

DEEP-WATER RISERS: DATA CHECKLIST

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1. ENVIRONMENTAL DATA

- water depth and tidal ranges;
- sea state scatter diagram (or wave height probabilities), for the drilling season;
- if available, idealised current profiles and their persistence (likelihood of occurrence) during the drilling season, else;
 - current meter data (current speed versus time, for each measurement depth).

Soil strata data for checking of latched operations:

- maximum depths of each soil strata and the following data per soil type:
 - for clays: shear strength, submerged unit weight, initial strain (ϵ_{50}) (if available), per layer;
 - for sands: friction angle, submerged unit weight, initial modulus (if available), per layer.

2. FLOATING VESSEL DATA

- name, drilling/deployment and survival draughts and trims relative to vessel datum;
- response amplitude operators (magnitude *and* phase) for heave, surge and pitch (or heave, sway and roll, if more severe) at drilling/deployment draught;
- response amplitude operators (magnitude *and* phase) for heave, surge and pitch (or heave, sway and roll, if more severe) at survival draught;
- the sign conventions and datum for these response amplitude operators;
- the elevation of the drill floor above the vessel datum;
- range of hook elevations during deployment;
- rig operating limits, as significant wave height and zero-crossing period, for:
 - open water drilling;
 - conductor and surface casing deployment;
 - riser deployment;
 - latched drilling;
 - latched non-drilling (i.e., waiting on weather);
 - hang-off conditions;
- dimensioned drawing of vessel lower hull for clash checking (preferred), otherwise the locations of all possible clash points, including:
 - moonpool dimensions and elevations;
 - pontoon dimensions and elevations;
 - lower brace dimensions and elevations.

3. MONITORING SYSTEMS AVAILABLE

- current monitoring data availability;
- sea state monitoring data availability.

For latched operations, the following information is also required:

- tension monitoring data availability;
- flexjoint and balljoint angle monitoring;
- on-board real-time riser monitoring packages and capabilities available.

4. DRILL AHEAD (OPEN WATER DRILLING) DATA

- drill string properties (diameters, weight per joint, joint length, etc.)
- drilling torque;
- drilling speed;
- drill fluid densities;
- drill assembly data (submerged weight of bit, collars, pipe, etc.)

5. CONDUCTOR AND CASING DEPLOYMENT DATA

5.1 Conductor Data

- extension joint outside diameter, wall thickness and grade;
- extension joint length;
- conductor outside diameter, wall thickness and grade;
- conductor joint length;
- number of conductor joints;
- installation method (drilled and cemented or jetted);
- weight of conductor assembly during deployment;
- connector capacities (axial and bending);
- connector fatigue data (SCFs and S-N data).

5.2 Casing Data

- well schematic showing casings to be deployed prior to riser installation;
- wellbore profile (MD versus TVD);
- outside diameter, weight, shoe depth, and mud weight, for each casing to be deployed;
- top of cement level, cement weights (lead and tail), and tail height, for each casing;
- cementing policy (particularly if stinger cement job) and contents of casing during deployment;
- coupling capacities (axial and bending);
- coupling fatigue data (SCFs and S-N data).

5.3 Work String Data

- work string diameter, weight and grade;
- HWDP OD, ID and *either* string length *or* joint length and number of joints (if used);
- drill collar OD, ID and *either* string length *or* joint length and number of joints (if used).

5.4 Running Tool Data

- detail drawings for conductor and all casing running tools;
- axial and bending capacities;
- fatigue data for critical locations (SCFs, S-N data).

5.5 Deployment Method

- what is the preferred deployment sequence?
- is a spider used for deployment?
- does the casing spider provide:
 - lateral restraint during casing running?
 - vertical restraint while making up the next joint?
 - both of the above?

6. RISER DATA

6.1 Design Data

- generic rig-based riser design calculations;
- site specific riser operating envelopes (drilling and non-drilling) and supporting calculations;
- top tension policy and operating guidance;
- conductor axial and lateral strength assessment;
- vortex induced vibration fatigue calculations;

6.2 Tensioning System

- number of riser tensioners, tensioner capacity, fleet angle (if applicable);
- number of tensioners per accumulator.

6.3 Upper Ball Joint

- type;
- rotational stiffness (if any: usually zero);
- rotation limit;
- rated axial load capacity.

6.4 Telescopic Joint

- type;
- weight in air (outer barrel only);
- coupling type;
- dimensioned drawing (preferred), otherwise:
 - length when shut;
 - maximum stroke;
 - mean stroke (drilling draught);
 - tension ring height above lower connector;
 - maximum diameter (e.g., across choke and kill line take-offs);
 - termination spool details, if any.

6.5 Riser

- riser diameter, wall thickness and grade;
- coupling type;
- choke and kill lines diameter and centre/centre spacing;
- ditto for any other riser attachments, if applicable (e.g., mud booster lines);
- joint length and weight in air;
- riser space-out, including pup joint data (if applicable).
- buoyancy module diameter and length;
- number of buoyancy units per joint;
- weight in air, per buoyancy unit;
- net uplift, per buoyancy unit.

6.6 Riser Adapter

- weight in air;
- weight in seawater;
- dimensioned drawing of riser adapter/LFJ/LMRP/BOP system (preferred), otherwise;
- height (connector top flange to centreline of LFJ).

6.7 Lower Flex Joint (LFJ)

- type;
- rotational stiffness;
- rotation limit;
- rated axial load capacity.

6.8 Lower Marine Riser Package (LMRP)

- weight in air;
- weight in seawater;
- hydraulic connector (to BOP): type, pressure rating, and lock pressure;
- bolted flanges: type, pressure rating, and bolt make-up stress;
- dimensioned drawing of riser adapter/LFJ/LMRP/BOP system (preferred), otherwise;
 - swallow height (centreline of LFJ to top of re-entry spool).

6.9 BOP

- weight in air;
- weight in seawater;
- hydraulic connector (to wellhead): type, pressure rating, and lock pressure;
- bolted flanges: type, pressure rating, and bolt make-up stress;
- maximum shut-in pressure at subsea wellhead;
- dimensioned drawing of riser adapter/LFJ/LMRP/BOP system (preferred), otherwise;
 - swallow height (top of re-entry spool to top of wellhead connector spool).

6.10 Subsea Wellhead

- type (particularly if rigid lock-down);
- lock-down capacity and fatigue durability (SCFs, S-N curves);
- height of datum above mudline;
- detail drawings.

6.11 Conductor

- conductor data in accordance with 5.1;
- planned top of cement depths.

7. RISER DEPLOYMENT AND HANG-OFF DATA

7.1 Deployment

- what is the preferred deployment sequence?
- what is the layout of the riser installation equipment?
- is a spider used for deployment?
- does the spider provide:
 - lateral restraint during riser running?
 - vertical restraint while making up the next joint?
 - both of the above?

7.2 Disconnect and Hang-off Data

- planned disconnect tension;
- recoil system design data;
- hang-off beam elevations and restraint provided;
- temporary flexjoint elevation and rotational stiffness;
- hang-off beam and support capacities.