BS EN 16310:2013

BSI Standards Publication

Engineering services — Terminology to describe engineering services for buildings, infrastructure and industrial facilities

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National foreword

This British Standard is the UK implementation of EN 16310:2013.

BSI, as a member of CEN, is obliged publish EN 16310:2013 as a British Standard. However, attention is drawn to the fact that, during the development of this European Standard, the UK committee voted against the approval of EN 16310:2013.

Attention should be called to the terms and definitions set out in this standard, which are not consistent with BS ISO 6707-1:2004: *Building & civil engineering — Vocabulary — Part 1: General terms*.

This standard presumes a 'licence to build' as part of 'statutory approval', which is not universally the case throughout the European Union, nor the European Economic Area. The UK committee are concerned that this may make implementation of this standard difficult in some regions.

The EU Procurement Directives require contracting authorities and entities to give first preference to European Standards. However, this requirement is not absolute and the UK committee advises that the above concerns are taken into account when drafting contracts for engineering consultancy services in the United Kingdom, whether or not they are being drafted by, or on behalf of, bodies subject to one or more of those Directives.

The UK participation in its preparation was entrusted by Technical Committee CB/500, Procurement, to Panel CB/500/-/1, Engineering consultancy services — Construction.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Engineering services - Terminology to describe engineering services for buildings, infrastructure and industrial facilities

Services d'ingénierie - Terminologie destinée à décrire les services d'ingénierie pour les bâtiments, les infrastructures et les installations industrielles

Ingenieurdienstleistungen - Terminologie zur Beschreibung von Ingenieurdienstleistungen für Gebäude, Infrastruktur und Industrieanlagen

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

Foreword

This document (EN 16310:2013) has been prepared by Technical Committee CEN/TC 395 “Engineering consultancy services”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard contains a glossary of key words concerning engineering services, provided in the construction of buildings, infrastructure and industrial facilities. The glossary can contribute to the conditions for free competition and a level playing field for engineering service providers (including architects) in the European Community. It is intended to lower or remove the barriers that these providers are confronted with in cross border operations and co-operations due to different interpretations of relevant terms in different European countries. The terms that are incorporated in the glossary are in line with those developed by CEN/TC 395 for other industries.

Each construction project is managed through a series of stages and therefore staging is important for the management and assessment of engineering services. However, the standard stages in projects and related national plans of work of engineering service providers (including architects) differ from country to country and may also be subject to differences in legislation. For these reasons, it is not the intention of this standard to harmonise national plans of work. However, in cross border operations and co-operations it is important that all parties concerned have a common view on the actual staging and the engineering activities that take place within each stage. To facilitate this, some information about the stages in the life cycle of built assets is given in Annex A. This annex may offer a common reference framework onto which engineering service providers (including architects) can ‘map’ their project-specific scope of work in cross border projects, while the actual scope of work is to be specified in contracts.

1 Scope

This European Standard contains a glossary of terms, which can contribute to the conditions for free competition and a level playing field for engineering service providers (including architects) in Europe in the construction of buildings, infrastructure and industrial facilities.

The terminology in this European Standard aims at facilitating the cooperation between sectors and between countries in the field of engineering services. It is structured on the basis of "successive stages" of an operation of construction. It does not concern the description of the contents of the tasks to be performed, neither on their scheduling, nor on the actors concerned, which depend on the national context, the type, and of the importance of the work and its environment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15643-3:2012: *Sustainability of construction works — Assessment of buildings — Part 3: Framework for the assessment of social performance*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply:

3.1
assessment
appraisal
judgment
ongoing process of gathering, analyzing and reflecting on evidence to make informed and consistent judgments (about the quality of a service, process or product)

Note 1 to entry: A related term is: control.

3.2
brief
written document that states the client’s requirements for a construction project

[SOURCE: ISO 6707-2:1993]

3.3
building
construction work that has the provision of shelter for its occupants or contents as one of its main purposes; usually partially or totally enclosed and designed to stand permanently in one place

[SOURCE: ISO 6707-1:2004]

Note 1 to entry: See Annex B.

3.4
client
person or organisation that requires a building to be provided, altered or extended and is responsible for initiating and approving the brief

[SOURCE: ISO 6707-1:2004]

Note 1 to entry: A related term is: customer, which is defined as an organisation or person that receives a product (see EN ISO 9000:2005).

3.5
construction contracting
specific form of procurement, where only the actual execution of the project on site is procured, including facilities and materials

Note 1 to entry: Related terms are: contractor prequalification/qualification, contractor surveys, calls for bids/tenders, technical bid tabulations, commercial bids tabulations, contractor selection, contract award.

3.6
contract
binding agreement

[SOURCE: EN ISO 9000:2005]

Note 1 to entry: No consensus in Europe exists about how and when a contract is legally binding, due to differences in legal requirements.

Note 2 to entry: A contract between an Engineering Service Provider (ESP) and a Client may include (references to) general conditions, project specific conditions, a specification of the ESP's scope of work in the project and financial arrangements.

3.7
control
management process in which the actual performance is compared with planned performance, the difference between the two is measured, causes contributing to the difference are identified and corrections are made to eliminate or minimise the difference to an acceptable level

Note 1 to entry: Related terms are: assessment, verification and validation.

Note 2 to entry: In addition to corrections, corrective actions may be taken to eliminate the cause of a detected nonconformity or other undesirable situation.

3.8
cost
amount of money necessary for the attainment of a goal

Note 1 to entry: Related terms are: project budget, target budget, cost in use, life cycle cost.

3.9
cost in use
cost of running/operating a facility or product

3.10
engineering
intellectual activities necessary to define, design, produce, sustain and recycle a product, a process or a built asset

3.11
engineering services
intellectual tasks provided during one or all stages of the life cycle of a product, a process or a built asset by specialised professionals

3.12
environmental aspect
aspect of construction works, part of works, processes or services related to their life cycle that can cause change to the environment

[SOURCE: ISO 21931-1:2010]

EXAMPLE Use of energy and mass flow, production and segregation of wastes, water use, land use, emissions to air (examples added to the definition of environmental aspect in ISO 15392).

3.13
environmental impact
any change to the environment whether adverse or beneficial, wholly or partially resulting from environmental aspects

[SOURCE: EN 15643-3:2012]

Note 1 to entry: Related terms are: durability, sustainability.

3.14
functioning
working of an asset, equipment or product

Note 1 to entry: A related term is: performance.

3.15
client approval
decision by the client to continue, change or terminate the project, on the basis of an assessment of (sub) stage results

3.16
handover
step at which possession of the construction works is surrendered to the client upon completion with or without reservation

[SOURCE: EN 15643-4]

Note 1 to entry: A related term is: signing off (a contract).

3.17
industrial facility
any fixed equipment and/or facility which is used in connection with, or as part of, any process or system for industrial production or output

Note 1 to entry: See Annex A.

3.18
infrastructure
built facilities that are required in order to serve a community's developmental and operational needs, including e.g. roads, railroads, water ways, water and sewer systems, energy networks and data networks

Note 1 to entry: See Annex B.

3.19
life cycle
all consecutive and interlinked stages in the life of the object under consideration

[SOURCE: ISO 15392:2008]

Note 1 to entry: The definition in EN ISO 14040 is: "consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal'.

Note 2 to entry: Annex A shows an example of a life cycle with respective stages and sub-stages.

3.20
life cycle cost
LCC
cost of a building or part of works throughout its life cycle, while fulfilling technical requirements an functional requirements

[SOURCE: EN 15643-4:2012]

3.21
maintenance
combination of all technical and associated administrative actions during the service life to retain a building or an assembled system (part of works) in a state in which it can fulfil its technical and functional requirements

Note 1 to entry: Maintenance includes cleaning, servicing, repainting, repairing, replacing parts of the construction works where needed, etc. (see CPD Guidance Paper F).

Note 2 to entry: Adapted from the definition in ISO 15686-1 and ISO 6707-1 according to the CPD Guidance Paper F.

3.22
maintenance support
services in relation to maintaining the facility according to predetermined objectives

3.23
operation support
services in relation to running the facility in an optimum and safe way, including the monitoring and management of the expected performance

3.24
performance
expression relating the magnitude of a particular aspect of the object of consideration relative to specified requirements, objectives and/or targets

Note 1 to entry: Adapted from the definition in ISO 6707-1 according to the draft recommendation of ISO/TC59/AHG Terminology.

3.25
performance testing
evaluation of the compliance of an asset, equipment or product with specified performance requirements

3.26
process
set of interrelated activities which transforms inputs into outputs

[SOURCE: EN ISO 9000:2005]

3.27
procurement
process which creates, manages and fulfils contracts relating to the provision of goods, services and engineering and construction works or disposals, or any combination thereof

[SOURCE: ISO 10845-1:2010]

Note 1 to entry: Related terms are: procurement services, purchase planning, supplier research and selection, value analysis, price negotiations, supplier prequalification, supplier qualification, supplier surveys, calls for bids/tenders, technical bid tabulations, commercial bid tabulations, supplier selection, contract award.

Note 2 to entry: 'Procurement services' are distinguished from 'Procurement', as these services may be provided by an engineering service provider, though the scope of the ECF does not include the actual signing of the contract (this is the sole responsibility of the client) and the supply of their object.

3.28
project
unique process, consisting of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources

[SOURCE: EN ISO 9000:2005]

3.29
project budget
assessment of the cost of a project

3.30
project documentation
set of documents used to define the extent and nature of a built asset or a product

3.31
project management
professional service that applies (application) methods, tools, techniques and competences to the overall planning, co-ordination and control of a project life cycle, from inception to completion, aimed at meeting a client's requirements in order to produce a functionally an financially viable project that will be completed on time within authorised cost and to the required quality standards

Note 1 to entry: This definition enhances an existing definition of project management in ISO 10007.

Note 2 to entry: Direct sources for this definition are:

- ISO/TC 236 - Project Management - ISO 21500;
- Code of Practice for Project Management for Construction and Development: 4th Edition (1996), issued by CIOB Chartered Institute of Building / International Construction Project Management Association;
- Capstone CM Body of Knowledge, CMAA Construction Project Management Association of America.

3.32
quality
degree to which a set of inherent characteristics fulfils requirements

[SOURCE: EN ISO 9000:2005]

Note 1 to entry: For example for buildings, the quality of the built asset corresponds with the capacity of meeting user's needs as defined at the outset (see definition of building given in 3.3).

3.33
risk
effect of uncertainty on objectives

[SOURCE: ISO Guide 73]

Note 1 to entry: An effect is a deviation from the expected - positive and/or negative.

Note 2 to entry: Objectives can have different aspects (such as financial, health and safety, and environmental goals) and can apply at different levels (such as strategic, organisation-wide, project, product and process).

Note 3 to entry: Risk is often characterised by reference to potential events and consequences, or a combination of these.

Note 4 to entry: Risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence.

Note 5 to entry: Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of, an event, its consequence, or likelihood.

3.34
stage
phase
period within the life cycle of an entity that relates to the state of its initiation, design, construction, operation or dismantling/recycling

3.35
statutory approval
official license to build, to be issued by the local authorities, after these authorities have determined compliancy of the design with the applicable regulatory requirements

Note 1 to entry: A related term is: building permit.

Note 2 to entry: In some EU countries, the application of a building permit is a (sub) stage in its own right.

3.36
supervision
monitoring that the asset is constructed on site in compliance with the project documentation and regulatory requirements

Note 1 to entry: Related terms are: control, monitoring.

3.37
target budget
established boundaries for the funding required for a defined scope of works

3.38
time
(estimated) time involved with a set of activities

Note 1 to entry: Related terms are: schedule, overall schedule, milestones, detailed schedule.

Note 2 to entry: The legal rules for regulating the computation of time limits and periods differ among EU countries. In order to ensure legal certainty and to avoid misunderstandings (e.g. periods expressed in working days or calendar days), it is advisable for parties to refer to a general rule for the computation of time. One example of such a common standard is Article I.-1:110 of the Draft Common Frame of Reference for European Private Law (DCFR).

3.39
validation
confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled

[SOURCE: EN ISO 9000:2005]

Note 1 to entry: The term “validated” is used to designate the corresponding status.

Note 2 to entry: The use conditions for validation can be real or simulated.

Note 3 to entry: Related terms are: fit for purpose, control, verification.

Note 4 to entry: Validation may be described as ‘to check if the right thing is built’.

3.40
verification
confirmation, through the provision of objective evidence, that specified requirements have been fulfilled

[SOURCE: EN ISO 9000:2005]

Note 1 to entry: The term “verified” is used to designate the corresponding status.

Note 2 to entry: Confirmation can comprise activities such as:

— performing alternative calculations,

— comparing a new design specification with a similar proven design specification,

— undertaking tests and demonstrations, and

— reviewing documents prior to issue.

Note 3 to entry: Related terms are: control and validation.

Note 4 to entry: Verification may be described as: ‘to check if it is correctly built’ or: ‘to check the component or asset is built as required’.

Note 5 to entry: Other terms related to life cycle stages and sub-stages can be found in Annex C; descriptions of these additional terms can be found in Annex A.

Annex A
(informative)

Stages in the life cycle of built assets: Buildings, Infrastructure and Industrial Facilities

A.1 General

This annex describes the stages and sub-stages in the life cycle of buildings, infrastructure and industrial facilities. The description is intended to be a reference framework to which engineering service providers (including architects) can 'map' their project specific scopes of work in cross border projects, while the actual scope of work is to be specified in contracts. It is emphasised that it is not intended to harmonise national plans of work of engineering service providers (including architects). The aim is just to provide a reference for fine tuning the contributions of participants from different countries in building projects in the EU.

A.2 Staging

The distinction of stages in the life cycle of a built asset is important for the management and assessment of engineering services. The main characteristics of the staging are listed here.

— Each (sub) stage has its own characteristic and represents a vital step in the life cycle of the built asset.

— Each stage represents a specific state of the built asset (for instance 'as required', 'as designed', 'as built', 'as operated'). The client or owner decides on the transition from one stage to the other on the basis of an assessment of e.g. cost, organisational aspects, time, documentation, quality, risk and environmental impact ("go-or-no-go decision").

— A building project may apply to one or more stages in the life cycle of the built asset.

— The naming and sequence of some sub-stages within the main stages may vary from sector to sector and/or from country to country.

An example of the functional stages in the life cycle of built assets is shown in Figure A.1. The stages and sub-stages are further described in Table A.1.

It should be noted that most industrial facilities projects include one or more building projects.

A.3 Statutory approval and tendering

Statutory approval and tendering or procurement do not have the same importance for industrial facilities as they have for building and infrastructure and they do not take place at same time in the life cycle of the built assets concerned.

— In the life cycle of **buildings and infrastructure (B&I)**, applying for a statutory approval ('building permit') and the preparation and organisation of tenders are very important activities of engineering service providers. However, these activities cannot be appointed exclusively to one or two specific (sub) stages in the asset's life cycle, as the procedures may differ widely from country to country. For example, applying for a statutory approval may in one country be a process that overlaps with several (sub) stages, where it is a fixed 'one stop moment' in another. Tendering may take place in different (sub) stages in the asset's life cycle, depending on the nature of the project and the client's market strategy. Moreover, both statutory approval applications and tendering are subject to differences in legislation in the EU member states.

— A significant portion of **industrial facilities (IF)** is composed of equipment and materials manufactured at shops by vendors and interconnected an installed on the construction site by construction contractors according to specifications and drawings from engineering service providers. Procurement and Construction Contracting are significant functional stages in the life cycle of IF.

Figure A.1 gives an overview of the stages. In this figure, a reference is given to EN 15643-3:2012 that also includes a set-up for stages in the life cycle of built assets. The stages and sub-stages proposed in Figure A.1 can be considered as a further elaboration of the stages given in EN 15643-3:2012.

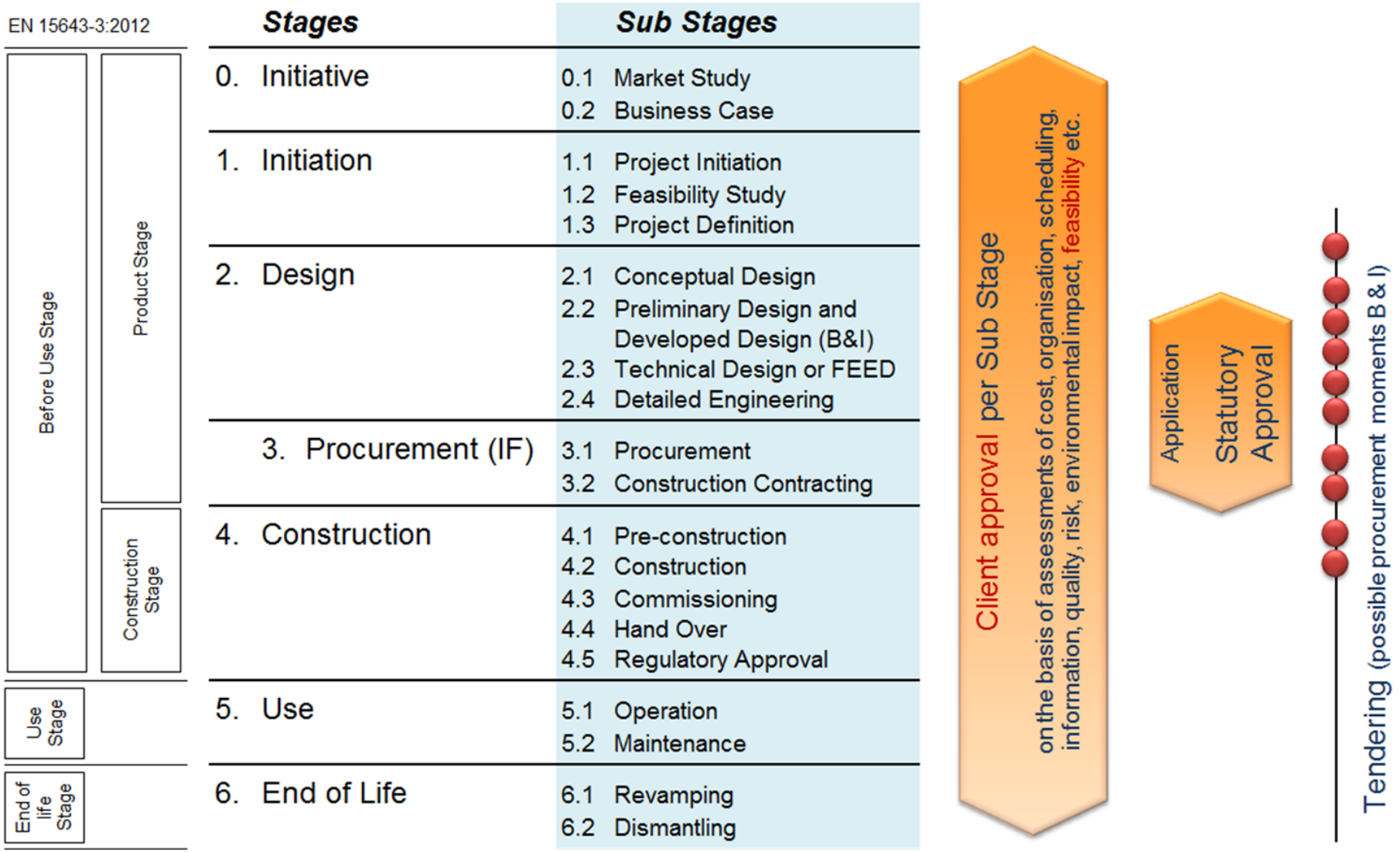

Figure A.1 — Stages and sub-stages in the life cycle of built assets

A.4 Stages and sub-stages

Table A.1 gives information about how stages and sub-stages could be used.

Table A.1 — Stages and sub-stages *(1 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
0	initiative	X	X	stage where the need for a facility emerges and is established			
0.1	market study	X	X	sub-stage where the (future) demand and supply conditions for a specific type of facility in a specific area are studied or where the type of facility that will be needed by society, companies and/or consumers is identified	opportunity market analysis investigation of needs strategic orientation		A market study serves to help decide what type of project to develop and/or is helpful in arranging permanent and construction financing for a proposed development.
0.2	business case	X	X	sub-stage where a structured proposal is developed that functions as a decision package for decision makers in a project, explaining why a facility is required and outlining, the facility's nature and performance characteristics, major project risks and success criteria	business plan	key performance indicators return on investment cost/benefit analysis strategic orientation: the definition of the political goals, the space and time of the considered operation; the decision to act by the way of a building project and not by any other way programming	

Table A.1 — Stages and sub-stages *(2 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
1	initiation	X	X	stage where the context of the facility or product to be developed is identified and the requirements are defined			
1.1	project initiation	X	X	sub-stage where the general scope for the facility is defined and the client's and/or the end users' needs are globally analyzed			
1.2	feasibility study	X	X	sub-stage where the (regulatory, technical, financial, …) ability to meet with the client's and users' ambitions, needs, requirements, wishes, expectations and constraints is investigated, taking into account stakeholder interests		investment and products cost estimation return on investment estimation / cost-benefit analysis preliminary geotechnical study of the site and diagnostic environmental impact assessment preliminary overall plot plan	This sub-stage may be repeated one or more times in a loop with the project definition stage. (Site) surveys and investigations should be executed from this stage. The mode of tendering and procurement could be decided from this stage on. The feasibility of a project is also evaluated after each design sub-stage as an input for the client approval process

Table A.1 — Stages and sub-stages *(3 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
1.3	project definition	X	X	sub-stage where the client's and/or the end users' ambitions, requirements, wishes, expectations and constraints and applicable regulatory requirements are identified, analyzed and recorded in detail	programming project identification documents	scope of works general time schedule / milestones design brief / client's brief / terms of reference / project brief performance requirements / assessment methods limits of supply / coordination of interfaces target budget return on investment targets technology survey and selection (IF)	The project definition is the stage in which the relevant information for designers and others to define the scope of the work is determined. The project definition documents list the given constraints which cannot be revised, and the project requirements, theories and assumptions. All of these might not be completely defined at this stage; some may be revised in response to feedback from later stages of the design process. Constraints' may include: budget, environmental impact, time schedule, health & safety, life cycle costing, landscape value etc. For IF 'technology' is an input from technology owners and/or process licensors (mostly different from the client).

Table A.1 — Stages and sub-stages *(4 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
2.	design	X	X	stage where the client's and/or the end users' ambitions, requirements, and applicable regulatory requirements are transformed into the specification for building the asset, to be agreed before its construction			
2.1	conceptual design	X	X	sub-stage where plans for the asset(s) are developed that offer options and solutions on a planning scale, to determine the general form and schematic layout of the asset(s) to be built within the allocated area	site layout outline design master plan design concept	urban planning/ landscaping infrastructure on site / provision of services quantities and qualities preliminary plant / project / process description and overall performances calculation	This stage may require additional surveys and site investigations including: - site and condition surveys intended to inform the client and the design team about site conditions and the state of existing buildings/ structures; - preliminary investigations intended to inform the client about the technical and statutory constraints the project has to satisfy.

Table A.1 — Stages and sub-stages *(5 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
2.2	preliminary design and developed design	X X	X	sub-stage where a design of the asset is developed that offers a broad insight covering planning aspects, functional organisation, spatial structure and general appearance, enabling the client to make informed strategic choices between functional concepts and options envisaged sub-stage where the design of the asset is further developed, providing detailed representations of the layout, the structure, associated technologies and the appearance of the asset and where suitable methods of construction, the use of materials and typical technical details as necessary for a good understanding of the asset to be built are examined	basic design schematic design final design	functional layout target budget basis of design (IF) preliminary equipment list and expected performances (IF) preliminary units diagrams and layouts (IF)	The client should know at this stage how the facility is going to be operated.

Table A.1 — Stages and sub-stages *(6 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
2.3	technical design or FEED	X	 X	sub-stage where the asset is specified in such detail, that clear understanding is given to the stakeholders on the characteristics of the end result and the cost of implementation can be established sub-stage where the facility is specified in detail so that the cost of implementation can be established and/or that the contractor can be selected	technical design (B&I) FEED: Front End Engineering Development (IF)	technical specifications procurement / tendering bill of quantities / material take-off design documentation construction drawings basis of design (IF) process description with diagrams (IF) expected and guaranteed performances (IF) equipment list (IF) job specifications for design (IF) equipment specifications (IF) installation & construction design (P&IDs, routings, layouts) (IF) regulatory approval	'Specifications' may consist of detailed drawings and written specifications.

Table A.1 — Stages and sub-stages *(7 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
2.4	detailed engineering	X	X	sub-stage where the project is fully described, so that equipment manufacturing and asset construction and installation of equipment can take place	construction design	production documents calculations shop drawings assembly drawings construction drawings design review / check / assessment / validation technical specifications functional analysis (IF) equipment and materials installation and construction design (P&IDs, layouts, isometrics, guide drawings, standard construction drawings) (IF) equipment and materials requisitioning (IF) coordination between detailed design and shop drawings (IF) design review / check / assessment / validation (IF) operating manuals / user manuals (IF)	Production drawings, calculations and other documents are produced and supplied by the architect/consulting engineer or by the contractor and suppliers. In the latter case the production documents should be checked by architects and/or engineering service providers. Engineering service providers (including architects) in the IF sector may in this stage need (or be asked) to supply 'guide drawings' and maybe also some 'standard construction drawings'. 'Shop drawings' are produced by (equipment) Vendors or Construction Contractors. For IF this stage also includes specification of equipment to be procured and incorporated in the unit.

Table A.1 — Stages and sub-stages *(8 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
3.	procurement		X	stage where fabrication / construction / installation sites are provided with equipment and materials and fabrication / construction / installation contracts are awarded			
3.1	procurement		X	sub-stage where equipment and materials to be incorporated in the IF are provided on the construction site in accordance with project specifications		procurement services equipment supply purchasing supplier prequalification / vendor prequalification / qualification supplier surveys / vendor surveys requests for quotations inquiries / calls for bids technical bid tabulations commercial bid tabulations supplier selection / vendor selection purchase order award expediting inspection / vendor surveillance transportation/traffic/logistics factory acceptance tests – FAT	'Procurement services' are distinguished from "Procurement", as these services may be provided by an ESP (Engineering service provider) even though the scope of the engineering consultancy firm may not include the supply of the equipment & materials (i.e. the client or a delegate may be the actual purchaser of the material).

Table A.1 — Stages and sub-stages *(9 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
3.2	construction contracting		X	sub-stage where contracts for supply of construction services, installations and materials are awarded		contractor prequalification / qualification contractor surveys calls for bids/tenders technical bid tabulations commercial bids tabulations contractor selection contract award	Construction contracting is a specific form of procurement, where only the actual construction of the project on site is procured. For IF, the awarding of construction contracts is analogue to placing orders for the supply of equipments and materials, which is a part of the sub-phase 3.1
4.	construction	X	X	stage where the design is converted into a built asset that complies with the contract documents and applicable regulatory requirements			
4.1	pre-construction	X	X	sub-stage where the actual construction of the asset is prepared and scheduled and project specific prefab parts and components may be produced	construction preparation	construction management cost controlling / quantity surveying factory acceptance tests – FAT (B&I)	

Table A.1 — Stages and sub-stages *(10 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
4.2	construction	X	X	sub-stage where the asset is built in compliance with the contract documents and applicable regulatory requirements		supervision control construction management monitoring project performance cost controlling / quantity surveying construction HSE management construction quality management inspection construction schedule control and progress measurement construction contract administration regulatory approval (IF) field engineering (IF) material management (IF)	

Table A.1 — Stages and sub-stages *(11 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
4.3	commissioning	X	X	sub-stage where is it verified that installed equipment is ready for use		user manuals pre commissioning functional test ready for commissioning certificate – RFCC (IF) site acceptance tests –SAT (IF)	In buildings the installed equipment are e.g. HVAC systems. It is verified if these systems are functioning in accordance with specifications. In industrial facilities tests of the equipment (dynamic, drying tightness etc.) are carried out without and before introducing the product that will feed this equipment for producing the end product of the plant.
4.4	handover	X	X	sub-stage where final checks of compliance with the contract documents are performed. At this point the project is handed over to the client and where the starting points and conditions for maintenance and operations are established		signing off the contract and passing on responsibility as built documentation maintenance manuals ready for start-up – RFSU (IF)	

Table A.1 — Stages and sub-stages *(12 of 15)*

		B&I	IF				
4.5	regulatory approval	X		sub-stage where is established and confirmed by the authorities that the built asset complies with the regulatory requirements and that the asset is released for use			

Table A.1 — Stages and sub-stages *(13 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
5.	use	X	X	stage where the built asset is being used and maintained			
5.1	operation	X	X	sub-stage where the facility is being run and exploited and where the expected performance is monitored and managed		start-up (of usage) performance testing operation support safety manuals and instructions facility management accident management / incident management environmental performance assessment serviceability / user satisfaction (ISO 15686-10) achieving compliance with new regulations	'Performance testing' in IF are the tests, as part of the start-up, to check that performance guarantee figures (quality of end products, production capacity, utilities, consumption of raw materials) are met along a test during which an engineering consultancy firm may manage the operation of the plant, with assistance of the 'Process Owner' or 'Licensor'. In Building and Infrastructure 'performance testing' can only be carried out during operation, but is important for signing off the construction contract

Table A.1 — Stages and sub-stages *(14 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
5.2	maintenance	X	X	sub-stage where the asset is maintained according to predetermined objectives		maintenance support facility management maintenance inspections and plans updating of documents routine maintenance monitoring of installations life cycle approach energy efficiency environmental monitoring	Predetermined objectives may be for example: - life cycle approach and environmental efficiency; - energy, waste and water management procedures; - routine inspections planned renewal of installations; - updating of the documentation etc.

Table A.1 — Stages and sub-stages *(15 of 15)*

	Stages and sub-stages	Applicable for		Definitions	Synonyms	Related terms	Remarks
		B&I	IF				
6.	end of life	X	X	stage where the built asset is revamped or dismantled after it's functional and/or economic life span			
6.1	revamping	X	X	sub-stage where the built asset is updated for continued use		debottlenecking refurbishing renovation restoration retrofit redevelopment	'Revamping' is establishing a new cycle in the life of the built asset; it may be considered a new project in its own.
6.2	dismantling	X	X	sub-stage where the built asset is taken down, removed and (partly) recycled after it's functional and/or economic life span	site closing general facility shutdown	demolition: removal of structures decontamination: removal and treatment of (e.g. asbestos or lead) contaminated materials waste management: reuse of selected materials, selection of the appropriate landfill according to waste properties, design of new waste storage landfill recycling	

Annex B
(informative)

Sub Sectors and Disciplines within the Scope of Buildings, Infrastructure and Industrial Facilities

Table B.1 *(1 of 2)*

Sectors	Subsectors	Disciplines
Building	Agricultural Commercial buildings/retail Cultural Educational Exposition facilities Industrial Judicial Laboratories Leisure and sports Medical care Medical cure Offices Public buildings Religious Residential/Dwellings Tourism Etc.	Architecture Building Science (including acoustics) Building Service (MEP) Engineering Construction management Cost management Facility management Geotechnical Engineering Health, Safety and Environment Advice Interior Design Landscaping Management services Programme engineering Project management Structural Engineering Urban planning Value management Etc.
Infrastructure	Airports Bridges, fly-over's Coastal protection Harbours Land use planning Networks (water, gas, electricity, communication, chemicals, sewers) Rail Roads Tunnels Water/waste water Water ways/Canals Etc.	Acoustics Archaeology Architecture Civil Engineering Construction management Cost management Environmental Engineering Flow Management Geodesy Geotechnical Engineering Hydraulics Landscaping Management services Programme engineering Project management Service Engineering (Electrical Engineering, …) Structural Engineering Traffic Engineering Urban planning Value management Water management Etc.

Table B.1 *(2 of 2)*

Sectors	Subsectors	Disciplines
Industrial Facilities	Agro-industrial plants Chemical Fertiliser Food processing industries Manufacturing industries Mining / metals Off shore & subsea facilities Oil & Gas Petrochemical Pharmaceuticals plants (Life Sciences) Power plant Waste processing Etc.	Air conditioning engineering Buildings & structural engineering Civil engineering Electrical Engineering Expediting Inspection Instrumentation engineering Lay-out engineering Mechanical engineering (including ovens & furnaces, rotating equipment, pressure vessels) Piping engineering (including materials & corrosion) Process engineering (including heat transfer) Project Management components (control (estimating & cost, planning & progress, documentation, …), risk, contract, quality, HSE, security, IT, configuration, materials, …) Purchasing Safety, Noise, Environmental engineering Subcontracting Traffic Etc.

Annex C
(informative)

Alphabetical index

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