



# Material Management and Inventory Management at NLC India Limited: A Diagnostic Study

**Induja S**

MBA – Logistics and Supply Chain Management, School of Management Studies,  
VELS Institute of Science, Technology and Advanced Studies (VISTAS), Chennai  
Guide: **Dr. Madhumita G**, Associate Professor, Department of Management Studies,  
School of Management Studies, VISTAS

## How to Cite this Article:

S, I. (2026). Material Management and Inventory Management at NLC India Limited: A Diagnostic Study. International Journal of Creative and Open Research in Engineering and Management, 2(10), 1-9.  
<https://doi.org/10.55041/ijcope.v2i10.110>

## License:

This article is published under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and the source are credited.

© The Author(s). Published by International Journal of Creative and Open Research in Engineering and Management.



<https://doi.org/10.55041/ijcope.v2i10.110>

## Abstract

Organisations that run large, continuous industrial operations live or die by how well they move materials through their supply chain not just having stock, but having the right stock, priced sensibly, and on hand exactly when operations need it. NLC India Limited, a coal and lignite mining and power generation enterprise, is a useful case in point precisely because the scale of its operations leaves little room for improvisation when materials fall short or pile up. This paper examines how material and inventory functions are actually carried out at NLC procurement, stock control, storage, handling, supplier evaluation, and the degree to which digital systems support day-to-day decisions. The research followed a descriptive design, drawing primary data from a structured questionnaire completed by 50 employees across material management, procurement, stores, and inventory functions, and secondary data from company records, purchase documentation, and annual reports.

The picture that emerges is broadly reassuring, with two clear exceptions. Record-keeping is trusted (80% rated it accurate), stock-level discipline is reasonably strong (74% for min-max maintenance, 72% for safety stock adequacy), classification tools are in active use (70% for ABC analysis), and digital infrastructure is well embedded (84% confirmed ERP/SAP or equivalent systems are in place). Receiving, storage, and handling all drew favourable ratings as well. Yet 24% of respondents reported frequent or very frequent stock-outs, and half described excess inventory as an ongoing problem the two findings sitting side by side rather than

trading off against one another. That combination is the central puzzle this paper works through, and it points toward a planning and forecasting gap rather than a failure of operational execution. The paper closes with a set of practical measures: sharper demand forecasting, more consistent classification discipline, closer supplier monitoring, regular verification, deliberate safety-stock calibration, tighter cross-department coordination, and fuller use of the real-time monitoring capability the organisation already owns.

**Keywords:** Material Management; Inventory Management; Inventory Control; Procurement; Stock Management; Supply Chain Management; Operational Efficiency.

## 1. Introduction

For an enterprise built around mining and power generation, material management is not a support function sitting off to the side it is close to the operational core. NLC India Limited depends on a continuous, dependable supply of spare parts, machinery components, electrical fittings, lubricants, and safety equipment, and any interruption in that supply has knock-on effects across production. Where material flow is managed well, operations run more smoothly, waste stays contained, and costs stay predictable.



This study sets out to examine how material and inventory management actually functions inside NLC, how materials are planned, procured, received, stored, controlled, and issued, and how stock levels are tracked, suppliers assessed, and information systems put to use. Underlying the whole exercise is a balancing act familiar to anyone who has managed physical stock at scale: too little inventory disrupts operations, too much ties up capital and space unnecessarily, and an organisation can suffer from both problems in different corners of its operations at the same time.

The practical motivation for the study is straightforward making sure the right materials show up in the right quantity at the right moment, across an organisation whose operations don't pause for supply gaps. Where inventory control falls short, the fallout tends to show up as stock surpluses, shortages, elevated carrying costs, and production delays. This study aims to assess where current practice stands and where it could be tightened.

NLC India Limited operates as a Navratna Central Public Sector Enterprise under the Ministry of Coal, Government of India. Established in 1956, its activities span lignite and coal mining, thermal power generation, and renewable energy. Given that scale, dependable material availability and disciplined inventory control aren't optional refinements they're operational necessities.

## 2. Objectives of the Study

The study's core purpose is to examine and evaluate material management and inventory management practices at NLC India Limited, with particular attention to how effectively these practices ensure material availability, control inventory costs, and support uninterrupted operations. More specifically, it sets out to:

- Examine the existing material management system
- Study the inventory control techniques currently in use
- Analyse procurement and purchasing procedures
- Assess how effectively inventory management maintains optimum stock levels
- Evaluate storage, handling, and distribution practices
- Identify factors influencing inventory management and material availability
- Study methods used to control inventory costs and reduce material wastage
- Examine the role material management plays in supporting mining and power generation activities
- Evaluate stock monitoring practices and inventory record maintenance
- Understand how information systems and technology are utilised
- Identify key challenges faced in inventory control
- Assess the relationship between inventory management and operational efficiency
- Analyse supplier management and procurement processes
- Recommend measures to improve material management and inventory control practices

## 3. Conceptual Framework and Review of Literature

The framework guiding this study treats material and inventory management not as one activity but as a chain of interdependent ones planning, procurement, receiving, inspection, storage, stock control, material handling, supplier management, and information-system support. Each link in that chain affects material availability, cost, wastage, and ultimately operational efficiency further down the line.

The logic runs roughly as follows: material planning and procurement feed into inventory control and stock-level management; that, in turn, shapes storage and handling practice; and these together determine material availability and cost outcomes, which finally show up as operational efficiency (or the lack of it). Supplier performance and computerised inventory systems function as supporting pillars running through the entire chain, while stock verification, ABC classification, reorder-level discipline, and safety-stock planning feed directly into the inventory-control stage.

The literature consulted for this study broadly supports the idea that sound material and inventory management contributes to operational efficiency, cost containment, production continuity, and more effective use of resources. Gopalakrishnan and Sundaresan (2018) make the case for treating materials management as an integrated function rather than a set of disconnected



tasks. Baily et al. (2015) lay out the core principles of procurement and how they should be managed. Dobler and Burt (2016) examine what distinguishes world-class supply management from merely adequate practice, and Monczka et al. (2020) provide a broader treatment of purchasing and supply chain management as a discipline. Beyond the academic literature, the study also draws on organisational and government procurement documentation, including NLC India Limited's own Purchase Manual, the Manual for Procurement of Goods, the General Financial Rules, and the Government e-Marketplace framework sources that ground the analysis in the specific regulatory and procedural environment NLC operates within.

## 4. Research Methodology

### Research Design

The study adopted a descriptive research design. Because the aim was to understand and characterise existing material and inventory management practice at NLC India Limited rather than to test a specific hypothesis about cause and effect a descriptive approach fit the purpose better than an experimental or purely exploratory one.

### Population and Sample

The population consisted of employees working in Material Management, Purchase, Stores, Inventory Control, Warehouse Management, and Logistics and Supply Chain functions. A sample of 50 respondents was drawn using convenience sampling, with participants selected on the basis of availability and willingness to participate during the internship period in which this research was conducted.

### Data Collection

Primary data came from a structured questionnaire distributed to employees across purchase, stores, inventory, and logistics-related departments, supplemented by informal conversations, direct interviews, and on-the-ground observation. Secondary data was drawn from company records and reports, purchase and inventory documentation, annual reports, the organisation's website, and relevant books, journals, and published academic material.

### Research Instrument and Analysis

The questionnaire covered material purchasing, handling, storage, inventory control, stock-level maintenance, physical stock checking, material availability, supplier performance, and technology use. Responses were analysed using percentage analysis, with tables, charts, and graphs used to present the findings.

As with any study of this scope, some limitations apply. The internship timeframe constrained how much data could be gathered, and the conclusions are shaped by the sample size, respondent availability, the limits of what company information could be disclosed, and general resource constraints. The findings, accordingly, are specific to the material and inventory functions examined at NLC India Limited and should be interpreted within that scope rather than generalised beyond it.

## 5. Analysis and Discussion

The 50 responses gathered for this study cluster into a picture that is, on the whole, more encouraging than not but the encouraging parts and the concerning parts turn out to be connected in ways worth teasing apart.

### Who answered, and why it matters

Most respondents sat in the middle of their careers: 36% were between 31 and 40 years old, and a combined 68% had at least five years of hands-on experience in material or inventory-related roles. Only 24% were newer entrants (20–30 years) and just 12% were over 50. This matters for how the findings should be read the opinions captured here come largely from people who have lived through several stock cycles and procurement seasons, not from staff still forming their impressions of how the system works. Their assessments carry the weight of repeated observation rather than first impression.



## Records are trusted verification habits explain why

Confidence in the accuracy of inventory records was high, with 80% of respondents rating it positively (36% strongly so). That confidence doesn't appear out of nowhere: 70% of respondents said physical stock is checked either monthly or quarterly, meaning verification is a routine embedded in the workflow rather than an annual formality squeezed in before audits. When checking happens often, discrepancies get caught and corrected before they compound which likely explains why the record-accuracy numbers hold up as well as they do.

## Where the system runs well and where it doesn't, simultaneously

Three operational areas score consistently strong: receiving and inspection (80% rated excellent or good), storage practices (also 80%), and material handling (78% rated efficient or highly efficient). Read together, these numbers describe an organisation that handles material competently once it's already inside the gate the mechanics of intake, shelving, and movement are not where the friction lies.

The friction shows up one layer earlier, in planning. Despite 74% of respondents agreeing that min-max stock levels and reorder points are properly maintained, and 72% saying safety stock is adequate, the organisation still reports both stock-outs (24% frequent or very frequent, another 40% occasional) and excess inventory (50% flagging it as a problem). That combination is the most telling result in the dataset. It is not simply a case of "too little" or "too much" it suggests the targets themselves may be miscalibrated for at least a meaningful subset of materials, even though the mechanics of tracking against those targets are functioning fine. A well-run system built on a loosely-fitted forecast will still produce shortages in some lines and surpluses in others, no matter how disciplined the record-keeping is.

ABC classification, used according to 70% of respondents (with 20% saying it isn't and 10% unsure), and the finding that 76% said slow-moving or obsolete stock is identified "always" or "often," point toward classification tools that exist and get used but perhaps not uniformly enough across all material categories to prevent the planning gaps described above.

## Procurement and suppliers: mostly on schedule, unevenly monitored

Procurement timeliness drew a favourable 78% ("always" or "often" on time), and 80% of respondents linked good inventory management directly to lower material costs. Supplier evaluation, however, was reported as regular by only 64% of respondents noticeably lower than the other performance metrics in the survey. Given that supplier delay is one of the most direct external causes of a stock-out, this gap is arguably under-addressed relative to its likely operational impact.

## Technology: the strongest card in the deck

Eighty-four percent of respondents confirmed the organisation runs ERP/SAP or an equivalent computerised inventory system the single highest figure recorded anywhere in the survey. This is significant less for what it says about current performance and more for what it implies about capacity for improvement. An organisation with digital infrastructure already in place doesn't need a new IT investment to close its forecasting gap; it needs to use the system it already has more aggressively for demand modelling and real-time reorder triggers, rather than layering these functions on top of manual judgment.

## A causal map, not a single culprit

A fishbone (cause-and-effect) analysis applied to the two central problems stock-outs and excess inventory traced contributing factors across six areas: People, Process/Method, Supplier, Material, Technology, and Measurement. What emerges from mapping the causes this way is that neither problem stems from one weak link. Coordination gaps between departments, forecasting weaknesses in the procurement process, supplier-side delivery variance, the inherent characteristics of slow-moving material, under-used real-time monitoring, and inconsistencies in stock verification all show up as contributing threads. That breadth is itself informative: it rules out any single-fix solution and points instead toward a coordinated set of interventions across departments, systems, and supplier relationships.



## Issuance method as an open question, not a stated practice

The study also examined FIFO and LIFO as candidate approaches to stock issuance. FIFO's main advantage in reducing the risk of materials aging or becoming obsolete while sitting in storage is directly relevant given that obsolete or slow-moving stock was flagged as a recurring concern. To be clear, this survey did not establish that NLC India Limited currently follows either method as formal policy; FIFO is raised here as a candidate worth piloting for shelf-life-sensitive categories, not as a description of existing practice.

## Overall system sentiment

Consistent with the pattern above, 86% of respondents agreed that sound material management improves operational efficiency broadly, and 80% described themselves as satisfied or highly satisfied with the current system. Satisfaction at this level, held alongside acknowledged planning gaps, suggests employees see the system's foundation as sound their concerns are about calibration and consistency, not about the basic architecture of how materials are managed.

## 6. Findings and Suggestions

### Key findings

Taken as a whole, the study finds that material management at NLC India Limited succeeds at getting the right materials to the right place through fairly systematic purchasing, receiving, inspection, storage, and issuing procedures, with inventory records maintained closely enough to track movement and availability with confidence.

Even so, several weak points stand out. Procurement delays occasionally affect material availability. Excess inventory adds unnecessary storage and handling costs and raises the risk of material deterioration over time. Material shortages, on the occasions they occur, carry real potential to disrupt operations, and supplier reliability plays a direct role in whether materials arrive on schedule. On the positive side, organised warehouse layout makes locating and retrieving materials faster, and routine physical verification catches discrepancies between recorded and actual stock before they grow into larger problems.

### Suggestions

- Review inventory levels on a regular cycle to keep stock closer to optimum rather than static targets set once and left unrevised
- Apply ABC analysis consistently across material categories, with particular attention to high-value items
- Set reorder and safety-stock levels deliberately for critical materials rather than uniformly across all items
- Strengthen demand forecasting so that shortages and surpluses can be reduced together, rather than one improving at the expense of the other
- Assess supplier performance periodically against quality, price, delivery time, and reliability
- Tighten coordination between purchasing, stores, production, and finance departments
- Continue physical stock verification on a regular schedule
- Review slow-moving or obsolete materials periodically rather than allowing them to accumulate
- Organise warehouse space more systematically, with clear labelling, coding, and material identification
- Make fuller use of the ERP/inventory software already in place to strengthen real-time tracking of material movement
- Consider FIFO for materials where shelf life and ageing genuinely matter, based on the characteristics of each material category and existing store policy

## 7. Conclusion

Material and inventory management plays a genuinely load-bearing role in how smoothly and efficiently an organisation like NLC India Limited runs. This study shows that careful planning, purchasing, storage, handling, and control of materials all contribute to keeping the required stock available at the right time and in the right quantity.



management, physical verification, systematic storage, material handling, procurement timeliness, supplier evaluation, and the use of computerised inventory systems. That a large share of respondents connected inventory management with lower material costs, and material management more broadly with improved operational efficiency, only underscores how central these functions are to the organisation's performance.

At the same time, the coexistence of stock-outs and excess inventory shows there is still room to improve inventory planning specifically, even where operational execution is strong. Strengthening demand forecasting, maintaining consistent inventory classification, setting appropriate reorder and safety-stock levels, monitoring suppliers more closely, verifying stock physically on a regular basis, improving cross-department coordination, and moving toward fuller real-time inventory monitoring would all help close these gaps. On balance, the study concludes that a more integrated approach to material and inventory management can meaningfully support cost control, material availability, better use of resources, and overall operational efficiency at NLC India Limited.

## References

- Gopalakrishnan, P., & Sundaresan, M. (2018). *Materials management: An integrated approach*. Prentice Hall India.
- Baily, P., Farmer, D., Crocker, B., Jessop, D., & Jones, D. (2015). *Procurement principles and management* (11th ed.). Pearson Education.
- Dobler, D. W., & Burt, D. N. (2016). *World class supply management*. McGraw-Hill Education.
- Monczka, R. M., Handfield, R. B., Giunipero, L. C., & Patterson, J. L. (2020). *Purchasing and supply chain management*. Cengage Learning.
- NLC India Limited. (2023). *Purchase manual* (revised edition). NLC India Limited.
- Government of India, Department of Expenditure. (2022). *Manual for procurement of goods* (updated June 2022). Department of Expenditure.
- Government of India, Department of Expenditure. (2017). *General financial rules (GFR), 2017*. Ministry of Finance.
- Government of India. (n.d.). *Government e-Marketplace (GeM): A centralized procurement platform for government organizations*. India.gov.in.
- Government of India. (n.d.). *Central Public Procurement Portal (CPPP)*.
- Government of India, Ministry of Micro, Small and Medium Enterprises. (n.d.). *Policies and procurement guidelines for MSMEs*.