

GENERAL SPECIFICATION

STRUCTURAL

GS EP STR 500

Onshore Structure - General

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1. Scope

This document defines the general procedures and Company requirements to be applied in the execution and reporting of the structural design and fabrication of onshore structures.

This specification is applicable for substructures, their foundations, modules, superstructures and appurtenances. This specification also applies to the structural design of equipment packages.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

The structural design of onshore structures shall be conducted in accordance with the reference documents including codes and standards defined in specifications listed in **GS EP STR 510**.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published at the effective date of this document.

Reference	Title
Not applicable	

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and addendums, is the latest revision published.

Reference	Title
GS EP STR 001	Weight monitoring and weighing offshore and onshore units
GS EP STR 108	Requirements for evaluation of finite elements analysis and results
GS EP STR 510	Onshore structure - Design

3. Applicability

This specification is applicable to the following engineering tasks:

- Preliminary and basic design
- Development of Project Particular Specifications
- Detailed design
- Expertise.

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4. Definitions of terms

Throughout this specification, the following definitions shall apply:

Certifying Authority: Means the company in charge of the certification of the platform (or part thereof) and of issuing of the relevant certificates in accordance with the rules defined in the contractual reference documents.

Company: Any entity of the TOTAL Group mentioned in the contract or the order.

Contractor: Individual or company to which the work contract is awarded.
The Contractor may be responsible for carrying out the execution studies.

Engineering Company: Individual or company providing, according to this specification, the following services:

- Basic studies and possibly detailed studies
- Potential procurement of material
- Placement of work orders.

The Engineering Company may be the Contractor or Company.

MWS: Marine Warranty Surveyor.

Third party: Means the company in charge of independent design appraisal or independent analysis or independent inspection in accordance with the rules defined in the contractual reference documents. Third party can be an independent Company, the Certifying Authority, the MWS, or the Classification Authority as defined in contractual reference documents.

QA/QC Quality Assurance / Quality Control

5. Design quality control

5.1 Contractor quality management plan

At the beginning of the design phase, Contractor shall submit a detailed Quality Management Plan for the structural discipline to Company for review/approval. All applicable corporate general procedures and project-specific procedures shall be supplied to Company, and no structural design shall be initiated before the approval of the Quality Plan by Company.

The Quality Plan shall, from the beginning of the work, cover the full duration of the work and all parties involved in it. If the work is divided between a Contractor and a number of Subcontractors, then there shall be clear single responsibility for the structural engineering over the full period. Procedures shall be issued to show team reporting structure, working methods for management of internal and external interfaces, and Vendors; procedures for criticality assessment; planning and change control; procedures pertaining to use of software; procedures relating to the execution and checking of the different types of analysis that will be undertaken; procedures relating to the management of 3D plant models and checking of drawings; procedures relating to engineering queries, production site queries, deviation requests, non-conformance and other

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communications; and weight control. A list of names, signatures, and responsibilities of all signatories to engineering documents shall be supplied and kept up to date. The quality plan shall include job descriptions for all of the contributors to the structural engineering, and shall define the minimum qualifications and experience needed in each case.

For weight control, refer to **GS EP STR 001**.

GS EP STR 108 provides additional guidance on quality management of engineering analysis and simulation which shall be addressed in Contractor's Quality Plan.

Each and every document issued by Contractor shall be verified and checked by its QA/QC system. Document verification by Contractor shall be performed at several levels:

- Structural discipline checks by component design engineer and discipline lead
- Inter-discipline checks
- Project engineer checks and Engineering management approval.

Each level of verification shall be signified by a box in the document title block. This box shall be signed by the lead engineer in charge of the discipline or the project manager. Document signing protocols shall ensure devolution of responsibility to originating engineers, with ultimate responsibility for review by the lead structural engineer. A project management signature shall indicate confirmation of compliance with the procedures and fulfilment of the Contractual requirements.

5.2 Company review

Unless noted otherwise in the Particular Project Specification or in the Contract, each calculation note or drawing shall be submitted to Company for review/comment. The calculation notes shall be issued together with the fabrication drawings. No drawing shall be issued for tender, for construction or for material order without Company review. The Company expects to review engineering drawings during the course of their development and will not accept to review any fabrication drawings without first having reviewed the design calculations. Company review/comment approval does not release Contractor from his responsibility concerning the subject design. No document may be issued which in any way deviates from the Contract requirements without prior approval by Company in writing.

5.3 Computer software packages reliability

All software packages, programs and sub-programs used shall have been previously tested and known to give reliable results. Software packages used for global 3D structural analyses shall be validated by a recognized Third Party approved by Company, and validation reports shall be issued to Company.

5.4 External quality check

In addition to its review, Company reserves the right to have the calculation notes, the drawings and the various documents checked or verified by:

- A Third Party, as defined in section 4 above
- A Certifying Authority, as defined in section 4 above
- A Marine Warranty Surveyor, if applicable according to execution plan of project.

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In such case, Contractor shall supply each and every documents requested by the Third Party or Certifying Authority.

6. Structural design plan

Contractor shall submit a detailed structural design plan and document register to show a task breakdown, activity durations and planned completion dates, plus planned date of issue for all documents at their various issues including the status of issue ("for comments", "for approval", "for call for tender", "for construction", "as-built drawings", etc.) and the schedule of design. The planning shall be supplied to show the main cycles of reanalysis, and to indicate dependencies for key information from others, including data supplied by other disciplines within the Contractor's organization. The planning shall show the design and review logic required to complete calculations and gain approval before the issue of drawings used for construction.

An overall manning histogram shall be supplied for the discipline, with separate identification of supervision, engineering, particular specialists, and draughting/modelling.

Contractor shall provide reporting of progress against the plan at regular discipline coordination meetings with Company's specialists.

7. Documentation of design development

7.1 Phasing of design development

The type and content of engineering documentation that is required will depend on the stage reached in the development of a project. A typical project will move from feasibility and other early studies into a period of Basic Engineering, and then into Detailed Design. Engineering documentation shall be supplied throughout the construction and installation phases, and further works during the operating life shall be continually recorded. The particular phase and context of any work must be defined in the contract, and it is the responsibility of the Contractor to request clarification in respect to any ambiguities in this respect.

7.2 Feasibility studies

Generally, the purpose of structural feasibility studies is to determine:

- If the solution is technically achievable with due account taken of all the potential variations, such as weight or volume growth consistent with the uncertainty parameters of the studies in hand. Such studies shall establish all of the potential failure modes, and document an evaluation of foundations, strength and stability under intact and damage conditions, during construction, installation and service, and establish methodologies and equipment for installation.
- An estimate of the costs and the project time schedule.

The following documents shall be supplied:

- Design report(s) which set the work in context, and define the main input assumptions. These shall describe the structural calculations performed, and clearly state the main conclusions and any recommendations for further evaluation. Structural calculations at this stage should be as simple as possible to evaluate the dominant behaviour and the configuration of the main or special components and items of equipment. Other common or