



By following a "chain link" method of moving products within the warehouse into a revised layout, Bi-Lo Foods was able to complete a major re-racking of 603,000 sq. ft. at its main facility with a minimum disruption of service, and simultaneously making

significant improvements to increase warehouse efficiencies. Racks were supplied by Engineered Products and the overall warehouse layout redesign developed by Bi-Lo Foods in conjunction with representatives of Kom International.

Innovative "Chain-link" method ensures smooth warehouse changeover

By Marc A. Wulfraat

By adopting a unique approach to resetting its distribution center, Bi-Lo, Inc., Mauldin, South Carolina, performed a major overhaul of its internal warehousing operations involving a new rack layout, re-arrangement of product locations to achieve faster throughput, and updating of equipment and fixtures. Products were moved within the warehouse during the reset using a system aptly called the "Chain Link" method (described fully later in this article). The company achieved all its major goals with a minimum of disruption of operations.

Bi-Lo, Inc. operates 195 grocery stores in the trading area of North Carolina, South Carolina and Georgia. Since its origins in 1961, in Greenville, South Carolina, Bi-Lo has experienced a dramatic growth in sales such that today, the company is recognized as being a leading food distributor in the South East. Bi-Lo has been a subsidiary of the holding company, Ahold NV of the Netherlands, since 1977.

Including several building expansions, Bi-Lo has operated its 603,000 sq. ft. full line dry grocery/repack/tobacco distribution



To achieve the maximum high storage capacity required efficient slotting of product in the Bi-Lo Foods distribution center.



Bi-Lo Foods has begun shipping to stores on plastic pallets (Cadillac), which reduce worker and product injury sometimes caused with wood pallets.



Picking bays were ergonomically designed to prevent unnecessary bending and twisting on the part of Bi-Lo's order selectors.



To obtain a high level of forklift usage with minimum disruptions Bi-Lo installed a new battery charging room with 60 state-of-the-art chargers, furnished by C & D Charter Power Systems.

center in Mauldin, South Carolina for over 25 years.

Despite the fact that Bi-Lo has traditionally experienced higher than average productivity rates, the facility needed a facelift to improve overall efficiency, to reduce operating costs and to provide additional capacity to sustain anticipated future growth. As such, Bi-Lo management established a proactive set of corporate goals:

1. To reduce the firm's reliance on 6 outside storage warehouses (holding 50 percent of corporate inventory volume) thereby eliminating product movement between facilities.
2. To improve storage capacity and reduce product damage by replacing floor storage and drive-in racks (formerly 40 percent of building capacity) with both single and double deep racks,
3. To reslot according to a strategy of fast velocity product in the front and slow velocity product in the back of the building to enhance order selection productivity and ergonomics.
4. To establish a secondary pick line for specific vendors within a 146,000 sq. ft. facility across the road from the main distribution center to alleviate pressure during receiving hours.
5. The replacement of all remaining gas powered sit-down counterbalance forklift vehicles with new electric standup deep reach trucks (Crown).
6. To install a new roof on the building with additional ventilation and ceiling fans to improve air circulation.

7. To upgrade 25 percent of its over the road tractor units with state of the art electronic engines.**T**

eam Approach:

To approach the first four objectives effectively, Bi-Lo employed the services of Kom International, a materials handling consulting firm specializing in the design, implementation and reset of food distribution centers. A project team of specialists consisting of Bi-Lo distribution managers and Kom consultants was established to spearhead the changeover. The team approach was instrumental in the success of the project as it combined practical operations experience with technical warehousing expertise.



Three key executives at Bi-Lo spearheaded the firm's successful changeover of its warehouse operations. Left to right: Gene Vaughn, distribution projects manager; David Cooke, vice president, distribution; Jack Simmons, site manager, dry grocery operation.

Marc A. Wulfraat is a senior consultant with Kom International, Inc., specializing in warehousing and distribution in the food industry. He is a graduate of Concordia University and received an MBA in International Business from McGill University and The Manchester Business School in England. This article draws upon his experience with a major facility reset project at Bi-Lo, Inc.



At Bi-Lo, the re-racking and re-slotting of the distribution center was made easier with the use of radio frequency transmission of necessary information.



The LXE radio frequency units mounted on the forklifts provided real time inventory tracking throughout the changeover period.

In planning the strategy to reset the Mauldin facility, the Kom/Bi-Lo team faced a difficult challenge. "In a relatively short time frame, we basically had to reslot 5,500 grocery items within the same four walls while reracking the facility, upgrading the building, maintaining store service levels, opening 10 new retail stores and remaining sane," stated Gene Vaughn, Bi-Lo's Distribution Special Projects Manager. The potential complexity of moving 27,000 pallets up to 3 times each, without outside expansion space, was dramatically simplified through a proactive and carefully planned team approach.

Getting the Job Done:

Our first step was to identify and evaluate options for new operating systems and layouts for the main facility and the secondary warehouse across the road. The evaluation of alternative layouts and different slotting strategies/operating systems is a critical first step in the path to developing an efficient and effective food distribution center.

This initial planning helped Bi-Lo identify a three-phase strategy as follows:

- 1. November, 1993-Replace floor storage of pallets at

the secondary warehouse with a rack and aisle layout slotted by case height within family grouping (e.g. canned goods, glass product, boxed goods, liquid soaps, etc.).

- 2. December 1993-Transfer the receiving for 70 vendors and the subsequent order selection necessary to the secondary warehouse. This move pulled 1,200 SKU's and 20 percent of the shipping volume out of the main facility, providing a maximum reduction in receiving activity.

- 3. Dec. 94 to Mar. 94-Reset the main dry grocery facility to attain more storage capacity by:
 - Filling the rail well with concrete to capture more usable storage space
 - Replacing the former salvage operation with a dock gaining 13 new receiving doors
 - Replacing all floor storage and drive in racks with single and double deep racks
 - Reslotting all products in the warehouse such that 80 percent of the volume is shipped from the front half of the building.

The completion of steps one and two provided the relief necessary to commence the changeover of the main facility. At this point, a 10 phase rack installation was developed by

VITAL FACTS

NAME OF COMPANY: Bi-Lo, Inc.
LOCATION: Mauldin, South Carolina
SIZE OF DISTRIBUTION CENTER: 603,000 sq. ft.
NO. OF STORES SERVICED: 195 supermarkets

DEPARTMENTS

Products	Size (sq. ft.)	Aisle Width	Rack Height
Dry grocery	545,000	11'13"	24' to 32'
HBA/Candy	49,550	11'13"	24' to 32'
Tobacco	8,450	11'13"	24' to 32'

NO. OF ORDERS SHIPPED PER WEEK: 600
AVERAGE NO. OF PIECES PER ORDER: 1383
FARTHEST DELIVERY POINT FROM DISTRIBUTION CENTER: 250 miles
RADIUS WITHIN WHICH 75 PERCENT OF STORES ARE LOCATED: 130 miles
NO. OF OVER-THE-ROAD TRACTORS: 135
NO. OF DRY TRAILERS: 278
NO. OF REFRIGERATED TRAILERS: 107
NO. OF SHIFTS OPERATED IN WAREHOUSE: 2
NO. OF RECEIVING DOCK DOORS: 70

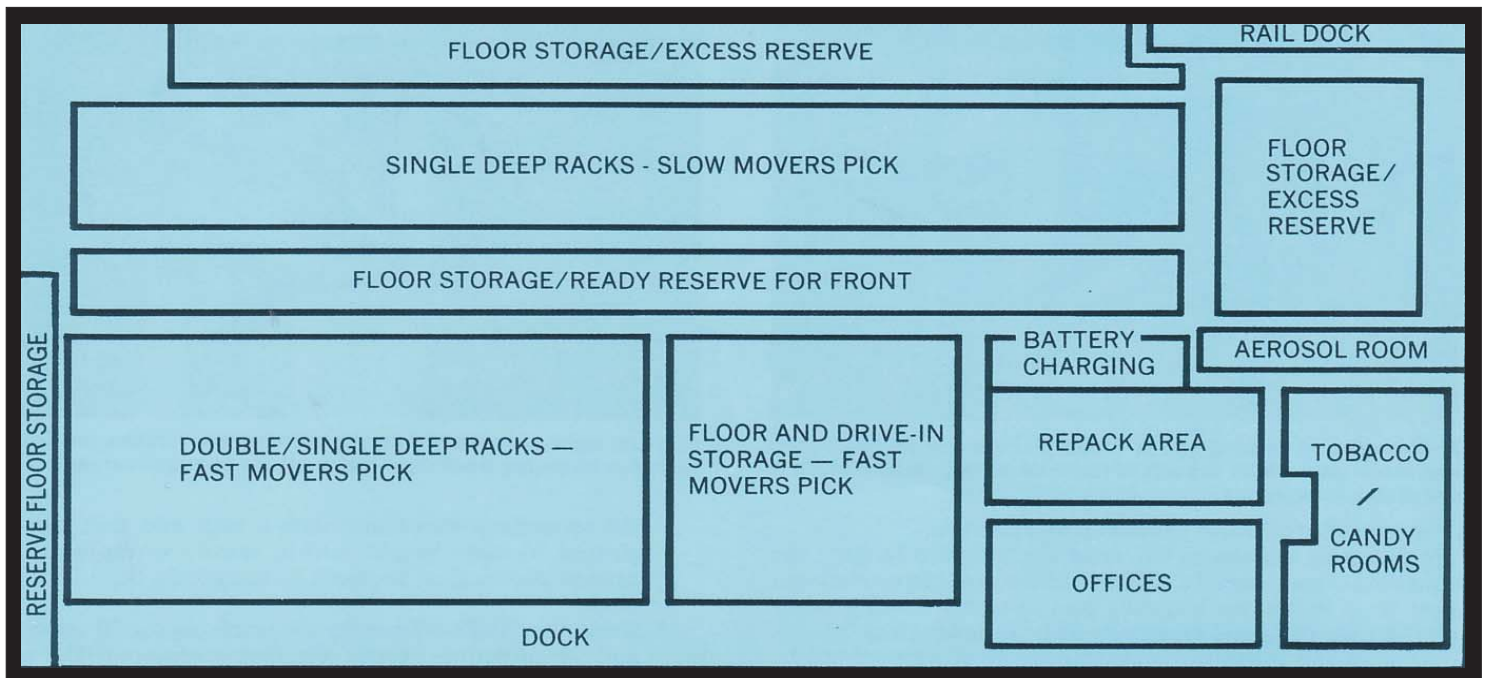
EQUIPMENT

Type of Equipment	No. of Units	Make
Tractors	135	White/Volvo/Ford
Trailers (dry)	278	Great Dane/Trailmobile Fruehauf
Reefers	107	Great Dane/Trailmobile
Traffic doors (freezer)	4	Ry-Tec
Traffic doors (cooler)	10	Ry-Tec
Storage racks		Engineered Products
Forklift trucks	80	Crown
Pallet jacks	141	Crown
Forklift radio frequency units	80	LXE
Plastic pallets	20,000	Cadillac Products
Warehouse lights		Wide Lite
Battery chargers		C&D Charter Power Systems

DESIGN/ENGINEERING FIRM: Kom International

KEY PERSONNEL:

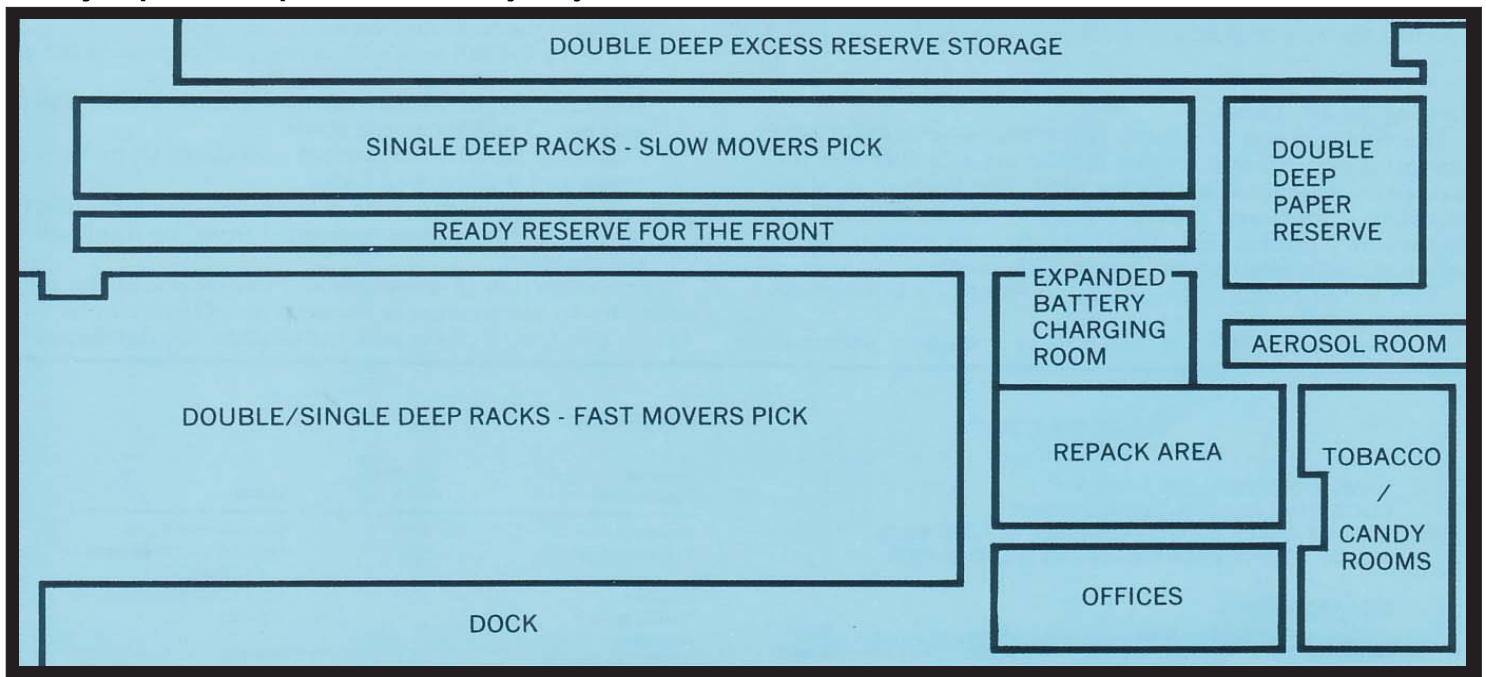
David Cooke, Vice President, Distribution
 Gene Vaughn, Distribution Projects Manager
 Jack Simmons, Site Manager, Dry Grocery Operation



BEFORE

The above simplified drawing shows the location of the various departments in the Bi-Lo Foods warehouse before the new layout plan was implemented. Two major objectives

were to reduce product damage and enhance order selection productivity by slotting products according to movement.



AFTER

The two major objectives cited above were accomplished by replacing floor storage and drive-in racks with both single and double-deep racks. Also fast movers were moved to the

front of the building and slow movers to the rear. By using the "chain link" method of moving product 95 per cent of items went directly to their final home slot in a single transfer.

this point, a 10 phase rack installation was developed by the Kom/Bi-Lo team in coordination with the rack supplier, Engineered Products, Inc. of Greenville, South Carolina. Each phase of rack installation covered a section of the 603,000 sq. ft. being reset at the main facility.

To facilitate the process of maneuvering products within the same four walls without outside storage, Bi-Lo management successfully reduced inventory levels from 3.6 weeks to 3.0 weeks within a short time frame. Combined with the transfer of 70 vendors to the secondary warehouse, the reduction in inventory provided enough unoccupied pallet positions to accept pallets being transferred out of a building area in which work was in

process.

The most difficult challenge being faced was the maintenance of an organized pick line for all 6,700 products at ground level such that each item could be selected and shipped on a continuous basis. Under no circumstances could the disruption of the reset affect Bi-Lo's store service levels. The task was successfully accomplished using the "chain link" method described below. "It is like performing open heart surgery on a patient while he is still up and walking around," cites David Cooke, Bi-Lo's Vice President of Distribution. "The net result is that we moved 95 percent of the items *directly* to their final home slot in a single product transfer without the usual two to three pallet transfers saving us up to 60,000

pallet moves. This saved us a significant amount of labor and overtime expense."

"The Chain Link Method"

This method is one of several options, which can be used to execute the reset of a food distribution center and consists of the following steps:

1. Final slot the distribution center so that every item in the facility has a current slot location address and a new fixed slot location address. The strategies for slotting a warehouse are beyond the scope of this article, however an informative article on this topic appears in the January/February, 1994 issue of *Grocery Distribution* (pg. 9).

2. Develop a computer database of all existing storage address locations as well as a database of all future storage address locations (upon completion of the reset). Each storage address location is a pallet address within the facility and should have "pick" or "reserve" status.

3. Perform a computer search for existing "pick" slots within the warehouse, which are open (i.e. No item is actively slotted at that location).

4. Generate a first phase product move whereby items are transferred to the available open slots if their new final slot address corresponds to the open slot address.

5. The completion of phase one will liberate a number of other slot address locations within the facility, which can in turn be final slotted in a similar fashion. This process repeats itself until completion of the changeover.

6. After the completion of each phase, it is important to update the database containing the whereabouts of each pallet to avoid the loss of product during the process.

A series of 30 stages of product moves

were required for Bi-Lo to complete the changeover of the facility during a four-month period. These stages were coordinated with the installation of new racks and sprinkler systems, the dismantling of old drive-in racks, the roof/ventilation system/lighting modifications and changes to battery charging areas which were ongoing throughout the reset.

To simplify the process of tracking pallets being moved throughout the facility during the reset, Bi-Lo relied on its internally developed pallet locator system. Each time an operator transferred product to any of the 37,000 pallet locations within the facility, the warehouse computer system was instantly updated real time via LXE radio frequency terminals mounted on every lift truck.

Results:

The changeover of the Mauldin dry grocery facility will yield the following results:

1. Replacement of floor storage and drive-in racks with single and double deep racks provides a 23 percent increase in net working storage capacity of the building adding 300,000 cases capacity.

2. Elimination of five and six pallet deep floor storage for reserve inventory significantly improves forklift productivity due to elimination of lengthy product searches/pallet moves to access desired skid; and dramatically reduces product damage.

3. Storage of product in racks increases available pick facings, improves selection productivity and facilitates inventory control and housekeeping efforts.

4. Replacement of gas powered forklifts with electric deep reach trucks permits a

cleaner work environment and a reduction in aisle width requirements.

"We believe that by racking our entire main facility, we can eliminate three outside storage facilities and we anticipate an increase in overall throughput of 20 cases per man-hour as a result of reslotting the warehouse and eliminating double handling of product," according to Jack Simmons, Bi-Lo's Site Manager for the dry grocery facility.

The reset facility will have the capacity to hold over 37,000 pallets in a more *ergonomic* environment for order selectors. Larger slot openings at ground level were incorporated into the plans to minimize the bending and twisting activity prevalent in the selection process. Furthermore, the revised slotting of the facility takes into account such factors as case weight and height to minimize the height which heavier products are lifted by selectors.

As part of the program to improve working conditions for order selectors, Bi-Lo introduced 20,000 plastic pallets (Cadillac) eliminating safety problems with wooden pallet boards and protruding nails. Compared to wood pallets, the plastic pallets are lighter to handle, last longer and are nestable which is important when warehouse space is at a premium.

Bi-Lo's proactive steps towards improving its distribution facilities are part of an overall corporate commitment to improve service to stores, to improve the working environment for associates, to continue successful sales growth and to maintain a reputation for excellence.

OUR OTHER CLIENTS INCLUDE: Albert Heijn B.V. • Bi-Lo, Inc. • C&S Wholesale Grocers, Inc. • Dillon Companies, Inc. • First National Supermarkets, Inc. • Giant Food Stores, Inc. • Grace, Kennedy & Co., Ltd. • Hannaford Bros. Co. • Lucky Stores, Inc. • Marsh Supermarkets, Inc. • Minyard Food Stores, Inc. • OK Grocery Company • The

Oshawa Group Limited • The Penn Traffic Company • Promodes • Quality Markets, Inc. • Richfood, Inc. • J. Sainsbury Pic. • Etablissements Schiever • Seaway Food Town, Inc. • Shaw's Supermarkets, Inc. • Sobeys Inc. • The Stop & Shop Companies, Inc. • The Vons Companies, Inc. • Weis Markets, Inc.

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