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	Safe Operation of Aged Equipment	Rev. Date 26-03-2025	Rev 1

SCOPE
This Engineering Guidance Note provides information to owners and users of aged equipment to aid in managing the equipment in a safe working condition. The aim is to ensure that aged equipment is safe to operate, and where reasonably practicable is modified to meet the latest applicable revision of the Industrial Truck standard AS2359.

1. DEFINITIONS:

- a. **Aged equipment** – Typical an industrial truck or forklift that has accumulated 10,000 hours of operation or is 10 years of age, in a normal operating environment.
- b. **Normal operating environment** – Single shift operation, on improved hard level surface, indoor in typical ambient temperatures between 25° C and 40°C.
- c. **Abnormal operating environment** – May include the following: multi-shift operation, harsh, dusty, wet or corrosive environments, outdoor operation, or cold store/freezer application.

2. OBLIGATIONS OF SUPPLIERS OF USED EQUIPMENT:

Suppliers of used equipment have obligations under the Work Health and Safety (WHS) Regulation 2011. These include:

- Provision of information for safe use.
- Service history.
- Details of any existing fault and notification that fault requires rectification before the equipment can be used

3. CHECKS WHEN PURCHASING USED/AGED EQUIPMENT:

When considering purchasing a used/second hand piece of equipment there are several checks that should be made so you know the condition of the equipment. These include but are not limited to:

- Complete service history
- Operator manual availability
- Safety & warning decals are all in place a legible (usually detailed in operator manual)
- Capacity plate is in place and legible.
- Safety equipment is in good condition, e.g., seat belt, horn, safety lights (if fitted), overhead guard, brakes.
- If equipment has been modified evidence of approval from OEM.
- Condition and function of controls
- Availability of spare parts
- Warranty and post-sale support

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4. MAINTAINING IN SAFE OPERATING CONDITIONS:

Owners and users of aged equipment need to ensure they are safe to operate. The Daily operator check is the critical first step in maintaining equipment in good working order. As the name implies this should be carried out prior to using the equipment each day, or for multi-shift operations prior to commencing each shift.

The Operator manual for the equipment should include information on daily pre-start checks. These will typically be in two parts; these carried out prior to starting the equipment, and those carried out with the equipment running.

Pre-Operating checks:

- Condition of hydraulic hoses
- Condition of lift chains
- Condition of forks
- Safety & warning decals
- Oil leaks
- Condition of tyres/wheels including locking rings on split rims
- TBA

Operating checks:

- Hydraulic functions: Lift, tilt, attachments
- Warning devices; horn, strobe lights, travel alarms.
- Steering function
- Brakes, check stopping distance.
- TBA

5. ENHANCED INSEPECTION OF AGED EQUIPMENT:

Aged equipment may be used regularly or periodically. In either case the equipment should be subjected to enhanced inspections to check that critical items are in good repair.

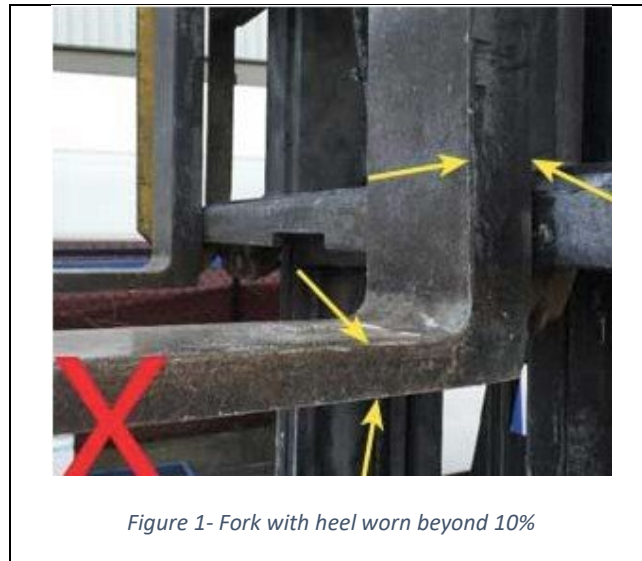
Items that should undergo enhanced inspection include:

- Forks
 - Lift Chains
 - Hydraulic hoses and tubes
 - Structural connections
 - Structural welds
 - Safety devices
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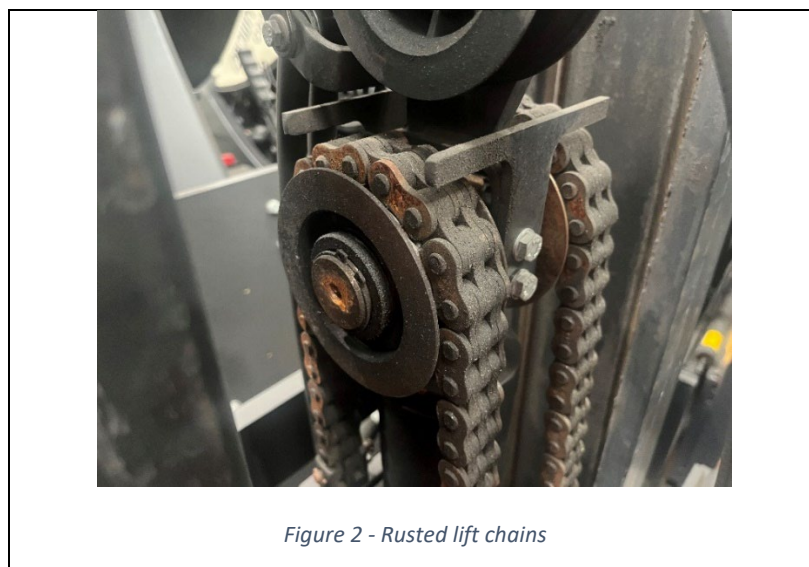
a. FORKS

Forks should be checked for wear and bending/deflection. The critical area is the fork heel, refer Figure 1. Wear of the fork heel that reduces the blade thickness by more than 10% can lead to fork failure. Forks with wear beyond 10% of the original blade thickness should be removed from service immediately and replaced.



b. LIFT CHAINS

The lifts chains consist of a structure of overlapping plates joined together with riveted pins, refer Figure 2. In operation the link pins and plates may wear leading to elongation of the chain, which can result in chain failure. Chain elongation (or stretch) beyond 3% of the original length is conditioned unacceptable and chains should be replaced. Also, poor lubrication can result in “frozen” links, typically due to corrosion/rust.



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c. HYDRAULIC HOSES AND TUBES

Hydraulic hoses typically are constructed of several layers of materials to provide the inner tube, middle core for strength and flexibility and an outer sheathing to protect the inner and middle layers. The outer layer is typically rubber (nitrile, neoprene, or butadiene) or PTFE (Teflon) material.

The outer layer material can be degraded by exposure to environment and chemicals, such as cleaning fluids, brake, and transmission fluids. Degradation of the outer layer can lead to hose failure, refer Figure 3. Also, pressure cycles through normal use will eventually lead to fatigue failure of the hose. Fatigue failure of the inner hose may be visible as a bubble or lump on the outer layer. If this is found the hose should be replaced immediately.

Cuts, nicks, splits or delaminating in the outer layer will lead to a hose failure. A hose exhibiting and damage of this type should be replaced immediately.



Figure 3 - Damaged hydraulic lines

d. STRUCTURAL CONNECTIONS

Structural connections in the equipment will include both bolted connections using structural fasteners, and critical linkages, such as chain anchor pins, mast tilt cylinder pivot pins/shafts, steering linkage pins/axles and power train mounts.

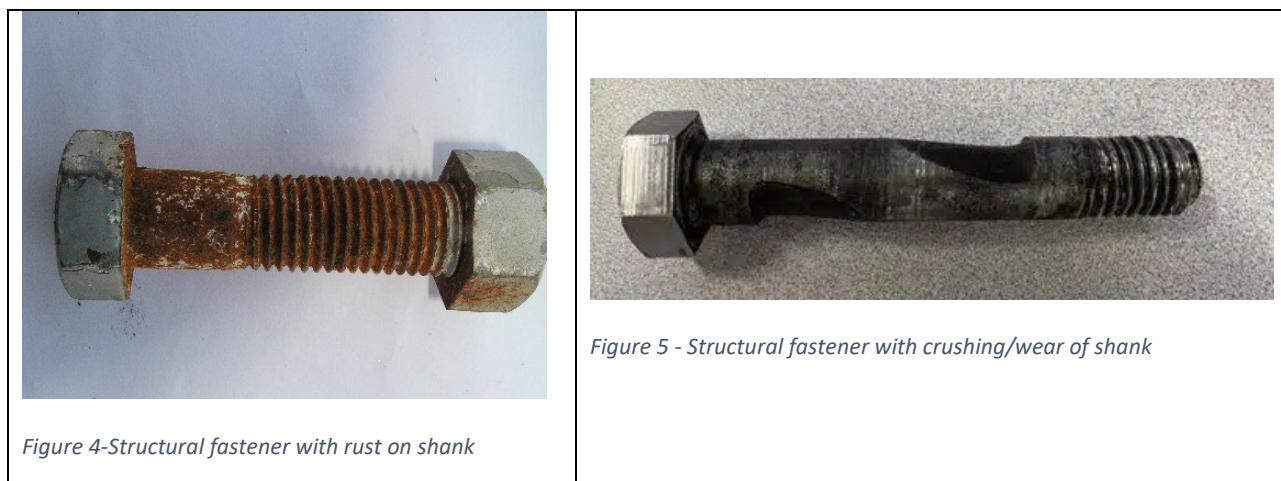
Structural fasteners are typically employed to ensure joints that transmit high forces can sustain the forces safely during the operating life of the equipment. However, structural fasteners are subject to fatigue due to load cycling and the joint strength can reduce over time.

All structural bolted connections will require the fastener to be tightened to a specified torque to achieve the required joint strength. Strain due to load cycling can cause elongation of the fastener, reducing the

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join strength. The torque of these fasteners should be checked during an enhanced inspection. Removing the fastener to check for signs of corrosion and fatigue should be carried out. This will aid in determining if a fastener should be replaced. Where a fastener is replaced, the replacement should be of the same structural grade as the original.

Corrosion on the fastener shank or crushing/wear the fastener shank are indicators that a fastener should be replaced, refer Figures 4 & 5.



Wear of chain anchor pins, steer linkages or tilt cylinder pins are indicators of potential for failure.

e. STRUCTURAL WELDS

The chassis of industrial trucks and forklift lifts are typically a welded assembly of steel components, that may include steel plate, castings, and forgings. Stress in structures over the life of the equipment will accumulate damage that will manifest as cracks in the steel structure and/or the welded connections between the components.

In aged equipment an enhanced inspection should include welds in critical areas, and the steel in the structure adjacent to welds, for cracks.

To conduct this inspection, it will be necessary to clean the equipment to remove all surface dirt and, in some cases the protective paint coating. Initial examination should consist of a visual examination for cracks and a non-destructive test (NDT), such as a dye penetrant test.

Cracks in welds may be repairable where they have not extended into the parent metal. In consultation with the OEM or a competent person it may be possible to effect repairs by removing the original weld and, after suitable preparation laying down a new weld. Any weld repair should be subject to a post weld NDT to ensure the repair is sound. The type of NDT will depend on the weld type and location in the structure. Various NDT methods include dye penetrant, magnetic particle, ultrasonic & X-ray.

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Cracks that have extended beyond the weld into the parent metal may be repaired through a process that include both weld repair as detailed in the preceding paragraph and measure to arrest further growth of the crack in the parent metal. Further crack growth may be arrested by drilling through the material at the tip of the crack. Again, the OEM or a competent person should be consulted. Where a crack tip is end-drilled, continuous inspection should be maintained to monitor the crack.

f. SAFETY DEVICES

Industrial trucks and forklifts maybe equipped with safety devices, including the overhead guard, load backrest extension, seat belt and other devices, such as a “3rd post” on end rider trucks.

These devices should be checked during an enhances inspection to identify damage which may compromise the safety device.

6. MAINTENANCE AND STORAGE OF AGED EQUIPMENT:

Industrial trucks and forklifts are used seasonally in some industries and may also be used sparingly where demand peaks and toughs dictate fleet utilisation.

In both these situations it is important to consider what is required when placing equipment into storage, maintaining during storage, and bringing back into service after storage.

Consideration should be given to the following when storing equipment used periodically or seasonally:

- Disconnect the battery, the power source on a battery electric truck, or the starter battery on an IC engine truck.
- Maintenance of battery, including periodic charging to maintain battery “health”.
- Sealing breathers in engines and drivetrains of IC engine equipment.
- Lubrication of exposed components, such as lift chains, cylinder rods, mast channels and greaseable bushings & bearings.
- Jacking truck up to prevent “flat spotting” of tyres/wheels.
- Cover equipment to prevent dirt/dust settling on equipment. Covers should be breathable to prevent condensation, that could cause corrosion.

When bringing equipment back into service after storage, remove any seals on breathers, and clean the equipment. You should also carry out a pre-start inspection and consider a PM (preventive maintenance) service depending on the length of storage. If the equipment has not been serviced in the previous 12 months, then a service is required to comply with the WHS regulations.

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7. UPGRADE OF AGED EQUIPMENT:

Consideration should be given to carrying upgrades to bring the aged equipment in line with the current standard, where practicable.

Consideration should be given to the following:

- Installation of seat belt if not present.
- Installation of sequential seat belt interlock, even where a seat belt is already provided.
- Pneumatic tyre inflation pressure decal
- Pneumatic tyre safety warning decal
- Camera to aid environment view
- Pedestrian alert system such as “halo” lights or detection systems. These can be a camera or sensor type device.
- Suspension seat.

DISCLAIMER:

The information provided in this Guidance Note is based on information collected from its members *and is up to date at the time of publication*. While this information may assist the user to form an opinion, it is not a substitute for an appropriate site assessment. Any decision made or actions taken must be based on an appropriate and specific site and risk assessment. AFITA accepts no responsibility for any recommendations, advice, statements, and conclusions expressed or implied, and gives no warranty or assurance as to the accuracy or validity of the information provided.