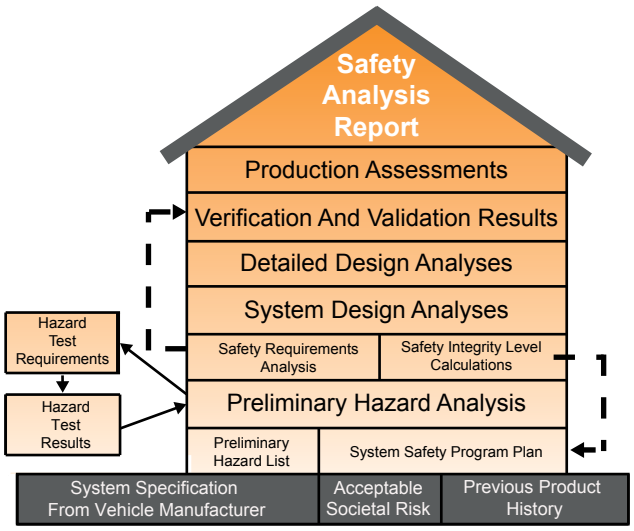
Systems & Safety

The Systems and Safety group at Conekt provides systems and safety analysis to its parent company TRW Automotive and other leading companies in a variety of industry sectors. The level of analysis varies from providing specific analysis tasks to developing complete safety cases for systems. Typical analysis tasks include:

- System Description
- Hazard Analysis
- System FTA (Fault Tree Analysis)
- System FMEA (Failure Modes and Effects Analysis)
- Common Cause Analysis
- Sneak Circuit Analysis
- Maintenance Safety Analysis



The "House of Safety"

Safety analysis of a product or system (prior to sale or exposure to the public) reduces the likelihood of harm caused by the product. This lessens the probability of injury to individuals and litigation, with consequent reductions in the associated costs of providing a defence, the loss of reputation and the impact on revenue.

For safety critical products, Conekt applies a safety process that is based upon international standards. Completion of these analyses will support evidence based arguments that the risk associated with this product is acceptable.

The analyses are applicable to a specific system design, which is documented at the beginning of the safety process. Using knowledge of the environment that the system will operate in, a hazard analysis is performed and the required Safety Integrity Level is determined. The Safety Integrity Level imposes requirements upon many aspects of the product including system architecture and detailed tailoring of the safety analysis tasks. Initial analysis of the product at a system level is followed by examination of the intended hardware and software.

A maintenance safety analysis is performed to ensure that maintenance activities cannot degrade the safety of the system and that the maintainer is not exposed to unacceptable risk of injury. To ensure that the production process will not introduce safety related failures, a production FMEA is undertaken. Each analysis task places safety requirements on the system and a verification task confirms that these requirements have been met. Finally, the results of all the analyses are summarised in a safety analysis report to identify the residual risk and its acceptability (or alternatively what issues must be addressed in order to make the residual risk acceptable).

TRW Conekt
Technical Centre
Stratford Road
Solihull B90 4GW
United Kingdom

Tel: +44 (0) 121 627 4242
Fax: +44 (0) 121 627 4243
conekt-enquiries@trw.com
www.conekt.co.uk

The Conekt Approach

When a traditional mechanical automotive system, such as ignition switch and key, is being replaced by an electronic equivalent, a number of safety considerations need to be made. TRW Conekt was approached by a Tier 1 automotive supplier to support the redesign activity of an electronic replacement for a mechanical ignition switch and key.

Conekt assessed and managed the safety risk posed by this new system at the design stage by adopting a "Safety Case" approach. By using bespoke analysis tools and industry best practices including Hazard Analysis, Fault Tree Analysis (FTA) and Failure Modes and Effects Analysis (FMEA), the risk posed by the design was assessed.

Benefits

By carrying out a preliminary hazard analysis, Conekt was able to report on the likelihood of occurrence of each of the principal hazards during vehicle use. Hazards during maintenance, non-operational periods and disposal were also considered.

The safety analysis identified 15 improvements that were successfully integrated into the production process, culminating in the successful commercial launch of the product, which has now seen a number of years of service without incident. Close client collaboration brought about a number of improvements in the client's own processes, which allowed them to address and rectify a further five potential safety issues.

Applications

Safety analysis has been applied to a number of systems including the following:

- Electric Steering
- Automated Parking System
- Electric Parking Brake
- Lane Departure Warning
- Adaptive Cruise Control
- Fuel Cell System and Electric Drive System for Fuel Cell Taxi

For more information on Systems and Safety, contact:

Tel: +44 (0) 121 627 4242 or Email: conekt-enquiries@trw.com with "Systems Safety" in the subject line.

conekt
powered by TRW

TRW Conekt
Technical Centre
Stratford Road
Solihull B90 4GW
United Kingdom

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Fax: +44 (0) 121 627 4243
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