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PROFESSIONAL EXPERIENCE

Major Projects

Impact Analysis using Discrete Element Method (PhD) (2006-2013)

(Guide: Prof.C.LakshmanaRao, IITM)

- A new element is developed in two dimensional domain for the analysis of solid structures using discrete element method to replace the conventional circular discrete element.
- Advantage of the new element (square element) for discrete element simulation is highlighted through different studies using MATLAB platform.
- Square discrete element is validated by comparing the result with analytical and experimental results for cantilever and fixed beam subjected to dynamic loading.
- Ballistic impact analysis of bullet penetrating targets using one dimensional discrete element and two dimensional square discrete elements has been successfully carried out and the results are found to be matching with empirical results available in literature.

An improved Design for Filament Wound Pressure Vessel (M.Tech) (2004-2005)

(Guides: Dr.C.Sudheer(CUSAT) and Dr. R. Ramesh Kumar (VSSC))

- Filament wound pressure vessels are widely used in launch vehicles due to its high strength to weight ratio. The project work was carried out to perform a parametric study and to propose a feasible design modification for the existing vessel.
- Design modification mainly consists of reducing the weight of pressure vessel for the same pressure capacity.
- Methodology consists of carrying out finite element analysis of filament wound pressure vessel, comparison of results with values obtained from hydraulic test and changing of material of the pressure vessel which can reduce the weight of pressure vessel.
- The pressure vessel was successfully analyzed using FEM and an improved design resulted in significant weight reduction.

Maintenance of Hydraulic Emergency Brake System in Quay Crane (B.Tech)(2001-2002)

(Guides: Mr. Arunashankar Butt (LBSCE) and Dr. Vidhyadharan (Cochin Port Trust))

- Quay cranes are one of the most popularly used cranes in port due to its tonnage capacity. Emergency brakes are used for quay crane at the time of emergency, which is having a problem of inefficiency in brake application at full load condition.
- The aim of project work was to find out the reason for the brake inefficiency by using theoretical formulation. The rectification methods to avoid slippage condition were proposed in this project.

Teaching & Research Experience

Position: **Assistant Professor in Ship Technology (Cochin University of Science and Technology)** (July 2015-*till date*)

Performed works: Teaching engineering subjects to B.Tech students (Naval architecture and ship building) and M.Tech students (Computer aided structural analysis and design).

Subjects covered: Engineering mechanics, Applied thermodynamics, Analysis of structures, Design of Machine Elements, Production management & operations research, Fracture Mechanics and Dynamics of structures.

Position: **Associate Professor in Mechanical Engineering (Toc H Institute of Science and Technology)** (October 2013-July 2015)

Performed works: Taught engineering subjects to B.Tech mechanical engineering students.

Subjects covered: Strength of materials, Hydraulic Machinery and Finite Element Analysis laboratory.

Position: **Project Officer at IIT Madras** (September 2011-October 2013)

Project: Blast mitigation through fluid-structure interaction

Project Coordinator: Prof. C. LakshmanaRao

Performing works: Experimental and numerical simulation of blast mitigation for network of fluid filled pipes using ABAQUS software.

Position: **Lecturer in Mechanical Engineering (Jyothi Engineering College)**

(June 2005-June 2006)

Performed works: Taught engineering subjects to B.Tech mechanical engineering students.

Subjects covered: Engineering mechanics, Strength of materials, Advanced mechanics of solids, Environmental studies, Industrial management and Strength of materials laboratory.

EDUCATION

PhD, Applied Mechanics, October 2013

IIT Madras, Chennai

CGPA: 8.75/10

M.Tech., Computer Aided Structural Analysis and Design, May 2005

Department of Ship Technology, CUSAT, Cochin

CGPA: 8.55/10

B.Tech., Mechanical Engineering, June 2002

LBS College of Engineering, Kasaragod

Overall Percentage: 76.06

Pre-Degree (12th Standard), June 1998

C M S College, Kottayam

Overall Percentage: 80.00

SSLC(10th Standard), June 1996

M T S High School, Kottayam

Overall Percentage: 77.83

SCHOLASTIC ACHIEVEMENTS

- B.Tech with *Honours* Degree
- Percentile of 89.43 in GATE 2003
- Secured 2nd Rank for M.Tech in Computer Aided Structural Analysis & Design
- Student Member of American Society of Mechanical Engineers(2012-2013).
- Life time member of Indian Society of Applied Mechanics.

SOFTWARE AND PROGRAMMING SKILLS

Software Proficiency : PFC2D, ABAQUS, ANSYS, NISA & AUTOCAD

Scientific Application : MATLAB

Operating System : Windows, Linux

Computer Language : C & FORTRAN

PUBLICATIONS

Journal Papers

1. **Rajesh P Nair, Alex A Earali, Igin John and Sujith K M**(2015), Finite Element Simulation of ballistic Impact on thin steel plate, *International Journal of Innovative Research in Science, Engineering and Technology*, 4, pp.51-52
2. **Rajesh P Nair & C Lakshmana Rao** (2014), Numerical Simulation of Ballistic Impact on Particulate Composite Target using Discrete Element Method: 1-D and 2-D models, *International Journal for Computational Methods in Engineering Science and Mechanics*, 15, pp.9-16
3. **K Vineet Kumar Reddy, Rajesh P Nair and C Lakshmana Rao**(2013), Numerical Modeling of Response of Beams Subjected to Blast Loading, *Journal of Structural Engineering*, 40, pp.85-89
4. **Rajesh P Nair & C Lakshmana Rao**(2012), Simulation of depth of penetration during ballistic impact on thick targets using a 1-D discrete element model, *Sadhana*, 37, pp.261-279

Conference Papers

1. **Renjith R & Rajesh P Nair**, Evaluation of Mechanical Characteristics of Natural Fiber Composites, *International Conference on Composite Materials & Structures*, 27-29th Dec 2017, IIT Hyderabad (Paper accepted for oral presentation)
2. **Geethika Dev & Rajesh P Nair**, Impact Analysis of a Motorcycle Helmet Using Finite Element Method, *Indian Conference on Applied Mechanics*, 5– 7 July 2017, MNNIT Allahabad
3. **Swathy Raj S & Rajesh P Nair**, Impact Analysis of Offshore Tubular Member Using FEM, *Indian Conference on Applied Mechanics*, 5– 7 July 2017, MNNIT Allahabad
4. **Athira T V & Rajesh P Nair**, Structural Analysis of Concrete Bunkers, *Indian Conference on Applied Mechanics*, 5– 7 July 2017, MNNIT Allahabad
5. **Jeevan V L & Rajesh P Nair**, Numerical evaluation of blast mitigation using fluid structure interaction, *Indian Conference on Applied Mechanics*, 5– 7 July 2017, MNNIT Allahabad
6. **Parvathy S Pillai & Rajesh P Nair**, Crack Propagation Studies and Life Cycle Estimation of High Pressure Gas Bottles, *Indian Conference on Applied Mechanics*, 5– 7 July 2017, MNNIT Allahabad.

7. **Sriram KV & Rajesh P Nair**, Parametric study using FEM for Graphite-Epoxy composite plate subjected to transverse load, *Advances in Technology, Engineering & computing –A multinational colloquium-2017*, Jan 27-28, 2017, SCMS SET, Cochin
8. **Rajesh P Nair, Alex A Earali, Igin John and Sujith K M**, Finite Element Simulation of ballistic Impact on thin steel pate, ICETME, September 3-5, 2015, TIST, Cochin.
9. **Rajesh P Nair & C Lakshmana Rao**, Analysis of elastic body using square discrete element method, ICCMS, December 10-13, 2014, SERC, Chennai.
10. **Priyank singh, Rajesh P Nair & C Lakshmana Rao**, Ballistic impact simulation of 2-D elastic body using square discrete element method, INCAM 2013, July 3-6, 2013, IIT Madras.
11. **Rajesh P Nair & C Lakshmana Rao**, Simulation of failure of a fixed beam subjected to impact load using QDEM, *ASME-International Mechanical Engineering Congress and Exposition*, November 9-15, 2012, Texas, USA.
12. **Vineet Kumar Reddy K, Rajesh P Nair and C Lakshmana Rao**, Numerical Modeling of Response of Beams Subjected to Blast Loading, *ICCMS*, December 10-12, 2012, IIT Hyderabad.
13. **Rajesh P Nair & C Lakshmana Rao**, Simulation of failure of a cantilever beam subjected to impact load using QDEM, *ICCMS*, December 10-12, 2012, IIT Hyderabad.
14. **Rajesh P Nair, Anoop N Honnekeri & C Lakshmana Rao**, Numerical simulation of Ballistic Impact on thick targets using Discrete Element Method-1D and 2D models, *International Conference on Composites for 21st Century: Current and Future Trends*, January 4-7, 2011, IISC Bangalore.
15. **Rajesh P Nair & C Lakshmana Rao**, Elastic Response of Cantilever beam using QDEM, *ICCMS*, December 1-5, 2009, IIT-Bombay.
16. **M D Ghouse, Rajesh P Nair, C Lakshmana Rao & B N Rao**, Numerical modeling of failure in materials, *Indo-Russian Workshop on Topical problems in Solid Mechanics*, November 11-14, 2008, BITS Pilani, Goa.
17. **Rajesh P Nair, Rohit Deshmukh and C Lakshmana Rao**, Simulation of Penetration During Ballistic Impact Using 1-D DFEM, *International Conference on Multiscale Modeling and simulation*, January 2-4, 2008, IISC Bangalore.
18. **Rajesh P Nair, C Lakshmana Rao & B N Rao**, One-dimensional approach to ballistic impact problems using discrete finite element method, *ICTACEM*, December 27-29, 2007, IIT Kharagpur.

UGC/AICTE/ISTE RECOGNIZED

ORIENTATION/REFRESHER/WINTER COURSES ATTENDED

| Sl. No. | Nature of the course/Summer School | Place | Duration | Sponsoring Agency |
|---------|---|--------|--|-------------------|
| 1 | Participated in two day "Induction programme for newly recruited teachers" conducted by the university | Cochin | 15 th - 16 th February 2016. | CUSAT |
| 2 | Participated in one Day Workshop on Advances in Technologies for Sustainable Development as part of National Technology Day | Cochin | May 11 th 2016 | CUSAT |

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| 3 | One week workshop on “Mechanics of modeling soft materials” organized by Department of Applied Mechanics,IITM | Chennai | June 13 th 2016 - June 19 th 2016 | GiAN(MHRD), Govt. of India |
| 4 | One week workshop on “Mechanics of Nano-Electronics Packaging” organized by Department of Applied Mechanics,IITM | Chennai | Dec 5 th 2016 – Dec 9 th 2016 | GiAN(MHRD), Govt. of India |
| 5 | Pre conference workshop on high Temperature Design & Analysis organized by INCAM 2017 | Allahabad | July 4 th 2017 | Applied Mechanics Dept, MNNIT & ISAM |

POSITIONS OF RESPONSIBILITY

- Student advisor for OEC students of Ship technology Department, CUSAT (2015-2017)
- Department coordinator for Shastrayan 2017
- Staff member for local transport facility team of NAAC team (2016)
- Core Coordinator for 2nd International conference on Emerging trends in Mechanical Engineering 2015, TIST Cochin.
- Core Coordinator for 1st Indian Conference on Applied Mechanics 2013, IIT Madras.
- Chairman of Applied Mechanics Students Association, 2008-2010
- Coordinator for "Research Expo" at *Shastra*2008 (Technical festival of IIT Madras)
- Class representative of M.Tech Programme (2003-2005)
- Member of Mathematics Club at high school Level (1995-1996)

SPONSORED RESEARCH PROJECTS SUBMITTED FOR GRANT

Principal Investigator for the project titled “*Design and Analysis of a Biomimetic Composite Glider.*”

Category: **Sponsored Research**

Project Cost: **Rs. 29.15 lakhs**

Status: The project has been submitted for funding, dated 30th July 2016, from **National Design & Research Forum (NDRF)** under the National Program for Unmanned Marine Vehicles (UMVs).

CONTRACT RESEARCH PROJECTS ONGOING

Principal Investigator for the project titled “*optimization of viscoelastic interleaves in composite laminates*”

Category: **Sponsored Consultancy project**

Project Cost: **Rs. 9.6 lakhs**

Status: The project proposal as a single bid submitted for funding dated 22nd Aug 2017 to NPOL,DRDO

PERSONAL INFORMATION

Date of Birth : 8th January 1981
Gender : Male
Nationality : Indian
Passport Number : M3378255
Addaar Number : 615433753135
Pan Number : AOVPN3424J
Languages Known : Malayalam, English, Hindi&Tamil.
Eye Sight : Normal
Physique : 169 cm Height, 70kg Weight.
Interests : Cricket, Table Tennis, Books & Songs.
Father's Name : K R Parameswaran Nair
Spouse Name : Nithya Remadevi

REFERENCES

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