



Engineering and Design Services

SERVICE PROVIDED

Among the services we provide:

- Structural and Mechanical Design
- Finite Element Analysis
- Design Verification
- Fatigue and Design Life Review
- 3D Design and Modelling
- 2D / 3D Drafting Services
- Lifting Operation Plans (LOLER)
- Feasibility Studies
- Offshore Surveys
- On-Site Engineering Services
- Deck Strength Assessment
- On-Demand Engineering Resources

We use the following engineering and design software in-house:

- Autocad
- Autodesk Inventor
- Staad.Pro
- FS2000
- Mathcad

We have significant experience in the engineering of offshore structural steelwork for both fixed and mobile offshore units and have applied our knowhow to the following:

- Crane Booms and Boom Rests
- Drilling Structure New-Builds and Upgrades
- Additional Living Quarters
- Brownfield Development
- HVAC Support Steelwork
- Lifting Appliances

EXPERIENCE AND EXPERTISE

Since establishing in 2011, we have continually developed and expanded our expertise while providing our tailored engineering, design and support services to an increasingly diverse customer base in the following areas:

- Drilling Facilities
- Offshore Cranes
- Top Side Structural Steelwork
- Cargo Handling Equipment
- Subsea Installations

Our professional engineers draw on knowhow and experience gained through an extensive range of project work in the Oil & Gas sector spanning more than 30 years combined.

We have comprehensive understanding of codes and standards from the following organisations and institutions:



GENERAL SUPPORT

Nodal provide fast response engineering support to our customers to complement and enhance their existing offshore capabilities.

Whether refurbishment, modification, installation or inspection, we provide our expertise as and when necessary to minimise offshore crew downtime and to ensure offshore activities are undertaken safely, efficiently and within applicable codes and standards.

We provide assistance with:

- Rigging
- Lifting Eyes & Tugging Point Verification
- Deck Capacity Assessment
(for unusual/one-off equipment manoeuvres)
- Equipment Supports
- Temporary Bracing & Support Design

Any other areas where engineering involvement is required to ensure operations are performed safely and within time and cost constraints, Nodal are available for consultation. No project is too small.

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Lifting appliances



LIFTING EQUIPMENT SERVICES

Where specialist, non-standard lifting equipment is necessary to conduct a lifting operation in a controlled, safe and efficient manner, Nodal have the engineering experience, technical know-how and proven track record to provide the right solution. We work closely with our customers to discuss requirements, offer our own input, and establish design criteria before moving on to the design, verification, third party approval and supply the following types of equipment:

- Runway Beams
- Bespoke Lifting Equipment
- BOP Handling Equipment
- Loose Gear (Link Plates, Spreaders, Clamps etc)

We work with DNV GL (DNV 2.22 "Lifting Appliances"), Lloyd's ("Lloyd's Code for Lifting Appliances in a Marine Environment") and other industry recognised codes and standards to ensure the final product is fully compliant with current regulations and safe for use.

Nodal lifting equipment can offer the following benefits:

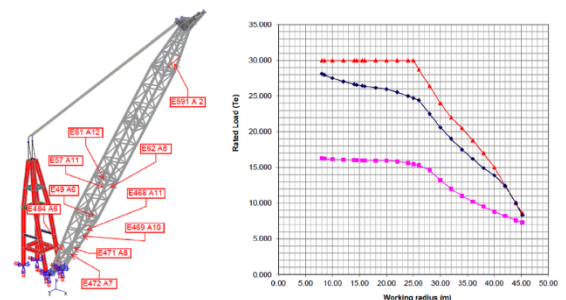
- Safer lifting operations
- More efficient lifting operations
- Reduced labour costs due to simpler lifting operations
- Save time offshore
- Bespoke designs to suit unique requirements

The investment in Nodal bespoke lifting equipment upfront can pay dividends offshore in terms of time and labour costs saved, not to forget the benefits of added safety to personnel involved in lifting operations.

CRANE SUPPORT SERVICES

Cranes are an essential component in the day to day safe handling of heavy equipment aboard offshore installations and vessels. Crane operational capabilities can be limited by various factors including ageing, original design specification, and mounting location.

Nodal provide detailed engineering reviews including abnormal weight crane analyses for one-off lifts, damaged crane boom capacity assessment and fatigue life assessment of crane structures.



CRANE AUXILIARY EQUIPMENT DESIGN

Nodal also specialise in the design of auxiliary equipment to support, enhance or facilitate unusual and unique crane lifting operations, where an existing crane would otherwise not be suitable for the task in hand.

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Drilling structures



ANALYSIS & VERIFICATION

We specialise in the analysis of onshore and offshore drilling structures to **API Specification 4F** and associated standards for the purpose of new build, remedial or upgrading the capacity of existing rigs.

Our clients are provided with a comprehensive engineering verification report including:

- Rated Capacity
- Load Graphs
- Footing Loads
- Structural Stresses
- Structural Deflections
- Bolted and Welded Connections Verification

Our engineers shall provide a detailed list of recommendations for any modifications necessary to ensure the structure can operate safely within required operational and environmental parameters, and class and regulatory requirements.

The services we provide include:

Structural Design & Analysis
Connections Design & Verification
Modifications Design & Verification
On-site Engineering Consultancy
Mast Raising Analysis
Mast Guying Review (**API 4G**)
Mast Stability Review
Damaged Rig Capacity Review

RIG COMPONENTS

Operational requirements and regulations change over time and existing rig equipment may not have current documentation or certification in place to verify its capacity.

Nodal provide independent structural design and verification of rig components to **API 8C** and associated standards including, but not limited to the following:

- Crown Components
- Mast Raising Components
- Racking Boards
- Rod Boards
- Guide Rails
- Pipe Racking Equipment Supports
- Wind Walls
- Hang-off Padeyes

GUYED LAND RIG CONVERSIONS

Time, operational or cost constraints can lead to the use of guyed land rigs in areas unsuitable for an adequate guying pattern. This invariably results in higher risk to drilling crews and equipment, and the potential for significant downtime in the event of a mast twisting or collapsing.

Nodal provide the experience and capability to conduct a thorough review of rig stability for given locations and provide bespoke engineering solutions to permit the safe use of guyed land rigs as freestanding structures.

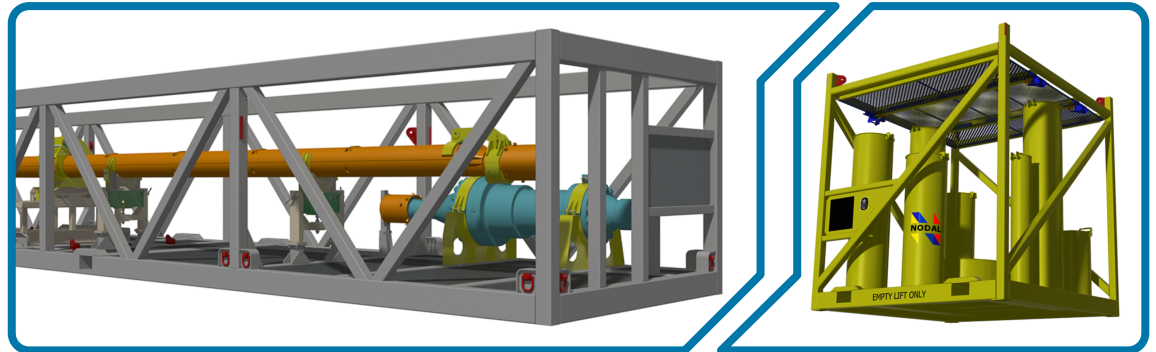
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Offshore cargo solutions



DESIGN & ENGINEERING SERVICES

Our customers require to ship valuable and sensitive tools and equipment for installation or use offshore. Handling and shipping, especially in what can be an extremely hostile offshore environment, can place onerous and unpredictable loads on equipment which they may not have been designed to withstand. In some cases traditional offshore containers will not offer sufficient capacity or adequate protection, stability or restraint to ensure safe and undamaged arrival at their destination.

Nodal designed offshore freight containers and cargo baskets are bespoke engineered to suit specific cargo requirements and certified in accordance with **DNV GL 2.7-1** (for gross weights up to 25,000 kg) or **2.7-3** (for portable offshore units).

These containers do not require spreaders, and can be lifted anywhere worldwide by any crane with sufficient capacity and are suitable for repeated use.

Liaising directly with DNV GL or Lloyd's and the client or end user, we guarantee we will achieve the appropriate certification and a finished design which meets client requirements for safety, functionality and ease of use.

Our tailored equipment shipping baskets provide the necessary protection during transit to extremely valuable and sensitive components ensuring they will be delivered to their destination ready for use.

All baskets are designed with safety, useability and functionality as a priority. All necessary clamps, rollers, tugging points and supports necessary to provide ease of use, sound support and restraint for the most onerous transit and operational conditions shall be provided for, whether off-the-shelf items or specially designed bespoke components.

WHAT IS A DNV 2.7-1 CONTAINER?

DNV GL 2.7-1 certified offshore containers and cargo baskets are specifically designed for dynamic lifting via padeyes and a DNV GL certified lifting sling set equipped with shackles. They are inspected at the design stage, material procurement, production and final load & NDE tested. Not only is a prototype tested, but a specified number of randomly selected units from each batch are tested. These containers have solid steel construction, including the flooring.

They are required to have a uniquely identified DNV GL certified lifting set, significantly stronger steel, more stringent production compliance and to have all the testing documentation to prove their worthiness for the rigors of offshore conditions.

DNV GL review their standards every few years to ensure newly certified equipment meets and exceeds current safety and engineering requirements.

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Lifting plans and procedures



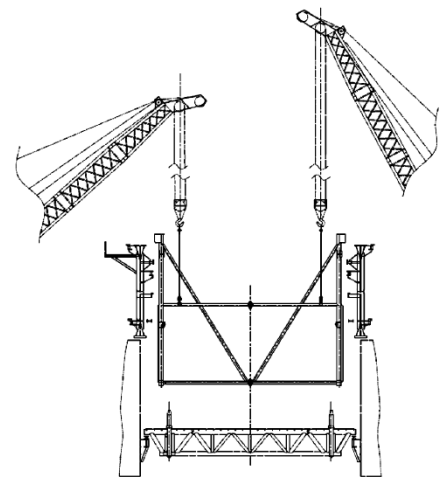
SAFE AND METHODOICAL LIFTING PLANS

All offshore lifting operations must be carefully planned so that foreseeable risks have been accounted for and relevant controls put into place.

Nodal can assist in writing an appropriate plan, surveying the area of the lift and creating the necessary risk assessments, lift plans, rigging specifications and summary drawings in accordance with industry standards including the Lifting Operations and Lifting Equipment Regulations (**LOLER**).

Where specialist or bespoke lifting equipment is necessary to conduct a lifting operation in a controlled, safe and efficient manner we provide the necessary technical knowhow and experience to design and/or supply the right tools for the job.

Engineering input from Nodal at planning stage has saved our customers considerable time and resources during lifting operations over and above providing clear, methodical and safe procedures for offshore teams to work to.



- Lift Planning and Risk Assessment
- Development of Lifting Operation Plans & Procedures
- Rigging Load Calculations / COG Calculations
- Rigging Equipment Specification and Review
- Review of Rigging Points / Supporting Steelwork
- Supervision of Lifting Operations
- Rigging Arrangements
- Step by Step Lifting Operations Drawings

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