Enterprise Impact

Links to areas addressed:

- Sales
- Customer Service
- Production Scheduling
- Purchasing
- Shipping

SyncManufacturing™ synchronized planning, scheduling and execution based on real-time demand

Many may think that an adaptive manufacturing system that focuses on production planning, scheduling and execution only benefits schedulers and shop floor operators. This is not the case with SyncManufacturing™ software from Synchrono®. SyncManufacturing™ takes a holistic, demand-driven view of the enterprise and looks at the process of managing demand orders throughout the value stream.

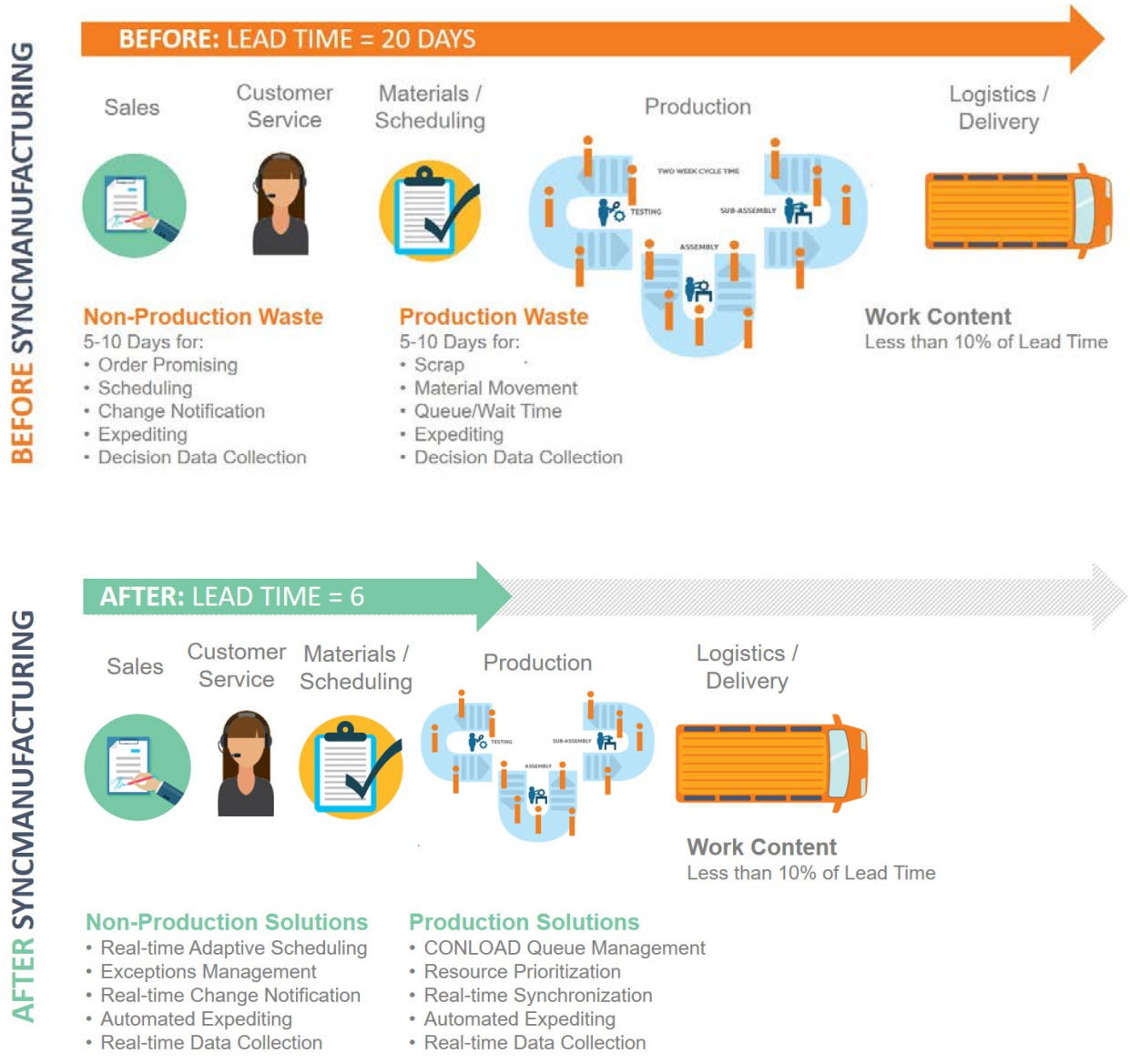
synchrono® manufacturing software

Driving waste out of the value stream

Taking the principles of Lean manufacturing to the next level takes effort. But more than that, it takes an unwavering focus on the identification and elimination of waste in the manufacturing environment.

SyncManufacturing™ software focuses on improving response time and eliminating waste by targeting both production and non-production forms of waste. The diagram below contrasts the before and after states of an environment using SyncManufacturing™ software and the waste-reducing functionality associated with every aspect of the value stream.

Impact on lead time and waste before/after using SyncManufacturing™ software



Next, let's look at how the waste-reducing solutions in SyncManufacturing™ software deliver value to individuals and teams across the enterprise.

Sales

The **Capable-to-Promise (CTP)** functionality in SyncManufacturing™ software allows sales to perform what-if analysis to determine when a new demand order or quote can be completed based on current capacity and material availability. The real-time scheduling engine considers all existing demand and supply when determining the CTP date to provide real-time order promising accuracy to the sales organization.

Sales Impact

The sales team no longer needs to use static lead times or work with multiple departments in the organization to determine when they can potentially ship an order. With the CTP functionality in SyncManufacturing™ software, they have real-time knowledge of the feasibility of meeting the customer's requested ship date.

For most manufacturers, demand fluctuates - ebbing and flowing. Unfortunately, while demand fluctuates, capacity remains consistent, creating a challenge for manufacturers to respond quickly to demand. CONLOAD™, the scheduling engine in SyncManufacturing™ software, works to level load demand and improve asset utilization.

SyncManufacturing™ software gives sales visibility into open capacity in the future, so they can take an active role in shaping and influencing demand, and therefore, profitability.

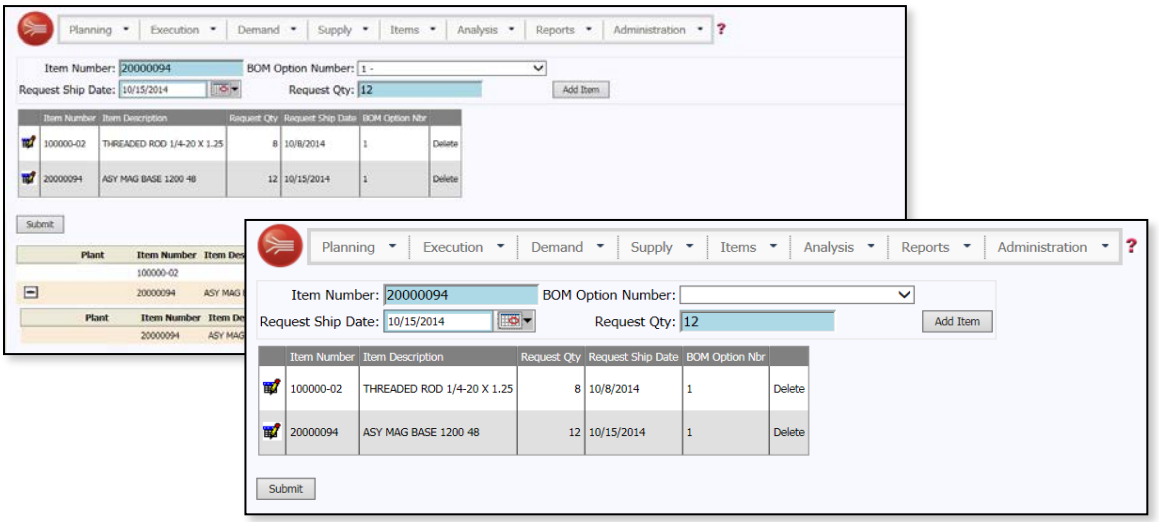


Figure 1: SyncManufacturing™ builds the schedule based on the customer's desired delivery date. The software works backward to synchronize materials, machines, methods and people; ensuring all resources are on hand when required to complete the order as promised. Everyone, including sales and customer service, has real-time visibility of order status.

Customer Service

To deliver truly valuable customer service, account managers and/or customer service reps need real-time visibility of the status of their customer orders. They need to know if an order is going to ship on time - and should a disruptive event occur, they need visibility into projected late orders so they can provide an early warning to their customers.

SyncManufacturing™ software provides visibility to order status, so account management and customer service reps can proactively work with their customers in the event an order is projected to ship late - or work with purchasing and/or production to determine if the delay can be resolved before missing the desired delivery date.

The **Late Order Report** in SyncManufacturing™ software becomes a valuable tool for account managers and the customer service team. The software updates the projected completion date in real-time, based on the status of execution. If the production floor is getting behind - or if needed material will be arriving late - the projected completion date will be updated to reflect this.

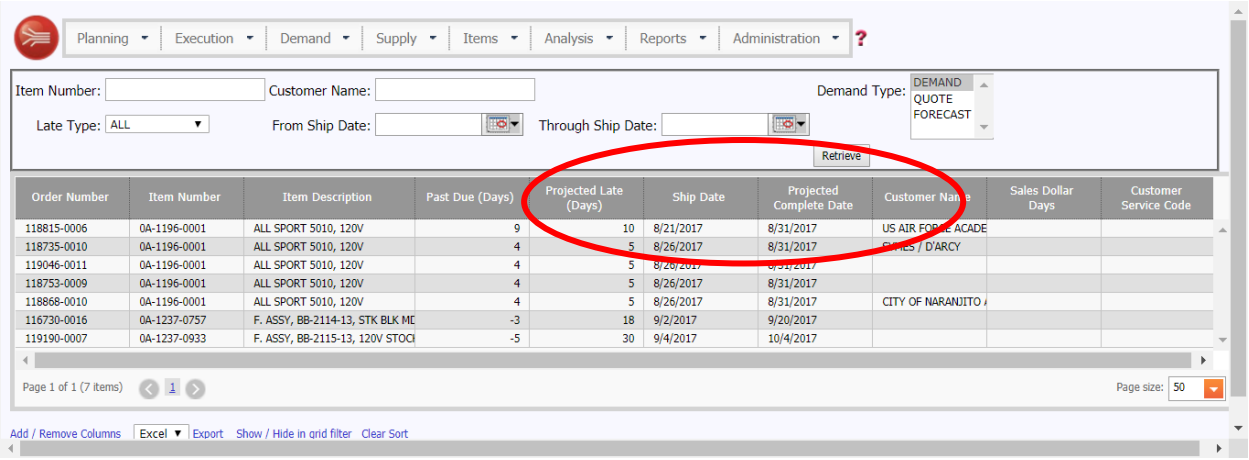


Figure 2: SyncManufacturing™ Late Order report

Customer Service Impact

Customer service would be easy if all orders shipped on time. The reality is that sometimes things happen and an on-time shipment is not possible. From the customer's perspective, the worst-case scenario is the due date passes, the product has not arrived, and they have not been notified of the status. Customer intimacy and satisfaction is significantly improved if the account manager or customer service rep is proactive in communicating status to the customer. With SyncManufacturing™ software, there should be no unnecessary surprises.

Order change management is often a time-consuming aspect of an account manager or customer service representative's job. In most static environments, when a customer calls in with a change, the

manager/rep must begin a series of tedious communications to ensure the proper people and areas are aware of the change so they can respond accordingly.

In SyncManufacturing™ software, this process is fully automated. When a manager/rep receives notification of a customer change, they simply enter the change in the ERP system. This change flows instantly to SyncManufacturing™. The software then determines the impact of the change, and realigns priorities in real-time. Instantly, all impacted areas are aware of the change without any emails, phone calls, or an excessive waste of time.

Account managers and customer service reps can focus their efforts on revenue producing functions by eliminating or significantly reducing the wasteful processes associated with change order management communication.

Production Scheduling

In SyncManufacturing™ software, the role of the scheduler evolves from constantly monitoring and manipulating the schedule - to managing only the exceptions. The **Master Schedule** (fig. 3) in SyncManufacturing™ software uses red, yellow and green color coding to signal whether an order is projected to be late based on material or capacity restrictions. The red orders are the only orders (exceptions) that a scheduler needs to take action on. All other orders should be left alone to flow through the process.

This simplified color coding directs the scheduler to the orders that require their attention. In addition, SyncManufacturing™ clearly distinguishes whether it is a material or capacity constraint, providing critical information necessary to resolve the exception.

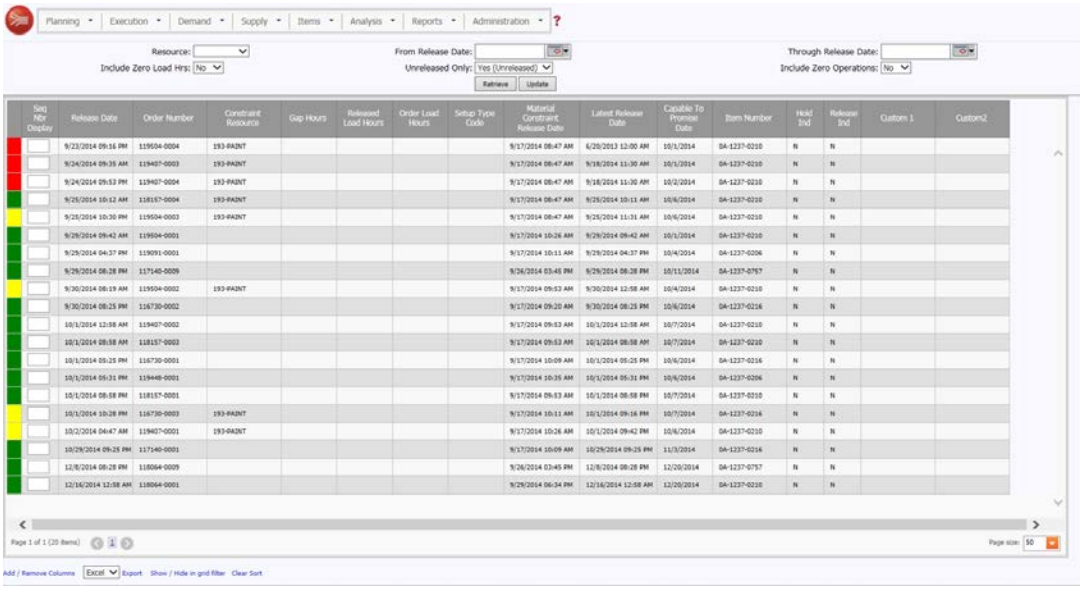


Figure 3: SyncManufacturing™ Master Schedule screen.

SyncManufacturing™ software addresses the need to level production, maintain a constant rate of work-in-process and create predictability. This is achieved through CONLOAD™, a Synchrono-patented scheduling engine. CONLOAD™ uses the capacity of the pacemakers or constraints in the environment to set the optimal pace for releasing work into production. This process helps ensure the rate of production is optimized – and orders are flowing – from inception to delivery.

The **Gating Schedule** shown below (fig. 4) is a workload regulation tool that controls the release of orders into production. Release times are calculated down to the minute for maximum control.

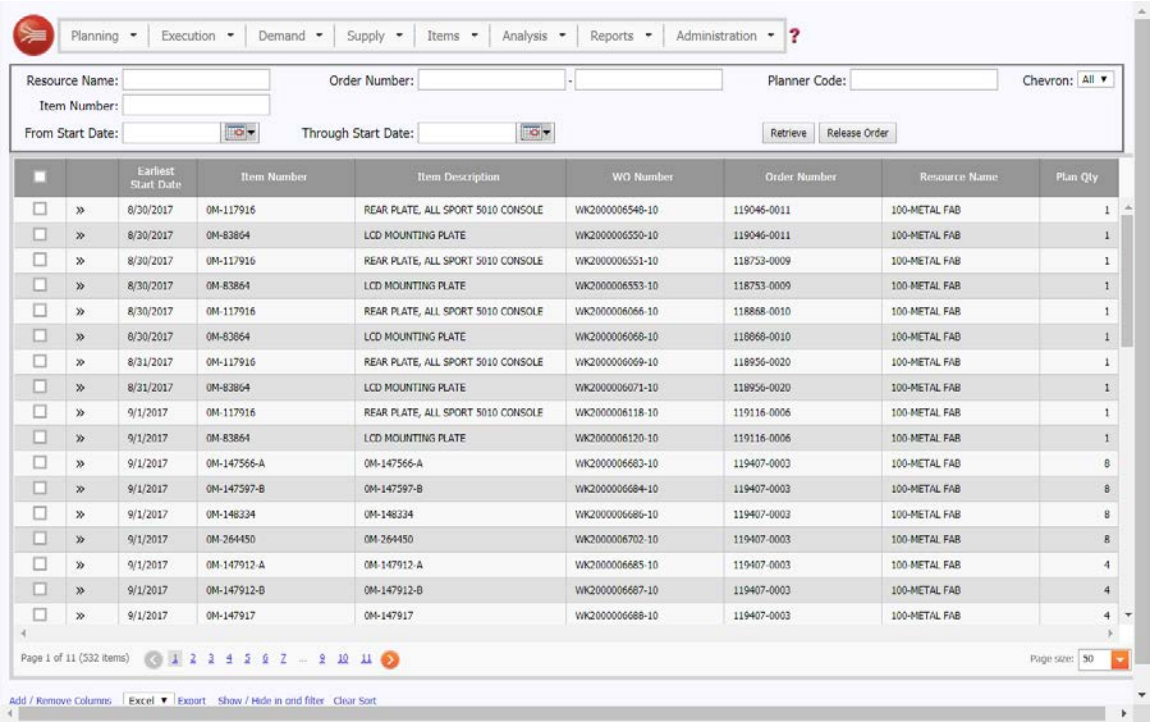


Figure 4: The Gating Schedule in SyncManufacturing™ software releases work into production based on the capacity of the constraint(s) in the system. This ensures production flows at the optimal pace, from order inception to shipping.

Production Scheduling Impact

Implementation of SyncManufacturing™ software typically drives a company to reduce the number of resources for scheduling and expediting. These resources are often moved to areas of the company where they can be involved in more value-added activities.

The CONLOAD™ scheduling engine allows companies to tightly manage work-in-process (WIP) and therefore cycle times. This focus on flow and velocity drives companies to continually reduce cycle time and improve velocity through the production floor, allowing companies to strategically reduce lead times to their customers. CONLOAD™ also has a tremendous impact on predictability. By maintaining consistent queues in production, cycle times become consistent and order delivery predictability is achieved.

Purchasing

A manufacturing plant is a living, breathing entity comprised of hundreds of resources and thousands of materials which come together every day in unique patterns. Synchronizing these materials and resources is a challenge manufacturers struggle with every day. Inevitably, to manage this growing complexity, organizations segment their functional areas into silos (and then build sub-silos within these silos.) Over time, software companies have built systems to support these local silos. For example, scheduling systems for the planners/schedulers; order promising systems for customer service; MES systems for shop floor control; and vendor collaboration systems for purchasing.

Just because these silos are in place, does not mean the tremendous dependencies between the silos no longer exist. In effort to control their area, the silos inevitably buffer themselves with extra time and inventory. By doing this, extraordinary communication mechanisms are implemented to coordinate activities between the silos.

Moving beyond functional silos to modern demand-driven response

At the heart of the modern demand-driven manufacturing response is a clear, unadulterated demand signal exposed to every level in the company and throughout the extended supply chain. Everyone from the shipping clerk to the expeditor in purchasing is acutely aware of what the customer's needs are, in real-time. This signal does not wait for a system to be run overnight, does not sit in the distribution center until they have a full truck load of demand, or wait to be added to the schedule by the production planning department. The schedule must be transformed from a discrete object - a piece of paper or a spreadsheet - into a living, breathing, real-time process running 24/7.

After this transformation, the schedule is no longer a sequence of tasks to be run. Instead, all operations are tied to an order and given a relative priority against all other jobs that are waiting to be processed. The only other critical piece of information beyond this order-driven priority is an indication of what jobs have all the material, tooling, machine programs, quality plans, etc. available to execute them. Once these two steps are achieved, every level within operations is given the capability to make the right decisions. This is the modern, demand-driven response.

The most prevalent negative impact felt by batch-driven systems occurs in purchasing. With SyncManufacturing™ software, the constraint-based schedule reflects production capacity and material availability. Purchasing, therefore, starts with achievable requirements. Next, by tying scheduling and execution together, the impact of variability is accounted for. Purchasing can be confident that the information they are looking at throughout the day is always reflective of reality.

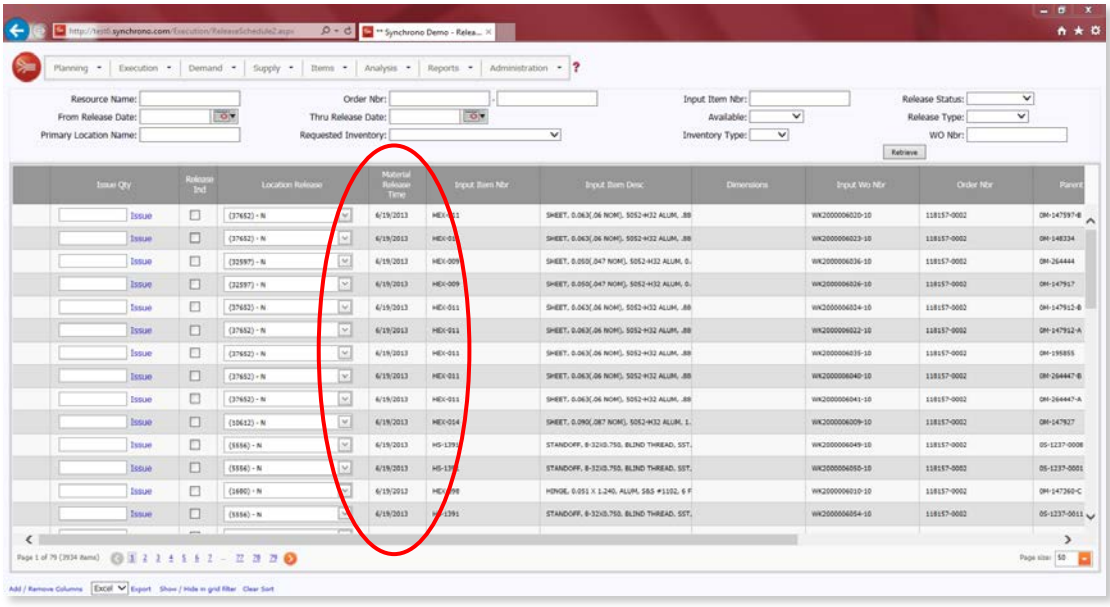


Figure 5: Real-time material synchronization – informs purchasing and material handlers of missing materials needed and when production will need them.

Purchasing impact

Purchasing can move away from the non-value-added processes that are an outcome of planning and expediting that is not based on real-time information – and that does not synchronize activities or communicate effectively across the silos. Instead, purchasing can focus more attention on activities that provide value, such as working on new sourcing programs or tightening inventory management.

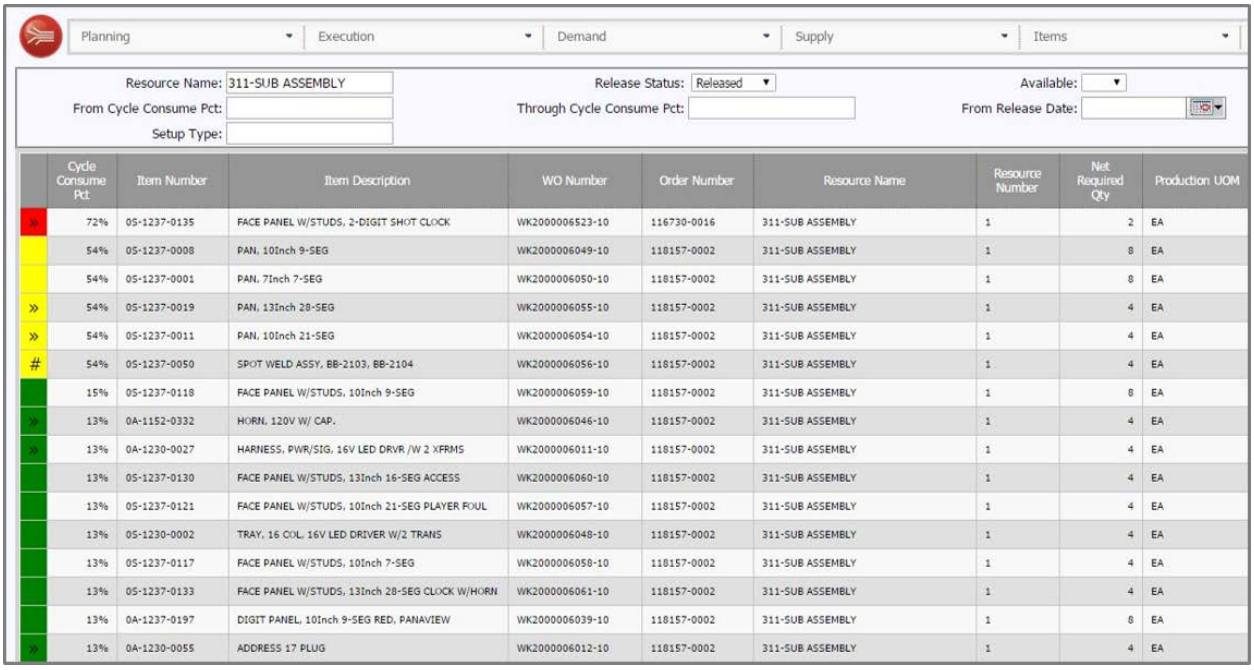
SyncManufacturing™ software allows demand-driven signals to be propagated throughout the supply chain. This reduces the bull-whip effect and excess inventory caused by supply-optimizing systems. The result is more collaborative supplier relationships and reduced inventory levels.

Production

SyncManufacturing™ releases work into production based on the existing workload. In assembly environments with multiple sub-assemblies coming together at an assembly point, the software offsets the priorities of each sub-assembly to ensure they flow into assembly in a synchronized manner.

Once work is released into production, SyncManufacturing™ software focuses on velocity, flow and synchronization. From a production operator's standpoint, they are given a single priority list displaying the order in which work needs to be performed. No longer do they have multiple priority lists (e.g., a scheduled dispatch list and an expedite list) and possible emergencies coming from various forms of communication throughout the day. All variability that occurs during the day is captured and the impact communicated through SyncManufacturing™ software. All the extraneous lists are no longer necessary as the system becomes an automated expeditor.

The **Resource Priority List** (fig. 6) informs the operators on the floor of their priorities, including what work is available to be worked on (indicated by >>) and work that is in jeopardy of being late (red zone). This screen is rich with information to help operators work in the most effective way to support customer delivery, velocity and synchronization. This screen is also used by outside contractors to communicate priorities.



	Cycle Consume Pct	Item Number	Item Description	WO Number	Order Number	Resource Name	Resource Number	Net Required Qty	Production UOM
»	72%	0S-1237-0135	FACE PANEL W/STUDS, 2-DIGIT SHOT CLOCK	WK2000006523-10	116730-0016	311-SUB ASSEMBLY	1	2	EA
	54%	0S-1237-0008	PAN, 10Inch 9-SEG	WK2000006049-10	118157-0002	311-SUB ASSEMBLY	1	8	EA
	54%	0S-1237-0001	PAN, 7Inch 7-SEG	WK2000006050-10	118157-0002	311-SUB ASSEMBLY	1	8	EA
»	54%	0S-1237-0019	PAN, 13Inch 28-SEG	WK2000006055-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
»	54%	0S-1237-0011	PAN, 10Inch 21-SEG	WK2000006054-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
#	54%	0S-1237-0050	SPOT WELD ASSY, BB-2103, BB-2104	WK2000006056-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	15%	0S-1237-0118	FACE PANEL W/STUDS, 10Inch 9-SEG	WK2000006059-10	118157-0002	311-SUB ASSEMBLY	1	8	EA
»	13%	0A-1152-0332	HORN, 120V W/ CAP.	WK2000006046-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
»	13%	0A-1230-0027	HARNESS, PWR/SIG, 16V LED DRVR /W 2 XFRMS	WK2000006011-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0S-1237-0130	FACE PANEL W/STUDS, 13Inch 16-SEG ACCESS	WK2000006060-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0S-1237-0121	FACE PANEL W/STUDS, 10Inch 21-SEG PLAYER FOUL	WK2000006057-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0S-1230-0002	TRAY, 16 COL, 16V LED DRIVER W/2 TRANS	WK2000006048-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0S-1237-0117	FACE PANEL W/STUDS, 10Inch 7-SEG	WK2000006058-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0S-1237-0133	FACE PANEL W/STUDS, 13Inch 28-SEG CLOCK W/HORN	WK2000006061-10	118157-0002	311-SUB ASSEMBLY	1	4	EA
	13%	0A-1237-0197	DIGIT PANEL, 10Inch 9-SEG RED, PANAVIEW	WK2000006039-10	118157-0002	311-SUB ASSEMBLY	1	8	EA
»	13%	0A-1230-0055	ADDRESS 17 PLUG	WK2000006012-10	118157-0002	311-SUB ASSEMBLY	1	4	EA

Figure 6: Resource Priority List

The **Production Plan** (fig. 7) is a drill-down view (multiple-level BOM/routing) of an order and its status. SyncManufacturing™ software always ties production orders back to the end customer demand. The ovals depict materials coming from stock; the rectangles depict operations, and the diamond is the demand order. White indicates the material is available or the operation has been completed. Red, yellow, or green shapes show the status of the material or uncompleted operation.

Figure 7: Visual Production Plan - the ovals depict materials coming from stock; the rectangles depict operations, and the diamond is the demand order. White indicates the material is available or the operation has been completed. Red, yellow, or green shapes show the status of the material or uncompleted operation.

The pacemaker/constraint creates the focus for a Lean manufacturer, which in turn sets the production rhythm for the plant or value stream. In focusing on the constraint or pacemaker, manufacturers can apply the principles of continuous flow and ultimately, achieve more production throughput.

SyncManufacturing™ software provides numerous real-time and historical analysis tools to assist in determining the constraint and to identify if the constraint(s) are moving. CONLOAD™, the scheduling engine in SyncManufacturing™ software, regulates the workload, setting the proper flow of work into production based on the performance and capacity of the constraint (pacemaker). This allows for more predictable cycle times and controls WIP inventory levels.

The software contains reporting and analysis tools to help manufacturers identify constraints and where production flow is compromised.

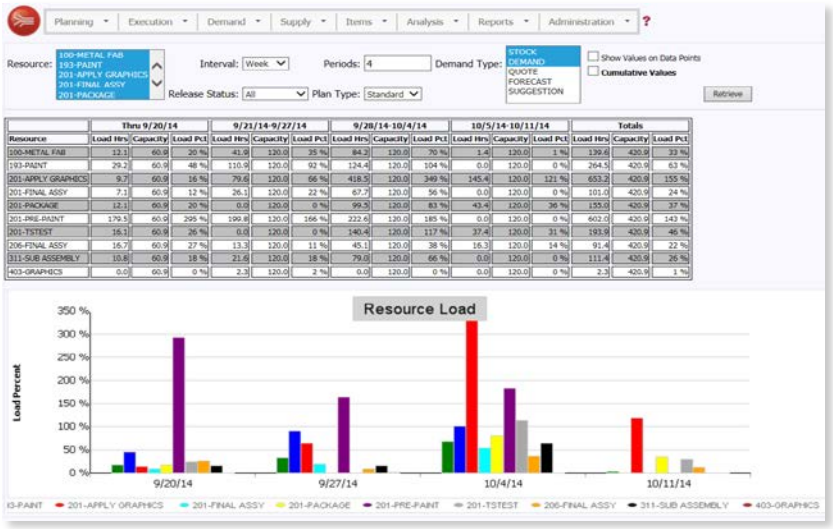


Figure 8: Resource Load Report – shows if future demand creates constraints not previously identified.

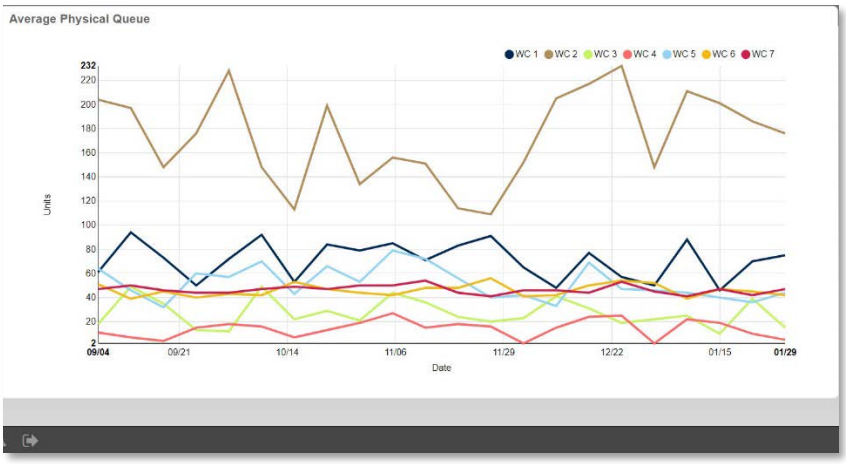
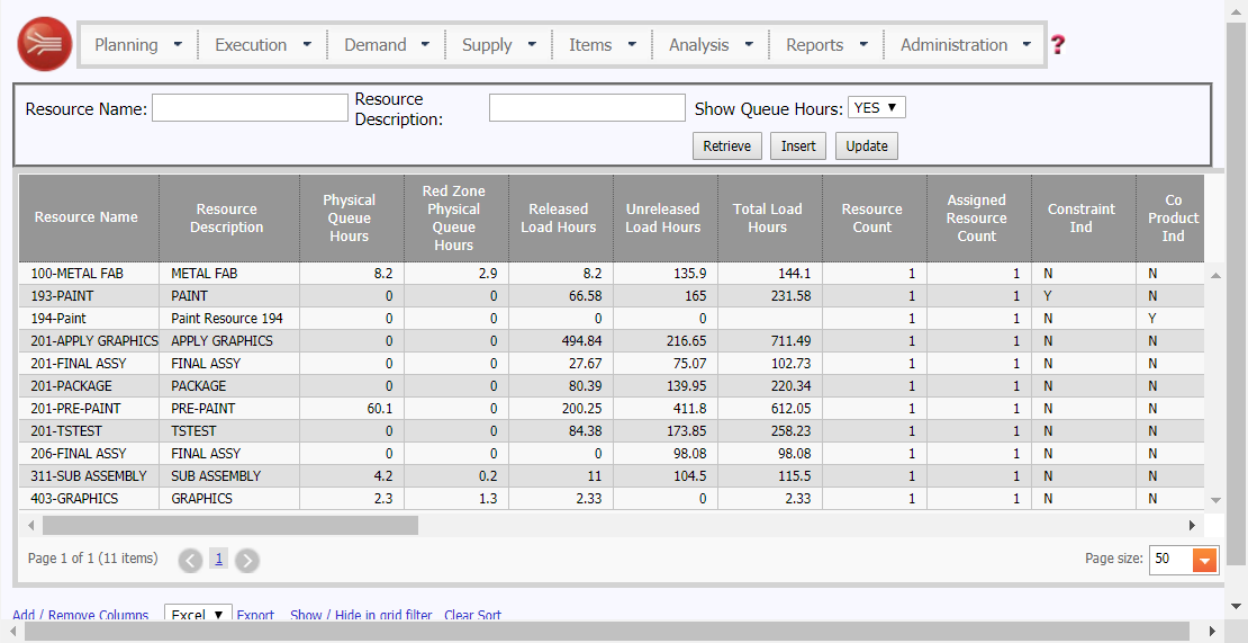


Figure 9: Queue Hours History -analyzes resource queue hours to determine where flow in the production process is impeded.



Resource Name	Resource Description	Physical Queue Hours	Red Zone Physical Queue Hours	Released Load Hours	Unreleased Load Hours	Total Load Hours	Resource Count	Assigned Resource Count	Constraint Ind	Co Product Ind
100-METAL FAB	METAL FAB	8.2	2.9	8.2	135.9	144.1	1	1	N	N
193-PAINT	PAINT	0	0	66.58	165	231.58	1	1	Y	N
194-Paint	Paint Resource 194	0	0	0	0		1	1	N	Y
201-APPLY GRAPHICS	APPLY GRAPHICS	0	0	494.84	216.65	711.49	1	1	N	N
201-FINAL ASSY	FINAL ASSY	0	0	27.67	75.07	102.73	1	1	N	N
201-PACKAGE	PACKAGE	0	0	80.39	139.95	220.34	1	1	N	N
201-PRE-PAINT	PRE-PAINT	60.1	0	200.25	411.8	612.05	1	1	N	N
201-TSTEST	TSTEST	0	0	84.38	173.85	258.23	1	1	N	N
206-FINAL ASSY	FINAL ASSY	0	0	0	98.08	98.08	1	1	N	N
311-SUB ASSEMBLY	SUB ASSEMBLY	4.2	0.2	11	104.5	115.5	1	1	N	N
403-GRAPHICS	GRAPHICS	2.3	1.3	2.33	0	2.33	1	1	N	N

Figure 10: Resource Detail – provides real-time information on every resource, hours queued and released.

Production Impact:

Based on the **Resource Priority List** (fig. 6), it is apparent to everyone whether or not the schedule is being adhered to. Production operators are expected to work their lists from top to bottom. Typically, the rules are for them to complete all red jobs before moving to yellow and complete all yellow jobs before moving to green. The chevrons (>>) in the left-hand column of the Resource Priority List indicate that all the material is available (both from upstream operations and from stock) at the resource.

If a resource has several jobs in the red zone with no chevrons - yet there are many jobs with chevrons in the yellow and green zones - then we can safely conclude that the upstream resources are not adhering to the schedule. This becomes obvious to anyone viewing the Resource Priority List, including downstream operations, the production supervisor, the plant manager and others. With this level of visibility, it does not take long for operators to make schedule adherence a priority.

Adherence to the schedule guarantees synchronization and predictability. Disruptions to flow and the ability to increase velocity are based on managing queues and removing disruptions to flow. With the use of the analysis tools in SyncManufacturing™ (figs 8-10), it is easy to identify where flow is disrupted and improvement efforts should be focused.

For production, SyncManufacturing™ software drives synchronization, velocity, flow, and continuous improvement.

Shipping

Initially, when an order is inserted into the system, SyncManufacturing™ software calculates the capable-to-promise date. As time passes, variability can occur that impacts the order. Whether this variability is due to late materials, production issues, customer changes or other events, SyncManufacturing™ re-calculates the projected completion date and displays this on the Shipping Schedule so shipping can more effectively plan logistics. In addition, the Shipping Schedule (fig. 11) in SyncManufacturing™ software clearly indicates which orders are available to ship by designating it with a chevron (>>).

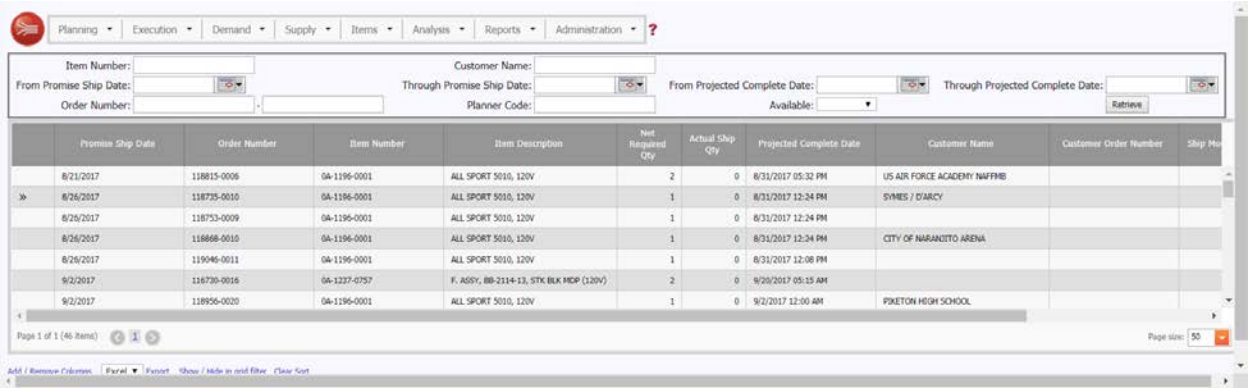


Figure 11: Shipping Schedule. Orders with a chevron in the first column (>>) are ready to ship.

Shipping Impact

Shipping has visibility into what orders are currently available to ship and when the orders not currently available are projected to be complete. The result is more effective logistics planning and potential cost savings.

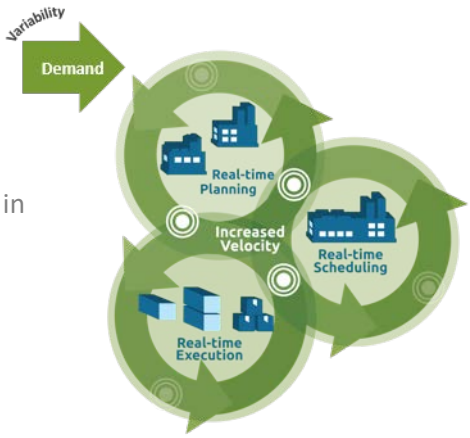
Summary

SyncManufacturing™ software was created for the sole purpose of customer demand execution. When demand signals are received by a manufacturer, the manufacturer needs systemic synchronization of all key resources to ensure a company-wide focus on achieving the highest level of customer satisfaction and delivery:

- Labor, materials and operational capabilities are available to execute the presented demand;
- Execution signals are properly aligned throughout the manufacturing process;
- All resources are focused on the right demand priorities and do not waste capacity (machine, labor, materials) or create chaos during the production process.

SyncManufacturing™ software enables modern demand-driven manufacturing by aligning production planning, scheduling and execution; through synchronizing all layers of manufacturing and by focusing on - and optimizing - the following key drivers:

Drive Velocity



SyncManufacturing™ software **improves velocity** and throughput through its patented scheduling technology and by adhering to these principles:

- Reduced, and a consistent level of work-in-process results in predictable cycle times and increased on-time delivery
- Real-time synchronization of all resources throughout manufacturing operations and the extended supply chain, enables improved:
    - Resource prioritization
    - Material flow
    - Labor alignment and execution
- Let the system work the orders, taking action only on exceptions, using real-time exception management tools.

Control Variability

SyncManufacturing™ software drives velocity by helping companies **control the variability** that inevitably occurs in manufacturing. SyncManufacturing™ software:

- Protects against variability at the highest or most aggregate level
- Provides real-time execution alignment tools that allow users to manage variability by seeing its impact in real-time, to proactively adjust and meet end customer demand
- Applies exception-based methodologies so energy is spent only on variability that is outside the norm and that will have a negative impact on customer delivery.

Create Predictability

In driving velocity and controlling variability throughout the manufacturing process, SyncManufacturing™ software **creates predictability**. Once predictability is created within production, it translates out to other areas, including customer order promising, delivery, inventory, material predictability and the supply chain.

Embrace Simplicity

Eliminate guesswork for sales, customer service, engineering and purchasing. The release schedule in SyncManufacturing™ software relies on material requirements based on actual production and performance (rather than projections or promises). This is how SyncManufacturing™ aligns execution and eliminates unproductive buffers between organizational silos.

SyncManufacturing™ software utilizes a launch and flow strategy. Release of work to the factory is controlled by the constraints/pacemakers of the system. The software gates into the system enough work-in-process to protect the pacemaker(s) from running out of work, but no more than is required to fulfill this goal. This keeps the amount of work-in-process inventory at a consistent level. Once work is

released into the system, SyncManufacturing™ maintains a real-time Priority List, keyed off delivery date and cycle time, used by operators in the factory to know the priority of released work and the urgency of each order.

Visibility

The significance of visibility to the enterprise is that information becomes actionable. Workers see what needs to be addressed or worked on before it is too late. This proactive exception management is fundamental to creating predictability, controlling variability and driving velocity.

It may be called "visibility" to see where an order is on the shop floor or to find out an order or material is already past due. Visibility to what was recorded to have happened (rear-view window) is not what manufacturers are asking for when they ask for more visibility. That kind of "visibility" is pointless - and is the type of visibility batch-driven systems offer. In today's manufacturing environment, events happen too fast for anyone to wait for a report tomorrow - or to find out after an order or material is already late.

It is not about visibility to cost, visibility to manufacturing status, or visibility to supplier reliability, it is about global visibility to meeting customer demand, managing variability, creating predictability, and driving velocity. Visibility should answer the question – "What must I do right now to ensure my area is meeting the demands of the customer?"

This document has focused on the impact SyncManufacturing™ software has on the various areas within the four walls of the enterprise. SyncManufacturing™ synchronizes the supply chain from the factory out. That is, it synchronizes activity within the four walls of the company and ensures alignment out to the larger supply chain. This enables manufacturers to create pull-based supply chains where the all too common bullwhip effect is eliminated. The entire supply chain is connected dynamically as a living, breathing entity with complete visibility of reality.

"With Synchrono, our velocity is up; our direct costs are down. Additionally, we've dropped WIP by 25%. I cannot imagine running my business without Synchrono."

- Director, Manufacturing Operations

"In two years, we've seen a 27% reduction in cycle time, WIP reduction from $32M to $21M and 60% reduction of average number of days late for delivery."

- Vice President, Global Business Improvement

"With Synchrono, we have confidence in accepting new orders and making new customer commitments. Customer Order status is visible to everyone in real-time. Production priorities are easy to manage. Our shop floor time has been cut in half."

- Vice President, Operations

The business impact of SyncManufacturing™ software

The following are results Synchrono® clients across various industries have achieved using SyncManufacturing™ software.

Manufacturer	SyncManufacturing™ Results
Metals Producer	• Reduce WIP by 16% • Reduce stock inventory by 28% • Eliminate daily expedite calls • Reduce expedite expenses by ~50%
Industrial Equipment	• 15% WIP reduction in 1st 3 months • Queue levels reduced by 25% • On-time performance from 40% to 90%
Industrial Equipment	• On-time performance from 75% to 95% • Revenue growth of $12M consuming added capacity
Electronics Equipment	• Lead Time reduced by 50% • On-time performance from 80% to 95%
Industrial Equipment	• Lead time reduced by 35% • On-time performance from 45% to 94%
Equipment Manufacturer	• 44% Increase in revenue • 20% Increase in inventory turns • 60% Reduction in WIP
Specialty Materials	• 100% MTO conversion • On-time performance from 89% to 99% • Inventory turns from 20 to 33
Industrial Equipment	• Reduce inventory by 36% • On-time performance from 71% to 95%

Request a custom demo of SyncManufacturing software here.

About SyncManufacturing™ Software

SyncManufacturing™ software was the first system on the market that synchronized planning and scheduling with production execution; increasing workflow and enabling a closed loop process. Also referred to as a pull-based or respond planning system, SyncManufacturing™ software includes a patented scheduling methodology, CONLOAD™, to further distinguish the product in the market. CONLOAD™ (for consistent load) helps manufacturers effectively manage their system constraints to reduce congestion and drive flow throughout the production environment. It does this by releasing work onto the factory floor based on the capacity of the system constraint(s). SyncManufacturing™ has produced dramatic results for a diverse set of clients by leveraging CONLOAD™ and other key capabilities within the software. Gartner research recognized Synchrono® as a *Cool Vendor* based on the unique value offered by SyncManufacturing™ software. Request a custom demo of SyncManufacturing here.

About Synchrono®

Synchrono is a leading provider of demand-driven manufacturing systems that improve flow, manage constraints and drive on-time delivery. The company's manufacturing operations, supply chain and ekanban solutions are based on Lean and constraints management methodologies and integrate with existing ERP and other systems. Sync with us at www.synchrono.com.