Universitetet i Stavanger

COLLABORATIVE COMPETENCE CLUSTER ON INDUSTRIAL ASSET MANAGEMENT
UNIVERSITY OF STAVANGER

CIAM

Master student projects

Center for Industrial Asset management

2014

List of Master Students Projects 2014

Title:	**Application of Reliability Centered Maintenance on a Drilling System**
Status:	Open
Abstract:	The first part of the thesis is an introduction of the drilling system where the theoretical background of the drilling system is described. Then the reliability centered maintenance (RCM) methodology is described. RCM is a logic way of identifying what equipment that needs to be maintained with a preventative maintenance basis rather than letting it fail and then fix it basis, commonly referred to as the run to failure (RTF). The maintenance strategies are described in 3.2 Reliability centered maintenance include many different hazard analysis types and techniques. The failure mode, effect and criticality analysis (FMECA) is the main technique in this thesis. The work of conducting a FMECA and failure tree analysis is very time consuming, this thesis will therefore have a main focus on a sub system. The subsystem described in detail is the top drive. A fault tree analysis is used to describe the system boundaries while the FMECA is used to create a risk priority ranking and a risk matrix. A maintenance plan for the top drive is proposed in Appendix B.

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Title:	**Development of a Procedure for the Assessment of Microbiologically Influenced Corrosion in Risk Based Inspection Analysis**
Status:	Open

Abstract: Microbiologically Influenced Corrosion (MIC) is a degradation mechanism that has received increased attention from corrosion engineers and asset operators in the recent years. In the thesis, the most important aspect of MIC is presented and discussed. Further, previous models that have been developed in order to assess the impact of MIC on asset integrity are presented. From a risk perspective, MIC is not satisfactorily assessed by the current models and the models lack a proper view of the MIC threat. Therefore, a review of parameters that affect MIC is presented.

The mapping and identification of parameters is based on the review of past models and extensive literature study of the subject. The parameters are discussed and subsequently combined in a suggested procedure that allows assessment of MIC in a RBI analysis. The procedure is sub-divided into one screening step and one detailed assessment, which fits the recommended approach to assess risk in a RBI analysis. Interface between the suggested procedure and the RBI concept is discussed. Several recommendations are made in the identification of what, when, where and how to inspect, as well as what to report. Lastly, an example that illustrates application of the procedure is given.

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Title:	**Evaluation of Risk Factors in the Interface between Engineering and Workshop**
Status:	Open
Abstract:	The thesis will look at relevant literature in project and interface management and it will evaluate IK's work process, communication, documentation, and their contribution to the interface. The thesis will also follow an ongoing project on Statfjord A to evaluate the performance of the improvements made after the incident, to see if they have the expected effect or if they need further improvements. The thesis concludes that IK has had a major development since the accident in 2008 but there are still some improvements that can be made to better the interface and to reduce the coherent risk. The key factors that were used in the evaluation, proved to be relevant to the performance of the interface and the thesis provides 7 different suggestions for improving these factors. The largest improvement potential was identified within the work process where lack of definition was the main issue. The communication could also be improved by including the mechanics earlier in the project to reduce the probability of errors caused by misunderstanding and lack of information will be reduced

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Title:	**Effects of the Arctic conditions to human and organizational performance – A review**
Status:	Open

Abstract: This master thesis will focus on the effects of the Arctic conditions on human and organizational performance. The Arctic is a harsh and challenging environment and it is important to consider how the environment affects human and organizational performance.

In today's industries, highly modernized technologies are being employed as part of the operations. Small scale to large-scale industries benefit from technology. However, it is not the top concern of running one. Despite the overwhelming serviceability of these technologies lies the human being beneath. There can be no operation without the people behind. People is the core substance of the industrial operation, nevertheless human beings have limitations. These are the reasons why human factors and organizational performance are being studied.

The thesis will discuss human factors, how a distinct human being can be of influence of a technology and how it will make or break the system. I will also consider how the effect of organizational performance management influences the realization of goals of the organization as well as the systematic performance process of the industrial assets.

Finally, this research will give analysis of the arctic regions and its factors and locations. The developing industry in some part of the Arctic specifically the Barents Sea will be discussed with respect to how human factors are to be considered in this type of environment, and the organizational performance management which is needed to administer this area.

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Title:	**Product Management: Visualization Technology and 3D Simulator of Aker Solutions**
Status:	Open

Abstract: This Thesis has focused on Visualization and Simulation Technology in oil and gas industry. It contains the common usages and the implementation process of this new advance technology. 3D Visualization Technology has just been introduced since last decades in Exploration & Production of oilfield development. Aker Solutions has introduced the new innovation technology product solutions, which is 3D simulator software for training, planning and testing purposes in relation to operational projects within their business areas. Aker MH AS, Drilling technologies department, Stavanger, has opened the master thesis topic of product management, which the author had this opportunity to write academic report about this product services. The first intention of this thesis topic are to find out where Aker Solutions stands in the industrial for simulation services and how this product is positioned going forward. However, to adapt this thesis into industrial assets management discipline the objectives included the usage benefits and mapping future solutions of the product mainly for the topside operational of Oilfield development particularly at offshore platforms. The structure of Thesis consists of the technology status reviews, an analysis and evaluation of product usages, the benefits of the product and future solutions for oil and gas industry. The work process of the product is called Visioneering®, which is a combination of visualization technology and engineering process. The concept of this technology work process is to provide the simulation services for operation performance improvement by reducing risk in the operation, ensuring process reliability and lowering offshore operation costs and downtime. This thesis also illustrates the basic of oilfield operational process of drilling, maintenance, modification, subsea, and installation of Aker Solutions for better understanding of the product usage.

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Title:	**Analysis of the Life of Field concept and its fitness to the future subsea asset maintenance on Norwegian Continental Shelf**
Status:	Open
Abstract:	The main scope of this master thesis is to analyse subsea asset maintenance on Norwegian Continental Shelf (NCS) and to evaluate the fitness of the Life of Field (LoF) concept to the future subsea asset maintenance on NCS. Subsea asset maintenance is part of subsea asset operation and maintenance which is a subsequent phase of subsea asset installation. This study is started by describing the role of subsea asset maintenance in O&G field development. The critical enablers which enable subsea asset maintenance to successfully perform the role are also described. Additionally, the offshore operation and the object of subsea asset maintenance are also parts of the description. Existing subsea asset maintenance projects on NCS will then be presented to identify the current practices of subsea asset maintenance on NCS. Afterwards, since subsea asset operation and maintenance is a subsequent phase of subsea asset installation, a number of subsea asset installation projects awarded on NCS in the last 10 years will be presented to predict the upcoming trend of subsea asset maintenance on NCS. The findings regarding the current practices and upcoming trend will help to identify the requirements of the future subsea asset maintenance on NCS. This study will be continued by describing the LoF concept used by Subsea 7 in providing subsea asset maintenance services to O&G companies. Analysis will subsequently be performed to evaluate the LoF's fitness to the future subsea asset maintenance on NCS.

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Title:	**Enhancing the Performance of Complex Engineering Systems Through Industrial Cluster: Issues, Challenges, and Opportunities**
Status:	Open
Abstract:	This thesis studies five industry cases in the world, it describes the development and performance of industry clusters in these countries, and by comparing different aspects of the clusters, the paper shows the similarities and differences of the clusters, especially it analyzes the challenges and risks in the clusters. Industrial clusters have unique competitive advantage but also have potential challenge and risk. Because of the organizational structure of industrial cluster and geographic boundary, they limit the further development of the cluster. Creating boundaryless organization makes the main body of industrial clusters full of activity, and improves the flexibility of clusters and the adaptability to the change of the outer environment.

Student name:	Xun, Hu
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Title:	**Identify Environmentally Critical Elements (ECE)**
Status:	Open
Abstract:	This study is based on information from internal GDF SUEZ E&P Norge AS (GDF SUEZ) documents. This includes system books, P&ID's and external journals regarding Environmentally Critical Elements (ECE). The scope of the thesis is to research parts of the Gjøa offshore installation and identify if there are any environmentally critical elements that have been overlooked during the identification of safety critical elements. To reduce the risk of acute discharge to sea the equipment/tags that are identified will be listed into a checklist. The checklist system will be as similar as possible to the already existing safety critical elements (HSE). The checklist will contain the classified criticality of production, HSE (safety) and the environment to compare them with each other. There are four system that have been analyzed to find ECEs.

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Title:	**Optimizing of pipeline maintenance using deposit profile technology**
Status:	Open
Abstract:	With an aging pipeline system, the petroleum industry is experiencing new challenges in maintaining the pipeline integrity. In the Master's thesis, a method and technology for internal pipeline diameter detection is presented. By measuring the pressure signature during a conventional utility pigging operation, the changes in internal pipeline diameter are detected. The method is evaluated and its applicability for optimizing the pipeline maintenance programme is discussed. The first part of the thesis is an overview of the challenges that operators are facing concerning pigging operations. Various solutions are reviewed for maintaining pipeline integrity. Further is a review of current management plans with focus on inspection activities. Thesis method and technology including the theory involved is presented with relevant examples. Two case studies at test laboratories were conducted as part of the thesis. The first case study verified the method and technology. The subsequent case study gave indications toward the method's detectability and repeatability. The result of the case studies show potential for implementation and optimization of the pipeline maintenance programmes. Finally, a few suggestions that might improve the technology are discussed.

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Title:	**Maintenance Strategies for Functional Products**
Status:	Open
Abstract:	This thesis attempts to understand and design maintenance strategy that could be used for oil and gas production lines consisting of functional products/performance based service delivery. Different service delivery strategies are presented, with respect to product and service delivery, and characterized each of these service delivery strategic models. Critical challenges related to maintenance strategy of performance based service deliveries are presented, in order to identify influence factors of maintenance strategy design. Maintenance management system for functional products is suggested and established in order to achieve operation and maintenance objectives. A case study on Offshore Mobile Drilling Unit is carried out in order to understand how to design maintenance strategy of performance service delivery. In addition, responsibilities of operating company and contractor are defined, with respect to the operation, maintenance activities including service support system. The case study is divided into four parts. A basic offshore rotary rig is presented in the first part. Drilling and well professionals are presented in the second part. Semi-submersible mobile rig unit contract is presented in the third part while conducted guided interview performed, and questionnaire is answered by interviewee can be found in the fourth.

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Title:	**Creating an Integrated Digital Platform for Asset Integrity Tools**
Status:	Restricted
Abstract:	Restricted

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Title:	**Vurdering og forslag til forbedring av eksisterende arbeidsprosess for reservedelsstyring i et offshore modifikasjonsprosjekt**
Status:	Restricted
Abstract:	Restricted

Student name:	Sandsbakk, Tina
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Title:	**Challenges and Opportunities in Tags and Tag-related Technical Information Management Process in EPCIC and MMO Project: Mapping Industrial Practices and Evaluation of a Tag Management Application**
Status:	Restricted
Abstract:	Restricted

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Title:	**Improving the Mechanical Strength and Durability of Mono-conductor Cables through Design Optimization and Material Selection**
Status:	Restricted
Abstract:	Restricted

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Title:	**Exploring the Competitive State of Practices in a Project Environment: Issues, Challenges and Recommendations Based on an Industrial Case**
Status:	Restricted
Abstract:	Restricted

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Title:	**Continuous Improvement Based on Cost of Quality and Lessons Learned in an EPC Project of and Oil & Gas Industry**
Status:	Restricted
Abstract:	Restricted

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Title:	**Review and Recommendations of Technical and Organizational Project Execution: The Case of MEG Project**
Status:	Restricted
Abstract:	Restricted

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Title:	**Choosing Appropriate Commercial Models for Overseas Business: A Case Study of a Chinese Oil Service Provider towards Internalization**
Status:	Restricted
Abstract:	Restricted

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Title:	**Analysis of Global Forces in the Wellhead/Wellhead Connector as a Function of Wellhead Lateral Support and Stiffness**
Status:	Open
Abstract:	During the life of a well (typically 20 years), a number of operations need to be performed that requires the wellhead/wellhead connector to connect directly to a rig through a riser system. While connected to the vessel the wellhead and conductor system is subjected to many forces from the riser, BOP, waves and vessel. In deep water, a small movement from the vessel can mean a large movement in the riser and BOP stack, which leads to higher loads on the wellhead/wellhead connector. This project will look into the angle of rotation and displacement of the wellhead datum considering bending stiffness and lateral support of the wellhead. Bending moment and shear forces obtained from a riser analysis of a drilling riser (done in OrcaFlex) will be applied at the wellhead datum.

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Title:	**Subsea Gas Transition Hubs**
Status:	Open
Abstract:	The focus of this thesis is to eliminate the requirement of an umbilical. Many R&D projects, with the objective of reducing costs and risks related to umbilicals, have commenced the later years. Although many of the projects have been successful, the umbilical maintains as the only option to meet subsea production systems requirements. In this thesis, based on earlier studies, alternative solutions for power supply and communication have been evaluated. All the equipment that are required to maintain the gas transport functions will be incorporated within a 230 tons subsea manifold (excluding protection structure). This includes a remotely operated subsea flow control valve, a subsea High Integrity Pressure Protection System (HIPPS) and a subsea pig launcher guiding base. The structure also incorporate isolation valves, which facilitate the opportunity to retrieve the HIPPS and flow, control modules if maintenance is required. The subsea control system is based on the All-Electric technology which eliminates the requirement of hydraulics for valve actuation. The control system is powered by a rechargeable Lithium-Ion battery package which requires periodic recharging of energy from an intervention vessel. Communication between the subsea system and the master control station is provided by a connection to the integrated subsea fiber network in the North Sea. This subsea concept implements technologies that have not been widely used by the industry; hence, a qualification program must be initiated before a fully functional subsea gas transition hub is ready for installation.

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Title:	**A Parametric Study of Variable Deck Load for Drilling Vessels**
Status:	Open
Abstract:	This thesis presents a parametric study of the VDL where the objective is to identify technologies that can reduce the required VDL, and attempt to quantify reduction potentials for key contributors of the required VDL. Theoretical background for the semi-submersible drilling rigs and VDL is presented. The identified technologies are presented and their reduction potential is established and discussed, as well as the increased operational capacity due to the identified technologies. The focus has been on technologies that can reduce the key contributors of the VDL. The capacity of the drilling rig Maersk Deliverer, together with the characteristics of the drilling rigs on the market today was used as a basis to identify the largest contributors of the VDL and the potential increase in capacity. The results show that there is potential to reduce the required VDL by applying new technologies. For existing rigs this means increased operational capacity, e.g. a 4th generation drilling rig has the potential to operate within the same operational range as a 5th generation drilling rig. The reduction in required VDL also leads to more free storage space, which is an advantage when drilling in remote locations. For the development of future generations of drilling rigs the results indicates that the size can be reduced without decreasing the operational capacity.

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Title:	**Technological Challenges and Possible Solutions for Drilling Operations in the Great Barents Region**
Status:	Open
Abstract:	Starting with a description of the metocean conditions of the Barents Sea, the thesis will discuss the challenges for development of potential hydrocarbon fields in the Barents Sea Area. Main accent in the presented Master thesis will be placed on a review of the technological challenges for drilling operations, by providing a comparison of different International Safety Standards and Technical Regulations relevant for the Arctic region, in particular, for the Barents Sea Area including follows: American Petroleum Institute (API); International Organization for Standardization (ISO); Norsk Sokkels Konkurranseposisjon (NORSOK); Federal Agency on Technical Regulating and Metrology (Russian Federation); Other relevant standards. As well, risky scenarios during drilling operations in the Barents Sea will be analyzed to ensure well control and integrity and environmental safety. Design according to different standards will be compared. Based on a review of possible technical solutions for drilling operations in the Barents Sea Area, conclusions regarding using different Safety Standards and Technical Regulations will finally be given.

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Title:	**An Evaluation of New Technologies with the Potential to Reduce Air Emissions from Floating Mobile Offshore Drilling Units**
Status:	Open
Abstract:	In this thesis three new technologies with the potential to significantly reduce the release of air emissions have been evaluated. The rigs considered are semi-submersibles and drillships as they have the capacity to reach ultradeep water sites. One potential method is to implement natural gas engines on MODUs, as natural gas is the cleanest burning fossil fuel. LNG will allow for 20-25% lower CO2 emissions and 90-95% lower SOx emissions. In addition, the NOx emissions will be significantly reduced. Another measure is to implement new drilling technologies, which have the potential to reduce required rig size and indirectly reduce the air emissions. There are large differences in fuel consumption for the large and the small rigs, as large rigs have higher power requirements. In addition, larger rigs require more power for station keeping which is a major fuel consumer. The drilling methods have the potential to be combined. The reductions are even larger, especially for the semi-submersible, which allows for a reduction of 43%. The drillship considered allows for a reduction of 38% when the drilling methods are combined. Both methods will lower the cost of operation and may therefore be an attractive alternative in the future. The weight reduction is only based on mud and riser weights and one can expect even larger reductions in air emissions as BOP, Xmas tree, mud pumps and associated equipment are to be implemented in the calculations. To use LNG as fuel combined with the drilling methods may be attractive for new builds as LNG is a lower cost fuel than diesel.

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Title:	**Evaluation of Module Handling System on Current Riserless Light Well Intervention Units to Improve Up-time**
Status:	Open
Abstract:	In this thesis work, it is attempted to identify the critical elements of the module deployment system and analyze their significance in the objective of raising the operational weather limit. Hence, the module handling system was carefully studied. Critical failure modes were found to be failure of crane wire due to excess loading, failure of lower cursor system due to impact loading and clashing of module to moonpool walls. Analysis of the module deployment system against these failure modes was ensued. Orcaflex simulation software was selected. System guide wires, crane wire, vessel and moonpool were modelled. DNV recommended practice with appropriate calibration was utilized to calculate hydrodynamic coefficients for the module. Asgard field data was selected, 1-year unrestricted current condition was employed, regular wave analysis for module in moonpool and irregular wave analysis for module beneath moonpool was performed. Finally, sensitivity of the failure parameters to the system particulars was studied.

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Title:	**Evaluation of Jack-Up Units in Deeper Water in the North Sea**
Status:	Open
Abstract:	The aim of this thesis has been to investigate challenges and possible limitation associated with purpose-built jack-up units for weathering the ultra harsh environment of the North Sea. Two Site-Specific Assessments (SSAs) have been performed of a jack-up unit for all-year operations at the Johan Sverdrup field. The jack-up unit is a "similar" design as the MSC CJ- 70 Class drilling unit, which is able to operate at water depths up to 150 meters and drill wells down to 10 000 meters. She is the largest built jack-up class unit in the world. In addition to the Site-Specific Assessments (SSAs), a parameter study has been performed to investigate and quantify the sensitivities related to water depth, air gap, lightship weight, soil conditions and other effects related to uncertainties in stiffness, hydrodynamic loading, soil structure interaction, nonlinearities and statistical parameters.

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Title:	**A Study of Fracture Mechanisms When Exposed to Hydrostatic Loads**
Status:	Open
Abstract:	Bridgman experiment is an experiment that was conducted by Bridgman in 1912. This simple experiment consists of a rod going all the way through a pressure vessel. When pressurizing the vessel, the rod is loaded on the curved surface and when pressure get high enough, the rod fractures. There are still disagreement on the reason for fracture. Two explanations tend to stand against each other. One side explaining the fracture with use of the effective tension theory and the other side with use of Von Mises criterion and Poisson ratio. With examples from calculation of buoyancy, the two sides are explained and understood. Both sides with experiments differentiating them and their arguments. Then the theory on effective tension is elaborated by super positioning and explained. During the thesis, experiments were conducted. Bridgman experiment, bending experiment and tension experiment. All rods were cut down in size and photographed in SEM (Scanning Electron Microscope) to have a closer look at the fracture surfaces. It was shown that the fracture surface from Bridgman experiment is a fracture surface of tension. Results were discussed with several experts and feedback from both sides were discussed. Further investigations in three different softwares, AutoCAD Inventor, OpenFOAM and Ansys. Neither of the softwares show axial tension in the rods during pressure loading. Experts on the softwares were contacted and defended their software.

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Title:	**Offshore Ice-resistant Fixed Platform for the Dolginskoye field in the Pechora Sea**
Status:	Open
Abstract:	The master thesis will describe the concept for an Ice-resistant Fixed Production Platform that can successfully operate at the Dolginskoye field in the Pechora Sea. Because of the shallow water, the harsh ice conditions and the functional requirements a Gravity Based Structure (GBS) of the caisson-retained type will be suggested as the most efficient solution. Other GBS types are also considered for comparison. The existing experience of facilities currently installed in the Pechora Sea and other Arctic areas is taken into consideration for designing the concept. Technological features of the Prirazlomnaya OIRFP (Offshore Ice-resistant Fixed Platform) and the Varandey Oil Terminal are discussed in the work. In order to estimate all possible loads acting on the structure, its shape, size and material issues will be carefully analyzed. These parameters also influence transport and installation operations, weight and layout of topside equipment, storage capacity, and, therefore, the field development scenario. Finally, the thesis will present a conceptual model and calculations, which are needed to estimate on-bottom stability and the ice-breaking capability of the structure.

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Title:	**Comparison Study of Selected Uncoupled Riser Concepts in Deep Water and Harsh Environment**
Status:	Open
Abstract:	This thesis focuses on a comparison study of the two uncoupled riser configurations based on ultimate limit state (ULS) and accidental limit state (ALS) results by considering the possibility to avoid/prevent iceberg collision. As explained previously, the risers to be studied are set to be installed in the Norwegian Sea which has harsh environmental conditions. Three different water depths have been chosen on purpose, which are 100m, 400m, and 1500m. In the event of iceberg approach, this thesis work presents two solutions for comparison study. The two solutions are to drift/side-step the floating structure or to disconnect the riser/mooring system using a disconnectable turret. The repot will suggest the optimum solutions; the most suitable uncoupled riser configuration for the Norwegian Sea condition with respect to the riser performance for the case of floater drift off and the geometry of a disconnected riser. Based on detail strength analysis in operating and accidental conditions, this thesis concludes that COBRA riser concept has robust and efficient design to install in the Norwegian Sea conditions. In addition, the COBRA configuration in 1500 m water depth is feasible to perform a 250 m side-stepping in the event of an iceberg approach.

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Title:	**Modification of Cementing Tool With Respect to Collapse Pressure Rating**
Status:	Open

Abstract: The intention for this project was to increase the collapse pressure rating for the C-Flex SS 9 5/8" by modifying the design. This project started by evaluating the existing design. This was done before the modification of the C-Flex SS 9 5/8" design was implemented. Two design alternatives were made. In the first design alternative there are placed to seals at the opposite side of the threads compared to the position of the seal in existing design. This position of the seals will prevent the threaded connection from being pressurized when the tool is exposed to collapse pressure. In the second design alternative two seals are positioned at the same side of the threads as for the existing design. The difference is that in this design there are two seals. In this design the threaded connection between the end coupling and the housing will be pressurized when the tool is exposed to collapse pressure. Calculations and analyses were made for both design alternatives. These were used to check whether the designs gave satisfying results or if some additional adjustments had to be made. Calculations and analyses for the existing design and for the two design alternatives were compared.

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Title:	**Different Scenarios of the Oil Fields Development in the Pechora Sea**
Status:	Open
Abstract:	The Arctic region is thought to play a key role in the world's oil and gas field development and hydrocarbon resources production. Estimates indicate that approximately 25% of the world's unexplored hydrocarbon reserves lay beneath the depths of the Arctic regions. Starting with a description of the most urgent oil and gas prospects in the eastern part of the Barents Sea the project will discuss investigations for arctic offshore structures, types of offshore structures, transportation system for arctic conditions, the challenges for development of potential hydrocarbon fields in the Barents Sea Area. Main accent in the presented project will be placed on the case study which has been done with regard to the oil field development. Also economical calculations will support technical decisions concerning complex schemes of arrangement. As well, risky scenarios during platform transportation to the place of installation and during process of offloading will be analyzed to the environmental safety. Based on a review of possible technical solutions and economical evaluations for oil field development in the Arctic sea, conclusions will be finally given.

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Title:	**A Study of the Changes in Freeboard, Stability and Motion Response of Ships and Semi-Submersible Platforms Due To Vessel Icing**
Status:	Open
Abstract:	Four different types of vessels were analyzed in order to study the effect the ice has on dissimilar vessels, which are a fishing boat, a platform supply vessel, a drillship and a semi-submersible platform. Further, a case study and a parameter study have been undertaken for these vessels. The case study examines an icing event that could occur in the Barents Sea under a winter storm. The parameter study reveals the exact amount of sea-spray ice needed in order to make the vessels unsafe. The calculated results revealed that icing accumulations had a significant impact on the freeboard, stability and motion response for the vessels. It was also calculated that the smallest ship, the fishing boat, was much more likely to lose its freeboard and stability due to vessel icing. This boat has a length of 23.10 m, which was three times shorter than the platform supply ship and almost ten times shorter than the drillship. However, the calculated amount of ice needed in order to make the two larger ships and the semi-submersible unsafe was so immense that such a situation is considered as highly unlikely to occur. Further, this work also includes a proposal for further studies that can be done on this subject.

Student name:	Wold, Lise Eide
Academic advisor:	Gudmestad, Ove Tobias
Partners:	
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Title:	**Analyse av kraftsituasjonen på Skarv FPSO**
Status:	Open

Abstract: Denne avhandlingen er skrevet som en avsluttende del av masterstudiet i Industriell Økonomi ved Universitet i Stavanger. Oppgaven er normert til 30 studiepoeng og ble gjennomført våren 2014.

Masterstudiet har vært et tverrfaglig studie med emner innenfor blant annet økonomi, risiko og elektro. Oppgaven er hovedsakelig en teknisk oppgave men inneholder også elementer som økonomiske vurderinger og risiko.

Arbeidet med oppgaven har vært utfordrende men også svært lærerikt og interessant. Jeg har fått benyttet mye av det jeg tidligere har lært innenfor el-kraft, økonomi, Excel og risiko. Men ettersom dette har vært en relativt bred oppgave har jeg også vært nødt til å gå inn på områder som jeg ikke har vært borti før, som for eksempel gassproduksjon, utstyr relatert til offshore, kontrollsystem osv. Det har ført til at jeg har lært mye nytt, og i tillegg fått benyttet det jeg allerede har lært i løpet av masterstudiet i en mer praktisk sammenheng. Under arbeidet med oppgaven fikk jeg også et generelt innblikk i en ingeniørs hverdag i et oljeselskap.

I forbindelse med oppgaven har jeg samarbeidet tett mer BP Norge, Stavanger. BP har vært positive til masteroppgaven og gitt meg kontorplass i deres lokaler, i tillegg til egen bruker på intranett. Dette har vært til stor hjelp underveis i oppgaven, da veien til avklaringer har vært kort. Jeg vil gjerne rette en takk til alle ved BP Norge som har vært åpne for å besvare spørsmål og har satt av tid til møter. En spesiell takk til Espen Arild Berge for forslag til oppgave, tilrettelegging og god hjelp underveis, Rolver Seth og Harry Myklebust for god veiledning og konstruktive tilbakemeldinger.

I tillegg vil jeg rette en stor takk til min veileder ved Universitet i Stavanger, professor Mohsen Assadi for sitt engasjement og konstruktive tilbakemeldinger. Tilbakemeldinger fra Assadi har vært til stor hjelp og retningsgivende for oppgaven.

Student name:	Wold, Lise Eide
Academic advisor:	Assadi, Mohsen
Partners:	Berge, Espen Arild (BP Norge), Seth, Rolver (BP Norge), Myklebust, Harry (BP Norge)
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Title:	**Improve and Optimize the Management of Diving Support Vessel (DSV) During Design, Construction, and Operation**
Status:	Open
Abstract:	The purpose of this master thesis is to make some proposal to improve and optimize the safety management in the process of design, construction, and operation, basing on the diving operations on DSV 709, and what we have learnt from the Industrial Economics program. This thesis mainly focuses on the design and operational issues of a saturation diving support vessel (DSV). First, make the right investment decisions from the market survey of the saturation diving operation and the market needs, referring to the worldwide saturation diving support vessels design and specification. In DSV design stage, design a more reasonable human, machine and organizational interface by fully considering the human factors, organizational factors and the actual operation demands of saturation diving teams, especially the safety of saturation divers in a hyperbaric environment. During construction, how to execute the project management, monitor safety, cost and schedule the more effective. In the operational phase, choose the suitable maintenance strategies for the vessels and saturation diving equipment. Monitor the running status in order to ensure the sustainability, availability, high performance, and safety for potential improvement in economic performance and safety.

Student name:	Qingkui, Yin
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Title:	**Kan taus kunnskap hos inspektører danne grunnlag for en risikomodell for skip?**
Status:	Open
Abstract:	Sjøfartsdirektoratet har de senere år jobbet mye med utvikling av det risikobaserte tilsynet. Direktoratet har etablert metodikk for risikovurdering på overordnet nivå. Det mangler imidlertid en metode for konkret å ta stilling til risiko på et enkelt fartøy. Som en del av dette ser oppgaven nærmere på hvordan taus kunnskap hos direktoratets inspektører kan nyttes til å utvikle en modell for risikovurdering av skip. Datainnsamling gjøres ved hjelp av intervju av et utvalg inspektører. I tillegg gjennomføres en spørreundersøkelse blant inspektørene på bakgrunn av resultater fra intervjuene. I forkant av intervju og spørreundersøkelse er det gjort litteratursøk.Resultatene analyseres ved hjelp av teoretiske perspektiver knyttet til risikobegrepet og risikoforståelse i tillegg til teori om læring og taus kunnskap. I drøftingen diskuteres direktoratets tilnærming til risiko med hensyn til uanmeldt tilsyn. En konkluderer med at det primære hensyn med tilsyn er å sikre at ikke aktørene operer med uakseptabelt risikonivå. Videre vises det at under gjeldende regelverksregime på skip er det fra et tilsyns ståsted lite forskjell på tolerabel og akseptabel risiko. Det introduseres et nytt begrep, sikkerhetstilstand, som brukes for å uttrykke hvorvidt et fartøy opereres innenfor regelverkets krav. Dette gjøres primært fordi inspektørenes erfaringer er vanskelige å relatere til risiko direkte. Disse knytter seg i langt større grad til årsaksforklaringer rundt hvilke faktorer som tyder på at de kan forvente mange og alvorlige funn i et tilsyn. Bayesianske nettverk nyttes kvalitativt for å systematisere og synliggjøre funnene. Avslutningsvis drøftes relasjon mellom sikkerhetstilstand og risiko på skip. Relasjonen mellom disse synliggjøres i en modell. Det vises her til at en i videre arbeid må se til andre kilder for å få god informasjon om forhold som påvirker risiko utover sikkerhetstilstand. Til sist benyttes modellen i et praktisk eksempel som også ble prøvd under spørreundersøkelsen. Eksempelet synliggjør at modellen har kvalitativ nytteverdi. Videre vises det hvordan arbeidet kan videreføres for å etablere en kvantitativ modell.
Student name:	Gåseidnes, Håvard
Academic advisor:	Lindøe, Preben Hempel
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Title:	**On the Human error in Maintenance: Risk potential and Mitigation**
Status:	Open
Abstract:	In this thesis, we have firstly reviewed the maintenance management evolution process, meanwhile depends on relevant data and conclusions from other literatures, we found that in general human errors are the causation factors for large number of maintenance failures and the accidents and incidents thereafter, thus human errors become one of the biggest challenges faced by the industry. With the finding we establish the research objectives of the thesis as to firstly identify general patterns of human errors by establishing human error classification system, then try to identify human errors influencing factors of those human errors occurred in the maintenance process, Finally try to examine the management status of those influencing factors in the Norwegian Maintenance management regimes. We have set our discussion scope mainly on North Sea Oil & Gas Industry; therefore, we firstly conducted a survey of North Sea legislation regimes, then legislation regimes of UK and Norway consequently as a background for further discussion.

Student name:	Peng, Guicang
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Title:	**Anskaffelse av grunnundersøkelser i bygg- og anleggsprosjekt: En kartlegging av dagens utfordringer og anskaffelsesstrategier**
Status:	Open

Abstract: Riksrevisjonen (2010, 2012) fremhever uforutsette grunnforhold og svak gjennomføring av grunnundersøkelser som et problemområdet i bygg- og anleggsbransjen, og en viktig årsak til store kostnadsoverskridelser og forsinkelser i offentlige vegprosjekt.

Oppgaven studerer anskaffelsesforholdet mellom byggherre, rådgiver og grunnundersøkelsesentreprenør fra rådgivende geoteknikers perspektiv. Gjennom 10 dybdeintervju med de ulike aktørene i verdikjeden, er utfordringer ved anskaffelsen av grunnundersøkelser kartlagt og systematisert. I lys av utfordringene diskuteres aktuelle strategier for å styre leveransen av grunnundersøkelser slik at rådgiveren kan sikre et godt geoteknisk prosjekteringsgrunnlag og redusere usikkerhet ved grunnforholdene i et prosjekt. Studiet har avdekket utfordringer både fra byggherren som oppdragsgiver, og fra leverandør av grunnundersøkelser. Byggherrerelaterte utfordringer knyttes i hovedsak til lav planleggings- og bestillerkompetanse, mens de leverandørrelaterte utfordringene knyttes til usikkerhet i leverandørmarkedet og usikker kvalitet i utførelsen av tjenestene. Analysen viser et verdiskapende potensial gjennom tettere samarbeid mellom aktørene. Samarbeid med byggherren begrenses av offentlige regelverk. Leverandørforholdet derimot har større mulighet for integrasjon og samarbeid. De geotekniske rådgiverne søker langsiktige leveranseforhold, horisontale samarbeidsavtaler og vertikal integrasjon for å kompensere for de leverandørrelaterte utfordringene og slik sikre et godt geoteknisk prosjekteringsgrunnlag.

Student name:	Rudlang, Tore
Academic advisor:	Jan Frick
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Title:	**Risk Management Using Big Real Time Data**
Status:	Open
Abstract:	Adding to societal changes today, are the miscellaneous big data produced in different fields. Coupled with these data is the appearance of risk management. Admittedly, to predict future trend by using these data is conducive to make everything more efficient and easy. Now, no matter companies or individuals, they increasingly focus on identifying risks and managing them before risks. Effective risk management will lead them to deal with potential problems. This thesis focuses on risk management of flight delay area using big real time data. It proposes two different prediction models, one is called General Long Term Departure Prediction Model and the other is named as Improved Real Time Arrival Prediction Model. By studying the main factors lead to flight delay, this thesis takes weather, carrier, National Aviation System, security and previous late aircraft as analysis factors. By utilizing our models can do not only long time but also short term flight delay predictions. The results demonstrate goodness of fit. Besides the theory part, it also presents a practical and beautiful web application for real time flight arrival prediction based on our second model.

Student name:	Cheng, Jie
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Title:	**Parle PSO in Spark**
Status:	Open
Abstract:	This thesis focuses in contributing to the problem of efficiently distributing the PSO using a new technology named Spark. This thesis describes how to adopt the classic Particle Swarm Optimization algorithm to the distributed Big Data platform Spark. The solution of the problem is to firstly define the Spark data structure (Resilient Distributed Datset) for our PSO algorithm and then create the initialization algorithm for parallel PSO. The main processing algorithm consists of Foreach Operation design and Collect Operation design. We implemented our algorithm using Java and tested it with a real world use case of energy optimization for buildings. The use case is part of the EU FP7 research project named SEDS1 (Self-Learning Energy Efficient Buildings and Open Spaces) that has the participation of the University of Stavanger. The experiments show that both Spark and Hadoop could carry out big data calculation, which normal serial PSO could not handle.

Student name:	Cui, Long
Academic advisor:	Esteves, Rui Paulo Maximo Pereira Mateus , Rong, Chunming , Wlodarczyk, Tomasz Wiktor
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Title:	**Predict the Flow of Well Fluids: A Big Data Approach**
Status:	Open
Abstract:	This thesis focuses in contributing to the problem of efficiently distributing the PSO using a new technology named Spark. This thesis describes how to adopt the classic Particle Swarm Optimization algorithm to the distributed Big Data platform Spark. The solution of the problem is to firstly define the Spark data structure (Resilient Distributed Datset) for our PSO algorithm and then create the initialization algorithm for parallel PSO. The main processing algorithm consists of Foreach Operation design and Collect Operation design. We implemented our algorithm using Java and tested it with a real world use case of energy optimization for buildings. The use case is part of the EU FP7 research project named SEDS1 (Self-Learning Energy Efficient Buildings and Open Spaces) that has the participation of the University of Stavanger. The experiments show that both Spark and Hadoop could carry out big data calculation, which normal serial PSO could not handle.

Student name:	Asadollahi, Reza
Academic advisor:	Esteves, Rui Paulo Maximo Pereira Mateus , Rong, Chunming
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Title:	**Framework of Evidence Collection with Temporal Logic and First-Order Logic for Providing Accountability in Cloud Service**
Status:	Open
Abstract:	Two approaches on processing source of evidence and policy are shown and compared. The first approach processes them as MFOTL using MonPoly. The second approach processes them as Prolog (FOL) using Pyke. Testing on those two approaches using the implementations done on this thesis shows that representing accountability policies in MFOTL gives more expressiveness than representing them in pure Prolog (FOL). However processing of MFOTL used in MonPoly gives no more flexibility in terms of practical usage and improvement than using Prolog with Pyke.

Student name:	Ang, Suryanto
Academic advisor:	Wlodarczyk, Tomasz Wiktor , Rong, Chunming
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Title:	**Vekstselskaper – En analyse av gaselleselskaper i Rogaland**
Status:	Open

Abstract: I dag etableres det rekordmange virksomheter i Norge, og etablering av nye virksomheter er svært viktig for et land da det skaper innovasjon og vekst. Vekst kan oppstå både som vekst i antall selskaper og vekst innad i selskapene. Det er tidligere forsket på hva som forårsaker vekst og hva som gjør at noen selskaper opplever høy vekst mens andre så vidt overlever. Økt fokus på hvilke faktorer som skaper vekst kan kanskje bidra til å generere mer vekst. Med bakgrunn i dette har vi valgt å rette oppgaven vår mot vekstselskaper. Problemstillingen vår er:
Hva kjennetegner et vekstselskap i Rogaland? Er det de samme faktorene som er utdypet i tidligere litteratur, eller er Rogaland særegent?
For å kunne svare på problemstillingen har vi tatt utgangspunkt i selskaper fra gasellekåringen til Dagens Næringsliv, regnskapsinformasjon fra Proff Forvalt og tidligere litteratur skrevet av David Storey og Jim Collins. Metoden som er brukt er kvalitativ i form av dybdeintervjuer av vekstselskaper. Ved å studere vekstselskaper i Rogaland har vi kommet frem til 11 fellesnevnere knyttet til entreprenøren, selskapet, strategien og driften. Samtidig har vi funnet ut at vekstselskaper i Rogaland, med sin høye andel oljeselskaper, ikke er så særegne som mange skulle tro.

Student name:	Hansen, Silje Mellemstrand and Skei, Charlotte Ringard
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Title:	**Strategivalg i produksjonsbedrifter: Analyse av trender i Europa**
Status:	Open
Abstract:	Gjennom analyse av utvalgte trender fra IMSS (International Manufacturing Strategy Survey) vil denne studien undersøke hvordan strategiene har vært i produksjonsbedrifter i Europa fra 1992 til 2013. Strategiområdene som undersøkes er; konkurransestrategi, valg av leverandører, bruk av Just-in-Time, prosessdesign, organisasjonsnivå og kontrollspenn og belønningssystem. Studien har en deskriptiv og kausal tilnærming og det er benyttet kvantitative primærdata innhentet av det globale nettverket rundt IMSS. Det blir utført både longitudinelle analyser og tverrsnittanalyser, og det gjøres enkle statistiske beregninger. Oppgaven har to studieområder som undersøkes. Studieområde 1 består av bedrifter fra Norge, Danmark, Sverige og Nederland og studieområde 2 består av bedrifter fra Belgia, Finland, Irland, Storbritannia og Tyskland i tillegg til bedriftene i landene i studieområde 1. Et hovedfunn er at bedriftene ser ut til å utvikle seg i retningen av å bli mer komplekse. Dette gjenspeiles av at bedriftene baserer belønningssystemene sine på flere faktorer i 2013 enn i 1992, og at flere bedrifter har mer enn ett prosessdesign i 2013 enn i 1992. Det er også funnet at bruk av Just-in-Time har hatt en nedadgående trend. Internt i studieområdene er det ikke funnet noen sammenheng mellom antall organisasjonsnivå og kontrollspenn per linjeleder. Ved sammenligning av studieområdene viser funnene totalt sett likevel at studieområde 2 har mindre kontrollspenn enn studieområde 1, samtidig som området også har høyere gjennomsnittlig antall organisasjonsnivå. I konkurransestrategi styres viktigheten av attributtene lavere salgspriser og mer individuell tilpasning i stor grad av prosessdesignet. Ved valg av leverandør er det funnet en positiv sammenheng mellom viktigheten av kriteriet leveringsdyktighet og bedriftenes bruk av Justin-Time. Produktdesign og kvalitet, tilpasningskvalitet og leveringspålitelighet har vært de viktigste attributtene i bedriftenes konkurransestrategi totalt sett gjennom alle undersøkelsene. Lavest pris, kvalitet og leveringsdyktighet har vært de viktigste kriteriene ved bedrifters valg av leverandør.

Student name:	Sandal, Liv Toril and Marvik, Olav
Academic advisor:	Jan Frick
Partners:	
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Title:	**En analyse av utfordringene petroleumsnæringen vil møte når de beveger seg mot Nordområdene**
Status:	Open
Abstract:	This thesis provides a gathered overview over the numerous challenges the petroleum industry will face in the High North. It will provide the reader with a greater knowledge of the various challenges for the petroleum industry, and the different types of challenges that has to be resolved in order to establish installations and to deploy personnel in this area.

Student name:	Viste, Karianne
Academic advisor:	Jan Frick
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Title:	**Hydrodynamic Analysis during Manifold installation in the Gulf of Mexico**
Status:	Open
Abstract:	The thesis is focused on hydrodynamic analysis of the installation of a 4 slots submarine Manifold at a depth of 1300 meters located in the Gulf of Mexico. The OrcaFlex software is used for simulation of the installation vessel and forces induced on the Manifold being lowered down. Different installation methods are tested.

Student name:	Pavon-Manzo, Diana Denisse
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Title:	**Bevegelses analyse lekter**
Status:	Open
Abstract:	The thesis elaborates on the topic of roll motion of a vessel and analyses the roll damping coefficient using Wadam and Moses computer programs.

Student name:	Pettersen, Kenneth Thorsen
Academic advisor:	Gudmestad, Ove Tobias
Partners:	Aibel, Haugesund
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Title:	**Loadout Manual for the Edvard Grieg Process Module**
Status:	Open
Abstract:	This thesis contains a study of a loadout operation at Aker Solutions Egersund for the Edvard Grieg process module, which will happen in late December 2014. The study is mainly focused on mooring of the barge and risk analysis through all steps of the operation.

Student name:	Bjørkeland, Rudi
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Partners:	Aker Solutions, Egersund
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Title:	**Identification of Local Environmental, Geographical or Cultural Factors that May Influence Offshore Operations and Maintenance Processes**
Status:	Open
Abstract:	In this thesis, a series of methodologies with respect to risk analysis & risk assessment, decision making engineering and ergonomics is used to analyze the causes and consequences related to the influence factors on offshore operations and maintenance processes. A risk-based methodology concerning offshore operations is proposed to provide helpful information contributing to show how to identify and deal with circumstance in offshore operations and maintenance processes.

Student name:	Yang, Hao
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Title:	**Effects of Impacts from Large Supply Vessels on Jacket Structures**
Status:	Open
Abstract:	Restricted

Student name:	Aladina, Dody
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Title:	**Hvilke elementer påvirker beslutningsgrunnlaget til beredskapsledere i Statoil, og hvilken betydning kan disse elementene ha for beslutninger og læring**
Status:	Open
Abstract:	Restricted

Student name:	Jensen, Thomas and Drevland, Øystein
Academic advisor:	Lindøe, Preben Hempel
Partners:	Statoil
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Title:	**Kan godt sjømannskap ivaretas gjennom mål- og funksjonskrav?**
Status:	Open
Abstract:	I denne studien har jeg rettet oppmerksomhet mot det maritime sikkerhetsstyringsregimet. Gjennom innføring av blant annet International Safety Mangement Code [ISM-koden] og den nye Skipssikkerhetsloven (2007), har det maritime regelverket gradvis utviklet seg i retning av å bli mer mål- og funksjonsbasert. Historisk sett har regelverket innenfor skipsfart vært preget av preskriptive regler og detaljregulering. Jeg valgte derfor å se nærmere på hvordan rederier og myndigheter kan regulere risiko i et mål- og funksjonsbasert regime. For å belyse problemstillingen tok jeg utgangspunkt i ankerhåndteringsfartøy, som er et eksempel på et avansert offshore servicefartøy med risikofylte arbeidsoperasjoner. Den norske offshoreflåten er verdensledende, og det var derfor interessant å se på regelverksutviklingen knyttet til denne fartøystypen. For å besvare problemstillingen utformet jeg fire forskningsspørsmål. Først forsøkte jeg å få innsikt i hva som kjennetegner et funksjonsbasert maritimt sikkerhetsstyringsregime (1). Videre ønsket jeg å finne ut hvordan myndigheter og klasseselskaper kan føre tilsyn og vurdere etterlevelsen av funksjonelle krav (2). Deretter forsøkte jeg å undersøke hvordan rederier kan tilpasse sikkerhetsstyringssystemene til egne behov og aktiviteter (3). Avslutningsvis så jeg på hvilke styringsutfordringer og –muligheter det er knyttet til et funksjonsbasert regelverk (4). Jeg intervjuet representanter fra Nærings- og fiskeridepartementet, Sjøfartsdirektoratet, klasseselskap og rederier for å få innsikt i det maritime regimet. Hovedfunnene i denne studien peker i retning av at funksjonskrav ikke er et innarbeidet begrep innenfor skipsfartsindustrien. Et særtrekk ved det maritime sikkerhetsstyringsregimet er at det er preget av en form for dobbeltregulering. Det er utviklet nye mål- og funksjonskrav, for eksempel i ISM-koden, som kommer i tillegg til den eksisterende detaljreguleringen. Videre kommer det frem av undersøkelsen min at de internasjonale normene er drivende og legger føringer for rederiene, og er av mer praktisk betydning enn den norske reguleringen. Funksjonskrav kan videre være vanskelig å vurdere etterlevelsen av. Funnene viste at det eksisterer en usikkerhet hos rederiene omkring delegeringen av tilsynsmyndighet til klasseselskap.

Student name:	Nordbø, Ane
Academic advisor:	Lindøe, Preben Hempel
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Title:	**Sikkerhetsstyring - uten grenser?**
Status:	Open
Abstract:	Moderne produksjon av varer og tjenester fører med seg en rekke trusler ovenfor økologiske, biologiske, psykososiale og materielle verdier (Karlsen 2010). Tjenester og produkter utsettes stadig for en mer multinasjonal produksjonsprosess. Petroleumsindustrien er en virksomhet hvor utviklingstrekkene innebærer økt internasjonalisering (Arbeidsdepartementet 2013). Den økte internasjonaliseringen i industrien har ført til at norske selskaper i økende grad har startet opp med virksomhet i Asia. Dette er et relativt nytt område for den norske petroleumsindustrien å være involvert i. Manglende kunnskap om hvilke utfordringer dette innebærer med tanke på HMS-styring og sikkerhet gjør dette til et aktuelt tema. I denne oppgaven blir følgende problemstilling undersøkt; Hvilke utfordringer ved sikkerhetsstyring identifiserer leverandørorganisasjonen ved samhandling i leverandørkjeden? Problemstillingen undersøkes ved å gjøre en to-casestudie, med utgangspunkt i Yins (2014) forskningsdesign; casestudie. Begge casene er hentet fra en leverandørorganisasjon i petroleumsindustrien, som har konstruksjonsvirksomhet i henholdsvis Thailand og Dubai. Empirien samles inn gjennom intervju og dokumentanalyse. Innsamlede data analyseres og utfordringer identifiseres. Utfordringer oppstår innen kontraktsforhold, sikkerhetsstyringssystem, sikkerhetskultur og HMS-lovgiving og regulering. Funnene diskuteres opp mot teori om sikkerhetskultur med utgangspunkt i DeJoys (2005) teori om atferds- og kulturbasert tilnærming, Antonsens (2009) maktperspektiv, HRO-teori (Weick, Sutcliffe og Obstfeld 1999, Aven m.fl. 2004) og Argyris og Schöns (1996) læringsteori. Man ser at ved å støtte seg på teoretiske tilnærminger, samhandling, relasjonsbygning, erfaring og læring kan man møte utfordringene som oppstår.

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