

Akram P. A.

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Department of Ship Technology

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EXPERIENCE

Department of Ship Technology,

Cochin University of Science and Technology – Kochi.

Assistant Professor – Applied Mechanics

October 2020 - PRESENT

Teaching Areas – Engineering Mechanics, Finite element analysis, and Engineering Graphics.

Smart Engineering and Design Solutions (India) Pvt. Ltd., Kochi.

Deputy Manager – Hull Structures and Finite Element Analysis

November 2018 - October 2020

- Full ship finite element modeling and analysis of an ASW project involving the extreme strength analysis, residual strength analysis, whipping analysis, vibration analysis, transient shock analysis, and foundation impedance analysis.
- Finite element modeling and structural design assessment of a passenger vessel [1200 Passengers, About 140m length]. This vessel is classed by Lloyd's Register (LR).
- Computational Fluid Dynamics in OpenFOAM – calm water resistance problem. A study of the Magnus effect in 2D was also performed.

Assistant Manager – Hull Structures and Finite Element Analysis

June 2016 - October 2018

- Finite element modeling and structural design assessment of a passenger vessel [500 Passengers and 150 tonnes cargo, About 100m length]. The vessel is classed by the American Bureau of Shipping (ABS). The strength analysis of various equipment foundations such as the azimuth thruster foundation and normal modes analysis was performed.
- Ship hull lines creation from point cloud data - The hull lines were recreated with help of Python and VBA customization in AutoCAD from the point cloud scan data. AutoCAD customization in VBA for the generation of shell expansion drawing.
- Developing programs for the classical approach of static wave balance for wave loading.

Junior Design Engineer – Hull Structures and Finite Element Analysis

July 2014 - May 2016

- Finite element modeling and structural design assessment for the design development of an LNG fueled bulkcarrier, as per ABS DLA/SFA system. The design has been received approval in principle from the class American Bureau of Shipping (ABS). The vibration response analysis (frequency response) was performed for the early identification of potential vibration issues.
- Microsoft Excel VBA programming for boil-off gas and LNG fuel management simulations of the vessel and prediction of holding time without venting off the boil-off gas. Holding time and fuel management in a voyage was simulated to devise the boil-off gas management strategy.

Trainee Design Engineer – Hull Structures and Finite Element Analysis

November 2012 - July 2014

- Finite element full ship modeling and structural strength analysis of Bulkcarriers, Tanker, Fast Patrol Vessel (FPV).
- Free and Forced vibration analysis of Bulkcarriers and FPV. The analyses were performed on 3D, full ship finite element model.
- Vibration response control and optimization of radar mast of FPV under the

excitation forces due to waterjet and main engine operation.

- Global strength analysis of Bulkcarriers and Tankers using CSR Software and ABS DLA/SFA system. Local Strength analysis of Bulkcarriers, Tankers, and FPV.
- Eigenvalue buckling strength analysis.
- Fatigue strength analysis of Bulkcarriers using CSR software and ABS DLA/SFA system.
- Linear static analysis of mooring fittings, equipment foundations for Bulkcarrier and FPV.
- Preparation of documents against actual obligations, contractual agreements and produce any required submissions to classification society, owner, and shipyard during the design and construction phase of vessels.

Octa Engineers (Designs) Pvt. Ltd., Bangalore.

Internship

June 2011 - 6 Weeks

- Analysis and design of an offshore living quarters module (LQ).
- The various analysis and design considerations for the in-place and the lifting situations were subjected to study with the aid of STAAD Pro V8i software.

MASTERS THESIS

Structural damage detection by dynamic non-destructive technique.

Abstract: The existence of damages results in changes in structural properties, such as mass, damping, and stiffness, and these changes will alter both static and dynamic behavior of the structures and thus can be detected by measurements through distributed sensors. The shift in natural frequency caused by the damage contains information on some generalized coefficients of the unknown stiffness variation. Changes in the nodes of the mode shapes can be used to identify localized damages. An optimization problem utilizing the method of genetic algorithm for the solution, involving modal analysis in each iteration of optimization is formulated for finite element model updating and detection of damage. The objective function formulation and finite element programming were performed in

MATLAB. The genetic algorithm method in the optimization toolbox within the MATLAB environment was utilized.

MASTERS SEMINAR

Scaled modeling of SPAR platform, where a detailed study of the scaling laws in general and the case-specific to spar platforms was performed.

AREAS OF INTEREST

Finite element analysis, Structural Mechanics, Wave hydrodynamics, Computational Fluid Dynamics, Computer Programming, Image Processing, Ship Response Prediction, and Machine Learning.

SOFTWARE SKILLS

FEA Softwares - **MSC Nastran, FEMAP**

CFD Softwares - **OpenFOAM**

Structural Analysis Software - **STAAD.Pro V8i**

Scientific computing - **MATLAB, Scilab, GNU Octave, Scipy**

Programming Languages - **Python, C++, VBA (Microsoft Excel, FEMAP, AutoCAD), FORTRAN, AutoLISP**

Drafting Softwares - **AutoCAD, FreeCAD**

3D Modelling and BIM - **Revit, Rhinoceros, Blender 3D**

Project Management Softwares - **MS Project, Primavera, OpenProject.**

EDUCATION

National Institute of Technology, Calicut

M. Tech. Civil Engineering – Offshore Structures

2010-2012

A full-time masters program with special emphasis on Offshore Structures. The various subjects include Wave Hydrodynamics, Structural Dynamics, Finite Element Analysis, Structural Stability, Design of Offshore Structures, Fracture Mechanics, Earthquake Engineering, Dynamics of Offshore Structures, and Stochastic Processes.

School of Engineering, Cochin University of Science and Technology – Kochi

B. Tech. Civil Engineering

2005-2009

EMEA HSS, Kondotty – Malappuram

Kerala HSE – XII – Science

2003-2005

MUES, Kondotty – Malappuram

CBSE – X

2002-2003