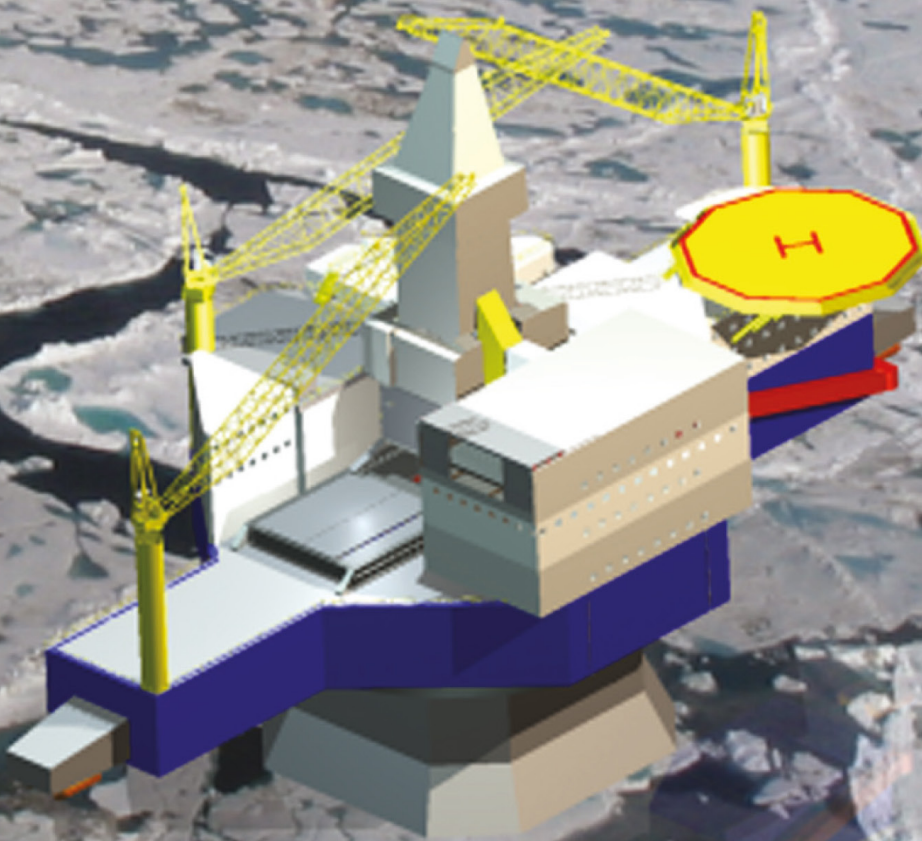


TECHNOLOGY
REVIEW **2009**



CONTENTS

About KOMtech

1 **Chairman's Message**

3 **Editorial Note**

4 **Mobile Ice-Resistant Offshore Drilling Unit** Design challenges of MIRODU include shallow waters during tow and massive ice loads that are anticipated at site



10 **Assessment of Keppel FELS Jackup for Arctic Summer Drilling** Potential for jackup usage in mild ice conditions encountered during the summer season

14 **Conceptual Design and Development of a New Arctic Lifeboat** Screw propelled Arctic Lifeboat developed for operation on ice and in ice-infested waters



23 **Design and Construction of Icebreakers for Operation in Barents Sea** Capable of year round operation in the Barents and Arctic Seas

32 **A Concept for a Modular Drilling Rig** A fully modularised drilling unit for intervention, work-over and light drilling, based on 26-tonne modules



46 **Rotaset Racker Vertical Pipe Handling Machine** Capable of providing faster racking speed and safer operational functionality

53 **Approach towards Standardisation in FPSO Topside Process Design** Decision support algorithm developed to help designers in the selection of process packages

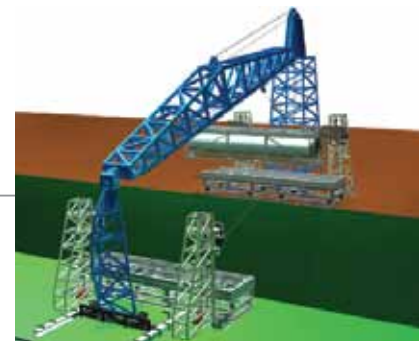


68 **Selection & Development of Offshore LNG Liquefaction Process for Associated Gas** A single N₂ expander cycle with non-flammable refrigerant pre-cooling capable of handling a wide range of feed gas variations

76 **Multi-Product FPSO Conversion with Pressurised LNG Storage Tank** Integration of pressurised LNG storage tanks into existing ship-hull allows Floating Liquefied Associated Gas (FLAG) development together with oil production

81 **Review & Development of Side-by-Side Mooring Configuration for LNG Offloading** Innovative Balanced Arm & Yoke concept designed to minimise relative motions

89 **A New Offshore Cargo Transfer System** Coupled to the motions of both vessels, the system is designed to quickly and safely transfer cargo between vessels



- 98 Oil-water Interaction Study on the Concept of a Wet Subsea Storage Tank** Theoretical and experimental investigation on the feasibility of a wet subsea storage tank
- 107 Marine Emissions: Issues, Challenges and Potential Solutions** Control and reduction of marine emissions is an essential task which requires immediate attention
- 115 New Concrete for Offshore Structures** Breakthrough in concrete technology allows the production of impermeable, lightweight and high strength concretes suitable for offshore applications
- 123 Integrated In-Situ Soil Testing Device for Jackup Rigs** New approach for seabed characterisation towards safe installation of jackup rigs
- 130 Sizing, Installation and Performance of Photovoltaic Power Plants** Annual energy savings of 76,500kWh and estimated "avoided CO₂" emission of 1,300 tonnes over 25 years



Editorial Note

It is an honour to be involved in this first publication by KOMtech. Technology Review 2009 summarises research work carried out by KOMtech over the past 12 months. The objectives are to stimulate further thoughts and innovations among readers, and showcase competencies available in KOMtech. The scope covers emerging technologies related to the offshore and marine industry. The papers are written for engineers and are intended for business and technology decision makers. The opinions expressed in the papers are the views of the researchers at this point in time while future studies are still on-going. They may not represent the official position of KOMtech. Every attempt has been made to ensure accurate and factual-representation of the topics presented.

For the first issue of this publication, the task of the editorial committee has been a challenging one; firstly to conceptualise the direction of this journal and then to carry out uncompromisingly to achieve a high standard in all the articles. What you have in your hand is the result of the hard work put in by the authors as well as the editorial committee. Without their dedication and comradeship, the publication of this journal would not have been possible.

I would like to express my sincere thanks to all the authors and committee members, and look forward to our continuing and successful collaboration.

Yours truly,
Edgar Lim
Chairman, Editorial Committee

EDITORIAL COMMITTEE : Advisors Mr Charles Foo and Dr Foo Kok Seng **Editorial members** Mr Edgar Lim, Dr Michael Perry, Mr E.T. Mohan Dass, Mr Saeid Hosseini, Mr Chong Wen Sin, Ms Wong Chai Yueh and Ms Shelvi
