

Structural Design Governance Standard

(Formerly BOP325)

Sign Off					
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Reviewer	Date	Name	Signed	Role	
Author	30/01/2020	Mike Elliott	<i>Signed in IMS</i>	Structural Engineering Manager	
Checker	30/01/2020	Duncan Gould	<i>Signed in IMS</i>	Principal Structural Engineer	
Approved	30/01/2020	Mike Elliott	<i>Signed in IMS</i>	Structural Engineering Manager	

Version History		
Version	Date	Purpose of Issue
1.0	04/02/20	Initial issue in IMS, replacing BOP325

All changes to this revision of the document are denoted by a line down the right-hand side of the applicable paragraph.

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1 Standard Reference

The applicability of standards for this document is listed in the IMS document register, QY-FT-012.

2 Purpose

This document defines the governance strategy for the design of all installations on Arqiva owned or managed sites/structures.

It defines and references the policies and procedures to be followed in the design, installation, modification and removal of all structural elements of the site, including masts, towers, antenna support steelwork, buildings, retaining walls, etc.

These rules are in place to ensure that sufficient controls and measures are applied to safeguard Arqiva's sites and structures ensuring that they remain safe and fit for purpose; and that all works are carried out in a way that does not compromise the safety of the public, Arqiva staff, Site Sharers or Contractors.

Installations will be required to meet design standards satisfying Arqiva and their landlords.

3 Scope

This document applies to:

- All persons who design or manage installations on Arqiva sites including Arqiva employees, Site Sharers and Contractors. Site Sharers are responsible for and liable for any work undertaken by their own appointed contractors or sub-contractors on an Arqiva site, and for ensuring compliance with the requirements of this document.
- All Arqiva owned and, where applicable, managed masts (guyed structures), towers, poles, roof mounts, other antenna support structures, gantries, buildings and civil engineering structures such as retaining walls and satellite dish bases.

This document should be read in conjunction with EI-SD-005 Control of equipment on masts, towers and rooftops

References are made to other support information including policies and standards and these shall be adhered to as applicable to the design.

The terms and conditions related to the provision of site infrastructure services are detailed within this document and the Site Services Framework Agreement ("SSFA"). The associated procedures are detailed with the OPM and/or SSL and/or MSSA.

4 Overview

Arqiva has a diverse portfolio of telecommunications & broadcast installations that range from flagship structures like Emley Moor & Crystal Palace to installations in discreet street works structures.

Arqiva aims to maximise the physical use of the sites and the antenna support structures within the portfolio whilst maintaining structural integrity and a safe working environment.

The structures within the portfolio can be split into the following main types:

- Guyed Masts
- Towers
- Monopoles
- Rooftops (including water towers, fire training towers & concrete towers)
- Wooden Poles

Each of these structure types have a variety of complexities that require the design of installations to be carefully considered and the designer to be sufficiently competent.

The Arqiva Structural Engineering Team will provide advice on request to any external design organisation to ensure that these complexities are suitably addressed.

5 Roles and Responsibilities

The role of Structural Design Authority is held by the Arqiva Structural Engineering Manager and activities are delegated to individuals within the Arqiva Structural Engineering Team or other authorised Structural Engineers.

The Arqiva Structural Engineering team ensures that the design of installations on Arqiva sites achieves satisfactory levels of structural integrity and safety. All persons who influence the design of an installation are considered to be Designers as defined by the CDM Regulations 2015.

6 Standard

6.1 Design Philosophy

6.1.1 Design for structural integrity

Designers shall use all reasonable skill, care and diligence in the production of a design. All elements of a design shall be in accordance with best practice, applicable legislation and Arqiva technical standards. All designs shall meet the specified serviceability requirements for a structure or a structural element and give due consideration to the overall stability and integrity of the structure in addition to addressing the design of the individual elements.

6.1.2 Design for public safety

Designers should ensure that all installations are designed in such a way that the public are not exposed to unacceptable risks from the construction works or normal site operation.

6.1.3 Design for safe access and maintenance

During construction, contractors have available to them cranes, mobile platforms and scaffolding etc. Once built, these are not readily available at short notice to Field Technicians who may have to visit site out of hours or in adverse weather conditions to carry out repairs. Designers should therefore ensure that safe access is provided to all parts of the installation.

6.1.4 Design to maximise the potential for sharing the infrastructure

All sites should be designed to maximise the potential for site sharing where practically possible.

Arqiva design standards and requirements shall take precedence over any other parties' standards unless the latter are of a higher quality or Health and Safety standard. Variation from the Arqiva standards shall be approved by the Structural Engineering Manager prior to their incorporation into any design undertaken.

6.2 Design Compliance

The design & construction of all installations on Arqiva Sites will be subject to specific levels of governance. Design compliance will be deemed to have been achieved when the requirements of this document have been met as applicable. No work on an Arqiva site shall be undertaken until the appropriate approvals have been achieved.

The applicability of design governance is determined by a number of factors including site type, structure type, scope of work, internal or external design.

6.2.1 Structural feasibility approval

Every application for a loading change to an antenna support structure will be subject to a feasibility review by an approved Structural Engineer. Loading changes include additional equipment, removal of equipment and modifications to or repositioning of existing equipment e.g. height or bearing changes.

The response provided by the Structural Engineer will define the requirements for design approval.

At application a fully completed Site Share Application Form (SSAF) is required to be submitted including details of the proposed loading change including any proposed equipment to be supported on the structure (i.e. make and model of antennas, dishes, MHAs, size and quantity of feeder cables). If information is missing, the application may be returned to the customer applications team.

Each application will be reviewed by the approved Structural Engineer and a governance category will be assigned in accordance with the guidelines in Appendix A.

The Structural Engineer will also specify if a design is required to be carried out by the Arqiva Structural

Engineering team. This may be specified for highly complex projects.

Where new equipment is to be installed on existing steelwork, a design governance category will be assigned as appropriate in respect of the size of the equipment and the nature of the existing steelwork.

Governance category for feeder cable upgrades will be determined dependant on the proposed change to the size, quantity and location of feeders, i.e. feeder support/ route detailed drawings will be required where a significant change to the loading on the structure will result.

The requirement for design approval on third party sites (e.g. BT Reach) varies depending on portfolio. Refer to clause 6.4 for specific requirements.

6.2.2 Design specifications

The design of all antenna and feeder support steelwork on Arqiva masts and towers shall comply with BD-TS-001 Guide to the Design and Installation of Antenna and Feeder Support Steelwork on Masts and Towers.

The design of all other construction works (civil and structural) on Arqiva sites shall comply with Arqiva specifications/standards as appropriate.

Arqiva maintains standards and specifications for many aspects of design and build projects and these are available via the Livelink Extranet.

For major structural projects, e.g. new towers, strengthening and extensions to existing structures and foundations, the SE team may issue additional requirements dependent on the scope of works.

6.2.3 Detailed Design Approval

All design information shall be submitted in accordance with BD-SD-003 - Requirements for the Submission of Project information for Approval Standard

Arqiva will require detailed design drawings, and where appropriate calculations, to be submitted for approval for:

- Installations with governance categories 3, 4, 931 - 944
- New masts, bespoke towers and other bespoke antenna support structures.
- New buildings and civil engineering structures (e.g. retaining walls).
- Modifications to buildings and structures.

Method statements and risk assessments will be required as determined in section 5.4.

Once the required design information has been submitted to the Arqiva Structural Engineering team for approval a review will be undertaken. Formal confirmation of the design being accepted will be provided by claiming of the "Steelwork Drawings (Ant) Approved By" milestone in KEEP. Where a design is not considered suitable or where further information is required, the SE team will respond accordingly to the Site Implementation Project Manager.

6.3 Supervision requirements

6.3.1 Site Access

Refer to EI-SD-002 Arqiva Site Access Standard.

6.3.2 On-site supervision

Refer to EI-SD-005 Control of equipment on masts, towers and rooftops and BOW011 Criteria which determine the requirement for attendance on Arqiva sites.

6.3.3 Method Statements & Risk Assessments

Refer to EI-SD-005 Control of equipment on masts, towers.

6.4 Other approval requirements

6.4.1 Building Regulation Approval

All projects on Arqiva sites will be subject to Building Regulation Approval where applicable.

It is the responsibility of the designer to make the necessary submission to the local Building Control authority. Confirmation of Building Regulation Approval must be provided to Arqiva prior to works commencing.

6.4.2 Third Party approvals

Due to the diversity of the Arqiva portfolio, there are additional approval processes applicable to some of the sites. This requires the preparation of design information in certain formats to meet with the specific approval processes pertinent to the portfolio.

6.4.3 BT

All installations on the BT Reach portfolio of sites are subject to compliance with an agreed Technical Concurrence Template (TCT). This document sets out the design and installation criteria for installations. The majority of sites are rooftop installations however exchange buildings with land can be used for the installation of towers or monopoles.

A site specific Technical Concurrence Pack (TCP) must be prepared and submitted to the BT Relationship Manager for approval at Detailed Design stage. The Arqiva Drawing Delivery Manager will manage this process.

6.4.4 National Grid

The National Grid portfolio of sites includes overhead line transmission structures (pylons) and operational gas sites. Due to the complexities of these sites, there are specific design approval processes that must be followed.

6.4.5 Pylon Design Review Process

TGN179 structural assessment. At feasibility review stage, the Structural Engineer will undertake a TGN179 assessment in order to determine if the site specific pylon is suitable for the installation of telecom equipment. The design governance category will then be assigned in accordance with the guidelines in clause 4.1 and recorded in the feasibility comments in Keep.

Design Review Sign Off. At the site multi-skilled visit (MSV), the National Grid (NG) Cellular Project Leader (CPL) will complete the pre-approved G3 tower template relevant to the specific tower. These templates have been created in order to identify the locations on the towers where equipment can be safely installed without breaching electrical safety clearance distances.

This document must be provided on site by the designer for the CPL to complete. Once completed, it will provide an agreement to the location of the antenna, dishes, feeder route and ground based equipment module. Provided that the site design drawings match the agreed and signed tower template, there is no further need for any design approvals from National Grid.

Should the requirements for the site change during the project prior to the installation, the site drawings must be sent to the NG CPL and a revised tower template prepared and signed.

6.4.6 Operational Gas Sites Compliance Process

All equipment installations on operational gas sites are subject to compliance with the Transco T/PM/ INS/7 Management Procedure. This procedure sets out the policy that will be applied to the siting, design and operation of plant and equipment on or adjacent to operational gas sites, where the presence of gas during normal and abnormal operation could present a hazard that must be managed.

Once the design has been completed it must be submitted for approval in accordance with the Transco T/PM/G17 Management Procedure.

6.5 Installation Inspections and Acceptance

Along with the governance levels placed on the design and the supervision of projects on Arqiva sites, there may be a requirement for periodic inspection of work during the construction phase on major structural projects, e.g. new towers, strengthening and extensions to existing structures and foundations.

The project manager shall provide the Arqiva Structural Engineering team with a programme of works prior to

works commencing and agree with the SE team the requirement for interim visits to inspect critical activities during construction.

Acceptance of a completed installation will be dependent on provision of certain handover documentation as defined in BD-SD-003 – Requirements for the Submission of Project information for Approval Standard.

6.6 Rectification of defects

Arqiva reserves the right to carry out inspection of any installations or modifications, at any time, and to require the rectification of any work not complying with the required standards of design. This requirement will be given in writing and the Site Sharer/ contractor responsible must take appropriate corrective action, and notify Arqiva in writing of that action, within one month.

Should such action and notification not take place in the required time Arqiva reserves the right to take steps such as may be necessary to obtain compliance with this document. The costs of this work will be charged to the Site Sharer/ contractor concerned.

In the event of the Site Sharer's equipment presenting a significant safety risk in the opinion of a suitably qualified or experienced Arqiva employee, Arqiva will take such immediate action as necessary to render the equipment safe. This may include removal from service. The costs of such work will be charged to the Site Sharer/ contractor concerned.

Any unauthorised installations of antennas or other equipment on Arqiva's structures will be regarded as a near miss, will be reported as such and be subject to an investigation. This shall include all installations that do not comply with the structural feasibility response.

6.7 Interference

In accordance with the provisions detailed in the SSL / MSSA, Arqiva reserves the right to switch off any Site Sharer's equipment causing interference to any site user at any time. Furthermore, Arqiva reserves the right to switch off any Site Sharer's equipment to further an investigation into the cause of any interference. Should this be necessary, Arqiva will take all reasonable steps in the circumstances to inform the Site Sharer to allow the Site Sharer time to attend. Should the interference remain unresolved either party may request the matter to be resolved by an independent expert in accordance with the procedures outlined in the relevant site agreement.

6.8 Modification or removal of Structural Elements on Arqiva structures

Without exception, there shall be no modifications or removal of structural elements to any Arqiva structure without written approval from the SE team and this work will always require supervision by Arqiva.

Refer to EI-SD-005 Control of equipment on masts, towers and rooftops

7 List of Related Documents

Document No:	Document Title:
EI-PY-001	Structural Governance Policy
EI-SD-005	Control of equipment on masts, towers and rooftops
EI-SD-002	Arqiva Site Access Standard
BD-SD-003	Requirements for the Submission of Project information for Approval Standard
BOP630	Requirements for the Design of Single or Multi-user Roof Top Installations
BOP310	Mast and Tower Design and Appraisal Policy
BOP309	Inspection and Maintenance of antenna support structures
BOS010	Generic Specification for the Design, Fabrication and Erection of Masts
BD-TS-001	Guide to the Design and Installation of Antenna and Feeder Support Steelwork
BOW142	SHE Rules
BOW109	SHE Rules for Contractors