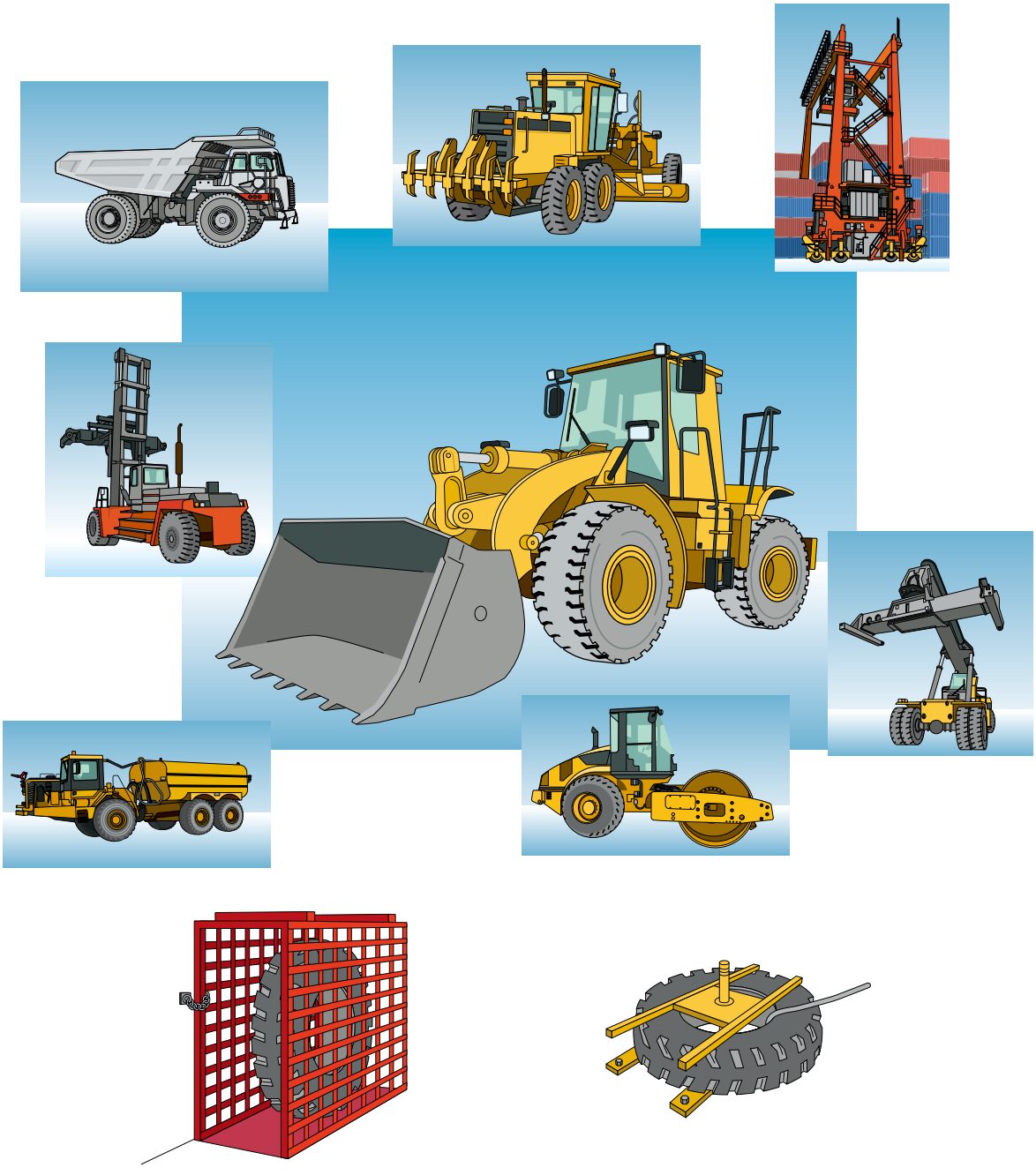
Guidance Notes on Safety at Work for Demounting, Mounting and Inflation of Tyres of Heavy Mechanical Vehicles



Occupational Safety and Health Branch
Labour Department

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Table of Contents

1. Introduction

1.1 In recent years, there have been a number of accidents involving demounting, mounting and inflation of tyres of heavy mechanical vehicles which resulted in serious bodily injuries or even death of workers. As these operations are very common in the relevant industries, workers tend to regard them as simple operations. However, improper handling and inflation of tyres may cause a blowout and an explosion of wheel components leading to serious consequences. Workers staying on the trajectory path of the flying fragments could be seriously injured or killed. Manual handling injuries are also common as wheel components are too heavy to be handled manually. Apprentices or inexperienced workers may engage in tyre operations without adequate training and knowledge of the risks involved. Therefore, it is imperative for workers to follow safe working procedures in handling and inflating tyres.

1.2 This Guidance Notes (GN) provides essential guidelines on safety at work for demounting, mounting and inflation of tyres of heavy mechanical vehicles to prevent accidents. It is not intended to replace manufacturers' service and safety manuals. Reference should always be made to these materials.

1.3 Employers or proprietors should know that it is their responsibility to provide and maintain a system of work on demounting, mounting and inflation of tyres which is safe and without risks to health. They should also ensure that their employees are adequately trained on the correct procedures and the safe use of proper equipment. On the other hand, employees should be reminded that they have the responsibility to comply with the safe system of work.

1.4 This GN should be read in conjunction with "A Guide to the Factories and Industrial Undertakings Ordinance (Sections 6A & 6B) - Know Your General Duties". The legal provisions impose general duties on proprietors and persons employed with regard to the safety and health at work in industrial undertakings.

1.5 For the purpose of this GN, unless the context otherwise requires, the following interpretations apply:-

"Heavy Mechanical Vehicle" (重型機械車輛) includes, but is not limited to, reach stackers, front loaders, dumpers, loaders, gantry cranes, mobile cranes, heavy trucks, buses and other heavy mechanical equipment equipped with tube or tubeless tyre with single or multi-piece rim.

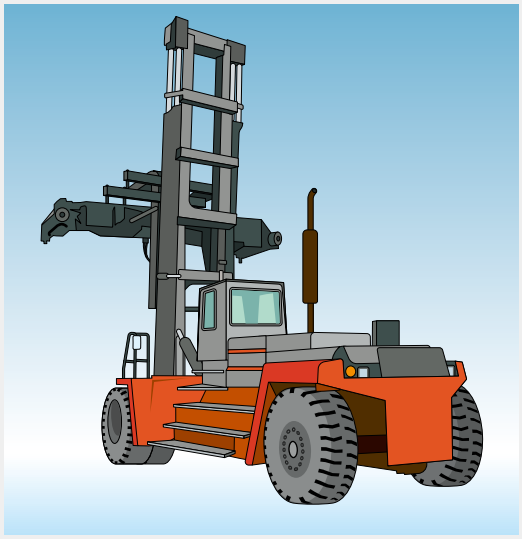
"Multi-piece rim" (多件式輪輞) consists of two or more parts, one of which is a side or locking ring designed to hold the tyre on the rim by interlocking components when the tyre is inflated.

"Tubeless Tyre" (無內膽式輪胎) means a tyre without an inner tube to support the outer tyre when inflated. Compressed air/gas is filled into the space between the tyre and the rim directly.

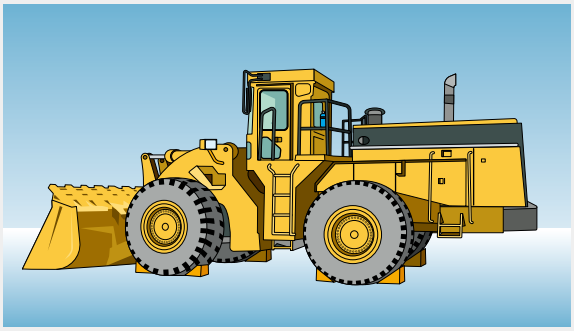
"Wheel" (車輪) includes outer tyre, inner tube (if applicable), rim and all assembly components.

"Demounting, Mounting and Inflation of tyre" means demounting, mounting and inflation of tyres (including the wheels) and its related activities such as manual handling of tyres.

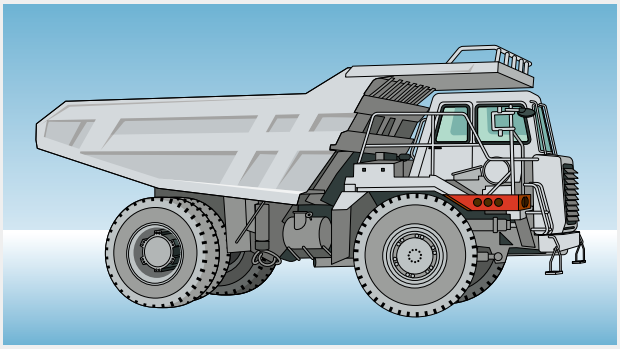
Figure 1: Common types of heavy mechanical vehicles



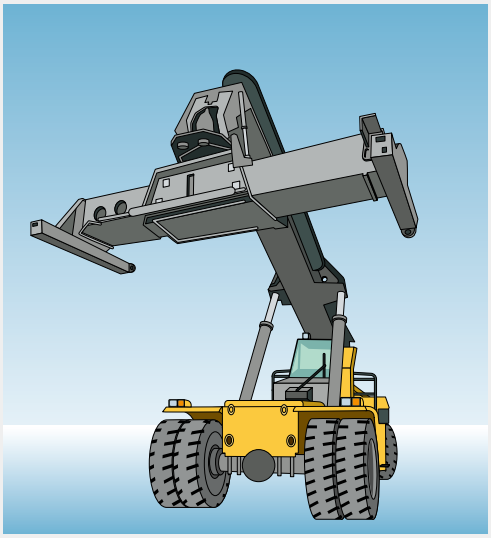
Front Loader



Loader



Dumper



Reach Stacker

Gantry Crane

2. Legal Requirements and Provisions

2.1 The legal obligations on the employer and the proprietor in relation to the safety aspects on demounting, mounting and inflation of tyres at workplaces and in industrial undertakings are laid down in the provisions of the Occupational Safety and Health Ordinance (OSHO) and the Factories and Industrial Undertakings Ordinance (FIUO) and their subsidiary regulations.

2.2 Section 6 of the OSHO and Section 6A of the FIUO impose general duties on the employer and the proprietor with regard to the safety and health at work of their employees at a workplace or in an industrial undertaking respectively. These include the legal requirements to provide their employees with plant and systems of work that are, so far as reasonably practicable, safe and without risks to health. The employer and the proprietor should also provide all necessary safety and health information, instruction, training and supervision to their employees.

2.3 Section 7 of the OSHO imposes general duties on the occupier of the premises with regard to the safety and health at work of an employee at a workplace that is not under the control of the employee's employer. These include the legal requirements to provide the employee with the premises, the means of access to and egress from the premises and any plant or substances kept at the premises that are, so far as reasonably practicable, safe and without risks to health.

2.4 Section 8 of the OSHO and Section 6B of the FIUO impose legal obligations on the employee, including the servicing worker involved in demounting, mounting and inflation of tyres of heavy mechanical vehicles, to take reasonable care for the safety and health of himself and of other persons who may be affected by his acts or omissions at work.

3. Major Hazards and Causes of Accidents

3.1 Demounting, mounting and inflation of tyres can be extremely hazardous. Major hazards and their associated causes of accidents include the following:-

(A) Blowout and explosion

An inflated tyre contains tremendous stored energy. Blowout and explosion of the wheel components are the most serious types of hazards. A tyre blowout occurs when the wheel cannot hold the inflated pressure contained in it. A tyre explosion is an explosive reaction that produces instantaneous pressure inside the tyre. Anyone in the trajectory path of the flying components arising from a blowout or an explosion can be seriously injured or even be killed. Common causes of blowout and explosion are as below:-

I) Causes of blowout

A blowout relates to the conditions of the wheel components and the quality of their assembly. The common causes of a blowout are over-inflation, zipper rupture and the use of incompatible or damaged wheel components.

a) *Over-inflation* means a tyre is being inflated above the recommended tyre pressure. This can be attributed to unawareness of the recommended tyre pressure, improper mounting tyre on the rim, and use of improper/faulty inflation tools such as the absence of any pressure regulator or gauge and the malfunction of the pressure gauge and valve.

b) *Zipper rupture* refers to the fatigue rupture in the tyre sidewall and this weakening of tyre carcass can cause the tyre to burst violently. This can be attributed to an inherent design defect of the tyre, substandard tyre condition, excessive wear and tear on the tyre carcass, constant under-inflation of the tyre, mechanical impact on the tyre and overloading operations.

c) *Use of incompatible or damaged wheel components* can result in a violent release of air or other gases from inside the tyre. This mainly refers to mismatched tyre and rim, incompatible rim parts and abnormal wear and tear or failure of wheel components (Figures 2, 3 & 4).

II) Causes of explosion

The most common cause of a tyre explosion is the pyrolysis of rubber compound as a result of heat/energy source. Pyrolysis is defined as the irreversible chemical decomposition of a material under the effect of heat. During tyre pyrolysis, degradation of the rubber takes place. A mixture of flammable gases such as styrene, butadiene etc. can be generated during pyrolysis of rubber. If the concentration of the flammable gaseous mixture reaches its explosivity level while the temperature reaches the auto-ignition temperature of the mixture, an explosion may occur.

(B) Handling of heavy objects

Tyres and rim components of a heavy mechanical vehicle are often too heavy to be handled safely by a person alone. Without suitable mechanical aids, handling those loads may lead to severe injuries such as sprains, strains, back pains, hernias and damages to the back, joints, ligaments, muscles and intervertebral discs, etc.

(C) Use of compressed air

Both high-velocity air and particles propelled by the air pose high risks. Without wearing suitable eye protectors, the servicing workers are liable to eye injuries.

3.2 There are other causes of these accidents such as lack of careful inspection before inflation, lack of relevant knowledge or effective training of the operators, non-compliance with the safety instructions and failure to use safety equipment.

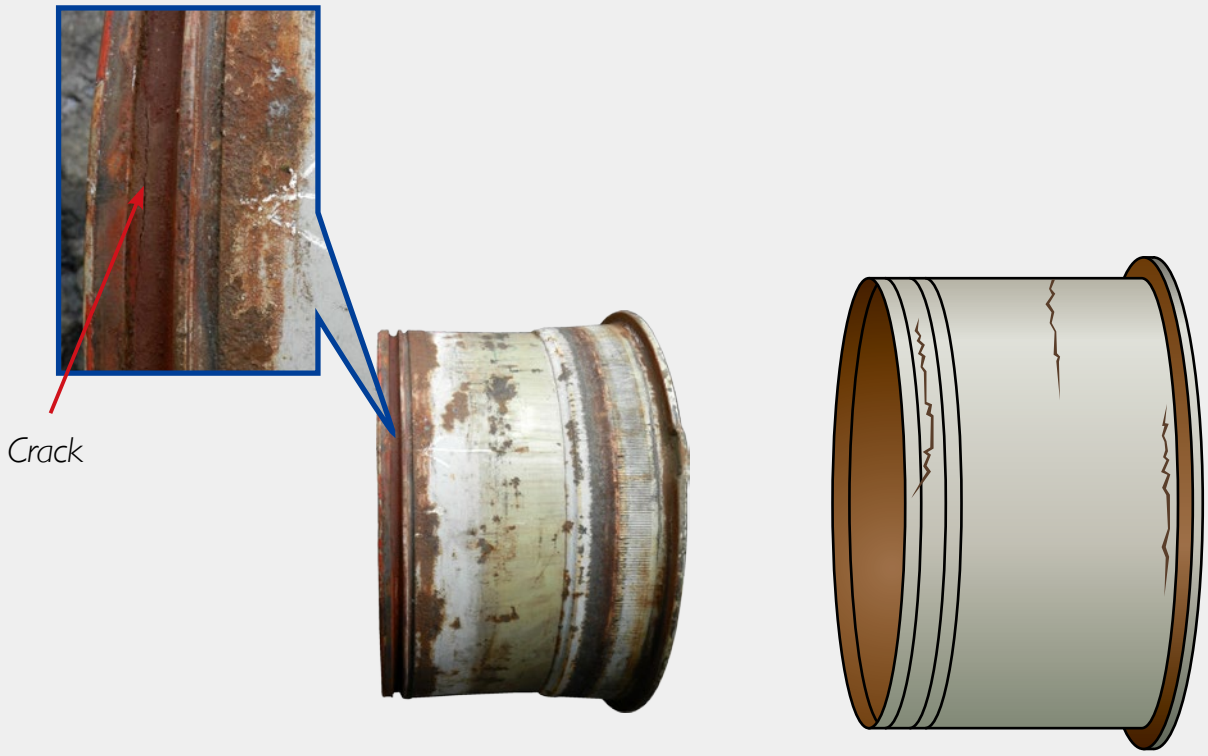


Figure 2 Cracks in the component of a multi-piece rim

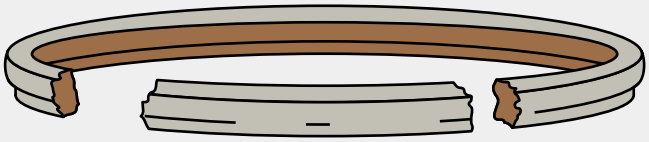


Figure 3 Broken lock ring

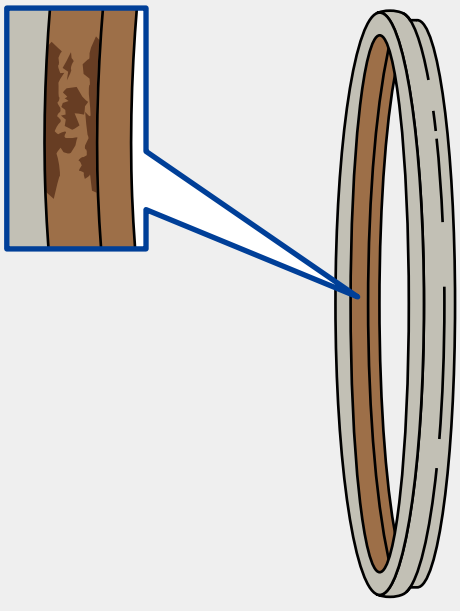


Figure 4 Corrosion on the lock ring

4. Safe System of Work

4.1 Before carrying out any operation involving demounting, mounting and inflation of tyres, the person responsible for the operation including the employer, the proprietor and the person having the management or control of the operation should devise and provide a system of work which is safe and without risks to health.

4.2 The following steps should be taken to establish a safe system of work for the operation: -

(A) Conducting risk assessment

A comprehensive risk assessment should be carried out by a competent person to identify all potential hazards associated with the demounting, mounting and inflation of tyres before the commencement of work (Figure 5).

The basic steps in risk assessment include the following:-

(a) to identify the hazards;

(b) to consider who may be affected and how;

(c) to evaluate the risks arising from the hazards, and to consider whether the existing safety measures are adequate or more should be taken;

(d) to record the risk assessment findings; and

(e) to review the risk assessment from time to time and to re-conduct if necessary.

The risk assessment should be specific to the work task. This includes examination in detail of the work procedures, identification of possible ways that can cause personal injuries, evaluation of the adequacy of precautionary measures and effectiveness of appropriate safety measures, working environment, ground conditions, limitations of equipment, the trajectory of any flying wheel components, ineffective maintenance, mismatch of the rim components and over-pressurization of tyres, etc.

The risk assessment should be reviewed regularly whenever there has been a significant change in the working conditions, working environment or particulars of the work, etc. These should be properly documented.

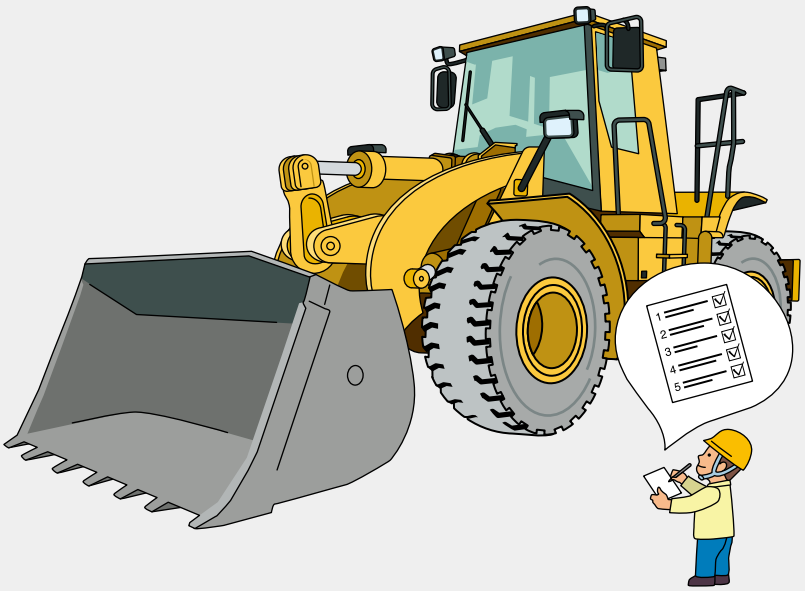


Figure 5 Conducting risk assessment before work

(B) Planning the operations

In planning the operations of demounting, mounting and inflation of tyres, all foreseeable risks identified in the risk assessment should have been taken into account so as to ensure that the operations are carried out safely. Planning should include the identification and description of working locations, scale and duration of the operations, job sequence, use of equipment, traffic conditions and possible entry of other persons into the work area, etc.

(C) Defining safe working procedures

Safe work methods and procedures for the required operation should be laid down for the safe system of work. Safe working procedures should be established to ensure that all identified hazards are eliminated or risks minimized. These should incorporate all safety measures derived from the risk assessment. In formulating the safe working procedures, reference should always be made to manufacturers' specifications of both tyre and rim components and that of any other equipment for information on the recommended practices of safe demounting, mounting and inflation of tyres.

(D) Implementing the system

To effectively implement the safe system of work, the person responsible for the operation of demounting, mounting and inflation of tyres has the duties to provide the information, instruction, training and supervision to the workers (Figure 6). Supervision should be given by competent persons with sufficient safety knowledge and work experience so as to ensure that, while at work, the safe work methods are properly implemented. An effective communication arrangement at the workplace should be established so that all relevant personnel including managers, supervisors and workers are fully aware of the safe work methods, the potential operational risks and necessary precautionary measures to be adopted and their roles to play. The workers should follow the in-house safety rules, safety practices and procedures. Finally, their performance should be regularly monitored and reviewed so as to improve the effectiveness of the system.

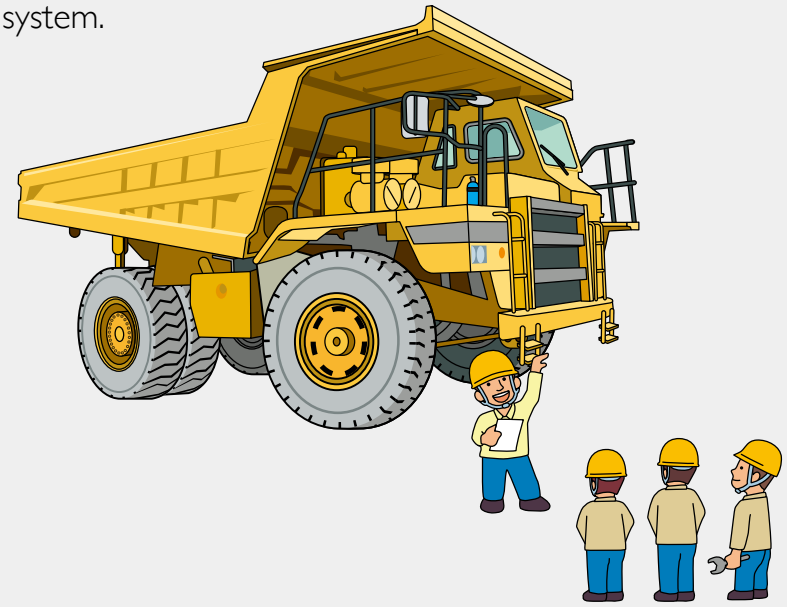


Figure 6 Adequate safety related information, instruction, training and supervision should be given to workers

(E) Reviewing the system

A system of work should be periodically reviewed to ensure its workability and effectiveness. The reviewing process is essential to see how good the safe system of work is performing and whether adjustment or improvement is required. It is particularly important whenever there is a significant change in work method, team composition, use of equipment, working environment, etc. Attention should also be paid to the feedback from workers for further improvement on the effectiveness of the system.

5. Safety Precautions

5.1 This section introduces the necessary safety precautions associated with demounting, mounting and inflation of tyres for reference. Employer or proprietor should make reference to these precautions in devising the safe system of work for the operations. In addition, manufacturers' instructions and recommendations should be consulted. To ensure effective implementation of the system, all workers carrying out these operations should be suitably and sufficiently trained.

5.2 Before starting the work, the heavy mechanical vehicle should be in a service position as follows:-

(a) it should be parked on firm and level ground with the parking brake applied;

(b) the engine should be switched off;

(c) the electrical system should be isolated with the use of the battery main switch; and

(d) insofar as the service position is concerned, other steps recommended by the manufacturer of the heavy mechanical vehicle for repairing should also be taken. For example, a boom of the reach stacker should be fully retracted and lowered to a horizontal position.

5.3 The following safety precautions for demounting, mounting and inflation of tyres should be noted:-

(A) Demounting tyre

(a) The workplace for demounting tyres should be sited at a safe distance away from other job sites or operations

(b) Adequate precautionary measures should be taken to stabilise the heavy mechanical vehicle by proper blocking, chocking and supporting.

(i) The wheels other than the one to be handled should be chocked to prevent the vehicle from moving (Figure 7).

Figure 7 The wheel is fixed with chocks

(ii) Heavy-duty jacks should be used to raise the heavy mechanical vehicle and to elevate the side of the vehicle with the wheel to be demounted. Adequate and effective steps should be taken to ensure that all the jacks are located on a firm and level base during jacking. **Never conduct vehicle jacking process on inclined ground to prevent the vehicle from moving.** The heavy mechanical vehicle should then be rested properly on steel stands or steel stands with hardwood blocks. All these supports should be of sufficient capacity. **Never rest the heavy mechanical vehicle on jacks only** when carrying out any demounting, mounting and inflation of tyres. For the proper use and positioning of the jacks, always follow manufacturer's manual of the heavy mechanical vehicle.

(iii) If pneumatic jacks are to be used in raising the heavy mechanical vehicle, always ensure the connectors of the air hose to the pneumatic jacks are connected properly especially when quick release coupling connectors are used. Improper seating of the quick release coupling connectors may result in dislodgement of the hose connector during use, thus causing injuries to workers.

(c) Prior to carrying out any work (including the loosening of the nuts and clamps) on the wheel of the heavy mechanical vehicle to be demounted, **the tyre must be completely deflated** (Figure 8). For a dual wheels assembly on the same side of the axle of the heavy mechanical vehicle, **both tyres must be completely deflated**.

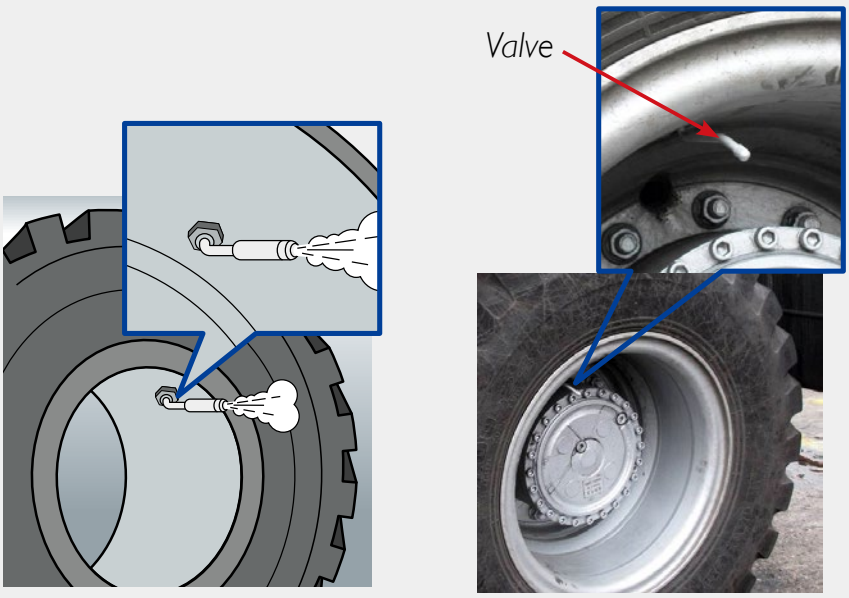


Figure 8 The tyre must be completely deflated before demounting

(d) The valve stem should be checked to ensure that it is not clogged. If the valve stem is clogged, refer to the manufacturer's manual for the proper handling method. **Never use a hammer to hit the valve for the purpose of releasing it from clogged condition.** A sudden break off of the valve will lead to sudden release of the tyre pressure and may eject the valve and its components, thus causing injury.

(e) A tyre pressure gauge should always be used to measure the residue pressure inside the tyre during deflation. For tubeless tyre, attention should be made to inspect if the rim edges are loosened from the tyre leaving gaps to ensure that pressure inside the tyre has been totally released.

(f) Deflating an excessively hot tyre must be avoided. Together with the heavy mechanical vehicle, the excessively hot tyre should be put at a safe place for sufficient cooling time.

(g) Precautions should be taken to keep all servicing workers out of the trajectory when deflating. The trajectory is any potential path or route that pieces of the wheel components may travel due to blowout or explosion.

(h) Hands of the servicing worker should be kept away from where the demounting tools are functioning.

(i) After a thorough assessment, sufficient manpower and suitable mechanical aids should be arranged to handle the wheel components. Mechanical aids such as lifting appliances and lifting gear (LALG) should be used to prevent injury due to handling of heavy wheel components. For the lifting operation, all safety requirements must also be observed such as periodic examinations of the machines, competent operators and effective signalling arrangements, etc. The person responsible for the lifting operation must ensure that no one else is nearby when the lifting operation is underway.

(j) If LALG is involved, the LALG should be tested and examined before use according to the Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations.

(k) After the tyre is thoroughly deflated, the nuts and clamps of the wheel can be removed. However, never remove all the nuts and clamps before the mechanical aid(s) is in position to avoid the wheel from sudden dislodging from the wheel hub and causing injury to the worker.

(l) Persons other than the servicing workers should not be allowed to stand near the location where tyre demounting is in progress. The same precaution should also be applicable to mounting and inflation of tyres.

(B) Mounting tyre

(a) The workplace for mounting tyres should be sited at a safe distance away from other job sites or operations.

(b) Prior to mounting, wheel components should be inspected to ensure that they are in good conditions. Attention should be given to signs of cracking, wear, corrosion, deformation and broken beads. No damaged, worn or cracked parts should be used and they must be replaced at once upon discovery. Always consult the manufacturer's manual of the heavy mechanical vehicle to see whether measurements on the wearing of the critical parts of the rim such as the rim body and the lock ring are necessary. If necessary, non destructive test (NDT) should be carried out to the rim components when the rim and its components are dismantled from the wheel. The NDT may include magnetic powder method and/or penetrating fluid to identify cracks on the rim components.

(c) The interior of a tyre should also be checked even if it is new. All dirt, water, rust and other foreign matters on the lock rings, gutters, rim components, the interiors of the tyres, etc. should be removed.

(d) Adequate and effective steps should be taken to ensure that all parts of the assembly are correctly matched. Rim components should not be interchanged. It should be double checked to ensure that all the rim components are correctly assembled before mounting.

(e) Tyre and rim dimensions should be matched with each other by consulting the manufacturer's manuals of the tyre and the heavy mechanical vehicle. Attention should be paid to the marks on the tyre which will show the type of tyre, the dimension of tyre, the dimension of the rim and other essential information related to the selection and installation of the tyre.

(f) When mounting the wheel to the wheel hub, the nuts and clamps should be tightened by using a torque wrench which is set at the value recommended by the manufacturer of the heavy mechanical vehicle.

(g) After mounting the wheel, the assembly should again be verified to be correct.

(h) During the insertion of the tyre into the rim, only suitable mounting lubricants (if applicable) recommended by the manufacturer of the tyre and rim should be used. The application of flammable petroleum-based lubricants or other materials of similar nature must be avoided.

(i) The rim components should be well protected against corrosion.

(j) Attempt should never be made to rework, weld, heat or braze on the rim components during the mounting process. The heat applied to these components can increase the internal air pressure of the tyre enough to burst them or may cause an explosion due to pyrolysis of tyre.

(k) Mechanical aids such as LALG should be used to facilitate the mounting of the wheel on the mechanical vehicle. Precautionary measures should be taken to ensure that all workers stand clear of the lifting operation in progress.

(C) Inflating tyre

(a) The workplace for inflation of tyres should be sited at a safe distance away from other job sites or operations.

(b) Prior to tyre inflation, all the wheel components should be checked to ensure that they are compatible, serviceable and correctly assembled.

(c) Safety restraining devices such as safety cages and frames should always be used for tyre inflation (Figures 9 and 10). Restraining devices must be of adequate strength to absorb the explosive forces and of proper size to restrain wheel components in the event of failures. No worker should be allowed to lean any part of his body on or against the restraining device during tyre inflation.

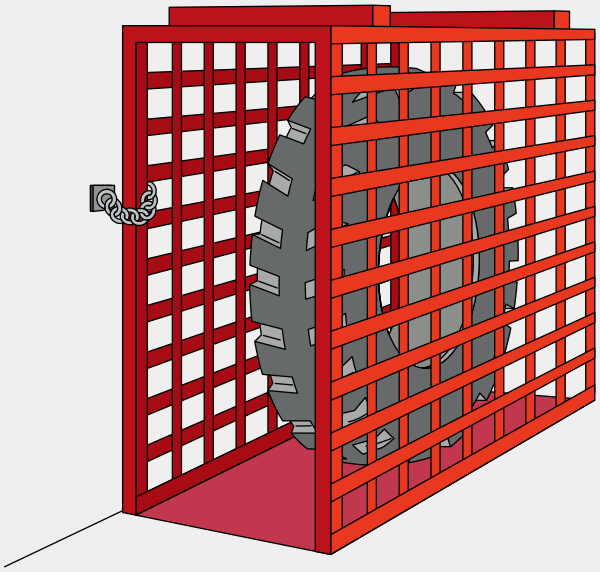


Figure 9 Safety Cage

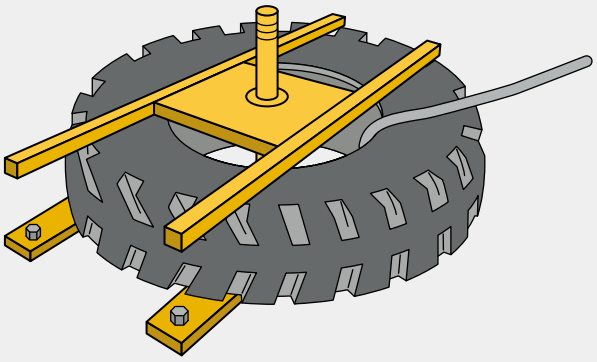


Figure 10 Safety Frame

(d) A safe inflation procedure should be devised and implemented, specifically taking into account the specifications recommended by the manufacturers of both tyre and rim components and the manufacturer of any equipment.

(e) For certain kinds of heavy mechanical vehicles, the inflation of the tyre is carried out after mounting the wheel to the wheel hub. **Always tighten the nuts and clamps before inflation.** The nuts and clamps should be tightened by using a torque wrench which is set at the value recommended by the manufacturer of the heavy mechanical vehicle.

(f) Adequate and effective steps should be taken to ensure that **all workers stand clear of the trajectory danger zone during tyre inflation.** A clip-on air chuck with an in-line valve, a pressure gauge equipped with a pressure regulator should be used for inflating the tyre (Figures 11 and 12). The inflating pressure should be limited to the recommended pressure provided at the manufacturer's manuals of the tyre and the heavy mechanical vehicle by adjusting the pressure regulator.

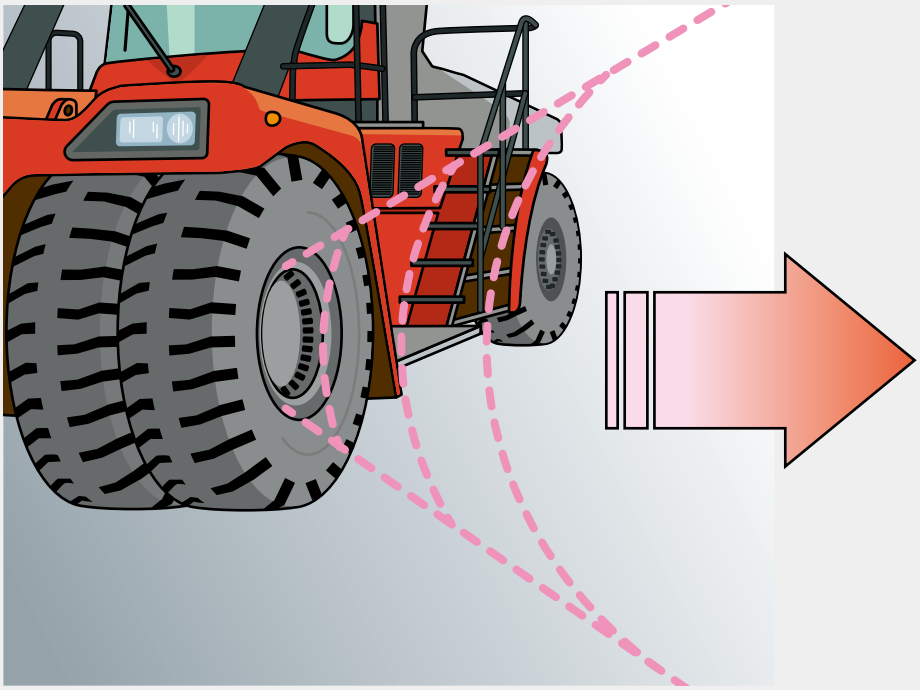


Figure 11 Stay away from the trajectory danger zone while inflating a tyre

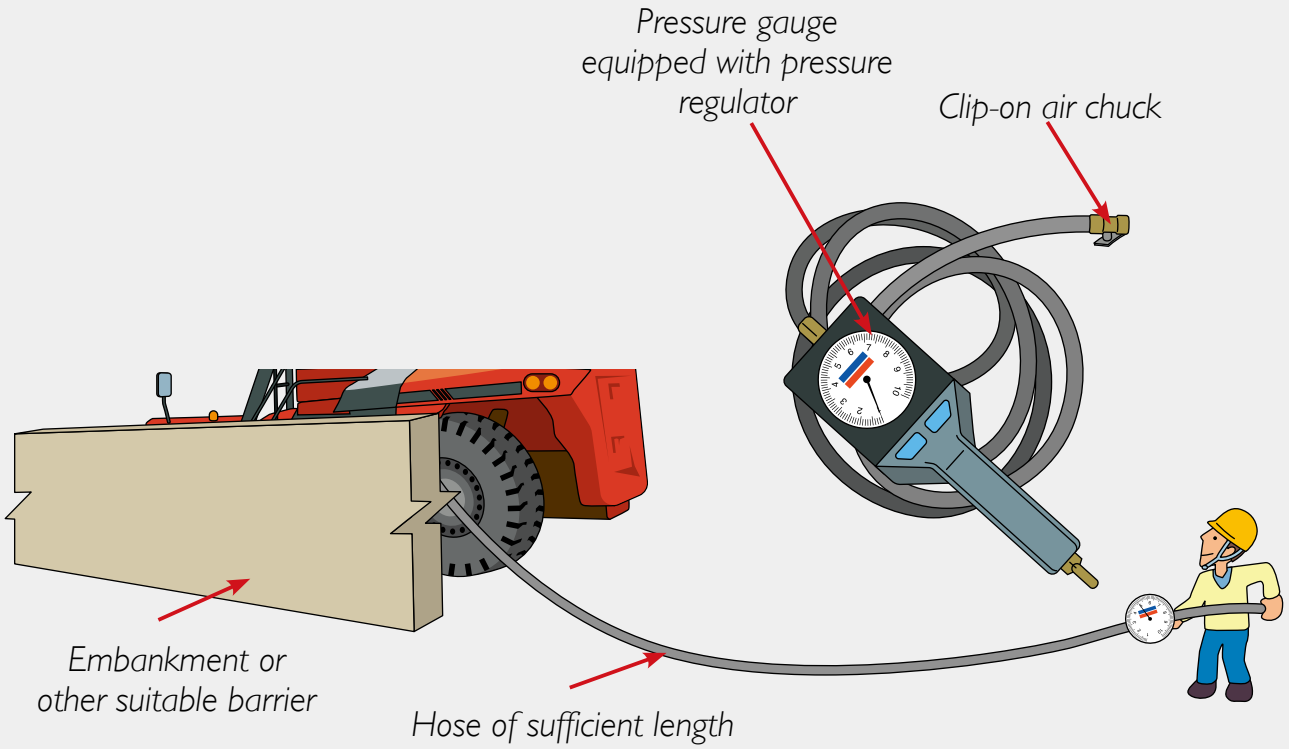


Figure 12 Suitable airline assembly (including a clip-on air chuck, an in-line valve, a pressure gauge equipped with pressure regulator and a hose of sufficient length)

(g) If there are other situations that it may not be reasonably practicable to fit a wheel into a restraining device, a safe system of work should be devised to ensure that the work can be done in an equivalent level of safety. The following points should be noted in devising the system:-

(i) the wheel is securely restrained;

(ii) effects of any blowout and explosion of wheel components are contained safely;

(iii) adequate and effective steps are taken to keep all workers out of the trajectory danger zone; and

(iv) references should always be made to manufacturers' specifications of both tyre and rim components and that of any equipment.

(h) Proper engagement of every wheel components should be regularly checked during the initial inflation process. The tyre should be inflated to the recommended pressure only if all the components are correctly assembled. If the components are not seating correctly, immediate measures should be taken to deflate the tyre. After they have been disassembled for inspection, the incorrect seating should be determined and rectified.

(i) Most importantly, the tyre must never be inflated to a pressure exceeding the value recommended by the manufacturers of the tyre and the heavy mechanical vehicle.

(j) A tyre should not be re-inflated when there is obvious or suspected damage to the wheel components, for example, a tyre that has been run flat or well below its recommended operating pressure.

(k) Tyre blowout hazard could be eliminated by the use of solid tyres which have been used in some heavy mechanical vehicles. The responsible persons could consult the manufacturers on the feasibility of using solid tyres for the heavy mechanical vehicles.

(D) Manual handling operations

(a) To avoid excessive exertion by a single worker, a team lifting arrangement should be adopted with the use of mechanical aids whenever necessary.

(b) Mechanical aids such as overhead cranes, electric chain blocks, forklift trucks, etc. should be used to minimize the risks associated with the handling of heavy objects.

(c) For details of precautionary measures on manual handling operations, please refer to "Guidance Notes on Manual Handling Operations" and "A Guide to Part VII of the Occupational Safety and Health Regulation (Manual Handling Operations)".

(E) Others

Appropriate personal protective equipment such as suitable safety helmets, eye protectors, high visibility or reflective jackets and safety shoes should be worn while at work.

6. Competence of Workers

6.1 Demounting, mounting and inflation of tyres should only be carried out by workers who have adequate training and experience and are competent to perform the duties. They should also be physically fit and proper to carry out the duties in a safe manner.

7. Information, Instruction, Training and Supervision

7.1 Under the law, the employers and proprietors are required to undertake the general duties to ensure, so far as reasonably practicable, the safety and health at work of their workers. These duties include the provision of information, instruction, training and supervision. It is therefore essential for workers involved in demounting, mounting and inflation of tyres to be suitably and sufficiently trained on the proper procedures, inflation steps, assembly inspections, use of the proper tools and safety equipment, etc.

(A) Information

Information refers to the materials that are provided to the workers on the hazards they may encounter at work, and the precautions to take. It is of vital importance to provide them with the necessary information in time. Most of the hazards can be identified by the workers in advance if they can obtain such information, for examples, before taking up the work for the first time, before carrying out the work after a significant change in its nature and upon discovery of new or greater hazards at work.

(a) For safe operating procedures, the following information should be covered:-

(i) various potential operational hazards;

(ii) corresponding precautionary measures to eliminate the hazards;

(iii) arrangement of work procedures;

(iv) emergency plans and evacuation procedures;

(v) safety rules and measures that workers should comply with;

(vi) safe procedures for operating work equipment; and

(vii) correct use of personal protective equipment.

(b) Information can be made available to workers by verbal, written or other means such as electronic mail. The content should be easy to understand and adequately assessed to be effective. Otherwise, an officer who is competent should be appointed to explain such information to the workers so that each of them understands its content and knows how to use it properly.

(B) Instruction

Proper instructions should be provided to ensure that the workers carry out their duties safely. Effective steps should be taken to enable them to adhere to the safe working procedures. The safety instruction of each work procedure should cover safety preventive measures and appropriate information. Checklists for certain "dos" and "don'ts" are useful to facilitate their observations for safe operation, maintenance, inspection, testing and examination of the wheel components. Undoubtedly, safety instructions laid down by the manufacturers of the tyre and rim components and that of any equipment are of the utmost importance.

(C) Training

The workers should possess the prerequisite skills for their safety at work. The training should include but are not limited to the following:-

(a) safe working procedures;

(b) inspection skills and techniques to look for mismatch and damages of wheel components;

(c) correct use of safety restraining devices such as safety cages and frames; and

(d) proper handling of wheel components, including the use of mechanical aids in handling heavy components.

Depending on the necessity of the workers, suitable and sufficient training should be provided (Figure 13). For example, induction training should be provided for new recruits, additional training for workers who encounter new or greater hazards at work and refresher courses for workers to acquire the most updated knowledge and skills.

Figure 13 Workers should be suitably and sufficiently trained

(D) Supervision

To ensure the safe work method in place, a competent person with adequate safety knowledge and work experience should be appointed as a supervisor to oversee the performance of workers. Without adequate supervision, workers may act recklessly and put themselves and other workers in danger. Hence, the supervision is very important to ensure all workers to follow the safe work method.

8. Preventive Maintenance and Periodic Inspections

8.1 Preventive maintenance program should be devised and implemented to ensure the sustainability of the safe condition of wheel components. In addition, periodic inspections should be carried out to identify any damage of them. Damaged or worn parts must be replaced at once upon discovery. Always make reference to the tyre manual as well as the manufacturer's manual of the heavy mechanical vehicle in devising the preventive maintenance program.

9. Workplace Conditions

9.1 Workplace conditions are very critical to ensuring the safe demounting, mounting and inflation of tyres of heavy mechanical vehicles. It is essential to ensure that the premises are safe prior to the work.

9.2 Areas used should be enclosed or fenced off. Warning notices on prevention of unauthorized entry should also be posted in conspicuous area as well as around the vehicle. The servicing worker or supervisor should ensure that the area surrounding the vehicle is clear of persons and equipment before performing such work. When considering a suitable place for the work, barriers such as walls, containers or other natural barriers should be set up or arranged with the aim of reducing the effects or injuries to anyone once the tyre or rim components fly off or explode.

9.3 The work should not be performed on grades, slopes, ramps or cambers with gradient.

9.4 The surfaces or floors should be:-

(a) firm, flat, smooth and level;

(b) free from debris, bumps, objects or contaminants;

(c) free from potholes or loose materials; and

(d) well-drained.

9.5 The working environment should be sufficiently well lit by natural or artificial lighting. Lighting should be so arranged to avoid glare where practicable. Extremes of light and dark between adjacent areas should be avoided as it needs some time for the eyes of servicing workers to adapt to a sudden change in light intensity.

9.6 Any work should be avoided when weather conditions may possibly endanger the stability of the equipment or cause danger to the servicing workers working nearby. Attention should also be paid to weather warnings announced by the Hong Kong Observatory such as the thunderstorm warning, rainstorm warning, typhoon signal, flooding signal and strong monsoon signal, etc.

10. Documentation

10.1 To perform tyre demounting, mounting and inflation work safely, manufacturers' manuals such as rim manuals, tyre manuals, service manuals and maintenance manuals should be readily available for reference by the relevant personnel in the workplace.

10.2 A logbook system should be in place to record all inspections, tests, repairs, maintenance and hours of service of the respective wheel components. All entries should be dated and signed by the operators, maintenance staff or supervisors. The person responsible for the heavy mechanical vehicle should ensure that the logbook is kept up-to-date and easily accessible for inspection.

11. Responsibilities of Employees and Workers

11.1 For demounting, mounting and inflation of tyres, employees or workers should cooperate with their employers or proprietors and follow the safe system of work. They should also take care of the safety and health of those who may be affected by their negligence or recklessness at work, including the employees and workers themselves. The points to note include:-

(a) to receive the necessary safety training to gain an understanding of the potential hazards, the safe work methods and the precautionary measures to be taken when performing the work;

(b) to adhere to the safety rules and the safe work methods;

(c) to use properly all safety devices and equipment including the personal protective equipment; and

(d) to report any defects to the employers or proprietors.

LIST OF REFERENCE

* "Servicing Multi-piece and Single Piece Rim Wheels", Occupational Safety and Health Standards 29 CFR 1910.177, Occupational Safety and Health Administration, US.

* "Safety during Tyre Inflation in Motor Vehicle Repair", Health and Safety Executive, UK, 2010.

* "Safe Work Practices for Large Vehicle Tire Servicing", The Workers' Compensation Board of British Columbia, Canada, 2006.

* "Workplace Health and Safety Bulletin– Servicing Tires Safely", GS003-General Safety, Government of Alberta, Employment and Immigration, 2004.

* "Health and Safety Guidelines for Tyre Fitters", Occupational Safety & Health Service, New Zealand, 2001.

* "Tyre Safety, Fires and Explosions - Guideline", Safety and Health Division, Department of Industry and Resources, Western Australia, 2005.

* "Health and Safety in Motor Vehicle Repair and Associated Industries", Health and Safety Executive, UK, 2009.

* "Safety Bulletin – Tyre Fires, Pyrolysis and Explosions", Department of Natural Resources and Mines, Queensland Government, 2004.

** In preparing this GN, reference has also been made to the manuals, handbooks and fact sheets from Michelin, Goodyear, Yokohama, Bridgestone, Titan and Kalmar.

ENQUIRIES

If you wish to enquire about these Guidance Notes or require advice on occupational safety and health matters, please contact the Occupational Safety and Health Branch of the Labour Department through:


Telephone : 2559 2297
(auto-recording service available outside office hours)


Fax : 2915 1410


E-mail : enquiry@labour. gov.hk

Information on the services offered by the Labour Department and on major labour legislation is also available on our website at http://www.labour.gov.hk.

For details on the services offered by the Occupational Safety and Health Council, please call 2739 9000.

COMPLAINTS

If you have any complaints about unsafe workplaces and work practice, please call the Labour Department's occupational safety and health complaint hotline at 2542 2172. All complaints will be treated in the strictest confidence.

Occupational Safety and Health Branch
Labour Department

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