

PR-NET-OSM-060



MANAGEMENT OF TELECOMS WORK ON OVERHEAD LINES

OPERATIONAL SAFETY MANUAL - SECTION 7.3



PR-NET-OSM-060	Management of Telecoms Work on Overhead Lines - Operational Safety Manual - Section 7.3		Applies to	
			Distribution ✓	Transmission
Revision: 1.00	Classification: Public	Issue Date: March 2023	Review Date: March 2028	

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1 Introduction

- 1.1 **SSEN-D** proactively supports the utilisation of its assets to provide site solutions for **External Sharers** use.
- 1.2 Telecommunications companies such as mobile phone operators are willing to site share on existing **SSEN-D** telecoms masts or construct their own mast structures on **SSEN-D** property, such as within a substation boundary.
- 1.3 The utilisation of existing structures such as **High Voltage** overhead tower lines and rooftops on existing substation buildings offer an attractive solution to these companies and planning authorities who are under increasing pressure to ensure that existing structures, rather than new free-standing masts, are used for leasing opportunities.
- 1.4 **SSEN-D** have landlord responsibilities to ensure the safety management of all **Telecoms Operatives** visiting **SSEN-D** sites. This document sets out how operational safety is maintained from the **System** to ensure that as far as reasonably practicable, all persons visiting sites work in accordance with **SSEN-D** requirements and are safe from the hazards encountered with working in such a hazardous environment.

2 Scope

- 2.1 This document is in addition to the **Operational Safety Rules** and applies to all **SSEN-D** owned/operated overhead line, tower and structure assets, and its requirements **Shall** be followed by all **SSEN-D** employees, contractors working for **SSEN-D** and contractors working on **SSEN-D** owned or managed sites.
- 2.2 It is designed to ensure that following appropriate risk assessment, all Telecoms work on **High Voltage** overhead lines, towers and structures is undertaken safely, with correct equipment and PPE, and in compliance with the relevant rules and **Approved** procedures.
- 2.3 It also defines the operational considerations, safety procedures and associated responsibilities necessary to ensure the safe authorisation of work by all **Telecoms Operatives** that carry out work on **SSEN-D** property for which **SSEN-D** have management responsibility, in accordance with **SSEN-D** rules and procedures.
- 2.4 Adequate consideration and assessment **Shall** be made to ensure that the **Telecoms Operatives** are **Competent** to carry out their work safely and that they have adequate safety management procedures in place prior to being granted safe access.
- 2.5 All **Telecoms Operatives** **Shall** be made aware of the **Dangers** and risks of working in the vicinity of overhead lines and **Shall** adequately demonstrate their clear understanding of the strict limitations imposed on their activities dictated by **SSEN-D** procedures and their responsibilities including the reporting of safety and environmental incidents.

3 References

The documents detailed in Table 3.1 - Scottish and Southern Electricity Networks Documents, and Table 3.2 - External Documents, should be used in conjunction with this document.

Table 3.1 - Scottish and Southern Electricity Networks Documents

Reference	Title
PR-NET-OSM-006	SSEN Distribution Operational Safety Rules – Operational Safety Manual – Section 1.1
PR-NET-OSM-028	Switching Terminology and Approved Abbreviations - Operational Safety Manual - Section 4.4
PR-NET-OSM-040	Use and Completion of Operational Documents - Operational Safety Manual - Section 5.2



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Reference	Title
PR-NET-OSM-059	Management of Work and Access to Towers - Operational Safety Manual - Section 7.2
PR-NET-OSM-043	Access to Substations and Switching Sites - Operational Safety Manual - Section 6.1
WI-NET-OSM-002	Personal Protective equipment and Workwear for Live Environments
N/A	SSEN SHE Handbook (Held in Safety, Health and Wellbeing SharePoint Site)

Table 3.2 - External Documents

Reference	Title
EAWR	Electricity at Work Regulations 1989 (as amended)
CDM	Construction, Design & Management Regulations 2015 (as amended)
ESQCR	Electricity Safety Quality and Continuity Regulations 2002 (as amended)
ENA Engineering Recommendation G78	Recommendations for Low Voltage Supplies to Mobile Phone Base Stations with Antennae on High Voltage Structures

4 Definitions

- 4.1 The words printed in bold text within this document are either headings or definitions. Definitions used within this **Approved** Procedure are defined within the list presented immediately below, or within Section 2 of the **Operational Safety Rules**.
- 4.2 **Circuit Identification Flags**
Flags of an **Approved** type with a base which **Shall** only fit the corresponding bracket fitted to the associated tower leg, usually carrying the unique colour and symbol of the tower circuit.
- 4.3 **External Sharers**
All external companies who **SSEN-D** enter into an agreement with, who either share on an existing **SSEN-D** telecoms mast or construct their own mast structure on **SSEN-D** property.
- 4.4 **Longitudinal Face**
Both of the opposite faces on a steel tower which are parallel to the line of **Conductors**.
- 4.5 **Mobile Work Equipment**
Mobile items of equipment which are used to carry out work. They might include cranes, vehicles and Mobile Elevating Working Platforms (MEWPs). They also include any vehicles having buckets on movable arms and vertical rising platforms whether self-powered or not.
- 4.6 **Operational Incident**
An incident involving work or testing on or near the **System** that results in the infringement of **Safety Distance**, electrical flashover, or any erroneous operation on the **System**.
- 4.7 **Operational Safety Rules (OSR)**
The **SSEN-D** Distribution set of rules, as read with related documents and procedures, that provide generic safe systems of work on the **System** therefore ensuring the health and safety of all who are liable to be affected by any **Danger** that might arise from the **System**.
- 4.8 **Pennant**
Approved flag type device of red colouring which when attached to a tower or structure conveys a specific warning (detailed in the text).

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4.9 Safe Climbing Level

Where applicable, the vertical height, usually marked on the tower leg, up to which it is safe to climb on the outside step bolts. On 132kV towers, this height is usually indicated by a plate fixed to each climbing leg 15 ft (3.5m) below the line of the bottom set of **Conductors**.

4.10 Telecommunication Activities

All activities carried out by **Telecoms Operatives** who visit **SSEN-D** property under which **SSEN-D** have a site management responsibility.

4.11 Telecommunications Isolation Record Sheet

This sheet provides written confirmation that telecommunications equipment fitted to a tower has been Isolated.

4.12 Transverse Face

Both of the opposite faces on a steel tower which are perpendicular to the line of **Conductors** and are therefore positioned at a greater distance from the **Conductors** than the **Longitudinal Faces**.

4.13 Telecoms Operative

Parties who access **SSEN-D** property, under which **SSEN-D** have management responsibility, to carry out **Telecommunication Activities**. This **Shall** encompass both mobile phone operators, telecommunication owners and all the agents and contractors working on their behalf. This also includes **SSEN-D** staff and their contractors.

4.14 Wristlets

Items which carry the unique colours of a specific tower circuit. Issued to **Working Party** members as a visual reminder of the tower line which has been made safe for work. The unique colours match those on the **Circuit Identification Flags** for the respective tower circuit.

5 Identification

Apparatus associated with the overhead tower line on which work, or testing is to be carried out, **Shall** be readily identifiable and have fixed to it, a means of identification that **Shall** remain effective throughout the course of the work.

6 Personal Protective Equipment

6.1 Persons who are required to work or carry out work on or near the **System Shall** wear suitably **Approved** Personal Protective Equipment (PPE). Furthermore, where warning labels or signs identify the existence of a particular hazard, additional and appropriate PPE **Shall** be worn.

6.2 As a minimum, PPE **Shall** meet the requirements of WI-NET-OSM-002.

7 Dangers

The main **Dangers** to personnel when undertaking **Telecommunications Activities** in proximity to the **High Voltage System** are electric shock, burns or falls arising from:

- Inadequate precautions taken to control induced voltages from other adjacent **Live Apparatus**

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- Proximity of a lightning storm
- Incorrect use of climbing aids and associated PPE
- Inadvertent contact with **Live Apparatus** due to **Safety Distances** not being observed
- Exposure to Radio Frequency (RF) Radiation radiating from telecommunication equipment
- Damage to **Live High Voltage Apparatus** such as underground cables
- Exposure to large touch & step potentials arising from a Rise of Earth Potential (ROEP) event

8 Erection of Telecommunication Equipment on SSEN-D Steel Towers adjacent to Live Conductors

8.1 Scope

- 8.1.1 This document provides guidance on the safe installation of telecommunication equipment on **High Voltage** overhead tower lines with adjacent circuits **Live**.
- 8.1.2 This section addresses the requirements associated with the installation of specialist telecommunications equipment on the tower but does not address the technical requirements of the insulated platform at the base of the tower on which the telecommunications operator's equipment is mounted, however, the general requirements for health and safety apply to both.
- 8.1.3 The technical requirements and arrangements by which electricity supplies are provided to the site is not included within this document. This information is detailed in the Energy Networks Association Engineering Recommendation G78 and other information prepared by and made available from **SSEN-D**.

8.2 General Responsibilities

8.2.1 SSEN-D Project Manager

The **SSEN-D** Project Manager **Shall**:

- Deal with enquiries in accordance with the Multiple Site Agreement, including assessing the tower's suitability for mounting antennae and providing guidance on the positioning of third-party equipment
- Ensure that all technical assessments have been completed prior to legal agreement and provide advice and recommendations to others on the findings
- Ensure that, as far as reasonably practicable, adequate consideration is given to the implications of the design on the health and safety of **SSEN-D** staff and their contractors
- During the project planning stage, ensure that all the necessary arrangements for health and safety as outlined in this document are in place
- Ensure that **Telecoms Operatives** are provided with appropriate information and guidance relating to site specific hazards and **SSEN-D** requirements for health and safety
- Assess the contractor's safety documentation and as far as reasonably practicable, ensure that appropriate arrangements for health and safety have been made in line with **SSEN-D** standards

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- Allow only trained, Competent and experienced personnel to access **SSEN-D** towers for this work activity
- Ensure that a safe system of access is provided to allow personnel to access towers with Radio Frequency antennae mounted.
- Ensure adequate access arrangements are in place with the landowner to protect the existing **SSEN-D** wayleave agreement.

8.2.2 Principal Contractor

The Principal Contractor **Shall**:

- Ensure that the installation is designed and built to Energy Networks Association Engineering Recommendation G78 and **SSEN-D** requirements
- Complete the proposed works to the design and specification set out in the contract documents
- Carry out the works with due regard for the welfare of site personnel, without putting at risk, their health and safety and that of others who might be affected by the project
- Adopt a Construction (Design and Management) Regulations (CDM) 2015 (as amended) approach to the management of health and safety reflecting industry best practice
- Ensure that the Construction Health & Safety Plan is implemented and maintained throughout the construction phase
- Manage activities in such a manner that the resultant environmental impact is reduced to a minimum and that all the relevant current environmental legislative requirements are met
- Submit a detailed work program to **SSEN-D** for approval
- Provide adequate notice so that circuit outages can be arranged.
- Provide risk assessments and method statements to **SSEN-D** for approval
- Provide all the necessary information in line with **SSEN-D** Access Procedures so that access can be managed safely
- Comply with **SSEN-D** Incident and Near Miss reporting procedures and all other requirements
- When necessary, plan for base station outages in accordance with the Telecommunication Operator's requirements to eliminate Radio Frequency hazards
- Inform the appropriate authorities or landowner on which the tower sits and gain consent prior to work commencing

8.2.3 Team Leader

The Team Leader responsible for the installation **Shall**:

- Provide the necessary level of supervision of personnel and works to ensure the safe operation of site works in accordance with industry standard working practices
- Consider the method statements, risk assessments and control measures specified to reduce risks and prevent harm from occurring
- Receive **Safety Documents** where relevant from **SSEN-D** and ensure that the responsibilities as **Safety Document** holder are applied in accordance with **SSEN-D Operational Safety Rules** and **Approved** procedures.
- Comply with the requirements of the Construction, Design & Management Regulations 2015 (as amended).

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- Identify and evaluate local hazards and where they are found to be significant, undertake a local risk assessment, specifying and implementing appropriate control measures.
- Co-ordinate all site activities including those of the Client and others that might affect the health and safety of persons on site.
- Conform to any special requirements requested by the landowner or relevant authority.

8.3 Suitable Tower Types and the Safe Positioning of Equipment

Tower Suitability

- 8.3.1 **SSEN-D** towers encompass a variety of different specifications operating at up to 132kV, however not all of these tower types are suitable for telecommunication purposes. Before a tower design or specification can be **Approved** as being suitable for use, a design study **Shall** be completed which examines the availability of safe **Working and Access Clearances** to all the **Conductor** positions, ensuring that the minimum **Safety Distance** relevant to the operating voltage can be achieved at all times for the scope of work intended. This **Shall** also consider the objects being handled.
- 8.3.2 The majority of tower specifications found throughout **SSEN-D** that are suitable for use are listed in Table 8.1 with some additional information added indicating the relevant tower type that should be utilised for each particular specification.
- 8.3.3 As a general rule, 33kV and 66kV tower designs are not suitable for mounting telecommunications equipment due to their smaller physical size and therefore, having insufficient **Working and Access Clearance** available for a safe installation. Other tower specifications not included in Table 8.1, may be considered for use and may only be utilised after the appropriate tower design drawings, such as the specific line clearance diagrams, have been examined as part of the design assessment. All potential tower installations **Shall** be assessed as to their suitability for **External Sharer** use.
- 8.3.4 Having assessed the suitability of the tower design or specification, further consideration **Shall** be given to the type of telecommunications equipment that is proposed for installation. Generally, only suspension tower types associated with the range of specifications available in Table 8.1, are suitable for telecommunications equipment installation. Tension or angle towers are not normally utilised; however, they may be used under limited circumstances. Special structures such as tee-off towers, junction towers, terminal towers, or gantry towers are not suitable. The configuration of these towers is such that, there is insufficient safe **Working and Access Clearances** from the line **Conductors** to relative work positions on the tower body considering the objects being handled.

Positioning of Equipment

- 8.3.5 The **SSEN-D** preference is for the telecommunications equipment assembly to be positioned sufficiently below the **Conductors**. In limited cases such as those employed on large extension towers (angle or suspension types), where the required height for Radio Frequency planning purposes can be achieved at this level, this might be feasible. Consideration **Shall** be given to ensure that the equipment is located sufficiently below the **Conductors** considering the length of objects being handled.
- 8.3.6 On many occasions the desired location will be on the upper portion of the tower at or near the **Conductor** height. Stringent guidelines regarding the acceptable location of equipment have to be enforced due to the risks of working in proximity to **Conductors**.

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- 8.3.7 In order to maximise the safe **Working and Access Clearances** from **Live Conductors** and ensure that the installation and maintenance activities are undertaken as safely as possible, defined installation and safe zones of work on the upper portions of the tower structure for each tower specification **Shall** be established by the **Senior Authorised Person**. Areas of maximum clearance are listed in Table 8.1 as a guide.
- 8.3.8 In most cases, equipment **Shall** be placed on the upper portion of the tower located between the bottom and middle cross arm level on both the **Transverse Faces**. **No** equipment **Shall** be allowed to be placed on the Longitudinal Faces of the tower at any height. The angle of deflection (usually around 35°) makes allowance for insulator and **Conductor** movement under high wind conditions.
- 8.3.9 Usually, all the equipment is grouped together on the same assembly, however, under some circumstances, there might be a requirement to gain additional height for the dish position to achieve a clear line of sight to another location. Careful consideration **Shall** be given to ensure that the location and design of the dish and its support, **Shall** ensure that there are adequate **Working and Access Clearances**.
- 8.3.10 Consideration **Shall** also be given to how the dish is handled from within the tower body to the outside for fixing, as any closely knitted bracings might obstruct a 0.3m or 0.6m dish. A risk assessment **Shall** be undertaken to support the justification.

Table 8.1 - Maximum Line Clearances

Tower Specification	Tower Type	Clearance Measured	Drawing Reference	Area of Maximum Clearance	Notes
L132 (PL16) Blaw Knox Ref: K1124	D2S	2.5m	BK47/9000 & XM2092-11	Between bottom and middle crossarm	Insulator deflected at 45°
L132 (PL16) Blaw Knox Ref: K8323	D22	2.5m	BK47/9101 & XM1904-14	Between bottom and middle crossarm	Insulator deflected at 45°
L7C (1963)	D	2.7m	JE47/1250 E5142-159	Between bottom and middle crossarm	Insulator deflected at 35°
L4 (M) (1972)	D	2.4m	BK47/8400 & XM472-1	Between bottom and middle crossarm	Insulator deflected at 35°
L3 (1956)	DS	3.9m	BK47/8805 & XM2758-152	Between bottom and middle crossarm	Insulator deflected at 30°
L3 (1953)	D	3m	BK47/8801 & XM2758-8A	Around middle crossarm box	Insulator deflected at 30°
L2	D	2.9m	BK47/9202	Around either the middle or bottom crossarm	Insulator deflected at 35°
PL1	D2	2.5m	BK47/9950	Between bottom and middle crossarm	Insulator deflected at 45°
PL4	D2	2.6m	BK47/11100	Between bottom and middle crossarm	Insulator deflected at 45°

NOTE: Drawing numbers quoted include both National Grid and designer's (e.g. Blaw Knox or JLEve) references.

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8.4 Design of Mounting Assembly and Associated Equipment

- 8.4.1 Under normal working practices, the length of objects being handled on the upper portions of an overhead line tower carrying **Live Conductors** is restricted to small hand tools, no more than 0.5m in length. The typical length of the objects that are required to be handled when installing telecommunications equipment are in excess of this length.
- 8.4.2 A dispensation to this ruling has been agreed to allow the activity to be undertaken under **Live** circuit conditions, providing certain stipulations are met and that all work **Shall** be carried out in accordance with the **Approved** procedures set out in this document.
- 8.4.3 There is a restriction placed on the maximum length of any object which can be taken up the tower for this purpose and this has been set at 2.2m. This is governed by the antennae length which, by design, has to be a minimum length to achieve sufficient gain for radio performance requirements for all frequency bands of operation (GSM (4/5G), 900 & 1800 MHZ and UMTS 2100 MHZ). Usually, this type of installation is employed in rural areas where longer coverage, and hence greater gain is required.
- 8.4.4 The conditions of the dispensation are:
- Completion of a technical assessment
 - A detailed risk assessment and an **Approved** method statement
 - A Construction Health and Safety Plan has been developed and accepted
 - All staff are trained, competent and certified for this particular activity and hold the relevant documentation
 - There is sufficient provision made for safe access to the tower
 - Specific consideration is given to local site conditions at the time of installation
 - Rigging contractor is accredited by a certification authority recognised by **SSEN-D**
- 8.4.5 The dispensation **Shall** be **Approved** by the **Designated Engineer** and it **Shall** be subject to a review.
- 8.4.6 At the design stage, every opportunity **Shall** be made to restrict the length of the objects handled. Where large horizontal steelwork is required to be installed on the body of large extension towers, sections **Shall** be designed in a number of pieces and coupled together to reduce the risks.
- 8.4.7 Consideration **Shall** be given as to design of the mounting assembly and the associated position of equipment so that the risks are reduced during the installation and removal processes.
- 8.4.8 Consideration **Shall** be given to the access required by **SSEN-D** staff or its contract partners to the tower for their activities.
- 8.4.9 The Principal Contractor **Shall** ensure that the complete installation is designed and built to Energy Networks Association Engineering Recommendation G78 and **SSEN-D** requirements.
- 8.4.10 The following elements of the design of the tower installation are critical to ensure that any design proposal meets **SSEN-D** requirements:
- All equipment and respective support steelwork **Shall** be mounted on the **Transverse Faces** only. The design of the tower assembly **Shall** be such that no part **Shall** project beyond the tower leg, into the **Longitudinal Face** of the tower
 - **No** part of the assembly **Shall** exceed the length of 2.2m. which is the maximum length set by the dispensation. Where long horizontal members are required to bridge across a tower body section, a coupling arrangement **Shall** be utilised to reduce the length of objects being handled

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- The weight of the assembly and equipment **Shall** be supported by all the tower legs with no attachment to any tower bracings
- All steelwork and bolts **Shall** be galvanized and there **Shall** be no drilling of the tower structure to accommodate the assembly or any associated equipment
- Adequate clearance **Shall** be provided in proximity to the tower legs so as to not obstruct the climbing leg, causing a hazard or hindrance to any persons climbing the structure. It is desirable to locate the equipment as close as possible to the centre of the tower face
- Feeder cables **Shall** run up the inside of the tower body on a non-climbing leg
- On no account **Shall** the integrity of the tower anti-climbing guard be undermined by the installation. If necessary, further enhancements **Shall** be **Approved** and put in place
- Additional signage **Shall** be fitted to indicate the presence of Radio Frequency (RF) hazards. It **Shall** be positioned such that it is clearly visible from all usual climbing routes

8.4.11 Careful consideration **Shall** be given to the type of antenna selected for the installation. Where possible, 'Remote Electrical Tilt' **Shall** be utilised so that future adjustments to the angle of tilt can be made from the ground level, reducing the frequency to work at height.

8.5 Project Planning

Arrangements for Health and Safety

8.5.1 All construction activities associated with the installation of the telecommunications equipment on steel towers **Shall** follow the principles and practices of the Construction, Design & Management Regulations 2015 (as amended). A Construction Health & Safety Plan **Shall** be developed by the Principal Contractor and forwarded to **SSEN-D** for their approval.

Electricity at Work Regulations

8.5.2 Regulation 14 of the Electricity at Work Regulations, regulates work on or in proximity to **Live Conductors**. Wherever practicable, installation work involving the erection or removal of long objects such as antennae or their associated support steelwork, **Shall** be carried out with both circuits **Dead**.

8.5.3 Where 8.5.2 is not practicable, a thorough assessment should be made of the risks and work **Shall** only be carried out with adjacent circuit(s) **Live**, when an assessment shows that this can be done safely, and it can be justified. A risk assessment has been completed as part of the appraisal process and it is recognised that the installation work can be safely carried out under **Live** circuit conditions, providing certain criteria are met and appropriate controls are in place during the installation process.

8.5.4 It is critical that during the project planning stage, these controls are accounted for and implemented during the build process. As part of the project planning process, a formal request for a circuit outage **Shall** be made to **SSEN-D** and if successful, the work **Shall** be carried out under circuit outage conditions.

Line of Sight and Panoramic Views

8.5.5 During the planning stage, the **External Sharer** might require a 'line of sight' from the tower position in order to determine whether a clear line of sight can be achieved from the tower to another dish at a remote location. This is an alternative and often cheaper solution than bringing in a BT leased line into the site. Panoramic photographs from the proposed equipment height might also need to be undertaken.



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- 8.5.6 Verifying the line of sight **Shall** only be achieved by employing an **SSEN-D Approved** contractor to climb the tower and undertake the work. No MEWP or similar mobile vehicle **Shall** be employed. The work may be done safely under a **Limitation-of-Access** with both circuits **Live**, provided **Safety Distances** can be maintained.

Competency of Contractor(s) and their Staff

- 8.5.7 Only companies who have been assessed by an accrediting body recognised by **SSEN-D** and have gained accreditation may be considered for the tower installation work.
- 8.5.8 All personnel engaged with installation work **Shall** be trained, experienced and competent to carry out all of the tasks involved, having undertaken specific training for the task. They **Shall** be familiar with the risk assessments and **Approved** method statements.
- 8.5.9 As the installation process is safety critical, extreme care **Shall** be exercised to ensure that only **Competent** personnel are utilised. Prior to a **Live** installation, the competency of the contractor, their staff, together with the suitability of the method statement **Shall** be demonstrated via a trial installation. This **Shall** be held under **Dead** conditions.
- 8.5.10 All persons in the installation team **Shall** be certified for the relevant tasks and **Shall** hold **SSEN-D Competent Person** status or a higher level of authorisation. The climber's authorisation **Shall** be restricted to carrying out **Telecommunication Activities** on towers only. This authorisation **Shall** be used in strict compliance with the **Approved** method statements.

Structural Assessment

- 8.5.11 A structural assessment of each proposed tower installation **Shall** be carried out at the project planning stage. This is to verify that the structure is capable of withstanding the additional loading imposed on the tower structure by the telecommunications equipment. A condition inspection **Shall** also be carried out as part of this assessment.

Earthing Considerations

- 8.5.12 Under some circumstances, an **Earthing** study might be necessary, particularly where the **Earthing** characteristics of the site might be influenced by the presence of the base station. This might impact on the local environment.
- 8.5.13 The calculation of the Rise of Earth Potential value and associated contour value are required for the safe design of a power supply.

Risk Assessments and Method Statements

- 8.5.14 A detailed risk assessment and a written method statement are required for each construction project detailing the method of work to be employed on the **High Voltage** overhead tower line.
- 8.5.15 The work **Shall** take place in accordance with a risk assessment and method statement which has been approved by **SSEN-D** and that has been tested under field trials. There might be a requirement to undertake additional work on the tower associated with the project, which might have been highlighted as part of the structural assessment, to bring the tower up to the required standard.

Pre-Construction Meeting

- 8.5.16 A pre-construction meeting **Shall** be held involving all the interested parties to discuss and finalise all health and safety related matters including operational safety requirements. The purpose of the meeting is to ensure that:
- Key responsibilities are agreed
 - All parties are fully conversant with the proposed method of work and associated procedures to be employed during the construction

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- All parties are aware of any previous discussions that have taken place and any agreements that have been reached

8.6 Installation Process

General Requirements

- 8.6.1 Where relevant, the circuit to be made **Dead Shall be Isolated, Earthed**, identified and the relevant **Safety Documents** issued in accordance with the requirements of the **Operational Safety Rules** and **Approved** Procedures before work commences.
- 8.6.2 A **Permit-to-Work** or **Limitation-of-Access Shall** be issued depending upon whether a circuit outage can be obtained or not and **Shall** be issued to a suitably **Authorised Person** once all the requirements have been satisfied. The recipient **Shall** be trained and competent to receive the **Safety Documents** and hold current **SSEN-D Authorisation**.
- 8.6.3 Under outage conditions, the **Permit-to-Work Shall** be issued to a suitably **Authorised Person** who **Shall** be responsible for the supervision of the installation and ensuring safety from the **System** is maintained.
- 8.6.4 **Additional Earths Shall** be issued with the **Permit-to-Work** and **Shall** be applied to the **Conductors** of the **Dead** circuit(s) adjacent to the point of work.
- 8.6.5 **Circuit Identification Flags Shall** be issued to the recipient of the **Safety Document** and **Wristlets Shall** be issued to all members of the **Working Party**.
- 8.6.6 Prior to work commencing, an on-site risk assessment **Shall** be carried out and the **Control Engineer Shall** be contacted to arrange for any Delayed Auto Reclose (DAR) facility to be switched out on the **Live** circuit. The **Control Engineer Shall not** reclose the **Live** circuit in the event of it tripping until the personnel on site have been contacted.
- 8.6.7 The **Control Engineer Shall** be informed each day by the team leader of the commencement and suspension of the work.
- 8.6.8 When a circuit outage cannot be obtained or an outage cannot be provided which is within a reasonably practicable period of time around the scheduled construction date, then where possible a **Limitation-of-Access Shall** be issued under **Live** circuit conditions to facilitate the installation work on the tower. An **SSEN-D Senior Authorised Person Shall** issue the safety documentation to the team leader of the **Working Party**. Clause 8.6.6 and 8.6.7 **Shall** be followed.
- 8.6.9 Fundamental to the safety of the work is an emergency plan which specifies that in an event where there is a loss of control during **Live** working, it **Shall** be necessary to switch off the **Live** circuit as soon as practicable by remote control operation in order to make the workplace safe or to reduce the risk of any further injury or damage. An emergency plan **Shall** be agreed and appropriate provisions made.

Pre-start Briefing

- 8.6.10 A pre-start briefing **Shall** be undertaken with all the relevant staff present to outline all the safety requirements and working practices that **Shall** be followed
- 8.6.11 The **SSEN-D Project Manager Shall** satisfy himself that before work commences, all of the necessary Operational Safety requirements are in place.

Method of Installation

- 8.6.12 In some cases, the installation work on the tower will take place under Live circuit conditions. Therefore, stringent guidelines **Shall** be followed to ensure that safety from the **System** is maintained at all times. The method of work **Shall** reflect this condition.

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- 8.6.13 Adequate consideration **Shall** be given to the local weather conditions, and no work **Shall** take place during adverse weather conditions. In the event, or near approach of a lightning storm, all work on the tower **Shall** cease immediately. The effectiveness of the on-site communications systems and supervision **Shall not** be impaired by the weather conditions and where there is a possibility that adequate controls cannot be maintained which might result in the infringement of the **Safety Clearance**, work **Shall** cease.
- 8.6.14 All work **Shall** be carried out in accordance with an **Approved** method statement which **Shall** comply with the **OSR** and associated **Approved** procedures.
- 8.6.15 The following requirements ensure that operational safety is maintained during the installation process. These **Shall** be contained within the contract partners method statement:
1. All personnel **Shall** carry company ID and valid authorisation certificates.
 2. The DAR **Shall** be switched out on any **Live** circuits for the duration of the works.
 3. The person in charge of the **Working Party Shall** inform the **Control Engineer** before work commences and when work has been suspended or completed. Should the circuit protection operate, then the person in charge of the **Working Party Shall** be contacted by the **Control Engineer** before attempting a re-closure.
 4. All climbers **Shall** be trained in the specific method statement, competent to climb towers and **Shall** be trained in tower rescue techniques. A tower rescue kit **Shall** be made available at the tower location throughout the duration of the works.
 5. A risk assessment **Shall** be carried out prior to work commencing. Attention **Shall** be paid to any additional safety precautions necessary as outlined in Energy Networks Association Engineering Recommendation G78.
 6. Work **Shall not** be carried out in adverse weather conditions, particularly when high winds are present or there is a risk of lightning occurring. Weather conditions **Shall** be monitored by all site personnel.
 7. The team leader **Shall** be responsible for the work and **Shall** be present on site at all times during the work.
 8. A **SSEN-D** Project Manager **Shall** be in attendance during the tower installation to act as an additional control or supervisory measure.
 9. All climbing personnel **Shall** be permanently attached to the tower structure at all times.
 10. The attachment system **Shall** meet the approval of **SSEN-D**.
 11. All climbing above the **Safe Climbing Level Shall** be done on the inside of the tower body. A person may use the step bolts of a climbing leg up to this point, providing the minimum **Safety Distance** is maintained. If the **Safe Climbing Level** is not visible, a suitable height **Shall** be agreed with the **SSEN-D Senior Authorised Person** on site and this **Shall** be marked with a **Danger Notice** or **Red Pennant**. No access **Shall** be granted on the **Longitudinal Face** of the tower above the **Safe Climbing Level**.
 12. **Red Pennants Shall** be fixed at the junction between the tower body and all the crossarms to define the Zone of Work within the tower body.
 13. All tools and materials **Shall** be raised within the tower body in a controlled manner using an endless hauling rope. The hauling line **Shall** be fixed above the work position within the tower body and **Shall** be secured when not in use.
 14. Where the design of the installation permits, all work **Shall** be carried out from within the tower body with no object or bodily part extending beyond the **Longitudinal Face**, close to the **Conductors**. It is permissible to allow a person to extend their arm and

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tool beyond the **Transverse Face** to handle and secure equipment during the installation process.

15. There might be circumstances where installation personnel might need to climb on the outside of the tower body to handle items. If so, the climber **Shall** remain central to the **Transverse Face** only, observing the **Safety Distances** at all times. If this is required, permission must be granted by the **SSEN-D Senior Authorised Person**.
16. Large items of steelwork or antennae **Shall** be carefully fed through the tower bracings of the **Transverse Faces** only, from within the tower body, in a vertical and controlled manner. No part of these items **Shall** protrude past the **Longitudinal Face** during the installation process. They **Shall** remain attached to the lifting rope and a safety sling until they are fixed in position.
17. Adequate precautions **Shall** be taken to eliminate or control the risk of Induced Voltages from adjacent **Live Conductors**.
18. The anti-climbing gates **Shall** be secured when the site is left unattended and any temporary items secured above the barbed wire.

Supervision

- 8.6.16 There **Shall** be close control and **Personal Supervision** of all aspects of work on the tower when work is being carried out with **Live** adjacent circuits. Particular attention **Shall** be paid to when long objects are being handled into position through the tower bracings.
- 8.6.17 The Principal Contractor has the responsibility to ensure that a satisfactory system of supervision is provided and implemented which **Shall** identify the person in charge and the responsibilities of all other staff. A safe system of work incorporating a continuous level of supervision and adequate communication **Shall** be provided which **Shall** ensure co-ordination and control of work.
- 8.6.18 The role of the **SSEN-D** Project Manager during the installation is to satisfy themselves that all appropriate measures are to be / being applied in accordance with this document.

8.7 Maintenance and Repair Activities

- 8.7.1 Once the installation has been commissioned, there will be a future requirement to access the tower to carry out repairs or maintenance activities.
- 8.7.2 Access requests **Shall** be assessed on an individual basis by an **SSEN-D Senior Authorised Person** and appropriate measures planned. Under some circumstances such as the replacement or upgrade of antennae, a request for a circuit outage **Shall** be made. Depending upon the level of risk, a **SSEN-D Senior Authorised Person** might be required to attend site if it is deemed necessary.

8.8 Avoidance of Danger from Radio Frequency Radiation Hazards

- 8.8.1 In addition to the electrical hazards associated with working in proximity to the **High Voltage System**, there is the additional risk of working in close proximity to equipment that emits Radio Frequency radiation. Exposure levels exceeding the national recommended guidelines might be experienced, close to, and directly in front of the antennae within the 'Exclusion Zones'.
- 8.8.2 Access to towers containing telecommunication equipment **Shall** be in accordance with PR-NET-OSM-059 Management of Work and Access to Towers - Operational Safety Manual - Section 7.2.

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8.8.3 In order to enable safe access to towers where **External Sharers** telecommunication equipment is installed, all sites **Shall** be fitted with isolation switches that **Shall** enable safe access to be maintained for the duration of the work. The switch **Shall** provide the facility for ac and dc isolation to all tower mounted equipment, eliminating any risk of remote start up once the site has been shut down. Operation of the switch **Shall** be undertaken in accordance with the agreed isolation procedure detailed in PR-NET-OSM-059 Management of Work and Access to Towers - Operational Safety Manual - Section 7.2, which has been agreed with the **External Sharer**. Where site specific information has been prepared, this **Shall** be complied with.

8.8.4 Access to **High Voltage** overhead tower lines carrying telecommunications equipment **Shall** not be permitted unless the following has been addressed by the Project Manager responsible for planning the work:

- Site specific drawings showing the location of the equipment and all the 'Exclusion Zones' are consulted
- Site specific Access Schedule indicating whether a site shutdown is recommended or not, is consulted
- A risk assessment is completed indicating the appropriate control measures for the Radio Frequency Radiation Hazard
- Tower access route is assessed and agreed by an **SSEN-D Senior Authorised Person**
- Appropriate control measures are implemented as necessary. These might include a site shutdown and associated isolation and/or the use of Radio Frequency monitors

9 Use of SSEN-D Premises for Site Sharing Activities

9.1 Scope

9.1.1 This section covers the following:

- Operational aspects that **Shall** be considered when dealing with new enquiries relating to the installation of new telecommunications masts and equipment on **SSEN-D** Property at operational and non-operational sites which are managed by **SSEN-D**
- Access procedures and associated requirements for all **Telecoms Operatives** visiting **SSEN-D** sites which are managed by **SSEN-D** to carry out **Telecommunications Activities**

9.1.2 This section is not applicable to telecoms equipment positioned on non-operational premises, sites or buildings.

9.2 Responsibilities

9.2.1 Where relevant, all work **Shall** be carried out in accordance with **SSEN-D OSR** and associated **Approved** procedures.

SSEN-D Project Manager

9.2.2 The **SSEN-D** Project Manager **Shall** ensure that, as far as reasonably practicable, the Visitor's safety management procedures are adequate, implemented and managed throughout their activity. This **Shall** be achieved by the assessment of the health & safety information provided and the monitoring of their activities during site works to ensure high standards of safety are implemented and managed.

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9.2.3 When initiating new legal agreements with site sharers, legal drawings **Shall** be annotated to show areas of the site that have restricted access to **Telecoms Operatives** who do not have **SSEN-D** operational authorisation.

9.2.4 The **SSEN-D** Project Managers **Shall**:

- Act as a point of contact for all applications
- Provide all relevant health and safety information to the **Telecoms Operatives** in relation to **SSEN-D** Sites, ensuring that they are aware of the risks and the procedures necessary
- Assess applications using the **Operational Safety Rules** and ensure that adequate consideration is given to controlling the hazards in proximity to the **High Voltage System**
- Assess all health & safety documentation provided
- Identify the most practical route for a **Low Voltage** supply to the **External Sharer** installation
- Co-ordinate with relevant departments within **SSEN-D** to gain advice and approval for each installation
- Advise on suitable positions and method of work for carrying out 'line of sights'
- Assess the likely impact of the proposed installation on all existing installations including those owned and operated by **SSEN-D**
- Carry out any tests and inspections following the completion of work to ensure the acceptability of the installation with standards
- Co-ordinate the access of **Telecoms Operatives** to **SSEN-D** premises to ensure that they have the competence to carry out work to the relevant Health and Safety legislation and that no conflicts arise
- Ensure that all **Telecoms Operatives** have safe access and egress at each site
- To ensure that where necessary, an independent **Earthing** study is performed on substation sites to assess the risks associated with step and touch potentials arising from the construction of a telecommunications site and to design a safe means of providing an electricity supply
- Ensure suitable supervision of cranes, scaffolds and other equipment and materials transported by vehicles to avoid **Danger**

SSEN-D

9.2.5 **SSEN-D** is responsible for:

- The general authorisation of applications ensuring that no conflict **Shall** exist between the presence of a telecommunications installation (either **External Sharer** or **SSEN-D** owned) and **SSEN-D**'s ability to operate its network as desired
- Confirming whether **SSEN-D** sites or buildings will be retained in the future and that there is space available which can be used for telecommunications purposes
- Providing technical advice when required on appropriate matters such as **Earthing**, 'hot' site issues, or civil engineering matters
- Providing authorisation regarding the use and alteration of existing **SSEN-D** premises to accommodate **External Sharers**, ensuring that all the relevant considerations have been accounted for by **SSEN-D**

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Telecoms Operatives

9.2.6 **Telecoms Operatives Shall** be responsible for;

- Adopting a Construction, Design & Management Regulations 2015 (as amended) approach to the management of health & safety, reflecting industry good practice
- Demonstrate to **SSEN-D** the competency of all individuals who will be working on site
- Providing work risk assessments and method statements for assessment by **SSEN-D** Project Managers
- Prior to the commencement of works on site, arrange a pre-start meeting with all relevant parties present to finalise all health and safety related matters including operational safety requirements, access issues, material handling requirements, etc. A formal record of the proposed arrangements and actions agreed at the meeting Shall be made
- Confirm and provide evidence where necessary that all the outstanding items raised have been addressed before works commence on site
- Providing a detailed programme of work
- Provide all the necessary information and documentation/evidence requested by **SSEN-D**
- Notifying **SSEN-D** of all safety and environmental incidents
- Ensuring that installations are designed and constructed to consider the recommendations provided from a specialist **Earthing** report

9.3 Location of External Sharer Equipment

9.3.1 The location of **External Sharer** equipment **Shall** be sited in accordance with the **SSEN-D** policy and **Shall** be **Approved** by the appropriate department of **SSEN-D**.

9.3.2 **SSEN-D Shall**, where practicable, locate **External Sharer** equipment within a separately designated and fenced compound area. A separate access **Shall** be defined to avoid the unnecessary passage in proximity to the **High Voltage System** or access into unauthorised compounds with **Live** electrical equipment present.

9.3.3 The following points **Shall** be considered when assessing the possible location of **External Sharer** equipment:

- The location of existing power cables and other services including any drains or culverts
- The falling distance of **External Sharer** equipment in relation to operational **Plant** and **Apparatus**
- Safe access and egress for **External Sharer** personnel
- The proximity of Radio Frequency Radiation Exclusion Zones to envisaged high level work areas which may be entered by **SSEN-D** personnel or their contractors during their normal activities
- The possibility of providing an access route or climbing aid to unauthorised areas containing **SSEN-D Plant** and **Apparatus**
- Any future expansion plans to modify substation or building areas as outlined by **SSEN-D**

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9.4 Operational Safety Rules and Approved Procedures

- 9.4.1 All works within substations **Shall** comply with the relevant sections of the **Operational Safety Rules** and the Operational Safety Manual.
- 9.4.2 Particular attention **Shall** be given to the specific requirements associated with the use of access equipment and vehicles, the use of cranes and **MEWPs**, and the control of civil works within a substation environment. The **SSEN-D** Project Manager **Shall** be responsible for on-site risk assessments and provision of supervision required as necessary in order to comply with this document.
- 9.4.3 All advertising hoarding installations **Shall** be installed outside open terminal compounds or operational areas and **Shall not** compromise site security.

9.5 Site Access

- 9.5.1 Detailed requirements for all **Telecoms Operatives** accessing **SSEN-D** premises for **Telecommunication Activities** **Shall** be in accordance with the **SSEN-D** access policy and associated **Approved** procedures.
- 9.5.2 A number of **SSEN-D** radio sites are co-located with **SSEN-D** substation sites. On these sites, providing a risk assessment has been undertaken and all substation operational equipment is separately fenced or housed within secure buildings and housings complying with the Electricity Safety Quality and Continuity Regulations 2002 (as amended), unaccompanied independent access may be granted to radio site **Telecoms Operatives** to carry out certain **Approved** types of work, as agreed by the **Designated Engineer**.
- 9.5.3 All **Telecoms Operatives** to **SSEN-D** radio sites managed by **SSEN-D** **Shall** notify **SSEN-D**. The following conditions are mandatory when dealing with access requests:
- All relevant information such as the nature of the intended work, the number of persons and vehicles attending site etc. **Shall** be obtained so that an assessment by a **SSEN-D** Project Manager can be made
 - Method statements, risk assessments and any other relevant health and safety information **Shall** be provided to **SSEN-D** in order to assess, where reasonably practicable, whether adequate safety management procedures and precautions are in place
 - Where climbing is necessary, proof of the climber's competency to climb **Shall** be provided
 - Any special safety precautions or access arrangements relating to each individual site, **Shall** be relayed to the **Telecoms Operatives**
 - All **Telecoms Operatives** **Shall** log on and off the site by telephoning the agreed **SSEN-D** site access number
- 9.5.4 The preferred methods for access are:
- Through an **External Sharer** gate off the public highway or private driveway
 - Shared access via a **SSEN-D** access gate
- 9.5.5 Under exceptional circumstances, **External Sharer** equipment may be located in open terminal compounds. Where access is required, **Approved** arrangements **Shall** apply.

9.6 Working at Height

Working at height **Shall** only be allowed once an assessment has been carried out by an **SSEN-D SAP** and appropriate **Safety Documentation** is issued. Working at height **Shall** only be commenced once all the relevant safety information has been provided so as to ensure that, as far as reasonably practicable, all the necessary safety precautions have been addressed.



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9.7 Earthing

- 9.7.1 All **Earthing** Systems including the provision of lightning protection on **SSEN-D** Sites and or structures, **Shall** be **Earthed** in accordance with the **SSEN-D Earthing** requirements. Where relevant, an appropriate design of an **Earth** electrode system **Shall** be undertaken to accommodate the inclusion of the telecoms equipment to an existing substation **Earthing** system.
- 9.7.2 As a result of potential high fault currents and voltage rises occurring at the substation, adequate design **Shall** ensure that maximum touch and step voltage contours in the vicinity of the telecoms compound do not exceed recommended limits.

9.8 Building and Civil Works

- 9.8.1 All building and civil works on **SSEN-D** sites **Shall** be performed in accordance with **SSEN-D** policy and the Operational Safety Manual.
- 9.8.2 Any building and civil works undertaken **Shall** not compromise the security of the site.

9.9 Avoidance of Danger from Radio Frequency Radiation Hazards

General Obligations

- 9.9.1 **SSEN-D** adopts a precautionary approach on exposure to Radio Frequency radiation, adopting industry codes of practice, recommendations and guidance.
- 9.9.2 There is a risk of exposure of Radio Frequency radiation to **SSEN-D** employees or their contractors and employees working on behalf of **External Sharers** who might come in close proximity to equipment positioned on **SSEN-D** owned site sharing masts or an **External Sharer** mast or rooftop installations.
- 9.9.3 **External Sharers** have an obligation to ensure that the power and frequency levels emitted are maintained within their licensed levels and that they provide advice and information to those who are affected. They **Shall** consult with **SSEN-D** to provide Radio Frequency power levels and coverage information for all installations sited within **SSEN-D** premises, ensuring that personnel are not adversely affected by the emissions. All relevant information **Shall** be provided to **SSEN-D** for consideration.
- 9.9.4 Where reasonably practicable, the **SSEN-D** Project Manager **Shall** ensure that the location of the Radio Frequency source and its associated 'Exclusion Zones' **Shall** be outside the working areas entered by personnel working on behalf of **SSEN-D**. Personnel working at height on **High Voltage Plant** or Overhead Line Towers and Poles might be in close proximity. In some circumstances this cannot always be avoided, adequate warning signage **Shall** then be displayed to warn of the **Danger**.

Working in Close Proximity to Radio Frequency Equipment

- 9.9.5 There are often circumstances where there is a requirement for **Telecoms Operatives** to work in close proximity to or within 'Exclusion Zones' to carry out activities on radio towers or rooftop installations on behalf of Telecommunication Operators. In all cases, a risk assessment **Shall** be undertaken, and appropriate control measures **Shall** be agreed with **SSEN-D** before work commences, e.g. restricted exposure times. Where necessary, as a primary control measure, appropriate equipment might need to be switched off for the duration of the work. The use of Radio Frequency monitors **Shall** be employed by all personnel.

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9.9.6 Where external service providers are working on behalf of **SSEN-D** in proximity to antennae emitting radiation, a safe system of work **Shall** be employed incorporating primary and secondary control measures. Safe Access **Shall** be managed by **SSEN-D** and the following precautions **Shall** apply:

- A risk assessment **Shall** be completed
- Where necessary, documented recording of the **Switching/Isolation** provided by the appropriate **External Sharers**
- Site Induction including the issue of **Safety Documents** (Authorisation of Access Document) and relevant information
- The issue and the application of Radio Frequency monitors
- Where relevant, the testing of area prior to work
- Monitoring of site radiation levels

9.10 EMC Compatibility

Equipment installed by any **External Sharer Shall** meet current Electro-Magnetic Compatibility (EMC) approvals. Where installed equipment causes interference with **SSEN-D Plant and Apparatus**, it **Shall** be the responsibility of the **External Sharer** to remove the equipment or provide the appropriate degree of suppression.

10 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	TBC	1.00	Richard Gough
02				