NEW STEELS FOR AN EVOLVING AUTO INDUSTRY

Future mobility is creating opportunities for steel. The industry is already moving to take advantage of them.

By Sam Kusic

In the industrial histories that are yet to be written, 2014 surely will be considered an important year in the steel industry’s long-standing relationship with carmakers. And probably for the wrong reasons.

That was the year Ford began producing an aluminum-bodied version of its best-selling F-150 pickup truck. It was also the year that consultancy Ducker International made this startling prediction: by 2025, more than 75% of all new North American pickup trucks will be aluminum bodied.

Still, for all of the hand-wringing prompted by those events, the mass defection from steel to aluminum hasn’t occurred and, if anything, steel has only strengthened its position in the five years since. In fact, automakers have unveiled seven all-new pickups in that time, and all seven have been steel intensive.

“We know our competition is out there working [on future mobility]. They have projects going on demonstrating how their material is best for future mobility. We should never forget … that the highest-volume-selling pickup truck in the automotive industry became aluminum intensive.”

And based on the conversations during the SSS conference, the industry won’t let itself be upstaged again.

Through a daylong series of technical panel discussions, which were moderated by AIST executive director Ron Ashburn, Hall and others made it clear that steel is moving to meet the needs of a rapidly changing market.

Hall, for one, told attendees that steelmakers have succeeded despite viable challenges from alternate automotive materials because of their willingness to collaborate among themselves and with automakers.

“We worked with automakers on body-in-white projects to look at body structures and demonstrate how we could optimize mass reduction and (safety) performance at the best value. We did this on a component level as well,” she said. But she cautioned that steel risks losing ground to aluminum body closure panels and to startup electric vehicle manufacturers (count Tesla among them) who are basing their lightweighting strategies around aluminum.
“Now is not the time to cut back on collaboration,” she said. “Collaborating allows us to deliver results faster. We need to collaborate even more. We need to listen to our customers and our shareholders. They not only want us to survive, they want us to succeed.”

To succeed, steel will have to anticipate a market that is becoming increasingly electrified.

Bernard Hoffman, vice president of global product development and engineering at United States Steel Corporation, said that in 2011, there were all of three electric vehicles on the market, each with minimal ranges, around 70 to 80 miles. And those were generally limited for sale as fleet vehicles.

But by next year, electric vehicles will be represented in all market segments, including trucks.

And growth will only continue from there. By 2025, electric vehicles are expected to account for 26% of North American fleet, said Peter Leblanc, ArcelorMittal’s chief marketing officer for North America and its global automotive unit.

Panelists said those vehicles likely will look and operate differently, too. They’ll run on batteries. They’ll be connected to one another and to the traffic grid. They’ll drive themselves, too. And the owners won’t necessarily be the passengers.

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–Jody Hall

“We anticipate that cars of the future will likely be purchased and used by future mobility providers, not necessarily as much as the consumer,” said Leblanc.

That in mind, he said, automakers will adopt flexible and modular designs, which for one means optimized interior space and a smaller footprint. And they may not have a B-pillar, which would make it easier to climb into and out of a vehicle.

The B-pillar is a major structural component, so steel will have to be ready with solutions that can enable that design. And it will be, if it isn’t already.

According to Leblanc, the tensile strength of steel has multiplied by a factor of six over the last 25 years. Whereas advanced high-strength steels (AHSS) were considered to be those with strengths of a few hundred megapascals, now those strengths measure in the thousands of megapascals.
ArcelorMittal is among those with ultrahigh-strength products. In fact, it has, in the last two years, introduced more than a dozen advanced and third-generation steel grades for the automotive industry.

Along with advances in metallurgy have come multi-million-dollar investments manufacturing capability.

U. S. Steel and joint-venture partner Kobe Steel, for instance, are building an advanced galvanizing line at their facility in Ohio. The line will galvanize U. S. Steel’s XG3 steel, its third-generation AHSS product. It will be manufactured in Pittsburgh, where U. S. Steel aims to build a US$1 billion endless cast-roll facility.

ArcelorMittal, meanwhile, has invested US$2.5 billion in upgrades and acquisitions over the last five years. Projects include a US$140 million replacement of pusher-style reheating furnaces with two walking beam furnaces at its Burns Harbor plant in Indiana; a US$107 million replacement of the galvanizing line at Dofasco in Canada; and a US$47 million upgrade to the No. 2 galvanizing line at its AM/NS Calvert LLC joint-venture sheet processing facility. The upgrade included quench and partitioning capabilities.

Nucor, meanwhile, is ramping up a US$230 million specialty cold mill and US$240 million galvanizing line in Arkansas. It and joint-venture partner JFE Steel also are preparing to open a galvanizing line in Mexico. And in addition, it is spending more than a half-billion dollars to expand its Gallatin sheet mill in Kentucky.

“We can’t make third-generation material with the facilities we had 20 years ago,” said Dean Kanelos, market development and product applications manager at Nucor. “We had to step up to the plate and modernize our facilities to be able to do that.”

Although steel in general has reaffirmed its prominence as the auto industry’s material of choice, questions remain as to whom in steel will be making automotive grades. As it is, high-end grades are largely the province of the integrated producers.

But that is changing as electric arc furnace (EAF) producers move up the value chain. Perhaps one of the most telling signs that they are came just a few weeks before the conference, when General Motors announced its annual supplier awards. Among the recipients this year was Nucor. It was, according to Nucor, the first time an EAF steelmaker won the supplier honor.

“It was a big deal for us,” said Kanelos, noting that the award was based on quality and dependability, but also technology advancement.

As EAFs take greater market share, and as carbon output becomes a greater problem, there has been growing speculation about how much longer blast furnace technology has before it’s rendered obsolete.

Lourenco Goncalves, chairman and chief executive of Cleveland-Cliffs Inc., told conference attendees that right now, the advantage blast furnaces enjoy lies with the feedstock – they’re able to convert ore into virgin metal.

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But that’s something EAFs could do, too, with access to the right inputs, something he aims to supply once Cleveland-Cliffs completes its US$830 million hot briquetted iron plant in Toledo, Ohio.

“EAFs cannot access the high end of the value chain if they use just scrap. If they just feed the beast with only scrap, there are limitations,” he said.

And demand is there — he said the plant initially was targeting 1.5 million tons of production. Now, he said, they are aiming for 1.9 million tons.

Pino Tese, chief executive of SMS group’s North American subsidiary, predicted that blast furnace construction will end after 2030 as the world transitions to a hydrogen-reduction/EAF production route.

But World Steel Dynamics founder and managing partner Peter Marcus said integrated producers still have advantages over the EAF operators — some own their own iron ore mines, he said, and they’re low cost. They also have dedicated automotive customers.

“It’s going to be very hard to dislodge some of these plants,” Marcus said.