Session Chairman:

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"Resource Use"

TOTAL RESOURCE USE

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My presentation concerns equipment in use and being developed for use in the distribution centers of our industries.

The slide series depicts the latest in types of racking, material handling equipment, selection systems and sortation devices.

The presentation closes on challenges to all of us for the future.

1. Due to the very high labor content in the cost of doing business, and the continued loss in the productivity level achieved in our industry, the need to mechanize and automate has become a necessary and vital consideration.

2. The cost of permitting inefficient storage methods is becoming prohibitive.

3. Restricted space to operate high lifts makes the put-away and replenishment function time-consuming and costly. With increasing emphasis being placed on dating of merchandise, efficient rotation in storage is almost mandatory.

4. There is an opportunity for excessive damage in tight working space.

5. Selection from drive-in and drive-through racks is difficult and time-consuming. There is a possibility of OSHA violation or worker concern about selecting product from underneath full pallets in storage slots.

6. There is a better way of storing a small number of SKU's with a high inventory and turnover--the use of gravity flow racks. Product is loaded on the receiving side of the facility and, under a controlled flow, travels to the shipping side of the building. First-in, first-out rotation is achieved--at no handling cost.

7. Selection is not done while the product is in the flow racks. The wide aisle is used by the high lift operator to remove captive pallets from storage and unload into the selection line. No one but the high lift operator is permitted in this aisle during replenishment. The aisle shaded in blue is where the selectors operate. Rotation is not only achieved while the product is in storage but during the selection function.

8. The use of narrow aisle fork trucks with lifting capacities of 40 feet

with loads exceeding 1,500 pounds, is becoming common in our industry. This truck's side-to-side movement in a 63" aisle is controlled by a wire buried in the floor eliminating metal guide tracks on the floor. Pallets are placed in storage slots by side loading 90° to the direction of travel by the truck.

9. On this version, the truck is guided by a wire in the floor; however, the operator goes up and down with the load.

10. This lift truck called a turret truck permits placing or removing a pallet from both sides of a narrow aisle without repositioning the truck. The forks rotate 180°.

11. Picking from several levels--especially important to wholesalers who have many low velocity items--can be achieved with this unit with total safety of the operators.

12. This unit has a 180° turning radius on the forks permitting selection from both sides of the aisle.

13. Here the lift is guided in the aisle by a wire in the floor. The operator's safety is protected by a tether which allows total freedom of movement but will not allow the operator to fall from the pallet.

14. This unit is very versatile operating in narrow aisles--wire-guided.

15. This narrow aisle truck is guided in the aisle by a channel on the floor. It is also provided with an electric sensing device that automatically positions the truck laterally to permit pallets to be placed in slots in the higher levels without risk of hitting the rack uprights.

16. Another version of a turret truck using an over-the-load turning mechanism--there is limited pallet height load capacity but has all the other advantages of the turret truck.

17. A wide aisle truck completely controlled by the operator.

18. This cart is a wire-guarded riderless four-wheel pallet transporter. All electronic components are located in the front for easy maintenance. All controls are printed circuit boards. It is battery-powered and will operate 16 hours between charges at a speed of 1.5 mph.

19. The sensing device in the front of the cart not only protects the battery and control equipment but stops the cart when it comes in contact with another object. It is equipped with a device to accumulate carts on spurs and at loading and unloading stations.

20. Optional use provides for an automatic load and unload station system. Carts activate loading and unloading conveyor. Capable of opening and closing doors, turns on lights, even blows its own horn.

21. Another type of load.

22. Automated storage and retrieval system are in use today--with more on the way.

23. Racking has become an important feature with significant implication in new facilities.

24. Today an increasing number of systems support the building. The internal revenue service has rules that these special purpose structures can, for tax purposes, be depreciated as equipment rather than building. Such storage facilities often qualify for investment and sales tax exemption--

adding up to a savings of more than 20% as compared to a comparable free-standing building.

25. Feeding the system with product is under computer control. Here, the operator is given the storage location information which has been generated by an on-line slot management system.

26. The product is placed on conveyors that feed automated storage equipment.

27. The other end of the conveyor line--Here are the feed lines to a stacker crane storage system. Pallets are fed automatically to a system that feeds individual storage lanes--the pallets are then picked up by the crane and placed in the proper storage location.

28. A typical narrow stacker crane aisle. In this installation, the crane is computer-controlled. Modern systems apply the distributive computer concept, which is--several small computers share tasks formerly performed by a single large computer. Each S/R machine has its own on-board processor which provides the automation. The infeed conveyors are controlled by a similar processor.

29. This crane is equipped with radio-controlled rack entry modules (REM's). The crane retrieves pallets of product from storage and delivers the pallets to the correct picking slot.

30. A close-up of the "REM" and the crane operator location. This crane system carries two pallet loads on each in/out trip--reducing travel time and increasing its capacity/hour. The REM is the solid yellow surface which is electrically raised and lowered when under a pallet, making for a smooth pickup and dropoff of the load.

31. What was accomplished in the last decade?

32. A first step that was taken to increase productivity was the introduction of the double length pallet jack. The advantages are obvious: double capacity when used for transport or selection activities--reduction in labor and capital expenditures and reduced maintenance labor requirements.

33. Cart selection and the introduction of tuggers to permit the assembly of "trains" of carts--permitting the selector a higher percentage of selection time by reducing travel time.

34. However, the improvement in productivity by the introduction of double length pallet jacks and cart trains for pallets or carts was only the first step. The traditional selection methods of having the order-picker go to the product and when selection was completed, spend time transporting the product to the dock, began to be seriously questioned.

35. Companies began to look seriously into different methods of moving product from the dock, and new questions were raised on truck loading techniques.

36. Much work has been completed to improve the efficiency of the system. The introduction of towlines which eliminates the labor burden of transporting products to the dock from the selection area.

37. And radio-controlled tuggers that reduce selector walking time, permit safe movement of product without the need of a person.

38. The rotating warehouse concept--bringing the product to the selector--has been introduced and is being used by a number of companies. The picker remains at a fixed location, travel time is practically eliminated, and he can concentrate on his primary task--selecting merchandise.

39. Here is the automatic change of direction--mechanism of the rotating warehouse system: two turntables working in a pre-set sequence reverse the direction of cars of product--to repeat the cycle of selection.

40. Other methods were needed--the mechanized pick-to-belt conveyor or batch system is used by some companies. The computer combines several orders. Pick density goes up and walking time goes down. The labor cost of travel time to the dock is eliminated.

41. The system is adaptable to refrigerated environments. Here, a pick-to-belt system is used to select frozen food.

42. What's ahead?

43. Computer controlled systems are being installed. A typical automatic system permits individual stores to be selected eliminating the need for the additional function of sorting cases that is inherent in batch selection techniques.

44. Many computer controlled systems are replenished manually. Some systems have mechanized replenishment. Fork trucks bring pallets to a depalletizer where individual layers of cases are removed mechanically and fed onto power takeaway conveyors. The cases are fed to lane loaders where the operator directs the cases into the appropriate lane.

45. The high cost of freezer space and the very high cost of using people in a hostile environment have led to the installation of computer controlled selection by automatic equipment in freezer operation.

46. Here cases of frozen food are being selected and conveyed in a predetermined computer controlled sequence in a freezer operation.

47. Another challenge is the handling of broken case items--health & beauty aids, cigarettes, candies, spices--for example. This equipment picks such items automatically. The computer controlled module is indexed to the proper lane and picks the correct number of these small items at high rates.

48. These items are then conveyed to a packing station--all those small boxes, bottles, and tubes now can be selected--automatically.

49. Selection of cases to belts or conveyors when manually performed is usually done by batching store orders. This situation requires the installation of sorting equipment. The equipment available today is diverse although it is activated with the same basic equipment--a laser scanner. Here a high speed belt system is presenting cases to be scanned in prior to being sorted.

50. There are many methods in practice today for sorting product. A "pop-up" wheel diverter is shown transferring a case into the proper accumulation line. The "pop-up" diverter keeps the case being sorted under positive control, making for a smooth transition of case direction.

51. Tip tray sorters are also used. They lend themselves best to handling cases containing product that are unbreakable. Loading the tray

sorter requires the cases to be literally thrown from an input conveyor onto the tray. The loading and unloading of trays puts undue strain on breakable products.

52. A typical application of a tip tray sorter handling general merchandise. This configuration permits the case handlers to load carts for more than one store at a time; yet, handle a diverse size of case with ease.

53. A pusher bar sorter in use. Cases are directed to the accumulation line line at 90° to the direction of travel of the feed conveyor.

54. This air operated pusher diverter is used for a variety of products, some of which seemingly do not appear to be capable of sorting automatically.

55. An indication of the size of installation using sorting.

56. A good example of a different use of a tray sorter. Product is removed from the master carton, price marked, and then placed on a tray to be sorted by store.

57. A different view of the same application.

58. An expanded view of the various applications and flexibility of the tray sorter.

59. One of the reasons why the use of a tray sorter is not practical for "breakable" merchandise.

60. A method widely used with conveyor systems for truck loading. Products are sorted by store or route. Use of this system minimizes truck dock congestion and reduces the number and use of material handling equipment.

61. The approach--A telescoping conveyor which moves directly into the truck can be used in floor loading or when palletizing cases. In both situations the cube of the trailer can be maximized, damage controlled, and a high level of productivity achieved. The speed of the conveyor has a tendency of pacing the loader, provided the speed is not excessive.

62. The computer has other uses than those already mentioned. Not enough scientific use of the computer has been made by our industry. Two potential areas not used are; the predetermination and review of product slot location, with the goal of reducing transportation time and distance during the put-away function, regardless of the equipment used. Second, the maximizing of the cube of the building by matching the pallet cube to the proper sized slot opening. How often have we observed in distribution centers wasted space in storage slots?

63. An on-line system of slot management to control the handling of inbound merchandise is a must today. A good system reduces the put-away cost by reducing the number of "handlings" of a pallet, and by increasing the cube utilization by using a floating slot storage system.

64. Robots--Are they part of our future?

65. The automotive industry has successfully introduced robot welding machines.

66. Robots are not limited to welding.

67. To the question--Can Robots help reduce food production costs?--I answer, yes. Soon, but not today. When depends on us.

68. Three areas in the food distribution system stand out as likely candidates:

The first and least complex is in a freezer where there is motivation to get people out. The second example would be the use of robots in the rotating warehouse concept where product is brought to the selector. This is a more complex problem but solvable in the near future. The third example is palletizing as it comes off the delivery conveyor from a batching system.

69. These applications would clearly enhance existing systems. It is not necessary to wait for the "ultimate" system. The "building block" approach would maximize the possibility of achieving increases in productivity in a logical progression of steps--not in one complex undertaking.

70. The time is upon us to begin identifying individuals within the company who have, or in whom you can develop technical skills and operating knowledge which is essential in the development and design of appropriate systems.

71. Whether a large or small company, "now" is the time. Current and emerging technology applies equally. In small companies emerging technology could provide an excellent competitive advantage and enhance the ability to grow.

72. Automation is necessary for future advances in productivity. Now is the time to consider an industry-wide effort to standardize packaging in terms of size, quality, and coding. The economic savings will be substantial in the distribution system.

73. My last slide speaks for itself--Much can be done--It is well within current technology. We cannot afford to wait any longer.

I have enjoyed the opportunity to make this presentation and sincerely hope that one or more of the ideas presented become a reality as part of your efforts--be they as a supplier, consultant or operator.

Thank you.

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