# 8. [IMPROVED INTEGRATION OF THE SUPPLY CHAIN (FR-344)](https://www.construction-institute.org/improved-integration-of-the-supply-chain-in-materials-planning-and-work-packaging-version-2-0)

**Report Summary:** Materials are the life blood of projects. If materials cannot flow smoothly from specification to fabrication to site installation, then project performance will be poor. All too often, even well planned and well executed projects face disruptions to materials flow. Indeed, late or missing materials are a common occurrence on almost every project. Site materials management is an extension of the material management processes, procedures, and systems that are initiated in the earliest stages of a project. Site materials management includes receiving, inspecting, warehousing, and controlling the release of incoming materials. The purpose of management programs is to ensure that the right quantities of the right materials and equipment are anticipated as early as possible to ensure that these components are provided at the right time to the project’s construction forces in a cost-effective manner. With proper planning and true system integration, material shortages can be identified a priori. This early notice ensures that required materials are acquired in sufficient time to support the needs of construction forces and surplus inventory is kept to a minimum.

RT-344 Part I explores the visibility of materials in the project supply chain and offers recommendations to improve materials tracking and support effective decision-making. The research identified a large number of visibility items and enablers that are associated with common decisions and concluded that project supply chain performance will improve if projects and firms pay closer attention to visibility. Part II explores opportunities for improvement that may stem from improved visibility. A particular focus of this second part of the study is the cost of carrying stocks of materials to the project. Knowing cost information can help teams make better decisions about achieving the right balance of materials as a buffer against the risk of shortages. A better understanding of costs is a prerequisite for improving policies or optimizing behavior. Collectively, these findings make the case that significant opportunities are available for reducing inventory holding costs while making the material on hand more effective.

RT-344 Part II also presents metrics for excess inventory and a framework for decision-making to augment project planning processes. Radio frequency identification (RFID) technology for access control is used to help define the high-level needs and benefits of implementing an access control solution for construction sites. This approach not only satisfies project management requirements at the site but also serves to meet the client’s expectations regarding the reliable control of personnel site access and quantifies the daily attendance of the site workforce. RFID is especially helpful when a company experiences an increase in the size of the project and workforce.

An overall recommendation from RT-344 is that firms and projects should immediately take steps to improve visibility on their projects. Overall, a three-pronged approach is needed to improve firms and projects: self-assess, close the gaps, and align with other efforts.

The following steps should be taken in the planning phase as the basis for a decision framework:

1. Estimate direct holding costs.
2. Establish the applicable cost of capital for the project.
3. Explore alternatives for holding inventory.
4. Decide on the planned inventory based on costs and risks.

**Key Takeaways:**

## (1) Recommendations to improve visibility: Self-assess supply chain visibility ([FR-344](https://www.construction-institute.org/improved-integration-of-the-supply-chain-in-materials-planning-and-work-packaging-version-2-0), Appendix E)

## (Project Phase: Concept through Construction)

* Review existing tools and documentation to identify current levels of supply chain visibility.
* Define desired visibility based on specific business requirements and industry standards.
* Analyze case studies and examples of successful supply chain visibility implementations.
* Identify gaps in current supply chain visibility and prioritize areas for improvement.
* Develop a plan to address identified gaps and improve overall supply chain transparency.

## (2) Recommendations to improve visibility: Close the gaps in supply chain visibility ([FR-344](https://www.construction-institute.org/improved-integration-of-the-supply-chain-in-materials-planning-and-work-packaging-version-2-0), Appendices A and B)

## (Project Phase: Concept through Construction)

* Implement new tools and technologies to improve supply chain visibility.
* Develop standardized processes and procedures for data sharing and collaboration.
* Establish clear communication channels with stakeholders to ensure timely issue resolution.
* Conduct regular audits and assessments to identify and address potential risks.
* Foster a culture of transparency and accountability throughout the organization.

## (3) Recommendations to improve visibility: Align with other efforts, such as advanced work packaging and federal enterprise procurement.

## (Project Phase: Concept through Construction)

* Collaborate with stakeholders to identify and leverage existing initiatives.
* Review industry best practices and benchmarks to inform supply chain visibility improvements.
* Engage with relevant organizations and associations to stay informed about emerging trends.
* Develop a plan to integrate supply chain visibility into the overall business strategy.
* Establish metrics and key performance indicators to measure progress.

## (4) Four-step decision process: Step 1 Estimate direct holding costs.

## (Project Phase: Concept through Construction)

* Review historical data to estimate direct labor and staffing costs that are associated with inventory storage.
* Calculate the provision of laydown space and related expenses as a percentage of the total project costs.
* Consider industry benchmarks and best practices when estimating direct holding costs.
* Develop a range for the estimated direct holding costs, taking into account variability in project requirements.
* Refine the estimates based on actual project data and lessons learned from previous projects.

## (5) Four-step decision process: Step 2 Establish the applicable cost of capital for the project.

## (Project Phase: Concept through Construction)

* Determine the type of financing used to fund the project (e.g., loans, equity).
* Research and identify the borrowing costs associated with each funding source.
* Calculate the corporate rate or sponsor's weighted average cost of capital.
* Consider industry benchmarks and best practices when establishing the applicable cost of capital.
* Verify the accuracy of the established cost of capital through consultation with financial experts.

## (6) Four-step decision process: Step 3 Explore alternatives for holding inventory.

## (Project Phase: Concept through Construction)

* Identify potential locations for laydown yards and assess their feasibility.
* Research options for supplier kitting to reduce storage needs.
* Evaluate the costs associated with each alternative (e.g., land acquisition, infrastructure development).
* Consider industry benchmarks and best practices when selecting an inventory holding strategy.
* Develop a plan to implement the chosen alternative(s) and monitor its effectiveness.

## (7) Four-step decision process: Step 4 Decide on planned inventory based on costs and risks.

## (Project Phase: Concept through Construction)

* Determine the optimal level of inventory to minimize costs and maximize efficiency.
* Assess the risk associated with holding too little or too much inventory (e.g., stockouts, overstocking).
* Evaluate the impact of changing market conditions on inventory levels and adjust plans accordingly.
* Consider industry benchmarks and best practices when determining planned inventory levels.
* Develop a plan to implement and monitor the chosen level of inventory.