Project logistics: Containerized vs. break-bulk selection approach

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EY Parthenon

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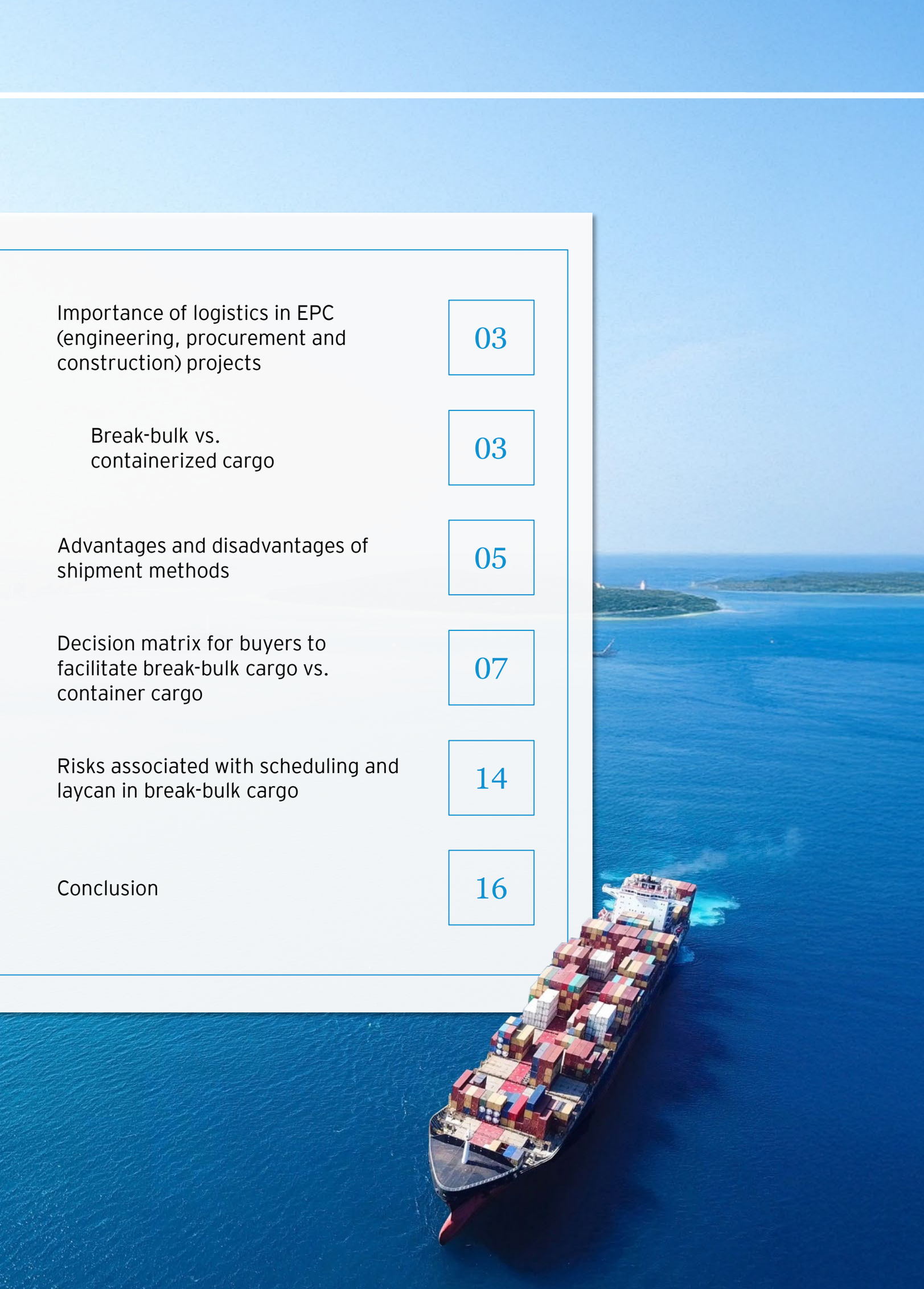

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Importance of logistics in EPC (engineering, procurement and construction) projects

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Logistics plays a pivotal role in the success of EPC projects, which are typically characterized by their large scale and complexity. These projects often require the coordination of multiple components, from the initial engineering designs and procurement of materials to the construction and commissioning of the facilities. Effective logistics management is essential to ensure that all these elements come together in a timely, cost-effective and efficient manner.

Break-bulk vs. containerized cargo

In the realm of EPC logistics, two primary methods of shipping cargo are prevalent– break-bulk and containerized cargo. Each method has its own set of advantages and challenges, and choosing the right one is crucial for the project's success.

Break-bulk cargo

Break-bulk refers to cargo that is transported in bags, boxes, crates, drums or barrels – goods that must be loaded individually rather than in intermodal containers. This method is often used for oversized or heavy items that cannot fit into standard containers, such as large machinery, structural steel piping and other construction materials. The main advantage of break-bulk shipping is its flexibility in accommodating various sizes and shapes of cargo.

However, break-bulk cargo requires more handling, which can increase the risk of damage or loss. It also tends to be more time-consuming, as each piece must be loaded and unloaded individually, which can lead to higher labor costs and potential delays. Therefore, meticulous planning and coordination are necessary to minimize these risks.

Containerized cargo

Containerized cargo, on the other hand, involves goods being shipped in standard-sized containers, which can be easily transferred between different modes of transport, such as ships, trains and trucks. This method offers greater efficiency and security for the cargo, as containers are designed to be sealed and locked during transit. It also streamlines the handling process, reducing loading and unloading times, and can be more cost-effective due to the standardized nature of the containers.

However, containerized shipping is not without its limitations. It is not suitable for all types of cargo, particularly those that are too large or heavy to fit within the dimensions of a container. Additionally, the reliance on container availability and the need to adhere to container shipping schedules can pose challenges.

Choosing the right method for project success

The decision between break-bulk and containerized cargo is significant in EPC logistics. The choice depends on various factors, including the nature and dimensions of the cargo, the project timeline, cost considerations, and the infrastructure available at the origin and destination points.

For EPC projects, which often involve a mix of standard and oversized items, a hybrid approach may be necessary. This could involve using containerized shipping for standard materials and break-bulk for exceptional items. The key is to develop a logistics strategy that aligns with the project's overall objectives, ensuring that all materials arrive at the construction site when needed, without incurring unnecessary costs or delays.

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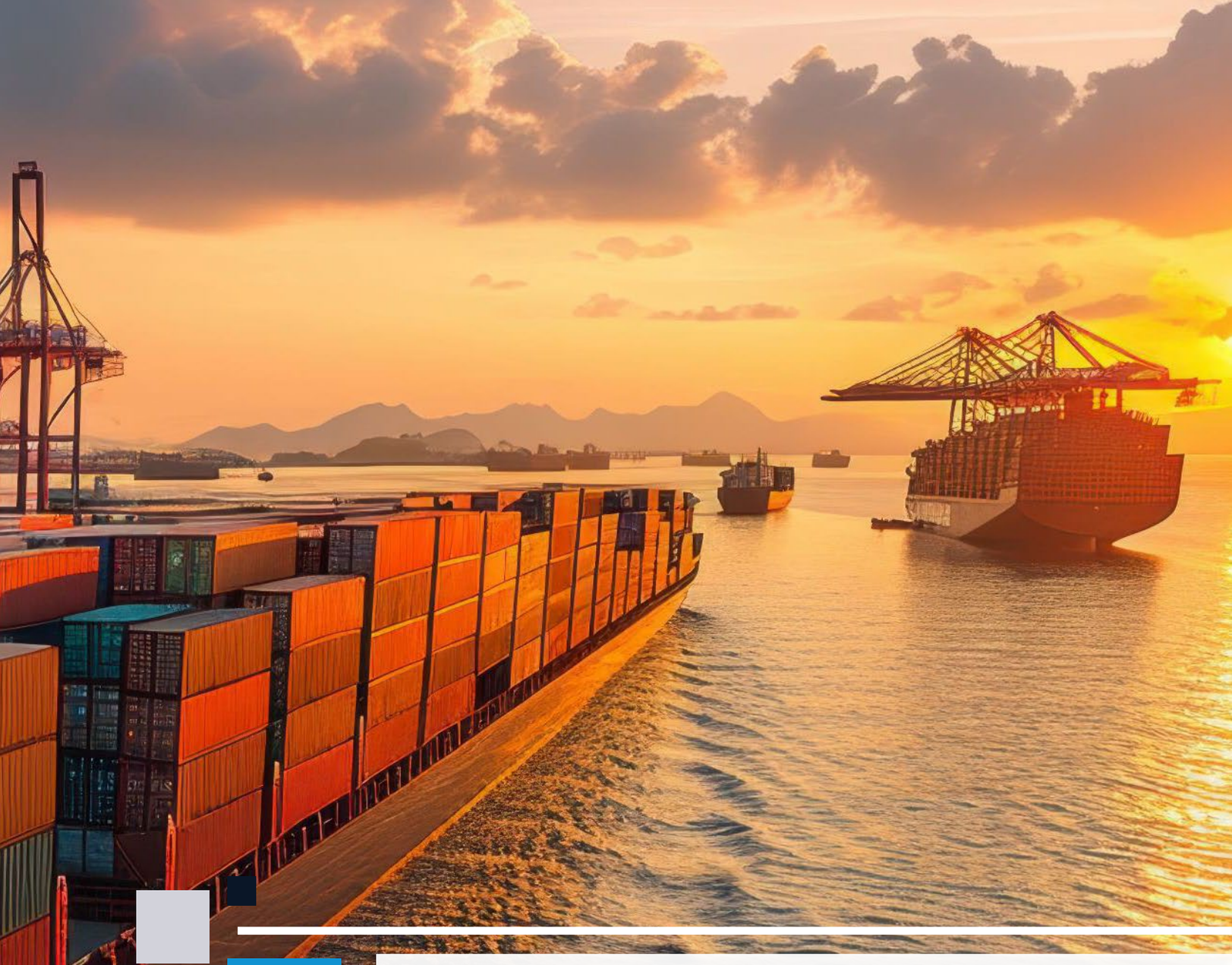
Advantages and disadvantages of shipment methods

General purpose container (GP)	Open top/flat rack (OT/FR) container	Break bulk
Standardization Easy handling, stacking and transportation	**Size flexibility** No standard container height limitation	**Size flexibility** No restriction, ideal for large/heavy cargo
Loading at supply Ease of loading at supplier site is high	**Loading at supply** Ease of loading at supplier site is high	**Loading at supply** Ease of loading at supplier site is high
Cost effective Low cost due to standard efficient handling	**Unloading at site** Easy of unloading is high due to open top	**Unloading at site** Easy of unloading at delivery site is high
Availability Readily available at ports and inland deports	**Convertible** Versatile loading and unloading	**Direct loading** Direct loading beneficial for certain cargo
Damage chances Low chances of in-transit damage to cargo	**Availability** Limited availability than general containers	**Availability** Need to pre-book for availability on time
Size limitation Fixed dimension limiting loadable sizes	**Damage chances** Higher chance of in-transit damage than GP	**Damage chances** High chance of in-transit damage than other
Unloading at site Ease of unloading at delivery site is low	**Higher cost** Container cost is 1.5 times of normal GP	**Higher cost** Minimum inducement is required leading to higher cost



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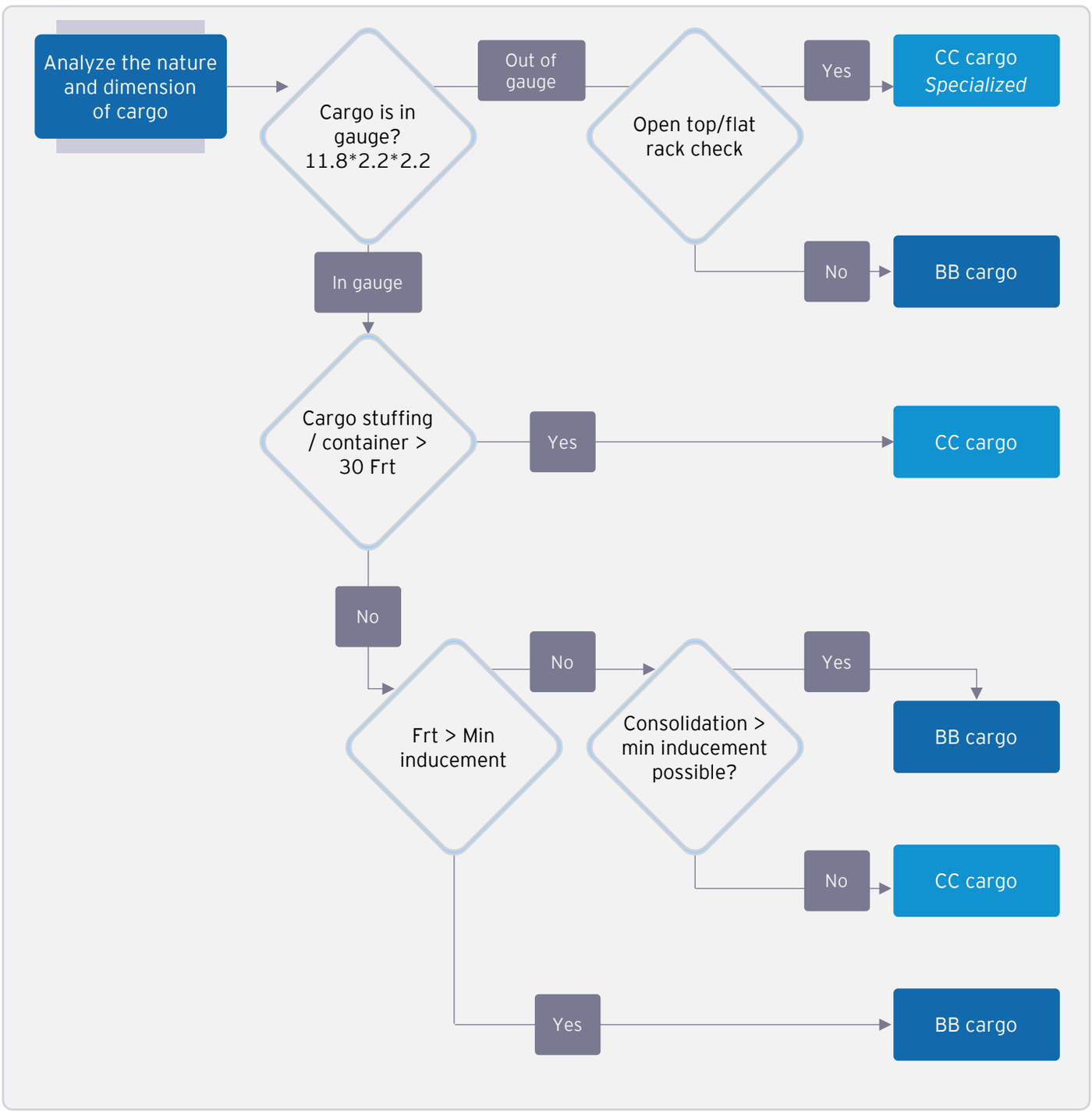
Decision matrix for buyers to facilitate break-bulk cargo vs. container cargo



In the above figure, cargo stuffing/container threshold is set at 30. This is the ratio of average container rate and average break-bulk rate ($3000/$100)*. As per lane economics, this threshold will vary. However, on average, it shall be around 30. *(*Reference rates have been obtained from sea rates.com)*

Buyers need to negotiate the minimum inducement, keeping in mind supplier delays, shipment delays and decide the minimum inducement requirement. In general, this minimum inducement is often in the range of $100,000 to $500,000.

As per the above decision matrix, the main factors determining the cost impact on logistics are fourfold:

01 Cargo dimensions:

Standard 40" General Purpose Container has dimensions of 12.05m*2.35m*2.35m. Accordingly, cargo has to be evaluated considering some loading margins on whether it can be stuffed inside a container or not. Typically, cargo falling within the dimensional thresholds of containers is called in-gauge cargo.

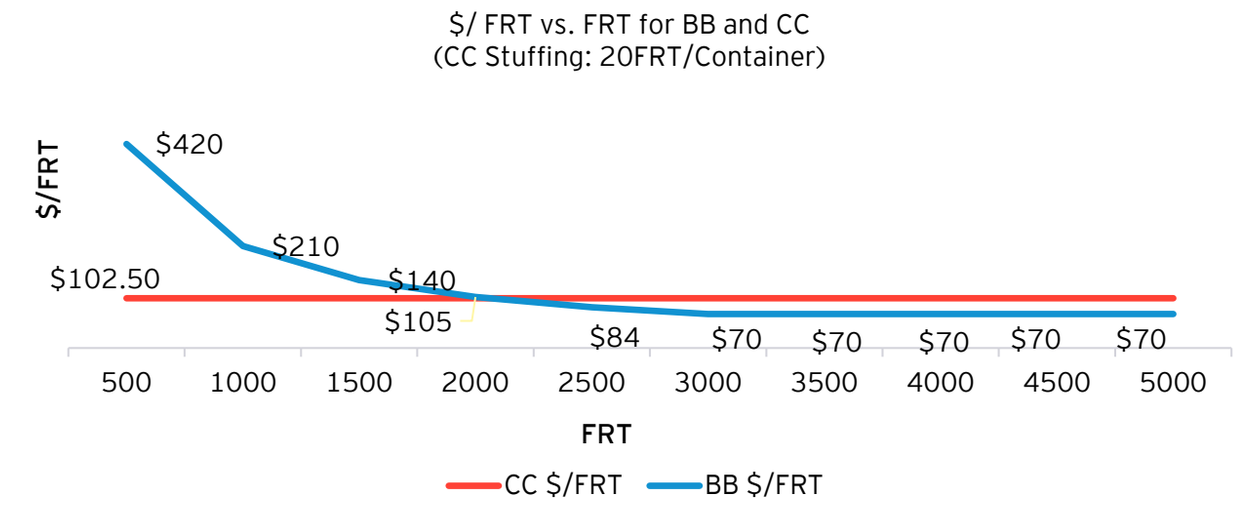
Cargo that falls outside the threshold of container cargo dimensions is called out-gauge cargo. Although these cargo types are outside the purview of 40" GP containers, there are some containers (Flat rack and open top) that are designed to allow for specialized stuffing. The complete container gauge dimensions are as below:

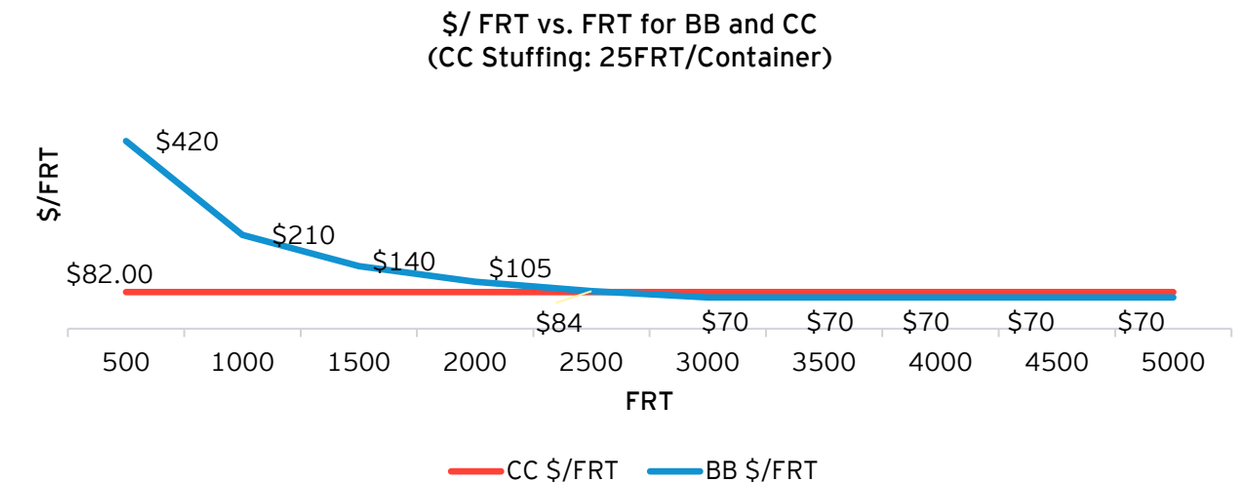
Snapshot	Container type	Internal dimensions (L*W*H)	Door opening (W*H)	Cubic capacity	Cargo weight
	20" General	5.89m*2.35m*2.36m	2.33m*2.26m	33m3	21,700Kg
	20" High cube	5.89m*2.35m*2.69m	2.33m*2.59m	37m3	21,700Kg
	40" General		2.33m*2.26m	66m3	26,500Kg
	40" High cube	12.05m*2.35m*2.69m	2.33m*2.59m	76m3	26,500Kg

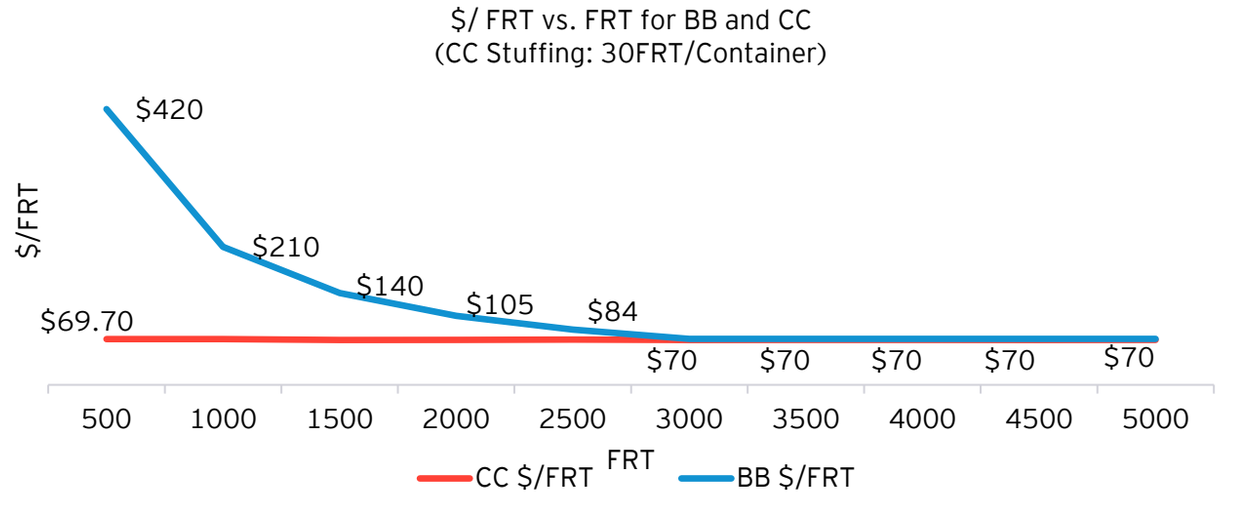
Snapshot	Container type	Internal dimensions (L*W*H)	Door opening (W*H)	Cubic capacity	Cargo weight
	20" Flat rack with sides	5.89m*2.35m*2.23m	Side opening W: 2.59m	30m3	26,500Kg
	20" Flat rack without sides	6.00m*2.35m*0.23m		33m3; Max height; 2.36m	23,500Kg
	40" Flat rack with sides	12.05m*2.35m*2.23m	Side opening W: 11.66m	63m3	36,000Kg
	40" Flat rack without sides	12.20m*2.35m*0.65m		67m3; Max height; 2.36m	39,000Kg
	20" Open top	5.89m*2.35m*2.36m	2.33m*2.29m	32m3	21,700Kg
	40" Open top	12.05m*2.35m*2.69m	2.33m*2.29m	66m3	26,500Kg

02 Cargo stuffing levels:

Typical cost difference between break-bulk and container cargo is:







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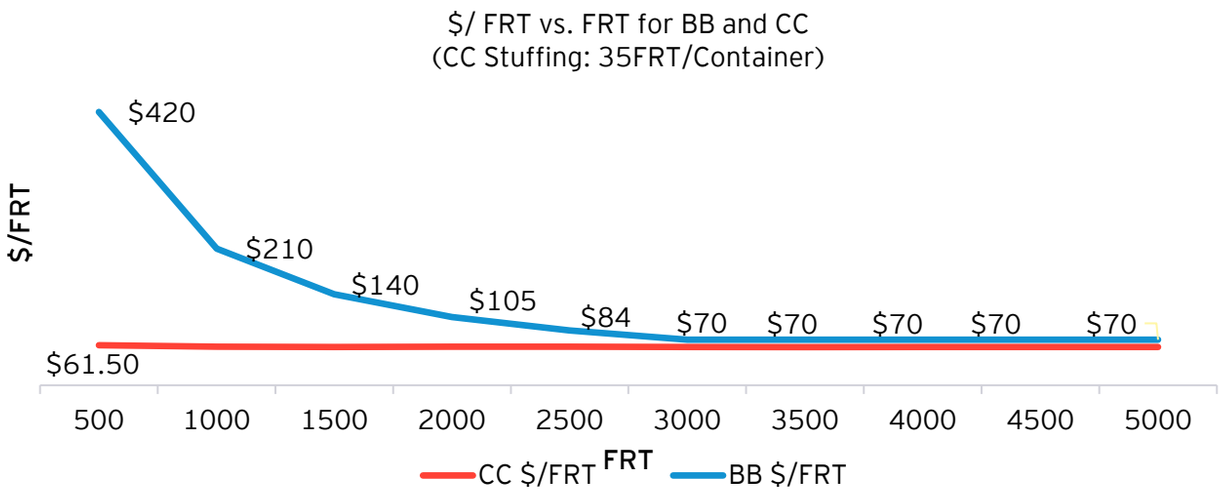


The above figures are based on prevalent market rates from China to India, and it is also assumed that the threshold set for minimum inducement is met. It can be clearly observed that the viability of container cargo logistics improves with the stuffing of containers. Further, we also observe that, beyond a certain stuffing level (30FRT/container in the above figures), container cargo logistics becomes viable across the FRT range. This stuffing level can be empirically derived for cases where minimum inducement threshold is met as below:

$$Stuffing\ level > \left(\frac{CC\ rate\ per\ container}{BB\ rate\ per\ FRT}\right)$$

In case where the minimum inducement threshold is not met, the Stuffing Level for container cargo viability is dependent on the total FRT of shipment as follows:

$$\text{Stuffing level} > \left(\frac{\text{CC rate per container}}{\text{BB rate per FRT}}\right) * \left(\frac{\text{Actual shipment FRT}}{\text{Minimum inducement FRT}}\right)$$

03 Minimum inducement:

Minimum inducement is a term used in the shipping industry to refer to the minimum amount of cargo needed to make a voyage economically viable for a carrier. This concept has a significant impact on logistics costs, especially in the context of chartering vessels for bulk or break-bulk cargo. The impact of minimum inducement on logistics costs can be particularly significant for buyers, as it directly affects the total landed cost of the goods they are purchasing. Here are some ways in which minimum inducement can influence logistics costs for buyers:

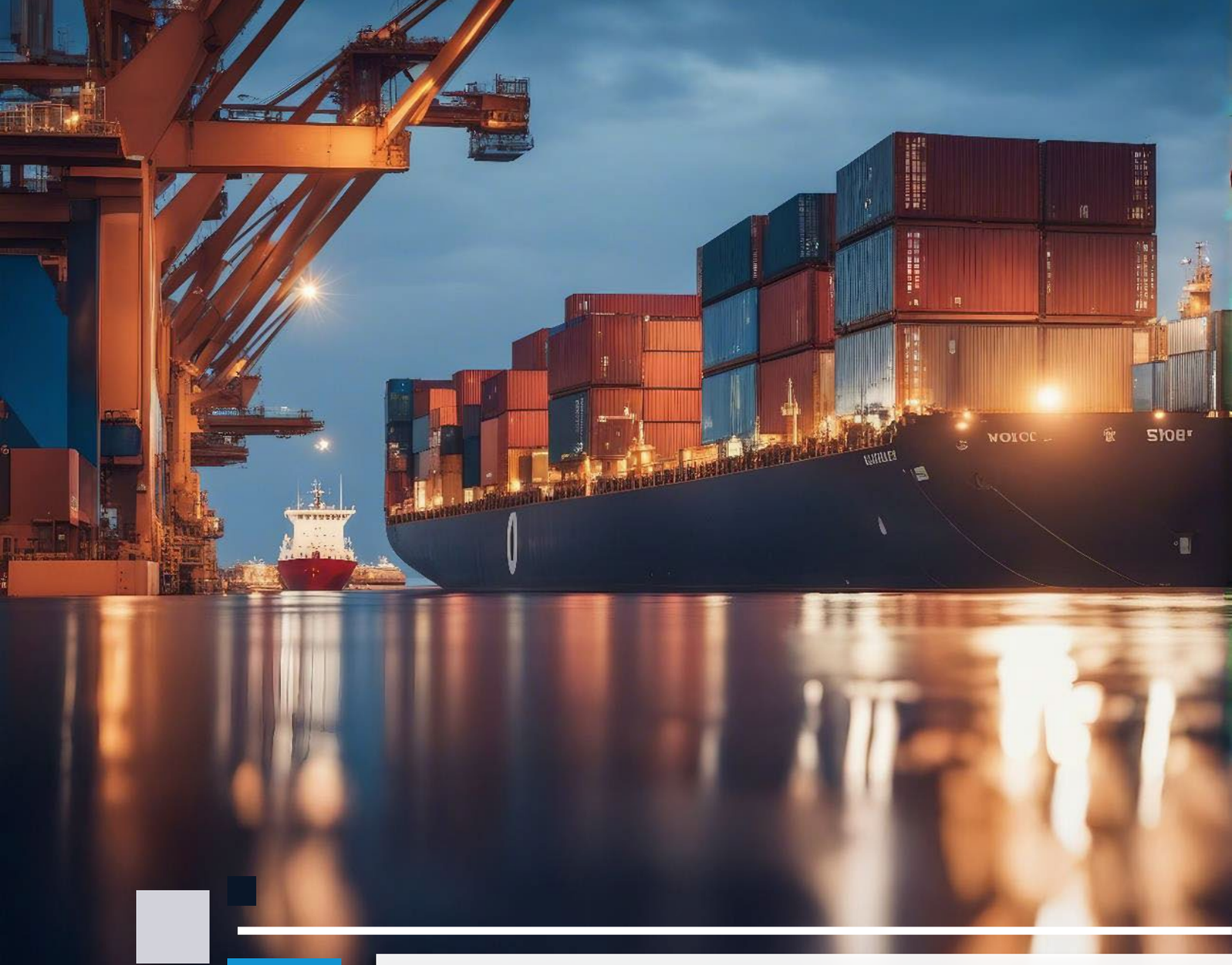
- **Freight rate fluctuations:** If a buyer's cargo does not meet the minimum inducement level for a carrier, the buyer may be subject to higher freight rates to make up for the carrier's lost opportunity to carry a full load. This increase in freight costs will directly affect the buyer's bottom line.
- **Supply chain delays:** Carriers may adjust their sailing schedules if minimum inducement levels are not met, potentially causing delays in the supply chain. For buyers, this can mean slower inventory turnover, missed sales opportunities, and potential penalties for late delivery of goods.
- **Inventory costs:** Buyers may need to order larger quantities of goods to meet minimum inducement levels, leading to higher inventory levels. This can increase costs related to storage, insurance, and capital tied up in unsold goods.
- **Dead freight charges:** If buyers are under contractual obligations to provide a certain volume of cargo and fail to do so, they may incur dead freight charges. These penalties for the unshipped cargo increase the overall cost of logistics for the buyer.
- **Risk management:** Buyers may face increased risks due to potential disruptions in the supply chain caused by minimum inducement-related issues. They may need to invest in risk management strategies, such as having multiple carriers or routes, which can add to the logistics costs.
- **Administrative overhead:** Managing logistics to meet minimum inducement levels can require additional administrative work, including more complex planning, negotiation, and coordination with carriers. This increased overhead can lead to higher operational costs for buyers.
- **Market power and negotiation**: Buyers with significant cargo volumes that consistently meet or exceed minimum inducement levels may have more negotiating power with carriers, potentially securing better rates and terms. Smaller buyers, however, may have less leverage and face higher costs.
- **Total landed cost impact:** All these factors contribute to the total landed cost of goods, which includes the purchase price plus all logistics costs associated with getting the product from the supplier to the buyer's location. Higher logistics costs due to minimum inducement issues can erode profit margins and make goods less competitive in the market.

For buyers, understanding and effectively managing the implications of minimum inducement is crucial to controlling logistics costs and maintaining a competitive edge in procurement and supply chain management

04 Cargo consolidation opportunities:

Lastly, in cases where the minimum inducement threshold is not being met, it is further recommended to scope out cargo consolidation opportunities within the same sail-off window. This primarily ensures that, with the newly consolidated volume, the minimum threshold level can be met.

However, despite the robust selection method, buyers typically face lot of challenges in execution of break-bulk shipments and the risks associated with the same. Here, we will also analyze the risks associated with break-bulk shipments.



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Risks associated with scheduling and laycan in break-bulk cargo

Managing risks associated with scheduling and laycan in break-bulk cargo requires careful planning and proactive strategies. Below are key risks and mitigation measures to consider:

- **Port congestion:** Delays due to port congestion can lead to missed laycan windows, resulting in demurrage charges or missed shipping opportunities.
- **Carrier reliability:** If a carrier fails to present the vessel within the laycan period, it can disrupt the entire supply chain.
- **Cargo readiness:** Ensure cargo is ready and adequately packed well before the scheduled laycan period. Implement stringent quality control checks to avoid last-minute issues. Failure to have cargo prepared can lead to significant additional costs, potentially in the millions, due to minimum inducement requirements and deadweight penalties. These costs arise when the cargo volume does not meet the carrier's minimum requirements, leading to underutilization of the vessel's capacity and thus higher per-unit shipping costs. Deadweight charges may also be incurred for the weight of cargo that was booked but not actually loaded, further increasing expenses. It is crucial to coordinate closely with all supply chain partners to ensure cargo readiness aligns with shipping schedules to avoid these excessive costs.
- **Weather conditions:** Adverse weather can delay shipping schedules, impacting the laycan period and potentially causing demurrage or detention costs.
- **Mechanical failures:** Equipment or vessel mechanical failures can lead to unanticipated delays, affecting the laycan schedule.
- **Regulatory delays:** Customs holds, or other regulatory delays can push cargo loading beyond the laycan period.

To minimize these risks, consider the following mitigation strategies:

- **Buffer time:** Build in buffer time when scheduling to accommodate potential delays due to port congestion or other unforeseen events.
- **Carrier due diligence:** Vet carriers for reliability and track record. Have backup carriers in case of issues with the primary one.
- **Cargo preparation:** Ensure cargo is ready well before the scheduled laycan period. Implement quality control checks to avoid last-minute issues.
- **Weather monitoring:** Keep abreast of weather forecasts and plan accordingly. Consider weather clauses in contracts to account for delays.
- **Maintenance checks:** Ensure that all handling equipment and vessels undergo regular maintenance checks to prevent mechanical failures.
- **Customs compliance:** Ensure all documentation is compliant with customs regulations to prevent delays. Consider using customs brokers to expedite the process.
- **Contract clarity:** Have clear terms in the contract regarding laycan periods, demurrage, and dispatch to avoid disputes.
- **Insurance:** Secure appropriate insurance to cover potential losses due to delays or missed laycan periods.
- **Communication:** Maintain clear and constant communication with all parties involved, including ports, carriers, and logistics providers.
- **Contingency planning:** Have a contingency plan in place for each stage of the shipping process to quickly address any issues that arise.

5

Conclusion

Commercially, break-bulk shipment shall be preferred for cases where buyers can negotiate the requirement of minimum inducement for freight forwarders. Since the number of shipments/ transactions for BB cargo is not large in quantum and there might be numerous changes to schedule/FRT, etc., the final rates can be obtained by spot instead of formulating rate contract and proper due diligence need to be carried out to finalize the type of cargo.

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