



The Importance of Data Analysis

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Are you tasked with designing your next DC or making some enhancements to your existing operation? When time is of the essence, one might think it is better to dive in and start making important project decisions without prioritizing the data analysis phase of a project. Organizations can struggle to engineer the perfect solution while getting lost in analysis paralysis, but doing the due diligence of analysis can prevent costly mistakes.

Taking the Time

How about the company that sources their building before the storage requirements and processes are sufficiently defined and then learns that the building is too small for the volumetric capacity required? Or, have you ever been involved in a delayed start-up because of difficulty handling a product that does not meet the operating parameters of the installed equipment? These are expensive mistakes that are easily avoided when taking the time to follow the Analyze phase of the DesignBuild Process (Figure 1). This is AHS' six-step process that helps keep your project on track to meet goals, schedule, and budget.

AHS' process of data analysis ensures that design requirements are correctly identified to meet the customer's business needs.



Figure 1 - AHS DesignBuild Process

While it may be easier, initially, to use existing summarized data, the downstream risks of potential problems typically far outweigh the time benefit of skipping the important step of analyzing the data. Even when companies have their own internal engineering group analyzing the data and feel confident in the direction they want to proceed, it is still beneficial to have a third party review the data. Often times, a second set of eyes can provide a unique, unbiased perspective; and ultimately, a collaborative approach leads to an improved design.

Raw Data

Whenever possible, AHS prefers that customers supply detailed data files including inbound receipt data, inventory snapshots, and SKU

item details like dimensions, weights, case weights, and pallet information. Historical SKU and line-level order data is also desired. Raw data is preferred over summary data because when data is previously summarized, the parameters used in developing the summary are often unclear. This can result in misunderstandings. There could be subsets of important data that were excluded, or the opposite problem could exist that irrelevant data is influencing the results. Having the raw data allows data modeling, which in turn, allows exploration of multiple scenarios.

Having access to the raw data can also help to better understand the process. Frequently, the scope of the project influences how to best summarize the data. Summarizing without the understanding of the complete scope of the project can be problematic. For example, if a customer only provides a weighted average of cubic volume per unit to size storage, the storage medium selected and quantity specified may not suit their process well if their products range largely in size. Although the weighted average could be representative of a typical consumer product bottle or carton, the total range in product complexity could include products as large as TVs or other large appliances. Having the raw data, in this instance, would enable specification of multiple storage types and the appropriate distribution of each so that the storage solutions will accommodate all products.

Do Not Underestimate

Do not underestimate the importance of data for selecting and sizing material handling equipment systems. Product characteristics like

shape and size are needed for determining suitable storage systems and handling methods. Dimensional information and weight data of each entity type handled (pallets, cases, bundles, totes, and units) and the volumetric relationships between each (i.e. cases per pallet, units or bundles per case, units per bundle, etc.) are needed. A download of your WMS item master, which should contain all the dimensional data including any special handling requirements like cooler/freezer, stack ability limitations, or pre-ship value-add requirements, is beneficial. This information, combined with SKU level inventory demand, is needed to select the storage types that optimize your space allocation. If you don't already maintain this information about your products, there are machines on the market that can be used to automate the dimensional data gathering process. These product characteristics are also used to define specifications like roller spacing and necessary conveyance widths for adequate turning radiuses.



Correct Data = Correct Design

Inbound receipts and outbound order volumes anticipated for the life of the new system are required to determine throughput. Historical

data on facility transfers, returns, product movement, SKU growth, and order profile data like lines per order and units per order help ensure that processing and staging areas are sized appropriately, and that the equipment specified will meet the required rates.

The intended purpose of the new facility or operational process is critical. Is the facility going to be used for store distribution only? Will it be used for any ecommerce fulfillment? Is the growth percentage of each expected to change? Will you be picking full pallets, cases, units or a combination of these? Will order fulfillment be batch or discrete pick? Will you pick into tote or final shipping carton? These options should be evaluated and design assumptions clear before moving into detailed design.

Seasonal fluctuations can have a large impact on the design. Peak demand profiles can vary greatly from non-peak with deltas as great as 10 times non-peak parameters. A system designed for just overall average may be significantly undersized when it comes to peak, or alternatively a system designed for peak could be significantly oversized most of the time. The requirements for both periods should be taken into consideration to design a cost-effective design.

The Analysis Process

Establishing requirements that are considered immune from question or criticism upfront (non-negotiable business rules) can save time and headache during the analysis process. While

reviewing data, opportunities sometimes arise which the customer cannot pursue due to cultural constraints. AHS will identify the opportunities, but ultimately, the customer has the responsibility to decide direction. An example of this would be if what appeared to be an exorbitant amount of inventory on slow moving products was observed. AHS would make the call-out but recognizes that considerations like bulk rate buying strategies may result in the customer moving forward without considering a change to the requirement or process.

Sometimes customers will argue that the data is only historical. "Why would we use historical data to design from when it doesn't represent our future demand?" While it is true that it would be foolish to use historical data without considering growth or predictable changes in the business, wouldn't it be advantageous to use the data that you have rather than to start with nothing as your baseline? To quote George Box, a famous British statistician, "All models are wrong, but some are useful".

Data Validation is Critical

Data is not only important in DC and fulfillment design; it is also vital to daily operations. Operations staff should frequently review production data to identify improvement opportunities and adjust staffing and processes as necessary. There are many tools available today including warehouse execution software (WES) that provide real-time data analytics to visualize operational data and help Operations Management run a more efficient operation.

Of course, the results of data analysis are dependent on the quality of the data supplied. Data validation is critical. The more holes or missing data there is, the more assumptions will need to be made which will impact accuracy. Assumption validation is critical. Knowing there are commonly limitations to the data, the solution should be derived from a cohesive team with both quantitative and qualitative analysis.



Conclusion

When designing your next DC or making a modification to your existing operation, consider taking the time to analyze available operations data. Doing so will improve confidence in your future investment and save you from making costly mistakes.

Contact our experts at AHS, LLC for help!

Call us at **800-891-5504** or email us today at **info@ahs1.com**.