

# Increasing Productivity and Customer Satisfaction through Improvements in Shipment Planning



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## Executive Overview

Manufacturers in the packaging industry are continuously confronted with ever-higher energy and raw material costs and price erosion. At the same time corrugated plant managers are increasingly challenged to improve productivity and efficiencies, while also reducing costs and increasing value for customers. However, when embarking on an improvement program, one area frequently overlooked has been the shipping department.

Problems in shipping can greatly undermine a packaging company's attempts to add value and increase overall competitiveness. Common problems related to ineffective, reactive, or nonexistent shipment planning processes include poor customer service, increased costs (fuel, fees, inventory, and labor), late or incomplete deliveries, and lost productivity.

Without the tools and processes in place to mitigate these issues, customer confidence and satisfaction can drop sharply—while costs increase. Can corrugated manufacturers overcome these problems and create additional value for customers at the same time? Yes, a new class of integrated shipment planning solutions can help manufacturers overcome shipping challenges and improve customer satisfaction.

This whitepaper examines the problems that corrugated manufacturers face related to shipping and suggests solutions that can not only mitigate these issues, but will also have a positive impact on the performance of the entire organization.

## Supply Chain Trends

The sizes of shipments are shrinking, while at the same time shipment frequencies are increasing, resulting in more transactions and higher associated transaction costs across the corrugated supply chain. In addition, globalization is adding a new challenge for many packaging manufacturers—that of serving geographically dispersed customers who are sensitive to price and service levels.

The continuously rising costs associated with supply chain logistics—particularly fuel prices—coupled with the current economic climate is making it difficult for many manufacturers to meet increased customer demands for higher service, and better products at lower prices.

To address this, packaging manufacturers should look to better communication, coordination, and visibility across their operations in order to increase efficiencies in manufacturing and facilitate superior customer service.

Unfortunately, while visibility is the key to effective customer service, lack of real-time information and order visibility is the norm for most manufacturers and their customers. Key reasons for this include:

- Inadequate systems or processes, particularly shipment planning
- Insufficient integration between existing systems
- Lack of digital connectivity between suppliers, manufacturers, and customers

Achieving and maintaining visibility will enable packaging companies to make better-informed business decisions, and provide customers with accurate and reliable information.

## Industry Challenges

Lack of adequate shipment planning processes and systems results in packaging manufacturers facing a number of challenges; these include, but are not limited to:

- Lack of visibility
  - Poor customer service
  - Slow inquiry responses and order fulfillment
  - Inaccurate production and delivery (manual data entry)
- Underutilized trailers
  - Poor customer service
  - Increased number of trips
  - Increased fuel costs
  - Delayed or late deliveries
  - Low driver productivity
  - Excessive trailer pool , or fleet size
- Excessive trailer pool or fleet sizes
  - Increased costs (fuel, fees, labor)
  - Wasted capital
- Poor or no route planning
  - Underutilized trailers
  - Extra trips
  - Late deliveries
  - Higher fuel costs
- Inefficient dock operations
  - Lost productivity (searching for orders)
  - WIP bottleneck (WIP on floor)
  - Inaccurate loading (time wasted shuffling orders)

- Inaccurate paperwork, including bills of lading (BOLs), delivery order, ASN, etc.
  - Lack of accountability
- Poor or no integration between production and shipping
  - Difficulty in reacting to customer demands
  - Difficulty in maintaining expected service levels
  - Low trailer utilization
  - Lower driver productivity
  - Higher fuel costs (extra trips)
  - Late deliveries
- Reduced manufacturing and shipping productivity
  - Time wasted due to shipping department being unaware of overall schedule or customer-specific shipping instructions
  - Late/incomplete orders
  - Increased waste
  - Reduced profit

The result of failing to address these challenges is increased costs and shrinking profits for an industry that already faces high capital and operating costs—compounded with low profit margins. Adoption of modern shipment planning processes and integrated shipment planning solutions will enable packaging manufacturers to deal with these issues and increase profitability across their organizations and supply chains.

## What Affects Trailer Utilization?

Trailer Utilization refers to both the efficient load (cubing) and route planning of individual trailers, and to efficient management of trailer fleets (or pools). Low trailer utilization results in increased costs and reduced productivity in both shipping and manufacturing operations. Some challenges that negatively affect trailer utilization include:

- Planning/scheduling integration poor or lacking
- Inefficient or non-existent cubing solution
- Poor load planning/routing
- Inefficient dock operations
- Low driver productivity
- Excessive trailer pool/fleet sizes

### Push planning—no integration with shipping

Too often, companies plan with a very narrow focus on one area of a plant's operations. For example, in many box plants, the focus is on corrugator scheduling and efficiencies—specifically reduction of side-trim. The schedule for the corrugator dictates the schedule for converting and shipping; usually at the expense of efficiencies in those areas. Orders are pushed through the plant based upon what's best for the corrugator.

Cost savings realized with this planning model are typically lost due to the negative effects on converting and shipping, and the lack of flexibility in the scheduling process. Push planning makes it difficult for manufacturers to react to changing customer demands, and to maintain expected service levels. In the shipping department, push planning results in low trailer utilization, higher fuel costs, and delayed deliveries.

### No cubing, load planning, or route optimization

Lack of visibility and integration between manufacturing and shipping precludes efficient cubing, load planning, and route optimization. Each of these processes is related, and interdependent, with inefficiencies in one

process directly affecting the other two. There's no way any of these functions can be performed efficiently without shipping having real-time access to the status of orders within manufacturing.

Again, the results in the shipping dept are underutilized trailers, increased number of trips, and poor customer service—leading to increased costs and lower profits.

### **Inefficient dock operations**

Inefficiency in dock operations is symptomatic of poor production coordination and lack of visibility across processes, from sales order processing through production, and into shipping. All areas of the organization need accurate real-time information to coordinate planning. Inefficiencies in dock operations will negatively effect an organization in multiple ways, including:

- Productivity lost due to time spent searching for finished goods
- WIP bottlenecks and space wasted in shipping or on plant floor
- Extra trips due to inaccurate or incomplete loading of orders
- Additional credits and discounts to customers
- Time wasted by excess hostling of trailers
- Late deliveries
- Dissatisfied customers
- Lost business
- Lost revenue
- Detention fees (third party logistics provider (3PL) time wasted sitting at your dock)

### **Driver productivity**

Driver productivity will be significantly lower when integration between shipping and production is poor or absent, and visibility is lacking.

Productivity is most often lost due to:

- Time spent waiting in yard, or at docks

- Poor route and load planning
- Inaccurate loading, resulting in more time lost “shuffling” load at customers’ docks
- Inaccurate information, including order-of-delivery, BOL errors, etc.
- Multiple, unnecessary trips to deliver partials, or re-deliver lost or incorrect orders
- Lack of accountability because supervisors don’t have real-time delivery data

### **Excessive trailer pool or fleet sizes**

Whether a company has a private fleet or utilizes a third party logistics provider (3PL), bias often pads the trailer pool sizes. To ensure that they meet service levels both providers and customers will often contract for more trucks/trailers than they need. For example, if an assessment indicates that a customer needs twenty trailers, a 3PL might pad this number and contract for twenty-five or thirty to ensure adequate service levels are maintained.

Similarly, customers often pad the initial estimate themselves and may add additional trailers to the 3PL’s recommendation for their own peace of mind. The result is a customer that only needs twenty trailers might end up contracting for thirty or forty.

The same holds true for private fleets where inefficiencies lead to manufacturers maintaining extra trailers, trucks, and drivers. Inaccurate data compounds problems by precluding accurate analysis of actual needs and forecasted demand. Without accurate historical and real-time data, fleet owners are unable to identify their actual trailer requirements and adjust accordingly.

### **Lack of accurate real-time information**

In addition to the needs of planners, visibility of information is the key to effective customer service. When visibility is lacking, CSR’s and sales professionals cannot provide necessary information to respond to customer inquiries or make accurate and reliable promises. This leads to a lack of

timeliness in both response and order fulfillment, and inaccuracy in production and delivery—often due to duplicated efforts or users having to enter data manually because of integration failures. Lack of visibility creates additional challenges for manufacturers including:

- Lack of timeliness (slow inquiry responses and delayed order fulfillment)
- Inaccuracy due to manual data entry
- Conflicts of interest with packaging customers (order discounts due to late arrival) and 3PLs (inaccurate reporting of delivery status and condition)

Potential conflicts of interest make it crucial that manufacturers automate and have real-time access to necessary data. Packaging manufacturers shouldn't rely on customers to report delivery of their own orders, since they may benefit from late delivery (discounts).

Likewise, a 3PL may be unreliable when reporting because they benefit from maintaining their service level commitment with the manufacturer. Acquiring accurate, detailed data from automated systems, such as wireless driver terminals, allows manufacturers to control their costs and respond to customers in a timely manner.

### **Effect on lean manufacturing**

To reduce costs and improve customer service, many packaging manufacturers are moving to a lean manufacturing environment. With very small quantities of inventory on hand at plants, efficient logistics are crucial in a lean manufacturing environment.

In an integrated company, inefficiencies in shipping are quickly felt on the production lines at associated plants and can have enormous implications. Likewise, in an integrated supply chain, logistical problems will cascade down the supply chain, increasing associated costs for all involved companies.

To address these issues and to ensure that plants and supply chain partners always have the materials that they require, there is a tendency to overspend on shipping. This reactive approach doesn't benefit the organization as a whole—and is not sustainable in the long-term.

## Importance of a Cohesive Planning Strategy

Adoption of a cohesive planning strategy that integrates shipment planning with the planning of manufacturing operations will facilitate improvements company-wide. Overall, efficiencies gained will offset any perceived losses in one area—such as corrugator side-trim—through cost reductions and service improvements throughout operations.

### Flow planning

Flow planning is the optimization of customer requirements, raw materials, machines, people, and processes to meet customer and business needs. Flow planning processes are based upon customer-focused pull-through scheduling techniques that schedule shipping, converting machines, and corrugators based on a customer's required due date and time.

Flow planning is a holistic planning approach, where order promising, quantity management, shipping, corrugating, and converting are coordinated to schedule an order efficiently across an entire plant. Typically, this begins with shipment planning, which prioritizes orders by time and date due at customer's dock. The process then works backward through manufacturing scheduling, and finally corrugator schedules. The planning solution then works forward from the corrugator, back through converting, and back into the shipment planning solution.

This flow planning loop runs continuously as an integrated solution, optimizing the schedule throughout the plant and reacting to changes in real-time. This provides both agile scheduling and superior visibility throughout the order life cycle. Without an integrated shipment planning solution a cohesive planning environment and improved efficiencies throughout the plant will be limited or unachievable.

### Order promising

It's critical to begin the planning process as soon as possible, either during the negotiation with a customer (referred to as order promising) or as soon as an order is received. Planners must check all required resources to ensure that the capacity to meet customer requirements and expectations exists. In this regard, planners need to make sure that capacity includes not only machine

time but also all other items required to successfully fulfill the order. This includes, but is not limited to, materials, machines, tools, people, and transportation.

If planners note any potential problem with an order, they should address it as soon as possible. The earlier in the production cycle that planners address any lack of capacity the more economically beneficial the solution will be.

## Quantity management

One of the most overlooked areas when optimizing the planning cycle is quantity management.

Quantity management requires that planners consider many factors involving very complex calculations. Quantity management processes determine the target quantities that must be available before conversion and the high and low limits (e.g. corrugator under runs and overruns) that will ensure meeting all requirements. Factors involved in this analysis include:

- Customer allowed overruns and under runs
- Projected waste quantities that will occur during conversion
- The affect quantity variance will have on shipping costs
- Utilizing allowable quantity variances to optimize overall costs

Orders for truckload quantities allow little variation as overruns will require extra shipping costs or will become wasted product. Items that are produced to inventory and released over time allow for greater variance than other products. Quantity management is a critical factor in optimizing costs by avoiding make-up orders, optimizing truck loading, and taking advantage of flexibility when it's possible.

Flow planning, which typically begins with shipment planning prior to producing a production schedule, is the only way to perform this high cost task and ensure that it's done in the most cost effective manner. Most plants ignore this function and depend on the ability of key personnel to react on the fly when the product arrives in the shipping department. By this time, it's too late to proactively include shipping requirements into scheduling decisions.

## Integrated Shipment Planning Solutions

An integrated shipment planning solution is distinct from common shipping software packages due to the level of integration with a manufacturer's planning processes and solutions. Contrast this with most shipping software, which is largely isolated within the shipping department, and at best has minimal integration with a company's business systems.

The integration that does exist is usually limited to sharing of shipment status within an organization, and sometimes with its customers. Often this information is inaccurate, too old, or incomplete. This is largely due to the standalone nature of the system, and its inability to inform and communicate with other processes within a plant.

Because of these limitations, common shipping software is of minimal use beyond the shipping department and its contribution to the successful planning of manufacturing operations is insignificant. Rather than improving efficiency and aiding in the reduction of costs associated with waste it can actually lead to increased waste as shipping personnel are forced to work around the software—often coping through additional manual processes.

An integrated shipment planning solution is part of a manufacturer's planning and scheduling processes. It doesn't merely inform other systems of due dates or shipping statuses, it plays an integral role in scheduling the entire plant, and is an essential element in the flow planning process. An integrated shipment planning solution is a planning solution, not simply a reporting solution.

Some attributes of an effective, integrated shipment planning solution are:

- Schedules shipments based on live manufacturing production data
- Works iteratively with the master planning system to resolve issues related to changes in schedule, changes in customer requirements or unforeseen events during production
- Plans loads to include orders that must be delivered that day
- “Cubes” trailer loads to efficiently use available space
- Plans and optimizes routes to produce most efficient delivery route/schedule for current orders

- Plans loads based on order of delivery to avoid shuffling of loads at customers dock
- Provides fork lift drivers with pick lists and loading instructions for fork lift drivers
- Alerts users when a delivery has been completed
- Alerts planners of potential scheduling problems so they can take preventative action
- Provides users and management with actionable, real-time shipping status—speeding response time to customer inquiries

### Shipping catches up with lean

An integrated shipment planning solution enables packaging companies to address the challenges they face through improvements in shipping operations and related best practices. This will result in improved efficiencies, which include:

- **More effective route planning and optimization**—fewer miles, more efficient delivery—rather than making multiple less than truckload (LTL) deliveries to individual customers, shipment planning optimizes routes and consolidates shipments.
- **Increased utilization of trailers due to better load planning**—consolidation of less than truckload shipments allows optimized cubing of loads, and improved dock operations.
- **Real-time connectivity**—today, advanced Shipment Planning solutions can leverage the Internet and wireless networks, to provide real-time information to shippers and customers—offering unprecedented levels of visibility across the entire supply chain. Wireless connectivity allows plants to receive, real time shipping data—including signed BOLs, arrival condition reports, etc...

### Principal benefits

It's important to emphasize that the positive effects of adopting an integrated shipment planning solution extend beyond the shipping department to all manufacturing and business operations within and organization, as well as to its customers and supply chain partners.

The principal benefits realized include:

- Increased productivity
- Improved on-time order delivery
- Increased customer satisfaction
- Improved visibility
- Improved processes
- Reduced waste and associated costs
- Increased profitability

### What to look for

When selecting an integrated shipment planning solution, it's important to look for a vendor with in-depth experience with, and knowledge of, your industry's manufacturing best practices and processes—as well as supply chain execution. The solution must reflect this experience if you're to realize the associated benefits—especially the reduction of costs associated with late deliveries or waste.

A generic solution will reduce the likelihood of your organization realizing benefits and may reduce overall plant efficiency as employees develop workarounds, or adopt manual processes to cope with the software's inability to meet their requirements.

Some key requirements when selecting an integrated shipment planning solution include:

- The solution should be industry specific to limit customization, workarounds, and proliferation of offline manual processes
- Integration with planning, scheduling, and MES systems is essential (“Flow planning” model)
- Route planning and optimization
- Cubing and load planning to increase trailer utilization
- Real-time reporting
- Real-time connectivity
- Wireless connectivity

## Measuring the ROI

Measuring the return on investment (ROI) for an integrated shipment planning solution begins with consideration of the potential improvements and efficiencies gained from having complete visibility across all operations. Next, consider the overall increase in productivity across all operations.

It's important to establish baseline measurements to ascertain current performance and productivity levels within your plant. Some key measures include:

- Current percentage of orders delivered on time
- Average length of delivery in hours
- Cost of truck/trailer insurance
- Current labor costs
- Current number of daily trips, as well as number of trips per customer, and miles per trip
- Current fuel consumption and related cost, as well as forecasted fuel costs
- Current cost (penalties/discounts) incurred because of missed, late, or partial deliveries
- Average completion rates of orders
- Trailer utilization in terms of cubing (cubic feet/meters)
- Trailer utilization in terms of order pool size
- Cost of capital equipment maintenance compared to utilization rate of trailers
- Overall productivity levels in manufacturing and shipping
- Efficiency of dock operations, including average time required to load trailers and average idle time for trailers at dock

Considering these measures and establishing a baseline will give you a realistic view of your current costs related to shipping and will allow you to gauge the possible savings that you'll realize after implementing a shipment planning

solution. You need to know exactly where things are now, so that you can continually measure performance and improvement in the future.

## **Expected results**

By implementing an integrated shipment planning solution, packaging manufacturers can expect significant results including:

### **Improved visibility**

- Real-time order information for shipments
- Simplified order tracking
- Improved customer service

### **Efficient shipment planning**

- Intelligent planning of order delivery (dates), trailer-loads, and routes
- Accurate real-time and historical data for ongoing analysis of shipping efficiency and trends (including forecasting of trailer pool requirements)
- Increased trailer utilization
- Lowered shipping costs

### **Improved productivity**

- Increased driver productivity
- Increased manufacturing and shipping productivity
- Reduced waste related to damage and missed loads
- Reduced costs (fuel, labor, maintenance, etc.)

### **Greater customer satisfaction**

- Improved customer service
- Increased on-time deliveries
- Reduced returns due to shipping errors

### **3PL related results**

When companies utilize the services of a third party logistics provider, they can expect the following related benefits:

#### **Accurate measures of 3PL performance**

- Objective data versus carrier reports
- Lower costs
- Improved service levels

#### **Reduced detention fees**

- Attributable to more efficient dock operations and trailer load planning

#### **Smaller trailer-pool sizes**

- Ability to analyze real-time and historical shipping data
- Forecast trailer pools

#### **More accurate billing**

- Accurate delivery times and status—wireless integration
- Use own BOLs versus using carrier provided BOLs
- Audit carrier invoices

## CTI Shipment Planning Solution

CTI Shipment Planning is the only packaging industry specific integrated shipment planning solution.

CTI Shipment Planning is simple to use, yet extremely powerful. The solution works as the front-end of the production scheduling process to determine the best time, from the shipping perspective, that orders should be complete and ready to load.

At the back end of the scheduling process, CTI Shipment Planning displays or prints the actual loading plan that specifies loading times, locations, sequences, quantities, and the specific locations of orders within each trailer—reducing shipping errors and increasing on-time deliveries.

CTI Shipment Planning uses a proprietary cubing algorithm to determine optimum use of available trailers/containers—while integration with the Microsoft® MapPoint® Web service facilitates efficient shipment routing, and increases on-time deliveries.

Full integration with the rest of our suite of manufacturing and supply chain solutions enables you to react to changing customer demand, and to identify problems before they affect production efficiency. Combined with optimized route planning and customer-supplied constraints, our solution reduces the number of trailers required and total trips made—lowering fuel consumption and reducing other freight related costs.

With CTI's Shipment Planning you can:

- Improve planning throughout your organization
- Increase efficiency and productivity
- Reduce waste and related costs
- Easily conduct “What if?” scenarios and evaluate schedule changes prior to making any commitments
- Generate pick lists and loading instructions

- Use live production data to ensure schedule accuracy
- Receive automated delivery receipt notification
- Receive exception alerting to inform planners of potential scheduling problems
- Get real-time reporting
- And more...

## Conclusion

Improvements in shipment planning have a significant positive impact throughout an organization—far beyond the shipping department. By implementing a modern shipment planning solution and processes companies in the packaging industry can improve planning, productivity, and customer service while at the same time reducing costs and gaining superior visibility into all of their business processes.



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