

Bringing quality to internal customers

*Process improvement delights California berry producer Driscoll's,
From carton production to inspection to inventory*

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The Central Coast of California is home to many produce growers and shippers, including the world's largest Berry producer: Driscoll's of the Americas. Based in Watsonville, California, the more than 100-year-old family-owned business, like many others, aims to delight its customers. This applies to those who receive the company's berries and to internal customers and suppliers as well.

A few years ago, Driscoll's Supply Chain group took this philosophy a step forward. Miguel Miciano, Director of Procurement, took the lead and reached out to Driscoll's suppliers and asked for their participation and commitment to work together as a team to reduce operational costs along the supply chain.

Two early partners that aggressively worked with Driscoll's to reduce operational cost included Sambrailo Packaging of Watsonville, California, and Sustainable Productivity Solutions of Scotts Valley, California.

Sambrailo began in 1923 when Charles Sambrailo first recognized the need to improve produce handling methods. He approached growers and shippers with packaging solutions such as paper liners designed to protect apples as they were packed into wooden boxes.

The Scotts Valley location of Sustainable Productivity Solutions, just north of "America's Salad Bowl," provided the impetus for the company to apply continuous process improvement to produce growing and shipping.

Together, these three organizations have worked to improve various aspects of Driscoll's supply chain, and this is the story of their cooperative journey to improve operational performance. As Miciano stated "we've made significant progress the last couple of years, but it feels like we have only scratched the surface of how we can work together to the mutual benefit of all".

The improvement efforts

Both Sambrailo and Sustainable Productivity Solutions worked on improving different aspects of this process.

Sambrailo developed and installed an inbound inspection process to improve the quality of the clamshells (the containers berries are placed in) provided to the growers. Sustainable Productivity Solutions generated improvement ideas for the harvesting

through inbound process and later used simulation modeling and analysis to design a more efficient network for Driscoll's Central Mexico operations.

In addition, Sustainable Productivity Solutions worked with Driscoll's and its suppliers to re-engineer the new product development process.

Driscoll's Central Mexico network includes seven Driscoll's distribution centers and 15 supplier distribution centers. Currently, the supply chain process for packaging materials goes from these supplier distribution centers directly to each of seven Driscoll's distribution centers. The packaging materials flow modeled is shown in Figure 1.

Some of the challenges with this current materials flow include:

- Each of the seven Driscoll's distribution centers has to use existing floor space to perform the inspection process. As the business continues to grow, it is preferable that this floor space be used for processing finished product.
- In addition, this inspection process not only takes resources away from more critical processes, it is difficult to ensure that the discipline exists to execute the inspection process every time.
- Due to the suppliers' preference to deliver in "full truck load" equivalent, the Driscoll's distribution centers are forced to carry more product on-site than they desire.

To resolve these issues, it was proposed that the supply chain be modified by inserting a materials hub between the supplier distribution centers and the Driscoll's distribution centers. This solution comes with significant costs for both the leasing and the operation of this hub facility. To assess the benefits/costs of inserting this hub into the supply chain, simulation models were developed and analyzed by Sustainable Productivity Solutions.

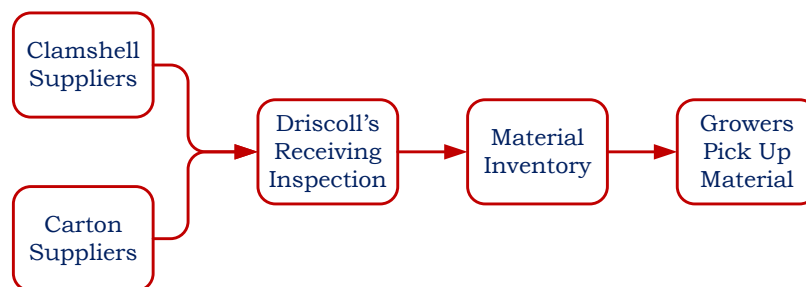


Figure 1: Modeling the problem

The current raw material flow for packaging materials included a number of challenges.

The initial model was a reflection of the currently existing supply chain. This model was built with a high level of detail that focused more on the interactions between the various distribution centers on a daily level. The model kept track of inventory levels and how frequently a desired material pickup by a grower at a Driscoll's distribution center could not be met. This initial model was validated against previous growing seasons' data.

Next, a model was developed with the hub inserted between the suppliers and the Driscoll's distribution centers. In this model, all supplier deliveries went to the hub instead of to the individual Driscoll's distribution centers. And the Driscoll's distribution centers' replenishment orders were sent to the hub instead of to the individual suppliers. This new flow allowed the Driscoll's distribution centers to get deliveries of only what they needed versus full truckloads of material. Of course, as noted above, suppliers prefer to deliver full truckloads.

Figure 2 shows a screen shot of the hub simulation model, while Figure 3 shows the results from the hub simulation model



Figure 2: A view to improvement
 This screenshot shows the hub simulation model.

		Base	Hub	Different Inventory Management Strategies					
# Trucks in Network per Day		45.1	62.5	64.3	60.7	60.7	64.8	64.7	63.8
Average Transit Time (hrs)		4.1	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Max Inventory (#Pallets)	Hub		3388.6	3484.3	3690.9	3318.6	3432.8	3423.6	3377.4
	DOTA Cd. Guzman	463.0	509.0	437.8	731.0	1016.3	373.2	361.7	395.1
	DOTA Tapalpa	252.8	277.1	216.9	374.1	516.7	180.7	174.3	184.1
	DOTA Mazamitla	37.7	72.4	54.6	97.5	136.8	57.6	50.7	58.5
	DOTA Jocotepec	536.4	604.4	474.7	810.0	1122.1	379.5	347.4	386.3
	DOTA Jacona	1616.5	1365.0	1064.9	1882.0	2456.3	884.0	874.1	936.5
	DOTA Los Reyes	317.4	365.4	282.3	484.0	675.4	226.1	220.0	226.8
	DOTA Tupataro	239.5	296.3	225.6	396.8	555.8	184.7	170.6	199.3
# Missed Requests per Day	DOTA Cd. Guzman	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOTA Tapalpa	8.6	0.0	0.1	0.0	0.0	0.1	0.2	0.2
	DOTA Mazamitla	8.8	0.1	0.5	0.4	0.5	0.4	0.6	0.4
	DOTA Jocotepec	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	DOTA Jacona	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOTA Los Reyes	6.3	0.1	0.1	0.2	0.0	0.0	0.1	0.0
	DOTA Tupataro	7.6	0.1	0.2	0.1	0.1	0.1	0.1	0.1

Figure 3: The hub of good delivery

Adding a hub helped the frequency of missed deliveries decline dramatically, as shown by these results from the hub simulation model.

Comparing the results of the hub model versus the current supply chain model, the following were the key benefits of a hub-based supply chain:

- The frequency of missed deliveries from the Driscoll’s distribution centers went from an average of three or four missed deliveries per day to almost zero per day for the hub-based system. Since the hub is the only source of deliveries for the Driscoll’s distribution centers, distribution centers receive deliveries daily. And this ensured consistent replenishment when needed. Also, deliveries are composed of all the various products needed.
- Thanks to the daily deliveries from one destination (the hub), the inventory management strategy used can be made more specific to the level of demand of an item. For example, for high movers, the distribution centers can carry less inventory than before since they can receive replenishments quicker with the hub system. For slow movers, the distribution centers carry more inventory (in proportion to demand) than fast movers. This policy can be delineated further into multiple volume-based buckets. Applying this strategy to the hub model reduced inventory levels by more than 20 percent.

The hub simulation model will continue to be used to prepare the inventory management strategy for each season.

Developing an inbound inspection process

Beginning in 2013, Sambrailo Packaging established a team to thoroughly map the processes that it takes to manage Driscoll’s complex and unique packaging operations.

Every detail from forecast and procurement to vendor and inventory management to issuance and invoicing was dissected. This analysis identified how Driscoll’s could

more effectively manage operating costs, minimize risk, improve scalability and enhance quality.

This analysis also identified the areas where Sambrailo Packaging can provide enhanced operational support to Driscoll's, above and beyond what would be considered standard packaging procedures. From this, Sambrailo Resource Management was born. This team now works with Driscoll's and other customers to improve their operational performance in five key areas: product development, vendor and supply chain management, product testing and qualification, packaging operations management and product traceability.



The inbound packaging inspection program was implemented first at two of Driscoll's facilities in Central Mexico.

Out of this process mapping, both companies collaboratively designed a core process template that is adaptable to global expansion in the future. As part of this core template, it became evident that quality assurance and quality control protocols early on in the packaging supply chain would mitigate risk and reduce cost implications further downstream. Focusing on product testing and qualification, Driscoll's and the Sambrailo Resource Management team initiated an inbound packaging inspection program in November 2015.

The inbound packaging inspection program was implemented first at two of Driscoll's facilities in Central Mexico – Ciudad Guzman, Jalisco, and Jacona, Michoacan. Through this program, Sambrailo regional packaging quality inspectors conducted

initial cursory inspections of supplier pre-build inventories and provided training and support to Driscoll's warehouse operations staff. Driscoll's trained warehouse staff then conducted full inspections of all inbound packaging.

More than 40 characteristics of the packaging features were inspected with data and images uploaded to a cloud-based database in real time. From November 2015 through March 2016, more than 7,000 individual inspections on trays and clamshells have been executed.

The goals of this program were to provide objective data to all parties involved, to push greater accountability back to the supplier base and for everyone to work together toward a "zero defect culture."

The data from the program allowed Driscoll's and Sambraileo to evaluate suppliers' manufacturing capabilities against stated quality expectations. The program filters out quality-related issues before packaging goes out into the field, giving suppliers time to make necessary adjustments prior to the start of the season and minimizing packaging quality issues for Driscoll's growers.

Sambraileo Resource Management and Driscoll's are currently implementing the inbound inspection program at many of Driscoll's locations in the United States as well. Driscoll's has found that it allows their growers to be more efficient because they do not have to interrupt the harvesting process to resolve packaging defects in the field.

Ultimately, the Sambraileo Resource Management team, through the inbound inspections, acts as a filter, shortening the control loop of information. The faster data is fed back to the vendor pool, the faster they are able to implement change. The future effects of quality-related issues are minimized, reducing many cost implications that could have grown exponentially throughout the supply chain. The risk of food safety violations is potentially reduced, and costs can be lowered over time due to less waste.

The primary expected benefit of the Sambraileo inbound inspection process is that Driscoll's platform will delight its customers and enhance brand equity thanks to improved packaging quality.

Re-engineering clamshells and cartons

Clamshells are both a mechanism for storing and protecting the berries, as well as for presenting or displaying the berries on the grocery store shelf.

For certain times of the year or certain markets, a need for a new clamshell or carton design can arise. For example, for Valentine's Day, certain markets want to provide a heart-shaped clamshell. In another situation, a regional market may have demand for a specific clamshell size. Or a growing region may need a hand-fold carton as opposed to a machine-fold carton.

These needs for new or modified clamshells and cartons arise frequently.

The focus of this re-engineering effort was an informal, nonstandardized new product development process. This process often resulted in many efforts to create new clamshells and cartons that were not communicated well within Driscoll's and often had no justified business case. These projects tied up resources, were not always implemented efficiently and were difficult to prioritize. There was a strong need for a formalized and standardized toll-gate driven process.

Sustainable Productivity Solutions worked with Driscoll's personnel and their suppliers to bring rigor to this process. The first step was to understand the current processes and failure points. The major failure points identified included:

- Poor communication and coordination between suppliers and Driscoll's
- Failure to communicate design objectives and specification fully (Information is missing.)
- Failure to consistently calculate the expected return on investment/value proposition
- Failure to document design iterations
- Difficult to design packaging that works for all regions/varieties because of fruit size variability
- Incomplete engagement of all critical stakeholders during design projects

Once these findings were communicated among all stakeholders, a process mapping exercise was used to develop what the desired process would look like. From there, toll gates were identified, the specific requirements for each toll gate was defined and the results were communicated to all involved teams. Significant effort was placed in involving all stakeholders during the process definition phase. Then individuals were assigned to manage this process and to drive the discipline into the organization to follow this process.



Figure 4: Working on it

The process improvement team is still working to implement this revamped material design flow for developing new clamshells and cartons.

The effort to follow this material flow shown in Figure 4 is not complete. We are currently in the stage of driving the discipline to follow the process. Occasionally we have had lapses where an individual has tried to circumvent this process. For the most part, though, most stakeholders are happy with the greater clarity and transparency.

Teamwork based on transparency and trust

All these various efforts have driven significant improvements in Driscoll's ability to move faster as an organization as well as in executing current processes.

The Driscoll's-Sambrailo-Sustainable Productivity Solutions team believes that the critical drivers of their joint success is Driscoll's effort to be transparent and trusting. This has energized both Sambrailo and Sustainable Productivity Solutions to be more creative and aggressive in how they can help Driscoll's run a more efficient, effective and flexible business.

Khaled Mabrouk is an operational engineering leader with Sustainable Productivity Solutions. He has 30 years of experience delivering operational improvement and design success stories, both working as an external consultant to numerous Fortune 1000 companies and as an internal consultant within Fortune 500 companies. Mabrouk is also a part-time University level industrial engineering lecturer with terms at San Jose State University, Wayne State University and Eastern Michigan University. He has been an active member of the Institute of Industrial and Systems Engineers since 1985 and is a director for IISE's Lean division.

Erik Sambrailo leads Sambrailo Packaging's continuous improvement and automation efforts. As Project Manager, he is responsible for the oversight and development of technically demanding innovation projects throughout the company. Prior to rejoining the family business two years ago, Sambrailo spent several years in the Bay Area managing construction projects for various high-tech companies. Sambrailo graduated from the University of Colorado with a B.S. degree in architectural engineering.