



The Benefits of Virtual Training for Firefighters

A White Paper by VSTEP Simulation



Virtual Training



A New Era for Firefighter Training

One sentence that summarises the importance of training for firefighters:

“**Train as if your life depends on it - it does¹.**”

Training is beneficial for fire departments in a number of ways. It seeks to:

- Familiarise firefighters with firefighting strategies and tactics.
- Improve their responsiveness while performing essential tasks.
- Ensure proficiency in correctly using available equipment.
- Develop communication during emergencies, thereby fostering better teamwork.

While the benefits of adequate training are clear, it is often hindered by the high risks and costs. Firefighters face a difficult challenge of discovering how to adequately prepare learners to make good decisions when facing dangerous or extraordinary situations. One option provides simple learning materials such as books and class lectures, however these are likely inadequate preparation techniques as they do not fully reflect stressful and highly-complex situations. For this reason, trainees are exposed to live training, which can not only be extremely costly, but also hazardous. For many safety professionals, training has long offered an unappealing trade-off between simple, low-risk but ineffective solutions or effective, yet high-risk and expensive solutions.

Virtual training presents a third option: a method of training that can remedy this learning trade-off and provide effective training in a safe and cost-effective environment.

Rapid Advancement of Virtual Training

In an ever-changing era of technology, virtual simulation technology has advanced greatly and established itself as a valuable tool in many domains: education, entertainment, clinical purposes, emergency response and more. This is because virtual training allows the training of large and complex scenarios that would otherwise be extremely resource and time demanding when carried out as a live exercise. It presents a good fit with the training conducted in the emergency response domains, most specifically firefighters as they often deal with high risk, low frequency incidents during deployment. Virtual training offers a solution that is realistic, safe, efficient and at a much lower cost than live fire training.

Benefits of Virtual Training²

1 Cost-effectiveness

A lower budget is one of the biggest threats to adequate training. This is because obtaining a reusable structure for live fire training can easily cost up to one million US dollars, making it difficult for smaller fire departments to administer live fire training frequently to their employees³.

Virtual training can easily tackle these problems by allowing firefighters to train for a variety of scenarios in a single location. It presents an affordable adaptation of the content for different scenarios, the portability of the equipment for easy transport and the flexibility to adapt to any training objective.



2 Complex and Varied Training Scenarios

Using virtual training also means that trainees can experience a wider variety of complex training scenarios in a single session. An oil leakage on offshore platform, the evacuation of passengers in a crashed aircraft or combatting wildfire are some of the many possibilities of virtual training. The complexity of each training can range widely from practicing evacuation procedures to learning to communicate effectively between firefighter and paramedic teams during a traffic accident. You can have total control over the scenario simulation and are able to repeat exercises without having to coordinate additional resources and personnel. Virtual training offers a versatile and flexible solution, that can be adaptable to any discipline within the fire service.

3 Visual Immersion

Virtual technology aims to simulate true-to-life incidents, thus increasing the overall feeling of presence and total immersion in the event. Given the ability to conduct training in fully immersive environments, the trainees can experience the feelings of threats, psychological stress and anxiety during scenario practise much more intensively. This effectively enhances firefighters' preparedness for the environment, decision-making process and execution of tasks when exposed to real incidents. The ability to immerse oneself in environmental conditions such as fire and smoke brings added value to the training.

4 Train in a Risk-free Environment

In 2018, there were a total of 8,380 injuries and 11 deaths caused by live training in the United States alone⁴. Live fire training is very effective due to its immersive nature, yet it exposes trainees to extreme heat, smoke, chemical hazards and sometimes even death. Virtual training offers an additional training for high risk, low frequency scenarios without exposing trainees to the risks. It presents firefighters realistic and risk-free training exercises without necessarily affecting training efficiency. Using simulation, instructors can recreate effects that look and behave like fire, smoke and its accompanying sounds. As the situation is highly realistic, it provides trainees the feeling of adrenaline rush and forces them to develop response strategies, while always remaining in a risk-free environment.

5 Better and Faster Learning

Virtual training not only saves time and reduces risks, but also significantly increases potential training outcomes compared to traditional training methods. Most research examining the technology's effectiveness have found that it reduces the time taken to learn, increases the amount learned, and helps learners retain knowledge longer⁵. Instructors can use virtual training software to create true-to-life scenarios that are more engaging for trainees. This is because trainees have the capability to repeat exercises, track their actions and receive instant feedback.

6 Data Recording and Playback

The ability to record trainees' actions and play them is a powerful strength of virtual training software. Reflective thinking and reconsideration of plans in highly dynamic environments is a valuable skill for jobs in the emergency response domain, due to the nature of the highly valuable and stressful environments these jobs are performed in. With virtual training, trainees can divide roles and responsibilities in groups and enhance communication skills. After each exercise, instructors playback the recording, provide feedback on their individual actions and discuss alternative approaches. Through this method, trainees gain deep insights into their performance and build response strategies for critical scenarios.

Save Time and Simplify Fire Training

Virtual training cannot fully replace traditional training exercises but it does offer complementary exercise for high-risk scenarios without encountering any risk associated to it. With its flexibility and versatility, it can be adaptable to different training goals and a variety of learning skills.

Learning Skills



Build situational awareness.



Train for risk identification.



Assess resource placement options.



Train roles and responsibilities.



Build command and control skills.



Train and assess communications.

Train for Any Possible Scenario, Whenever and Wherever Convenient

Virtual safety training can assist you to train for complex incident scenarios from wildfire, chemical spills, search and rescue, urban firefighting to aerial firefighting. The simulated environment of fire on a ship, an offshore platform, airplane engines or in confined environments such as warehouses and chemical plants are all possibilities to enhance the preparedness of fire departments.

Fire & Rescue

UK research shows that virtual training can produce similar outcomes as live fire training, while increasing the confidence of firefighters when encountering real-life fires⁶. Using virtual training, safety professionals can immerse themselves in highly detailed and unpredictable situations such as apartment complex fire incidents, warehouse fire incidents, farm fires and traffic incidents on highways. This enables the building of expertise that can instantly be utilized in real-world scenarios.

Virtual training also allows firefighters to fight fires numerous times, thereby learning to enhance their performance based on gathered feedback and identify hazards without putting anyone at risk. It can equip your trainees with skills such as Incident Command Leadership, Emergency Firefighting, Teamwork, Evacuation Management and many more.



Aviation

With global passenger numbers expected to reach 8.4 billion passengers by 2037 according to the latest IATA report, the need for safety measures is becoming more apparent⁷. A crucial aspect of enhancing safety capabilities is enhancing expertise of safety personnel, through the introduction of training exercises. To maintain high training standards within airport grounds and enhance safety awareness, more airports across the world are becoming interested in the possibilities that virtual training offers to their safety teams.

Virtual training can be done in a cost-effective and risk-free environment for incident scenarios including airplane clashes, airport vehicle collisions and runway incursions among others. Simulated airport environments also allow training on correct airside driving procedures, security surveillance and runway checks.



Maritime

In 2016, there were 3,145 marine casualties & incidents and 79 serious casualties in the world⁸. Human error continues to be a factor in causing maritime incidents⁸. Enhancing the knowledge and skills of those in charge of safety onboard vessels through improved training is vital in order to avoid accidents in the future.

Virtual training expands the competencies of maritime professionals by preparing them for offshore incidents such as engine room fires, man overboard incidents, machinery damage, vessel collision and more. Trainees develop skills such as risk assessment, decision support and identification of high-risk areas that can be utilized in the event of a real shipboard incident.



Industrial

The growth of chemical industries has led to an increase in the risk of incidents associated with hazardous chemicals, resulting in fire, explosion and toxic release. Data reveals that roughly 78% of equipment failures in the chemical process industry are technically oriented around design and human/technical interface errors⁹. However, training for human errors and technical understandings has not been given the attention it deserves. These accidents can be prevented through better design and appropriate operations by crew members. Virtual training, with a large library of petrochemical environment and objects, can prepare safety personnel for industrial incidents such as gas leaks, liquid spills, tank fire incidents, pressurized storage tank fire incidents and more. These training exercises can provide trainees with hands-on experience and various training options regardless of time or location constraints.



Medical

Preparation for mass-casualty incidents remains a priority for EMS responders all around the world. Incident Command has been the primary method for practicing skills necessary to manage large numbers of sick and/or injured patients. Staging mass-casualty incidents often involve a time-consuming process of recruiting volunteers to play patients and taking many healthcare and safety personnel away from their day-to-day duties¹⁰.

Virtual training can be an alternative training for the management of small and large-scale casualties and personnel: dividing roles and responsibilities, defining code triage, exercising teamwork and communication skills. It allows trainees to immerse themselves in these situations and enhance preparedness for disastrous situations.



Who can benefit from virtual training?

- Fire/Rescue departments
- City Governments
- Police
- Fire Brigades in the Maritime industry
- CCTV Organizations
- Industrial Organizations
- Aviation Organizations
- and more...

Equipping your organization with the potential to train for a variety of scenarios in safe and immersive virtual environments would cost a fraction of live fire training, yet can greatly enhance the preparedness of your personnel. With virtual training, the demanding need for time and resources to conduct live training can be mitigated without having to expose trainees to chemical hazards, risks of injury or even fatalities. Furthermore, it allows full control of the scenario creation and the ability to record and playback exercises. This helps trainees engage better in training exercises and acquire extensive skills.

All in all, virtual training can cater to the needs of any organizations with a focus on crisis and/or security, regardless of the size or budget of the organization.

Response Simulator

Training Solution

Response Simulator (RS) is an advanced virtual training platform built in collaboration with safety and security experts. By using state-of-the-art technology RS immerses users in a realistic 3D environment in which almost any scenario can be simulated. This allows training to take place whenever and wherever, bypassing the high costs and dangers associated with practical training.

Benefits

- **Enhanced capabilities** - Create detailed scenarios using a range of powerful and easy-to-use creation tools.
- **High Ecological Validity** - Choose functionality and content to suit your sector and training goals.
- **User Centric Design** - Simple, intuitive interface allows non-technical users to quickly learn and operate RS.

The 3-step process to world-class virtual training



Better, Safer Learning at a Lower Cost

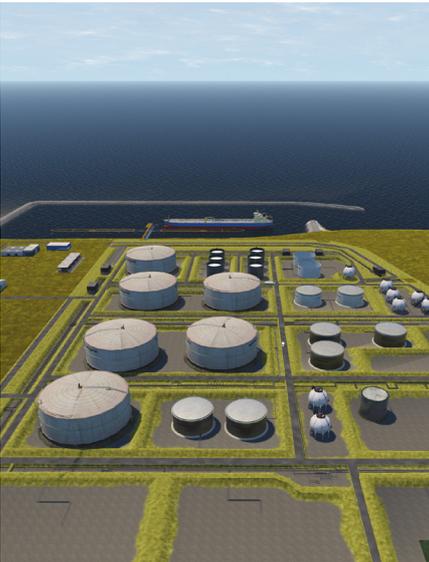
The current landscape, in which safety and security professionals work, demands newer, more stringent safety training procedures. To ensure that they are prepared to face potentially dangerous situations, they must obtain the necessary knowledge for correct procedural handling. This is typically done through practical training, which remains costly and prone to accidents. Response Simulator eliminates these problems and allows users to train their skills in an advanced virtual environment.

Response Simulator is also available in multiple setups, perfectly suiting your specific training needs whether it's for individual assessment, classroom demonstration or multi-user training.

Content and Functionality Packages

RS systems come with a broad range of base content that can be used to create any kind of training scenario. Three industry specific content packages are available for purchase in addition to this content:

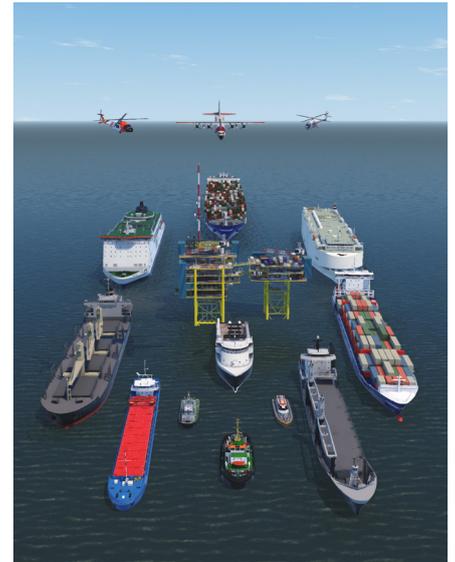
Industrial



Aviation



Maritime



“The virtual training platform Response Simulator was designed to adapt to different training objectives and has been adopted by 26 countries around the world. Firefighters can prepare for complex and challenging scenarios in a safer and more controlled environment that doesn't require exposure to hazardous environments”

Ben Borrie, RS Product Manager

Response Simulator users



“Since using RS, we have achieved thousands of hours of Officer level competency assessments. The product has been continually pushing the boundaries of the market with its ability to create more and more challenging scenarios.”

Lee Jackson
Cheshire Fire & Rescue Service



“The modularity of Response Simulator makes it adaptable to different industries and objectives. Start small with RS Creator and grow to a full RS solution as you expand your training needs.”

Lars Lundmark
Skyskol AB





Save Time and Simplify Fire Training

Using the state-of-the-art product Response Simulator, you can prepare your trainees to make decisions and build awareness in the heat of the moment. It offers an affordable and effective alternative for safety training of tactical, strategic and operational response. It ensures that you can teach your trainees response strategies for complex situations in a timely and risk-free manner!

Getting started with Response Simulator

Considering the increase in performance, cost and time saving in comparison to traditional training methods, virtual training with RS can show a rapid return on investment. Ultimately, virtual training and its benefits are limited not by costs or technology but purely by imagination.

Each simulator project is different and every simulator can be a key investment to improve skill and safety throughout your organisation. We understand that getting started may be daunting. That is why our team is dedicated to help tailor the product to your training needs and requirements.

Contact us today!

Flexible

With a variety of content packages, our product can be catered to different industry sectors and training needs.



info@vstepsimulation.com

Building on expertise

RS is built on 12 years of collaborating with industry experts to deliver the best possible product in the market.



vstepsimulation.com/response-simulator

The Benefits of Virtual Training for Firefighters

A White Paper by VSTEP Simulation

References

1. Goodson, C., & Murnane, L. (2008). Essentials of fire fighting and fire department operations. Brady/Prentice Hall Health.
2. Engelbrecht, H., Lindeman, R. W., & Hoermann, S. (2019). A SWOT Analysis of the Field of Virtual Reality for Firefighter Training. *Front. Robot. AI* 6: 101. doi: 10.3389/frobt.
3. A basic live fire training structure - High Temperature Linings (2017)
4. Fahy, R. F. & Molis, J. L. (2019). NFPA report-Firefighter fatalities in the United States - 2018.
5. Real learning in a virtual world: How VR can improve learning and training outcomes - Deloitte (2018)
6. University of Nottingham (2019). Virtual reality training could improve employee safety. *ScienceDaily*. Retrieved April 3, 2020 from www.sciencedaily.com/releases/2019/09/190916212516.htm
7. International Air Transport Association. (2015). IATA 20-Year Air Passenger Forecast. IATA: Montreal, QC, Canada.
8. European Maritime Safety Agency (2017). Annual Overview of Marine Casualties and Incidents 2017.
9. Kidam, K., & Hurme, M. (2013). Analysis of equipment failures as contributors to chemical process accidents. *Process Safety and Environmental Protection*, 91(1-2), 61-78.
10. Heinrichs, W. L., Youngblood, P., Harter, P., Kusumoto, L., & Dev, P. (2010). Training healthcare personnel for mass-casualty incidents in a virtual emergency department: VED II. *Prehospital and Disaster Medicine*, 25(5), 424-432.