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ANTI CLIMBING DEVICES FOR OVERHEAD LINES

PURPOSE AND SCOPE

This document forms part of a suite of documents which define National Grid's functional and performance requirements for new plant and equipment.

This specification defines the requirements for Anti-Climbing devices for lattice steel towers and should be read in conjunction with PS (T) 018 and TGN (E) 194. This specification aligns with Energy Networks Association Technical Specification 43-90 but gives additional information specific to large lattice towers. For other tower designs reference shall be made to Electricity Network Investment - Asset Policy.

PART 1 – PROCEDURAL

1 GENERAL REQUIREMENTS

There are three types of ACD to be found on National Grid towers. The type fitted will be dependant on tower type, height, leg extensions and location.

- a) Type A Wrap-Around – Type A is wrapped wholly around the tower body and does not contain any End Frame (Half Moon units) as shown in Appendix A.
- b) Type B Single Leg – Type B is wrapped around the individual legs of the tower as shown in Appendix A.
- c) Enhanced - This may be Type A, Type B or a combination of both. Enhanced ACD's shall have close wrapped barbed wire at all corner support brackets as shown in Appendix B. If multiple devices are present on the tower at least one shall be fitted with close wrapped barbed wire at all corner support brackets. In exceptional circumstances, where persistent attempts to access the towers have been made, one off devices may be commissioned under agreement with a National Grid Overhead Line Engineer. This can include but is not limited to the use of anti-climbing paint and temporary step bolts, which when absent from the tower prevent objects from being inserted into the step bolt hole, but at the same time does not permit the necessary foothold required for unauthorised access.

The three types of ACD's that are installed on National Grid towers must be compliant with towers that have cellular installations.

The ACD shall be designed as low maintenance equipment, capable of withstanding corrosion, vibration and the expected mechanical loads and give a service life of more than 60 years.

1.1 Materials

Stainless Steel Barbed Wire should be manufactured to generally comply with BS 4102:1998. The minimum quality should be set against the following specification:

- d) Type: Shall be stainless steel barbed wire of two ply construction with stainless steel barbs spaced at 50mm.
- e) Presentation: Supplied in 100 m rolls and wound on wooden spools with polypropylene carrying handles.

- f) Wire/Barb Type: 1.95 - 2.00 mm Stainless Steel grade 304 (18% Chromium 8% Nickel). Produced in accordance with BS EN 10088-3.
- g) Tensile Strength: 600 - 750 N/mm

All steelwork, nuts, bolts and washers used shall conform to the requirements of TS 3.04.16.

The use of pressed steel for ACD fabrication is not permitted under any circumstance.

Wire ties to be 4" x 16g Stainless steel grade 304 Produced in accordance with BS EN 10088-3.

1.2 Anti-climbing Paint

If anti-climbing paint is to be applied to a tower then appropriate warning signs should be displayed to identify that anti-climbing paint has been applied to the tower steelwork. The warning signs must comply with current legislation.

There are several manufacturers of anti-climbing paint. No product or products are recommended but the anti-climbing paint used should be none hazardous with no risk to the environment and that the application of the paint complies with all relevant law and legislation.

1.3 Temporary Step Bolt System

This system will consist of 2 parts.

1.3.1 Temporary climbing step bolt

- a) General
 - (i) The step bolt shall be manufactured from BS3692 Grade 8.8 high tensile steel.
 - (ii) The diameter of the bolt shall be 16mm and covered with a suitable corrosion resistant coating.
 - (iii) The bolt must be suitable to be used with the current fall arrest equipment utilised on National Grid towers.
 - (iv) The bolt must be designed for quick installation into the tower attachment boss without requiring use of hand tools.

1.3.2 An attachment boss for the temporary stepbolt, which will be attached to the tower and remain in situ.

- a) General
 - (i) The attachment boss must be designed for easy installation to the tower using hand tools only.
 - (ii) The design should enable the tower attachment boss to be captive to the tower.
 - (iii) The tower attachment boss must both blank off the step bolt hole and inhibit unauthorised access.
 - (iv) The attachment boss must comply with EN795 Anchorages.

- (v) The attachment boss must be supplied with a suitable corrosion resistive coating.

b) Testing

The Step Bolt and attachment boss shall be type tested as follows:-

(i) Static Test

A static force of 6kN shall be applied, in the direction of use in service, for a minimum of 3 minutes, the step bolt and attachment point bracket shall carry the load without failing, some bending of the step bolt will be acceptable as long as there is no significant deformation.

(ii) Dynamic Test

This shall be carried out according to the principals set out in BS EN 364 section 5.5.2.

A solid mass of 100kg shall be joined via connectors, to BS EN 362, and a lanyard, BS EN 354, of length 2.00m +/- 50mm to the step bolt and attachment boss under test.

At a maximum of 300mm horizontally from the step bolt and attachment boss and by means of a quick release device, support the solid mass such that when released it will fall freely through 2.0m before the lanyard starts to arrest the fall. The solid mass shall be arrested, some bending of the step bolt will be acceptable.

The Dynamic test shall be carried out at both ambient temperature and at -10°C.

1.4 ACD Design Requirements

In order to comply with the Electricity Safety, Quality and Continuity Regulations 2002 the following design criteria shall be met.

- a) The ACD shall have gates fitted to each leg of the tower that, when open, shall be suitable for safe, unhindered access and egress to the tower leg for a linesman and the gate shall not be liable to inadvertent closing. The gate shall be capable of being locked by a National Grid approved device.
- b) Support members adjacent to the access gate of the ACD shall be capable of supporting a load of 1.5 kN.
- c) All Gate and End Frame (Half Moon) steelwork shall have close wrapped barbed wire as shown in Appendix B.
- d) The ACD shall not create any additional hazard to normal working including any additional hazard to a person falling from above.
- e) The ACD shall be capable of manual fitting to any leg of any National Grid tower, without the need to drill, modify or damage tower steelwork or protective coatings.
- f) The ACD shall not create a hazard to persons or animals at ground level adjacent to the tower leg.
- g) The ACD shall be constructed in a position not less than 2.8 m and, normally, not more than 3.5 m from ground level at each support point. In exceptional