

Materials Management: Planning, Control and Monitoring of the Material Flow

Materials management refers to the entirety of all processes for planning, procuring, storing, supplying and controlling materials within a company. It links requirements determination, order processing, warehousing and disposition into a continuous material flow and thereby secures the supply of production. For buyers and supply chain managers, it is the operational backbone that translates strategic procurement decisions into reliable availability.

Key facts

- Materials management encompasses requirements determination, order processing, warehousing, disposition and inventory controlling along the entire material chain.
- Key objectives are availability, minimal inventories and low process costs – often described as the service-level triangle.
- Commonly used tools are Material Requirements Planning (MRP), ABC and XYZ analysis, and disposition metrics such as inventory coverage.
- Excessively high inventories tie up capital, while excessively low ones jeopardise production; materials management constantly balances this tension.
- Digital systems such as ERP and MRP modules automate disposition and purchase requisitions and reduce maverick buying.
- Disruptions in materials management have an immediate impact on delivery dates, contribution margin and customer availability.

Definition: materials management

Materials management is a core area of logistics and deals with the quantitative and qualitative supply of a company with production materials, trade goods and auxiliary materials. It steers the material flow from demand via procurement and warehousing to provision at the point of consumption.

Distinction from procurement and logistics

Procurement management, i.e. strategic purchasing, develops supplier strategies, conducts awards and shapes contracts – materials management implements these frameworks operationally by deriving requirements, issuing orders and monitoring inventories. Within logistics, materials management constitutes the in-house portion, while distribution logistics and transport cover the downstream area. In practice, the distinction often shows in the organisational structure: disposition and warehousing typically sit with materials management, while framework agreements and supplier selection lie with purchasing.

Overview of tasks

The core tasks can be divided into five building blocks: requirements determination and planning, order processing, goods receipt and quality inspection, warehousing and picking, and inventory controlling.

Added to this are cross-functional tasks such as material master data maintenance, bill-of-materials management and coordination with production planning. Without properly maintained master data – such as procurement lead times, minimum order quantities and disposition methods – none of the tasks mentioned functions reliably.

Materials management in the procurement process

Materials management provides purchasing with operational requirement quantities and dates, from which concrete purchase requisitions are created. In return, it feeds purchasing with data on consumption, prices and delivery reliability, which flow into supplier evaluations and material group analyses. This interface is one of the most common sources of error: incomplete requirements information leads to expedited purchases, higher prices and excess inventory.

Methods and procedures in materials management

The control of the material flow follows established methods that are combined in different ways depending on material criticality and consumption behaviour. The goal is always to achieve high availability with the lowest possible planning effort.

Material Requirements Planning (MRP)

Material Requirements Planning (MRP) derives secondary requirements for raw materials, parts and assemblies from primary requirements – such as customer orders and forecasts – via bill-of-materials explosion. From requirement quantities and available stock, the system calculates gross requirements, purchase order proposals and date shifts. Modern ERP systems also support the tracking of open orders and availability checks via Available to Promise (ATP), so that sales commitments are based on real stock levels.

ABC and XYZ analysis

ABC analysis classifies materials by value significance: A-items typically account for the majority of inventory value, while C-items generate administrative effort at low value. XYZ analysis supplements this with consumption consistency – X-items run evenly, Z-items sporadically. From the combination of material classification and risk classes, the disposition strategy emerges: A-X items are planned on a demand-driven basis and managed closely, while C-Z items are often handled via reorder-point or stock-based methods with simple rules. This classification also serves as the basis for stocktaking frequencies and safety stocks.

Reorder-point and demand-driven disposition

With the reorder-point method, falling below a defined reporting stock level automatically triggers an order – suitable for constant consumption and warehouse articles. For series production and expensive components, demand-driven disposition prevails, deriving order quantities and dates directly from the MRP run. In practice, the majority of part numbers run automatically; the planner concentrates on exceptions, bottlenecks and A-parts. In addition, catalogue buying or supplier-managed kanban is often used for low-value repeat parts to reduce process costs.

Coordination with sales and production

To ensure disposition does not plan against forecasts, materials management, sales and production align in regular coordination processes. Sales and Operations Planning (S&OP) links demand planning, capacities and material requirements over the medium term and prevents dispositions from being based

on outdated planning assumptions. At the operational level, daily or weekly material reviews supplement short-term demand changes and delivery problems.

Key KPIs in materials management

Metrics make the performance of materials management measurable and show whether the balance between availability and inventories is being achieved. In practice, certain measures have established themselves as standard.

Delivery service and inventory metrics

Delivery service, i.e. service level, is typically measured as the share of positions delivered in full and on time; target values in industry are frequently above 98 per cent. On the inventory side, inventory coverage, inventory turnover and average stock levels are the central measures. Inventory coverage indicates how many time units of consumption can be covered from current stock – if it falls sharply, there is a supply risk; if it rises sharply, capital is tied up.

Disposition quality and process metrics

In addition, companies frequently measure the number of expedited orders, the share of unnecessary dispositions, shortages or production stoppages due to material shortages, and supplier on-time delivery. The data quality of material masters – such as the share of correct procurement lead times – is also increasingly regarded as a KPI, as it determines the automatability of disposition. A uniform definition is important: without clear measurement rules, service levels and inventory metrics are often interpreted differently between departments.

Metrics in the steering loop

Individual metrics only take effect in combination: if the service level rises while inventory coverage remains constant, that is a genuine performance improvement signal; if coverage falls sharply at the same time, service may have been bought at the price of capital tie-up. Many companies therefore combine inventory and service metrics in a joint scorecard and discuss them together with purchasing, for example in supplier evaluations and savings analyses. The ROI in procurement can also be partly traced back to operational material effects in this way.

Risks and controls in materials management

Disruptions in the material flow rarely arise from a single cause – the interplay of data errors, delivery problems and planning uncertainty is typical. Effective controls therefore act at several points.

Supply and supplier risks

Single-source positions for critical components, long replenishment lead times and dependent supply chains are the greatest supply risks. Countermeasures range from safety stocks and alternative suppliers to systematic single-source management that consciously steers dependencies rather than overlooking them. Material classification and risk classes help to concentrate limited monitoring resources on critical articles. For strategic raw materials such as wood products, proof requirements are added, such as FSC/PEFC certificate evidence in the supply chain.

Inventory and process risks

Excessive inventories frequently arise from inflated safety allowances, outdated procurement lead times

or unresolved legacy stock; moreover, fixed-term contracts tempt buyers into bringing purchases forward when price adjustment clauses are misjudged. Uncontrolled requirements from functional departments – maverick buying – bypass disposition and framework agreements and increase costs and inventories. Controls include clear approval processes for requirements, regular stocktakes and inventory analyses, and automated disposition rules that make exceptions visible.

Data and system integrity

Materials management lives on correct master data: incorrect bills of materials, procurement lead times or batch obligations automatically generate incorrect orders. Regular master data maintenance, four-eyes principles for critical changes and reconciliation between stock records and the physical warehouse are therefore standard controls. Contractual safeguards such as retention of title on supplier accounts or netting agreements in a group context can also become relevant when payment and ownership issues arise at the warehouse.

Current developments in materials management

Digitalisation, supply chain instability and sustainability requirements are significantly changing materials management. Three lines of development currently shape practice.

Automation and digital procurement

ERP-supported disposition is being supplemented by predictive analytics that anticipate fluctuations from consumption history and delivery data. In indirect procurement, companies rely on catalogue content management and punch-out processes to handle requirements without manual order runs and to reduce maverick buying. AI-supported tools are also increasingly supporting request creation and award decisions in the upstream and downstream procurement process.

Resilience and liquidity management

Following the disruptions of recent years, many companies are building buffers: multi-sourcing strategies, deliberately increased safety stocks for critical articles and closer collaboration with strategic suppliers. In parallel, financial synchronisation is coming into focus: instruments such as reverse factoring extend payment terms without burdening suppliers and thereby stabilise the supply chain even in difficult market phases. Materials management provides the inventory and demand data as the basis for this.

Sustainability and reporting obligations

Supply chain decarbonisation has moved from a peripheral topic to a regular task: materials management and purchasing must provide emissions- and origin-related data on materials in order to meet statutory reporting obligations and customer requirements. This expands material master data with attributes such as carbon footprint, proof of origin and certificates. In practical terms: anyone who structures material classes and material masters cleanly today is creating the data foundation for upcoming sustainability reporting.

Typical metrics

Service level / delivery reliability: typically > 98 %

Share of positions delivered on time and in full

Inventory coverage: industry-dependent, commonly 30–90 days

Trend is more important than the absolute value; large deviations indicate planning errors

Inventory turnover: typically 4–12 per year

strongly dependent on industry and product value

Supplier on-time delivery: target usually > 95 %

Basis for supplier evaluation and safety stock levels

Share of automated dispositions: in practice often > 80 %

Indicator of master data quality and process maturity

Practical example

A medium-sized mechanical engineering company with around 12,000 active part numbers suffered from rising inventories combined with frequent material shortages. An analysis showed: over 60 per cent of purchase order proposals were based on outdated procurement lead times, and there were no alternative suppliers for critical A-parts. The company overhauled its disposition in a nine-month project. After implementation, average inventory coverage fell noticeably while the service level remained stable and the number of expedited purchases dropped significantly.

- Reclassification of all articles by ABC/XYZ and derivation of differentiated disposition rules
- Correction of procurement lead times in the material master and discontinuation of outdated manual mark-ups
- Establishment of alternative sources and safety stocks for the top-risk parts (risk classes)
- Monthly scorecard of service level, inventory coverage and expedited orders as a steering basis

Conclusion

Materials management is the link between strategic purchasing, production and sales – it translates requirements into orders and deliveries into production capability. Its success is decided less in individual major projects than in the ongoing maintenance of master data, disposition rules and metrics. Companies that systematically operate material classification, risk monitoring and coordination processes achieve high availability with lean inventories. Given volatile supply markets and growing sustainability requirements, the function is gaining further importance. Those who are well organised here are simultaneously creating the data foundation for modern procurement management.

Frequently asked questions

What does materials management mean?

Materials management encompasses all processes for planning, procuring, storing and supplying materials within a company. It ensures that production and sales are supplied with the required materials on time. Core areas include requirements determination, materials planning (disposition), order processing and inventory controlling.

Which tasks belong to materials management?

Typical tasks include requirements planning, materials disposition, issuing and tracking purchase orders, goods receipt, warehousing, as well as stocktaking and inventory controlling. Added to this are master data maintenance and coordination with purchasing, production and sales. The goal is a high level of availability with minimal capital tie-up.

What is the difference between materials management and procurement?

Strategic purchasing shapes supplier strategies, contracts and awards; materials management implements these frameworks operationally by deriving requirements and steering orders. The boundaries are fluid and depend on the organisation. In many companies, disposition falls under materials management, while framework agreements and supplier selection remain with purchasing.

Which metrics are important in materials management?

Key metrics are service level / delivery reliability, inventory coverage, inventory turnover, the number of expedited orders and supplier on-time delivery. In addition, the data quality of material master records is increasingly being measured. What matters is looking at these metrics together, as individual KPIs can easily be optimised at the expense of one another.

How does Material Requirements Planning (MRP) work?

MRP explodes primary requirements from orders and forecasts via bills of materials into secondary requirements for components and raw materials. From demand, available stock and procurement lead time, the system generates purchase order proposals with quantities and dates. Planners review and process these proposals, with a large proportion passing through automatically in practice.

How can inventory be reduced without jeopardising availability?

Proven practices include sound ABC/XYZ classification, realistic procurement lead times, differentiated safety stocks and focusing monitoring on critical A-parts. In addition, closer coordination with sales (S&OP) and reliable suppliers with short, stable lead times help. Blanket inventory reduction without risk assessment, by contrast, frequently leads to shortages.