



10 Rules of Success for Warehouse Design

Warehouse design is not “rocket science”. It is often the case that there is a wide range of potential solutions to a warehouse requirement dependent on the preferences of the individual user (some organisations may prefer automated design solutions and others may prefer more “conventional” and labour intensive solutions).

Whatever your preference it is essential – “if you are to generate a successful design” – to follow a number of important “rules” and fundamental stages in the design process, as summarised in the ten stages set out below.

1. Analyse your Requirements – Dig for Gold

What do you want the warehouse to do? You must analyse your requirements not only in terms of stock and product but also as to what the business needs are. Look at your product range and get rid of obsolete and redundant stock before determining the stock profile, by SKU (Stock Keeping Unit). Then identify the throughput, both in total volumes and by SKU, looking at the Customer Demand history and be sure to allow for “peaks” and “troughs” in stockholdings and throughputs, as well as “average” situations. Ensure that the business has a vision of the future so that provision can be made for changes in product ranges, variations in throughput, hopefully growth, and how, by increased volume to existing customers or more customers. Will there be changes to the stockholding policy due to changes in suppliers, different lead times or order quantities and last but by no means least what are the customer service needs, now and in the future.

2. Design from the Inside, Out

As the costs of buildings and related mechanical and electrical services often represent the largest part of any investment in a new warehouse, and once built it is difficult to change it is vital to ensure that the warehouse is designed from the inside out. Warehousing is very largely about efficient space utilisation and cost-effective materials handling. When designing a new warehouse building, these essentials must be considered first, before the building structure. Only when the optimum storage and handling solution has been designed, should the structural grid, column positions, building height and other details of the building be defined. If, for instance, the column grid is

not modular with the racking layout, there is a significant risk that columns will intrude into aisles and operational areas. It is also more economic to build upwards than outwards (per cubic metre of space) so, when planning racking and storage layouts, always make the best possible use of height, in order to minimise the size of the building “footprint”. When planning working and movement areas, however, it is essential that adequate floor space be provided for the processes to function efficiently without congestion and “pinch points”.

3. Unitise and Standardise

The “unit load” concept is fundamental to good warehousing and stores practice for most organisations. The unit load, whether pallet, tote or ISO freight container makes handling and storage much more efficient and cost-effective than “hard-balling” and storing individual items, with the amount of space wasted, time-consuming double-handling and product damage that can arise when handling loose goods.

However, it is important to ensure that the range of unit load types and sizes used i) are first determined to best match the range of products and stocks that have to be handled and stored ii) are compatible with the industry “standards” that apply to your industry iii) are modular with each other so that they can be inter-stacked when full or empty and iv) is kept to the minimum possible number of variants, in order to provide adequate choices but, at the same time, maximising flexibility, especially when used in conjunction with storage systems.

4. Plan for Good Space Utilisation

Space costs money Use it wisely. Use Pareto (A,B,C) and other analysis to categorise products according to their storage, handling and throughput characteristics, then select storage systems which offer good space utilisation, selectivity and stock rotation to meet those characteristics. Don't forget to use the available building height to maximum advantage. You must select the materials handling equipments which complement the storage systems and also facilitate good space utilisation (ie those which will allow you to work with the narrowest practicable aisles). Remember, handling and storage equipment usually accounts for only a relatively small proportion of total warehousing costs. Investment in the right equipment can save a great deal more, both in terms of building costs and through good productivity, labour costs.

5. Plan for Efficient Materials Flow

Why meander when you can travel in straight lines? Decide on whether a through-flow layout best suits your warehousing needs and site layout, or ‘U’ flow and plan flow-efficient routes in terms of: i) stock layout (using product popularity or other appropriate product grouping e.g. layout by product “family group”) and ii) the processes logical arrangement of the warehouse such as receiving, putaway, picking, packing, and despatch. Ensure that the most appropriate types of handling equipment are used according to the types of load to be moved and how far and how fast they need to be moved. It is usually the case that hand trucks and trailers are economic and flexible for localised movement. However, automatic guided vehicles (AGV's) or conveyors will be more appropriate if goods have to travel significant distances. For “medium” distances powered trucks might be used.

6. Plan for Productivity

Labour costs are usually variable, according to the number of staff employed, productivity and wage rates. They are therefore readily controllable and every effort should be made to minimise them, though without sacrificing customer service or accuracy. Benchmark productivity and performance against “best in class” for all processes and then focus on those processes which appear to be less efficient or productive than they should be. Order picking – ‘which can account for half more of total direct labour costs’ – is often a process where cost savings can be made, through changes in picking methods, reduction in the length of picking routes, the introduction of appropriate IT and materials handling equipment and, the incentivisation of staff. Introduce performance standards so that you can monitor individual and group KPIs (Key Performance Indicators), then train, train, re-train your staff.

7. Specify the “Umbrella”

– to Protect from the Elements

Prepare the building performance specification only after planning the storage and handling systems and internal layout of the warehouse (i.e. plan from the inside, out). Key items to be specified at this stage will include, among others:-

- Dimensions of the structural column grid
- Clear operating height from floor to top of the very top load, plus the operating clearances above
- Floor loadings, flatness and finishes
- Loading dock arrangements
- Mezzanine floors; heights, types and loadings
- Lighting levels, heating and environmental needs
- Fire protection and compartmentalisation
- Offices and employee amenities

8. Think Outside the “Box”

– Don't Incur Congestion Charges

At large D.C.'s over 60% of site area can be allocated to roadways, parking, and external activities. Make sure that: i) the whole site has a secure perimeter ensuring the employee car parking is secure externally and separated from the main site for internal security of stock ii) Proper routes need to be defined for commercial vehicles and may be split between your own vehicles and suppliers' vehicles. Adequate parking and manoeuvring space must also be allowed for vehicles. All access and egress for vehicles and pedestrians should be controlled, security-wise. Pedestrian routes must be safe and properly defined. Pallets, cages and waste should be stored in properly designated, enclosed areas. Plan to avoid congestion and don't over-develop the site!!

9. “Future Proof” the Plan

– Don't be a Dinosaur

Businesses tend to be dynamic so future-proof your investment by building in flexible processes that are reliable and resilient. Don't forget to consider reverse logistics and allow for future changes in business needs covering product ranges, stockholding policy and customer demands. When designing in the facility take into account future potential changes in handling and storage technology and information technology that might influence its layout and process at some future time.

Remember too, that at some time in the future your trading circumstances may change and you might wish to vacate the warehouse. It is therefore important that the building be designed in such a way that it is readily marketable to any one of a number of potential future occupiers. Therefore, even though the building may be designed for your specific use at the outset it should not be so customised that it is not suitable for other users.

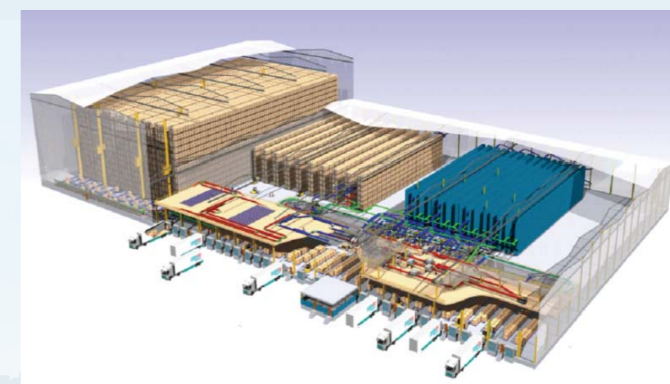
10. A Few Do's and Don'ts

DO properly consider and evaluate all the options as there is often more than one solution to a project.

DO talk to equipment suppliers – but remember their objectives that they will wish to sell you their equipment and not necessarily give an unbiased view

DO “network” with people in other companies and industries, as good practice in one industry can often be adopted by another.

DO take great care if you're considering automation as it can be totally unforgiving and very costly if it is got wrong!



DO run exhaustive “Checks and Balances” on your plans before going ahead – seek outside independent consultancy advice to check all your work. **DON'T** be a pioneer, let someone else find the problems first and **DON'T** leave any stone unturned in your quest for the best possible solution. Remember it is much easier to make changes at the planning stage than it is after a warehouse is up and running.



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