List of Selected Engineering Projects

Assessment of Safety of Pipelines.

Position: Consultant.
Client: Grande Dixence S.A., Switzerland, 2009.

Best Practice Methodology for Tunnel Risk Assessment.
Development of best practices and methodology for tunnel risk assessment using Bayesian Probabilistic Nets.

Position: Consultant.
Client: Norwegian Public Roads Administration (Statens Vegvesen), Norway // ASTRA, Switzerland, 2009.

PEGASOS Refinement Project (PRP).
Probabilistic Seismic Hazards Analysis using Bayesian Probabilistic Networks.

Position: Consultant.
Client: swissnuclear, Olten, Switzerland, 2008-2011.

Probabilistic Typhoon Model for Japan.
Education and Training support.

Position: Instructor, Consultant.
Client: AON Re, Tokyo, Japan, 2008-2009.

Risk Assessment of Tunnels.
Assessing risks and identifying risk reducing measures.

Position: Consultant.
Client: Norwegian Public Roads Administration (Statens Vegvesen), Oslo, Norway, 2008.

Criteria for the Safety of Third Persons.
Assess existing - and propose best practice for requirements to safety for persons in the public domain in Norway.

Position: Consultant.
Client: Proactima AS, Stavanger, Norway, 2008 (in contract for DSB, Norway).

Risk-Based Inspection Planning for PEMEX Platforms.
Development and Implementation of iPlan, Analysis of Results and Completion of written Report.

Position: Consultant.
Client: Zentech, Houston, Texas, 2008.

Inspection Planning of Ship Hull Structures.
Development of software tool using Bayesian Probabilistic Networks.

Position: Consultant.
Client: Bureau Veritas, Paris, France, 2008.

Sicherheitskonzept QGP, Andermatt Tourist Resort.
Risk management concept of natural hazards as basis for Decision making.

Position: Consultant.
Client: Andermatt Alpine Destination Company AG, Andermatt, Switzerland, 2007-2008.

E39 Tunnel, Kristiansand.
Tunnel Risk Analysis based on Bayesian Probabilistic Nets.

Position: Consultant.
Client: Norwegian Public Roads Administration (Statens Vegvesen), Kristiansand, Norway, 2007.

Risk Screening for Risk Based Inspections for P38 FSO.

Position: Consultant.
Client: Bureau Veritas, Paris, France, 2007.

LIST OF SELECTED ENGINEERING PROJECTS

RISK ANALYSIS AND RELIABILITY BASED CALIBRATION OF SAFETY FACTORS FOR DESIGN CRITERIA OF FPSO SYSTEMS.

POSITION: CONSULTANT.
CLIENT: IMP INSTITUTO MEXICANO DE PETROLEO, MEXICO CITY, MEXICO, 2007.

RISK BASED DESIGN SPECIFICATIONS FOR FPSO'S IN THE MEXICAN GULF.

POSITION: CONSULTANT.
CLIENT: IMP INSTITUTO MEXICANO DE PETROLEO, MEXICO CITY, MEXICO, 2006.

RAPID RISK BASED REPAIR PRIORITIZATION OF PLATFORMS.

POSITION: CONSULTANT.
CLIENT: IMP INSTITUTO MEXICANO DE PETROLEO, MEXICO CITY, MEXICO, 2006.

RISK BASED CONDITION CONTROL OF FAÇADE ELEMENTS.
DEVELOPMENT OF RISK BASED APPROACH FOR PLANNING OF PROOF LOAD TESTS OF FAÇADE ELEMENTS, INCLUDING:

- EVALUATION OF PREVIOUSLY DEFINED STRATEGY FOR CONDITION CONTROL BY PROOF LOAD TESTING
- DEVELOPMENT OF THEORETICAL FRAMEWORK AS WELL AS PROBABILISTIC MODELS FOR THE ASSESSMENT OF RISK REDUCTION BY PROOF LOAD TESTS OF FAÇADE ELEMENTS.

POSITION: CONSULTANT.
CLIENT: WALT & GALMARINI AG, ZURICH, SWITZERLAND, 2006.

REVIEW OF SCHEME: COLLECTION OF INCIDENT DATA.
A REPORTING SYSTEM UNDER DEVELOPMENT BY REGA WAS EVALUATED AND CRITICALLY ASSESSED, INCLUDING:

- REVIEW OF PROPOSED REPORTING SYSTEM
- CRITICAL ASSESSMENT AND OUTLINE OF IMPROVEMENT POSSIBILITIES.

POSITION: CONSULTANT.
CLIENT: REGA, ZURICH, SWITZERLAND, 2006.

BAY OF CAMPECHE, MEXICO.
RISK BASED INSPECTION PLANNING OF STATIC PROCESS EQUIPMENT "AKAL-C COMPRESSION C4" AND "AKAL-C ENLANCE", INCLUDING:

- ASSESSMENT OF PRELIMINARY ANALYSIS OF THE PLATFORM AKAL C
- DEVELOPMENT OF SOFTWARE BASED ON THE RISK-BASED INSPECTION PLANNING
- DEVELOPMENT OF A MAINTENANCE INSPECTION MANAGEMENT SYSTEM
- PARTICIPATION IN INTERNAL AND EXTERNAL WORKSHOPS CONCERNING THE AKAL-PLATFORMS
- PREPARATION AND LECTURING FOR A TRAINING COURSE ON RISK-BASED INSPECTION PLANNING.

POSITION: CONSULTANT.
CLIENT: COMIMSA, CIUDAD DEL CARMEN, MEXICO, 2006.

DECISION ANALYSIS INSPECTION PLANNING.
DEVELOPMENT OF RISK ACCEPTANCE CRITERIA FOR INSPECTION PLANNING OF FLOATING PRODUCTION, STORAGE AND OFFLOADING FACILITIES INCLUDING:

- EVALUATION OF THE FEASIBILITY OF FLOODED MEMBER DETECTION FOR INSPECTION OF TUBULAR MEMBERS OF STEEL JACKET TYPE OFFSHORE STRUCTURES
- DEVELOPMENT OF TENDERING MATERIAL FOR RBI FOR PROJECTS TO ARMADA HESS, TOTAL MIRAMAR AND PTTEP.

POSITION: CONSULTANT.
CLIENT: BUREAU VERITAS, PARIS, FRANCE, 2005-2006.

DEVELOPMENT OF GENERAL INSPECTION FOR PLATFORMS USING BAYESIAN PROBABILISTIC NETS.

POSITION: CONSULTANT.
CLIENT: IMP INSTITUTO MEXICANO DE PETROLEO, MEXICO CITY, MEXICO, 2005.

List of Selected Engineering Projects

Risk-Based Inspection Analysis.
Consulting concerning "two Example Joints in a Steel Offshore Platform in the Danish Part of the North Sea".

Position: Consultant.
Client: DNV, Denmark, 2005.

Computational Framework for Inspection and Maintenance Planning of Concrete Structures subject to Corrosion.
Maintenance management of concrete structure software system planning, including:

- Methodology developments
- Proof reading of reports, discussions and quality control
- Development of computational tools.

Position: Consultant.
Client: COWI, Denmark, 2004-2005.

Platforms in the Gulf of Mexico.
Reassessment and inspection planning project, including:

- Development of methodology and software-implementation
- Conducting courses and other knowledge transfer concerning RBI for offshore structures.

Position: Consultant.
Client: UNACAR, University in Ciudad del Carmen, Mexico and Zentech, Houston, USA, 2004.

Decommissioning Risk Assessment.
Technical risk assessment for the "refloat" and "in-situ" decommissioning options for the concrete structures MCP01 on the Frigg field, including:

- structural reliability analysis
- degradation assessment and modelling for the concrete structures
- assessment of residual capacity of the concrete structures
- operational risk analysis
- cost benefit analysis using Bayesian networks.

Position: Project manager and lead engineer.
Client: TotalFinaElf, Stavanger, Norway, 2003.

Bay of Campeche Jacket Structures.
Service life assessment and extension study using risk based approaches for the fixed steel jacket structures in the Bay of Campeche, Mexico.

Position: Responsible for overall methodology and philosophy and for the development of RBI plans.
Client: Pemex, Ciudad del Carmen, Mexico, 2002-2004.

Bongkot Jacket Structures.
Development of risk based inspection (RBI) plans for all fixed steel jacket structures of the Bongkot oil production field.

Position: Expert consultant to Bureau Veritas, Paris, France.
Client: PTT-EP/TotalFinaElf, Bangkok, Thailand, 2002-2003.

Code Reliability Quantification Study.
Quantitative assessment of the reliability and safety of structures designed according to the proposed partial safety factors and load combination factors of the Swisscodes.

Position: Expert consultant to the client.
Client: Swisscodes project, Switzerland, 2002.

Third Abu Dhabi Island Bridge Crossing.
Check of the design basis for the third bridge crossing for Abu Dhabi Island.

Position: Expert consultant to the client in collaboration with COWI.
Client: Works Department, Emirate of Abu Dhabi, 2002.

List of Selected Engineering Projects

Generic Risk Based Inspection Planning – Field Implementation.
Development and implementation of generic risk based fatigue crack growth inspection plans for all the Mærsk Olie og Gas fixed steel offshore platforms in the North-Sea.

Position: Project manager and lead engineer.
Client: Mærsk Olie og Gas, Esbjerg, Denmark, 2001-2003.

Chad FSO RBI.
Development of risk based inspection plans for the floating production and off-loading unit Chad. The RBI includes detailed inspection planning in regard to fatigue crack growth as well as corrosion.

Position: Expert consultant to Bureau Veritas, Paris, France.
Client: ExxonMobil, Surrey, U.K., 2001-2002.

Decommissioning Risk Assessment.
Technical risk assessment for the" refloat" and "in-situ" decommissioning options for the concrete structures TCP2, TP1 and CDP1 on the Frigg field (Lead Engineer), including:

- structural reliability analysis
- degradation assessment and modelling for the concrete structures
- assessment of residual capacity of the concrete structures
- operational risk analysis
- cost benefit analysis using Bayesian networks.

Position: Project manager and lead engineer, 1999-2000. Expert consultant, 2000-2002.
Client: TotalFinaElf, Stavanger, Norway, 1999-2002.

Jotun & Balder Risk Based Inspection Planning.
Risk based inspection planning for the offshore installations on the Jotun and Balder fields (Esso Norge), including:

- static process equipment
- FPSO ship hull structures
- jacket and topside structures
- sub-sea satellites, flexible piping and risers
- Project responsible for the RBI for the process equipment and development of probabilistic models for the degradation of flexible pipelines based on failure rate statistics.

Position: Project lead engineer.
Client: Esso Norge, Stavanger, Norway, 1998-1999.

In-situ Disposal of the Ekofisk Tank and Barrier Structures.
Responsible for the assessment of the future degradation and associated risks for the Ekofisk Barrier and tank structures corresponding to different in-situ disposal and degradation mitigation options. Responsible for the development of economical risk models for the evaluation and comparison of the different disposal options.

Position: Responsible for reliability and risk assessments.
Client: Phillips Petroleum, Stavanger, Norway, 1998-1999.

Probabilistic Framework for RBI.
Responsible for the development of a consistent probabilistic framework for the DNV software ORBIT-Offshore for RBI for process systems. This includes the development of a Bayesian methodology for the utilisation of inspection results in the inspection planning.

Position: Project manager.
Client: Internal DNV development, Oslo, Norway, 1998-1999.

Inspection Philosophy Document.
Formulation of inspection philosophy for the inspection planning for the South Arne offshore installation.

Position: Lead engineer.
Client: Amarada Hess, Denmark, 1998.

List of Selected Engineering Projects

Øresund High Bridge.
Probabilistic fracture mechanics and crack growth analysis for verification of safety for welded connections in the main girder.

Position: Lead engineer.
Client: Skanska, Sweden, 1997.

Storebælt East Bridge.
Fracture mechanic and crack growth analysis for verification of safety for cast hanger clamps with defects.

Position: Lead engineer.
Client: Storebælt, Denmark, 1997.

MMS - Maintenance Management Systems.
Responsible for establishing basis, risk based models and software systems for quantifying the relation between the operation and use of the rail system and need for maintenance and reinvestments. The project utilises principles of the economical decision theory and RCM methods.

Position: Project manager for advanced risk assessments.
Client: Danish Railways, Denmark, 1996-1998.

Safeguarding and Rehabilitation of the Zarate Brazo Largo Bridges Cable Stayed Bridges.
Assessment of cable deterioration, reliability evaluation of strength and fatigue life of damaged stays (parallel wire bundles), planning and evaluation of laboratory tests on stay wires, reliability based evaluation of safety format and design basis for emergency and rehabilitation phases, using statistical models for traffic and train loads.

Position: Lead safety and reliability engineer.
Client: Direction National de Vialidad, Argentina, 1996-1998.

Design Basis for Cable Stayed Bridge Using Carbon Fibre Based Stays and Reinforcement.
Calibration of partial safety factors for the design of a cable stayed bridge using carbon fibre material for the stays as well as the reinforcement of the girder. The partial safety factors are calibrated according to specific safety requirements using structural reliability analysis.

Position: Responsible for structural reliability assessments and methodical developments.
Client: The Danish Road Directorate, Denmark, 1996.

Guideline for Reliability Based Assessment of Existing Highway Bridges.
Two phase project performed in collaboration with Prof. O. Ditlevsen, DTU (phase I) and the Danish Road Directorate (phase II). During the project a guideline for reliability bases assessment of existing bridges is formulated. Phase I comprises a thorough description of probabilistic framework, modelling of loads and structural capacity. Phase II adapts the special conditions valid for the bridges of the Danish road directorate to the general models identified under phase II.

Position: Initiator and project leader (COWI).
Client: Phase I: The Danish National Science Foundation (STVF), Phase II: the Danish Road Directorate, Denmark, 1996.

Lillebæltsbroen of 1935, Large Riveted Steel Bridge.
Reliability based reassessment of characteristic train loads for ultimate limit state (ULS) and fatigue limit state (FLS) verification of superstructure using non-stationary FEM evaluations for the assessment of bridge dynamics.

Position: Lead engineer.
Client: The Danish Railways, Denmark, 1996.

DuraCrete Project BE 95-1347.
Durability based design of concrete structures. Formulation of the basis for a design code for concrete structures taking basis in durability aspects and service life costs. The design basis is formulated using state of art models for deterioration and strength of concrete structures. The calibration of the design basis is performed using statistical methods and modern reliability analysis.

Position: Responsible for reliability analysis and probabilistic modelling.
Client: European Community, Brussels, 1995-1998.

List of Selected Engineering Projects

Ørestad, Mini Metro.
Design basis for civil works in connection with the design of the Mini Metro Structures, Copenhagen, Denmark. The Euro Codes were used as basis for the design basis.

Position: Project manager and lead engineer.
Client: Ørestadsselskabet, Denmark, 1995.

Management of Marine Fouling.
Assessment of removal and design marine fouling profiles for fixed steel offshore structures in the North-Sea.

Position: Project manager and lead engineer.
Client: Mærsk Olie og Gas, Esbjerg, Denmark, 1994-1995.

Dronninggårdvej Bridge, Railway Bridge.
Reliability analysis with respect to fatigue life and evaluation of inspection methods.

Position: Lead engineer.
Client: The Danish Railways, Denmark, 1994.

Lillebæltsbroen of 1935, Large Riveted Steel Bridge.
Strength and fatigue life re-assessment. The work included a detailed assessment of the fatigue characteristics for riveted structures including FEM analysis of stress concentration factors. Reliability analysis were performed to assess the residual fatigue life and the effect of inspections

Position: Lead engineer.
Client: The Danish Railways, Denmark, 1994.

Gudenåbroen, Pile Foundation, Concrete Bridge.
Strength and durability reassessment in connection with an up-classification of the bridge. The work included a re-evaluation of the concrete strength and a comprehensive probabilistic model of the pile foundation strength updated by pile strength experiments.

Position: Lead engineer.
Client: The Danish Road Directorate, Denmark, 1994.

Eurocodes, Consequence Analysis.
An evaluation of the ENV 1 Part 3 (traffic loads) with respect to an assessment of the differences in reliability as compared to the existing specifications for traffic loading.

Position: Lead engineer.
Client: The Danish Road Directorate, Denmark, 1994.

Chloride Penetration Model.
Corrosion Initiation Life. Formulation of statistical methods for the assessment of the corrosion initiation life for reinforced concrete structures. The basis of the models consists of observed chloride concentration profiles and the diffusion theory.

Position: Lead engineer.
Client: The Danish Road Directorate, Denmark, 1994.

Decision Making for Requalification of Structures.
BRITE EURAM project 5935. Development of a common decision basis for the requalification of bridge structures, offshore structures and power plant installations. Multi criteria decision making. Bayesian uncertainty modelling. Fuzzy uncertainty modelling. Case studies.

Position: Responsible for reliability analysis and probabilistic modelling.
Client: European Community, Brussels, 1993-1996.

List of Selected Engineering Projects

Nohoch-B Offshore Production Platform.
Inspection and maintenance planning of fixed steel offshore structures, using IMREL software. Assisting NDE-Technology, University College London in using the IMREL software for reliability and life cycle costs based inspection planning of Pemex structures in the Gulf of Mexico.

Position: Project lead engineer.
Client: IMP Instituto Mexicano de Petroleo, Mexico City, Mexico, 1993-1995.

The Finite Element Program NASCOM.
Further developments of the commercial Finite Element computer code for linear elastic analysis, including temperature gradient loading and Eigen-frequency analysis.

Position: Team member.
Client: RCP-GmbH, Germany, 1993.

IMREL.
Development of a Software Module (IMREL) for the "Inspection and Maintenance Planning for Fixed Offshore Structures subject to Fatigue".

Position: Project manager and lead engineer.
Client: ELF-Production, ELF Aquitaine, France, 1992.

RISC Project.
Implementation of reliability software in the RISC Project (University College London) which is an integration of expert systems with inspection and maintenance planning software using advanced models for the fatigue crack growth.

Position: Responsible for reliability analysis and probabilistic modelling.
Client: European Commission, Brussels, 1992.

Fatigue Experiment Planning.
Statistical considerations of lifetime predictions. Developments of models for the crack initiation lifetime of metals subject to low and high cycle fatigue loading.

Position: Lead engineer.
Client: MAN-Technologie GmbH, Munich, Germany, 1992.

ARIANE 5 Front Skirt Structure.
Statistical analysis of experimental data on the strength and stiffness. Reliability analysis and estimation of the systems reliability of the ARIANE 5 front shirt structure.

Position: Responsible for reliability analysis.
Client: MAN-Technologie GmbH, Munich, Germany, 1990-1992.

Traffic Modelling for Storebælt.
Statistical analysis and collection of data on congested traffic (Storebælt-Eastern Bridge). Collection of data on queue length and queue duration from the German highways.

Position: Assistant to Prof. Dr. Ing. Habil. Rüdiger Rackwitz.
Client: Storebæltforbindelsen, Denmark, 1989.

Parallel Wire Cable Reliability.
Statistical analysis of fatigue life experimental data of steel wires for the construction of the Storebælt suspension bridge.

Position: Assistant to Prof. Dr. Ing. Habil. Rüdiger Rackwitz, TU Munich.
Client: Storebæltforbindelsen, Denmark, 1989.