NPS/001/033 - Specification for Fixed Fall Arrest Systems for use on Telecommunication Towers

1. Purpose

The purpose of this document is to define Northern Powergrid's functional and performance requirements for the installation of Fixed Fall Arrest Systems onto telecommunication towers.

This document supersedes the following documents, all copies of which should be destroyed;

Document Reference	Document Title	Version	Published Date
NPS/001/033	Specification for Fixed Fall Arrest Systems for use on Telecommunication Towers	1.0	February 2017

2. Scope

This document applies to the design and installation of fixed fall arrest systems onto both existing and new telecommunication towers.

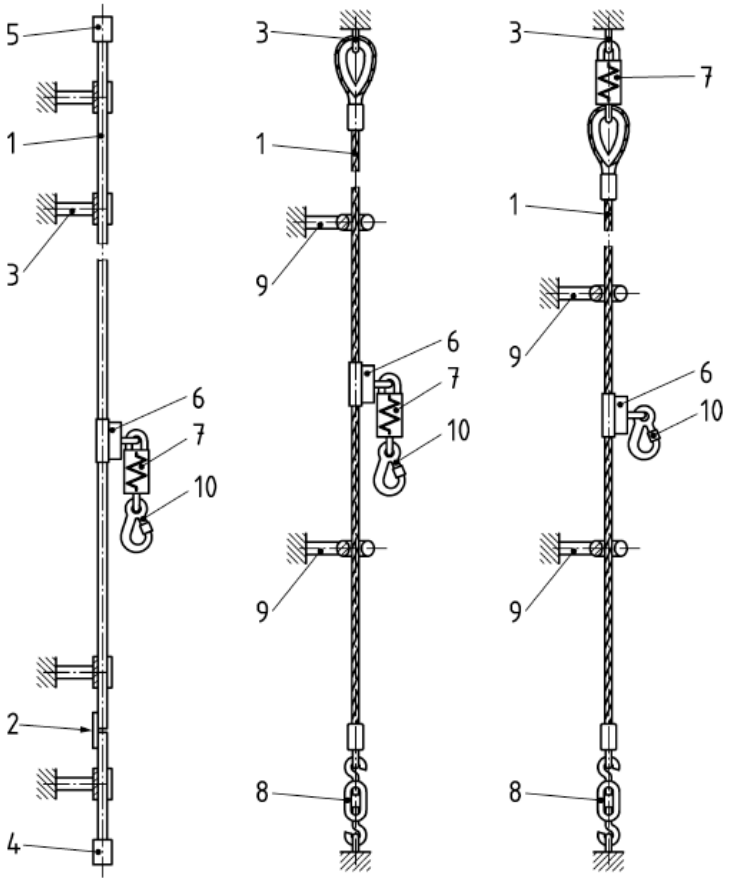
A fixed fall arrest system is a supplementary safety device which provides fall arrest for telecommunication engineers and riggers whilst climbing the towers designated climbing system. The fixed fall arrest attachment system may be either a Rigid Rail or Rigid Wire vertical fall arrest system designed for retrofit onto existing vertical round or square rung fixed ladder systems.

2.1. Table of Contents

3. Technical Requirements

The fixed fall arrest attachment system shall be vertical fall arrest system designed in accordance with BS EN 353-2:2014 – Figure 1 type (a) Rigid Rail system or type (b) Rigid Wire Rope anchor line for retrofit onto a centrally located ladder systems comprising of vertical round or square rung fixed ladder systems which provide access to work platform located at key locations on the structure or to the top of the tower structure itself.

Systems will generally comprise of the following:-



a) Example of a rigid anchor line made of rail

b) Examples of a rigid anchor line made of wire rope

Key

1	rigid anchor line	4	stop type A or B	7	energy dissipating element
2	joint	5	stop type A	8	tensioner
3	bracket	6	guided type fall arrester	9	guiding bracket
				10	connecting element

Figure 1 — Examples of guided type fall arresters including rigid anchor lines

Note

Figure 1 above taken directly from BS EN 353-2:2014

Top Anchors – Bracket or "Stop Type A" installed at the top of the fall arrest system onto the top ladder rung or adjacent ladder stringer.

Coil Energy Absorber – Constant force energy absorber (attached to the top anchor of a rigid wire system or the connecting element between the guided type fall arrester and the climbers harness) designed to ensure that the load applied back to the structure and the climber in the event of a fall is limited to a maximum of 6kN. The supplied unit shall be designed to accommodate a minimum load of 200kg (the load nominally assigned to two simultaneous climbers). Additionally in the case of a wire rope system this unit shall be supplied complete with a red fluorescent indicator showing if a fall has occurred on this system.

Intermediate or Guiding Bracket - Brackets that support the Rigid Anchor Line, ensuring the correct stand-off distance from the structure is maintained. The spacing of the intermediate brackets is dependent on the height and location of the tower. However typically these will be installed every 4m or (3m in areas of high wind loading)

Bottom Anchors – also known as bottom brackets or "Stop Type A or B" which in the case of a wire rope system provide a swage-free system termination and an integral tensioning device. (Normally also includes an indicator disc which will spin freely if the system is at the correct tension. Or in the case of a Rigid rail System the "Stop Type A or B" brackets are used to terminate the rigid rail system and prevent the guided fall arrester from unintentionally passing a specific point or becoming detached from the rigid rail. Where stop devices are designed to be opened they shall be so designed so such that they can only be operated by deliberate manual action, shall be self-closing and not be removable from the rigid anchor line.

Rigid Anchor Line – is a Rigid Rail or Tensioned Wire Rope fixed at both extremities and where fitted, any terminations, brackets, joints, connectors, energy dissipating elements, tensioning elements and stop devices, intended for use with a guided type fall arrester. In the case of a wire rope then this is a factory tested and certified tensioned stainless steel rope with a minimum nominal diameter of 8mm and fixed between the top and bottom anchors.

Guided type fall arrestor / Ladder latch unit – Removable device with a self-locking function used to secure the climber to the Rigid Anchor Line via a chest D ring, which allows free movement up and down the structure but locks automatically on the anchor line when a fall occurs. The device shall only be detachable by at least two consecutive deliberate manual actions.

3.1. General Requirements - Procedural

All systems shall be CE marked, designed and tested in accordance with BS EN 353 – 14 "*Personal Fall Protection equipment – Guided type fall arrestors including an Anchor Line*".

3.2. Life Cycle and Maintenance Costs

The fall arrest system shall be designed to provide a minimum service life of 20 years with minimal life cycle costs over that period. The manufacturer shall complete Appendix 2 stating recommended pre-commissioning testing requirements, Routine Inspection and maintenance recommendations for their proposed system taking into account the specific environment in which it will be installed. In addition this shall also include a list of any replacement requirements for each aspect of their system in order to achieve this service life. Ideally the system shall be required to provide a minimum guaranteed maintenance free life exceeding 20 years in all environmental conditions.

Notwithstanding the above requirement to provide inspection recommendations, at present it is planned that all sites will have their fixed fall arrest system inspected annually.

3.3. Design Requirements

The fall arrest system shall be designed to withstand all environmental loadings including wind and ice and loadings imposed by personnel during climbing operations. The wind and ice loading shall be assessed in accordance with BSEN 50341-2-9 (UK NNA) using a maximum basic mean hourly wind speed of 25m/s. The partial load factor (Gamma v) to be used shall be taken as 1.2 and the altitude as 250m. The strength factor shall be taken as 1.15. Site specific calculations shall be produced for altitudes above 250m and support bracket spacing adjusted accordingly where required.

The supplier shall submit to Northern Powergrid upon request any design calculations to prove that the system is adequately designed and that the proposed support bracket spacing is suitable for the loading imposed on the system.

3.4. Testing

The supplier shall carry out testing in accordance with BSEN 353-1: 2014 Table 1 and clause 5 and in addition any tests applicable to the service performance of the fall arrest system components. These shall encompass vibration due to wind in both regimes of low amplitude with high frequency (Aeolian vibration) and high amplitude with low frequency (galloping). The amplitude and number of cycles in the test setup shall be agreed with Northern Powergrid. The fall arrest system shall be tested to provide a minimum mechanical rating of 200kg (assumed to match the simultaneous fall of 2 men) without any failure or damage to the components.

3.5. Performance Requirements

The fixed fall arrest system shall be designed for Installation with the services live on the tower as the radiation risk is low whilst in the central structure of the tower. The inherent hazards of the transmitting equipment located on the towers shall be overcome when installing the equipment. Proposed installation methods shall be submitted for approval by Northern Powergrid before any activity is undertaken.

Note

Towers with a source of high radiation exposure should be identified by the climbing team and the appropriate precautions taken before climbing starts. In accordance with the Northern Powergrid telecoms code of practice, Radiation badges/detectors will be worn by climbing teams.

The system design shall allow for the tensioning of any the wire rope systems to be carried out entirely from the bottom of the fixed fall arrest system.

The system shall enable a continuous climb from bottom to top without the requirement to detach the guided type fall arrestor from the rigid anchor line when it passes over guiding brackets. The guided type fall arrestor shall be provided with an anti-inversion mechanism to prohibit the device from being connected to the rigid anchor line upside down.

Where wire rope systems are offered, the system shall be designed to incorporate visual indicators which can be checked prior to climbing to enable a visual assessment confirming that the system is in a suitable condition to climb.

The system shall permit up to 2 persons to climb simultaneously and shall be able to sustain a 200kg or 2 man simultaneous fall with no damage to the tower. Appropriate signage indicating the climbing capability of the system shall be supplied and affixed adjacent to the bottom fixing anchor.

3.6. Precautions Against Unauthorised Access

All systems shall be designed to allow climbers to attach to the fixed fall arrest system from ground level. However in no way should this requirement interfere with the requirement for all telecoms towers to be fitted with ACD systems that prevent unauthorised climbing of the tower.

The materials used in the manufacture of the components of the climbing system shall be designed so as not to attract the acts of vandalism and theft and compromising safety of the public and personnel.

Note

Due to the strategic importance of telecommunication towers and masts to the network operations within Northern Powergrid it shall normally be a requirement for sites to be only accessed through a system of supervised access.

3.7. Wear, Corrosion or erosion from Vibration

The fixed fall arrest system components shall be demonstrated to withstand all loading conditions including the dynamic effects due to rigid anchor line vibrations generated by wind and how this is controlled by the support brackets. Intermediate supports shall be proven by test not to cause fretting of wire strands through normal operational use or from wind induced cable motion.

Materials in direct contact with the tower steelwork shall be of a similar grade steel and have similar corrosion protection to that of the tower steelwork or shall be electrically isolated from tower steelwork to prevent galvanic corrosion from dissimilar materials. The tower shall not act as a sacrificial anode with respect to the mating components of the system.

3.8. Marking

Marking on the guided type fall arrestor and the rigid anchor line shall conform to BS EN 353-2:2014 and BSEN 365.

3.9. Installation and Instructions for Use

In accordance with the requirements of Appendix 2 the Manufacturers/Installers shall include advice on correct installation and the instruction for use of the system as detailed in BS EN 353-1:2014 clause 7.2 and 7.3.

3.10. Training requirements for Access to Northern Powergrid Sites

It shall be the responsibility of the successful installation company to both provide and maintain levels of training and certification throughout the term of the contract that satisfies the Northern Powergrid Telecommunication Tower access requirements.

4. References

The products described within this specification shall comply with all current versions of the relevant International Standards and British Standard Specifications current at the time of supply.

4.1. External Documentation

Reference	Title
BSEN 353-1:2014	Personal Fall Protection equipment – Guided type fall arrestors including an Anchor Line
BSEN 50341-2-9 :2015	Overhead electrical lines exceeding AC 1 kV. National Normative Aspects (NNA) for Great Britain and Northern Ireland (based on EN 50341-1:2012)
BSEN 365	Personal protective equipment against falls from a height — General requirements for instructions for use, maintenance, periodic examination, repair, marking and packaging

4.2. Internal Documentation

Reference	Title
None	

4.3. Amendments from Previous Version

Reference	Title
Whole Document	Updated to current CDS Document Template, incl. Information Classification
Whole Document	Document reviewed - no update or content change required – Republished as version 1.1 with a new 3 year review period set

5. Definitions

Reference	Title
None	

6. Authority for issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Dan Rodrigues	CDS Administrator	02/02/2017

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period;

Standard CDS review of 3 years?	Non Standard Review Period & Reason	
Yes	**Period:** n/a	**Reason:** n/a
Should this document be displayed on the Northern Powergrid external website?		Yes
		Date
Ged Hammel	Senior Policy & Standards Engineer	08/02/2017

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Andrew Boughton	Telecoms Project Engineer	07/02/2017
Mark Taylor	Telecoms Lead Operations Engineer	09/02/2017
Steve Williams	Telecoms Operations Delivery Team Leader	09/02/2017
Mike Storey	Operations Assurance Manager, Safety, Health & Environment	02/02/2017

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
David Gazda	Senior Policy & Standards Manager	02/02/2017

This document has been reviewed and republished with no content change, other than formatting

Appendix 1 – Pricing Schedule

See the invitation to tender document associated with this specification.

Appendix 2 – Pre-commission Testing, Routine Inspection and Maintenance Recommendations

Suppliers shall provide:

a) Anticipated service life of proposed system including any limitations or recommended modifications likely to improve the service life for systems installed in aggressive service conditions e.g. within 5 miles of the coast, high pollution areas or increase elevation areas. (see Clause 3.2).
b) Recommended Minimum guaranteed maintenance free life expectancy, including details of any life cycle costs i.e. any interim components replacement or procedures that need to be carried out (including costs) to achieve the system service life. (see clause 3.2).
c) details of all installation requirements
d) details of the recommended pre-commission testing and inspection required.
e) details of periodic inspection and maintenance requirements to be undertaken during the lifetime of the system including the provision of any necessary drawings or instructions and associated parts lists for the installation, pre-commission testing and inspection and maintenance.

Appendix 3 – Test Certification details

The following information shall be provided by the supplier for technical review by Northern Powergrid. Additional information shall be provided if requested.

Details of testing carried out in accordance with BSEN 353-1-2014		Report Name / Ref	Provided (Y / N)
Clause 5.1	General examination of material and construction		
Clause 5.2	Static Strength		
Clause 5.3	Dynamic performance and function tests		
Clause 5.4	Corrosion resistance		
Clause 6	Marking		

Appendix 4 – Technical Information Check List

The following information shall be provided by the supplier for technical review by Northern Powergrid. Additional information shall be provided if requested.

Requirement	Provided (Y / N)
Appendix 1 – copy of pricing schedule template populated with description of service or item and related costs	
Appendix 2 – Details of required anticipated service life, together with inspection and maintenance requirements.	
Appendix 3 – Completed schedule of testing carried out	
Complete set of drawings for all fittings proposed to satisfy this specification	
Sample method statements – detailing how these installations would be carried out safely	
Declaration on technical non-conformances to this specification	