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Steel wheels in style

Conventional wisdom on steel wheels is that consumers prefer the appearance of aluminum alloy wheels and expect to see them on premium vehicles. Steel wheels are those ugly black ones hidden by hub caps, and even the hub caps have gone from stylish chromed steel to cheap-looking plastic, right?

Not anymore. Steel wheel makers are looking to reclaim some market share lost to aluminum, and they are not just making a case for the economics of steel. Improved materials and stamping techniques make possible steel wheels that weigh the same or less than comparable

aluminum wheels, while featuring the kind of open-spoke styling that is popular with consumers. Witness the high-end chrome wheels on the Mustang GT.

Consumer surveys showed that buyers do not care from what material their cars' wheels are made, only that they have the open-spoke styling that is so popular, said Jim Cran, Project Manager for **American Iron and Steel Institute's** wheels task force, which commissioned the poll. Steel-wheel market share dipped to about 42% by 2000, but has since rebounded to about 47%, according to the institute.

Car makers have adopted aluminum wheels in the belief that they are what consumers want, when in fact those customers only want the appearance that was until recently only possible with aluminum wheels, he asserted.

"[OEMs] thought the consumer preferred aluminum and would pay extra for that wheel," said Cran. "Actually, the consumer does not know what material the wheel is made of, and they don't care. They showed no preference between steel and aluminum."

This news was met skeptically, according to Cran. "At first, they [OEMs] were incredulous. But the cost savings were so great and with this information, we finally started making some inroads."



The "mag" wheels on the retro-styled Mustang are not magnesium, or even aluminum, but rather are Hayes Lemmerz spoked steel wheels clad in chromed plastic to create the appearance of vintage mags at an affordable price.



This chrome-clad steel wheel for the Ford F-250 saves \$50 per wheel in cost compared to the aluminum alternative.



Even painted steel wheels need not be the plain black discs usually seen beneath hubcaps, as this ArvinMeritor wheel illustrates.

Cost seems to be the most important criteria in today's fiercely competitive market, and the potential savings from replacing an aluminum wheel with a steel one of the same size and similar appearance is about \$120 to \$160 for a set of four car wheels, said Cran, and the **Ford F-150's** chrome-clad steel wheels save \$200 compared to aluminum wheels.

Because steel wheels are stamped from thin sheets of steel, they lack the three-dimensional appearance of aluminum wheels, so suppliers dress them up with plastic cladding that simulates the appearance of popular alloy wheels. Of course, steel wheels have long been dressed up with hub caps, but most consumers do not like their appearance or their susceptibility to falling off. Today's cladding is either bolted or glued on, so falling off or theft is no longer a concern.

"If you dress up a wheel, it doesn't really matter what is behind it," observed

Scott Murray, Director of Clad Development for **McKechnie Vehicle Components**, a supplier of plastic cladding. "It levels the playing field from the aesthetic side."

It is still easier to create large wheel openings with aluminum than with steel because of the added depth of the aluminum material, but high-strength steel and new stamping techniques are permitting ever larger openings on steel wheels, Murray said.

"In the last five years, the steel wheel started to catch up because of the high-strength steels that were available and also because of new improved simulation techniques for wheels with larger, more open windows," said Eduardo Mikami,

wheels very heavy. As a result, the steel wheels sold on the **Chrysler PT Cruiser** are only 0.1 lb (0.05 kg) heavier than the alloy wheels, and those on the **Chevrolet Cobalt** are only 0.2 lb (0.09 kg) heavier, according to Cran. "We don't say steel is lighter or heavier, because it is style-dependent," he said.

So weight has been pretty well eliminated as an issue, but one of the concerns held by OEMs has been the durability of the cladding. With real-world experience growing by the day, car makers are gaining confidence in the technology. "[OEMs] say, 'We have to make sure this is not going to fall apart,'" Mikami said.

Another concern has been fear of being seen as misrepresenting the product to



Though conventional wisdom says that optional aluminum wheels reduce weight, these Hayes Lemmerz 16-in steel wheels (shown on the Chevrolet Malibu), at 17.7 lb (8 kg), are more than 1 lb (0.45 kg) lighter than the available 17-in aluminum wheels, which have a mass of 18.9 lb (8.6 kg) each.

Product Engineer for the Wheels Division of **ArvinMeritor**. So advances in steel wheels are also attributable to improved design and simulation software that lets engineers maintain necessary strength while trimming away material, he said.

"Before, we had to make the tools, then test them, and then go back to the drawing board if there was a problem. Now, it is much easier because we can predict the process flow. When we go to the shop and build the tools, we already know how it will go, so it saves time and money," said Mikami.

That is not to minimize the importance of new types of steel. "The [traditional] steels wouldn't support the deep draws that are in the stamping process," he said. "With improvements in the manufacturing process, they came up with the high-strength low-alloy (HSLA) and dual-phase steel that allowed us to expand into deep draws."

Those materials also let the wheels feature thinner spokes without using a thick gauge of steel that would make the

customers, because the chrome-clad steel wheels are commonly assumed to be alloy wheels. "Sometimes the dealer doesn't even know what wheels are on the car," said Cran, so OEMs are trying to educate sales staffs and consumers on the issue.

The result is increasing interest from the domestic manufacturers, with transplant manufacturers still taking a wait-and-see approach, said Tom Heck, Director of Engineering for North American Wheels at **Hayes Lemmerz International**. "I expect there to be renewed interest from the Asian transplants, probably next year," he said.

One advantage of steel wheels is higher durability and tolerance for scraping curbs. The steel wheel itself is less prone to damage, and the clad surface can simply be replaced if it is damaged. "If [drivers] do curb the wheel, rather than having to replace the whole wheel, you replace the trim," said Heck. "The cladding bolts on, so it is very secure, but if you do need to remove it for repair, you can do that."

Dan Carney

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For more than 50 years, Fumagalli steel wheels have been delivering the highest levels of quality and service for its OEM customers. Using advanced analytical software and high-strength, low-alloy steel, Fumagalli achieves a highly styled bright finish appearance for less money than aluminum. Drop-center, bead-seat, full-face and high-ventilation wheel models are available up to 22.5 inches in diameter.

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