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Indian Machine Tool
Manufacturers' Association

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AEROSPACE COMPONENTS
Excelling in the Air



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Driving the Future



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Chairman, VDW

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Source: Magix, Wand Media

Source: Team MMI

As the Indian Auto Industry moves towards the more stringent BS VI emission norms, it is crucial to have a clarity over what prompted the move to happen and how the industry is preparing for it. Industry experts help explain its effect across various segments of the Indian Auto and Machine Tool Industries and their own contribution towards this massive change...

Pollution Stops Play' screamed headlines across the world on December 3, 2017, when a cricket Test match between Sri Lanka and India in Delhi was interrupted due to air pollution. The levels measured were 15 times more than the WHO limits. This was the first recorded instance of an international match being called off due to pollution that brought worldwide attention to India's endemic pollution problem.

Vehicular emission is a major contributor to the worsening air quality of Indian cities and 22 of the 30 most polluted cities in the world are in India. In cities like Delhi, the levels of cancer-causing particulate matter in the air is 6 times more than the prescribed levels by WHO.

Government initiatives

In October 2016, India signed the Paris Climate Agreement, which obliges it to bring down its carbon footprint by 33-55 percent from the levels recorded in 2005 over 12 years. This warranted the need for a stricter norm that could reduce the emissions considerably and put India on track to meet the Paris agreement goals.

In normal circumstances, BS V would have been rolled out by 2021 and BS VI in 2024, but in 2016, the Government decided to take strong measures and announced that India would leapfrog directly from BS IV to BS VI emission norms by March 31, 2020. When implemented, this would be the fastest transition from BS IV to BS VI anywhere in the world.

All about BS VI

BS VI is equivalent to Euro VI, which is the norm for emissions across Europe. The major difference between BS IV and forthcoming BS VI norms is the



Source: Ashok Leyland

"OEMs cannot sell any BS IV vehicles after March 31, 2020, and this hard move from BS IV to BS VI would require a well-orchestrated transition not just in OEMs, but also in Tier 1 and Tier 2 suppliers so that we are not left with any dead inventory."

Dr N Saravanan
Chief Technology Officer
Ashok Leyland

presence of sulphur in the fuel. While the BS IV fuels contain 50 parts per million (ppm) sulphur, the BS VI grade fuel only has 10 ppm sulphur content. Also, the harmful nitrogen oxide emissions will be brought down by nearly 70 percent in diesel cars and 25 percent in petrol cars, and cancer-causing particulate matter like PM 2.5 and PM 10 will be brought down by a whopping 80 percent in diesel cars.

Auto and machine makers' take

Ashok Leyland is the second largest commercial vehicle manufacturer in India. On India's leapfrogging from BS IV to BS VI, Dr N Saravanan, Chief Technology Officer, Ashok Leyland, says, "While it is a significant challenge for the industry to make this quick transition from BS IV to BS VI, the industry is gearing up to meet the challenges. OEMs cannot sell any BS IV vehicles after March 31, 2020, and this hard move would require a well-orchestrated



Source: TRUMPF (India) Pvt Ltd

"The decision by the Government is for the good of all, and when it comes to the business of TRUMPF, we are proud to share that we have a very important role to play in empowering Automobile manufacturers to meet the BS VI norms through a unique tool - Laser Technology."

Pradeep Patil
Managing Director
TRUMPF (India) Pvt Ltd

transition not just in OEMs, but also in Tier 1 and Tier 2 suppliers so that we are not left with any dead inventory. The primary technology is in the area of After Treatment system, which is a combination of DOC (Diesel Oxidation Catalyst), DPF (Diesel Particulate Filter) and SCR (Selective Catalytic Reduction). Some of the manufacturers are also expected to make some changes to the engine."

Offering unique Laser Technology

Pradeep Patil, Managing Director, TRUMPF (India) Pvt Ltd, is bullish about TRUMPF's prospects with the new BS VI norms coming in. He says, "The decision by the Government is for the good of all, and when it comes to TRUMPF, we are proud to share that we have a very important role to play in empowering Automobile manufacturers to meet the BS VI norms through a unique tool - Laser Technology." For Automotive companies, to comply with BS VI norms will mean that they will need to invest in technology across

The deadline given to the auto companies is March 31, 2020, after which no new vehicles would be registered that are not BS VI compliant. When implemented, this would be the fastest transition from BS IV to BS VI anywhere in the world.



Source: Toyota Kirloskar Motor Pvt Ltd

“Due to the introduction of BS VI, the parts that we have had to change are mainly powertrain, exhaust and a few other electronic parts. As a result, the main parts that have been introduced are DPF (Diesel Particulate Filter), SCR (Selective Catalytic Reduction), DOC (Diesel Oxidation Catalyst) and Urea Tank (NO_x dosing unit), to name a few.”

Shekar Viswanathan
Vice Chairman & Whole-time Director
Toyota Kirloskar Motor Pvt Ltd

various areas. TRUMPF has cutting-edge laser technology solutions for fuel injection systems, transmission, powertrain, exhaust systems and Body in White (BIW) part production with mass volumes.

The company has proven laser applications in a number of different areas like Laser cleaning, laser cutting, laser welding, laser hardening applications for transmission, power train, exhaust systems etc. It has even developed a laser drilling application where lasers are used as a tool for drilling operations in fuel injection systems.

All these solutions are already proven in other parts of the world and, hence, will help auto makers in India to upgrade their technology and comply with BS VI norms.

Overall, there seems to be a bright future for TRUMPF, and we see our businesses growing exponentially over the next few years as the auto makers and Tier 1 and Tier 2 suppliers adapt to the new technology.



Source: Yamazaki Mazak India Pvt Ltd

“We have seen an increase in demand for our high-performance, high-accuracy machines ever since the Government of India decided to implement BS VI.”

Anil Bharadwaj
Managing Director
Yamazaki Mazak India Pvt Ltd

Innovating to overcome challenges

On being asked for his opinion on BS VI and how this will affect Toyota Kirloskar Motor Pvt Ltd in the long term, Shekar Viswanathan, Vice Chairman & Whole-time Director, Toyota Kirloskar Motor, says, “As a responsible global auto manufacturing company at the forefront in offering advanced and environment-friendly motoring technologies, we are globally compliant with the stringent emission standards. We have the advanced technology required. There are many complexities in upgrading the diesel engine to BS VI not just as an engine design, but also the complete packaging of the power train and related emission control and exhaust treatment components in the vehicle. Some of our vehicles also need SCR to comply to BS VI pollutant levels, which will be an additional component that can be seen. Also, it is not just exhaust gases control, but also the OBD (On Board Diagnostics) parameters that monitor the health of

the engines on BS VI criteria. Thus, striking the right balance between technology and cost has been the bigger challenge for us to make our vehicles comply to BS VI norms.”

The company, he notes, is ready for any future trends in mobility and has even invested in a state-of-the-art Diesel engine manufacturing plant near Bengaluru (Jigani) in India. It is capable of manufacturing diesel BS VI engines with a minimum investment.

“Due to the introduction of BS VI, the parts that we have had to change are mainly powertrain, exhaust and a few other electronic parts. As a result, the main parts that have been introduced are DPF, SCR, DOC and Urea Tank (NO_x dosing unit), to name a few,” adds Viswanathan.

Yamazaki Mazak is one of the world’s largest machine makers. Anil Bharadwaj, Managing Director, Yamazaki Mazak India Pvt Ltd, talks of the challenges ahead, “We have seen an increase in demand for our high-performance, high-precision machines ever since the Government of India decided to implement BS VI. Mazak Corporation is a world leader in the design and manufacture of productive machine tool solutions, and we have already been supplying these high-performance machines across Europe, the US and worldwide for Euro VI-related components.” “We have also developed a state-of-the-art controller to enhance machine performance with the development of the ‘Mazatrol Smooth Controller’, which allows for programming everything from simple to complex part geometries and enables the high performance and high precision that is required for BS VI components,” he informs.

BS VI is slated to bring down cancer-causing particulate matter like PM 2.5 and PM 10 in diesel cars by a whopping 80 percent.

Mazak also has a wide variety of new high-performance, high-precision machines – from Turning Centers to Horizontal and Vertical Machining Centers to state-of-the-art Multi-Tasking machines, which will help Indian customers to comply with the stringent tolerances required to machine BS VI components.

At the cutting edge

Gusti Tool Works LLP (GTW) is a total cutting tooling solution provider, predominantly in Special Custom-Built Tooling for high productivity at world-class quality levels. Toshi G Hormusjee, Managing Director, GTW, who is also the Founder and Former President of the Indian Cutting Tool Manufacturers' Association, says, "We are specialists in tooling for fuel pumps (domestic and export) and, thus, are in a prime position to adapt to the changes brought in by the new norms. Our philosophy has always been to provide high-precision and faster cutting solutions to our customers. As the tolerance band keeps getting tighter for components, so does the precision required in cutting tools. We expect the components manufactured for BS VI norms to have closer tolerances and newer materials, and we are ready for this."

"Since our highly experienced team is equipped with world-class machines and measuring instruments, we are ready for the challenge it brings. Apart from manufactured products, we also offer world-class BS VI solutions from our international partners – FMT, Swiss Bore and Micro Tools," he adds.

Artificial Intelligence (AI)

Forms and Gears is one of the oldest fixture builders in the



Source: Gusti Tool Works LLP

"With the deadline for BS VI on the horizon, we are looking forward to a cleaner and a more environment-friendly approach in the auto industry. Our philosophy has always been to provide high-precision and faster cutting solutions to our customers."

Toshi G Hormusjee
Managing Director
Gusti Tool Works LLP

country and Reji Varghese, Managing Director, Forms and Gears, thinks the way forward is by harnessing the power of Industrial AI. He says, "The automakers have and will continue to make substantial investments to up-grade existing models to BS VI. A lot of these investments will require upgradation of fixtures and tooling and not necessarily new investment in machines."

"Anticipating this, we have partnered with a few of the world's leading cutting tool companies to offer a complete turnkey package to the auto makers and Tier 1 suppliers for BS VI conversion - Fixtures, Tooling and Complete Engineering from concept to run offs," he adds.

Together with its partner, ASM Technologies, a company that specializes in AI, Machine Learning and Deep Learning / Neural Networks, Forms and Gears has now developed a product called Smartfix 4.0, which is an Industry 4.0-enabled Fixture leveraging the capabilities of AI and Machine Learning.

In Industrial AI, the process




Source: Forms and Gears

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Reji Varghese
Managing Director
Forms and Gears

known as 'training' enables Machine Learning algorithms to detect anomalies and test correlations while searching for patterns across the various data feeds from multiple sensors mounted on the Fixture. The health and behavior of the Machine, Fixture and Cutting Tools are constantly evaluated and a number of useful outcomes like predictive maintenance of Fixture and Machine, Safety Alerts, Tool Wear Analytics, Cost Per Component Analysis Per Tool etc. are generated on a regular basis. "As emission norms become more stringent and component tolerances become more rigorous, harnessing the power of AI will be the future of manufacturing," stresses Varghese.

Joint effort needed

In spite of all that's being done by the Government and the Auto Industry, the Auto sector is only one of the causes of air pollution. The Government needs to address other urgent environmental issues also on a priority basis if the efforts of the auto makers to move to BS VI are to be effective. 

As emission norms become more stringent and component tolerances become more rigorous, harnessing the power of AI will be the future of manufacturing.