

Developing a Rapid Damage Assessment Policy for the Worthington Fire Department

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Certification Statement

I hereby certify that this paper constitutes my own project, that where the language of others set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

Abstract

The problem was that the Worthington Fire Department had not prepared a plan that will enable our personnel to conduct a rapid damage assessment following a natural, technological, or societal disaster. The purpose of this research project was to develop a rapid damage assessment policy. Action research methodology was used to answer the following questions:

- (1) what standards or guidelines exist relative to the development and implementation of a rapid damage assessment policy;
- (2) what are the main objectives of rapid damage assessment;
- (3) what are the critical components of an effective rapid damage assessment program; and
- (4) how have other departments developed similar programs?

Research procedures included a comprehensive literature review that related to research questions 1-3. A survey that targeted current EFO members, a local survey, and personal interviews were utilized to determine how other departments have developed and implemented similar programs.

The results of the project indicated that there were Federal, State, and Local guidelines that provide the legal authority for performing damage assessments. The results also indicated that a key objective for performing damage assessments is related to supplying the needed information for Federal aid. The results also identified critical components as well as how other departments have developed rapid damage assessment policies.

The results also supported the following recommendation: the adoption of the rapid damage assessment policy and the damage assessment forms that were developed as a result of this research project. Other recommendations that are also a result of this project include the need to perform comprehensive risk assessment of Worthington's district, develop a damage assessment training curriculum, and the development of a severe weather operations S.O.P.

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Introduction

The Worthington Fire Department (WFD) is located in the suburbs of Louisville, Kentucky. This area of Kentucky has a history of being hit by natural disasters such as floods, tornados, severe electrical storms, winter storms that contain snow and ice, hurricane winds, and earthquakes. The area is also susceptible to technological hazards such as large hazardous material releases, transportation system accidents, and power failures. There has also been a history of societal hazards such as large civil disturbances. Over the years the damage caused by these events has been substantial. The problem is that WFD has not prepared a plan that will enable emergency responders to effectively conduct an initial rapid damage assessment following a natural, technological, or societal disaster.

The purpose of this Applied Research Project (APR) is to develop a rapid damage assessment policy for the Worthington Fire Department. Action research methodology will be used to answer the following questions: (1) what standards or guidelines exist relative to the development and implementation of a rapid damage assessment policy; (2) what are the main objectives of rapid damage assessment; (3) what are the critical components of an effective rapid damage assessment program; and (4) how have other departments developed similar programs?

Background and Significance

The Worthington Fire Protection District (WFD) is one of 18 Metro Louisville Suburban Fire Districts, which covers 20 square miles in northeastern Jefferson County and a part of Oldham County. It services primarily the 40241 zip code having a residential population of 24,421. The overall population we serve consists of 35,000 residents and a daytime population of approximately 75,000. WFD also services two main interstate highways, a main railroad line, and various other manufacturing facilities including the 6 million square foot Ford Truck

Assembly Plant. We operate from three stations, which respond to nearly 2000 runs a year. The responses include fire, medical, hazardous materials, confined space, trench rescue, and technical rope rescue.

WFD is an ISO Class 3 combination fire department operating on a 3.6 million dollar budget. It has 29 career employees, 4 part time employees, and 25 volunteers. With these personnel, one engine company and a truck company is staffed 24 hours a day, and a second engine is staffed nightly by a 9 hour volunteer crew. In addition, we are fortunate to have the staffing capabilities that are dedicated to community risk reduction that includes a 40 hour captain and a 24/48 sergeant.

The demographics of the protection district have changed dramatically over the last 15 years and are still changing. The district continues to evolve from a mostly rural area to an area consisting of wider highways, shopping centers, hotels, churches, schools and a rapidly growing population. In reality, the population is growing at a faster rate than the highway infrastructure can handle.

With all of this expansion comes a higher demand for our services. In a response to these greater demands, WFD transitioned from a volunteer department to a combination department in 2002. We have become more proficient in technical rescue and hazardous materials response as well as further the development of our fire fighting skills. In addition, all of this population and infrastructure growth that has occurred and that is continuing to occur puts us at greater risk for the potential loss of life and or property damage as the result of natural or technological disasters.

As stated earlier, WFD is part of 18 suburban fire districts that surround the city of Louisville. Even though our district has a governmental boundary that defines the confines of

our district, we do not necessarily have an operational boundary. By this I mean we can be dispatched to any part of Jefferson County or for that matter, the city of Louisville as the incident or the need for specific resources dictates. This is a significant background principle to keep in mind in order to gain the necessary insight as to what types of large scale events we have experienced in our entire area as well as what the potential is for future events that we may need respond to as opposed to just the events that have occurred within our jurisdictional boundaries.

Since our area is bordered by the Ohio River to the north and various tributaries located throughout our district and neighboring districts, flooding is probably the most common hazard we face that can lead to widespread damages. Our district experiences flash flooding throughout the year while our neighboring districts and the city can experience river basin flooding. While access to specific areas within our district can be affected by flash flooding, this problem is typically short lived while basin flooding can be of a more long term event that in the past has caused substantial damages to the infrastructure, businesses, and residential neighborhoods. Although we have had numerous flooding events over the last ten years, our most recent flood of significance came in 1997 while other great floods have occurred in 1964 and 1937.

Tornados have also proved to be significant events in our area. Although statistics show that we are at biggest risk for tornados in March, April, and May, most recent history has shown that we can experience these events at any time. As the author was beginning this research project, the WFD district was hit by an EF1 tornado in early January of 2012. The path of destruction narrowly missed one of our three stations and it caused significant damage to three neighborhoods around that same station. The station and its crew were safe but they were out of service because the area around the station was totally impassible and a rapid damage assessment of the area was obviously needed.

In early March of 2012 even as this project progressed, our area narrowly missed several large tornados, including at least one EF4 tornado that obliterated small towns just north of our area and caused severe damage in other areas just east and south of our district leading to excess of 35 fatalities. And again, on March 23, 2012 our county was hit by another EF1 tornado that touched down just to the south of our district, narrowly missing us.

Earthquakes in our district have also been felt as recently as the summer of 2008. Although it was minor, it brought home the reality that we can surely suffer an event that could be substantial. The reason for this threat is that the greater Louisville area sits along the New Madrid Fault line. According to Jefferson County Emergency Operations plan, the New Madrid Fault has enough energy stored to produce a 7.6 magnitude quake which is projected to cause a 4.0-4.5 magnitude event in the Louisville/Jefferson county area. It is also projected that more people would be potentially affected in our area as opposed to anywhere else in the state. ("Earthquake Hazard Analysis," 2011)

Hurricanes have typically caused major rain events that lead to river basin flooding or flash flooding in our district and throughout Jefferson County. Although rare, we did experience a significant wind event without the heavy rain as the result of Hurricane Ike in 2008. The event caused numerous power outages, road closures, and significant property damage in our district. It also compelled us to do a damage assessment throughout our district in order to determine if roads were impassable or if we suffered any infrastructure damages. The damage assessment process we used was fundamental at best since we do not have a formal process in place.

As for technological hazards that we may be susceptible to, hazardous materials releases are the most probable. We have responded to numerous hazardous materials releases throughout our district due to rail line traffic, interstate commerce, and industrial applications. Some of

these events have resulted in declarations of the highest level, large scale evacuations, or disruption of traffic due to highway closures. One particular industry in our district poses a great risk to a larger portion of our population due to its operating with anhydrous ammonia. Due to the nature of the product itself, the hazardous materials incidents we have responded to involving anhydrous ammonia have been declared to the highest level and one particular incident did involve large scale evacuations. Aside from past releases, the plant involved has 33,000 pounds of anhydrous stored for use. We have developed various event models that involve a catastrophic release of the 33,000 pounds of material that indicate that such an event would wipe out a number of our neighborhoods that are adjacent to this plant. In addition, we have responded to other large scale hazardous materials events in other locations within our county.

This background information demonstrates that the area we protect has narrowly missed large scale events that were capable of causing widespread damage, injuries, and death. It also demonstrates that we can face the risk of significant events in the future regardless of what time of year it is. The significance of this project is that it is crucial that we have a rapid damage assessment plan/policy developed and put in place that can not only work for initial response and recovery operations within our own district but that it may also serve as a model for our region. Presently we do not have a plan to do a rapid assessment. In the past we have arbitrarily checked specific areas within our district that we felt were either high hazard areas or areas that posed access issues but this process lacked coordination and an adequate reporting process. Implementation of this damage assessment plan will provide our department with a logical and efficient way of assessing damage and effectively communicating our findings.

This project supports the United States Fire Administration's strategic plan operational objectives of improving local planning and preparedness as well as improving the fire and

emergency services' capability for response to and recovery from all hazards. ("USFA Strategic Plan," 2012) This project also supports and is relevant to the training objectives of the United States Fire Academy's Executive Analysis of Fire Service Operations in Emergency Management class (EAFSOEM). Specifically the project relates to the portion of the class that dealt with performing damage assessments after a large scale event. The unit analyzed different types of damage assessments, how damage assessment information is obtained and processed, and the specific purposes of damage assessments. (*Damage Assessment*, 2011)

Literature Review

The purpose of this literature review is to identify what standards or guidelines exist relative to the development and implementation of a rapid damage assessment policy, the main objectives of damage assessment, what are the critical components of an effective damage assessment program, and how have other agencies developed such programs. The review process will include examining how local, state, federal, and international agencies deal with the damage assessment process. It should also be noted that the term "windshield survey" may be used within this project as a synonym for rapid damage assessment.

The literature review begins gaining an understanding of what damage assessment is. A summarization indicates that damage assessment is the gathering of information that relates to the impact on life and property within a defined area as the result of an event or events. The EAFSOEM training manual provides information relating to the two phases of damage assessment: Immediate Damage Assessment and Preliminary Damage Assessment. Immediate damage assessment relates to a rapid gathering of damage estimates upon initial arrival at the area or specific site. It is conducted during the active phase of the incident. In contrast, a preliminary damage assessment is conducted during the post incident phase. It is a more detailed

examination and analysis of the total damage sustained because of the event. Although both are equally important, the focus of this project is the immediate damage assessment phase or initial damage assessment. (*Damage Assessment, 2011*)

The EAFSOEM manual also identified critical components that should be included in an immediate damage assessment. These components include but are not limited to: number of deaths or injuries, potential for additional loss of life or injury, unsafe conditions, evacuation needs, and the need for emergency services. The critical deployment of emergency services will be based on information received from the immediate damage assessment. In addition, the capabilities of emergency services will also be determined since the damage assessment will also include the identification of damaged response vehicles, damaged stations, and if there are any injured response personnel. Other critical components will address infrastructure damage, hazard potential, property loss, and area access.

Another critical component within the damage assessment process is the need for an adequate way to gather and effectively communicate the damages. A form that is recommended to aid in effective communication should include geographical information, street or highway information, identification of the occupancy type for structures involved, visual damage percentages of structures, target hazard information, and infrastructure information.

From the incident management aspect, immediate damage assessments will provide the critical information that will help with identifying incident objectives, the development of strategic and tactical objectives, resource needs, deployment of needed resources, and for the relaying of information to the Emergency Operations Center. Aside from operational objectives, the immediate damage assessment process will provide information as to whether state or federal aid is needed. (*Damage Assessment, 2011*)

The reasoning for performing damage assessments begins with looking at how it relates to recovering from disasters. According to the Federal Emergency Management Agency (FEMA), damage assessments will begin in the recovery phase of an incident. Immediately after a large event that has caused a large amount of damage, immediate damage assessments or “windshield surveys” will begin in order to determine the extent of the damage. The importance of this step will help give a rapid broad characterization of the number of buildings affected and the amount of damage. The initial damage assessment is the key element that will lead to whether or not to seek a declaration of the event. Typically the initial survey is followed by a Preliminary Damage Assessment (PDA) that will provide the scope and magnitude of the event. ("Preparing for Post Disaster Recovery," 2010)

David McEntire indicated that damage assessment is a vital activity that ironically has not received much attention. The importance of performing damage assessments and lessons learned was illustrated by McEntire and Jill Cope in their quick response research project of the earthquake that hit Paso Robles, California in January of 2004. Among the lessons discussed, a few key lessons indicated that: damage assessment plays a vital role in the initial minutes and hours after an event and is relevant to the initial emergency operations phase of the disaster; damage assessment is a crucial phase that helps the emergency teams with making decision to request resources; damage assessment is a repetitive process especially if further damage continues to occur after the initial event has passed. (McEntire & Cope, 2004)

Damage assessments are of different types and diverse methods have been used to carry them out. Initial damage assessments, also referred to as drive-through assessments were carried out by using vehicles operated by fire personnel, public works and the Red Cross. Other agencies conducted aerial damage assessments. The data gathered from these initial assessments

would then be passed on to help with the Preliminary Damage Assessment which opens up the possibility for receiving a Presidential Disaster Declaration. (McEntire & Cope, 2004)

The American Red Cross (ARC) provides disaster program guidance through its Disaster Assessment Toolkit. Within this toolkit, the ARC's equivalent to rapid damage assessment and relevant to this project is what they refer to as Impact Assessment. For the ARC, impact assessment is the first step of a four step process of gathering damage reports that will feed into the remaining three steps: Preliminary Damage Assessment (PDA), Area Damage Assessment (ADA), and Detailed Damage Assessment (DDA).

Mazza states that PDA indicates the number of affected buildings by a percentage of total buildings within the impact area, ADA is the method chosen when dealing with large, densely populated area, and finally the DDA evaluates building and infrastructure damages in more detail. (Mazza, 2009) As mentioned earlier, the focus of this project is on the initial or impact damage assessment process, but understanding what the other phases of the damage assessment process will help with identifying why it is important to conduct rapid damage assessments.

The ARC continues that:

“Impact assessment information obtained during the collection process will establish boundaries, scope, size, demographics, and timelines of the event, as well as the infrastructure status. An impact assessment must be initiated at the onset of a disaster and continue throughout the disaster relief operation”. (American Red Cross, 2008, p. 40)

The ARC has also identified resources that can help with the collection of impact assessment information. The resources may include but are not limited to historical records, previous impact reports, maps, demographics, housing profiles, and satellite information. The

toolkit also identifies specific information that should be gathered that would be critical components of a damage assessment program. These essential elements of information include: boundaries of the disaster, socio-economic impacts, jurisdictional boundaries, status of transportation, status of communications, status of electrical service, status of water and sewer systems, status of natural gas service, status of critical facilities, hazard identifications, weather and environmental concerns, and demographics. (American Red Cross, 2008)

Mazza also provides information relative to the classification of damaged buildings. This information will serve as another key component when developing an initial damage assessment policy. Mazza compares how the ARC and FEMA classify damaged buildings along with the related criteria. This comparative information is contained in tables 1 and 2. (Mazza, 2009, p. 18)

Table 1: *ARC Damage Classifications and Criteria*

Classification	Flood Damage Criteria	Non-flood Damage Criteria
Destroyed (D)	>60 in.	Structure totally gone; total collapse; major section(s) of walls missing or collapsed; building shifted on foundation
Major (MJ)	36 in.- 60 in.	Large section(s) of roof missing; extensive wall damage
Minor (M)	12 in.- 36 in.	Minor structural damage; broken windows; some roofing/siding damage
Affected (A)	0 in.- 12 in.	Debris against structure; some roofing material missing; building useable without repairs
Inaccessible (I)	N/A	N/A

Table 2: *FEMA Damage Classifications and Criteria*

Classification	Flood Damage Criteria	Non-flood Damage Criteria
Destroyed	N/A	Structure completely gone; permanently uninhabitable; not economically feasible to repair; complete failure of major structural components (2 or more walls, substantial portion of roof); dwelling pushed off foundations; an unaffected structure that will require removal or demolition
Major	12 in. or more on first floor	Significant structural damages sustained including substantial failure of structural elements; uninhabitable; more than 50% damage
Minor	12 in. or more in basement	Minor structural damage; temporarily uninhabitable until repairs are completed; less than 50% damage
Affected	N/A	Minimal damage to structure and/or contents; habitable without repairs
Inaccessible	N/A	Debris against structure; some roofing material missing; building useable without repairs.

Bhati discusses what some of the main objectives are when performing rapid damage assessments. He believes that the ability to perform damage assessments is a prerequisite for all disaster management activities. It is broken down into two levels: emergency relief and a detailed technical analysis of the damage. The purpose of the emergency relief level is to help provide the basis for the amount of medical relief and food stocks. The detailed technical analysis will provide the information needed to make long term restoration and rehabilitation decisions. (Bhati, 2011)

Bhati further defines the basic objectives of the overall damage assessment process as: making a rapid assessment of affected areas for the extent of the impact for the purpose of

immediate rescue and relief operations; prepare estimates for the type and amount of relief needed; detailed assessment for long term rehabilitation; the identification of focus areas for purpose of replication. “In short, damage assessment is an important tool to assimilate and document the extent of the impact of a disaster, and forms the basis for disaster management actions”. (Bhati, 2011, p. 1)

The Santa Clara County, California emergency services training program on damage assessments indicates that the primary objective of doing damage assessments is to determine the severity and magnitude of the event. Additional objectives include but are not limited to: quantifying home and business damage, can local resources handle emergency response and recovery, helps with resource allocation decisions, provides state and federal agencies with needed information, it measures the economic impact of the event, and data should be collected and submitted to state agencies within 36 hours. Recommend equipment while performing the windshield survey included pen or pencils, official reporting forms, blank paper, maps of the area, GPS units, fuel supplies, and food and water for the team or teams. ("Damage Assessment Objectives," 2011)

Another key component that is in the same realm as recommended equipment relates to being able to collect, analyze, and disseminate information quickly and accurately. “One of the most significant hurdles for any type of disaster response is obtaining the right information as quickly as possible to gain situational awareness and make the best strategic and tactical decisions “. (Johnson, 2007, p. 1)

The challenge of bringing together data that has been captured from multiple sources can be addressed with technology. Geographic Information System (GIS) technology has been used to address the issues of collecting, consolidating, analyzing, and disseminating critical

information. Johnson also listed the benefits of using GIS technology during the emergency response and recovery phases of the event. The benefits include, but are not limited to:

- GIS can assist with conducting complex emergency management analysis by making the process less time consuming and streamlined.
- GIS can help map potential natural hazards.
- GIS can help identify which population densities, governmental buildings, hospitals, and utilities are at risk.
- GIS expedites difficult damage assessment problems.
- GIS can identify evacuation routes.

The authority that provides the guidelines that a rapid damage assessment policy must operate under comes from the federal, state, and local levels of government. It begins with the Robert T. Stafford Disaster Relief and Emergency Act (Stafford Act). The Stafford Act authorizes the President to issue major disaster, emergency, and fire management declarations, which in turn enable federal agencies to provide assistance to states overwhelmed by disasters. By definition a major disaster is any natural event that occurs in any part of the United States, which in the determination of the President causes sufficient damage to warrant major disaster assistance. (*Aid in Disasters*, 2008)

The legal requirements for major disaster declarations and how they relate to damage assessments are found in the Stafford Act. All requests must be made by the Governor of the affected state. The basis for the request will be made when, after initial rapid damage assessments and preliminary damage assessments (PDA) have been completed, the situation is determined to be beyond the capabilities of the State to handle. Joint PDA's will then be conducted by state and federal (FEMA) officials in order to determine the magnitude of the

damages. “Once the PDA’s are summarized, the Director of FEMA makes a recommendation on the Governor’s request to the President”. (Bazan, 2005, p. 4)

If a declaration is made, the Stafford Act will also provide for two types of federal assistance: general federal assistance and essential federal assistance. Under general federal assistance the President may direct the use of any resource granted under the law, coordinate all disaster relief assistance, and provide technical and advisory support to the affected state and local governments. Essential assistance provides for assistance that is essential to meeting immediate threats to life and property. (Bazan, 2005)

At the state level, Kentucky’s Emergency Management provides the guidelines for which damage assessment information will be collected and processed. Specifically Kentucky Regulatory Statute KRS 39A.100 provides the legal requirements for invoking the emergency powers for the Governor and local chief officers in the event of an emergency or major disaster. ("KRS 39A.100," 2012)

The requirements for performing damage assessments in the event of any kind of disaster are set forth from the Kentucky Department of Emergency Management (KYEM). KYEM states within the damage assessment appendix that in the event of a disaster, a damage assessment shall be conducted and will be required and the results of the assessments will provide the basis for further action by the Judge Executive, Mayor, and Governor. ("Damage Assessment," 2011)

The KYEM damage assessment appendix provides for direction and control, operations concepts, and responsibilities. Operationally, Emergency Management Directors will be responsible for conducting damage assessments. The initial damage reports will then be submitted to the State Emergency Operations Center (EOC). State damage assessment teams may be requested by the County Judge or Mayor to assist with the assessments. The assessment

forms to be used are also provided for within the appendix. In the event a joint PDA is conducted, KYEM will make the determination as to what agencies will be assigned and the number of personnel assigned. Results of the assessments will provide the basis for determining if a declaration is needed as authorized in KRS 39A.100. ("Damage Assessment," 2011)

Local direction is provided through the Louisville/Jefferson County Emergency Operations Plan that was created by Louisville Metro EMA. The disaster recovery section of this emergency operations plan states that all recovery activities will be coordinated through the Emergency Operations Center (EOC) and these activities will begin during the response phase of the event. Initial damage assessment, referred to as the "initial damage impact survey", is specifically listed as one of the recovery activities that will be required.

The initial damage impact section requires that:

"In the immediate aftermath of the disaster, a countywide "Initial Damage Impact Survey" will be conducted. The goal of this survey is to determine the magnitude and severity of damage to private and public buildings and infrastructure; and if a severe rainfall event, determine the level of flooding damage. All impact survey team members must report impact survey results to the EOC within hours of disaster impact".

("Jefferson County Emergency Operations," 2011, p. 36)

Aside from evaluating the magnitude of damage, the local emergency operations plan identified other goals of the damage assessment process. They are to determine the type of assistance that is needed, priority of resource distribution, and priority of infrastructure restoration. It also indicates that a combined damage report will be compiled by using damage assessment data from all municipalities and unincorporated areas of the Louisville Metro area. It also directs that all cities are responsible for damage assessments within their boundaries while

Public Works and Engineering will perform damage assessments for public infrastructure. There is no mention as to what specific role emergency services will perform with respect to initial damage assessment or how other assessment teams will be developed. ("Jefferson County Emergency Operations," 2011)

In comparison, the emergency operations plan for Lexington Fayette Urban County Government, which is located approximately 60 miles to the east of Louisville, is very specific about the makeup of the Damage Assessment Teams (DAT). These teams are organized as part of the initial damage assessment process. The teams are broken down in the following categories:

- Critical Facilities Inspection Team (DAT #1): comprised of Fire and EMS personnel, engineering, Building and Code Enforcement.
- Utilities Inspection Team: each utility company will assess its own facility for damages.
- Streets and Roads Team (DAT #2): made up of personnel from Streets, Roads and Forestry, and the Kentucky Highway Department.
- Bridge/Pedway Inspection Team (DAT #3): coordinated by Engineering and Public Works.
- Lexington Fayette Facilities Inspection Team (DAT #4): personnel from Risk Management, Code Enforcement, Building Inspection, Sanitary Sewers, and Parks and Recreation.
- University of Kentucky Inspection Team (DAT #5): personnel from UK's Department of Emergency Management.

- Residential and Commercial Inspection Teams (DAT #6): personnel from PVA, Building Inspection, Code Enforcement, and private contractors.

The team leaders for the DATs will report their findings to the EOC Director. ("Lexington Fayette Emergency Operations Plan," 2007)

The Damage Assessment Annex for the City and County of Broomfield, Colorado indicates that rapid damage assessment is used synonymously with windshield survey. The annex requires that a windshield survey will be done initially to get a general impression of the impact area. This windshield survey will be followed by a report that contains more detailed information that will be used to determine if state or federal aid is warranted. A key point that this annex clarifies is the role of first responders. First responders will perform a windshield survey with the intent of gaining information as to what damages were sustained and what resources are required as a result of the damages, but will not assess or process damage estimates. ("Broomfield Damage Assessment Annex," 2011)

Broomfield also refers to Initial Damage Assessment (IDA) as timely and comprehensive information that indicates the scope and impact of the event. Included the IDA is more specific information relating to dollar amount estimates of damages and the costs incurred during response to the event. The basis of the IDA will provide the needed information for state and federal Preliminary Damage Assessments (PDA). The annex also dictates that the IDA will be conducted by qualified teams made up of inspectors and engineers. ("Broomfield Damage Assessment Annex," 2011)

An international perspective on damage assessment is contained in the Government of San Lucia's Damage Assessment and Needs Analysis Plan (DANA). It identifies three major teams in the damage assessment process: Reconnaissance Team (Recon Team), National

Damage & Needs Analysis Team (DANA), and the District Assessment Team (DDAT). The Recon Team operates at the national level and is responsible for conducting an initial overview within 4-6 hours of the event. DANA is a national team that is responsible for conducting the IDA for all major disasters. The DDAT is responsible for conducting what is referred to as the Initial Situation Overview (ISO) which is their equivalent of a Rapid Damage Assessment and the IDA within a specific district. The ISO is to be completed within 4-8 hours and the IDA within 12-24 hours of the event. In St. Lucia, fire and EMS response teams are considered to be part of the DANA. ("St. Lucia DANA," 2009)

In order to summarize this literature review, it is important to mention that there is a large amount of written material supporting the topic of this applied research project. The challenge was to succinctly extrapolate the necessary information that stayed within the time frame and scope of this project. The author believes that the literature research sufficiently and effectively identified what existing standards or guidelines there are that are relative to the development and implementation of a rapid damage assessment policy, the main objectives of damage assessment, the critical components of an effective damage assessment program, and how have other agencies developed such programs. In addition, even though there was not a specific research question that sought to define damage assessment, the author felt it was necessary to add such definitive information within the literature review process.

The standards or guidelines that the literature research identified come from Federal, State, and Local authority. At the Federal level, the Stafford Act provides the legal requirements for major disaster declarations as well as the requirements for performing damage assessments. At the State level, in this case Kentucky, the research identified that Kentucky Regulatory Statute KRS39A.100 is what provides the standard for emergency declarations and damage assessment

requirements. The Local level authority for Jefferson County is provided through the Louisville/Jefferson County Emergency Operations Plan. The American Red Cross Tool Kit also serves as an operational guideline that is designed to help guide the various agencies involved through the various phases of response and recovery.

Objectives of damage assessment that were identified through the literature review included but were not limited to: damage assessment is a key component of the response and recovery phases that will help determine short term and long term recovery objectives; initial damage assessments are critical in order to provide needed information that the damage declaration process relies on; it helps to identify the scope and magnitude of the incident; identifies resource needs and aids in resource deployment decisions; aids the Incident Commander with developing initial strategic and tactical objectives; identifies life safety hazards and critical infrastructure damages. Fiscal recovery and functional recovery are also objectives of damage assessments.

Key components that were identified include the need to have an effective mechanism in place that will help consolidate, analyze, and disseminate the damage assessment information rapidly and effectively. Geographic Information System (GIS) technology was identified as a tool for that purpose. Proper forms that help identify affected areas during the rapid damage assessment phase along with GPS units, maps, risk assessments, pre-plans, identification of damage assessment teams, and damage classification information were identified as additional components.

The research also identified how other states and cities have implemented similar programs. The research also included international perspectives. It was also noted that the

overall process of damage assessments is not just a one-time action, but it is a continuous process that re-evaluates the response and recovery phases until the operation is finally completed.

Procedures

The literature review has provided a solid basis for providing answers to what guidelines or standards exist relative to developing damage assessment policies, what are the main objectives of damage assessment, what are the critical components of a damage assessment policy, and it also helped to identify how other counties, cities, states, and nations have developed such programs. The focus of the procedures will be directed at answering question #4: How have other departments developed similar programs. The procedures will also be directed at identifying other aspects of policy development that the author feels are critical from an emergency services point of view.

To effectively accomplish the procedural objectives, two survey instruments were developed and utilized to gather specific information relating to how other departments have developed and implemented rapid damage assessment policies. The media for these surveys was Survey Monkey.

A rapid damage assessment survey was developed and distributed to participants outside of our county. (Appendix A) The subjects were current Executive Fire Officers from throughout the country and the group consisted of 792 total recipients.

Questions #2 and #4 were directed related to the research questions of this project. Question #2 sought to answer what other departments identified as the main objectives of a rapid damage policy while question #4 sought to answer what other departments have identified as critical components.

Other critical information that the survey sought to determine was how data is communicated, what obstacles existing policies have encountered, if pre-assigned areas or routes had been established, and how the policies themselves were structured. This survey did not seek any additional information relating to standards or guidelines because the author felt that the literature review provided adequate findings along those lines.

A rapid damage assessment survey was also developed and distributed to 17 departments within Jefferson County. (Appendix B) This survey sought to identify much of the same information with the exception of question #7. This question sought to answer how departments within Jefferson County have handled rapid damage assessment for the events that we have experienced in recent years. Once again this survey did not inquire about standards or guidelines since the literature review adequately identified the state and local standards that we must follow.

In addition, telephone interviews and one personal interview were conducted with chief officers and non-officers of four of the largest departments within Jefferson County and one outside of Jefferson County, who by virtue of their location, have experienced significant flooding events and major damage from tornados. Major Brad Michel, of the Middletown Fire Protection District was interviewed on 5/8/2012, Firefighter Scott Milliner of the Pleasure Ridge Park Fire Department was interviewed on 5/13/2012, Deputy Chief Daryl Roy of the Fairdale Fire Department was interviewed on 5/13/2012, retired Lexington Capt. Steve Dellis (current WFD Asst. Chief) was interviewed on 5/13/2012, and Major Terrence Delaney of Louisville Fire and Rescue was interviewed on 5/19/2012. (Appendix B)

A limitation to be noted indicates that although there was a substantial amount of information uncovered relating to the damage assessment process and its overall importance, it was difficult to find current information specifically relating to emergency services performing

rapid damage assessments. The significantly low response to the Jefferson County survey can be noted as another limitation.

Results

The target group for the survey outside of Jefferson County consisted of 792 Executive Fire Officers. Of that group, 90 (11%) completed the survey. The following results were recorded.

Question #1 sought to determine how many of the respondents have developed and rapid damage assessment policy. The answer options were yes, no, and unsure. Thirty-four (38%) responded yes, 55 (61%) responded that they do not have one, and one responded unsure.

Question #2 sought to determine what other departments viewed as the main objectives of a rapid damage assessment policy. The results of this demographic were as follows:

Table 3: *Main Objectives of a Rapid Damage Assessment Policy*

Objective	Respondents	Percentage
Life Safety	33	37%
Infrastructure Damage	33	37%
Resource Allocation	31	35%
Identify Access Issues	30	34%
Determine Response Capability	22	24%
Number of Deaths or Injuries	20	22%
Evacuation Needs	19	21%
Hazardous Materials	18	20%
Compliance with State and Federal requirements	9	10%

Other responses included the need to track damage assessments on a computer grid in order to help with establishing long term Incident Action Plans and the need to identify what area or areas have been affected.

Question #3 sought to determine how other departments determined who would perform rapid damage assessments. The results were as follows:

- Teams were pre-staged prior to the onset of the event. The teams are made up of a front end loader and operator, one engine company, and one police officer.
- The company officer is assigned.
- All on duty companies.
- Chief officers, public works, and code enforcement officials
- Just public works official were assigned.

Question # 4 sought to identify what are the critical components. The results are as follows:

Table 4: *Critical Components*

Critical Component	Respondents	Percentage
Reporting Forms	26	29%
Risk Assessments	24	27%
Damage Classification Guides	23	26%
Maps	23	26%
Radios	22	24%
Cell Phones	18	20%
Camera	14	14%
GIS	12	13%
Pre-plans	12	13%
GPS	10	11%

Other responses included use of a helicopter (1 response) while others included the use of police officers and auxiliary civilian personnel who are trained in damage assessment techniques.

Question #5 sought to determine what methods of data communication were being utilized. The results are as follows:

Table 5: *Methods for Communicating Damage Assessment Data*

Communication Method	Respondents	Percentage
Directly to EOC via Radio	18	20%
Through a Branch via Radio	12	13%
Directly to EOC Electronically	9	10%
Through a Division via Radio	7	8%
Through a Branch Electronically	5	6%
Through a Division Electronically	2	2%

Other responses included:

- Reporting directly to radio room and then to EOC
- Web EOC
- Cell phones if operable
- Depends on what communications systems are still in service

Question # 6 sought to determine what obstacles other have experienced if they their program has been used. Twenty three responded that they have used their program while fourteen responded that they have not. Obstacles they encountered included:

- Companies were pulled into an assignment prior to finishing a rapid assessment
- Data collection and reporting problems
- Too much radio traffic, overloaded radio system

- Lack of training and understanding the role that was assigned
- Accuracy of information
- Access to damaged areas
- Adequate staffing and coordination of communications
- Need for better mapping so efforts were not duplicated

Question # 7 sought to determine if other departments have pre-assigned areas or routes for assessment personnel. Twenty three indicated that they did while fifteen indicated that they did not.

Question #8 solicited copies of rapid assessment policies that others have developed. Four respondents sent their current policies while two others sent copies of their training programs that are used to teach the rapid damage assessment process.

The target group for the survey within Jefferson County consisted of 17 departments. Of that group, only one recipient completed the survey and the indication was that they had no rapid damage assessment program. The results of this survey were so limited that the author cannot determine if the recipients didn't want to complete the survey or they did not know what rapid damage assessment is.

In light of the poor response to the survey, the author conducted interviews in order to garner information on how other departments in our area have developed rapid damage assessment policies. After being asked if their department has a rapid damage assessment policy, the overall result indicated that none of the targeted departments have any formal rapid damage assessment policy and without providing them with a further explanation, they didn't know rapid damage assessment is.

When asked how do they assess or have they assessed damages without having a formal policy in place the following results were gathered. Major Michel from Middletown indicated that they have never really done an assessment. Deputy Chief Roy from Fairdale Fire Department indicated that they will “play it by ear and react to what happens”. He did add that they will divide their district into four branches and position a command car within each branch in order to allocate resources as needed.

Firefighter Scott Milliner from Pleasure Ridge Park indicated that they will establish an Emergency Operations Center (EOC) in advance of the event. Their district would then be divided up according to the coverage area of each station. Within each area, each company officer would pass on requests for resources to the EOC as each event unfolds but they don't really go out and assess the damages, extent, or magnitude of the event.

Major Terrence Delaney of Louisville Fire and Rescue (LFR) indicated that they do not have any formal policy for performing rapid damage assessments. They will respond to runs as they come in or as civilians flag down companies for assistance. However, if they have a loss of communications systems failure they will have all companies perform a block by block assessment as to what the needs may be. They have even put fire personnel in the police helicopter as a way of surveying the magnitude of the event especially during widespread flooding.

In addition LFR does have a call back system in place so that they can staff additional companies and service vehicles. They will utilize phone trees or automatic dial out logic programs that will contact the previous shifts personnel.

WFD Assistant Chief Steve Dellis is also a retired Captain from the Lexington Fire Department. Chief Dellis indicated that Lexington does not have a formal written policy that

addresses performing rapid damage assessments. Rather, they had an informal process that was designed to ramp up their staffing in advance of a significant event or in the aftermath of a sudden event. This process included calling back off duty personnel and moving firefighters that are assigned to the shop back to front line apparatus. The process after that was to have all companies to go out into their respective districts to survey the situation and to perform rescue or fire suppression activities as needed.

Unexpected information was uncovered that is certainly relevant and will benefit the overall development and implementation of a rapid damage assessment policy. The information uncovered that was not intentionally sought after consisted of developed training programs. Through the literature review process, the author discovered a power point based training program. In addition, two more training power point programs were submitted to the author as a result of question # 8 of the non-Jefferson County survey (Appendix A). These programs will no doubt play a critical role when it comes to training our personnel regarding what damage assessment is, why we do it, and how to do it.

Discussion

With the goal of developing a rapid damage assessment policy, there was a need to determine what standards or guidelines exist relative to the development and implementation of such a policy. It was determined that there are governmental standards and guidelines that exist at the Federal, State, and Local levels. There were also non-governmental guidelines that were discovered during the literature review.

At the Federal level, the authority that provides the guidelines for a rapid damage assessment policy is the Robert T. Stafford Disaster Relief and Emergency Act (Stafford Act). This act provides the legal requirements for major disaster declarations. It also provides the

President with the power to issue major disaster, emergency, and fire management declarations. If a declaration is made, the Stafford Act also provides for general federal assistance and essential federal assistance.

At the State level, in this case Kentucky, the Kentucky Regulatory Statute KRS 39A.100 provides the legal requirements for the Governor and local chief officers to invoke emergency powers in the event of an emergency or major disaster. (“KRS 39A.100,” 2012) The Kentucky Department of Emergency Management (KYEM) requires that damage assessments in the event of a disaster will be performed. KYEM provides direction and control, operations concepts, and responsibilities. The results of the assessments will provide the basis for determining if a declaration is needed. (“Damage Assessment,” 2012)

At our local level, in this case Jefferson County, the authority comes from the Louisville/Jefferson County Emergency Operations Plan. The plan contains an initial damage assessment section that requires that damage assessments will be completed in order to determine extent and magnitude of the damages or extent of flooding. The plan indicates that cities and Public works officials will conduct damage assessments but it does not mention specifically what role emergency services will have. (“Jefferson County Emergency Operations Plan,” 2011).

In comparison, the emergency operations plan for Lexington Fayette Urban County Government, which is located approximately 60 miles to the east of Louisville, is very specific about the makeup of the Damage Assessment Teams (DAT). It indicates that DAT #1 will be comprised in part of fire personnel in charge of critical facilities inspections. (“Lexington Fayette Emergency Operations Plan,” 2007). Also, the Broomfield, Colorado Damage Assessment Annex is more specific about the role of first responders. First responders will

perform a windshield survey with the intent of gaining information as to what damages were sustained and what resources are required as a result of the damages, but will not assess or process damage estimates. ("Broomfield Damage Assessment Annex," 2011)

The American Red Cross provides damage assessment and disaster guidelines through its Disaster Assessment Toolkit. This toolkit has been viewed as the most comprehensive model that has been used by FEMA as well as by other emergency management professionals. Mazza states that the "Damage assessment guidelines and procedures developed by the American Red Cross are arguably the most comprehensive available..." (Mazza, 2009, p. 42)

It should be noted at this point, that although the Federal, State, and Local legal guidelines all indicate that damage assessments are required to be performed, they do not necessarily indicate who will do them or how they will be done, especially as it relates to rapid damage assessments being performed by emergency services personnel. There is also no indication given of any type of penalties that may be incurred if an agency does not perform damage assessments. But based on the information uncovered throughout this research project, the true penalty for not performing damage assessments in a comprehensive and timely manner will result in poor response, slowed recovery, and possibly no state or federal funding through damage declarations.

Main objectives of performing damage assessment were identified through the literature review and what other departments have identified. The initial objective is to determine the scope and magnitude of the event. The broader objective is to determine whether the damages are significant enough to seek aid through a disaster declaration. To that end, the damage assessment data is critical in order to complete the declaration process. "In short, damage assessment is an important tool to assimilate and document the extent of the impact of a disaster,

and forms the basis for disaster management actions”. (Bhati, 2011, p. 1) Immediate damage assessments will also provide the critical information that will help to identify short and long term strategic and tactical objectives.

Other departments that have developed damage assessment policies have indicated additional objectives such as determining life safety issues, infrastructure damages, resource allocation, access issues, response capability, and evacuation needs.

The critical components of an effective damage assessment policy have also been identified through literature review and by what other departments have done. Of those components, some critical ones include, but are not limited to:

- Having an adequate process in place to gather data, analyze and disseminate the data quickly and accurately. According to Johnson, geographic information system (GIS) technology has been used to address these issues. (Johnson, 2007, p. 1)
- A system that is designed to classify the damages to buildings is another critical component. According to Mazza, The American Red Cross (ARC) and FEMA provide formulas that contain the damage classification and criteria. This comparative information is contained in tables 1 and 2. (Mazza, 2009, p. 18)
- The need to have a system to identify the number of deaths or injuries, potential for loss of life or injury, unsafe conditions, evacuation needs, and the need for emergency services. (Damage Assessment, 2011) In some respects these can also be viewed as objectives.

Other key components that have been identified by other departments include the use of reporting forms, risk assessment data, maps, radios, cell phones, and pre-plan information.

In general terms, this project has provided the basis for understanding how important rapid damage assessments are to the overall damage assessment process, to the response and recovery phases of the incident, and how critical this information is as it relates to the damage declaration process. McEntire (McEntire & Cope, 2004) indicates just how crucial damage assessment is. He also stressed that performing damage assessments is an ongoing process until the event has passed.

Another item that came to light was the fact that rapid damage assessment has a number of synonyms such as windshield survey, immediate damage assessment (EAFSOEM), initial situation overview (ISO) in St. Lucia, drive through assessment or initial assessment (McEntire & Cope), and impact assessment (ARC). However, the term initial assessment can have two connotations within the damage assessment process. It has been associated with the rapid damage assessment phase by some, but it mostly appears to be associated with the assessment phase that becomes more comprehensive and more specifically relates to dollar amount estimates of damages and the costs incurred during the response to the event. In contrast, the rapid damage assessment process is not focused on cost but is more concerned with emergency response, immediate resource allocation, scope, and magnitude. Therefore, it is the author's opinion that the term "initial" should not be used in the same context as rapid assessment.

Concluding the discussion about this project, the end product of this research project is intended to develop a rapid damage assessment policy. In order to meet this objective it was necessary to answer questions relating to identifying standards and guidelines for rapid damage assessment policies, objectives and critical components of damage assessment policies, and what other departments have done.

The author feels that this project has successfully provided answers to these questions as well as providing the necessary information that will aid in the development and implementation of a rapid damage assessment policy. In addition, the research has provided definitive information about what damage assessment process, its importance, how it relates to the overall recovery phase after an event, and how it relates to the declaration process.

The background section of this project illustrated that our area is prone to severe weather events and susceptible to other large scale events. Because of this history, it is critical that this policy is developed and implemented. The nature of such a policy will have its challenges due to staffing limitations, run volumes, training, and education. The conceptual nature of performing a rapid damage assessment will pose moral and ethical issues for those of us who are in the fire service because in theory the person or people performing the rapid damage assessment are not suppose to concern themselves with events they roll up on. There are to report the situations and keep moving as opposed to taking action.

However, we do have some things that will work in our favor. Due to how we operate during what we call “operation weather”, we have become used to dispatching our own companies from our own emergency operations center when our county alarm office is being overwhelmed with runs. Another thing that can work well for us is that we already have our district divided into three branches that correspond to our three stations. Within those branches, each is divided up into boxes. These branches and boxes will no doubt help with establishing areas for damage assessment teams to operate in and will aid in the damage reporting process.

There are implications resulting from this research project. Organizationally, with the development and adoption of a rapid damage assessment policy, the Worthington Fire Department (WFD) will be supporting the United States Fire Administration’s strategic plan

operational objectives of improving local planning and preparedness as well as improving the fire and emergency services' capability for response to and recovery from all hazards. WFD will be looked upon as a leader in the fire service and it will be providing a vital service to our community.

Recommendations

This research project has indicated that our district is prone to events that can cause widespread damage. The premise of this project was that the Worthington Fire Department (WFD) needed to develop a rapid damage assessment policy that will enable the fire personnel of this district to effectively respond in the event a damaging event did occur.

It is recommended that WFD adopts the Rapid Damage Assessment Policy (Appendix C), the Damage Assessment Report (Appendix D), and the Response Capability Report (Appendix E) that was developed as a result of this research project. In conjunction, it is also recommended that a comprehensive damage assessment training curriculum is also developed to supplement this rapid damage assessment policy.

In addition, it was also discovered through this research project that a critical component that is used by other departments is risk assessment data. With that said, it is recommended that this WFD conducts a comprehensive risk assessment of the district. A final recommendation that supplements the rapid damage assessment policy is that WFD should also develop a severe weather operations standard operating procedure that covers tornados, extreme heat and cold, hurricanes, and floods.

For future researchers or organizations dealing with this same issue, it is recommended that they begin to educate themselves about the importance of the damage assessment process

and how it relates to the declaration process and Federal aid. To identify what level of risk they face relative to significant events that can lead to sudden large scale damages.

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Table 1

Table 1 contains the damage classifications and criteria that are used by the American Red Cross.

Table 1: *ARC Damage Classifications and Criteria*

Classification	Flood Damage Criteria	Non-flood Damage Criteria
Destroyed (D)	>60 in.	Structure totally gone; total collapse; major section(s) of walls missing or collapsed; building shifted on foundation
Major (MJ)	36 in.- 60 in.	Large section(s) of roof missing; extensive wall damage
Minor (M)	12 in.- 36 in.	Minor structural damage; broken windows; some roofing/siding damage
Affected (A)	0 in.- 12 in.	Debris against structure; some roofing material missing; building useable without repairs
Inaccessible (I)	N/A	N/A

Table 2

Table 2 contains the damage classifications and criteria that are used by FEMA.

Table 2: *FEMA Damage Classifications and Criteria*

Classification	Flood Damage Criteria	Non-flood Damage Criteria
Destroyed	N/A	Structure completely gone; permanently uninhabitable; not economically feasible to repair; complete failure of major structural components (2 or more walls, substantial portion of roof); dwelling pushed off foundations; an unaffected structure that will require removal or demolition
Major	12 in. or more on first floor	Significant structural damages sustained including substantial failure of structural elements; uninhabitable; more than 50% damage
Minor	12 in. or more in basement	Minor structural damage; temporarily uninhabitable until repairs are completed; less than 50% damage
Affected	N/A	Minimal damage to structure and/or contents; habitable without repairs
Inaccessible	N/A	Debris against structure; some roofing material missing; building useable without repairs.

Table 3

Question #2 sought to determine what other departments viewed as the main objectives of a rapid damage assessment policy. The results of this demographic were as follows:

Table 3: *Main Objectives of a Rapid Damage Assessment Policy*

Objective	Respondents	Percentage
Life Safety	33	37%
Infrastructure Damage	33	37%
Resource Allocation	31	35%
Identify Access Issues	30	34%
Determine Response Capability	22	24%
Number of Deaths or Injuries	20	22%
Evacuation Needs	19	21%
Hazardous Materials	18	20%
Compliance with State and Federal requirements	9	10%

Table 4

Question # 4 sought to identify what are the critical components. The results are as follows:

Table 4: *Critical Components*

Critical Component	Respondents	Percentage
Reporting Forms	26	29%
Risk Assessments	24	27%
Damage Classification Guides	23	26%
Maps	23	26%
Radios	22	24%
Cell Phones	18	20%
Camera	14	14%
GIS	12	13%
Pre-plans	12	13%
GPS	10	11%

Table 5

Question #5 sought to determine what methods of data communication were being utilized. The results are as follows:

Table 5: Methods for Communicating Damage Assessment Data

Communication Method	Respondents	Percentage
Directly to EOC via Radio	18	20%
Through a Branch via Radio	12	13%
Directly to EOC Electronically	9	10%
Through a Division via Radio	7	8%
Through a Branch Electronically	5	6%
Through a Division Electronically	2	2%

Appendix A**Survey Monkey External Questionnaire**

1. Has your department developed a rapid damage assessment policy? If no or unsure, proceed to end of survey. Thank you
 - a. Yes
 - b. No
 - c. Unsure

2. What are the main objectives of your rapid damage assessment policy? Check all that apply:
 - a. Life safety
 - b. Number of deaths or injuries
 - c. Identify access issues
 - d. Evacuation needs
 - e. Emergency service resource allocation
 - f. Determine if response capability is limited due to damage or injured personnel
 - g. Infrastructure damage
 - h. Hazardous materials issues
 - i. Compliance with State and Federal aid requirements
 - j. Other

3. How has your department determined who will perform the rapid damage assessment?

4. What does your policy identify as critical components? Check all that apply:
 - a. GIS

- b. GPS
 - c. Reporting forms
 - d. Damage classification guides
 - e. Maps
 - f. Cameras
 - g. Pre-plans
 - h. Risk Assessments
 - i. Cell phones
 - j. Radios
 - k. Helicopters/planes
5. What is your method of communicating the damage assessment data?
- a. Directly to the EOC via radio
 - b. Through a branch via radio
 - c. Through a division via radio
 - d. Directly to the EOC electronically
 - e. Through a branch electronically
 - f. Through a division electronically
 - g. Other
6. Has your damage assessment policy been used, if yes what have been some of the obstacles?
7. Do you have pre-assigned areas or routes for the assessment personnel?
8. Could you please send me your current policy via email?

Appendix B**Survey Monkey and Phone Interview Questionnaire for Jefferson County**

1. Has your department developed a rapid damage assessment policy? If no or unsure, proceed to end of survey. Thank you
 - a. Yes
 - b. No
 - c. Unsure

2. What are the main objectives of your rapid damage assessment policy? Check all that apply:
 - a. Life safety
 - b. Number of deaths or injuries
 - c. Identify access issues
 - d. Evacuation needs
 - e. Emergency service resource allocation
 - f. Determine if response capability is limited due to damage or injured personnel
 - g. Infrastructure damage
 - h. Hazardous materials issues
 - i. Compliance with State and Federal aid requirements
 - j. Other

3. How has your department determined who will perform the rapid damage assessment?

4. What does your policy identify as critical components? Check all that apply:

- a. GIS
 - b. GPS
 - c. Reporting forms
 - d. Damage classification guides
 - e. Maps
 - f. Cameras
 - g. Pre-plans
 - h. Risk Assessments
 - i. Cell phones
 - j. Radios
 - k. Helicopters/planes
5. What is your method of communicating the damage assessment data?
- a. Directly to the EOC via radio
 - b. Through a branch via radio
 - c. Through a division via radio
 - d. Directly to the EOC electronically
 - e. Through a branch electronically
 - f. Through a division electronically
 - g. Other
6. Has your damage assessment policy been used, if yes what have been some of the obstacles?
7. How have you performed a rapid damage assessment after significant events our area has had in the past?

8. Could you please send me your current policy via email?

Appendix C

Worthington Fire Protection District

STANDARD OPERATING PROCEDURES

Section xx.xx

Rapid Damage Assessment Policy

Enactment Date: 00/00/12 Effective Date: 00/00/12

I. Purpose

This standard operating procedure defines the rapid damage assessment procedures that are to be followed in the event of a large scale natural disaster, technological disaster, or a societal event. The data gathered from this assessment is a critical part of the damage declaration process, the response and recovery aspect following a major event, it is critical in ensuring that appropriate resources are being dedicated to reduce the loss of life and reduce property damage, and to provide incident stabilization.

II. Scope

A rapid damage assessment will be conducted within the confines of our district. In the event of a large scale event, there will be an assessment conducted in every part of our district. If the event is not widespread, it will be determined as quickly as possible the scope and magnitude of the event. Once that is determined, a thorough assessment will be conducted within the confines of the event within our district.

This assessment, depending on its size, could involve all personnel. All off duty personnel will be subject to a call back to duty if the event is widespread. An Emergency Operations Center will be established and all direction, personnel assignment, and damage assessment reporting will come from and go through the EOC.

III. Authority

The authority on which this Standard Operating Procedure is based on comes from the following levels of government:

1. **Federal Government:** The Robert T. Stafford Relief and Emergency Assistance Act
2. **State Government:** Kentucky Regulatory Statute KRS 39A.100 and the Kentucky Department of Emergency Management (KYEM).
3. **Local Government:** The Louisville/Jefferson County Emergency Operations Plan in conjunction with Louisville Metro EMA.

IV. Rapid Damage Assessment

The purpose of rapid damage assessment is not to estimate the dollar amount of the damage, but to assess the nature, magnitude, and scope of the event so that the decision makers can assign the appropriate priorities to their response and request outside resources that are the most beneficial and most needed.

Rapid damage assessment takes place during an incident and focuses on addressing immediate lifesaving and life sustained needs. The ability for this department to perform a rapid assessment accurately and within the first few hours of an incident is critical to providing an adequate response for life-threatening situations and imminent hazards.

Rapid damage assessment will be accomplished by driving through the affected areas as assigned by the EOC or Branch Director. Walking or the use of aircraft may be required. Depending on the severity and scope of the damage, security support from law enforcement agencies may be required.

The individuals or teams who are performing the rapid damage assessments are to report their observations of events that may be unfolding, life hazards, or any other hazardous conditions to their Branch Director or the EOC Director so that proper resources can be assigned. It is not the intent of these teams or individuals to stop in order to mitigate each incident they observe. **It is imperative not to stop and render assistance unless immediate actions will save lives.** Delaying the flow of critical information will slow the response from outside agencies.

Data that is developed will be recorded on the Rapid Damage Assessment form and the Response Capability Assessment form and transmitted via radio to the EOC. The EOC Director will be responsible for consolidating and disseminating the data to the Louisville EMA.

V. Internal Assessment

An internal assessment will be the first part of the rapid damage assessment process. This internal assessment is designed to determine what our response capabilities are. The Response Capability Assessment form will be used to document this inspection. The internal assessment will assess the following:

1. **Personnel:** indicate if personnel assigned to our stations are capable of making responses. The assessment will indicate if there are no injuries, minor injuries, major injuries, or fatalities.
2. **Facility Status:** are the stations operational, have they experienced damage and if so indicate if the damages are minor, moderate, major, or total loss.
3. **Apparatus:** indicate if our apparatus are in service or out of service. Indicate if damage to each apparatus is minor, major, or total loss and why.

VI. External Assessment

A rapid assessment of our assigned areas will be performed immediately following an event. The Rapid Damage Assessment form will be used to record the following data:

1. **Structural Damage Assessment:** this will be a rapid assessment of all residential, commercial, educational, medical buildings, or target hazards in order to determine what percentage are destroyed, have major damage or have minor damage.
2. **Flooding:** in the event of a flood event, this will be a rapid assessment of all residential, commercial, educational, medical buildings, or target hazards in order to determine what percentage are destroyed, have major damage or have minor damage.
3. **Road/highway/bridge Assessment:** this will be assessing if they are passable, flooded, have trees down, have arcing wires down.
4. **Infrastructure Status:** are there any gas leaks, power outages, water main breaks, or sewer system breaks.
5. **Victim Assessment:** identify the number of people who are uninjured or displaced, injured or trapped, fatalities.
6. **Incidents:** identify any ongoing incidents or special concerns.

VII. Damage Classifications and Criteria

We will follow the American Red Cross damage classifications and criteria:

Classification	Flood Damage Criteria	Non-flood Damage Criteria
Destroyed (D)	>60 in.	Structure totally gone; total collapse; major section(s) of walls missing or collapsed; building shifted on foundation
Major (MJ)	36 in.- 60 in.	Large section(s) of roof missing; extensive wall damage
Minor (M)	12 in.- 36 in.	Minor structural damage; broken windows; some roofing/siding damage
Affected (A)	0 in.- 12 in.	Debris against structure; some roofing material missing; building useable without repairs
Inaccessible (I)	N/A	N/A

VIII. Procedures


A. During the Event:

1. **First**, all companies will maintain a position of safety for our personnel.
2. If a company is caught out of quarters when an event strikes, all measures possible will be taken to get personnel back to a position of safety until the event passes and it is safe enough to make responses.
3. Follow Operation Weather dispatch protocols.
4. The Emergency Operations Center (Worthington Base) will be established by the Battalion Chief (EOC Director) and Branch Leaders will be established if there are enough personnel to do so.

B. After the Event:

1. Immediately complete the Response Capability Assessment form and notify Battalion Chief of status. If Branch Leader has been established, report directly to that person.
2. Call back all off duty personnel and volunteer personnel if event size warrants it.
3. Three branches will be established: branch 1, 2 & 3 that coincide with stations 1, 2 & 3.
4. Units within each Branch will begin conducting a rapid damage assessment by following the pre-determined box numbers that exist within each Branch. The Rapid Damage Assessment form will be completed at this time. This will also help determine the areas that may or may not be affected.
5. Report findings back to Branch Leader or EOC Director.
6. Calls for emergency services and resources will be coordinated through the EOC as we would normally do when operating under Operation Weather.
7. Maintain your assignment until relieved by your Branch Director or EOC Director.

Appendix D

<u>Worthington Fire Department Rapid Damage Assessment Report</u>			
Date: _____ Time: _____ Branch: _____ Box#: _____			
Damage Assessment			
	%Destroyed	%Major Damage	% Minor Damage
Residential			
Commercial			
Schools			
Hospitals			
Target Hazards			
Flooding			
	%Destroyed (>60 in.)	% Major (36-60 in.)	% Minor (12-36 in)
Residential			
Commercial			
Schools			
Hospitals			
Target Hazards			
Road/Highway/Bridge Assessment			
	Yes	No	Notes
Passable			
Flooded			
Trees Down			
Wires Down/Arcing			
Infrastructure Status			
	Yes	No	Notes
Gas Leaks			
Electric On			
Water Main Breaks			
Sewer Main Breaks			
Victim Assessment			
Uninjured/displaced #			
Injured/trapped #			
Fatalities #			
Ongoing Incidents or Special Concerns			
<u>Name/Rank:</u>		<u>Report Submitted to EOC/Branch Director:</u>	
		Yes	
		No	

