DRIVING THE BLUE ECONOMY
TEXAS A&M UNIVERSITY AT GALVESTON

BREAKBULK EDUCATION DAY

HOUSTON MARITIME Center & Museum

ABSTRACT

To mitigate millions in revenue loss from offshore rig downtime, we propose a strategic framework for critical spare parts management. This involves a hybrid "Just-in-Case" inventory policy for vital components, prioritizing OEM parts, and a Vendor-Managed Inventory for common MRO items. The cornerstone of this strategy is a centralized forward stocking and logistics hub in the Port of Kaohsiung, Taiwan, leveraging its strategic location and Free Trade Zone status. This integrated approach transforms the supply chain from a reactive cost center into a proactive asset that safeguards uptime and fortifies profitability.

$38,000,000 Average Annual Loss Per Platform from Unplanned Downtime

Transocean and Oceaneering are major players in the offshore energy sector with corporate headquarters in Houston. Transocean is a premier offshore drilling contractor specializing in ultra-deepwater and harsh environments, where operational reliability is paramount to its business model. This focus on flawless execution means the company has a low tolerance for Non-Productive Time (NPT). In contrast, Oceaneering is a global technology company that provides a wide range of engineered services, including Remotely Operated Vehicle (ROV) services and asset integrity management. Oceaneering is known for its proactive approach to inventory management, having developed its own custom application, OMS-Invent, to manage over $60 million in spare parts inventory for its global ROV fleet. While they both operate in the same industry, their distinct roles—Transocean as a pure-play driller and Oceaneering as a diversified service provider—shape their unique supply chain needs.

Downtime Duration	Estimated Cost Range (USD)	Source/Study
1% Annually (approx. 3.65 days)	$5.037 million	Kimberlite Research
Average Annual (approx. 27 days)	$38 million	Industry Averages
High-End Annual Estimate	Up to $88 million	Industry Averages
Single Day (LNG Facility)	Approx. $25 million	Industry Averages

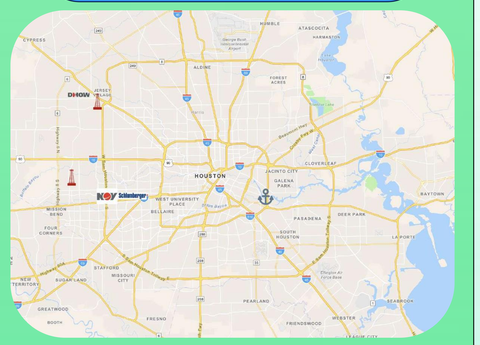
THE STRATEGIC FRAMEWORK- A SMARTER APPROACH

Non-Productive Time (NPT) is a critical financial risk

- Offshore operations are vulnerable to component failure in harsh conditions
- Traditional, cost-focused inventory management exposes operators to catastrophic financial loss.
- Investing in supply chain resilience safeguards revenue while still being a high return strategy

The Houston Hub: A Global Epicenter

-Operators: Transocean, Oceaneering
- OEMs: NOV, SLB (Cameron)
- Distributor & Service Provider: DNOW



	V (Vital)	E (Essential)	D (Desirable)
A (High Value)	BOP Control Panel	Fluid end assembly for end pump	Spare Crane Boom Section
B (Medium Value)	Specialized Seals	Piston Assembly for a Power Swivel	Replacement Cabin Furniture
C (Low Value)	Specialized Gasket	Standard Hydraulic hoses and fittings	Cabin Fittings

Prioritizing by Impact, Not Just Cost

We classified critical offshore oil rig parts by both financial value such as A (high Value), B (Medium Value), and C (Low Value) as well as operational importance to pinpoint resources to the goal of preventing lengthy, expensive downtime.

SOURCING STRATEGY (OEM vs. Aftermarket

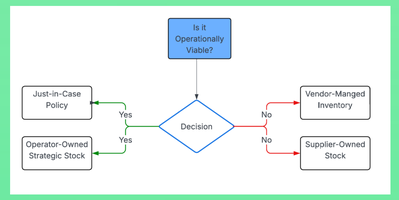
Mitigating Risk Through Strategic Sourcing.

For all "Vital" and "Essential" parts, the OEM relationship is mandatory to ensure quality, maintain warranty, and transfer liability, a lesson reinforced by the Macondo incident.

Category	OEM	Aftermarket
Quality	✓	
Warranty	✓	
Liability Protection	✓	
Lower Initial Cost		✓

The Best of Both Worlds

A hybrid model that utilizes a JIC policy for critical spares where the operator owns and manages a safety stock based on the ABC-VED matrix. The hybrid model ensures maximum security for mission-critical parts while improving capital efficiency for routine MRO items.



Comparison: OEM vs Aftermarket Parts

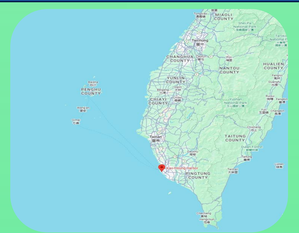
Evaluation Criterion	OEM	Aftermarket
Initial Cost	Higher Initial price	Lower initial price
Quality	Specifications meet original design	Quality varies, parts remain relatively high quality
Warranty	maintains OEM warranty	Voids manufacturer warranty
Liability	Manufacturer is liable for failure	Operator assumes full liability during failure
Compliance	Meets all industry standards	Compliance regulations may not meet
Technical Support	Full access to OEM technical support	Technical support may be limited to none
Lead Time	Longer Lead times	Shorter lead times

SOLUTION AND IMPLEMENTATION

The Global Solution: Kaohsiung Logistics Hub

- **Infrastructure:** World-class port with heavy-lift and breakbulk capabilities.
- **Location:** Central to all major APAC operations.
- **Free Trade Zone (FTZ):** The financial game-changer.
- **Duty Deferral:** Frees up working capital.
- **Streamlined Logistics:** Enables rapid deployment to rig.

The Port of Kaohsiung is strategically important as the ideal location for a centralized forward stocking and logistics hub for offshore rig spare parts in the Asia-Pacific region. Its most critical advantage is its Free Trade Zone (FTZ) status, which offers significant financial and logistical benefits by allowing companies to store and re-export high-value inventory without incurring customs duties, thereby improving capital efficiency and enabling a faster response to emergencies. This unique combination makes Kaohsiung a powerful solution for creating a resilient supply chain that can effectively minimize costly operational downtime.



Potential Supplier Scorecard

1. Quality	NOV	SLB	DNOW
Defect Rate	5	4	4
Conformance to Specs	5	5	4
Average Score	5.00	4.50	4.00
2. Cost	**NOV**	**SLB**	**DNOW**
Price Competitveness	1	3	5
Payment Terms	2	5	3
Average Score	1.50	4.00	4.00
3. Delivery	**NOV**	**SLB**	**DNOW**
On Time Delivery (OTD)	5	3	4
Average Lead Time	4	2	4
Average Score	4.50	2.50	4.00
4. Partnership	**NOV**	**SLB**	**DNOW**
ESG Adherance	5	4	3
Supply Chain Resilience	5	3	3
Average Score	5.00	3.50	3.00
Total Average Score	4.00	3.63	3.75

**To conduct this analysis without access to proprietary information, this scorecard utilizes estimations derived from public domain sources, such as industry reports, corporate filings, and news articles.*

SUPPLY CHAIN RISK MATRIX

Risk Description	Likelihood Impact (1-5)	Risk score level	Mitigation Strategy
Extended lead time for critical OEM component (e.g., valve, BOP part)	4, 5	20, High	Implement JIC inventory policy for all 'Vital' parts at the Kaohsiung strategic hub. Establish long-term supply agreements with OEMs to secure production slots.
Geopolitical instability or trade tariffs impacting a key supplier region	2, 5	10, Medium	Diversify supplier base for non-proprietary items. Utilize the Kaohsiung FTZ to buffer against tariff impacts. Monitor geopolitical risk as part of ongoing supply chain management.
Logistics disruption (e.g., port closure, freight capacity shortage)	3, 3	9, Medium	Utilize the multi-modal capabilities of the Kaohsiung hub (sea and air). Pre-qualify multiple freight forwarders and carriers. Maintain contingency plans for alternative shipping routes.
Price volatility for raw materials (e.g., steel)	4, 1	4, Low	Hedge against commodity price swings through financial instruments where appropriate. Leverage bulk purchasing power through distributor partnerships (e.g., DNOW).

CONCLUSION

Spare parts availability on offshore rigs is a high-stakes issue, with downtime causing multi-million-dollar losses. Our research proposes a hybrid Just-in-Case (JIC) and Vendor-Managed Inventory (VMI) model to balance reliability and cost efficiency. Using a Risk Matrix, Supplier Scorecard, and a logistics hub in Kaohsiung, this strategy safeguards rig uptime while laying the groundwork for predictive, data-driven supply chain solutions.

References

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