Simulation: The Next Step in Driver Training

BY ROBERT RAHEB

SIMULATION TRAINING HAS BE-come the benchmark and an acceptable standard in training. Departments that fail to proficiently and routinely train their members in vehicle operations are leaving themselves exposed to litigation not only from the community but also from the members themselves. Fire apparatus collisions are a leading factor in traumatic firefighter deaths; more than 25 percent occurred in apparatus collisions in 2008,[1] surpassed only by medical emergencies such as stress-induced heart attacks.

In most states, every firefighter who drives or operates apparatus is required to attend and successfully complete specific training in accordance with National Fire Protection Association (NFPA) guidelines; in some states, a firefighter must also possess a commercial driver's license (CDL). And yet, we are still killing ourselves and others while performing our duties.

We all recognize that the public is poorly educated about yielding the right-of-way to emergency vehicles, but many other factors lead to a collision. In this nation, there are more people driving than ever before.

THE VEHICLE

Vehicle manufacturers have improved on the sound dampening of road noise (i.e., our siren) and have added more distracting features than ever before, such as 500-watt, 12-speaker stereos; global positioning system navigation; and DVD players.

Vehicle engineering has also improved greatly, with antilock breaking systems, electronic stability programs, intuitive cruise control, and adaptive suspension. Some vehicles have added features that can identify another vehicle in the blind spot, identify oncoming perpendicular traffic and much more. All of these so-called "improvements" arose out of trying to engineer a fix to a behavioral problem. Despite all the advances in automotive engineering, the national death toll from vehicle accidents still hovers around 42,000 per year.[2] Why? Because we do not correct bad behavior, and instead we try to create a solution for the effects of that bad behavior.

Drivers increase their risky behavior as vehicles and roadways are perceived to be "safer" and vehicles are more equipped with technology. However, if you check your mirrors every few seconds and your blind spot periodically and when you change lanes, why do you need something to tell you that a vehicle is in your blind spot?

THE ROADWAY

U.S. roadways are some of the world's finest, yet we are seeing more and more areas of disrepair on them. Our roads keep getting wider to accommodate more cars and ease congestion, although that rarely works, and these roadways can become dangerous even when there is little traffic. Most of these roads are long, straight, and wide and appear safe as opposed to a narrow winding road that appears extremely dangerous. Consider how a driver that is new to an area behaves or feels when driving on an open stretch of straight roadway vs. driving on a narrow, winding mountainous road or the driver who has traveled the road so often that it becomes routine. For years, scientists have had variations on this theory and have called it a number of things such as "risk homeostasis" or "risk compensation." What it really means is that we change our behavior in response to perceived risk without even being aware of it.[3]

THE DRIVER

Most drivers fall into three categories: inexperienced, diminished capacity, and everyone in between—and they all share the road. The inexperienced driver—Generation Y—grew up on video games and has probably clocked more hours behind the wheel of a video game than behind the wheel of a real vehicle. Studies show that drivers who play video games that feature reckless driving are associated with reports of reckless driving even after researchers take into account factors that might impact careless driving behavior such as age and gender.[4] These drivers tend to forget to check their blind spot; they have grown up in a world of MTV and immediate gratification, and most allow 20 minutes for a 30-minute commute.

Drivers older than age 70, on the other hand, recognize they have slowed down. They have identified that combining certain actions are dangerous (e.g., texting while driving). They grew up in a world where practical application was the way to learn; things took time, and drivers must be patient. These drivers sometimes make too many excuses for their behavior behind the wheel. Daily aches and pains and medical conditions such as diminished hearing and eyesight make it difficult for them to get around. This also negatively impacts their performance behind the wheel (e.g., yielding the right-of-way to an emergency vehicle).

That leaves everyone else. Most of us are caught in the middle and are trying to live two lives—those of our parents and those of our children. We recognize that the way we get our information is changing and that we must change with it. This information is coming at us faster than ever, and we understand that we develop knowledge over time and with experience. We constantly fight to keep up with the overload. Many of us don't eat right, don't get enough sleep, work too many hours, and suffer from some type of ailment that requires medication. More of us than ever are driving while under the influence of a medication that may dull the senses, cause drowsiness, affect reaction times, or change the way

we perceive things. Alcohol alone contributes to 40 percent of the total traffic deaths in the United States. (2) The one common denominator in all this is that we as drivers "underestimate the task of driving while overestimating our ability to perform that task." (3)

THE EMERGENCY VEHICLE OPERATOR

Age, experience, and training in operating emergency vehicles vary throughout the fire service. Fire apparatus operators (FAOs) have one of the most important jobs in the fire service—getting everyone to the incident without mishap. If that one aspect fails, all other aspects of the assignment fail with it. The FAO should be instructed and evaluated and given a physical by a physician each year. The NFPA specifies the frequency, amount, and type of training but, unfortunately, a static cone course and anecdotal stories of previous crashes do not prepare the FAO for the high-risk, low-frequency event that usually occurs with unfavorable outcomes.

CURRENT TRAINING

Some states, such as California, require that the driver have a CDL to operate a vehicle more than 26,000 pounds (gross vehicular weight). Other states, such as New York, exempt firefighters from this requirement. The NFPA requires that all departments provide training for new drivers, but it is at the discretion of the department whether to provide refresher training for seasoned drivers. The NFPA also requires that all apparatus operators demonstrate proficiency in knowledge and in skill; there is very little one could do to teach judgment.

Judgment is developed through experience and is based on knowledge. Therefore, the definition of experience is "the knowledge you needed three minutes ago." The unfortunate reality is that when one's judgment is wrong, the consequences can be devastating. The community's perception of the fire department has changed. Liability issues have grown beyond our comprehension, and members killing civilians in the "performance of their duties" can face both civil and criminal litigation.

Navigating a static cone course helps develop spatial judgment, depth perception, and mirror use but does nothing for the decision process when drivers are faced with high-risk, low-frequency events or decisions such as when to enter into an intersection or which direction to cross. In the past, judgment could be taught only on the job; it is the way most departments still do it. It is very limited, it cannot be duplicated or played back for review or critique, and you can't take it back when you make a serious mistake. When responding to a call is not the best time to teach someone how to properly enter an intersection, nor is it a good idea to try to teach someone what to do when you hit a soft shoulder after he's just hit the soft shoulder.

Advanced simulation training allows us to perform training in high-risk, low-

frequency situations with measureable results that can help reduce death, injury, liability, and litigation in a safe, educational format. A growing number of agencies across the country have already enhanced their training and are starting to see favorable results and outcomes.

Only a few companies have developed full-sized, high-fidelity driver training simulators. Simulation allows the student to drive in both typical and atypical situations and to learn how to control and handle these situations. Simulators emulate a variety of vehicles, specifically, your department's type of vehicle. The driver is surrounded by visual displays that replicate different types of terrain, from urban to mountain to desert settings. The instructor can change weather, traction, and traffic (density and aggressiveness) on the fly. Weather can vary from a dry, sunny day to a rainy or snowy night. The instructor can also create scenarios based on events that may have occurred or persistent situations that are reoccurring within the department. The student sits in a cab that replicates the vehicle in every way, from instrumentation to steering and braking; the seat can have up to six degrees of freedom, which enables the student to feel momentum, inertia, and centrifugal force.

Fire Department of New York EMS experienced a reduction in intersection collisions by as much as 38 percent after implementing simulation training.[5] A large oil refinery transportation company in Canada reduced fatal accidents by more than 50 percent after implementing simulation training.[6]

The Los Angeles City (CA) Fire Department has been using its simulator program since 2006. An independent auditor for the city performed a "Vehicle Liability Claim/Litigation Frequency by Accident Type" audit and identified the following:

- a 50-percent reduction of broadside collisions;
- a 75-percent reduction in failure to stop/yield collisions; and
- a 59-percent reduction in litigation severity costs, from just under $900,000 to just above $350,000.[7]

The average cost per claim dropped 58 percent from just under $9,000 to just over $3,600. "We have trained over 2,700 members, and the simulator allows us to see how our members will react and drive during an emergency scenario and shows members how to improve their driving skills," said Captain Kevin Mulvehill, who oversees the department's simulator program.

The San Bernardino County (CA) Fire Department (SBCFD) has used its simulator since July 2009. Housed in a mobile classroom connected to different locations throughout the county, instructors have used it to train close to 350 personnel. Some of the recent feedback on its driver training program determined the following:

- "Simulation incorporated many of the common 'watch-out situations' while driving and was a good review, reminding me to be situationally aware while driving."
- "Hands-down, favorite part was the

tiller simulator. It would be impossible to train us all on the tiller position at the training center, and the simulator gave me my first opportunity to experience the mechanics of driving a tiller."

- "I thought the simulator was a very good training tool. Before I went I was not sure of its value as a training tool. However, after experiencing it, I was astonished at how real the situations feel and the 'stresses' it puts you through."
- "I felt the intersection clearings and apparatus spotting were the most valuable."

SBCFD Captain Jeff Birchfield, the training officer in charge of the simulator, said that being able to change locations with the simulators gave his staff more training options. He says, "Having the simulators housed in a mobile classroom allows us to reach remote areas of the county, allows that response area to maintain coverage without backfilling, and allows the students to get a full day of training in."

One important benefit of simulation training is that the student gets immediate feedback from both the simulator and the instructor. Since most new recruits are around age 25 or younger, most of them are familiar with this type of training and embrace the concept. Even in the training phase, students placed into simulation training and taught the concepts of vehicle handling showed an accelerated learning curve when placed into the actual vehicle, improving the training program's success rate and reducing the vehicle's fuel consumption and wear and tear.

The safe emergency landing of U.S. Airways Flight 1549 into the Hudson River in New York City was not just a matter of luck. Rather, it was what happens when preparation meets opportunity. Captain Chesley "Sully" Sullenberger had clocked hundreds of hours on simulators practicing emergency situations, so he was "lucky" that all of his preparation met opportunity.

Regardless of how much driving we may do, we do not deal with emergency situations on a regular basis. We need to develop and maintain those skills so that when the opportunity arises, we are better prepared to handle it.

Simulation training has become the benchmark and an acceptable standard in training. Departments that fail to proficiently and routinely train their members in vehicle operations are leaving themselves exposed to litigation from not only the community but also the members themselves. ●

ENDNOTES

1. National Fire Protection Association Firefighter Fatalities in the United States, 2008.

2. U.S. Department of Transportation, National Highway Traffic Safety Administration, Fatality Analysis Reporting System; 2008.

3. Vanderbilt, T. "Traffic: Why We Drive the Way We Do." Knopf; 2008.

4. Rettner, R. "Video Games with Reckless Driving May Play Out in Real Life." *LiveScience*. June 2010.

5. Raheb, R. "Creating a Return on Investment: How One EMS Department Used Simulation to Reduce Liability and Create Systematic Change in Its EVOC Program." 2010.

6. Meade D, D. Tate (SPE), Schlumberger, D. Bouwkamp. SPE 111813, "The Evolution of a Driving Simulator Program," FAAC, Inc.

7. City of Los Angeles, "City Attorney FY's 02/03 to 06/07 averaged vs. FY 07/08."

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