DRIVING THE BLUE ECONOMY
TEXAS A&M UNIVERSITY AT GALVESTON

BREAKBULK EDUCATION DAY

HOUSTON MARITIME Center & Museum

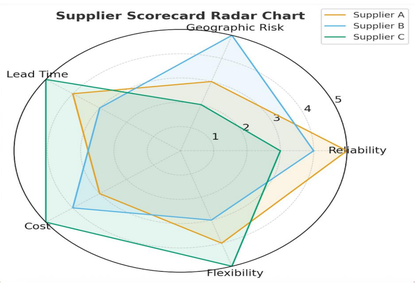
Abstract

Offshore Rig operations rely heavily on availability of critical spare parts to maintain safety, minimize downtime, and ensure operation, This project will evaluate parts availability challenges in the offshore sector by reviewing current inventory policies, assessing supplier performance, and recommending optimized stocking strategies. The analysis includes the development of a risk matrix to identify and prioritize high impact supply disruptions, alongside a supplier scorecard framework to evaluate vendor reliability, responsiveness, and logistical efficiency. The projects outcome aims to reduce lead times and improve overall readiness for offshore assets.

Supplier Evaluation

Supplier evaluation plays a key role in keeping the offshore energy supply chain resilient. Rigs rely on critical spare parts, and any delay in getting them can lead to costly downtime. To lower this risk, suppliers can be compared using criteria like reliability, geographic risk, lead time, cost, and flexibility. A supplier scorecard helps organize these comparisons, while the radar chart gives a clear picture of each supplier's strengths and weaknesses. Together, they show the trade-offs, such as a supplier that is reliable but more expensive, versus one that is cheaper but riskier. This process makes sourcing decisions more effective, helps avoid disruptions, and keeps essential spare parts available when they are needed most.

Criteria	Supplier A	Supplier B	Supplier C
Reliability	5	4	3
Geographic Risk	3	5	2
Lead Time	4	3	5
Cost	3	4	5
Flexibility	4	3	5



The supplier scorecard and radar chart compare three suppliers across key factors like reliability, cost, and lead time. The visuals make it easy to see strengths and weaknesses at a glance and show why balancing trade-offs is important for keeping offshore rigs supplied without delays.

Stocking Strategy

- Set aside a budget and assign an inventory manager to determine what spare parts can be purchased within the budget.
- Calculate Inventory turns by taking Dollar value of Manufacturing, Repair, and Overhaul (MRO)inventory issued over 1 one-year period divided by the Average dollar value of all MRO inventory over the same period.
- Ensure that inventory manager and maintenance staff understand how, when, why equipment would fail in order to stock the right number of parts to perform the required maintenance at the appropriate times.
  - This knowledge enables the ability to identify the bills of materials necessary for maintenance.
  - Helps understand periodicity of replacement.
  - Helps understand optimal maintenance strategy
- Determine **Economic Order Quantity (EOQ)** to reduce the total inventory cost by mitigating storage and ordering expenses.
- Determine the Reorder Point.
- Run Usage reports to gauge inventory to determine slow moving stock
- Determine the amount of **Safety Stock.**
  - **Safety Stock = (Maximum Usage × Maximum Lead Time) − (Average Usage × Average Lead Time).**
- Put into place a strong standardization department that works closely with technicians and engineers.
  - Helps verify and maintain Fit, Form, and Function (FFF) for materials and commodities.
  - Ensures accuracy, compliance, and helps streamline order processing when part numbers are kept up to date.
- Utilize inventory management software to track spare parts, procurement, replenishment processing, optimize inventory levels, and minimize stockouts.
- Implement controlled storage environments with climate control.
- Utilize corrosion resistant coatings.
- Maintain strategic supplier relationships.

EOQ= √(2Cpr/Ch)

Cp = Average costs of ordering parts
r = Annual demand for parts
Ch = Anticipated annual cost of storing parts

Inventory Policy Review

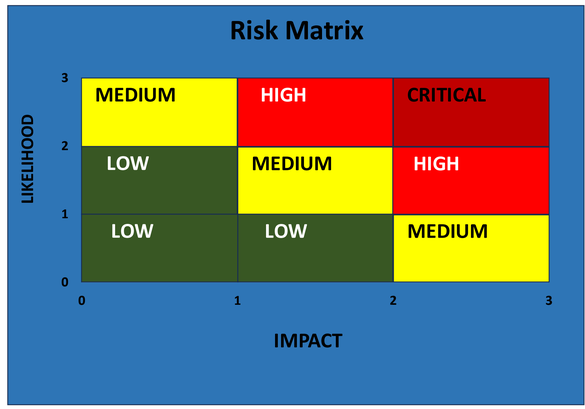
Weaknesses		
Rig Parts	Perishables	Non-Perishables
. Low buffer stock → Higher risk of downtime . Just-in-time becomes primary strategy	. Limited shelf life → constant need for replenishment . Suppliers are susceptible to delays	. Traditionally overstocked → increase in carrying and storage costs

Gaps & Impact	
Policy Gaps Identified	Resilience Impact
. Inventory policy becomes uniform across all categories . Can lead to unreliable lead times from suppliers	. Less flexibility operationally . Susceptible to more disruptions within the supply chain

Risk Assessment

Assessing risk is a continuous cycle repeating upwards of every 6 months to weekly depending on the needs of the crew and supplies. This loop broken down simply would be as follows:

- Map, classify, and rank goods by cruciality
- Assess exposure
- Score the good based on assessment and exposure risk
- Stress test/plan for all possibilities
- Prioritize actions and allocate resources based on risk score



References:

Spare Parts Availability for Offshore Rigs

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