NSP/007/025 – Guidance on Substation Design: Working at Height

1. Purpose

The purpose of this document is to provide guidance on design of Primary and Supply Point substations in order to comply with the requirements of the Work at Height Regulations (2005). It has been prepared to satisfy the requirements of Electricity Safety Quality and Continuity Regulations 2006.

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

Reference	Version	Date	Title
NSP/007/025	2.0	March 2018	Guidance on Substation Design: Working at Height

2. Scope

This document applies to all Primary and Supply Point substations constructed on the Northern Powergrid network.

2.1. Table of Contents

3. Working At Height - Design Principles

3.1. General

Substation design should ensure that wherever possible, construction, operation and maintenance activities can be undertaken without the need to work at height. Where this is not possible the design must allow this work to be undertaken safely.

Fixed arrangements must be provided to allow all routine switching operations to be performed without the need for temporary access equipment. Where other operational activity requires the use of mobile or portable access equipment, sufficient electrical and mechanical clearance shall be provided to allow this equipment to be used safely.

All stairs, steps, fixed ladders and walkways shall be designed in accordance with BS5395-3 Part 3 and with reference to the Building Regulations (2010) Sections K1 – K3.

3.2. Basements, Cable Trenches and Underground Chambers

Where it is not possible to avoid the use of basements, trenches and chambers these should be designed to be as shallow as is possible within the necessary functional requirements.

All vertical drops must be protected by safety guard-rails or secure covers to prevent danger.

Entry into basements, trenches or chambers shall be via steps with hand rails or where this is impractical, by fixed ladder.

Fixed ladders shall be fitted with safety hoops where a fall would otherwise result in injury. Hand rails shall be provided at the top to allow safe landing and a hatch or gate shall be provided to guard the open drop.

The design of basements, trenches or chambers must also consider the Confined Spaces Confined Space Regulations: HSE ACOP L101 and Substation Design Guidance Document NSP/007/026 Confined Spaces.

3.3. Substation Buildings

Buildings shall be designed to minimise the need to work at height wherever possible. They should be no taller than required to meet operational functionality and the relevant building regulations. Maintenance-free materials should be employed wherever possible. Fragile roof materials shall not be used. Steps, walkways and loading bays shall be fitted with hand rails where the height above ground level exceeds 380mm. Interior lighting shall be wall mounted where possible and ceiling lights should be mounted at the lowest level commensurate with good design practice.

3.4. High Level Structures

Where access is necessary to the top of high-level structures for operational or maintenance purposes, a safe means of access shall be incorporated. Where this is by fixed ladder it shall be fitted with safety hoops and a fixed fall-arrestor rail. Handrails shall be provided at the top to allow safe landing. The lower end of the fixed ladder shall terminate 2m above ground level and shall be fitted with a lockable anti-climbing gate. Where access is necessary along the top of the structure, a walkway or fall arrester rail system shall be provided.

Where it is intended that access will be provided by mobile elevating work platform (MEWP) or other portable access system, the substation shall incorporate adequate access and sufficient electrical and mechanical clearance to allow these methods to be used safely.

3.5. External Lighting

External lighting shall wherever possible be designed to avoid the need to work at height. Lighting columns should normally be of a folding design that can be maintained from ground level. Where ladders are necessary to gain access to light fittings, ladder lashing points shall be provided.

Where larger high level lighting columns are necessary they shall fulfil one of the following requirements:

- Be capable of being maintained from ground level
- Have a safe fixed access arrangement such as by a fixed ladder in compliance with BS5395-3 Part 3.

3.6. Plant and Switchgear

Plant and switchgear should be selected to enable all routine operational activities to be undertaken from ground level. These activities should include switching and inspection activities and relay interrogations including draining gas from Buchholz relays.

Where routine switching and inspection activities require access above ground level, steps and access platforms shall be provided. These shall be equipped with handrails where the height above ground level exceeds 380mm.

Access for maintenance shall be considered during substation design. Where scaffolds will be used, sufficient physical and electrical clearance shall be provided to allow the scaffold to be brought onto site and erected.

Where routine access will be required to the top of a transformer tank or the roof of a transformer sound-proofed enclosure (SPE), anchor points for inertial reel fall arrestors shall be provided

4. References

4.1. External Documentation

Reference	Title
	Electricity Safety Quality and Continuity Regulations 2006
	Work at Height Regulations (2005)
	Building Regulations (2010)
BS 5395-3	Stairs, ladders and walkways. Part3: Code of Practice for the design of industrial type stairs permanent ladders and walkways.
HSE ACOP L101	Confined Spaces Confined Space Regulations: HSE ACOP L101

4.2. Internal Documentation

Reference	Title
NSP/007/026	Design Guidance Document: Confined Spaces.

4.3. Amendments from Previous Version

Reference	Description
	Doc Review

5. Definitions

Reference	Definition
Na/	n/a

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
Liz Beat	Governance Administrator	25/03/2024

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
Mark Thompson	Specification & Design Manager	28/03/2024

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
Steve Duck	Operations Manager	02/04/2024

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Dave Sillito	Head of Major Projects	09/04/2024