

RHIZOMENERGY

DELIVERING SOLUTIONS



RHIZOME ENERGY LIMITED

WE AIM TO PROVIDE A RANGE OF MULTI-DISCIPLINARY SERVICES FROM
ENGINEERING CONSULTANCY TO CONSTRUCTION SUPPORT.

ABOUT US

RHIZOME ENERGY LIMITED IS AN ENGINEERING CONSULTANCY COMPANY BASED IN UK. TOGETHER THE COMPANY DIRECTORS HAVE MORE THAN FORTY SEVEN YEARS OF EXPERIENCE IN OIL & GAS, MARINE AND ENERGY INDUSTRIES.

RHIZOME ENERGY'S ENGINEERS & ASSOCIATES COME FROM RANGE OF BACKGROUNDS & DISCIPLINES AND ARE HIGHLY EXPERIENCED, WHICH THEN GIVES THE ABILITY TO HANDLE MULTI-DISCIPLINARY PROJECTS.

OUR COMPANY UNDERSTANDS THE TRANSITION IN THE ENERGY INDUSTRY AND ENVIRONMENTAL EFFORTS. HENCE, WE HAVE ALL RESOURCES TO MEET THE ENGINEERING DEMAND WITHIN THE RENEWABLES, HYDROGEN PRODUCTION, AND CARBON CAPTURE TECHNOLOGY.

SECTORS

GREEN ENERGY

NUCLEAR

POWER

OIL & GAS

MARINE

SERVICES

⇒ CONSULTANCY

- EXPERT TECHNICAL ADVICE.
- SUPPORT TO DEFINE PROJECT BASIS OF DESIGN.
- SOLUTION TO EXISTING TECHNICAL PROBLEMS.
- SUBJECT MATTER EXPERT (SME)

⇒ CONCEPT & DETAIL DESIGN

- FRONT END ENGINEERING & DESIGN (FEED).
- DETAILED DESIGN.
- CLIENT APPROVAL.
- CLASS APPROVAL.
- READY FOR CONSTRUCTION.

⇒ THIRD PARTY REVIEW

- DETAILED TECHNICAL REVIEW.
- CO-ORDINATION OF TECHNICAL COMMENTS.
- ENSURING SATISFACTORY FINAL DOCUMENTATION.

⇒ CONSTRUCTION SUPPORT

- DEFINE SUITABLE FABRICATOR YARDS.
- REQUEST OF QUOTATION TO AGREED FABRICATORS.
- TECHNICAL & COMMERCIAL REVIEW OF BIDS.
- KICK OFF MEETINGS.
- CONSTRUCTION REPRESENTATION.
- SITE QUALITY & HSE CONTROL.
- SITE TESTING & COMMISSIONING.

⇒ Procurement Support

- DEFINE SUITABLE VENDORS.
- REQUEST OF QUOTATION TO AGREED VENDORS.
- TECHNICAL & COMMERCIAL REVIEW OF BIDS.
- KICK OFF MEETINGS.
- DESK EXPEDITING
- PACKAGE DOCUMENTATION REVIEW.
- INSPECTION TEST PLAN MANAGEMENT.
- FACTORY ACCEPTANCE TESTING WITNESS.
- DELIVERY AS PER CONTRACT SPECIFICATION.

⇒ Expert Witness

- INDEPENDENT REVIEW OF DISPUTE.
- REVIEW OF EVIDENCE.
- EXPERT REVIEW UNBIASED FULL REPORT.
- RESOLUTION OF DISPUTE.

ENGINEERING DISCIPLINES

PIPING & PROCESS

COMPLETE PROCESS & PIPING DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- PROCESS FLUID CALCULATIONS.
- PRESSURE DROP & CFD ANALYSIS.
- SURGE ANALYSIS.
- PIPE SIZING.
- WALL THICKNESS CALCULATIONS.
- VALVE DATASHEETS.
- PIPING & VALVE SPECIFICATIONS.
- P&IDs, GENERAL ARRANGEMENTS.
- PIPING DESIGN DRAWINGS, PIPING ISOMETRICS & MATERIAL TAKE OFFS.
- PIPE STRESS ANALYSIS (STATIC & DYNAMIC ANALYSIS).
- 3D MODELLING USING SOFTWARE SUCH AS PDMS & AUTOCAD 3D.

MECHANICAL

COMPLETE MECHANICAL DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- DESIGN SPECIFICATION FOR EQUIPMENT SUCH AS SWIVEL STACK ASSEMBLY, HYDRAULIC POWER UNITS, WINCHES, AIR COMPRESSORS, ROLLER & PLAIN BEARINGS, PUMPS ETC.
- BEARING LOAD CALCULATIONS.
- BOLTING CALCULATIONS.
- CATHODIC PROTECTION DESIGN – OFFSHORE APPLICATION.
- PRESSURE VESSEL DESIGN (ASME SECTION VIII / PD5500).
- STORAGE TANK DESIGN (API 650).
- PIGGING FACILITY DESIGN (C/W PIG RECEIVER & LAUNCHER DESIGN) SUITABLE FOR ALL TYPES OF PIGS INCLUDING INTELLIGENT PIGGING.
- DETAILED MAINTENANCE MANUALS

STRUCTURAL

STRUCTURAL DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- **STRUCTURAL DESIGN CALCULATIONS, INCLUDING USE OF SOFTWARE TOOLS SUCH AS STAAD, ANSYS ETC.**
- **DRAWINGS UP TO RELEASED FOR CONSTRUCTION.**
- **DETAILED FABRICATION DRAWINGS.**
- **BILL OF MATERIALS (BOM).**

NAVAL ARCHITECT

NAVAL ARCHITECT DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- **MOORING DESIGN CALCULATIONS USING ARIANE, ORCAFLEX ETC.**
- **MOORING SPECIFICATION.**
- **MOORING LIFE EXTENSION STUDY**
- **RISER ANALYSIS**
- **CLASHING ANALYSIS**
- **SELECTION OF MOORING COMPONENTS (CHAIN, WIRE, SHACKLES, ETC.)**



ELECTRICAL & INSTRUMENTATION

ELECTRICAL & INSTRUMENTATION DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- **ELECTRICAL SINGLE LINE DIAGRAMS AND SCHEMATICS.**
- **INSTRUMENTATION SINGLE LINE DIAGRAMS AND SCHEMATICS.**
- **ELECTRICAL LOAD CALCULATIONS.**
- **INSTRUMENT DATASHEETS.**
- **EQUIPMENT DATASHEETS.**
- **SPECIFICATIONS FOR EQUIPMENT, CABLES ETC.**
- **TERMINATION DRAWINGS.**
- **DETAILED MAINTENANCE MANUALS.**



SAFETY

SAFETY DESIGN, INCLUDING BUT NOT LIMITED TO BELOW :

- **DELUGE – FIRE WATER CALCULATIONS.**
- **DELUGE – FIRE WATER EQUIPMENT SPECIFICATION.**
- **DELUGE – PIPING SPECIFICATIONS.**
- **DELUGE – PIPING ISOMETRICS.**
- **HAZARDOUS AREA DRAWINGS AS PER API CODES (SUCH AS API 505, IP15 ETC.)**
- **ESCAPE ROUTES.**
- **F&G LAYOUTS**
- **F&G DETECTOR SPECIFICATIONS & DATASHEETS.**
- **HAZOP & HAZID REPRESENTATIONS.**

REFERENCES

OFFSHORE

REFERENCES ARE PROVIDED AS PER THE EXPERIENCE OF THE COMPANY, IT'S STAFF MEMBERS AND ASSOCIATES OF THE COMPANY. REFERENCE FOR OTHER SECTORS & DISCIPLINES CAN BE PROVIDED ON REQUEST.

S.No	PROJECT	END CLIENT	SCOPE	YEAR
1	NAM DU U MINH FPSO PRE—ENGINEERING	HBA OFFSHORE	PRE-ENGINEERING DELIVERABLES FOR NAM DU U MINH FPSO	2020
2	FPSO LIFE EXTENSION STUDY	QUEST GLOBAL	LIFE EXTENSION STUDY—EXPERT CONSULTATION	2019
3	INDEPENDENT REVIEW—SWIVEL COMPATIBILITY	HBA OFFSHORE	REVIEW OF A STOCK SWIVEL, ENSURING COMPATIBILITY TO PROJECT	2019
4	FSO GOLDEN STAR	LMC/ IDEMITSU	THIRD PARTY REVIEW ASSISTANCE	2019
5	CALM BUOY AND PLEM	CONFIDENTIAL	BUOY & PLEM - PIPING DESIGN AND PLEM — STRUCTURAL	2019
6	OSX-1 FPSO	FPSO INVEST	SWIVEL & TURRET INSPECTION	2019
7	KARISH & TANIN FIELD DEVELOPMENT PROJECT	ENERGEAN OIL & GAS	PIPE STRESS ANALYSIS	2019
8	GREATER ENFIELD DEVELOPMENT - FPSO	WOODSIDE	FPSO - TURRET TECHNICAL AUTHORITY	2019
9	AL SHAHEEN	QATAR PETROLEUM	STRUCTURAL ANALYSIS	2019
10	ESCRAVOS EXPORT SYSTEM SPM	CHEVRON	PIPING & PROCESS DESIGN AND PACKAGE MANAGEMENT	2019
11	HELANG FPSO	YINSON	VARIOUS STRUCTURAL FE ANALYSIS	2018
12	RU VI BALONGAN SPM SYSTEM	PERTAMINA	PIPING & PROCESS DESIGN AND PACKAGE MANAGEMENT	2018
13	LAYANG FPSO	THHE - MALAYSIA	TURRET MOORING SYSTEM - TECHNICAL AUTHORITY	2016
14	COLD ENVIORNMENT CALM BUOY	STEP CHANGE ENGINEERING	NEW CALM BUOY SPECIFICATION	2016
15	KRAKEN FPSO	BUMI ARMADA - UK	TURRET MOORING SYSTEM - TECHNICAL AUTHORITY	2015
16	GENERIC	LMC - UK	TURRET STRUCTURAL ANALYSIS	2015
17	GENERIC	EMAS OFFSHORE	FE ANALYSIS OF VESSEL AND MOORING SYSTEM	2015
18	GENERIC	LMC - UK	TURRET SOLID MODELING AND MESHING	2015
19	CATCHER FPSO	PREMIER OIL - UK	TURRET MOORING SYSTEM - TECHNICAL AUTHORITY	2014
20	FSO SUSKAN	TEEKAY - THAILAND	TURRET PIPING DESIGN	2014
21	FSO BELIDA	CONOCOPHILLIPS - INDONESIA	TURRET PIPING DESIGN	2014
22	FSO GAZA	MOOG-LYBYA	TURRET PIPING DESIGN	2013

REFERENCES (CONTINUED.)

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23	PETRONAS FLNG 2 FEED STUDY	SAMSUNG HEAVY INDUSTRIES - KOREA	TURRET PIPING DESIGN	2013
24	SMART MOORING SYSTEM	SIGMA OFFSHORE - ABERDEEN	NEW MOORING SYSTEM CONCEPT DESIGN	2013
25	LEWEK EMAS FPSO - DUA FIELD ADDITION	EMAS - SINGAPORE	TURRET PIPING & MECHANICAL	2012
26	PERISAI KAMELIA	EMAS - SINGAPORE	TURRET PIPING, MECHANICAL & STRUCTURAL	2012
27	LEWEK EMAS FPSO	EMAS - SINGAPORE	TURRET PIPING & SWIVEL DESIGN	2011
28	CHEVRON CAPTAIN FPSO	CHEVRON	FAIRLEAD STRUCTURAL ANALYSIS	2010
29	FSO RATU SONGKHLA	M3NERGY - MALAYSIA	TURRET MOORING SYSTEM - PROJECT MANAGMENT	2008-2009
30	LIVORNO FSRU	SAIPEM - ITALY	TURRET MOORING SYSTEM - PROJECT MANAGMENT	2008
31	AQUILA FPSO	SAIPEM - ITALY	TURRET MOORING SYSTEM - PROJECT MANAGMENT	2008
32	FSO5	MONOBUOY - MONACO	TURRET MOORING SYSTEM - PROJECT MANAGMENT	2008
33	FSO CENDOR	MISC	PROJECT MANAGEMENT	2006
34	AOKA MIZU	BLUEWATER - NETHERLANDS	TURRET PIPING DESIGN	2005
35	SOOROSH FSU	NIOC - IRAN	TURRET PIPING & SWIVEL DESIGN	2000
36	CAKERAWALA FSO	SAIPEM - ITALY	TURRET PIPING & SWIVEL DESIGN	2000
37	GLAS DOWR FPSO	PETRO SA - SOUTH AFRICA	TURRET AND TOPSIDES UPGRADE	1999
38	JOTUN FPSO	EXXONMOBIL - NORWAY	TURRET PIPING DESIGN	1997
39	GLAS DOWR FPSO	BLUEWATER - NETHERLANDS	TURRET PIPING DESIGN	1996
40	CALM BUOYS	BLUEWATER - NETHERLANDS	PLEM & BUOY PIPING DESIGN	1997-2004

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1	LIQUID KNOCK OUT VESSEL SKIDS	ENG-CAD	DESIGN CLACULATIONS AND REPORTS FOR LIQUID KNOCK OUT VESSEL SKIDS	2020
2	STRUCTURAL FRAME	ENG-CAD	STRUCTURAL CALCULATIONS	2020
3	SARIR GAS UTILIZATION PROJECT J-22	ARABIAN GULF OIL COMPANY	PIPE STRESS ANALYSIS	2019
4	GENERIC	BRITISH SUGAR	BRANCH WELDOLET STRENGTH CALCULATION	2019
5	GENERIC	ENG-CAD	PRESSURE VESSEL DESIGN CALCULATION	2019
6	GENERIC	ANGLIAN WATER	BIO-GAS DIGESTER TANK CFD ANALYSIS	2019
7	GENERIC	ENG-CAD	CRANE BASE FOUNDATION DESIGN	2019
8	CHELMSFORD ADVANCED DIGESTION	ANGLIAN WATER	PRESSURE DROP CALCULATION	2019
9	OXY FAR WEST	OCCIDENTAL - OMAN	PIPING DESIGN	2017
10	TANAP	TRANS ANATONIAN - TURKEY	PIPELINE DESIGN	2017
11	BG TIE-IN & GAS COMPRESSION	BRITISH GAS - UK	PIPING DESIGN	2010
12	SELLAFIELD - FELLSIDE BOILER PROJECT	PX-GROUP-UK	PIPING DESIGN	2010
13	EXXONMOBIL CHEMICAL PROJECT (PETROCHEMICAL)	EXXONMOBIL - SINGAPORE	PIPING DESIGN	2008
14	HYDROTREATER PROJECT	BP REFINERY - ROTTERDAM	BUILT-IN MODULES - EXTENSION PROJECT	2007 - 2009
15	HYDROFINER PROJECT	BP REFINERY - ROTTERDAM	VARIOUS PLANT MODIFICATIONS & EXTENSIONS	2007 - 2009
16	EXPORT REFINERY PROJECT	RELIANCE JAMNAGAR - INDIA	PIPING DESIGN	2006
17	LNG REGASIFICATION TERMINAL	ENERGIA - MAXICO	PIPING DESIGN	2006
18	KASHAGHAN REFINERY PROJECT	AGIP KCO - KAZAKHSTAN	PIPING DESIGN	2005
19	SULFUR RECOVERY UNIT-6	BP - GRANEMOUTH - UK	PIPING DESIGN	2005
20	MSQ UP-GRADATION - REFINERY	INDIAN OIL - MATHURA, INDIA	PIPING DESIGN	2000
21	WYTCH FARM	BP - UK	DESIGN OF BEAM PUMP INSTALLATION	1992
22	HARWICH REFINERY	CARLESS-REFINING UK	SURVEY & DRAFTING AS-BUILT P&ID's	1993
23	BACTON GAS TERMINAL	AMOCO, SHELL, PHILLIPS - UK	VARIOUS PLANT MODIFICATIONS & EXTENSIONS	1988-1995

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