



# Industrial Applications SIL-2 Safety Compliance

## *Success Story - May 2018*

### Customer Profile

Our customer is a leading manufacturer of remote control products and provider of aftermarket services for mining, commercial, railroad, and other industrial markets. They have operations in South Africa, Brazil, Canada, and Europe. They are supported by an extensive sales and distribution network throughout North and South America, Asia, Africa, and Australia.

### Business Challenges

The client engaged SQA Consultant for testing their products family that consisted of 15 variants. Initially, this product line was certified for EN 954-1 standard. However, as per the updated guidelines from the European Union's Machinery Directive, all the variants needed to comply with EN 13849. Therefore, the primary challenge for SQA Consultant team was to meet the certification requirements of the new standard for all the variants within a limited timeline. Some of the features were common in all the products and a concept of baseline was implemented. Another challenge was to make sure that all the variants complied with the enforced standard. Verifying a huge number of lines of re-factored code for all the products posed another big challenge. Maintaining the safety measures of all the products was equally important as the products were to be used in hazardous environments. In case of any malfunction, the products had to inform/behave/react correctly. Documentation required for the compliance of the standard EN 13849 was also another significant task.

### Solution Overview

By keeping the time constraint in mind, SQA Consultant team validated all the products by listing down all the features and dividing them into small packages. We then prioritized these features such that common safety and non-safety features in the baseline were verified with the highest priority and then unique safety and non-safety features were validated. All the products were also validated to confirm that no ripple effect was introduced. The re-factored code, which consisted of more than 70,000 lines, was verified through MISRA safety rules, code complexity algorithms and technical reviews between different teams. To achieve the SIL-2 certification, SQA Consultant team performed different analyses including the Failure Mode and Effects Analysis (FMEA) and Fault Tree Analysis (FTA). These analyses helped in increasing the product reliability and analyzing undesired state of the system. Safety measures and risk mitigation techniques were also implemented using both software and hardware components. As documentation is an integral part of standard compliance, we prepared a checklist to cover all the documentation requirements. The checklist included all the requirements for the previously complied and the new standard. We then prepared all the required documents and submitted a complete package to assessor for approval.

### Achievements

We achieved the following during our product testing life cycle:

- » Improved test strategy to validate the systems within time limit
- » Safety Risk Assessment
- » Functional Safety Testing
- » Evaluation of safety application
- » SIL-2 certification from external auditor

This also helped us to acquire different projects from similar industries which is a key success of our expertise and skills.

## Business Results

Using optimized testing strategy and techniques, we were able to deliver the project on-time with the best quality.

On behalf of the above solutions, our client managed to achieve:

- » An extension of their target market
- » Increased safety for their products
- » Improved sales

## Contact Us

Explore ways to use our expertise in growing your business while establishing a valuable partnership with us.

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