

Examining the Need for Standardization of the Initial Damage Assessment Process

in Louisa County, Virginia

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CERTIFICATION STATEMENT

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

Signed:_____

Abstract

A recent earthquake centered in Louisa County, Virginia required County officials to undertake an extensive and prolonged initial damage assessment process. The problem was that the Louisa County Department of Fire and Emergency Medical Services (EMS) did not have an established system for conducting these assessments initially caused errors in the process. The action research method was used to fulfill the purpose of this research, which was to develop a tool for Louisa County to conduct consistent and accurate initial damage assessments in the future.

Literature review, a questionnaire, and personal interviews were used to answer the following questions: why should localities perform initial damage assessments, what tools are other localities using, what elements these tools have in common, and what tools would benefit Louisa county in future damage assessment techniques? Results demonstrated why departments should perform initial damage assessments, that standardized policies, procedures and forms are used by other departments, with some elements in common, and that Louisa County would benefit from adopting such policies and procedures.

Based upon the research results, a recommendation was made for Louisa to implement a standardized process for initial damage assessment, to include standardization of paperwork and data intake.

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Introduction

The problem is that the Louisa County Department of Fire and EMS does not have an established system to conduct Initial Damage Assessments (IDAs) following a major natural or manmade disaster. This lack of a standardized system leads to inconsistent monetary valuations and inaccurate structural damage counts by the personnel conducting and compiling the IDAs.

The purpose of this research is to examine how other industries, emergency management entities, and fire and rescue agencies conduct their IDAs and to determine the need for a standard policy or tool to conduct these assessments in Louisa County. In addition if a need is found, the research aims to develop a standardized process for conducting IDA's.

Action research method was used in this project, and the research sought to answer the following questions:

1. Why should localities perform timely and accurate Initial Damage Assessments?
2. What types of tools are other departments utilizing to gather IDAs?
3. What common components are present in the different IDA tools used by these departments?
4. What IDA tools would benefit Louisa County personnel by enabling them to conduct IDAs without the inconsistencies and inaccuracies which have been noted in previous IDA attempts?

Results and data were gathered through literature review, interviews with stakeholders in Louisa County, review of IDA instruments utilized by other departments, and questionnaires delivered to decision makers in other departments in Virginia.

Background and Significance

Louisa County is situated 35 miles east of Charlottesville, 50 miles west of Richmond along the I-64 corridor, and is 95 miles southwest of Washington, DC. The County is 514 square miles of rural land with pockets of business, light and heavy industry and residential growth areas. Louisa County's population is approximately 33,000 (*Louisa COOP*, 2011). This population is spread throughout the farm country of the county with some more dense concentrations in the towns of Louisa and Mineral as well as the Zion Crossroads area of the County.

Louisa County is subject to numerous natural hazards which include severe thunderstorms, flash flooding, tornadoes, hurricanes and occasional major winter storms. In addition, Louisa is located in an active seismic zone and is home to the Lake Anna Nuclear Power Station, which, due to the seismic activity presents a significant hazard (*Louisa COOP*, 2011).

The North Anna Nuclear Power Station is an important source of revenue for the local government as well as a large employer for the citizens of Louisa County. Lake Anna, the lake built specifically to cool the reactor water, is a center of housing and recreation for the county and adds to the quality of residents' lives. Its presence does, however, add a level of risk and complexity to any natural or manmade disaster affecting the area.

The Louisa County Department of Fire and EMS is an all-hazards combination fire and rescue department consisting of 34 full time and 30 part time personnel. All career personnel are cross-trained for fire suppression and EMS, including both Advanced Life Support and Basic Life Support. In addition, there are approximately 200 volunteers on the roster, operating from 11 stations. Some of these volunteers are cross-trained, however many are either solely EMS or suppression oriented. Only a fraction of this number of volunteers are operationally active. Service is provided from seven fire stations and four rescue stations, with career staff operating

out of five of these stations in total. The career staff operates on a four platoon system with 24 hours on shift and 72 off. The Volunteer personnel have no set scheduling from department to department. In FY2011 the department answered 6500 calls and there has consistently been a 10 percent increase in call volume each year. Louisa County Department of Fire and EMS has only basic capabilities for hazardous materials or technical rescue incidents. Any incident exceeding these capabilities requires a mutual aid request to the Virginia Emergency Operations Center (VAEOC) for a regional team to mitigate the event.

There have been career staff in the county for approximately 10 years, but only in January 2011 was the Department of Fire and EMS legally formed by local ordinance and a Fire Chief placed in charge of overall operations. In addition to being responsible for fire department operations, the Fire Chief is also designated as the local emergency manager. As a result the senior staff routinely takes part in EOC drills and other emergency management planning activities. This includes heavy involvement in federally mandated radiological emergency preparedness drills.

In the past, Louisa County had experienced minor to moderated damage to infrastructure and similar interruption of services due to storms, hurricanes and winter weather. None of these events had required County officials to seek state or Federal aid. However on August 23rd, 2011 an earthquake registering 5.8 on the Richter scale occurred, with the epicenter two miles outside the town of Mineral, which essentially lies at the center of Louisa County. Estimates suggest that the quake caused approximately 80 million dollars in damage to public and private structures. More than 20 million of this was residential, with the bulk of the remaining damage being to the high school and middle school.

Initially it was unclear how much damage had been done by the earthquake and the primary focus was on the safety and integrity of the North Anna Nuclear Power Station. Once the initial response was over, the need to undertake the process of Initial Damage Assessment of

public structures as well as individual homes became evident. The Louisa County Emergency Operations Plan (EOP) does point out the need for IDA teams to be deployed as part of one of the Emergency Support Functions (ESF's), but does not specify a deployment process, nor does it provide an instrument or tool to accomplish this task (*Louisa EOP*, 2010)

This lack of direction resulted in on-the-spot creation and duplication of IDA forms and the process being developed and refined as it occurred. Several types of employees were used in this process, including: fire department personnel, building inspectors, and personnel from the County Assessor's office. As the task grew larger, mutual aid building inspectors were called from around the state. Many of the teams were from outside jurisdictions utilized their own forms for the Initial Damage Assessment effort, further complicating the process. This lack of a refined, standardized process and failure to provide a well thought out data recording instrument, such as a standardized form which could be easily understood and utilized by multiple disciplines, led to uncertainty for the IDA teams. It also caused confusion for the personnel trying to compile the data and submit it to the Commonwealth of Virginia. These factors initially resulted in some double counts of structures, inconsistent monetary valuations, and unpredictable assessment of the degree of structural damage. This is an important point because the Commonwealth of Virginia uses the data submitted in the IDAs to determine whether or not to seek Federal aid or if the locality is eligible for aid from the Commonwealth itself. Inaccurate data could cause a locality to fail to meet criteria for assistance.

This Applied Research Project (ARP) is relevant to the course goals of the National Fire Academy's Executive Development course because it will demonstrate the need for the application of research and use of teams to accomplish the task of Initial Damage Assessment. One goal of the Executive Development course is to "...improve executives abilities to: ...Lead effectively and efficiently within a dynamic and complex organization by enhancing the development of teams and the application of research" (National Fire Academy, 2011, p. ix).

This research directly relates to and supports the United States Fire Administration's second strategic goal in that it will better prepare responders in Louisa County to plan and prepare for a major incident, resulting in much more effective mitigation. This ARP will also support portions of strategic goal number three by demonstrating the need for improvement in the system of damage assessment in order to better respond to and recover from an incident. Should the incident escalate to one qualifying for state or federal aid, the response framework in Louisa will be better prepared to interact with state and federal agencies (United States Fire Administration [USFA], n.d.).

Literature Review

The literature review for this paper was initiated while attending the September 2011 Executive Development course. During this time the researcher made daily use of the Learning Resource Center (LRC) on campus to develop a wide variety of references regarding the damage assessment process. Upon returning to Virginia the research was continued through internet access to the LRC, research on the World Wide Web, and use of resources available through the Louisa County Department of Fire and EMS as well as the Virginia Department of Emergency Management.

It is critical to recognize the importance of the damage assessment process to a community which has experienced a major disaster, whether natural or manmade. Before examining this importance, it is imperative to determine what is meant by Initial Damage Assessment. In Virginia the damage assessment process is broken down into three parts: the Rapid Needs Assessment (RNA), the Initial Damage Assessment (IDA), and the Joint Preliminary Damage Assessment (PDA). This research will focus on the IDA which is typically undertaken after the initial emergency response. It is the local government's responsibility to conduct the IDA, which evaluates the impact of a disaster on residences, businesses, public infrastructure and emergency response. The IDA must generally be submitted to the Virginia

Emergency Operations Center within seventy two hours of the incident (Virginia Department of Emergency Management [VDEM], n.d.).

There are several reasons why it is vital for localities to perform a thorough, timely and accurate Initial Damage Assessment. Ranous (1995) notes that a properly performed damage assessment holds great importance in that it evaluates structures for safety and will allow the public to return to their buildings in as timely a manner as possible. This not only positively affects safety, but will aid in rebuilding the economy and will have a positive psychological effect on those impacted by the disaster. Regarding the psychological aspect of a disaster and ways in which an IDA may help the public, Cole, Ewell, and Ferguson (1993) note that both public and government officials often desire to quickly know the results of the damage assessment because it helps them gain some perspective on the scale of the incident.

Arguably the most important aspect of a proper, well organized Initial Damage Assessment is a financial one. McEntire (2002) emphasizes this and notes that state and federal monies will not be tasked to the recovery process to help the locality until the scale of damage is known. The Virginia Department of Emergency Management, (VDEM), also highlights the point that the locality must present the IDA to their agency within 72 hours so that the scale of the damage can be evaluated in order to request assistance from the Commonwealth and the Federal Government if appropriate (Virginia Department of Emergency Management [VDEM], n.d.). In summary of this point on financial importance, the citizens, businesses and non-profit organizations of a locality affected by a disaster cannot expect to be awarded any grants or loans without completion of a thorough and accurate damage assessment (McEntire & Cope, 2004).

The literature review for this research project revealed multiple tools for gathering the data needed to complete the Initial Damage Assessment. VDEM utilizes a laminated two sided form which sets forth guidelines for their personnel to categorize damage into one of four categories: Affected Habitable, Minor, Major, or Destroyed. The form then goes into detail on

how to place a structure in each category based on the type of damage incurred (Virginia Department of Emergency Management [VDEM], 2007). In his EFO Paper Siems (2010) developed a directive and standardized form for use in the Edina Fire Department. Although the author of this paper refers to the process as rapid damage assessment, the tools he developed encompass many of the necessary components for an IDA (Siems, 2010). Szakacs (2009) also developed a policy and standardized form for the Holland Fire Department in his 2009 EFO paper.

Though many of the sources reviewed developed or recommended the use of standardized forms and departmental policy, Loftus (2007) notes that many departments are making heavy use of technology such as Geographic Information System (GIS), Global Positioning System (GPS), mobile computers and aerial photography. In his research he points out that the vast majority of the departments surveyed for his ARP utilized one or more of these technologies. It is worth noting that most of the respondents to the survey for Loftus' research were located on the Eastern Shore of Maryland, and Virginia, or in the Hampton Roads region of Virginia. Due to geographical location these departments have a long standing history of responding to hurricane damage (Loftus, 2007), making these localities more aware of the need for investment in emergency management. In addition, many of these departments are in the more populous areas of the Commonwealth and have more funding available for disaster preparedness than do the central and rural areas of Virginia.

In the event of a significant emergency, the Dominion nuclear power stations at North Anna and Surry, VA both extensively utilize policies and standardized forms in their damage assessment process (S. M. Wood, personal communication, March 23, 2012).

As part of this ARP the researcher wished to identify some of the components which were common to the various damage assessment tools. During the literature review, some common elements were identified from existing or draft assessment apparatus. Initial and

ongoing training in performing damage assessment was a component found in multiple policies and procedures. The Standard Operating Procedure for Clay County Fire and Rescue calls for annual training not only to keep personnel proficient but also to determine whether or not the SOP needs review (Knoff, 2009). For similar reasons, the policy proposed for the Santa Rosa Fire Department also requires initial and annual training on how to properly perform damage assessment (McCormick, 2010). Virginia Department of Emergency Management does not require routine training for personnel, but does offer and recommend a one day course for those actually performing or overseeing the assessments (Virginia Department of Emergency Management [VDEM], n.d.). Training is a key component of preparing the personnel at the two nuclear power stations in Virginia for any sort of serious emergency. Not only do the personnel receive initial training, but recurrent training and evaluation on the various procedures occurs every five weeks. The importance of this training is emphasized by the fact that if an employee fails a post training evaluation, they are pulled from the line and must undergo remediation and re-evaluation (S. M. Wood, personal communication, March 23, 2012).

In addition to training being a common factor, common terminology is used to describe the damage to structures. In Virginia, the Department of Emergency Management utilizes a guideline form with the categories of Affected, Minor, Major and Destroyed. As an aid to the assessors each of the categories is accompanied with descriptive examples of what types of damage correspond to each grouping (VDEM, 2007). In the rapid damage assessment form created for the Edina Fire Department these same categories are used with abbreviated description of requisite damage (Siems, 2010). These categories coincide in name to the classifications which the Federal Emergency Management Agency (FEMA) uses once that agency arrives to perform its Preliminary Damage Assessment to assess the need for federal aid (Federal Emergency Management Agency [FEMA], 2005). In theory this should reduce

discrepancies between local, state and federal assessments. However in practice the assessor's subjectivity will affect how a structure is categorized.

The last question addressed via this literature review was which IDA tools, if any, would benefit Louisa County in conducting future damage assessments. As part of the disaster preparation process and in order to accurately collect data, planning for a means to collect data is imperative if the process is to be efficient and accurate. Standardization of forms, terminology and categorization of damages is specifically recommended (Planitz, 1999). Increased consistency and accuracy in the damage assessment when a standardized form is used is supported by research performed by Bragg in his exploration of how to better prepare the Akron Fire Department for post storm damage (Bragg, 2009).

Mr. Casey Littlefield, building inspector for Louisa County, was interviewed by phone regarding this question. Mr. Littlefield was heavily involved in the prolonged and extensive damage assessment process following the August 2011 earthquake. Mr. Littlefield indicated that future damage assessment attempts would benefit from standardized tools. He specifically stated that a standard form would aid in consistency of damage assessments. He also noted that use of existing GIS technology might benefit efficiency by more exactly pre-determining routes for the damage assessment teams (C. Littlefield, personal communication, March 16, 2012).

This literature review revealed that it is important for localities to conduct Initial Damage Assessments for a number of reasons, including citizen safety, psychological, political and financial reasons. Based on this portion of the research, some of the tools used to conduct damage assessments are: standard operating procedures, standardized forms, and more technologically intensive forms of assessment tools such as laptops, GPS and GIS. As for common elements within the various apparatus used to perform damage assessments, initial and repetitive training stood out as did utilization of common terminology which is consistent with State and Federal language. Based on existing literature and personal interviews, utilization of

one or more of these tools to standardize collection of data and prepare ahead of time would likely benefit Louisa County in any future damage assessment efforts, whether large or small.

Procedures

The subject for this research project was developed during the weeks leading up to and the two weeks during which the author attended the Executive Development Course at the NFA. During the Executive Development Course a problem statement, along with a purpose statement and four research questions which the author sought to answer were developed. Action research was chosen as the research method to answer these questions: 1) Why should localities perform timely and accurate Initial Damage Assessments? 2) What types of tools are other departments utilizing to gather IDAs? 3) What common components are present in the different IDA tools used by these departments? 4) What IDA tools would benefit Louisa County personnel thereby enabling them to conduct IDAs without the inconsistencies and inaccuracies noted in previous IDA attempts? In answering these questions the author desired to achieve the purpose of this research by developing a tool for Louisa County personnel to conduct consistent, accurate Initial Damage Assessments.

A literature review was conducted at the National Fire Academy's Learning Resource Center during the Executive Development course. Literature reviewed included books, magazine articles, journals, government documents and Executive Fire Officer Program Applied Research Projects. Upon return to Virginia the researcher continued the review with the use of the LRC online card catalog, web resources as well as State and Local government documents.

A nine question questionnaire, (Appendix A), was developed in December 2011 and was subsequently mailed to 36 combination fire departments throughout Virginia on the 26th of December, 2011. The departments were chosen based on having similar size and/or administrative structure as Louisa. The purpose of the questionnaire was to determine what tools, procedures, personnel and systems other similarly composed localities were using to

conduct initial damage assessments. The deadline for the return of the questionnaire was the end of January, 2012. Twenty of the 36 questionnaires were returned completed, yielding a 55 percent response rate.

In mid-March phone interviews with two stakeholders in the Louisa County damage assessment process were attempted. This was necessary because their written questionnaires were not returned, and given their first hand experience, the author believed that their insight of these particular stakeholders would be vital to achieving the purpose of this ARP. In addition, in March, a phone interview was conducted with the Emergency Preparedness Specialist for the North Anna and Surry Nuclear power stations. This interview lent insight into this unique industry's procedures for damage assessment

There were limitations noted during the development of this applied research process. With only a 55 percent return of the questionnaires, the sample size of departments was smaller than expected. The questionnaire requested that, if possible, a copy of pertinent forms, SOP's or procedures be returned with the completed questionnaire, but only one respondent, Accomack County, actually returned any established IDA tools. This meant that comparison of the elements of the various tools was left almost exclusively to the literature review. Only one of the two phone interviews was conducted with the Louisa County stakeholders due to inability to make contact with the second person despite repeated attempts over a period of two months. The researcher was limited in his ability to further pursue retrieval of these tools due to responsibility for the local recovery effort from the earthquake and a subsequent employment change.

Results

This research project sought to improve service to the citizens of Louisa County by answering four research questions. A literature review, a questionnaire to other departments in Virginia, and personal interviews yielded the results that follow. The first question, why should localities perform timely and accurate Initial Damage Assessments, was largely answered

through the literature review, with multiple authors citing the importance of the damage assessment phase of a recovery effort. The damage assessment should be performed in the interest of public safety in order to determine if a structure is safe and when the people may inhabit it again (Ranous, 1995). In other work the importance of the process is emphasized because of its psychological impact in helping both the public and government officials to understand how extensive the damages are (Cole et al., 1993). Another source points out that the IDA can have great financial implications for localities, specifically that the locality cannot become eligible for aid from the State or Federal governments without performing accurate damage assessment (McEntire & Cope, 2004).

The second research question sought to identify what types of tools other departments were using to gather the data for their initial damage assessments. During the course of the literature review several sources referred to using policies and or forms in order to standardize the process. This was true for the Edina Fire Department (Siems, 2010), The Holland Fire Department (Szakacs, 2009), and the Virginia Department of Emergency Management (VDEM, 2007). Additionally the Dominion Power Company also makes use of extensive policies and standardized forms to efficiently direct their damage assessment process at their nuclear power stations located in Virginia (S. M. Wood, personal communication, March 23, 2012).

The questionnaire sent to departments in Virginia that are similar in composition to Louisa County revealed that 90% of the departments that responded did have a formal system in place for the damage assessment process. Of these departments, 13 of 18 (72 %), used a combination of standardized forms, citizen phone reporting, and electronic collection as data collection instruments. Of the departments which had an established system in place 83% utilized an Excel Database to compile the data gathered during the IDA. One department had custom written software for this purpose and two departments only identified their software type as “other”. Of the respondents 45% utilized building inspectors to perform initial damage

assessment, and 45% utilized a combination of police, fire, building inspectors, assessors, public works employees, or volunteers to accomplish this task.

The next question attempted to identify any common components found in the various tools identified during the research. The SOP for both the Clay County Fire Department (Knoff, 2009), and the proposed policy for the Santa Rosa Fire Department (McCormick, 2010) call for their personnel to undergo repetitive training on how to properly complete a damage assessment. Dominion power uses a combination of frequent, repetitive training and evaluation in order to assure that their employees are proficient in damage assessment (S. M. Wood, personal communication, March 23, 2012).

Terminology was also identified as a component common to multiple standardized forms. The damage descriptors of Affected, Minor, Major, and Destroyed along with descriptions to match were found in literature available from the Commonwealth of Virginia (VDEM, 2007), as well as the Federal Emergency Management Agency (FEMA, 2005). Siems (2010) also proposed a policy and assessment form for the Edina Fire Department which incorporated these same categories and very similar descriptions to aid in appropriate assessment and categorization of damage.

Additionally the questionnaire revealed that ease of use was an element desired by agencies. Of the departments which responded 73% utilized a system or instrument which could be easily used by any of the disciplines, (fire, police, building inspectors, etc), which might be involved in the IDA collection. Though personal interview with Louisa personnel revealed the belief that pre-determined routes would aid in completing IDA's more efficiently, only 15% of departments had any kind of a pre-determined route as a component of the system they utilized (C. Littlefield, personal communication, March 16, 2012). When asked about training, 80% of the agencies indicated that they did perform training, but 70% had training intervals of greater than a year. Twenty percent never conducted training as part of their process.

The last question strives to identify what IDA tools would benefit Louisa County personnel by enabling them to conduct IDAs without the inconsistencies and inaccuracies which have been noted in previous IDA attempts. Planitz (1999) recommends use of standardized forms and terminology as well as standardized criteria for categorization of damages. Standardized forms are advocated by others familiar with the process of damage assessment, along with considering the use of GIS (C. Littlefield, personal communication, March 16, 2012). The answers to the questionnaire reveal that 90% of departments use an organized system, and 72% utilize a combination of different tools, including standardized forms, phone reporting and use of electronics in implementing this system.

Discussion

Louisa County is subject to multiple hazards, some natural and some manmade. These include but are not limited to tornadoes, hurricanes, flooding, winter storms and earthquakes. Louisa has already suffered damage from all of these natural hazards, most notably more than 80 million dollars in damage from the August, 2011 5.8 magnitude earthquake. In addition the presence of the North Anna Nuclear Power Station means that any one of these hazards has the potential to disrupt operations and possibly cause a radiological emergency in addition to the natural disaster already occurring.

During the recent earthquake in Louisa County the researcher, who at the time was the new Fire Chief and Emergency Manager, noted that there was no specific policy or plan to implement the initial damage assessment process, which he noted first hand was required prior to being evaluated for State and Federal aid. The author entered into this research project with the objective of determining whether a well developed policy or procedure, along with appropriate tools to aid in gathering and organizing the data, would aid in the damage assessment process if incorporated in the Louisa County Emergency Operations Plan.

In order to minimize the overall impacts of these incidents on the public, it is clear that Louisa needs to be able to perform an organized, efficient and accurate damage assessment once the immediate event is under control. Numerous sources reference the absolute importance of completing a timely, accurate assessment of damage for reasons of public safety, psychological factors involving members of the public and reasons involving financial aid (Cole et al., 1993, Ranous, 1995, McEntire and Cope, 2004). The questionnaire utilized in this research seems to support the importance of the damage assessment process, and point to the need for localities to perform it in that 90% of the respondents have a system in place to perform this function.

There are multiple examples of the use of systematic IDA's, with standardized forms or other tools found in the literature review. VDEM uses a standardized guide to aid in the IDA process (VDEM, 2007). A policy and standardized form was developed for the Edina Fire Department (Siems, 2010), as well as for the Holland Fire Department (Szakacs, 2009). Other research has pointed out the possibilities for the use of newer data gathering tools such as GPS, GIS and laptop computers (Loftus, 2007). The use of standardized forms is advocated by personnel who were heavily involved in recent damage assessments in Louisa County (C. Littlefield, personal communication, March 16, 2012). Data gathered during this research does not provide a clear answer to a specific solution for standardization, but rather points to utilizing a combination of standardized forms, phone reporting and electronic data gathering tools. A combination of these tools was used by 72% of the departments which responded. The questionnaire addressed an issue not specifically cited in the literature review: that of how to store, manipulate, and compile the data gathered by the damage assessment teams. The overwhelming majority, 83%, of the departments responding utilize Excel software for this function. Existing literature and the research conducted in this ARP point to using a systematic approach to damage assessment with the use of standard policy and forms as an industry best practice.

Common components were found among the various tools used to perform initial damage assessments. The need to assure that personnel are adequately trained to perform damage assessment and properly work within policy and utilize the system provided is demonstrated in policies written for both Clay County Fire and Rescue (Knoff, 2009), and the Santa Rosa Fire Department (McCormick, 2010). The Virginia Department of Emergency Management provides a one day course to help those responsible for performing or overseeing assessments understand how to properly perform them (VDEM, n.d.). 20% of the respondents to the questionnaire do not provide training for their personnel; however 70% of the departments indicated that they perform this training at intervals of greater than a year. Common terminology is another element which was noted during the literature review. Both the guideline used by the Virginia Department of Emergency Management (VDEM, 2007), and the form created for the Edina Fire Department (Siems, 2010) for damage assessment include language for damage categories and descriptors of this damage which is consistent with the system utilized by FEMA in its Preliminary Damage Assessment process (FEMA, 2005). Officials from Louisa County believed that pre-determined routes for damage assessment teams would aid in the efficiency of deployment and therefore the overall process (C. Littlefield, personal communication, March 16, 2012). The research conducted for this ARP revealed that only 15% of the respondents utilized pre-determined routes as part of their damage assessment system. It is unclear why this component is not incorporated into more damage assessment policies, and whether its absence is an oversight or due to a belief that this practice is impractical in the face of disaster? Regarding the instrument or system used in collection of IDA data, ease of use across disciplines was sought by 73% of respondents.

Several of these tools would benefit Louisa County personnel in their efforts to conduct consistent, accurate initial damage assessments. Advanced preparation in order to conduct an efficient and accurate damage assessment is recommended by experts in the field, and this

preparation should include standard forms, terminology and damage categories (Planitz, 1999).

The incorporation of standardized forms in order to complete high quality damage assessments is also supported by more recent applied research conducted by NFA students (Bragg, 2009).

Again, at least one Louisa County official believes that a standard form and pre-determined routes for assessors would benefit the county in future endeavors (C. Littlefield, personal communication, March 16, 2012). The response at the Lake Anna Power Station to the August earthquake went very smoothly and company officials credit this high quality response to standard processes and training ethic (S. M. Wood, personal communication, March 23, 2012). Results from the questionnaire distributed reveal that 90% of the organizations responding have a formal system in place to complete damage assessments, and that 72% utilize multiple IDA data gathering tools to record results. Training is conducted by 70% of these departments and 73% of the organizations have attempted to make their IDA tools easy to use by multiple disciplines. The literature review and research for this ARP indicate that incorporation of several of these IDA tools and common components included within them would benefit Louisa County in conducting consistent, accurate damage assessments.

Implementing a standardized policy along with stock forms and a systematic approach to the initial damage assessment process in Louisa County will improve the County's ability to conduct accurate, thorough assessments. This increase in efficiency will improve the local authorities' ability to respond to a natural or manmade disaster and subsequently pursue financial aid from both the Commonwealth of Virginia and the Federal authorities.

Recommendations

The research conducted for this project indicates that damage assessment is a vital step in the response to a disaster. Louisa County has struggled with correctly and proficiently performing this step in the recent past. Results of this ARP indicate that many departments and

agencies are utilizing standardized forms and policies in order to aid in the accuracy and efficiency of this important step.

Because the research conducted in this ARP indicates that Louisa County could benefit from the development of a standardized damage assessment tool, it is recommended that the Louisa County Department of Fire and EMS develop a policy which will clearly define damage assessment procedures. In addition to procedures, this policy should define who is responsible for performing the damage assessments, and what tools or implements they will be required to use. This policy should also require both initial and systematic repetitive training in how to properly perform an initial damage assessment.

A standardized form with common terminology and damage categorization, which is consistent with terminology and categories currently utilized by the Commonwealth of Virginia as well as FEMA, should be created for use in conjunction with this policy (Appendix D). Once approved the policy and attendant forms should be incorporated into the Louisa County Emergency Operations Plan, and assessed for improvement and the incorporation of new technologies at intervals not to exceed two years. The proposed policy and form included in appendix D of this paper will be provided to Louisa County Department of Fire and EMS for review and potential incorporation into the Emergency Operations Plan.

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[Damage-Assessment](http://www.vaemergency.gov/em-community/training/G111-Disaster-Damage-Assessment)

Appendix A

Initial Damage Assessment Questionnaire

1. Does your organization currently have a system in place to perform initial damage assessments?

Yes

No
2. If you answered yes to question #1 please circle what, if any, type of data collection instrument or tool you utilize in this system.
 - a. Standardized IDA form
 - b. Citizen phone reporting
 - c. Electronic collection (Toughbook, IPAD etc.)
 - d. A combination of more than one of theses
 - e. Other (Please Specify)
3. What type of database is used to compile the IDA data which is gathered?
 - a. Excel
 - b. Access
 - c. Other (Please specify)
 - d. Custom written software
4. What method for assigning monetary valuations for structural damage does your organization's IDA system have?
 - a. Personnel assign a monetary value based on percentage of structural damage
 - b. Estimation based on description of damage later compared to assessed value
 - c. No specific system
5. Who conducts your Initial Damage Assessments?

Police

Fire-

Building Inspectors

Assessors

Public Works

Volunteers

A Combination of all of these

Other (if other please specify)
6. If you use a standard instrument or system to collect your IDA data, is it designed to be easily used by any of the above disciplines?

Yes

No

7. Who coordinates the flow of incoming data from the field teams conducting the IDA's (data gathering, compilation and entry into local and state databases)?
 - a. Fire Dept. personnel
 - b. Emergency Manager
 - c. Building Dept.
 - d. Other (if other, please specify)

8. Are any of the following used to deploy IDA teams along pre-determined routes?
 - a. Postal routes
 - b. School bus routes
 - c. Other (please specify)
 - d. No pre-determined routes are used

9. How often does your department provide training for the personnel responsible for conducting the IDA's in your community on how to perform this duty?
 - a. Multiple times a year
 - b. Once a year
 - c. Interval is greater than a year
 - d. Never

Appendix B

Initial Damage Assessment Questionnaire Results

1. Does your organization currently have a system in place to perform initial damage assessments?
 - Yes-**90%**
 - No-**10%**
2. If you answered yes to question #1 please circle what, if any, type of data collection instrument or tool you utilize in this system.
 - a. Standardized IDA form-**16.6%**
 - b. Citizen phone reporting-**5.5%**
 - c. Electronic collection (Toughbook, IPAD etc.)-**5.5%**
 - d. A combination of more than one of theses-**72.2%**
 - e. Other (Please Specify)-**0%**
3. What type of database is used to compile the IDA data which is gathered?
 - a. Excel-**83.33%**
 - b. Access-**0%**
 - c. Other (Please specify)-**11.11%**
 - d. Custom written software-**5.5%**
4. What method for assigning monetary valuations for structural damage does your organization's IDA system have?
 - a. Personnel assign a monetary value based on percentage of structural damage-**20%**
 - b. Estimation based on description of damage later compared to assessed value-**50%**
 - c. No specific system-**30%**
5. Who conducts your Initial Damage Assessments?
 - Police
 - Fire-**10%**
 - Building Inspectors-**45%**
 - Assessors
 - Public Works
 - Volunteers
 - A Combination of all of these-**45%**
 - Other (if other please specify)
6. If you use a standard instrument or system to collect your IDA data, is it designed to be easily used by any of the above disciplines?

Yes-**73.6%**

No-**26.3%**

7. Who coordinates the flow of incoming data from the field teams conducting the IDA's (data gathering, compilation and entry into local and state databases)?
 - a. Fire Dept. personnel-**5%**
 - b. Emergency Manager-**80%**
 - c. Building Dept.-**10%**
 - d. Other (if other, please specify)-**5%**

8. Are any of the following used to deploy IDA teams along pre-determined routes?
 - a. Postal routes-**5%**
 - b. School bus routes
 - c. Other (please specify)-**10%**
 - d. No pre-determined routes are used-**85%**

9. How often does your department provide training for the personnel responsible for conducting the IDA's in your community on how to perform this duty?
 - a. Multiple times a year-**5%**
 - b. Once a year-**5%**
 - c. Interval is greater than a year-**70%**
 - d. Never-**20%**

Appendix C

Louisa County Staff Interview Questions

Interview with Casey Littlefield- Louisa County Building Inspector

1. Regarding the August 23rd earthquake in Louisa County and the subsequent Initial Damage Assessment, what were the strengths of the process?

“Teamwork was essential, the ability of the individuals to work together and pull together through long hours, regardless of what their normal responsibilities entailed.”

2. In what areas, if any, did you note errors or inconsistency?

“I think that communication was a big issue between the Community Development Department and the Assessor’s office. There were duplication of counts and monetary values due to data returning to more than one point of contact, damage assessment teams composed of building inspectors would return with the results of the day and turn them in at the EOC, the assessors took their results to their office and entered them prior to the sheets coming to the EOC. This caused many reports to be entered into the database twice. “

“Though everyone was working hard to be consistent, our difference in training and background caused people to assess the same damage differently.”

3. Do you have any suggestions on how to improve the damage assessment process?

“Use the GIS system and existing map grids to better plan routes for damage assessors. Some sort of pre-planned routes for DA teams would be helpful. Damage assessment sheets need to come back to a single point of contact or central database to minimize confusion and inaccuracies.”

“The County needs a guide or form that matches more closely to what the Virginia and FEMA use to help the teams assess damage more consistently.”

Appendix D

LOUISA COUNTY DEPARTMENT OF FIRE & EMS STANDARD DEPARTMENT POLICY		
	SUBJECT: Damage Assessment Procedures	
	S.D.P. ---	
	PAGE 31 OF	
	CATEGORY: Operations	EFFECTIVE DATE: TBD
	REVISION DATE:	
APPROVED BY: , Fire Chief Department of Fire and EMS		
FORMS REQUIRED: IDA Form		

PURPOSE:

The purpose of this policy is to define the procedures which will be followed by Louisa County personnel while performing Initial Damage Assessments, (IDAs). These procedures will be initiated at the direction of the Fire Chief/Emergency Manager or his duly appointed deputy after an adverse event, either natural or manmade, is believed to have caused significant property damage in the county.

POLICY:

This policy applies to all full- and part-time employees who, as part of their duties, will be expected to perform Initial Damage Assessments in the post response phase of an incident. This includes but is not limited to Fire & EMS personnel, building inspectors and other personnel from the Community Development department, and personnel from the assessor's office.

I. Implementation of IDA procedures

A. This Damage Assessment Procedure may be implemented at the direction of the Fire Chief or his deputy when the following conditions are present:

1. A natural or manmade disaster has occurred and:
 - a. There are reports of significant structural damage to residences or public structures in the county, or
 - b. The event is significant enough to reasonably suspect significant damage which cannot be reported due to loss of infrastructure (phones, intranet, electricity etc.), or
 - c. For any other reason which the Fire Chief deems necessary

2. This procedure will only be implemented when there is no longer critical threat to life, (ongoing severe storm conditions, active tornado's, unacceptably high radiation levels, etc.). The Fire Chief/Emergency Manager will advise the County Administrator of implementation of this policy and coordinate with affected department heads in order to communicate needs to affected personnel.

B. Reporting for duty:

1. Damage assessors will be notified activation of this procedure or time of anticipated activation and will report to the Emergency Operations Center, (EOC), on the date and time they are directed to.
2. Upon arrival at the EOC teams will be assembled and briefed by the Emergency Manager or his designee. The briefing will include at a minimum:
 - a. Nature and known scope of the disaster;
 - b. Known hazards and safety issues;
 - c. Brief recap of forms, procedures and goals;
 - d. Anticipated routes and work areas;
 - e. Anticipated work periods
 - f. Method of communication with the EOC and procedure in case of emergency
3. The Emergency Manager or his designee will provide teams with appropriate IDA forms and necessary equipment and will deploy the teams along either pre-determined routes or routes determined by the apparent scope of damage.
4. Upon return from the field teams will report immediately to the IDA intake position, which will be situated in near the EOC and clearly labeled, and IDA intake manager staffing this position all IDA forms as well as a summary of any assigned areas not covered. This is the only place IDA forms are to be turned in.

C. Processing of Initial damage Assessments:

1. In order to properly process the IDA forms, compile the data gathered, enter it into Virginia's Web EOC, and prepare for further deployment of teams there are several tasks which must be performed.
2.
 - a. The IDA intake manager will compile the IDA forms and note any area's or addresses which were assigned but not covered, he will then relay this information to the Emergency Manager who will assure that these areas are re-assigned. The IDA forms will then be turned over to the Administrative Assistant for Fire and EMS.
 - b. The Fire and EMS A. A. will enter the data from the IDA forms into the Excel database designed for this purpose this database is to be password protected and save both on the local machine and on the H drive.
 - c. The IDA forms will then be taken to the Emergency Manager or his designee for entry into the Virginia WebEOC program for transmission to the VAEOC.
3. The procedure outlined above is the only acceptable procedure for processing the incoming IDA forms, any deviation must be approved by the Emergency Manager.

D. Dissemination of initial damage assessment data:

1. No less than once daily the Public Information Officer will prepare an internal memorandum to the County Administrator and the Fire Chief outlining damage totals. At the direction of the County Administrator this memorandum may also be distributed to specific State and Federal Officials.
2.
 - a. Once the data is reviewed by the County Administrator, and the Fire Chief, the PIO will be advised to release the information in the form of a press release.

E. Training

1. The personnel who are identified in this policy as being involved in the IDA procedure will undergo initial training on the procedures as well as forms and equipment involved.
 - a. This training will be accomplished at least annually, preferably in conjunction with an EOC drill.

Louisa County Initial Damage Assessment Form

Owner

Name _____ Address _____

Contact with owner Y N Phone _____

Name of Assessor _____ Access granted inside the structure Y N

Affected Systems: Exterior: Foundation ☐ Chimney ☐ Roof ☐Walls/siding/windows ☐**Notes:** _____

Interior: Foundation ☐ Truss system/Rafters ☐ Walls/Ceilings ☐ Doors ☐Floors ☐ Plumbing ☐ Electrical ☐**Notes:** _____

Utilities: Electric ☐ Gas ☐ (Natural ☐ Propane ☐ Water/Sewer (Septic ☐
City ☐)**Notes:** _____

Category (Circle One): Affected Minor Major Destroyed**Estimated Dollar Value of Loss \$** _____**Description*:****Affected-** minimal, habitable without any repairs, chimney damage, broken windows, soaked carpet < 2 inches, missing shingles, minor flooding in basement.**Minor-** damaged, not habitable without minor repairs, trees on structure, smoke damage, many shingles missing or shifted, many broken windows or doors, minor shifts in foundation, 2 inches to 2 feet on first floor or 1 foot or more in basement. Wet insulation under house, sewage in basement.**Major-** not habitable without major repairs, collapse walls, frame damage, missing or collapsed roof, extensive damage to utilities, bowed or cracked walls, doors jammed or difficult to operate. 2 to 4 feet on first floor, 1 foot or more on the first floor if there is a basement**Destroyed-** Structure is not economically feasible to repair, leveled, second floor missing, significant foundation damage, major shifting off foundation, more than 4 feet on first floor.

* Descriptions adapted from VDEM Individual Assistance Damage Assessment Level Guidelines, 2007

Appendix E

Interview with Stephen Wood, Emergency Preparedness Specialist, Nuclear Protection Services & Emergency Preparedness, Dominion Resources Services, Inc.

1. What sort of tools for damage assessment does Dominion use at the North Anna and Surry Nuclear Power Stations? Policies, procedures, checklists etc.?

“We have three sets of procedures used by different disciplines. Normal Operating procedures, Abnormal Operating procedures, which are algorithmic procedures....in other words, if you find this, this then do this, or go to this particular procedure. The third is emergency implementation procedures for major emergencies, not really for damage assessment but to try and mitigate know damages from progressing. We have procedures for many different events, for instance, one for adverse weather events, one for seismic events, etc. All of these forms are extensively procedurally and checklist driven.”

2. How regularly do personnel practice these procedures or train with these tools?

“We formally practice all of our procedures in our simulator. We take the policies and procedures into our training setting and revise them as technology progresses, and then re-test them in our simulator. There are training drills every five weeks where procedures are evaluated and revised.” “Of course, not all procedures can be tested every 5 weeks.” “We then evaluate personnel on knowledge and skills regarding these procedures, anyone who does not pass this evaluation has his certifications pulled and must undergo remediation until they can pass the evaluation.”

3. In the August Earthquake, what effect do you think these tools and training for damage assessment had on NAPS personnel’s response?

“The response operated exactly the way it was supposed to and this event did not catch us by surprise, it definitely re-enforced our training ethic, and the use of standardized procedures.” “We have looked at the Fukushima, Japan incident and created another set of administrative controls in order to address strategic thinking towards mitigating a catastrophic effect should an event exceed the capacity of our damage assessment and control plans. This set of guidelines will be used to help us think unconventionally to mitigate the incident”