Fire Watch

Los Angeles Fire Department Newsletter

June 2005
Volume 2, Issue 6

Los Angeles Fire Department
200 North Main Street
Los Angeles, CA 90012
(213) 978-3845
Fax (213) 978-3815

Visit Our Website
www.lafd.org

Our Mission
"To preserve life and property, promote public safety, foster economic growth through leadership, management and actions, as an all-risk fire and life safety response provider."

The Los Angeles Fire Department Newsletter is published monthly by the Planning Section.

Direct Newsletter inquires to:

Planning Section
LAFD
200 North Main Street, Rm. 1800
Los Angeles, CA 90012

LOS ANGELES FIRE DEPARTMENT
EMERGENCY VEHICLE OPERATIONS COURSE

Most of us probably remember participating in past Department driver training exercises. The training was usually conducted independently and on an annual basis at the battalion level. Training exercises consisted of driving our station's apparatus through a series of traffic cones rarely allowing us the opportunity to proceed through the apparatus' transmission gear range. Looking back on these exercises, they taught us the general parameters of the apparatus but did little to educate us in vehicle dynamics and proper road position. The bulk of our education came in the way of "on- the-job training" with our assigned instructors being the rated members at the fire station level.

As traffic volume increases and the highway and interstate system becomes more complex, emergency responders are facing growing risks to their personal safety while responding to emergency incidents and while working in traffic. In response, the Department has developed the Emergency Vehicle Operations Course (EVOC). One of the purposes of this course is to identify individual practices that may decrease risks and reduce the number of injuries and deaths that occur while responding to and returning from incidents.

Conducted at the Frank Hotchkin Memorial Training Center (FHMTC) and the EVOC site at FHMTC, the EVOC course includes:

- A 16-hour program for all uniformed members (completed every 2 years)
- Dedicated driver continuing education

The 16-hour program for all uniformed members will consist of four hours of classroom lecture reinforcing driving policies, operating principles and factors affecting vehicle dynamics including proper apparatus road position. Four hours of

simulator training will follow the lecture period focusing on driving awareness, techniques and driver reaction. The EVOC training concludes with eight hours of supervised behind the wheel apparatus operation and instills cornering techniques, emergency braking and vehicle suspension dynamics.

STATE-OF-THE-ART DRIVING SIMULATORS ARRIVE!

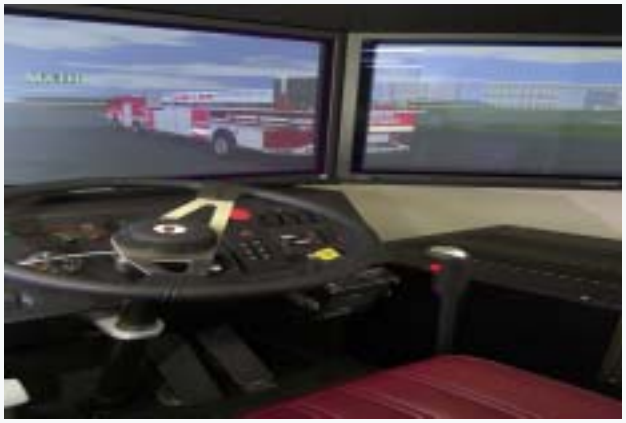
The Department recently received four driving simulators developed by FAAC Inc., headquartered in Ann Arbor, Michigan. For more than 30 years, FAAC Inc. has provided systems engineering and software products to the Federal government and private industry. The company continues to lead the driver training industry in technology transferred from the military to commercial products. FAAC Inc. also offers a full range of simulator products: airport crash apparatus, bus, fire, EMS, law enforcement, and truck driving simulators.

Driving simulators have been in use by law enforcement agencies for some time, but are relatively new to the fire service. Agencies using FAAC Inc. training simulators include the California Department of Transportation, Los Angeles Police Department, Santa Ana Police Department, Ventura County Fire Protection District, and the FDNY. Utilizing FAAC's driving simulation technology will place the Los Angeles Fire Department at the forefront of driver training effectiveness in the fire service. To date, 80,000 drivers nation wide have been trained using FAAC Inc. driving systems.

From initial concept to realization, the purchase process took approximately three years. Funding of slightly over $500,000 for the project came from California Joint Apprentice Committee monies.

DRIVING SIMULATORS - AN IMPORTANT ROLE

The EV-1000/V3 driving simulators and software will be used to help reduce emergency response driving crashes causing injuries, property damage, and death to



LAFD personnel and civilians. In an LAFD study of the 824 crashes involving Department and civilian vehicles between 1999 and 2001, 143 of the total crashes resulted in injury to either LAFD personnel or civilians (including three civilian fatalities). According to the City's Attorneys Office, approximately $4.6 million was paid out to plaintiffs resulting from litigation following these crashes.

The newly purchased driving simulators will provide for directed individual emergency response training within the new EVOC program. The EVOC program is designed to augment the LAFD's existing driver training efforts that previously did not include an emergency driving component.

MODERN TECHNOLOGY PROVIDES A REALISTIC EXPERIENCE

The EV-1000/V3 simulators and the essential software will create an interactive simulated environment with traffic pattern challenges, pedestrian/civilian vehicles responding/not responding to emergencies with lights and sirens, real time hazards (car door opening into traffic), fire and smoke visuals, day and night light levels, and weather variations. By training in this variety of simulated virtual environments, drivers of heavy and light apparatus will be able to refine or develop emergency driving skills WITHOUT RISK TO FIREFIGHTERS OR CIVILIANS!

Installation of the four simulators - three heavy apparatus simulators (one configured with a manual transmission) and one light vehicle simulator - has recently been completed. The EVOC training room at the Frank Hotchkin Memorial Training Center houses the four driving simulators. These simulators also provide the flexibility of changing their configurations to represent fire engines, rescue ambulances, battalion sedans, and even truck and tiller apparatus.

The driving simulators have been networked together and provide real-time interaction among all training participants. Accompanying computer software will allow the training cadres to create and modify their own individualized driving scenarios in support of the LAFD training program. This capability will also provide an excellent resource for accident analysis, reconstruction, and remedial training.

Scripted simulator scenarios will enable standardized training. Over time, all personnel can receive the exact same training. Scripted scenarios are geared toward specific decision-making skills such as:

- Proper driving skills
- Steering exercises
- Awareness of surroundings
- Emergency responses
- Intersection analysis
- Multiple apparatus responses
- Learned responses to hazardous situations

Using the latest driving simulation technology available will reduce accidents and injuries while increasing the safety of Department members and the community.

A VIEW FROM INSIDE THE DRIVING SIMULATOR

Presentation of the simulated driving world is accomplished through Computer- Generated Imagery (CGI). The scene presented in the driving simulator depicts obstacles and vehicles interacting from every quadrant of the driver's vehicle. The scene includes computer-generated left-, center-, right-, and rear-view mirrors showing the entire virtual world in proper perspective to the vehicle. The driving simulator has a full wrap-around field of view; while seated in the driver's seat, students will have a total horizontal field view of 180 degrees.

Each EV-1000/V3 simulator features three 42" plasma flat-screen displays wrapped around a driving station utilizing an actual automobile or heavy apparatus dashboard. The dash panel from a Ford Crown Victoria sedan is used as the basis for the light vehicle driving simulator. There are three main components in each driving compartment: the seat, dashboard instruments, and driving controls. Functional dashboard instruments are used for the driving station. The driver seat and controls are from actual vehicles to provide an authentic feel and response. Additionally, built into the simulator is a device designed to give the driver the variable feel of changing road conditions.

The heavy apparatus simulator is actually built much like our own apparatus with instruments, lights, and switches that are either active or replicated. Active instruments include Jake Brake, speedometer, tachometer, oil, and temperature gauges. Each station is also equipped with a headset allowing students to interact with the instructor if needed. Regardless of which simulator the student is using, the physical response of the steering wheel, brakes, etc. for any desired vehicle has been programmed into the computer. Multiple stations are linked together through the Instructor Operation Station.

SIMULATOR CONTROL – THE INSTRUCTOR OPERATION STATION

The Instructor Operation Station enables instructors to control the operation of the simulator, select training scenarios, replay any portion of the session to highlight good or bad driving performance, and perform record keeping of individual training sessions. Upon completion of a driver training session, a scoring page can be generated which provides a summary of the available scoring information such as curb strikes, stop sign violations, following distances, speed and fatal/non-fatal collisions. At the discretion of the instructor, the complete set of scoring data for each driver training session can be saved for future review.

The instructor is also able to select certain apparatus failures. Some of the instructor-induced vehicle failures can include:

- Engine overheat
- Brake fade
- Steering axle tire blowout

For example, in the engine overheat condition, the information is communicated to the driver through dashboard instruments similar to an actual vehicle. The instrument indicating the status change has both audible and visual indicators. If the student fails to act appropriately to the changing vehicle information, the pre-programmed mechanical response will occur.

SIMULATING DYNAMIC VEHICLE PERFORMANCE

The vehicle performance model is an accurate software representation of all the components of the vehicle being simulated. Features include accurate vehicle brakes, a suspension system including springs, shock absorbers, tire effects, and the vehicle steering system. The vehicle model will react to forces dependent upon

vehicle speed, road friction conditions, wind conditions, and driver inputs. For example, the model creates a skid if the driver operates the simulator in a manner that would normally result in a skid. All vehicle models not only react to the driver's inputs but also provide the necessary data to the cab for its functional instruments.

Specific apparatus responses to projected forces (e.g., acceleration speed, braking resistance, distance, speed, evasive maneuvers, etc.) can be programmed for any given scenario. Sounds associated with vehicle acceleration, deceleration (Jake Brake) tire squeal, and siren/horn sounds lend additional realism to the driving simulators.

FLEXIBLE VIRTUAL WORLDS

The simulators have many different virtual worlds of operation, including city, urban, rural area, expressway, and even our Department EVOC driving course. Each one of these virtual worlds has up to 85 continuous miles of roadways available to the student. The city virtual world, when combined with variable traffic behavior that the instructor can manipulate, will provide many different training opportunities including:

- Maneuvering in tight city streets
- Maneuvering on multi-lane city boulevards
- Maintaining posted speeds
- Reacting to traffic signals, stop signs, and yield signs
- Passing and being passed by vehicles
- Making lane changes
- Reacting to crossing pedestrians and other emergency driving hazards

In the virtual EVOC scenario, pylons are located and depict the actual physical Department course. This specific simulation facilitates the low-speed maneuvering and parking that are part of the requirements for Commercial Driver Licensing and the Department's Driver Training Program.

The simulators allow instructors and students to view apparatus position from the driver's perspective and from an overhead vantage point. This feature is useful during the scenario replay/review to demonstrate apparatus placement in relation to curbs, other apparatus spotting scenarios, and intersection limit lines. Finally, the manufacturer has customized the visual simulations by incorporating pictures of actual LAFD apparatus into the programmed computer graphics.

CONCLUSION

In 2004, the LAFD logged 714,658 total emergency responses. Non-emergency operation of Department vehicles and required emergency responses by the Department's 250-plus companies continue to pose the potential threat for vehicle collisions. Associated costs of vehicle crashes, both monetary and human, are a constant consideration for the members of the LAFD. The newly created Emergency Vehicle Operations Course and our state-of-the-art driving simulators will reduce accidents, prevent injuries, and limit property and vehicle damage. Similar agencies have experienced as much as a 43% accident rate reduction using simulator technology.

The value of continuing to improve Department members' driving skills obviously goes beyond limiting monetary costs such as the $4.6 million in City litigation settlements cited previously.

Improved apparatus driving skills will ultimately save lives!

Special thanks to Captain Frank Espinosa, a 24 - year veteran of the Los Angeles Fire Department and currently assigned to In-Service Training Section, Program Development and Delivery Unit who provided this month's article.