



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



## ZENTECH INCORPORATED SCOPE OF SERVICES

**Zentech Incorporated (Zentech) provides multi-discipline Design and Engineering for different types of vessels, topside, process facilities, and modules**

Facilities Catered to:

- ◆ Fixed Platforms
- ◆ MODU's
- ◆ Jackets
- ◆ FPSOs / FSOs
- ◆ MOPUs
- ◆ LNG Terminals
- ◆ FSRUs
- ◆ Floating Power Generation
- ◆ Process Modules
- ◆ Renewable Energy
- ◆ P2X projects: Green Hydrogen / Methanol

**Zentech does Design and Engineering for both Green Field & Brown Field projects**

Types of services:

- ◆ Front End Engineering & Design (FEED)
- ◆ Basic & Detailed Design
- ◆ As-Built
- ◆ Review Engineering
- ◆ Adequacy Checking
- ◆ Feasibility Studies
- ◆ Project Management
- ◆ Construction Support
- ◆ Commissioning Support



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



## Scope of Services Provided by Zentech

### **Project Management, Construction and Commissioning Services; including but not limited to:**

- ◆ Project Management in Offices, Fabrication Facilities, Shipyards and Offshore
- ◆ Procurement: Interaction with Vendors, Writing Requisitions (MRs) or Data Sheets, Technically Choosing the Equipment, Negotiating and Buying Equipment, Attending FATs, etc.
- ◆ Development of detailed Work Scopes
- ◆ Method Statement, Construction and Upgrade Procedures
- ◆ Construction Management in Fabrication Facilities, Shipyards and Offshore
- ◆ Interaction with Class, Shipyard, Flag State and Marine Warranty Surveyors
- ◆ Reactivation and Commissioning
- ◆ GAP Analysis

### **Production and Production Support Related Services; including but not limited to:**

- ◆ MODU – MOPU Conversions
- ◆ FSO Conversions
- ◆ FPSO Conversions
- ◆ Well Intervention Barges – Construction, Modifications and Upgrades
- ◆ Crane Barge Conversions and Upgrades
- ◆ Pipe-lay Barge Conversions and Upgrades
- ◆ Decommissioning and P&A Vessel Solutions

### **Structural Engineering and Analysis; including but not limited to:**

- ◆ Pre-FEED and FEED
- ◆ Basic & Detailed Design
- ◆ Design, Modeling and Analysis – Offshore Fixed and Floating Structures
- ◆ Structural Analysis (Tool: STRUCAD/SACS/ANSYS)
  - In-place
  - Site Specific
  - Transportation
  - Lift
  - Fatigue
- ◆ Linear and nonlinear structural analysis of Floating bodies for gravity loads, wind, wave and current
- ◆ Frequency domain dynamic analysis for machine vibrations and response to earthquakes, waves, etc.
- ◆ Time domain dynamic analysis for blasts with or without temperature loads, pressure loads, seismic motions, machine vibrations.
- ◆ Nonlinear analysis including material plasticity, buckling etc. for structures and mechanical components such as pinions, locking system of a jack-up.



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- ◆ Finite element analysis for Stress Concentration Factors, plated structures, and solid bodies.
- ◆ Fatigue analysis for welded joints including dynamic effects due to waves, wind, and other time varying loads such as during transportation.
- ◆ Strength and Fatigue analysis for components such as mooring ropes, chains, crane pedestals and other components on ships.
- ◆ Crack propagation analysis due to general loading and fatigue loading for components with defects in material experienced either through inclusions, material imperfections or existing minute cracks.
- ◆ Reliability analysis for Reserve Strength Ratio (RSR) and Risk Based Inspection (RBI) Planning.
- ◆ Local Analysis (Tool: FEMAP)
- ◆ Design of modular structures, integrated units, multilevel units
- ◆ Structural Drafting (Tools: BOCAD, TEKLA)
- ◆ 3D Modeling (E3D, SP3D)
- ◆ Bill of Quantities and material specifications
- ◆ Local and Global strength analysis
- ◆ Forensic Analysis: Post Failure
- ◆ Full Global Analysis
- ◆ Redundancy Analysis
- ◆ Site-Specific Analysis
- ◆ Punch –Through Analysis
- ◆ Hull and Scantlings Design
- ◆ Leg Extension
- ◆ Cantilever, Substructure, Drill Floor, Derrick: Engineering, Modifications and Upgrades
- ◆ Crane, Thruster and Other Equipment Foundations: Engineering and Design
- ◆ Collision Analysis
- ◆ Corrosion Analysis
- ◆ Wet and Dry Tow Analyses and Procedures
- ◆ Earthquake Analysis
- ◆ Blast Analysis
- ◆ Risers (Rigid and Flexible) Analysis
- ◆ Subsea Pipelines



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



**Naval Architecture and Marine Engineering Services; including but not limited to:**

- ◆ Pre-FEED and FEED
- ◆ Detailed Design
- ◆ Intact and Damage Stability analysis of floating bodies
- ◆ Motion response analysis of floating bodies
- ◆ CFD analysis for resistance, and other flow problems.
- ◆ Analysis of "sloshing" effects
- ◆ Analysis of "slamming" effects
- ◆ Longitudinal strength analysis
- ◆ Modification of the Ship structure for additional POB, Helideck, Lifeboat addition or systems' modification both mechanical and electrical engineering related
- ◆ Life Enhancement of vessels through ZAIMS service, identification of components that need to be replaced.
- ◆ Preparation of Dead weight Surveys and Inclining Experiments and actual performance of it
- ◆ Establishing a new Load line for modified vessels
- ◆ Shipyard construction support
- ◆ Commissioning procedures
- ◆ Operations Manuals & Stability Booklets
- ◆ On-board operations' software for loading and stability of floating bodies
- ◆ Mooring advisory with mathematical means and real time equipment performance
- ◆ Vessel salvage studies
- ◆ Mooring Analysis (Static, Quasi-static, Dynamic and Fatigue)
- ◆ Tonnage and Freeboard Calculation
- ◆ Load Line Calculations
- ◆ Displacement and Payload Upgrades
- ◆ Jacket Transportation and Load Out
- ◆ Dynamic Positioning (DP) Analysis
- ◆ Loading Conditions and Preload/Ballasting Procedures
- ◆ In person attendance offshore for offshore vessel moves

**Mechanical Engineering Services; including but not limited to:**

- ◆ Pre-FEED and FEED
- ◆ Detailed Design
- ◆ P&IDs
- ◆ Isometrics and PCF's
- ◆ Piping General Arrangements
- ◆ Complete 3D Modeling
- ◆ Piping Systems up to 15,000 psi
- ◆ Firefighting System



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- ◆ System Steam Balance Calculations
- ◆ Riser Tensioners Upgrade
- ◆ Skidding Systems Design and Modifications
- ◆ Mechanical Locking Systems
- ◆ Calculation for Noise and Vibration
- ◆ HVAC System for Gulf and Artic Conditions
- ◆ Equipment Data Sheets and Specifications
- ◆ Steady State and Transient Hydraulic Studies
- ◆ Piping Stress analysis
- ◆ Design of specific customized mechanical components
- ◆ Predictive Maintenance Services using proprietary usage intensity algorithms including provision of sensors and monitoring.
- ◆ Preparation of Data Sheets, Specifications and Selection Rotating Equipment:
  - Centrifugal Gas Compressors
  - Blowers
  - Centrifugal Pumps (API)
  - Gas Turbine Generators
- Static Equipment:
  - Vessels
  - Exchangers
  - Packaged Units
- ◆ Review of Vendor Documents
- ◆ Procurement Support
- ◆ Factory Acceptance / Site Acceptance

**Electrical Engineering Services; including but not limited to:**

- ◆ Pre-FEED and FEED
- ◆ Detailed Design
- ◆ Low and medium voltage power system design: concept, basic and detailed for O&G, energy, utility and industrial applications, both onshore and offshore.
- ◆ Electrical troubleshooting, fault diagnostics, root cause analysis, phenomena simulation, and customized studies.
- ◆ System analysis: power flow, short circuit, protection coordination, harmonics, motor starting, and arc flash.
- ◆ Analysis and design of energy storage systems and power electronics.
- ◆ Design/upgrade of safety systems: fire & gas, emergency shutdown, public addresser, general alarm, telecom, SIS
- ◆ Dynamic positioning system design.
- ◆ Instrumentation, control and navigation system design and improvement.
- ◆ As-built packages: existing system surveys and drawings update
- ◆ Hazardous area assessment and update.
- ◆ Intelligent Survey – Termination Healthy Status (infrared survey)



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- ◆ Predictive Maintenance Services using proprietary usage intensity algorithms including provision of sensors and monitoring.
- ◆ Power System Studies (Tool: ETAP)
  - Load Flow
  - Short Circuit
  - Motor Starting etc.
- ◆ Electrical Power Generation and System Design
- ◆ Single Line Diagrams (SLDs)
- ◆ Protection Relay Coordination
- ◆ Cable Routing Design, Layouts and Material Take-Off
- ◆ Lighting System Design, Layouts and Material Take-Off
- ◆ Earthing System Design, Layouts and Material Take-Off
- ◆ Electrical Terminal Connection Diagram
- ◆ Preparation of Electrical Equipment Data Sheets and Specifications
- ◆ Review of Offers and Vendor Drawing

**Instrumentation Engineering Services; including but not limited to:**

- ◆ Instrumentation Design Basis
- ◆ Control Philosophy and Specifications
- ◆ Detailed Engineering and Specifications for:
  - Distributed Control Systems
  - Programmable Logic Controllers
  - Emergency Shut Down Systems
- ◆ Fire and Gas Detection System
- ◆ Philosophy and Specification
- ◆ Sizing of Control Valves, Flow Elements, Safety Valves, etc.
- ◆ Instrument Indexing
- ◆ Data Sheets/Specifications for Instruments, Control Valves, Safety Valves
- ◆ Instrument Bulk Material Take-off
- ◆ Cable Selection and Scheduling
- ◆ Control Room Design including Panel, Console Layouts
- ◆ Cable Tray Layout and Conduit Routing
- ◆ Instrument Installation Hook-ups
- ◆ Instrument Loop Diagrams
- ◆ Review of Vendor Drawings and Documents
- ◆ Technical Bid Evaluation for Instruments, Valve



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



### **Process Engineering Services; including but not limited to:**

- ◆ Process Simulation & Process Optimization (Tool: HYSYS)
- ◆ Expertise in Dynamic Simulation for transient behavior studies
- ◆ Flow Sheet development with Heat and Material balances
- ◆ Preparation of PFD and P&ID
- ◆ Specifications for Process Equipment and Instruments
- ◆ Line Sizing, Equipment Sizing
- ◆ Basic Engineering Package for Process Units, Utilities
- ◆ Conceptual Top-side Layout
- ◆ Process Control Philosophy
- ◆ Process Shutdown Philosophy (Normal & Emergency)
- ◆ Cause and Effect Diagram
- ◆ HAZOP Studies
- ◆ Flare network analysis (Tool: FLARENET)
- ◆ Hydraulic calculation (Tool: PIPENET)
- ◆ Heat Exchanger design (Tool: HTRI)
- ◆ Blow down study (Tool: HYSYS Depressurization)

### **Process Safety**

- ◆ Risk:
  - Qualitative Risk Assessments
  - Quantitative Risk Assessments
  - Risk/Opportunity Workshop Facilitation
  - Functional Safety Assessments
  - Technical Integrity management
  - Process Safety Management
  - ALARP Demonstration
- ◆ Technical Safety:
  - Safety Cases
  - Emergency Response Planning
  - HAZID/HAZOP Facilitation
  - Layout Reviews
  - Safety Critical Elements
- ◆ Identification
  - Fire Safety Studies
  - Reliability/Availability Modeling
  - Major Hazard Areas



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



### **LNG Plants Design and Engineering:**

- ◆ Process Design and Equipment Selection based on Project Requirements
- ◆ General Arrangement and Equipment Layout
- ◆ Structural Design – Offshore – Jack-up Rig / Platform or Land
- ◆ Detailed Engineering and Equipment Procurement
- ◆ Project Management & Commissioning

### **P2X Projects: Green Hydrogen, E-Methanol, Green Ammonia:**

- ◆ Coordination with Renewable Energy Providers & Project Sizing based on Power Profile
- ◆ Green Hydrogen – Electrolyzer Selection and BOP Equipment Design
- ◆ Technology Licensor Selection for Methanol, Ammonia and other uses
- ◆ General Arrangement and Equipment Layout
- ◆ Detailed Engineering and Equipment procurement
- ◆ Project Management & Commissioning

### **General Arrangement and Layout Studies; including but not limited to:**

- ◆ General Arrangement and Equipment Layout
- ◆ Fire Safety and Prevention Plan
- ◆ Escape Routes and Hazardous Area Plan
- ◆ Watertight Integrity and Structural Fire Protection Plan
- ◆ Crane Radius and Material Handling Studies
- ◆ Detailed Layout for Overall Topsides / Process Plant
- ◆ 3D MODELING (Tools: E3D / SP3D)
- ◆ Equipment Layout Drawings
- ◆ Piping Materials
- ◆ Specifications
- ◆ Specifications for Specialty Items
- ◆ Piping General Arrangement
- ◆ Piping Isometrics
- ◆ Pipe Stress Analysis (CAESAR II)
- ◆ Pipe Support Design
- ◆ Material Take Off

### **Software Enabled Services**

- ◆ Asset Integrity Management Solution for Fixed and Floating Structures including Commercial and Military Ships.(**ZAIMS** \*)
- ◆ Vessel Management Solutions (**ZAIMS** for Vessels)



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- ◆ Load and Stability Management (LoJack, LoSemi, LoShip)
- ◆ Weight Management Solutions (WMS)
- ◆ Mooring Advisory Software (ZenMas/ ZenMap)
- ◆ Mooring Analysis Software (ZenMoor)
- ◆ 3-D Crack Propagation Prediction (ZenCrack)
- ◆ Wave Radiation Diffraction Program for Floating Bodies (Neptune)
- ◆ Zentech Watch Circle Program for Drillships- Mathematical Modelling ( Z-Watch Circle)

\* All vessels using Zentech Patented **ZAIMS** Service automatically qualify for SHM Tier 2 notation on their vessels

### **New Build Vessel Designs**

- ◆ Jack-ups - Drilling (R-550-D)
- ◆ Jack-ups – Liftboats / Multipurpose Service Vessels (MPSVs) (Z-210)
- ◆ Jack-ups – Specialized design for LNG Facility
- ◆ Jack-ups - Semi Hybrids for Polar Waters
- ◆ Jack-ups - Multipurpose service vessels for disassembly, transport and reassembly for areas such as Caspian Sea (Z-210 – CS)
- ◆ Jack-ups - vessels for Wind Farm Installation
- ◆ Semisubmersibles (Eva-Plus)
- ◆ Self-Erecting Platform Rigs
- ◆ Swath vessels for Wind Farm Maintenance
- ◆ Vessels for Gathering Plastics in the Ocean
- ◆ Offshore Liquid Mud Plant Vessel (LMPV)
- ◆ Anchor Handling Tug Supply (AHTS) vessel

Note: All vessels using Zentech Patented **ZAIMS** Service automatically qualify for SHM Tier 2 notation on their vessels

### **Specialty Services - SIGNAGE**

- ◆ Signage surveys with detailed GAP ANALYSIS
- ◆ All signs can be customized as per the client's requirement
- ◆ Shall be installed with our rope access team - faster and cost effective (can avoid scaffolding)
  - International safety-Mandatory, Prohibition and warning signs
  - Valve and equipment tags
  - IMO signs – Life saving and fire fighting
  - Pipe markings color coded for Oil/Water/Brine/Etc.
  - Operational Boards



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- Right to know signs
- Other specific customer needs
- ◆ Multilingual Signage for wide temperature range, -40F to 250F
- ◆ 5 Year Replacement Warranty on Signage

### **Specialty Equipment**

- ◆ Locking Device for Jack up Legs (Zen-Lock)
- ◆ Catching Dropped Objects (Zee-Sock)
- ◆ Jetting System
- ◆ Load Monitoring Devices for Offshore Jackups and Fixed Platforms

### **ZXR: Virtual Capture Modeling**

- ◆ ZXR–Marketing (ZXR-M)
  - Detailed Photo Realistic Walk-Thru with 3D model
  - “Tagging,” or notations of, areas with media attachments (PDF, JPG, Video, Sound, or any type of media)
  - Facilitate exploring onboard
  - Eliminate traveling to offshore assets
  - Cross-collaboration with Clients
  - Photorealistic - HD Quality; “Final Product” Marketability
- ◆ ZXR–Engineering (ZXR-E)
  - Point Cloud Data: A set of data points in space. Each point has its set of (X,Y,Z) coordinates
  - Data capture (even in no lighting environments) within +/- 1-2mm accuracy
  - Ability to accurately create, modify, or compare 2D drawings and 3D
  - Maximizes integration to review onboard state with design and engineering teams by exploring spaces in a 360 environment from their own computers
- ◆ ZXR–Inspection (ZXR-I)
  - STOP THE NEED OF PERSONNEL ENTERING TANKS FOR INSPECTIONS – saving time, money, and reducing risk of personnel
  - Collaborative viewing
  - Improved Structural Integrity thru higher quality inspection planning
  - Data capture (even in no lighting environments) with onboard lighting system
  - 3D Modeling with onboard LIDAR
  - UTI Thickness Gauging with onboard Module
  - Flammable Gas Monitor onboard
  - Intrinsically Safe for Zone(s) 1 & 2
- ◆ ZXR–Rover Inspection (ZXR-ROV)
  - Underwater inspection of legs and hulls at a depth of up to 1000m
  - Advanced SONAR modeling capable



14800 Saint Mary's Lane, Suite 270  
Houston, Texas 77079, USA  
P: (281) 558-0290 / F: (281) 558-0295  
[www.zentech-usa.com](http://www.zentech-usa.com)  
[zentech@zentech-usa.com](mailto:zentech@zentech-usa.com)



- UWILD, Sea Chest, Ballast Tank, Mooring/Riser Inspections and Drill Monitoring

### **Green House Gas (GHG) Services**

- ◆ Carbon Footprint Accounting System (Z02), as per EPA and GHG Protocol
- ◆ Assessment and improvement of energy systems for carbon reduction
- ◆ Carbon footprint and lifecycle assessments (LCA)
- ◆ Green Hydrogen /Methanol: EPIC of Modular Plants. (In partnership with Splitwaters)

### **Preventive & Predictive Maintenance Services (PMS)**

#### **◆ Vibration Monitoring and noise Analysis**

- **Predictability:** Enables maintenance staff to schedule repairs and procure necessary parts in advance.
- **Safety:** identifies and rectifies faults; thus, preventing potential hazards.
- **Preserve the Equipment:** By minimizing unexpected failures, vibration monitoring helps in avoiding production halts.
- **Optimize Maintenance:** Extends the lifespan of equipment and aligns maintenance schedules more closely with actual needs.
- **Reliability:** Anticipates problems before they occur, enhancing the overall reliability of machinery and instilling confidence in maintenance schedules and budgeting.

#### **◆ Thermography**

- Condition assessment of equipment
- Early detection of defects and predicting breakdowns and their severity
- Life extension of equipment
- Customized PMS development
- Conducting live surveys and hence no production losses

#### **◆ EX Survey**

- Conduct a review of the facility and provide condition of asset
- Gap Analysis
- Hazardous Area inspection and verification to check the products in Hazardous Area for compliance with the requirements directives and Hazardous Zone
- Technical Support, EX Design, Drawings, Check List, Manuals and Risk Assessment
- Documentation: Inspection Report, EX Register, and Certificate Verification