# RINA UAE EVENT 2024

## Technical Seminar

SCAN REGISTER

THE ROYAL INSTITUTION OF NAVAL ARCHITECTS

SCAN MAP

18 DEC 2024 | 06:00 PM - 09:30 PM | AL MINA BALLROOM, CROWNE PLAZA, DUBAI JUMEIRAH

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# Program.

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| **06:00 PM - 06:30 PM** | **Registration** |
| **06:30 PM - 06:35 PM** | **Welcome Speech**<br>RAJESH V. PANICKER, MRINA<br>RINA UAE Branch - Secretary |
| **06:35 PM - 07:00 PM** | **1st Presentation**<br>FIKRI BASAR YALCINER, PHD<br>NMDC<br>**TOPIC:**<br>"CREATIVE ASSET REPURPOSING: FEM BASED CONVERSION DESIGNS FOR EFFICIENT AND COST EFFECTIVE SOLUTIONS" |
| **07:00 PM - 07:25 PM** | **2nd Presentation**<br>ABDULLAH ALKHALEDI, PHD<br>PAAET, CTS, SEA DELTA<br>**TOPIC:**<br>"LH2 TANKER FOR THE HYDROGEN ECONOMY DESIGN AND POWER" |
| **07:25 PM - 07:50 PM** | **3rd Presentation**<br>NAVEENKUMAR K. UTHAMANTHIL, M.TECH – DNV<br>**TOPIC:**<br>"INFLUENCE OF VARIOUS FATIGUE ASSESSMENT METHODOLOGIES ON FATIGUE DAMAGE PREDICTIONS OF A TYPICAL OFFSHORE STRUCTURE" |
| **07:50 PM - 07:55 PM** | **Closing Remarks**<br>ASHIK SUBAHANI, CENG, FRINA<br>RINA UAE Branch - Chairman |
| **07:55 PM - 09:30 PM** | **Networking Dinner** |


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Speaker 1

**06:35 PM – 07:00 PM**

**FIKRI BASAR YALCINER, PHD**
Lead Structural Engineer
NMDC Energy Fleet
Abu Dhabi, UAE

**TOPIC I:**

## "CREATIVE ASSET REPURPOSING: FEM BASED CONVERSION DESIGNS FOR EFFICIENT AND COST EFFECTIVE SOLUTIONS"

**PROFILE:**

Fikri Basar Yalciner, Phd (c) has been working as a Finite Element Method (FEM) Specialist for more than 2 decades and mainly for the Oil&Gas and ship structure design/modifications. In his current role as Lead Structural Engineer, Mr. Bashar has played a pivotal role in performing strength calculations for the NMDC Energy fleet, including one of the largest float-over barges, which carried the 32,000 MT Guinness World Record Topside. Prior to his career at NMDC, he was involved in critical projects such as Turkiye`s first navy ship project MILGEM. In addition to his industry expertise, Mr. Bashar gives lectures at university level on fatigue, fracture mechanics and FEM. He is also a technical member of International Institute of Welding (IIW) and API 579 Fitness for Service Standard Committee.

**ABSTRACT**

This presentation covers two distinct case studies that demonstrate efficient asset modifications in response to project demands:

**Case 1:** Modifying a Lift Vessel for Wind Turbine Generator (WTG) Monopile Installation
This case investigates the feasibility of repurposing a lift vessel into a WTG monopile installation vessel, supporting the global transition to renewable energy and decarbonization. Offshore wind farms are essential to achieving energy transition goals, and the efficient installation of WTGs is critical to their success. The structural integrity assessment of the modified vessel, using Finite Element Method (FEM), was developed and conducted in-house by NMDC Energy.

**Case 2:** Global Analysis and Remodeling of the Largest Float-Over Barge in the Region
This case focuses on the remodeling and global analysis of the region's largest float-over barge, designed to carry the 32,000 MT Guinness World Record Topside.

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**07:00 PM – 07:25 PM**

**DR. ABDULLAH ALKHALEDI**
-Asst. Prof. Dept. of M. Engg., PAAET, CTS, Kuwait
-Consultant at Sea Delta Marine and Offshore Company

**TOPIC II:**

## "LH2 TANKER FOR THE HYDROGEN ECONOMY DESIGN AND POWER"

**PROFILE:**

Dr. Abdullah Alkhaledi is an Assistant Professor at the Department of Automotive and Marine Engineering in the College of Technological Studies (CTS) in Kuwait and a consultant in the Sea Delta Marine and Offshore Group. He is holding a PhD in Mechanical (Marine) Engineering from Cranfield University where he was awarded the Arthur Lefebvre Prize 2023 for his excellent work and outstanding scientific contribution in the field of design and performance assessments for a novel hydrogen tankers including propulsion systems developed by integrating renewable energy technologies with COGAS fueled by hydrogen working towards the future zero-emission target.

Dr Abdullah Alkhaledi research focuses on finding innovative solutions to increase the efficiency of the supply chain and transportation of hydrogen as a clean, carbon-free fuel, in order to contribute to achieving the global goal of reaching zero emissions in the future and mitigating the negative effects resulting from global climate change, in addition to implementing the strategy and commitments of the Member States to achieve the United Nations climate change regulations within the framework of the approved climate change agreement aimed at reducing carbon emissions by 2050 to reach the zero carbon target through the employment and production of hydrogen and the techno-environmental and economic assessment of the hydrogen production, transportation and supply chain. In addition, designing liquefied hydrogen tankers, ships stability analysis, renewable energy evaluation, hydrogen-fuelled combined cycle gas turbine simulation and examination, marine turbo-electric propulsion systems integration, and contributing to the achievement of a future maritime zero-emission target and the global climate change mitigation by creating innovative solutions.

Speaker 2

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**07:00 PM – 07:25 PM**

Speaker 2

**TOPIC II:**

## "LH2 TANKER FOR THE HYDROGEN ECONOMY DESIGN AND POWER"

**ABSTRACT**

Achieving global climate change mitigation targets requires serious solutions to the global energy sources decarbonisation. Hydrogen as a clean alternative fuel represents a successful and viable option to achieve the future zero-carbon target, and it is considered a leading contender as a fuel for the future economy, and it is anticipated that there will be a strong demand for vessels capable of transporting liquefied hydrogen from the production to the consumption sites. However, the seaborn transportation of hydrogen represents a significant gap in the hydrogen supply chain; this leads to the following philosophical question: what would the hydrogen carrier ship look like? The novel contributions of this study are to present a new design and evaluation for a liquefied hydrogen (LH2) tanker fuelled by hydrogen in support of decarbonisation, storage and transportation of liquefied hydrogen with a total capacity of ~280,000 m3 as a cargo and uses the boil-off gas for propulsion for the loaded leg of the journey. A hydrogen-fuelled combined-cycle gas turbine was modelled and examined as a ship prim-mover to achieve the twin objectives of high efficiency and zero-carbon footprint. Also, the study presents an economic analysis of a liquefied hydrogen tanker, to determine the viability of using such ships to transport hydrogen in the future to contribute toward implementing a green hydrogen economy. Established methods were employed using state-of-the-art design and analysis for determining the LH2 tank sizing, ship hull design, ship stability, and ship characteristics. Additionally, the ship propulsion system was designed and evaluated based on the ship resistance requirements in off-design and degraded performance of the gas-turbine topping cycle. Moreover, a techno-economic and environmental risk assessment (TERA) method were developed to evaluate the suggested design in different conditions. The results indicated that the LH2 tanker could carry 20,000 tonnes of liquefied hydrogen in a fully loaded with a displacement tonnage of 232,000 tonnes, and the design has been shown to be stable. The liquid hydrogen boil-off is supplied to the ship's main engine, thereby saving 29% of the liquefied hydrogen fuel consumption of the ship in the fully loaded condition. Economically, the results indicate that the ship's implementation can cover the ship's capital cost within no more than 2.5 and 6 years in the best and worst-case maritime shipping prices conditions, respectively. Investments in ships such as the vessel designed and evaluated in this study represent an essential constituent of the decarbonisation process and could be one of the solutions to achieving almost the zero-emissions target in the future. This study definitively answers the question regarding the hydrogen tankers design and assessments.

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**07:25 PM – 07.50 PM**

**NAVEENKUMAR K. UTHAMANTHIL, M.TECH**
Principal Structural Engineer
Jack-Up Service Centre
DNV

Speaker 3

**TOPIC III:**

## "INFLUENCE OF VARIOUS FATIGUE ASSESSMENT METHODOLOGIES ON FATIGUE DAMAGE PREDICTIONS OF A TYPICAL OFFSHORE STRUCTURE"

**PROFILE:**

Naveen began his career nearly 20 years as a Structural Engineer. Joined Noble Denton as a Structural Engineer way back in 2008. Having worked with the design of various offshore structures such as jack-ups, jackets, subsea structures, etc., he moved on to the Offshore Service centre at Dubai in 2014. He is currently working extensively on the advisory and approval side of Jack-Up structures as Principal Structural Engineer. His expertise lies in fatigue, life-extension, global behaviour of offshore structures. Moreover, he has published and presented on these topics at various journals and forums.

**ABSTRACT**

Agenda of the presentation would be to discuss the influence of various fatigue assessment methodologies on fatigue damage predictions of a typical Offshore structure and seeks to establish some insights on the suitability of each method in dealing with nonlinearities due to variable submergence and drag forces during the passage waves. Special focus shall be given to the time-domain approach to fatigue with rainflow-counting methodology. Sesam setup for the fatigue assessment using Python scription for setting up the workflow on relevant inputs for hydrodynamic, structural and fatigue analyses (Wajac, Sestra and Framework) shall also be discussed along with a case study on the sensitivity of mesh refinement.