

Best Practices for Crossdock Facility Layout Design





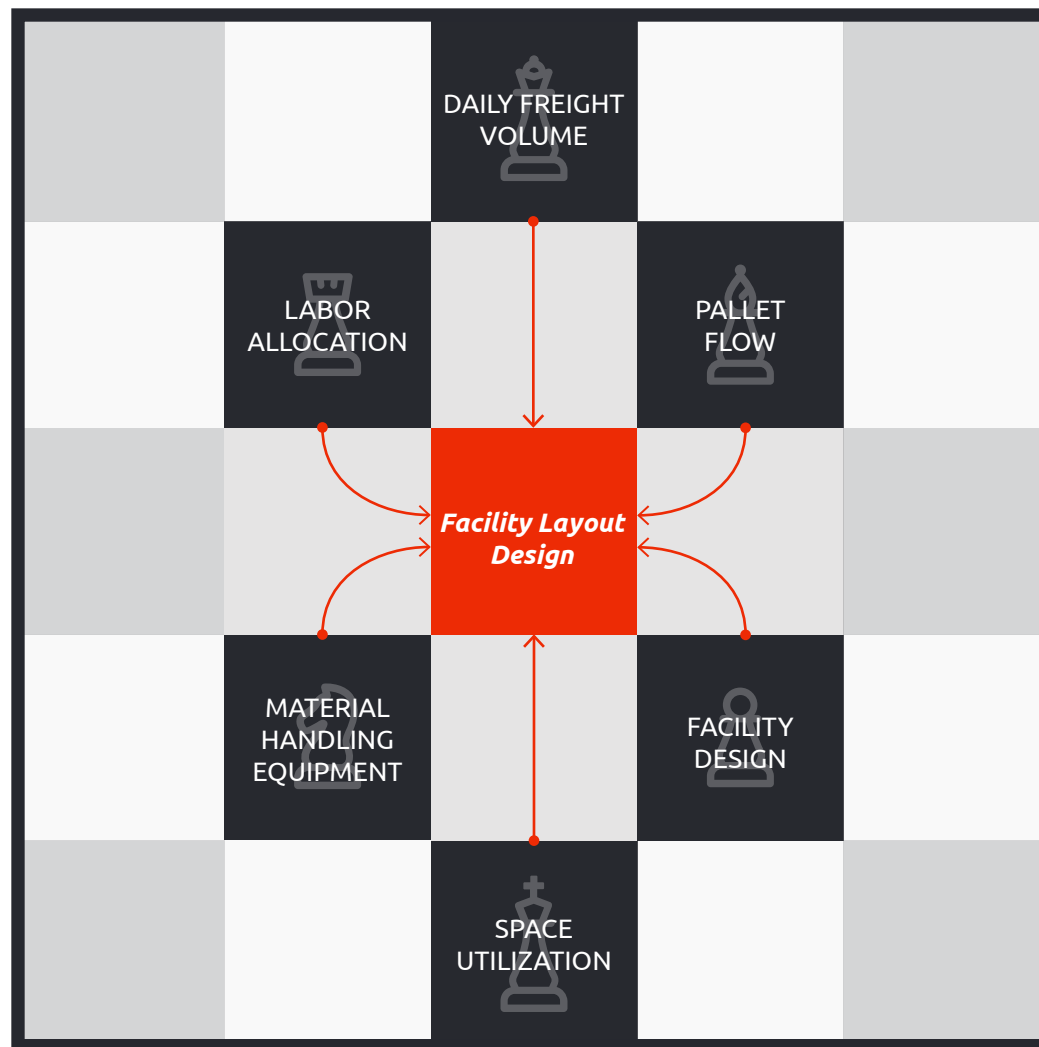
Crossdocks are a dynamic environment – freight characteristics change, customer requirements come and go, material handling capabilities evolve, there’s personnel turnover, how we use facilities changes... the list goes on. Leadership and managers are challenged to maintain operational efficiency; the way they use the building – the current layout – is really designed for outdated needs, the perceived high costs and potential disruptions of implementation often discourages operators from making necessary changes. Organizations do not have the appropriate tools or analytical skillsets readily available to continually optimize the facility designs. Also, while managers have the knowledge required to support a design (i.e. physical constraints, customer requirements, understanding of volumes, etc.) they are not trained to apply that knowledge to create a design. Finally, change is scary for the manager and for the operators, with the post-design implementation being the most discouraging factor. However, if the objective is to control costs, improve flows for scalability, minimize damage, and increase safety, then following best-practices and using these insights can help an organization overcome crossdock layout challenges.



Current State Understanding

While it can be tempting to focus on desired changes, organizations must first analyze their current operations. Ideally, this would start by gathering detailed requirements as part of a discovery working with operations team members to understand what is happening today with the processes and understanding the facility structure. Documentation, in the form of SOPs and/or current state swim-lane diagrams are acceptable starting points, but on-site (or remote observations via webcam) are essential. Your documentation cannot be generic across the network or the company, rather it needs to state very specifically details about how each door is used, which customers require certain equipment, when and how different areas of this building are used and why, for example. The graphic to the right shows key factors that should be considered during this analysis.

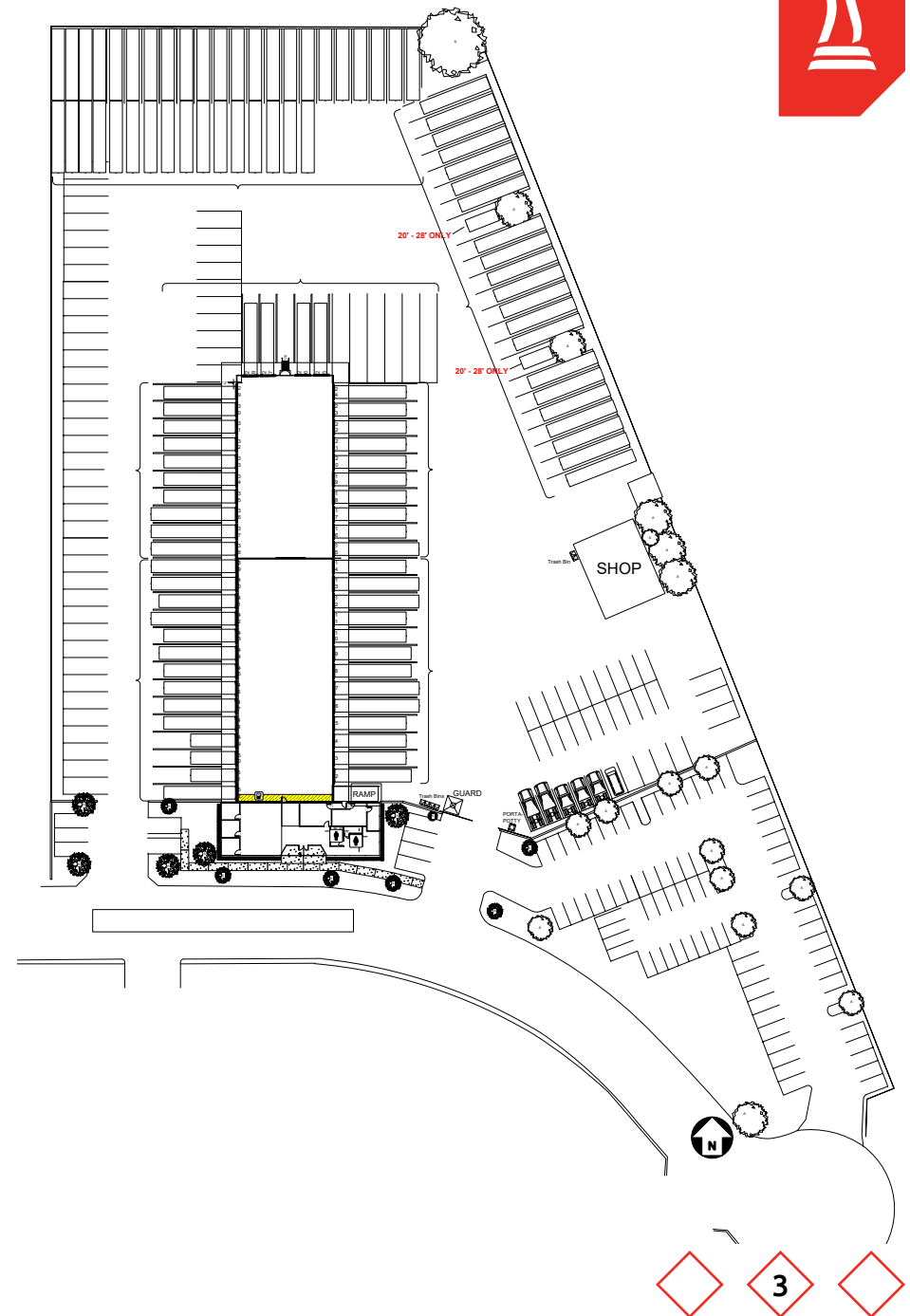
Understanding the current state helps identify pain points and areas for improvement and supports informed decision-making for an optimal future state. So do not be tempted to skip current state “because we already know it”; documentation forces critical thinking such that future state considers all the details.



Future State Best Practices

Freight Flow:

A crossdock operation should be designed to facilitate one-direction freight flow, however building shape can inhibit this. In some cases, this will not be possible due to pre-existing constraints like the shape and size of the yard – ‘think outside of the box’, literally. The building’s dimensions can restrict the use of types of equipment in certain areas. Parking areas, truck turning radius, the need for office space, attached or nearby maintenance and fueling stations, dedicated yard spots for customers renting overflow space... the list goes on. Accurately accounting for equipment types and types of trucks is essential for knowing which doors to use with adequate space. Automation is always intriguing, but inconsistently shaped freight in crossdocks, plus the high fixed cost of these automated systems, usually rules them out. Ideally, the designer should use architectural drawings that outline building and yard dimensions to have exact measurements.



Tactical Layout Considerations:

Staging Zones - Ideally, a crossdock does not require staging areas, zones for routes, however, customers' needs / layouts vary, and all freight cannot flow from trailer-to-trailer. Operators might need these zones due to other various operational challenges, such as certain equipment use (box trucks can't have forklifts loading directly), drivers are frequently delayed or needing to consolidate shipments together on specific outbound trailers. Whatever the reason is, the design should place them away from high-traffic lanes (limiting congestion and damage) but as close as possible to their respective outbound doors (minimizing travel time and reducing handling). Lastly, segmenting the zones by freight type and ensuring good visibility for monitoring and control is key. Utilizing 2D and/or 3D modeling tools can help optimize the design by considering walking and MHE travel spaces, ensuring an efficient layout.

OS&D - Correctly designing a space for OS&D and claims processing is also important because freight can be ignored for extended periods... or even forgotten! It is recommended to place these near dispatchers' offices as it ensures that issues are addressed in a timely manner; proximity encourages frequent and quick inspections. Placing these near offices also reduces likelihood of theft, more common in unsupervised areas.

Similarly, placing material handling equipment (MHE) near OS&D & claims provides the same benefit of ensuring better surveillance.

The Test Weight - How can such a stupid simple tool – a 1,000 lbs dumb weight – create so much extra work? Just do not designate its home location, and you'll find it nomadically moving about the facility. Poka-yoke it; laydown floor markings, and locate it near the MHE area, close to other commonly used (and non-mobile things) like the dimensioner and charging stations. It is normally used only at the beginning of a shift, so put it where that shift starts. Like some of the of the other section's design principles, keep it away from highly congested areas, but keep it close to the office area.

Walking / Travel Zones - When designing walking and traveling areas, the most important factor is the equilibrium between speed and safety; ensure space for both pedestrians and material handling equipment. Clearly marked pedestrian paths, with or without guardrails, are essential visual/physical cues and maintain smooth operations. To further enhance safety, walking zones should be separated from high-traffic MHE areas, reducing the risk of obstructions and collisions. While designing, consider industry standard measurements (provided by OSHA or safety product distributors) as starting points.





Signage - When it comes to signage, the important considerations are placement and visibility. Signs must be easily seen from a distance to guide both staff and drivers effectively. If the signs have QR codes, they should be scannable from afar to minimize delays. When determining location, beams can be friend or foe – they are posts or obstructions. Ceilings can be friends too, depending on the height. Additionally, proper lighting is essential, whether natural or artificial. Signs should be readable throughout the day, accounting for glare or shadows that could affect eyeballs or scanners.

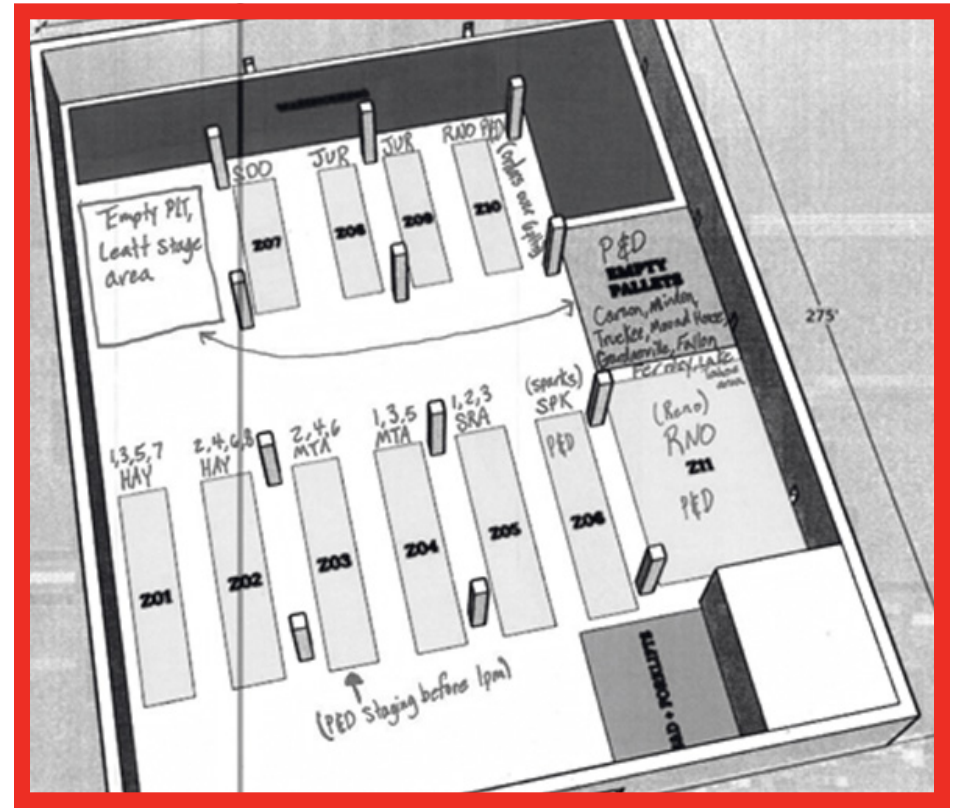
Having examined the various factors influencing crossdock layout, the table below provides standard measurements commonly utilized in facility design, though these can vary depending on specific needs. This reference serves as a valuable guide for determining appropriate dimensions for your business, ensuring that the design meets best practices and operational requirements.

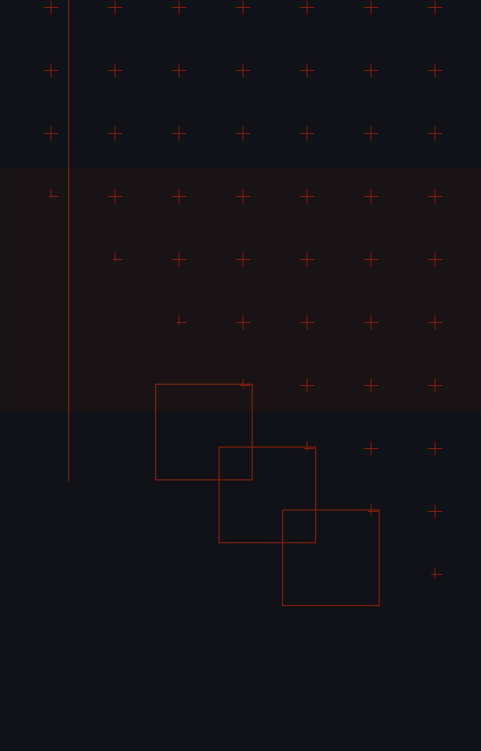
Design Specification	Dimensions / Measurements	Reasoning: Why is this the standard
Pedestrian Aisles Width	4'	OSHA recommends a minimum of 4 feet for pedestrian aisles to avoid accidents and ensure safe evacuation paths
Forklift Radius of Movement	12'	According to OSHA, adequate space must be provided for forklifts to turn safely without endangering workers or damaging goods
Standard Pallet	48" x 40"	This size is standardized by ISO (International Organization for Standardization) and is compatible with most racking systems, forklifts, and transport vehicles, facilitating efficient handling and storage
Staging Zone	'N' x 2 Pallet Spaces	Standard trailer width, plus access freight from both sides
Signage Font Size	For every 10 feet of viewing distance, need 1 inch of letter height	Following this general rule will help ensure that signage has letters large enough to be visible from the intended viewing distance
Signage Size	24" x 36"	OSHA Standards - Some facilities can accommodate for smaller signage if it still meets visibility and access standards
Signage Distance (Human Readability)	5'	Minimum distance recommended by OSHA and ANSI for signs to be easily readable
Signage Distance (Range of devices)	3" - 70'	Highly device dependent

Translating architectural renderings, excel spreadsheets and data inputs, OSHA guidance, customer requirements, SOPs, and institutional knowledge into a future state design visual can be challenging; specific software tools, very affordable ones, such as SketchUp, help with that translation into a 3D design. While industrial engineers are the most natural fit for these tools, employees comfortable with configuring common Microsoft products or web productivity tools should be able to master them. Modeling with a 3D design helps the engineers apply best practices, communicate options, and then incorporate feedback from operators and other stakeholders. It also gives them a chance to experiment and propose new concepts – challenging status quo in a crossdock is OK, in fact it is encouraged – gaining new efficiencies requires pushing the boundaries of experienced operators opinions and biases. Combining a well-crafted design with manual markups creates a powerful reinforcement tool, deepening understanding and facilitating better problem-solving and decision-making.

Implementing best practices in crossdock design is crucial for enhancing operational efficiency. However, to truly maximize the benefits of these improvements, organizations should also focus on preparing employees for the change through early communications, WIFM analysis, training, and equipping them with supporting technologies like scanners and automation systems. Proper training ensures that staff will accept and

effectively navigate the redesigned layout and utilize their new tools, while technology enhances accuracy and streamlines processes. When these elements are combined—an optimized layout, skilled personnel, and advanced technology, companies can drive continuous improvement, achieve greater efficiency, and ultimately enhance profitability in a crossdock. This integrated approach not only addresses immediate operational needs but also supports long-term success.





Selecting the appropriate vendor for your business can be a daunting task, but when done correctly it makes all the difference. The tips and tricks outlined in this paper will set you up for success, but execution will be dependent on an engaged and disciplined team throughout.

Forerunners third-party presence and expertise in selections has proven to help our clients maintain accountability, and when coupled with our tested methodology, the right vendor is sure to be selected. Learn more about Forerunners capabilities at:

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