

Applying Lean Principles – Reducing Waste in Supply Chain Logistics

Introduction Supply chain logistics encompasses the coordinated movement, storage, and control of goods across functions such as goods-in, picking, replenishment, transport, and stock management. These processes are essential for ensuring service reliability, operational efficiency, and cost effectiveness. However, logistics environments are highly susceptible to non-value-adding activity. Lean methodology, particularly the “9 Wastes” identified by Ohno (1988) and later expanded by Liker (2004), provides a structured way to identify inefficiencies that reduce productivity and increase operational cost. The presence and impact of waste across logistics operations, with a particular focus on **Waiting, Motion, and Transportation** waste. These three categories were selected due to their measurable effect on labour time, workflow continuity, and cost. Quantitative data has been used to determine the scale of each waste, followed by critical analysis and targeted Lean-based improvements aimed at supporting long-term operational efficiency.

9 Wastes	Logistics Supply Chain Example
1. Transport	Moving pallets between distant warehouses because of poor layout.
2. Inventory	Excess safety stock sitting in storage, tying up cash.
3. Motion	Warehouse staff walking long distances to pick items due to poor racking layout.
4. Waiting	Trucks waiting at docks for loading due to scheduling issues.
5. Overproduction	Ordering too many spare parts “just in case,” leading to overstock.
6. Overprocessing	Double-checking shipments multiple times due to unclear QA standards.
7. Defects	Incorrectly labelled packages causing returns and re-shipping.
8. Underutilised Talent	Drivers’ suggestions for route improvements are ignored.
9. Environmental Waste	Running half-empty trucks instead of consolidating loads. Alejandro-Chable, J.D. et al. (2022)

	Lean Waste Overall Graphs Summary			
Waste Category	Sub-category Details	Hours Lost per Day	Daily Cost (£)	Annual Cost (£)
Waiting Waste	Goods-in waiting (9.5 hrs)	28.1	421.5	109,590
	Picker waiting (18.6 hrs)			
Motion Waste	Excess walking (17.7 hrs)	20.3	304.5	79,170
	Searching for tools/items (2.6 hrs)			
Internal Transport	Double-handling pallets (6.4 hrs)	7.65	114.75	29,835
	Internal transport ineff. (1.25 hrs)			
External Transport	Empty running miles		319.20/week	16,598
TOTAL		56.05	840.45	218,595

Wates being investigated.

Transportation waste refers to any unnecessary movement of materials or products that does not add value. Lean literature highlights poor layout, excessive movement of goods, and inefficient routing as common causes. **BusinessMap (2026)**

- Double-handling pallets in goods-in.
- Moving stock multiple times before storage.
- Inefficient route planning for deliveries
- Poor warehouse layout leading to long internal travel distances.

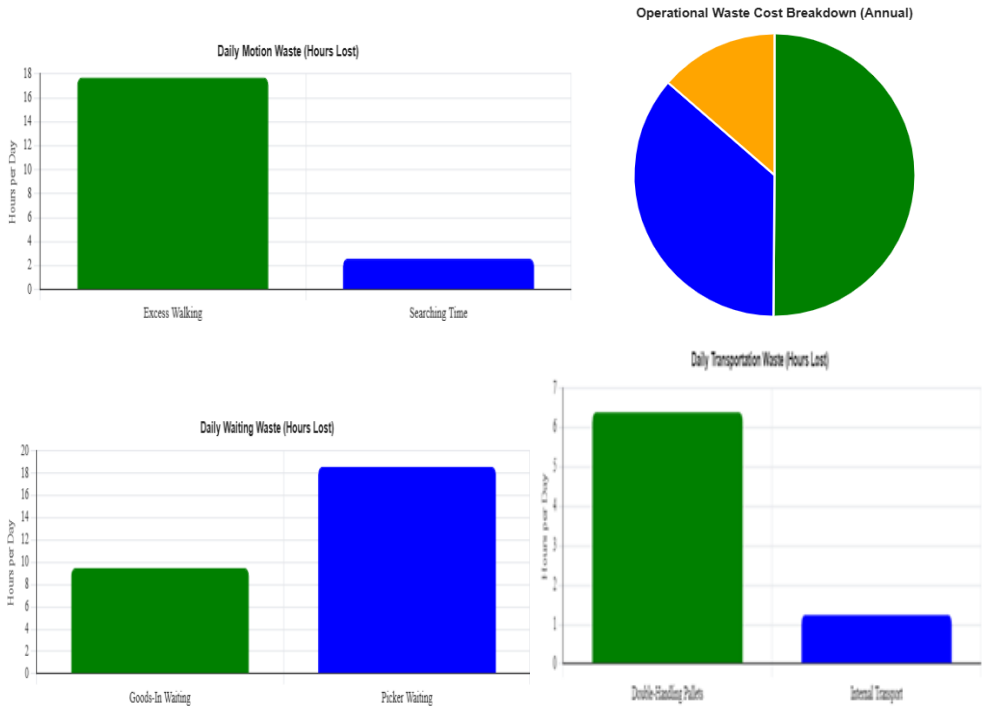
Waiting waste occurs when people, products, or equipment sit idle due to delays in a process. Examples include downtime due to late materials, paperwork delays, or imbalanced workflow. **Lean Enterprise Institute (2026)**.

- Goods in waiting for trailers, documentation, pallets.
- Picking: waiting for replenishment or equipment.
- Transport: waiting for loading, unloading, instructions.
- Stores/stock control: waiting for approvals or system updates.

Motion waste concerns unnecessary physical movement by workers walking, bending, reaching, searching rather than movement of goods. Excess motion reduces productivity and increases fatigue and safety risk. **Pereira, R. (2009)**.

- Pickers walking excessive distances.
- Staff searching for tools, labels, or pallets.
- Unnecessary bending, reaching, manual handling.
- Yard staff locating trailers or keys

Quantification of the data



Proposed Future Improvements

- Waiting Waste Improvement 1:**
Introduce dock appointment scheduling to reduce trailer queueing.
Estimated Value Saved: £15,000–£25,000 per year.
- Improvement 2:**
Implement real-time stock and replenishment alerts to prevent pickers waiting for stock.
Estimated Value Saved: £10,000–£18,000 per year.
- Motion Waste Improvement 1:**
Optimise layout using ABC slotting to reduce walking distance.
Estimated Value Saved: £20,000–£28,000 per year.
- Improvement 2:**
Apply 5S to tools, scanners, and labels for faster access and reduced search time.
Estimated Value Saved: £8,000–£12,000 per year.
- Transport Waste Improvement 1:**
Introduce direct put-away lanes to eliminate double-handling.
Estimated Value Saved: £6,000–£10,000 per year.
- Improvement 2:**
Standardise internal routes for forklifts and pallet trucks to minimise unnecessary travel.
Estimated Value Saved: £4,000–£7,000 per year.

Conclusion - Implementing these targeted improvements across waiting, motion, and transport waste delivers significant operational benefits. By minimising delays, reducing unnecessary movement, and eliminating inefficient handling, the organisation can lower costs, boost productivity, and strengthen workflow reliability. Collectively, these enhancements support a more efficient, safer, and higher-performing logistics operation that contributes to long-term sustainability and improved service quality.

References - Alejandro-Chable, J.D., Salais-Fierro, T.E., Saucedo-Martinez, J.A. and Cedillo-Campos, M.G. (2022) *A New Lean Logistics Management Model for the Modern Supply Chain. Mobile Networks and Applications*, 27(5), pp.1873–1888.

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