

PROF. SRINIVASAN CHANDRASEKARAN

Kind attention:

Prof. Sarinya, Dean, International Maritime Studies, KU SRC

Director, KU International College

Period of Visit: 5th Jan till 29th April 2024

Visiting Professor, Faculty of International Maritime Studies, Kasetsart University Sri Racha campus

Also affiliated to KU, International College, Bangkok campus

Full Professor (Higher Academic Grade), Dept of Ocean Engg, Indian Institute of Technology Madras

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h-index: 27; i10-index: 81

Top achievements:

Listed within 2% of the top scientists worldwide for the 4th Consecutive Year, as reported by an independent survey conducted by MIT, USA

Recipient of Fellow, Ministry of Italian University Research (MiUR): A prestigious fellowship awarded to non-European citizen to participate in the research activities in European universities.

Recipient of Best Teacher Award by IIT Madras in 2022.

Recipient of Best Reviewer award by Int. J of Steel Structures

Associate Editor, Int. J Sustainable Marine Structures

Editorial member: Int. J. steel structures, Int J. of Marine Tech & Research, OMAE, IJOPE

Chandrasekaran Srinivasan
Indian Institute of Technology Madras
Verified email at iitm.ac.in - Homepage
Offshore structures Reliability and Risk assess... structural dynamics
earthquake engineering HSE for oil and gas industrie

TITLE	CITED BY	YEAR
Dynamic analysis and design of offshore structures S Chandrasekaran Springer India	139	2015
Dynamic behaviour of square and triangular offshore tension leg platforms under regular wave loads S Chandrasekaran, AK Jain Ocean Engineering 29 (3), 279-313	138	2002
Triangular configuration tension leg platform behaviour under random sea wave loads S Chandrasekaran, AK Jain Ocean Engineering 29 (15), 1895-1928	96	2002
Wire arc additive manufacturing of functionally graded material for marine risers S Chandrasekaran, S Hari, M Amirthalingam Materials Science and Engineering A 792, 139530	73	2020
Stability analysis of TLP tethers S Chandrasekaran, NR Chandak, G Anupam Ocean Engineering 33 (3-4), 471-482	68	2006
...	59	2015

	All	Since 2019
Citations	2475	1521
h-index	27	21
i10-index	81	52

Public access: 2 articles not available, 1 article available

During my stay as Visiting Professor at IMS SRC, I am planning to take up the following activities:

1. Educational activities

A1. Teaching course work: I am sharing the teaching load of one of the core courses, “Ship Analysis and Dynamics” with Dr. Sirirat Jungrungruentaworn and Dr. Nonthipat Thaweewat. I am involved in teaching Eighteen (18) hours as per the schedule- 7th Feb, 14th Feb, 21st Feb, 28th Feb, 06th March, 13th Mar 2024 (09:00 to 12:00). Last semester, I taught 50% of the course contents of “Fundamentals of Offshore Engineering” along with Dr Surasak Surasak Saengsupavanich

2. Research proposals

I am willing to perform the following research during my presence. All of them require funding support from KU to take up this research at KU SRC. I am collaborating with faculty colleagues of KU SRC and involving them in conducting these experimental and numerical studies. I shall also be involved physically in all the works and shall try to complete them before I leave. I am expecting all of them to lead to good journal papers in Q1 quarter, scopus-indexed journals. My affiliation in these submissions shall be linked to KU SRC and KU IC. I kindly request the Dean (KU SRC) and the Director (KU IC) to release funds to carry out these studies.

a) Force and drag reduction on Elliptical cylinders with and without perforated cover:

This is focused to investigate the advantages of ellipse-shaped members in offshore and coastal structures than can help reducing wave and current loads. Apart from enjoying force reduction due to a better aspect ratio in comparison to cylinders, they are also expected to show lesser drag coefficient and pressure reduction. The scaled model will be investigated in wind tunnel at KU SRC. Further, the study will also be extended with an outer perforated cover, which can help reduce pressure on the inner member. Researchers, through the earlier studies showed a significant force reduction on the members fixed with an outer perforated cover. The research proposal, which will be submitted for grant request shall cite all relevant scientific literature and detailed methodology to carry out this work. The work is expected to be completed with 60 days from its start, and detailed report can be prepared.

Nature of work: Experimental studies in wind tunnel and numerical investigations

Proposed budget: 100,000 Thai Baht

Principal investigator: Prof. Srinivasan Chandrasekaran

Co-investigators: Dr. Sirirat Jungrungruentaworn, Dr. Nonthipat Thaweewat, Dr. Surasak Saengsupavanich

b) Structural Health Monitoring, assessment and control of semi-submersibles and Buoyant Leg Storage Regasification platforms (BLSRP)

Semisubmersibles and BLSRPs are indicatively preferred for deep water oil and gas exploration and shall achieve larger applications in the near future. In particular, with an increasing demand of LNG usage in seaways, Regasification containers and platforms are expected to be commissioned in large numbers in the near future. The Principal investigator developed a decent know-how in the analysis and design of semisubmersibles and BLSRPs. With the help of the co-investigator, appropriate control mechanisms will be proposed and investigated to restrain the pitch/roll motion and surge motion of these floating structures. The research proposal, which will be submitted for grant request shall cite all relevant scientific literature and detailed methodology to carry out this work. The work is expected to be completed within 120 days from its start, and detailed report can be prepared.

Nature of work: Experimental studies in wave basin and numerical investigations

Proposed budget: 300,000 Thai Baht

Principal investigator: Prof. Srinivasan Chandrasekaran

Co-investigators: Dr. Kantapon Tanakitkorn

Student participation: One PhD student from IIT Madras shall visit KU SRC to fabricate the model and conduct experiments.

3. Research works under sustainable developments

Green energy is the targeted focus of most of the developing countries. Wave energy harvest is one of the achievable targets in Thailand with the presence of long coast lines. I am proposing to conduct an advanced research in design and development of Wave energy device with an appropriate power take-off mechanism (PTO) to achieve a higher efficiency. A preliminary, bio-mimic inspired wave energy device is already developed in IIT Madras with multi-functional objective. A paper is also submitted to Int. J. of Sustainable Energy Technologies and Assessment, which describes the preliminary design of the model. The paper is co-authored by Prof. Sarinya as well.

The current proposal will focus on the design and development of an appropriate Power Take-off system for the bio-mimic device, developed at IIT Madras. The model fabrication and design of PTO will be carried out in KU SRC to carry out experimental studies. Numerical studies will be carried out in IIT Madras to validate the experimental results.

Nature of work: Experimental studies in wave basin, KU SRC and numerical investigations at IIT Madras

Proposed budget: 300,000 Thai Baht

Principal investigator: Prof. Srinivasan Chandrasekaran

Co-investigators: Dr. Sirirat Jungrungruentaworn, Dr. Nonthipat Thaweewat

Student participation: One PhD student from IIT Madras shall visit KU SRC to fabricate the model and conduct experiments.

4. Book writing

A proposal for book writing is submitted to CRC Press, USA pending approval. The book titled "Fundamentals of Offshore Engineering", authored by Srinivasan Chandrasekaran, Surasak Phoemsapthawee, Shanker Krishna and Hari, S will address the basics of offshore engineering with a focus to prepare the learners understand the layout of offshore oil and gas production systems. It also introduces HSE in oil and gas industry with an emphasis towards safety measures in design and operations. The glossary of crude oil and natural gas, including the essentials of seismic surveys and green energy systems are helpful for the users. Details of offshore platforms, describing the types, historical development, basics of analysis and design, environmental loads encountered including recent updates on new-generation platforms in one the main focus of this book. Chapters describing the petroleum production process, subsea engineering and offshore pipelines help readers to know an overall picture of the oil and gas production systems.

This book shall serve as reference material for both academicians and practicing professionals. The scope of the book includes discussions related to the estimate of wave loads, wind loads, ice loads, and fire loads that during the service life of offshore platforms. The basics of HSE, as discussed in one of the chapters of this book shall be helpful to understand and revise the safety principals, which are essential requirements of every engineering professional employed in the offshore industry. The topics on offshore pipelines and subsea engineering help readers to understand the fundamentals about petroleum production, pipeline installation etc. A wider scope and distributed contents of this book is designed to attract readers from various disciplines, namely civil, structural, ocean, naval arch, chemical, production, mechanical, safety, offshore, and marine engineering.

The readers shall get comprehensive knowledge about offshore engineering and prepare for a higher level of learning in this domain of expertise. A dedicated book, addressing these topics to cater to the multi-disciplinary engineering approach is largely absent in the scientific literature. This book shall be a reference material to many universities that teach offshore engineering to senior undergraduate and first level post-graduate students. This book will also serve as a guide to practicing engineers.

5. Journal publications

1. Basanagoda Patil, Srinivasan Chandrasekaran, Meher Prasad and Sarinya Sanitwong Naayutthaya. 2024. Energy harvest on TSUSUCA DOLPHIN under regular waves: Experimental studies- Paper submitted to Journal of Sustainable Energy Technologies and Assessment on 6th Jan 2024 (Submission Ref No. SETA-D-24-00084; This is a Scopus indexed Journal in Q1 quartile with impact factor of 7.6)
2. V. Ferren, C. Saengsupavanich, I. Magdalena, M. N. Farras Dhiya, Sarinya Sanitwong-Na-Ayutthaya, S. Chandrasekaran. 2024. Analytical Optimization of Gabion-Pile Coastal Protection Structure, Paper submitted to Physics of Fluids (Scopus indexed, Q1, Impact factor 4.98)
3. Thennavan, Srinivasan Chandrasekaran, Surasak Saengsupavanich. 2024. Structural assessment of steel coped beams: Experimental and Numerical Investigations. Paper submitted to Journal of Building Engineering (Scopus Indexed, Q1 with Impact factor of 7.14)
4. Shyba, Srinivasan Chandrasekaran, Kantapon Tanakitkorn. 2024. Coupled dynamic analysis of Buoyant Leg Storage and Regasification Platform with risers. Paper under preparation and will be submitted to journal in 1 month

6. Short course and workshop

A short course is proposed to be conducted in March or April 1st week in KU SRC. This workshop will be conducted in Kasetsart University, Faculty of Maritime studies, Sri Racha campus, Chonburi, Thailand in collaboration with KU, International College, Bangkok.

Title: Design and development of floating modules for Coastal, offshore and mission rescue applications for naval defense

Duration: 4 days

Day 1: Environmental loads on floating bodies- dynamics of floating bodies- Design guidelines- Examples- Geometric forms and functions

Day 2: Fire loads- fire-resistant design concepts under hydrocarbon fire- impact loads- design perspectives

Day 3: Polyfloat- Conceptual design of modular components- Manufacturing methods and products- industrial applications- Structural characterization under critical applications (IITM report and more details on its improvement)

Day 4: Rescue vessel- design concept- modular floats- assembly and use- design of rescue vessel using Polyfloat- probable applications for naval defense.

Audience:

Industrial participants: civil, mechanical, structural, naval arch background, Coastal engineers

Faculty from Universities- Students- research scholars

Fees and Registration (to be arranged by KU SRC and KU, Intl College)

Course fees: Thai Baht 4000 for industrial participants and Faculty members

Students and Researchers: Thai Baht 2000

Certificate of participation will be issued jointly by KU SRC and KU, International College

We will extend this to about 25 participants

Sponsorship: 50000 Thai Baht from a company from India (to be arranged by Prof. Chandrasekaran)

This course will add academic value to the University apart from earning revenue. It will also help popularize knowledge transfer of KU to public domain and stakeholders.

7. MoU organized

1. During Feb 11-17th, 2024, an official meeting is arranged in India to sign a MoU between KU SRC and Gujarat Technical University, India. The event is sponsored by Prof. Chandrasekaran and invitation is extended to Prof. Sarinya, Prof. Phansak and Prof. Cherdvong to attend the meeting. Invitation includes total return airfare by economy class, accommodation and other contingency expenditure for the invitees.
2. MoU is also planned between KU and IIT Madras. Templates of the respective MoUs are being exchanged for further action between the parties. Prof. Chandrasekaran will be coordinating the MoU from the IIT Madras as Champion of this MoU.

8. Special Lectures/open seminar

Open seminars and special lectures are planned to attract students and faculty of various disciplines including civil, mechanical, naval arch and ocean engg, Marine engineering, Aerospace, Chemical and production engineering, and basic sciences

1. Fire resistant design of ships and offshore structures (06 hours)- Scheduled in Building 24, IMS- 3rd Floor, KU SRC

Dates: 24th Jan 2024: 13:00 to 16:00 hrs (3 hours)

31st Jan : 13:00 to 16:00 hrs (3 hours)

2. Health, safety and Environmental Practices for ships and offshore structures (06 hours)

Dates: 28th Feb: 13:00 to 16:00 hrs (3 hours)

6th March: 13:00 to 16:00 hrs (3 hours)

3. Computer aided structural analysis using Matlab (15 hours)

Scheduled to be conducted in KU International College for civil engineering, naval architecture, marine engineering students

Basics of statically indeterminate structures using stiffness method: 3 hours

2d beam analysis using Matlab- 3 hours

2d truss analysis using Matab – 3 hours

2d frame analysis orthogonal frames – 3 hours

2d frame analysis – non-orthogonal frames – 3 hours

3d space frame analysis – 3 hours

9. Development of Web-based courses and new courses to strengthen existing curriculum

Course Title	Fire-resistant design of structures
Discipline	Civil Engg, structural engg, Offshore engg and Naval Arch, Ocean engineering, Mechanical engg
Duration of course	36 hours
Is this course syllabus approved by AICTE or by Senate in your/any institute? If Yes, please give the course name and institute under which this is approved.	The course is reviewed in BAC after approval from the Depart, DCC. Now, it will be placed in the forthcoming Senate for approval. This is relatively a new course and of high demand as no such parallel course is being taught in other universities and IITs.

Course curriculum	It is relatively a new course with intensive contents towards structural design for fire resistance. No such course is currently taught in any International Universities. Only a marginal portion of the proposed syllabus may be taught in the structural design course. Objective of the proposed course is purely based on the industry demand and job perspective of UG and PG students of the above disciplines, as mentioned above.
Intended audience	Senior Bachelor Degree students of Civil Engg, Naval arch and Ocean Engg, Marine studies, PG students of structural engineering, PG students of Mech, Aerospace and Appl Mech, Faculty of civil engineering, PG students of Ocean engg and Naval arch, MS and PhD scholars of the above discipline
Is it a core/elective course?	Core course
Is it a UG/PG/PhD course?	B.Tech, M.Tech and PhD
Which degrees would it apply to? (BE/ME/MS/BSc/MSc/PhD etc)	BE, B.Tech., ME, M.Tech., M.S (by research), PhD
Pre-requisites in terms of educational qualification of participants, if any other courses should be done before this can be done	4 th year UG students, PG students of 1 st Sem of the following disciplines, namely civil, structural, naval arch, aerospace, Appl. Mech., Mech., Ocean engg., offshore structures.
Industry recognition of this course – List of companies/industry that will recognize/value this online course	All major consulting organizations
Will the final certification exam be– paper/pen or computer based - both are proctored	Paper/pen mode
Will the course require use of any software such as Matlab or any programming language,etc or any other tool? If yes, does it have a linux based compiler available or if licensed, can we get the educational license for the same?	Yes. It intensively uses and encourages the readers to use Matlab. Source code for solving numerical are included in the lectures. Tutorial supports will be extended.
Names of potential reviewers for the course (can be from other institutes – will be used if we need any additional inputs on the course) – Name, Dept, email id, Institute	<p>Prof. Arvind Kumar Jain Professor and former Head Dept of Civil Engg, IIT Delhi arvindjain57@yahoo.com</p> <p>Dr. Gaurav Srivastav Associate professor and Mazumdhara Chair, Dept of Civil Engg, IIT Gandhinagar. gauravs@iitgn.ac.in</p> <p>Prof. Katta Venkataramana, Former Dean and Professor</p>

	<p>Dept of Civil Engineering, NIT Suratkal Email: ven@nitk.ac.in Mobile: 9448475875</p> <p>Prof. B.J Shah, Principal Professor of Structural Engineering Govt Engineering College, Modasa, Gujarat https://gecmodasa.ac.in/departments/am/faculties/faculty-profile.php?f_username=am_BJS Email: bjshah.gecm@gmail.com Mobile: 9909996474</p> <p>Prof. Nasir Shafiq Professor (Structural Engineering) Dept of Civil and Environmental Engg Universiti Teknologi PETRONAS, Malaysia Email: nasirshafiq@utp.edu.my</p>
<p>List of reference materials/books/</p>	<p>References:</p> <ol style="list-style-type: none"> 1. Srinivasan Chandrasekaran, Arvind Kr. Jain, Nasir Shafiq, M. Mubarak A. Wahab. 2021. Design aids for offshore platforms under special loads, CRC press, Florida, pp. 280, ISBN: 9781032136844 2. Srinivasan Chandrasekaran. 2019. Advanced steel design of structures. CRC press, Florida, ISBN: 978-036-72-3290-0 3. Srinivasan Chandrasekaran and Gaurav Srivastava. 2018. Design aids of offshore structures under special environmental loads including fire resistance, Springer, Singapore. ISBN: 978-981-10-7607-7 4. Srinivasan Chandrasekaran, Gaurav Srivastava. 2022. Fire-resistant design of structures, CRC Press, FLORIDA, USA. 5. Srinivasan Chandrasekaran and A.K.Jain. 2016. Ocean structures: Construction, Materials, and Operations, CRC Press, Florida, ISBN: 978-149-87-9742-9. 6. Srinivasan Chandrasekaran. 2015b. Advanced Marine structures, CRC Press, Florida (USA), ISBN 978-149-87- 3968-9. 7. Srinivasan Chandrasekaran. 2018. Advanced structural analysis with Matlab. CRC Press, USA, ISBN:978-0-367- 02645-5 8. ASCE. 2010. Design of blast-resistant buildings in petrochemical facilities, Task Committee on Blast-resistant design- Design Handbook by ASCE, Virginia, ISBN:978-0-7844-1088-2. 9. Srinivasan Chandrasekaran, Arvind Kr. Jain, Nasir

	Shafiq, M. Mubarak A. Wahab. 2021. Design aids for offshore platforms under special loads, CRC press, Florida, pp. 280, ISBN: 9781032136844
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1. Introduce the course in about 4-5 lines

The proposed course shall familiarize the participants with the Fire-resistant design of structures and its application to Industrial and offshore structures using Indian and International design codes. On the successful completion of the course, participants shall gain extensive knowledge about the design approaches for fire resistance. Gain knowledge about material properties at elevated temperatures. They will learn about fire, blast, and explosion characteristics that are quite common in heavy industrial structures, process plants, and nuclear reactors. The course contents will help to compute accidental loads that arise from fire, blast, and explosions using Indian and International codes

Course contents (36 hours)

Fire chemistry- classification of fire- types of fire-suppression systems- Extinguishers and fire-fighting systems

Explosion chemistry- types of explosions- computing damage from explosions- numeric examples- Matlab programs- Industrial explosions- control and mitigation- safety perspectives- flammability diagrams

Fire load- Fire limit state- code guidelines- design philosophy- discussions from international codes, National Building codes- Fire safety guidelines- planning guidelines for fire safety- Problems on fire resistance design using Indian and International codes of practice

Numerical model of blast loads- an estimate of blast loads- design for blast loads

Review of design procedures under conventional loads- accidental loads- design approach- fire-resistance- concrete structures- steel structures- design examples

Fire protection and suppression systems- types- extinguishers- accidental case studies- lessons learned from case studies- layout of fire-fighting systems