Warehouse Slotting Optimization:

Canadian foodservice company creates and implements new slotting initiative, achieves massive productivity increase & reductions in operational costs

Optricity™

The Company

The company covered in this case study is one of the largest foodservice companies servicing various restaurants, hospitals, and healthcare related entities, in addition to providing food commodities for large chain stores across Canada all from a handful of distribution centers. Since its founding, the company has grown in the industry by maintaining a passionate commitment to the people and companies it serves.

The Challenge

This case study focuses on the unique challenges presented by this company's Ontario distribution center (DC). This location is a complex environment that has over 19,000 active SKUs with an extremely diverse product mix. The freezer section alone consists of over 5,600 active SKUs across two sections: Pick in Reserve (PIR) and the Main Line Section (main). The main section is the prime picking area while the PIR area is used to batch pick slow moving items.

This company was exclusively using a slotting strategy that had been implemented successfully across its subsidiary locations. After a period of changes and fast business growth within the company, specifically within the Ontario DC, the operations team recognized the need for a new and more advanced slotting strategy. The goal for this new strategy was to improve pallet build quality, better utilize the PIR area, and implement better product grouping by customer, while increasing overall efficiency. The company realized that it already possessed the necessary tool to implement these new potential

"Our slotting strategy was outdated and basic. It created numerous constraints and bottlenecks, which increased costs and inefficiencies and negatively impacted the operation."
- Inventory Control Manager,
Ontario Distribution Center

improvements, though the Ontario software users required further training with the slotting optimization solution, OptiSlot DC™ (OptiSlot) Software, in order to address the increased complexity of their model and optimize their slotting strategy.

The Solution

The operations team headed to Optricity's headquarters in Research Triangle Park, North Carolina for training. Through the training session, the OptiSlot users of Ontario-based team gained necessary techniques to utilize the full potential of the software. The knowledge obtained would support the team in tailoring a strategy specific to address their immediate operational needs, while also providing a foundation to adapt to changes they may face in the future. In addition to the need to improve pallet build quality, better utilize the PIR area, implement better product grouping by customer, and increasing overall efficiency, the team wanted to ensure that unique restrictions were addressed, and that the overall strategy was crafted for sustainability.

Once the team had gained a complete and cohesive knowledge of the software, they were able to quickly and efficiently deep dive into their operation's needs and form an effective new slotting strategy of their own. In order to do this, they needed to perform a fresh data pull and analysis. This was a crucial step in their process when optimizing their slotting strategy because this data is the foundation on which they would build their model.

Working with the Optricity team on this project has been fantastic. The hospitality while training (at their location in North Carolina) was appreciated. And the follow up conversations gave us a better understanding of our program use."
- Inventory Control Manager,
Ontario Distribution Center

With a fresh set of data and a fully built warehouse model, the team was now ready to begin with the optimization. The first part of the optimization involved in qualifying items to the main area or to PIR. To qualify the items, the unit movement for each item was analyzed. Ideally, hits should had been used but hits data was not available. This step in the process would drive most the productivity improvements of the optimization as it would reduce the number of out of stocks in the main and PIR sections and better utilize the batch pick functionality of the PIR area.
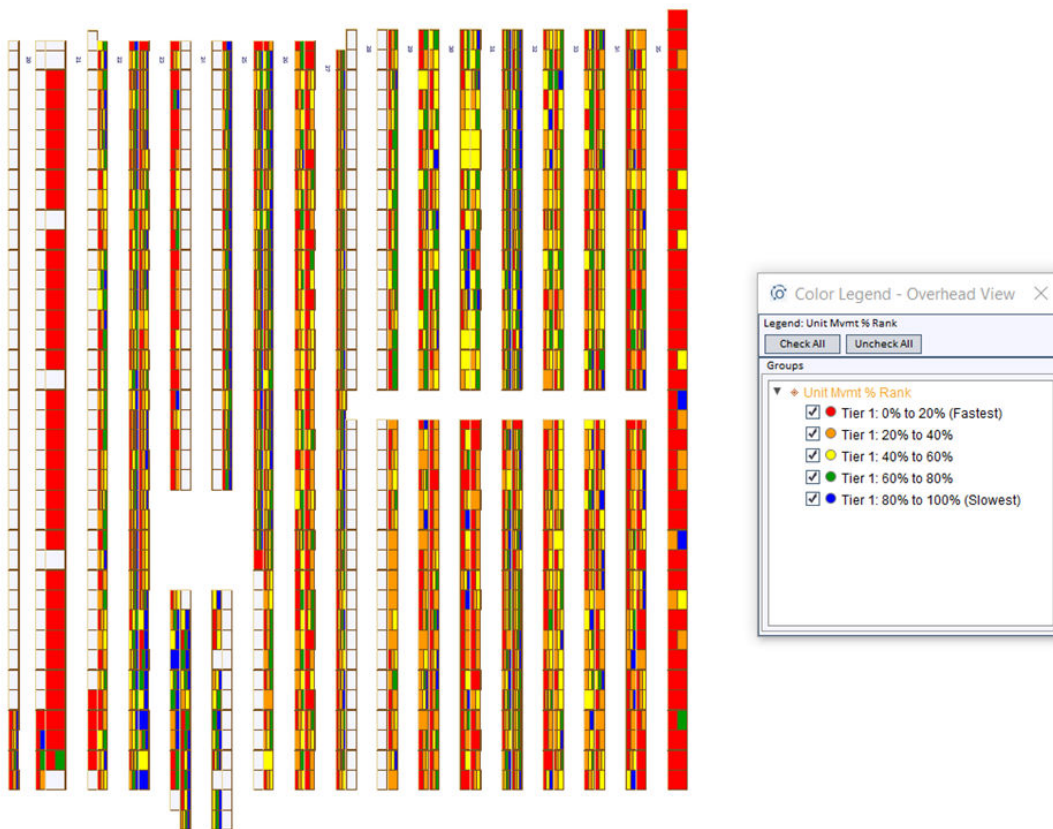

Image 1 - Heat Map by Unit Movement % Rank Before Optimization

In conjunction with the qualification of items, the Ontario team deployed use of a unit movement grouping effort to maximize the utilization of the cross aisle in the first half of the main area. This will occasionally allow the selectors to skip certain aisles in the picking process, resulting in a reduction of horizontal travel. Note Images 1 and 2: in Image 2, the optimized state, there are no slow-moving items inside of the upper half of the cross aisle unless the items belong to a specific product group that designated to that particular aisle.
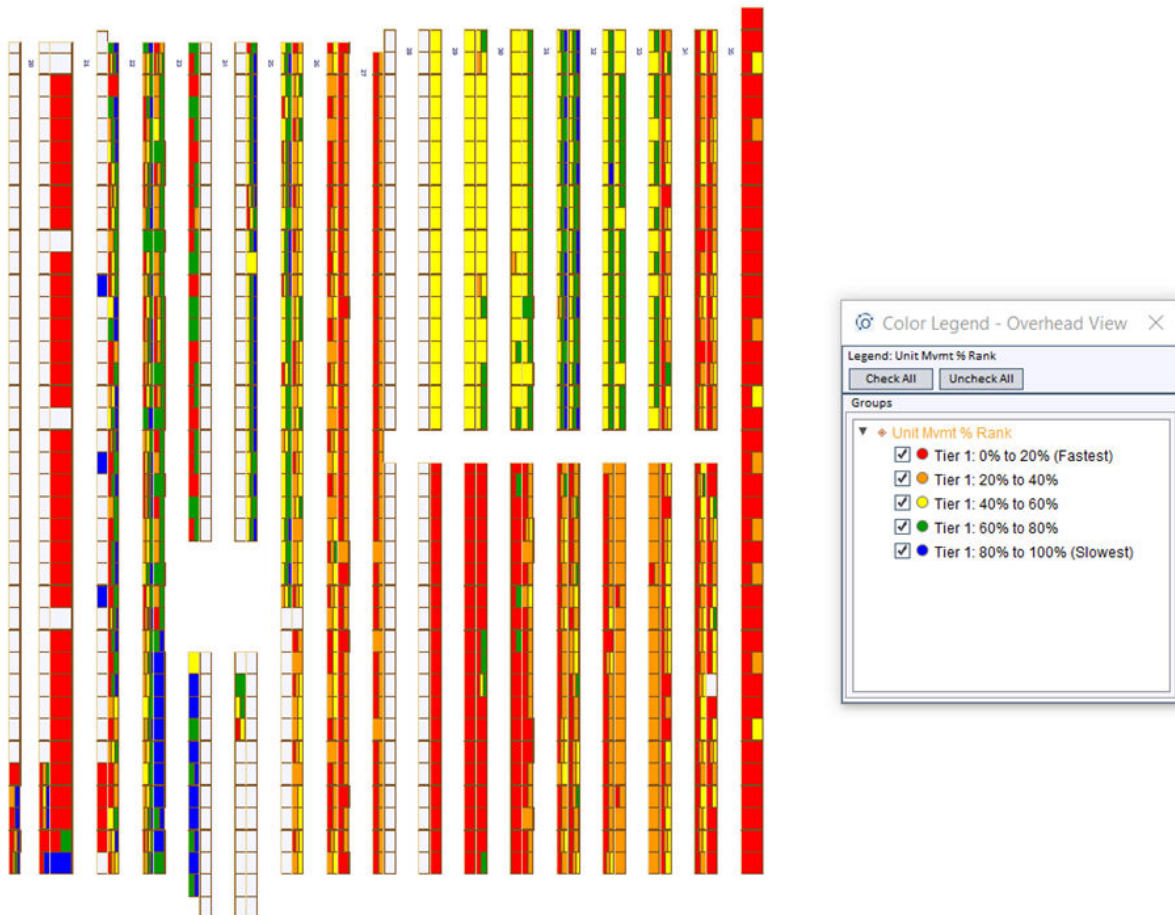

Image 2 - Unit Movement % Rank Optimized State

In addition to the already existing case weight item sequencing, the team added a variety of family groupings to the model. This will help keep customer orders close to each other and increase the quality of the pallets built, allowing them to both increase efficiency (pick density improvements) and reduce damages.
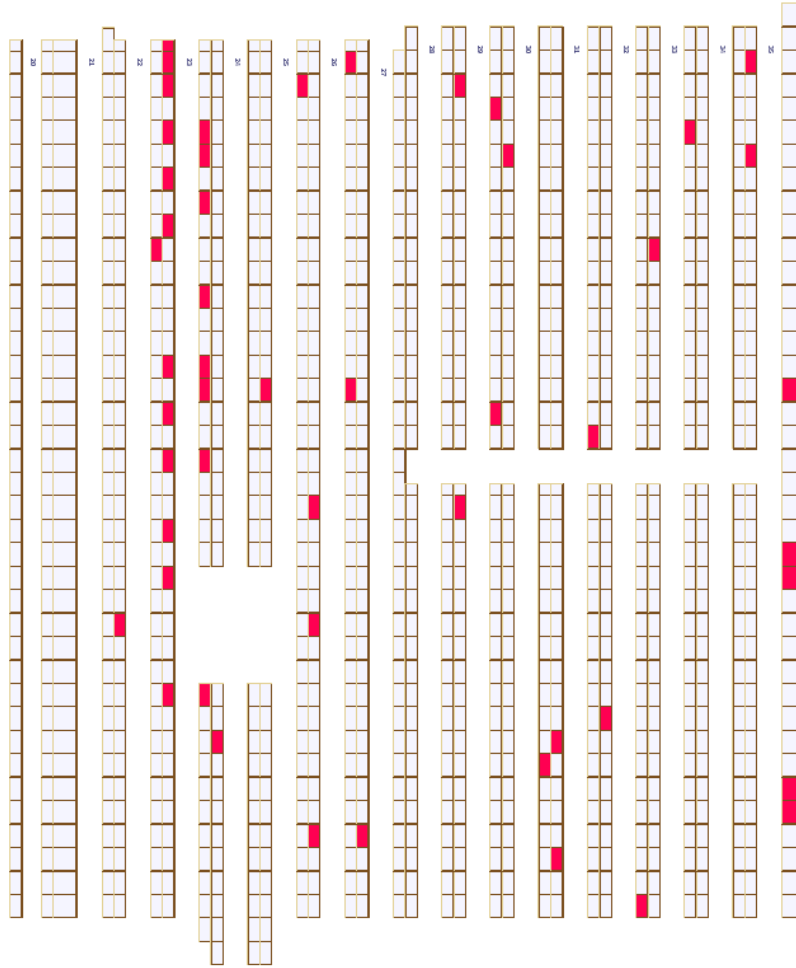
Image 3 – Product Group 1 Before Optimization

These changes alone caused the slotting score, a measure of how well the rules of the optimization are being applied to the model, to go from 71.86 to 95.24 which highlights a significant improvement for both customer grouping and pallet build quality.
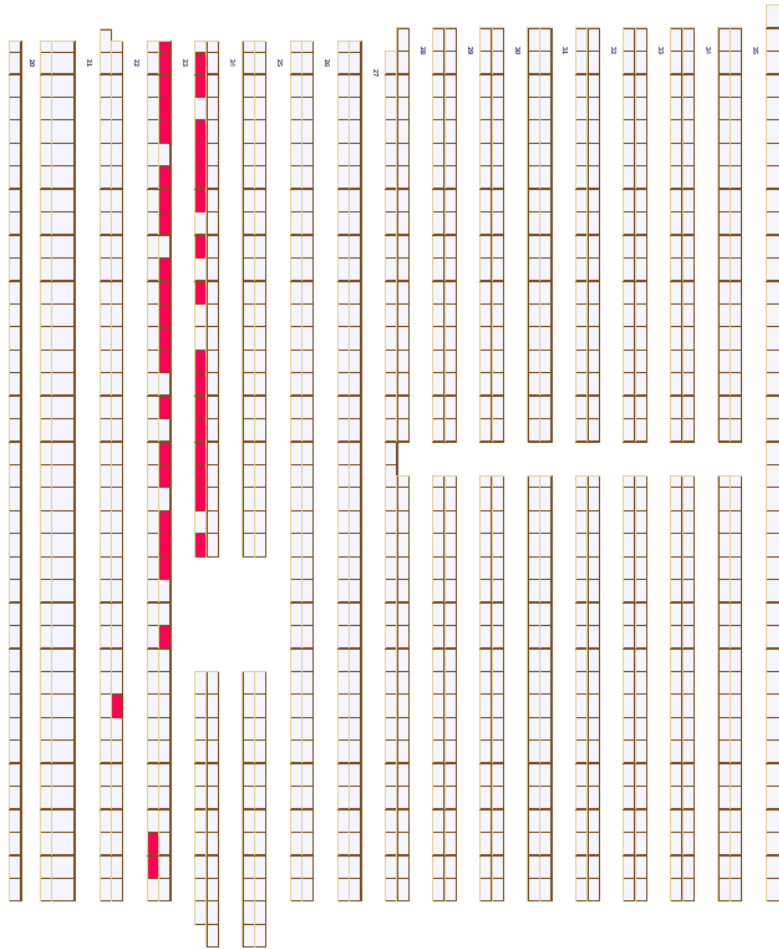
Image 4 – Product Group 1 Optimized State

The Results

The theoretical results expected from the projects can be seen in Image 5 below.

Parameter	Current Slotting	Freezer Move - Weight Item Group	Difference	Pct Diff
Lines Per Hour	61.6	76.6	15.0	24.35%
Units Per Hour	139.7	173.3	33.6	24.06%
Feet per Unit	79.666	68.881	10.786	13.54%
Cost per Unit ($)	0.156	0.125	0.030	19.39%
Units Picked	14,594	14,897	303	2.08%
Lines Picked	6,434	6,583	149	2.32%
Total Orders	50	50	0	0.00%
Total Exits	100	103	3	3.00%
Avg. Exits per Order	2.000	2.060	0.060	3.00%
Total Distance	1,162,651.638	1,026,116.447	136,535.191	11.74%
Travel Time	61:30:57	54:17:31	07:13:27	11.74%
Time to Pick	21:00:32	21:52:12	00:51:40	-4.10%
Setup & Closing Time	09:10:00	09:26:30	00:16:30	-3.00%
Out of Stock Time	12:45:00	00:20:00	12:25:00	97.39%
Total Time	104:26:30	85:56:13	18:30:17	17.72%
Total Cost ($)	2,271.604	1,869.128	402.476	17.72%
* Replenishments	4,763.8	4,521.2	242.7	5.09%

Image 5 - Order Pick Analysis Results

The theoretical results were very promising, showing an approximate increase of 24.35% in lines per hour. With these expected results, the team began preparations to make all the required moves, which included allocating labor and instructing the team on how to perform the moves.

The team made their full reslot over a period of 5 weeks through utilizing overtime shifts on the weekends to fully reslot the main warehouse area. Since this was a quite long period to perform all the moves, a data refresh had to be performed for the last week of the moves. This data refresh included the seasonal movement for the incoming season which caused additional required moves.

The Ontario team saw an increase of 13.33% improvement in productivity, increasing cartons per minute from 1.75 to 2.0 on average or about 105 to 120 cases/hour. The PIR section also saw a reduction of 34% in its utilization which was one of the main goals of the strategy.

"Our new slotting solution is much more efficient. Our Optricity Engineer was an incredible trainer. He took the time to explain the impact of all the options in the program, which in turn allowed the team to utilize the program to its best capabilities."
– Inventory Control Manager, Ontario Distribution Center

About Optricity

Optricity creates and supports warehousing analysis, optimization and performance improvement software. To develop its solutions, including the highly acclaimed warehouse slotting application, OptiSlot DC™, Optricity utilizes a blend of warehousing domain expertise, advanced mathematics and software engineering skills.

The Platform of planning solutions includes slotting, profiling, integration, simulation, @Ease Warehousing Technologies™ and the Moves Conductor™ for warehousing operations.

For more information:

Optricity
68 TW Alexander Drive
PO Box 12499
Research Triangle Park, NC 27709
+1 (919) 237-4846
info@optricity.com | www.optricity.com |