

Automotive Manufacturing Challenges that Minitab can Solve

Automotive manufacturing faces many unique challenges today. New technologies like artificial intelligence, 5G and computer vision are being incorporated into an already advanced manufacturing process. New regulations on standards require the need to be nimble and efficient. Process optimization, supply chain flexibility and reducing emissions have never been more important.

For over 50 years, Minitab has been helping auto manufacturers navigate changes in the industry. With a global team and local support around the world, Minitab understands global trends and specific, regional challenges. Our proven solutions have helped the automotive industry solve problems and analyze their data to develop better, safer and more efficient vehicles.

Current State:

Your auto manufacturing processes are not fully optimized. This leads to wasted time and decreased production.

Minitab's Solution:

Maybe your assembly line isn't fully balanced, and you face significant bottlenecks. One singular workstation taking up too much time can slow down your whole operation.

Or maybe you are losing efficiency with sluggish changeover times, and procedures need to be tightened up.

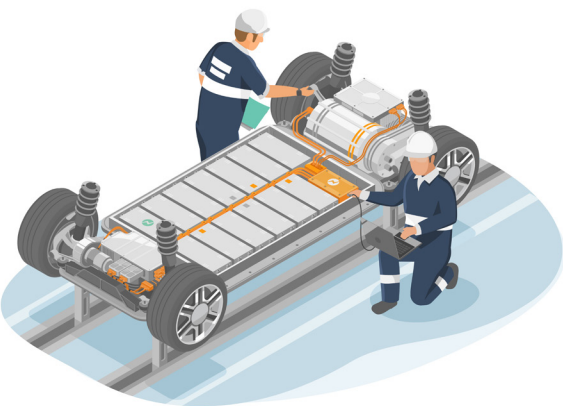
Perhaps you are faced with unscheduled machine downtime due to breakdowns that disrupt production.

These are just some examples. With Minitab Workspace, you can use a Value Stream Map to point out bottle necks and opportunities for improvement. Then, in Minitab Statistical Software, you have access to the most cutting-edge tools that can test theories on how to break them, such as Design of Experiments (DOE).

Or, you can design a DOE with different factors like changeover steps, the use of special tools and fixtures and the training level of the operators. By collecting data based on different combinations, you can identify the most efficient changeover procedures, which will save you precious minutes of downtime.

Suppose you want to improve your maintenance practices to minimize the total amount of time machines are not working due to unexpected repairs. You can simply design a DOE by varying maintenance intervals, the different types of maintenance tasks performed and your inventory of spare parts. With your collected data on equipment uptime and maintenance costs for different combinations, you can select the maintenance strategy that minimizes downtime and maintenance expenses while ensuring your equipment is running as smoothly as possible.

Furthermore, when dealing with larger historical datasets and more complex manufacturing processes, Predictive Analytics in Minitab can help identify long-term trends, anticipate equipment failures, and provide valuable insights into process optimization. The combination of predictive analytics and traditional statistical methods offers a holistic approach to achieving optimal manufacturing efficiency.



Current State:

Your supply chain is still not operating as efficiently as you would like.

Minitab's Solution:

Whether you are trying to forecast demand or manage your inventory effectively, Minitab can help.

If your team is trying to forecast demand for specific auto parts to ensure timely procurement, a time series analysis can be helpful. With this tool, you can analyze historical demand data, identify seasonal patterns and trends and identify recurring events that affect demand. Armed with this information, you can create accurate demand forecasts and optimize industry levels to reduce carrying costs.



But what about those carrying costs? Inventory management can also be aided by time series analyses. With it, you can monitor inventory levels over time and examine historical patterns and fluctuations in inventory levels. With this, you can optimize reorder points, order quantities and safety stock levels. You can maintain a resilient supply chain while minimizing carrying costs.



Current State:

Your current manufacturing practices produce quite a bit of pollution. You'd like to reduce emissions generated during the manufacturing process.

Minitab's Solution:

With welding, painting and a high level of energy consumption, your operation likely produces more pollution and emissions than you'd like. With regression analysis and response optimization, you can examine relationships and make improvements. Predictive Analytics may also provide enhanced insights, and you can run both analyses to compare results.

Additionally, Predictive Analytics can complement regression analysis by identifying emerging trends and possible sources of emissions before they become larger issues. By combining these approaches, you can gain a comprehensive understanding of your manufacturing process's environmental impact and uncover opportunities for further emissions reduction.

Let's take welding, for example. You can conduct regression analysis to understand how welding parameters (such as welding current and voltage) affect emissions of pollutants like volatile organic compounds and particulate matter.

During data collection, you can collect emissions data from welding processes with varying parameters. You measure and record VOC and particulate emissions under different conditions.

With regression and Predictive Analytics, you can develop models to quantify the relationships between welding parameters and emissions. Response optimization allows you to identify the optimal welding parameters that minimize emissions while maintaining the quality of the weld and structural integrity.

Not only can these tools help you reduce the pollution your plant produces but can also help reduce the amount of raw energy it takes to complete a task—ultimately protecting your bottom line.


Minitab

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