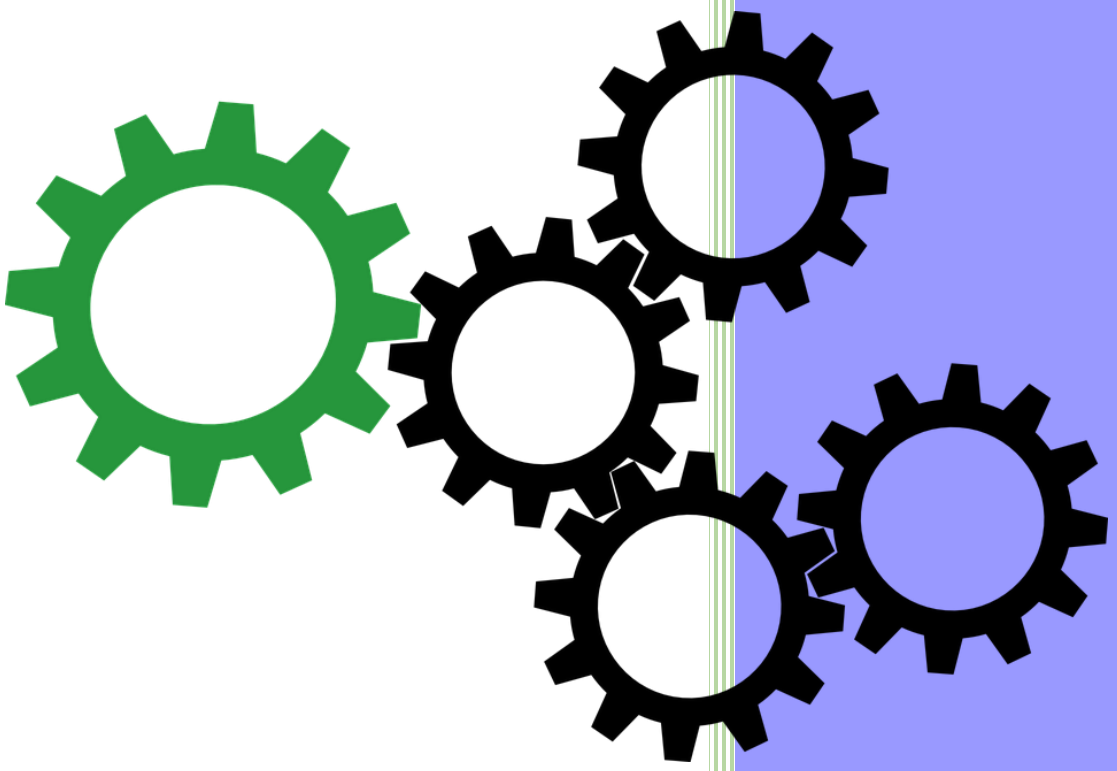
Handbook

Using Simulations to Enhance Training



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The purpose of this guide is to present ideas for why and how simulation-based training should be included in multiple aspects of every department's operations and training programs. It is divided into two parts:

- **Part I. Using Simulation-Based Training in the Fire Service**: Typical training areas where simulations can fit; and,

- **Part II. Developing Your Simulation Training Plan**: A 'how do I start' guide with suggestions to help you enhance your own program.

Part I. Using Simulation-Based Training in the Fire Service

Although computerized simulation-based training has been known in the American Fire Service for over 20 years, it has been underutilized and largely misunderstood during that time. Some typical reasons for not adopting computer-based simulation are fear of technology, budget issues, building simulations that cause even the best incident commander to fail, or just a lack of time to build simulations.

We absolutely and unequivocally believe in the need for live-action evolutions as part of training. Computer-based training cannot replace those. However, proper use of computerized simulations can significantly improve an organization's readiness by providing relevant, consistent, efficient, and more frequent practice and evaluation opportunities.

The NIOSH Firefighter Fatality Investigation and Prevention program has identified the Top 5 causes for Line of Duty Deaths on the Fireground. They are as follows:

1. Lack of Risk Assessment – including the following:
    - Lack of size-up
    - Continuous fire growth and building monitoring
    - 360 surveys of the scene.
2. Lack of Incident Command
3. Lack of Fireground Accountability
4. Communications Troubles on the Fireground
5. Lack of SOGs/SOPs or failure to follow SOGs/SOPs

Each of these aspects of firefighter line of duty deaths can be improved upon using computer-based simulation training. Departments serious about preventing death and injuries of its members need to start with these NIOSH 5 causes in mind to prepare their departments. We as fire officers and fire instructors want to be able to use simulation-based training to develop and protect our members, learn from history without repeating it, train consistently, and validate proficiency through training.

There are three rules of simulation-based training that should always be kept in mind:

1. It can be enjoyable and fun, but its purpose is to teach not entertain
2. It's training, not hazing
3. No one 'fails' while conducting simulation-based training – students must discuss the issues with a simulation, before returning to the simulator to conduct the simulation the correct way as to develop the correct, "slide in their slide tray".

In the following sections, we present specific uses of simulation-based training in five areas:

1. Company-Level Training
2. Officer Development
3. SOG Development and Validation
4. Promotional Exams
5. Continuing Education.

I.1 Using Simulations for Company-Level Training

The typical purpose of using simulations for company-level training is to help firefighters know what to expect, to get the routine down, and to practice working in their team effectively together. Through simulations, officers can teach firefighters to understand their roles and responsibilities in fulfilling company objectives.

> *When conducting company training, identify one or two objectives. Making these the focus of the training will keep the training focused and on track.*
>
> *— Brian Zaitz, Assistant Fire Chief, Kirkwood FD*

One of the great parts of the latest simulation-based training technology is the ability for any firefighter or fire officer to run it locally off a phone, tablet, or laptop computer. A fire company can be on the street, snap a photo with their device, spend a couple minutes adding smoke/fire to the screen, and then you have a small simulation that can be used to quickly illustrate a tip or provide a topic for an hour-long discussion. Simulations can be used for one-on-one mentoring, or ways for company officers to discuss tactics or strategies with their crew regarding past incidents or potential scenarios. Additionally, smoke/fire can be moved around to change the scenario up, thus presenting several different strategic and tactical options.

Additional company-level training options include:

1. Fireground Tactical Scenarios
2. Haz-Mat Scenarios
3. EMS/MCI Scenarios
4. Developing RPDM
5. Size-Up and 360's
6. Fireground Communications and Radio Systems
7. Post Incident Analysis.

Benefits

Simulations made based on local structures, potential hazards, or famous incidents can help company officers relate real-world experience to their crew, providing a concrete mental image rather than an abstract story. Incidents that the crew experienced can make teaching lessons and 'what if's more relevant and impactful, bringing theoretical concepts to practical reality. Simulated, specific situations can help the officer teach the crew to function well as a team. With several members, you can have them rotate through different positions to help them appreciate how their actions impact the team and beyond.

I.2 Using Simulations for Officer Development

The typical purpose of using simulations for officer development programs is to give potential officers realistic and relevant opportunities to practice and demonstrate the operational fireground skills required to perform at that rank. The simulations may also be used in the process of teaching requisite knowledge to illustrate concepts.

Officer Development programs train future officers on the skills they need to master in leading their subordinates, coordinating with their superiors, and interacting with others involved in emergency response. Exposing future officers to all relevant incident types is invaluable and may not be practical or achievable on the training ground. Since the all-hazards capabilities of SimsUshare allows an organization to create simulations for nearly all imaginable incident types, you can use SimsUshare to teach and evaluate students at an appropriate level, and enable them to practice what they learn.

Example Exercise Topics

- Strategy Selection
- Size-Ups
- Initial Reports
- Transfer of Command
- Recognition Primed Decision Making (RPDM)
- Reading the building
- Reading smoke and fire
- Risk identification
- Risk mitigation

In typical officer development programs, students must be exposed to different occupancy and construction types, as well as incident types during their initial and recurring training, as they develop the skills to operate as an officer in your organization. It's up to you to determine the specific skill set for the level for which you are training (e.g., Lieutenant, Captain, or Executive Officer).

Officer Development can take the form of formal officer academies and devoted study or informal programs that include training for firefighters or officers acting in a superior rank (i.e., 'acting officers').

Benefits

Students are exposed to real life incidents, in a safe and controlled environment which is conducive to learning. Students can experience more incidents using simulations than they would respond to in months or years, depending on the organizations call volume, thereby enhancing knowledge, skills and abilities in a much shorter timeframe. Students can receive immediate feedback and be provided the opportunity to apply new knowledge and skills within the same day.

Example Procedure

Training may be divided into several parts:

1. Online or self-paced learning: knowledge and procedure acquisition before classroom or sim lab training. Simulated situations can be presented, with automated feedback or guidance, to help students practice for classroom and sim lab performance
2. Classroom: teaching, discussion, and practice with immediate or delayed feedback. Short-duration simulations can be interspersed with teaching knowledge or procedures, as concrete illustrations can make the learning more impactful
3. Sim Lab: Practicing skills, applying knowledge, and evaluating performance. Personnel can rotate through positions (command and otherwise) to help them know what to expect and get the routine down.

While classroom time is precious due to expense and logistics, don't overload classes with content in short periods. Learning experts recognize that frequency of training and spacing between training sessions aid in skill retention.

In the next sections, we present specific processes for Officer Development in critical foundation areas.

I.2.1 Occupancy Status

New Officers should be exposed to several repetitions of identifying occupancy status. Occupancy status may be confused with occupancy type but is completely separate.

Occupancy status will always be one of the following:

1. Occupied
2. Unoccupied
3. Vacant
4. Abandoned

Occupancy status is the first item that should be considered prior to strategy selection and subsequent development of an Incident Action Plan (IPA).

Occupancy status is the foundation of every risk/benefit profile based on incident priorities of Life Safety, Incident Stabilization and Property Conservation (see Appendix C for a checklist you can use to evaluate objectives met during training exercises).

Still photos should be used for this training. Ensure photos include each status type.

The following process should be used:

1. Present a single photo
2. Officer identifies occupancy status
3. Officer provides feedback as to why status was selected
4. Discuss factors influencing occupancy status, such as:
    a. time of day
    b. vehicles present
    c. economy (good economy allows one parent to remain home concept)
    d. children's toys present outside
    e. real estate signage
    f. signs of unkept property (overgrown grass), absence of window coverings or furniture etc. State of disrepair, broken windows etc.
5. Repeat process a minimum of 3 times for each Officer

I.2.2 Strategy Identification/Selection

Simple, single-view simulated scenarios can be utilized to develop strategy selection skills for all Fire Officers. Start with single family residential and transition to commercial occupancies. This training should occur in a Sets & Reps manner to build "muscle memory".

The following procedures will build knowledge, skills, abilities and confidence:

1. Present a “scenario” to an officer
2. Allow adequate time to process available information
3. Officer identifies a strategy
4. Have officer explain justification for selected strategy, keeping in mind the incident priorities; Life Safety, Incident Stabilization, Property Conservation
5. The selected strategy must support incident priorities based on a risk/benefit profile
6. Discuss indicators present in the “scenario” that should influence strategy selection, such as; time of day, likelihood of occupancy, vehicles present, children toys in yard etc. Fireground clock, occupancy status, fire/smoke conditions, tenability of interior conditions, resources or lack thereof etc.
7. Repeat a minimum of 3 times for each officer.

I.2.3 Incident Action Plan

Develop multiple exterior view scenarios that allow the officer to obtain the information necessary to rapidly develop an Incident Action Plan.

The instructor can navigate the scenario at the request of the officer to provide the requested position view. An example would be smoke/fire showing on the C Side of a commercial occupancy. Although it may appear to be coming from the structure, it would actually be a dumpster fire. This highlights the need to ascertain all available information prior to developing/announcing the IAP and committing resources.

The following steps should be conducted:

1. Present scenario to officer
2. Navigate exterior views if necessary/as requested
3. Officer then verbalizes his IAP
4. Discuss the IAP and factors influencing IAP
5. The IAP should involve the first due unit and/or first alarm assignment
6. Repeat a minimum of 3 times for each candidate

I.2.4 Initial Reporting

Officers should develop skills to complete the Initial Report based on arrival information, which would normally include a minimum of 2 sides of the structure. Any scenario including this would be sufficient for this section of training.

If the organization does not utilize a standardized Initial Report, it is critical that one be developed prior to this training. Each officer should be presented a scenario and provide an Initial Report in a timely manner, including all information required in the Initial Report. Complete a minimum of 3 rotations for each officer.

I.2.5 Full Scenarios

Upon completion of didactic training and previously discussed training sections, officers are exposed to full scenarios. Training should begin with simple, single family residential and consistently building on the officer's knowledge, skills and abilities.

The most important factor during scenarios is to allow the officer to be successful yet operating on the outer limit of their comfort zone, which is the only way to develop knowledge, skills and abilities. Success does not always mean correct decisions, but students should not be given scenarios that will result in apparent failure.

There should be enough role players to fill a first alarm assignment, which is one role player per apparatus.

Scenarios should be conducted in the exact manner that the organization expects an actual response to occur. All communications should occur on a training channel or talk about radio to reflect "real life".

Scenarios should be limited to Initial Report and assignment of the first alarm, which normally occurs within 5-7 minutes. Arrival times of apparatus/role players should be compressed, but within reality of actual times.

Upon completion of each scenario, the instructor should lead an immediate Debrief, utilizing a standardized debrief form such as given in Appendix C.

I.3 Using Simulations for SOP/SOG Validation

The typical purposes of using simulations for validating SOG's are (a) to ensure that your policies are practical and consistent, and (b) you have demonstrated evidence that your personnel can apply them properly.

Every fire department is expected to have written operating policies, procedures and fire ground operation protocols. However,

- How well do department members know what these SOPs/SOGs are?
- Have SOPs/SOGs been adequately *vetted* prior to their release to make sure they are relevant to your operations and area?
    - Have stakeholders provided input?
    - Have SOP/SOGs been tested using simulations to make sure they work on the scene?
    - Have you compared your SOP/SOGs to mutual aid partners for consistency?

Benefits

SimsUshare can be an effective tool to validate and/or test operational SOPs/SOG's for several of the following reasons:

- Validation and/or testing is conducted in a low stress, safe and sterile environment. No risk of injury or illness to firefighters
- Allows for multiple "run throughs" with very little reset time, unlike training ground evolutions
- Administrators can make immediate changes to SOP's/SOG's and re-validate/retest changes immediately. No need to reconvene command staff and operational personnel
- Provides direct financial and logistical benefits.

Examples of SOPs/SOGs you can enhance with simulations

- ICS Policy and Terminology
- Mayday Policy Validation
- Communications and Channel Assignments
- Sector/Division/Group
- Active Threat/Rescue Task Force
- MCI
- Haz-Mat
- Technical Rescue
- Emergency Operations Center (EOC) exercises
- Other SOP/SOG actions, terminology, and tactical/functional assignments

Example Procedure

Organizations may create specific simulations or utilize "standard" simulations. Depending on the SOG/SOP being validated, the simulation can be managed in a format that drives the specific causal situation needed for validation/testing. As well, participants may enact specific communications to provoke the intended SOG/SOP.

Upon completion of the simulation, all participants can immediately review and discuss the effectiveness or lack thereof of the intended SOP/SOG. The actions and communications of the IC and participants can be evaluated for compliance with the SOG/SOP immediately following the simulation.

A good idea to have the people making the training be distinct from those evaluating the candidates, to reduce potential bias or vagueness in the evaluation. If possible, have a formal train-the-trainer program

to give your evaluators specific instructions and guidance, and even evaluate their performance on mock examples.

Example. Developing sims around a specific SOP or related SOP's, e.g., Initial Operations, which typically have distinct segments such as initial size-up & radio report; Condition-Actions-Needs reports; Strategic shifts; Follow-up report, Command transfers; and assigning units by Task, Location, and Objective

1. Identify typical incident types and conditions for your response area
2. Which of the situations is/are the SOP's likely to apply to? Sims may be designed to cover all SOP's or have specific features to highlight one or more set of desired actions.
3. Identify relevant actors/participants, and define resources that may or may not reasonably be available in a real incident
4. Pull out the relevant measurable actions from the SOP, e.g., "Radio communications shall be to the receiver from sender using the following model…"
5. Pull out relevant assessment items that are not specific actions (e.g., "All communications shall be clear text")
6. For extra credit, try to relate the benchmark to a national or regional consensus standard such as NFPA or OSHA, depending on your department's policies
7. Based on #4 and #5, assemble a checklist or evaluation metric that articulates relevant benchmarks
8. Relate the benchmarks to where you expect candidates will accomplish them, to give you evaluators some focus during the exercise(s) about what to pay attention to.

I.4 Using Simulations for Promotional Exams

The typical purpose of using simulations for promotional exams is to provide an economic, efficient, and safe means to evaluate a candidate's operational competency in the field, as opposed to live evolutions.

Tactical scenarios have long been part of promotional processes. Some have been as simple as whiteboard scenarios or sand tables, others have been actual scene photos, and others have been actual photos with simulated fire or smoke drawn in. Some benefits to using computer-based simulations over, or in addition to previous types of tactical scenarios during promotional exams (such as live evolutions) are:

Tip: Conducting exercises using SimsUshare CTC (Command Training Center) automatically provides a timestamped transcript of candidate movement in virtual incidents, which can be useful for post-incident evaluation and potential candidate challenges to the exam.

1. Added realism by using local photos as well as smoke and fire that is dynamic to the scene
2. Consistent objectives and timing, especially important for ensuring all candidates receive the same conditions
3. Easily resettable
4. Benchmarking and evaluation for proficiency.

I.5 Using Simulations for Continuing Education

The typical purpose of using simulations for continuing education is to provide relevant and realistic application of specific concepts. Where possible, it is important to base the simulations off real hazards or incidents in your first-due to make the training relatable.

Monthly, weekly or daily every fire department conducts continuing education training. This training is necessary to ensure firefighters and officers are trained and ready to respond to whatever emergency may face them on the scene. Simulation-based training can be used in continuing education training in several ways, such as:

1. Fireground Tactical Scenarios
2. Haz-Mat Scenarios
3. EMS/MCI Scenarios
4. Developing Recognition-Primed Decision-Making (RPDM)
5. Size-Up and 360s
6. Functions and roles of the Incident Command System
7. Fireground Communications and Radio Systems
8. Post Incident Analysis
9. Accountability System Training use and proficiency.

Part II. Developing Your Simulation Training Plan

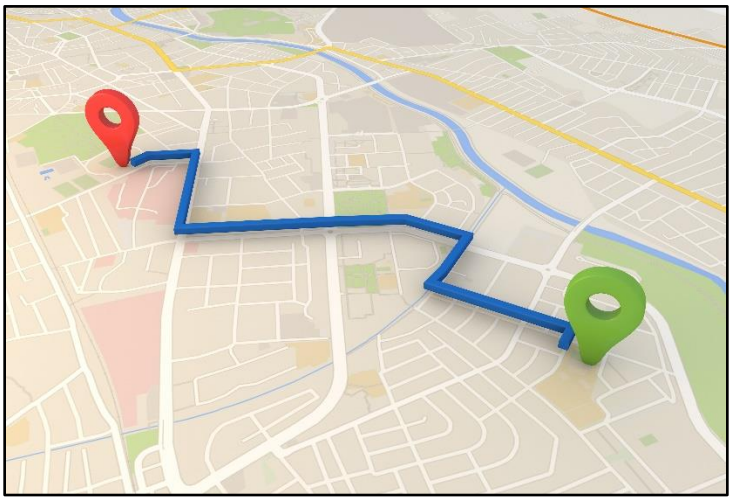
Effective training occurs as the result of applying a successful process, not by virtue of owning a piece of technology. In this part, we suggest components of a successful process and how you might consider creating your own plan to create a process that works for your organization.

That having been said, SimsUshare is an all-hazards incident simulation platform that can be central to your training process.

but where do I start?

II.1 What Are Your Training Goals and How will You Measure Success?

Your training is here…



… but you want to get it to here.

For example, identify and choose from your top three training gaps such as:

- Pre-incident planning
- Size-up skills
- Communication skills
- Strategy & tactics
- Critical thinking
- Personnel accountability
- ICS / deployment
- SOP compliance

It goes without saying to choose and prioritize goals based on how important and achievable they are, given your resources. One technique for turning a goal into an actionable plan is to think with the end in mind. Imagine you have implemented a training process that achieves the goal(s) you chose. What does that look like, and how specifically are measuring that the goal is achieved?

For example, instead of starting to develop training with the admirable but vague goal to 'improve communication skills', think about specific instances in which you want to improve communication, such as size-up reports, and determine how you will measure success. Then you can back into the types of exercises you will need to develop or acquire.

A simple question that should be answered foremost is *WHO is being trained to perform WHAT as measured by HOW*. It is worth mentioning that considering your goals and identifying how you will solve them is an iterative process, not a 'once and done': don't be surprised if you discover additional training gaps once you feel you've got a handle on addressing your initial gaps.

II.2 What Types of Simulations Might You Consider?

While it may not be hard to think of possible incidents, we suggest you consider a systematic, **two-pronged** approach, to ensure coverage:

One

Develop a list of **hazards** and possible incidents in your area, from the *bread and butter* incidents—single and multi-family residences, commercials, etc.—to the more rare but serious incidents that *keep you up at night*.

Two

Consult your **SOP's/SOG's** as a starting point for the simulation training you are developing.

Possible Types of Incidents

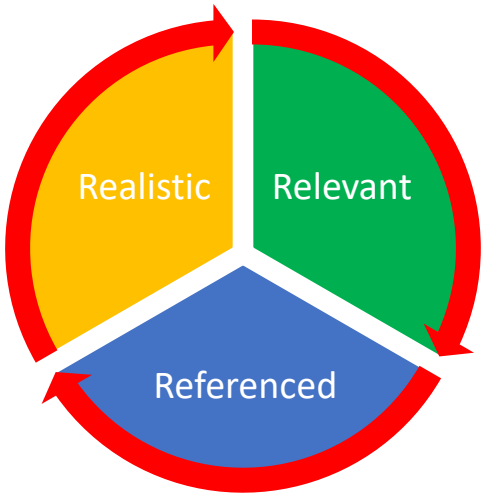
- Residential
- Commercial
- Stand Alone
- Big Box
- High Life Hazards (HLH)
- Strip Mall
- Special Hazards, such as HazMat, Active Threat/Rescue Task Force, MCI
- Wildland
- Transportation
- Industrial Safety
- Industrial-Municipal Interface
- Military
- Military-Civilian Interface

Your SOP's/SOG's should help you determine who needs to be trained to what competency. Later in this document we discuss how to determine the level of detail needed for your simulations. You certainly don't need to overanalyze this to begin, in fact most organizations start getting their feet wet with simple Company-Level Training simulations. However, for a more detailed SOP/SOG approach, check out

II.3 Basic Guidelines When Creating Simulations

- Simulations complement (complete) your existing training program. Don't build your program around the simulations you create. Rather, use them to make your training program better (more effective).
- Often simple simulations will nicely illustrate the training points you want to convey. You can make very elaborate simulations if you like but determine before you start how detailed they need to be. You can always add to them later.
- Make sure you match the scenario to the students' expected roles within the response model.

II.4 The Three R's of Creating Effective Training Simulations



Realistic training simulations accurately reflect real situations.

Relevant training simulations are practical and address current department concerns.

Referenced training simulations are supported by department SOPs/SOGs or a recognized industry guideline.

II.5 Simulation Level-of-Detail and Timespan

Simulations can vary widely in terms of the detail you need to include for the target use and the audience.

	Sets & Reps	**Multi-Decision Exercise**	**Full Scenario**
Description	Quick-turn, single interaction scenarios that build 'muscle memory', followed by feedback & critique.	Allow exercise to evolve after one or more decisions made and consequences begin to manifest.	From dispatch or on-scene arrival through command transfer or scenario completion. Once individual concepts and skills have been practiced, allow conditions to change, observing or evaluating the candidate's

			actions and consequences of actions that permit planning and plan iteration
Objective	Develop critical thought processing and initial decision-making skills that are required for a safe and effective IAP. When students have demonstrated consistent performance on the stated objective, they are then exposed to full scenarios which allow all learned knowledge and skills to be demonstrated in combination.	Set of decisions resulting in action and consequence	Allowing sufficient time for plans to be developed and consequences to play out until successful or unsuccessful conclusion (for example, command relieved)
Duration	May be 5 minutes or less.	Should be less than 10 minutes.	May be up to 20 minutes or longer.
Views	Normally performed with single view scenarios, although "standard" multi-view scenarios can also be used.	Depends on the role of the student(s). For example, for Battalion Chief and Executive Officer students who typically remain at the Command Post or EOC, you would need a limited number of views. Alternatively, company officers and firefighters who need to visit several views (such as interiors) will need more views.	

II.6 Instructional Formats for Teaching with Simulations

Instructor-Led

- Use simulations in the classroom to illustrate conditions and decision points
- Use simulations in the classroom to illustrate concepts and knowledge
- 'Sim lab' environment or individual screen with single instructor playing multiple support roles and evaluating a candidate's decisions and actions
- 'Sim lab' environment with other instructor and students as role players feeding scripted information to the candidate, then rotating students through the officer candidate's position.
- **Tip:** Conduct objective critiques immediately following each scenario to maximize learning impact.

Self-Paced Training (e.g., electronic or online)

- Use simulations in self-paced content to illustrate conditions and decision points
    - e.g., NIOSH reports, incident reconstructions, etc.
- Use simulations to present conditions and decision points, with explanatory feedback regarding user's decision.

II.7 Scoring Training Assessments

We strongly suggest that you develop at least a simple assessment/evaluation process for all your training, not simply 'where it counts' such as for promotional exams. We recommend developing a consistent and simple strategy for scoring and determining an acceptable score for passing a student. For example, 100% for Essential actions, 85% for Critical actions, and 75% for Non-critical actions. One simple but useful scoring strategy is to assign a point score of 0, 1, or 2 for each action. The idea of scoring a candidate along the three action categories is so that a missed important action cannot be compensated for by a strong performance in the third category (non-essential nor critical). See Appendix A. Example Scoring Sheets for example scoring sheets you can adapt.

II.8 Learning to Make Simulations with SimsUshare

SimsUshare is easy-to-use and loaded with features, however, to get the most out of it, some basic training will be very helpful.

II.8.1 Self-Paced Options

- Learn how to use the software:
  - If you like a detailed **User Guide**, we have one of those here: https://simsushare.com/sus-documentation; but
  - If you prefer short **how-to videos**, we've got plenty of those on our website, at https://simsushare.com/tutorials-and-help or
  - If you want to quickly learn everything about making and sharing simulations, why not attend the free online **SimsUshare Academy** (https://academy.simsushare.com). The courses are outlined below:

Developer Level l (Foundation)

A one-hour self-paced online course that covers the fundamentals of creating simulations with SimsUshare:

- Download, install, and activate SimsUshare
- Play simulations
- Add and configure smoke and fire effects
- Create simple 360's/walkarounds, and
- Distribute and share your simulations.

Developer Level II (Intermediate)

This one-hour self-paced online course expands on the Developer I skills by showing you how to develop more intricate sims:

- Navigating among locations beyond simple walkarounds
- Evolving conditions (by time or by instructor control)
- Masking effects to make smoke & fire appear from behind buildings
- Using your own pictures and audio files
- How to make videos from your sims

Developer Level III (Advanced)

Complete your training with a one-hour self-paced online course that explains how to build more nuanced features into your simulations.

- Advanced navigation and movement among locations
- Designing branching-logic simulations to account for crew decisions and varying consequences
- Combining smoke and fire elements for blending and wind
- Simulating visual damage on buildings and property.

II.8.2 SimsUshare Sim-Building Workshops

Workshops offer a classroom setting for learning as well as means to tailor instruction to specific training goals. Workshops can be conducted in-person or online.

Foundational Sims with SimsUshare Workshop

This 2-hour class is oriented to new SimsUshare customers who would like personal, hands-on assistance in developing and using simulations for your Department or area. It covers the material presented in the SimsUshare Academy class Simulation Developer I and CTC Operator I. No SimsUshare experience is necessary. Since the class is taught on-site, we typically offer the same class at different times of the same day, to accommodate various shifts.

In place of running the class multiple times during the day, it can be extended to include parts of intermediate or advanced skills, along the lines of the SimsUshare Academy online class Simulation Developer II and Simulation Developer III.

Nuts and Bolts of SimsUshare Workshop

This is a technical class on the how to use more advanced features of SimsUshare, such as building branching logic sims, advanced picture editing and masking, and the subtleties and complexities of designing multiplayer simulations. The class is limited to 10 participants, and students are expected to bring materials (pictures and audio) for the types of simulations they would like to build.

Appendix A. Example Scoring Sheets

You can use and adapt the following scoring sheets (originally from Orange County Fire Rescue) to help you develop your own organization's benchmarks.

A.1 Example Scoring Checklist for Company Officers (Structural Firefighting)

In the following checklist, the items in **BOLD** are essential, i.e., not completing this is an automatic failure.

1.	Construction	Yes No
2.	Describe Occupancy	Yes No
3.	Estimate Building Size	Yes No
4.	Smoke	
5.	Location	Yes No
6.	Color	Yes No
7.	Velocity	Yes No
8.	Fire (Flames)	
9.	Location	Yes No
10.	% Involvement	Yes No
11.	Establish Command	Yes No
12.	Names Command	Yes No
13.	Announce Command Mode	Yes No
14.	**Completes a 360**	Yes No
15.	Announces Location of Command	Yes No
16.	Command Presence	Yes No
17.	Clear Concise Order	Yes No
18.	Calm Demeanor	Yes No
19.	**Collects Passports (PAS TAGS)**	Yes No
20.	Assigns Proper Title Group	Yes No
21.	Assigns units in a timely manner	Yes No pta 1-2min >2min
22.	**2 Out Assigned**	Yes No
23.	Utilities Secured	Yes No <2min 2-5min >5min
24.	**Secondary Egress**	Yes No
25.	Maintains Accountability	Yes No
26.	**Proper Size Attack Line**	Yes No
27.	Orders Proper Entry Location	Yes No
28.	Secure Water Supply	Yes No
29.	Second Line	Yes No
30.	**RIT Assignment**	Yes No
31.	**Safety Officer Assigned**	Yes No
32.	**Primary Search "All Clear"**	Yes No started completed
33.	**Ventilation**	Yes No

34. Water on the Fire	Yes	No
35. Fire Knock Down	Yes	No
36. Fire Out	Yes	No
37. Secondary Search "Secondary Search Complete"	Yes	No same crew 2nd crew
38. Checking for Extension	Yes	No
39. Overhaul	Yes	No
40. Face to Face	Yes	No
41. Conducted PAR at Appropriate Time	Yes	No Started Completed

Mayday Check List

1. Verifies Mayday Call	Yes	No
2. Declares Emergency Radio Traffic	Yes	No
3. Attempts to contact FF	Yes	No
4. Announces Unit, Rank, Name, and last known location over radio	Yes	No
5. Activate RIT	Yes	No
6. Face to Face w/RIT CO	Yes	No
7. Controls other units	Yes	No
8. Requests Additional Alarm	Yes	No
9. Assign RIT Group	Yes	No
10. Assigns activated RIT to Different Radio Channel	Yes	No
11. Assign RIT liaison	Yes	No
12. Replace Deployed RIT	Yes	No
13. Back up RIT to support first RIT	Yes	No
14. Establish ready and waiting EMS Team	Yes	No
15. After Mayday event advise dispatch return to normal operations	Yes	No

A.2 Example Scoring Checklist for Battalion Chiefs (Structural Firefighting)

In the following checklist, the items in **BOLD** are essential, i.e., not completing this is an automatic failure.

1. Talking On Radio While Responding	Yes	No
2. Writing While Responding	Yes	No
3. Announce Arrival On Scene	Yes	No
4. **Completes a 360**	Yes	No
5. Face to Face/Pass On	Yes	No
6. "I have Command"	Yes	No
7. Names Command	Yes	No

8.	Announces Command Mode	Yes No
9.	Announces Location of Command	Yes No
10.	Situation Update	Yes No
11.	Clear Concise Orders	Yes No
12.	Calm Demeanor	Yes No
13.	Utilizes Command Tech	Yes No
14.	Properly Use of Command Board	Yes No
15.	**Collects Passports (PAS TAGS)**	Yes No
16.	Assigns Proper Title Groups/Divisions	Yes No
17.	Assigns units in a timely manner	Yes No pta 1-2min >2min
18.	**2 Out Assigned**	Yes No
19.	Utilities Secured	Yes No <2min 2-5min >5min
20.	**Secondary Means of Egress**	Yes No
21.	Maintains Personnel Accountability	Yes No
22.	**Proper Size Attack Line Utilized**	Yes No
23.	Orders Proper Entry Location	Yes No
24.	Secures an Appropriate Water Supply	Yes No
25.	Second Hose Line	Yes No
26.	**RIT Assignment**	Yes No
27.	**Safety Officer Assigned**	Yes No
28.	**Primary Search "All Clear"**	Yes No started completed
29.	**Ventilation**	Yes No
30.	Water on the Fire	Yes No
31.	Fire Knock Down	Yes No
32.	Fire Out	Yes No
33.	Secondary Search "Secondary Search Complete"	Yes No same crew 2nd crew
34.	Checking for Extension	Yes No
35.	Overhaul	Yes No
36.	Conducted PAR at Appropriate Times	Yes No started completed
37.	Calls for Resources when needed.	Yes No
38.	Establish Level II Staging Area	Yes No
39.	Solutions are Logical & Reasonable	Yes No
40.	Maintains Proper Span of Control	Yes No
41.	Rehab Set Up	Yes No

Mayday Check List

1.	Verifies Mayday Call	Yes	No
2.	Declares Emergency Radio Traffic	Yes	No
3.	Attempts to contact FF	Yes	No
4.	Announces Unit, Rank, Name, and last known location over radio	Yes	No
5.	Activate RIT	Yes	No
6.	Face to Face w/RIT CO	Yes	No
7.	Controls other units	Yes	No

8.	Requests Additional Alarm	Yes	No
9.	Assign RIT Group	Yes	No
10.	Assigns activated RIT to Different Radio Channel	Yes	No
11.	Assign RIT liaison	Yes	No
12.	Replace Deployed RIT	Yes	No
13.	Back up RIT to support first RIT	Yes	No
14.	Establish ready and waiting EMS Team	Yes	No
15.	After Mayday event advise dispatch return to normal operations	Yes	No

Appendix B. Example Sim Development from SOP/SOG's

Several years ago, we developed an SOP/SOG adherence-evaluation program centered on HazMat OP's. We followed the procedure laid out in Section I.3, but rather than consider one or two OP's, we tried to capture the set related to HazMat. In the process this brought in OP's related to all emergency calls.

Here is the introduction to our project:

The greatest protocols in the world are of no use if personnel are not following them. Much of the NIMS/ICS material to date has been developed at a generic level with the expectation that training officers will take the lessons back to their departments to bring their SOP's in line with these guidelines. However, there has been a lack of assistance to help these officers align local policy with Federal guidelines. Furthermore, there has not been much practical advice as to how a department assesses compliance.

Our aim is to give departments a concrete process and set of materials for tying these two together in a consistent and comprehensive way. Furthermore, by providing practical templates that are known to be comprehensive and a way to demonstrate the link between local SOP's and Federal guidelines, a department may be able to spot deficient SOP's.

From a testing perspective, we believe that SOP's must be actionable and the best training is performance based—one in which personnel demonstrates that they can accomplish the steps in the SOP's to a satisfactory level set by the department.

The primary objective of this project is to demonstrate a performance-based way to evaluate adherence to protocol, and remediate where needed to bring the department to a functionally consistent and proper level. A simulation system is a software tool that can be used to conduct virtual emergency incidents that simulate real conditions for emergency responders, particularly those with command, decision-making, and communication responsibilities. SimsUshare gives a platform for a performance-based evaluation.

This project consists of developing simulation exercises, evaluation metrics, and a two-day, HSEEP-compatible delivery program that can be used to assess department personnel's adherence to both local Standard Operating Procedures (SOP's) and Federal NIMS/ICS guidelines, in particular, sections from NFPA 1500, 1561, 1710, and 1026, and elements of ICS 100, 200, 300, among others. By compiling an example

comprehensive set of actions/benchmarks, based on a department's SOP's, other departments may gain a big head start in developing an evaluation procedure based on its own SOP's.

The Protocol Adherence Documents (PAD's) are standardized scoresheets, developed by SimsUshare, covering the set of SOP's that relate to first-in company officer and battalion chief responsibilities in HazMat incidents. The process concept is not limited to HazMat, but HazMat was chosen due to the mission of the agency funding this project. The current focus regarding SOP's and command relate to NIMS Type 4 and 5 incidents, along with the early portion (first 15-20 minutes) of Type 3 incidents. Regarding Federal guidelines, we have not integrated OSHA regulations because not all states follow OSHA guidelines, and such an endeavor would increase the complexity of this project.

Here is a synopsis of the materials developed:

There are two PAD's currently: a company officer document, and a battalion chief document. Each document consists of a preface—basic explanations for our development team, and then a series of categories such as Arrival Report, Command, Safety Officer, Fire, Bomb Threats, etc. Within each category is a set of actions or benchmarks by which candidates are evaluated. Each category may not be relevant to a particular scenario. For example, a category such as "Clandestine Labs" is not relevant for an Expressway incident, or normal working fire.

Each evaluation point (action/benchmark) is described briefly and linked back (via crosswalk) to the relevant SOP and/or Federal guideline. Much of the SOP's are obviously based on NFPA guidelines, so we found it more succinct to refer to the SOP rather than the NFPA guideline. In the future, we may feel it beneficial to articulate the relevant NFPA guidelines.

Creating an evaluation that faithfully represents the protocols was a daunting task that required a lot of reduction/condensing. We spent a great deal of time distilling the essential, measurable aspects of the protocols. Since evaluators will need some amount of Fire Service experience, we used common sense to dictate what typically should be implicitly understood (and hence not appear), and what needed to be explicitly described. For example, we chose to say "has a command staff" instead of the more detailed "has a liaison, safety, PIO, and IC."

Overall, a department adapts the PAD's to its SOP's by reviewing the actions/benchmarks and making appropriate adjustments. Our hypothesis, however, is that most of the items are sufficiently common that they will remain from department to department.

And getting to the interesting stuff, here are the SOP's and scenarios we built:

SOP's and the Scenarios

We determined the following set of SOP's were relevant for our study:

OP#	SUBJECT
02	Hazardous Chemicals & Material/Site Control
06	Confined Space Emergencies
07	Expressway Procedures
11	Response to Bomb Threats
12	Railroads

19	Incident Command System
24	Radiological Incident Procedure
29	Clandestine Drug Operations
31	Petroleum Properties & Chemical Plants
34	LNG/LPG Emergencies
35	Multiple/Mass Casualty
37	Self-Contained Breathing Apparatus & PASS Device
40	Incident Safety Officer

From this list of protocols, we defined seven (7) scenarios that we could use to evaluate personnel performance (first-in company officer and battalion chief):

1. **Radiological Response**: On a routine EMS call in progress, a paramedic's rad meter goes off with four times the amount of normal levels of radiation. When team comes in with more monitoring, highest levels are detected near moving van located near a Government building.
2. **Railcar Spill onto Interstate with Car Accidents**. Rail cars paused for track work ahead; railcar sits on top of bridge over Interstate-95. Rail car has a leak. It leaks acid onto the highway and three-car accident ensues. Call goes out initially as a vehicle accident.
3. **Overturned Chemical Tanker in Downtown Site**. Tanker truck overturns downtown, near the Convention Center, causing a release of product. Can be presented as accidental or deliberate (terrorism).
4. **Unknown Fumes / Clandestine Drug Lab**. This is the 'routine' call that goes bad. Call comes in about unknown fumes from townhouse/rowhome in downtown setting. During investigation, it is discovered that a neighboring house has drug lab in basement.
5. **"Bobtail" Truck (LPG) Accident**. Small truck carrying propane to homes is parked at gas station. Brakes overheat and start fire. Flames impinging on compressed gas cylinder—lots of opportunity for mayhem. Can be accidental or deliberate, and we can possibly vary the location of the truck for more complexity based on exposures.
6. **Confined Space / Basement Incident**. Workers on a construction site in a basement, or sewer or gas company working in confined spaces (not a fire).
7. **Industrial Fire**. A multi-alarm fire at a local industrial refinery or chemical plant. This scenario would give practice coordinating with the industrial fire brigade as well as complexities at an industrial site.

Here is a mapping between scenario and SOP:

	Scenario #						
OP #: Operational Procedure	1	2	3	4	5	6	7
02: Haz Chem & Materials/Site Control	X	X	X	X	X	X	X
06: Confined Space Emergencies						X	
07: Expressway Procedures		X					
11: Response to Bomb Threats	X						
12: Railroads		X					
19: Incident Command	X	X	X	X	X	X	X
24: Radiological Incident Procedures	X						

29: Clandestine Drug Operations				X			
31: Petroleum Properties & Chemical Plants							X
34: LNG/LPG Emergencies					X		
35: Multiple/Mass Casualty	X	X	X				X
37: SCBA & PASS Device	X	X	X	X	X	X	X
40: Incident Safety Officer	X	X	X	X	X	X	X

Finally, here is the process by which we filtered the work and familiarized the evaluators with the checklists:

The Process of Adapting the PAD's

We suggest the following steps for a department to adapt the PAD's to their protocols.

1. Review the PAD's overall to determine which actions apply to your department and which do not. Remove any material that does not apply, for example, an action concerning cellars in a region where construction does not typically permit a cellar.

2. Review material carefully to gain comprehension. It may be helpful to write a description of each action in terms of your local language, to help explain it to your evaluators/instructors, and to determine where in your protocols the action appears (or does not). We don't recommend changing the wording of the action if possible, since it likely is coming from the NFPA guidelines, but you will have to explain it to your staff and hence it can be useful to prepare such contextualized assistance.

3. Identify and write down which of your SOP's each action relates to. This will give you an authoritative document if the integrity of the evaluation is challenged. It will also help reveal if you have any gaps in your SOP's that should be corrected.

4. Prioritize the actions. We suggest three groups of actions (we develop this further in the Scoring section, below):
    a. Essential: which actions must be performed. In other words, an officer missing one of these actions is automatically failed.
    b. Critical: which actions are important to perform, but not essential.
    c. Other: actions that are neither essential nor critical, but good to do.

Appendix C. Debrief Master

The next page can be projected onto a white board and checked off by the instructor during each scenario and then reviewed with the students.

Doing so provides objective, visual feedback and learning!

LIFE SAFETY = ALL CLEAR
INCIDENT STABILIZATION = FIRE CONTROL
PROPERTY CONSERVATION = LOSS STOP

INITIAL REPORT

- □ BUILDING DESCRIPTION
- □ SMOKE/FIRE CONDITIONS
- □ INITIAL ACTIONS or ASSIGNMENTS
- □ CALL COMMAND
- □ NAME INCIDENT
- □ COMMAND LOCATION

STRATEGY

- □ OFFENSIVE
- □ DEFENSIVE

OPERATIONAL MODE

- □ INVESTIGATION
- □ FAST ACTION
- □ COMMAND

RISK MANAGEMENT

- □ 360°
- □ SAFE INITIAL ACTIONS
- □ WATER SUPPLY
- □ I-RIT (2 IN / 2 OUT)
- □ RIT
- □ UTILITIES
- □ VENTILATION
- □ ACCOUNTABILITY - PAR
- □ SEARCH
- □ USE OF SUPPORT OFFICER
- □ FIRE ABOVE OR BELOW
- □ TIME BENCHMARK
  - □ RE-DECLARE STRATEGY
- □ EFFECTIVE COMMUNICATION
- □ SCENE SECURITY