

Maintenance Recommendations for Flight Bros Structures

Flight Bros' structures are designed in accordance with AS 3995-1994, Design of Steel Lattice Towers and Masts. Appendix A of the Standard refers to maintenance and inspection and is reproduced below.

APPENDIX A MAINTENANCE AND INSPECTION (Informative)

A1 GENERAL The reliability of a structure depends on the quality of materials and construction, and the adequacy of maintenance provided after installation. This Appendix provides a general framework for maintenance and inspection.

A maintenance program will involve planned inspections and repairs during the life of the structure. Records should be kept of all inspections, modifications, facilities and equipment placement, and repairs carried out.

A2 SCOPE OF MAINTENANCE INSPECTION The scope of maintenance and inspection should cover all aspects that are relevant to the maintenance of structural integrity, and to the servicability of the structure and its communications functions. The inspections should cover, as far as possible, the following:

- (a) Loose or missing bolts
- (b) Fatigue cracking
- (c) Damage from structural overload
- (d) Vandalism (including rifle damage)
- (e) Corrosion of galvanised steelwork
- (f) Degradation of paint systems
- (g) Vibration
- (h) Lightning damage
- (i) Foundation deterioration and cracking
- (j) Loose or damaged guy wires and fittings
- (k) Ground surface erosion
- (l) Evidence of soil creep or landslides
- (m) Settlement

- (n) Earthing integrity
- (o) Auxiliary antennas, mountings and feed systems
- (p) Maintenance of safety facilities
- (q) Site security
- (r) Guyed mast verticality and twist
- (s) Navigation lighting
- (t) Condition of insulators

A3 MAINTENANCE INSPECTION FREQUENCY The inspection intervals need to be tuned to the operational environment and structural/service functional needs. Structures that have known vibrational problems, or are in a very corrosive environment, or are in a very windy or ice environment may need more frequent inspections.

The interval between maintenance inspections in particular will depend on factors such as:-

- (a) corrosion potential of the environment and the degree of protection required for maintenance of design reliability;
- (b) importance of the structure to its service;
- (c) severity of local conditions (i.e. wind, ice);
- (d) sensitivity to structural response; and
- (e) influence of ground conditions.

It is recommended that the interval between inspections should be between two and five years according to the relative importance of the above factors.

A4 SCHEDULED MAINTENANCE AND REPAIRS Maintenance and repair tasks should be undertaken by experienced crews with the appropriate equipment. The replacement of any structural members should be approached with caution and an engineering valuation (*sic: should be "evaluation"*) may be necessary before work commences.

On guyed masts, variation in guy tensions may be critical to the performance of the facility. Where inelastic construction stretch is not removed from guys prior to installation, it may be necessary that retensioning be undertaken at the end of 12 to 18 months after construction. Guy tensions should be maintained to within $\pm 5\%$ of the design values.

A5 ELECTRICAL HAZARDS Maintenance crews should be aware of any electrical hazards, particularly radiation, while undertaking work on communication structures. Advice on these aspects should be sought from the site owner and referenced to AS 2772.

Manufacturer's Recommendations

As manufacturer of the structure, Flight Bros makes the following additional recommendations:

1. Particular attention should be paid to the following aspects
 - 1.1. examine the point where any steelwork enters concrete for corrosion of the steel, cracking of the concrete or indications of water ingress.
 - 1.2. examine the soil around footings to identify lifting or pull out.
 - 1.3. inspection of the fall arrest system in accordance with the manufacturer's instructions and stamping the compliance plate.
 - 1.4. inspection of all accessible drain holes in members to ensure none are blocked.
2. Loadings on a structure should not be increased or rearranged without engineering assessment. This includes larger antennas, additional antennas, relocated antennas, larger diameter cabling, additional cabling and or changes to mounts or other ancillaries. Flight Bros recommends the opportunity be taken as part of the inspection to perform a detailed survey of all the loads on the structure so that a comparison with previous inspections will reveal any changes.
3. Flight Bros also stresses the desirability of guyed masts being straightened and the guys retensioned 12 months after the mast is erected. Where a guyed mast is part of a microwave link, where deflection is an issue, or on sites where the foundation material is subject to significant settlement, it may be necessary to check guy pretensions on a regular basis to ensure that the link continues to function in high winds.
4. All inspection and maintenance work needs to be performed by suitably qualified and equipped riggers. Retensioning guys and straightening masts in particular requires high levels of skill and should not be attempted without the correct equipment.