Case Study

Vivin Imports

Wetherill Park

Vivin Imports is one of Australia's largest furniture wholesalers supplying to major furniture retailers and independents. With recent growth in residential home construction and renovations, Vivin has experienced an increased demand for its products across the country.

To accommodate this business growth, the company had to elevate its logistics capability to retain and build on its competitive advantage. The distribution centre was identified as a crucial contributor to supply chain efficiency and effectiveness. The Vivin management felt a critical change was required and committed to a new purpose-built 23,300m² distribution centre.

The next step was to decide how this distribution centre should be fitted out.

Vivin knew that they had capacity constraints in their existing warehouse, and adding to the complication was the regulatory compliance for fire safety coverage, particularly for foam products and mattresses. The new warehouse required a storage solution to accommodate oversized products and ensure appropriate safety compliance.

The Initial Layout

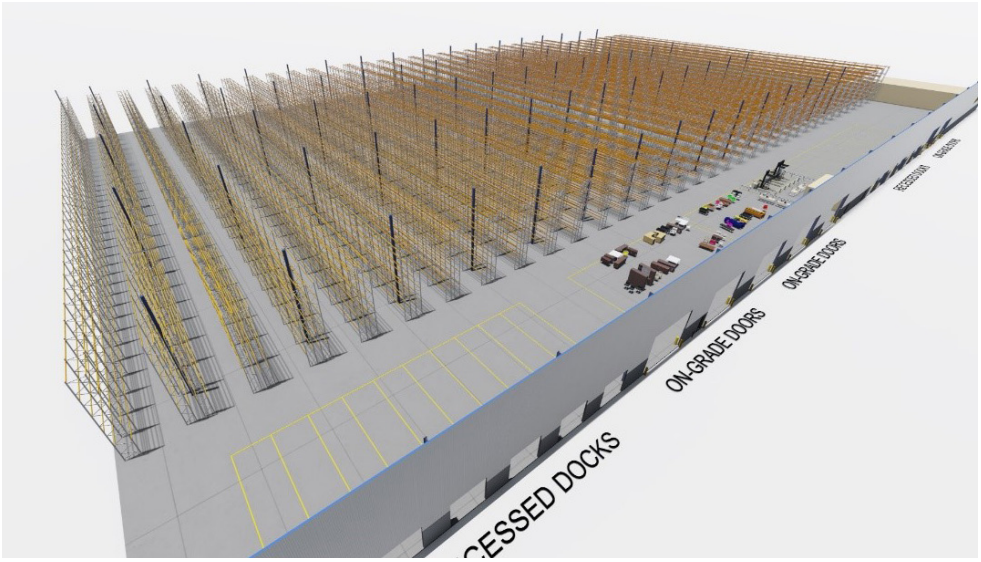
Dexion Solutions was invited to put forward a proposal for the new distribution centre based on an existing pallet racking configuration supplied. This consisted of standard selective pallet racking with 2,600mm clear entry bays arranged to 3,420mm aisles throughout the warehouse. Half of this layout was to be fitted with in-rack fire sprinklers.

Our experience told us that this was an industry adopted ‘default’ layout where there was no in-depth operational qualification of client operations undertaken. Based on the understanding that not all products have the same dimensional characteristics and demand profile, we question why many businesses accept this ‘uniform’ arrangement.

It could be that there is a lack of understanding of warehouse operations amongst many suppliers. This results in them often taking a lowest ‘cost only’ approach which drives the design to what we often come across – a ‘default selective rack layout’. Likewise, many clients have a very good understanding of the price and product specifications, but not the value of a total solution. That’s because this value can be difficult to explain in sufficient detail by those selling the equipment. As a result, both supplier and customer often agree on a ‘default’ layout.

To demonstrate the limitations of this default layout, we took the 2D drawing supplied and turned it into a 3D render. This gave Vivin a better perspective and understanding of the solution they would end up with, and allowed the Dexion Solutions team to highlight any potential shortfalls of the design.

Dexion Solutions go the extra mile to fully analyse the space and develop 3D renders where appropriate to ensure the customer has a thorough understanding of what can be achieved – adding so much more value and insight to the project. This additional stage in planning can also be recognised in ROI well into the future.



Default Layout – generated in 3D by Dexion Solutions to give the client perspective of the solution they requested.

Developing a Complete Solution

Dexion Solutions isn't simply a pallet racking supplier. We have teams of specialists in place to provide a full service storage solution.

Instead of opting for a default pallet racking layout, Dexion Solutions works in the best interests of the client.

Our team requested design relevant data, which included a snapshot of inventory, transaction table and the item master. This was then backed up with operational site observation and development of a process logic to support the design. The purpose of this study was to retain what was being done well, as well as engineer out the existing limitations, risks and difficulties where possible.

This is what we found:

- Standard 2,600mm clear entry bays did not provide optimised storage density for the range of products so we altered the design to include a calculated combination of 2,600mm and 3,850mm clear entry bays.

- To account for product overhang and a 100mm longitudinal flue in accordance with Fire Engineering and AS 4084:2012, this directed the design towards the specification of customised double entry frame depths of 2,106mm and 2,303mm respectively. The basic design only had a single double entry 2,106mm arrangement, which would have restricted the storage of oversized products like sofas.

- Finally, no elevations were provided in the original design so these had to be calculated. Twelve (12) differing elevations were designed to accommodate the 100mm transverse flue space as per criteria specified in FM8-9.

Now that the storage profiles had been determined, it was then time to develop a fully optimised warehouse layout.

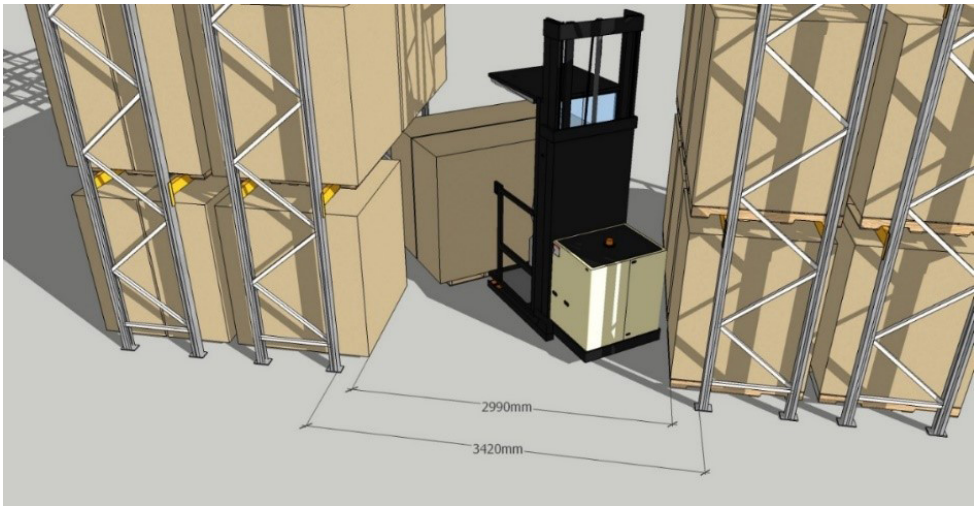
The storage system had to accommodate non-standard product sizes, all while balancing productivity with storage.

To achieve this, the layout developed by Dexion Solutions comprised of 1,500 bays of selective Speedlock racking with different frame depths and bay widths to accommodate variations in product dimensions.

Aisle Widths

The original default design had 3,420mm aisles rack to rack, but was this adequate? Let's consider how the space will be used.

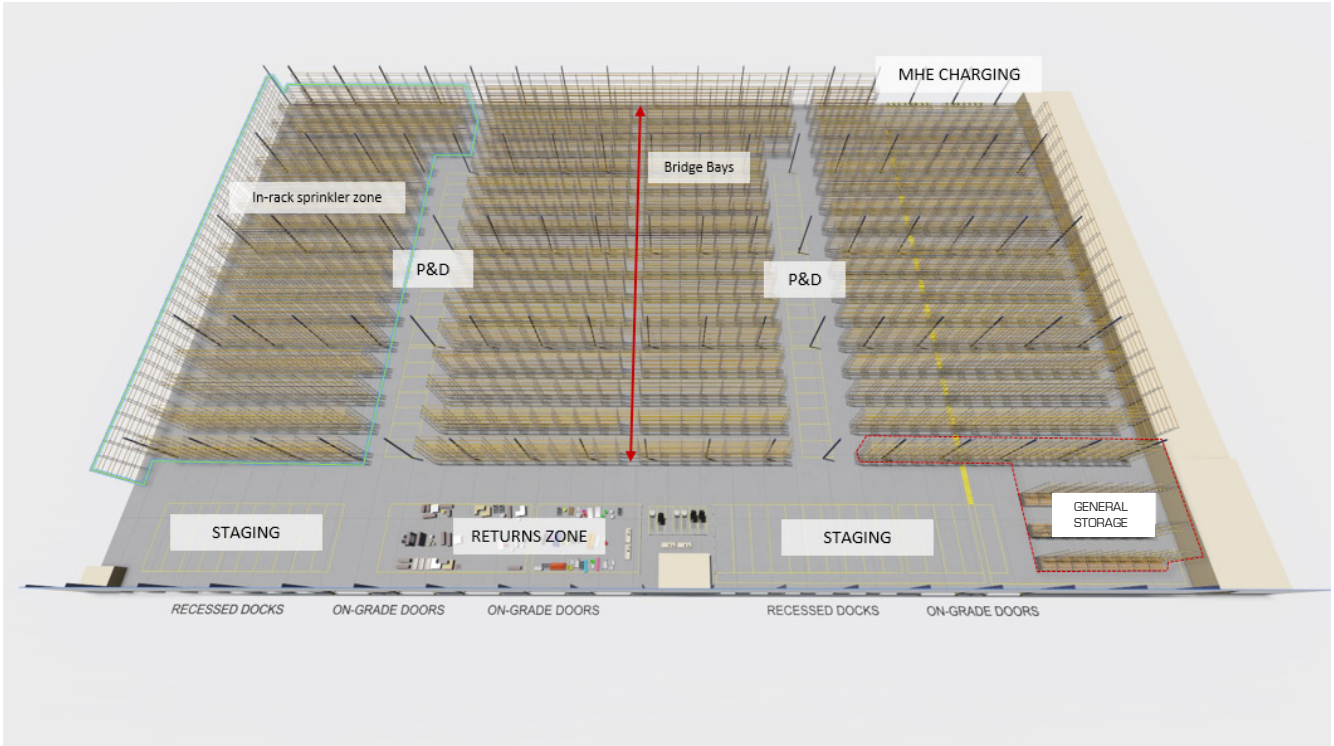
2,100mm width pallets are put away and retrieved at ground level and at height. While the aisles are certainly wider than the pallet, the space doesn't consider the materials handling equipment that will be used to manoeuvre the pallets. As shown in the diagram below, the resulting sweep arc of a forklift turning towards the racking is not considered in the conforming design.



Adhering to a 3,420mm aisle would have resulted in a 343mm aisle width deficit!

Aisle widths had to be increased to 3,850mm for operational viability, which was independently verified by the MHE provider. With larger aisle widths, the rack orientation was required to change from North to South to East to West due to the building column grid.

This flagged a significant change to the initial layout and it marked a fundamental change from being a *storage centric* design to one that was *operationally focused*.



The non-conforming design proposed by Dexion Solutions in 3D, where the orientation of racking was changed to better optimise the warehouse space.

In-Rack Fire Sprinklers

The initial layout directed that half the site be fitted with in-rack sprinklers. For this qualification, Dexion Solutions used inventory data and item master lookups to identify all the items that needed additional fire coverage. A line by line slotting calculation was applied. This was not as easy task!

From this exercise, it was determined that just over a quarter of the site required in-rack sprinkler coverage, quite a difference from half the site. This area allocation also accounted for likely and predicted storage variations. With a reduced area for in-rack sprinkler coverage, a significant cost saving was instantly realised. Combined with all the previous qualifications, this verification just added another layer to the optimised solution that could not be ignored.

In-rack fire sprinklers installed in 1/4 of warehouse.

Furniture Repair Zones

To complete the solution, a concept of operations was developed, with staging areas and furniture repair zones laid out. The material flow was calculated along with the operational task sequences. This ensured that both the physical and logical designs were complementary to each other.

Furniture repair zones laid out.

Warehouse Management System Integration

The system logic threads that were recommended could be applied to the Warehouse Management System (WMS) for configuration to achieve balanced task flows. The pertinent points about the operational sequences were the inclusion of batch and discrete order picking based on order profile waving, pick and drop locations for intermediary task staging, and task interleaving. With both the physical and logical designs undertaken in tandem rather than in isolation, a verifiable, auditable and clearly specified result was planned and achieved.

Labels and End of Aisle Signs

The design of a warehouse location map and the subsequent location labelling specification can be crucial to a project's success. For Vivin, the Dexion Solutions team used 3,850mm beam lengths, which were mapped out and labelled for three locations per bay, instead of the average of two locations across a shorter beam length. This will allow for the storage of one OR two non-standard product sizes, while also allowing for flexibility to use each level for up to three standard pallets.

The labels are made of polyester with a long term adhesive, making them ultra-durable and resistant to liquids. A unique feature of these labels is that they can be removed and relocated without tearing, offering even further flexibility for the customer.

End of aisle signs were also installed as an identification tool to clearly define the aisles amongst the racking bays.

Safety and Compliance

Bay profiles were configured to conform with FM Global Fire Engineering transverse flue requirements. 100mm longitudinal flue space maintained between products for oversized products to conform with fire regulations (FM global requirement) and AS 4084: 2012.

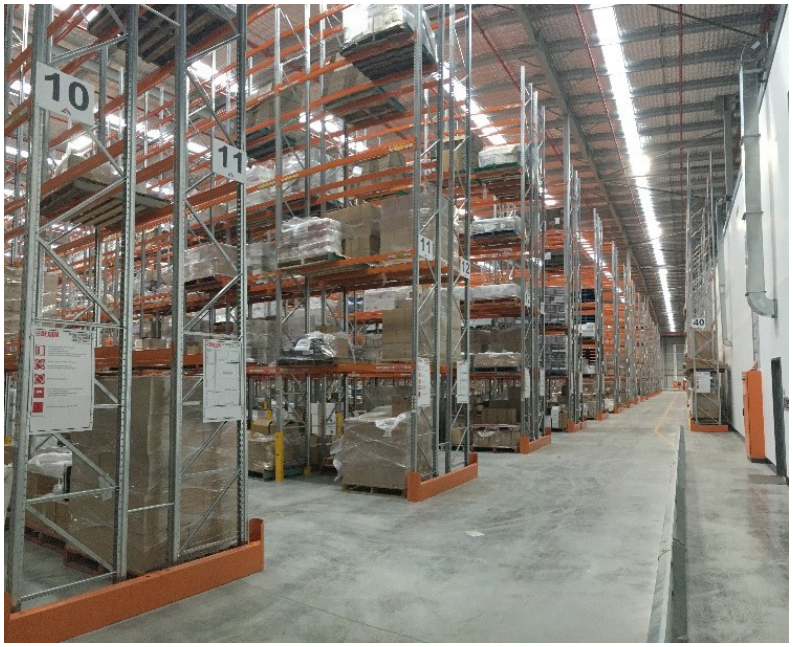
To further enhance the safety of the warehouse, Dexion Solutions also provided the following:

- **Rack Protection:**

The warehouse storage solution was further enhanced with rack protection, including specially designed baseplates with heavy duty fixings, front and rear deflection guards, and upright protection. Dexion Solutions ensure all upright protection used is in safety yellow, as this stands out most prominently against the racking creating a much safer warehouse environment.

- **Safe Working Load Signs:**

Safe working load signs were installed for each bay of racking. This ensures the storage systems does not get overloaded by warehouse operators, and meets Australian Safety Standards.



- **Traffic Management Plan and Line Markings:**

A traffic management plan is crucial to creating optimal traffic flow throughout the warehouse and minimising any risk of collisions. As part of a good traffic management plan, line markings can effectively segregate pedestrian and materials handling equipment, reducing the potential for accident or injury and ultimately improving overall workplace safety.

Dexion Solutions also provided an evacuation plan as a template for the customer to use.

Conclusion

Dexion Solutions concentrated on the principle of balancing productivity with storage. All the work done was qualified by analysis, observation and logic which are fundamental in any solution design. The client's interests were always in the equation and Dexion Solutions provided a value proposition, not just materials. This is added value that will be realised every day, year on year.

"The Dexion Solutions team really stood out from the start with their knowledge and comprehensive approach to storage systems. Not willing to settle for the standard approach, James and the team analysed our operational data and business goals to completely optimise the warehouse space.

Dexion Solutions were great to work with and through this experience we have gained insights that will be used to enhance our day-to-day warehouse functions.

We're confident this warehouse solution will provide the business with a competitive advantage well into the future."

Mark Redman
National Logistics Manager | Vivin Imports

WATCH THE VIDEO - CLICK HERE