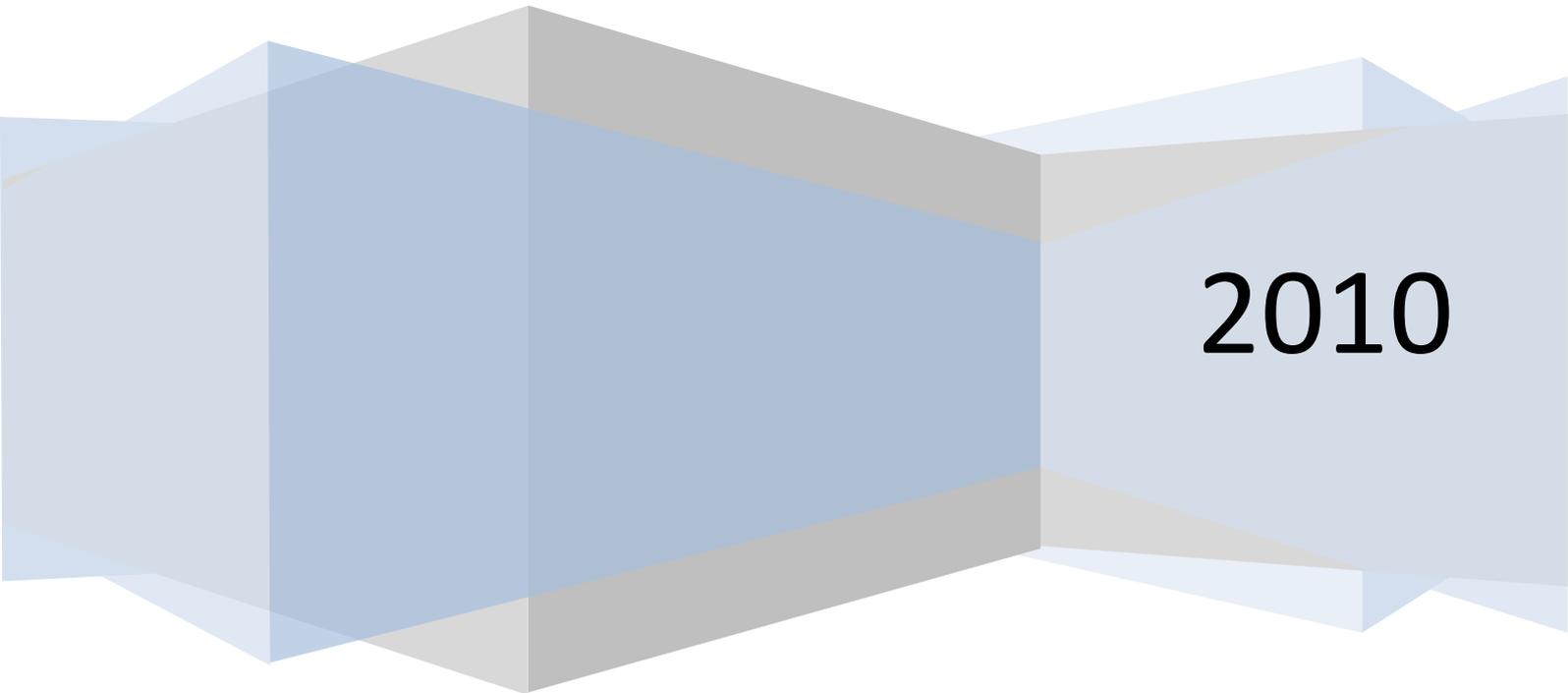


Master student projects

CIAM - Center for Industrial Asset Management



2010

Title: *Determination of an optimum testing and inspection interval for pressure safety valves (OPEN)*

Abstract: This master thesis work tries to examine the current procedures used for testing pressure safety valves, and the benchmark that are used in defining an inspection and testing interval for pressure safety valves. I have started by describing some basic elements of the design of safety valves, then go on to look at how these valves are tested. I have also examined the current criteria most owners of the pressure safety valves use in setting up their maintenance programs. The aim of this thesis in the end is to try and modify the current intervals being used in the oil and chemical industries today so as to cut down unwanted cost, guarantee the safety of personnel, and safe guard against any form or accidents in the plant. This thesis shows a conservative approach that is also in line with approved standards that can be used for setting an optimum inspection and testing interval.

Student name: Dibiat, Chidi Benjamin
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Title: *Performance measurement in maintenance and modification contracts (In Norwegian)*
(CONFIDENTIAL)

Abstract: Temaet for oppgaven er prestasjonsmåling i vedlikehold og modifikasjonskontrakter. Det er tatt utgangspunkt i Aker Solutions sitt Troll/Brage prosjekt som forholder seg til et slikt system. Oppbygningen av prestasjonsmålesystemet i Troll/Brage presenteres. Videre ønskes det å klargjøre hvorfor det gikk tre år før Aker Solutions så en effekt av dette systemet. Slik skal også utfordringer i neste Statoil Rammeavtale identifiseres. Avslutningsvis gjøres det et forsøk på å fremstille prestasjonsmålesystemet i Troll/Brage på en oversiktlig måte.

Student name: Thulin, Henriette Bruvik
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Title: *Perception gaps and improvement measures to health and safety incidents: A case study from the construction industry (OPEN)*

Abstract: This thesis will unveil some of the challenges faced by management when implementing a work paradigm change for the human component in a human-production-organisation interface. With support from Skanska Norway AS it discusses live scenarios related to their efforts in becoming The World's leading HSE construction company. Granted full disclosure, the thesis will present identified trends derived from previous data, project measurement and "Blue-Collar workers" interviews/conversations, site inspections, and production progress meetings in combination with their coherent strategies and procedures.

Student name: Albertsen, Rune
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Title: *Use of data in maintenance decision making (OPEN)*

Abstract: In the oil and gas industry in Norway, the concept of asset management always has been a challenging and complex in both organisational and technological aspects. In the recent years, with more advanced industrial plants and improvement of Information and Communication Technology (ICT), the definition of asset management has been changed and new concepts of smart assets, e-maintenance and Integrated Operations (IO) have been developed. The concepts focus towards more effective proactive monitoring of asset management. Today one of the biggest challenges the oil and gas industry is facing is defining implemented integrated work disciplines and better and effective control of remote assets. These improvements focus towards developing more reliable decision support systems based on real-time data from offshore and establishment of onshore support for more safe and reliable offshore work. The result of implementing this system greatly affects existing maintenance decision making process through optimising value of organisation and industrial assets. The study presented here focus on identifying different challenges related to data for decision making. The study highlights identical challenges and proposes several possible solutions on how effective data analysis can aid optimised performance of offshore assets.

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Title: *Statoil drilling and well learning curves, experience, and theory: Is there a learning curve from drilling the first well with a new rig and onwards (OPEN)*

Abstract: This thesis is performed for Statoil in Statoil premises in Stavanger. Statoil is a large offshore and subsea oil and gas operator in Norway, with increasing activity internationally, both offshore as well as on land. The thesis will look at Statoil's experience data, mainly in Norway, and compare these with established learning curve theory in the drilling and well business, in order to develop an updated method for learning curves in the time estimation proves in the company. Time and cost estimation is tightly linked and this thesis' main contribution will be to the time aspect. The time and cost aspects of drilling and well operations have gained increased attention during recent years, with strongly escalating cost, and the thesis is a part for the initiative to improve the estimation process.

Student name: Hellstrøm, Anders
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Title: *Cost and schedule overruns in modification projects: Reasons and measures to avoid (CONFIDENTIAL)*

Abstract: The purpose of this thesis is illuminating why it so often is cost and schedule overruns in modification projects executed in the oil and gas industry on the Norwegian continental shelf, and how to avoid these overruns. Where in the project life cycle has the project team the greatest influence on the modification project? What technology should be used? What actions can be done to avoid cost- and schedule overruns in modification projects? How is the project organization built up? Which pitfalls an organization must avoid? These are all questions that are answered in this thesis.

Modification projects have become a more common project form on projects executed in the oil and gas industry. Many of the offshore installations which are built in the North Sea are old; it means that the installations need upgrades for current regulations and standards. A modification project is often executed while the offshore installation is in operation. This involves a number of challenges when it comes to planning, scheduling, time consumption and execution of modification projects.

Student name: Løkling, Øyvind
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Title: *Artificial Lift – Electrical Submerged Pump, best practice and future demands within subsea applications (OPEN)*

Abstract:
Student name: Hollund, Bernt S.
Academic advisor: Carstensen, Conrad
Partners: Statoil
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Title: *VRD Plant Performance Testing Project (OPEN)*

Abstract:
Student name: Enerstvedt, Asbjørn
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Title: *Process safety in modification projects offshore (In Norwegian) (OPEN)*

Abstract: Problemstillingen som blir tatt opp i denne oppgaven er å belyse følgende problem:
I et modifikasjonsprosjekt hvor en ny plattform med høyere utviklet teknologi skal ha interface med en eldre plattform, skal sikkerhetsfilosofien sørge for sikkerheten til både personell og drift under normal og uønskede hendelser. Gjennom denne rapporten skal man ta utgangspunkt i en høytrykk separator i et modifikasjonsprosjekt og drøfte fremgangsmåten og installasjon av nødvendige komponenter og barrierer som skal sørge for separatorens sikkerhet med hensyn til personell, miljøet og drift.

Student name: Lorestani, Bahram
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Title: *Electrical submersible crude oil pumps at Statoil Mongstad: A study with emphasis on identifying problem areas, causes of the problems, and measures to increase the reliability (OPEN)*

Abstract: Denne oppgaven er en studie av råolje eksportpumpesystemet på Statoil Mongstad. Den har fokus på å identifisere ulike feil som har inntruffet og identifisere rotårsak og tiltak som kan forhindre hendelsene a gjenta seg i fremtiden.

For a å besvare problemstillingen vil teori om forskjellig typer vedlikehold og ulike aspekter rundt pålitelighet bli gjennomgått. Funksjonaliteten og aktuelle feilmekanismer for pumper og elektromotorer er beskrevet far a å bygge opp en forståelse og identifisere hvilke problemområder en kan ha i et pumpesystem.

De data som er brukt i analysen er hentet fra bedriftsinterne databaser, rapporter, diverse bedriftsinterne dokumenter, intervjuer og mater med personell fra Statoil og eksterne leverandører. Datagrunnlaget og relevant litteratur er benyttet for a løse problemstillingen.

Oppgaven konkluderer med årsakene er til feilhendelsene er sammensatte og at flere faktorer spiller inn Pa pålitelighet og tilgjengeligheten til systemet. De viktigste faktorene er: ikke tilfredsstillende vedlikehold, forurenset oksidert smøreolje og eventuelle partikler fra lagerskader. Det foreslås flere ulike tiltak som for eksempel a å innføre lik instrumentering på test og i drift. Begrense vanninnholdet i smøreoljen til et minimum ved a å skifte filter design og starte med drenering av smøreolje reservoar ukentlig. Sørge for integriteten til oljeanalysene kvalitetssikres. Det foreslås også a å se på muligheten for implementering av vibrasjonsovervåkning da dette vil kunne si mye om tilstanden til lagrene i maskinen og gi muligheten for a planlegge eventuelle vedlikeholdsoperasjoner. I tillegg vil dette kunne gi mulighet til a stoppe maskinen for maskinen havarere og på denne måten hindre eventuelle følgeskader.

Student name: Storheim, Bjarte
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Title: *How to make a maintenance procedure for minor offshore drilling equipment (Bachelor thesis in Norwegian) (OPEN)*

Abstract: Hovedmålet med oppgaven er å utforme en mal for hvordan man skal lage en prosedyre for periodisk og korrektivt vedlikehold av mindre offshore boreutstyr etter retningslinjene i NORSOK og klassifiseringsorganisasjonen Det Norske Veritas standarder, for å øke produktiviteten og effektiviteten i vedlikeholdsarbeidet.

Student name: Endrerud, Ole-Erik Vestøl
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Partners: National Oilwell Varco
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Title:	<i>Implementing condition based maintenance within an asset management framework (OPEN)</i>
Abstract:	<p>The thesis shall describe how to implement Condition Based Maintenance within an Asset Management context. Asset Management (AM) is an area within Oil & Gas (O&G) Business with a large development potential in order to give companies added value in their operations. With the increased use of Integrated Operations concepts, a new approach for maintenance engineering is necessary. The asset performance is a result of the following four aspects:</p> <ul style="list-style-type: none"> • Design qualities • Operational Support • Maintenance support • Management Functions <p>A framework/methodology is needed to handle the maintenance aspects properly in early design phases and EPCI phase. The early design phase is very important for influencing the maintenance qualities. The master study describes a theoretical framework with a main focus on the Maintenance Strategy in early design phase (Front End Loading) and subsequently Maintenance Engineering in the detail project phase (EPCI). Development of suitable Maintenance Engineering Methods to comply with Condition Based Maintenance strategies and Integrated Operations concepts is also an objective in the thesis.</p>
Student name:	Gusfre, David
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Partners:	Aker Solutions
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Title:	<i>Exposure of Norwegian oil service industry segments to effects of globalization (OPEN)</i>
Abstract:	<p>This thesis intends to explore and describe the effects of Globalization on Norwegian oil service industry and the exposure of oil service industry segments to global competition. We tried to find out current trends and factors governing the globalization process in 21st cen. The information required is sourced from various sources like books, technical papers and online articles etc. Based on our findings, we tried to correlate the trends and governing factors in globalization to Norwegian oil service industry, in order to evaluate its exposure to global competition. The exposure of Norwegian oil service industry to global competition is evaluated in both qualitative and quantitative ways. The basis for an internet based survey to validate our findings from industry is also formulated. The actual survey is not covered in this thesis due to time limitation and will be conducted by Stavanger University in coming months.</p> <p>Key words: Globalization, Globalization effects, Competition, Oil Service Industry</p>
Student name:	Kale, Prashant B.
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Title:	<i>Integration of condition monitoring data to preventive maintenance activities: issues, opportunities and challenges (OPEN)</i>
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Abstract:	<p>Current oil and gas industry practices show a continuous interest in the opportunity of maintenance optimization and related cost reduction. A case study is performed to identify the opportunities of maintenance optimization, by identifying the opportunities of integrating available condition monitoring data effectively and efficiently to update and improve preventive maintenance activities. This research is aimed to clarify issues, challenges and opportunities to integrate condition monitoring data in planning and executing preventive maintenance activities. In addition, maintenance costs of selected equipment were analyzed and estimated with respect to different maintenance strategies to derive the economical effects of such integration. In the thesis current issues, challenges and opportunities of integration of condition monitoring data to preventive maintenance activities are discussed.</p> <p>Keywords: Preventive maintenance, predictive maintenance, condition based maintenance, pumps, maintenance costs, offshore maintenance management, maintenance optimization.</p>
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Partners:	Apply Sørco
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Title:	<i>Wind turbine simulation with computational fluid dynamic tool (OPEN)</i>
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Abstract:	
Student name:	Bezadi, Beza
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Title: *Industrial services perspective of the oil and gas industry – a case study of the Nigerian National Petroleum Corporation (OPEN)*

Abstract: Within the NNPC, its subsidiaries are charged with the main responsibility of providing services for the Corporation, they are also given the mandate to outsource services from specialized companies, most of who have been in the Oil and Gas Industry business long enough. From the upstream to the downstream businesses that the Corporation is involved in, some of these subsidiaries go into some sort of partnership in the form of joint venture agreements with some reputable international service companies operating in Nigeria. Notable to mention here is the Integrated Data Services Limited, commonly called IDSL. IDSL has been able to establish this sort of partnership through its joint venture with other specialist companies, and with this step they have been able to give the Corporation a competitive edge. The IDSL has a working relationship with two companies in the area of seismic data acquisition, on land and swamp. These are the joint venture with United Geophysical Company (Nigeria) Limited, and Petroleum Geo-Services ASA (PGS). With United Geophysical Company (Nigeria) Limited, they achieved the following; acquired Sercel SN 309 for their operation on AGIP JOB, CREW 166 and acquired 4D Seismic Data Acquisition Equipments Sercel SN408 for SPDC JOB, CREW 165. This subsidiary is working very hard when it comes to providing services for the corporation, with an ultimate goal of becoming the centre for the provision of geophysical and petroleum engineering services in the world of the Oil and Gas Industry. It is the intention of this thesis work to identify with the NNPC and describe how the group through its respective subsidiaries provides services for the citizens of the Nigeria and its foreign customers from overseas.

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Title: *Early project phases and uncertainties in cost and schedule (CONFIDENTIAL)*

Abstract:

Student name: Gu, Minli
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Title: *Lifetime extensions of aging oil and gas platforms (CONFIDENTIAL)*

Abstract: A large number of facilities and parts of the infrastructure on the worldwide offshore facilities are approaching or have exceeded their original design life. These fields are having and still producing substantial level of hydrocarbons which is recoverable and profitable if the field's life time is extended. Thus parts of this infrastructure are being considered for use beyond their planned design life. But focusing on safety consideration - the condition of systems, structures and components (SCC) may not be acceptable for extended operation.

The purpose of this project is to establish the necessary method or guidelines for assessing life extension in order to ensure technical and operational integrity of these ageing facilities.

The objective of this project is to highlight what are the ageing mechanisms due to which the installation is degraded physically and functionally including the human factors and organisational issues.

This documentation of ageing mechanism will provide the foundation for life extension process. This report is done in close coordination with Aker Solutions in particular the Maintenance & Materials technology department for LE assessments of ageing oil and gas platforms.

Student name: Palkar, Sushil
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Title: *Conception and development of method/apparatus for close-visual inspection of subsea structures in underwater poor visibility cond. (CONFIDENTIAL)*

Abstract:

Student name: Agbakwuru, Jasper
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Title: *Next generation coil tubing units – reliability and maintenance planning using real time diagnosis and condition monitoring (CONFIDENTIAL)*

Abstract: Coiled tubing is one of the most flexible well intervention concepts that exist today. As the oil and gas operator companies realize that the modern maintenance perspective needs to be adapted also to their wells and down hole assets, the market for well interventions and well maintenance will grow. Such services will become increasingly appreciated and valued. These huge opportunities presuppose a high quality reliable service delivery. One of the most important factors to achieve this is sustainable reliability based maintenance of the well intervention equipment.

This master's thesis has been carried out with the purpose of pointing out how coiled tubing well intervention operations can become more reliable. The thesis is focusing on the primary tool needed to perform a coiled tubing campaign, the coiled tubing unit, and is seeking to identify how this equipment can be enhanced to an increased reliability level. Technical, organizational, and procedural aspects of operations and maintenance of such assets are being analyzed and discussed. A failure mode effect and criticality analysis of the coiled tubing unit is presented along with historical failure data and several state of the art solutions from other industries. Various condition monitoring techniques are also presented and considered along with the analyses in an attempt to locate new tools and technologies that can improve the fault diagnosis and maintenance processes.

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Title: *Reliability, availability, maintainability and supportability factors in an arctic offshore operating environment (OPEN)*

Abstract: With oil and gas production reaching its tail end on many fields on the Norwegian Continental Shelf, the industry is looking towards the Arctic to start exploration and production. It is estimated that 14% of the worlds remaining oil and natural gas reserves are found in Arctic areas, most of these offshore. The harsh Arctic conditions concerning climate, lack of infrastructure and long distances generate challenges in respect to keeping risk low and regularity high on oil and gas producing installations in this area.

The research presented in this thesis highlights the challenges concerning operation and maintenance of offshore production installations in Arctic areas. Challenges to Reliability, Availability, Maintainability and Supportability (RAMS) in Arctic areas are identified.

The case study conducted as a part of this study indicates that maintenance will be essential in keeping regularity high on an offshore oil and gas production facility in the Arctic. Harsh operating conditions can cause increases in failure frequencies, failure modes and failure mechanisms resulting in a need for different and more frequent preventive maintenance. Many maintenance tasks and corrective repairs can be expected to be more time consuming in the Arctic than in temperate areas. Furthermore, the economic model gives an overview of the increase in man-hours and costs when the activities are planned to be conducted in arctic areas.

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Title: *A quantitative and risk based approach for identification of preventive maintenance intervals without the use of specialists (In Norwegian)*
(OPEN)

Abstract: Med utgangspunktet "Å finne fram til en framgangsmåte og optimeringsmodeller som kan danne et kvantitativt beslutningsgrunnlag for tildeling av ressurser til forebyggende vedlikeholdsintervaller velegnet for små og mellomstore bedrifter", er det foreslått en risikobasert framgangsmåte for tildeling av forebyggende vedlikeholdsintervaller basert på bevis og data.

Med kvantitative metoder belyses verdien av ulike strategier tydelig, og det bør da bli enklere å oppnå aksept for de valgte strategiene. Fokuset er på enkle og lite ressurskrevende metoder og begrenser seg til grunnleggende modeller som blokk, alder og minimal reparasjon. I tillegg behandles et tilfelle med både deterministiske kostnader og kapitalkostnader. Modellene illustreres med virkelige eksempler fra en mellomstor norsk bedrift, Finnfjord AS. Her utvelges kritiske systemer som skal vurderes for optimalisering. Identifiseringen av dette utstyret baseres på en risikobasert metode, og basert på analyse av datagrunnlaget blir de mest relevante modellene for optimering av vedlikeholdsintervaller presentert. Gjennom casene blir det demonstrert at disse metodene også fungerer i praksis. Det ble funnet at bedrifter med begrensede ressurser og kompetanse vil kunne ta i bruk grunnleggende modeller, men at det foreligger et potensial for et større bruk av optimeringsmodeller hvis programvaren som allerede er på markedet i dag videreutvikles. Bruk av modellene og den nødvendige dataanalysen er demonstrert med ferdige oppsett i standardverktøyet Excel for weibullfordelte levetider. Oppsettene vil også kunne fungere som maler for lignende tilfeller

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Title: *Development of an Integrated Inspection and Maintenance Strategy (OPEN)*

Abstract: For the management of the integrity of a process plant two commonly used methods are Reliability Centred Maintenance (RCM) and Risk Based Inspection (RBI). The application of RCM is based on the International standard IEC 60300-3-11 and NORSOK Z-008, whereas that of RBI is based on API580/API581 and DNV-RP-G101. Both methodologies have quite a similar philosophy involving the estimation of the risk by combining probability of failure and consequence of failure regarding individual equipment. Based on the estimated risk, suitable inspection and maintenance activities are planned.

This thesis reports the work carried out in analysing the possibilities of integration of existing maintenance and inspection methods into one unified approach. In the process of analysis the thesis makes a comparative study between the two methodologies' overall working process and management programmes. The key elements that have been considered are: availability of resources, screening process, grouping and classification of equipment, the consequences of failure assessment, probability of failure assessment, risk evaluation, task application, planning and updating of existing plans.

The results of the comparative study show that while there are many similarities between the methodologies, there are also some differences. The similarities are regarding the configurations of the strategies and use of common results to govern further actions, while the differences are due to the inherent nature of different equipment. The study has shown that it may be possible to develop an integrated platform for carrying out a unified analysis without losing vital aspects of either of the two methods.

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