



Warehouse Picking Strategies and how to implement them in Business Central

Jason Chance

LIDD Consultants, Inc

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Speaker Introduction

Jason Chance

Senior Developer

LIDD Consultants

NAVUG Member since 2009



Session Objectives

01

Understand the four main picking strategies

02

Understand the data analysis necessary to determine an appropriate picking strategy

03

Understand how NAV/BC can be used (or not) to execute these picking strategies

Why Picking Matters in Your Warehouse



Picking accounts for 50% of labor, making it the most important labor function



Picking transactions represent 66 – 90% of line transactions

Single biggest source of error



Picking determines customer service

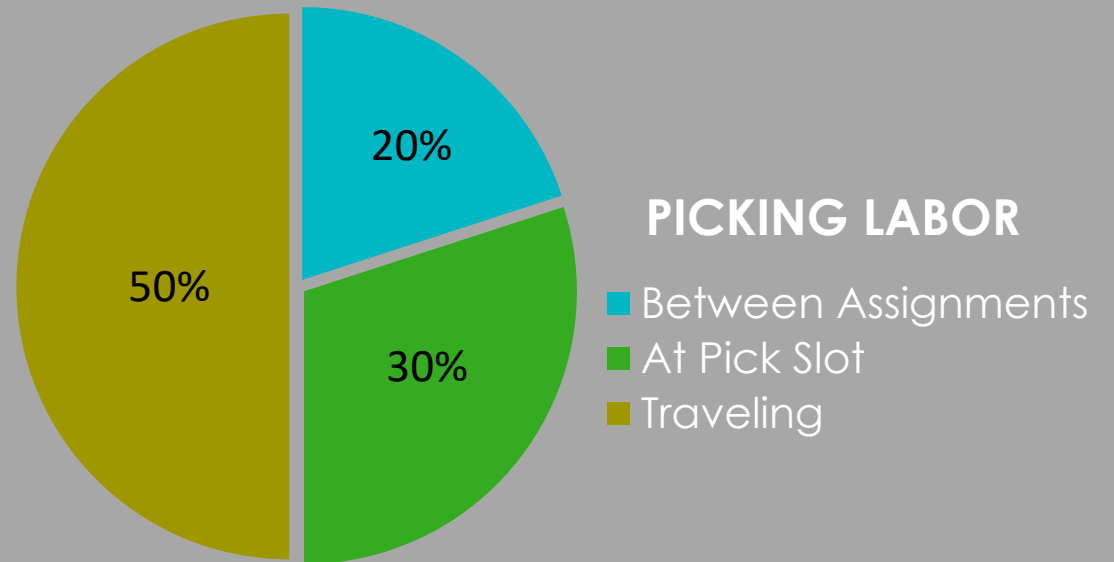
Presentation & accuracy of the order

Turnaround time from placement to shipment

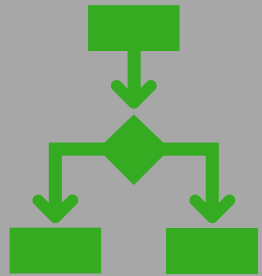
Picking Strategy

- Minimize picking labor
 - Create a short pick line without introducing excessive replenishment tasks
 - Create intelligent picking tasks

Picker travel is the biggest labor component in a warehouse

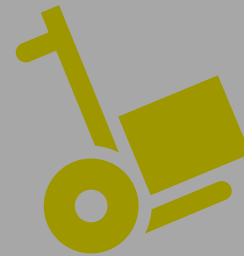


Two Fundamental Questions



Is a complete order assigned to a picker?


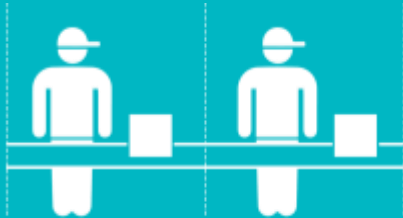

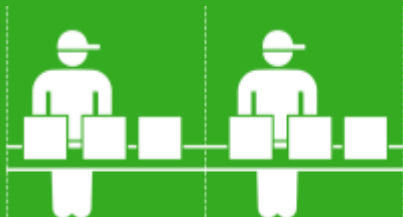
Are multiple pickers required to complete an order?



How many orders are in each assignment?

Do pickers pick one or many orders at a time?

Picking Strategies

	PICK COMPLETE	ZONE PICK
SINGLE ORDERS	 <p>One picker picks one order</p>	 <p>One picker picks part of one order in their zone</p>
BATCH ORDERS	 <p>One picker picks multiple orders</p>	 <p>One picker picks parts of multiple orders in their zone</p>

Data-Driven Picking Strategy



Your operation will dictate your ideal picking strategy

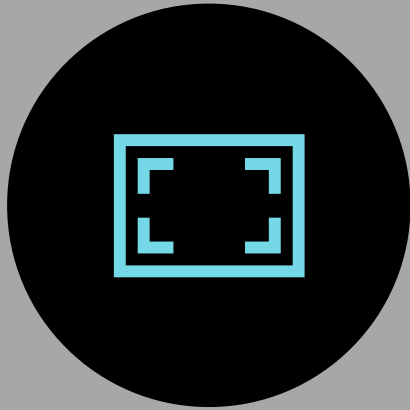


Use transactional and master data to profile your operation's needs:

Customer Order Profiles

Item Profiles

Order Profile – Key Attributes



ORDER SIZE



ORDER
CHARACTERISTICS



SHIPPING MEDIUM

Order Size

- Order lines - the number of locations a picker must visit
- Cubic feet - the physical size of the order and the ideal order “container”
 - Is the order going to be picked and shipped in cases, totes, pallets, or trucks?

Order Size - Large Foodservice Distributor

Cube Shipped per Order	Weekly Averages		% of Orders
	Orders	Cube Shipped	
< 5 cube	385	569	30%
5 to 10 cube	155	1,174	12%
10 to 20 cube	175	2,490	14%
20 to 30 cube	89	2,173	7%
30 to 60 cube	145	6,360	11%
60 to 120 cube	151	13,344	12%
> 120 cube	188	42,965	15%
Total	1,286	69,074	100%

Local Natural Grocers = 42%

Health Food Stores = 32%

Supermarkets = 27%

Order Characteristics

- Consider order distribution across a variety of organizational categories
 - SKU variety and proximity dictates total pick line length for each order
 - Temperature and restricted zones
 - Handling UOM & Container type

Order Characteristics

- Are lines ordered in eaches, cases, layers, or pallets?
 - What is the distribution of these within an order?
 - What are the %s of orders with each line combination
 - Could a single line require a mix of these? (ex. 1 case and 2 eaches)

Order Characteristics

Example from a Wine & Spirits Distributor

EA
CA
MIX

Order Line Profile	Avg. Weekly Orders	Avg. Weekly Order Lines	Average Weekly Bottles Ordered				Avg. Weekly Full Cases Ordered
			As Bottles	As Full Cases	Total	% Total	
a. One bottle per line	442	1,330	1,330	-	1,330	9%	-
b. Multiple bottles per line	1,112	2,420	8,723	-	8,723	58%	-
c. One case per line	218	290	-	3,485	3,485	23%	290
d. Multiple cases per line	30	40	-	1,214	1,214	8%	101
e. Case(s) & bottle(s) on a line	13	16	77	231	308	2%	19
Total	1,512	4,096	10,129	4,929	15,058	100%	411

Shipping Medium

- Are your orders shipped in parcels, totes, or pallets?
 - What is the distribution of these?
- Do any SKUs or customers require special considerations or packing?
- How often do shipments occur in a week?
- Are there separate and characteristically distinct docks?

Item Profile – Key Attributes

- Variety
- Incremental Impact
- Item Characteristics

Item Profile – Variety

- How many SKUs are available for order?
- Important variety types:
 - Absolute (different SKU numbers)
 - Category
 - Temperature Zone
 - Handling Characteristics
 - Expiry Date / Shelf-life
 - Uniqueness (which ones are specific to a client/plant/warehouse)
- Distribution of Variety

Item Profile – Variety

Zone	SKUs	% SKUs	Weekly Averages		
			Order Lines	Eq. Cases Shipped	Cube Shipped
Mezzanine	9,652	59%	18,734	10,811	3,097
Long Products	808	5%	2,114	35,864	10,689
Bulk Floor Pallets	266	2%	1,021	33,303	65,915
Full Case Regular Rack	4,602	28%	8,858	28,455	69,385
Full Case Pick Tower	179	1%	869	2,349	2,205
Canopy	478	3%	2,292	435,531	228,466
Fictive	89	1%	-	-	-
No Location Information	196	1%	225	4,928	91,230
Total	16,270	100%	34,112	551,242	470,988

Item Profile – Incremental Impact

- How do slow, medium, and fast SKUs behave in absolute terms?
- 80/20 rule
 - Top 20% of SKUs account for 80% of cube shipped
- 50/1 rule
 - Bottom ~50% of SKUs account for <1% of cube shipped

Item Profile – Incremental Impact

	% SKUs	SKUs	Weekly Averages					Weekly Ratios		
			Cumulative Order Lines	% of Cumulative Order Lines	Cumulative Cases Shipped	% of Cumulative Cases Shipped	Cumulative Cube Shipped	% of Cumulative Cube Shipped	Lines Shipped per SKU	Cases Shipped per SKU
Fast	0-5%	105	26,833	29.8%	32,388	42.4%	26,822	61.4%	255.5	308.5
	5-10%	105	43,382	48.2%	46,686	61.2%	33,385	76.4%	157.6	136.7
	10-15%	105	53,860	59.8%	55,560	72.8%	37,032	84.7%	100	85
Medium	15-20%	105	62,022	68.9%	62,087	81.4%	39,358	90.0%	77.7	62.2
	20-25%	105	69,754	77.4%	66,408	87.0%	40,860	93.5%	73.6	41.2
	25-30%	105	76,200	84.6%	69,867	91.6%	41,910	95.9%	61	33
	30-35%	105	80,811	89.7%	72,207	94.6%	42,590	97.4%	43.9	22.3
	35-40%	105	83,390	92.6%	73,525	96.4%	43,005	98.4%	24.6	12.6
	40-45%	105	85,221	94.6%	74,320	97.4%	43,266	99.0%	17	8
Slow (<1% of cube shipped)	45-50%	105	86,611	96.2%	74,816	98.1%	43,429	99.4%	13.2	4.7
	50-55%	105	87,506	97.2%	75,204	98.6%	43,531	99.6%	8.5	3.7
	55-60%	105	88,009	97.7%	75,456	98.9%	43,597	99.7%	4.8	2.4
	60-65%	105	88,439	98.2%	75,700	99.2%	43,639	99.8%	4.1	2.3
	65-70%	105	88,888	98.7%	75,894	99.5%	43,666	99.9%	4.3	1.8
	70-75%	105	89,246	99.1%	76,045	99.7%	43,685	99.9%	3.4	1.4
	75-80%	105	89,455	99.3%	76,134	99.8%	43,697	100.0%	2.0	0.8
	80-85%	105	89,667	99.6%	76,189	99.9%	43,704	100.0%	2.0	0.5
	85-90%	105	89,795	99.7%	76,229	99.9%	43,708	100.0%	1.2	0.4
	90-95%	105	89,900	99.8%	76,256	99.9%	43,710	100.0%	1.0	0.3
95-100%	102	90,067	100.0%	76,300	100.0%	43,711	100.0%	1.6	0.4	
Total		2,097	90,067	100.0%	76,300	100.0%	43,711	100.0%	43.0	20.8

15% of items make up 85% of cube shipped

Item Profile – Item Characteristics

- Physical size (cube) of items
- Weeks of Supply required
- Velocity
- Temperature Zone
- Food – Specific rules and regulations regarding storage and handling

Item Profile – Item Characteristics

Temperature Zones Example from a Food Wholesaler

Branch	Department	SKUs	Average Weekly			Average Inventory		Weeks on Hand
			Order Lines	Quantity Shipped	Cube Shipped	Quantity	Cube	
15	DRY	66	30,003	38,703	39,284	110,181	98,778	2.8
	COOLER	55	77,383	252,740	41,242	101,441	21,196	0.4
	FREEZER	101	70,949	419,912	18,037	1,123,787	48,022	2.7
	Branch 15 Total	222	178,335	711,355	98,564	1,335,409	167,995	1.9
25	DRY	1,362	19,610	56,245	18,467	94,415	72,464	1.7
	COOLER	202	5,352	45,041	10,402	22,960	7,885	0.5
	FREEZER	603	3,225	9,167	5,504	32,887	17,932	3.6
	TBD	3	2	2	1	-	-	-
	Branch 25 Total	2,170	28,188	110,455	34,374	150,262	98,281	1.4
Total		2,392	206,523	821,810	132,938	1,485,671	266,276	1.8


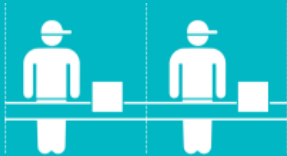

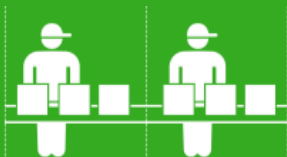
Recap

Order Profile

- Order Size
- Order Characteristics
- Shipping Medium

Item Profile

- Variety
- Incremental Impact
- Item Characteristics

	PICK COMPLETE	ZONE PICK
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Case Studies

Bedding Distributor

Foodservice Distributor

E-Commerce CPG

Case Study: Bedding Distributor Overview

Who they are:

- Bedding brand

What do they do:

- Manufacture and distribute products through retailers and e-commerce D2C drop ship
- Products include pillows, sheets, comforters, blankets, mattress pads, and protectors

Case Study – Bedding Distributor

Scenario

Customer orders vary from one pallet to a truckload

Customer-specific SKUs

- Always slotted and picked together

High cases shipped per order line

Multiple orders per day per customer

- Orders can go to different DCs

Varying pallet requirements (by customer, by geography)

Case Study – Bedding Distributor

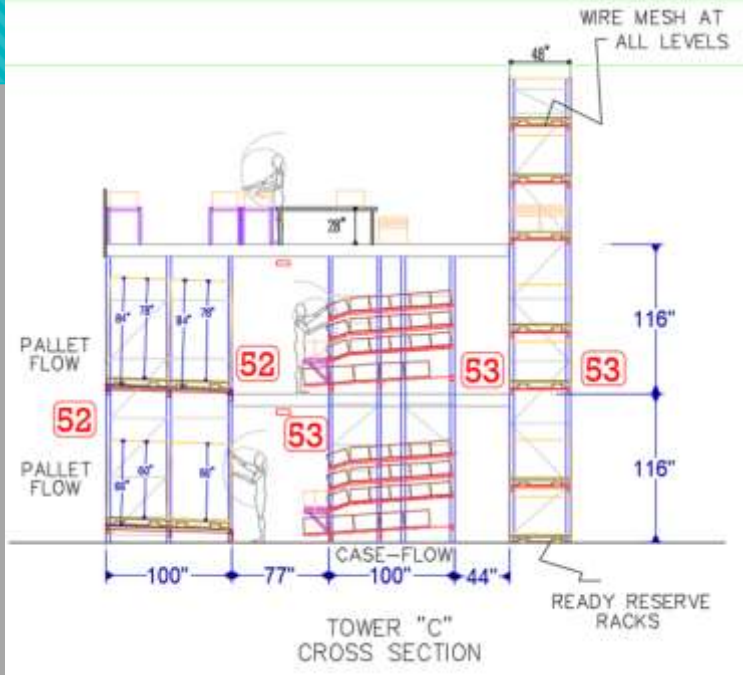
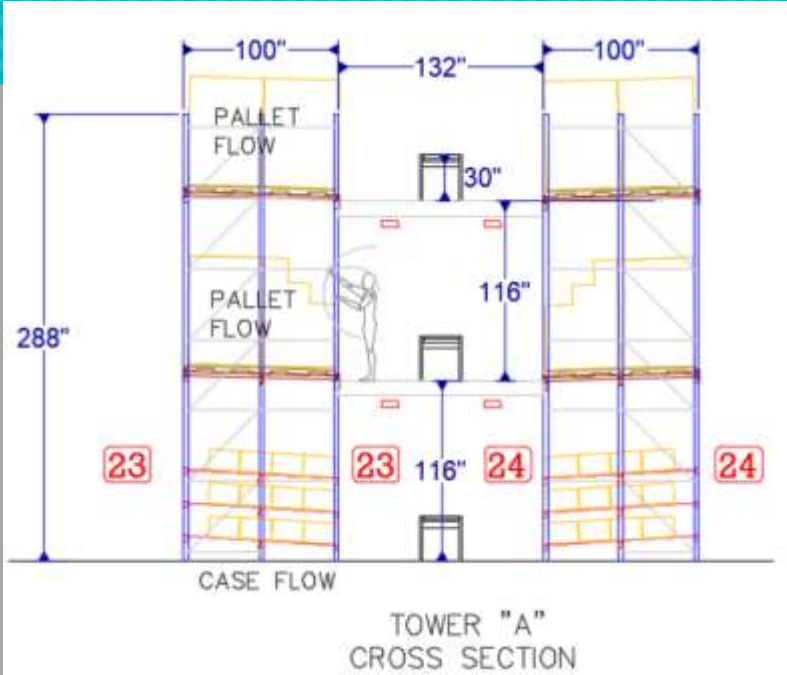
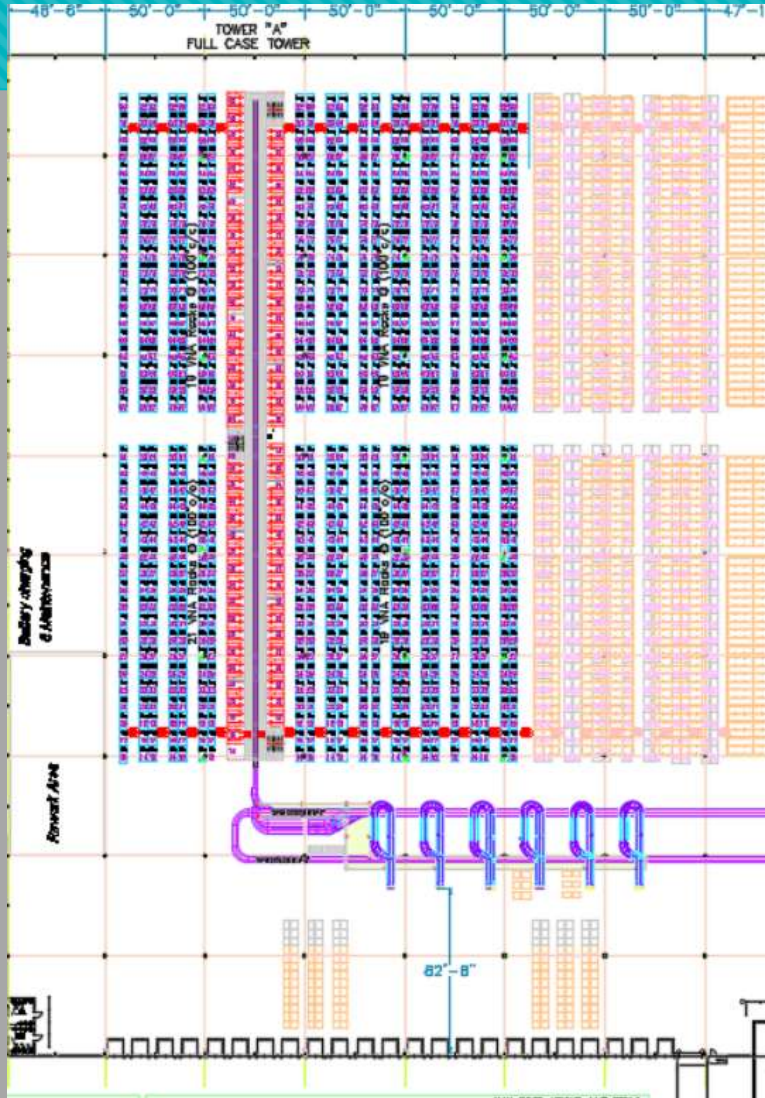
Scenario

Cube Bracket	Weekly Averages				Averages Ratios		
	Orders	Order Lines	Cases Shipped	Cube Shipped	Cube per Order	% of Orders	% of Cube Shipped
< 30	175	498	1,993	1,360	8	43.3%	0.4%
30-60	43	372	2,673	1,830	43	10.6%	0.6%
60-120	29	256	2,098	2,446	86	7.0%	0.8%
120-250	28	221	2,925	5,088	181	6.9%	1.7%
250-500	29	200	5,611	10,449	367	7.0%	3.4%
500-1,000	35	330	11,480	24,905	722	8.5%	8.2%
1,000-2,000	28	621	36,353	39,463	1,409	6.9%	12.9%
> 2,000	39	3,152	279,038	219,931	5,621	9.7%	72.0%
Total	405	5,651	342,170	305,473	754	100%	100%

>1 pallet
(1 pallet =
60 cube)

Case Study – Bedding Distributor

Layout



Picking Strategy

	PICK COMPLETE	ZONE PICK
SINGLE ORDERS	<ul style="list-style-type: none">Individual pickers would not have time to complete orders <p>One picker picks one order</p>	<ul style="list-style-type: none">No need for zones due to low SKU variety per customerCreates complex order consolidation at the dock <p>One order component picked per zone</p>
BATCH ORDERS	<ul style="list-style-type: none">Creates largest pick assignmentsMust be thoughtful about how this volume will be handled: conveyer & sortation <p>One picker picks multiple orders</p>	<ul style="list-style-type: none">Won't produce as high a hit rate as batch picking <p>Multiple order components picked per zone</p>

Increased Throughput Due to Sortation

Parameters	Before	After
Pick Rate	100	250
Cases Shipped/ Week	340,000	340,000
Labor Hours / Week	3,400	1,360

- **Before pick rate** includes palletization time – pickers have to manually palletize items
- **After pick rate** does not include palletization – pick rate is 400 without palletization

Conclusion

Batch picking produces the most efficient picking environment

Introducing sortation increases batch size, reduces pick errors and simplifies palletizing

Overview

Who they are:

- Foodservice distributor servicing 33 states (Central and eastern)

What do they do:

- Foodservice distributor
- Broadline and chain distribution services
- Associated services

Scenario

Customers order 1-2 pallets from each temperature zone per week

Very low SKU count = high hit rate on pick line

High cases shipped per order line

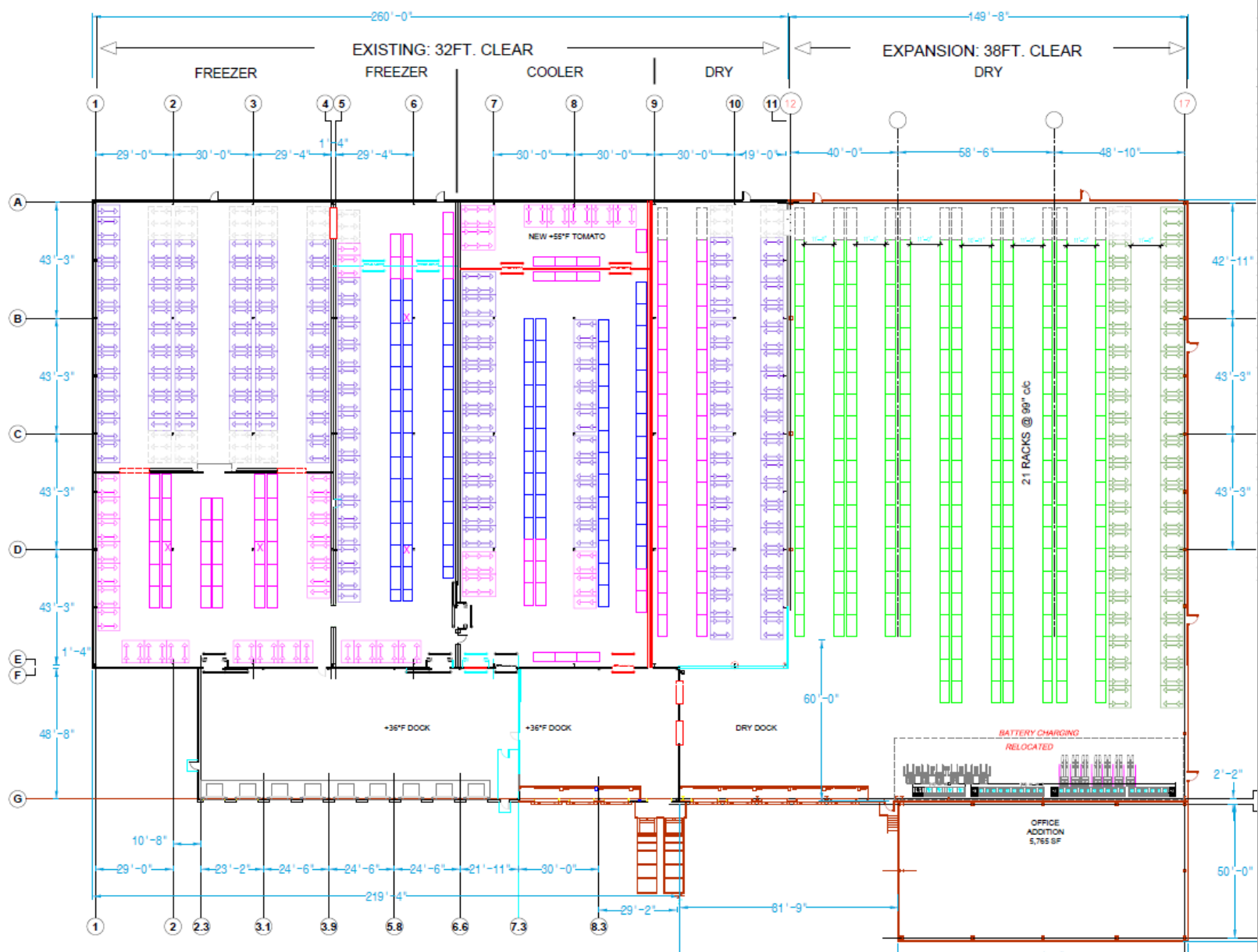
Case Study – Foodservice Distributor

Scenario

Department	Cube Bracket	Weekly Averages					Ratios			
		Orders	Order Lines	Cases Shipped	Cube Shipped	% Cube in Department	Avg. Lines per Order	Avg. Cases per Line	Avg. Cube per Case	Avg. Cube per Order
1-DRY	1 - less than 10 cubic feet	30	208	247	184	0.4%	7	1	1	6
	2 - from 10 to 30 cubic feet	414	7,591	8,700	9,352	21.2%	18	1	1	23
	3 - from 30 to 60 cubic feet	666	19,239	22,591	27,821	63.1%	29	1	1	42
	4 - from 60 to 120 cubic feet	92	3,958	4,906	6,473	14.7%	43	1	1	71
	5 - from 120 to 240 cubic feet	1	114	145	185	0.4%	102	1	1	165
	6 - from 240 to 600 cubic feet	-	-	-	-	0.0%	-	-	-	-
	7 - from 600 to 1,200 cubic feet	0	0	91	94	0.2%	1	700	1	750
DRY		1,202	31,110	36,681	44,109	100.0%	26	1	1	37
2-COOLER	1 - less than 10 cubic feet	21	108	138	126	0.4%	5	1	1	6
	2 - from 10 to 30 cubic feet	679	11,067	15,378	15,489	44.3%	16	1	1	23
	3 - from 30 to 60 cubic feet	494	11,284	18,688	18,764	53.7%	23	2	1	38
	4 - from 60 to 120 cubic feet	8	244	539	548	1.6%	29	2	1	65
COOLER		1,203	22,703	34,743	34,927	100.0%	19	2	1	29
3-FREEZER	1 - less than 10 cubic feet	11	30	44	66	0.2%	3	1	1	6
	2 - from 10 to 30 cubic feet	407	2,771	6,139	9,535	21.8%	7	2	2	23
	3 - from 30 to 60 cubic feet	708	6,990	18,491	29,019	66.5%	10	3	2	41
	4 - from 60 to 120 cubic feet	72	934	3,180	4,985	11.4%	13	3	2	70
	5 - from 120 to 240 cubic feet	0	5	40	56	0.1%	13	9	1	149
FREEZER		1,198	10,729	27,894	43,661	100.0%	9	3	2	36
Total		1,209	64,541	99,318	122,697	0.0%	53	2	1	101

Case Study – Foodservice Distributor

Layout



Picking Strategy

	PICK COMPLETE	ZONE PICK
SINGLE ORDERS	<ul style="list-style-type: none">• Travel through multiple temperature zones• Double pallet jack won't fit entire order <p>One picker picks one order</p>	<ul style="list-style-type: none">• Fits with temperature zone split (1 picker per zone)• Order size per zone fits on double pallet jack <p>One order component picked per zone</p>
BATCH ORDERS	<ul style="list-style-type: none">• Orders are too large• Handling is complex without sortation <p>One picker picks multiple orders</p>	<ul style="list-style-type: none">• Single order produces large enough pick assignment <p>Multiple order components picked per zone</p>

Conclusion

- Temperature zone picking creates an organized, efficient picking operation
- Due to order size, pick assignments fit to standard material handling equipment (double pallet jack)

Overview

Who they are:

- E-Commerce CPG Company

What do they do:

- They sell products across a wide array of categories for \$3 each
- They cut out built-in markups from intermediary parties to offer quality items at a low cost

Case Study – E-Commerce CPG

Scenario

01

Orders of 10-20 items (non-subscription)

02

Low hit rate – 15 items out of 1,000 per order

03

Ordered by eatches – low volume per SKU

04

Orders must be transferred and packed from totes into shipping boxes

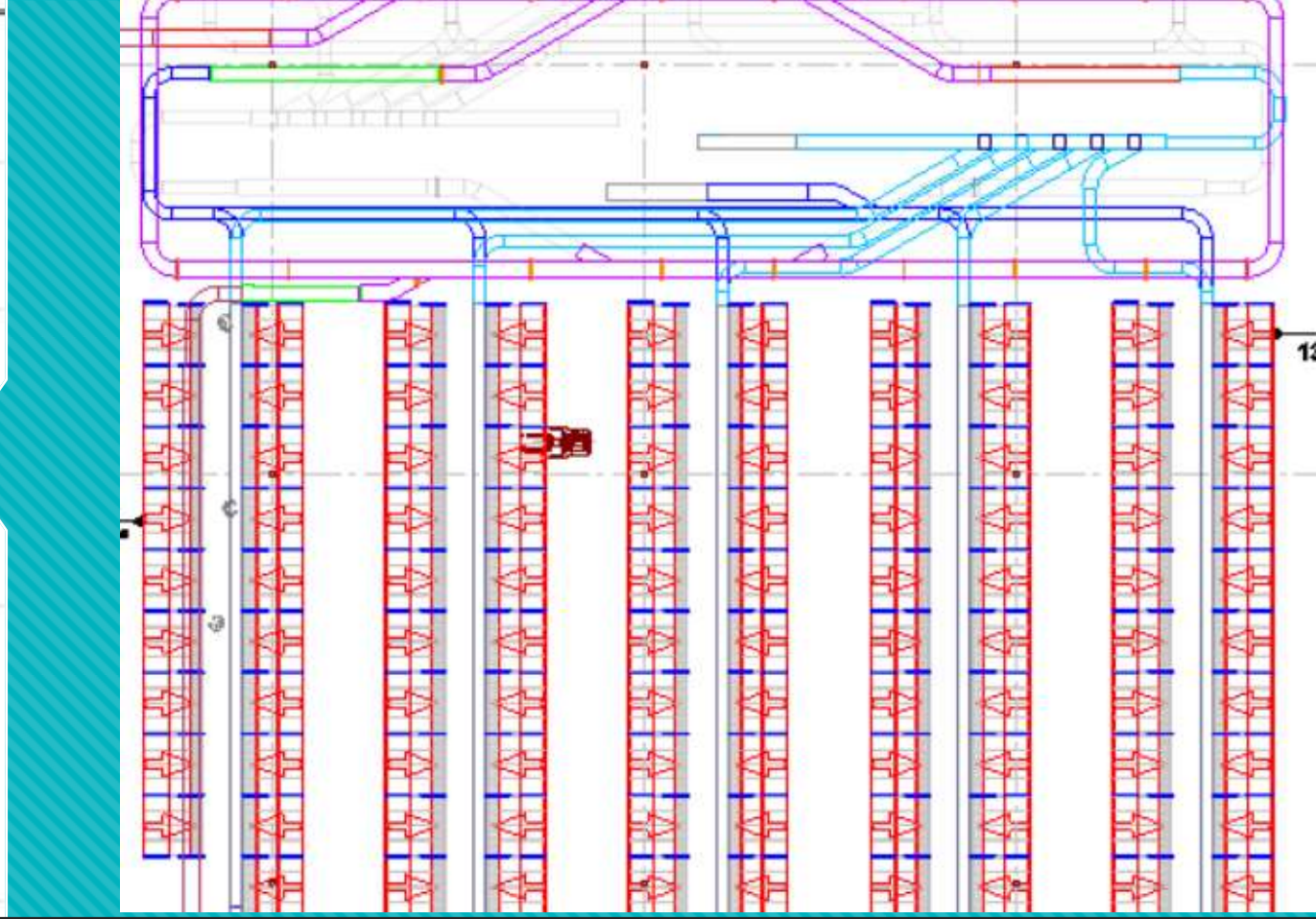
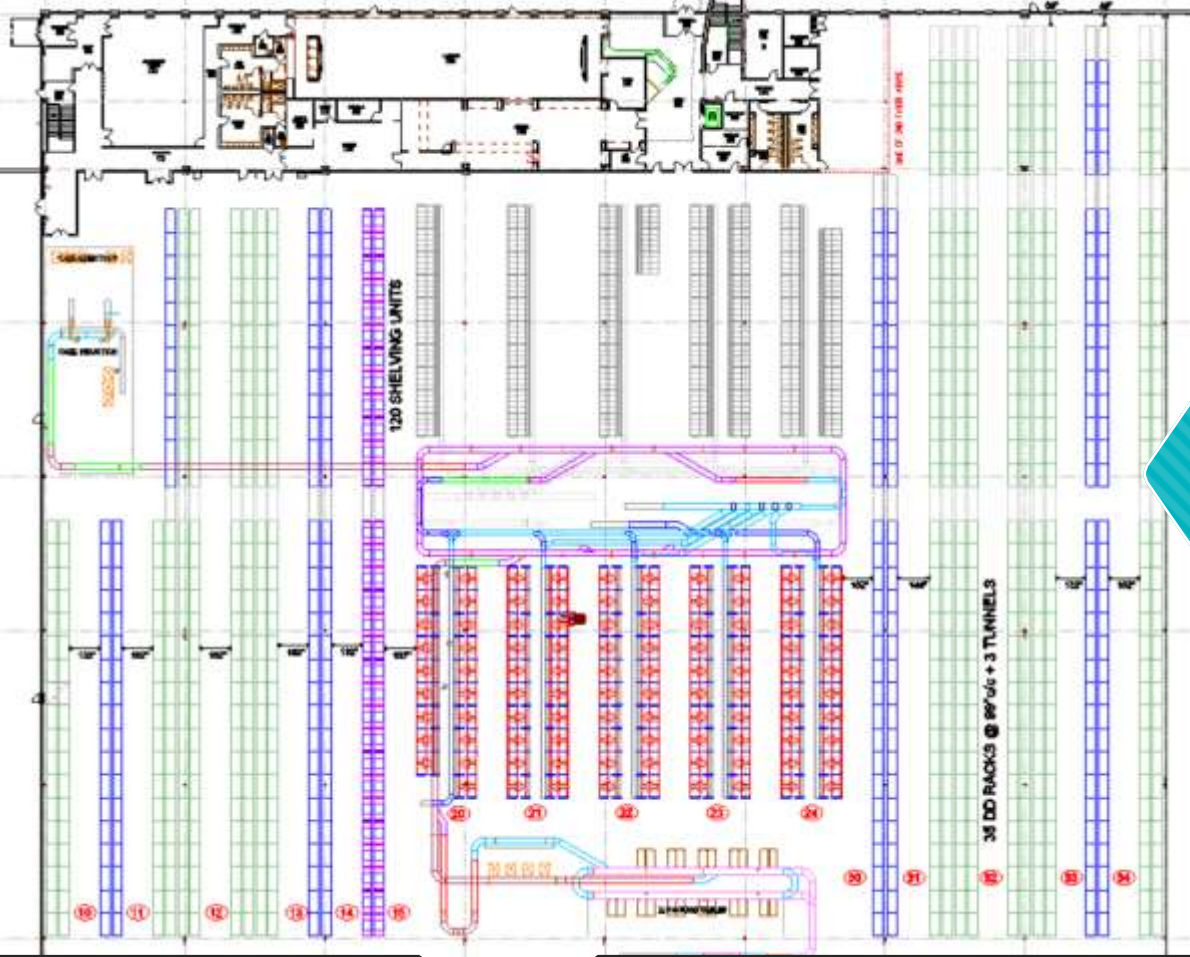
05

Total volume of orders is substantial

Order Line Bracket	Weekly Averages							Ratios		
	Orders	% Orders	Order Lines	Eaches Shipped	Cases Shipped	Cube Shipped	% Cube Shipped	Lines per Order	Eaches Per Line	Cube per Order
< 5 lines	3,143	18%	11,433	16,748	1,206	939	7%	3.6	1.46	0.30
6-10 lines	4,381	26%	34,079	43,486	3,139	2,507	19%	7.8	1.28	0.57
10-15 lines	6,425	38%	84,600	94,881	7,082	5,361	41%	13.2	1.12	0.83
> 16 lines	3,135	18%	67,009	74,378	5,663	4,226	32%	21.4	1.11	1.35
Total	17,083	100%	197,120	229,492	17,089	13,034	100%	11.5	1.16	0.76

Scenario

Case Study – E-Commerce CPG



Layout

Case Study – E-Commerce CPG

Picking Strategy

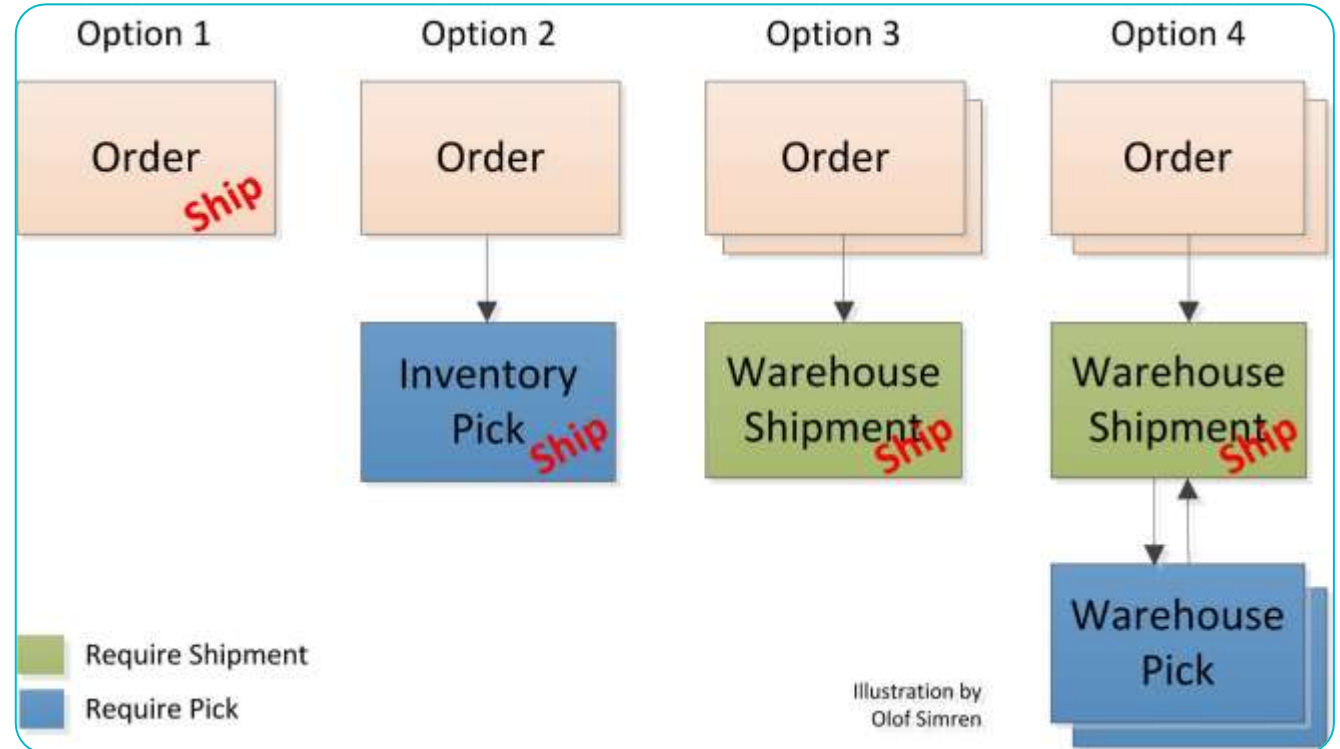
	PICK COMPLETE	ZONE PICK
SINGLE ORDERS	<ul style="list-style-type: none">Requires travel of entire pick line to complete each order <p>One picker picks one order</p>	<ul style="list-style-type: none">Orders are too smallToo many orders to consolidate <p>One order component picked per zone</p>
BATCH ORDERS	<ul style="list-style-type: none">Even large batches will have low hit rateIntroduce error when handling multiple orders at a time <p>One picker picks multiple orders</p>	<ul style="list-style-type: none">With correctly sized zones, pickers can stay busy with minimal travelIntroducing sortation will dramatically reduce picker travel <p>Multiple order components picked per zone</p>

Conclusion

Zone picking multiple orders produces the most efficient picking environment

Sorting orders between zones reduces picker travel and increases pick rates

What are my options in BC/NAV



Business Central Demo

Jason Chance

jason.chance@lidd.com



Thank you!
Let's keep in touch

