

DETERMING THE IMPACTS OF EXERCISE
PARTICIPATION ON DISASTER RESPONSE

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Liberty University

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Abstract

There are many opinions surrounding the importance and effectiveness of emergency exercises and their influence on the response phase of emergency management.

Understanding how exercises affect emergency response operations can help training and exercise programs enhance the structure and implementation of meaningful, strategic exercises. However, there is limited research available to validate this. This qualitative study analyzed the responses of 106 survey participants and found that exercise participation positively impacted the ability of individuals to respond to incidents and disasters. By analyzing and categorizing a series of open-ended responses, it was determined that the most important benefit of exercise participation centered around building internal and external relationships, understanding plans, and enhancing communications.

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List of Abbreviations

After Action Report (AAR)

Center for Disease Control (CDC)

Comprehensive Emergency Management Plan (CEMP)

Department of Homeland Security (DHS)

Emergency Action Plan (EAP)

Emergency Operations Center (EOC)

Emergency Operations Plan (EOP)

Federal Emergency Management Agency (FEMA)

Full Scale Exercise (FSE)

Functional Exercise (FE)

Homeland Security Exercise and Evaluation Program (HSEEP)

Improvement Plan (IP)

Subject Matter Expert (SME)

Tabletop Exercise (TTX)

CHAPTER ONE: INTRODUCTION AND OVERVIEW

Introduction

Exercises in emergency management are a component of the cyclical preparedness cycle. Exercise program management includes design and development, conduct, evaluation, and improvement planning for completion (Department of Homeland Security, 2020). Exercises are used by various agencies to provide their employees and stakeholders emergency-related plan education and execution in a controlled environment. They are also used to identify planning and operational gaps and related areas for improvement. All industries, including the public sector, private sector, faith-based institutions, volunteer organizations, non-profits, tribal government, and others, have designed or participated in exercises for their employees and volunteers.

When recommendations and lessons learned are not corrected or implemented after an exercise, there can be direct impacts during a response. The 2004 exercise Hurricane Pam is a prime example of this. The exercise scenario was very similar to the forthcoming Hurricane Katrina and exercised much of the area impacted by Katrina. The committee's report on Katrina found that while exercise participation positively impacted the preparation for response, the lessons learned and the exercises' corrective actions were incomplete (Davis, et al., 2006). Officials stated that participation in the Hurricane Pam exercise was invaluable to their response. Still, residual unclosed planning gaps related to communications, coordination, resource management, evacuation, and others,

negatively affected responders and officials' ability to make life-saving decisions (Davis, et al., 2006).

Exercises range from discussion-based to operations-based. Discussion-based exercises exist to educate and familiarize participants with plans, policies, and procedures and are led by presenters or facilitators (Department of Homeland Security, 2020). Discussion-based exercises include seminars, workshops, tabletop discussions, and games. Operations-based exercises are more hands-on and often focus on clarifying roles and responsibilities (Department of Homeland Security, 2020). Operations-based exercises include drills, functional and full-scale applications.

Exercises vary in intensity and complexity and are generally accepted in the emergency management profession as an essential conduit for testing, validating, and improving plans (Department of Homeland Security, 2016). Exercises allow participants to practice emergency plans and apply their training in no-fault atmospheres. Exercises are a way of addressing specific objectives that can increase participant knowledge and understanding through practical discussions or hands-on activities in a controlled and targeted environment. Completing exercises can support readily available strategic thinking, reduction of uncertainties, and practical problem solving that can be used during a disaster (Krepinevich, 2002). The effects of exercises may extend beyond planning benefits, providing valuable experience in high-stress or high-intensity situations that participants can recall during an emergency or disaster situation.

There are many tools available through the Homeland Security Exercise and Evaluation Program (HSEEP) provided by FEMA to guide the "design and development, conduct, evaluation, and improvement planning" processes (FEMA, 2020). However,

these guides and templates do not provide analysis methods that can capture the effects of the exercise process and its impact on subsequent response. There is an evaluation component within HSEEP, but this is used to evaluate corrective actions identified through the exercise process. Internally, evaluations can be compared to determine if the corrective actions implemented from prior exercises made an impact on future exercises. Measuring the impact of exercises and lessons learned on future response is elusive with the tools at hand.

Statement of Problem

There are many opinions on the importance of conducting exercises, but there is little research available that validates these opinions through trends and analysis. Though there are many tools available through HSEEP to guide the exercise cycle, the evaluation component focuses internally on the improvement of plans, training, and operations. These guides and templates do not provide analysis methods that can capture the effects of the exercise process and its impact on subsequent response.

Significance

This study sought to identify the perceived impacts of exercises on emergency response through qualitative surveys from exercise participants who have been involved in a subsequent incident, emergency, or disaster response. The study considered key factors in exercises, such as the type of exercise, level of participation, breadth of engagement, length of time between the most recent exercise and subsequent response, effectiveness of the improvement planning process, and lessons learned through exercise

participation. Research findings will be used to identify trends in exercise programs that have the most significant perceived impact on response.

Purpose

The purpose of this study is to determine the perceived impact of exercises on the response phase of emergency management. Understanding how exercises improve or inform emergency response can help training and exercise programs enhance the structure and implementation of meaningful, strategic exercises. It can help improve how exercises are evaluated and how improvement plans are implemented.

CHAPTER TWO: LITERATURE REVIEW

The DHS recognizes exercises as a useful tool for evaluating preparedness programs, validating plans and training, increasing awareness of hazards, and clarifying participants' roles and responsibilities (Department of Homeland Security, 2016). Exercises are used to execute and improve all types of emergency-related plans, policies, and procedures. The Emergency Operations Plan (EOP) and its annexes are often the focus of emergency exercise objectives and evaluation because they guide all-hazards and all-threats response (FEMA, 2010). In some agencies, the EOP is called an Emergency Action Plan (EAP) or a Comprehensive Emergency Management Plan (CEMP); however, their purposes are alike. As noted, there are several types of discussion-based and operations-based exercises. These exercise types and descriptions, taken from FEMA's website, are found below (FEMA, n.d.a; FEMA, n.d.b).

Discussion-Based Exercises	
Seminar	Orient participants to or provide an overview into strategies, plans, policies, or procedures. Valuable when an entity is developing new plans or making changes to existing plans or procedures.
Workshop	More structured than seminars. Participant attendance and collaboration from relevant stakeholders is essential to obtain consensus and produce effective plans, procedures, and agreements.
Tabletop Exercise (TTX)	Facilitate conceptual understanding, identify strengths, and areas for improvements, and/or achieving changes in

	perceptions. Participants are encouraged to problem-solve together through in-depth discussion.
Game	A simulation of operations that often involves two or more teams, usually in a competitive environment, using rules, data, and procedures designed to depict an actual or hypothetical situation.
Operations-Based Exercises	
Drill	Coordinated, supervised activity usually employed to validate a specific function or capability in a single agency organization. Commonly used to provide training on tasks specific to new equipment or procedures, to introduce or validate procedures, or practice and maintain current skills.
Functional Exercise (FE)	Validate and evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of functions. Typically focused on exercising plans, policies, procedures, and staff members involved in management, direction, command, and control functions. (Example: Exercising EOC operations utilizing a simulation cell for communications and deployments instead of physical resources.)
Full-Scale Exercise (FSE)	High stress multi-agency, multi-jurisdictional activities designed to test coordinated responses and rapid problem-solving skills. These are the most complex, resource-intensive, and possible expensive exercises.

Table 1: Exercise Types and Descriptions

The military has used exercises, or field exercises, for many years to discuss and operate under multiple scenarios and predict more effective strategies. Exercises are used to incorporate experimentation in different levels of military service which support these strategies and critical thinking (Krepinevich, 2002). In 2005, the CDC was part of the

response efforts during Hurricane Katrina. The CDC identified in their After-Action Report (AAR) that there was a “need for greater awareness of basic knowledge concerning emergency response operations” (CDC, 2005, p. 5). The CDC determined that 51% of their deployed force of 421 CDC employees, approximately 215 people, had not been deployed for an emergency response previously and that regular exercises throughout the agency would better prepare their employees for future response (CDC, 2005). They also determined that by incorporating exercises into their improvement plans, they could test updated or newly developed policies and procedures from the improvement plan. The CDC’s AAR stated that previous AARs had determined that additional training and exercise opportunities were needed, but these improvements had not been made (CDC, 2005).

Preceding the response to the I-35W Minnesota bridge collapse in 2007, top representatives from Minneapolis, Hennepin County, and the State of Minnesota attended a rigorous four-day emergency management course where the participants exercised the city’s Emergency Operations Plan (FEMA, 2007). Leadership identified areas for improvement that were subsequently implemented before the response as a direct result of their exercise participation (FEMA, 2007). Participants addressed the corrections identified and invested in equipment, infrastructure, training, and plan development (FEMA, 2007) Relationships were developed and strengthened as a direct result. FEMA’s report noted that responders trained together both in classroom and field settings and therefore “knew what to do and with whom they needed to coordinate their response” (FEMA, 2007, p. 13). Participation in the exercise supported the ability of leadership to make critical decisions cohesively during the response to the bridge collapse.

Upon evaluation of the response to Hurricane Katrina, evaluators noted seamless coordination between government agencies and volunteer organizations where joint planning and exercising had occurred before the disaster (Townsend, 2006a). This was not the case for all agencies discussed in the evaluation. The evaluation noted that in some cases, non-governmental organizations were successful in spite of the inability of their government partners on the state and local level to provide coordination and guidance, especially in the instances of volunteer and donations management. The importance of emergency exercises where they had been lacking in the past was not understated in the recommendations from evaluators, who encouraged these agencies to begin conducting routine and regular exercises within and across organizations to directly address some of the lessons learned in their report (Townsend, 2006b).

Exercises were an essential component of the response to the shootings at the Virginia Polytechnic Institute and State University (Virginia Tech). Response organizations, such as local law enforcement and emergency medical services, had completed training and exercises that enhanced their ability to respond to an active shooter scenario (TriData Division, System Planning Corporation, 2009). Police officers from both the Virginia Tech Police Department and the Blacksburg Police Department reportedly participated together in practical exercises which enhanced their ability to provide a coordinated response, regardless of which agency officer arrived on-scene first. Where practices were not exercised, such as the utilization of the WebEOC incident management system by local hospitals, there were delays in response (TriData Division, System Planning Corporation, 2009). Virginia Tech also did not conduct exercises for sending out alerts (TriData Division, System Planning Corporation, 2009). Additionally,

the Office of the Chief Medical Examiner had not been included in prior exercises which was noted as a specific opportunity for improvement to improve related processes (TriData Division, System Planning Corporation, 2009). 5

There are benefits identified in the correlation between exercises and mass casualty incident response involving a terrorist attack. These benefits include improved response coordination by utilizing recently exercised plans and improved confidence in roles during the response (Skryabina, Betts, Reedy, Riley, & Amlot, 2020). When surveyed, health care staff who had participated in an exercise reported feeling significantly more prepared to respond to subsequent incidents compared to health care staff who had not participated in an exercise (Skryabina, et al., 2020). They also reported being more familiar with their incident management plan and understanding how to use and recommend improvements to it than their counterparts who has not participated in an exercise (Skryabina, et al., 2020). Open-ended responses found that study participants found the opportunity to practice their response was the most beneficial impact of exercises on their response (Skryabina, et al., 2020).

Conducting exercises has been shown to improve participant knowledge of plans, policies, and procedures, thus promoting "overall competence and confidence" (Skryabina, Reedy, Amlot, Jaye, & Riley, 2017, p. 274). Some studies identified specific benefits of exercises which included an increase in confidence, improved perceptions of preparedness, a better understanding of roles and responsibilities, and the Incident Command System (Skryabina, et al., 2017). Pre- and post-exercise surveys also identified that participant knowledge of emergency management, policies and procedures, plans, and department preparedness had improved because of their exercise participation

(Skryabina, et al., 2017). The improvement of future exercise performance, facilities, and plans in the months following an exercise indicated that the exercise would also be likely to improve response outcomes as well (Skryabina, et al., 2017). It is also expected that identifying planning gaps through exercise will have an overall impact on the improvement of an organization's future emergency response (Skryabina, et al., 2017).

The impact of practice on performance has historically been viewed as something that largely defines, as well as differentiates between, an expert and novice. Through a meta-analysis of practice and performance in various settings, such as games, music, sports, education, and professions, researchers noted that, while important in most settings, practice did not necessarily guarantee high performance (Macnamara, Hambrick & Oswald, 2014). They concluded that, although not as important as described in earlier research, deliberate practice was “unquestionably important as a predictor of individual differences in performance from both a statistical and a practical perspective.” (Macnamara, Hambrick, & Oswald, 2014, p. 1615). The effects of practice on performance were found to be lower on activities that were less predictable, such as handling an aviation emergency (Macnamara, Hambrick, & Oswald, 2014). However, the effects of deliberate practice had a greater impact on performance when *retrospective methods* were used to determine practice needs by assessing past events or situations (Macnamara, Hambrick, & Oswald, 2014).

CHAPTER THREE: RESEARCH METHODOLOGY

This study was a qualitative study that asked participants to share their perspectives based on participation in one exercise and one subsequent response. The research conducted was basic, inductive, and exploratory, and sought to understand how exercise and response participants view the influence and criticality of emergency exercise participation. Participation was voluntary and completely anonymous so participants could share truthful opinions about their exercise participation without fear of retribution from a current or previous employer.

Data was collected solely through an online survey. The survey consisted of 32 required multiple-choice and open-ended questions. It was built in an online program and distributed through social media platforms and listservs. Though the survey targeted emergency management professionals, they were encouraged to share the survey with their colleagues who met the criteria. The survey and research methodology were reviewed and approved by the Liberty University Institutional Review Board.

Potential respondents were required to answer two qualifying questions to confirm they met the required conditions and had participated in at least one exercise and one subsequent response. There were 152 responses to the survey. However, only 106 met the qualifications and completed the survey to be eligible for analysis, yielding a 70% completion rate out of the 152 respondents. A thematic analysis of the data identified recurring themes within the open-ended responses. Each response was analyzed for keywords or ideas and then categorized to identify commonalities.

There is little existing research that validates emergency exercise participation's importance or applicability and its impacts on response. Impacts are also a subjective determination, recognizing that understanding plans, building relationships, feeling prepared, and responding well are individual determinations. While some quantitative data was extracted from the responses, measuring exercise participation effectiveness and its correlation to successful response cannot be quantified and remains subjective data for exercise participants.

CHAPTER FOUR: FINDINGS

Quantitative Summary

The survey received 152 responses with a 70% completion rate. There were 106 completed responses for this survey, representing a wide range of agencies, experiences, and roles. Localities were the most represented type of agency, as shown in Table 2. In addition to the agencies listed in the table, there was also participation from healthcare, tribal, and military sectors.

Agency Type	Responses	Percent of Participants
Local	37	35%
State	26	25%
Federal	18	17%
Non-Profit	8	8%
Private Industry	7	7%
Other (please specify)	6	6%
Regional	4	4%

Table 2: Agencies represented in survey responses.

The highest represented role among the respondents was the emergency manager. Other positions represented included planner, emergency support function representative, situational awareness provider, volunteer, intern, and epidemiologist. Table 3 provides an overview of the roles represented amongst respondents.

Agency Role	Responses	Percent of Participants
Emergency Manager	54	51%
Coordinator	18	17%
Manager/Department Head	15	14%
Other (please specify)	11	10%
First Responder	8	8%
Administration	0	0%

Table 3: Agency roles represented in survey responses.

Respondents needed to identify a single past exercise and subsequent response that they had been a part of to qualify for research participation, even if they have participated in more than one. Table 4 displays the types of exercises respondents identified for discussion. Over 80 percent of the exercises chosen by the respondents for the survey were operations-based.

Exercise Type	Responses	Percent of Participants
Full-Scale Exercise	53	50%
Functional	29	27%
Tabletop	14	13%
Drill	5	5%
Seminar	2	2%
I'm not sure	2	2%
Workshop	1	1%

Table 4: Exercise types represented in survey responses.

Survey respondents represented numerous exercise-related roles. In addition to the survey options, respondents also participated in their exercises as the exercise planner, exercise director, or served in multiple positions and support roles. Table 5 details the participant exercise roles.

Exercise Role	Responses	Percent of Participants
Participant	41	39%
Controller	23	22%
Facilitator	19	18%
Other (please specify)	12	11%
Evaluator	9	8%
Observer	2	2%

Table 5: Exercise roles represented in survey responses.

Most respondents, 95%, shared that their exercise produced corrective actions or areas for improvement. They also noted that training was provided (Table 7), and plans were improved (Table 8) due to the exercise. Table 6 shows the number of respondents that stated corrective actions and areas for improvement were completed following the exercise.

Corrective Action Completion	Responses	Percent of Participants
Yes	66	62%
No	20	19%
I don't know.	17	16%
Not applicable.	3	3%

Table 6: Completed corrective actions from the exercise.

Training Provided	Responses	Percent of Participants
Yes	56	53%
No	25	24%
I don't know.	2	2%
No training was recommended from the exercise.	23	22%

Table 7: Post-exercise training provided.

Plans Improved	Responses	Percent of Participants
Yes	89	84%
No	12	11%
I don't know.	5	5%

Table 8: Post-exercise plan improvements.

Qualitative Summary

Survey participants described the level of external agency involvement in their exercises and what effect they perceived that involvement to have on exercise outcomes. 58% of the respondents felt that the right agencies were involved and were essential to the exercise. However, 27% of the respondents noted that external agencies were missing, although it did not hurt the exercise outcome. No respondents stated that a missing external agency hindered the progress of the exercise. The missing external partners were not specifically named by the respondents.

Most survey participants felt somewhat familiar with their emergency operations plan, policies, and procedures before the exercise. Post-exercise plan familiarity was notably increased for respondents. All respondents reported being at least *Very Familiar* with their emergency plans after the exercise. Table 9 represents the level of familiarity respondents perceived having with their plans before their exercise, and Table 10 illustrates the level of perceived familiarity after the exercise.

Pre-Exercise Plan Familiarity	Responses	Percent of Participants
Extremely familiar	56	53%
Very familiar	36	34%
Somewhat familiar	12	11%
Not so familiar	1	1%
Not at all familiar	1	1%

Table 9: Pre-exercise plan familiarity.

Post-Exercise Plan Familiarity	Responses	Percent of Participants
Extremely familiar	72	68%
Very familiar	34	32%
Somewhat familiar	0	0%
Not so familiar	0	0%
Not at all familiar	0	0%

Table 10: Post-exercise plan familiarity.

Participants described, as applicable, anything gained from the exercise that was essential to their subsequent response. Nine percent of participants said that they believed their exercise experience provided vital tools in their response. Out of their open-ended responses emerged several themes. Communication was the most recurring theme, followed by clarifying roles and responsibilities, and process, procedure, and plan familiarity. Many relationship-building themes were also frequently discussed, including improved networking, teamwork, partnerships, and collaboration. Respondents discussed the importance of understanding and enhancing their resource request and management processes, validating their plans, setting expectations, and addressing training needs.

Participants also described what experiences they referenced from their exercise during their response, if any. While 91% of respondents felt that the exercise experience was beneficial overall for the response, 79% of respondents stated that they referenced specific exercise participation experiences. The response benefits echoed many of the same themes identified in exercise participation. Respondents noted that they utilized improved communication skills and methods, role and responsibility clarifications, improved relationships, enhanced resources and resource management, plan improvements and enhanced knowledge of plans, processes, and procedures during their emergency response.

Most participants, 88%, stated that their exercise participation directly influenced their ability to execute their response plans and procedures. The most common themes in their explanations were related to the improved efficiency in their response and increased plan familiarity and plan improvements. Many respondents also noted feeling more confident about their response actions, improved communications internally and externally, and improved expectations due to exercise participation. Many found that their real-world response was expedited and more effective through enhanced plan execution. Other improvements were determined to be related to an agency's ability to complete corrective actions, such as addressing planning gaps, training gaps, impact analyses, and improving coordination and resource management. Adversely, respondents who did not believe that their exercise participation influenced how they executed plans and procedures noted their agency's inability to document lessons learned or complete corrective actions before the response. One participant also stated that exercised procedures were not followed during the response.

Survey participants described the influence of their exercise participation on both internal and external relationships. While there were some commonalities expressed internally and externally, there were also some unique influences in each. Internally, respondents overwhelmingly described the improvement in relationships and teamwork as the most significant result of participating in an exercise with their colleagues. Many respondents wrote that there were improvements in internal collaboration, awareness, and role clarification as well. Some stated an increase in the buy-in after the exercise and noted that communication, confidence, trust, and coordination were improved.

Externally, survey participants again stated with an emphatic response that relationships improved because of the exercise participation. Many also noted an increase in the understanding and awareness of external partners and their roles, processes, and procedures. In the spirit of relationship building, respondents also stated that teamwork and networking with new external partners increased through exercise participation. Some noted that communication, collaboration, and coordination were improved. They also found that mutual aid, trust, and information sharing were a part of these improvements. In the few responses where survey participants did not identify internal or external influences from their respective exercises, they cited arrogance, egos, or lack of appropriate participation and representation as limitations.

Respondents provided ratings of their overall perceptions related to their exercise and response participation. Most respondents felt that the exercise they discussed in their survey was similar to the real-world incident they experienced during their response.

Exercise Similar to Response	Responses	Percent of Participants
Yes	69	65%
Somewhat	31	29%
No	6	6%

Table 11: Exercise similarity to response.

Most respondents felt that participating in one exercise increased their ability to complete their response duties. However, respondents felt that participation in multiple exercises was more influential in improving response roles.

Single Exercise Improved Response	Responses	Percent of Participants
Strongly agree	37	35%
Agree	51	48%
Neither agree nor disagree	11	10%
Disagree	3	3%
Strongly disagree	4	4%

Table 12: Single exercise participation improved real-world response ability.

Multiple Exercises Improve Response	Responses	Percent of Participants
Strongly agree	78	74%
Agree	22	21%
Neither agree nor disagree	2	2%
Disagree	1	1%
Strongly disagree	2	2%

Table 13: Multiple exercise participation improves real-world response ability.

Overall, most respondents also determined that they felt better equipped to respond to an incident and were more familiar with their emergency plan elements because of their exercise participation.

Equipped for Response	Responses	Percent of Participants
Strongly agree	59	56%
Agree	37	35%
Neither agree nor disagree	4	4%
Disagree	3	3%
Strongly disagree	3	3%

Table 14: Equipped to respond to an incident because of exercise participation.

Familiarity with Plan	Responses	Percent of Participants
Strongly agree	72	68%
Agree	24	23%
Neither agree nor disagree	4	4%
Disagree	2	2%
Strongly disagree	4	4%

Table 15: Familiar with plan elements because of exercise participation.

Participants described what elements may have been missing from their exercise to further support their response efforts. Answers to this question varied greatly, but a few recurring themes did emerge. Respondents felt that additional appropriate

representation or participation from other agencies at their exercise was the number one element that would have better supported their response. Additionally, a lack of leadership involvement or leadership support was the third most notable missing element. Many respondents felt that the scenarios were unrealistic, too stressful, not stressful enough, lacked input from proper subject matter experts, or did not drive the exercise towards the stated objectives. Some noted failures in completing corrective actions and providing training after the exercise directly impacted their response ability. Other missing elements included unclear or unattainable objectives, insufficient time to complete the exercise, and a lack of progressive approaches to exercises.

Finally, survey participants provided an overall rating of their perceptions of the importance of emergency exercises related to improving relationships, improving responses, improving procedural knowledge, and as an essential element of emergency management. Their responses were overwhelmingly in support of exercises as a vital element for emergency preparedness and response.

Exercises Improve Relationships	Responses	Percent of Participants
Strongly agree	94	89%
Agree	10	9%
Neither agree nor disagree	1	1%
Disagree	0	0%
Strongly disagree	1	1%

Table 16: Exercise importance for improving relationships.

Exercises Improve Responses	Responses	Percent of Participants
Strongly agree	89	84%
Agree	11	10%
Neither agree nor disagree	3	3%
Disagree	2	2%
Strongly disagree	1	1%

Table 17: Exercise importance for improving responses.

Exercises Improve Plan Knowledge	Responses	Percent of Participants
Strongly agree	86	81%
Agree	16	15%
Neither agree nor disagree	2	2%
Disagree	1	1%
Strongly disagree	1	1%

Table 18: Exercise importance for improving plan/policy/procedures knowledge.

Exercises are an Important Element of EM	Responses	Percent of Participants
Strongly agree	96	91%
Agree	6	6%
Neither agree nor disagree	3	3%
Disagree	0	0%
Strongly disagree	1	1%

Table 19: Exercise importance in emergency management.

CHAPTER FIVE: CONCLUSION

The survey results showed that most respondents, which represented many roles, experiences, and agencies, found exercises to be an essential element in responding to incidents and disasters. By analyzing and categorizing the participants' open-ended responses, it was determined that the most important benefit of exercise participation for response centered around building internal and external relationships, understanding plans, and enhancing communications. This was true even though survey participants also represented every type of discussion- and operations-based exercise defined by HSEEP.

Most respondents, 91%, stated that they believed exercise participation was beneficial for all players during their response, and 79% said they referenced an experience from their exercise during the response. The ability to discuss, practice, and improve plans directly affected a participant's ability to follow disaster plans. The prompt completion of corrective actions and documented lessons learned is critical to foster improvements and plan support during a subsequent response. Most respondents, 88%, stated that their enhanced ability to reference and execute their plans, policies, and procedures during a response was directly related to their participation in exercising them.

Many participants described their response capabilities as expedited, more efficient, and more effective, and contributed these improvements to their exercise participation. Respondents often discussed their shift in expectations, which helped them

better prepare to work with external partners and effectively fill internal roles. The exercise's similarity to the response may have impacted the improved ability to respond in familiar circumstances. However, it is reasonable to assume that agencies will typically exercise for emergencies they are more likely to experience. Though objectives remain a driving factor in exercises, the quality of the exercise scenario was mentioned several times by respondents, concluding that even if the scenario is similar to a real-world response, a poorly written scenario can distract participants who rely on it to force discussions and plan improvements.

Exercises are imperative for building relationships internally and externally. Improvements in trust, collaboration, coordination, understanding, and awareness are intricately linked to the ability to build relationships for exercise participants. It was repeatedly cited as one of the most important elements of an exercise, regardless of the type of exercise conducted. However, the success of relationship improvements and teamwork can be hindered by leadership if they do not support exercise efforts.

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APPENDIX A: Survey Questions

1. I agree to participate in this study and understand that my participation is voluntary, anonymous and that I can end my participation at any time by exiting this survey before submission. Yes / No
2. Have you ever participated in an emergency exercise? Yes / No
3. Have you ever participated in the response to an incident, disaster, or emergency? Yes / No
4. What type of agency did you represent during your exercise and response? Local / Regional / State / Federal / Private Industry / Non-Profit / Other (please specify)
5. What is/was your role in that agency? Emergency Manager / First Responder / Administration / Manager/Department Head / Coordinator / Other (please specify)
6. Was the exercise a: Seminar (lecture-based education) / Workshop (developed a product, such as a plan or procedure) / Tabletop (worked through modules and discussion questions) / Drill (tested a single response procedure) / Functional (tested capabilities in real-time, utilized SimCell, no deployment of real assets) / Full-Scale (actual deployment of resources in real-time) / I'm not sure (please describe)
7. Who planned this exercise? My agency planned this exercise. / Another agency planned this exercise and I was invited to participate. / My agency planned this exercise with another agency. / I'm not sure.

8. What was your role in the exercise? Participant / Observer / Evaluator / Controller / Facilitator / Other (please specify)
9. How many people from within your agency participated in the exercise? 1-5 / 6-10 / 11-15 / 16-25 / 25+ / I'm not sure.
10. Were external agencies represented at the exercise? Yes, and they were all essential. / Yes, but some essential agencies were missing. / Yes, but some did not need to be there. / No, this was an internal-only exercise. / No, and it hindered the progress.
11. Was this exercise beneficial? Yes / No / Why or why not?
12. How familiar were you with your emergency operations plan/policy/procedure prior to the exercise? Extremely familiar / Very familiar / Somewhat familiar / Not so familiar / Not at all familiar
13. How familiar were you with your emergency operations plan/policy/procedure after the exercise? Extremely familiar / Very familiar / Somewhat familiar / Not so familiar / Not at all familiar
14. Were corrective actions or areas for improvement identified during the exercise? Yes / No / I don't know.
15. Were the corrective actions/areas for improvement completed? Yes / No / I don't know. / Not applicable.
16. Were recommended trainings provided to you because of the exercise? Yes / No / I don't know. / No training was recommended from the exercise.
17. Were plans improved because of the exercise? Yes / No / I don't know.
18. How many total exercises have you participated in? 1 / 2-5 / 6-10 / 11-15 / 16+

19. Was there anything gained from the exercise that was essential to the response? If yes, what was it?
20. Did you reference experiences from your exercise during the participation in your response? What were they?
21. How did exercise participation influence how you executed your response plans and procedures?
22. How did exercise participation influence your relationships with fellow responders internally?
23. How did exercise participation influence your relationships with fellow responders externally?
24. Was the exercise threat, hazard, or scenario similar to the real-world response you experienced? Yes / Somewhat / No
25. Participation in one exercise increased my ability to complete my response role. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree
26. Participation in multiple exercises increased my ability to complete my response role. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree / Not applicable
27. I felt equipped to respond to an incident because of my exercise participation. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree
28. I was more familiar with certain elements of my plan because of my exercise participation. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree

29. How familiar were you with your emergency operations plan/policy/procedure prior to the response? Extremely familiar / Very familiar / Somewhat familiar / Not so familiar / Not at all familiar
30. How familiar were you with your emergency operations plan/policy/procedure after the response? Extremely familiar / Very familiar / Somewhat familiar / Not so familiar / Not at all familiar
31. Was there anything missing from the exercise that would have better supported the response effort?
32. Exercises are important for improving relationships. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree
33. Exercises are important for improving responses. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree
34. Exercises are important for improving knowledge of plans/policies/procedures. Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree

APPENDIX B: Tables

Discussion-Based Exercises	
Seminar	Orient participants to or provide an overview into strategies, plans, policies, or procedures. Valuable when an entity is developing new plans or making changes to existing plans or procedures.
Workshop	More structured than seminars. Participant attendance and collaboration from relevant stakeholders is essential to obtain consensus and produce effective plans, procedures, and agreements.
Tabletop Exercise (TTX)	Facilitate conceptual understanding, identify strengths, and areas for improvements, and/or achieving changes in perceptions. Participants are encouraged to problem-solve together through in-depth discussion.
Game	A simulation of operations that often involves two or more teams, usually in a competitive environment, using rules, data, and procedures designed to depict an actual or hypothetical situation.
Operations-Based Exercises	
Drill	Coordinated, supervised activity usually employed to validate a specific function or capability in a single agency organization. Commonly used to provide training on tasks specific to new equipment or procedures, to introduce or validate procedures, or practice and maintain current skills.
Functional Exercise (FE)	Validate and evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of

	functions. Typically focused on exercising plans, policies, procedures, and staff members involved in management, direction, command, and control functions. (Example: Exercising EOC operations utilizing a simulation cell for communications and deployments instead of physical resources.)
Full-Scale Exercise (FSE)	High stress multi-agency, multi-jurisdictional activities designed to test coordinated responses and rapid problem-solving skills. These are the most complex, resource-intensive, and possible expensive exercises.

Table 1: Exercise Types and Descriptions

Agency Type	Responses	Percent of Participants
Local	37	35%
State	26	25%
Federal	18	17%
Non-Profit	8	8%
Private Industry	7	7%
Other (please specify)	6	6%
Regional	4	4%

Table 2: Agencies represented in survey responses.

Agency Role	Responses	Percent of Participants
Emergency Manager	54	51%
Coordinator	18	17%
Manager/Department Head	15	14%
Other (please specify)	11	10%
First Responder	8	8%
Administration	0	0%

Table 3: Agency roles represented in survey responses.

Exercise Type	Responses	Percent of Participants
Full-Scale Exercise	53	50%
Functional	29	27%
Tabletop	14	13%
Drill	5	5%
Seminar	2	2%
I'm not sure	2	2%
Workshop	1	1%

Table 4: Exercise types represented in survey responses.

Exercise Role	Responses	Percent of Participants
Participant	41	39%
Controller	23	22%
Facilitator	19	18%
Other (please specify)	12	11%
Evaluator	9	8%
Observer	2	2%

Table 5: Exercise roles represented in survey responses.

Corrective Action Completion	Responses	Percent of Participants
Yes	66	62%
No	20	19%
I don't know.	17	16%
Not applicable.	3	3%

Table 6: Completed corrective actions from the exercise.

Training Provided	Responses	Percent of Participants
Yes	56	53%
No	25	24%
I don't know.	2	2%
No training was recommended from the exercise.	23	22%

Table 7: Post-exercise training provided.

Plans Improved	Responses	Percent of Participants
Yes	89	84%
No	12	11%
I don't know.	5	5%

Table 8: Post-exercise plan improvements.

Pre-Exercise Plan Familiarity	Responses	Percent of Participants
Extremely familiar	56	53%
Very familiar	36	34%
Somewhat familiar	12	11%
Not so familiar	1	1%
Not at all familiar	1	1%

Table 9: Pre-exercise plan familiarity.

Post-Exercise Plan Familiarity	Responses	Percent of Participants
Extremely familiar	72	68%
Very familiar	34	32%

Somewhat familiar	0	0%
Not so familiar	0	0%
Not at all familiar	0	0%

Table 10: Post-exercise plan familiarity.

Exercise Similar to Response	Responses	Percent of Participants
Yes	69	65%
Somewhat	31	29%
No	6	6%

Table 11: Exercise similarity to response.

Single Exercise Improved Response	Responses	Percent of Participants
Strongly agree	37	35%
Agree	51	48%
Neither agree nor disagree	11	10%
Disagree	3	3%
Strongly disagree	4	4%

Table 12: Single exercise participation improved real-world response ability.

Multiple Exercises Improve Response	Responses	Percent of Participants
Strongly agree	78	74%
Agree	22	21%
Neither agree nor disagree	2	2%
Disagree	1	1%
Strongly disagree	2	2%

Table 13: Multiple exercise participation improves real-world response ability.

Equipped for Response	Responses	Percent of Participants
Strongly agree	59	56%
Agree	37	35%
Neither agree nor disagree	4	4%
Disagree	3	3%
Strongly disagree	3	3%

Table 14: Equipped to respond to an incident because of exercise participation.

Familiarity with Plan	Responses	Percent of Participants
Strongly agree	72	68%
Agree	24	23%
Neither agree nor disagree	4	4%
Disagree	2	2%
Strongly disagree	4	4%

Table 15: Familiar with plan elements because of exercise participation.

Exercises Improve Relationships	Responses	Percent of Participants
Strongly agree	94	89%
Agree	10	9%
Neither agree nor disagree	1	1%
Disagree	0	0%
Strongly disagree	1	1%

Table 16: Exercise importance for improving relationships.

Exercises Improve Responses	Responses	Percent of Participants
Strongly agree	89	84%
Agree	11	10%
Neither agree nor disagree	3	3%
Disagree	2	2%
Strongly disagree	1	1%

Table 17: Exercise importance for improving responses.

Exercises Improve Plan Knowledge	Responses	Percent of Participants
Strongly agree	86	81%
Agree	16	15%
Neither agree nor disagree	2	2%
Disagree	1	1%
Strongly disagree	1	1%

Table 18: Exercise importance for improving plan/policy/procedures knowledge.

Exercises are an Important Element of EM	Responses	Percent of Participants
Strongly agree	96	91%
Agree	6	6%
Neither agree nor disagree	3	3%
Disagree	0	0%
Strongly disagree	1	1%

Table 19: Exercise importance in emergency management.