As engineers, we need to overcome the faulty mindset that auto safety is all about improving driver behavior. Historically, the auto industry was not the initial leader in promoting seat belts. Early on, the U.S. military and other groups were at the forefront as they provided seat belt installation programs. The adoption of airbags was actively delayed by automakers who made vocal objections to President Richard Nixon. The battle cry was "safety doesn't sell."

It was Dr. William Haddon, an emergency room medical doctor, who brought before Congress the need for safety-glass windshields and for removal of hazardous projecting control knobs located on dashboards. Both broken glass and protruding knobs were unnecessary hazards for car occupants if a collision or sudden braking occurred, throwing occupants into the dashboard. In the early 1980s, electronic technology included closed-circuit television to overcome blind zones, ultra-high-frequency near-object radar detection to reduce collisions and automatic braking systems to prevent skidding. It wasn't until nearly 30 years later that these innovations became standard equipment on the more expensive luxury cars. Compare this to our nation's race to place people on the Moon and ensure their safe return, where the development of new safety technology was a major priority.

Early in the 1950s, when I began my engineering career in design-based safety, I learned that car manufacturers' top management accepted safety features only when these features reduced production costs. They felt the idea of personal injury to
the user was speculative, and provided no basis for an added product cost. Little awareness existed of the fact that by ensuring for safe design, greater profits would ensue. Compare this to building design and engineering professions that required licensed engineers to stamp and sign their work to ensure the work met all standards and was safe. Because of this, their failure rate was phenomenally lower than that of the auto industry. Now, compare the millions of dollars expended for the cost of liability or recall for auto accidents due to unsafe design to that of accidents occurring in the building industry. The difference is glaringly lower.

Let us connect some dots to see why the auto industry is more vulnerable to costly lawsuits and recalls. The answer is almost too obvious! Car manufacturers have long claimed that they are competent to select qualified engineers, which they call the engineer licensing exemption. Is it that they do not want their engineers to have the last legal word in requiring safe design, or is it that licensed engineers may demand more compensation for their professional services? When it came to the earnings of the CEOs of these car manufacturers, it seems as though the sky was the limit. When the company loses money from an incompetent CEO's choice of unsafe design that produces liability and recalls, these CEOs do not waive their obscene salaries. When canned, they simply float away on their "golden parachutes." In the corporate boardroom of auto manufacturers, safe design was not a high-priority issue. Corporate legal counsel was always quick to claim that runaway tort liability was the cause of the loss, and that it was working with its lobbyists to enact tort reform.

As long as auto accidents are the fault of drivers' misbehavior, no one is responsible for ensuring safer design. Change is on the way as driverless cars are arriving. Safe design now overcomes foreseeable driver error. Google is doing tests on self-driving cars. Ford Chairman of the Board Bill Ford is pressing ahead with the design of automated cars to overcome design hazards that cause both accidents and roadway congestion. Volvo has a car that can drive itself in busy traffic. Safety features that provide for the car's intervention overcome the variables of human driver performance in maintaining safe clearance from other vehicles. Both Michigan and Nevada are allowing the testing of "driver assist" features on public roads. It is said that up to 30 percent of a car's cost can be attributed to the design safety electronics, and by 2040, that may rise to 40 percent. This dramatic change presents a real need for the skills of system safety engineers in the auto industry.

Finally, behavior-based safety is being replaced by design-based safety that provides for driver-assist and passenger protection features. This change, at last, involves management's acceptance of design-based safety and provides new opportunities for system safety specialists.