TECHNICAL BULLETIN 12
INSPECTION AND REPAIR OF FORK ARMS

Reason For This Bulletin

This bulletin has been produced to ensure that those involved in the inspection and repair of “in service” fork arms on fork lift trucks have the correct information.

Aim

The aim of this bulletin is to provide members of the Fork Lift Truck Association with clear guidance on the requirements for the inspection and repair of “in service” fork arms on fork lift trucks.

Who Should Read This Bulletin

Any person involved in the routine inspection or Thorough Examination of fork lift trucks must be familiar with the detail of this bulletin. Any person responsible for the safe operation of fork lift trucks should also be familiar with the content of this bulletin.

Standards

The inspection requirements described in this bulletin comply with the following standards:

ISO 2330	Fork Arms – Technical Characteristics and Testing
ISO 5057	Industrial Trucks – Inspection and Repair of Fork Arms in Service on Fork Lift Trucks.

Frequency of Inspection

Once in service, fork arms must be inspected as part of the Thorough Examination of the truck to which they are fitted. The interval between such inspections would therefore not be more than 12 months. As part of good practice the fork arms should also be routinely inspected as part of regular service inspections. Visual checks should be included in the operator’s daily or pre-shift checks.

Marking

ISO 2330 requires that the rated load and load centre of each fork arm is permanently marked on the fork shank. For example, for a fork of 750kg capacity at 500mm load centre the marking will be shown as:

750 x 500

In addition, some forks may show the minimum allowable fork blade thickness, at the worn part of the heel. These details should be shown together in the form that follows. For example, for a fork of 750kg capacity at 500mm load centre with 35mm minimum blade thickness at the heel the marking will be shown as:

750 x 500 x 35

At the start of an inspection it should first be checked that these details are clearly marked and legible. If this information cannot be read then the fork arm must be taken out of service.

Checking for Cracks

Each fork arm should be checked visually for cracks. Particular attention should be paid to the heels and hooks, including the hook attachments. If there is any doubt about the serviceability of a fork arm, further crack detection processes should be employed. In any event, if cracks are detected the fork arm(s) must be withdrawn from service.

Fork Tip Deflection

A pair or set of fork arms must be checked for any difference in height when they are mounted on the fork carrier. The difference in tip heights must not exceed 3% of the blade length (30mm per metre) or any maximum difference recommended by the manufacturer of the fork lift truck. If it does, the fork arms must be withdrawn from service and not used until they have been re-set and formally tested.

It should be noted that 3% is the absolute maximum – similar to the 3% maximum chain elongation. Forks would normally be changed before they reach this limit. The competent person inspecting the forks must take into account the application and environment when determining at what point the forks should be replaced.

Positioning Locks

There is a requirement to prevent unintentional sideways movement of the fork arms. The competent person must ensure that a positioning lock or similar device is fitted. It should be inspected to ensure that it functions correctly and is free from damage. If any fault is found the fork arm must be withdrawn from service until the necessary repairs have been made.

Fork Arm Blade and Shank

The fork arm blade and shank must be inspected for wear, with particular attention being paid to the heel. The maximum amount of permissible wear is 10%. If the thickness of the blade or shank is reduced to 90% of the original thickness, or to the minimum thickness determined by the manufacturer of the fork arm or fork lift truck, the fork arm must be taken out of service. It should be noted that if the forks have been manufactured with

additional material at the heel the wear of that extra material does not count within the 10% limit.

Most forks are manufactured with a 90 deg angle between the blade and the shank, although some may vary. The angle between the blade and the shank should be measured. There should not be a deviation of more than 1 deg. If there is a deviation of between 1 deg and 3 deg the forks must be reset by the manufacturer. If there is a deviation of more than 3 deg the forks should be taken out of service. In practical terms the deviation from manufactured angle equates to the following tip heights.

1000 mm forks	1 deg = 17mm 3 deg = 52mm
1200mm forks	1 deg = 21mm 3 deg = 63mm

Fork Arm Mountings

The support face of the top hook and the retaining faces of both hooks must be checked for wear and/or damage. If any such wear or damage results in excessive clearance between the fork arm and the fork carrier the fork arm must be taken out of service. Other types of mounting must be subject to similar checks as appropriate.

Modification

Modifications such as the welding of brackets or drilling of holes must be authorised by the fork manufacturer.

Repair and Testing

ISO 5057 states that only the manufacturer of the fork arm, or an expert of equal competence, shall decide if a fork arm may be repaired, and such repairs must be carried out in accordance with the recommendations of the fork arm manufacturer. It goes on to state that surface cracks and wear should not be repaired by welding and describes specific measures and tests that must be undertaken before fork arms may be returned to service. This includes yield tests with a load up to 2.5 times the fork capacity.

Note: An “expert of equal competence” would need to be able to show that they had received and followed the manufacturer’s recommendations for any specific repair carried out.

HSE Advice

HSE advice to local authority enforcement officers includes the following.

- A common reason for rejection is when wear of the heel exceeds 10% of the original thickness of the fork arms. This wear is usually caused by the forks rubbing along the ground in use and can occur due to failure to adjust the truck load chains to provide the

necessary clearance.

- The reason for the standard recommending that repairs are only carried out by the fork arm manufacturer or an expert of equal competence may not be clearly understood by the truck owner. If welding is to be carried out, for example, to replace the top hook, the repairer should be aware of the steel specification from which the original components were made. The correct material for the replacement part, the correct welding consumable and the correct welding method can then be selected. The welding method can include weld preparation, preheating stress-relieving and re-heat treatment to the manufacturer's specification. Use of "mild steel" materials and ordinary jobbing welding methods are likely to result in an unsatisfactory and unsafe repair.

- It should be noted that the BS considers that surface cracks and wear are not suitable for repair by welding. Reputable repairers do not recommend welding at the heels of forks to replace metal removed by wear because, for example, localised heating and mismatch of materials or errors in heat treatment are likely to adversely affect the performance of the fork arm.

Further Information

Further information on fork arms is contained in the following publications. (Prices shown are current at the time of printing, member price/non-member price.)

BS ISO 2328:2007 Fork Lift Trucks – Hook-on Type Fork Arms and Fork Arm Carriages, Mounting Dimensions. (£37.00/£74.00)

BS ISO 2330: 2002 Fork Lift Trucks, Fork Arms, Technical Characteristics and Testing. (£37.00/£74.00)

BS ISO 2331: 1974 Fork Arms for Fork Lift Trucks. Vocabulary for Hook-on Type Fork Arms. (£17.00/£34.00)

BS ISO 5057: 1993 Industrial Trucks – Inspection and Repair of Fork Arms in Service on Fork Lift Trucks. (£17.00/£34.00)

BITA GN62 Rev 1 (May 2011) Maintenance, Inspection and Repair of Fork Arms & Attachments

British Standards publications are available on line at www.bsonline.bsi-global.com or by contacting them direct on telephone number 0208 996 9001.

March 2006
Amended July 2010
Amended August 2011
Amended Dec 2013

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