



When Design For Six Sigma Fails

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Explained By Gabriel Daniels PE. Lean Six Sigma Master Black Belt

Design for [Six Sigma](#) is a methodology that commonly uses DMADV roadmap. Here is a DMADV sequence that led to a spectacular failure this decade.

D – Define – In the US, car fuel economy standards and car fuel emission norms present a design contradiction. If a car maker is excellent with emission norms, it is hard to meet fuel economy expectations. The goal of this DMADV project is to meet both the needs.

M – Measure – Detailed correlation studies indicate that better emission controls create an adverse impact on torque and acceleration which affects driving experience. This means great driving experience affecting car sales and feedback is inversely affected by good emission controls.

A – Analyze – Emission controls are assessed for effectiveness during pollution tests that are conducted just once every two years. This test is done when pedals are used but the car steering is not in use.

D – Design – Modify the car software to activate emission control mechanism so as to ensure clean exhaust during testing. When on road, with steering in use, the software deactivates pollution controls and allows emission of pollutants beyond norms. This provides good driving experience and great feedback leading to more sales. As software is protected and it is illegal to fiddle with software, even lawmakers cannot read into the trick.

V – Validate – Test, retest and validate the software. Check-in pilot tests, in real samples, in



While the above DMADV roadmap is created for discussion and debate, VOLKSWAGEN is likely to have gone through a similar design sequence. With about half a million cars sold that faced more than a million pollution tests, it was a true six sigma performance for the software. The design for six sigma performance led to greater market share for the company, it also helped beat Toyota in Sales Revenue and VW became the largest selling car in the world. All went well for the company till they were caught and asked to correct the issue. The company had no option but to hide the real issue as disclosing the reason would have led to heavier fines. Finally, they had to admit that the cheating was done by design. The company now faces up to USD 18 billion in fines (not too big for them), loss in market cap of USD 15 billion (also manage-able for VW), loss of goodwill for the management, the company and the German nation as car-makers (this surely is a big loss).

Germany is highly respected for attention to detail, flawless technical decisions and great manufacturing execution. The Volkswagen failure was not a design failure.

poor design objective construed by a handful of people. The nation should be an instance behind and is likely to come up with many shining instances of excellence.

In the real sense, DFSS did not fail, the faulty strategy did. With respect to this, here are few questions for everyone to answer.

For more on this topic and others check out [Paramonos Research Labs](#), a cost savings & strategy consulting firm that partner with executives on solving complicated problems within their organization using the latest data collection tools and methodologies.

1. The failure, in this case, is not so much with a set of people who used an illegal strategy but more with the faulty rules. Do you agree?
2. While in this case, cheating was done in a manner that could be termed illegal, there are others who use loopholes and cheat while being within the legal framework. If the intent of the law is not met – it may be termed as a legal way of cheating. Do you think cheating can be called legal and illegal?
3. There will always be smart companies who will make cheating look legal. Social pressures cannot overcome the internal need to enhance profits. Do you agree?

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