

Health, Safety and Environment (HSE) in construction-related activities

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness -for petroleum industry developments and operations. Furthermore, NORSOK standards are as far as possible intended to replace oil company specifications and serve as references in the authorities regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with supported by OLF (The Norwegian Oil Industry Association) and TBL (Federation of Norwegian Manufacturing Industries). NORSOK standards are administered and published by NTS (Norwegian Technology Centre).

Annexes A, B and C are informative.

Introduction

This standard is a revision of NORSOK S-CR-002N, renumbered to NORSOK S-012.

This standard applies to the execution of construction-related activities on- and offshore, as well as marine installation activities. This includes the construction of new installations, shut-down/decommissioning and modifications to/upgrading of existing installations.

The intention is to ensure that adequate precautionary measures are taken in order to prevent harmful effects to people, the environment or material assets in connection with the scope of work. The standard focuses on conditions that can be controlled at the construction site, and presupposes that HSE aspects related to the execution of the construction-related activities are addressed during the engineering phase.

The entire standard has been revised. Revision 2 focuses on ensuring that the content and requirements in this standard shall be project-specific, rather than defining requirements to the Company's HSE management system, which is addressed in NORSOK S-006.

1 Scope

This standard defines requirements related to health, safety and environment (HSE) related to construction and installation- activities on- and offshore, including marine installation activities.

The requirements in this standard set requirements to each project execution.

NORSOK S-006 describes requirements to the Company's HSE management system, which is therefore not covered by this standard.

The standard attempts to define a process for the project through which all involved parties focus on risk, activity, responsibility, systematisation and communication/collaboration.

When contracts are entered into for simple assignments with limited risk, the Company and the Contractor shall agree on the extent to which the standard shall be applied.

2 Normative references

The following standards include provisions and guidelines which, through reference in this text, constitute provisions and guidelines of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet or exceed the requirements and guidelines of the standards referenced below.

NORSOK S-002	Working environment
NORSOK S-006	HSE evaluation of contractors
NORSOK J-003	Marine operations

3 Terms and definitions

3.1

Scope of work

all work to be done, all materials to be delivered, and all commitments to be fulfilled by the Contractor under the terms of the contract

3.2

Contractor

the company or person named in the contract and who is to be responsible for the delivery in accordance with the specified terms

3.3

Company

the company named in the contract that has ordered the delivery

3.4

principal enterprise

the company with statutory responsibility under Norway's Working Environment Act for coordinating work on safety and working environment in the individual companies

3.5

shall

verbal form used to indicate requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted, unless accepted by all involved parties

3.6

should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.7**can**

verbal form used for statements of possibility and capability, whether material, physical or casual

3.8**accident**

event that has caused injury, illness and/or damage to/loss of assets, or harm to the environment or to a third party

3.9**unsafe condition**

condition that could cause injury, illness and/or damage to/loss of property, damage to the environment or to a third party

3.10**near-miss**

incident which, under slightly different circumstances, could have caused injury, illness and/or damage to/loss of assets, or harm to the environment or to a third party

3.11**undesirable event**

event that has caused, or could have caused injury, work-related illness and/or damage to/loss of assets, or harm to the environment or to a third party. This includes accidents, hazardous conditions and near-miss incidents

3.12**risk**

classification of the most probable consequences/losses and the most probable frequency of recurrence in connection with an undesirable event/condition. Ref. Annex A

3.13**notifiable event**

undesirable event or other condition that must be reported in accordance with prevailing statutory regulations to the authorities

3.14**occupational injury**

injury suffered through an accident at work

3.15**lost-time injury**

occupational injury leading to the injured person being unable to resume, or must be relieved of, his/her normal duties in the next shift or subsequent shift(s). This also includes cases where the injury occurred on the last day of the working period

3.16**sickness absence rate**

number of working days lost due to own sickness absence (self-certified days plus days certified by a doctor) as a percentage of all scheduled working days

3.17**fatality**

death resulting from an accident directly related to the individual's work or employment

3.18**serious injury resulting in possible disability**

serious occupational injury that has led, or can lead, to disability

3.19**serious injury**

any injury that **could lead to permanent or long-term disability**, such as the following:

- head injury with concussion, unconsciousness or other serious consequences;
- loss of consciousness resulting from working environment factors;
- skeletal injury, except for simple fractures or broken fingers or toes;
- damage to internal organs;
- full or partial amputation of part of the body;
- poisoning with the risk of long-term health damage, such as H₂S poisoning;
- injury caused by heat, frost or chemical leading to full skin penetration (third degree burn) or partial skin penetration (second degree burn) to the face, hands, feet or abdomen, as well as all other injuries leading to partial skin penetration and covering more than five per cent of the body;
- hypothermia;
- permanent or long-term inability to work disability.

3.20

medical treatment

occupational injury that requires treatment or examination by a doctor, or where treatment is carried out under the supervision of a doctor, such as minor surgery, stitching wounds or use of prescription medication. Simple treatment of wounds, eye baths and the like or not considered medical treatment, even if administered by a doctor

3.21

first aid

all occupational injuries not covered by the definitions in 3.17, 3.18, 3.19 or 3.20.

3.22

alternative work

job different to the one the person normally carries out, as a result of an injury and without a prior doctor's certificate

3.23

suspected work-related illness

illness or symptoms that the employer or health personnel suspect can be due to exposure, strains, harmful effects or other conditions at the current or previous workplaces

3.24

marine installation activities

can include the following:

- installation of subsea templates;
- installation of subsea production equipment;
- installation of pipelines and control cables;
- lifting operations in connection with hook-up and installation of offshore production modules;
- flotel activities.

4 Responsibility

The Contractor shall work systematically with HSE in accordance with established management principles.

The Contractor's organisation shall reflect that responsibility for HSE matters is implemented as a line responsibility at all levels. The Contractor shall ensure management's commitment and attention to all HSE matters in all phases of the scope of work.

The Contractor and the Company shall comply with the local legislation in the state where the activities are located. If the requirements provided in this document are less strict than, or in conflict with, the legislation of the state, the latter shall take precedence.

The Company that assumes the role of principal enterprise, and possibly safety responsible for marine activities and/or principal contractor for assignments not covered by the Working Environment Act, shall have the overall responsibility for ensuring that the activity at the construction site is planned, organised, carried out and documented in accordance with the applicable HSE programme.

The principal enterprise also has full responsibility for coordinating HSE activities for all personnel working on the contract object.

5 HSE – risk assessments

5.1 Introduction

Risk assessments shall be planned, carried out and used actively as a tool for preventing harmful effects on people, the environment or material assets related to scope of work.

Risk assessments involve a systematic mapping of potentially harmful influences, their consequences and their probability.

Even if it is not possible to eliminate all risk connected with the scope of work, the Contractor shall, to the extent that it is possible, follow up the assessments with risk-reducing measures. Probability-reducing measures shall be implemented prior to consequence-reducing measures. When implementing consequence-reducing measures, collective safety measures shall take precedence over individual safety measures.

Results from risk assessments shall be made known to all parties involved in a way that is suited to the different target groups, and used actively in the planning and execution of the scope of work.

The risk assessments shall include all phases and activities connected with the scope of work, and shall be carried out prior to the start of the activities.

The risk assessments shall be documented, and should be done in the following three Steps:

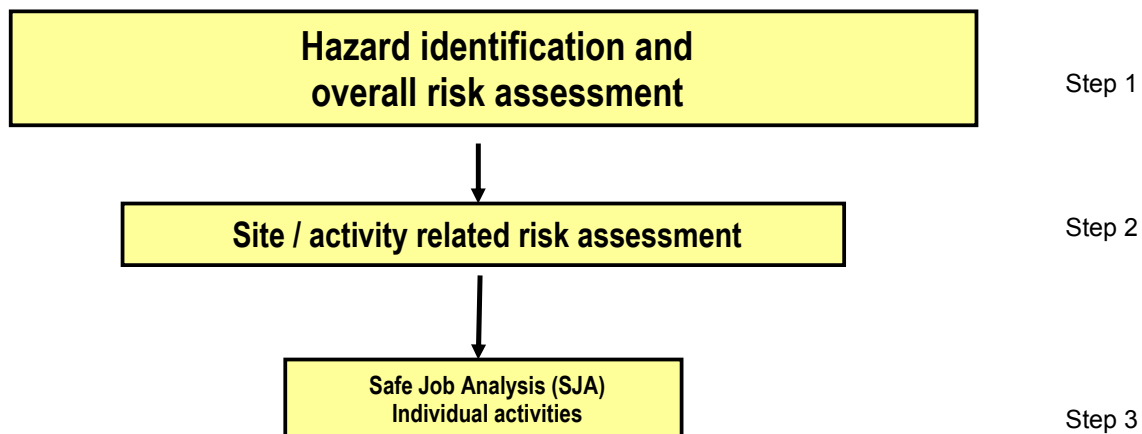


Figure 1 – Basis for the implementation of a risk assessment

5.2 Step 1: Hazard identification and overall risk assessment

The Contractor shall carry out an overall assessment to identify potentially harmful effects that have an unacceptable risk. Risk shall be classified by defining the consequences and probability of the identified harmful effects.

The standard does not set requirements to the use of a specific method for carrying out risk assessments.

The approach shown in Annexes A and B can be used to classify and record unacceptable harmful effects in the relevant phases and activities.

For activities and phases where high-risk harmful effects are identified, detailed assessments shall be carried out (see steps 2 and 3).

For activities and phases where medium-risk harmful effects are identified, detailed assessments should be carried out.

5.3 Step 2: Site / activity related risk assessment

After step 1 is carried out, a more detailed assessment shall be carried out on the activities identified as high or medium risk. The purpose of the assessment is to identify those sub-activities that contribute to increased risk, and possibly implement risk-reducing measures.

The same approach can be used as in step 1.

Activities identified with continued high risk following the implementation of the risk-reducing measures shall be subject to a Safe Job Analysis.

5.4 Step 3: Safe Job Analysis (SJA)

Safe Job Analyses are used for activities that are hazardous, and activities not covered by existing procedures/instructions.

An SJA shall always be carried out when deviating from established safety routines.

Before the activity commences, all involved personnel shall participate in reviewing the SJA to familiarise themselves with all elements of risk.

To ensure maximum quality and involvement in these assessments it is important that representatives from both the performing units and construction management participate.

6 HSE programme

The Contractor shall establish a specific HSE programme and associated activity plan for the scope of work covered by this standard. The overall risk assessment (Step 1), ref. section 5.1, shall be carried out before the HSE programme is established. The programme shall be designed in accordance with applicable management systems. The HSE programme shall be an active document and updated when necessary, such as in the event of major changes in design and/or scope of work.

The HSE programme shall deal with health and working environment, safety, external environment, emergency response and security.

The HSE programme shall be presented to the Company for review in accordance with agreed milestones. The Company shall be notified of any changes to the programme.

The HSE programme shall cover the following points:

1. Define **targets and requirements**, including:
 - Define the project's HSE objectives and how the Company and Contractor's HSE objectives shall be met
 - Identify project-specific requirements related to HSE
2. Describe **focus areas** for the execution of the scope of work and why these are chosen.
3. Define **responsibility and roles**, including:
 - Define principal enterprise and overall HSE management system for the different activities
 - Define all involved companies' area of responsibility and interfaces (such as hired-in labour, subcontractors, etc.), as well as the Contractor's strategy for following them up.
 - Describe roles and responsibilities in the project organisation, e.g. the responsibility of the line, who is responsible for supervisory activities etc.
 - Describe the relationship between the project organisation and base organisation with specific reference to support functions such as HSE, QA, human resources, maintenance, logistics etc.

4. HSE activity plan

The HSE activity plan shall define which activities are implemented to meet objectives and requirements. The plan shall also identify who is responsible, the expected result, planned time for implementation, status of the activities and references to relevant documents.

The HSE activity plan shall, where relevant, cover the following **project-specific** points:

- Establishment and implementation of HSE procedures
- Follow up and implementation of actions from tender evaluation
- Follow up and implementation of actions from previous project phases
- Implementation and follow up of risk and construction feasibility studies
- Implementation of emergency preparedness analyses, assessments and drills
- Experience transfer from/to other projects
- Identification of HSE-related verification activities
- HSE reporting
- Implementation of HSE management inspections
- Preparation of fire and safety placards for the contract object
- Identification and establishment of necessary support systems / indirect activities
- Implementation of HSE training
- Implementation of HSE campaigns, motivation measures and theme meetings

7 Construction feasibility studies

The Contractor shall review the construction feasibility analyses from the engineering phase (ref. NORSOK S-002) to ensure that identified problems have been solved and that any necessary compensatory measures are planned and implemented.

Furthermore, the Contractor shall review his own construction feasibility studies and evaluate, as a minimum, the following points:

- Arrangement and installation sequence with regard to lifting capacities, access, ergonomics, etc.
- Measures to reduce work at great height, over the side, in confined spaces, etc.
- Handling materials and equipment
- Choice, handling and use of chemicals
- Production methods and access for welding, grinding, surface treatment, cleaning etc.
- Choice of method, tools and production equipment etc. bearing in mind noise, dust, temperature, pollution, vibration, weight and other physical/chemical strains
- Possibilities of using fixed installations, e.g. for lifting, access, ventilation and lighting in the construction phase
- Plan and arrange for temporary equipment/support systems, such as access, ventilation, lighting, heating, water, production gases, air, electricity, waste handling, fire fighting and other safety equipment, storage space etc.

The construction feasibility studies shall form the basis for planning and execution of the scope of work/construction activities, and shall therefore be implemented before the activities commence.

If a satisfactory HSE standard cannot be attained, the identified problems shall be solved and followed up with compensatory measures. Measures that reduce the probability of problems arising shall take precedence over measures that limit the possible harmful effects of the problems.

The construction feasibility studies shall be systematic and documented, e.g. through the use of checklists. Representatives from both the project management and the employees shall participate in the construction feasibility studies. Specialist assistance shall be obtained from sources including design engineers, fabrication personnel and HSE consultants.

8 HSE reporting

8.1 Control and follow up of activities

The Contractor shall control and follow up his own activities. The results and follow up of these controls shall be made available to management, own personnel and the Company.

8.2 Notifying and reporting undesirable events/conditions

All notifiable undesirable events or unsafe conditions that the Contractor is aware of shall be reported to the Company without undue delay, irrespective of where the event took place (on the Contractor's premises, onsite or elsewhere). The notification shall include a brief description and time of the event. The notification shall be followed up with a written report at a later date. The report shall include identified causes and measures.

It shall be **clarified between the Contractor and the Company and stated in the HSE programme** which parties in the project (subcontractors, partners, hired-in labour, engineering etc.) are included in the notification and its scope of work.

8.3 Instruction from the authorities

Any statutory order that the Contractor may have received and that is relevant to the scope of work shall be reported to the Company without undue delay. Any legal proceedings instituted against the Contractor pursuant to HSE legislation during the execution of the scope of work must also be reported to the Company without undue delay.

8.4 Monthly HSE reporting

Health, safety and environment shall be reported as part of the project's monthly report. The attached format, annex C, can be used for this purpose.

The report shall include the following points:

- Activity plan with status of the individual activities
- Description of high-risk incidents and other relevant remarks to the results
- Other relevant information

The following results and parameters should normally be reported:

- number of fatalities
- number of serious injuries resulting in possible disability
- number of serious injuries
- number of medical treatments
- number of incidents of harm to the external environment
- number of material damage incidents
- number of high-risk incidents/conditions
- number of lost-time injuries
- number of injuries resulting in alternative work
- number of closed/completed measures related to undesirable events
- number of ongoing measures related to undesirable events
- number of overdue measures related to undesirable events
- number of new incidences of suspected work-related illness
- sickness absence as a percentage
- total hours worked in the project

It shall be **clarified between the Contractor and the Company and stated in the HSE programme** which parties in the project (subcontractors, partners, hired-in labour, engineering etc.) are included in the reporting and its scope of work.

Annex A (informative) Classification of risk/risk matrix

	Occupational injury	Environment	Material/ Production	Most probable frequency of recurrence				
				Less frequent	1 - 5 years	6 mths - 1 year	14 days - 6 mths	0 - 14 days
Most probable consequence	Fatality	Very severe pollution	Over 5 mill. NOK			HIGH		
	Serious injury, possible disability	Major pollution	Over 1 mill. NOK					
	Serious injury	Moderate pollution	Over 250.000 NOK			MEDIUM		
	Medical treatment	Minor pollution	Over 50.000 NOK		LOW			
	First aid	Insignificant pollution	Under 50.000 NOK					

- Highrisk -> Shall be analysed further
- Medium risk -> Consider further analyses
- Low risk -> Further analyses normally unnecessary

**Annex B
(informative)
HSE risk assessment form**

<h1>Norsok</h1>			HSE – RISK ASSESSMENT				Date:	
			Project:		Part-project:		Page:	
Ref. no.	Activity - site	Undesirable event/condition. What can go wrong?	Causes of event/condition	Consequence of event/condition	Risk	Remarks / Measures	Resp.	Dead-line

Annex C (informative) HSE reporting

The report shall include the following points:

- Status of the activity plan in the HSE programme
- Description of high-risk events/conditions and other relevant remarks to the results
- Other relevant information

Results:

	Total		Project loc. 1		Project loc. 2		Project loc. n	
	Period	Acc. total	Period	Acc. total	Period	Acc. total	Period	Acc. total
Fatality	0	0	0	0	0	0	0	0
Serious injury with possible disability	0	0	0	0	0	0	0	0
Serious injury	0	0	0	0	0	0	0	0
Medical treatment	0	0	0	0	0	0	0	0
Harm to the external environment	0	0	0	0	0	0	0	0
Material damage	0	0	0	0	0	0	0	0
High-risk events/conditions	0	0	0	0	0	0	0	0
Lost-time injuries	0	0	0	0	0	0	0	0
Injury resulting in alternative work	0	0	0	0	0	0	0	0
Closed/completed measures	0	0	0	0	0	0	0	0
Ongoing measures	0	0	0	0	0	0	0	0
Overdue measures	0	0	0	0	0	0	0	0
Suspected incidences of work-related illness	0	0	0	0	0	0	0	0
Sickness absence in % *	0	0	0	0	0	0	0	0
Total hours worked	0	0	0	0	0	0	0	0
Defined values **	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*) Sickness absence is reported for the period or for the quarter, and the last 12 months. Sickness absence can be reported one period in arrears. Sickness absence can be reported in terms of the project's activities or for the Company overall. Everything that is reported must be stated in the report.

**) Defined values in the HSE programme. Based on the information above, the different parties in the project can define and report relevant values.

Statistics can be extracted and annexed to the report as a separate attachment. The format above is only an example, but the information stated therein shall be reported.

