

# Fast Hourly MRP Can Save \$Millions

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When ordering and tracking parts and materials through the supply chain using hourly instead of daily planning periods, inbound warehouses can be eliminated. The cost to build and manage unneeded warehouse space can cost millions of dollars.

Why do manufacturers think they need inbound warehouse space? What is the impact?

1. **Production/Assembly space is limited.** This limited space usually requires small manageable quantities to be pulled from an inbound warehouse. This typically requires additional cost to unpack what was ordered from the suppliers, put it away in the warehouse and then re-pack it into smaller containers.
2. **Protection against transportation delays.** If the warehouse holds 2 or 3 days of material, transportation delays of 1 or 2 days will minimize impact to production. A warehouse holding 2 or 3 days of material requires a large building with lots of people to unpack, put away, pick, repack and send to the production line. These are all non-value added activities.
3. **Cannot trust suppliers to ship on time.** Depending on the timeliness of suppliers, extra inventory is put into an inbound warehouse with the same impact as described above (2).

What is the alternative to inbound warehouses?

1. **Use the same trucks, sea containers and rail cars that deliver parts** and materials to the inbound warehouse. This eliminates additional transportation cost associated with transporting parts from warehouse to production line. Also, this eliminates the cost to locate and pick parts in the warehouse, repack and send them to the production line. Eliminating inbound warehouses can save \$millions.
2. **Deliver the trucks directly to the dock door at the production** facility instead of the warehouse. It takes the same amount of trucks to deliver to the production facility as a warehouse. Trucks can be staged outside in pre-defined parking spaces for long lead-time items that may come from overseas.
3. **Completely unload the trucks at the dock door** and either move the material directly to the production line or a staging area. This eliminates all non-value activities at the warehouse.

How can inbound warehouses be eliminated?

1. **The key is** being able to deliver the right truck/container/rail car to the correct dock door at the right time and being able to completely unload it knowing that the material inside will be needed in a reasonable amount of time. A good target is 2-3 hours. This is possible if you know the hourly demand of the sales orders being built.
2. **When loading shipping containers at the suppliers location, mix parts numbers** so that no part number will last longer than 2 to 3 hours. This can be done if the hourly demand is known in advance.
3. **Order with two kinds of order multiples.** Use an internal delivery order multiple and a pallet size order multiple for external suppliers. If the material cannot fit line side, it can be moved to a staging area using a forklift directly from the truck. The internal delivery multiple is then used for delivery to line side using the right internal delivery method (i.e. KANBAN/Order Card, Pull/Pick List, Call Part or In-House sequencing).
4. **Make sure line side storage requirements** such as flow racks drive packaging requirements which in turn drive order multiples.
5. **Use returnable packaging.** Standard returnable packaging has been designed for stacking and easy movement by forklifts. The same returnable containers can be used for different parts. The quantity of parts that fit in a returnable container determines the order multiples. A returnable modular package is used for the internal delivery multiple, which is then stacked to form a pallet. A full pallet determines the order multiple from the supplier.

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6. **Do not repack.** Fill the returnable modular package at the supplier location. The overall cost is less than having to unpack and repack it at an inbound warehouse. The piece price may be slightly higher, but the overall cost of the completed product is less.
7. **Clearly label the modular packages and the pallet loads with instructions for the forklift driver.** The label should include Part Number, Description, Quantity, Linefeed location where it will be used and staging area if applicable. If the staging area is defined, the driver knows to move the material from the truck to staging area. If there is no staging area, the linefeed location is the destination.
8. **Calculate Material Requirements in Hourly Buckets.** Using pallet size order multiples and hourly requirements, multiple deliveries can be planned in a day at the right hour. If multiple deliveries are not practical, such as sea freight, the same information can be used to load sea containers. The first sea container can be loaded with the parts needed first, the second container with the parts needed next, etc. Loading by required date and time gives a representative mix of parts that closely matches what will be used at the production line. This makes it possible to completely unload a truck/container when it is delivered to the dock door.

### Why has hourly planning periods not been used in the past?

1. Computers were not available or were slow.
2. Material Requirement Planning (MRP) programs were written so they would finish the calculation in a reasonable amount of time, like a weekend.
3. In standard ERP/MRP systems today, daily planning periods (buckets) are typical but MRP calculations take several hours.
4. People have viewed existing ERP/MRP programs as too complex to change.
5. Inbound warehouses are common, why change?

### How is fast hourly planning periods possible today?

1. Inbound tracking using shipping notices and in-transit updates generate accurate estimated times of arrival. These arrivals are added to projected on-hand balances in the hourly period they will arrive.
2. A new Fast MRP calculation engine has been developed. It was complex to develop but it is very simple to use. It is called FastMRP™. It is accurate down to the takt time of the production/assembly line.
3. FastMRP™ was developed for manufacturers who mass-produce highly complex configured products. This means a large number of orders per hour where each one can be uniquely configured.
4. Now MRP can run multiple times in one hour, providing a constant update on the supply chain, looking for shortages and delays. This provides the information needed to react to unexpected events quickly. A MRP run for a complex product, such as an automobile with 1500 components and a production schedule with 32,000 orders will run in less than 5 minutes.
5. FastMRP™ can be integrated with existing MRP/ERP systems from leading software vendors.

In summary, the cost to build and manage unneeded warehouse space, which can cost millions of dollars, becomes savings through cost avoidance. Other benefits include:

1. Lower line side inventory requirements with the ability to dynamically explode new part requirements as the Bill of Material changes and scheduled dates change.
2. Less obsolescence with improved engineering change control
3. The ability to allow changes to customer orders closer to production time

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