Mechanics Of Offshore Pipelines Volume 1 Buckling And Collapse

Offshore PipelinesMechanics of Offshore PipelinesA Bibliography of Offshore Pipeline LiteratureOffshore PipelinesGlossary of onshore and offshore pipelines (Firm)The Integrated Stability Analysis of Offshore PipelinesSubsea Pipeline SystemsDesign and Installation of Marine PipelinesOffshore Pipeline Design, Analysis, and MethodsDesign, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines (Limit State Design)Tow Methods Design Guide for the Installation of Offshore PipelinesCondition Monitoring of Offshore Pipelines Using Vibration Based MethodsGeotechnical Analysis of Offshore Pipelines and Steel Catenary RisersDesign and Construction of Offshore PipelinesBeam Theory for Subsea PipelinesMechanics of Offshore PipelinesSubsea Pipeline Design, Analysis, and InstallationAdvances in Offshore Oil & Gas Pipeline TechnologyOffshore Pipelines Ebook CollectionThe Abandonment of Offshore Pipelines Boyun Guo Stelios Kyriakides N.W. Lai Boyun Guo Omnium technique des transports par pipelines Bassem Samir Hassan Youssef Alexander Arnfinn Olsen Mikael Braestrup A. H. Mousselli American Gas Association. Pipeline Research Committee. Offshore Supervisory Committee Xue-Lin Peng Matthew Steven Hodder L. Skjolingstad Alexander N. Papusha Stelios Kyriakides Qiang Bai R. F. De la Mare Yong Bai Health And Safety Executive Staff

Offshore Pipelines Mechanics of Offshore Pipelines A Bibliography of Offshore Pipeline Literature Offshore Pipelines Glossary of onshore and offshore pipelines (Firm) The Integrated Stability Analysis of Offshore Pipelines Subsea Pipeline Systems Design and Installation of Marine Pipelines Offshore Pipeline Design, Analysis, and Methods Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines (Limit State Design) Tow Methods Design Guide for the Installation of Offshore Pipelines Condition Monitoring of Offshore Pipelines Using Vibration Based Methods Geotechnical Analysis of Offshore Pipelines and Steel Catenary Risers Design and Construction of Offshore Pipelines Beam Theory for Subsea Pipelines Mechanics of Offshore Pipelines Subsea Pipeline Design, Analysis, and Installation Advances in Offshore Oil & Gas Pipeline Technology Offshore Pipelines Ebook Collection The Abandonment of Offshore Pipelines *Boyun Guo Stelios Kyriakides N.W. Lai Boyun Guo Omnium technique des transports par pipelines Bassem Samir Hassan Youssef Alexander Arnfinn Olsen Mikael Braestrup A. H. Mousselli American Gas Association. Pipeline Research Committee. Offshore Supervisory Committee Xue-Lin Peng Matthew Steven Hodder L. Skjolingstad Alexander N. Papusha Stelios Kyriakides Qiang Bai R. F. De la Mare Yong Bai Health And Safety Executive Staff*

offshore pipelines covers the full scope of pipeline development from pipeline designing installing and testing to operating it gathers the authors experiences gained through years of designing installing testing and operating submarine pipelines the aim is to provide engineers and management personnel a guideline to achieve cost effective management in their offshore and deepwater pipeline development and operations the book is organized into three parts part i presents design practices used in developing submarine oil and gas pipelines and risers

contents of this part include selection of pipe size coating and insulation part ii provides guidelines for pipeline installations it focuses on controlling bending stresses and pipe stability during laying pipelines part iii deals with problems that occur during pipeline operations topics covered include pipeline testing and commissioning flow assurance engineering and pigging operations this book is written primarily for new and experienced engineers and management personnel who work on oil and gas pipelines in offshore and deepwater it can also be used as a reference for college students of undergraduate and graduate levels in ocean engineering mechanical engineering and petroleum engineering pipeline design engineers will learn how to design low cost pipelines allowing long term operability and safety pipeline operation engineers and management personnel will learn how to operate their pipeline systems in a cost effective manner deepwater pipelining is a new technology developed in the past ten years and growing quickly

offshore oil and gas production was conducted throughout the entire 20th century but the industry s modern importance and vibrancy did not start until the early 1970s when the north sea became a major producer since then the expansion of the offshore oil industry has been continuous and rapid pipelines and more generally long tubular structures are major oil and gas industry tools used in exploration drilling production and transmission installing and operating tubular structures in deep waters places unique demands on them technical challenges within the field have spawned significant research and development efforts in a broad range of areas volume i addresses problems of buckling and collapse of long inelastic cylinders under various loads encountered in the offshore arena several of the solutions are also directly applicable to land pipelines the approach of mechanics of offshore pipelines is problem oriented the background of each problem and scenario are first outlined and each discussion finishes with design recommendations new and classical problems addressed investigated through a combination of experiments and analysis each chapter deals with a specific mechanical problem that is analyzed independently the fundamental nature of the problems makes them also applicable to other fields including tubular components in nuclear reactors and power plants aerospace structures automotive and civil engineering structures naval vehicles and structures

this bibliography is an up to date collection of available literature pertaining to offshore pipelines articles are listed as to subject matter in the key word index and are listed under names of authors in the author index a general index is also included where article sources can be found

the development of oil and gas fields offshore requires specialized pipeline equipment the structures must be strong enough to with stand the harshest environments and ensure that production is not interrupted and remains economically feasible however recent events in the gulf of mexico have placed a new importance on maintenance and reliability a new section condition based maintenance cbm introduces the subject of maintenance written by tian ran lin queensland university of technology and yong sun csiro earth science and resource engineering two of the main objectives of cbm is maximizing reliability while preventing major or minor equipment malfunction and minimizing maintenance costs in this new section the authors deal with the multi objective condition based maintenance optimization problem cbm provides two major advantages 1 an efficient approach for weighting maintenance objectives

and 2 a method for specifying physical methods for achieving those objectives maintena cost and reliability objectives are calculated based on proportional hazards model and a control limit cbm replacement policy written primarily for engineers and management personnel working on offshore and deepwater oil and gas pipelines this book covers the fundamentals needed to design install and commission pipeline projects this new section along with a thorough update of the existing chapters represents a 30 increase in information over the previous edition covers offshore maintenance and maintenance support system provides the fundamentals needed to design install and commission pipeline project methods and tools to deliver cost effective maintenance cost and system reliability new section on condition based maintenance written by tian ran lin queensland university of technology and yong sun csiro earth science and resource engineering yong sun csiro au

truncated abstract pipelines are the main conduits in offshore hydrocarbon developments and for economical and environmental reasons must be designed to safely operate in remote locations and under harsh environments for pipelines laid directly on the seabed pipeline on bottom stability is critical and analysis techniques should accurately simulate the real offshore processes occurring this thesis is concerned with the on bottom stability analysis of offshore pipelines under the action of wave and current loading it details how hydrodynamic load modeling pipe soil interaction modeling and the coupling effect between the hydrodynamic load and the pipe soil interaction can be properly considered the motivation is to develop an integrated pipeline on bottom stability analysis program and design methodology and to use it to achieve a better understanding of hydrodynamicpipe soil interaction a hydrodynamic modeling program that generates a 3 d ocean surface estimates the wave kinematics at the pipeline level and calculates the hydrodynamic loads on the pipeline was coded in fortran it has been named uwahydro pipe soil interaction is modeled using plasticity based techniques again coded in fortran in the uwapipe program a unique pipeline on bottom stability simulation program was developed by integrating uwahydro and uwapipe with the commercial finite element program abaqus the developed modeling program can efficiently evaluate the movement of a long pipeline under storm conditions as shown by a parametric study of 1250 m of pipeline under one hour of storm characteristic of the australian north west shelf region probabilistic methods are also discussed in this thesis and are used to develop further understanding of the pipeline on bottom stability and to estimate the reliability of the pipeline under different design conditions a sensitivity study using realistic uncertainty in the input basic random variables was conducted to inform engineers of which are the most critical parameters in the pipeline on bottom stability design a set of pipe centrifuge tests was carried out using the beam centrifuge facility at the university of western australia the tests were designed to investigate the pipe soil interaction behavior under the action of complex load paths similar to the hydrodynamic loads conditions offshore this subjected the pipe soil model for the first time to loading conditions different to those used to derive its parameters the applied loads were designed to be gradually increasing to allow examination of different pipe soil interaction stages with different loads intensity results showed that the pipe embeds itself during the earlier stages of cyclic loads and also shapes the side berms larger cyclic loads were required to lift the pipe from its embedment zone and to break out of the berms created however the centrifuge tests confirmed that basic pipe soil behavior could still be numerically modeled but with conservative predictions of sliding uplift failure at cyclic loads smaller than the experimental limits

this book is a comprehensive guide to the classification design construction and maintenance of subsea pipeline systems it provides an in depth exploration of offshore pipeline architecture serviceability and the rigorous standards required for certification and verification the chapters cover critical topics such as risk evaluations for novel features survey and inspection regimes materials and welding specifications geotechnical and environmental conditions flow assurance analysis strength and stability criteria and special considerations for pipe in pipe designs readers will also discover detailed discussions on pipeline rectification intervention design routing installation procedures testing protocols and maintenance strategies this book is an indispensable resource for anyone involved in the offshore oil and gas industry engineers architects and safety management professionals will find this book particularly valuable it serves as both a reference for academics and students in industrial design and engineering fields and as a textbook for marine architecture courses whether you are overseeing the design of new pipelines or ensuring the integrity of existing ones this guide offers the latest research and practical insights to help you navigate the complexities of subsea pipeline systems

this comprehensive handbook on submarine pipeline systems covers a broad spectrum of topics from planning and site investigations procurement and design to installation and commissioning it considers guidelines for the choice of design parameters calculation methods and construction procedures it is based on limit state design with partial safety coefficients

truncated abstract subsea pipelines are essential structural systems to transport natural oil or gas from offshore oil wells to an onshore location damage along a subsea pipeline might occur because pipelines are directly and continually exposed to the hydrodynamic environment free spanning is a very common problem both in the design phase and during operation of pipelines such spans may be subjected to fatigue damage caused by direct wave and vortex induced vibrations viv therefore appropriate amount of in service inspection monitoring and assessment to ascertain their conditions are essential in industry in addition to the visual inspection by divers there are three techniques that are normally used to identify free spans along pipelines named side scan sonar multibeam echosounder and video camera however as all these tools need a remotely controlled towed vehicle to carry the inspection tools and an appropriate vessel to support this performance this kind of inspection can only be performed at scheduled intervals which may cause the pipelines operates under dangerous conditions therefore an effective and reliable method that can monitor the subsea pipeline conditions continuously will be very useful this is the motivation of exploring and applying vibration based methods to subsea pipeline free span monitoring this thesis contains four parts in the first part numerical simulation is performed to explore the feasibility of using vibration properties of subsea pipeline structures and model updating technique to identify pipeline conditions a finite element model of subsea pipeline is developed which takes into consideration the fluid pipe soil interaction ambient excitation for marine environment is simulated based on jonswap spectrum dynamic responses of the pipeline system to the simulated ambient wave forces are calculated which are considered as measured responses in subsequent analysis for pipeline condition monitoring and damage identification noise effect on dynamic response measurement is studied by considering two levels of random noises in the calculated dynamic response data three signal processing methods i e frf frequency response function ssi stochastic subspace identification and bss blind source separation are

used to extract dynamic properties of the pipeline system the extracted dynamic properites are used in model updating analysis to identify pipeline conditions results corresponding to the three data extraction methods and different levels of noise are compared the influences of measurement noises and numerical errors of data extracrtion methods on pipeline condition monitoring results are discussed next based on the initial fe model analysis a scale model was designed and built in the laboratory with removable springs linking the polyethylene pipe and a steel frame to simulate the support of the sea bed three types of laboratory tests were carried out to verify the suitability and efficiency of the model based damage identification method particularly finite element model updating technique using different excitation sources the impact hammer test the wind tunnel test and the towing tank test

as hydrocarbon developments move further offshore into deeper water the pipelines and risers used in the transportation of oil and gas form an increasingly significant component of the development infrastructure offshore pipelines and risers must be designed to withstand exposure to a range of loading conditions throughout their lifetime on bottom pipelines laid directly on the seabed must be shown to be stable and not become overstressed when subjected to environmental and operational loads similarly risers which transport hydrocarbon products between deep water floating platforms and the seabed are subjected to various cyclic loadings and must be shown to not suffer from fatigue damage the interaction of the pipeline or riser with the seabed serves as boundary conditions in a structural analysis of the system therefore an accurate representation of the geotechnical behaviour in a pipe soil interaction model is critical to the assessment of structural response this thesis investigates the interaction of cylindrical objects with soil and its application to the analysis and design of offshore pipelines and risers the behaviour observed during experimental investigations performed to assess the effect of various loading conditions on pipe soil interaction response is used to develop analytical models which are appropriate for use in an integrated soil structure interaction assessment of the pipe soil system the combined vertical lateral behaviour of on bottom pipelines is explored an interaction model is presented which is applicable to the prediction of pipeline response when subjected to combined vertical and lateral loading on a soft clay seabed in undrained conditions the effects of various vertical cyclic loading regimes on pipe soil interaction in soft clay are investigated experimentally results from a suite of tests exploring a wide range of vertical cyclic loading conditions in the touchdown zone of a steel catenary riser are presented pipe soil interaction stiffness is observed to vary widely according to operative seabed strength variation from initial in situ strength conditions analytical frameworks are presented which describe the variability of operative undrained shear strength due to the effects of soil remoulding along with subsequent reconsolidation the overall behaviour of the lower section of a steel catenary riser is explored experimentally details of an instrumented pipeline which was developed to investigate three dimensional riser seabed response are presented the apparatus and analysis methodology developed allows for comparison of behaviour observed during experiments performed using a short element of pipeline assuming two dimensional plane strain conditions and the validation of pipe soil interaction models developed from element tests this thesis progresses the understanding of geotechnical aspects of offshore pipeline and riser behaviour it advances the predictive capabilities of pipe soil interaction models enabling more accurate response assessment and efficient design

introducing a new practical approach within the field of applied mechanics developed to solve beam strength and bending problems using classical beam theory and beam modeling this outstanding new volume offers the engineer scientist or student a revolutionary new approach to subsea pipeline design integrating use of the mathematica program into these models and designs the engineer can utilize this unique approach to build stronger more efficient and less costly subsea pipelines a very important phase of the world s energy infrastructure significant advances have been achieved in implementation of the applied beam theory in various engineering design technologies over the last few decades and the implementation of this theory also takes an important place within the practical area of re qualification and reassessment for onshore and offshore pipeline engineering a general strategy of applying beam theory into the design procedure of subsea pipelines has been developed and already incorporated into the iso guidelines for reliability based limit state design of pipelines this work is founded on these significant advances the intention of the book is to provide the theory research and practical applications that can be used for educational purposes by personnel working in offshore pipeline integrity and engineering students a must have for the veteran engineer and student alike this volume is an important new advancement in the energy industry a strong link in the chain of the world s energy production

as deepwater wells are drilled to greater depths pipeline engineers and designers are confronted with new problems such as water depth weather conditions ocean currents equipment reliability and well accessibility subsea pipeline design analysis and installation is based on the authors 30 years of experience in offshore the authors provide rigorous coverage of the entire spectrum of subjects in the discipline from pipe installation and routing selection and planning to design construction and installation of pipelines in some of the harshest underwater environments around the world all inclusive this must have handbook covers the latest breakthroughs in subjects such as corrosion prevention pipeline inspection and welding while offering an easy to understand guide to new design codes currently followed in the united states united kingdom norway and other countries gain expert coverage of international design codes understand how to design pipelines and risers for today s deepwater oil and gas master critical equipment such as subsea control systems and pressure piping

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in 1987 the department of energy who at the time were responsible for authorizing the construction and operation of pipelines in uk waters undertook a major study of the problems of pipeline abandonment the work was carried out by john brown engineers and constructors

ltd and consisted of a comprehensive review of the engineering environmental and economic implications of subsea pipelines at the end of their operating life

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