

# **2006 Warehouse Education Research Council and DC Velocity Annual Warehouse Benchmarking Study**

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These are the results from a study conducted by WERC and DC Velocity Magazine in partnership with Georgia Southern University and Supply Chain Visions. The findings represent the results of the 2006 benchmarking survey which included responses from 807 participants. The metrics are categorized into classifications of Customer, Productivity/Efficiency, Cost and People.



	Key Metrics	Major Opportunity	Disadvantage	Average or Median	Advantage	Best in Class	Actual Median
CUSTOMER	On time shipments	< 93.2%	85 - 97.08%	97.08 - 98.66%	98.66 - 99.5%	> 99.5%	98%
	Fill Rate - Line	< 91.76%	91.76 - 96%	96 - 98%	98 - 99.5%	> 99.5%	97.30%
	Fill Rate - Order	< 90%	90 - 96%	96 - 98.5%	98.5 - 99.5%	> 99.5%	98%
	Average time from order placement to shipment	> 48 hrs	24 - 48 hrs	12 - 24 hrs	5 - 12 hrs	< 5 hrs	24 hrs
	Order picking accuracy	< 98%	98 - 99%	99 - 99.5%	99.5 - 99.9%	> 99.9%	99.30%
	Percent of orders shipped complete	< 90%	90 - 96%	96 - 98.5%	98.5 - 99.7%	> 99.7%	98%
	Percentage of orders sent damage free	< 97.28%	97.28 - 99%	99 - 99.5%	99.5 - 99.8%	> 99.8%	99%
	Percentage of orders with correct invoice	< 95.6%	95.6 - 98.3%	98.3 - 99.8%	99.8 - 99.9%	> 99.9%	99%
	On time delivery	<90.2%	95%	97%	98%	99%	97%
	Perfect Order Index	75.50%	78.78%	90.34%	95.80%	98.40%	93.16%

	Key Metrics	Major Opportunity	Disadvantage	Average or Median	Advantage	Best in Class	Actual Median
PRODUCTIVITY / EFFICIENCY	On time receipts	< 85%	85 - 90.8%	90.8 - 96.24%	96.24 - 99%	> 99%	95%
	Overtime Hours	> 12%	10 - 12%	5 - 10%	3 - 5%	< 3%	7%
	Cases shipped per person	< 25	25 - 75	75 - 100	100 - 250	> 250	99.9
	Lines shipped per person	< 9.92	9.92 - 24	24 - 40.84	40.84 - 82	> 82	25.9
	Pallets shipped per person	< 6.4	6.4 - 11.6	11.6 - 25.6	25.6 - 33	> 33	21
	Backorders as a percentage of total orders	> 12.24%	6.24 - 12.24%	3.88 - 6.24%	1.5 - 3.88%	< 1.5%	5%
	Average warehouse capacity used	< 70%	70 - 80%	80 - 85%	85 - 92%	> 92%	85%
	Peak warehouse capacity used	< 85%	85 - 93%	93 - 96%	96 - 100%	100%	95%
	Equipment/Forklift capacity used	< 25%	25 - 45%	45 - 78%	78 - 87%	> 87%	62.50%
	Honeycomb percentage	< 23%	23 - 70%	70 - 80%	80 - 90%	> 90%	75%
	Average cubic capacity used	< 65%	65 - 75%	75 - 84%	84 - 91.2%	> 91.2%	79%
	Inventory count accuracy	< 96%	96 - 98.7%	98.7 - 99.5%	99.5 - 99.8%	> 99.8%	99%
	Warehouse damage	> 2.8%	1.2 - 2.8%	1 - 1.2%	.56 - 1%	< .56%	1%

	Key Metrics	Major Opportunity	Disadvantage	Average or Median	Advantage	Best in Class	Actual Median
PEOPLE	Value added per employee	< 10	10 - 27.24	27.24 - 72.8	72.8 - 97.994	> 97.994	50
	Annual workforce turnover	> 25	14.56 - 25	8 - 14.56	8	< 4.12	10
	Employee productivity vs standard	< 81%	81 - 89.6%	89.6 - 96.8%	96.8 - 108.1%	> 108.1%	95%
	Productive hours to total hours	< 75%	75 - 84%	84 - 88%	88 - 95%	> 95%	85.80%
COST	Days raw material on hand	> 60	30 - 60	21 - 30	10.8 - 21	< 10.8	30
	Days of finished goods inventory on hand	> 73.8	45 - 73.8	28 - 45	14 - 28	< 14	35
	Distribution cost per unit shipped	> 20	2.3 - 20	1.2 - 2.3	.6 - 1.2	< .6	1.6
	Inventory shrinkage as a percent of total inventory	> 3	1.2 - 3	.7 - 1.2	.2 - .7	< .2	1
	Average days sales outstanding	> 51	44 - 51	31 - 44	18 - 31	< 18	38
	Distribution cost as a percentage of sales	> 12%	6.18 - 12%	4.4 - 6.18%	2.1 - 4.4%	< 2.1%	5%
	Direct distribution cost as a percentage of total cost	> 20.16%	12 - 20.16%	5.1 - 12%	2.48-5.1%	<2.48%	8.50%
	Indirect distribution cost as a percentage of total cost	> 29.8%	9.68 - 29.8%	5 - 9.68%	1.2 - 5%	< 1.2%	7%
	Administrative cost as a percentage of total cost	> 30%	20 - 30%	7 - 20%	1.8 - 7%	< 1.8%	10.40%
	Net margin percentage	< 5.5%	5.5 - 8%	8 - 15%	15 - 20.7%	> 20.7%	10%
	Average value of backorders as a % of sales	> 12.4%	5 - 12.4%	3 - 5%	1 - 3%	< 1%	4%
	Loss Sales (% SKU's Stocked Out)	>10%	5 - 10%	2.6 - 5%	1 - 2.6%	< 1%	3%

	Key Metrics	Definition	Calculation
CUSTOMER	On time shipments	Shipped means off the dock, on the truck and in transit to it's final destination.	# of orders shipped on time / # of total orders shipped. On time is defined by the customer request and SHOULD NOT be moved once it is entered into the system
	Fill Rate - Line	This metric measures the percentage of line items on a specific order shipped from stock within 24 hours of order release.	# line items filled from stock within 24 hours of order release / total number of lines on the order
	Fill Rate - Order	This metric measures the percentage of orders shipped from stock within 24 hours of order release.	# of orders filled from stock shipped within 24 hours of order release / total number of stock orders
	Average time from order placement to shipment	The time between order placement by the customer and order shipment from the supplier.	date order shipped - date order placed
	Order picking accuracy	This measures the accuracy of the orders picked, errors may be caught prior to shipment.	orders picked correctly / total orders picked
	Percent of orders shipped complete	Complete means that all lines / units ship with the order.	# of orders shipped with all lines & units / total number of orders shipped
	Percentage of orders sent damage free	This measures the fact that the customer got their product in good and usable condition.	# of orders shipped damage free / # total orders shipped. **Note - this can be based on a statistical quality sample and extracted.
	Percentage of orders with correct invoice	The portion of total orders for which the customers received an accurate invoice with the order.	# of orders with correct invoice / # of total orders
	On time delivery	The percentage of orders that arrive at their final destination on the date agreed upon.	# of orders delivered on time / total number of orders
Perfect Order Index	An order that meets all of the following criteria: complete, on-time (as defined by customer - could be on time delivery or on time shipment), perfect documentation, perfect condition.	% of on time orders x % of complete orders x % of damage free orders x % of orders with accurate documentation as defined by customer (e.g. invoice, ASN, labels)	

	Key Metrics	Definition	Calculation
PRODUCTIVITY / EFFICIENCY	On time receipts	The number of orders received from a supplier on the date requested.	# of orders received on time / total number of orders
	Overtime Hours	The number of time units worked by an employee above and beyond their normal work time allocation.	total time worked - standard work time
	Cases shipped per person	The number of individual cases of product shipped by an employee.	# of cases shipped by employee / total number of cases shipped
	Lines shipped per person	The number of lines from an order shipped by an individual employee.	# of lines shipped by employee / total lines shipped
	Pallets shipped per person	The number of pallets of product shipped by an employee.	# of pallets shipped by employee / total number of pallets shipped
	Backorders as a percentage of total orders	The portion of total orders that are held and shipped late due to lack of availability of stock. Can be measured by lines or by PO, by units or by \$ value.	# or \$ of orders (or lines or units) held and not shipped / total # or \$ of orders (lines or units)
	Average warehouse capacity used	The average amount of warehouse capacity used over a specific amount of time (month to month or yearly).	average capacity used / average capacity available
	Peak warehouse capacity used	The amount of warehouse capacity used during designated peak seasons.	peak capacity used / capacity available
	Equipment/Forklift capacity used	The amount of up time logged for equipment / forklifts.	amount of time equipment is used / total amount of time available for use.
	Honeycomb percentage	Measures how well actual cube utilization within the warehouse is managed. Especially important where slots may be only partially full. An example would be if 1 unit is in a location, and it has room for 10, the utilization for that slot/bin location is 10%.	actual cube utilization / total warehouse cube positions available
	Average cubic capacity used	Measures how well a warehouse is using its capacity of slots. For example, if there is product in a slot (even if it is only 1 carton) that slot would be 100% utilized.	% of slots used / total capacity of slots
	Inventory count accuracy	Measures the accuracy (by location and units) the physical inventory compared to logical inventory: If the warehouse system indicates that 10 units of part number xyz are in location 29, inventory count accuracy indicates how frequently one can go to such a location and find that the physical count matches the system count.	absolute value of the sum of the variance between physical inventory and perpetual inventory (by location and by units)
Warehouse Damage	Measures damage caused by warehouse operations.	Warehouse damage (damage caused by warehouse operations) as a percent of cases or units	
PEOPLE	Value added per employee	How effective is the employee base at generating value.	(total revenue - material purchase) / total employees (FTEs)
	Annual workforce turnover	The rate at which permanent employees are replaced (excludes casual or seasonal labor).	# of NEW employees at the beginning of the period / total # of employees at the beginning of the previous period
	Employee productivity vs standard	Measures employee productivity against a standard developed by the company for that activity. **NOTE - Standard is developed by each company based on their work profile.	total time worked / standard work time
	Productive hours to total hours	Measures employee productivity against total hours (includes all hours including indirect and direct).	hours billed to a specific activity or project / total hours worked

	Key Metrics	Definition	Calculation
COST	Days raw material on hand	The number productive days before raw material supply is consumed.	$\text{gross raw material inventory} / (\text{value of transfers} / 365 \text{ days})$
	Days of finished goods inventory on hand	The number of days of finished goods inventory on hand. Measures the volume of finished goods inventory needed to support your business. Lower is better - pending service levels are being met.	$\text{average daily balance of inventory} / \text{average rate of "sales" or use for past 3 months in units per day}$
	Distribution cost per unit shipped	The cost to run distribution relative to the units shipped through distribution. Distribution costs include: management activities, track inventory deployment, receive, inspect, and store inbound deliveries, track product availability, pick, pack, and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	$\text{total cost of operating distribution} / \text{total units shipped}$
	Inventory shrinkage as a percent of total inventory	The amount of breakage, pilferage, and deterioration of all inventories relative to total inventory. Usually stated in terms of value; not units.	$\text{sum (value of breakage, pilferage, deterioration to all inventory)} / \text{total value of all inventory}$
	Average days sales outstanding	The amount of time required to convert receivables to cash. To even out seasonality, this includes a rolling 5 month average of AR (This is also known as 'Average Collection Period').	$\text{average 5 month AR} / (\text{total annual sales} / 365)$
	Distribution cost as a percentage of sales	Activities included in the operate warehousing process are: management activities, track inventory deployment, receive, inspect, and store inbound deliveries, track product availability, pick, pack, and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	$\text{total cost of operate warehousing} / (\text{total revenue} * .001)$
	Direct distribution cost as a percentage of total cost	The portion of total expense required by distribution activities. Distribution activities include the following: management activities, track inventory deployment, receive, inspect, and store inbound deliveries, track product availability, pick, pack, and ship product for delivery, track inventory accuracy, track third-party logistics storage and shipping performance.	$\text{distribution cost} / \text{total cost}$
	Indirect distribution cost as a percentage of total cost	The portion of indirect distribution expense as a portion of total expense. This does not include any expenses as noted in the definition above for direct distribution costs.	$\text{indirect distribution cost} / \text{total cost}$
	Administrative cost as a percentage of total cost	The portion of total warehouse administration expense required to support warehouse operations.	$\text{administrative cost} / \text{total cost}$
	Net margin percentage	Net Margin is: Net Income (usually net of tax and interest) and represents a companies profitability.	$\text{net margin } \$ / \text{revenue } \$$
	Average value of backorders as a % of sales	This measures the value of sales orders that are held up in back orders as a percent of total sales orders. This is a key sales indicator.	$\text{average value of backorder (over some defined period of time)} / \text{average value of sales (during the same period)}$
Loss Sales (% SKU's Stocked Out)	An important risk indicator: what percent of sales were lost due to stock outs.	$\$ \text{ sales that were lost (i.e. they did not become backorders)} / \text{total sales}$	