TECHNICAL NOTES

VASFT003

Why Batch Pick?

Batch picking is a process where multiple orders are filled simultaneously, and it is used to reduce transit time. With a "man to goods" system where an order selector travels to the product to fill orders, batch picking can drastically reduce the travel time. In a "goods to man" system where product is delivered to the selector, batch picking can reduce delivery traffic.

This paper addresses batch picking in a "man to goods" system. With modern technology, the transition to a batch pick system can be very inexpensive and un-complex both in implementation and operation. This paper provides the basis for determining the benefit of transitioning a "pick ticket" based order fulfillment system into a batch picking system.

To analyze the benefits of a proposed transition to a batch fulfillment system, the order fulfillment process is divided into three time categories.

- Pick Time – (PT) the time to retrieve an item from its storage location and place the item in the "order" container.
- Transit Time – (TT) the time to travel to an item
- Setup and Close Time – (CT) the time to prepare or setup the "order container" prior to putting any items into it and the time to complete the order container once the required items have been collected.

To analyze the potential benefits of a system, the values for each of the above items must be known. Obtaining these numbers is a very easy process; do not believe those that would tell you that it is complex. Just follow the following five steps:

- Obtain the normal or average overall picking productivity for a worker Base Fulfillment Rate (BFR) in units per hour. For an existing system, this is easily obtained by dividing the total number of units picked, packed and shipped over some period of time by the number of workers that preformed that work. Normalize the value into the number of units per hour. Insure that the time used does not include "non-productive time". The result is an average BFR units per hour that a worker can pick, pack and make ready for shipping. . If there are no existing metrics, this number will need to be estimated. There are many existing installations that should be similar enough to get an estimate. Additionally, if necessary, there are several simple techniques to refine such estimates.
- Obtain the average units per order container (i.e. carton) (UC) by either reported metrics or estimation.
- Obtain the order container (carton) Setup and Close Time (CT) in seconds through direct measurement. This time does NOT include any pick time or travel time. It only includes preparation time prior to picking and completion time following picking. This measurement is always done through observation with a stopwatch. If there is no existing system to measure, set up and measure the time of a simulated operation with real goods, cartons, simulated labels, tapers, staplers, etc. Take many measurements and calculate an average.
- Determine the Pick Time (PT) in seconds also through direct measurement using a stopwatch. The pick time should not include any walk time but should include any required location or SKU verification, the picking of the product and the placement or packing in the order

container. Make many measurements and take an average.

- Once the above values are obtained the average Transit Time (TT) in seconds is calculated. This calculation yields a TRUE representation of the REAL AVERAGE TRAVEL TIME, for there are no other "productive time" operations that the worker may be doing other than prepare, travel, pick, pack and close. The formula is:

TT = (3600/BFR) – (PT + (CT / UC))

For a system that has a base fulfillment rate (BFR) of 120 units per hour, 10 units per carton (UC), a pick time of 6 seconds and a carton setup and close time of 60 seconds, the transit time is:

TT = (3600/120) – (6 + (60/10))

TT = (30) – (6 + 6)

TT = 18 seconds

To batch-pick with a pick cart is one of the most popular ways of reducing transit time per transaction. Picking several orders at the same time will reduce the transit time by nearly the number of orders picked simultaneously – the size of the batch (SB). There is a small increase in handling time of each item due to the need to select which order container to put the item into – the selection time (ST). There are means to nearly eliminate the additional selection time (ST) through lights and automatic pushers. ST is almost never greater than 2 seconds and in many cases can be less than .5 seconds.

The calculated transit time for the new batch fulfillment system (TTN) is based on the calculation of transit time (TT) for filling single orders (see above). The formula for calculation is:

TTN = (TT / SB) + ST

Converting from a paper based single order fulfillment system as described above to a batch picking system with carts holding nine orders (SB) would yield a travel time of

TTN = (TT / SB) + ST

TTN = (18 / 9) + 2

TTN = 4 ; or a travel time reduction of TT – TTN = 18 – 4 = 14 seconds

The fulfillment rate of the new batch system (NFR) is calculated as follows:

NFR = 3600 / (TTN + PT + (CT / UC))

NRF = 3600 / (4 + 6 + (60 / 10))

NFR = 3600 / 16

NFR = 225

The single order fulfillment rate (FR) in the example above was 120. With the new fulfillment rate of 225, the productivity increase is a whopping 187% (225 / 120)

Why batch pick? Because you are not running a gym!