



Norsk olje&gass

«Standardisation in the Petroleum Sector»

«International ISO standardization seminar
for the reliability technology and cost area»

ISO/TC67/WG4

Statoil Business Centre, Stavanger, Norway, April 26th 2016

Aud Nistov,
Technical director HSE and Standardisation
Norwegian Oil and Gas

Contents

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Strategy Chart – Norwegian Oil and Gas 2015 - 2017

Ambition 2015 - 2017	The Norwegian oil and gas sector is recognized as the key driver for value creation and innovation - and as an industry that actively addresses the global climate change issues		
Strategic Areas	Strategic Goals		
Climate	1.1. Achieve society's acceptance of gas as part of the solution for tackling climate change	1.2. Support industry's efforts to reduce emissions to air	1.3. Work actively together with the industry on CCS as a measure for tackling climate change
Northern Areas	2.1. Achieve society's support for further oil and gas development in the Northern Areas	2.2. Work for opening of the waters off Lofoten, Vesterålen, Senja and Barents Sea North-East	2.3. Contribute to enhancing educational opportunities and to attract people to the industry
Industry Growth and Cost	3.1. Communicate the value creation and innovation by the industry	3.2. Work for sustainable and competitive wages and salaries in the industry	3.3. Work for competitive and predictable fiscal conditions
Safety and Regulations	4.1. Improve learning and experience transfer to reduce major accident risk	4.2. Achieve cost-effective standards and increased use of international standards	4.3. Work for cost-effective and predictable regulations

FROM AMBITION TO ACTION

Norwegian Oil and Gas Position Standardisation

Ambition	<ul style="list-style-type: none"> Stimulate competitiveness through standards which help to make the NCS competitive – ie, attractive for investment – and encourage exports by the Norwegian oil supplies industry
Strategic goals	<ol style="list-style-type: none"> Increased use of international standards Contribute to more cost-effective standards
Key Strategic elements	
International standards	<div style="display: flex; justify-content: space-around;"> <div data-bbox="291 507 879 705" style="border: 1px solid blue; border-radius: 15px; padding: 10px; width: 45%;"> <p><u>1. New standards proposed as international standards</u></p> <p>Proposals for new standards should be aimed primarily at the international level.</p> </div> <div data-bbox="920 507 1600 705" style="border: 1px solid blue; border-radius: 15px; padding: 10px; width: 45%;"> <p><u>2. Industry involvement in the ISO</u></p> <p>Industry involvement is a prerequisite for improving and strengthening international standardisation work.</p> </div> </div>
Cost-effective standards	<div style="display: flex; justify-content: space-around;"> <div data-bbox="291 807 744 1083" style="border: 1px solid blue; border-radius: 15px; padding: 10px; width: 30%;"> <p><u>3. Management</u></p> <p>Ensure effective processes and quality assurance of NORSOK standards.</p> </div> <div data-bbox="772 807 1252 1083" style="border: 1px solid blue; border-radius: 15px; padding: 10px; width: 30%;"> <p><u>4. Regulations and cost</u></p> <p>Standards referenced in the regulations must be formulated to avoid unnecessary tightening of the rules or adverse cost increases.</p> </div> <div data-bbox="1280 807 1755 1083" style="border: 1px solid blue; border-radius: 15px; padding: 10px; width: 30%;"> <p><u>5. Study – NORSOK standards</u></p> <p>Perform a study on existing NORSOK standards to determine whether these should be withdrawn, maintained unchanged, revised or proposed as international standards.</p> </div> </div>

NORSOK standards 1994 -2016

NORSOK = Norsk sokkels konkurranseposisjon

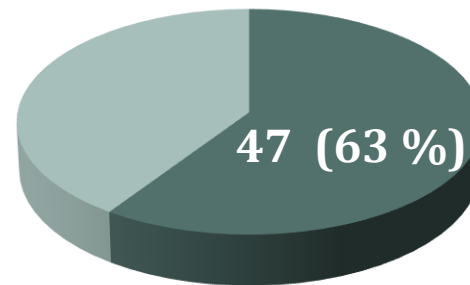
NORSOK project 1994:

- NORSOK aims to cut the investment cost of future North Sea projects by 50 per cent and operating costs by 25 per cent, by various actions, including development of common standards to replace individual company specifications
- **88 NORSOK standards were developed**

NORSOK – intentions:

- Interim standardisation solution
- To be replaced by international standards

Status 2016:
75 NORSOK
standards



■ Referred to by the PSA

NORSOK Standards for use in the oil and gas industry

M-001 Materials selection
M-101 Structural steel fabrication
M-120 Material data sheets for structural steel
M-121 Aluminium structural material
M-122 Cast structural steel
M-123 Forged structural steel
M-501 Surface preparation and protective coating
M-503 Cathodic protection
M-506 CO2 corrosion rate calculation model
M-601 Welding and inspection of piping
M-622 Fabrication and installation of GRP piping systems
M-630 Material data sheets and element data sheets for piping

N-001 Integrity of offshore structures
N-002 Collection of meteorological data
N-003 Actions and action effects
N-004 Design of steel structures
N-005 Condition monitoring of loadbearing structures
N-006 Assessment of structural integrity for existing offshore load-bearing structures

P-002 Process system design
R-001 Mechanical equipment
R-002 Lifting equipment
R-003 Safe use of lifting equipment
R-004 Piping and equipment insulation
I-001 Field instrumentation
I-002 Safety and automation system (SAS)
I-005 System control diagram
L-001 Piping and valves
L-002 Piping system layout, design and structural analysis
L-CR-003 Piping details
L-004 Piping fabrication, installation, flushing and testing
L-005 Compact flanged connections
H-003 Heating, ventilation and air conditioning (HVAC) and sanitary systems

S-001 Technical safety
S-002 Working environment
S-003 Environmental care
S-005 Machinery - working environment analyses and documentation
T-001 Telecom systems
T-003 Telecommunication and IT systems for drilling units
T-100 Telecom subsystems
E-001 Electrical systems
C-001 Living quarters area
C-002 Architectural components and equipment
C-004 Helicopter deck on offshore installations

M-650 Qualification of manufacturers of special materials
M-710 Qualification of non-metallic sealing materials and manufacturers
S-006 HSE-evaluation of contractors
S-011 Safety equipment data sheets
S-012 Health, safety and environment (HSE) in construction-related activities
R-005 Safe use of lifting and transport equipment in onshore petroleum plants

U-001 Subsea production systems
U-009 Life extension for subsea systems
U-100 Manned underwater operations
U-101 Diving respiratory equipment
U-102 Remotely operated vehicle (ROV) services
U-103 Petroleum related manned underwater operations inshore

Y-002 Life extension for transportation systems

I-106 Fiscal metering systems for hydrocarbon liquid and gas

Z-001 Documentation for operation (DFO)
Z-CR-002 Component identification system
Z-DP-002 Coding system
Z-003 Technical information flow requirements
Z-004 CAD symbol libraries
Z-005 2D-CAD drawing standard
Z-006 Preservation
Z-007 Mechanical completion and commissioning
Z-008 Risk based maintenance and consequence classification
Z-013 Risk and emergency preparedness assessment
Z-014 Standard cost coding system (SCCS)
Z-015 Temporary equipment
Z-018 Supplier's documentation of equipment

D-001 Drilling facilities
D-002 Well intervention equipment
D-SR-007 Well testing systems
D-010 Well integrity in drilling and well operations

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M-101 Structural steel fabrication
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M-622 Fabrication and installation of GRP piping systems
M-630 Material data sheets and element data sheets

P-002 Process system design
R-001 Mechanical equipment
R-002 Lifting equipment
R-003 Safe use of lifting equipment

S-001 Technical safety
S-002 Working environment
S-003 Environmental care
S-005 Machinery - working environment analyses and documentation

NORSOK Analysis

NORSOK owners will conduct a review of all NORSOK standards according to the following criteria:

- Are NORSOK standards cost-effective?
- How may NORSOK standards contribute to improved competitiveness for Norwegian petroleum industry?
- How may NORSOK standards contribute to ensure a satisfactory level of safety on the NCS?
- Are there international standards that can replace NORSOK standards, or alternatively; Can NORSOK standards become "internationalized"?

N-001 Integrity of offshore structures
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N-003 Actions and action effects
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N-005 Condition monitoring of loadbearing structures
N-006 Assessment of structural integrity for existing

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of special materials
alating materials and manufacturers

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Z-018 Supplier's documentation of equipment

Petroleum Standardisation – Expert Groups

Updated 2014-05-14

NORSOK Expert
Groups, ISO and CEN
Mirror Committees

Standards Norway Sector Board
Petroleum Industry

Project Manager
Roar Heum



NORSOK Expert Groups	Drilling, Subsea Underwater	Structures, Geotech, Marine, Pipeline	Process, Equipment, Piping	Electrical, Instr. Telecom, Temp.Eq.	Material	HMS, Regularity, Civil, HVAC	ISO / CEN / IEC Supervision / Coordination
	ISO/TC 67/SC 3/4	ISO/TC 67/SC 2/7	ISO/TC 67/SC 6	IEC/CENELEC	ISO/TC 67/SC 5	ISO/TC 67/SC 6	ISO/TC 67&CEN/TC 12
EG D Drilling Arild Thorstrud Rocksource	EG G Geotechnology Viggo Karlsen Statoil	EG P Process Clive Wilson ConocoPhillips	EG I Instrumentation Oystein Fosså ConocoPhillips	EG M Material Mons Hauge Statoil	EG C Civil / Architect Sven-Arne Aronsson Markhus AS	EG A Administration Roar Heum Standards Norway	
EG U Subsea Torolf Hæhre Shell		EG R Mechanical Tore Olav Pettersen ConocoPhillips	EG IM Metering Endre Jacobsen Statoil		EG H HVAC Stein Erik Uldalen Statoil	EG Z CCS Cost Coding System Rune Hellem Statoil	
EG UB Underwater Cato Hordnes Statoil	EG N Structural Lars Gunnar Karlsen Statoil	EG RL Lifting Stein Ove Dyngeland Statoil	EG T Telecom Jan Robert Moen Statoil		EG S HMS Arne Haugan Statoil	EG I SCD System Control Diagrams Idar Pe Ingebrigtsen Statoil	
EG WF Well fluids Arne Torvøll Statoil	EG Y Pipeline Svein Harald Sätendal Statoil	EG Z MC&P Halvdan Holter Statoil	EG Z TE Temporary Equipment Ove Jan Hana ConocoPhillips		EG Z R Reliability Engineering and Technology Sture Angelsen DNV GL	EG Z TI Technical Info TBN	
		K 117 Offsh. Containers Dag Steensen, DNV GL					
			Coordination with: NEK (The Norwegian Electrotechnical Committee)				

ISO Standards for use in the oil & gas industry

- ISO 10418 Basic surface safety systems
- ISO 10423 Wellhead & christmas tree equipment
- ISO/TR 11389 Reliability modeling/safety systems (New)
- ISO 13532 Drill-through equipment (DRP)
- ISO 13534 Hoisting equipment - crane/mast
- ISO 13535 Hoisting equipment - specification
- ISO 13626 Drilling and well-servicing structures
- ISO 13702 Control & mitigation of fire & explosion
- ISO 13703 Offshore piping systems
- ISO 14274 Reliability/maintenance data
- ISO 14692 GPP piping, Parts 1-4
- ISO 14693 Drilling equipment

- ISO 15156-1 Selection of cracking resistant materials for use in H₂S environments
- ISO 15156-2 Cracking-resistant steels and cast irons for use in H₂S environments
- ISO 15156-3 Cracking-resistant alloys for use in H₂S environments
- ISO 15128 HWC
- ISO 15544 Emergency response
- ISO 15663 Life cycle costing, Parts 1-3
- ISO 17776 Assessment of hazardous situations
- ISO 30813 Production assurance and reliability management
- ISO 21457 Materials selection
- ISO 23936-1 Thermoplastics
- ISO 23936-2 Elastomers (New)
- ISO 25746 Method of test for offshore fire dampers
- ISO/TS 29001 Sector-specific quality management systems



- ISO 13624-1 Marine drilling riser systems
- ISO/TR 13624-2 Marine drilling riser system analysis
- ISO 13625 Marine drilling riser couplings
- ISO 19901-7 System-keeping systems for floating offshore structures (New)
- ISO 19904-1 Flooding offshore structures



- ISO 19900 Offshore structures - general requirements (New)
- ISO 19901-1 Metaseen design and operating considerations
- ISO 19901-2 Seismic design
- ISO 19901-3 Topside structures
- ISO 19901-4 Geotechnical and foundation design
- ISO 19901-5 Weight control
- ISO 19901-6 Marine operations
- ISO 19902 Fixed steel offshore structures (Amend)
- ISO 19903 Fixed concrete offshore structures
- ISO 19905-1 Jack-ups (New)
- ISO/TR 19905-2 Jack-ups (commentary) (New)
- ISO 19906 Arctic offshore structures

- ISO 2977-5 Gas turbines - procurement
- ISO 10428 Sucker rods
- ISO 10431 Pumping units
- ISO 10434 Bolted metal steel gate valves
- ISO 10437 Special-purpose steam turbines (New)
- ISO 10438 Lubrication, shut-off and control systems, Part 1-4
- ISO 10439 Centrifugal compressors
- ISO 10440-1 Rotary-type positive-displacement process compressors (all-line)
- ISO 10440-2 Rotary PD packaged air compressors
- ISO 10441 Flexible couplings - special
- ISO 10442 Integrally geared air compressors
- ISO 12311 Spiral plate heat exchangers (New)
- ISO 12312 Hairpin heat exchangers (New)
- ISO 12631 Reciprocating gas compressors
- ISO 12691 High speed enclosed gear units
- ISO 12704 Calculation of heater tube thickness
- ISO 12705 Fixed heaters for general service (New)
- ISO 12706 Air-cooled heat exchangers
- ISO 12707 Reciprocating compressors
- ISO 12709 Centrifugal pumps
- ISO 12710 Reciprocating positive displacement pumps

- ISO 14491 Flexible couplings - general
- ISO 15541-1 Plate & frame type heat exchangers
- ISO 15541-2 Brazed aluminium plate-fin type heat exchangers
- ISO 15449 Pipes
- ISO 15761 Steel valves DN 100 and smaller
- ISO 16812 Shell & tube heat exchangers
- ISO/TS 16901 Risk assessment of offshore LNG installations (New)
- ISO 17292 Metal ball valves
- ISO 21049 Centrifugal and rotary pumps shaft sealing
- ISO 23251 Pressure-relieving and depressuring systems
- ISO/TS 24817 Composite repair of pipework
- ISO 25457 Flare details
- ISO 27599 Compact flanged connections (New)
- ISO 28300 Shipping of storage tanks
- ISO 28460 LNG - Ship to shore interface

- ISO 13628-1 Subsea production systems (Amend)
- ISO 13628-2 Subsea flexible pipe systems
- ISO 13628-3 Subsea FSI performance systems
- ISO 13628-4 Subsea wellhead and tree equipment
- ISO 13628-5 Subsea control umbilicals
- ISO 13628-6 Subsea production control
- ISO 13628-7 Compliance/keepover riser system
- ISO 13628-8 ROP and interfaces

- ISO 13628-9 ROP intervention systems
- ISO 13628-10 Bonded flexible pipe
- ISO 13628-11 Flexible pipe systems for subsea and marine applications
- ISO 13628-15 Subsea structures and manifolds

- ISO/TR 10400 Calculations for OCTG performance properties
- ISO 10405 Case/line of casing/tubing
- ISO 10407-1 Drill stem design
- ISO 10407-2 Inspection and classification of drill stem elements
- ISO 10414-1 Field testing of water-based fluids
- ISO 10414-2 Field testing of oil-based drilling fluids
- ISO 10416 Drilling fluids - lab testing
- ISO 10417 Subsea safety valve systems
- ISO 10434-1 Rotary drill stem elements
- ISO 10434-2 Threading and gauging of connections

- ISO 10426-1 Well cementing
- ISO 10426-2 Testing of well cements
- ISO 10426-3 Testing of deepwater well cement
- ISO 10426-4 Preparation and testing of atmospheric foamed cement slurries
- ISO 10426-5 Shrinkage and expansion of well cement
- ISO 10426-6 Static gas strength of cement formulations
- ISO 10427-1 Blow spring casing centralizers
- ISO 10427-2 Centralizer placement and stop-collar testing
- ISO 10427-3 Performance testing of cement float equipment

- ISO 10432 Subsurface safety valves
- ISO 11968 Casing and tubing
- ISO 11961 Drill pipe
- ISO 13005 Tubing element alloy pipes (New)
- ISO 13006 Drilling fluids (Amend)
- ISO 13007 Drilling fluids - processing systems evaluation
- ISO 13002-1 Measurement of viscous properties of completion fluids
- ISO 13002-2 Measurement of properties of proppants
- ISO 13002-3 Testing of heavy brines
- ISO 13002-4 Measurement of stimulation & gravelpack fluid leakoff
- ISO 13002-5 Measurement of long term conductivity of proppants
- ISO 13002-6 Measuring leak-off of completion fluids under dynamic conditions (New)
- ISO 13678 Thread compounds
- ISO 13679 Casing and tubing connections testing
- ISO 13680 CRA seamless tubes for casing & tubing
- ISO 14310 Packers and bridge plugs

- ISO 14998 Accessory completion equipment (New)
- ISO 15136-1 Progressing cavity pump systems
- ISO 15136-2 Progressing cavity pump systems - drive heads
- ISO 15463 Field inspection of new casing, tubing and plain and drill pipe
- ISO 15464 Gauging and inspection of threads
- ISO 15546 Aluminium alloy drill pipe
- ISO 16070 Lock mandrels and landing nipples
- ISO/TS 16300-2 Well integrity operational plans (New)
- ISO 17078-1 Side-pocket mandrels (Amend)
- ISO 17078-2 Flow control devices for side-pocket mandrels
- ISO 17078-3 Locks & seals for side-pocket mandrels & flow control devices
- ISO 17078-4 Side-pocket mandrel and related equipment
- ISO 17824 Sand control screens
- ISO 20312 Design of aluminium drill string
- ISO 27627 Aluminium drill pipe thread gauging (New)
- ISO 28781 Subsurface tubing mounted formation barriers

- ISO 2182 Steel pipe for pipeline transportation systems (New)
- ISO 12490 Actuation, mechanical integrity and sizing for pipeline valves
- ISO 12736 Wet stored insulation coatings (New)
- ISO/TS 12747 Pipeline life extension
- ISO 13623 Pipeline transportation systems
- ISO 13847 Welding of pipelines (New)
- ISO 14313 Pipeline valves
- ISO 14723 Subsea pipeline valves
- ISO 15589-1 Cathodic protection for on-land pipelines (New)
- ISO 15589-2 Cathodic protection for offshore pipelines (New)

- ISO 15590-1 Pipeline induction bends
- ISO 15590-2 Pipeline fittings
- ISO 15590-3 Pipeline flanges
- ISO 16708 Pipeline reliability-based burst rate design
- ISO 21329 Test procedures for pipeline mechanical connectors
- ISO 21809-1 Polyethylene coatings (3-layer PE and 3-layer PP)
- ISO 21809-2 Fusion-bonded epoxy coatings
- ISO 21809-3 Field joint coatings
- ISO 21809-4 Polyethylene coatings (2-layer PE)
- ISO 21809-5 External concrete coatings

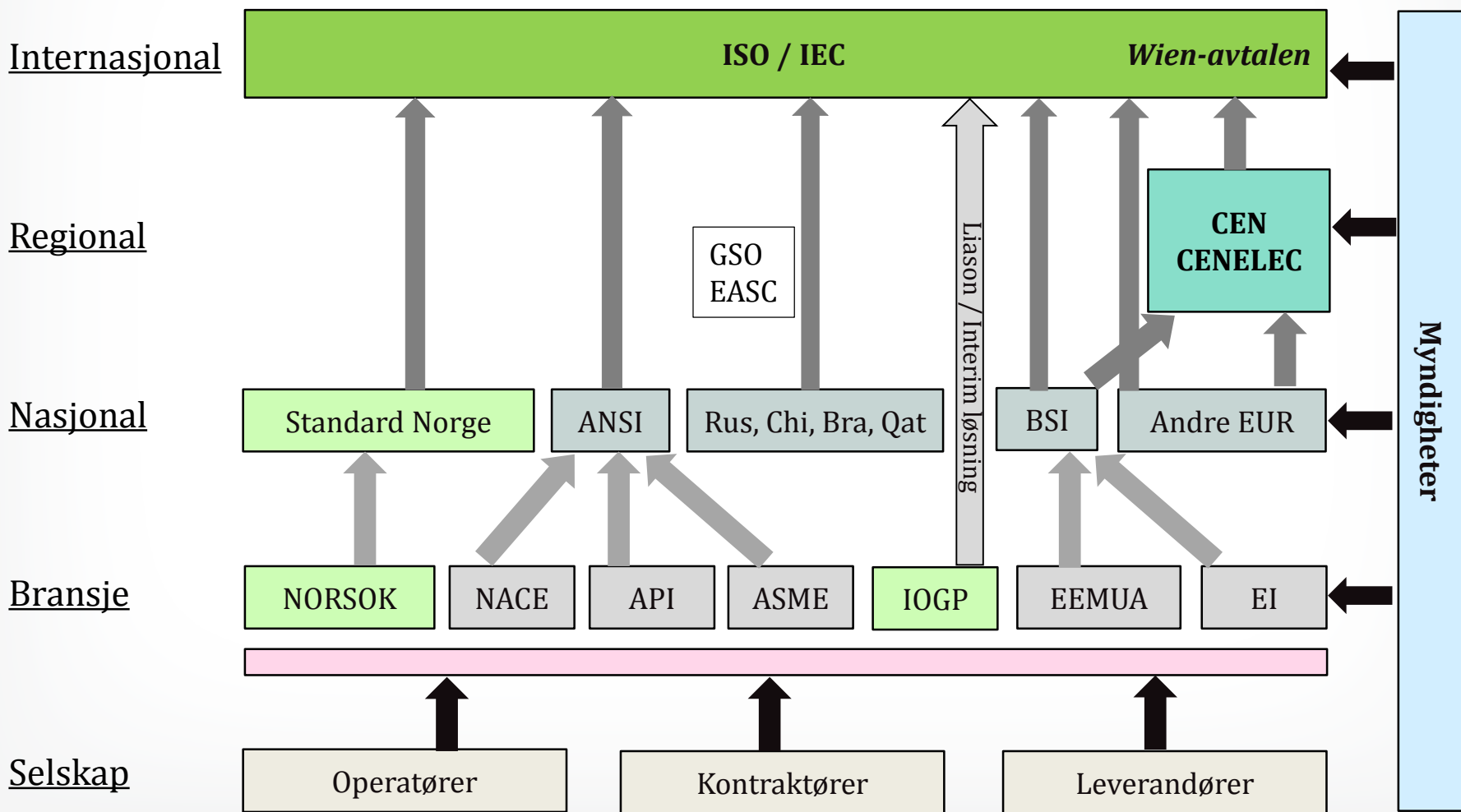


Standards in brown issued in 2012

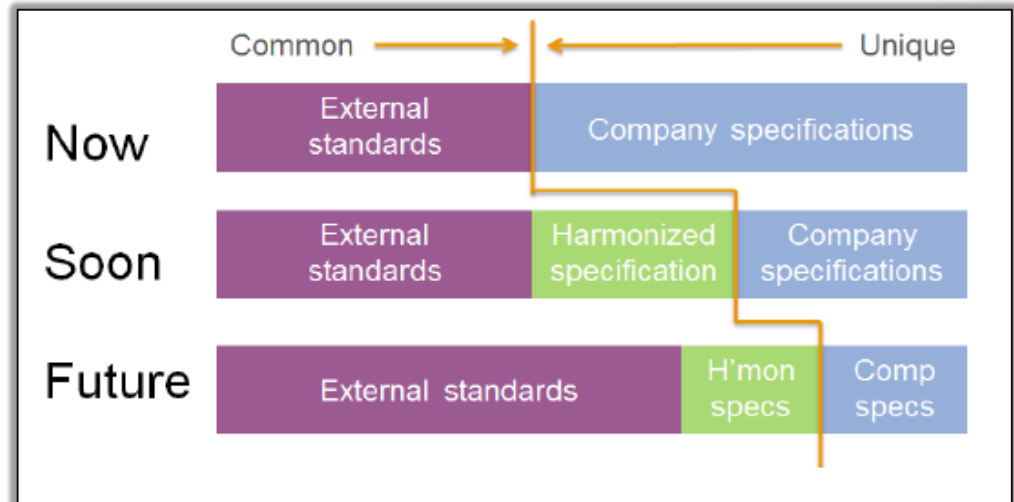
Standards in green are a priority for 2013 issue

These ISO standards are only a core collection of several hundreds of International Standards available for the oil & gas industry

International Petroleum Standardisation



Harmonizing Company Specifications



Identifying Cost Driving Factors

Identifying cost driving factors related to drilling and well area

Goal and deliverables

A task force is to investigate and identify cost driving factors related to the drilling and well area. The supplier companies are to discuss and identify different segments within the drilling and well area where company specific specifications might represent cost driving factors. The supplier companies' experiences of operator specific requirements may be related to drilling and well segments such as equipment specifications, mud recipes, coating specifications, cement requirements, specifications for valves, crane issues etc.

A **Task force** has been established.



Prerequisite:

*The **task force shall not** investigate, elaborate upon and demonstrate the specific company requirements, which are the operators "know how" and encumbered with duty of confidentiality. However, the task force is asked to identify the areas and the segments where such company specific requirements, based on the participating supplier companies' experience, may be found to represent cost driving factors.*

Other initiatives



16.06.2015
PTIL/PSA



Agenda

Reports

Events

Energy: Oil & Gas



Social sciences related to the petroleum sector (PETROSAM2)

Norsk

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Research projects

Procurement and contracting as drivers for the rising costs problem in the Norwegian offshore oil & gas industry

Project owner: Buskerud and Vestfold University College

Recent empirical evidence indicates that the operating costs have been rising along the whole offshore oil & gas value chain on the NCS. Further, it suggests that documentation and control requirements set by E&P companies for their suppliers significantly exceed those set by any other industrial actors; and that these higher requirements may be a significant driver behind the rising costs problem on the NCS.

Del



The way forward

- High-quality industry standards
- Standards should contribute to good technical and cost-effective solutions
- Ensure good resource utilisation and the most acceptable possible petroleum management
- In a global market, the industry will first and foremost work actively for the development and use of international standards
- Furthermore, national industry standards such as NORSOK must close identified gaps between international norms and Norwegian requirements
- Industry standards could contribute to developing and maintaining Norway's national and international competitiveness
- Use of industry standards can help to encourage increased exports by Norway's oil and gas supplies industry and contribute to making the NCS attractive for investment

Thank you !