

As Wheels Turn for International Bicycle Manufacturing, It's Expected Titanium Will Continue to Enjoy the Ride

By Michael C. Gabriele

When it comes to pondering the use of titanium for the global production of bicycles, one might say that the wheels are always turning when it comes to the latest designs and technology, and that industry trends and consumer preferences go in cycles.

Andrea Carolina Clark, titanium product manager, Continental Steel & Tube Co., Fort Lauderdale, FL, will share her perspective on "The Future of the Global Bicycle Industry" during the TITANIUM EUROPE 2018 Conference and Exhibition, sponsored and organized by the International Titanium Association (ITA), which will be held May 14-16 in Seville, Spain.

According to an abstract of her presentation, Clark will deliver an in-depth assessment of the future of the global bicycle industry. She will examine the current drivers of the bicycle industry in different world regions and it emphasizes on the growing demand for titanium bicycles and the expected global sales market in 2025.

Clark, in her presentation, indicates that the global bicycle industry is expected to continue growing as various organizations continue to advocate for cleaner environment, cheaper energy and a healthier lifestyle. High demand for low-cost transportation in developing countries as well in the United State and Europe will increase the relevance of bicycles and help the entire market grow over the next five years.

"Titanium will remain an essential metal for bicycle producers since the costs associated with production have reduced in the past few years due to new innovative manufacturing technologies," she states in her abstract. "Titanium is now used for the production of regular, everyday bikes,

unlike in the past when it was utilized only for producing bicycles used in professional events. The bicycle industry is expected to continue growing in the public sector and with new competition trying to enter the market." Clark's presentation will outline the production, consumption, revenue and market share and growth rate of titanium bicycles in different global regions.

Titanium first emerged as an intriguing industrial material option for bicycle manufacturing in the 1970s. Bike builders, competitive riders, and eventually the bike riding public took note of titanium's inherent mechanical properties, light weight, strength and resistance to corrosion when compared with steel.

An article in the online newsletter *Bicycle Times* (written by Karl Rosengarth and originally published in *Bicycle Times Magazine*, "Everything you ever wanted to know about titanium") recalled that, during the 1970s, "enterprising bike builders (initially) used available commercially pure titanium tubing designed for aerospace hydraulic systems to build the first titanium bicycle frames. Component compatibility forced builders to use tubing sized similarly to steel bikes of the era. The inherent flexibility of titanium, combined with the small tubing diameter, produced bikes with more frame flex than most riders deemed acceptable."

The online article explained that by the 1980s, bikes manufactured with superior titanium alloys (Ti-3Al-2.5V and Ti-6Al-4V), gained greater notoriety. "Still, the available tube diameters (typically 1.25-inch max) were not optimized for bicycle frames. While there was a lot to like about the early titanium alloy bikes, they had yet to shed their 'flexy' reputation. Titanium

alloy bicycle fabrication reached a tipping point during the 1990s and early 2000s when the tubing mills started producing thin-walled titanium alloy tubing. Finally, the frame designers/builders had an array of tubing that allowed them to optimize frame strength and stiffness—from the rear stays, to the main tubes, to the bottom bracket, to the head tube."

However, by 2000 carbon fiber bicycles became the rage, especially in competitive racing. As a result, titanium as a high-end material of choice in cycling lost some of its luster. The consumer market for bicycles typically takes it cues from advances in the highly competitive, international sport of cycling, with demanding, aerospace-like specifications for bike frames and related components. Bicycle manufacturing, especially for professional racing, is a complex balancing act that involves speed, safety, lightweight aerodynamic designs as well as the subjective category of rider "feel and comfort."

Still, titanium has maintained its share of fans in the bicycle business. And based on Clark's observations, the international bicycle industry, as a whole, continues to show signs of growth and it's expected that titanium will benefit from this trend. Cycling historian Jeff Groman, who sold, built and repaired bikes for 35 years and was the proprietor of Classic Cycle on Bainbridge Island, WA, said "bike riders and bike builders still love titanium." Groman, interviewed three years ago, said many bike builders have learned how to properly weld and machine titanium, he said. And for riders who live in Groman's neck of the woods—the habitually rainy Pacific Northwest—titanium bikes never rust.

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"There's no downside to titanium when it comes to bikes," Groman declared. "For riders, titanium bikes have a great 'feel,'" meaning that the bikes provide a solid, comfortable, smooth ride. "The feel is similar to steel for bike riders, but titanium is stronger and lighter. And when you get off the seat and pedal up hill, a titanium bike really moves."

Clark, interviewed just prior to departing for the TITANIUM EUROPE 2018 gathering, said that Continental Steel & Tube, supplies titanium tubing to bicycle manufacturers. According to Clark, Continental Steel & Tube's experience within the industry "allows us to approach other manufacturers with confidence. We make regular personal visits to bicycle manufacturers to promote our raw materials. We are strictly a material supplier and distributor of raw materials (from select mills) including titanium tubing, which is the main product we supply to the titanium bicycle industry."

Bicycle production, based on steady consumer demand and the growth of cycling as a popular international sport, remains strong in North America, Europe, Asia and Australia. "In terms of production of titanium bicycle, China dominated the global market with a share of 41.6 percent in 2017 and is projected to grow up to 43.5 percent by 2025," she said, providing a preview of her conference talk. Clark said that major factors driving the growth of this market in this region include: the skills required by new production workers or engineer in the industry are relatively basic and can be acquired over short periods of time, which attracts thousands of low-income workers; population growth and the desire for alternative modes of transportation; and increasing affluence and the benefits of maintaining healthy, active lifestyles. Clark said Grade 9 (Ti3Al-2.5V), Grade 2 and Grade 5 (Ti6Al-4V) remain the most popular titanium alloys for bicycle production, echoing the observations made by the Bicycle Times article for bicycle production in the 1980s.

Continental Steel & Tube (<https://continentalsteel.com>), an ISO 9001:2008 registered company, is a distributor of titanium, stainless steel, nickel, steel, aluminum, brass and bronze, with distribution centers in Miami, Houston, Chicago, Detroit, Los Angeles, and the New York City metropolitan area. Clark was born in Colombia and moved to South Florida when she was 12 years old. After attending school at Florida International University she worked in the aerospace industry supporting the C-130 and F-16 programs for four years. Since 2008 she has held the position of titanium product manager at Continental Steel & Tube. Being bilingual in English and Spanish has been a very valuable asset in her career development, allowing her to fully interact in the international market.