



Guidance Note GN-014

Structural Inspections of Masts and Towers



MATS Group Guidance Note

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1 Introduction

The purpose of this document is to provide guidance on structural inspections for tower and mast owners (Telecoms and Broadcast) within the UK. It will describe the minimum requirements for inspecting the structure and the ancillary telecommunications equipment that is fitted to a tower or mast.

The tower or mast owner should manage the estate in such a manner that the risk of injury to employees, subcontractors and the general public is minimised as far as is reasonably practicable.

There is no single document or standard that specifies what constitutes an acceptable through-life estate management system to minimise risk levels as far as is reasonably practicable. It is recognised that some tower and mast owners have stringent in-house processes and procedures for the inspection of their towers, built up over a number of years' experience and assessment of risks within their estates.

This document does not detail these in-depth company policies and procedures but provides guidance on the minimum recommended requirements to other companies which may not have similar regimes in place. It also clarifies areas of ambiguity relating to responsibilities for inspection on sites that are shared with third parties.

The guidance draws on what is accepted as the minimum requirements by recognised tower and mast owners supported by British or European Standards where they exist.

It is understood that individual companies/infrastructure owners may choose to operate more stringent or more frequent inspection regimes than are recommended in this Guidance Note.

2 Scope

This document provides guidance on the requirements for condition inspecting of masts and towers (Telecoms and Broadcast) including ancillary equipment fitted to the structure within the UK. It also identifies responsibilities for inspections where equipment is installed on a third party site.

It assumes that the structure was originally built to the required standards and that the design of new structures and appraisal of existing structures, concerning both the derivation of environmental loading conditions and the determination of structural response, are undertaken in accordance with current British / European Standards and in line with industry best practice. Also specified equipment and mounting steelwork should be fit for purpose and rated to withstand site specific conditions.

This guidance also assumes that further structural review, potentially including full analysis of the structure, will have been undertaken in the following circumstances:

- prior to use of the structure (following completion of all identified snagging) or a proposed change of use of the structure, i.e. incorporating additional apparatus or equipment on the structure.
- following an incident in which significant damage or structural distress has occurred.
- by recommendation following a previous condition inspection.

This document does not provide details of how to climb the structure safely to undertake the inspection, and assumes that the persons undertaking the inspection are competent to complete the inspection safely.

3 Competent persons

A condition inspection should be carried out by, and certificates signed by, a competent person. A competent person should:

- have a minimum of three years' collective relevant experience in the inspection and construction of the type of structure involved, or have attended a structural inspection course to obtain relevant information on the specific structures in order to conduct an inspection adequately. If only the latter is the case, there must be robust internal procedures and additional expertise in place as a back-up to provide further advice and experience as required.
- have the appropriate level of climber competency to operate safely on the structures involved. (See MATS Guidance Notes GN-001 – Work at Height Training and GN-012 – Climbing Masts and Towers.)

Each tower and mast owner will have a person/team in place to oversee the inspection regime and assess its effectiveness in identifying issues and ensuring that these issues are resolved in a satisfactory manner. This person/team will either have the following competency or access to following competency:

- a suitably qualified structural engineer. (Definition to be agreed)

4 Condition Inspections

The objective of a condition inspection is to undertake a sufficiently detailed assessment of the structure, to determine whether the structure is in a satisfactory condition and to ensure that the form of access and places of work are fit for purpose and comply with statutory requirements.

If possible/available, obtain a copy of the previous structural condition report or safe to climb certificate prior to inspection. This may prove to be a valuable source of information or reference basis for comparison while conducting the structural inspection.

5 Inspection Frequency

There is very little guidance on the frequency required to inspect a mast or tower. Standard BS8100 does state that Class A & B towers inspection periods should not exceed 2 and 5 years respectively, however this only covers Steel Lattice towers and there are many different types of masts and towers in a telecommunications and Broadcast network. Also it is often difficult to find out on older structures whether they were built to BS8100 standard, and what classification they fall under, this is especially difficult if the tower has been transferred to other parties during its life.

Although BS8100 has been withdrawn, and there is no similar reference to inspection frequency in its successor BS EN 1993-3-1, it is anticipated that similar inspection guidance may be provided in the yet to be released NCCI document PD 6695-3-1. There is also no guidance requirements for equipment fitted to masts and towers.

Based on the fact that there is little guidance available owners of all structures should base their structural inspection frequencies based on basic risk assessment, these assessments should include:

- Height of Structure, increased risk the larger the structure
- Manufacturers recommendations
- Previous maintenance records – if consistently no issues have been raised over various inspections (and no significant changes have been made to the structure the previous inspection) this may extend the inspection frequency.
- Age – as the structure gets older the inspection frequency may need to increase.
- Loadings – structures where there is little or no information on their loading status or which are known to be highly loaded, e.g. approaching 100% of its design criteria, may need more frequent inspections.

- Location – structures in populated areas may need to be inspected more frequently than those in very rural areas; also close to railway lines and roads. Structures in very exposed conditions (wind, rain, sea) may need inspecting more frequently than those in sheltered areas.
- Any statutory inspections required e.g. fall arrest that determine a set frequency that cannot be exceeded
- Areas where there are high levels of vibration from external sources.

The decision should be made by persons with the competence to assess all the required information and determine a suitable inspection frequency.

It is recommended that the frequency of inspection for the following types of structures does not exceed an annual inspection:

- Sites with current structural issues identified and/or stated in any structural analysis reports.
- Sites loaded over 100% design criteria – these should also have internal procedures in place to manage the overload to minimise any associated risks and a remedial action plan in place to resolve issues.
- Guyed masts.
- Temporary structures – may be subject to their own assessments on a case by case basis
- Linked structures, e.g. forming part of a complex antenna arrangement.
- Structures using innovative structural form, techniques or materials
- Major masts/towers and broadcast sites or other critical infrastructure.

Note : - It is highly likely that there will be structures and structure types that require different inspection frequencies than those stated. It is recommended that these particular structures be assessed by a competent person and an inspection frequency defined as and when required.

The following despite being a part of the structure will need to be inspected annually but may be done in isolation and more frequent than the structure itself. E.g. a structure may be determined as a 2 yearly inspection but the fall arrest system that is installed on the structure will need to be done annually or prior to use.

- Fall arrest systems. (may be extended from annual if manufacturers state this or prior to use)
- Structures with person-riding access systems.
- Lowerable structures requiring partial dismantlement before lowering.

6 Third Party Equipment

It is the responsibility of the owner of any equipment (cables, bracketry, antennas etc) installed on a tower or mast owner's site to be inspected, to ensure the equipment is structurally sound. It is recommended that the inspection of such equipment is again based on risk assessment. These assessments should include:

- Height on the Structure, higher risk the higher the location
- Manufacturers / designers recommendations
- Previous maintenance records – if consistently no issues have been raised over various inspections (and no significant changes have been made to the structure the previous inspection) this may extend the inspection frequency.
- Age – as the equipment gets older the inspection frequency may need to increase.
- Loadings – panel or dishes will have higher wind loading than dipoles for example

- Location – equipment on structures in populated areas may need to be inspected more frequently than those in very rural areas; also close to railway lines and roads. Structures in very exposed conditions (wind, rain, sea) may need inspecting more frequently than those in sheltered areas. As this is covering equipment on third party sites, the sites will be visited by other parties to do other work and this must be considered
- Whether the equipment is operational or not. - If equipment is operational then degradation of the radio system will normally be noticed if there is any structural changes, therefore may be deemed less risk than equipment that is non operational and cannot be monitored in anyway

There may be agreements in place with tower and mast owners to inspect this additional equipment when they conduct their inspection of the tower or mast; this is acceptable provided that the frequency of inspection meets the requirements explained in this document.

If the tower or mast owner completes the inspection of the additional equipment, agreements or records should be kept to demonstrate compliance. There should also be a robust system in place to ensure any issues raised are resolved.

Where tower or mast owners are not inspecting the additional third party equipment it is for the equipment owner to arrange with the tower or mast owner to gain access in order to undertake the inspection. The tower or mast owner may ask for evidence of inspection at any time.

It is the responsibility of anyone conducting an inspection on a tower and identifying any safety issues or concerns with any third party equipment or equipment outside their original scope of work, to report it to the specific owner as soon as possible.

The owner of any equipment on a third party tower or mast owner's site should ensure that the equipment is inspected within the frequency periods described in this document; this may be completed internally or by third party agreements. A process should be in place to ensure:

- Adequate documentation is available to demonstrate the inspection taking place.
- Robust procedures in place to fix and repair any issues identified within suitable timescales based on the element of risk.
- There is an audit trail demonstrating compliance to this document for all equipment on third parties structures.

7 Completing the Inspection

Each company will have its own instructions to guide inspectors on what to cover for the type of mast or tower they are inspecting.

The person undertaking the inspection will use their competency to determine if the site passes its inspection and/or what issues are to be raised that need resolution. If there is any doubt then the issue will be escalated within the company, utilising the expertise of the overseeing or supervising person. If necessary a fully qualified structural engineer will be used for more detailed analysis.

A condition report should be completed for all inspections, which is sufficiently detailed to demonstrate that the site is structurally sound at the time of the inspection. It should include photographs to provide evidence of any issues raised.

All tower and mast owners should have a robust system in place for dealing with any issues or recommendations raised at the time of inspection, and an audit trail to demonstrate rectification. This should also include a process to deal with urgent health and safety issues identified at the time of inspection.

8 Use of Drones

The use of Drones for inspections is encouraged as reduces exposure to the higher risk activity of working at heights, however this must be balanced against the quality of the inspection required to ensure the structure is safe. Where drones are used this should be as part of an inspection regime which also includes tower climbing

All Drone pilots used for inspections must have the required levels of permission from the Civil Aviation Authority (CAA) and the required insurance.

An adequate risk assessment must be undertaken to ensure that the inspection undertaken by a Drone is suitable for the associated risks for the structure requiring the inspection. This risk assessment must take into account the following:-

- Location - exposure to elements, populated or rural areas, shared sites
- Risk to third parties if a failure occurred
- previous inspection records
- Type of structure, including height
- Any mandatory physical inspection requirements e.g. fall arrest systems
- Can Drones be flown in the location of the structure as defined by the pilots and companies CAA permissions

If it is deemed that the site is suitable for either interim or permanent Drone inspections as part of the companies Inspection regime, all photos taken by the Drone pilots must be reviewed by another person with the competency to oversee the photos. This will be to determine if the Drone pictures are suitable and sufficient as to identify any existing or potential structural defects, and to assess the condition of the structure.

The competent person will address any issues with the quality of the Drone inspection and initiate any corrective action required from assessing the inspection photos

9 Records

All tower and mast owners should also have a robust system in place for raising any significant issues identified at the inspection to any persons that may be affected by the finding, including third parties.

The primary records that should be kept include:

- Details of inspections, audits and reviews
- A fault history of the structure and remedial action taken.
- Maintenance Records
- Identification of similar structures to assist in identifying fault trends.
- Photographs of inspections.

Related MATS documents

- MATS Group Guidance Note GN-001 – Work at Height Training
- MATS Group Guidance Note GN-005 – Medical requirements for climbing masts and towers
- MATS Group Guidance Note GN-008 – Mast and Tower Rescue

The information in this document does not absolve contractors or suppliers from their responsibility to identify and comply with all relevant legislation, regulations and legal standards nor does it take precedence over laws, regulations and external standards