SOCIETY OF ALLIED
WEIGHT ENGINEERS, INC.

Aerospace • Marine • Offshore •
Land Vehicle • Allied Industries

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RECOMMENDED PRACTICE

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TERMINOLOGY USED IN WEIGHT MANAGEMENT OF OFFSHORE PROJECTS

Revision Letter **PD-01**

Prepared by
Offshore Industry Committee
Society of Allied Weight Engineers, Inc.
(SAWE, www.sawe.org)

Change Record

All substantive changes to the current revision of this document are identified by a solid black vertical line on the left border of the text. A summary of those changes is detailed below.

The revisions shown here are only for approved revisions of the 2024 copyright year. The change record history for previous revision years should be referenced in the documents from those years, if applicable.

Rev	Date	Description	Entered by
-	01 May 2018	Initial Issue (original unpublished drafts completed in 2017 with only non-substantive changes made thereafter)	B Randall, M. Rapier, A.K. Matschinsky
WD	06 May 2024	Working Draft	J. Robertson
CD-01	23 May 2024	Initial Committee Draft	J Robertson
PD-01	23 Sep 2024	Public Draft	J Robertson

Foreword

This document was authored by the SAWE Offshore Industry Committee.

This document shall be maintained as a stabilized document; this status shall be subject to review on a ten-year cycle from the approval or last revision of the document.

Questions regarding this document may be made by e-mail to: STANDARDS@sawe.org.

Disclaimer

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1 Scope

At the onset of each project, weight management specific definitions are listed in applicable documents to clarify weight management terminology to be used on that project. Efforts should be made to utilize SAWE standard definitions. However, project specific definitions may take into consideration specific terminology used in client specifications and terms common to governing bodies with jurisdiction. Where there is conflict between SAWE recommended terminology and client terminology, work with the client to come to a consensus on what definitions will be used. The agreed upon definitions shall be recorded prior to being issued for project use.

2 Purpose

This document has been created to ensure consistency across all weight management documents used in offshore projects. This document starts with terms as defined in ISO 19901-5: 2003-2021. Additional terms commonly used for weight management, but not defined by ISO, are included and, to the extent possible, have been defined per their most common industry usage.

3 Associated Documents

This recommended practice shall be used in conjunction with the following publications. When a document has been superseded, the current revision shall apply.

SAWE RP O-2	SAWE Recommended Practice, Coordinate Reference System for Offshore Systems

4 Definitions, Abbreviations, Acronyms

4.1 Definitions

Refer to ISO 19901-5 [1,2,3], § 3 for paragraphs identified as such in the definitions below.

Aft Perpendicular

A vertical datum line passing through a ship's rudder stock, the aft end of the rudder post, or a convenient point at the aft end of the vessel. Applicable only to ship-shaped floating facilities.

Area, Deck

Area of an individual deck or mezzanine defined by the outside perimeter of the deck level including egress ways, porches, stair landings, etc. Access platform areas are not included.

Area, Facility

Combined deck area of all primary decks and mezzanines defined by the outside perimeter of the deck level including egress ways, porches, stair landings, etc. Access platform areas are not included.

Assembly

(ISO 19901-5:2021) Designed and fabricated group of discipline bulks and tagged equipment which form one unit.

(SAWE clarification) Not to be confused with a module (see below). Examples include skids, packages, and other pre-assembled units. An assembly is typically a portion of a module that due to transportation or installation issues cannot be installed until after the module has been installed on the facility.

Ballast

Solid or variable fluid content used to control draft, heel, trim, or vertical center of gravity (VCG). Solid ballast may be used to develop on-bottom weight for gravity-based structures.

(SAWE clarification) Solid ballast is permanently fixed and is not variable. Liquid ballast permanently stored on board may also be considered fixed ballast. Fixed ballast is generally intended to lower the VCG.

(SAWE clarification) Variable ballast is liquid (generally sea water) which can be pumped from tank to tank, pumped overboard, or drawn from the sea to adjust trim and/or draft for various facility operations such as altering the location of the drilling derrick, receiving a heavy temporary load, mitigating stability impairment due to hull damage, etc.

(SAWE clarification) – Variable ballast is also used to compensate for usage of consumables and variability in cargo weight.

Budget Weight

(ISO 19901-5:2021) Weight and center of gravity reference values as part of the control weights.

(SAWE clarification) A weight baseline established as a control reference during a project phase. Budget weight is calculated by adding the agreed upon weight margin to the gross weight (at the time of establishing the budget). Budget weight is exclusive of future reserve. The budget weight shall only be updated because of change(s) to the design basis and shall be captured by the management of change (MOC) process.

Bulks

(ISO 19901-5:2016) Component or arrangement of components defined as stock materials or of low complexity.

NOTE: Bulk items support equipment items by providing infrastructure around and between them.

(SAWE clarification) The weight of all materials and components not included in the Master Equipment List (MEL). Bulks include items such as structural steel, piping, valves, electrical cables etc.

Center of Gravity (CG)

(ISO 19901-5:2021) Point in a body or system of bodies at which the entire weight is considered to act.

(SAWE Clarification) For assemblies, modules, or entire facilities, the CG is the point through which all weights which make up a specific loading condition may be assumed to act.

Can also be abbreviated as CoG.

Center of Gravity Envelope

(ISO 19901-5:2021) Defined volume within which the CG of an assembly is constrained for a specified loading condition.

(SAWE clarification) Throughout the course of the project, the CG for each loading condition should remain within the designated envelope. The allowable envelope may vary from one loading condition to another. The dimensions and location of the envelope are determined by the capacity of the supporting structure for the specified loading condition. This may be stability requirements for a transport vessel, lifting capacity for a crane, or structural capacity for a facility.

(SAWE clarification) The envelope must be defined in three-dimensions and the location of its center using the project CG coordinate system. Envelopes are defined for assemblies, modules, and facilities as required.

Consumables

(ISO 19901-5:2021) Material used and replenished during normal operation of a facility.

(SAWE clarification) Consumables are typically used in the utility (non-process) systems on a facility (e.g., diesel fuel, all waters, etc.). Consumables are located in equipment (tanks) and piping of a facility.

Content

Fluids, powders, or materials held within equipment, piping, or storage spaces, at their normal operating levels. Typical contents are hydrocarbons, cooling and heating mediums, chemicals, fuels, condensates, seawater, fresh water, dry powders, dry stores for workshops, sack stores, etc.

Fluids that are continuously installed within equipment (e.g., coolants and lubricating oils) are not content. These fluids are included in the equipment dry weight.

The dead volume of a tank (i.e., volume of content located beneath the bottom of outlet piping) shall be included when determining the weight of content in a tank or vessel.

See Dry Weight and Normal Operating Level for further explanations.

Control Weights

(ISO 19901-5:2021) Budget weight (and associated CG envelopes), NTE weight (and associated CG envelopes), and reserves (e.g., management reserve, planned future reserve, unplanned future reserve) for each loading condition.

(SAWE clarification) Weight baselines established as control references during a project phase. Control weights shall only be updated because of changes to the project design basis and shall be captured by the MOC process.

Company Operations

Temporary items (bulks and equipment) employed by the Company after start of operations. Examples are wireline, coiled tubing units, temporary equipment for maintenance or periodic specialized operations.

Coordinate System

A three-dimensional system utilizing distances from a specified origin to locate the CGs of bulks and equipment. Also used to define the CG for the facility.

See SAWE Recommended Practice O-2, *Coordinate Reference System for Offshore Systems*

Cut-Off Date

The deadline for accepting updated weight and CG data from disciplines and other sources for inclusion in the impending weight report. Data received after the cut-off-date will be incorporated into the following report.

Deadweight (DWT)

(ISO 19901-5:2016) Total carrying capacity of a floating structure.

NOTE: Includes weight of crude oil, deck cargo, temporaries, water, snow and ice accumulations, marine growth, ballast water, consumables, and crew and their effects.

(SAWE clarification) Deadweight is the sum of all variable weights (e.g., crude oil, deck cargo, temporaries, marine growth, ballast water, consumables, and crew and effects). Essentially the total weight of a floating facility excluding its lightship weight.

(SAWE clarification) Applicable only to floating facilities. A measure of how much weight a floating facility is carrying or can safely carry; it does not include the lightship weight. DWT is the sum of the weight of cargo, fuel, fresh water, ballast water, provisions, POB, mooring and riser vertical loads, and gangway connections (if applicable).

- Deadweight can be calculated at any given point by subtracting lightship weight from total current weight.
- Maximum allowable deadweight is displacement at maximum draft minus the lightship weight.

Deck Level

A general location describing an item's location within the facility. Specifically related to the horizontal plane on which the item is located.

See Table 5-1 for typical deck level designations.

Delivery Team

Engineering groups responsible for the design and fabrication of specific elements of the facility. Typical delivery teams include Topsides, Hull, Mooring, Sub-Sea, Drilling, and SURF. Other teams may be identified as required by project specifics.

Design Allowance

Addition applied to net weight of bulks and equipment to account for anticipated weight growth due to the level of uncertainty in the current design. It also considers weight growth due to design development and fabrication. Design allowance is also referred to as weight allowance.

NOTE: Design allowance is commonly expressed in the weight database as a percentage of an item's net weight. Design allowance may also be expressed as a lump sum weight applied to either an individual item in the weight database or included in a discipline as a separate entry.

When expressed as a percentage of an item's net weight, the magnitude of the design allowance will be reduced as the item's design evolves and the uncertainty associated with the item's weight is reduced.

Discipline

(ISO 19901-5:2016) Discrete branch of engineering reflecting a single aspect in the project.

Engineering group responsible for the design and procurement of specific bulks and equipment within their scope of work.

See Table 5-2 for typical discipline designations.

Displacement

(ISO 19901-5:2016) Weight of the volume of water displaced by a floating structure.

NOTE: The sum of lightweight and deadweight including mooring system loads, riser loads, appendences, and/or appurtenances e.g. structures outside the moulded hull. Applicable only to floating facilities.

Dry Weight

Weight of a bulk or equipment item, assembly, module, topsides, or facility in its dry installed condition. Includes permanent fluids (e.g., lubricants, hydraulic oil, coolants, filter media, etc.). Excludes content.

(SAWE clarification) Dry is a critical loading condition typically tracked in a weight report. Dry weight is important as it presents the weights of bulks required to complete the work.

Equipment

(ISO 19901-5:2016) Component, or arrangement of components, built for specific function(s).

NOTE: The component/assembly normally has unique documentation due to its function and complexity.

(SAWE clarification) Equipment items are typically provided by a supplier/vendor as an assembled package or skid and include related bulks (e.g. supporting structural frame, piping, electrical, instrumentation, etc.). Items of equipment are responsible for, or involved in, a specific function, (e.g., separators, turbine-compressors, pumps, power generators, cranes, etc.). They are identified on drawings and documents by standardized identifiers used to distinguish between standalone equipment and packages. See also Master Equipment List (MEL).

Estimate to Complete (ETC)

(ISO 19901-5:2021) Estimated weight of bulks and/or equipment with insufficient definition measured by weight take-off.

(SAWE clarification) An additional quantity provided by each discipline lead and added to the weight database to account for items identified but not yet defined in the engineering drawings or 3D model. As these items are defined by engineering and their weights added to the database, the ETC shall be reduced to reflect the advanced state of engineering. ETC is not to be confused with Design Allowance.

Estimated Weight

(ISO 19901-5:2021) Weight derived by using norm-based calculations or previous experience.

(SAWE clarification) Estimated weights exclude design weight allowance. See also Net Weight.

Facility

(ISO 19901-5:2021) Topsides and substructure that is built and installed to serve a particular purpose.

Facility Weight

Combined weight of topsides and its hull, or supporting structure, excluding vertical loads exerted by riser and/or mooring systems.

Front End Engineering and Design (FEED)

(ISO 19901-5:2021) Phase following the conceptual design phase, during which the selected concept is matured and design parameters normally are fixed.

First Fill

(ISO 19901-5:2016) Initial filling of specific contents in equipment or piping lines prior to start of operation of an offshore facility.

NOTE: First fill may occur towards the end of fabrication of a module or topsides, prior to transport to the installation site (e.g., filling diesel fuel tanks for power generation equipment). First fill excludes permanent fluids considered in equipment dry weights. Care must be taken not to double-count first fill weights with content for bulks and equipment.

Float-Out

(ISO 19901-5:2016) Loading condition in which a major assembly is transferred from a dry construction site to become self-floating.

(SAWE clarification) Float-Out is a critical loading condition typically tracked in a weight report.

Forward Perpendicular

A vertical datum line passing through the intersection of a ship's stem (or bow) with the waterline (usually the design waterline). For column stabilized units, this is normally the forward-most point of the hull. Applicable only to floating facilities.

Future Reserve, Planned

(ISO 19901-5:2021) Reserve to account for planned modifications (e.g., additions, removal, or relocations) during the operations phase of the facility.

(SAWE Clarification) Planned Future Reserve is often developed when there are defined changes to be made to a facility –a predetermined time (e.g., several years after the start of operations) for which an estimated weight and CG are included in a weight report.

Future Reserve, Unplanned

(ISO 19901-5:2021) Reserve to account for the addition of unplanned modifications during the operations phase of the facility.

NOTE: Examples include equipment upgrades, process and non-process system modifications (including new flowlines), additional supporting structures, etc.

(SAWE Clarification) Unplanned Future Reserve is an assumed lump sum weight and CG included in a weight report to account for potential weight growth after the start of operations.

Grillage

(ISO 19901-5:2016) Steel structure, secured to the deck of a barge or vessel, designed to support the cargo and distribute the loads between the cargo and the barge or vessel.

(SAWE clarification) Cargo is an assembly, module, topsides, or hull.

Gross Weight

(ISO 19901-5:2016) Sum of the net weight and weight allowances.

(SAWE clarification) Sum of calculated weight and design allowance. Also known as Reported Weight. Gross weights are always paired with net weights in a weight report.

Heel

The angle of inclination of a vessel about its longitudinal axis (transverse rotation, to port or starboard). Applicable only to floating facilities.

Hook-Up and Commissioning (HUC)

(ISO 19901-5:2021) Installation of components or assemblies after the modules have been installed in their final position, to connect to the existing installation.

(SAWE clarification) Construction phase of a facility where interconnecting material (hook-up items) are installed between assemblies and modules, modules and modules, or topsides and supporting structures. Includes commissioning of systems prior to start of operations. Also referred to as Integration and Commissioning.

Hook-Up Item

Equipment or bulks installed (or relocated from a temporary to a permanent location) in an assembly, module, topsides, or facility after being placed in its final location (i.e., item required to integrate portions of the facility which were installed separately). This also applies to interconnecting bulks located between adjacent modules or assemblies within a facility.

Hook Weight

The sum of lift weight and the weight of rigging. This represents the total amount of weight to be supported by the crane at its hook.

(SAWE clarification) Hook weight is not often tracked in a weight report as the weight of rigging is developed by the lifting contractor and is subject to change without the weight report being updated. Therefore, hook weight is usually developed by the lifting contractor based on a published lift weight.

In-Place Conditions:

Refers to the group of loading conditions which occur with the facility in its final, operational location and state. Conditions normally included in this group are Initial Lightship, Initial Operating, Future Lightship, and Future Operating. Storm and Damage cases are also considered “In-Place”.

(SAWE clarification) In-Place Conditions are critical loading conditions for a floating facility typically tracked in a weight report.

Lift Weight

The gross weight of an item, module, or assembly in condition to be lifted. Includes all temporary bracing, pad eyes, trunnions, etc. Excludes all rigging.

(SAWE clarification) Lift is a critical loading condition typically tracked in a weight report.

Lightship

(ISO 19901-5:2021) Displacement of the complete floating facility (i.e. ready for service) with all its machinery, equipment and outfitting, including permanent ballast, required spare parts, constant process fluids and liquids in tagged equipment and piping at their working levels but without liquids in storage or reserve supply tanks, items of consumable or variable loads, stores, or crews and their effects.

(SAWE clarification) Systems necessary for basic operations should be filled with fluids to their normal operating level. Excludes hydrocarbons or other non-permanent process fluids).

(SAWE clarification) The lightship condition is a loading condition containing only the lightship weight. There are no other weights and/or loads considered. Applicable only to floating facilities.

Also known as Lightweight.

Lightship Content Weight

Weight of the content in equipment, piping, and systems as necessary for minimum operations. Includes permanent fluids in closed loop systems. Excludes process content (e.g., hydrocarbons or water for water injection). Applicable only to floating facilities.

Loading Condition

(ISO 19901-5:2021) Condition for which the weight and center of gravity of an assembly is required to be managed.

(ISO 19901-5:2016) NOTE: For each loading condition, all weight items and variable loads that are known or predicted to occur are identified, quantified, and located.

(SAWE clarification) Loading conditions are defined by project requirements and vary from project to project. For floating facilities, loading conditions are the details of all weights that contribute to the displacement, at their actual position onboard.

Also known as Load Case.

Load-Out

(ISO 19901-5:2016) Transfer by way of horizontal movement of an assembly, module, or topsides from its land-based fabrication site onto a floating or grounded transport barge or vessel.

NOTE: The following are typical load-out operations:

- Skidded: Load-Out using a combination of skidways, skid-shoes, or runners, propelled by towing engines, jacks, or winches;
- Trailer: Load-Out using multi-axle trailers (self-propelled modular transporter (SPMT)).

(SAWE clarification) Load-out is a critical loading condition typically tracked in a weight report.

Load-Out Weight

The gross weight of the item, including any hook-up or temporary items (e.g., load-out frame, set-up cans, skid shoes, etc.) installed at the time the item is loaded onto the transport vessel.

(SAWE clarification) Similar to hook weight, load-out weight may not track skid shoe weights in a weight report as their weight is developed by the load-out contractor and is subject to change without the weight report being updated. Therefore, load-out weight is usually developed by the load-out contractor based on a published weight for the item plus the weight for the skid shoes.

Longitudinal CG

The perpendicular distance from a transverse vertical plane through the referenced origin of the facility to the CG of an item.

Margin, Stability

The mathematical difference between the defined maximum allowable VCG and the calculated VCG. May have a positive or negative value and is indicative of the stability of a floating facility.

NOTE: The calculated VCG should include any free surface correction due to partially filled tanks.

NOTE: The maximum allowable VCG is defined via stability analysis.

Applicable only to floating facilities.

Margin, Weight

The mathematical difference between the budget weight and the gross weight for an assembly, module, topsides, or facility for a selected loading condition. This margin may have a positive or negative value and is an indicator of whether or not the loading condition budget weight has been exceeded.

Master Equipment List (MEL)

A project document used to track engineering design attributes (e.g., dimensions, power consumption, weight, etc.) of equipment used in a facility.

Mating

(ISO 19901-5:2016) Transfer of a major assembly supported on barge(s) or vessel(s) to a temporary or permanent support structure.

(SAWE clarification) Mating is a critical loading condition typically tracked in a weight report.

Mating Weight

The gross weight of a topsides ready for installation onto a hull or support structure. Includes all mating temporaries (guides, bumpers, etc.) but excludes the load-out and transportation specific weights (external sea-fastening, tie-downs, etc.).

Material Take-Off (MTO)

The calculated amount of bulk material and/or bulk weight that must be purchased to complete an assembly. This calculation accounts for wastage of material being fabricated and sold in pre-defined units. Note this is not to be confused with a weight take-off (WTO) where wastage is excluded. *An MTO is not adequate for weight management purposes.*

Module

(ISO 19901-5:2016) Major assembly of items forming a major building block which needs to be controlled with respect to weight and CG.

A contractually predefined building block of a facility that will be combined with other modules to complete the facility. Associated with topside construction on fixed and floating facilities.

Moment

The product of an item's weight times the perpendicular distance of the item's CG about the referenced axis from which the distance has been defined.

Mass Moment of Inertia (MMoI)

Moments calculated about the topside, hull, or facility global axes going through a defined datum point. (i.e., $Ixx = M(y^2 + z^2)$ where Ixx is the item's MMoI calculated from mass M and distances y and z from the item's CG to the Y and Z axes).

Calculated quantity for a rigid body that is undergoing rotational motion around a fixed axis. It is calculated based upon the distribution of mass within the object and the position of the axis, so the same object can have quite different moment of inertia values depending upon the location and orientation of the axis of rotation.

Net Weight

Best estimate of the weight for an item, assembly, module, or facility obtained from historical factors, early design documents or sketches, WTOs, 3D model extractions, or equipment vendor datasheets, or weighing certifications. Excludes design allowance.

See also Estimated Weight.

Normal Operating Level:

The elevation of the top of the fluid content in tanks and vessels used to determine content weight for operating loading conditions.

For process equipment, this is defined by the locations of level instrumentation on the P&IDs on which the equipment is defined. For tanks of consumable fluids (e.g. diesel fuel, water (drill, service, and fresh), etc.) the level is typically 60% of the tank's working capacity.

For tanks containing drilling fluids (e.g., mud and base oil, cuttings, mud cleaning, brine, etc.) that may be full, partially full, or empty during normal drilling activities, the weight of fluid is calculated by performing an analysis of tank usage and determining which combination of tank weights will result in a maximum weight scenario.

The normal operating level for drain tanks and process separators will be based on the fluid level established by the internal configuration of the tank.

For all other tanks and vessels, the level is 100% of its working capacity.

NOTE: To allow for expansion of the fluid, oil and fuel tanks are filled to a maximum of 98% of capacity.

Not-to-Exceed (NTE) Weight

(ISO 19901-5:2021) Maximum acceptable weight and CG envelope for the respective loading condition.

(SAWE clarification) Theoretical maximum weight of an assembly, module, or facility in a specific loading condition, which shall under no circumstances be exceeded, except through the MOC process. Design of special critical items (lift, support points, towing, jacking, installation, and operating conditions) may be based on NTE weights. NTE weight will be equal to the budget weight plus any management reserve.

(SAWE clarification) For floating facilities, NTE is used to define the maximum weight/VCG combination to meet all stability criteria.

Offshore

Refers to an oil, natural gas, or condensate field that is located under a body of water, or to activities or operations conducted in relation to such a field. Specific to weight management, offshore generally refers to loading conditions (or work done) at or near the final location of the facility (e.g., mooring operations, riser pull-in, topsides installation, commissioning, etc.).

Operating Weight

(ISO 19901-5:2021) Dry installed weight plus variable weight.

(SAWE clarification) The weight of a bulk or equipment item or system in its operational state, including contents at their normal operating levels and permanent fluids in equipment. For a total facility, operating weight also includes laydown and storage loads.

(SAWE clarification) Operating is a critical loading condition typically tracked in a weight report.

Opportunity, Weight

A potential event or item that, if implemented, will reduce the weight of the facility. Opportunities are tracked in a risk and opportunity register.

Personnel on Board (POB)

Number of personnel present on the facility during normal operations. POB weight estimate typically includes persons, their belongings, living quarters stores for catering (food, utensils), and laundry (bedding, etc.).

Pitch

The angular component of the oscillatory motion of a vessel measured about the transverse (y) axis. Applicable only to floating facilities.

Quayside

The area immediately adjacent to an assembly quay or pier used for mooring barges, transportation vessels, or floating structures for construction purposes or prior to being towed to an offshore location.

Radius of Gyration

The square root of the quotient of the floating facility's mass moment of inertia about the roll, pitch, and yaw axes, respectively, divided by the facility's displacement. It is also the perpendicular distance from a point mass to the axis of rotation.

$$R = \sqrt{I/A}$$

Also known as Gyradius.

Reference Origin

The location of the intersection of the x, y and z axes used in determining the CG. Refer to RP O-2 for details.

Regulatory Body

Any governmental agency, department, or subdivision and all national, regional, municipal, class society, or local authority with jurisdiction over the facility.

Residual Fluid Content

(ISO 19901-5:2016) Content in bulks and equipment remaining after testing or commissioning and being present during the subsequent loading conditions up to the start of production.

(SAWE clarification) Can also include unpumpable volume of fluid remaining in a tank while in-service (i.e., ballast remaining in a ballast tank after the tank has been 'emptied').

Rigging

Items needed during a lifting operation (e.g., slings, spreader bars, lifting frames, shackles, etc.).

Risk, Weight

A potential event or item that, if implemented, will increase the weight of the facility. Risks are tracked in a risk and opportunity register.

Roll

The angular component of the oscillatory motion of a vessel measured about the longitudinal (x) axis. Applicable only to floating facilities.

Scantling Draft

The maximum draft at which a vessel complies with the governing strength requirements. Applicable only to floating facilities.

Sea Fastening

Temporary items used to keep items in position during transportation at sea. May be internal or external to an assembly, module, or topsides.

Structure

Complete assembly capable of being lifted, containing bulks and equipment. Examples are module support frames, integrated decks, bridges, flare booms/towers and topsides modules for offshore facilities.

Supplier / Vendor

Organization providing bulk material or equipment for incorporation into the facility.

System

The combination of bulks and equipment supporting the same function (e.g., production of compressed air, generation of electrical power, separation of water from oil, etc.).

Temporary Items

(ISO 19901-5:2021) Items temporarily installed during a loading condition and removed afterwards.

NOTE: Temporary items do not form part of a facility's permanent dry or operating weight.

(SAWE clarification) Items used during fabrication, transportation, and/or installation (e.g., guides, stops, bumpers, scaffolding, etc.) and removed prior to start of operations.

Test Weight

(ISO 19901-5:2016) Sum of the dry weight plus the content required to test the equipment and assembly.

(SAWE clarification) Testing may be done to ensure the equipment is functioning correctly, or if there are any leaks in vessels or piping.

Topsides

(ISO 19901-5:2021) Assemblies placed on a substructure (fixed or floating) to provide some, or all, of a facility's functions.

NOTE: For floating facilities and jack-ups, the hull deck is not typically part of the topsides, however, some of the equipment mounted in or on the hull can be defined as part of the topsides.

NOTE: A separate fabricated deck or module support frame is typically part of the topsides.

(SAWE clarification) A topsides is typically a combination of several modules installed on a fixed or floating supporting structure.

Tow-Out

(ISO 19901-5:2016) Towing of a complete floating structure to the offshore installation site.

(SAWE clarification) Tow-out is a critical loading condition typically tracked in a weight report.

Transport

(ISO 19901-5:2003) Loading condition in which an assembly, module, or topsides is transferred from one inshore/at shore location to another location or to its final offshore installation location.

(SAWE clarification) Transport is a critical loading condition typically tracked in a weight report.

Transport Weight

Weight of an assembly, module, or topsides. including sea-fastening, installation temporaries, and construction temporaries.

Transverse CG

The perpendicular distance from the vertical centerline plane of the facility to the CG of an item.

Trim

The angle of inclination of a vessel about its transverse (y) axis (longitudinal rotation, to bow or stern). Applicable only to floating facilities.

Unauthorized Weight Growth

An unapproved change in weight that adversely affects project weight. Typically applies to weight growth during operations phase that has not been correctly tracked in a weight report.

Variable Weight

(ISO 19901-5:2021) Weights of fluid and powders in equipment and piping, including process and non-process fluids (e.g., brine, potable water, and diesel storage), drill pipe, drill casing, drilling consumables (e.g., fluids and powders), scaffolding, laydown areas and storage areas that occur coincidentally.

(SAWE clarification) Includes ballast water, consumables, crew and effects, and any other operating weights not specifically included as part of the lightship weight.

Vertical CG

The perpendicular distance from a horizontal plane through the vertical reference of the facility to the CG of an item.

Weighed Weight

Weight and CG of a piece of equipment, assembly, module, or topside determined using calibrated weighing devices and an approved weighing procedure.

Weighing Prediction

Predicted weight and CG of an assembly, module, topsides, hull, or overall facility calculated from the project weight report at the time of weighing.

Weight Data

Weight information (i.e., weight, CG, quantity, location, etc.) provided for inclusion in the weight report.

Weight Database

(ISO 19901-5:2021) Database containing the net weight take-off, gross weight take-off, and/or estimate to complete for each weight item that sums to the predicted weight and CG for each loading condition.

(SAWE clarification) Database typically includes codes per weight item identifying the installation phase, level of design allowance, source of estimate, plus others as required by the project.

Weight Item

(ISO 19901-5:2021) Individual or group of discipline bulks and/or equipment, variable weights, or assemblies identified for weight reporting purposes.

(SAWE clarification) Weight item is the lowest level of definition tracked in a weight database.

Weight Installation Code

(ISO 19901-5:2003) Computer code defining in which loading conditions a component or a weight item is present.

(SAWE clarification) Alphanumeric code used in weight databases to define if a weight item has been installed.

Also known as Weight Phase Code.

Weight Management

(ISO 19901-5:2016) All planned and controlled activities which deal with the:

- Definition and publication of the project weight procedures, objectives, and policies;
- Identification of, information about, and evaluation of alternative design solutions;
- Selection and implementation of an optimal design with respect to weight, CG, volume, functionality, cost, and progress;
- Monitoring and reporting weight data throughout the complete life cycle of an installation to assess present and potential weight status.

NOTE: Project management, engineering disciplines, and weight control discipline shall cooperate and participate to influence the weight management process by means of adequate working methods and tools.

(SAWE clarification) The various methods and techniques used to check, allocate, monitor, and control the weight and CG of a facility across the multi-disciplines involved in design and construction. The process involves collation of weight information, maintenance of a weight database, and consequent advice to disciplines and engineering management to allow actions to be taken to correct any adverse concerns.

Weight Management Objective

(ISO 19901-5:2021) Set of engineering goals necessary to fulfill weight and CG requirements.

Weight Monitoring

Obtaining, verifying, recording, and processing information on the weight of each weight item in a facility so that its aggregate weight and CG is always known.

Weight Policy

(ISO 19901-5:2016) Statement from the project management, based on the weight objective, defining how the weight objective is to be achieved.

NOTE: As a minimum, the policy should include:

- The importance of the weight objectives to the project aims and results;
- The priority, profile, and control of weights at different levels in the project;
- A philosophy for responsibility and authority within and between project groups engaged in weight matters.

(SAWE clarification) Commonly referred to as a Weight Management Philosophy or a Weight Philosophy.

Weight Reporting

(ISO 19901-5:2003) Adequate and timely weight and CG information reported with respect to content and presentation in order to fulfill expectations and requirements from/needs of organizations involved in the project.

Weight Report

(ISO 19901-5:2016) Regularly issued project document that details the weight and CG for required assemblies and load conditions based on best available information.

NOTE: This document provides the basic load case for the project structural integrity models.

(SAWE Clarification) Written and graphic presentation of project weight data issued on a regular basis and current as of a specific, defined cut-off date. Project requirements will define the regularity of issuing the weight report.

Weight Representative

Representative appointed by a discipline to coordinate presentation of their weight data and liaises with the weight management discipline.

Weight Reserve, Client

(ISO 19901-5:2016) Weight addition (usually a lump sum weight) controlled by the Client and used to cater for any orders for variation to the contractual design concept.

(SAWE clarification) In this case, Client is the project owner (i.e., oil company). This reserve is the mathematical difference between the NTE and budget weight for an assembly, module, or facility that is used to accommodate known items (i.e. future items for which an accurate weight has not yet been determined), as well as any unknown items that come about during the concept design (i.e. design changes initiated by the Client). As weights are assigned to specific items as Client requested changes are implemented, the Client reserve is reduced by an equivalent amount.

Also known as Management Reserve.

Weight Reserve, Contractor

(ISO 19901-5:2016) Additional weight (either a lump sum weight or percentage of a total weight) at a specified CG, controlled by the Contractor and used to account for any design growth within their control.

(SAWE clarification) In this case, Contractor is the engineering organization responsible for the design and material procurement for a facility. The Contractor controls this reserve to cover uncertainties early in the design process. As weights are assigned to specific items and uncertainties removed, the reserve is reduced by an equivalent amount. Any unused reserve should be remanded over to Client reserve when the design is frozen.

Weight Reserve, Fabricator

Additional weight (either a lump sum weight or percentage of a total weight) at a specified CG, controlled by the Fabricator and used to account for any fabrication weight growth within their control.

(SAWE clarification) In this case, Fabricator is the organization responsible for the fabrication of a portion of, or an entire facility. This reserve is controlled by the Fabricator to cover fabrication uncertainties. As weights are assigned to specific items, the reserve is reduced by an equivalent amount. Any unused reserve should be assigned to Client reserve when the fabrication is complete.

Weight Review Board (WRB)

Representatives from the Client/owner, design engineer, disciplines, and weight discipline tasked with the responsibility to approve or deny implementation of changes to data presented in the weight report.

Weight Status Code

(ISO 19901-5:2016) Code, based on the maturity of the design, used to identify the level of accuracy of the weight of a weight item.

(SAWE clarification) Alphanumeric code used in the weight database to define the source and/or uncertainty of the weight data for the weight item.

Weight Take-Off (WTO)

The calculated weight (exclusive of wastage) of bulk material to be installed to complete a weight item. Calculates the net weight. The weight discipline will add appropriate design allowance.

(SAWE Clarification) WTO is not to be confused with an MTO which includes material wastage.

Weight Threshold

A weight limit indicating that items with weight below the limit follow one set of reporting requirements while items above the limit follow a different set. Most often used to delineate what items must be weighed using load cells (e.g., items weighing more than 10 metric tonnes) and which items may be weighed using less restrictive measuring methods (e.g., items weighing less than 10 metric tonnes).

Weight Units

See §6 for recommended weight units.

Yaw

Rotation about the vertical axis (z). Applicable only to floating facilities.

4.2 Abbreviations

Abbreviations and acronyms used in the offshore recommended practice and standard documents are listed in Table 4-1.

Table 4-1. Abbreviations and Acronyms

Term	Description
ABS	American Bureau of Shipping
AFC	Approved for Construction
AFD	Approved for Design
BOD	Basis of Design
CAD	Computer-Aided Design
DDR	Design Deviation Request
DNV	Det Norske Veritas
FEED	Front End Engineering Design
FOI	Floating Offshore Installation
FPSO	Floating Production, Storage, and Offloading
FSU	Floating Storage Unit
GA	General Arrangement
GoM	Gulf of Mexico
HVAC	Heating, Ventilation & Air Conditioning
IFC	Issued for Construction
IFD	Issued for Design
ISO	International Organization for Standardization
MOC	Management of Change
N/A	Not Applicable
P&ID	Process and Instrumentation Diagram
PDMS	Plant Design Management System
PFD	Process Flow Diagram
RFQ	Request for Quotation
ROR	Risks & Opportunities Register
SACS	Structural Analysis Computer System (software)
SCR	Steel Catenary Riser
SPMT	Self-Propelled Modular Transporter
TA	Technical Authority
TBE	Technical Bid Evaluation
TLP	Tension Leg Platform
TQ	Technical Query
USCG	United States Coast Guard
WLB	Weight and Load Budget

5 Nomenclature

The following nomenclature, shown in Table 5-1 and Table 5-2, is typically used to describe offshore facilities.

Table 5-1. Typical Deck Nomenclature

Deck
Top of Column
Top of Hull
Cellar Deck
Production Deck
Main Deck
Weather Deck
Mezzanine Deck
Deck Box
FPSO Specific:
Main Deck
1st deck, 2nd deck, 3rd deck, 4th deck, etc.

Table 5-2. Typical Discipline Nomenclature

Disciplines
Architectural
Drilling
Electrical
HVAC
Instrumentation
Mechanical
Piping
Safety / Loss Control
Structural
Telecommunications
Weight Control

6 Weight Units

It is recommended that metric units (International System of Units, SI) be used wherever possible. However, it is commonplace for United States Customary Units (sometimes referred to as Imperial units) to be used on projects located in U.S. territorial waters. Below are the recommended units for each system.

6.1 U.S. Customary Units

Dimensions:	feet (ft) and inches (in)
Mass:	short tons (ST), long tons (LT) or pounds (lbs)
Fluid Volume:	barrels (bbl) or gallons (gal)

Note:

It is **not** recommended to use the unit *Kips* for the purposes of weight management. Most cranes, lifting devices, rigging and other installation equipment in the United States are rated in Short Tons. Additionally, barges, trucks, and other transportation equipment, as well as road and bridge capacities, are generally rated in short tons. The use of Kips (½ Short Ton) not only results in weight reporting in an unfamiliar unit, but the requirement to translate the weight to another unit for practical use introduces opportunities for error.

6.2 SI Units

Dimensions:	meters (m) and millimeters (mm)
Mass:	metric tonne (mt, t, te, or Te) or kilogram (kg)
Fluid Volume:	cubic meters (m^3)

7 References

[1] ISO 19901-5:2003, Petroleum and Natural Gas Industries – Specific Requirements for Offshore Structures - Part 5: Weight Control During Engineering and Construction, ISO International Standard, July 2003.

[2] ISO 19901-5:2016, Petroleum and Natural Gas Industries – Specific Requirements for Offshore Structures - Part 5: Weight Control During Engineering and Construction, ISO International Standard, March 2016.

[3] ISO 19901-5:2021, Petroleum and Natural Gas Industries – Specific Requirements for Offshore Structures - Part 5: Weight Management, ISO International Standard, November 2021.