

# Services for the oil and gas industries

OIL AND GAS  
SERVICES



The Lloyd's Register Group offers a diverse portfolio of engineering support services and products to the upstream and downstream oil and gas markets throughout the world.

With oil and gas expertise available worldwide, we are in an excellent position to meet local market demands.

## About us

Our collaborative style of working with clients and our clear understanding of individual clients needs enables us to achieve cost effective, solutions driven results at both a strategic and operational level of business. Our drive to develop long-term relationships with our clients provides the results they need to complete projects successfully.

## Service Delivery

The Lloyd's Register Group has an intimate knowledge and experience of oil and gas projects (over 1,000 installations) that support the total life of assets, from design through to decommissioning. We focus on improving the business performance of our clients by providing innovative solutions – both technically and through our drive to establish increasingly close and collaborative client relationships.

## Our services

The services we offer to the oil and gas industry can be grouped into the following broad categories:

- compliance services
- integrity services
- specialist consultancy services.

## Compliance services

We are recognised as a world leader in the provision of compliance services to the oil and gas industry. These services provide evidence of conformity with: regulatory requirements (certification); Lloyd's Register's Rules (classification); and duty holder's schemes (verification).



Our services include design appraisal, survey at manufacturers' sites, witnessing installations and commissioning. It may involve the following aspects:

- project quality system appraisal
- project quality management
- criticality-based verification
- certification to recognised codes
- co-ordinated in-house support services
- risk-based, as well as rule based classification
- audits.

Risk based classification gives the owner an alternative route to achieving class from the traditional prescriptive approach.

### **Integrity services**

The drive to improve safety and environmental performance, technical integrity, business risk and profitability has resulted in the need for a risk based approach to managing these issues.

### **Services geared to performance**

The Lloyd's Register Group offers integrity services designed and implemented in a systematic and managed way to improve the operating performance of assets. The aims of the services include:

- reduced number of system and equipment failures
- improved management confidence about future performance

- improved availability of systems and equipment
- systematic and auditable way of managing integrity system support by modern database tools.

We tailor the services to the current need whether this is a problem with specific equipment or a solution involving the development and implementation of an integrity management system.

### **Flexibility and appropriate solutions**

Our systematic approach is used on a wide variety of assets, including fixed and mobile installations, FPSOs, pipelines, storage and processing facilities.

The range of services extends to providing:

- integrity management strategies and risk based planning
- provision of management system documentation and procedures
- evaluation and selection of inspection and maintenance techniques
- upgrading information and data management systems
- provision of consultancy and integrity specialists.

### **Integrity – be safe and profitable**

From a baseline inspection, or setting up a new development to understanding the integrity status of ageing assets, systems and equipment, we can offer a solution that is appropriate and directs your investment towards a safe and profitable outcome.

### **Specialised consultancy services**

We offer a comprehensive range of specialist services to support clients in the cost effective design and operation of their assets. These services, which include design appraisal, integrity assessment and specialised consultancy, cover the following:

- pipeline engineering
- fixed and floating structures engineering
- corrosion engineering
- environmental engineering
- materials and NDE technology
- electrical and control engineering
- process plant and machinery engineering
- safety technology
- management systems.

### *Pipeline engineering*

We have substantial expertise in design and operational aspects of subsea and land pipelines. For subsea lines this expertise includes high temperature service conditions, pipe in pipe systems, reeled systems, deepwater, flexible pipe and riser systems. Stability, upheaval, spanning and strain based assessments are undertaken; reliability and limit state methods are often employed.

State of the art non-linear finite element software is used to undertake advanced analysis for lateral and upheaval buckling, riser dynamics, and fitness for purpose assessments on existing lines. Database and risk assessment methods are used to establish operational inspection strategies.

### *Fixed and floating structures technology*

This service is delivered by specialists in structural and civil engineering, geotechnical engineering and naval architecture, with expertise in fixed and floating structures constructed of either steel or concrete. Structural types include steel jackets, jack-up platforms, concrete gravity based platforms, FPSO's, tension leg platforms, semi-submersibles, barges, spars, and buoys.

For fixed structures, independent linear analyses are undertaken to certify/verify new structures while non-linear pushover analyses are used for assessing the residual strength of damaged structures. Guidance on inspection planning is also provided using the results from pushover analyses. For floating units, hydrodynamic modelling and motion response analyses are carried out with the results fed into finite element models to determine hull stresses and fatigue life. Fracture mechanics techniques are employed for fitness for purpose studies of weld defects.

### *Corrosion engineering*

Through early identification of excessive corrosion damage and implementation of corrosion control activities, corrosion engineering helps reduce costs by avoiding capital expenditure associated with frequent equipment replacement or repairs. Operating (OPEX) costs associated with inspection and corrosion monitoring activities are minimised through the use of focused, risk based inspection routines. Optimisation of chemical injection programmes has also resulted in OPEX reductions through minimisation of chemical usage and the avoidance of loss of revenue associated with unplanned plant shutdown, or



avoidance/minimisation of inspection driven shutdowns.

### *Environmental engineering*

Our environmental engineering capabilities range from small studies undertaken to provide specific cost-effective solutions for environmental control through to comprehensive packages. These include the provision of environmental impact assessment, development of associated environmental management systems, environmental awareness training packages and assessment of through-life performance.

### *Materials and NDT Technology*

Our materials and non-destructive examination (NDE) specialists include metallurgists, welding engineers and corrosion engineers who offer a wide range of inspection, failure investigation and advisory services to the oil and gas industry.

We provide advice on the selection and use of metallic and non-metallic materials and also undertake work in the field of fracture mechanics and fatigue.

Our NDE specialists have a wide range of practical and theoretical knowledge in all aspects of this field. Assistance and advice can be provided in all methods of NDE such as radiography, ultrasonic, liquid penetrant testing, magnetic particle inspection and eddy current testing.



### **Electrical and instrumentation**

Electrical and instrumentation engineering comprises a team of specialist engineers offering services in the following:

- power protection studies
- computer modelling of electrical machines, generators and induction motors
- power electronics, control and drives
- electrical protection settings
- harmonic studies
- IPSA power system studies software package
- DAPPER short-circuit analysis program
- ISIM motor starting analysis program.

### **Process plant and machinery engineering**

Process plant and machinery engineering provides a range of analytical services tailored primarily to the special needs of the oil and gas industry including the following:

- process and marine piping and pressure vessel design appraisal
- fire test certification of valves and fittings
- well control equipment
- pipe stress & finite element analysis (static and dynamic)
- mechanical transmissions assessment (gas turbines & compressors, I.C. engines, pumps, etc)
- rotor dynamic (lateral vibration) and torsional vibration analysis
- marine machinery assessment (steering gear, propellers, stern-tubes, etc)
- machinery foundations and alignment assessment.

### **Safety technology**

Safety technology provides a wide range of safety engineering and risk management services to the oil and gas industry, utilising a comprehensive range of tools for consequence modelling and risk analysis. These capabilities enable safety technology to offer a through-life service to clients based on development of the case for safety, providing added value solutions in all areas of business risk.

### **Management systems**

The safe and efficient use of equipment requires management systems that are based on a thorough understanding of the processes being fulfilled and the risks which threaten their successful operation. LR offers experts in management systems who have a sound understanding of the technology including its design and operation. They are able to provide solutions to management systems problems which can address specific issues or which offers a holistic approach. The management systems our experts can address include:

- operational
- safety
- environmental
- health and safety, and
- integrated management systems.

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