and modification

Employers should prepare rules and procedures for proper testing, maintenance, repair and modification of forklifts, including rules governing the qualifications of persons authorized to carry out these activities.

Section 8 of this guideline provides a description of considerations for forklift maintenance and modification.

Facility design

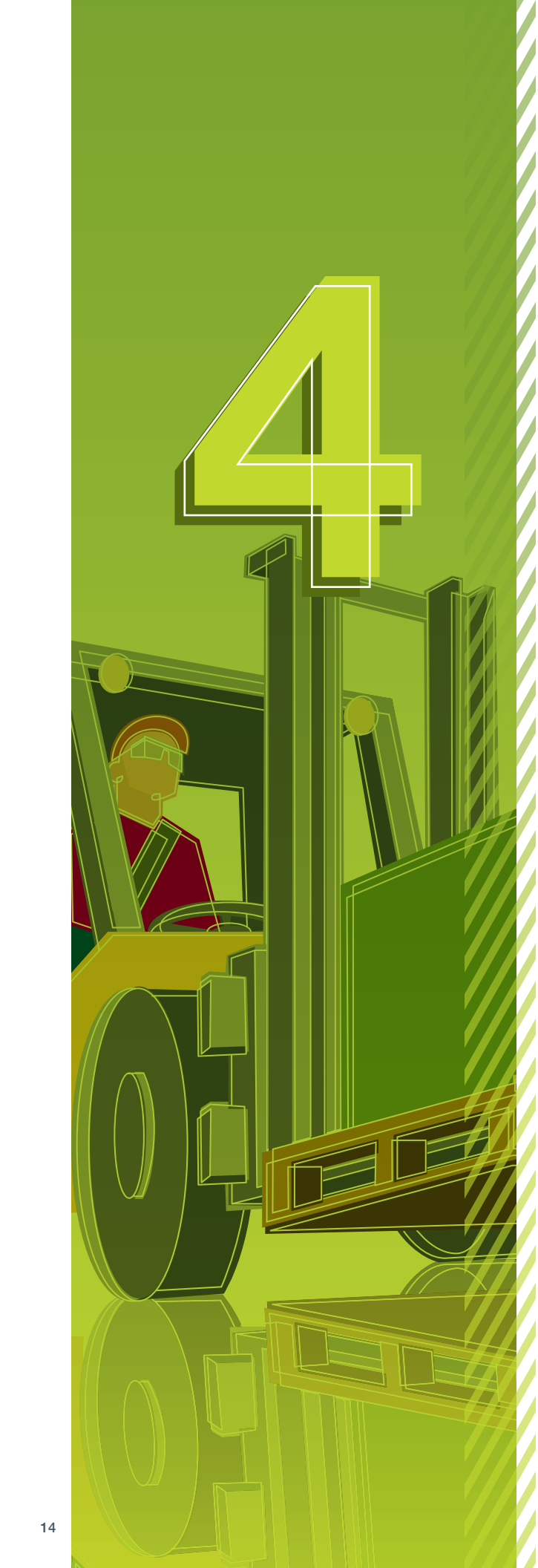
Employers should design and maintain the work environment to reduce the likelihood of incidents involving forklifts.

Section 9 of this guideline provides a description of considerations for facility design.

Preventing injuries to muscles, joints and bones

Employers should create a healthy work environment that prevents repetitive strain (or musculoskeletal) injuries.

Section 10 of this guideline provides a description of considerations for preventing injuries to the muscles, joints and bones of forklift operators.

A vertical illustration on the left side of the page. It features a large, stylized number '4' in a light green color with a white outline. Below the number, there is a stylized illustration of a forklift operator wearing a red shirt and a yellow hard hat, operating a yellow forklift. The background is a solid green color with a white diagonal line pattern on the right side.

Hazard assessment

Assessing worksite hazards before work begins is a requirement under section 7 of the Occupational Health and Safety Code.

In assessing the hazards, employers must:

- Identify how workers who operate or work around forklifts may be harmed, taking into consideration the equipment that will be used, the jobs to be done and the workplace environment.
- Prepare a written report specifying the existing and potential hazards identified. The written report can be useful in providing complete and consistent information to workers about the hazards associated with their work.
- Reassess the sources of harm if any element of the work, such as equipment, workers, loads or work environment changes in a significant way, and make appropriate changes to the written report on hazards, as necessary.

Techniques used to identify hazards may include seeking advice from safety associations or other specialists, talking with supervisors and workers, reviewing information from manufacturers and reviewing work processes. It is particularly valuable to analyze past incidents and injury data.

A sample approach to assessing hazards follows.

In addition to the hazard assessment process described above, forklift operators must complete a pre-use forklift inspection at the start of every work shift.

Refer to page 37 of this guideline for more information about pre-use inspections.

On the hazard identification checklist, check off all the existing and potential hazards that are present at your work site. Add any identified hazards specific to your work site to the list.



Company: XYZ Cargo Carriers

Date: December 1, 2010

Location: Stony Creek, Alberta

Completed by: Will B. Safe

Check off all hazards or potential hazards at your work site.

- ☒ Lifting and handling loads by hand
- ☒ Repetitive motion
- ☐ Slipping and tripping
- ☐ Workplace violence
- ☐ Working alone
- ☐ Loading/unloading trucks or trailers
- ☐ Shifting of boxes or loads being lifted by forklift
- ☐ Equipment hazards
- ☐ Faulty brakes/hydraulic lines
- ☐ Dirty or frosty windows
- ☐ Other vehicles
- ☒ Pedestrian traffic
- ☐ Other:

Identify the types of chemicals and check off all hazards or potential hazards at your work site.

-  Propane (fuel)
-  Battery charging
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Add any additional identified hazards specific to your work site that are not already listed.

Check off all hazards or potential hazards at your work site.

- ☐ Working conditions
- ☐ Fatigue
- ☐ Stress
- ☐ Other:

Step 2: Hazard assessment and control sheet

Take the hazards identified on the checklist above and list them on the hazard assessment and control sheet. Identify the controls that are in place: engineering, administrative, personal protective equipment (PPE) or a combination for each hazard.

- Set priorities.
- Where controls are identified that are not in place, develop an action plan to ensure they are completed.



Hazard Assessment and Control Sheet (Sample)

HAZARD	Adjusting materials on pallets (lifting and handling, repetitive motion).	Operating the forklift (equipment hazards, repetitive motions).	Entering and exiting the forklift (slipping and tripping).	Fueling the forklift (propane).
CONTROLS IN PLACE (LIST)	ADMINISTRATIVE: Ergonomics training for forklift operators, other workers and supervisors. PPE: Wear applicable PPE that is required in the area the forklift is operating in.	ADMINISTRATIVE: Forklift operators to be trained in the safe operation of the forklift they are using.	ENGINEERING: Grab bars and/or running boards, if applicable. ADMINISTRATIVE: Safe work procedures three points of contact. PPE: Non slip footwear.	ADMINISTRATIVE: Follow manufacturer specifications (i.e. turn off vehicle, no smoking, etc.), WHMIS training.
PRIORITY TO IMPLEMENT CONTROL	☐ Low ☐ Medium ☒ High	☐ Low ☐ Medium ☒ High	☐ Low ☒ Medium ☐ High	☒ Low ☐ Medium ☐ High
FOLLOW-UP ACTION(S) FOR CONTROLS NOT IN PLACE	Review forklift training records to ensure affected workers have received training appropriate to this hazard.	Review forklift training records to ensure affected workers have received training.	Inspect all forklifts to ensure grab bars or running boards are adequate for the type of forklift.	Review WHMIS training records to ensure all staff have training appropriate to this hazard.
DUE DATE	December 1	December 1	December 1	December 1
PERSON RESPONSIBLE	Will B.	Will B.	Kim M.	Will B.



Hazard Assessment and Control Sheet (Template)

HAZARD

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**CONTROLS
IN PLACE (LIST)**

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ENGINEERING:

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ENGINEERING:

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ENGINEERING:

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PPE:

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**PRIORITY TO
IMPLEMENT
CONTROL**

☐ Low
☐ Medium
☐ High

☐ Low
☐ Medium
☐ High

☐ Low
☐ Medium
☐ High

☐ Low
☐ Medium
☐ High

**FOLLOW-UP
ACTION(S)
FOR CONTROLS
NOT IN PLACE**

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DUE DATE

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**PERSON
RESPONSIBLE**

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5

Worker training and competency

Ensuring that workers are trained and competent are requirements under section 15 of the Occupational Health and Safety Regulation, and sections 211.1 and 256 of the Occupational Health and Safety Code.

An employer must ensure that workers who are assigned to operate forklifts are competent and qualified to do so. To fulfill these obligations, an employer should establish the competence of workers who will operate forklifts before assigning a worker to operate a forklift, and ensure that workers have achieved and can demonstrate the appropriate competencies.

A competent operator knows how to operate the particular class of forklift assigned, understands the hazards associated with the work involved, and is capable of operating the forklift in a manner that protects his or her own health and safety along with the health and safety of others in the workplace.

Establishing the competence of operators

To establish a worker's competence to operate a forklift, an employer should ensure that the worker:

- Has been informed of the hazards associated with operating a forklift in the particular workplace, including the hazards associated with the load, the design of the workplace, and the environmental conditions.

- Knows how to protect him/herself and others from the hazards.
- Has demonstrated to a designated skilled and experienced person that the skills and knowledge identified as final outcomes for operator competency have been learned.

The employer should develop an evaluation system to ensure ongoing competency of operators. This should include, but not be limited to, testing on operation of the forklift, knowledge and skill level regarding the forklift and company policy and procedures relating to forklift operations. This evaluation should assess the need for further training, training updates or refresher courses.

Employers may consult a safety association or the forklift manufacturer for information on institutions, agencies or people with expert knowledge of forklifts.

Employers should maintain in the workplace a record of workers competent to operate forklifts. For each worker, the record should indicate the skills and knowledge demonstrated, the class or classes of forklift on which the operator was trained and assessed, the name and affiliation of the trainer/assessor, the date the training/assessment took place, and training certificate expiry dates if applicable. Employers may provide operators with certificates of competency.

Forklift operator training courses should typically be full day in duration, i.e., at least seven hours of actual training time, and consisting of a balance between classroom theory and hands-on practical training.

While operators of forklifts must always be competent to work safely, as required by the OHS legislation, it is a best practice that operators of forklifts receive retraining at intervals not exceeding three years. Workers should also be retrained when equipment is modified, new equipment is introduced, when there are changes to the environment, and when there are changes to applicable legislation. Retraining should be consistent with the employer's forklift safety program and applicable legislation.

Eighteen months after training or retraining, a mid-term skills evaluation should be conducted to re-assess the operator's practical skills. The goal of this mid-term evaluation is to give the operator feedback for

any necessary corrective actions regarding pre-use inspection, startup and operation of the forklift.

Employers may choose to have training conducted by external trainers such as an industry health and safety association or a training company. Alternatively, training may be done in-house if there is an adequately qualified trainer. In-house trainers, in addition to being fully competent in training of workers and operating forklifts, must keep current on legislation, equipment changes, etc.

A forklift operator's training should be documented and records made available to a government occupational health and safety officer whenever requested. All operator training and evaluation should be conducted by individuals who have the appropriate knowledge, training and experience to train forklift operators and evaluate their competence.

Even though training can be acquired from outside agencies, employers are still responsible to ensure forklift operators are competent in their work environment with the forklifts they operate.

Some examples of when a refresher course should be given to operators are:

- Operator has been observed operating the forklift in an unsafe manner.
- Operator has been involved in an incident.
- Operator receives an evaluation that indicates he or she has operated the forklift unsafely.
- Operator is assigned a different type or class of forklift.
- Environmental conditions in the workplace change, which may affect the safe operation of the forklift. Examples include introduction of a flammable environment, introduction of additional forklifts or other equipment, etc.

A sample performance test for forklift operators is included on page 22.

If a medical condition affects a worker's ability to operate a forklift safely, the worker should not be assigned to operate a forklift.

Knowledge and skills required to be competent

Knowledge A competent forklift operator understands:

- The sections of the *Occupational Health and Safety Act*, Regulation and Code applicable to the work.
- The hazards associated with both the work being done and with the operation of forklifts.
- The principles of selection, operation, features, and limitations of the forklift.
- The workplace conditions and environment.
- Which workplace activities pose actual or potential danger to worker health and safety.
- The manufacturer's specifications related to the operation and safe load handling for the classes or types of forklifts operated.
- The procedures and practices for ensuring worker health and safety that are specific to the workplace.
- Training on the Workplace Hazardous Materials Information System (WHMIS).
- Training on Transportation of Dangerous Goods if handling, offering for transport or transporting dangerous goods (falls outside the scope of this guideline).

See pages 23–25 for a detailed listing of required knowledge.

Skills A competent forklift operator should be able to perform the following procedures in a manner consistent with the competence standards using the assigned forklift under typical workplace conditions:

- Pre-operational check (see page 37).
- Start-up and shut-down.
- General operation—stopping, starting, turning, driving forward and in reverse with or without a load, parking, and operating around personnel.
- Load handling—selection and security of loads, pick-up and placement, personnel lifting, stacking and unstacking, and handling specific to docks, trucks or rail cars.
- Loading and unloading—transport vehicles, structures and elevators.

- Operational maintenance—refueling or recharging, and checking and refilling fluids, as appropriate.

See pages 26–31 for a detailed listing of required skills.

Employers must ensure the health and safety of all workers

Employers should inform and instruct pedestrians, workers, supervisors, visitors and others in the workplace who will be around forklifts about the hazards, the rules and procedures they are to follow to avoid harm, and the location of the written rules and procedures. Employers should also ensure that supervisors and workers are informed of any changes to the rules and procedures.



Performance Test for Forklift Operators (Sample)

Operator's name:

Date:

TASK	OK	NOT APPLICABLE	NEEDS TRAINING
Conducted pre-operational check.	☐	☐	☐
Showed familiarity with the controls.	☐	☐	☐
Properly used seat belt or other restraining device.	☐	☐	☐
Started and stopped smoothly.	☐	☐	☐
Slowed down at intersections. Sounded horn at intersections. Obeyed all traffic signals.	☐	☐	☐
Planned route ahead, checked doorways. Kept a clear view of direction of travel.	☐	☐	☐
Turned corners correctly. Aware of rear end swing.	☐	☐	☐
Drove under control and within proper traffic aisles.	☐	☐	☐
Yielded to pedestrians.	☐	☐	☐
Drove straight up and straight down inclined surfaces, with and without loads.	☐	☐	☐
Properly drove backwards when required. Sounded horn before reversing (unless if forklift equipped with backup alarm).	☐	☐	☐
Approached load properly. Forks under load all the way, and centered.	☐	☐	☐
Lifted load properly. Load balanced properly and secured. Lowered load smoothly and slowly.	☐	☐	☐
Maneuvered with load properly. Travelled with load at proper height (approximately 10 cm above surface).	☐	☐	☐
Inspected bridge plates and dock boards.	☐	☐	☐
Made sure truck/trailer wheels were chocked/wedged.	☐	☐	☐
Placed load within marked area. Stacked load evenly and neatly.	☐	☐	☐
Parked properly, neutralized all controls, lowered forks to ground, set the brake, and turned off the engine.	☐	☐	☐

Assessed by:

Signature:



Knowledge to be Acquired

KNOWLEDGE INSTRUCTIONAL OBJECTIVE FINAL OUTCOME	Applicable legislation	Features of the forklift	Features of the forklift
	Applicable sections of the Occupational Health and Safety Act, Regulation and Code. Federal Transportation of Dangerous Goods legislation may also be relevant, but is not included.	Principles of operation and features	Manufacturer's specifications
	A competent operator knows/understands: ☐ A worker's duties ☐ A worker's duty to refuse unsafe work ☐ An employer's duties to protect workers ☐ How to ensure the health and safety of other workers in the area ☐ Requirements of lifting devices, materials handling, motor vehicles, and traffic control ☐ Requirements related to the handling of loads ☐ Requirements for personal protective equipment	A competent operator knows/understands: ☐ Classifications and designations ☐ Stability triangle and trapezoid ☐ What is meant by load centres ☐ Centre of gravity of load ☐ Longitudinal and lateral stability ☐ Centre of gravity of forklift ☐ Effects of speed, acceleration, sharp cornering, height, attachment, grades/ramps and load security ☐ Operator blind spots associated with the design of the forklift, its components, permanent equipment and attachments ☐ Main components of the forklift with emphasis on the lifting/handling systems and their basic functions ☐ The factors affecting stability, reach/retract, counterbalance principles, tilt ☐ 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 ☐ Weight and minimum battery weight	A competent operator knows/understands: ☐ Where to find the operator's manual ☐ The operating information outlined in the manual ☐ The pre-operational and maintenance tasks described in the operator's manual



Knowledge to be Acquired (continued)

KNOWLEDGE	Hazards in the workplace	
INSTRUCTIONAL OBJECTIVE	Dangerous activities	
FINAL OUTCOME	A competent operator understands the dangers of: ☐ Operating with restricted visibility (blind spots, corners, inspections) ☐ Operating without using a seat belt or other restraining device ☐ Parking a forklift 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 or walk under loads ☐ Permitting anyone to 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 ☐ Not tilting the mast back enough to stabilize the load ☐ Increasing the capacity of the forklift or overloading the forklift ☐ Using a forklift beyond its limitations (e.g., a forklift is not a crane) ☐ Stunt driving and horseplay ☐ Allowing anyone to stand on the fork or climb on the upright assembly ☐ Moving a load with someone steadying it ☐ Jumping from the forklift in the event of a tip-over ☐ Uneven surfaces ☐ Operating on a slippery surface (floors, ramps, dock plate) ☐ Explosive atmospheres ☐ The accumulation of exhaust emissions (e.g. carbon monoxide) in restricted spaces such as railway cars or trucks ☐ Operating with restrictions such as overhead equipment or other obstructions, e.g., stationary building structures ☐ Pedestrian traffic ☐ Workplace noise ☐ Inadequate lighting ☐ Other vehicular traffic	

	Hazards in the workplace	Hazards in the workplace	Hazards in the workplace
	Workplace specific rules and procedures	Workplace Hazardous Materials Information System (WHMIS)	Emergency procedures
	A competent operator knows/understands: ☐ The procedures and rules that have been established by the employer to ensure safe operation of forklifts in the workplace, including rules for when pedestrians have the right-of-way, signals used to manage traffic (if any), and rules for maintenance, testing and repair of the forklift	A competent operator knows/understands the Workplace Hazardous Materials Information System including: ☐ How to read and understand supplier labels and materials safety data sheets ☐ Knowing the hazards of, and how to work safely with, controlled products related to the operation of the forklift, being transported by the forklift, and in the area the forklift is operating.	A competent operator knows/understands: ☐ The emergency procedures applicable to the work site as defined by the employer ☐ How to operate the particular type or class of fire extinguisher in the workplace ☐ In case of forklift tip-over: ☐ Keep seat belt fastened ☐ Don't jump ☐ Hold on tight to steering wheel ☐ Brace feet ☐ Lean away from impact ☐ Lean forward



Skills to be Acquired

SKILL	Skills to be Acquired			
	General Operation	General Operation	General Operation	
TASKS TO BE ASSESSED	Pre-operational check (circle check)	Start-up	Starting, stopping and turning	
FINAL OUTCOME	Before operating a forklift, a competent operator: ☐ Carries out a visual inspection of the forklift and its attachments to ensure that the equipment is in good operating condition, using a checklist provided by the employer ☐ Follows recommended procedures for daily inspections of fluid levels	A competent operator: ☐ Uses the correct mounting procedures ☐ Assumes the appropriate driving position ☐ Ensures transmission/directional control lever is in neutral ☐ Ensures parking brakes are applied ☐ Activates start button/switch ☐ Ensures warning system is operating	A competent operator: ☐ Fastens seat belt (or uses other restraining device) before operating the forklift ☐ 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	

General Operation	General Operation
Shut-down and parking	Forward and reverse driving on level ground
A competent operator: ☐ Brings the forklift to a complete stop, sets the parking brake and returns transmission/directional control lever to neutral ☐ Lowers forks to the ground and tilts them forward ☐ Uses appropriate shut-down procedures and turns off power supply ☐ Chocks wheels if there is a risk of the forklift moving	A competent operator: ☐ 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 by the load being carried, drives the forklift in reverse or asks to be guided by another worker ☐ Keeps the load-engaging means or the load itself low (usually within 10 cm of the floor/surface and tilted backward) ☐ Keeps safe operating distance from other lifting devices, pedestrians, structures and machinery ☐ Observes traffic management procedures as established by the employer ☐ Drives at an appropriate speed, taking into consideration the type of device, the load, the pedestrian traffic along the travel route, any obstructions and the condition of the driving surface ☐ Adjusts fork arms and attachments appropriately to maintain load stability ☐ Observes weight restrictions for floors and freight elevators ☐ Takes appropriate action when encountering restrictions such as overhead equipment and other obstructing stationary structures



Skills to be Acquired (continued)

SKILL	General Operation	General Operation	Load Handling	
	TASKS TO BE ASSESSED	Operating around personnel	Selection of loads	
FINAL OUTCOME	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 forklift and load prior to travelling on an incline or uneven terrain ☐ Does not turn the forklift around on a ramp or incline ☐ Drives at an appropriate speed taking into consideration the effects of the slope of the driving surface on the forklift and load security ☐ Approaches the grade straight on, not on an angle ☐ Operates in appropriate gear ☐ Ensures visibility is clear in the direction of travel ☐ Verifies that the incline does not exceed the maximum permissible slope	A competent operator: ☐ Always faces the direction of travel ☐ When turning, ensures no personnel are within the forklift's danger zone ☐ Observes employer's policy for ensuring the safety of pedestrians ☐ If stopped at an intersection, does not move until eye contact is made with any personnel or operators of other vehicles at the intersection ☐ Maintains a safe distance from pedestrians	Before picking up a load, a competent operator: ☐ Assesses the weight distribution of the load and identifies limitations of the structures where the load is to be placed ☐ Ensures that the load is within the rated capacity for the forklift, taking into account the job to be done ☐ Checks forks/attachments to ensure that they are safe to use with respect to the equipment's capacity rating	

	Load Handling	Load Handling	Load Handling
	Load pick up and placement	Load security and integrity	Personnel lifting, lowering and supporting
	A competent operator: ☐ Checks overhead clearance ☐ Ensures safe distance from any live power source ☐ Engages at least two-thirds 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 unsecured articles are 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 forklift is in motion	A competent operator: ☐ Observes the limits for freestanding stack height ☐ Ensures the load is secure and balanced before lifting	A competent operator: ☐ Ensures forklift meets prescribed requirements ☐ Uses only a platform specifically designed for use with a forklift and equipped with a guardrail ☐ Ensures that the platform is secured to the mast as prescribed ☐ Raises and lowers the platform to test its operation before allowing a worker on it ☐ Ensures that the person on the platform dons the necessary personal protective equipment and is secured as prescribed ☐ Keeps the upright in a vertical position ☐ Remains at the controls at all times while a worker is on the platform ☐ Does not travel with a worker on the platform ☐ Ensures the safety of pedestrians in the area



Skills to be Acquired (continued)

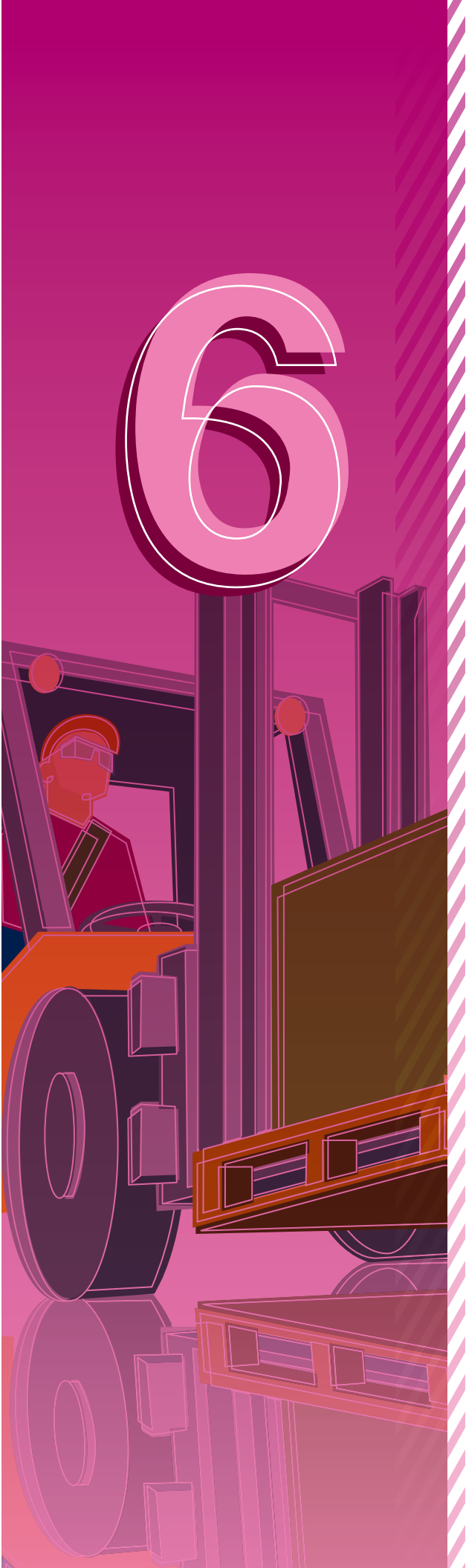
SKILL TASKS TO BE ASSESSED FINAL OUTCOME	Loading and unloading	Loading and unloading	Loading and unloading	
	Loading trucks and railway cars	Transporting loads in elevators	Unloading	
	Before entering any truck, trailer or railway boxcar, with or without a load, a competent operator: ☐ Ensures that the vehicle being loaded is adequately restrained to prevent movement ☐ Inspects floors for stability and integrity ☐ Ensures that the dock/bridge plate is designed to support the mass of the loaded forklift ☐ Ensures that the dock/bridge plate is firmly in position ☐ Ensures the trailer is properly supported by a jack stand where appropriate (e.g. when not connected to the tractor)	A competent operator: ☐ Ensures the elevator is capable of supporting the loaded forklift ☐ 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 forklift and load ☐ Sets the brakes on, lowers the load to the floor, places controls in neutral, shuts off the power and gets off the forklift	A competent operator: ☐ Verifies that the structure where the load has to be placed is able to carry the weight of the load ☐ When placing or stacking loads, does not block access to fire extinguishers, exits, stairways, eye wash stations, emergency shutoff switches, first aid kits, etc. ☐ When stacking loaded pallets, ensures the load at the bottom is secure and leveled ☐ Does not exceed the pallet stacking limit for the type of materials contained on the pallets ☐ Tilts load forward to level position ☐ Exits with forks level	

Operational maintenance

Refueling and recharging

A competent operator is trained to perform routine maintenance safely and given the responsibility to do so:

-  Follow the manufacturer's specifications and employer's procedures for safe refueling and recharging of the forklift including:
 -  Wearing the appropriate personal protective equipment, including eye protection
 -  Properly positioning and securing the forklift
 -  Observing workplace precautions with respect to fire hazards



Management, supervision and internal responsibility

Employers should appoint as supervisors of forklift operations, individuals who have the appropriate competencies. These individuals should know the hazards associated with the type of forklift being used, the loads being handled and the environment in which the forklift will be operated. Supervisors should know all of their employer's occupational health and safety policies and procedures. They should also be able to monitor and assess the safety of forklift operations, including having the ability to identify unsafe conditions and apply corrective measures.

Supervisors should be encouraged to watch for unsafe conditions and correct them immediately when they are detected. It is recommended that supervisors of forklift operations complete a forklift training course.

Internal responsibility can be achieved by involving workplace parties in managing the safety of forklift operations. To promote internal responsibility, the employer may involve the health and safety committee, health and safety representatives, supervisors and workers in identifying workplace hazards, developing rules and procedures to prevent injuries, identifying causes of incidents or 'near misses,' and monitoring forklift safety improvements.

Forklift selection

The proper class of forklifts should be selected based on criteria, which includes ensuring:

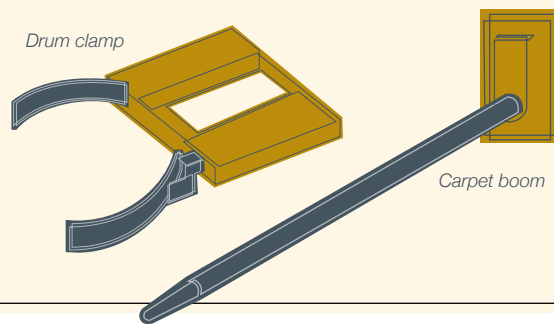
- That the carrying capacity, reach capabilities and the features of the forklift selected to do a job are suitable for the types of loads to be handled, the terrain over which loads will be carried and the design of the workplace.
- That the fire hazard designation of the forklift selected to do a job are suitable for the atmospheric conditions in the workplace (see section on *Fire hazard designation* to the right).
- Operators are protected against falling or intruding materials by means of suitable screens, guards, grills or structures.
- Every forklift clearly displays a load chart showing the maximum rated load and the variation of the rated safe load capacity with the reach of the forklift. If the forklift has been modified, the chart must reflect any changes to load ratings.
- Forklifts are equipped with warning devices and lights that are appropriate for the work environment.
- Where a seat belt or other restraining device is likely to contribute to the safety of the operator, the forklift is equipped with a seat belt, or other restraining device.
- Where a forklift has a rollover protective structure (ROPS), the forklift is equipped with a seat belt or other restraining device that prevents the operator from being thrown out of the protective structure.

If an employer purchases a used forklift, there is a possibility there may be some missing components or missing safety features. It is the employer's responsibility to ensure that if a used forklift is purchased, it is maintained and meets manufacturer specifications before the forklift is put into operation.

If equipment attachments are used—e.g., carton, drum or paper roll clamp, push pull or rotator attachment, carpet boom, fork extensions, etc.—request an updated load chart from the attachment supplier, forklift manufacturer or supplier, or have one developed by a professional engineer.

NOTE: You are not permitted to fabricate your own equipment attachments unless the design is certified by a professional engineer.

EQUIPMENT ATTACHMENTS: Examples



Fire hazard designation If fire or explosion hazards exist in the workplace, an employer must classify worksites in accordance with Part 10 of the Occupational Health and Safety Code.

Forklifts used in hazardous locations must comply with Part 10 of the Code. An employer may work with a forklift supplier to select a suitable forklift with the necessary safety features such as a built-in flame arresting device.



Safe operating procedures

Issues related to work practices and traffic management have been contributing factors in a number of fatalities and critical injuries involving forklifts.

Therefore, as a minimum, employers should ensure compliance with the following requirements:

- Forklift operators must be qualified to use the type(s) of forklifts being used.
- Forklifts fitted with rollover protective structure (ROPS) must have seat belts or other restraining devices designed to prevent the operator from being thrown out of the rollover protective structure.
- Forklift operator must use a seat belt, or other restraining device if the forklift is equipped with ROPS, when operating the forklift.
- No part of a load may pass over any worker.
- No load may exceed the maximum rated load capacity.
- All loads must be handled in accordance with the height and weight restrictions on the forklift's load chart.
- When a load is in the raised position, the controls must be attended by an operator.
- If an operator does not have a clear view of the path, assistance from a signaler who has been instructed in a code of signals for managing traffic in the workplace should be employed.
- Loads should be carried as close to the ground or floor as the situation safely permits.
- Loads that may tip or fall and endanger a worker must be secured.

- Where there is a potential for suspended loads to shift, all immediate zones below must be barricaded to prevent potential worker exposure to the danger of falling objects.
 - The employer must ensure that operators stack materials in such a way that the materials are vertical and stable, and cannot fall into a walkway if bumped.
 - Where a forklift is required to enter or exit a vehicle to load or unload, the vehicle must be immobilized and secured against accidental movement.
 - A forklift must not be used to support, raise or lower a worker unless the work is carried out in a fork-mounted work platform which complies with the OHS Code, and personnel on the work platform comply with the requirements for fall protection under the OHS Code (refer to section 2 of this document for references to legislation).
See diagram on page 36 of fork-mounted work platform.
 - Barriers, warning signs, designated walkways or other safeguards should be provided where pedestrians may be exposed to the risk of collision with a forklift.
 - Maintain sufficient air quality in areas where internal combustion engine powered forklifts are used, to control carbon monoxide and carbon dioxide hazards.
 - If attachments are used, forklift operators must receive specific training on how to safely use the different types of attachments for their forklifts.
 - Operational controls on equipment must be properly identified to indicate the nature and function of the controls.
 - A forklift left unattended must be immobilized and secured against accidental movement, and forks, buckets or other attachments should be in the lowered position or be firmly supported.
 - All load weight information either through manifest or appropriate calculations specified by competent persons should be made readily available to the forklift operator before the start of lifting operations.
 - No part of operator's body should extend beyond the side of the forklift while in operation.
 - Passengers are not allowed in the forklift while in operation unless the forklift is specifically designed with a passenger seat.
 - If the movement of a load or any part of the forklift creates a danger to workers, the employer must ensure that workers never remain within range of the moving load.
 - If workers cannot use designated walkways, then safe work procedures must be used to protect workers who enter areas where forklifts are operating.
 - As far as reasonably practicable, employers should restrict pedestrian access to areas where forklifts are operating.
 - The forklift operator is responsible for the safety of other workers in the vicinity of the operating forklift.
 - Workers in the vicinity of a forklift must be aware of the forklift's path of travel and avoid contact with the forklift at all times.
 - If a forklift operator believes that the load being moved is unsafe, the operator must exercise work refusal protocols as per section 35 of the *Occupational Health and Safety Act*.
- In addition to the safe operating procedures above, each workplace should develop and implement a set of rules and safe operating procedures to address the specific hazards in the workplace. Safe operating procedures may include everything covered throughout this best practices guideline plus:
- Battery handling and charging, and how to handle spills of battery electrolyte, if applicable.
 - Propane or other fuel handling, if applicable.
 - Use of equipment attachments, if applicable.
 - The use of load charts.
 - Use of personal protective equipment such as safety footwear, safety glasses, gloves, hard hats and hearing protection, where applicable.

Refueling

Refueling should be done in an area with adequate ventilation to prevent the accumulation of flammable vapours. Open flames in the refueling area are prohibited.

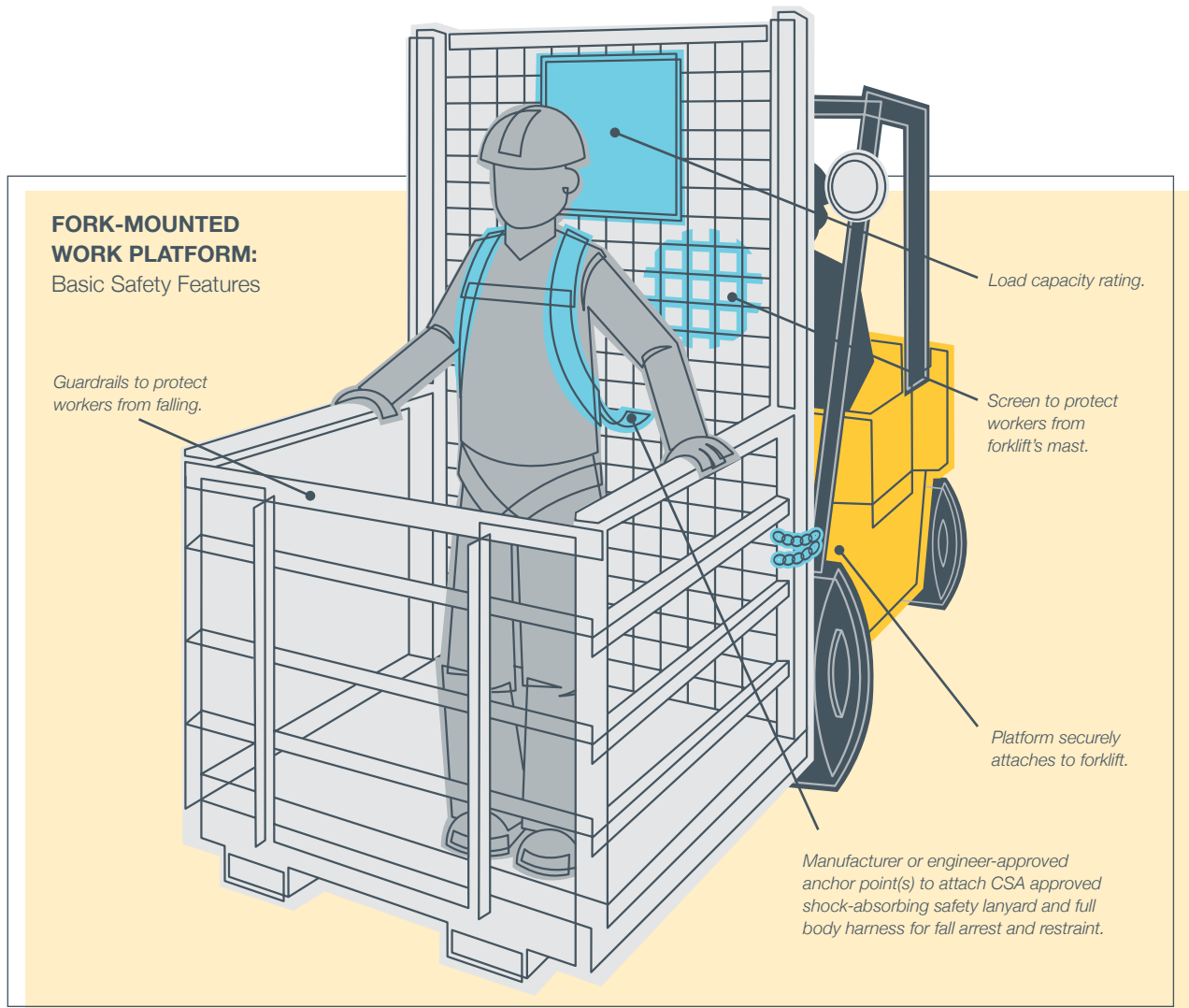
An appropriate class and size fire extinguisher must be in close proximity to the refueling operation and the operator must be trained on how to use the fire extinguisher.

The forklift must be turned off, properly parked and the operator out of the forklift during refueling.

Forklifts must be refueled by trained personnel. Minimum training will include the manufacturer's specifications for the forklift's refueling process plus the Workplace Hazardous Materials Information System (WHMIS).

Pre-use inspection

The forklift operator must complete the pre-operation daily checklist at the beginning of every shift. **See page 37 for a sample daily checklist.**





Pre-Operation Daily Checklist (Sample)

Forklift No.: Date:

Make: Shift:

	OK	MAINTENANCE REQUIRED
Is the forklift's appearance in good condition and clean?	☐	☐
Is the manufacturer's capacity plate clean and readable?	☐	☐
Check lift chains for equal tension, broken pins and extra wear.	☐	☐
Check the forks for damage.	☐	☐
Check for loose bolts and cracks on overhead guard, back rest and tilt cylinders .	☐	☐
Are the hydraulic hoses in good condition?	☐	☐
Check tires for cracks or other signs of wear. If inflatable tires, does air pressure meet the manufacturer's specifications?	☐	☐
Do the lights and horn work?	☐	☐
Check that the parking brake is working properly.	☐	☐
Check that the seat is in good condition and the seat belt is working properly.	☐	☐
Any signs of oil, coolant or fuel leaks under the forklift?	☐	☐
Check the fluid levels for the brake fluid, engine oil, hydraulic tank and coolant.	☐	☐
Start the engine and check the dashboard gauges for proper readings.	☐	☐
Make sure there is no excessive free play in the steering wheel .	☐	☐
Do the mast and forks raise, lower and tilt smoothly?	☐	☐
Check that the clutch engages properly. Does it shift roughly?	☐	☐
Hold the brake pedal down for 10 seconds. Is there any noticeable drift with the pressure?	☐	☐
If an electric forklift, is the battery in good condition and charged?		
Are all connections tight? Is the discharge indicator showing sufficient charge when you turn the key?	☐	☐

Operator name: Signature:

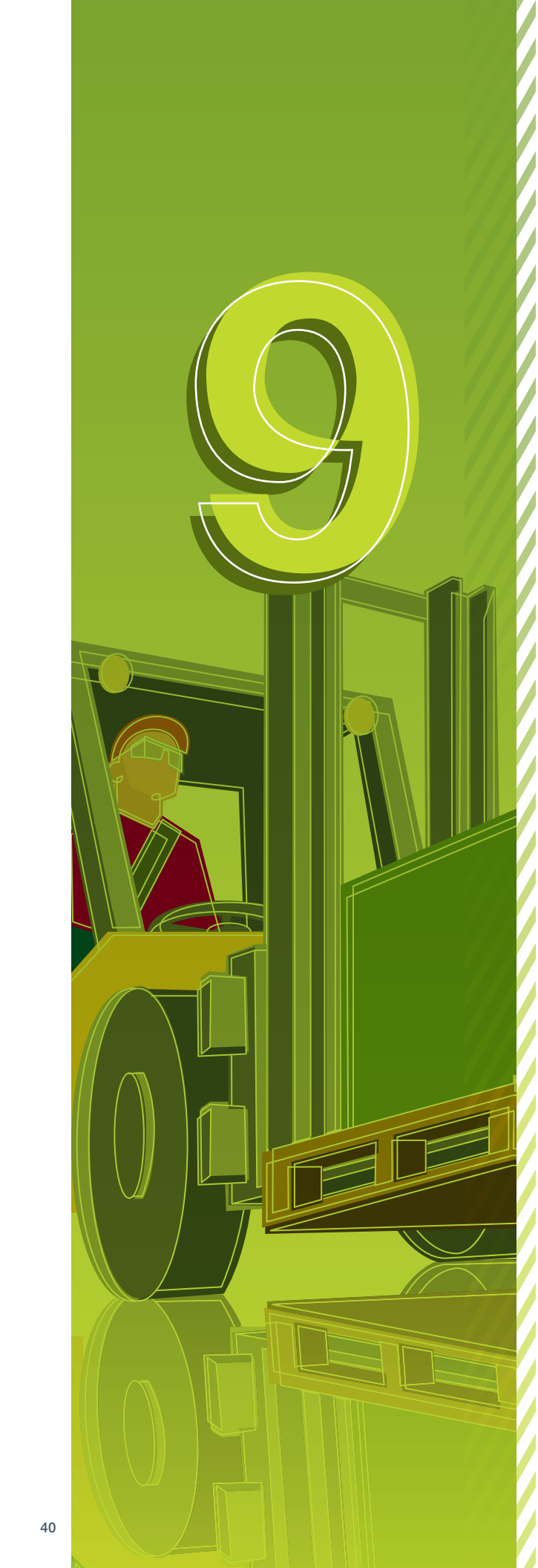


Equipment maintenance and modification

Employers must maintain in sound mechanical condition any forklifts provided to workers and a competent person must carry out the maintenance. Any repairs or modifications to any forklift should not reduce the safety factor. To achieve these objectives, employers should:

- Ensure any modifications, repairs and additions that affect capacity or safe operation of the forklift are performed with the written approval of the manufacturer or a professional engineer qualified in that field of work. Where such modifications or additions are performed, capacity, operation and maintenance instruction plates, tags or decals must be changed accordingly.
- Prepare and enforce rules for inspection, testing and maintenance:
 - Prepare written instructions on the nature and frequency of inspections, testing and maintenance, taking into account the work to be done and the environmental conditions to which the forklifts will be exposed. These instructions should be at least equivalent to the minimum requirements established by the manufacturer. They should require verification of the lifting capabilities of the forklift before it is used for the first time. They should also contain a schedule for monitoring the forklift's lifting capabilities, its mechanical fitness and vehicle emissions.

- Allow inspection, testing or maintenance to be performed only by persons whose training and experience provide them with sufficient knowledge on such activities and ensure that they comply with the written instructions.
- Allow only qualified, trained and experienced people such as the manufacturer's representative or a qualified maintenance technician to perform any repair, modification or replacement of any part of a forklift.
- Ensure a record is kept at the workplace of any inspection, testing, maintenance, repair or modification to the forklift and the name and qualifications of the person who did the work.
- Best practices with respect to forklift maintenance include:
 - Following the forklift manufacturer's specifications, including additional maintenance at 500, 1000, 2000 and 4000 hours intervals by a qualified mechanic.
 - Conducting hydraulic system and mast inspections including an annual lifting capacity check.
 - Conducting fork inspections including:
 1. checks for surface cracks,
 2. checks for straightness of blade and shank,
 3. checks for angle of blade to shank,
 4. check for difference in height of fork tips,
 5. inspection of positioning lock (when originally provided),
 6. check for wear, and
 7. check for legibility of fork markings (when originally provided).
- Where a supplier is responsible for maintenance of the forklift, an employer should ask the supplier for a written testing and maintenance schedule so compliance with the schedule can be monitored.



Facility design

Well designed workplaces contribute to the prevention of incidents and injuries. Therefore, employers should:

- Ensure that overhead and side clearances in aisles, loading docks and doorways are adequate to permit safe operation of the forklift and to accommodate the load being moved.
- Ensure that the forklift's travel path is kept clear and free of hazards.
- Ensure the workplace is ventilated properly to prevent accumulation of gases and vapours.

In addition, adequate lighting must be provided wherever forklifts are operating. A preferred method is for the facility itself to have adequate lighting. In the event that it isn't practical for the facility to have adequate lighting, the forklift itself must be equipped with lighting that illuminates the working area and the forklift's control panel.

Pedestrians and workers in the vicinity of forklift operations must be kept safe:

- Pedestrians must wear a piece of highly visible clothing.
- A facility where forklifts are operating must include designated walkways that separate pedestrians from forklift traffic. The designated walkways should be clearly visible to pedestrians by using methods such as physically separated walkways or highly visible floor markings. If designated walkways are not practical, safe work procedures may be used as an alternative.

Ensure that any storage racks being used are safely laid out, suitable for the type of forklift(s) being used, and suitable, strong and sturdy enough for the loads being supported.

Outdoor yards and construction sites have additional hazards that must be controlled, including safe paths of travel, smooth surfaces and adequate lighting.



Preventing injuries to muscles, joints and bones

To effectively prevent injuries to a worker's muscles, joints and bones, also known as preventing musculoskeletal injuries (MSIs), it is important to understand the risk factors that can lead to injury. It is also important to understand that any combination of risk factors increases the overall risk of injury.

Common risk factors include:

- Awkward or sustained postures;
- Forceful exertions;
- Repetitive motions; and
- Exposure to vibration.

Awkward or sustained postures occur when a worker adopts a non-neutral body posture while performing work duties for extended or repeated periods of time.

A neutral posture is a relaxed body sitting upright with the arms hanging comfortably at either side.

Some non-neutral postures typical of forklift operation include: frequent bending and twisting of multiple body parts in attempts to gain better visibility of the work at hand (looking up, down, to the side, backwards, etc.) while operating the forklift's controls, and straining to reach controls or pedals that are not comfortably within reach.

Reducing non-neutral postures will reduce the risk of injury and can be achieved by:

- Adjusting the forklift's operator's seat, to ensure workers are not straining to do everyday activities.
- Bringing movements closer to the centerline of the worker's body to increase the worker's control over body movement.
- Installing mirrors or other equipment to reduce the amount of head movement required.

Forceful exertions occur when the operator adopts actions that have the potential to physically overload his or her body, such as when a forklift operator jumps out of the forklift and manually pushes heavy items to line them up on a pallet.

To reduce the risk of injury, consider decreasing the physical effort required to perform work by either getting assistance from another worker or using equipment to move material.

Repetitive motions occur when a worker physically performs the same sequence of actions for extended periods of time with little or no variation in the muscles used. With repeated exposure, micro-injuries may accumulate and develop into a serious injury.

To reduce the risk of injury, consider rest breaks for the forklift operator or job rotation between competently trained workers throughout the work shift.

Exposure to vibration occurs when there is a direct transfer of repetitive movements of a machine or tool to a person's body, such as when a hand tool or heavy machine shakes repeatedly. When exposed to vibration, the body's muscles tighten and blood circulation decreases.

To reduce the risk of injury related to vibration, consider providing forklifts designed to withstand vibration and that reduce the amount of vibration the operator is exposed to, and ensure the forklift is maintained to reduce vibration. Also consider keeping floor surfaces smooth to avoid a bumpy ride for the forklift operator.

For additional information, refer to *Workplace Health and Safety Bulletin: All Shook Up—Understanding Vibration*, ERG026, employment.alberta.ca/documents/WHIS/WHIS-PUB_erg026.pdf

Control measures

Control measures to reduce the likelihood of injury are generally categorized into:

- Engineering controls;
- Administrative controls; and
- Personal protective equipment (PPE).

With respect to forklift operations, the controls that have the greatest likelihood of reducing the risk of injury are **engineering** and **administrative** controls. It is preferable to use a combination of these controls when considering the best method to reduce the risk of injury. Controls should be used in such a manner that the physical demands of work are kept within a worker's physical capabilities to work without injury.

Engineering controls Since injuries are more likely to occur when the physical capabilities of a worker are exceeded, physical changes to the work environment are the most effective way to reduce the risk of injury. Engineering controls should focus on reducing force and exposure to awkward postures.

With respect to forklifts, it is important to:

- Use the correct type of forklift for the job at hand.
- Use a forklift with sufficient operator space and comfort features including well-located hand and foot controls, clear control panel displays, and allowance for a good stance of the operator.
- Use a forklift that has seat belts installed, or other restraining device if the forklift is equipped with ROPS.

When a forklift overturns, the safest place for the operator is in the cab with his or her seat belt fastened. There are ergonomic factors to consider regarding seat belts, as they may affect the comfort of an operator if they are improperly fitted.

Properly fitted seat belts are crucial to safe forklift operation. If the seat belt does not fit the operator properly, it will either be rendered useless, or affect the operator's ability to move within the seat. Preventing normal operator movement while seated could result in strain injuries from working against the placement of the seat belt.

The lap belt should lie across the hips on top of the thighs. The shoulder belt should lie flat across the chest, centered between the neck and the edge of the shoulder. It should not touch or rub against the operator's face or hang loosely over the shoulder. If the seat belt does not fit the operator properly, adjust the seat belt height adjuster or have one installed by the equipment supplier or manufacturer if the forklift is not already fitted with one.

Since the purpose of a seat belt is to restrain the operator in the event of a crash or rollover, it will affect the operator's range of motion. Installing mirrors in the cabin can reduce the strain of moving against the seat belt and will also reduce the likelihood of a neck strain injury because of the decreased need for the operator to turn his or her head.

Administrative controls should be used to reduce workers' exposure to risks when physical changes to the work are not practical. Administrative controls reduce the risk of injury by changing the way work is performed.

Safe work procedures fall under administrative controls, as do stretching programs. It is important to remember that workers need adequate training and time to adjust to changes in work procedures and body movements. Supervisors should receive the same training to properly demonstrate and reinforce the safe performance of work.

Under an employer's safety management system, employers should identify the kind of injuries workers could suffer while performing their duties. This information can be gathered by:

- Reviewing previous injury reports.
- Considering the risks of injury during worksite hazard assessments.
- Surveying workers about current or past pain or discomfort.

Personal protective equipment used by forklift operators should reflect the hazards of the working environment, and include items such as eye, foot and hearing protection if necessary.

The table on page 44 outlines possible sources of injury and practical solutions to reduce the risks of injury.



Forklift Related Musculoskeletal Injuries (MSIs)

SOURCE OF INJURY	Rack work to include lifting, inserting, extracting, and lowering pallets.	Facing load sideways while extracting load. Neck is rotated with potential tilting while looking up to manipulate the load.	Constant gripping over long periods of forklift operation.	Prolonged looking upwards to workers elevated within the fork-mounted work platform.	Prolonged seating.	
BODY PART AFFECTED	Neck	Neck	Hands	Neck, entire body	Legs	
ON-THE-JOB EXAMPLE	Operator seated facing load	Removal of load from shelving	Maneuvering of forklift's steering wheel	Monitoring workers' activity while working above ground level	Forklift operation	
POSSIBLE INJURIES	Over-tilt of neck - potential strain	Risk for soft tissue, tendon and cervical spine damage	Muscle strain, tingling of hands	Neck strain, back injury	Reduced blood to legs, varicose veins	
POSSIBLE SOLUTIONS	Use of 'Universal Stance' forklift as opposed to 'Sit Down Counterbalance' forklift	Stand facing the load using the appropriate type of forklift	Provide additional soft-pads, apply rest breaks, stretching	Consider using different type of equipment instead of forklift	Provide foot rest, apply rest breaks and stretching	

	Working with elbows away from the body.	Driving forklift over rough terrain.	Shifting head sideways while moving equipment backwards.	Awkward gripping of hand wheels during forklift operation.	Exposure to cold environment.
	Hands, arms	Entire body	Neck	Hands	Entire body
	Hand grip on steering wheel	Exposure to vibration	Looking for pedestrians/objects while reversing forklift	Turning on corners	Handling cold items in cold storage/freezer environment
	Tendonitis	Spine shock	Neck and lower back twisting	Bent wrist causing pain and discomfort	Numbness
	Maintain proper positioning	Use equipment designed for rough terrain, consider air ride seats, and a quality seat cushion. Observe proper equipment maintenance. Use vibration-absorbing material to isolate vibration from the hands. Periodic ground plowing to smooth the surface. Rest breaks and stretching	Use correct type of forklift for the job, utilize swivel seats as part of engineering controls, keep shoulders in line with the hips	Grip hand wheels and maintain posture keeping the wrist straight	Wear appropriate clothing, use forklift designed for cold environment

Notes

