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Rethinking Recycled Lumber Processing

Auto-Max Builds on PRS Legacy of Innovation and Continuous Evolution

PRS Group

Forever Changing Recycled Lumber Processing

Auto-Max Builds on PRS Legacy of Innovation and Continuous Evolution

By Chaille Brindley

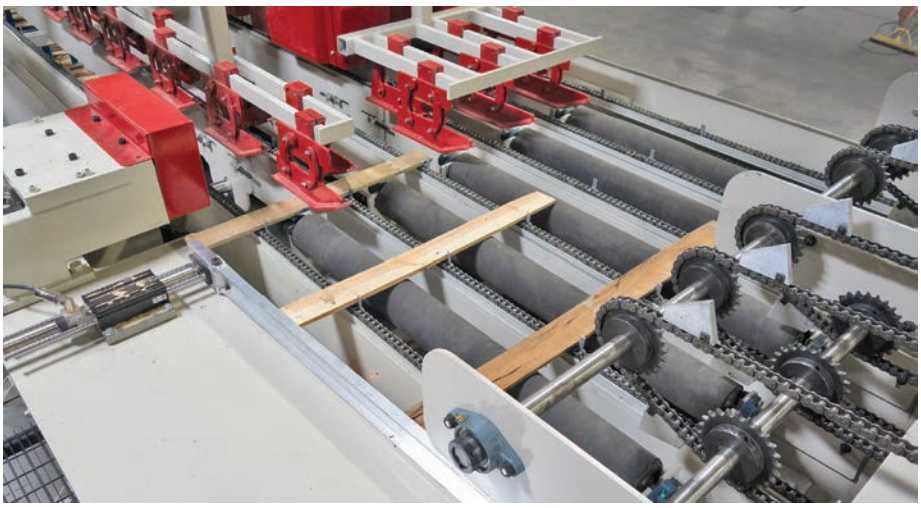
When you have been around as long as the team at Pallet Repair Systems (PRS) has, you know that perfecting innovation takes time. That's why PRS has been working on its latest automated trim saw, the Auto-Max, since 2019, and the good news is that the second version is ready to release to the pallet market. This trim saw system fully automates the processing of scanning, trimming and sorting reclaimed lumber. It can change how recyclers function, especially as they try to get maximum value out of every board with the least possible labor requirement.

The History and Genesis Behind the Auto-Max

PRS has been manufacturing end trim saw solutions for the pallet industry for 32 years. Over the span of three decades, its chain feed, single end trim Optimax saw model has been a best seller and customer favorite. Optimax trim saws are currently in use in 40 countries, in a variety of applications, from the reclaiming of recycled pallet lumber to cut backs and reclaiming of new pallet stock, but also in sawmills, lumber remanufacturing facilities, and many other wood product manufacturing and recycling operations.

PRS trim saws have continually evolved as time has passed and more experience has been gained. Fast forward to the rapidly changing landscape in the wood products industry. These trends include modern labor challenges, the desire to benefit from data driven manufacturing, and new advancements in technology. All these factors have come together to create the perfect environment for the development of the Auto-Max.

An earlier R&D project that also led to the Auto-Max started back in 2019 with a lumber scanning project for a PRS customer. That project aimed to provide a simple, lower cost scanning solution that would essentially pass or fail boards being processed in a saw room. As PRS engineers got deeper into the details, a bigger value proposition started to become evident. Considering a fail could mean a bad board end, or a cracked stringer foot, this sample board only failed to meet a certain board spec, but often would pass another board's required specifications – if trimmed or sorted. So, additional downstream processes would be necessary to divert, convey, analyze, trim and sort boards. The other dominant theme that started to emerge from PRS's involvement in this



Upgraded Board Diverter and Bin System: *The latest Auto-Max offers a scrap/unusable board diverter immediately after the VAB scanner to greatly reduce jams and waste in the sawing process. This version of the Auto-Max utilizes a linear drop bin sorting system after the saw system, which provides a more robust sorter for higher volumes and larger bin quantity options.*

The second version of the Auto-Max comes standard with four drop saws to provide greater cut length options and increased value output in the optimization process.

High-Volume Processing: *The Auto-Max scans, optimizes, trims and sorts pallet lumber at rates up to 30,000 pieces per shift. A number of improvements are in the works for future models; this includes automated material handling of finished product lumber bins, board stackers and Enterprise Resource Planning (ERP) integration with popular industry software platforms.*

"The Auto-Max cuts to very tight tolerances. It is right on the money. We run all these boards into our Viking Champion nailers. If you cut oversized boards, the material won't run as well in the nailers."

– Richard Berry, president of Berry Pallets

cut stock project was the inherent mistakes of human decision making. Production employees making mistakes is, of course, not new to manufacturing, but given the nature and volume of lumber processing, with human judgment calls being made on nearly every board and the value stream map of these processes, a scan/trim/sort solution's need became evident.

During early think tank sessions, PRS developed key goals for the project. The top five drivers are to achieve the following:

- Greatly reduce or eliminate the manual lifting and repetitive motion of trim saw operators
- Increase efficiency and productivity of the machinery with automatic, mechanical loading and feeding of the lumber
- Improve operator safety through 90% + hands free operation, and automated scrap removal systems
- Demand driven production with product prioritization, and flexible, customizable product definitions
- Scan to optimize lumber reclamation, definable by demand priority, value, other

The technology existed to achieve these goals. It just hadn't been put together at that time for pallet recycling. Most of these processes are standard in new sawmills today when it comes to processing and optimizing logs and getting the highest yield out of every log. In addition, PRS wanted to further reduce strain on workers and head count by automating as many functions as possible. This includes integrated and automatic scrap removal – from inbound material, unusable boards (defined by scan system), and trim scrap. Similar to a sawmill, line boards could be automatically sorted and bundled at the end in bins or bays. The PRS engineers also decided to deploy multiple drop saws to enable larger batch options and wider range of cuts.

First Generation Auto-Max Developed and Launched

The first machine was designed for and deployed at Berry Pallets in Waseca, Minnesota. Richard Berry, president of Berry Pallets, is definitely a gearhead and an owner who likes to be in the shop around the machines. Richard Berry said, "When it came to processing recycled boards, we were just buried in the material all the time. We never seemed to get ahead. I knew I needed a more automated process that was faster."

Berry Pallets selected the Auto-Max because of the footprint size of the unit, the production capability and the relative safety of the line compared to manual trim saws. Berry Pallets uses the Auto-Max to process both new and recycled boards.

While there were some other solutions on the market, Berry needed a different line layout. He explained, “Other automated trim saw lines were just too big. I needed something with a smaller footprint because we have used up a lot of our production space. “

PRS was willing to build and sell the first Auto-Max line to Berry Pallet, and this prototype was designed at a right angle, which saves space.

The prototype Auto-Max was designed to provide a lower cost and a smaller footprint option while still providing valuable optimization cut, sort, and data for any pallet cut stock reclaim operation. The process was similar in many ways to a traditional sawmill line, just tailored to producing recycled boards.

A multi-strand lumber infeed conveyor feeds an unscrambler with a proprietary board singulator. Singulated boards are conveyed onto a scanning conveyor, which presents the boards to a VAB scanning system. The scanned boards are logged, optimized to the chosen cut/sort recipes selected and then presented to the saw module. The first version saw had a moving datum fence, a fixed undercut saw to provide a double end trim, and two drop saws that also worked with the datum fence to provide a multitude of cut lengths. Once cut, the boards pass out the back of the saw and on to a high- speed sorting conveyor, which runs 90 degrees to the saw line. The high- speed belt conveyor works with a Joe Scan dimensional scanner and a series of board kickers to sort the boards to the appropriate bins.

The Second Generation Improved on the Initial Design

The latest Auto-Max offers a scrap/unusable board diverter immediately after the VAB scanner to greatly reduce jams and waste in the sawing process. V2.0 also comes standard with four drop saws to provide greater cut length options and increased value output in the optimization process. This version of the Auto-Max utilizes a linear drop bin sorting system after the saw system, which provides a more robust sorter for higher volumes and larger bin quantity options.

This second generation machine scans, optimizes, trims and sorts pallet lumber at rates up to 30,000 pieces per

Auto-Max Solves Bottleneck for Berry Pallets

Berry Pallets in Waseca, Minnesota, operates a state-of-the-art pallet manufacturing and recycling facility complete with the latest equipment. After buying a Robotic Dismantler from Alliance automation a few years ago, the company had a bottleneck in its recycled board production process.

Richard Berry, president and owner of Berry Pallets, stated, “When it came to processing recycled boards, we were just buried in the material all the time. We never seemed to get ahead. I knew I needed a more automated process that was faster.”

After reviewing various trim saw options on the market, he discussed the Auto-Max with Pallet Repair Systems (PRS) and decided to be the first customer for the prototype. Berry explained, “Other automated solutions were just too big. I needed something with a smaller footprint because we have used up a lot of our production space. PRS was willing to prototype for me the first Auto-Max line, and it is designed in a right angle, which saves space.”

Berry Pallets doesn’t store material outside. Everything is in sheds. So, the company processes mainly what it is getting ready to nail. Berry noted, “We like to cut everything, and then nail it right away without storing it outside.”

Due to its production schedule, Berry Pallets only processes recycled boards once per week. Berry commented, “We designed our automated trim saw line to require the least amount of human touches possible.” It has retrofitted an old forklift with a rotating clamp that allows pallets of boards to be moved and dumped onto the conveyor leading into the Auto-Max.

Everything, from recycled stringers and deck boards to even new lumber, is trimmed to size, sorted and collected in bins on the Auto-Max. Berry stated that PRS has thoroughly supported the prototype and development effort. He added, “Since this was the first Auto-Max, we knew there would be a lot of trial and error.”

One of the things that really impressed Berry was the accuracy of the Auto-Max. He said, “The Auto-Max cuts to very tight tolerances. It is right on the money. We run all these boards into our Viking Champion nailers. If you cut oversized boards, the material won’t run well in the nailers.”

Compared to manual production, Berry Pallets can trim a ton of boards with the Auto-Max. Berry said, “There’s no comparison. In ten minutes, the Auto-Max can process the same number of boards that a manual station will take 45 minutes to an hour to handle. The Auto-Max keeps us from burning out our workforce and improves our accuracy and yield. Also, the risk of injury is significantly reduced because the operator’s hand is not very close to the saw.”

shift. A number of improvements are in the works for future models; this includes automated material handling of finished product lumber bins, board stackers and Enterprise Resource Planning (ERP) integration with popular industry software platforms.

Jeff Williams, president of PRS, commented, "I've been saying for years that the next frontier in technological improvements in our industry will be machine vision, computerized decision making, data capture, and communication to and from the factory floor. Today's IT technology, industrial computers, sensors, and AI will play a pivotal role in the next 5-10 years."

Given the considerable investment and attention that the Auto-Max project has received from the PRS team, Jeff Williams credited his team for their diligence and ingenuity. He recognized the leadership and contributions of his brother, Greg Williams, director of machinery design; Dale Culley, mechanical lead for the R&D department; and John Armstrong, electrical & controls engineer for the Auto-Max.

PRS worked with some leading technology suppliers to pull off this project development, including VAB (a division of USNR) and Joe Scan. Their scanning and optimization capabilities enhance everything that PRS set out to accomplish.

"The length of this R&D project has been very intentional for PRS. We have placed a high priority on the Automax product line. We were patient and have waited to fully launch the commercial product until we were satisfied with the results from extensive testing – both in-house and in the field."

— Jeff Williams, president, PRS

Jeff Williams added, "The length of this R&D project has been very intentional for PRS. We have placed a high priority on the Auto-Max product line. We were patient and have waited to fully launch the commercial product until we were satisfied with the results from extensive testing – both in-house and in the field."

Greg Williams agreed and said, "We don't want to rush a machinery system of this caliber to market. It is important to vet out every detail to ensure we've got this right."

New Projects in the Works

PRS is not resting on its accomplishments with the development of the Auto-Max. The machinery supplier has some other projects in the works, including improved, faster pallet stacker bank systems and conveyors, which are utilized in PRS repair lines and sort systems. A new, stainless steel version of the fully automated PRS pallet stack dip tank system has just shipped and will soon be in service in Central America. And finally, PRS will soon announce a new software that will aid in the visualization of factory floor data. For more information on PRS, the Auto-Max, or any other projects in development, call (217) 291-0009, e-mail info@prsgroupinc.com or visit https://www.prsgroupinc.com/.

Optimized Trim Saw System: *The scanned boards are logged, optimized to the chosen cut/sort recipes selected and then presented to the saw module. This approach helps optimize yield better than a human operator can and ensures consistency and accuracy of cuts.*