Lot sizing in MRP

Once the NRs in both MPS and MRP are determined, a decision must be made as to how many of the items, parts, subassemblies, and end items should be ordered/produced. These decisions are called lot sizing decisions.

2 cases

- **Produce-to-order**
  - Usually
  - Lot size = custom order
  - (i.e., the product is custom made)

- **Produce-to-stock**
  - Size of the lot is dictated by production economics.
  - (i.e., there are only a few standardized designs)

Lot sizing methods

- EOQ
- EOR
- LFL, and
- Period order quantity (POQ)
Large lots

- Machine changeover cost are lower
- Administrative costs incurred in placing orders are lower
- Can take advantage of price breakers offered by suppliers if large lots are considered

<table>
<thead>
<tr>
<th>Q</th>
<th>Unit Price</th>
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<tr>
<td>1-499</td>
<td>$1.00</td>
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<tr>
<td>500-999</td>
<td>$0.90</td>
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<tr>
<td>≥1,000</td>
<td>$0.85</td>
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Small lots

- Lower average inventory levels
- Orders can be produced faster
- The risk of obsolescence due to product change in product designs is reduced
**Issues in MRP**

1. **Lot sizing (for produce-to-stock items only)**

   If economic order quantities are used at higher levels, there is a tendency to build up excessive inventories for lower-level parts & WIP.

   ![Diagram](image)

   - NR = 20
   - EOQ = 100
   - QA = 200
   - QA = 400
   - We only need 80 C's

   → Practitioners argue that using lot sizing in each and every level of BOM may not be the best approach.

**Remedy**

- Use LFL for end items and subassemblies
- Use minimum lot sizes at lower levels

**Purchased items**

- Order the minimum # to take advantage of the price break (even EOQ)<t>

**Items produced in-house**

- **assymptotic**
Safety Stock (SS)

- Use of SS for end items is justified
  (because we want to compensate for the variations/uncertainties associated with LTs and/or demand during LT)

- Use of SS for higher-level items that are used as service parts is also justified (for reasons stated earlier)

- Use of reduced levels of safety for lower level parts and units.

MRP in Assemble-to-Order Firms (ATOOF)

In ATOOF, literally there are thousands of end items with minor variations.
Ex: Automobile
- radio with AM/FM
- radio with AM/FM + CD player
- radio with AM/FM + DVD
- manual adjustment on side mirrors
- automatic

-
An MRP system based on unique end items will explode into several thousands of BOMs.

It would be difficult to handle the situation with a centralized system.

**Solution**

Prepare a final assembly schedule (FAS) one or two weeks in advance and use it separately from the MPS & MRP.

Assign the raws and parts used to produce the end items to 2 groups:

- Items that are common to these unique end items (familiar & runs and parts)
  - Explode the MPS into what is called the modular bill of materials (based on % of customer orders)
- Items not common are handled separately
  - Both are received on time to ensure that the end items are assembled and supplied to customers on time as required by FAS!
Capacity Requirements Planning (CRP)

CRP provides a key link between MRP and shop floor production.

What is CRP?
Once the POs have been determined by an MRP system/program, tests should be performed to assess if the available production capacity (both labor and M/Cs) on the shop floor is feasible to meet the MPS. This part of RRP is known as CRP.

What can we do if the capacity is unfeasible?

A Use

- Overtime (labor cap.)
- Standby equipment (M/C cap.)
- subcontracting (labor and M/C cap.)
A feasibility test in CRP is usually performed by preparing what is known as the load schedule. It is a pictorial representation comparing the actual m/c and labor hrs. required to produce the MPS with the available m/c and labor hrs.

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HW5 is due Friday (Nov. 2nd) in the bin outside my office (Rogers 416) by 11:30 am.
Test 1

- I graded it
- 2 keys have been placed in the Valley Library

0 ?? = Question not answered
and/or work not shown

Concept! = Conceptually wrong

XX

Overall, the performance was good!

\( \bar{X} = 75.71/100 \)
\( S = 13.02 \) (2.4 m in a 25 scale)

High = 100
Low = 34

HW1 = 4.64
HW2 = 8.25
HW3 = 3.26
HW4 = 5.43