Vamsee Achanta P.E., Subsea Engineering Leader

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Subsea Engineering leader (20+ years) for sustainable and automated engineering solutions, workflows and project success

Executive Summary

- Served in roles of increasing responsibility spanning from VP of Engineering, Engineering manager, Technical Manager, technical Lead and project manager in structural design and integrity areas for various offshore upstream brownfield and greenfield projects in both start-up, engineering services and contractor roles.
- Strong in-place and installation analysis using leading FE Software, particularly Orcaflex.
- O&G field life cycle (up, mid and downstream) experience for offshore and subsea projects. Design, operations/integrity management and decommission experience.
- Served as Committee member on professional bodies for API-RP-16Q, API-RP-17G, API-RP-17G2 and ASCE COPRI MRE for riser and structural engineering expertise.
- Over 10 years of data analytics experience in building digital twins coupled with a passion to automate. Build programming modules for streamline and automation to create upstream engineering microservices.
- Possess data science experience to implement physics-based algorithms in production environment for engineering teams. Working experience in :
  - Data (well data, WITSML drilling data, seismic segy data, for use as meta data and engineering/analysis data),
  - Implementation of web services for oil and gas industry
  - Databases (SQL design, queries, stored procedures),
  - Cloud technologies (Azure devops) and team work (Git, Teams, Jira)
  - Visualizations (spotfire, Power BI, python modules).
- Ability to lead and perform analysis as well as lead teams. Over 15 years of experience in employee mentoring, leading, project management and business development. Lead growth teams, manage projects and possess project evaluation experience. Experience (and thrive) in start-up and challenging environments. Possess qualities of teamwork, adaptation, hard work, perseverance, end-to-end knowledge-sharing documentation, resilience and servant leadership.
- Real-time application development in production-ready manner and Production support. Python programming with relational database interface design (class functions, sql tables, stored procedures or functions)
- Strong knowledge and know-how in the areas from seismic imaging (.segy files), drilling, completion (frac plugs, sand mitigation etc.), production data, risers, pipelines, interventions etc.
- Offshore asset design/upstream engineering and integrity management of assets. Structural engineering, fitness for service etc. Strong analytical skills of finance, probability, statistics etc. (part of data science)
- Can handle client interaction with very clear communications, strong documentation (from requirements to full-fledged reports/manuals)

Experience Summary

Area	System/Components	Analysis/Software
Field Development	Onshore and offshore planning analysis from cradle to grave Wet tree vs. dry tree Well drilling, completion, production, interventions, abandonment	Field economics Facilities planning
Subsea In-place design	All floaters & rigid/flexible risers pipelines geotechnical	Global analysis detailed structural analysis

Area	System/Components	Analysis/Software
Facilities In-place design	vessel hull & hydrodynamics SALM and CALM Buoy designs moorings platform analysis	Global analysis detailed structural analysis buckling, punch, and shear checks
Subsea Installations design	pipelines, umbilicals, risers, jumpers, manifolds etc	Design,Installation analysis detailed structural analysis
Detailed structural analysis	connectors/couplings/flanges rigid jumpers	Elastic plastic ASME VIII Div 2, Div 3 pipe buckling, plate buckling
Fitness for service	pipings, pressure vessels, vessel hull	Remaining useful life API579 & BS7910 fracture mechanics
Data analysis and algorithm development	near real-time drilling algorithms near real-time production algorithms measured data analysis for subsea assets	git github python plantuml automations visualizations

Project summary

Project	Skills
BP Macondo Containment Riser detailed design	Detailed design and delivery lead Global riser analysis; Suction pile design; Upper and lower flexible jumper designs; Installation analysis of all key components
FDAS APS Feasibility Design	Top Tensioned Riser, vessel mooring design; Technical lead for mooring and riser connected analysis to capture non-linear behavior. Economic analysis for Conversion of 6th Generation Drillship and new builds Marketing activities support with operators
Generic: Subsea Installation Analysis	Develop procedures and weather windows for manifolds, umbilicals, structures, risers, rigid jumpers, moorings etc.
Generic: Rigid Pipeline installation	Shallow water pipeline installation analysis with weather windows Global and local Buckling analysis
BP Thunderhorse SEMI in-field riser analysis	Strength analysis; Hurricane re-analysis post-2005 hurricanes
Chevron Jack St. Malo SCR FEED and detailed design analysis	Strength, fatigue and VIV analysis
BP-HMC Angola Block 31 Hybrid Riser detailed design	Detailed design package engineer
Murphy Azurite SBOP Drilling riser detailed design	Design package for drilling riser
Sewol Salvage Lifting Analysis	Lifting global and local hull analysis for a shallow water salvage operation (client: Govt. of Korea)
Generic: Fitness for Service	GoM topside piping assessment based on measured wall thickness Driling riser in-service joints FFS and 5 yr qualification Expert in API 579 and BS7910 codes
Generic: Single point moorings (SPMs) & CALM/SALM Buoys	In-place analysis and operating weather windows
Generic: Manufacturing experience	Project manager to deliver drilling riser subsea components (i.e riser joints, speciality jts, jewelry etc.) from raw material to finished products as packages

Project	Skills
Generic: Drilling, completion and intervention riser design and analysis	Multiple (100+) riser design verification projects
Generic: Data Analysis	Working knowledge and expertise in statistics, data analysis and automation of software processes and outputs
Chevron Bangka Production Riser FEED	Lead analyst for Strength, fatigue and installation analysis; Rigid and flexible riser design.

- Specialty in deepwater riser design for production, drilling and interventions/workover operations for multiple O&G projects.
  - Highly experienced in strength & fatigue design and connected & disconnect operations
  - Utilized measured data at location along riser to help estimate fatigue along the riser
  - Riser connector expert : Welded connections, Flanges, T&C, quick disconnect, dog style, etc.
  - Good knowledge of SCF, fatigue and sour service considerations.
  - Some key deepwater riser projects are:
    - Chevron Bangka SCR design & Jack St. Malo SCR Design
    - FMOG Marlin SCR detailed re-analysis to determine remaining life
    - BP Thunder Horse SCR riser operating envelopes
    - Completion and drilling Riser Analysis Training provided for Chevron
    - BP 20K riser design
    - Trendsetter 15K riser design
    - Shell 17K high pressure riser design
  - Deepwater Intervention Forum (DIF) presentation for Structural Considerations for Deepwater Interventions
  - Engineering process automation for engineering service companies
  - Riser experience include drilling and intervention riser design for deepwater and HPHT projects in GoM for various clients
  - Riserless experience include coiled tubing, riserless systems design & development, riserless completion installations
- Extensive oil and gas domain experience:
  - Concept -> FEED -> Detailed Design -> Operations (drilling, completion, production, intervention, integrity, condition based monitoring) -> Decommission.
  - Data software (wellview, PI & historians for production & corrosion data) and simulation software (ANSYS, Abaqus, COMSOL, Flexcom, Orcaflex etc. - helps tie in the prediction of unknown scenarios).
  - Extensive analysis automation experience in ANSYS ACT and APDL programming, Abaqus Python Scripting and OrcaFlex Python scripting
  - Asset experience includes subsea structures, riser, pipeline, mooring and vessel hull.
  - Fitness For Service, Corrosion, monitoring & integrity management, data science and software development.
  - Well versed with regulatory requirements. 30 CFR 250 (US) and Petroleum and Natural Gas Rules, 2008 (India)
  - Worked geographically in US, UK and Southeast Asia. Worked on Oil & Gas projects around the world (North America, Middle East, Brazil, West Africa and Australasia). Ability to embrace all cultures
- Volunteer contributor for Floating Drilling Equipment and Operations, International Association of Drilling Contractors (IADC, 12th edition, 2015)
- Oil & gas fabrication experience as follows to bring cost saving to project(s):
  - Manufacture techniques thru life cycle (Forging, machining, preparation, heat treatment, weldability, coatings etc.) for industrial components
  - Materials & metallurgy concepts, costing, manufacture, project management and delivery of custom midsize (USD 100,000 to USD 500,000) equipment with a manufacturing facility.
- Automation of processes with digital transformation, data science, programming experience:
  - Strong knowledge of Python, Matlab, R, Hadoop HDP Ecosystem, Spark (PySpark, Kafka, Spark Streaming), NIFI, VB, C#, Fortran, Java, javascript, C++, relational databases and SQL.
  - Extensive experience in signal processing and software programming in MATLAB.
  - Strong relational database knowledge, data governance and data structure. Entity Relationship and Data Flow. SQL coding to enable required output.
  - Experience in machine learning, data science, probability and statistics.
- Extensive experience with instrumentation sensors, data acquisition and data science. Fundamental knowledge of data cleansing, accuracy, errors, pass filters, nyquist frequency errors etc.
- Financial engineering experience with strong financial fundamentals. Passed CFA Level I.

Experience

Subsea Engineering and Analysis

Jan 2023 to Nov 2023, Houston, TX

- Installation analysis for subsea structures
  - Structures such as Manifolds, PLETs etc.
  - Flexible and umbilicals
  - Rigid/flexible jumpers
- Detailed subsea pipeline engineering analysis for installation of 42 inch thin walled (D/t of 67) pipe offshore Venezuela
  - Detailed finite element analysis in ANSYS to determine the bending moment capacity of pipeline which is outside the DNV code regime (D/t > 45)
  - Pipelay analysis in OrcaFlex to determine installation windows
  - Python and API programming utilized to obtain results and plots in an automated manner

VP of Engineering, FDAS

Jun 2016 to Dec 2022, Houston, TX

- Economic Analysis of GoM Offshore Fields
  - Obtain data from government body (BSEE data center) website to obtain field level economics for GoM fields
  - Tasks included SQL database storage, GIS information, financial analysis and visualizations.
- 6000 ft water Depth Semisubmersible Production Vessel Design Feasibility
  - Design of riser support structure and vessel interface design
  - Drilling Riser, production riser and Mooring feasibility analysis
  - A semi mooring analysis to help determine a feasible mooring configuration for deep water gulf of Mexico
  - The mooring configuration along with mooring loads and the associated anchor loads are determined
  - Coupled riser analysis to determine refined stroke requirements for 100 year and 1000 year hurricane conditions
  - Marketing quality 3D models and animation of host vessel, Riser and mooring system
  - Conversion analysis and Costing of idle 6th Generation Semi submersible drillships to repurpose as host vessels.
- Wellhead Fatigue Data Analysis
  - Utilized engineering and digital signal processing (DSP) expertise to analyze time series data
  - Assist SMEs (subject matter experts) with data exploration of 1 Hz (1 second) and 10 Hz (high frequency) measured data.
  - Performed basic data cleaning methods (rolling average, filtering) and advanced digital methods (fast fourier transforms, frequency filters, FFT and iFFT) to help SMEs understand and assess data to meaningful structural analysis quantities
  - Developed modular plug and play architecture for near real-time data processing for next project phase with following aspects.
  - Input and output data flexibility (input files, databases etc.) for Proof of concepts, SME testing and production)
  - Processing engine to accommodate various custom calculations
  - Detailed Hull finite element analysis for salvage ship SEWOL offshore Korea
  - Detailed stress analysis per DNV-RP-C102 performed in ANSYS for ship located subsea
  - Panel buckling analysis per DNV-RP-C201. Plate, stiffener and girder are considered as part of this analysis
  - ANSYS extension Python programming is utilized to automate the structural analysis process and reduce manual interventions and thus increase productivity.
- Implemented automation analysis for a riser service company to build digital twins by utilizing database driven data for following assets:
  - Drilling risers
  - Top tensioned risers
  - Lazy wave catenary risers
  - Simple catenary risers
  - Global riser analysis
  - Fitness for service per API 579:2016
  - Fatigue service life using S-N and crack growth approaches per BS 7910:2013.
- Detailed Subsea drilling riser adapter FE analysis
  - Detailed ANSYS FE analysis of the lower riser subsea adapter to ensure the resistance is greater than expected loading.
  - The expected loading is based on field specific riser analysis report. Both well control and no well control scenarios to ensure the adapter is fit for purpose.

    - Elastic-plastic advanced analysis considered per API-RP-17G
    - Python programming is utilized to automate the results and outputs
- Trendsetter Intervention System Design and Analysis:
    - Intervention system design for water depths ranging from 1500 ft to 10,000 ft and pressures of 15000 psi and 17500 psi.
    - Global riser analysis, riser connector and flange specifications.
    - Design to ensure sufficient operating envelopes using a Multi Service Vessel (MSV) and available stroke
    - Design of both upper and lower riser configurations
- Fitness for Service for risers, pipelines and subsea structures
    - Process wall thickness data using python.
    - Utilized Python libraries of Pandas, Numpy, Matplotlib and D3JS technologies.
    - Use machine learning algorithms to identify areas of large defects and perform detailed analysis on weakest pipe areas in an automated manner.
    - Developed python program code for 2016 API 579-1 & ASME FFS-I for acceptability (using classification) and acceptable flaws (using classification) by facture mechanics methodology of BS 7910.
    - Concept work to extend fitness for service to other structures (vessel storage and piping systems) to support stacked drilling rigs returning to service.
- Corrosion simulation analysis of damaged subsea mooring line for production facility experience for Oil and Gas using COMSOL software and java programming:
    - A damaged mooring line is modelled to determine the corrosion progression over the life of field
    - Utilized fluid mechanics, mass transfer, diffusion and electrochemical models in COMSOL for simulation of the corrosion mechanisms for galvanized steel wire.
    - Degradation of the blocking compound between wires also modelled as it decelerates the corrosion mechanisms
    - Parameters of model tuned to match experimentally measured corrosion data
    - Recommendations are provided for regular field inspections and post-hurricane inspections
    - Utilized COMSOL, Matlab, Java API and DOS batch processing to automate and process multiple models and associated results.

Data Science Lead, Occidental Petroleum

Sep 2017 to Dec 2020, Houston, TX and Remote

- Implemented 50+ physics based algorithms in production environment:
    - Implemented for multiple assets
    - Logging to ensure data integrity for assets
    - Clear insights into running status, asset status, failure reasons etc.
    - Top class documentation and visualizations
- Implemented real-time drilling analytics (20+ concurrent drilling campaigns) in production environment for a major shale integrated operator. Implemented following algorithms:
    - Bit position estimation
    - Torque and drag
    - Rig state identification
    - Dysfunction detections (stick and slip and buckling)
    - Time series data.
    - Implementation in edge computing and also production servers
    - IoT (edge device) implementation
- Implemented real-time production analytics in production environment (20,000 wells) to analyse the following:
    - Sucker rod pump dynacard analysis
    - ESP exceptions
    - Well Test Validations
    - Time shed analysis for well using well economics
    - Time domain data.
    - Implementation in edge computing and also production servers
    - IoT (edge device) implementation

Engineering Lead, 2H Offshore Inc

Aug 2003 to Jun 2015, Houston, TX

- Chevron - West Seno Bangka Steel Catenary and Flexible Riser Design
    - Lead engineer responsible for front end engineering design of production rigid riser and flexible riser. An umbilical

was also designed for controlling the Bangka wells.
    - Responsible for leading the installation analysis of rigid and flexible risers. Analysis is conducted to ensure acceptable installation response and determine the installation loads.
- BP Macondo Riser Engineering Manager Detailed design.
    - Ability to perform in crisis. Lead engineering manager responsible for design of Macondo free standing riser system used for containment of 2010 oil spill in Gulf of Mexico. Design was accomplished in 8 weeks when compared to typical design duration of 3 years.
    - Involved repurposing of several existing assets (Toisa Pisces and HP-1) and components (Flexibles fluid conduits, riser pipe etc.) to achieve the design and installation in 3 months.
- ENI Devil's tower Spar TTR Integrity and life extension
    - Assess fatigue life for TTR using measured data
    - Assist operator in life extension decisions and activities
    - Chevron Jack St.Malo SCR Analysis
    - Lead engineer for Chevron's Jack / St. Malo's pre-FEED SCR feasibility assessment study.
    - The scope of work includes evaluation of the strength response of SCRs attached to a semi-submersible or a spar, development of riser compression mitigation options where required as well as evaluation of the SCR fatigue response due to first and second order vessel motions and vortex induced motions (VIM) of the host vessel.
- BP Thunder Horse Riser/Flowline design Verification and installation support
    - Lead engineer responsible for the installation verification of the North Extension flowlines on the Thunder Horse field. The scope of the work includes independent third party verification of the flowline installation analysis as well as evaluation of the fatigue damage accumulated in the flowline during different stages of the installation operation.
    - Strength and configuration checks were also conducted for different configurations of the flowline during installation to verify the analysis conducted by the designer. Recommended limiting waves and currents are also defined for the installation of the flowlines.
- BP GoM (Thunderhorse, Atlantis, Horn Mountain) field integrity management analysis and model readiness
- Engineering criticality assessment (ECA) with fracture mechanics approach is also performed to determine the flaw limits.
- Assist operators with decisions and assistance of well and platform decommissioning activities:
    - Assist with Riser and riserless abandonment and decomm decisions
    - Well platform analysis and riserless study tools for decomm analysis
    - Knowledge of heavy lift salvage vessels used for platform decomm analysis
    - Reliance – KG-D6 Subsea and Flowline Integrity Management
- Integrity specialist responsible for inspection of existing KG-D6 infrastructure and integrity lead on subsea systems.
    - Inspection reports and engineering assessments requirements were given as part of the integrity program. These assessments were done for risers, flowlines and subsea equipment including umbilicals, manifolds, jumpers and trees.
- Reliance – KG-D6 In-Water Integrity Management Review
    - Integrity specialist responsible for review of existing RIL in-water integrity program. This integrity program incorporates risers, flowlines and subsea equipment including umbilicals, manifolds, trees and platform.
    - Assessment is done in the focus areas of regulations, document control, risk assessment, coverage, control documentation, performance measures, anomalies, reporting and computer models. Following the assessment, suitable actions and recommendations in these areas are proposed to further improve the existing integrity program. Best practises are also identified and highlighted for use in other areas of RIL business.
- HMC – BP Angola Block 31 Stand-by Package Engineering:
    - Package engineer for design of the stand-by package for the BP Angola SLHRs. The project included the detailed design and packaging of the flexible riser standby package. The package is used to clamp the flexible riser against the rigid riser and wet parked before the arrival of the host vessel.
    - Managed the detailed design and provided specifications, general and detailed drawings of the components. Liaise with the project team, client and operator to ensure all requirements, including ROV interfaces are captured in the design.
- Multiple field monitoring and measurement, signal processing and benchmarking analysis projects
    - BP Na Kika IM report with hundreds of inwater asset KPI measured parameters and health indicators using Matlab
    - BP Thunder Horse – Jumper motion data and slugging assessment using Matlab
    - VIV Fatigue of Free Spanning Pipelines
    - BP Horn Mountain – Flex-joint Monitoring
    - BP Thunder Horse – Completion Riser Monitoring
    - Global Industries – Span Pipeline VIV Analysis
    - BP Thunder Horse – Jumper VIV analysis
    - Root cause analysis of a spurious angle sensor for client damage control

    - Reliance – KG-D6 Subsea and Flowline Integrity Management Data analysis
- Multiple (100+) drilling, completion and intervention riser analysis Projects all over the world from shallow to deepwater for all major E&P companies.
    - Served on API committee as technical member for API-RP-16Q. Authored multiple sections in API-RP-16Q code released in 2016.
    - Connected and disconnected operations; Installation and retrieval analysis; strength and fatigue analysis; concurrent operations;
    - Global and local component detailed analysis
    - Excellent knowledge of drilling risers and components. Load sharing and non-load sharing flange designs.
    - Strong experience of DP and moored vessels and associated riser designs
- Other Projects:
    - Detailed subsea pipeline engineering analysis for installation of 42 inch thin walled pipe offshore Venezuela
    - Detailed Subsea drilling riser adapter FE analysis
    - Subsea BOP Flange pressure and thermal analysis
    - Land Rig DrawWorks Refurbishment Feasibility Study
    - Exxon Yellowtail SCR Feasibility analysis
    - Papa Terra TTR Thermal Analysis for design verification
    - Chevron - West Seno Bangka Steel Catenary and Flexile Riser FEED
    - Reliance KG-D6 In-water (risers, platforms, umbilicals) integrity management.
    - Deepstar – Drilling Riser Structural Damping Test
    - HMC – BP Angola Block 31 Freestanding/Hybrid riser design and Stand-by Package Engineering
    - JSM SCR Feasibility Analysis
    - Thunder Horse Flowline Installation Verification
    - ATP Mirage TTR CVA Review
    - Shear7 Software Benchmarking Analysis
    - BP Thunder Horse Flowline Manifold Fatigue Analysis
    - Riser Analysis Training Handbook
    - Kizomba Satellite Riser Pre-Feed Analysis
    - Murphy Azurite Surface BOP Drilling Riser Detailed design
    - Unocal – Gendalo SCR Feasibility Analysis
    - BP Na kika – Completion Riser Analysis
    - BP Thunder Horse – Top Tensioned Riser Tubing Landing Analysis
    - BP – High Pressure High Temperature (HPHT) Top Tensioned Riser Feasibility Study
    - Murphy Sabah - Kikeh Field Development
    - BP Thunder Horse – Vessel Envelopes for Extreme Storm Events
    - Murphy Oil Front Runner - Jumper Layout and Interference Analysis
    - BP Enterprise - Drilling Riser Stack up analysis
    - Grupo-R drilling riser analysis campaign manager
    - Performed analysis for 8 wells in GoM
    - Semi analysis
    - Shell Perdido Subsea riser less Pumping Intervention Assessment
    - Shell Stones WH Fatigue Analysis
    - Shell West Boreas BOP on Tree Assessment
    - Shell Popeye riser analysis
    - BP Na Kika Intervention Riser Analysis
    - FMC Gumusut Completion Riser Analysis
    - Helix Q4000 GOM Vito Intervention Riser Analysis

Awards & Recognition

- Multiple accolades for customer service and customer satisfaction
- 100% track record for on time and within budget project delivery

Education

Master of Science in Mechanical Engineering, Texas A&M University, College Station.

B. Technology in Mechanical Engineering, Indian Institute of Technology, Madras.

Publications

Publication	Date	Link
World Oil, Rediscovering the Promise of America's Great Lower Tertiary Play, A GoM lower teritiary field development	6/1/2021	link
World Oil, Assessing industry performance in America's great Lower Tertiary play, A GoM lower teritiary field assessment	4/1/2021	link
World Oil, Innovative strategy increases profitability of ultra-deepwater fields, Utilize technology to improve production	2/1/2020	link
Offshore, Multi-purpose drilling and production system aims to address challenges of Lower Tertiary	2/1/2020	link
Offshore Technology Conference (OTC), Heavy Lift Dynamics, Sewol Ferry Offshore Salvage	5/23/2017	link
Deepwater Intervention Forum (DIF), Structural considerations for Deepwater Riserless Systems	8/1/2015	n/a
Offshore Technology Conference (OTC), Mooring of MRE Structures - Comparison of Codes, Including IEC	8/1/2015	link
IADC, FLOATING DRILLING EQUIPMENT AND OPERATIONS	5/1/2015	link
SNAME, Riser and Subsea Asset Life Extension	2/15/2015	link
SPE Intelligent Technologies Workshop, Deepwater Subsea IM Case Studies	10/1/2012	n/a
SPE Deepwater Technology, Riser Systems for Deepwater India	9/1/2012	n/a
Petrotech, Subsea Integrity Management in Deepwater Developments	11/1/2010	n/a
OMAE, Benchmarking of SHEAR7v4.5: Comparisons to Full-Scale Drilling Riser VIV Data and Legacy Analyses	6/1/2009	link
Texas A&M University, An experimental study of endwall heat transfer enhancement for flow past staggered non-conducting pin fin arrays	5/1/2003	link