How to Lay Out a Warehouse or Distribution Center

Case Problem: Using SLP to plan an expansion

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Toiletries, Inc. – Warehouse Addition

Toiletries, Inc. produces and distributes a line of highly popular toiletry items. These include: toothpaste, shampoo, cologne, hairspray, deodorants, hand cream, mouthwash… some 42 items in all. Products are sold to large retail chains of grocery stores, drug stores, convenience stores and mass merchandisers. The number of stock keeping units is growing rapidly through product-family extensions. These include: toothpaste with various additives and flavors; additional deodorant scents; various shampoo formulations, and the like. Sales last year topped $400 million.

The company's production and distribution is centralized in suburban Toronto, but it has outgrown its current facility. As a result, warehousing is split into three separate areas, one of which is a rented space, roughly ¼-mile from the plant. (See RMA – 7163-4a and b). Most finished goods and all packaging materials are transported between the plant and the leased space.

A new warehouse is planned, adjoining the main production building. It is designed to be taken over by manufacturing as the need for additional production space occurs. Construction will be of reinforced concrete, with a ceiling height on the ground floor of 24 feet clear. (See RMA – 7163-5). A second floor will house inbound cartons of empty glass and plastic bottles, tubs, jars, and similar containers and dispensers. These will be fed by conveyor and gravity to various product filling lines in the adjacent manufacturing area.

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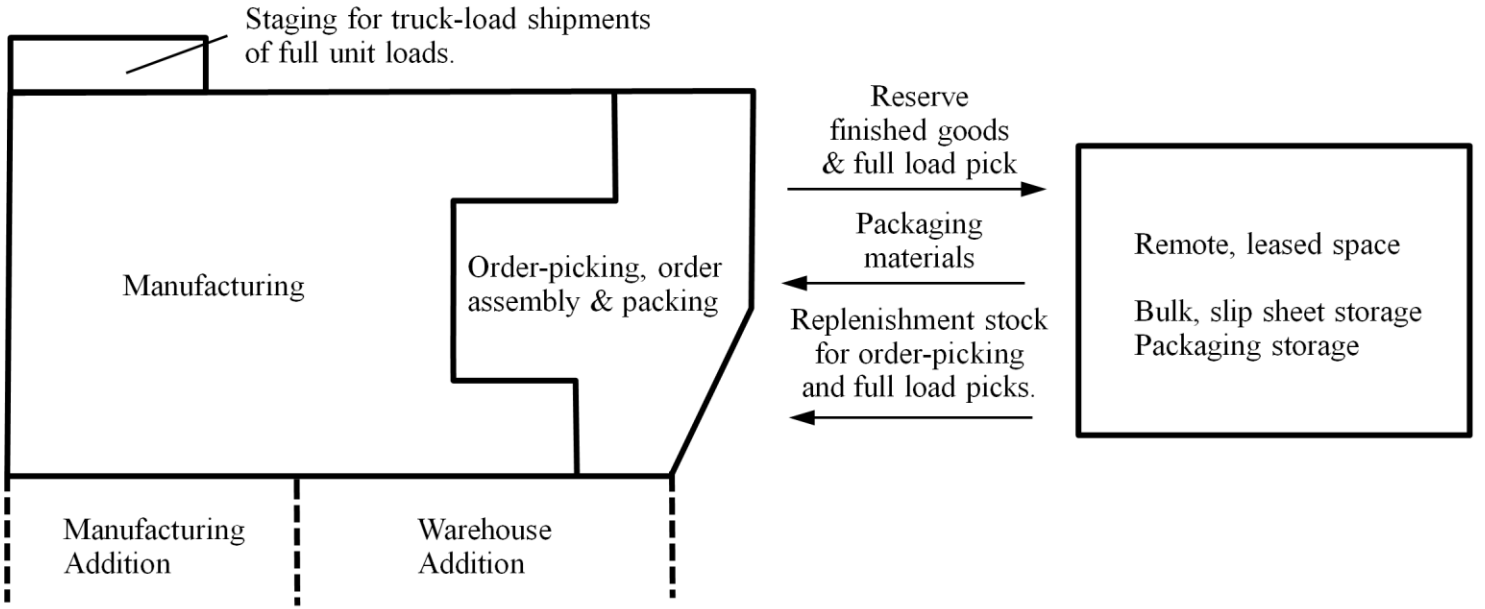
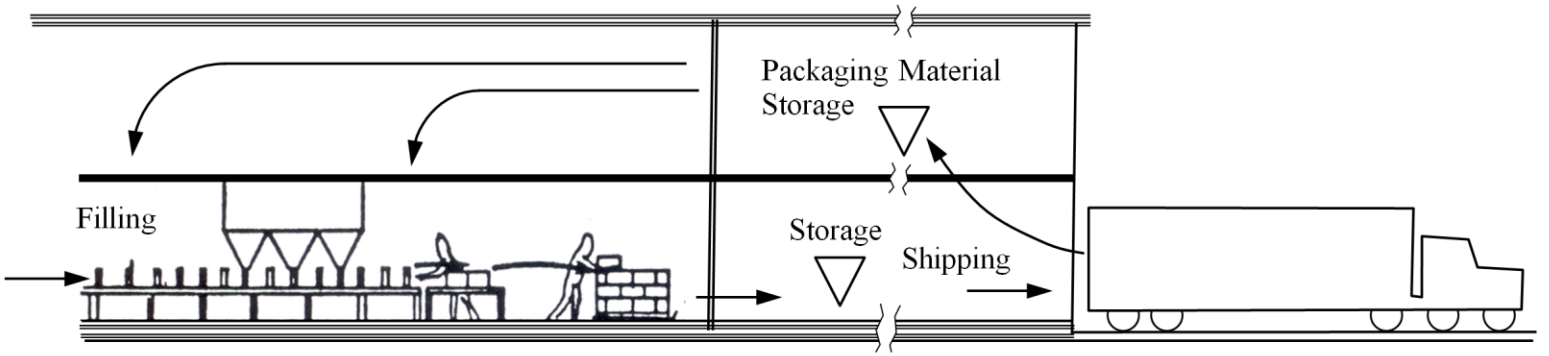
Toiletries, Inc. Current & Planned Facilities



Proposed Warehouse Addition (replaces three warehouse areas above)



Warehouse & Plant (Elevation View)

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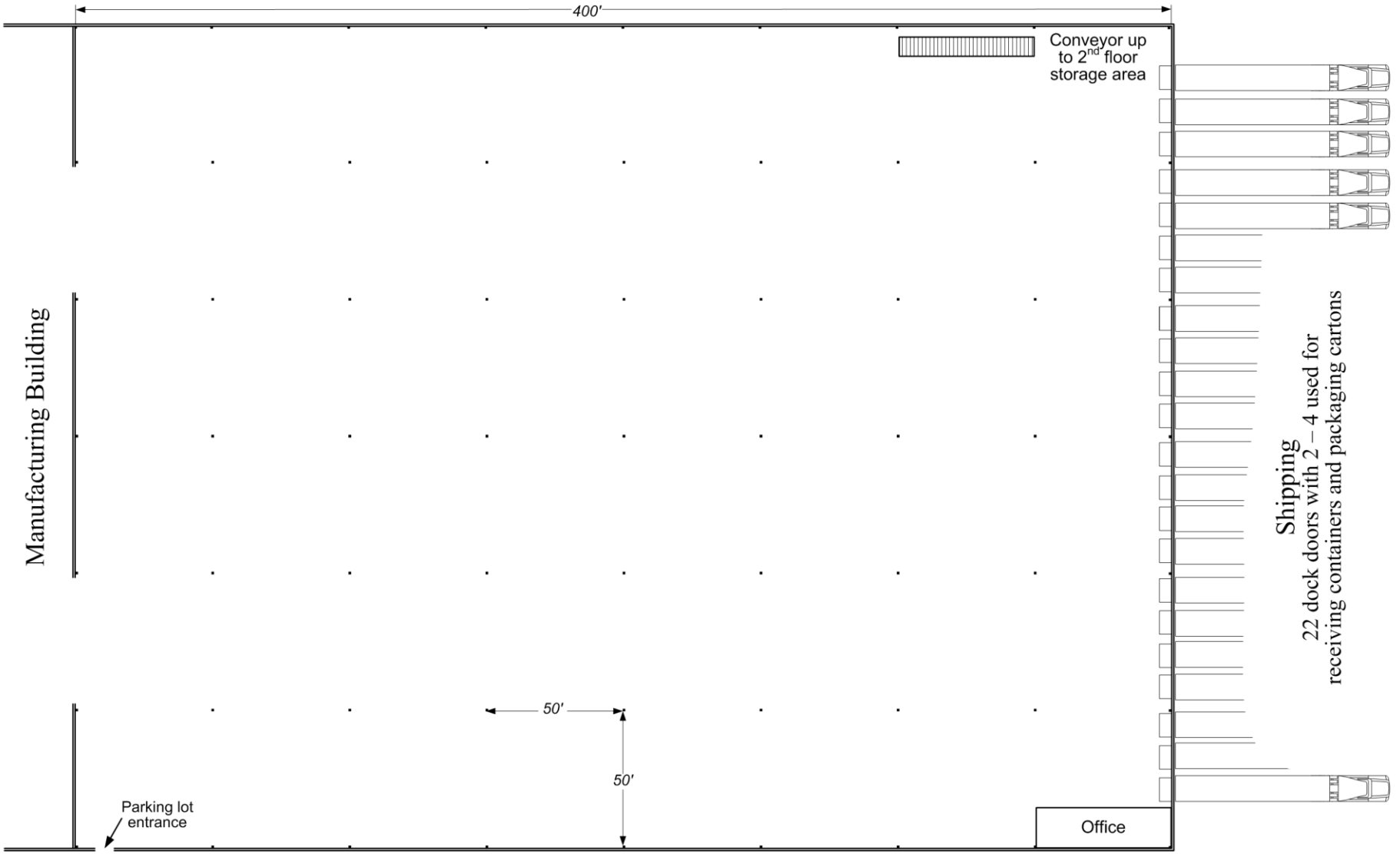
Toiletries Ltd. – Proposed Warehouse Addition



Two-story building with containers and packaging material stored on upper floor

Scale 0 20 40 ft.

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Toiletries, Inc. – Warehouse Addition continued…

The warehouse fills 600 to 1200 orders each day. An order may call for a full pallet-load quantity, individual cartons (cases), or individual items from a broken carton (case). In the past, large retail customers ordered in large, bulk quantities to replenish their distribution centers. Some still order in truck-load quantities, and about 50% of production is shipped this way. The balance is assembled as a combination of pallet-loads and order-picked cases and items. Cases and items are typically picked for individual retail stores and "cross-docked" at the customer's distribution center for immediate delivery to the store. To facilitate this process, Toiletries, Inc. ships its less-than-pallet-load orders in collapsible plastic tubs which are periodically returned by the customer.

Cartons from the manufacturing areas of the plant will be moved and stored on heavy paper slip sheets. These serve as pallets. And edge for gripping the sheet extends beyond the load. Forklifts equipped with a flat, wide blade and mechanical gripper pull the slip sheet load onto the blade. At discharge, the gripper holds the load while the truck backs away. Slip sheets can also be moved on conveyors. The typical slip sheet load is approximately 40 inches wide by 48 inches deep by 48 inches high and weighs less than 2000 lbs. These loads are stable and can be stacked up to three loads high on the warehouse floor. Lighter products can be stacked four loads high.

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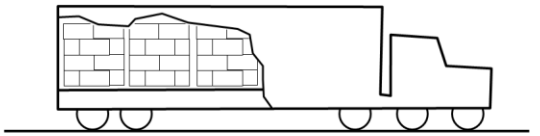
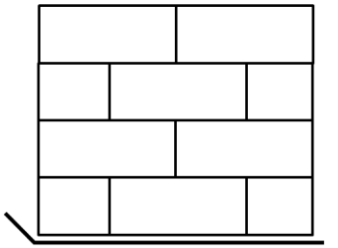
Toiletries, Inc. Units and Orders

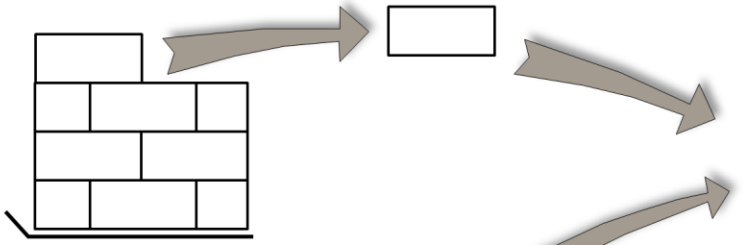


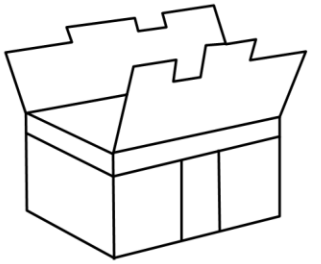
A. Full truckload of unit-load items only



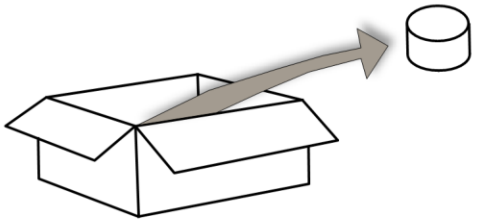
B. Full "unit load"

C & D.
One or more
cartons
(or cases)





E. One or more
individual items.



Collapsible plastic tub for
picked cases and items.

OR Combinations of B, C, D and E on the same order.
(Requires accumulation and/or sorting area.)

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Toiletries, Inc. – Warehouse Addition continued…

All shipments are made by truck. The new warehouse will have 22 dock doors. As many as four will be allocated to inbound packaging materials, as needed. Historically, most shipments have been made as truck-load deliveries to customers' distribution centers. However, larger customers are asking for small drop shipments directly to their retail outlets. As a result, many shipments today contain multiple, less-than-truckload orders, often for more than one customer.

Approximately 40 people will work in the new warehouse facility, concentrated in case-picking, order assembly and packing. Restrooms and a break area will be provided as part of the shipping dock offices. Additional personnel support areas are available in the manufacturing area.

The new warehouse will operate on two shifts. Seasonality is minimal and is limited to holiday gift sales of colognes.

Problem:

Building plans have been approved and ground-breaking is scheduled for next week. You have been assigned to plan the first-floor storage, order-filling, and shipping areas for the new warehouse. Your plan must show the layout of activity-areas and assure top management that material flow is efficient. The size, shape and dock locations for the new building are dictated by site conditions. But, you would like to confirm that the proposed addition is adequate for at least three years' growth.

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Toiletries, Inc. – Questions

1. What Phase of SLP are you in?
2. Can you prepare a list of activity-areas from the information given?
3. What additional key inputs would be useful?
4. What fundamental information do you need to prepare layout plans?
5. In developing a layout plan, which do you feel will be most important:
   a. Flow of materials?
   b. Other-than-flow considerations?
6. What methods would you use to estimate space requirements:
   (Calculation, Conversion from current space, or Rough Layout method)
   a. For bulk storage of full slip sheet loads?
   b. For order-picking of cartons and items?
   c. Order assembly and packing?
   d. For 2nd floor packaging material storage?

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