SAFETY: INTRINSIC & EXTRINSIC

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Safety is intrinsic to all systems, whether automotive or otherwise. In the mobility world, the rapid pace of development of safety systems that have kept pace with the ecosystem development is incredible. The systems have been active, passive, dynamic and warn the driver or occupants to take mitigating actions. The other reality is that any number of levels of safety and the amount of redundancy are not enough, though eventually they are dependent on life affecting aspects in mobility and its peripheral ecosystem. Severity of the functional environment determines the redundancies of safety levels.

Innovative safety techniques, components and sub-systems have proliferated across the vehicle. The differentiating factor is the agility of deployment, response time of the systems and the cost of deployment. All these safety aspects have to go beyond the regulations that are in place in a country or a region. Certain brands in the market place have been christened as safety hallmarks and they continue to go beyond customer expectations to maintain that status irrespective of regulations, market segments, pricing or customer demands.

The intrinsic safety features in an automobile are inbuilt in systems and sub-systems. For example, inside the engine there are safety valves, features that raise flags, activate the auxiliary components, for simplest appearing aspects like the oil level for cooling and lubrication. Though the check oil light on the instrument panel is an indication to the customer, several inherent actions have taken place in the engine under the hood of the vehicle that are not visible to the outside world.

CHANGE IN APPROACH

Imbibing safety in a vehicle sub-system requires a mind-set that challenges the system failure modes – if, then, how and what. Tools such as the Failure Mode and Effect Analysis have been in place and are extensively used by cross-functional teams at the start of the design, during the process. These have to be reviewed timely, along with cross platform teams at pre-specified intervals. These are live documents, may need on-going actions and continue to mature through the product development, and later through the deployment

and life of the system. All aspects are covered and captured during the product life cycle. The important and critical aspect of fool-proof safety is to ensure all lessons learnt in the current and next version of incremental or radical change of any system are captured and evolve to be better.

Lots have been said and researched about active and passive safety, pedestrian safety, connected vehicles, using telematics for safety, night driving, braking systems, stability control and terrains, innovations in electronics, data analytics, the sensors and materials.

The interesting anecdotes are in the live examples, such as the hydrogen engine propelled hybrid vehicle. A vehicle that uses hydrogen as fuel for combustion through storage tanks at 5,000 or 10,000 psi, and a 300 V traction battery that powers the electronics and motors. The extent of safety and the thought process, the back-ups with if-then-how-what scenarios, the safety hierarchies and the response times on the communications bus are subjects of amazing immaculate teamwork. Such technology intensive innovative vehicles become icons of safety in radically changing the mobility world.

Further, to ensure safety in the vehicle, the energy management aspects in vehicles, in spite of the multitude of vehicle systems, have incorporated fool-proof mechanisms to power the safety systems – come what may. Safety is at the top of the hierarchy while development, deployment and even during the life of a vehicle.

Safety is intrinsic and extrinsic, needs to innovatively alert the ecosystem and be embedded in the vehicle life style.

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