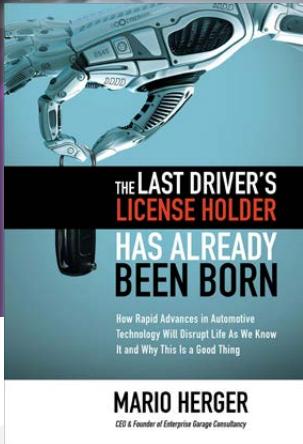


Locked on “Lightweighting” & “Customization” — Business Opportunities in EV Fasteners

Reflection on Mario Herger’s Book on EVs

by Dean Tseng, Fastener World



2020 is the boom year of electric vehicles (EVs) which burst in both production and sales in the last two pandemic years. EVs are an unstoppable force despite the fact that this spring is complicated by the abrupt and unpredictable Russia-Ukraine war leading to exponential price rise in steel, nickel (battery material), and aluminum (lightweight components material). There are 1,400 EVs on the road in the U.S., as well as 1,000 companies developing self-driving technology. In a global perspective, at least 6 self-driving taxi fleets are in trial run and could be officially on the road in 2030. Furthermore, General Motors announced the plan to only sell carbon-free vehicles by 2035.

The EV evolution could very well overturn the market in fleeting years. Besides a change in everyday life, there will be a ripple effect in the fastener industry's supply to the automotive market. A gasoline-powered vehicle uses about 2,000 screws. Converting to an EV will reduce 30% which is around 600 screws used. In light of this, Fastener World picked the book — "*The Last Driver's License Holder Has Already Been Born: How Rapid Advances in Automotive Technology Will Disrupt Life as We Know It and Why This Is a Good Thing*", written by Mario Herger, founder and CEO of Enterprise Garage Consultancy, as our book review for the month.

The World in the 2nd Car Revolution

Mario proclaims in his book that the automotive era as we know it is coming to an end and we are in the second car revolution, and he says it is happening right now! The emergence of Tesla represents “disruptive innovation”. He quotes Harvard professor Clayton Christensen’s study and writes that 50% to 80% of companies used to be the top and are no longer so after two to three decades of disruptive innovation. This phenomenon could also occur in the automotive industry. Although GM, Toyota and Volkswagen (giants from before the second car revolution) are trying to keep up in the EV field, Mario says those that can’t keep up will no longer be an independent company and could even disappear.

The conventional automakers’ mode of competition with opponents is the loop of losing and reclaiming a fraction of market shares. With the disruptive innovation staged by Elon Musk, Mario says it is not Tesla but the future that is impacting these automakers. Mario mentions Mercedes-Benz’s announcement to drop out of fuel cell development and its plan to roll out EVs this year (3 years ahead of schedule) are still 9 years behind Tesla, and he feels this giant automaker is on the precipice of approaching death. Following the plants in the U.S. and Shanghai, Tesla succeeds in making its physical presence with the official launch of the “gigafactory” in Berlin of Germany on March 22. As disruptive innovation seeps into Europe in a more powerful form, the European automakers now face the challenge which is this question: Is the automotive city Stuttgart following the footsteps of Detroit?

Mario quotes experts’ forecast that in as early as 2045 the last manned vehicles will disappear from the roads. This indicates we as the current generation are likely to enter the era of full electrification and self-driving before our lives end, and this is not some distant imagination. Whether you are supplying fasteners to automotive companies or looking to tap into the automotive fastener market, are you equipped for transformation? Have you thought of how you should deploy for the future all-out EV market? You should keep your eyes on the evolution of the EV market and its components.

Obsolete Components in EVs

A gasoline-powered vehicle could use over 2,000 components, but an EV engine system uses only as many as 20 components or so. The gap between them is by 100 folds and with EV, the repair cost can go down by 30% to 90%. The book writes EVs have higher torque output and thus they don’t need gears and gearboxes to drive them forward. Other components that can be removed from EVs are oil hose, oil pump, filter, drive coupling, flywheel, internal combustion engine, radiator, exhaust system, fuel system, traditional dashboard, and center console between the two front seats. EVs don’t need to replace engine oil and they use motors to brake, so they won’t need spark plugs, seals and brake pads.

Special Feature

Fig. 1. Global EV Sales up 109% in 2021, Totaling 6.5 Million Units



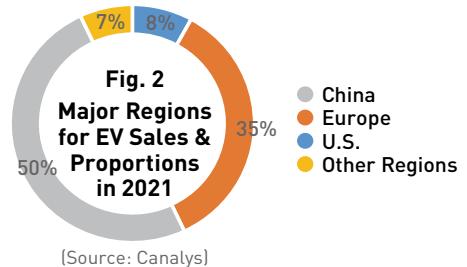
Tesla tops EV sales chart in 2021, surpassing Volkswagen.

This has 3 implications. First, the space taken up by hefty components are now saved and gives way to a lighter vehicle and more room for designers to design the internal vehicle structure with flexibility. Second, the fasteners used with these components will be gone as well and it will impact fastener demand. However, when there is a minus side there will be a plus side, because thirdly, there will be a stark demand increase in fasteners for power supply system including EV battery modules and wiring. This is the focal point that automotive fastener companies should be looking at.

Mario analyzes that some of the Tesla models use 16 battery modules consisting of 444 cylindrical batteries, with each row of batteries radiating heat through a cooling layer. This forms a battery box weighing as many as 100 kilograms. The bottom is attached with a metal plate to avoid puncture by outer objects. Totaling the weight of the batteries (318 kilograms), battery box, cooling liquid and other elements, a Tesla car can have a power supply system weighing up to half a ton. Therefore, EVs require lightweighting more than gasoline-powered vehicles do. Lightweighting is the big pool of business opportunities that fastener companies should grasp as soon as possible.

Special-function Fasteners Development

Although EVs can use some of the fasteners used on gasoline-powered vehicles, there are other EV components that require suppliers to develop fasteners with special functions. An example is a Japanese screw thread having asymmetrically aligned triangle slots for anti-loosening. It requires no nuts and can be installed in tight spaces, suitable for small components such as EV sensors. Another example is a lightweight aluminum screw developed for EVs, suitable for resin materials. Still another one is a high-tensile titanium screw that stretches and contracts like a spring under vibration to prevent loosening. Besides screws, there is a screw fastening device manufacturer developing products for Tesla. Some of the manufacturers observed that EVs require fastening fasteners in tight spaces and therefore requires the fastener to be used with adhesives. This will also affect the development of fasteners. These manufacturers took the initiative to contact EV makers and ask how they could customize fasteners for EV designs. Additionally, fastener and related business owners are suggested to think about what fasteners and fastening tools can improve EV power transmission and wiring and reduce the spending of time and labor.



Tesla now has physical presence in China and Europe, the top 2 sales market for EVs.

Other Influences Beyond Fasteners

Mario doesn't just lock on EVs, but also on self-driving vehicles. The future self-driving vehicles will not have a gear box, as well as a steering wheel, pedals and other control components. Connected to the Internet, self-driving vehicles can move in sync as a smart vehicle fleet. The car-to-car distance will remain unchanged and they will not need brake and acceleration. With automatically controlled intersections, traffic signs and traffic lights will disappear, meaning that the demand for some infrastructure fasteners will also be gone. He warns that we are not slowly progressing to the new technology era but we will probably have a head-on collision with it.

In addition, he mentions self-driving trucks will not require employing drivers and there will be no need to unload cargo from one vehicle of transport onto another. If future shipment uses unmanned self-driving, fastener business owners having purchased self-driving trucks will not have to employ drivers for delivery. We can let our imagination go further. In the future we could be seeing self-driving truck fleets, and all we will have to do is purchase auto cargo delivery service with a phone app.

There is another impact pertaining to a recent problem in Taiwan this year which is power supply. EV popularization could bring a new challenge for Taiwanese power plants because EVs use a lot of power to recharge and it will cast a huge load on the power grid. Will Taiwanese power plants be able to bear this high power volume and the impact from power outage? Furthermore, there will be more and more employees using EVs to commute and factories will have to install more charging stations, which lead to additional setup costs. Furthermore there are issues on raising the price on electricity bills in Taiwan. Although EV charging costs 5 times less than fueling up gasoline-powered vehicles, business owners still have to deliberately evaluate the increased power cost.

EVs are yet to popularize the whole planet but the development of special fasteners costs a lot of time and effort, so we have to deploy ahead right now. In fact, Taiwan has laid the foundation to embrace the business opportunities from EVs. We have world-class electronics, semi-conductors and fastener technologies. However, Taiwan's transformation into high-end fasteners is not fast enough and high-end fasteners are still limited to the front-row fastener companies, while others are still conventional. Hence, it is suggested that fastener associations in Taiwan can provide courses for members to get an insight on EVs and their potential business opportunities to prepare for the second car revolution.

