Worldcolor Continuous Improvement Initiatives

Case Study:
Distribution Efficiency Promotes Positive Environmental Impact

Company

Worldcolor Logistics provides sound, industry leading print distribution services allowing our customers to better focus on their core business.

Challenge

Utilize continuous improvement initiatives to dissect, analyze and increase the overall efficiency within Worldcolor's Print Logistics platform in order to reduce cost as well as significantly decrease annual carbon emissions.

Results

Between June 2007 and August 2009, Worldcolor eliminated 1,534 full truck loads from being shipped across North America. The collaborative effort between Worldcolor Logistics and participating Worldcolor print plants stopped 3,374,800 lbs. of CO_2 from being released into the atmosphere.

Summary

In 2007, Worldcolor Logistics (WCL) implemented several continuous improvement initiatives across our various business platforms with the goal of increasing distribution efficiency and decreasing the company's overall carbon footprint. Utilizing prior load plans as the basis for analysis, the Logistics group focused on increasing the average weight per loaded trailer at various facilities in order to reduce the number of trucks needed to move the product and thereby reduce the overall operating costs while still meeting all customers' needs. In addition to reducing the number of truckloads

shipped while moving the same volume of product, WCL positively impacted the environment by reducing diesel fuel consumption and significantly decreasing overall carbon emissions.

Background

In early 2007 it was declared that Worldcolor Press would begin aggressive process correction projects as part of a corporate continuous improvement initiative. This included finding various cost cutting measures that would affect both the plant and logistics divisions in a positive manner. One of the primary measures looked upon were load factors. Load factors are truck weights for all products leaving an origin facility to a specific destination. Using historical data, we investigated the origin destination pairs from a multitude of facilities. The primary focus of the data pull was to match each pairing with a historical load weight average on precise origin destination pairings. Using the previous year as baseline data, we determined the average weight of various destinations out of a select group of plants. The next step was to examine the product coming out of a facility and our flexibility in working with it. We have an abundance of product which is largely controlled by the business needs of our client base. Our goal is always to exceed customer needs; therefore, we had to strictly adhere to the guidelines of any customer routed products. Therefore, our continuous improvement methodologies had to be directed at only a particular amount of freight. This was beneficial in helping us select the correct lanes in which to apply our improvement techniques.

Deployment

Worldcolor Logistics identified the following as the primary focus of the project: reduce variation in production and administrative processes by applying structured problem solving techniques.

1. By altering the skid configurations within the trailers themselves we were able increase the amount of product in a trailer, while still keeping gross truck and axel weights below highway limitations. This included the investigation of staging configurations within the trailers themselves as well as possible double stacking of product when possible.
2. By heightening several areas of customer service communication, we were able to communicate the lead times of pre-planned product, allowing our load planning divisions to maximize truck weights and efficiencies.
3. By updating the current and establishing new guidelines for strategic loading initiatives throughout our consolidation network, we were able to allow print traffic divisions to have more flexibility in loading product on outbound truckloads, while maximizing trailer efficiency.
4. The North American consolidation network was analyzed and redefined. New delivery boundaries that further encouraged the strategic loading initiative were created, as well as new precedents for the load planning group.
5. Whenever business conditions allow it, converting transportation modes to intermodal from truck load allows us to reduce CO_2 emissions by 66% of what would normally occur, while still meeting customer needs.

Results

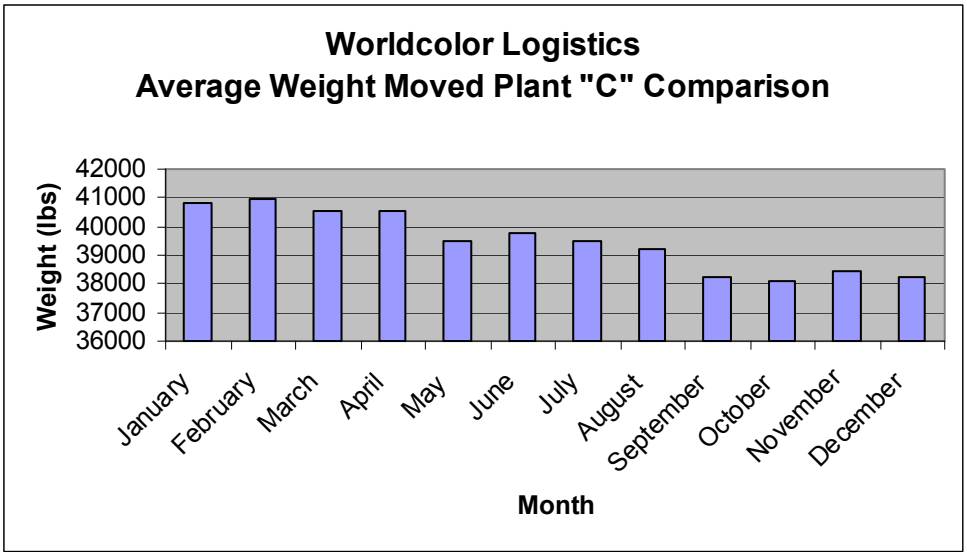
The combined efforts of the logistics and print divisions have continually eliminated shipments nationwide. Between June 2007 and August 2009, co-operative efforts between the parties have eliminated 1,534 full truck loads from being shipped across North America. The average tractor trailer takes 100 gallons of diesel to fill its tank. All of the loads in question for this project averaged 500 miles of loaded transportation while functioning at 5 miles of travel per gallon of diesel fuel. CO_2 emissions from a gallon of diesel are equal to 2,778 grams x 0.99 x (44/12) = 10,084 grams = 10.1 kg/gallon = 22.2 lbs./gallon. Therefore, this would account for 2,200 lbs. of CO_2 released into the atmosphere per truck load. Thus far, the conjoined efforts have stopped 3,374,800 lbs. of CO_2 from being released into the atmosphere.

Project Analysis / Development

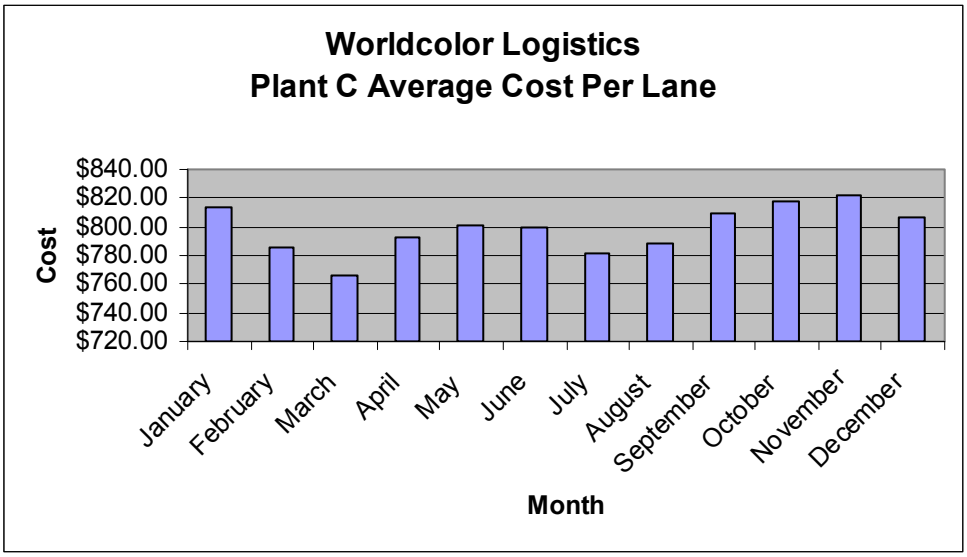
The first phase of the project was to find universal data that would allow us to create baselines. Baselines are metrics and standards that indicate a previous level of functionality. By manipulating variables to exceed these baselines, we are able to gauge the potential improvement created. Using various database reports, we were able to accurately extract the weights of all loads out of particular plants to the respective locations for the entire prior year. It was determined that many of the locations which shipped outbound product on a daily basis to a location within our own consolidation network would be the most viable candidates. The consolidation network is a series of first party centers where freight from first and third party facilities can be combined and sent to the final destination at the lowest cost possible to the customer, while

simultaneously creating the most efficient truck loads possible. Since we have primary control over the facilities inbound and outbound operations, these became the natural candidates on which to test project variables.

With the origin-destination pairs decided, we created all the respective baselines for the project. Based on historical data, we determined the average amount of product shipped to a particular destination. On a month by month basis, we determined the average amount of product moved out of a location into our consolidation network. For example:



Another important component to gauging the cost savings was to calculate the average cost of a load. This was determined to be a gross cost average (average cost on the lane plus fuel charges). For example:



Product was monitored on a weekly basis, highlighting all loads that were below their baseline averages. These exceptions were examined and attribute variables were attached to them in each specific case. Common reasons for the product not weighing more than the established baselines included the following: wood pallets, end of print cycles, specific customers that require the product to ship alone, bad skid staging, etc. After doing multiple analyses on the causalities behind the lower weight shipments, it was determined that the following would allow us to best apply continuous improvement methodologies: skid configurations, customer service alterations, strategic loading initiatives, examining the consolidation network and shipping intermodal.

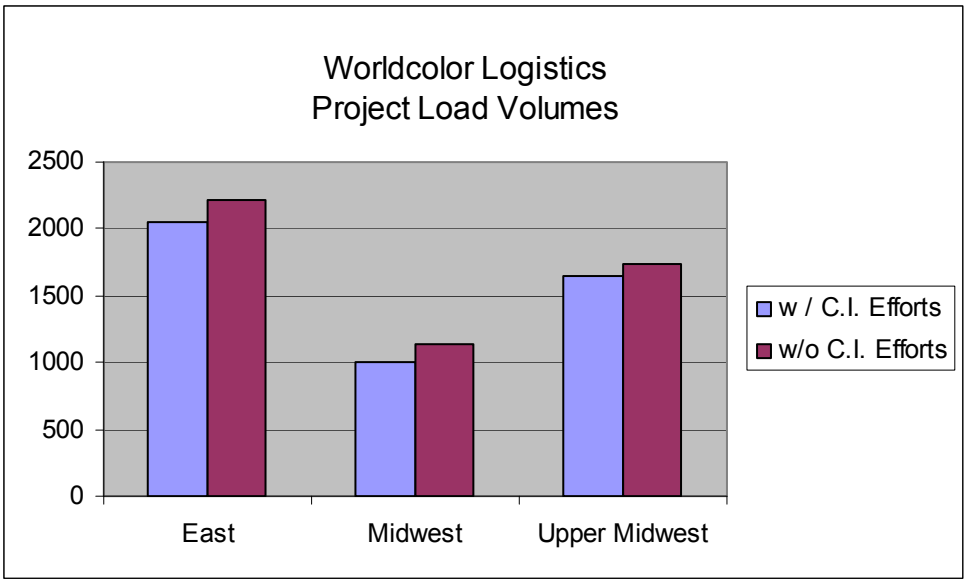
Skid Configurations

A predominant issue stopping us from reaching goal weights was the skid configurations on the trailers. There were no previous requirements to use particular trailer types before this project was initiated. Requiring that all trucking entities use a 53 ft. trailer helped the loading initiative tremendously. 48 ft. trailers only have 3491 ft.

usable cube space. 53 ft. trailers have 3859 ft. of usable cube space in addition to still meeting the legal highway weight limitations. This essentially allowed us to put another two pallets on each 53 ft. trailer, therefore increasing load factors. In addition, any skids that can be pin-wheeled width wise should be. This gave us the ability to increase potential skid counts, reaching up to 30 pallets to a trailer.

Trailer Type	Capacity	Loading	Inside Dimensions	Pallet Spaces
48 Ft. Trailer	3,491 cu ft.	Normal	Length (ft. -in.) 47 -6 BY Width (in.) 98 BY Height (in.) 108	24
53 Ft. Trailer	3,859 cu ft.	Normal	Length (ft. -in.) 52 -6 BY Width (in.) 98 BY Height (in.) 108	26
53 Ft. Trailer	3,859 cu ft.	Widthwise	Length (ft. -in.) 52 -6 BY Width (in.) 98 BY Height (in.) 108	30

The additional trailer requirements and pallet spaces accounted for the load reductions seen below out of select facilities.



Customer Service

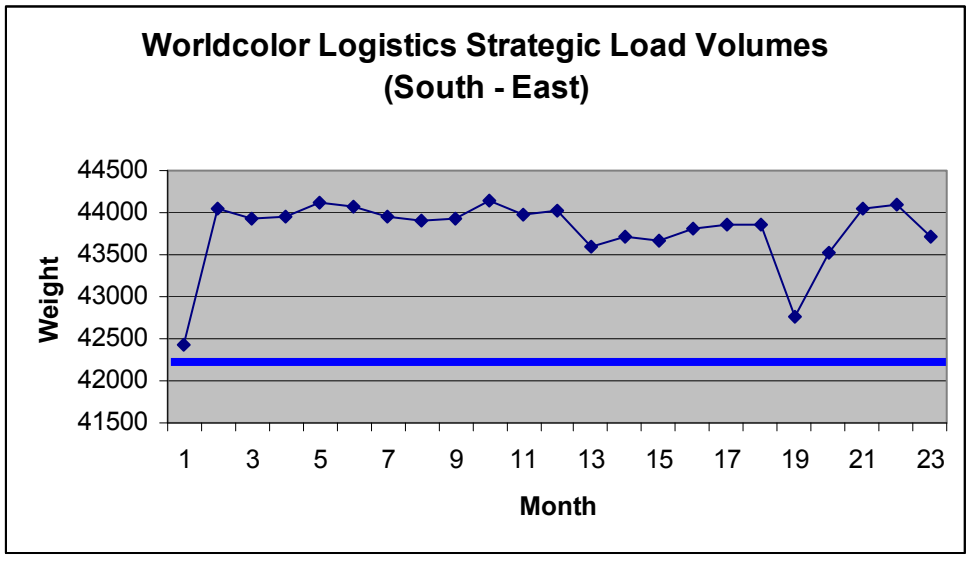
It was necessary to create as much lead time as possible in the customer service department. Throughout the initial phases of the project it was determined that heightening our awareness would better prepare the load planning and customer service groups for a variety of situations. The lead time in turning over customer data to the print facilities was shortened drastically. This allowed the facilities to heighten our awareness of any type of customer restrictions. Having this information helped our load planning division in planning the most efficient shipments, using the fewest number of trucks out of the plant as possible. In addition, our coordinators were able to use the plant's production schedule to combine smaller shipments from multiple jobs in order to decrease the amount of trucks required to distribute the freight. When load changes are required, our coordinators work with the plant to find the most effective way to ship the freight that may have missed its original load. If there is product that needs to ship earlier than other freight, we combine freight from multiple jobs based on production and shipping information communicated between the plant and logistics divisions. This serves to add stops to existing trucks or move freight via LTL carriers to maximize a truck's capacity.

Strategic Loading

To allow a greater amount of flexibility in regards to product movement, we initiated a strategic movement program. This allowed many of the print facilities we work with to pool a multitude of commodity types together. Plants were now able to move an abundance of different commodities on a truck directly to our consolidation network in the absence of an intricate load plan. Essentially, product is grouped together on a load

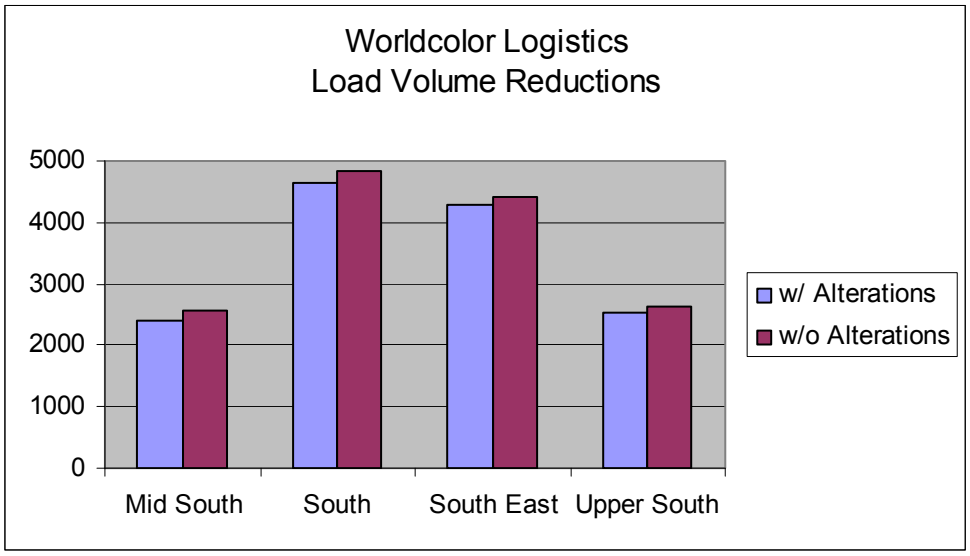
plan, shipped and sorted at a consolidation center and distributed to its final location. To assist with this particular initiative and increase overall load factors, we placed strict guidelines on the volume of product which needs to go on a trailer. For all consolidation centers east of the Mississippi, the loaded trailer weight should be no less than 44,000 lbs and no greater than 45,999 lbs. Facilities were given their respective baseline according to the previous year's average weight when shipping to the consolidation center in question, and were monitored on a load by load basis. Each instance of a load weight falling below the baseline average was investigated and an attribute was placed to each load in question. These attributes indicated the causality for the load weight and what variables could be manipulated to prevent these issues from occurring in the future.

Here is an example of one of the facilities in question; it is a month by month analysis of their load weight volumes after these procedures were instituted. The blue line represents the baseline when the project began.



All facilities using the strategic loading methodology to send outbound product to the west coast were given strict guidelines to adhere to with regards to trailer weights.

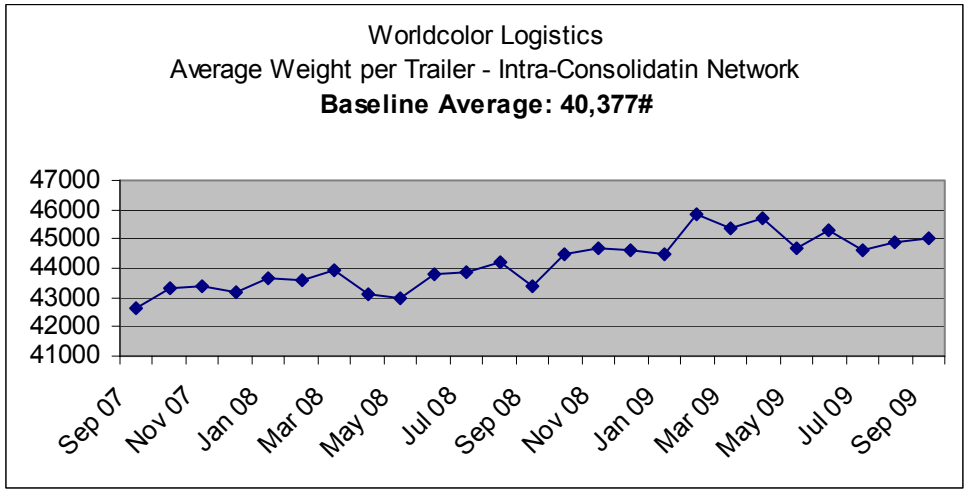
Printed materials shipping to the west coast consolidation network were given a mandatory minimum trailer weight of 43,000 lbs. and maximum of 44,000 lbs.. Facilities were not restricted from shipping strategically outside of these weight parameters, but did require approval from a project manager before doing so. Results of altering the weight shipment parameters can be seen below.



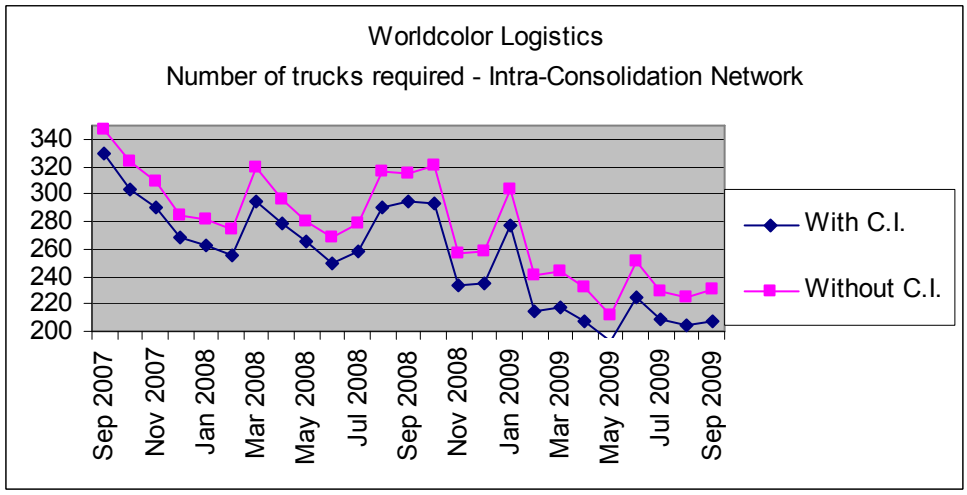
Consolidation Operations

The delivery parameters within the consolidation network were analyzed to determine the most effective routing. These parameters not only allowed for a decrease in operational costs, but also increased weight on designated lanes. Cost, origin plant, maintaining current service levels, avoiding plant disruptions in the press, binding, and shipping schedules and transit times were variables used in the analysis. By analyzing transit times, plant print schedules, service levels and transportation costs, we were able to reorganize the delivery procedures for southern Ohio, eastern Tennessee, western

Pennsylvania and Kentucky. Instituting these practices allowed us to increase the amount of product placed on a trailer between shipments that transported between consolidation centers. Again, by increasing the load volumes we were able to ship less product out on over-the-road trucks and further decrease our CO_2 emissions. Examples of the load weights follow:

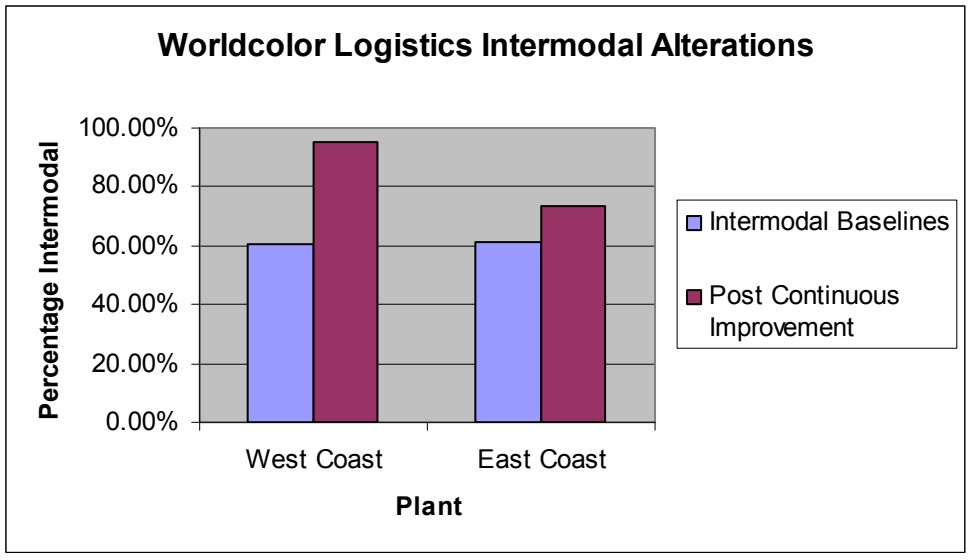


Here is a month by month break down of the amount of trucks needed to move product with and without the consolidation center metrics, which were altered with the project.



Intermodal Operations

Another aspect of the project we examined was where and how to institute more intermodal practices for our division. After evaluating all plants for cohesiveness, we applied specific criteria to those found most suitable. The first was step was to thoroughly analyze the selected areas for potential intermodal transportation. We examined every ramp destination pairing, our quantity going to that destination and our lead time with the general product headed there. Another operational change was to alter the ability to use the strategic loading program to require the use of intermodal transportation to the consolidation network. With the flexibility that the program rules provided, accompanied by the changes made in the customer service arena, we were able to decrease the amount of product travelling via over-the-road modes and convert it to intermodal transport. For example:



Results

Through efforts in analyzing skid configurations, customer service operations, strategic loading initiatives, consolidation metrics and intermodal operations, we jointly decreased the needed transportation volume by approximately 1534 loads. Applying continuous improvement methodologies has allowed us to continually examine and improve baseline metrics and initiatives while not only meeting the needs of our customer base, but also having a positive environmental impact.

Truck Loads Saved With Continuous Improvement Methodology	1534
Average Transportation In Loaded Miles Per Truck	500
Average Mileage Per Gallon Of Diesel (Loaded)	5
Lbs. Of CO_2 Emissions Per Gallon	22.2
Lbs. Of CO_2 Not Released Into The Atmosphere	**3,374,800**