



SAFETY ASSESSMENT
FEDERATION

Guidelines

Examination of in service
suspended access equipment and
building maintenance units
(Permanently installed)

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INTRODUCTION

These guidelines have been prepared by the Safety Assessment Federation (SAFed) together with the Specialist Access Engineering and Maintenance Association (SAEMA) to assist competent persons carrying out thorough examinations and maintenance engineers understand the requirements and scope of the thorough examination. They are not a legal requirement but considered to be good industry practice.

Regulation 9, of the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), requires that all lifting equipment provided for use at work is thoroughly examined by a competent person at regular intervals. Although not specifically covered by this document, where the safety and safe use of lifting equipment depends on the installation, it should be thoroughly examined prior to first use in accordance with LOLER Regulation 9(2)(a). First use includes when the equipment is operated for beneficial use during the construction phase of the building. Further, Regulation 5 of the Provision and Use of Work Equipment Regulations 1998 (PUWER) requires that equipment is properly maintained. This applies to all suspended access equipment. Thorough examination of Suspended Access Equipment by a competent person often requires the maintainer to be present at the time of examination, to prepare the equipment and facilitate examination, witness load testing and as part of the Safe System of Work. This is best achieved by coordinating maintenance visits with examinations and, by working together in this manner; the requirements under Regulation 5 of PUWER and Regulation 9 of LOLER can be fulfilled.

The aim of these guidelines is to achieve consistency of examination and testing, and to specify periodicities for supplementary examination and test. The results of the employer's risk assessment may necessitate variations to the nature and scope of the examinations and tests described and to the frequency with which they are performed.

Due to the location of the equipment, employers and employees should be aware of the risks of working at height and other known risks, such as radiation hazards, where the work area has telecommunications and other masts present. Legislation requires that building owners (or their managers) undertake a risk assessment of the area to be worked in, in order to ensure any significant risks have been adequately controlled. Where this is not available Engineer Surveyors should request such a site survey for radiation safety and refer back to their employer.

These guidelines have been framed in the context of the requirements of the Management of Health and Safety at Work Regulations 1999, Provision and Use of Work Equipment Regulations 1998 (PUWER), Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), Working at Height Regulations 2005, BS 6037 Code of practice for the planning, design, installation and use of permanently installed access equipment, and BS EN 1808 Safety requirements for suspended access equipment — Design calculations, stability criteria, construction — Examinations and tests.

These Guidelines are composed of four sections:

- 1.** The scope of the examination to be considered by the competent person during the thorough examination of Permanently Installed Suspended Access Equipment and Building Maintenance Units.
- 2.** A Detailed guide for the Competent Person with regard to Supplementary Testing of Suspended Access Equipment, to ensure the equipment is safe for continued use, with an information flowchart (Annex A).
- 3.** A Detailed guide for the Competent Person with regard to Supplementary Testing of Suspended Access Equipment tracks, paying particular attention to track hold down units (HDUs) with an information flowchart (Annex B).
- 4.** Supplementary examination and test certificates — Documentation to be provided when such examinations/tests have been carried out. These are to be made available to the Competent Person as required (Annex C).

TERMS OF REFERENCE

Auxiliary (materials) hoist - Hoist that is mounted on a suspension rig or trolley to raise and lower other materials independently of a platform.

BMU – Building Maintenance Unit – Suspended Access Equipment that is permanently installed on, and dedicated to, a specific building or structure and intended to be used for cleaning and maintenance of the particular building.

Bosun’s chair – Suspended chair, for one person only to use.

Competent person – Designated person who carries out a thorough examination and has such appropriate practical and theoretical knowledge and experience of the lifting equipment to be thoroughly examined as will enable them to detect defects or weaknesses and to assess their importance in relation to the safety and continued use of the lifting equipment.

Counterweights - Weights that are attached to a suspension rig to counterbalance the overturning moments.

Cradle or platform – Carrier suspended by ropes and used for lifting and lowering operatives and maintenance personnel.

Davit – A simple jib structure fixed to a roof or similar static structure usually for the suspension of a cradle or Bosun’s chair.

Examination scheme - Documented verification of an extension of periodicity of the thorough examination beyond the minimum legal requirements stated in the Lifting Operations and Lifting Equipment Regulations 1998. This could relate to either the whole or any part of the SAE or BMU. An examination scheme involves a thorough examination and would include a detailed schedule of checks, appropriate examination techniques and testing requirements, drawn up to suit the operating conditions of a specific item of lifting equipment.

Fall arrest device - Device acting directly on a secondary wire rope and which automatically stops and holds a platform in position.

HDU – Holding Down Unit – Components used to connect the track system to the building.

Luffing - Rotational upward/downward movement of jib(s) about a horizontal axis to allow positioning of a suspended platform.

Monorail track – Single track system generally fixed along the perimeter of a building to support and guide a mobile suspension rig (trolley unit).

NDT – Non-destructive Testing – Usually ultra-sonic for checks for deterioration of HDUs, or magnetic particle inspection or die penetrant spray for surface cracks in particular welds.

Operator - Designated person, suitably trained for working at height, qualified by knowledge and practical experience and provided with the necessary information to carry out operations safely of SAE

Overload protection device – A device that trips and acts automatically to stop the upward motion of a platform if the load in the suspension wire ropes exceeds the tripping limit.

Rated load - Rated load of persons and equipment that a suspended platform has been designated to carry by the manufacturer.

Rail track - Rails generally installed at roof level to support and guide a mobile suspension rig (trolley unit).

SAE – Suspended Access Equipment – Generic term used to describe equipment usually found on buildings and used for cleaning and maintenance of the particular building.

Safety Critical Component – Any component of an item of equipment which, should it or any part of it fail singularly, could cause a serious hazard. Note: A safety critical component may include back up safety device(s), which would come into operation, in the event of single component failure.

Secondary brake – A brake acting directly on a drum, traction sheave or final drive shaft and intended to stop the descent of a platform.

Secondary device - Device intended to stop the descent of a platform under emergency conditions. An example of such emergency conditions is breaking of a suspension wire rope or failure of a hoist.

Secondary rope - Steel wire rope not normally carrying the suspended load but rigged to work in conjunction with a fall-arrest device or secondary device.

Service brake - mechanical brake automatically applied by stored energy until released by an external sustained force, usually applied electrically, hydraulically or pneumatically, either under the control of the operator or automatically. An example of stored energy is spring force.

Suspension point - Designated position provided on a suspension rig assembly for the independent anchorage of the ropes, diverter pulleys or hoists.

Suspension rope - Active steel wire rope carrying the suspended load.

Thorough examination – A thorough examination is a systematic and detailed examination of the lifting equipment by a competent person to detect any defects that are, or might become, dangerous.

Trolley - Suspension rig mounted on wheels and designed to run on a track, runway or monorail to support a suspended platform.

Uplift – Force acting in the upward direction on a suspension rig where the overturning moments are greater than the stabilising moments.

1. Scope of Thorough Examination

The scope of thorough examination is applicable to both manual and powered permanently installed Suspended Access Equipment (SAE) and Building Maintenance Units (BMUs).

This scope covers activities that should be undertaken at each thorough examination and details the considerations that should be made by the competent person. However, the competent person may require additional specific tests not detailed in the scope of these guidelines, for example following exceptional circumstances.

In cases where there are grounds for concern regarding the condition of the BMU or where the condition of safety critical components cannot be ascertained, the competent person may require tests to be carried out as described in Section 2 of these Guidelines (refer also to Annex A). These tests should be used by the competent person in support of the thorough examination to determine the condition of the equipment.

An examination scheme prepared under Regulation 9 of LOLER 98 may be required to specify additional requirements to those outlined in these guidelines.

1.1. General

A thorough examination should include the following:

- A. An assessment of safe access and egress procedures to the structure together with a review of the risk assessment and appropriate and safe system of work.
- B. A close visual examination of all safety critical components from the building connections to the cradle (this requires consideration of the design of the building connections to determine how they will deteriorate over time, the track system or plinth, the trolley unit, the hoist system including the brake, suspension ropes and the cradle). In order to complete the thorough examination and decide on the tests outlined in 2.2.1, and 2.3.1, it may be necessary for the competent person to witness the equipment being operated in the maximum loaded condition (i.e. jib fully extended, cradle just above the ground for trolley mounted hoists) to determine whether there is uplift in normal service.
- C. Examination of the secondary device and secondary rope.
- D. An inspection of all drive systems for security/fitment of parts or wear.
- E. A functional check of all electrical safety devices, (e.g. anti-tilt device, anti-collision device, overload detection, secondary device safety switch, travel limits, interlocks, isolators, stop buttons, trip bars, etc.).
- F. A visual examination of the electrical supply, to determine the condition of cables and wiring, correct reeling, burnt or loose connections and deteriorated or damaged wiring/sockets.
- G. A visual examination to determine the effect of any water ingress to equipment that is likely to be detrimental to its safe operation.

- H. A functional test of all motions including a check of all controls for correct operation and correct marking in all modes.
- I. Confirmation of clear marking of the safe working load, any operating instructions marked on the machine including instructions for emergency recovery, manufacturers details (including CE marking where appropriate), the condition of hazard identification markings, safety notices, isolator identification,
- J. A functional test of the communication devices or systems used at site during equipment use (if fitted).
- K. Functionality and condition of any auxiliary hoist.
- L. Condition of any anchor points (for attachment of safety harnesses) and any equipment used for recovery from height.
- M. A review of previous thorough examination reports, including examination after installation and (where appropriate) details of any prior supplementary testing and their conclusions.
- N. A review and visual examination of all auxiliary components such as cradle suspension beams and rope diversion trolley systems.
- O. A review and examination of hard or soft cradle restraint systems in operation.
- P. The person carrying out the thorough examination should also check that rescue and escape from the cradle is possible, including protruding terraces and canopies.

1.2. Tracks, Tables, Platforms, Monorails and Davits

A thorough examination should include the following:

- A. Track or monorail fixing bolts and associated HDUs for correct fitment, condition and security. This may be supplemented by periodic detailed examination of the foundation unit under the roof lining or pillar cap to establish effects of weathering on steelwork. This examination will be requested at the discretion of the competent person based on history of individual units, evidence of water ingress or deterioration of mountings and common guidance (Refer to Annex B – Flowchart for examination of HDUs)
- B. Where underslung tracks are built into a building façade, exposure of fixings may also be required on a periodic basis as outlined above (Refer to Annex B – Flowchart for examination of HDUs).
- C. Track, turntables, interlocking lock off pins, shunts and sidings for alignment, security, corrosion, cracks, deformation and any other structural defects.
- D. Track rack and pinion drives where the trolley needs to drive up and or down an incline in the track. Engagement of pinion to rack must be confirmed during rated load test.

- E. End stops for security, suitability.
- F. Davit and davit sockets for structural defects (such as corrosion), deformation and their compatibility.
- G. Associated raising/lowering platforms / tables for positioning and /or parking of the access equipment should be thoroughly examined ensuring a safe system of work can be employed.

1.3. Trolley Unit

A thorough examination should include the following:

- A. Trolley unit structure, chassis and arms for corrosion, security, alignment and suitability for use.
- B. Alignment to roof track or system, together with assessment of any obstructions that may impede the safe and free function of the trolley unit during normal use.
- C. Condition and suitability of rope anchorage points and any other attachment.
- D. Slew rings and winch mounting units. Slewing rings used for articulation of the trolley unit, jib sections or at the jib head for positioning of the cradle, should be checked for evidence of excessive play. All slew ring bolts should be checked for correct security.
- E. Luffing screw(s) and assessment of wear of lead screw nut(s).
- F. Derricking devices and attachments.
- G. Jib structure, attachments and pulleys for corrosion, physical damage, alignment and weld defects.
- H. Testing for alignment and correct function of limit switches/devices in all modes of operation.
- I. Condition of tyres, wheels, or guide rollers and their assemblies, track braking units, restraining devices, etc.
- J. Condition and security of all linkage pins in the trolley structure.
- K. Traversing drive system such as motors, ropes, rope retainers, chains, etc.
- L. Hydraulic components including actuators, hydraulic motors, check valves, hoses for corrosion or damage. Additionally, trolley units with hydraulically operated luffing jibs should be checked for the presence of creep.
- M. Telescoping jib structures and wear pads.
- N. Final jib section mechanical end stops should be checked and confirmed.
- O. Adequate engagement of any rack and pinion jib drives should be also be confirmed, especially important if there is negative or positive jib luffing provided.

- P. Functional check of trolley mounted secondary device.

1.4. Suspension

A thorough examination should include the following:

- A. Condition and suitability of suspension ropes, safety ropes, auxiliary hoist ropes and their anchorages.
- B. Drums for condition, security and even layering device.
- C. Functional check of slack rope devices.
- D. Alignment and correct function of runners in building mullions together with associated safety cut out switches e.g safety devices in the event of 'hang up'.
- E. Confirm fitment and correct function of lateral restraining devices relating to the building together with associated electrical monitoring where appropriate.
- F. Confirmation of correct function of up and down cradle travel limits or safety stops including adequate suspension rope length and suitable rope termination.
- G. Even and correct layering of ropes on the winch drum(s).
- H. Rope storage facilities where appropriate.
- I. Independent fall arrest devices (such as Tractel 'Blocstops') should be examined and tested for effective operation in accordance with manufacturer's instructions.
- J. A functional check of the overload protection device.

1.5. Cradles/Bosun's Chairs

A thorough examination should include the following:

- A. Confirmation of appropriate safety information such as safe working load, CE mark requirement for PPE, instructions for no power descent, etc.
- B. Assessment of suitable and safe access and egress to cradle unit.
- C. Confirmation of suitable attachment and function of all safety devices including upper / lower travel limits, obstacle trip bar(s), and overload devices.
- D. Cradle structure frame, flooring, guard rails, toe guards and side panels.
- E. Security and condition of cradle side cushions and rollers / pads.

- F. Suitability, function and condition of any access gates to the cradle unit.
- G. Security, stability and condition of cradle extension platforms. This should include assessment of safe operating and usage instructions.
- H. Seat attachment on Bosun's chairs for suitability, condition, security of attachment and condition and effectiveness of operator restraint.
- I. Condition and suitability of bucket/accessories hoops and security of attachment to unit.
- J. Condition of any pantograph, its operating mechanism and linkages, if fitted.

1.6. Hoist Including Auxiliary (Material) Hoist

A thorough examination should include the following:

- A. Function of emergency lowering systems together with instructions for use.
- B. Assessment of condition and effective operation of the primary braking systems.
- C. Functional check of all safety devices, including overload, slack rope and bunching detection switches.
- D. Hoist unit for correct and safe function and correct spooling of ropes.
- E. Functional check of secondary device.

1.7. Travelling Ladders and Gantries

Travelling Ladders and Gantries are included in this scope (Although they are more commonly associated with PUWER inspection than LOLER thorough examinations) as they are increasingly being introduced for building maintenance functions. This equipment is permanently installed and can be quite complex in its construction and method of use

1.7.1. Travelling Ladders

An inspection should include the following:

- A. Ladder rungs for security, damage, deformation, and corrosion.
- B. Ladder frame and attachment to top and/or bottom runners.
- C. Any traverse mechanism and associated ropes and equipment.
- D. Where fitted, any cage assembly should be examined for structural defects and condition. This would include any fitted winches, suspension ropes and safety devices (this examination should be similar to that of a cradle where fitted).

- E. Any traverse restraining system or brakes (to prevent movement in wind).
- F. Assessment of the condition and security of the track mechanical end stops.
- G. Assessment of the condition and security of the fixings into building structure.

1.7.2. Travelling Gantries

A thorough examination should include the following:

Gantry rails and any associated hold down / supporting bolts. An assessment should be made of the condition and security of building connections, where the rails are cantilevered or underslung the examination outlined in 3.2.5 (HDU's in uplift) should be considered. (Refer to Annex B – Flowchart for examination of HDUs).

End carriages and wheel attachments running on the track.

- A. Any fixings (such as central king post bearing) that enable the structure or cradle to rotate
- B. Gantry structure for weld defects, damage, corrosion, deformation.
- C. Guard rails, mid rails, toe boards, flooring and safety harness attachment points.
- D. Any attachments that may be fitted to the structure.
- E. Where fitted, any cage assembly should be examined for structural defects and condition. This would include any fitted winches, suspension ropes and safety devices (this examination should be similar to that of a cradle where fitted).
- F. Any traverse restraining system or brakes (to prevent movement in wind).
- G. Assessment of the condition and security of the track mechanical end stops.

2. SUPPLEMENTARY TESTS

2.1. General

There is a necessity for certain components to be subjected to tests (or detailed examination) in order to supplement the periodic thorough examination. The extent and periodicity of these supplementary tests should be determined by carrying out a risk assessment and will depend upon the design, usage, duty and operating environment of the particular equipment. Where the employer has not had such a risk assessment carried out the following is given as guidance to the competent person carrying out a thorough examination.

- A. Existing documented load tests should be considered as being valid up to their expiry dates. The following tests should then be considered using reasoned engineering judgment, with any manufacturer's recommendations being taken into consideration.
- B. In cases where there are grounds for concern and the condition of the building maintenance unit and safety critical components can neither be ascertained nor substantiated, the competent person should request that specific tests are carried out, as described in these guidelines. The list of examinations and tests provided in this document are non-exhaustive and additional tests may be required on a case by case basis.

2.2. Every Two Years of Service

At two yearly intervals the tests described in section 2.2.1, 2.2.2 and 2.2.3 should be arranged to coincide with a thorough examination, to allow the competent person to witness them being undertaken.

It should be noted that BS 6037 requires that annual load tests should be carried out on suspended access equipment at intervals not exceeding 13 months.

The results of any tests carried out to support in service thorough examinations should be recorded using the certificate format shown in Annex C.1. and where appropriate Annex C.2

2.2.1. Cradle or Chair — Rated Load

The cradle or chair should be evenly loaded with its rated load (this load can include operatives) and then be operated throughout its full extent of movement. The decision to undertake the rated load test over the entire track system depends upon reasoned engineering judgment. For example, if the trolley unit presents no uplift in normal service then it may be unnecessary to undertake a rated load test over the entire track system. During these tests, the trolley unit (in particular the hoist brake) should be observed to check its efficiency when under load.

Care should be taken to ensure the equipment is safe to operate with the rated load. Rated load tests should only be undertaken immediately following a thorough examination and where there are no concerns regarding the integrity of the track system or stability of the equipment. For trolley mounted hoist systems it is sensible for functional checks of the unit (including the brake) to be undertaken from roof level within the building perimeter.

2.2.2. Cradle or Chair Overload Device

The correct function of the cradle or chair overload device should be proven.

2.2.3. Auxiliary (Materials) Hoist

Where the auxiliary hoist is rigged and available for use then its correct function should be verified and the rated load applied. The trolley should be operated throughout its full extent of movement to confirm the integrity of the system.

The correct function of the auxiliary hoist overload device should be proven.

2.3. Every Ten Years of Service

Section 2.3.1 to 2.3.9 provides details of the recommended supplementary tests. These tests are not normally required to be witnessed by the competent person carrying out the thorough examinations, but documentary evidence should be provided and reviewed by the competent person. Brief details of the supplementary tests undertaken are to be recorded on the summary certificate shown in Annex C, supported by full details on the relevant certificate C.3 to C.11, as appropriate.

2.3.1. Track HDUs

The track HDUs should be checked in accordance with section 3 of these guidelines. The result should be recorded using the certificate format shown in Annex C.3.

2.3.2. Secondary Device

The secondary device (fall arrest device or secondary brake) should be operationally tested to prove functionality and that it suitably engages and brings the cradle to rest in a controlled manner. This functional test does not have to be carried out with a load in the cradle. This test is not normally required to be witnessed by the competent person carrying out the thorough examinations, but documentary evidence should be provided and reviewed by the competent person.

Where it is not possible to prove the operation of the secondary device in situ, it should be removed, tested at a test house or workshop and re-fitted. The result should be recorded using the certificate format shown in Annex C.4.

2.3.3. Luffing Screw Nut

Where it is not possible to accurately assess the level of wear in a luffing screw nut, the nut should be stripped down and checked for condition. The result should be recorded using the certificate format shown in Annex C5.

2.3.4. Articulating Bogies of Trolley Units

The articulating bogies of trolley units which take uplift forces should be stripped down to assess the condition of the components if their condition cannot be ascertained by visual examination only. This assessment may include non-destructive testing (NDT) by an approved NDT practitioner. The result should be recorded using the certificate format shown in Annex C.6.

2.3.5. Turntables

Central swivel units of turntables should be stripped down to assess the condition of the components if their condition cannot be ascertained by visual examination only. The assessment process may require non-destructive testing by an approved NDT practitioner. Dismantlement may not be considered necessary where the trolley unit is known not to take uplift forces. The result should be recorded using the certificate format shown in Annex C.7

2.3.6. Hoists and Stop Blocks

Fully enclosed traction type hoists and stop blocks should be opened out for inspection of internal components. Dismantlement should be undertaken by a specialist in accordance with the manufacturer's instructions or sent back to the manufacturer for exchange where this is specified by the manufacturer. The result should be recorded using the certificate format shown in Annex C.8.

2.3.7. Slewing Rings

All slewing rings, particularly those supporting a cantilever boom, should be assessed for the amount of vertical play. Where there is cause for concern, such as vertical play that is greater than expected, the manufacturer should be consulted to provide criteria. Where the criteria have been exceeded then the slew ring should be renewed. The result should be recorded using the certificate format shown in Annex C.9.

2.3.8. Hydraulic Systems

Hydraulic lift cylinders and associated pipework should be dismantled and checked where it is not possible to ascertain their condition during a thorough examination. Rupture valves should be checked for correct operation. The result should be recorded using the certificate format shown in Annex C.10

2.3.9. Miscellaneous Parts

Miscellaneous parts may require to be tested/exposed as called for by the competent person. Details of any repairs or parts replaced should be recorded on the appropriate certificate in Annex C.11.

2.4. Records

Records of all tests must be issued to, and held on file by, the building duty holder for future reference or perusal by competent persons carrying out thorough examinations. The Records must include dimensions/particulars of any safety critical components that were found to be worn but suitable for further service.

3. TRACK HOLD DOWN UNITS (HDUs) (Refer to Annex B and D)

3.1. General

The two main types of track HDUs presently in use are manufactured from either stainless steel or from those containing ferrous components. It is recommended that the following procedure is adopted for these types of HDU, where there is a possibility of water ingress.

3.1.1. Known Design Details of the HDUs

The design details of the HDUs should be obtained and documentary evidence of this held on file by the duty holder for future reference.

3.1.2. Unknown Design Details of the HDUs Not in Uplift

The decision to excavate HDUs will depend on whether there is uplift and/or the condition of the upstand including the roof fabric. If it can be confirmed that no uplift is present and encasement is sound, then an assessment of the 'as seen' condition should be considered sufficient.

3.1.3. Unknown design details of the HDUs in uplift

Where design details are not known, they should be ascertained by excavating a single HDU unit to determine the complete HDU steel type and method of anchoring within the concrete cast. Where there is cause for concern a greater sample size (see 3.2.1) should be excavated.

To assist in determining HDU deterioration in the future, where practical, NDT can be used to set the parameters and pattern and establish acceptance/rejection for the remaining units.

3.2. Sample Advice

If a sample of HDUs is required to be excavated for further investigation, then the sample should consist of HDUs which are most likely to have deteriorated, are in uplift, or are subject to lateral forces. The location of the particular HDUs in the representative sample should be determined using reasoned engineering judgement on that basis. The following advice is given to assist in the selection of a sample.

3.2.1. Size of Sample

The sample should consist of at least 5% of the total number of HDUs in the system.

3.2.2. Corrosion

Corrosion is most likely to occur where HDUs are under greatest lateral stress due to movement of the HDUs allowing water ingress just below the surface where crevice corrosion can take place. HDUs at the end of a track are affected most by expansion and carry greater lateral loadings when the equipment is in use above them, especially if they are adjacent to a turntable.

3.2.3. Lifting or blistering of Roof Covering

Lifting or blistering of roof covering adjacent to HDUs, damaged flashing or clearance between flashing and HDUs, could indicate possible water penetration.

3.2.4. Markings on Sides of Plinths

Markings on sides of plinths may indicate products of corrosion leaching from under the flashing.

3.2.5. HDUs in Uplift

The sample should be limited to HDUs in uplift when uplift is the only concern.

3.2.6. Records

Records of which HDUs were exposed and the findings should be retained by the duty holder for future reference and to allow any future samples to be taken from a different area.

3.3. Stainless Steel HDUs

3.3.1. Stainless Steel Units

If the design drawings show that HDUs are anchored to the main building structure by a stainless-steel unit and there are no external indications of concern, no additional action is required.

3.3.2. Stainless Steel HDUs Anchored to Ferrous Steelwork

If stainless steel HDUs are anchored to ferrous components below the roof surface, then a sample (see 3.2) of the HDUs should be exposed and an assessment made of their suitability and condition.

Examples of these types of unit would be:

Where short stainless-steel bolts have been anchored to ferrous brackets which are in turn anchored to the main building structure, a sample (see 3.2.1) should be exposed to ascertain the condition of the ferrous brackets. If any of the sample brackets are found to have been unsuitably fitted or corroded in excess of 10% of the original cross-sectional area, then all remaining HDUs along the entire track should be exposed. If all sample HDUs are found to be in serviceable condition (or following exposure of all remaining HDUs, those deteriorated are repaired) then a suitable protective coating should be applied to them, the excavated material suitably re-built, and the equipment load tested over that section of track in accordance with BS 6037 Section 14 Verification, Commissioning and Handover prior to return to service.

In order to determine future deterioration;

Where none of the sampled HDUs were found to be unsuitably fitted or corroded, a technical report detailing the findings of the excavation works should be kept on file.

Where all remaining HDUs were exposed and any remedial work was undertaken, then a technical report, detailing the works undertaken, should be kept on file. Where possible, a record of NDT should also be kept on file that can be used as a comparison at future examinations.

Where old ferrous HDU bolts have been part excavated in the past, cut short and short lengths of stainless steel studding attached using joining nuts, the same procedure as (3.3.2.a) above should be adopted, only checking studs instead of brackets, with particular care being taken to ensure that the joining nuts are suitably located onto both threaded components.

3.4. Ferrous HDUs (Galvanised materials should also be considered as Ferrous)

3.4.1. Ferrous HDUs Encased in Concrete OR Ferrous Posts Anchored to the Main Building Structure

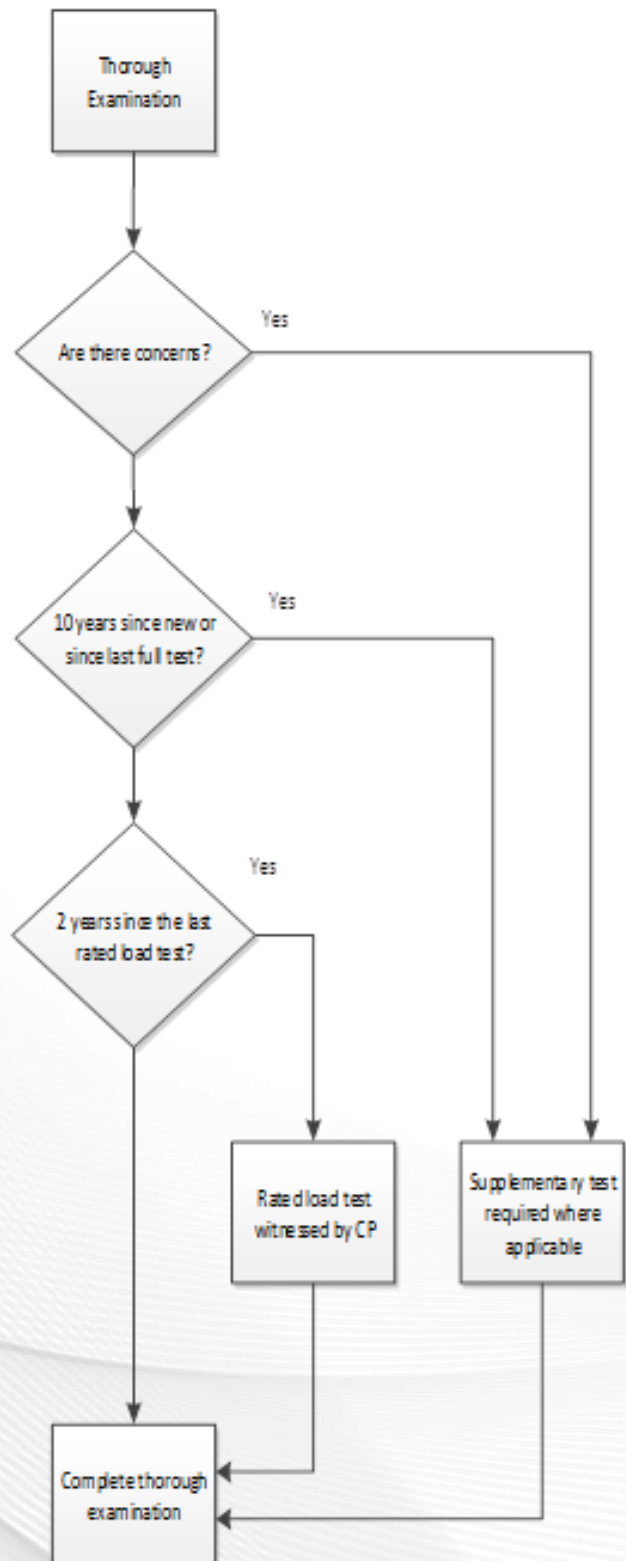
Where there is cause for concern, a sample (see 3.2) of the HDUs should be fully exposed to ascertain their condition and method of anchorage. If any of the samples are found to have been unsuitably fitted or corroded in excess of 10% original cross-sectional area then all remaining HDUs along the entire track should be exposed. If all sample HDUs are found to be in serviceable condition (or following exposure of all remaining HDUs, those deteriorated are repaired) then a suitable protective coating should be applied to them, the excavated material suitably re-built and the equipment load tested over that section of track in accordance with BS 6037 Section 14 Verification, Commissioning and Handover, prior to return to service.

In order to determine future deterioration;

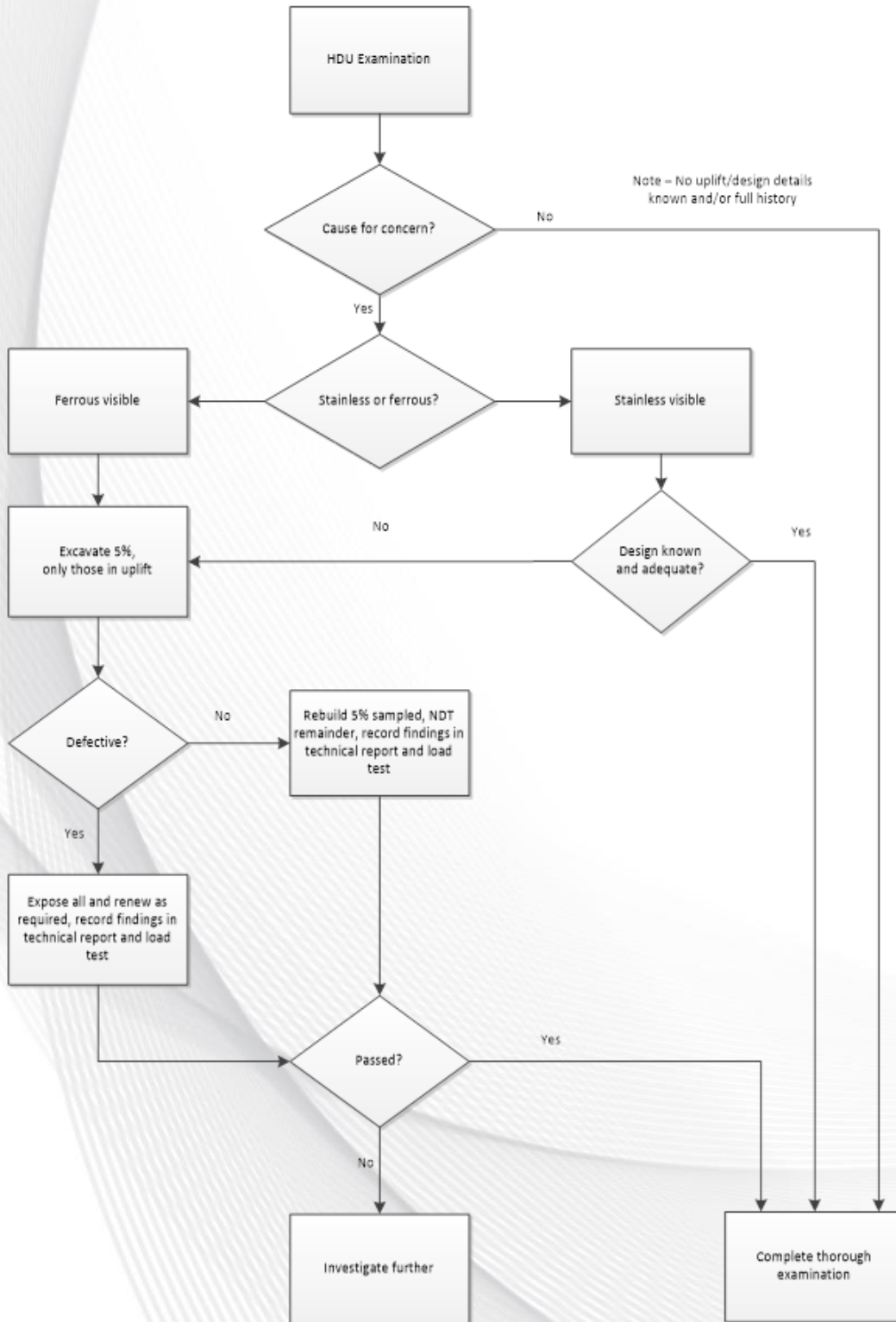
Where none of the sampled HDUs were found to be unsuitably fitted or corroded, a technical report detailing the findings of the excavation works should be kept on file.

Where all remaining HDUs were exposed and any remedial work was undertaken, then a technical report, detailing the works undertaken, should be kept on file. Where possible, a record of NDT should also be kept on file that can be used as a comparison at future examinations.

ANNEX A-FLOWCHART FOR THOROUGH EXAMINATION AND SUPPLEMENTARY TESTS



ANNEX B-FLOWCHART FOR EXAMINATION OF HOLDING DOWN UNITS



ANNEX C. 1 EVERY TWO YEARS SERVICE (AT TWO YEARLY INTERVALS)

Unique report reference ID: _____

Reference clause 2.2.1 Rated Load dynamic test and 2.2.2 Function of Overload device

Date of last recorded test(s) if known: _____

State method of examination / test: _____

Circle as applicable

Does the trolley travel freely along the tracks?	Yes	No
Does the cradle raise / lower fully without interruption?	Yes	No
Is the trolley designed to go into uplift?	Yes	No
Does the trolley go into uplift?	Yes	No
Are the track supports secure and in a sound condition?	Yes	No
Where applicable are track deflection measurements acceptable?	Yes	No
Was the function of the overload device proven?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C. 1 EVERY TWO YEARS SERVICE (AT TWO YEARLY INTERVALS)

Unique report reference ID

Reference clause 2.2.3 Condition of the auxiliary materials hoist

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Is the hoist in a good condition and functioning correctly when working in tandem with the cradle?	Yes	No
Do the hoist functions operate correctly, including manual lowering?	Yes	No
Was the rated load lifted just above the ground and the position maintained without slip or creep?	Yes	No
Was the function of the hoist overload detection device verified?	Yes	No
Was the hoist, rope in a good condition and attachments free from damage and/or permanent deformation on release of the rated load?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.3 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.1 Check on condition of track hold down units in uplift.

Date of last recorded examination(s) if known:

State method of examination

Circle as applicable

Is the design of the hold down unit unknown?	Yes	No
Did the exposure of a single hold down unit give cause for concern requiring a sample of 5% to be exposed?	Yes	No
Does the hold down unit comprise of ferrous bolts encased in concrete?	Yes	No
Did the 5% sample reveal any safety related issues, such as corrosion/material wastage, with the hold down units?	Yes	No
Do any of the 5% sample comprise of stainless steel bolts anchored to ferrous brackets?	Yes	No
Does any of the roof fabric around the hold down units require remedial attention?	Yes	No

If Yes, explain action below:

Circle as applicable

Does the result of the supplementary examination / test confirm the hold down units are in a satisfactory condition?	Yes	No
If yes, has a technical report been produced detailing the works undertaken and the findings for future reference?	Yes	No

If No, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.4 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.2 Secondary Device

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Was the secondary device operationally tested?	Yes	No
Did the secondary device operate as intended and engage in a controlled manner?	Yes	No
Following the test, is the secondary device free from any defects and in a sound condition?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary test(s)

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.5 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.3 Luffing Screw Load nut assessment of wear and condition

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Can an accurate assessment of the level of luffing screw / nut wear be carried out with the luffing assembly in situ?	Yes	No
Was the luffing nut and screw stripped down for examination?	Yes	No
Was the amount of luffing nut wear considered to be acceptable and has the assembly been re-built and put back into service?	Yes	No
Has a replacement luffing nut been fitted?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary test(s)

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.6 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.4 Condition of articulating bogies of trolley units

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Can an accurate assessment of the condition of the articulating bogie components be carried out by visual examination only?	Yes	No
Was the articulated bogie stripped down for examination?	Yes	No
Was non- destructive testing by an approved practitioner carried out?	Yes	No
Was the articulated bogie re-built and put back into service?	Yes	No
Has a replacement articulated bogie been fitted?		

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.7 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.5 Condition of Runway track turntables

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Can an accurate assessment of the central swivel unit condition be carried out by visual examination only?	Yes	No
Was the central swivel unit stripped down for examination?	Yes	No
Was non-destructive testing by an approved practitioner carried out?	Yes	No
Was the turntable re-built and put back into service?	Yes	No
Has a replacement turntable or central swivel unit been fitted?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref

Date

ANNEX C8 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.6 Condition of hoists and stop blocks

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Has the hoist / stop block been removed, opened out and inspected internally in line with the makers instructions?	Yes	No
Were all parts found to be in a satisfactory condition?	Yes	No
Was a functional test completed after the hoist / stop block was re-assembled?	Yes	No
Was the result of the test satisfactory?	Yes	No
Has the hoist / stop block been refitted, tested and found to be in a satisfactory condition?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.9 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.7 Condition of slewing rings

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Are the slew rings, bearings and gears in a sound condition?	Yes	No
Are the slew rings, bearings and gears adequately lubricated?	Yes	No
Are all slew ring connections in a good condition and torqued to the correct setting?	Yes	No
Has the slewing ring been checked for vertical play in line with the makers instructions?	Yes	No
Do all measurements for vertical play come within the makers criteria?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C.10 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.8 Condition of Hydraulic system

Date of last recorded examination / test if known

State method of examination / test:

Circle as applicable

Are the hydraulic pumps, motors, cylinders, rams and associated pipework in a good condition?	Yes	No
Does the hydraulic system maintain pressure?	Yes	No
Does the pressure relief valve operate satisfactorily?	Yes	No
Does the rupture/restrictor valve operate correctly?	Yes	No
Is the hydraulic fluid in a satisfactory condition?	Yes	No

If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____

ANNEX C11 EVERY TEN YEARS OF SERVICE

Unique report reference ID

Reference clause 2.3.10 Miscellaneous parts

Date of last recorded examination / test if known

State what was tested, the method of the examination / test and any relevant findings:

Circle as applicable

Did the test / examination prove the equipment to be in a satisfactory condition?	Yes	No
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If No, explain below:

Circle as applicable

Does the result of the supplementary examination / test indicate further remedial work is necessary?	Yes	No
--	-----	----

If Yes, state your recommendation(s) for further action required:

To be completed by the person or corporate body carrying out the supplementary examination / test

Signed _____ Position _____

Print Name _____

Equipment ID / Ref _____ Date _____