

The Push-button Inferno

Most firefighters are familiar with live fire training in burn containers or burn buildings. But what the firefighter academy in Vire in the northwestern French department of Calvados has to offer isn't a building, it's an entire city – and the **LARGEST FIRE SIMULATION FACILITY** in the world.



The simulation is so realistic that the firefighters at times feel as if they were on a live call.

Only realistic training prepares you for the genuine experience. That's why the cafeteria looks as if you could sit down and order a café au lait – but fire in the bar counter is only the push of the button away.



A fire has broken out in a single-family home. To combat it, an attack squad wearing respiratory protection advances into the rooms of the building. The two young firefighters bring a size C nozzle with three lengths of hose and a hollow stream nozzle tip into position. Smoke billows through the corridor. One of the men takes the nozzle and squats down on the right side of the door next to the hinges while the other stands in front of the door handle, takes off his glove and tests the temperature of the door from bottom to top with the back of his hand. It is hot.

Brief eye contact and the two firefighters know what they have to do. A securing strap is placed around the door handle; they are ready to go into action on the count of three. The man closest to the door handle does the counting and then pushes the door open. His colleague with the hose fires three blasts of water into the blazing room. The securing strap pulls the door back closed. The procedure is repeated twice to reduce the temperature in the burning room. The next step is to bring the fire under control. The door opens one last time. A shot of water is aimed to the right and to the left, then water is sprayed throughout the room in the form of a figure of eight lying on its side.

It's only now that the two men dare to enter the burning bedroom. The man operating the nozzle kneels down low and fires a shot of water straight up into the air. The water rains down on his helmet – a test of the air temperature. If the water had not come back down, this

would have meant that it had evaporated due to the high temperature. And that would have been dangerous. The burning bed is dealt with first, and the fire itself has been extinguished a short time later. "Great, that looked really good!" calls a voice.

Joël Bucher of Dräger France is standing in the corridor holding a remote control in his hand. That puts him in a position of control and ultimately decides whether the fire will be successfully extinguished and if complications will arise. If the room had not been cooled down first and if the air temperature had not been checked, a simulated flashover could also have been activated at the push of a button. In reality, a flashover is the nearly simultaneous ignition of flammable gases (pyrolysis gases) under the ceiling. "That is something you never want to see in reality," says one of the two firefighters. To date, both of them have tested all of the 32 fire locations at this fire simulation facility.

Fire – from basement to roof

The engineers from Dräger in Lübeck, Germany, spent several months working in close collaboration with the customer to plan the facility as realistically as possible down to the last detail. One of the highlights is the six-story high-rise apartment building. "Just about everything can burn there, from the basement to the roof," the second firefighter assures us. Just yesterday the two firefighters worked their way up to the third floor. This building can simulate the entire spectrum of structured fires. The "hotel

scenario" enables rescue crews and firefighters to train together, practicing such things as combined exterior and interior attacks, going into action for example on an aerial ladder.

On the fourth floor, a French Dräger technician is preparing the next training situation, in which the grease in a deep fryer is burning in a kitchen. The man points to the exhaust hood. "That can burn, too. It ignites passively if it's exposed long enough to the flames." It is very dark in the room. The man uses his headlamp to improve the sparse lighting. "Look here," he says as he points to a particular complication. The cover of the deep fryer is caught on the piece of steel representing the mounting for the neon tube and cannot be closed. The fastest and safest way to extinguish a grease fire is thus not an option.

When the two firefighters enter the kitchen, the deep fryer and the exhaust hood aren't the only things burning. The grease has overflowed and the fire is spreading rapidly across the kitchen floor. The air is scorchingly hot and damp. "The moisture is going to be a problem," says one of the firefighters. "One liter of extinguishing water generates 1,700 liters of water vapor. If the turnout gear soaks through, it no longer offers adequate protection against the 100 degree Celsius air that simply penetrates it."

Safe at all times

The two men were never in any actual danger, however. "Safety is a key feature during all Dräger fire simulations. Not >

Liquid escapes from a silo flange – and suddenly an area of nine square meters is in flames



Fire and smoke: In Vire, France, firefighters prepare for a real emergency.



Control room: The heat is on at the push of a button. And the top priority is safety.

> only do we have the trainer with the remote control; an easily accessible emergency stop button is also located down low on the door frame in each burn room,” says Bucher reassuringly. All fire simulations are conducted with approximately 90 percent propane gas. “It burns cleanly, makes an impressive flame and generates a lot of heat,” he says.

The entire facility is monitored from the control room on the ground floor, where the individual burn scenarios are also activated. The trainer starts the ignition of the respective fire location via a control panel satellite near the burn room. The simulation is then started via the remote control. The temperature at a height of one meter is limited to 250 degrees Celsius in all burn rooms. In addition, there are sensors on the ceiling that limit the electronically controlled flash-over to 650 degrees Celsius. Not even DIN 14097 specifies such high standards, but they further enhance the safety of the system. Sensors measure the gas concentration near the floor for added safety. If a critical value is exceeded here, the fire and the system are shut down immediately. At the same time, the emergency lights come on and the powerful smoke extraction system ventilates the room at an overall rate of up to 71,000 cubic meters per hour.

Simulating liquid fires with gas

There are also a number of training situations for the outdoor area, such as a fire in a gas cylinder storage scenario. If the gas cylinders lying around are not cooled down quickly, there is a violent



Not a department store on the outskirts of town, but a training facility in Vire.

École des Sapeurs-Pompiers Département 14

Located on 25 hectares of grounds just outside the city of Vire in Normandy, France, is the firefighting academy of the department of Calvados, which features Dräger fire simulation facilities, a road for simulating traffic accidents, training rooms, and accommodations. Each day, firefighters practice extinguishing fires and rescue and recovery maneuvers. Located on the grounds is a fire station with several tanker trucks, an aerial ladder and a rescue truck.

A small assortment of junked compact cars is available for practicing rescuing people from vehicles. François Fontaine, director of the consortium Défense & Sécurité, is convinced of the concept of the facility: “We have established optimal training conditions here,” he says. “The facility primarily serves the firefighters from Department 14, but guests from neighboring departments have also trained here before. In 2009 we conducted 5,000 person-days of training, and we’re expanding this to 7,000 person-days in 2010.” Fontaine emphasizes that the training facility is also available to privately organized company fire departments.

The roughly €22 million that it cost to build the firefighting academy was provided by private investors.

bang and a loud whistling sound, and a nearly transparent jet of flame shoots with a deafening noise roughly four meters into the air. The flange and surface fire at a hazardous goods truck is no less impressive. Liquid escapes from a silo flange. “Whoosh!” and suddenly an area of nine square meters is in flames.

Hot, hot, hot

Simulating a liquid fire in a gas simulation is a tricky undertaking. However, Dräger has lots of experience here. For example, in Thailand there is an aircraft fire simulation with a spill fire covering 750 square meters. When the firefighters conducted their first training session there and the large-area fire suddenly ignited, the men felt like dropping everything and running away as fast as they could. The exterior live fire training systems are made of steel and are cooled with water from a sprinkler system to extend the service life of the installations. Even the steel structures would otherwise quickly become brittle at the high temperatures reached by the fire.

The two firefighters are really exhausted after a day of training in Vire. In the course of the day, the young men have drunk more than five liters of water. In retrospect, the flashover made the greatest impression. “I didn’t even see it at first because of the restricted field of view you have when wearing the protective equipment” one of them says. But then there was the unimaginable heat. “I didn’t know that I could make myself that small,” he says. “This special effect can be practiced here at the

push of a button. Temperatures near the ceiling can reach up to 600 degrees Celsius,” explains Bucher. His headlamp illuminates the barely noticeable system of gas nozzles that is responsible for this effect. “With this sort of equipment, we can make sure that things really heat up in here,” he says.

An MCI in the supermarket

But that’s not all that the Vire facility has to offer. Next to the apartment building, it also boasts a shopping center that includes a complete passage with a drugstore, a laundry, a bistro, and a supermarket with rows of shelves. The

fire in the supermarket offers endless possibilities when it comes to demonstrating the extent of damage associated with a “Mass Casualty Incident” (MCI). The use of a thermal imaging camera to search for hot spots or missing persons is just one of the things that can be trained here. The shopping center has been recreated with great attention to detail, by the way. There’s even a condom machine on the outside wall of the drugstore.

Mario Gongolsky

Further information online, including:

 Fire locations in Vire

www.draeger.com/385/training