

NORSOK STANDARD

COMMON REQUIREMENT
CONTROL CENTRE

I-CR-004
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Please note that whilst every effort has been made to ensure the accuracy of the NORSOK standards neither OLF nor TBL or any of their members will assume liability for any use thereof.

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1 FOREWORD

NORSOK (The competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry as a part of the NORSOK initiative and are jointly issued by OLF (The Norwegian Oil Industry Association) and TBL (The Federation of Norwegian Engineering Industries). NORSOK standards are administered by NTS (Norwegian Technology Standards Institution).

The purpose of this industry standard is to replace the individual oil company specifications for use in existing and future petroleum industry developments, subject to the individual company's review and application.

The NORSOK standards make extensive references to international standards. Where relevant, the contents of this standard will be used to provide input to the international standardization process. Subject to implementation into international standards, this NORSOK standard will be withdrawn.

2 SCOPE

This standard covers the basic requirements for Control and automation design of a Control Centre (CC) on an offshore production installation. The standard shall be used for manned production installations.

The standard can also be used for drilling rigs and unmanned installations. In these cases it may be possible to omit parts of the requirements.

The standard shall be read in conjunction with the Control, operation and maintenance philosophy specific for each installation and normative references. The design of the CC shall be done in close cooperation with all other relevant disciplines.

3 NORMATIVE REFERENCES

NORSOK S-DP-001	Technical safety
NORSOK S-DP-002	Working environment
NORSOK C-CR-001	Living quarters area
NORSOK I-CR-002	Safety and automation systems
NORSOK O-DP-001	Operational principles
NPD YA-538	Menneske maskin forhold i kontrollrom (Not published in English)

4 DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

The below defined operational modes applies for the equipment in the CC.

Normal conditions:

- Start-up.
- Normal operation.
- Shut down (controlled and emergency).

Abnormal conditions:

- Equipment failure.
- System failure.
- Operation failures.
- Environmental changes.

4.2 Abbreviations

CC	Control Centre
CCR	Central Control Room
CCTV	Closed Circuit TeleVision
CER	Central Equipment Room
ECC	Emergency Control Centre
ESD	Emergency Shut Down
Ex	Explosion Proof
F&G	Fire and Gas
GA	General Arrangement
HVAC	Heating Ventilation and Air Conditioning
LER	Local Equipment Room
MCC	Motor Control Centre
MMI	Man Machine Interface
NORSOK	NORsk SOkkels Konkurransedisposisjon
NPD	Norwegian Petroleum Directorate
OS	Operator Station
VDU	Visual Display Unit

5 FUNCTIONAL REQUIREMENTS

5.1 Control Centre

A Control Centre is the assembly of technical and operational rooms and systems which are required to control, monitor and supervise an offshore installation.

5.1.1 General requirements.

The CC shall be designed for safe handling of normal and abnormal production situations. Priority shall be on emergency situations.

The overall requirements for the CC shall be laid down early in the design phase, and especially include:

- Installation restrictions, such as doors sizing and access routes.
- Modification to equipment.
- Future equipment.

- Computer floor shall have a minimum clearance from top of steel to top of floor of 500mm.
- Minimum free space from computer floor to false ceiling shall be 2680mm for rooms with wall and/or floor mounted equipment.
- There shall be sufficient space in the ceiling for HVAC and lighting.

5.1.2 Design environmental conditions and lighting

The environmental conditions for CC shall be designed according to the following.

5.1.2.1 Central Control Room (CCR)/Central Equipment Room (CER)

Normal operating conditions:

Ambient temperature: 20 - 24°C
Temperature gradient: 5°C/hours
Relative humidity: 30-60%

Abnormal conditions (vent failure etc.):

Ambient temperature: 5-45°C
Temperature gradient: 10°C/hours
Relative humidity: 20-80%

The need for air humidifier should be evaluated.

Draughts shall be avoided.

The CCR lighting should be sectionalised for individual intensity control (mimic, VDUs, work permit area etc).

5.1.2.2 Local Equipment Room (LER)

Normal operating conditions:

Ambient temperature: 18 - 24°C
Temperature gradient: 5°C/hours
Relative humidity: 30-60%

Abnormal:

Ambient temperature: 0-45°C
Temperature gradient: 10°C/hours
Relative humidity: 20-80%

5.2 Central Control Room

5.2.1 General

The CCR shall continuously be manned to ensure supervision, status monitoring and control of the various systems and processes for the installation.

The CCR shall be located "safe by location".

Personnel traffic within CCR shall be limited.

The process supervisor's office and eventual emergency room should be located adjacent to the CCR.

The CCR shall be operational according to modes defined in the Control, operation and maintenance philosophy, specific for each installation.

The MMI for marine control systems should be from the CCR.

Use of 3D modelling should be considered during the layout design.

5.2.2 Operator station

One operator shall be able to overview all operational systems, including process control, F&G, ESD, and Telecom equipment from a seated position, and be able to take the first action in emergency situations.

A sufficient number of operator stations shall be available for normal and abnormal conditions.

Operator Stations shall be arranged and designed in such a way that good individual work postures are achieved. Work surface heights shall be easily adjustable to account for differences in operator heights. VDU angle and distance from operator shall be easily adjustable to optimise viewing conditions.

5.2.3 Man Machine Interface

Man Machine Interface (MMI) for all relevant systems may include:

- MMI presentation shall be sought developed to common requirements for presentation to operator, independent of vendors chosen.
- Matrix functions for F&G and ESD.
- Large VDU-screens may be used to provide total plant overview for i.e. process, F&G and ESD status.

Any mimic layout shall be logically structured and easily readable for CCR operators.

Fiscal metering information should be available in CCR.

Closed Circuit Television (CCTV) may be installed. It shall be easily readable from OS. Operation of CCTV shall be possible from a seated position.

Expert systems and simulation tools may be installed.

5.2.4 Work permits

Work permit/personnel control shall be located in a room adjacent to CCR or at one specific location in the CCR.

5.2.5 Boards

Boards for listing of status/messages in emergency situations shall be located inside or in vicinity to the CCR.

5.2.6 Office equipment in CCR

Writing desk, filing cabinets and shelves in vicinity of operator station shall be provided. These shall have sufficient size to hold necessary manuals, operation procedures etc. for all CCR work.

Copy machine shall be available in vicinity of the CCR.

5.2.7 Printer area

The printer area for printing reports, alarm lists etc. shall be in or adjacent to the CCR.

5.2.8 Spare capacity

Future floor capacity for equipment extension shall be considered.

5.2.9 Room size relation

Room size relation depth to width shall not exceed the order 3:1.

5.2.10 Toilet and restroom facilities

Toilets and smoking room shall be located in close vicinity to CCR. Resting area for operating personnel should be located adjacent to CCR.

5.3 Emergency Control Centre

An ECC may in some cases be required in order to relieve the CCR and its staff from personnel traffic in a distressed situation.

Closeness to the CCR will facilitate easy communication lines between CCR-operators and the staff required for handling an emergency situation.

The room shall have internal and external communication facilities as required for emergency situations.

Under normal conditions the ECC may serve as a meeting room.

5.4 Central Equipment Room

The CER shall be located adjacent to CCR, and is normally not manned and shall be « safe by location».

CER is mainly used for location of central equipment.

Safety equipment needed in a major gas leak situation, which is not Ex certified should be located in CER.

CER should be equipped with engineering work station and all suitable furniture and equipment for maintenance purposes.

Future floor capacity for 20% equipment extension shall be available.

Location of, and cable routing to redundant equipment shall aim for diversity.

Cable entry shall be carefully considered and designed for future extension.

5.5 Local Equipment Room

LER is normally not manned and preferable safe by location.

Requirements related to maintenance equipment, floor capacity, cable routing and cable entry are the same as for CER.

6 SAFETY REQUIREMENTS

There shall be easy physical access to evacuation routes from CC. Ref. clause 3, Normative references.

Early smoke detection shall be evaluated in rooms/cabinets where early warning and manual action can save equipment from severe damage and avoid long plant shutdown.

7 INFORMATIVE REFERENCES

ISO/CD 11064-3 Ergonomic design of control centres, Part 3: Control room layout.

ANNEX A WORK SPLIT, TYPICAL (INFORMATIVE)

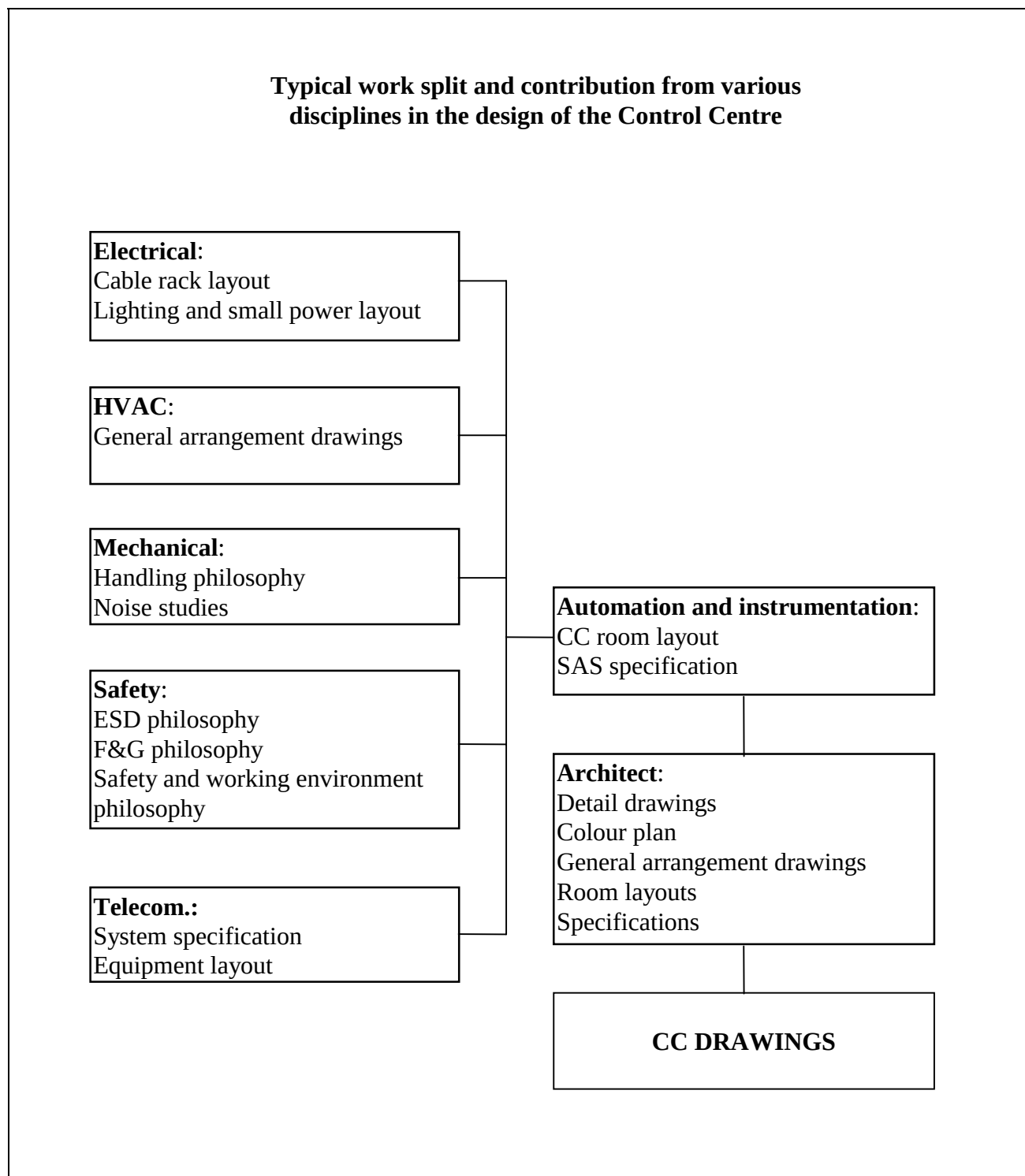


Figure 1 Work split in the design of the control centre, typical