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Executive Analysis of Fire Service Operations in Emergency Management

Rapid Damage Assessment: Will it Function as Expected When the Big One Hits?

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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 the language, ideas, expressions, or writings of another.

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Abstract

Performing rapid preliminary damage assessments immediately following a major disaster allows state and local governments to request much needed federal assistance. The problem was Miami Dade Fire Rescue (MDFR) has not had the opportunity to evaluate the current damage assessment system implemented after Hurricane Andrew in 1992. The purpose of this research paper was to evaluate the current system and determine its functionality after a natural disaster. An Evaluative Research was done to identify the types of damage assessment methods available and how they compare to other methods used elsewhere. Surveys, personal interviews and a literature review were conducted to determine if the current method functioned as anticipated. Additional personnel training, modifying the system to meet the specific needs of the community and a redundant communications system is recommended.

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Rapid Damage Assessment:

Will it function as expected when the big one hits?

Natural or manmade disasters can have a devastating effect on a local, State or Federal level, depending on the type and severity of the occurrence. Disasters, unlike most hazards, are inevitable and usually cover a large geographical area. They affect more lives and are broader in scope than any other emergency encountered in the fire service. Disasters can be classified as accidental or deliberate and natural or manmade, but regardless of the reason most generate injuries and death, can cause extensive property damage beyond control and can overwhelm any emergency response capabilities. Planning and preparation in advance of an incidence of this magnitude requires the use of a comprehensive disaster plan. This plan includes an evaluation of post disaster damages and what process and procedures, which are available, are required to receive Federal aid. The potential widespread devastation after a major disaster can impede the timely response needed to conduct a comprehensive evaluation or damage assessment of all affected areas which in turn can delay receiving outside assistance. Post disaster assessment is a key element of a successful disaster response.

According to a report by the Federal Emergency Management Agency (FEMA) “one of the most important objectives after any disaster is to inform individuals of the assistance available and to help them with the application and delivery process” of such aid (FEMA, 1997, p.7). The request for this assistance from the State or Federal level must be preceded by a comprehensive damage assessment report conducted by the affected local government stating all local resources have been overwhelmed. The primary responsibility for preparing a community and helping its citizens recover from the devastation of a disaster lies with the local government, and most disasters are successfully handled at this level (FEMA, 1999). It is essential for local government officials that are responsible for organizing post-disaster relief operations be properly informed

in order to make effective decisions about the deployment of needed resources. This information must be accurate and delivered in a timely fashion in order to identify what has happened, what needs to be done and what resources are available. Delays in gathering and disseminating this information will significantly and negatively affect the emergency responder's ability to direct resources where they are needed the most and impede any emergency declaration assistance available.

The research problem is that Miami-Dade Fire Rescue (MDFR) has not had an opportunity, under true post disaster conditions, to test and evaluate the current preliminary damage assessment system that was implemented after Hurricane Andrew destroyed most of South Miami-Dade County in 1992. An ineffective system can prevent the local authority's ability to allocate the necessary resources in a timely manner and can create delays in receiving much needed Federal assistance.

The purpose of this research is to evaluate the current preliminary damage assessment system used by MDFR. The evaluative research method was used to answer the following research questions:

- What preliminary damage assessment system do industry standards suggest for a post disaster incident in a large metropolitan area?
- What other methods or systems are available that can be used to perform rapid or preliminary damage assessments in a large metropolitan area like Miami Dade County?
- How does the current system of conducting preliminary damage assessment used by MDFR compare with other large metropolitan areas that have experienced hurricanes?

- If this system has not been tested under true severe post disaster conditions how can MDFR ensure it will function as expected?

Background and Significance

Florida has a large and rapidly growing population. The majority of this population is centered on regions of the state susceptible to hurricanes, tornadoes and flooding. Miami-Dade County is one of 67 counties in the State and is the most heavily populated county. With an estimated 2.4 million residents situated on the south east coast of the Peninsula and due to its proximity to the tropics and westerly winds that blow off the African coast along the equator, it is vulnerable to severe tropical storms called hurricanes. Gray (as cited in Kleinberg, 2001) states that because of a larger population and higher property values Florida should expect greater losses from hurricanes and predicts the next 35 years could produce 10 times more damage then the previous 35 years. Kleinberg (2001) predicts that Florida and the Eastern United States can expect more and stronger hurricanes for decades to come partly due to warmer Atlantic Ocean waters and weaker atmospheric winds. Predictions like these have triggered a growing awareness of the possible damage natural disasters can cause.

According to statistics in a National Oceanic and Atmospheric Administration (NOAA) report (Blake, Jarrell, Mayfield, and Rappaport, 2004) Florida has experienced five of the six costliest hurricanes since 1900. On August 24th 1992 Hurricane Andrew made landfall in South East Florida and devastated most of South Miami-Dade County. It was considered the costliest and third strongest hurricane in U. S. history. Gray (as cited in Kleinberg, 2001) states Hurricane Andrew was considered the worst natural disaster in U.S. disaster recovery history in terms of both human cost and destruction of property with more than $18 billion worth of damages and hundreds of thousands of people left homeless for months. The storm was a Category 5 hurricane when it struck the southeast coast of Miami-Dade County. Wind gusts in excess of 175 miles per

hour were registered at the National Hurricane Center in Miami and it destroyed everything in its path including local government infrastructures. Although Miami-Dade County, including MDFR, had a hurricane plan to deal with emergencies like this no one imagined there would be this much destruction. Many, if not all of the local county and city service providers were immediately overwhelmed with calls for help and assistance from citizens. Even those areas that were outside the path of destruction and not directly affected had difficulties addressing the concerns of their citizens. Hundreds of emergency calls to the 911 dispatch center were placed on hold until after hurricane conditions subsided and emergency vehicles were allowed to respond again. Even then units were not able to drive through the streets due to the massive amounts of debris blocking the roads. An accurate rapid assessment, or size up, conducted by local governments within a few hours after a disaster occurs is vital in providing an adequate response to life-threatening circumstances and impending hazards (Executive Analysis of Fire Service Operations in Emergency Management Student Manual [EAFSOEM], 2004).

The responsibility for providing emergency aid after a disaster lies with the local fire-rescue agency, which is the "first tier of defense in responding to natural and man-made disasters" (Florida Fire Chiefs' Association [FFCA], 2004, p. 5). The first and foremost responsibility is for conducting search and rescue functions, finding and treating victims and assuring transportation to the closest available hospital or medical facility. According to the FFCA Statewide Emergency Response Plan (SERP), which was created as a result of Hurricane Andrew (FFCA, 2004), "No community has the resources sufficient to cope with all emergencies" and "that it became abundantly clear from this disaster, and the ensuing relief effort which followed, that greater coordination for inter-agency disaster management was required" (p.5). The response to a major incident like this may deplete local resources while the community continues to experience typical emergencies. Determining the resources available to

respond to a disaster and identifying any gaps that need to be filled from outside sources is vital in specifically determining the lifesaving and life sustaining needs of post disaster victims. This is best accomplished by performing damage assessments of affected areas (FEMA, 2004).

MDFR is the seventh largest fire department in the nation with approximately 1,900 sworn, uniformed firefighters, an annual budget of just over $250 million and it responded to over 213,000 emergencies during 2005. It serves a growing, diverse population of more than 1.6 million residents through 108 rescue and suppression units strategically located in 59 fire-rescue stations within unincorporated Miami-Dade County and 30 municipalities, encompassing 1,883 square miles in size. It is a full service fire department that includes emergency medical services, fire prevention, hazardous materials, technical rescue service, marine firefighting, dive rescue, urban search and rescue, a Motorcycle Emergency Response Team (MERT) and owns four air rescue helicopters. Over 80% of MDFR's units are staffed and equipped to provide Advanced Life Support (ALS) services and according to statistics (MDFR report, 2005) it is "one of the youngest departments of its size in the country, as well as the fastest growing and most progressive" (p. VI).

As an emergency services provider, MDFR must provide immediate response to large- scale emergent situations such as inclement weather, plane crashes and other man-made disasters. In order to ensure preparedness for disaster/emergency situations, MDFR utilizes Incident Command Systems (ICS), which establish a command staff structure for emergency situations, clearly delineates roles and responsibilities and establishes operational support functions. Since Hurricane Andrew, MDFR has been tasked with being the lead agency in Miami-Dade County (MDC) for providing all these emergency services during and after a natural disaster, especially hurricanes. The MDC Emergency Operations Center (EOC) is located at MDFR Headquarters

and the Director of the Office of Emergency Management (OEM) is a sworn, uniformed MDFR Chief Fire Officer.

One of the most important functions for emergency service personnel following a disaster is the need to evaluate the impact that the disaster has had upon departmental resources and jurisdictional responsibilities Without this critical information local emergency managers cannot reasonably gather and direct emergency resources where they are needed the most (EAFSOEM, 2004). This became evident right after Hurricane Andrew struck on that August morning and emergency units scrambled to collect what little information they could gather to draw a picture of the damages the surrounding areas had sustained.

One of the many problems encountered that day was that MDFR had not developed a formal process or procedure that instructed responding emergency personnel how to perform timely and accurate damage assessments of their respective geographical areas and report that information in a structured format. All routes of communication had been disrupted including hard wire phone lines and cell phone towers, electrical power was out in the entire county, and many roads were covered with debris. As all local agencies, including MDFR, increased the response to the affected areas, other communities continued to experience the typical call load and usual variety of requests for aid that these agencies handled on a daily basis. With a majority of its regular response and resources assigned to the disaster areas they attempted, without results, to replenish resources and services to make available normal community services and protection. Local government was soon overwhelmed and was unable to provide all the necessary support these communities needed. A few days after the storm the front page of The Miami Herald newspaper had the words “We Need Help- Metro blames feds for failure of relief efforts” (Pielke & Pielke, 1997, p.11).

Many questions and concerns arose regarding the local and state government's inability to properly respond following the events of August 1992. The accounts and circumstances directly related to this disaster convinced local and state leaders that an evaluation of local and state statues and programs for disasters was needed and recommendations for changes and improvements were necessary. MDFR reassessed and analyzed its hurricane policy and procedure and modified it to best meet the needs of the community and prevent what happened after Andrew. The prospect of another major hurricane striking South Florida is high and MDFR must be certain the changes they have developed specifically meet the needs of the citizens of Miami-Dade County.

The significance of this research focuses on the United States Fire Administration's (USFA) five- year operational objectives "to appropriately respond to emergent issues in a timely manner" and to "advance the professional development of fire service personnel engaged in fire prevention and control activities". It pertains specifically to the National Fire Academy's (NFA) Executive Fire Officer's Program (EFOP) EAFSOEM R306 course and the need to analyze fire departments pre-incident level of preparedness in emergency management and access its risks (EAFSOEM Student Manual, 2004).

The intent of this research is to collect and analyze noteworthy data to determine the importance of conducting damage assessment as part of an emergency responders post disaster responsibilities. Research was also conducted to evaluate the performance of the damage assessment system implemented by MDFR after Hurricane Andrew and to measure its usefulness in terms of how it reduces delays in receiving much needed state and federal post disaster aid. I will employ the evaluative research method to explore numerous study materials and available resources to accomplish my research.

Literature Review

The literature review began by gathering appropriate data on the subject and conducting extensive research at the NFA's Learning Resource Center (LRC) in Emmitsburg, Maryland in August 2005. A significant amount of this research was done while attending the U.S. Fire Administration's, EFOP EAFSOEM course because of the considerable amount of research material and data available at the center. The purpose of the literature review was to identify which preliminary damage assessment systems industry standards suggest, how these systems compare with those used in other fire departments in hurricane prone regions, and to evaluate the system currently used by MDFR.

FEMA (1997) states that after a disaster the basic objective of a rapid or initial assessment is obtaining quick but reliable information required by relief agencies and public officials to accurately initiate a plan program for relief efforts. Such an assessment will increase the likelihood that funds and other resources are allocated to the most needed and hardest hit area after a disaster occurs. Because of the nature of disasters it is unlikely that a formal plan, no matter how complete, can anticipate all the critical problems that will arise, thus requiring Federal assistance.

The primary means of providing this Federal assistance is through the President's disaster assistance program, which is managed by FEMA. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended, (the Stafford Act) was established to support local and State governments after a disaster and establishes the requirements to obtain a Presidential disaster declaration. This law requires that the assistance of the Federal Government must be made by the Governor of the affected State "if the situation is beyond the capabilities of local or State forces" and then the Governor "may request that the President declare a 'major disaster' or an 'emergency' (FEMA, 1997, p.1)". The Governor must first

execute the State's emergency plan and present evidence that the incident is beyond the local and State's ability to provide an effective response. This proof usually begins with an evaluation of conditions based on information gathered by preliminary damage assessments, which can identify what has happened, what needs to be done, and what resources are available (Asian Disaster Preparedness Center [ADPC], 2000).

Damage assessment, as defined by FEMA (EAFSOM Student Manual [SM], 2004), "is the gathering of information related to the impact of an event, or series of events, on life and property within a defined area" (p. 6-2) and can be broken down into two types; immediate and post incident. Immediate or Rapid Damage Assessment (RDA) is usually conducted by the first fire and rescue companies on the scene during the active or initial phase of the incident to quickly understand the scope of the devastation and determine the amount of damage sustained. This responsibility can be shared with other emergency response agencies such as police and public works if the affected region covers a large geographical area but it must be a coordinated effort that produces accurate and non- replicated information. This information can be used in a number of ways and must address specific needs and concerns such as number of deaths and injuries, if unsafe conditions exist, and what type and amount of emergency services are needed. According to FEMA (2004) the fastest way of conducting RDA is by helicopter.

The second type of damage assessment identified by FEMA (EAFSOM, 2004) is the Post Incident Damage Assessment which is accomplished after the incident has been somewhat stabilized. It is less time sensitive but more detailed and specific than an RDA and is typically used to prepare reports for calculating cost reimbursements from the Federal Government. This type of assessment must also be capable of capturing accurate data but lends itself more to the team concept approach that uses the expertise available from different agencies and specialized personnel, including the private sector. Procedures for both types of assessments are required to

be in place prior to the occurrence of an incident in order to carry out an effective and efficient assessment of damages.

Research data collected from other sources use different terminology when describing damage assessments. In an article by McEntire (2002) titled “Understanding and Improving Damage Assessment” he points out that from a local emergency managers perspective there are essentially three types of damage assessments that can be conducted in one of three ways. The first is a rapid or initial damage assessment which mostly involves the gathering of data concerning injuries and deaths along with the degree of damages to structures and buildings. This assessment can be performed using any type of vehicle and allows responders to assess damages on the ground and at a distance while driving through the affected areas. This method is known as a “windshield assessment” (p.9). Another means of viewing large geographical areas to get a rapid overall view of the damages is to use aerial operations such as airplanes and helicopters. This method allows those individuals responsible for decision making, such as politicians and local managers, to obtain a rapid assessment of even larger geographical areas.

The second type of assessment described by McEntire (2000) is a Preliminary Damage Assessment (PDA) that is more comprehensive in nature. It assesses the extent of damages and losses and attempts to determine the condition of property in terms of basic critical needs in terms of security, safety and sanitation. This assessment involves state and federal emergency management officials and is used primarily to obtain a Presidential disaster declaration.

The third damage assessment referred to by McEntire (2000) is referred to as a technical damage assessment. This is performed to attain a ballpark figure of the costs associated with repairing, demolishing and rebuilding of damaged structures and infracstures and addresses engineering concerns in-depth. This type of assessment together with the PDA must be done

with site visits to the affected region to view the damages first hand and complete the necessary reports performed by specialists.

Further research discovered other types of damage assessments used. The ADPC (2000) considers there to be two types of assessments; a “Situation or Damage Assessment and a Needs Assessment” (p.2). A Situation Assessment describes what has happened and the Needs Assessment is a statement of what needs to be done. These assessments only describe conditions at the time they were made and the current situation will change over time thus the need for establishing a system for performing subsequent reports. ADPC (2000) mentions several types of reports and suggests they all should have a standard format with common terminology to ensure the information is understood by all those who have to act upon it and should be kept as simple as possible. One such report is a “Flash Report” which is merely to verify that a significant incident has actually occurred, to initially identify needed relief efforts, and to notify others to expect further updates (p.3).

The next type of report identified by ADPC (2000) is an” Initial Report” which should identify the severity of the disaster, what actions are being taken, how those affected are dealing with the current situation and to request needed outside resources. This report is usually conducted within a few hours of the flash report and is followed by an “Interim Report”. The interim report should build on previous reports that make available more specific information and is submitted at the same time every 24 hours. It emphasizes the change from the “needs of relief to the needs for rehabilitation and reconstruction” (p.3) and should point out potential problems not yet identified in previous reports. The last reports are the “Specialist or Technical Reports” followed by a “Final Report” (p. 4).

A report published by the University of Wisconsin’s Disaster Management Center (1995) explains that there are many different techniques and methods which can be used to collect data

about disasters. It also reminds us that “no one assessment is likely to meet the needs of all those involved in relief and reconstruction and each agency will have its own objectives and area of interest” (p.4) depending on who carries out the assessment. These assessments are usually conducted by three types of organizations; Governmental agencies, which are typically the most comprehensive type, relief and reconstruction agencies and organizations that provide economic assistance, such as lenders. The report suggests that disaster assessment might be divided into six key elements; “predisaster planning, survey and data collection, interpretation, forecasting, reporting and monitoring” These assessments can generally be performed using four methods; “field or on-site surveys, overflights, aerial photography, and remote reporting systems (p.9).

Research material found in an article by McDowell and Moore (2002) emphasizes that “damage assessment is dynamic based on the disaster” (p.10) and that a community must design a system based on their potential hazards. These authors suggest there are two damage assessment methods currently used. One is by FEMA, which identifies damage in four categories, and the other is by the Red Cross, which uses three methods. The “FEMA process is the standard used by government to report damage” and will be used by emergency managers to support requests for assistance from the state and federal government (p.10). The data collected from both agencies can be compared to support information collected if discrepancies occur.

McDowell and Moore (2002) state that damage assessments can also be performed with the use of computer software, such as the “Microsoft Access database” currently used by the State of Delaware (p.10). This system can convert both the FEMA and Red Cross assessments to fit their format then the gathered data can be graphically displayed using a “Geographic Information System (GIS). This GIS technology can prove very useful in determining the scope of the disaster, identifying critical locations and providing aerial views of the affected areas (McDowell & Moore).

According to a report by Poe, (2002) the Franklin County Emergency Management Agency in Columbus, Ohio employs Microsoft Excel computer software as a platform on which their damage assessment program was developed. This system can also share the information with FEMA and Red Cross; it has GIS capabilities, and can be used in a manual or handwritten format.

The researcher referred to an Applied Research Project (ARP) conducted by Robert J. Majka of the Bay County Fire Department in Panama City, Florida (2002) in which he determined that there are many types of damage assessments and also found the fire and rescue department is "expected to take the lead role in collecting and processing the information" during this process (p. 3). His research concluded that there "are two types of damage assessments, Initial or Immediate Damage Assessment (IDA), and Preliminary or Post- Incident Damage Assessment (PDA)" but considers IDA to be "the most essential component of a communities ability to effectively respond to and recover from disasters"(Majka, p.16). He supports the use of a "Windshield" damage assessment in order to get an overall big picture of the impact of the event followed by a more comprehensive assessment necessary to document the need of State and Federal assistance but also states that what works best in one community might not necessarily work in another (2002).

During a personal interview with Chief Carlos Castillo (2006), Director of Miami Dade's Office of Emergency Management and Emergency Operations Center, he points out that another method currently used by MDFR to perform a Preliminary Assessment is a "Disaster Assessment Snapshot". This method is similar to the "Windshield" assessment and is a tool designed to report preliminary conditions following a disaster. It includes reports of personnel, equipment, and facilities as well as a rapid "snapshot" of conditions and damage in the immediate area of the location where the assessment is performed. This is not a detailed assessment of situation and

needs and is designed to permit an initial report to be made using a common measurement device (Appendix A). First line supervisors at each fire station and other fire department personnel so assigned conduct the Disaster Assessment Snapshot (DAS) at his /her location as soon as severe weather conditions have subsided and must report the status of personnel, response units, facilities, neighborhood, access and local flooding. This information is eventually conveyed to the Emergency Operations Center (EOC) either by telephone, direct radio, or radio relay (MDFR, 2005 p. 2).

After the DAS is conducted it is followed by an "Intermediate Assessment" which is an assessment of a unit's primary response area. This action should take priority over routine incidents and includes assessments of both situation and needs. The information gathered during this process is compiled at all levels of the organization and is forwarded to the EOC as soon as possible (Castillo, 2006).

During a personal interview with Frank Reddish (2006), who is a Hazard Mitigation Coordinator for the County Manager's Office and is assigned to the Office of Emergency Management, he points out that damage assessment takes several forms depending on the event and extent or area covered by the event. He states that "no matter how severe the area, being small, does not require a large scale call-out of resources and hurricane damage assessments vary depending on the size or category of storm" (F. Reddish, January 20 ,2006). He continues to say that a tropical storm or category 1 or 2 hurricane requires much less involvement than would a storm of a category 3 or higher and a category 5; a catastrophic storm would require immediate assistance from the State or Federal Government. In this case a Rapid Impact Assessment Team (RIAT) which is made up of state engineers, the National Guard and perhaps a FEMA Urban Search and Rescue (USAR) team would be deployed to determine the overall impact on local infrastructure and ascertain the amount of immediate assistance needed (2006).

Reddish (2006) reminds us that Hurricane Andrew was a catastrophic event and most everyone knew there was considerable damage in South Dade County. Miami-Dade County did not have a standard system of damage assessment before Andrew so only drive around and fly-over surveys was conducted to determine just how widespread the damage was. Different agencies used different methods because many were looking for specific information useful to them but he adds that Miami-Dade County has worked diligently to streamline the whole process and make methods more streamlined. He states that the Snapshot Damage assessment system now used by MDFR was "developed sometime around 1999 but was not used up until this past year, when Hurricanes Katrina, Rita, and Wilma struck South Florida and the system performed with excellent results" (Reddish).

During and immediately after a hurricane or other significant event it is essential to have the emergency response agencies operating to assist the community. Snapshot Damage Assessments are performed by every MDFR emergency responder assigned to operations units and by several other pre-determined county agencies using the standard hard copy format (Appendix A). The Miami-Dade County Office of Emergency Management (OEM) has developed software called "Snapshot" (Appendix B) to instantly assess damages on a broad scale. Using the Internet, Miami-Dade County citizens can report the extent of damages sustained in their neighborhoods to the OEM and a map of the county showing the extent of damages and how widespread they are is then generated. According to Reddish (2006) the data collected from all the different local county agencies including MDFR after Hurricanes Katrina, Rita and Wilma closely matched the data submitted by citizens using this reporting arrangement.

According to a report of the 2005 Atlantic hurricane season (Wikipedia, 2006) this hurricane season was responsible for over $100 billion in damages and over 1,700 deaths. It was the most active season on record, surpassing the 1933 season's 21 storms and "is the only season on

record with three Category 5 storms on the Saffir-Simpson Scale" (p. 3). Hurricanes Katrina, Rita, and Wilma "are the three most intense storms ever in a single Atlantic hurricane season" (p.23) and all three hit South Florida. Hurricane Katrina, which struck South Florida 13 years to the day after Hurricane Andrew, "became the fourth most intense Atlantic hurricane in recorded history and was also the "costliest hurricane in U.S. history, surpassing 1992's Hurricane Andrew (p.3). Hurricane Rita was the third most intense Atlantic hurricane and Hurricane Wilma became the most intense hurricane in recorded history (p.23).

To summarize the literature review process, the researcher found that natural hazards like hurricanes are inevitable and are certain to strike South Florida again. The research confirmed the theory that even the largest, most equipped and organized local government cannot contend with the massive response needed after a catastrophic event such as a major hurricane. Instead, these communities must rely on assistance from state and federal emergency response agencies, particularly FEMA. Damage assessment reports must first be gathered from all the affected areas describing the extent of damages, resources needed, injuries and deaths, and if the local resources have been depleted. Most of the information gathered leads this researcher to believe that the local emergency first responders, due to the nature of their line of work, would be expected to conduct immediate post disaster rapid damage assessments. The research also identified numerous types of damage assessment methods and systems used by other emergency response agencies and the importance of performing these assessments as soon as possible. The earlier this data is gathered, processed and forwarded to the State the sooner the much needed outside assistance is received. The researcher will use the Evaluative Research Method to carry out the study.

Procedures

The purpose of this applied research project was to collect information from a wide range of sources with the intention of identifying several methods available to perform post disaster damage assessments. Data, in the form of personal interviews and surveys, was also gathered to compare current methods used by others in the industry and to evaluate those methods to that currently used by MDFR, which was developed in response to Hurricane Andrew. The research was evaluative in nature since a relatively new method of conducting initial or rapid damage assessment was analyzed and measured to determine whether it met the needs of the department and the community and if it performed as expected. The data gathered was based on the actual experiences of first responders who were involved in performing initial damage assessments immediately following Hurricanes Katrina, Rita and Wilma during the autumn of 2005.

Research began with a literature review conducted at the (LRC) at the National Training Center in Emmitsburg, Maryland and continued with further research at the Miami-Dade County Public Library, the Miami-Dade County Office of Emergency Management and the Emergency Operations Center for Miami- Dade County. The literature review focused on identifying post disaster related issues pertaining to damage assessments and the importance of accomplishing these assessments in a timely and accurate fashion. This author also referenced standards on both the fire services branch and other non-emergency related industry practices as it pertains to post-disaster damage assessments. The information had to be relevant to the subject and the purpose of the report and be as current as possible. Research data was collected through a literature review and conducted using written documents designed to provide extensive background material on the subject of emergency preparedness, response and mitigation. Books, newspaper and industry related magazine articles, FEMA reports and publications, previous Applied Research Projects, the Internet, personal interviews and survey instruments were used as sources.

A few factors limited the results of the research. The first and most significant limitation encountered throughout the project, particularly while conducting the research for the literature review section, was the majority of data found was linked to disasters due to earthquakes. While an extensive amount of data related to hurricanes and the subject of hurricane preparedness and response was discovered, little was found concerning the topic of conducting initial or immediate damage assessments or what types of assessments are recommended in the aftermath of natural disasters. A broad query on the Internet and World Wide Web (www) search engines revealed several hundred germane sites containing the key phrases “damage assessment” or “disaster surveys” but most dealt with private and commercial enterprises and were mostly earthquake related.

Unfortunately, during the course of this research project and within three months of each other Hurricanes Katrina, Rita and Wilma struck South Florida. They caused extensive wind and water damage throughout South Florida and left hundreds of thousands of residents without power and water for weeks. Fortunately, it was not a catastrophic event like that of Hurricane Andrew but enough to alter the scenery for some time. These storms were unsolicited visitors but they allowed Miami Dade County government agencies, especially MDFR, to evaluate the counties emergency plan and the effectiveness of the “Snapshot” damage assessment system they had implemented six years ago.

Another source of information used was interviews with key individuals from the Miami Dade County Office of Emergency Management and the Emergency Operations Center. Mr. Frank Reddish, a Hazard Mitigation Coordinator for the County Manager’s Office and Chief Carlos Castillo, the Director of the Office of Emergency Management and Emergency Operations Center were selected because of their vast knowledge and experience in the field of emergency management and were involved with the recovery efforts after Hurricane Andrew in

1992. Chief Castillo is also a graduate of the National Fire Academy's Executive Fire Officer's Program and a 25 year veteran of the fire service. Both individuals are considered experts in their fields and are intimately familiar with Miami Dade's Hurricane Procedures and hold key positions in Disaster Planning and Control.

The questions used in the interviews were open-form and designed to measure specific characteristics of the research and enhance the accuracy of the responses. The interviews took place during the week of January 16, 2006 and were conducted at the Emergency Operations Center at MDFR Headquarters. The oral interviews were followed up by telephone and electronic mail to aid in accuracy and recording purposes. Several questions were asked with the intention of obtaining a historical perspective of how damage assessments were performed prior to Hurricane Andrew, what system, if any, was used at the time, do all the local agencies use the same system today, and how effective was the "Snapshot" damage assessment system now used in Miami Dade County.

A survey instrument (Appendix C) was developed for the purpose of gathering information from other coastal communities and fire departments around the State of Florida who have experienced the consequences of a hurricane and were somewhat similar in size to MDFR. Those departments surveyed were asked if their communities had a dedicated hurricane plan, if it was used during the last hurricane, what if any damage assessment tool they employed and was it used effectively immediately after the storm. The survey instruments were sent to 13 fire-rescue departments around the State in November 2005 who are in close proximity to the Atlantic Ocean and the Gulf of Mexico. Some departments did not respond to the survey so additional communities not included in the original mail out were contacted via phone. Individuals identified as holding key positions within their department were selected because of their knowledge of emergency management and it is their responsibility to oversee this function

during an incident of this nature. The Florida departments surveyed were Palm Beach County Fire Rescue, Ft. Lauderdale Fire Department, Seminole County Fire Rescue, Citrus County Fire Rescue, Jacksonville Fire Rescue, Tampa Fire Rescue, Pensacola Fire Rescue, Boca Raton Fire Rescue, and Broward County Fire Rescue. The departments from other states surveyed were Myrtle Beach and Charleston Fire Department in South Carolina, Cobb County Fire in Georgia, and Wilmington Fire Department in North Carolina.

A similar survey instrument designed to determine if MDFR's "Snapshot Damage Assessment" was a practical and useful tool to use following a major event (Appendix D) was distributed via electronic mail during the month of November 2005 to each of MDFR's 59 fire rescue stations on all three shifts. The surveys were directed to every officer-in-charge of each fire station across the three shifts, using their user identification names in order to avoid random duplicate responses. This format was chosen because in the event of a post-disaster event these fire rescue officers, along with their crews, are tasked with performing rapid damage assessments of their first response territories. Every fire station is equipped with at least one personal computer and printer and all officers are required to log on daily to access information distributed by the department. A total of 177 surveys were distributed in this fashion and 140 were returned completed; a 79% return rate.

Definitions

Emergency Declaration- is a FEMA term used to define "any occasion or instance for which, in the determination of the President, federal assistance is needed to supplement State and local efforts and capabilities to save lives and protect property and public health and safety" (FEMA, 1997).

Geographic Information System (GIS) - A computer application used to store, view, and analyze geographical information, especially maps (American Heritage, 2002).

Hurricanes- are severe tropical storms that form over warm ocean waters, usually starting as storms in the Caribbean or off the west coast of Africa. They are defined as having winds of at least 74 miles per hour that rotate in a counter- clockwise direction around an “eye” that is the most violent part of the hurricane (Carpenter & Carpenter, 1993).

Major Disaster- “any natural catastrophe (including hurricanes, tornadoes, earthquakes…) or regardless of cause, any fire, flood, or explosion in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under ‘the Stafford Act’.

Natural Disaster- an incidence of an unusual or infrequent risk that impacts on susceptible communities or geographical areas, causing substantial damage, disruption and possible casualties and leaving the affected communities unable to function normally (Pielke & Pielke 1997).

NOAA- a federal agency focused on the conditions of the oceans and the atmosphere and plays several various roles within the Department of Commerce. It provides weather warnings and forecasts through the National Weather Service including data on climate, ecosystems and commerce (U.S. Department of Commerce, 2006).

Saffir-Simpson Scale- a system established to “provide standards by which hurricane winds and storm surges could be measured on a category scale from 1-5, with 5 being the most intense. The scale was named for its two developers: Herbert Saffir, a Florida consulting engineer; and Dr. Robert H. Simpson, a former director of the National Hurricane Center” (Carpenter & Carpenter, 1997, p.25).

Results

Based on an extensive literature review, a collection of data from survey instruments and personal interviews this researcher will attempt to make concluding findings and answer the following research questions related to post disaster damage assessment.

Research Question 1. What preliminary damage assessment system do industry standards suggest for a post disaster incident in a large metropolitan area?

The researcher found that there are no specific industry standards recommending any one type of damage assessment system and no one assessment will likely meet the needs of any one agency. What works best in one locality might not work in another. One obvious conclusion was the significance of having a damage assessment program in place prior to the occurrence of a major incident. It is considered an essential element in receiving much needed State and Federal post disaster assistance when local resources have been overwhelmed. A few types of damage assessment systems have been developed but are considerably similar in nature. FEMA has broken down assessments into two types: immediate and post-incident.

Immediate or Rapid Damage Assessments (RDA) is usually performed directly after the occurrence and safe conditions exist. They are usually performed by the first fire and rescue companies on scene during the active or initial phase to quickly size up conditions. These duties can also be shared with other agencies such as police and public work crews if the geographical area is large. In situations like this FEMA suggests the fastest and most effective means of conducting RDA's is with the use of helicopters. The second type is a Post Disaster Damage Assessment which is more detailed and is accomplished after the incident is somewhat stabilized. It is not time sensitive but requires especially skilled personnel from different agencies including the private sector. Procedures for both types must be in place prior to the incident if an efficient response is expected.

Another informational resource reviewed (McEntire, 2000) provided somewhat different terminology for basically the same form of damage assessment and suggested there are three types which can be performed in several ways. Two are similar to FEMA's adaptation except for the use of the term "windshield assessment". This assessment is conducted using any type of ground vehicle and allows responders to view damages close up or at a distance while driving through the affected areas and covering more territory than on foot.

Further research revealed that assessments are usually conducted by three types of organizations; Governmental agencies, relief and reconstruction organizations such as the Red Cross, and organizations that provide economic assistance, such as lenders. Most of the research pertaining to damage assessment was of the same opinion with the idea that what works best in one community might not necessarily work in another and emergency plans should be tailor made for each specific community. The research also suggested that the fire and rescue department should expect to take responsibility for this function.

Nearly all of the research material seemed to suggest the two most widely used types of damage assessments were the Initial or Immediate Damage Assessment (IDA) and a Preliminary or Post Incident Damage Assessment (PDA). IDA was considered by many the most important element in a community's capability to effectively respond and recover from a major incident or disaster.

Research Question 2. What other methods or systems are available that can be used to perform rapid or preliminary damage assessments in a large metropolitan area like Miami-Dade County?

Most of the research data found suggests that whichever method of damage assessment is utilized it must be designed to fit each community's needs and its probable hazards. Many communities prone to a certain type of potential hazard have concentrated their efforts and

resources around previous occurrences and have an established emergency response plan for the likelihood that it will occur again. An integral element of this plan includes a rapid damage assessment component of which the primary focus is to swiftly quantify the amount of damage to gain financial assistance from state and federal agencies. The shock of a disastrous event prompts a determination to take steps to be better prepared for the next one.

The research conducted could not determine whether there is a right way of conducting rapid damage assessment or which method worked best in any particular situation. However, the need to collect accurate and timely data was mentioned in the majority of research material reviewed and the use of computers and other high technology equipment seamed to be a trend many organizations have adopted. Several jurisdictions are using special computer programs and databases to compile the data collected by field personnel and geographically displaying this information using GIS technology. This technology provides current and accurate topographical and geographical displays of affected areas using satellite imagery. Wireless handheld technology has also evolved as an important tool as experience has shown that global communications systems will most likely be affected and not available for hours or days after a catastrophic occurrence.

The researcher noticed that two specific methods or systems used to perform rapid or initial damage assessments were mentioned several times throughout the research. The terms “Windshield and Snapshot Damage Assessment” were found to be the most widely used by the individuals interviewed and by the jurisdictions who responded to the survey. Mr. Frank Reddish, who is a Hazard Mitigation Coordinator for the County Manager’s Office, states that the “Windshield Assessment or drive-around utilizes personnel from police, fire rescue, Florida Department of Transportation (FDOT), and public works to drive through neighborhoods and report the scope and severity of the damages to the EOC” (2006). This method was considered

the preferred method for smaller storms and did not require the use of a specific form to document data.

The Snapshot Assessment method was not utilized in Hurricane Andrew since it was developed in 1999 but it was tested on various small storms after that. The system was used in earnest during the hurricane season of 2005 when Hurricanes Katrina, Rita and Wilma struck South Florida. The assessments done by MDFR for the OEM concerned whether or not neighborhoods were damaged and to what degree but without asking for dollar estimates. MDFR field units used the hard copy version to document the data collected (Appendix A) while those citizens who had access to telephones or computers used the computer software version (Appendix B). This method uses four levels of damage recognition: Little or no damage, damaged but habitable during repairs, damaged and not habitable during repairs and destroyed. The Miami Dade Building Department uses a similar version that employs only three levels of damage classification: little or no damage, dangerous structure and, unsafe structure.

Research Question 3. How does the current system of conducting preliminary damage assessment used by MDFR compare with other large metropolitan areas that have experienced hurricanes?

MDFR and the Miami-Dade County Office of Emergency Management have used similar versions of the Snapshot Damage Assessment system since 1999. The method used by MDFR (Appendix A) is performed by operations field units immediately after the occurrence and is usually performed by driving around the affected areas and documenting the visual assessment made. This is similar to the Windshield Damage Assessment system. A similar electronic version designed by the OEM (Appendix B) is designed to be used by any citizen who has access to a computer or telephone. This version instructs the individual to choose one of the four

photographs that closest resembles the damage sustained in their neighborhood and report that information back the OEM.

As a preliminary step in gathering information regarding how other fire departments around the southeastern United States deal with the consequences of a major hurricane a survey instrument (Appendix C) was developed and sent to several departments reasonably comparable in size to MDFR.

Survey question 1 asked if the communities surveyed had experienced a hurricane in the last 10 years. Eleven of the 13 respondents, or 85%, stated their communities had experienced a hurricane in the past 10 years. The remaining 2 respondents, or 15%, had not experienced one.

Survey question 2 asked if their department had an established hurricane plan or Standard Operating Procedure (SOP). 85%, or 11 out of the 13 surveyed stated their department had some type of written document or plan regarding hurricanes. The remaining two departments, or 15%, did not have a written policy or plan to deal with hurricanes.

Survey question 3 asked if they did have a written plan was that plan put into action prior to the last hurricane striking their community. 10 out of the 11 respondents who answered yes to the previous question said the plan was activated prior to the hurricane striking the area. Only one respondent, or 9%, did not implement their written plan. A clear majority answered yes.

Survey question 4 asked if the written hurricane plan included a system or method to conduct preliminary or rapid damage assessments immediately following a natural disaster, such as a hurricane. 11 of the 13 respondents, or 85%, answered yes to utilizing some type of system or method of conducting post disaster damage assessments. Only two respondents, or 15%, did not have a system for conducting damage assessment incorporated into their hurricane plan.

Survey question 5 asked the respondents who answered yes to question 4 what system or method of conducting post hurricane damage assessment do their departments use. The majority

of the respondents or five of the 11 who answered yes (45%) use the Windshield Damage Assessment method. Two respondents (18%) use the Snapshot Damage Assessment method; two others (18%) use the FEMA version with GIS forms and maps, one respondent (9%) used the Red Cross method and one (9%) used a different method utilized by their local city and county agencies.

Survey question 6 asked if the current system was utilized after the last hurricane. Nine of the 11 who responded yes to the previous question (82%) said the current system was used after the last hurricane that struck their community. The remaining two respondents (18%) acknowledged that the system was not used after the last hurricane that struck their community.

Survey question 7 wanted to determine how effective the method discussed in the previous question was. The majority of the respondents or seven of the 11 who answered yes to question six (64%) said the system functioned as expected. Three of the 11 respondents (27%) stated the system used was somewhat effective and only one respondent said the system did not function as expected.

Survey question 8 asked what changes, if any, would the respondents department plan to make to the system or method currently utilized. None of the respondents department planned to make any changes to the current system but half of those surveyed (50%) admitted not all those individuals who took part in conducting the assessments were sufficiently trained and suggested more training was necessary.

The survey results show that the vast majority of the departments surveyed have a dedicated plan designed to deal with disasters or major events and have implemented that plan during and after a hurricane. The majority of these departments also utilize some sort of damage assessment and the majority of them used it after the last hurricane. Just over half of these departments felt the system was effective and functioned as designed, some felt the system utilized was to some

extent useful and a small minority felt the system was not effective at all. Several types of damage assessment methods were identified as being used but the vast majority of the respondents stated their department was not planning to change the current system. Most did say the main problem they had was the lack of familiarity their personnel had with the procedures used and suggested more training on the subject was needed.

Research Question 4. If the damage assessment system currently used by MDFR has not been tested under true severe post hurricane conditions how can MDFR ensure it will function as expected?

MDFR reviews and updates its hurricane procedures annually, develops an annual Hurricane Plan and distributes pre-season facility checklists to ensure departmental readiness. Key staff is identified to serve in the Incident Command System and personnel are assigned to a labor pool, which can be used to perform post incident damage assessments. Other agencies within Miami Dade County who are also involved in damage assessment are the Office of Emergency Management (OEM), Public Works, the Building Department, the American Red Cross, police, U.S. Coast Guard, South Florida Management Agency, Farm Service Agency and some utility companies. MDFR is the lead agency in a post-disaster event and as soon as weather or conditions permit all on-duty fire station personnel are required to visually assess their designated neighborhoods from outside their facility or from the roof of the station if practical.

The 2005 Atlantic hurricane season became the most active season on record, shattering the previous records. Twenty seven tropical storms formed, a record 14 became hurricanes and of these 14 hurricanes three struck south Florida within a three month period. It was the only season on record with three Category 5 storms and all three made landfall in or around south Florida. Although these storms were not as destructive as Hurricane Andrew in 1992 they did cause significant death and destruction in several counties. These events allowed MDFR to test its

readiness and evaluate its hurricane plan. According to officials from the OEM (Reddish and Castillo, 2006) rapid damage assessments were conducted immediately following the storms utilizing the current Snapshot Damage Assessment method and the results were excellent. MDFR units conducted assessments of their respective territories using both the MDFR Disaster Assessment Snapshot (Appendix A) and the on-line version of the Neighborhood Damage Assessment Entry Form (Appendix B) when conditions permitted.

A survey instrument (Appendix D) was developed with the intent to measure the effectiveness of both systems and was distributed to every officer-in-charge of each of MDFR's 59 fire stations across all three shifts. These officers have the responsibility to ensure the assessments are performed accurately and the data forwarded as soon as possible back to the OEM via any way possible. The results of the 140 individuals who responded to the survey are as follows:

Survey question 1 asked the officers to gauge how familiar they were with the "Snapshot Damage Assessment" method of conducting post disaster evaluations that were used after the 2005 storms. Only nine of the 140 surveyed, or 6%, had never used this method before and 25 or 18% of them were somewhat familiar with it. The remaining responses were evenly divided with 53 individuals (38%) having used this system before and the other 53 were very familiar with the practice. This data shows the majority of those surveyed were familiar with the process.

Survey question 2 asked if this system was used by them immediately after hurricane conditions had subsided. 84% or 117 of the respondents stated that assessments were conducted as required immediately after it was safe to go outdoors. Twenty three respondents (16%) stated they were not able to conduct the assessments. This data also shows the vast majority of stations conducted the assessments as required.

Survey question 3 inquired whether the data gathered using this system was an accurate description and representation of the damages sustained in their respective first response territories. Again, 117 respondents (84%) agreed the data collected was an accurate portrayal of existing conditions and represented a realistic picture of their area. Twenty three or 16% said the data did not accurately describe the true damages in their areas. This data again illustrates the majority of respondents felt the data they collected was a factual illustration of the damages sustained in their areas.

Survey question 4 asked the respondents to determine if the Snapshot Damage Assessment system used by MDFR was simple or difficult to understand. Responses varied across all categories of choices. Less than 1% felt the system was very difficult to understand. Thirty three (24%) said it was somewhat easy to understand and 43 (31%) stated the system was easy to understand. The remaining 63 respondents (45%) said they had difficulties in understanding how to use the system. This data shows there are a wide range of responses and an apparent difference of opinion on the degree of difficulty in executing the task.

Survey question 5 solicited the respondent's opinion to determine if the current system was too complicated and time consuming to use. The majority of the individuals (78.5%) were of the opinion that the method currently used was not complicated or lengthy. The remaining 30 respondents (21.5%) felt it was too complex and long-drawn-out. The vast majority of the respondents were of the opinion that the system was not complicated to complete.

Survey question 6 asked all respondents if they were aware of any other methods or systems of conducting post disaster damage assessments and what those methods were. Responses in this category were limited to only two other types of assessments. One of the systems mentioned was the FEMA Rapid Needs Assessment (RNA) and the other was the Windshield Damage Assessment.

Disasters can surpass the capabilities of local and State resources and therefore justify federal assistance in the form of an emergency declaration. In order for a federal disaster declaration to be announced the federal government must determine through a preliminary damage assessment that local and state response and recovery capabilities have been or will be exceeded. Conducting damage assessment is perhaps the most important function performed immediately after a hurricane. Such assessments will increase the likelihood that federal funds and other resources are properly prioritized and targeted. It can also help to provide policy makers with guidance as they plan and implement the effort of providing needed assistance to the areas.

The research carried out determined there are several methods of conducting post disaster damage assessments and there is no one method better than the other. Each agency or community should implement their own damage assessment policy and procedures specific to their personal needs and what works well in one community might not work in another. The research also found that due to the nature of their line of work, the local fire and rescue provider would be the most suitable agency to perform these duties and would most likely be assigned the lead role.

Based on the results of the research conducted and the 2005 hurricane season experienced by those who live in Miami Dade County the original hypothesis can only be partially supported. MDFR was able to test and evaluate the current system of conducting Rapid Damage Assessments several times in a three month period but not under true disaster conditions. The theory that damage assessments need to be performed quickly and accurately immediately after a disaster was substantiated several times throughout the research including the theory that a lack of accurate assessments can create delays in receiving much needed federal assistance.

Discussion

The results of the study suggest that conducting damage assessments immediately after a major disaster can be critical to the deployment of emergency resources and cause unreasonable responses to the emergency. It is considered one of the most important elements of an agencies response to an emergency (EAFSOM, 2004).

The research determined that the method of conducting post disaster damage assessment currently used by MDFR is comparable to any other method used by other fire departments. This system was put to test during the course of this applied research project when three powerful hurricanes struck South Florida. These storms were not of the magnitude of Hurricane Andrew in 1992 and were not considered a “major disaster” requiring an “emergency declaration” from the Governor. They did however allow Miami-Dade County and MDFR to evaluate, under somewhat true hurricane conditions, the Snapshot Damage Assessment system that was created as a result of Andrew. According to Castillo and Reddish (2006) this method worked very well and functioned as planned each of the three times it was used this passed year. As a result of these events and the encouraging information received from those interviewed and surveyed it seems safe to say that the Snapshot Assessment was successful and should continue to be used in Miami-Dade County.

Based on the results of the MDFR survey (Appendix D) 45% of the respondents felt the forms were somewhat difficult to understand, possibly indicating more training and familiarization with those duties was necessary. A large percentage (86%) was not familiar with any other method or system available other than the Windshield Damage Assessment and the FEMA Rapid Needs Assessment. These were the two most used methods mentioned by the vast majority of the respondents from other departments. In comparison, half of the respondents (50%) from the other departments had similar opinions regarding the possible need for additional

training of personnel to become more proficient with the individual system used in their community. Results from a previous Applied Research Project (Majka, 2002) also concluded that many in the “fire service branch were not properly trained and equipped to perform accurate damage assessments” (p. 18).

It is evident to this researcher that the local fire and rescue organization is a key component in any emergency situation and will continue to play a significant role in performing initial damage assessments and other post disaster related activities (Majka, 2002). Several different methods or systems of conducting damage assessments were discovered but most research material reviewed pointed out that no one method or technique was likely to meet the specific needs of all (University of Wisconsin, 1995). Others (McDowell and Moore, 2002) corroborate the research review by saying any damage assessment method can be modified but must be designed to meet the needs of the community affected.

According to a post Hurricane Andrew report by the Florida Fire Chiefs Association (2004) local and State officials were forced to create stricter building codes and revise the state’s emergency response plan. It was apparent that initial delays and confusion in receiving more outside assistance illustrated that insufficient information about the damages incurred were accurately reported and set the stage for an inadequate response. The storm also uncovered substandard construction and impelled officials to strengthen the building codes statewide. This major event also compelled those in power to amend the book on disaster and emergency response which has led to better coordination between local, state, and federal agencies.

Recommendations

The 2005 hurricane season was considered unparalleled in our nations history and tested the capabilities of local, State, and Federal agencies. It is predicted that due to larger populations, higher property values and an expected increase in more and stronger hurricanes South Florida

will experience greater losses. Local governments and communities must be prepared for, and recover from major incidents or disasters and must learn from experiences of those who have dealt with these events. South Florida and MDFR must ensure that they are prepared as much as possible to endure any sort of major event or disaster. Based on the findings of this paper several recommendations are suggested, some of which have already been implemented due to the record hurricane season of 2005.

- The results of the research show that the Snapshot Damage Assessment (SDA) system created after Hurricane Andrew by Miami Dade County and MDFR functioned as expected.
- It is recommended that MDFR continue using the SDA system to perform post disaster rapid damage assessments on future major events.
- Minor modifications and fine tuning of the system is suggested including additional training by emergency responders from MDFR.
- MDFR should ensure that a comprehensive communications plan addresses the likely occurrence of a major loss of all land and air based communications.
- Additional research is not suggested but an evaluation of future true post disaster conditions would confirm if this method is an accurate portrayal of damages sustained.
- The research confirmed that the system used by MDFR will work as well as any other method presently available, as illustrated by the results of the surveys.
- It is recommended that other agencies and fire departments choose the right system designed specifically to fit their needs or modify an existing method tailored for their community.

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APPENDIX A

DISASTER ASSESSMENT SNAPSHOT

INSTRUCTIONS

1. During a hurricane, continuously monitor the status of personnel, equipment and the facility.

2. As soon as weather or conditions permit, view the neighborhood from outside the facility. (If practical obtain view from roof).

3. Complete the damage assessment based upon visual observations of the structures which can be seen.

   - Determine the approximate percentage of structures (25%, 50%, 75% or 100%), which have been 25% or less destroyed (if any), and circle that value in the first column.

   - Repeat the above step for the next 3 columns, 50%, 75%, and 100%.

     a. Determination of the proper value of destruction is based upon a visual observation as to whether the structure's damage is closer to 25, 50, 75, or 100 percent.

     b. Note**:** All columns may not be necessary. (i.e. if half of the structures are less than 25% destroyed and the other half are closer to 50% destroyed [than any other value], circle #2 in columns 1 and #4 in column 2. 100% of the structures visible in this example have been accounted for and the Snapshot score is 6).

   - Total the values circled and place that total in the line marked "Snapshot Score".

4. Estimate the number of feet of standing water in the area and enter this amount on the lone marked "Flooding".

5. Fill in the lines marked "Personnel", "Response Units", "Facility", and "Access" following the instructions on the form.

6. Identify your reporting location on the appropriate line in the top left hand corner of the form.

7. Reporting:

   - If radio communications are operational, report "Snapshot" information during the post-incident roll call. If radio communications are not in a "repeater" mode, relay your report to your Area Command or Battalion Station.
   - If no radio communications are available, attempt to telephone the information to your Area Command to Battalion Station.
   - If none of these communication systems are operational, forward the information to the Area Command or Battalion Station.

8. Retain the completed Snapshot form for documentation.

APPENDIX A

DISASTER ASSESSMENT "SNAPSHOT"

LOCATION: _____

DESTRUCTION

NO DAMAGE EQUALS 0	25 (OR LESS) PERCENT DAMAGE	50 PERCENT DAMAGE	75 PERCENT DAMAGE	100 PERCENT DAMAGE
25% STRUCTURES	1	2	4	6
50% STRUCTURES	2	4	6	8
75% STRUCTURES	4	6	8	10
100% STRUCTURES	6	8	10	16

SNAPSHOT SCORE: _____

PERSONNEL		**0** No Injuries	**1** Minor Injuries	**2** Serious Injuries (state specifics)	**3** Multiple Serious Injuries
RESPONSE UNITS		**0** All In Service	**1** All In Service; need repair	**2** Unit(s) Out of Service	**3** All Units Out of Service
FACILITY		**0** No Damage	**1** Minimum Damage	**2** Serious Damage	**3** Uninhabitable
ACCESS		**0** Clear	**1** Minimum Blockage	**2** Major Blockage	**3** Impassable
FLOODING		FT**.**			

APPENDIX B

Emergency Management

miamidade.gov

MIAMI-DADE

Neighborhood Damage Assessment Entry Form

To submit a Damage Report follow these steps:

1 **Report the address**

Write the address starting with the house number and following with the direction prefix, street name, street type, post direction suffix, city and zip code .

Notice that the direction prefix and direction suffix as well as the street type must be selected from the corresponding drop down list.

House number:	Direction:	Street Name:	Street Type	Dir. Suffix:
	none		none	none

City: Zip:

2 **Select the Damage/Flood Level**

From the Damage Level Pictures 1 though 4 shown below, choose the Damage Level and/or Flood Level Number that more closely resembles the damage in the address you are reporting. Then find the number in the Damage and/or Flood level drop down list.

The Flood Level is indicated by the numbers 5 and 6 shown only in picture 1, but it can be also applied to pictures 2, 3, and 4. Flood level 5 demonstrates street flooded or water level onto the property but outside the home, while flood level 6 demonstrates water level inside the home.

The pictures 1 through 4 can be enlarged by clicking with the mouse on them.

NO/MINOR DAMAGE HABITABLE | MAJOR DAMAGE HABITABLE | MAJOR DAMAGE UNINHABITABLE | DESTROYED

Damage level: Select a Damage level

Flood level: Select a Flood level

3 **Submit your Neighborhood Damage Report**

Please submit your Neighborhood Damage Report by clicking the SUBMIT button. **Thank you for your cooperation!**

APPENDIX C

Rapid Damage Assessment Survey

Please answer the following questions based on your knowledge and experience of the post disaster damage assessment method used by your department.

1. Has your community experienced a hurricane during the last 10 years?

☐YES ☐NO

2. Does your department have an established hurricane plan or SOP?

☐YES ☐NO

3. If yes, was that plan put into effect prior to the last hurricane hitting your community?

☐YES ☐NO

4. Does your hurricane plan include a system or method to conduct preliminary or rapid damage assessments immediately following a natural disaster?

☐YES ☐NO

5. If yes, what system or method of conducting post hurricane damage assessment does your department use?

6. Was this system or method used after the last hurricane?

☐YES ☐NO

7. How effective was the method used?

☐ Not Effective ☐ Somewhat Effective ☐ Functioned as Expected

8. What changes, if any, does your department plan to make to the current system or method now used?

Additional comments (optional):

APPENDIX D

Survey of MDFR's Snapshot Damage Assessment

Please answer the following questions based on your knowledge and experience with the post disaster Snapshot Damage Assessment tool used my MDFR.

1. How familiar are you with the "Snapshot Damage Assessment" method of conducting post disaster evaluation currently used by the Miami Dade Fire Rescue Department?

   ☐ Have never Used it ☐ Somewhat familiar ☐ Have use it before ☐ Very familiar with it

2. After the last hurricane, was damage assessment conducted at your station immediately after the storm conditions subsided?

   ☐ YES ☐ NO

3. If so, was the information gathered an accurate description and representation of the damages sustained in your territory?

   ☐ YES ☐ NO

4. Is the Snapshot Damage Assessment method used by MDFR simple to understand?

   ☐ Easy to Understand ☐ Somewhat easy to Understand ☐ Difficult to Understand ☐ Very Difficult Understand

5. In your opinion, is this method too complicated and time consuming to properly fill out?

   ☐ YES ☐ NO

6. Are you aware of any other method or system of conducting post disaster rapid damage assessment?

   ☐ YES ☐ NO

7. If so, what other method or system have you heard of?

APPENDIX E

November 19, 2005

Hello,

My Name is Robert Suarez; I am a Battalion Chief with Miami Dade Fire Rescue Department. I am currently enrolled in the National Fire Academy's, *Executive Fire Officer Program (EFOP).* I have completed my third course in the EFOP, *Executive Analysis of Fire Service Operations in Emergency Management* and in the process of writing an applied research paper. My paper is on the following topic: *Evaluate the current damage assessment system used by Miami Dade Fire Rescue.*

I would ask that you, or someone that you designate, please take the time out of your busy day and complete this survey and return it to me by January 14, 2006 either by email at rsuarez@miami-airport.com; by fax at (305) 869-1589, or mail to the following address:

Chief Robert Suarez
Miami-Dade Fire Rescue
9300 NW 41 ST
Miami, FL 33178

The information compiled by this survey will be combined with information from other departments from around the State. The compiled information will then be used to complete the research. Again, thank you for your assistance in taking the time to complete this survey.

APPENDIX F

CONDUCTED BY: _____ DATE: _____

INTERVIEW OF: _____ TIME: _____

REASON SELECTED: _____ PLACE: _____

My name is Robert J. Suarez. I am a participant of the Executive Fire Officer Program at the National Fire Academy. I am conducting an applied research project on Rapid Damage Assessment for the Executive Analysis of Fire Service Operations in Emergency Management course. Thank you for agreeing to this interview your knowledge in this field will provide more accurate information useful to my presentation.

1. Did the Miami Dade Fire Rescue Department have a system in place to conduct a post disaster damage assessment during Hurricane Andrew? If so, what type of system was used?

2. Do all the local agencies, including Miami Dade Fire Rescue Department, use the same system of conducting damage assessment?

3. How effective as the “snapshot” assessment method employed by the Office of Emergency Management after Hurricanes Katrina, Rita and Wilma?

4. Did Miami Dade Fire Rescue perform initial damage assessments after these last storms?

This concludes the interview. If you would like a copy of the completed research paper please provide a mailing address of where I may send you a copy:

Your assistance is greatly appreciated. Thank you.