

# Master Production Schedule (MPS): The Central Production Control Plan for Procurement and Manufacturing

The Master Production Schedule (MPS) is the medium-term production plan that specifies which finished products are to be manufactured in which quantities and in which periods. It links the sales plan with the manufacturing capacities and provides procurement with binding requirements as a basis for order quantities and delivery dates. For technical buyers and suppliers, the MPS is therefore one of the most important planning parameters of all: almost every material and capacity requirement can be traced back to it. The more reliable the MPS, the more stable the entire supply chain.

## Key facts

- The MPS translates the sales plan into a production-ready time-inventory plan for finished products and important intermediate stages.
- It typically covers a planning horizon of three to twelve months in weekly or monthly increments.
- The concrete order requirements for procurement and suppliers are derived from the MPS via material requirements planning (MRP).
- The key metric for MPS quality is schedule adherence, frequently targeted at over 95 per cent in practice.
- A realistic MPS balances demand, capacity, inventory levels and lead time between manufacturing and suppliers.
- With strongly fluctuating raw material prices and an unstable forecast, the coordination effort between procurement and planning increases significantly.

## Definition: Master Production Schedule

The Master Production Schedule (MPS), also known in German as the main production plan or primary requirements plan, is the medium-term planning level between the aggregated sales plan and detailed material disposition. It specifies in which period which quantity of a product is to be manufactured, taking into account customer backlog, forecasts, inventory targets and available capacities.

## Distinction from Sales & Operations Planning

While Sales & Operations Planning (S&OP) operates at an aggregated level across product groups and with monthly or quarterly granularity, the MPS concretises at item and weekly level. It is thus the operational translation of the S&OP guidelines. In practice, the MPS is often regarded as the conclusion of the planning cascade process before material disposition, as it consolidates the sales forecast, customer orders and inventory strategy into a single, capacity-checked manufacturing programme.

## MPS Line Items and Three-Line Logic

Classically, the MPS is shown as a three-line schedule: gross requirements (sales forecast plus customer orders), planned order receipts from production orders and the resulting projected inventory balance including the safety stock. For key components with long lead times, such as printed circuit boards, castings or special steels, many companies additionally maintain a partial MPS for critical upstream products. In this way, procurement incorporates long lead times into planning early on instead of waiting for the disposition results.

## Role in ERP and PPC Systems

In modern ERP and PPC systems, the MPS is maintained as a planning level with its own time buckets, in practice often divided into frozen zones. Within the frozen zone, changes are only permitted with approval in order to avoid chaos among suppliers and in manufacturing. This is followed by flexible zones, in which the plan is regularly adjusted to new forecast values and order situations through the MPS review.

## Methods and Approach for Creating an MPS

A robust MPS is not created in a rush but through a recurring coordination process between sales, planning, manufacturing and procurement. The goal is always to fix a realistic, capacity-compliant and delivery-capable manufacturing programme.

## Process in Typical Steps

In practice, a fixed procedure has proven its worth, typically repeated weekly or fortnightly in a cyclical manner.

- Record the demand situation: consolidate customer orders, sales forecasts and service requirements, assessing the forecast error in the process.
- Rough planning: distribute gross requirements across periods, taking open production orders and inventory targets into account.
- Capacity check: rough-cut capacity planning against bottleneck resources such as lines, key machines or bottleneck workstations.
- Rough material check: verify availability of critical materials, including long-lead parts and items managed under reorder logic.
- Release and freezing: agree the plan in the planning round, release it and update the frozen zone.

## Time Horizons and Frozen Zones

The MPS is frequently divided into three zones: a frozen zone close to the present day, in which hardly any changes are possible; a semi-flexible middle zone with defined change rules, such as quantity corridors; and a flexible zone in the further horizon. The length of the frozen zone is typically based on the cumulative lead time of the critical procurement items plus set-up and manufacturing times. If the frozen zone is shorter than this lead time, there is a risk of rescheduling with delivery delays or increased procurement costs.

## Alignment with Procurement

Procurement is not a downstream recipient of the MPS but an active co-designer. It contributes supplier lead times, minimum order quantities, raw material price volatility and the capacity situation of suppliers to the planning round. A clear procurement strategy for A and B parts, supported by sound supplier

segmentation, determines which items in the MPS must be critically reviewed. Good practice is a regular alignment between MPS cycles and ordering frequencies, for example for delivery concepts such as Just-in-Time or Just-in-Sequence.

## Key KPIs around the Master Production Schedule

Without measurement, MPS quality remains an assertion. The relevant metrics can be grouped into three categories: schedule adherence, supply and inventory quality.

### Schedule Adherence and Plan Quality

Schedule adherence measures how strongly the actual production output deviates from the planned MPS, typically as the percentage of quantities manufactured on schedule. In addition, companies use forecast accuracy, i.e. the forecast error as a MAPE value, to assess the robustness of the planning basis. In stable series production, schedule adherence values above 95 per cent are considered a solid level, while in project and one-off production, considerably lower values are naturally realistic.

### Supply and On-Time Delivery

Key metrics are the on-time-in-full (OTIF) delivery performance of one's own manufacturing towards customers as well as the on-time delivery performance of suppliers. An increased complaint rate in combination with delivery delays is often an indication that the MPS was put under capacity or material pressure and quality suffered. Supplier planning reliability can also be measured, for example via the number of unplanned demand changes within the frozen zone.

### Inventory and Capacity Utilisation

Inventory metrics such as stock coverage, turnover rate and the proportion of obsolete stock show whether the MPS plans the correct quantities and dates. A systematically too high MPS generates excess stock and tied-up capital, while a too low one generates material shortages and overtime. Planning discipline itself can be monitored via metrics such as the proportion of changed MPS lines after release – a direct indicator of reliability towards procurement and suppliers.

## Risks and Controls in the MPS

The most common mistake in practice is an unrealistic MPS that overstates customer service and internal capacities. This leads to rush orders, expensive special procurement and frustration among suppliers.

### Typical Risk Areas

The risks can be condensed into a few recurring patterns.

- Optimistic forecasts: sales and planning overstate demand; the forecast error is underestimated or not reported.
- Missing capacity check: the MPS is released without a rough-cut capacity check and becomes a paper plan in execution.
- Unclear change rules: without defined frozen zones and change deadlines, short-notice changes flood the suppliers.
- Raw material and market risks: raw material price volatility and single-source supply bottlenecks render the plan obsolete at short notice; solid single-source management and a clear risk policy are

required here.

## **Controls and Governance**

Effective controls start with planning discipline: defined change deadlines and thresholds, a regular planning round with decision-making authority and an escalation rule for deviations beyond defined tolerances. Procurement should keep an eye on supplier commitments such as minimum order quantities or call-off obligations that may arise from an MPS later revised; for pre-financing or down payments, a bank guarantee or surety bond may be considered as security. Legal and contractual questions – such as compensation for damages in the event of short-notice cancellations – must be examined on a case-by-case basis under contract law.

## **Link with Budgeting and Controlling**

The MPS provides the quantity frameworks for budgeting material requirements, staff capacity and working capital. In procurement controlling, it serves as a reference figure to underpin price negotiations, framework agreements and target prices with reliable sales volumes. If reality deviates significantly from the plan, procurement targets also lose their value – which is why plan deviations should systematically flow into monthly reporting.

## **Current Developments and Digital Implementation**

The MPS is becoming increasingly dynamic: shorter product life cycles, turbulent markets and complex supply chains call the classic, static weekly planning into question. Digital planning tools and better data availability are visibly changing practice.

### **Supply Chain Visibility and Real-Time Data**

Supply chain visibility – i.e. transparency over inventory, orders and delivery dates down to the supplier tiers – allows the MPS to be updated more quickly and realistically. Instead of monthly planning pushes, rolling forecasts and short-cycle plan reviews come to the fore. Those who systematically integrate supplier delivery data, for example via supplier portals and structured data exchange, recognise supply risks earlier and can adjust the MPS before material shortages occur. A prerequisite for this is functioning supplier enablement, so that suppliers can actually provide reliable digital feedback.

### **AI-Supported Forecasts and Planning Automation**

Statistical and AI-supported forecasting methods reduce the forecast error, especially with many items and seasonal patterns. Automated scenario calculations make it possible to run through MPS variants – for example in the event of demand peaks or supply failures – in a short time. What remains important: algorithms do not replace coordination with sales and procurement, but improve their decision-making basis. The planning round as a committee remains the linchpin.

### **Supply Chain Compliance and New Obligations**

Planning and procurement processes are increasingly converging, including from a regulatory perspective. The Corporate Sustainability Due Diligence Directive (CSDDD) and related supply chain laws require transparency about suppliers and procurement decisions; quantity- and date-accurate planning data facilitate risk assessment in the supply chain. Topics such as customs clearance in international procurement or toll manufacturing, in which contract manufacturers produce on behalf of others, also demand a clean coupling between the MPS and procurement processes. These regulatory questions must each be examined on a case-by-case basis.

## Typical metrics

### **Schedule Adherence: > 95 %**

Proportion of quantities manufactured on schedule; typical target value in series production

### **Forecast Error (MAPE): < 20 %**

The lower, the more reliable the MPS; strongly dependent on industry and product

### **Supplier On-Time Delivery (OTIF): > 95 %**

Basis for a stable MPS; lower values lead to planning turbulence

### **Plan Changes after Release: < 10 %**

Proportion of changed MPS lines within the frozen zone; indicator of planning discipline

## Practical Example

A medium-sized mechanical engineering company with around 350 employees manufactured to customer orders for a long time without a binding MPS. Procurement reacted to replenishment dates, long-lead parts were frequently reordered by air freight, and on-time delivery to customers suffered. The company then introduced a weekly MPS cycle with a defined frozen zone of four weeks.

- Joint planning round involving sales, manufacturing and procurement with a fixed date and decision-making authority.
- Partial MPS for the twelve critical long-lead parts, coordinated with supplier lead times.
- Defined change rules: short-notice quantity changes only within approved corridors, cancellation only with escalation.
- Weekly alignment of call-offs with the delivery concepts of the main suppliers, including notification of set-up changes in the event of plan changes.

## Conclusion

The Master Production Schedule is the hinge between demand and supply – and thus also the hinge between sales, manufacturing and procurement. A realistic, capacity-checked and consistently maintained MPS measurably reduces material shortages, inventory and special costs. Prerequisites are clear change rules, reliable forecast quality and the active involvement of procurement in the planning round. Metrics such as schedule adherence, OTIF and forecast error make plan quality measurable. Those who understand the MPS as a joint steering parameter rather than a mere manufacturing document lay the foundation for reliable supply chains and stable procurement costs.

## Frequently asked questions

### **What is a Master Production Schedule (MPS)?**

The Master Production Schedule is the medium-term production plan that specifies which products are to be manufactured in which quantities and periods. It links the sales forecast, customer orders and inventory targets with the available capacities. The concrete procurement requirements are derived from the MPS via material requirements planning.

### **What is the difference between MPS and MRP?**

The MPS plans the primary requirements, i.e. finished products and key components, at item and weekly level. Material requirements planning (MRP) derives the secondary requirements for all

subordinate components and raw materials from it. The MPS answers 'What do we manufacture and when?', while MRP answers 'Which material must be available when?'.

### **Why is the MPS important for procurement?**

The MPS provides procurement with reliable quantity and timing frameworks for contracts, purchase orders and supplier capacities. Without a stable MPS, there is a risk of short-notice changes, cost increases due to urgent orders and a loss of trust among suppliers. Procurement should therefore actively participate in the planning round and contribute lead times and raw material price volatility.

### **How long is the planning horizon of an MPS?**

In practice, the horizon is often between three and twelve months, depending on the cumulative lead time of the products and procurement items. What matters is less the absolute length than the structure into frozen and flexible zones. The frozen zone should correspond at least to the lead time of the critical materials.

### **Which KPIs measure the quality of an MPS?**

Central metrics are schedule adherence, forecast quality (forecast error, i.e. MAPE) and on-time delivery to customers and suppliers. In addition, inventory metrics such as turnover rate and stock coverage provide insight. The proportion of changed MPS lines after release indicates planning discipline.

### **How often is the MPS updated?**

Updates are typically carried out weekly or fortnightly as part of a fixed planning cycle, often as a rolling forecast. What is crucial is a defined rhythm rather than spontaneous planning pushes. Changes within the frozen zone should only be possible via a controlled escalation process.