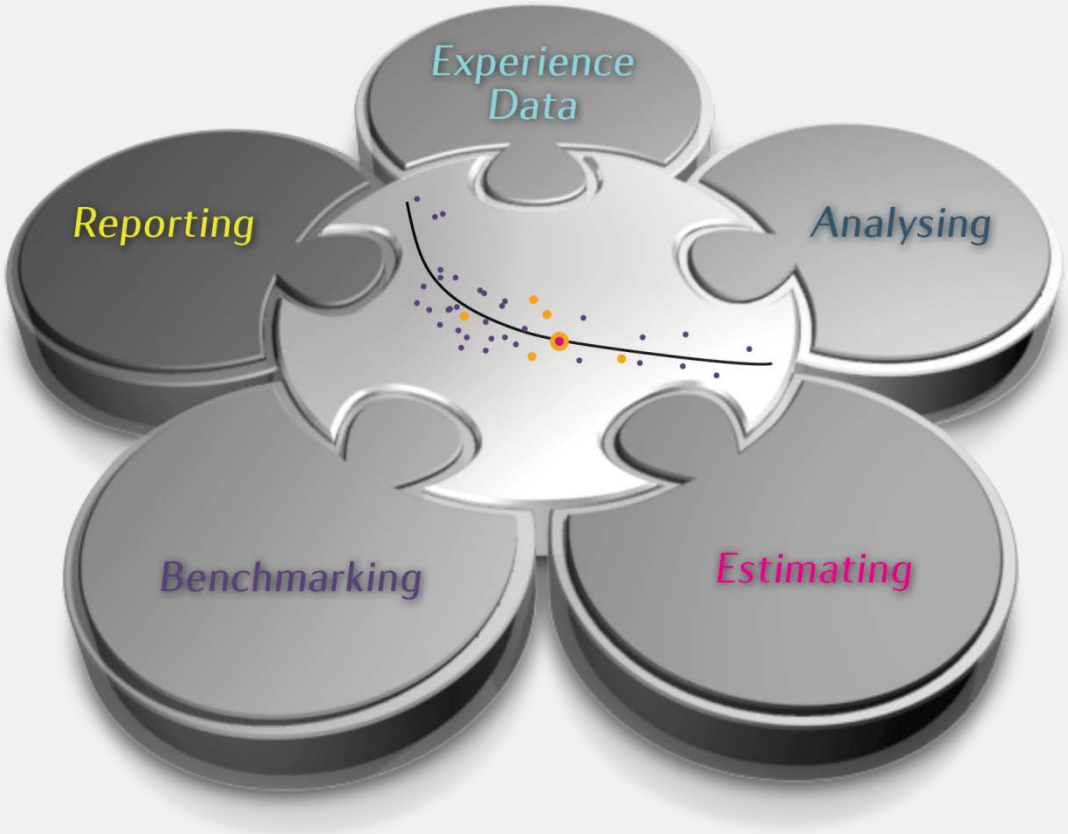

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ISO 19008: Standard Cost Coding System for oil and gas production and processing facilities. - Statoil experiences in using a Standard Cost Coding System within cost estimating, experience data, benchmarking and analysis

Rune Hellem, Statoil, Project leader for ISO 19008 and Olav Theodorsen, Statoil, Advisor Benchmarking and analysis

International ISO standardization seminar for the reliability technology and cost area.
Statoil Business Centre, Stavanger, Norway, 26 April 2016

Content

- Background and status of developing ISO 19008
- ISO 19008 - Standard Cost Coding System (SCCS)
  - Users
  - Codes and relationships
- Experience database
  - Collecting data
  - From SCCS to WBS
  - Use of Quantitative Experience database
- Benchmarking and Analysis
  - Objectives with Benchmarking
  - Statoil's Benchmarking Hierarchy

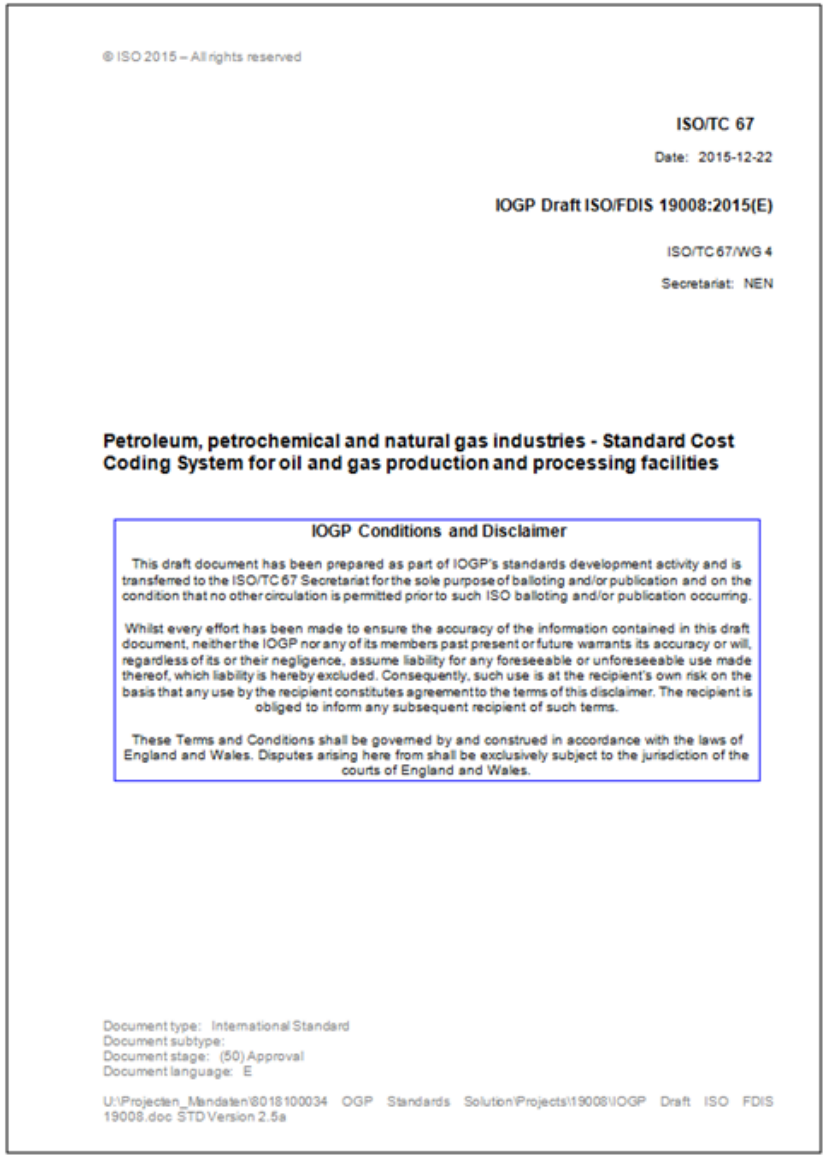
ISO 19008 - Standard Cost Coding System (SCCS) for oil and gas production and processing facilities

ISO 19008 development – background and status

- Developed as a joint Norwegian Operator committee. First edition 1989, accepted as a NORSOK Standard in 2002, (NORSOK Z-014). Rev. 2, May 2012
- NWIP to develop ISO 19008 based on NORSOK Z-014 approved March 2013
  - Expert members from 7 countries; Denmark, Germany, Italy, Kazakhstan, Netherlands, Norway, UK
  - Companies involved; DONG energy, Statoil, Tullow Oil, Eni, Shell, Wintershall, NCOC
- DIS approved 27 October 2015 by 17 countries out of 18
- FDIS ballot planned to start 28 April 2016
- Publication expected Q3 2016

ISO 19008 SCCS

- The ISO to be organised in:
  - a main document
  - three normative Annexes containing each of the coding structures PBS, SAB and COR with code, code name and definition
  - one informative Annex containing examples of use:
    - coded estimate
    - mapping between SAB-COR, PBS-COR, SAB-PBS
- The details in the Annexes will be available through a link to ISO Maintenance portal containing an ISO 19008 folder. The tables in electronic format (Excel files) will be placed here.



ISO/TC 67

Date: 2015-12-22

IOGP Draft ISO/FDIS 19008:2015(E)

ISO/TC 67/WG 4

Secretariat: NEN

Petroleum, petrochemical and natural gas industries - Standard Cost Coding System for oil and gas production and processing facilities

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Document type: International Standard
Document subtype:
Document stage: (50) Approval
Document language: E

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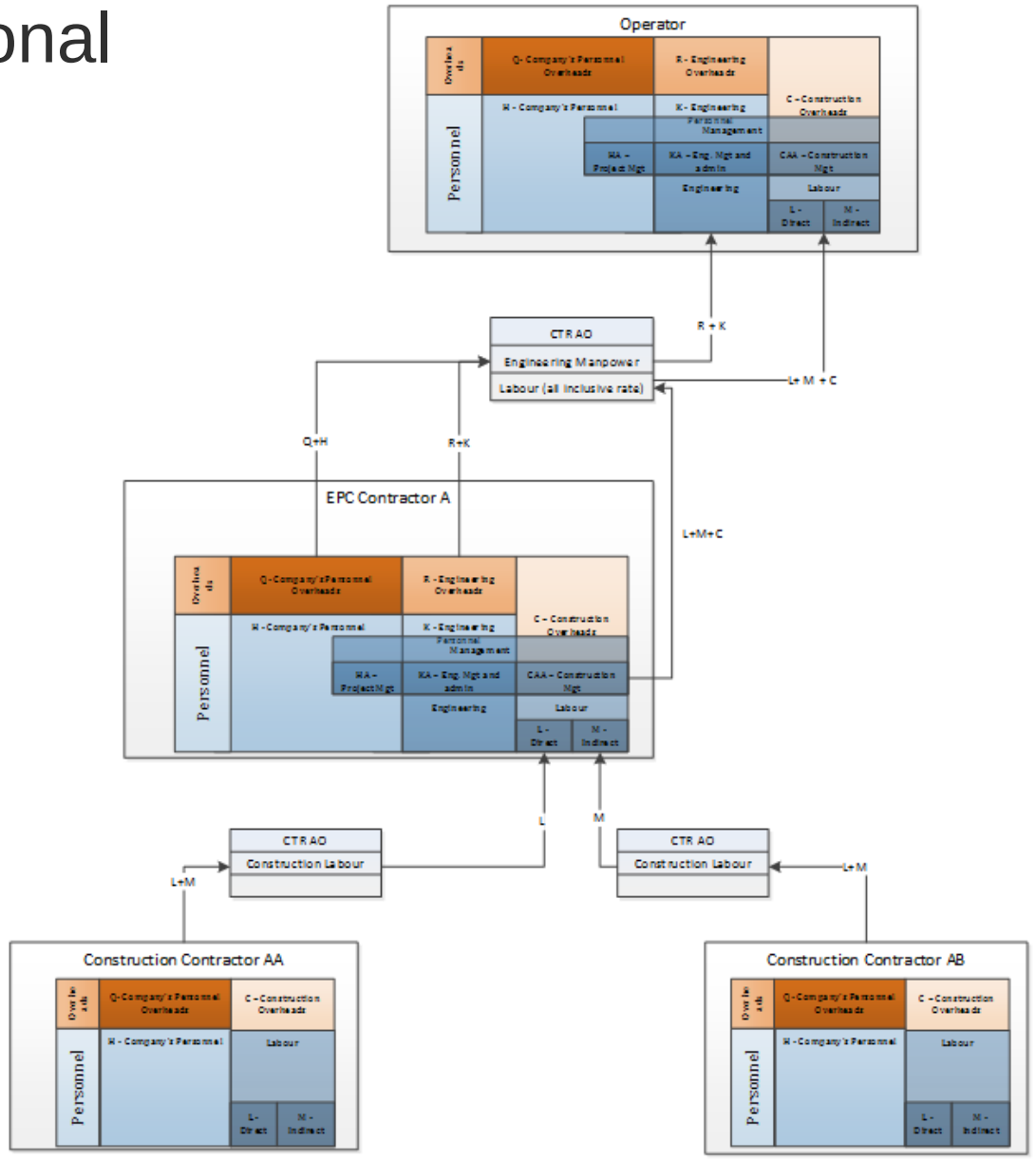
Users of this International Standard

- Operator
- Company
- Contractor

Both contractor and company can be using the SCCS for classifying their cost data.

The appropriate codes to be used internally for cost management and controls can differ from the ones presented to the client for the CTR, but will usually be composed/aggregated according to the requirements of the client.



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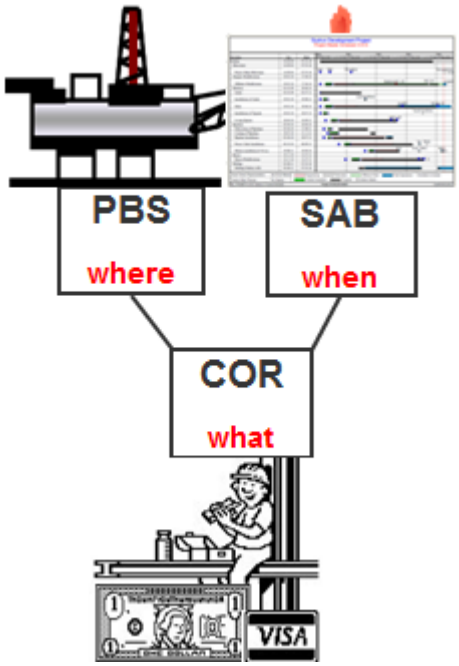
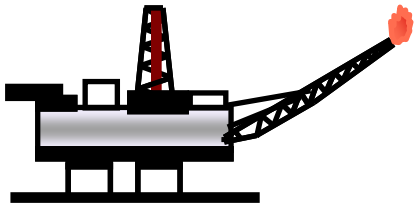
ISO 19008 - Standard Cost Coding System (SCCS)
PBS, SAB and COR

- **A project independent coding system** is necessary to identify cost, quantities, rates and norms across different projects
- SCCS is **not a project specific coding system opposed to WBS coding** which is linked to the contract structure during project execution
- Every cost item will be associated with a scope of work and so **can be classified by each of the three aspects/facets**. Each of the classifications in the facet has a numerical or alphabetical hierarchical code.
- The codes are combined to create **a complete composite code** for the costs. The nominated order for the composite codes is: **PBS, SAB, COR**.



PBS - Physical Breakdown Structure

Hierarchical breakdown



- **Defines the physical/functional components** of field installations.
- Enables an **oil and gas production** and **processing facility** configuration scheme to be classified.
- System/facilities descriptions in PBS are only intended to **provide guidelines for cost coding**, as the systems/facilities normally are designed and laid out differently and uniquely for each development project according to technical and functional requirements, construction philosophy and project realisation strategies.
- As a system/facility can cross individual PBS boundaries, **there is no exact correlation between a system/facility and PBS**.

PBS code Level 1	Code name
A	**Offshore installations**
B	**Onshore installations**

PBS code Level 2	Code name
AA	**Topsides**
AB	Substructures
AC	Offshore Wells
AD	Subsea system
AE	Transport systems
AW	Offshore wind park

PBS code Level 3	Code name
AAA	Drilling area
AAB	Wellhead and riser area
AABA	Wellhead area
AABB	Riser area
AAC	Process and utilities
AAD	Living quarter
AAE	Helideck
AAF	Flare
AAG	Deck appurtenances
AAH	Deck structure

PBS code Level 2	Code name
BA	Process, utilities and product handling
BC	**Civil, Structures, Marine and Buildings**
BD	Transport systems
BE	Drilling facilities
BF	Onshore wells
BG	Temporary facilities
BH	Infrastructure

PBS code Level 3	Code name
BCA	Civil
BCB	Buildings
BCC	Marine (Jetties and shore installations)
BCD	Structures (piperacks, modules etc.)

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SAB – Standard Activity Breakdown
Hierarchical breakdown

- Classifies the **activity component of scope of work**.
- The **alphabetical phase prefix** introduces a code for use of SCCS throughout all phases of a project, from exploration through removal of facilities.

SAB code Level 1	Code name
1	Management
2	**Engineering and procurement**
3	Equipment and Bulk Supply
4	**Construction**
5	**Installation, Transport and Logistics**
6	Other activities
7	General activities
8	Well Operations

SAB code Level 2	Code name
21	**Engineering**
22	Procurement

SAB code Level 3	Code name
211	Pre-execution engineering
212	Detail design engineering
213	Construction / fabrication / installation engineering
214	Follow on engineering

SAB code Level 2	Code name
41	Onshore construction
42	Atshore construction
43	Inshore construction
44	Offshore construction

SAB code Level 2	Code name
51	Land based installation
52	Marine operations
53	Logistics

SAB – phase prefix

E	Exploration
A	Appraisal
D	Development
P	Production
S	Shutdown and decommissioning
R	Removal

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COR – Code Of Resource
Hierarchical breakdown

- Classifies all **project resources** according to the type of contract/resource that is involved in the activity and has an associated set of rates.
- Classifies the complete scale of **resources involved in developing offshore and onshore facilities**.

COR code Level 1	Code name
COR code	**Code name**
A	General costs
E	**Equipment**
B	Bulk materials
K	Engineering personnel
R	Engineering overheads
L	Direct labour
M	Indirect labour
C	Construction overheads
H	Company personnel
Q	Company personnel overheads
S	Unit work
X	Marine operations and logistics
Y	Land based plant and equipment

COR code Level 2	Code name
EA	Architectural equipment
ED	Drilling equipment
EE	Electrical equipment
EG	Heating, ventilation and air conditioning (HVAC) equipment
EJ	Instrumentation equipment
ER	**Mechanical equipment**
ES	Safety/escape and firefighting equipment
ET	Telecommunication equipment
EU	Subsea equipment
EV	Mooring and marine equipment
EY	Transfer and control equipment

COR code Level 3	Code name
ERC	Miscellaneous mechanical equipment
ERD	Drivers and power transmissions
ERF	Heaters, boilers, furnaces and flares
ERH	Heat transfer equipment
ERK	Compressors, blowers and expanders
ERM	Material and product handling equipment
ERN	Mechanical equipment – solids
ERP	Pumps
ERT	Storage tanks/containment equipment – atmospheric
ERV	Vessels and columns – pressurised
ERX	Miscellaneous package units

Is this much?

- Johan Sverdrup P1 platform 18 000 mill. NOK
- Hyme subsea project 2 000 mill. NOK
- Statpipe Gas Processing Plant (Kårstø) 8 000 mill. NOK

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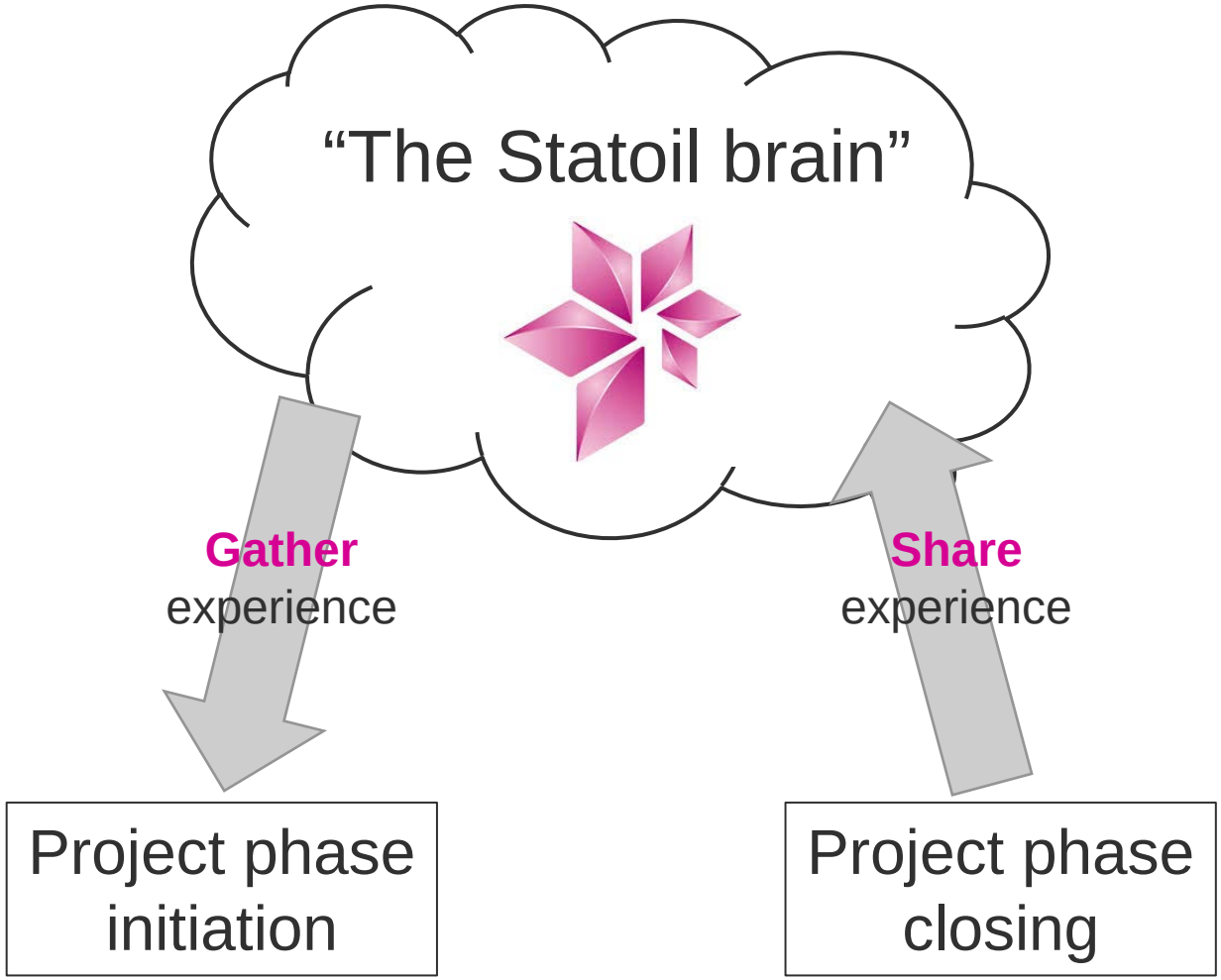
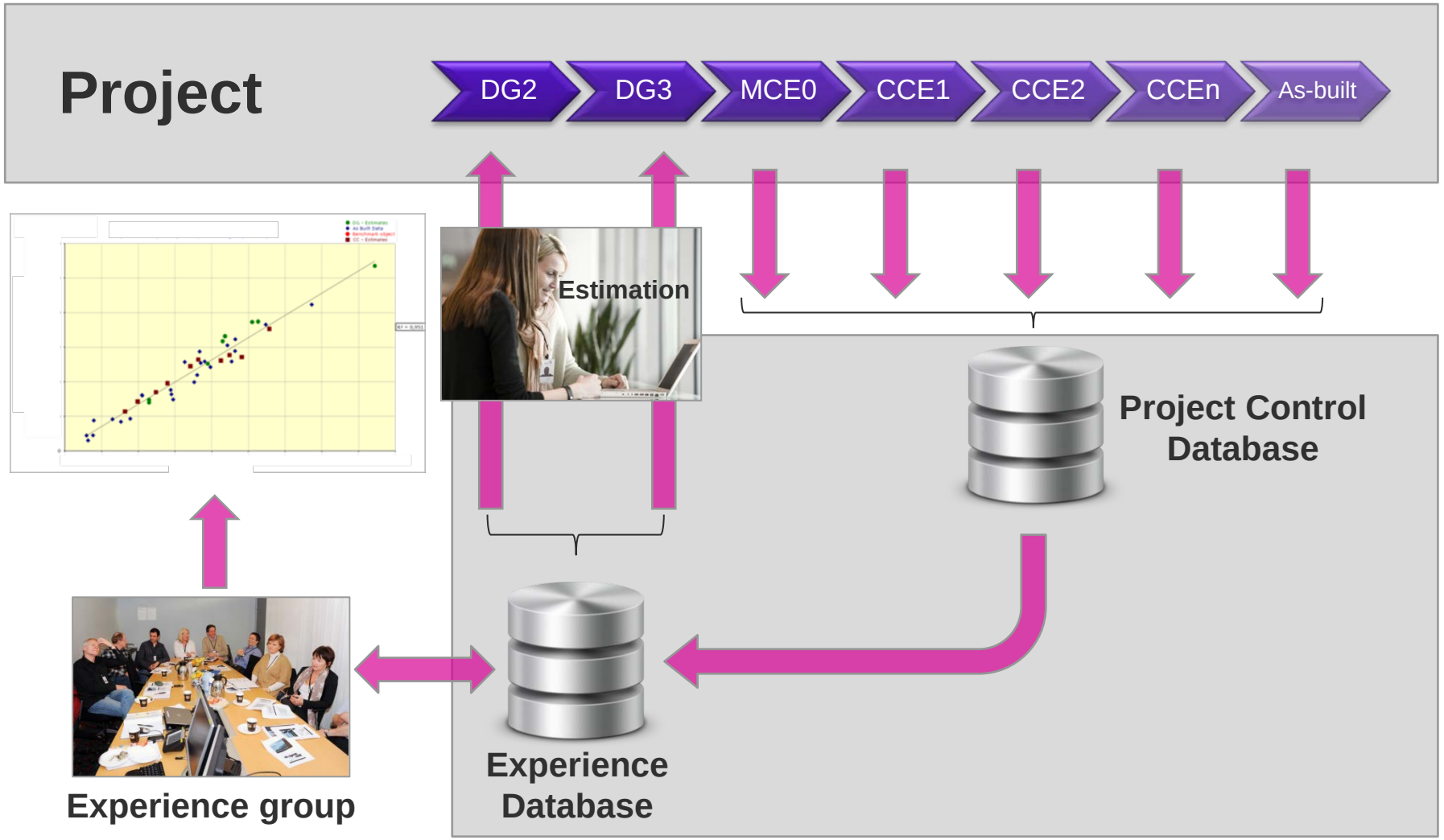
Quantitative experience data stored in Statoil's Experience Database

The Experience data Process



Transfer of Experience data



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From SCCS coded Estimate to WBS

- *Cost estimate established by estimating department*
- *Restructure cost estimate according to work packages for follow up in execution phase*

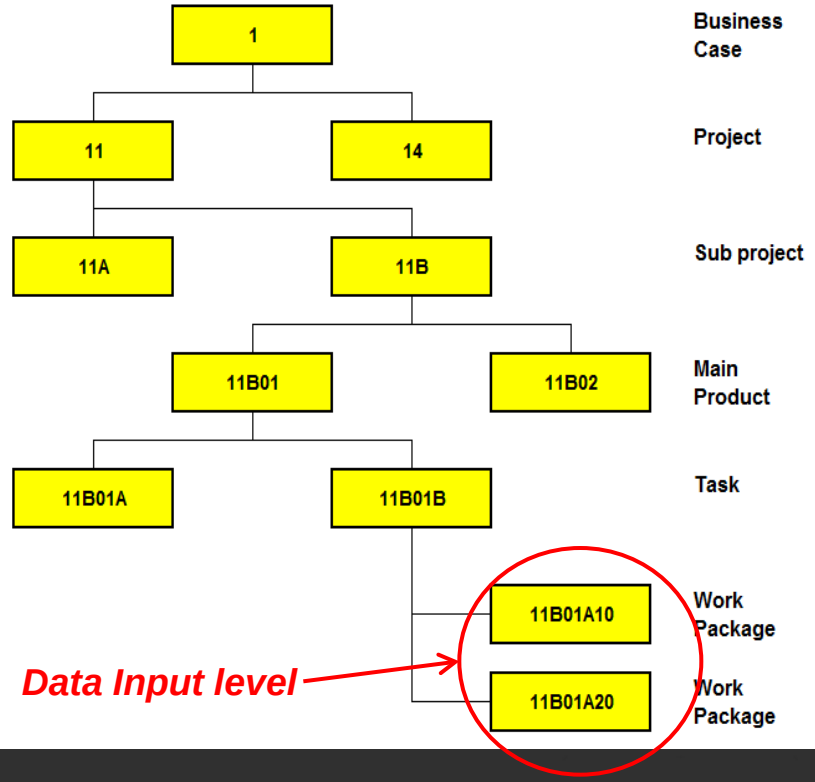
Estimate

SCCS			Description
PBS	SAB	COR	
AA	1	H	Pre-DG3 Management
AA	211	K	Pre-DG3 Studies
AA	1	H	Management
AA	211	K	FEED
AA			Incl. mhr-rate
AA	212	K	Detail Engineering
AA	31	E	Equipment
AA	32	B	Bulk
AA	4141	L	Prefab.
AA	4442	L	Installation work
AA	5231	XC	Lifting
AA	447	L	Commiss.
AA	12	HFB	Management

Main Contract Packages

Statoil Project X (Example)		
	Platform Modifications	Heavy Lift
Concept Development	Contractor 1	Statoil
Project Management	Statoil	
FEED	Feed Contractor	Heavy Lift Contractor
Preliminary Detail engineering	EPC (I) Contractor	
Procurement		
Fabrication		
Installation		
Comm.assist.		N/A
Commissioning / testing	Statoil	

WBS structure



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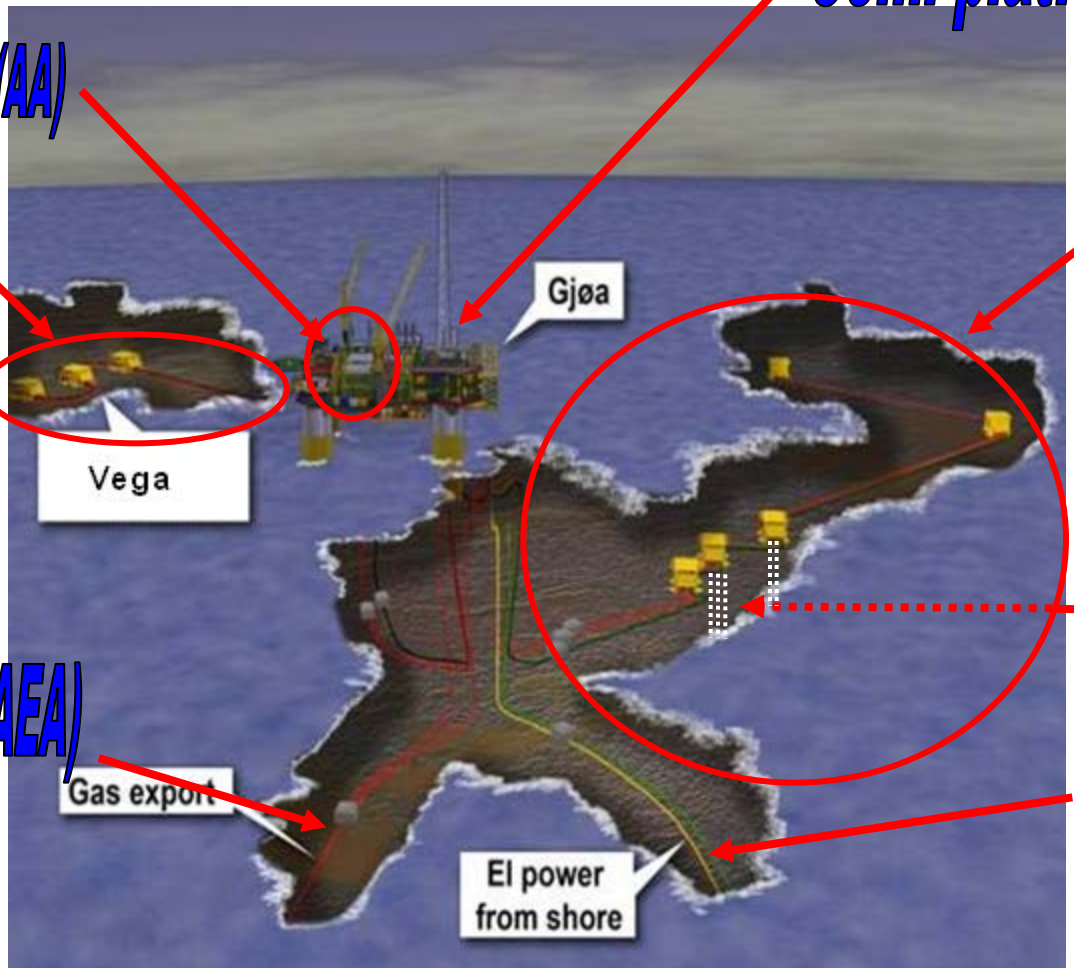
Storage of experience data by Project and PBS

Example: Gjøa development project



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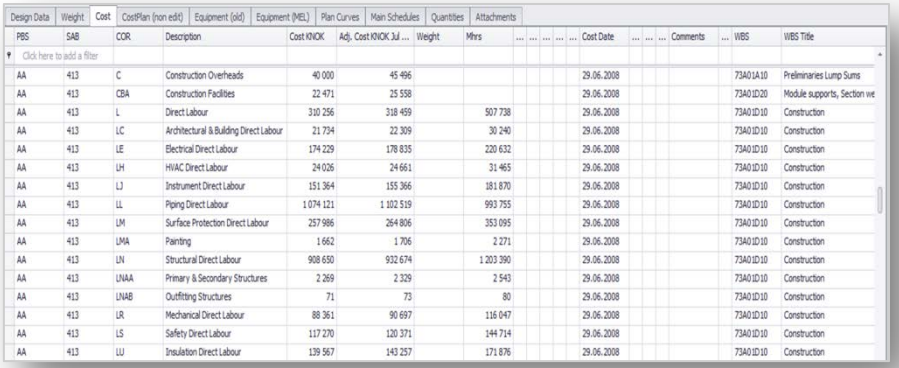
Amount of Experience data (per April 2016)

Facility Category	No.
Topside Modifications	205
Platform	138
Subsea	122
Onshore Facilities	111
Transport Pipeline	90
Wells	72
Offshore Storage and Offtake System	12
Offshore Cable-Umbilical	12
Offshore Bridge	8
Offshore Fibre Optic Cable	8
Onshore Cable-Umbilical	7
Cessation Platform	4
Cessation Subsea	2

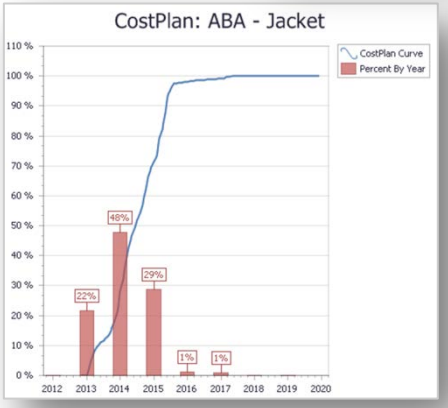
Quantitative data available in Database

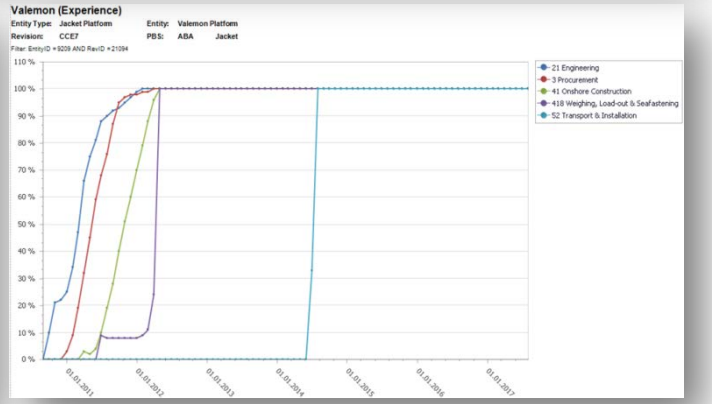
- Project cost and quantities – at a detailed level
- Cost plan (investment profile)
- Currency shares from contracts
- Design data
- Overall quantities (weights, man-hours etc.)
- Main Schedules & milestones
- Progress curves



Design Data	Weight	Cost	CostPlan (non edit)	Equipment (old)	Equipment (MEL)	Plan Curves	Main Schedules	Quantities	Attachments

PBS	SAB	COR	Description	Cost KNOK	Adj. Cost KNOK Jul ...	Weight	Mhrs	Cost Date	Comments	WBS	WBS Title
Click here to add a filter											
AA	413	C	Construction Overheads	40 000	45 496			29.06.2008		73A01A10	Preliminaries Lump Sums
AA	413	CBA	Construction Facilities	22 471	25 558			29.06.2008		73A01D20	Module supports, Section we
AA	413	L	Direct Labour	310 256	318 459		507 738	29.06.2008		73A01D10	Construction
AA	413	LC	Architectural & Building Direct Labour	21 734	22 309		30 240	29.06.2008		73A01D10	Construction
AA	413	LE	Electrical Direct Labour	174 229	178 835		220 632	29.06.2008		73A01D10	Construction
AA	413	LH	HVAC Direct Labour	24 026	24 661		31 465	29.06.2008		73A01D10	Construction
AA	413	LJ	Instrument Direct Labour	151 364	155 366		181 870	29.06.2008		73A01D10	Construction
AA	413	LL	Piping Direct Labour	1 074 121	1 102 519		993 755	29.06.2008		73A01D10	Construction
AA	413	LM	Surface Protection Direct Labour	257 986	264 806		353 095	29.06.2008		73A01D10	Construction
AA	413	LMA	Painting	1 662	1 706		2 271	29.06.2008		73A01D10	Construction
AA	413	LN	Structural Direct Labour	908 650	932 674		1 203 390	29.06.2008		73A01D10	Construction
AA	413	LNAA	Primary & Secondary Structures	2 269	2 329		2 543	29.06.2008		73A01D10	Construction
AA	413	LNAB	Outfitting Structures	71	73		80	29.06.2008		73A01D10	Construction
AA	413	LR	Mechanical Direct Labour	88 361	90 697		116 047	29.06.2008		73A01D10	Construction
AA	413	LS	Safety Direct Labour	117 270	120 371		144 714	29.06.2008		73A01D10	Construction
AA	413	LU	Insulation Direct Labour	139 567	143 257		171 876	29.06.2008		73A01D10	Construction





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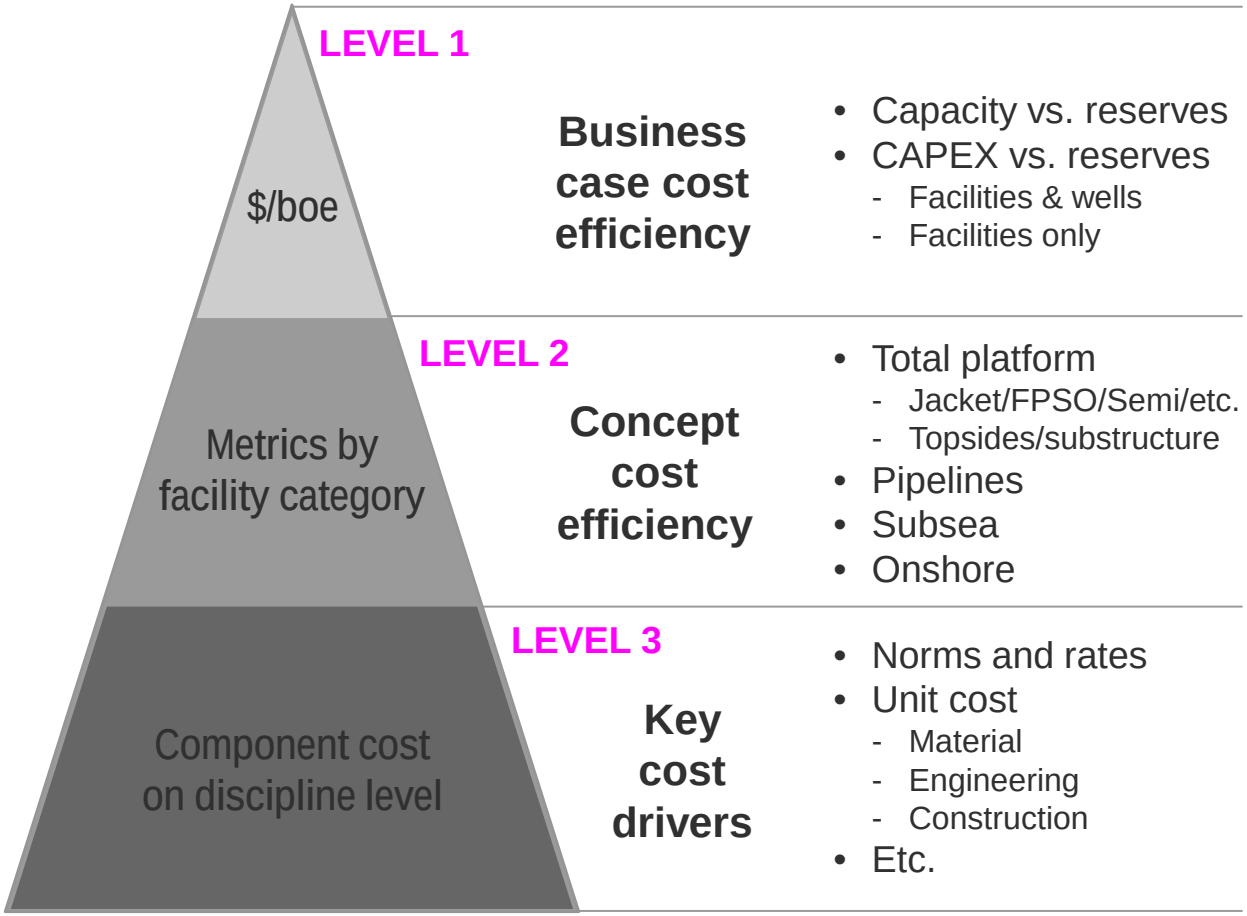
Benchmarking and Analysis

Benchmarking

Why benchmarking:

- Decision support
- Estimate calibration
- QC of estimates
- Challenge technical
- Communication



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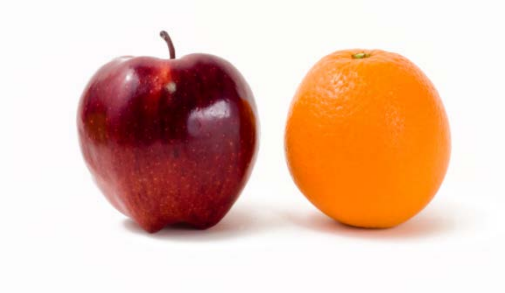
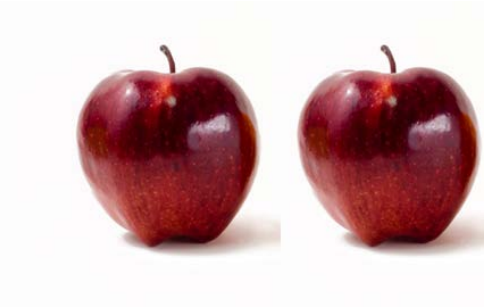
Benchmarking

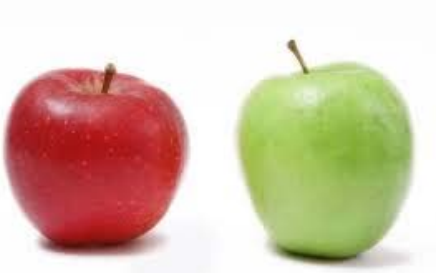
What we try to avoid:



What we hope to achieve:



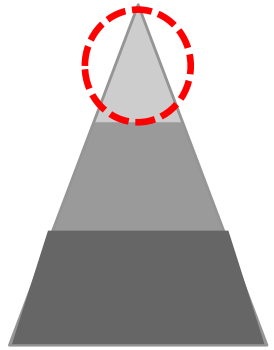
Where we usually end up:



Benchmarks - Level 1

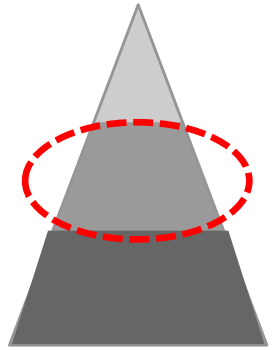
CAPEX/boed vs. Recoverable reserve (Mboe)

(Stand alone vs. Subsea tie-back field development)



Benchmark graphs removed due to confidentiality

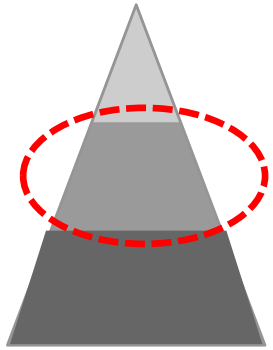
Benchmark Level 2 – Topside cost vs. weight
All platforms, All regions



Benchmark graphs removed due to confidentiality

Benchmark Level 2 - Topside cost vs. weight

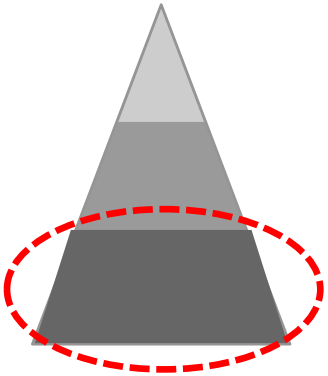
Semi platforms – Norwegian Continental Shelf (NCS)



Benchmark graphs removed due to confidentiality

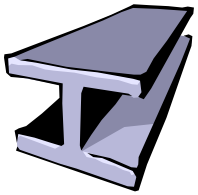
Benchmarks – Level 3

Norms & Rates - Input to Estimation tools



- Norms (Manhours / tonnes)
  - Engineering (by discipline)
  - Onshore/Atshore Construction (by discipline)
  - Offshore Construction (by discipline)

- Material rates (NOK/kg, NOK/m, etc.)
  - Equipment (by system / COR / package)
  - Bulk (by discipline)



- Manhour rates (NOK / Manhour)
  - Engineering
  - Onshore/Atshore Construction
  - Offshore Construction
  - Company Management
  - Project Completion

- Other Norms and rates
  - Detailed Piping norms and rates (by category, matr. quality & dimension)
  - Marine Operations (day rates per vessel)

There's never been a better time for good ideas

Q & A

ISO 19008: Standard Cost Coding System for oil and gas production and processing facilities - Statoil applications

Rune Hellem and Olav Theodorsen,
Advisors Cost estimating

www.statoil.com

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