

The New Age of Scale House Management



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This paper will present innovation with new technologies for improving shipments and deliveries through a single scale house operation. Plant travel logistics and shipment errors have been improved by utilizing automated scale house kiosks.

Due to the ever-increasing demands to keep a logistics department operating smoothly, scale house management has been a victim of stagnation in attention, design, technology and efficiency. Often, efficiency efforts are achieved in small steps by merely optimizing scale operators' current tasks rather than replacing them with systems that automate much of their process and allow for better time management. The perceived necessity of an operator at the helm of a scale house and the ease of allowing these operators to manually facilitate truck movement also contributes to a lack of progress in scale house management. Advances in technology that

would allow for efficient traffic flow, increased visibility and better data flow are often overlooked as efficiency improvements that will significantly provide cost savings and/or benefits that are worth the amount of planning and resources needed to build these automated systems. Operator engagement in the shipping and traffic processes are limited to repetitive tasks that do not allow them to become a part of the larger process since they are so busy with operations that could easily be completed by automation. Lastly, operations could utilize the valuable resource of traffic personnel in a more resourceful way if all or part of the routine work is completed

Figure 1



Nucor Steel Gallatin.

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by drivers, automation and the company's enterprise resource planning (ERP) system. Negotiating rates, researching lanes that offer better customer service, querying data from the system and analyzing rather than merely inputting data, and myriad other essential items that could increase efficiency and add return are possible if companies rethink the role and ability of a scale house and its operators.

History

In 2014, Gallatin Steel (now Nucor Steel Gallatin) in Ghent, Ky., USA, built a new scale house with separate inbound and outbound scales, and incorporated into it bar code technology. Phase 1 of the project focused solely on scrap and alloy trucks scaling in and out of the facility. All scrap purchase orders were issued a bar code for their drivers to use. This new system reduced truck wait times by 1–2 hours. In 2016, phase 2 incorporated coil trucks into this same scale system and began to operate all scales for the 300-plus trucks daily meandering their way through Nucor Steel Gallatin. Coil trucks had the singular problem of not having a purchase order issued and, therefore, no bar code to accompany the drivers. To remedy this, Nucor Steel Gallatin added a check-in kiosk station with three kiosks for drivers to check in with pertinent information and load number (Fig. 2). A bar code is issued to the driver, unique to their particular load.

The drivers use this bar code to identify themselves at the scale. Once they scan their bar codes on the inbound scale, they proceed to the coil yard to be loaded. The coil yard tractors are equipped with tablet computers that update a coil yard management application when a truck is weighed in and give them the coil location, truck identification information

and any special instructions that accompany the coil to be loaded. The coil yard tractor operators prepare and stage coils to be loaded while the driver is moving from the inbound scale. The back-end system checks weights, sends the truck information to the coil yard loading application for the operators to see, and changes the status of the load when the weight is accepted on the inbound scale. Once loaded, the driver returns to the scale house using the outbound scale, scans the same bar code, and, if no error occurs, the weight is accepted and the driver may proceed to the customer location. The bill of lading (BOL) is printed at the outbound kiosk. The back-end system ships the coil and begins the electronic data interchange (EDI) and accounts receivable (AR)/accounts payable (AP) processes with no added work for the scale operator.

Unique Identifiers/Bar Codes

The first item to address when looking to optimize scale house operations is the automation of as much of the process as possible. Bar code technology allows the company to issue a unique identifier to a truck either along with the purchase order or for the drivers to identify themselves at a check-in station to give them unique identifiers. Having a unique identifier is the crux of the entire process since it allows the system to follow the carrier throughout the entire process and tie the shipment to the particular carrier. This unique identifier gives the traffic team the ability to track the carrier through the entire process, including positively verifying shipment by tying the unique identifier with the shipment bar code before scale-out.

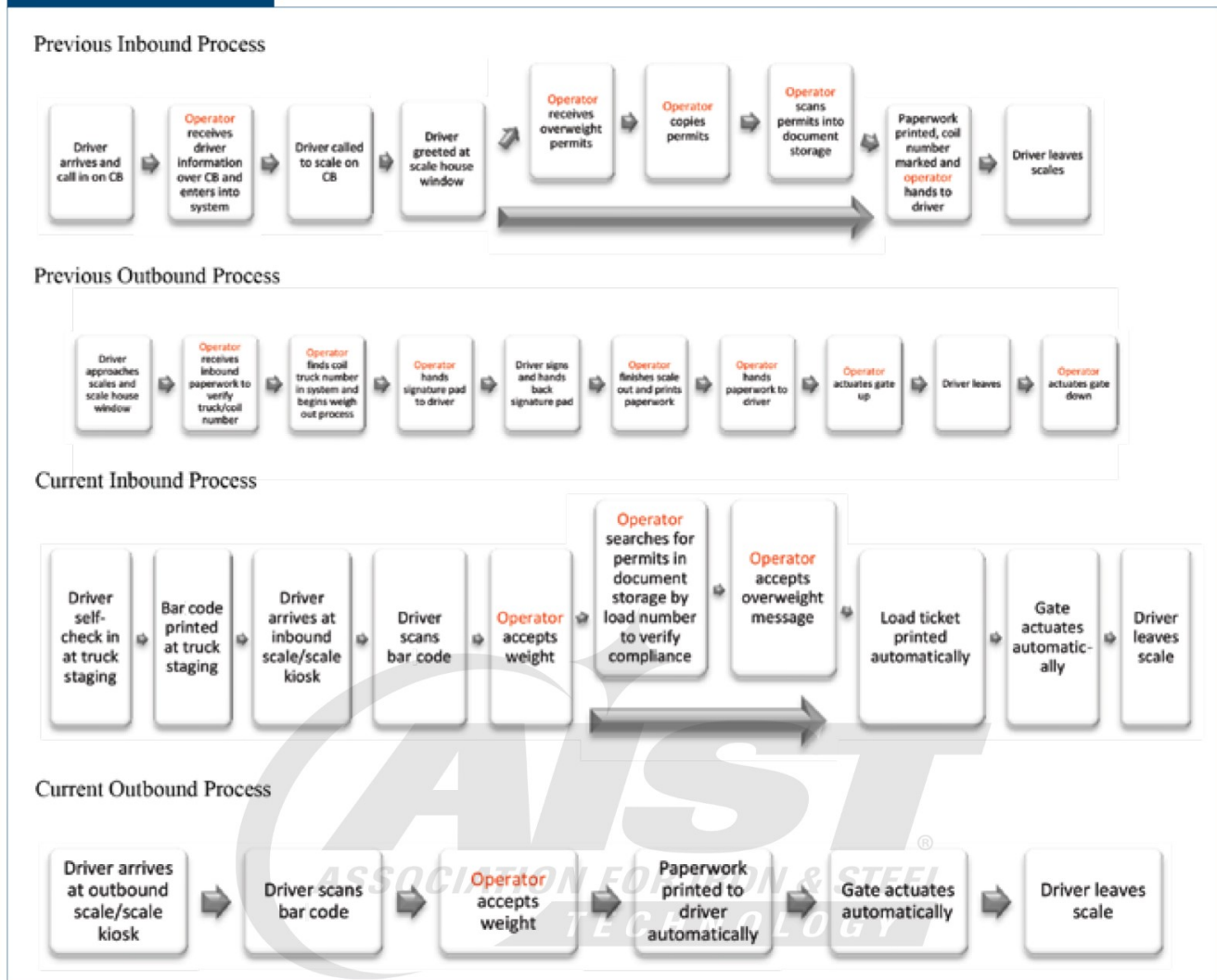
Where to incorporate the unique identifier is a way to strategically build traffic control into a scale-in operation. At Nucor Steel Gallatin, the decision was

Figure 2



Truck driver check-in station at current staging lot (a) and three kiosks to check in (b). The building is temperature controlled and contains some seating along with vending machines for drivers.

Figure 3



Previous and current coil scale-in processes. Note the limited operator interaction in the current system. Even some of this interaction will eventually be eliminated through automation.

made to keep trucks hauling coils out of Gallatin at a staging lot to control the number of those trucks within the property. This allows traffic teammates the ability to bring drivers into the coil loading yard at a rate which the yard can handle and not have a traffic backup within the mill, where it can pose a safety hazard and a clog in movement of other traffic. The system at Nucor Steel Gallatin calls drivers to the scale automatically. As a truck is weighed out, the system calls the next staged truck to the scale, allowing 10 trucks in the coil loading yard at one time, one in transit to the outbound scale and one in transit from the inbound scale to the coil loading yard. Checking in trucks this way also allows the traffic operators to obtain a mobile phone number from each truck and, with simple SMS text messaging technology, any message from status updates to truck rejections can be automatically sent or freeform texted to drivers

for instant communication. With increasing phone application technology, bar codes can be presented to drivers' phones and used throughout the process. This would allow facilities to obtain driver information sooner by having them check in with their phone and schedule appointments and receive their bar codes then as well.

Self-Service

The second major consideration for scale house optimization is building the system for self-service. At Nucor Steel Gallatin, this is handled by using the check-in station. All other drivers must still fill out a gate agreement to enter the property and reapply for that entry yearly. When using the check-in station, safety information is presented, terms and conditions

Figure 4



Scale kiosks. Nucor Steel Gallatin has an inbound scale, an outbound scale and one bidirectional scale. Any of the scales can be put into or taken out of service by the flip of a switch.

for shipment are given, and, other than final acceptance of the load at scale out, all agreements are made for entering Nucor property and hauling for Nucor. Using the check-in stations rather than a person to complete these routine tasks is efficient and can immediately identify a problem before carriers enter the facility.

User acceptance of new technology, particularly self-service technology, is difficult, especially in an aging population. However, many industries where self-service technology is the norm struggled with acceptance.¹ ATMs, vending machines, information kiosks and self-checkouts are just a few applications where consumers were reticent to accept but today account for more than US\$600 billion in North American transactions.¹ Three important factors are needed for acceptance of self-service technology: perceived usefulness, perceived ease of use and perceived enjoyment, as evidenced in a study the University of Tennessee.² One important result of the study was that the use of self-service technology served very little indication of customer patronage, but customer service was a leading indicator for continued patronage.² The implications here are enormous for implementing a self-service system: there will likely be no loss in customer/carrier retention based on the self-service technology.² The ability to gain “trust” in the new technology will depend on the system’s reliability, the service quality of the operation, and building a system that is easy to use and attempts to make the process fun.

User Interface and Data Integrity

Another component of a successful automated scale house process is the user interface for the scale operators. Using a dashboard-style interface where all check-in and scale processes can be managed from one screen will aid in the minimal amount of time being spent on the routine tasks of verifying truck weights, overweight permits and shipments. If the system is optimized, all operation can be completed in the system and verified on-screen for the operator to merely accept the weight. The user should be able to delineate between different product types and empty trucks. All information should be editable on the interface and messages should be able to be texted to drivers when needed. A comments section for free-form comments on load problems or issues with drivers should be included to log all information.

Identifying areas in need of improvement requires proper data collection to recognize where efficiencies can be gained. The only way to do this is to have a system to collect data. Humans are not only poor at monitoring items over a long period of time, but also have a hard time quantifying findings that they might have observed. Since humans can only focus on a few inputs, they have a hard time considering all factors that are involved in making a decision.³ These two factors stress the importance of automation to a company’s overall supply chain and business plan. Every input into the system can be collected, calculated, and correlated to areas that need improvement, are performing well or just do not work. Check-in times, scale-in and -out times, driver information, comments, manual statuses (such as a HOLD status or REJECTED), the amount of time it takes for operators

Technical Article

to input data, and all other inputs can be gleaned to optimize the system in specific and general ways.

Supply Chain Management

Logistics is not a profit center, but that does not mean that logistics has to live with its reputation as a cost center with money hemorrhaging from its gaping wounds of freight variances and fuel surcharges. Product has to move and it has to move according to the customer's order and specifications. It is a reality of all manufacturing that a product so carefully designed and built would need the best care as it moves to its final destination. It is also in the best interest of companies to have an efficient, cost-effective process in which to move products within and out of their facilities. The role of a traffic team fulfills this need and has the potential to do even more.

The challenge with scale house improvement is to provide automation that eliminates the need for the scale operators to spend time working on mundane tasks and moves them to a position to save money and/or make the company profit. Thinking of inbound and outbound movement of products as supply chain management as opposed to merely shipping

or logistics is one approach toward efficiency. The goal of supply chain management is to minimize system cost and waste; thus the emphasis focuses on the integration of raw material suppliers, manufacturers and the customer.⁴ Integrating the needs and expectations of raw material suppliers, manufacturers and end customers is the goal of every good supply chain management solution. Utilizing scale operators as more involved traffic personnel will help bridge gaps that exist between each involved party in a supply chain.

Opportunities for Employee Engagement

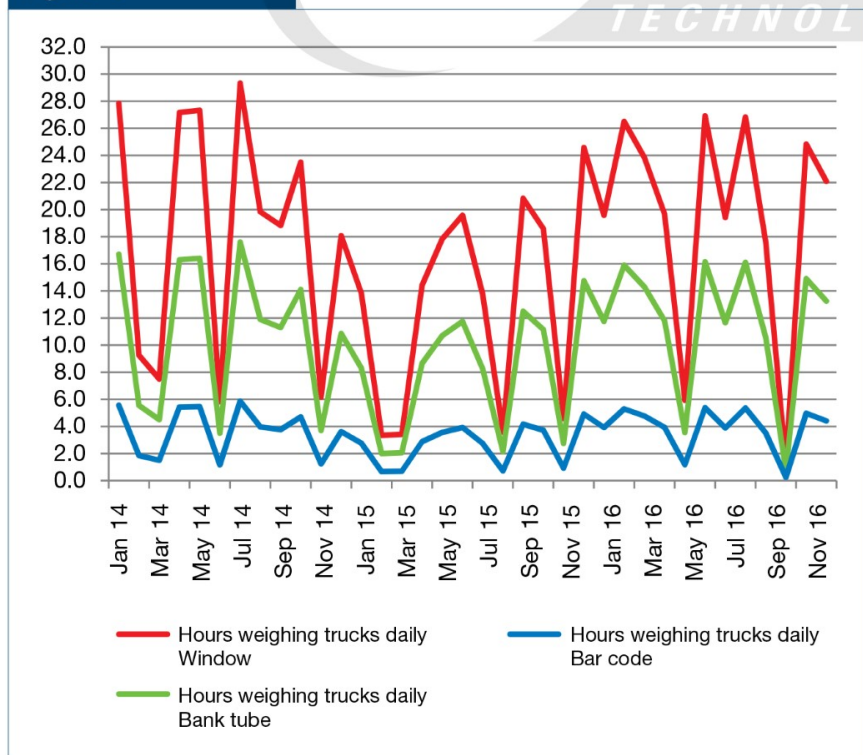
“Automated tools free sustainment planners from using calculators and managing large, unwieldy spreadsheets and allow more time for analysis,” according to an article by the U.S. Army.⁵

With limited operator interaction, scale-in and -out times can be limited to under 1 minute. In previous operations at Nucor Steel Gallatin, the drivers had to step out of their trucks and walk to the window of the scale house. The process was driven manually by the operator, who entered data into the computer, printed paperwork and handed it to the drivers. The drivers

would then sign the needed documents and hand them back over to be kept on file and scanned into a document storage system. This process took about 5 minutes to complete from the time the driver pulled onto the scale to the time the driver was leaving the scale outbound and inbound, in most cases. An improvement on this system was the use of bank tubes to pass the information between drivers and operators on the scrap side, which took the time on the scale down to about 3 minutes per truck. On the shipping side, it remained about 5 for the outbound and 3 for the inbound trucks (Fig. 3).

Fig. 5 shows the amount of time that can be saved when weighing trucks in and out is about 1 minute. Realistically, unless there is an anomalous situation, trucks can check in, weigh in, be loaded and weigh out without any assistance from an operator in the scale house. The management of the time saved could be crucial to a supply chain operation and to

Figure 5



Random sampling of truck traffic and minutes at scale for each step toward current process.

teammates' feeling of accomplishment and satisfaction at work.

Employee engagement is an important part of every career. In a 2003 Towers and Perrin Talent Report, 40,000 employees in the United States and Canada were assessed for employee engagement. The study found that only 17% of employees were highly engaged, 64% of employees were moderately engaged, and 19% were not engaged. Non-management employees made up a majority of the least engaged employees.⁶ Reasons for disengagement can be theorized, but the fact that employees do not feel that they are contributing to the team in a meaningful way causes them to be less communicative and withhold ideas, feeling that they have little say in matters of importance.

Scale house operators are perfect candidates for employee disengagement. Often, scale houses are on the fringes of a facility and those operators work in small spaces, performing the same tasks day in and day out. There can be a sense of detachment from the operation of the facility and the finished goods since there is not really direct contact with any of it. The job is vital to every company and yet becomes so monotonous that it can feel like scale operators are not even a part of the team. Automating the tasks that create the monotony in scale houses is the start of building a better team of engaged employees who are vital for not only the work they physically perform but also for the work they mentally perform.

If a company is going to make smart supply chain decisions, it needs the help of everyone connected with logistics to be involved in an active role. The entire team needs to have the ability to make decisions and participate actively in goal setting, project planning and execution if a shipping team truly wants to improve cost-saving and efficiency methods. A great way to benefit the organization as well as empowering employees and getting them engaged is automating repetitive, mundane jobs and allowing them to work in a more creative way toward making and saving money and building a more stable and efficient supply chain.

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