

SUPPLY CHAIN

Methods of Approach to Interruptions



STO Building Group Center of Excellence & Innovation

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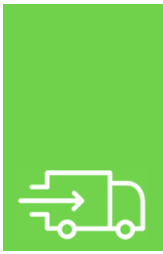
Disruptions in the supply chain may occur for many reasons: labor disputes, trade disputes, natural disasters, subtrade/vendor bankruptcies, exchange rate fluctuations, geopolitical events, and other causes, some of them foreseeable and others—like pandemics—that are less predictable. These disruptions could severely affect the supply chain and negatively impact project performance, particularly when it comes to schedule delays.

This analysis identifies the three major strategies for mitigating this impact: Expediting, Substitutions, and Stockpiling. Each of these strategies needs a careful analysis, a weigh-in process of pros and cons, and a thorough analysis of the trade-off between the risks and the costs to mitigate. While every project has its own specific challenges and circumstances, this analysis can serve as a guide for project teams to begin their analysis and identify a proposed approach for moving a project forward successfully.

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EXPEDITING



When material and equipment delivery disruptions adversely impact the schedule, one of the main avenues to mitigate the risk is the ability to expedite those materials and equipment. Expediting is a common solution to supply chain delays and is used frequently to accelerate the production and delivery of material and equipment.

GUIDELINES AND STRATEGIES

1. *As appropriate, the project team should discuss pre-purchasing and expediting certain materials/equipment with the client and format formal proposals, following these general guidelines:*

- Determine/identify a list of materials/equipment that may cause potential delays.
- Review with the project team and develop a strategy for action.
- Develop a contact tracking log or "call log" when determining expediting strategies.
- Contact key decision-makers at vendors and subtrades and verify that their contact lists are up to date.
- Map the entire supply chain—not just long-lead items. Disruptions and delays could appear even for what are assumed to be "short"-lead items.
- Study the critical path; not all items can be expedited.
- Communicate findings, inclusive of budget cost impacts, to the client to accelerate decision making.
- Check cash flow and inform the client. Vendors/manufacturers/subtrades typically require deposits of 30%...50%...75%, sometimes even 100%.
- Create a list of back-up suppliers/vendors/subtrades in the event the selected trade fails.
- Be prepared to pay the subcontractor when materials arrive to the subcontractor's yard or warehouse. Vesting and transfer of title should be considered in conjunction with a contract review.
- As goods are delivered and the trade subcontractor becomes responsible for them, make certain:
 - The materials/goods are properly secured and protected

- The materials/good are insured—either by the trade or potentially by an extension of builder’s risk coverage.
- The costs of extending builder’s coverage or having the trade provide coverage are understood by the client ahead of time
- If the materials/goods were damaged/destroyed/stolen from the trade’s yard or warehouse, it is documented to avoid a delay exposure
- Keep a log of supplier/vendor/subtrade performance. Were the materials/goods/equipment delivered in time, justifying the costs of expediting? Were the items damaged? Missing parts? Was documentation complete? Was the quality as expected?

2. *Determine expediting options:*

- *SHIPPING*

- Dedicated trucks
 - Investigate feasibility and availability. There is less and less availability due to high demand on the trucking industry
 - Determine liability and insurance requirements
- Rented trucks with pick-up by internal labor
 - Determine list of materials this would apply to and are local
 - Determine cost of truck and driver labor
 - Determine liability and insurance requirements
- Air freight
 - Determine liability and insurance requirements
 - Develop a relationship with a national transport company that provides quick-ship services

For all of the above shipping methods, please ensure:

- Tracking numbers are provided for all shipments
- Invoices or waybill backup are provided
- *MANUFACTURING*
 - Shop overtime
 - Determine how to get to the "front of the line"
 - Assess seasonal shutdowns (Can you pay to avoid these?)
 - Pay for additional production line use
 - For larger packages, split up orders to different shops (e.g., millwork, metals, drywall)

- Avoid customized specifications/detailing
 - Schedule unannounced visits to manufacturing facilities (irrespective of the location) to ensure product is being manufactured for the project. If in-person visits are not feasible (e.g., COVID-19), ask the vendor to submit videos or photos of production.
3. *Define and outline reasonable costs and present them to the client:*
- Establish baseline comparatives, i.e., cost of expediting vs schedule impact and schedule cost extension
 - Shop overtime vs. schedule savings
 - Flat rates
 - Percent of the overall cost of that material

PROS	CONS
Schedule maintenance	Adds costs
Potential schedule acceleration	Additional liability with shipping and receiving
Potential help with schedule flexibility	Potential quality impact
Early detection of possible flaws in design, manufacturing	Additional in-house resources for tracking and following up on orders
Potential to reduce project risk	

SUBSTITUTIONS



Substituting more readily available materials or equipment for long-lead items may be a feasible option when the materials in question are not integral components to the project's design or function.

GUIDELINES AND STRATEGIES

- *Determine the reason for the substitution: long-lead item, product availability, disruption in supply chain, part of value engineering/cost savings exercise.*
- *Get “buy-in”. It is essential that the client and design team have agreed to look into substitution before investing any time on researching alternatives. Shorter term gains in saving money or time could lead to mistrust and fragmented relationships if substitutions lead to inferior products.*
- *Review contracts for who takes responsibility of alternates and liability within design.*
- *Carefully analyze the impact of the substituted product or equipment:*
 - How does it affect the construction schedule?
 - What are the cost implications?
 - Does it comply with local standards and certifications?
 - Is your project LEED certified? Will substitutions impact LEED credits?
 - What are the performance specifications and warranties? Are they equivalent or inferior in performance?
 - How could the substitution affect design intent?
- *Carefully assess quality control. This decision could affect overall construction if an inferior product is selected. Look for:*
 - Compatible parts and fixtures
 - Architect/engineer approval
 - Warranty disruption
- *Start analyzing substitutions as early as possible in the preconstruction phase to allow time for client decision making.*
- *Allow time for subtrades to review; if possible, accelerate the approval/review process by consultants, engineers, architects, etc.*

- *Provide samples of substitutions for review and approval from consultants, engineers, architects, etc.*
 - *In emergencies or any event that may affect the chain of command (e.g., a pandemic), quickly confirm the chain of approval and locations for shipping/receiving in case they have changed.*
- *Propose substitutions for more standardized items. Avoid customized/specialty items with longer lead times.*
- *Create a log with successful/approved/rejected substitutions to eliminate duplication if the decision could apply to future projects with this client or design team. Check and recheck—substitutions for one project might not be applicable for another project.*
- *Look for alternative sources if supplier/vendor or material provenience resides in a severely affected region. Check online maps for a quick visual.*

PROS CONS

Schedule maintenance	Could jeopardize existing subtrade/vendor relationships and lose certain discounts or advantages. Analyze short-term vs long-term relationship. Explain this is a temporary measure
Potential cost benefits	Substitution may not be an equal alternative. Performance/efficiency may decline.
Potential for new relationships with local manufacturers or new materials	Additional coordination of different specifications
Early detection of possible flaws in design, manufacturing	Material comparability
Potential to reduce project risk	Potential time crunch with approval and coordination, materials that consultants may not be familiar with



STOCKPILING/ PRE-PURCHASE/ STORAGE

STOCKPILING – *Preliminary Design Phase* – In this phase, project procurement has not begun. This pre-purchasing approach allows the team to buy materials in bulk without exact quantities or final design, to be ordered and stored. Stockpiling could be a solution as it may protect the project against delivery delays.

- *Consider the market impact of the materials in question. This option may only apply to specific materials.*
- *Remember that substitution requires full team—consultant and client—agreement and sign-off on quantity orders.*
- *Prioritize goods/materials/equipment that are in high demand. If they are in high demand for this project, they are likely in high demand for other projects.*
- *Consider the size of the project. The costs/benefits may not be worthwhile for a smaller project.*
- *Stockpile items that are impacting the construction schedule. What materials and what critical trades are impacted by the supply chain disruptions?*
- *Verify project cash flow.*
- *As pandemic-related PPE (e.g., COVID-19) might require stockpiling, make sure each construction site has enough PPE and other safety materials (extra cleaning supplies, hand sanitizer, N95 masks, gloves, washing stations, thermometers, etc.). Construction sites may be closed or slowed down due to lack of this equipment.*
- *Consider material order quantities in take-offs—calculating material waste (off cuts, etc.) and attic stock.*
- *Ownership of material, legal implications, theft, damage, fire/water damage will lead to higher insurance premiums.*

- Consider the location of the stockpile, including security and protection. The type of protection may depend on materials in question.
- Assess the additional risk of maintaining stockpile and the associated costs.
- Consider the added insurance cost while stockpiling. Evaluate if builder's risk or property coverage can be extended. This will be subject to underwriting guidelines/inspections.
- Keep a log of suppliers/vendors/subtrade performances as well as a list of back-up suppliers/vendors/subtrades in the event the selected trade fails. Were the goods/materials/equipment delivered in time, justifying any added costs? Where the goods damaged? Missing parts? Was documentation complete? Quality?

PROS CONS

Full access to your inventory provides better customer service, faster response time to a schedule constraint	Insurance, liability, manufacturing defects, dye lots (matching finishes from old stock with new stock might be difficult due to discoloration, grain finish etc.)
National programs could benefit from stockpiling materials that could be used on multiple projects	Ownership of liability if something is wrong/incorrect
Buying in bulk could lead to savings	Material quantities could change, leaving the project in short quantity or overstock
Schedule maintenance	Issues with paying suppliers directly. Do we buy with a major sub, locking them in for the job?
	Warranty issues from date of manufacturing

PRE-PURCHASING – *Preconstruction Phase* – At this phase, the design is complete enough to determine quantities and pricing is competitive; cost and

quantity are signed off by the consultant and client, and the materials are ordered and stored.

- *Issues with paying suppliers directly—do we buy with a major sub and lock them in for the job? Other risks:*
 - Quantity could be too much or too little
 - Ownership of liability if something is wrong/incorrect
 - Warranty issues
- *Discuss the requirement for early procurement, payments, etc. with clients.*
 - Some clients may have manufacturing relationships and can issue direct purchase orders
 - Discuss storage requirements

PROS CONS

Full access to inventory; enhanced customer service and response time	Insurance, liability, manufacture defects, dye lots (matching finishes from old stock, discoloration, grain finish etc.)
National programs could benefit from stockpiling materials that could be used on multiple projects	Material quantities could change, leaving the project in short quantity or overstock
Buying in bulk could lead to savings	Issues with paying suppliers directly. Do we buy with a major sub, locking them in for the job?
Schedule maintenance	Warranty issues from date of manufacturing

STORAGE – *Construction/Tender Phase* – In this phase, subcontractors have been awarded and all materials have been ordered and stored regardless of lead time, required date on site, or government mandated shutdowns or limits.

- *Weigh the pros and cons of storing material and equipment at subtrade/vendor facilities vs your own storage.*

- Project-specific:
 - Preorder and store materials until required on site
 - Order materials and store until site work can continue (e.g., in a government shutdown)
- *Consider timing: Long term/short term.*
- *Collect waybills, packing slips, and photos of stored materials to confirm storage and costs.*
- *Confirm insurance requirements or bonding requirement at storage facility.*
- *Prepare to pay for the materials when they arrive to storage vs. typical scenario of arrival to site.*
- *Define ownership of material (legal implications, theft, damage, security requirements).*
- *Consider packaging material size and storage size required (pallets, boxes, skids, etc.)*
- *Consider additional handling cost from storage facility to site (added labor, risk of damage, etc.).*
- *Schedule unannounced visits to storage facilities (irrespective of the location) to ensure product is being properly stored. If in-person visits are not feasible (e.g., COVID-19), ask the vendor to submit videos or photos of production.*

PROS	CONS
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Schedule mitigation	
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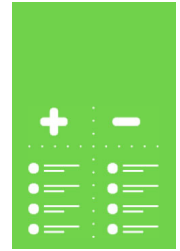
	<p>Storing in own facilities would require more internal resources and increase liability, insurance costs, and general conditions (warehouse manager, own delivery costs, loading/unloading)</p>
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Material availability when required on site	
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	<p>Long-term storage could lead to outdated inventory, discoloration, warping due to climatization, or reduction in warranties</p>
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Store in subtrade facilities to reduce GC liability	
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	<p>Additional handling of materials, which increases the potential for damage</p>
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SUMMARY OF PROS AND CONS

	Pros	Cons
EXPEDITING	Schedule maintenance	Adds costs
	Schedule acceleration	Added shipping liability
	Schedule flexibility	Potential quality impact
	Early detection of possible flaws	Added resources - ordering/tracking
	Potential to reduce project risk	
SUBSTITUTIONS	Schedule maintenance	Impact on relationships - design team/sub/vendors
	Cost benefits	Substitution may not be an equal alternative
	New relationship potential	Additional coordination
	Early detection of possible flaws	Material comparability
	Potential to reduce project risk	Time impact - approval and coordination, materials consultants not be familiar with
STOCKPILING	<p>Preliminary Design Phase - Project procurement phase has not begun. Buying materials in bulk without exact quantities or final design, to be ordered and stored.</p>	Full access to inventory - enhanced customer service and response time
		National programs could benefit from stockpiling materials that could be used on multiple projects
		Buying in bulk could lead to savings
		Schedule maintenance
PRE-PURCHASING	<p>Pre-Construction Phase - Design is complete enough to determine quantities, pricing is competitive; cost and quantity is signed off by consultant and client, ordered and stored</p>	Full access to inventory - enhanced customer service and response time
		National programs could benefit from stockpiling materials that could be used on multiple projects
		Buying large quantities could lead to volume savings
		Schedule maintenance
STOCKPILING / PRE-PURCHASE / STORAGE	<p>Construction/Tender Phase - Subcontractors have been awarded and all materials ordered and stored regardless of lead time, required date on site, or government mandated shutdowns or limits</p>	Full access to inventory - enhanced customer service and response time
		National programs could benefit from stockpiling materials that could be used on multiple projects
		Buying large quantities could lead to volume savings
		Schedule maintenance
STORAGE	<p>Construction/Tender Phase - Subcontractors have been awarded and all materials ordered and stored regardless of lead time, required date on site, or government mandated shutdowns or limits</p>	Schedule mitigation
		Material availability when required on site
		Store in subtrade facilities to reduce GC liability

Probability of Implementing Supply Chain – Methods of Approach

- Most likely
- Likely
- Highly unlikely

	EXPEDITING	SUBSTITUTIONS	STOCKPILING
Small-Scale Project (or General Tender) or No Preconstruction			
Medium-Scale Project or Sizable Preconstruction Duration			
Large-Scale Project or Large Preconstruction Duration			



ADDITIONAL CONSIDERATIONS



- *Different approaches for:*
 - CM projects and larger projects; preconstruction allows for investigation and analyses for the above methods, which are beneficial for the project. In early budgeting stages, communicate to the client the benefits and risks to include a budget allowance or a contingency for possible costs with expediting and substituting.
 - General tender (lump sum tenders); due to lack of preconstruction time, the above approaches might not apply. Provide a bid qualifications letter describing potential risks due to disruptions (material shortages, delays in manufacturing, delays in shipping) and how to mitigate potential risks if they do occur.
- *Prepare case studies with “real-life integration.” Show measures that were implemented so clients can see practical applications.*

- *Explore new technologies and digital platforms for procurement (e.g., SAP Ariba Discovery). These platforms could offer insights in potential supply chain disruptions.*
- *Stay in touch with business channels, industry-related professionals, and media for news and insights to spot possible disruptions in supply chain (factory closings, labor disputes, changes in demand, cyber-attacks disrupting vendor/subtrade day to day business, etc.).*
- *Get regular updates from vendors/suppliers/subtrades to spot potential supply chain disruptions, delivery issues, or manufacturing slowdowns.*
- *Check online maps from reputable media outlets to quickly identify affected regions states, or countries and verify provenience of materials/equipment that might be impacted.*