

Risk informed decisions in future collaboration environments

Mapping of information and knowledge onto a shared
surface to improve planner's risk identification

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Integrated Operations in the petroleum sector on the Norwegian Continental Shelf

- Focus is on enabling new ways of working in operations through implementation of innovative technologies.
- Introduction of new technologies can, however, also be a source of temporary or permanent increased workload.
 - Most companies have experienced investing in new solutions that are rarely or reluctantly used
 - Access to more data does not necessarily mean better overview or better communication

Our research questions

- How can new technologies improve collaboration in distributed teams on the Norwegian Continental Shelf (NCS) where Health, Safety and Environment (HSE) concerns must permeate all decision processes?
- Can the technology be an obstacle?
- What does it take for a technology to be an enabler of improved decisions, implementations and work practices?
- And can technology enable better risk identification?

Our approach

- Examining existing work practices and technology bottlenecks in IO teams through
 - Observing IO collaboration
 - Field visits
- Iteratively designing a testbed with several of the characteristics identified
- Using the testbed in initial usability studies
 - to assess how users interact with and react to the software
 - for collecting further user requirements for collaboration software

Our choices

- Focus on maintenance and (minor) modifications
- Focus towards safety related collaboration and risk identification
- Start with a single user in our tests to ensure basic usability before later testing in teams

The test bed

- This test bed is developed using an iterative design process
- Visualising in space and time
 - Notifications
 - Work orders
 - Work permits
 - Risks, conflicts and relations both as identified by people involved in the planning process
 - Working conditions (or predictions of these):
 - Noise
 - Zone classification

Display:

- Work Orders
- Work Permits

Background:

- Zone Classification
- Noise Classification

Legend:

- < 75 dB
- 75-80 dB
- 80-85 dB
- 85-90 dB
- 90-95 dB
- 95-100 dB
- 100-105 dB

Help...

Zoom in
Zoom out

Selected area:

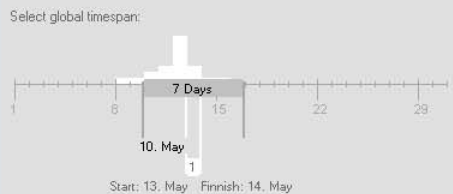
C21

Equipment:

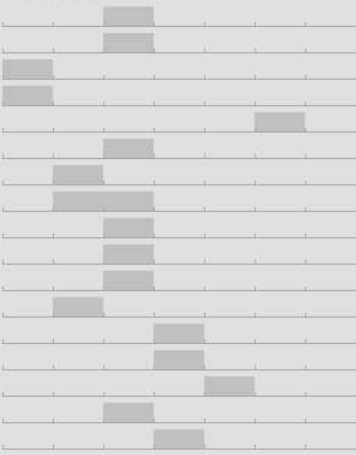
TB-62-001A

Raw diesel storage indeck tank

Select Deck:



Work Permits



Identifiser	Status	Description	Priority	Workcenter	By	Area	Equipment
8000	2	Feil på tilbakemld. oljechoke...	1	HAUT	Andersen	C41	A35
8001	4	Resert. av PZV421138 scal...	2	CMEK	Andersen	C21	X-51-021
8002	2	Resert. av PZV621017 Rådi...	2	CMEK	Andersen	C21	x-51-028
8003	2	24M - Hovedettersyn drains...	2	CMEK	Thorshov	C31	BRA-S5602
8005	4	Våtblåsing og sliping av rør ...	1	UOKX	Andersen	C51	X-65-002
8008	2	Rep/bytte av AFFF pumpe ...	2	HMEK	Andersen	C11	X-74-001B
8009	2	Lavt bakttykk i akumulator ...	2	HMEK	Thorshov	C21	X-51-011
8011	2	Montere personellbeskyttels...	2	UOKP	Andersen	C41	A23
8012	2	Demontere/montere isolasjo...	2	UOKQ	Andersen	C51	BRA-16
8013	2	Mont. stillasrekvv v/mannhu...	2	UOKB	Andersen	C21	TB-62-001A
8014	2	Montere blindinger	2	CMEK	Andersen	C21	TB-62-001A
8015	2	Montere blindinger	2	CMEK	Andersen	C21	TB-62-001A
8016	2	Entring av dieseltank A	1	UOKR	Andersen	C21	TB-62-001A
8017	2	Tilbakestille blindinger	2	CMEK	Andersen	C21	TB-62-001A
8018	2	Entring av dieseltank A	1	UOKR	Andersen	C21	TB-62-001A
8019	2	Påsoler ifm ettersyn av dien...	2	UOKQ	Andersen	C31	BRA-S5602
8020	2	24M - Hovedettersyn drains...	2	CMEK	Andersen	C31	BRA-S5602

Work permit: 8016 Level: 1 Status: Completed

Description:
ifm. innvendig insp.rengjøring

Current Status:

- In Progress
- Completed
- Ready to Schedule
- Scheduled
- Postponed

Worktype:

- Hot work class A
- Hot work class B
- Entry
- Safety-system trip
- Pressure testing
- Work over sea
- Hazardous chemicals
- Radioactive material
- Well operation
- Explosives
- Critical lift operation
- Other/Critical operation
- Work on hydrocarbon carrying system

Elements:

Add Element Cancel

Choose Type:

- Hazard
- Comment
- Prohibit
- Connect to: 8000 - Feil på tilbakemld. oljechoke A35

Description:
Verneutstyr: Hansker med lang arm beryttes

Display:
 Work Orders
 Operations

Help...

Background:
 Zone Classification
 Normal

Zoom in
 Zoom out

Legend:
 Explosion Danger
 No Danger



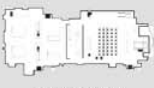
Selected area:

Equipment:

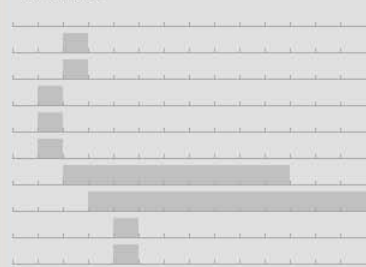
Select global timespan:



Select Deck:

- 
All Decks
- 
Mezzanine Deck
- 
Basement Deck

Work Orders



Identifier	Status	Description	Priority	Workcenter	By	Area	Equipment
7000	4	Maleprogram Jpk 5C10, C51...	2			C41	A08
7002	4	Feil på tilbakemelding oljech...	2			C41	A23
7003	4	Rep. av jockey på AFFF bra...	2			C31	X-65-001
7004	4	Lavt baktrykk i akumulator ...	3			C21	X-51-021
7005	4	Resert. sikkerhetsventil BR...	4			C41	A23
7006	4	Resert. sikkerhetsventil BR...	4			C41	A23
7007	4	FV for drainsentifuge (BRA...	4			C31	BRA-S5602
7008	4	V.kabel sprenger sikring C3...	5			C31	C31 Nord
7009	4	Gassløftchoke A08 stenger i...	2			C41	IA-13-071
7010	4	Smøre oljepumpe luftkomp B...	2			C21	PM-62-020
8012	4	Legge ut VK. EH82013.312 ...	4	HEL		C31	BRA-S5602
8013	4	24M - Hovedettersyn drains...	4	CMEK		C31	BRA-S5602
8014	4	24M - Assistanse leverander...	4	SPES		C31	BRA-S5602
8015	4	06M - Oljeskilt drainsentifug...	4	CMEK		C31	BRA-S5602
8016	4	24M - Skilte lagre på drains...	4	CMEK		C31	BRA-S5602
8017	4	Avisolere instrument rør ...	4	UOKQ		C31	BRA-S5602
8018	4	Reisolere instrument rør ...	4	UOKQ		C31	BRA-S5602
8019	4	Legge inn VK. EH82013.31...	4	HEL		C31	BRA-S5602
8020	4	RD151484 Rietur av skåler f...	4	REP		C31	BRA-S5602

Work order: 7007 Priority: 4 - Within 90 days Status: Ready to Schedule

Description:


Current Status:

- In Progress
- Completed
- Ready to Schedule
- Scheduled
- Postponed

Elements:

Add Element Cancel

Choose Type:

-  Hazard
-  Comment
-  Prohibit
-  Connect to: 7000 - Maleprogram Jpk 5C10, C51 Kjellerdek

Description:
 Kan vi legge inn risiko på tilhørende OP før vi kommer til AT søknad?

First usability study

- Eight users participated in the 1st usability evaluation.
- Represented four petroleum companies:
 - Statoil, Eni Norge, Shell, and GdF Suez.
 - Selected for the study by representatives from the petroleum companies from their pool of potential future users of IO-MAP.
- Participants were all involved in planning in their organisations
- Some had previous offshore planning experience, others had not

Building scenarios for testing

- Worked closely with IO Center partners Statoil and DnV on scenario development
- Using Statoils Brage installation as case
 - SAP
 - HSE profiles
 - Other platform data
- Input and evaluations by platform manager, HSE coordinator onshore, planner onshore

Some preliminary findings and indications from study and preparations

- IO MAP fills an important function in visualising risks in connection to tasks and location, offering an extra highlight and reminder of risks on the map
- Planners with pre-IO experience may have an advantage in identifying risk connected to a work order or operation at an early stage because of their off-shore knowledge and “gut-feeling”
- It seems that IO MAP may help planners who never worked off-shore to get a share of gut feeling through visualisations
- Feedback indicates that limited number of additions to the system will turn it into a groupware for distributed collaboration
 - Needs will differ between users, this can be accommodated
- History will remain an important parameter in our further work
- Indications so far are that the same tool can be deployed across disciplines, with slightly different interface settings
 - This must be investigated more closely

Input to further scope from participants

- All wanted to keep risk visualisation, and several further risks were proposed
- They also wanted to see
 - Contractor activities
 - Drilling activities
 - Work that does not need a work permit, but could influence on the overall situation
- Wanted the same tool for all participants in the planning cycle
- Wanted the tool in several meetings a day, as well as for information handling and sharing between meetings and work sessions.

Further studies

- The second usability evaluation is planned to be carried out in late 2010 early 2011
- This evaluation will focus on the usability of IO-MAP in a group context, i.e., to support a distributed team of planners in effectively developing maintenance and modification plans in which safety goals are adequately prioritized
- We will also study cultural differences

IO Center Participants

- Statoil, GdF SUEZ, Eni Norge, Total, Conoco Phillips, Petrobras
- Aker Solutions, IBM, DnV, Kongsberg, FMC