



The right track

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Tracking and tracing have two parallel functions in the metals supply chain: quality control and process improvement. It might seem that they should be sequential, with quality control primary and process improvement as an added benefit. But mills, service centers and vendors say that the two are very much in parallel, informing and enhancing each other.

“Inventory is where traceability begins,” according to Peter Weymouth, senior product manager for Atlanta-based Apteon. “We built the system, Axis ERP (enterprise resource planning), especially for that. If an axle on a vehicle breaks, you need to be able to trace back to a specific heat and fix whatever the issue was wherever along the supply chain it was.”

Sometimes the problem is metallurgical or in the fabrication, but often the problem is in a rush job, or an incorrect batch, or the wrong characteristics or settings being sent with a shipment.

“Tracking and tracing are not separate,” Weymouth said. “They are built through the whole system, from purchasing through shipping and claims. It all works in parallel: track and trace, quality control, characteristics, even metadata on how to improve the process, make it faster and better.”

That makes for an ideal, but Weymouth is frank about actual progress toward it. “As an industry I have to say that we are behind where other sectors are. Automotive is seamless. They won’t touch you if you can’t share information up and down. In metals we have an electronic data interchange (EDI) model that is common, but not a standard. Other sectors have moved ahead, and metals are just not there yet. There just is not a big demand from enough customers. The industry is Captain Kirk up front and Fred Flintstone at the back.”

It can be said that the progress of inventory management in metals is something of a dumbbell curve: more upstream in mining and downstream in fabrication and distribution than in primary metal making in the middle. For example, ArcelorMittal Mines Canada (AMMC) uses a system by OSIsoft at its historic QCM iron-ore mine in Port Cartier, Quebec.

Michel Plourde, systems director in information and operations technology at AMMC, said the inventory management system was put to a severe test when the mine increased its output and the logistics infrastructure had to keep up with out any physical expansion. “Last year the mine went from 23 million m.t. (metric tonnes) output to 26 million m.t.,” he said. “That 13-percent increase in volume went out through the same equipment at the same port,” using enhanced data infrastructure in lieu of expanded physical infrastructure. “It made all the sense in the world: a relatively minor investment in software improvement vs. C\$100 million (around \$75 million) for a second feed loader.”

From the outset the company wanted to handle the mine expansion with the existing handling infrastructure. “So it made sense to integrate all the talking and thinking through the data platform,” Plourde said. “We started aggregating and modeling data in context so that we could drive the operations to the performance targets. Once we had measurements to give to shop-floor operators or ship loaders we could let them know what was expected.”

Mine, mill, or service center, “it’s not enough just to have information,” according to Perry Zalevsky, industry principal for mining and metals at OSIsoft LLC, San Leandro, Calif. “Companies have to be comfortable with the data. Companies that are comfortable with the data will be comfortable making decisions, and will start thinking developmentally using it.”

One implication is that for more than a century mills have been optimized—on purpose or just by default—to maximize tonnage and minimize cost per ton of primary metal. Fabrication, distribution and sales were simply ways to move that

metal beyond the fence line. To some degree that thinking is now turning around with sales and inventory being optimized and that modeling flowing back to the mill.

“You can optimize for any process—slitter, pickler, hot mill, cold mill—but today’s models are much bigger and richer,” Zalevsky said. “You are not stuck with blindly optimizing for one unit or process but intelligently through the organization. That said, there may not yet be many steel companies that know how use that data and technology. Some are starting to.”

Given legacy assets and systems, Zalevsky stressed that inventory, supply-chain and other operational optimization “can be modular or holistic. Every mill and distributor has its own path. It can be for one or more facilities; it can include a few suppliers, and so forth. It does not have to be all or nothing. It can be incremental.”

Modular or holistic, inventory management is essential, Zalevsky added. “There is a long saying in metals, you have to have either inventory or information. If you are not quite sure when a customer might need metal, you have to hold some inventory to cover all eventualities. If you had more information, or maybe just better information, you would not have to hold so much inventory.”

In one case, a metals company started with inventory management, worked back to supply-chain and cost optimization, and found it was losing money on its biggest customer.

The firm was a client of Global Shop Solutions (GSS), relates Adam Grabowski, director of marketing. The operator had a steady annual gross of about \$30 million, with a net of only about \$4 to \$5 million. “Through the analytics and key performance indicators, the client realized that his largest customer was costing him money. So he stopped doing business with that customer. It cost him a third of his gross, but he almost doubled his net. Now he nets about \$8 million on a gross of \$20 million.”

Diving back to the core functions of tracking and tracing, Ralph Johnson, ERP software consultant at GSS said that new functions use attributes such as density, thickness, shape and so forth to create work orders, even estimates priced by weight or size. The estimates, once accepted, then become orders.

“Tracking by heat or lot number is the start, but the key is to the characteristics all the way through slitting or rolling, smaller and thinner. The heat has to be tracked through the whole way.”

The offering from GSS is called One System ERP. The company has installations as far upstream as a primary metal mill, but the majority of installations are in processing and fabricating, cutting and finishing and out to service centers. The semi-annual upgrades and enhancements to the core software are the result of continuous improvement, the voice of the customer and industry research, and serve customers across industries, including those in the metals inventory and distribution sector.

The 2016.1 module, released in June, has a mobile customer relationship management (CRM) function. “Mobile CRM has enabled metals manufactures to see all critical business functions from any device in real time,” Grabowski said. The mobile capability helps sales employees by providing access to customer contacts, quotes and supplier information from their mobile device in real time. “We have made it possible for our customers to give their customers a mobile application to self serve the status of jobs, shipping and many other critical data points. Customers no longer have to wait for an email or a phone call back about their order.”

The 2016.2 module that will be released this winter will focus on a series of dashboards that gather all relevant information onto one screen. “Several dashboards will be available covering inventory, shipping, work in process, and more. For inventory management, the shipping dashboard shows what is due out now, what is due out next, and what is late,” Grabowski said. “The information comes directly out of the ERP system.” Given the real-time immediacy of the operations, most users choose to base the system on servers at their plant, but it can be run remotely on GSS servers or through the cloud.

That linking of ERP and inventory management has underscored how closely inventory is tied to cash flow, Grabowski explained. “If you are not ordering properly—ordering too much or not enough and then paying to rush—you are compromising not just efficiency but also quality. That is the core of the system. The information for scheduling properly, what materials are needed, is tied back to automated purchasing. You are not relying on someone looking over a spreadsheet.”

There are also alerts built into the system to alert operators if jobs have been scheduled but there is not sufficient inventory. There are also key performance indicators to help improve efficiency or profitability. “Those indicators were developed in consultation with a large number of customers over time,” Grabowski said. “The indicators constitute what our most successful customers feel are best practices. Beyond that users can add their own or ask us to build new ones for them.”

Tracking and tracing starts when a coil—or a long form—“comes to life,” according to Walter Krancevic, chief commercial officer of CareGo Technology, based in Burlington, Ontario. “It has a unique identity and record with its physical attributes that sticks with it. But beyond that, you have to be able to find that coil in physical space. That is what makes coils and tubes different from consumer goods. They all may be in stacks on the warehouse floor, but they are not all the same.”

CareGo began as a typical warehouse company for coil. Efforts to improve inventory management and supply-chain efficiency led to a commission from a mill customer to build and operate a dedicated warehouse for the 25,000 tons a month. That greenfield warehouse enabled CareGo to start from scratch in what is largely a legacy business up and down the value chain.

The focus quickly narrowed on crane operation. The company developed proprietary software to automate crane operations down to the placement and retrieval of individual coils. That facility operated successfully for 10 years, at which time CareGo decided to sell all its logistics business and commercialize the design and optimization of inventory management.

The offering is called Telia and has three components: the software module that operates the yard layout for coil, pipe, or tube; the inventory management system; and the automation system that drives the crane without a human operator. Because of the importance of immediate interactive crane control, the system operates from a server on site, not off site or through the cloud. The first installation was at the Port of Liverpool in England.

“Everyone has their own inventory management system,” Krancevic said, “either legacy or new. But many of them involve someone walking the aisles with a clipboard checking numbers. A guy with a clipboard checking numbers is not adding to your bottom line.”

Not only can inventory and crane management be automated, those can be coordinated with vehicle loading and scheduling. “In most warehouses trucks show up helter skelter with a number scribbled on a piece of paper and then someone has to go and pick that coil. Telia has a kiosk where drivers enter the order number, as well as their vehicle information and certify they are operating safely. It’s like checking in for a boarding pass.”

Krancevic says velocity of trucks leaving loaded increases by 30 to 40 percent. “And drivers like it because there is no favoritism in loading.” Ideally the system has already staged the shipments due to go out that day, but it can dig for unexpected arrivals. “The foreman has all the appointments on his screen, who has checked in and who has not. He can also override the sequence if necessary.”

The essential philosophy behind the system is making the most of found space and time. “If you know you are light for loadings at a certain time, the crane can be scheduled for decanning or other functions then. “Inventory management is all about inches and seconds,” Krancevic said. “In the yard, you optimize coil placement, a few inches for each, and suddenly you have found thousands of square feet. Same with optimizing loads. If you can sort coils to maximize the load in each rail car, your cost per ton goes down.”

Krancevic credits steel mills with “enormous progress in manufacturing, performance and quality over the last 30 years. The industry would serve itself well to pay the same attention to inventory and supply chain.”

Schneider Electric SE is a major software provider across process control and ERP. “Metals are a new angle for us,” according to Tom Sabitzer, general manager for the Apla system that so far has primarily been used in mining but is moving downstream into metals. “We have just released a module for materials tracking and quality through processing,” he noted. “We are tracking ore from the mine to ports, trains, slurry pipelines and are able to make adjustments for quality and quantity manually, or automatically using survey results.”

The current plan is to move first into copper next year, working with a mining and metals firm in Australia, and from there into iron and steel, working downstream from coke, ore and limestone. “We understand the need to tweak the blend of materials to customize inputs,” Sabitzer said.

Inventory management is a bit of a balancing act, he added. “It can monitor a single commodity or bottleneck, or the supply chain end to end. It can be adapted for budget, for operations, or to a model. With all that, we understand the reluctance of some traditional manufacturers. But there is definitely a shift for integrating inventory with operations with assets.”