

STANDARD OPERATING GUIDELNE FOR  
RAPID DAMAGE ASSESSMENT

Executive Analysis of Fire Service Operations in Emergency Management

Development of a Rapid Damage Assessment

Guideline For the Warwick Fire Department

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October 2006

## ABSTRACT

The problem was the Warwick Fire Department did not have a rapid damage assessment guideline to assess damages in an accurate and timely manner.

The purpose of this research paper was to develop a standard operating guideline. Action research was used to answer the following research questions:

1. What type of large scale emergency or disaster is the City of Warwick likely to encounter ?
2. What is the importance and purpose of conducting a rapid damage assessment?
3. What is the purpose of a rapid damage assessment guideline?
4. What do Warwick Fire Department fire fighters know about damage assessment?

Procedures included a literature review, survey instrument and interviews with local experts.

Recommendations included implementation of this procedure, reinstating district inspections, training of fire department and other agency personnel, updating the Emergency Operations Plan and developing an Emergency Operation Center Plan.

**TABLE OF CONTENTS**

Abstract.....page 2

Table of Contents..... page 3

Introduction.....page 4

Background and Significance.....page 5

Literature Review.....page 8

Procedures.....page 23

Results.....page 26

Discussion.....page 33

Recommendations.....page 44

Reference List.....page 46

***Table of Figures***

Table 1.....page 30

**Appendices**

Appendix A: Proposed Rapid Damage Assessment Guideline .....page 49

Appendix B: Survey, Warwick Fire Department.....page 51

Appendix C: Interview Cover Letter.....page 52

Appendix D: Interview, McCartney.....page 53

Appendix E: Interview, Picozzi.....page 55

Appendix F: Interview, Armstrong.....page 57

Appendix G: Interview, Sullivan.....page 59

Appendix H: Interview, Warren.....page 60

## Introduction

“All politics is local”(Former Congressman Thomas P. (Tip) O’Neill, Dem - MA). The same can be said for emergencies. Most emergencies are handled at the local level. Fire departments are normally one of the first responders to an emergency, at the local level. Once an incident develops into a large-scale emergency/ disaster where local resources are overwhelmed, other outside agencies become involved. This escalation of the incident brings with it problems. Noted in an editorial column titled *The Greatest Terrorist* “... members of the military, local fire departments and the California Department of Forestry, among others, couldn’t coordinate effectively due to a lack of interoperability, and inability to share timely information and resources with the right people, including the public and citizen first responders”(Griffiths, 2003).

The city of Warwick being, a coastal community is vulnerable to a number of natural disasters. It is also vulnerable to man made disasters, as is any other community. The Warwick Fire Department (WFD) responds to all type of emergencies within the community, and is provided training and guidelines in how to deal with these incidents. The WFD has no training in how to accurately assess a large-scale emergency/disaster, even though we would be responding to it.

The problem is the Warwick Fire Department does not have a rapid damage assessment guideline to allow the fire fighters to assess damages accurately and in a timely manner, during a large-scale emergency. The ability to recognize the scope and severity of the emergency, relay accurate and timely information in the early stages of that emergency, and allocate and acquire limited resources is essential for the safety of the citizens and fire fighters alike.

The purpose of this research paper is to develop a standard operating guideline to be used by the Warwick Fire Department following a disaster. Action research was used to answer the following research questions:

1. What type of large scale emergency or disaster is the city of Warwick likely to encounter ?
2. What is the importance of conducting a rapid damage assessment?
3. What is the purpose of a rapid damage assessment guideline?
4. What do Warwick Fire Department fire fighters know about damage assessment?

### Background and Significance

The city of Warwick developed out of a rural farming community first settled in the early 1600's. Warwick is the second largest city in Rhode Island with a resident population of approximately 86,000 (United States [US] Census Bureau, 2000) that swells to around 150,000 during the day (MMA, 1994). Warwick is approximately 35 square miles in size with almost forty miles of coastline (I). The area's largest regional airport is situated in the middle area of Warwick (separate agency for Crash/Fire/Rescue). The city also provides emergency medical services to the airport. Warwick is a large, complex older city typical of the Northeast region of the country (p.3). Warwick has been the major retail shopping area in the state for a number of years, responsible for approximately 65% of the revenue generated by the state sales tax (p.6).

The Warwick Fire Department provides fire protection, emergency medical services and emergency response for the city of Warwick. Fire fighting activities date back to the colonial days (D'Amato,1996). Records show the first fire engine as having

been purchased around the early 1800's. The Warwick Fire Department was organized as a career fire department in 1956, from the seven existing volunteer fire companies operating out of seven fire stations.

Currently, the Warwick Fire department operates out of eight fire stations. Warwick Fire works a four-platoon system, manning nine engines (officer, 2 fire fighters), three ladders (officer, 1 fire fighter), one special hazards (heavy rescue) vehicle (officer, 2 fire fighters), two battalion chiefs and four rescue trucks (Advanced Life Support - officer, 1 fire fighter). Total on duty shift strength is forty- six fire fighters. The city is divided into two districts; basically an East/West split. Annually, the fire department responds to over 14,000 total calls.

The City of Warwick, R.I. has experienced several natural disasters in its history, many of them involving tropical cyclones. The earliest records for some of these storms occurred during the Colonial era. Weather incidents of the 1900's would prove to be some of the most destructive, both physically and economically. The Northeast Hurricane of 1938 was the state of Rhode Island, and the city of Warwick's worst disaster, claiming over 300 lives and costing more than \$100 million dollars (\$3 billion in 2005). Other storm events would follow including Hurricane Carol (1954), Hurricane Gloria (1985) and Hurricane Bob (1991), all causing flooding, loss of utility power and damage to structures costing millions of dollars in losses to the community. All these events would tax the emergency operations of all city departments, especially those involving the Warwick Fire Department. With no guideline, the department operated as it always does, responding to the overwhelming calls for assistance as received.

Events in the last several years in other parts of the country, especially those involving hurricanes, bolster the need for the Warwick fire department to have a plan for rapid damage assessment. The state of Florida would experience four major Hurricanes during the 2004 summer season, causing losses to thousands of properties and costing billions of dollars in losses. During Hurricane Katrina, areas in Mississippi (MI) suffered devastation that wiped out their local resources, including those evacuated ten miles inland. Ninety five percent of Waveland, MI residential and commercial structures were severely damaged (White House, 2006).

More than fifty percent of the United States population lives within fifty miles of a coast. Many of these areas are in the path of future hurricanes United States Geological Survey ([USGS], 2005). The years of 2004 and 2005 experienced some of the costliest losses ever. The USGS believes that the Atlantic basin is active once again and people in these areas should prepare for more active hurricane seasons. The National Weather Service (2006) states that “Americans live in the most severe weather- prone country on Earth” with some ninety percent of presidential declared disasters being weather related.

The Emergency Operations Plan for the City of Warwick ([COW], 2004), tasks various agencies with performing a damage assessment for their own facilities. The Fire department role, per the plan, is to perform; rescue, assist in search and rescue, provide emergency medical services, deploy personnel in an emergency and perform damage assessment in checking the damaged area for reports of fire. Not found in any Warwick Fire department guideline is how we are to perform damage assessment during a disaster.

The purpose of this research is to establish a rapid damage assessment standard operating guideline for the Warwick Fire Department. This will allow the Warwick Fire

Department to respond to a disaster in a safe, efficient and timely manner. It would aid the fire department in identifying the needs and priorities of the incident for the proper use and allocation of limited emergency resources.

This project relates to one of the goals of the United States Fire Administration's five-year operational objectives, "To respond appropriately in a timely manner to emerging issues" (EFO, 2003). Also, the National Fire Academy's, Executive Analysis of Fire Service Operations in Emergency Management (EAFSOM) course deals with issues involving disasters. The course purpose stated in the student manual is "...designed to improve the knowledge, skills, and attitude required of fire service leaders when applied to large-scale multi agency emergency incidents in their communities" (EAFSOM, 2005, p.1-4). Unit 6 refers to damage assessment and how to develop a process, identify procedures and train your personnel. In developing a guideline and training our personnel in its procedures, we are responding to the some of the objectives stated for that course.

### Literature Review

The literature review began with determining what type of large-scale emergency or disaster the City of Warwick, R.I. was likely to experience. Government sources, books and local history were reviewed to gather this information.

The city of Warwick (COW) conducted a hazard analysis in 2003. The risk to the city of Warwick was determined by using the National Oceanic and Atmospheric Administration (NOAA) Community Risk Assessment tool. This assigns a number based on the following formula; Frequency (+) Area of impact (X) Potential Damage

Magnitude = Total score. Based upon the score, the following hazards are listed by their severity.

- Tropical Cyclones (tropical storms, hurricanes, etc)
- Nor'Easters –similar to a hurricane. They are coastal storms involving heavy precipitation and high winds. The weather circulates off the water blowing in a North Easterly direction. Often they occur during the winter, with heavy snow and icing over many miles of coastline.
- Severe winter storms
- Droughts
- Storms Surges
- Floods
- Earthquakes
- Thunderstorms
- Hail Storms
- Tornado
- Temperature Extremes
- Dam Failure
- Hazardous materials Incident
- Coastal Erosion

Five of the top six have the potential for affecting large areas due to flooding issues that are associated with these type storms (COW, 2004).

The City of Warwick Hurricane Preparedness Guide (2004) lists ten areas of the city that are prone to flooding. These areas are; Potowomut, Buttonwoods, Oakland

Beach, Warwick Neck Peninsula, Conimicut Point, Gaspee Point, Narragansett Parkway, Arnold's Neck, Pawtuxet Village and Longmeadow. All the above areas will need evacuation if the hurricane is a Category 2 or stronger storm.

The City of Warwick, R.I. has experienced several natural disasters in its history, many involving tropical storms. The earliest records for some of these storms occurred during the Colonial era. The Great Flood of 1759 inundated the villages that would later make up the City of Warwick. In 1761, Warwick would experience two earthquakes in the area. On August 11, 1778, during the Battle of Rhode Island, a hurricane would strike, wiping out troops and ships of both the British and French fleets that were preparing for battle. Later that year, a severe winter blizzard would strike. Known as the Hessian Storm, it would paralyze the armies fighting in the area. The year of 1812 would see another major hurricane strike the area (Patrick, 1986).

Weather incidents of the 1900's would prove to be some of the most destructive, both physically and economically. The Northeast Hurricane of 1938 was the state of Rhode Islands and the city of Warwick's worst disaster, claiming over 300 lives and costing more than \$300 million dollars (\$3 billion in 2005). The Great Atlantic Hurricane of 1944 would follow causing flooding and wind damage. In 1954 Hurricane Carol struck on August 31<sup>st</sup>, followed by Hurricane Edna less then two weeks later on September 11<sup>th</sup>. Hurricane Diane made land fall on August 9<sup>th</sup> 1955, causing some of the worst flooding in state history in the northern part of the state.

The Great Blizzard of 1978 would dump over three feet of snow in Warwick over a three-day period, closing down Warwick, as well as the state of Rhode Island's major airport. Hurricane Gloria occurred on July 27, 1985 bringing heavy rains, flooding and

loss of utilities for seven days. Hurricane Bob would follow in August 1991, causing similar problems with rain, flooding and loss of utilities (D'Amato, 1992).

Hurricanes account for 67% of insured property losses (p.366). Approximately 36 million people have moved into coastal areas in the last several decades, increasing the potential for large loss of life and property (FEMA, 1997).

According to the United States Census Bureau (USCB), the population in the city of Warwick was 28,757, two years after the Hurricane of 1938 (USCB, 1940). The present population is approximately 86,000 people, a substantial increase. Housing units in the city have increased to 37,000 (USCB, 2000). In the Hurricane of 1938, Warwick would lose over 700 permanent residences and hundreds of summer homes (D'Amato, 1992).

Recent comments in a newspaper article concerning hurricane preparedness, "... if it happened again, the damage would be far worse because the houses are packed closer together now" and " damage to homes would be catastrophic"(Barbarisi, 2006). If a Hurricane were to strike Warwick with the same intensity as some of the previous storms, losses would be substantial. Also, for the years 1925-1995, six out of the top 30 damaging hurricanes in the United States would strike RI (Landsea,1998).

Most of the large-scale emergencies impacting the City of Warwick are of a weather related nature. Research indicates this. Technologically, the City of Warwick does have the regions largest airport, several of the states major highway systems intersect in the city, the Northeast rail line passes through the city and business and industry continue to expand in the area. Emergencies occur fairly frequently involving

these technologies. However, research does not indicate that they would have as large an impact, or cover as wide an area, as a natural disaster.

Damage assessment is the basis for determining the need for state and/or federal assistance and should begin as soon as it is determined that state or federal assistance may be requested. The community's damage assessment team must be organized and trained to enhance rescue effort, reporting procedures and damage documentation for emergency declarations. During or after an emergency or disaster, local government must determine its situation, location and the extent and nature of the disaster. Information should include: the type of occurrence or combination of occurrences, the kind of damage created by the occurrence and the extent and magnitude of the damage.

Immediate recon of the area is necessary and is used to determine the urgency and requirements for deployment of emergency equipment and manpower to the affected area. It also forms the basis for preliminary damage assessment reports and requests for mutual aid (COW, 2004).

In the plan the Warwick Police Department (WPD) is identified as conducting damage assessment and performing reconnaissance and reporting, isolating, damaged areas supporting the Emergency Operations Center (EOC).

The WFD function (COW, 2004) is to assist in providing search and rescue in an area, assist in the search operation, rescue of injured people, provide emergency medical services, and tend to the deployment of personnel in the event of an emergency. For damage assessment, it is to inspect damaged areas for fire hazards, assist with evacuation, alert all emergency support services of dangers associated with technical hazards and fire during emergency and perform damage assessment on its equipment.

Damage assessment is dynamic, based on the disaster and should use a system designed and based on hazards for your community (McDowell, 2002). Disasters can leave a great deal of destruction requiring a rapid emergency response. When tornadoes struck Wyandotte County, Kansas in 2003, volunteers trained in damage assessment conducted damage assessment on over 600 structures in 12 hours.

Without a predetermined system for damage assessment in place, it is almost impossible to complete a coordinated, comprehensive, timely search of an area. Incident command is unable able to identify and prioritize the incident parameters, nor the magnitude of the incident (Naum, Fitzpatrick 2003). A three-step process is identified dealing with the rapid assessment of the area, identification and location of affected structures and identification of buildings that require a more detailed analysis. Owing to the fact that damage may be overwhelming for local responders and additional outside resources may be called in to assist, local responders should use objectives and assignments consistent with operational procedures of outside specialized resources (either state or federal urban search and rescue teams). This will create a more effective, efficient system allowing these resources to begin operation.

That community need not be municipal. Business concerns also have a need for damage assessment. Several articles describe damage assessment. Newport News Waterworks in Virginia describes damage assessment as one of the most important strategies in a disaster. Personnel must be trained to perform damage assessment adequately (Keyes, 2002). Timeliness and accuracy of the assessment is noted for prioritizing the needs for recovery. Also noted is the staging of personnel so damage assessment can begin immediately after the disaster.

Damage assessment is listed as one of the two most important functions for a business in *Disaster Survival Planning: A Practical Guide for Business* (Bell, 1991). The process should have a means to account for all damage before deploying resources. Procedures should be spelled out detailing what information is needed, how it will be received, how it will be tracked and what the information flow will be. Pre-formatted forms are recommended for consistency in gathering of that information. Norman (1998) reinforces this by stating that actions must be based on sound information derived from a proper decision-making process.

The Warwick Public Library ([WPL], 1992) has a damage assessment procedure listed for recovery. It lists potential causes of a large-scale disaster. It identifies a damage assessment team and what its procedures and priorities are. The plan discusses the importance of documenting and photographing (prior to, also) the incident, staff rotations, allocation of resources and other topics of concern. In its procedures it describes when the building is safe to enter. It also reviews “rules of thumb”(p10D.3) for calculating the damage area. “Establish as semblance of order”(p.10D.3) is detailed as one of the twenty steps to gaining control of an incident. The statement “A disaster of this magnitude will probably be beyond your institution’s ability to cope” (p.10D.4), recognizes that they may be overwhelmed by the incident and details how to prepare for that outside assistance.

Handmer, et al., (2005) while discussing a consistent approach to long term damage assessment in Australia expresses concerns that are similar to the initial damage assessment. Damage assessment should be a step by step approach, should be able to be applied by people with minimal training or experience and it should support resource

allocation between communities, hazards and their approach to managing it. Damage assessment has been hampered by a standard approach across Australia.

“Damage assessment plays a vital role during the initial minutes and hours of disaster response operations” (McEntire, D.A., Cope, J. 2004, P.5). It should be one of the first activities and it allows you to establish priorities and acquire necessary resources to handle the disaster. Also noted are the several types of damage assessments that are conducted. Initial damage assessment is described as being performed by the fire department immediately after the disaster to evaluate safety concerns and mobilize resources. Referred to as drive through assessment, observers view damages in specific areas for a quick appraisal of the damage. Aerial damage assessment is also conducted using airplanes. Preliminary damage assessment gathers data and information in preparation for a disaster declaration. Site damage assessments are used for facilities by all organizations. It is an up close visual or walk through of a building to assess damage. Technical damage assessments come later and are used to identify amounts of reimbursement. During the Paso Robles Earthquake in California, one thing noted was the knowledge of standard operating procedures (SOP) especially in the use of standard marking symbols for buildings and searches.

FEMA Urban Search and Rescue ([FEMA, USAR], 2003) and Rhode Island USAR ([RI, USAR], 2003) state that if the local emergency responders have identified search opportunities it will greatly reduce the task force work load, and allow them to start operating without having to conduct their own initial assessment.

The Structural Engineers Emergency Response Plan (SEER) Manual refers to the Applied Technology Council (ATC) plan for disaster response. ATC-20 was designed for

evaluating buildings exposed to a seismic event and is used now for damage assessment from other means. It refers to a uniform system for the marking of damaged structures as part of the rapid damage assessment of structures (SEER, 2003). It also states that communities not normally exposed to natural disasters may not have a plan to deal with widespread damage.

“Damage assessment is listed as one of the two most important functions for a business” (Bell, 1991). It should be one of the first activities and allows you to establish priorities and acquire necessary resources to handle the disaster. For a community, to operate without a predetermined system for damage assessment in place, it is almost impossible to complete a coordinated, comprehensive, timely search of an area. Incident command is unable able to identify and prioritize the incident parameters, nor the magnitude of the incident (Naum, Fitzpatrick 2003).

The importance of a standard operating guideline is discussed in several texts. International Fire Service Training Association ([IFSTA] 1998) identifies standard operating procedures as specific as to how fire departments will operate in a given situation. Other terms are used to describe these activities, such as standard operating guidelines, general guidelines, etc. This standard provides a consistent point of reference that all members of the organization can train to. Three main objectives specified for incident scene management are life safety, incident stabilization and property conservation. Under the phases of scene management, scene assessment is the first step in size up. IFSTA refers to size up as an ongoing process describing; what has happened what is happening, what is likely to happen and the resources needed to respond. It is part of a process to locate, isolate and mitigate an incident using objectives, strategies and

tactics. National Fire Protection Association (NFPA) 1500 Standard (2002) states that the fire department should attempt to reduce injuries and take whatever actions necessary to prevent them. It also states that standard operating procedures should be in place or developed to reduce injuries. In regards to training, safety procedures for incidents that we respond to should be provided by the fire department and that training should be developed.

Edwards (2000) discuss *organizational analysis, operations analysis (p.118) and individual analysis*. This analysis looks at the entire organization reviewing the goals and objectives of that organization, if jobs are performed in a safe competent manner and how well the individuals perform up to existing standards.

Along with guidelines, training and planning are essential areas for successful damage assessment. Brunacini(1997) states that excellent fire service performance is a direct result of long term planning and it is up to the organization to take control of that plan. Excellent service requires diligence and continued refinement. Team coordination and interpersonal contact also defines the success of the operation. United States Army ([USA] 2002) discusses a similar view about training as a unit. The development of skills and proficiency and the use of a recognized standard is the most effective way to train. Standards must be enforced and followed for a successful outcome.

How people act in a situation is discussed in several articles. Klein (2003) discusses how fire fighters make decisions based on intuition, a process he calls recognition primed decision- making (RPDM). These decisions are made through cues that allow you to recognize patterns. Your actions are based on those patterns that allow

you to make a decision to affect the situation. Intuition demonstrates that decisions are often made with the information at hand and few options considered.

Similarly, Fender (2003) found that fire fighters normally operate based on previous experience, making decisions based on generalities due to the unknown nature of an emergency. Also noted is that sometimes fire fighters take personal risks in attempting to perform their duties.

To properly assess a situation requires a plan. Part of that plan is establishing priorities. Norman (1998) speaks about a fire fighters responsibility to gain knowledge to perform new tasks. In the performance of those tasks, actions must be based on sound information that comes out of a decision making process based on their understanding and appreciation of fire fighting principles. His five basic concepts apply directly to the initial damage assessment process; Concept one states that rescue is the top priority, Concept two is to perform tasks that protect the greatest number of people when resources are not sufficient, Concept three is the removal of those most threatened, Concept four is to effect a coordinated operation and Concept five is the safety of responding personnel.

Dunn (1992) in discussing searches as part of a “Collapse Rescue Plan” (p.21) and FEMA (1993) describe the five phases of a search plan as; site survey (assessment), search and removal of surface victims, accessible void space search, selected debris removal for tunneling to victims and general debris removal. The first steps are the easiest ones to perform for the rescue of a victim, requiring very little commitment of limited resources.

“The key to an effective organizational structure is in the flow of information to the command post” (Coleman, 2001, p.9). The incident commander must have an understanding of resources required, available and under what time constraints they will operate. You have to know what you need and where to get it. Risk assessment is discussed as having personnel trained to make educated, realistic decisions about expected outcomes during an incident. Part of that risk assessment is a realistic expectation of what can be accomplished depending upon the nature of the incident within your community, with the resources on hand.

EAFSOM student manual (2005) describes damage assessment as the “gathering of information related to the impact of an event, or series of events, on life and property within a defined area” (SM 6-3). Damage assessment is further separated as immediate and post incident. Immediate assessment is described as a rapid assessment of the damages in an area and is performed during the initial or active part of the incident. The immediate damage assessment is compared to a size up normally performed by a fire company arriving at an incident. It is usually started by the first unit arriving on the scene making a rapid, visual assessment of the situation. The importance of this damage assessment is critical for several reasons; determining the impact of the event, deploying resources and the proper utilization of limited resources.

McEntire (2002) states that people who are responsible for damage assessment must plan, train and drill with it in order to complete it effectively. Three types of damage assessment are discussed. Rapid or initial damage assessment is undertaken and involves collecting information on casualties, and numbers of building impacted by the disaster; discussed as being performed in a vehicle. The term windshield survey is also used to

describe it. Preliminary damage assessment is done by state and federal agencies for a presidential disaster declaration. Technical damage assessment is a more intense assessment of structures to determine their integrity and if they can be salvaged or need to be demolished.

Several articles were reviewed for damage assessment procedures. Cole, Ewell, Ferguson (1993) believe a survey should be easy to use by a fire officer, having minimal training requirements and a format requiring no booklet for review. The form used should be a narrative form with descriptions for each classification of damage. This was found to be more accurate than other forms using percentages. They also reviewed the use of global positioning system (GPS) for data collection.

NFA (1995) and Klem, Conroy, Tokle, Vawter, Dowty, Sachs (1989), discuss resource allocation and modifying normal apparatus dispatch procedures during times of a large scale emergency. Also discussed is the screening and prioritizing of calls for life threatening emergencies. NFA (1995) further enhances communications by decentralizing your dispatch and control of resources. Instead of being controlled by what normally is your central dispatch, each specific area would be handled by the local incident commander. This would be similar to the Incident Command Course (ICS) Area Command concept for controlling large incidents that is presented in ICS 300 and 400.

Smith (1989) talks about the dispatch priorities that are established in their disaster plan. Their community is a small community with two fire stations for response. Yet they experienced 1800 damaged structures and 175 calls for assistance in the first 16 hours after an earthquake. The priorities identified in their plan are life threatening fires

or hazardous materials incidents, medical emergencies and rescues. He also talks about ordering resources and wishing they had called for them early on in the incident.

Gordon (2006) reviews the city of Plantation, FL severe weather operations plan (SWEOP) and its operation for Hurricane Wilma. One of the comments is how the plan is updated yearly. The plan has three phases, pre-storm activation, response and post storm recovery. Damage assessment is covered under the response phase. Engine and rescue crews provide a quick damage assessment. Damage is rated based on comparisons to hurricane damage. Trees down, signs damaged, etc. are assigned as a Category 1. Structures that are damaged are rated as a Category 2, 3 or 4 based on the extent of damage. This information is then transferred to a map to rapidly identify damaged areas and assign resources.

County of Los Angeles (1996) earthquake policy for damage assessment has several stages. Personnel safety is the first level of safety. When this has been attended to, a site survey is completed. The site survey consists of; injuries to personnel, availability of the company, availability of other resources at the site and damage to the structure. Damage to the structure is evaluated using the “Earthquake Intensity Rating Level Scale” (P.7) with the scale going from Level 0 (nothing felt) to Level 5 ( Structural Collapse). This will be completed and reported to the Battalion Commander. A primary jurisdictional survey, reviewing the status of high hazard occupancies (hospitals, high rise, hazardous material facilities, etc) will then commence and be completed with results reported to the Battalion Commander. This will be only interrupted to respond to a life-threatening emergency. Secondary jurisdictional surveys are completed when other units are available. Battalion Commanders will make ready to establish a Battalion Command

post. Priorities for unit assignments are; life threatening (fires, people trapped, etc.), potential life threatening (natural gas leaks, etc.) non life- threatening (flooding, fire alarms, outside gas leaks, etc.). Also covered are dispatch modes with changes in normal dispatch procedures depending on the severity of the disaster.

Dayton Fire Department (1995) utilizes a disaster Assessment Snapshot report. It reviews the status of fire personnel, response equipment and facilities after a large-scale emergency. After these assessments, it focuses on the area around the fire station based upon visual observations. It evaluates neighborhood damage, access to the area and potential flooding. A form is filled out with damage values assigned for the level of destruction observed. The report is relayed via radio communications. If this is not operating, information is relayed to the Battalion or Area Command.

Fairfax County Fire & Rescue (1993) has a windshield survey procedure for rapid damage assessment. It is to be used for large- scale emergencies. Routes of travel for each fire district are identified and accompanying forms are attached for documentation. Sites are predetermined and ones that have a high potential for loss of life, hazardous material potential, essential services (water, natural gas, electrical, etc.). These forms will be updated annually.

The Fort Walton Fire Department hurricane plan has several steps to damage assessment. Crews respond out after the winds are below 50 miles per hour. The city is sectorized and assessment is performed in predetermined areas (near the water) first. Buildings are triaged from the vehicles with damages written down. Rescues are performed as they are encountered. Once this preliminary damage assessment is performed a more thorough examination of the building is performed using the USAR

marking system. Information is turned over to the EOC. One problem noted was that during Hurricane Ivan in 2004, as electrical power was turned on later on in the incident, fires were started due to electrical shorts. The fire department knew where the power was being turned back on do to the number of fires in a certain area (Bullard, personal communication, Sept.3, 2006).

To summarize, any time a community experiences a large- scale emergency or disaster, it will be confusing and overwhelming for the local responders. A standard approach to rapid damage assessment needs to be performed accurately and in a timely manner to minimize the loss of life, properly assess the dangers and damages, prioritize the needs, allocate limited resources and acquire outside agency support.

### Procedures

A literature review began at the Learning Resource Center at the National Fire Academy. Books, periodicals and other publications were reviewed. Additional reviews of information were conducted at the Warwick and Coventry Public Libraries and the Community College of Rhode Island Library.

The City of Warwick and the Warwick Fire Department written procedures, documents and manuals were researched. The City of Warwick's web site at <http://www.warwickri.gov> was accessed also.

Articles from fire fighting journals and magazines were researched along with on line journals and periodicals, via the Internet. Various government Internet web sites were accessed and any relevant publications from FEMA, NOAA, USGA and the US Census Bureau.

The following internet search engines were utilized; Google, Ask.Com, Yahoo Search. Searches were conducted for the terms damage assessment, rapid damage assessment and preliminary damage assessment. Various sources were indicated.

A survey was distributed to all Warwick Fire Department Fire fighters to determine their prior knowledge and experience in regard to the damage assessment process. The survey was conducted via the fire department e-mail, with the request that responses be either hard copied, or sent via the e-mail system back to the authors fire department e-mail address. The survey was conducted during the month of August with a response by August 30, 2006. A pool of approximately two hundred and fifteen (215) fire fighters would have access to the notice; fifty-nine (59) responses were returned (26.5%).

Interviews were completed with the department heads of the fire department, police department and department of public works for the city of Warwick. These individuals were chosen because their agencies are the ones responsible for emergencies in the city. Interviews were conducted with Colonel Stephen McCartney, Chief of the Warwick Police Department, on August 8, 2006 at the Warwick Police Headquarters. David Picozzi, Public Works Director, was interviewed on August 10, 2006 at the Public Works Facility. Kevin M. Sullivan, Emergency Management Agency Director and Chief of the Warwick Fire Department, and Edmund Armstrong, Assistant Chief of Operations for the Warwick Fire Department, were interviewed at Warwick Fire Department Headquarters on August 10, 2006. All the above were asked the same questions during the interview. Each agency has a different responsibility during an emergency and these

questions would provide an idea as to how damage assessment was viewed by these agencies.

Also interviewed was Robert Warren, Director of the State of RI, Emergency Management Agency, on August 21, 2006, at the Emergency Operation Center in Cranston, RI. He was asked the same five questions;

1. Are you familiar with the term rapid damage assessment or windshield survey?,
2. What department should be responsible for conducting a rapid damage assessment?,
3. What information should be included in a rapid damage assessment?,
4. Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?,
5. Has your department conducted any training with other departments in regard to rapid damage assessment?

Lastly, an information request was sent via e-mail to the yahoo groups that were set up from the three previous NFA classes that the author had attended for the EFO program. The request was for any information in regards to policies or procedures for disaster responses and/or damage assessment. Eight people responded to the request.

#### Limitations

Several limiting factors are noted. The author found plenty of information about damage assessment. Some of it was dated and most of it pertained to long- term damage assessment. Very little information was found specifically for rapid damage assessment.

For the information that was located, terminology was used interchangeably. Rapid damage assessment, preliminary damage assessment, windshield survey, site survey, area assessment, etc. are all used by various authors and publications to describe a similar task or activity.

Also, the rapid damage assessment guideline that is being drafted is one aspect of a process that needs to be completed. Training response personnel in the use of the guideline, identification of vulnerable areas, target hazards and the like, all need to be completed along with implementing the guideline for rapid damage assessment.

## Results

### 1. What type of large-scale emergency is the City of Warwick likely to encounter?

Historical information dating back to Colonial times indicates that the most likely cause of a large-scale emergency in the city of Warwick is going to be weather related.

The Hazard Analysis done by the City of Warwick in 2003 lists the categories by order of severity. The top five listed are; tropical storms, nor'easters, severe winter storms, droughts and storm surges (COW, 2003). Technical events such as dam failures or hazardous materials events are on the bottom of the list. Also, the technical hazards that have been experienced in the past are usually of short duration, and do not involve large geographic areas as has been experienced by the weather related events.

### 2. What is the importance of conducting a rapid damage assessment?

Immediate recon of the area is necessary to determine the urgency of the situation and requirements for deployment of emergency equipment and manpower to the affected area. It also forms the basis for preliminary damage assessment reports and

requests for mutual aid (COW, 2004). Without a predetermined system for damage assessment in place, it is almost impossible to complete a coordinated, comprehensive, timely search of an area. Incident command is unable to identify and prioritize the incident parameters, nor the magnitude of the incident (Naum, Fitzpatrick 2003).

“Damage assessment plays a vital role during the initial minutes and hours of disaster response operations”(McEntire, D.A., Cope, J. 2004, P.5). It should be one of the first activities and will allow one to establish priorities and acquire necessary resources to handle the disaster.

Damage assessment is the basis for determining the need for state and/or federal assistance and should begin as soon as it is determined that state or federal assistance may be requested. During or after an emergency or disaster, local government must determine its situation, location and the extent and nature of the disaster. Information should include: the type of occurrence or combination of occurrences, the kind of damage created by the occurrence and the extent and magnitude of the damage.

### 3. What is the purpose of a rapid damage assessment guideline?

International Fire Service Training Association ([IFSTA] 1998) identifies standard operating procedures as specific as to how fire departments will operate in a given situation. This standard provides a consistent point of reference that all members of the organization can train to. Three main objectives specified for incident scene management are life safety, incident stabilization and property conservation. Under the phases of scene management, scene assessment is the first step in size up. IFSTA refers to size up as an ongoing process describing; what has happened what is happening, what

is likely to happen and the resources needed to respond. It is part of a process to locate, isolate and mitigate an incident using objectives, strategies and tactics.

To properly assess a situation requires a plan. Part of that plan is establishing priorities. Norman (1998) speaks about a fire fighters responsibility to gain knowledge to perform new tasks. In the performance of those tasks, actions must be based on sound information that comes out of a decision making process based on their understanding and appreciation of fire fighting principles.

EAFSOM student manual (2005) describes damage assessment as the “gathering of information related to the impact of an event, or series of events, on life and property within a defined area (SM 6-3). Damage assessment is further separated as immediate and post incident. Immediate assessment is described as a rapid assessment of the damages in an area and is performed during the initial or active part of the incident. The immediate damage assessment is compared to a size up normally performed by a fire company arriving at an incident. It is usually started by the first unit arriving on the scene making a rapid visual assessment of the situation. The importance of this damage assessment is critical for several reasons; determining the impact of the event, deploying resources and the proper utilization of limited resources.

#### 4. What do Warwick Fire fighters know about damage assessment?

A survey was sent out to 215 fire fighters. A total of 59 were returned (26.5%). Two of the returns were not complete. Question 1 (Table 1) asked the number of years the respondent was on the WFD and showed that 41 (72%) of the respondents have ten or more years on the job.

Question 2 asked responders what their current position is. Of the 57 responders, 24 (41%) were company officers, 28 (47%) were fire fighters and 5 (8%) were chief officers. Further review of the returns show 5 out of 8 line chief officers (62.5%) returned the survey, 24 (35%) out of 68 company officers returned the survey and 28 (22%) out of 128 fire fighters returned the survey.

Question 3 asked the number of years as an officer. Half of the officers responding to the question, 15 out of 29 (52%), would have 5 or more years as an officer.

Question 4 asked about terms regarding damage assessment. In regard to damage assessment, 41 (69%) were not familiar with the term rapid damage assessment, 45 (76%) were not familiar with the term initial damage assessment and 41(69%) were not familiar with the term windshield survey.

In answer to question number 6, 58 (98%) believe the WFD has not trained its personnel in damage assessment. Question 7 asked for comments about what information should be provided to help perform rapid damage assessment. A majority of the comments concerned training and drilling in what rapid damage assessment is, how to perform rapid damage assessment and what the fire fighters responsibility is performing rapid damage assessment. A sample of some of the comments is provided. It details some of the training that fire fighters would like to see provided.



5. Agency heads for the Warwick police, fire and public works department were asked five questions about damage assessment. Also interviewed was the State of RI Emergency Management Director.

Are you familiar with the terms rapid damage assessment or windshield survey?

Sullivan, Armstrong, Warren (personal interviews, 2006) answered yes that they are familiar rapid damage assessment. McCartney (personal interview, 2006) answered yes, that it is in the City Emergency Operation Plan. Picozzi (personal interview, 2006) was not familiar with term rapid damage assessment.

Picozzi, McCartney (2006) answered no to a windshield survey. Sullivan, Armstrong, Warren (2006) stated they were familiar with the term windshield survey. Warren further states this information needs to be in a format that can be transmitted between Emergency Operations Centers (EOC). He further states that every discipline should be performing some type of damage assessment. “You have to have a way of prioritizing your calls”(Warren, personal interview,2006).

What department should be responsible for conducting a rapid damage assessment?

Warren (2006) feels the local community should determine the agency. McCartney (2006) states the Public Works, Fire Department and Building Department should be conducting damage assessment with the Police Department responsible for any security issues. Picozzi (2006) states the Fire Department, Public Works and Police Departments should all work together for damage assessment. Sullivan and Armstrong (2006) state the Fire Department should be the agency responsible. “We are going to be

operating in those areas before any other agencies, so we should be able to provide the first reports” (Armstrong, 2006).

What information should be included in rapid damage assessment (form)?

McCartney (2006) states that for the WPD, security issues and information to determine mobilization (manpower) levels should be included. Picozzi (2006) is not sure specifically but believes information about utilities should be noted. Armstrong and Sullivan (2006) state that information about the area (fire company district), amount and severity of damage should be noted. Armstrong states we should use a checklist for getting basic information. “We have no procedure for performing this triage” (Armstrong, 2006).

Information for immediate needs; roads, hospitals infrastructure, evacuation information, etc. as well as environmental damage should be included. “Assessment should reflect established priorities” (Warren, 2006).

Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?

McCartney(2006) states that damage assessment is detailed in the city operations plan and that agencies are trained in damage assessment. Public works has no damage assessment procedures (Picozzi, 2006). He is interested in information that this report may present. States he is unsure what training other departments have.

Armstrong and Sullivan (2006) state that no training is provided, even though the WFD should be the agency conducting rapid damage assessment.

Warren (2006) states no damage assessment training is provided. We need to look at training involving all disciplines, including other agencies at the second tier; i.e. insurance companies, etc.

Has your department conducted any training with other departments in regard to rapid damage assessment?

McCartney (2006) states the WPD has been involved with other departments for table top exercises for other exercises for airport certifications, etc.

Armstrong, Picozzi, Sullivan and, Warren (2006) state no training has been conducted with other departments for damage assessment. Armstrong feels the WFD should be in charge of the process of rapid damage assessment and providing the training, with the involvement of other agencies of the city. Picozzi feels we need to address other issues involved such as; acquiring resources, establishing memorandums of understandings (mou) and reviewing the Emergency Operations Center needs and equipment.

#### Discussion

The City of Warwick throughout the years has experienced a number of large-scale emergencies. Most of these emergencies were due to weather related activities, many involving tropical storms. In fact The National Weather Service (2006) states that “Americans live in the most severe weather- prone country on Earth” with some 90 % of presidential declared disasters being weather related.

The earliest records for some of these storms occurred during the Colonial era. Later on, weather incidents of the 1900's would prove to be some of the most destructive, both physically and economically. The Northeast Hurricane of 1938 was the state of Rhode Islands and the city of Warwick's worst disaster, claiming over 300 lives and costing more than \$300 million dollars (\$3 billion in 2005). Recent incidents of note; The Great Blizzard of 1978 bringing three feet of snow over a three day period closing down Warwick as well as the state of Rhode Islands major airport, Hurricane Gloria (1985) bringing heavy rains, flooding and loss of utilities for seven days, Hurricane Bob (1991), causing similar problems with rain, flooding and loss of utilities (D'Amato,1992). Snowstorms of record would occur in 1993,1996, 1999 and 2000.

The city of Warwick (COW) conducted a hazard analysis in 2003. The risk to the city of Warwick was determined by using the National Oceanic and Atmospheric Administration (NOAA) Community Risk Assessment tool. A natural disaster appears to be the most likely event that the City of Warwick will face due to the frequency, magnitude and area of impact identified in the plan.

Many of these emergencies would involve the flooding of areas of the city. Five of the top six have the potential for affecting large areas due to flooding issues that are associated with these type storms (COW, 2003). The City of Warwick Hurricane Preparedness Guide (2004) lists ten areas of the city that are prone to flooding. These areas are; Potowomut, Buttonwoods, Oakland Beach, Warwick Neck Peninsula, Conimicut Point, Gaspee Point, Narragansett Parkway, Arnold's Neck, Pawtuxet Village and Longmeadow. All the above areas will need evacuation if a hurricane is a Category 2 or stronger storm.

FEMA(1997) states that large numbers of people, approximately 36 million, have moved into coastal areas in the last several decades, increasing the potential for large loss of life and property.

The United States Geological Survey ([USGS], 2005) found that more than fifty percent of the United States population live within fifty miles of a coast. Many of these areas are in the path of future hurricanes. The years 2004 and 2005 experienced some of the costliest losses ever. The USGS believes that the Atlantic basin is active once again and people in these areas should prepare for more active hurricane seasons.

The City of Warwick change in population supports these facts. Warwick has seen substantial growth in its population since the 1938 Hurricane. This growth parallels the changes in population across the United States. According to the United States Census Bureau (USCB), the population in the city of Warwick was 28,757, two years after the Hurricane of 1938 (USCB, 1940). The present population is approximately 86,000 people, a substantial increase. Housing units in the city have increased to 37,000 (USCB, 2000). In the Hurricane of 1938, Warwick would lose over 700 permanent residences and hundreds of summer homes (D'Amato, 1992). Recent comments in a newspaper article concerning hurricane preparedness, "...if it happened again, the damage would be far worse because the houses are packed closer together now" and "damage to homes would be catastrophic"(Barbarisi, 2006).

Most of the large- scale emergencies occurring in the city of Warwick have been weather related, whether from a single occurrence or a cascading effect, i.e.; rain leading to flooding. Technological (man made) emergencies do occur, not normally involving large geographic areas or large segments of the population. The growth of the population

of the City of Warwick, along with Warwick being a Coastal community, would indicate that there is a potential for a large scale-emergency being weather related. When one reviews the history of the area, the probability of a large- scale emergency being weather related is overwhelming. The standard operating guideline that is being developed for rapid damage assessment should be able to be utilized as a guide for most of the large-scale emergencies Warwick will experience.

Immediate recon of the area is necessary and is used to determine the urgency and requirements for deployment of emergency equipment and manpower to the affected area. It also forms the basis for preliminary damage assessment reports and requests for mutual aid (COW, 2004).

Damage assessment is the basis for determining the need for state and/or federal assistance and should begin as soon as it is determined that state or federal assistance may be requested. During or after an emergency or disaster, local government must determine its situation, location and the extent and nature of the disaster. Information should include: the type of occurrence or combination of occurrences, the kind of damage created by the occurrence and the extent and magnitude of the damage.

Damage assessment is dynamic, based on the disaster and should use a system designed and based on hazards for your community (McDowell, 2002). Disasters can leave a great deal of destruction requiring a rapid emergency response.

In developing that system, the agency/agencies performing damage assessment should be noted. Chief S. McCartney (2006) believes the Department of Public Works (DPW) and the WFD would be better suited to perform the function of damage assessment. He believes WPD would be occupied with law enforcement security issues

affecting an area impacted and their involvement in damage assessment should be protecting emergency responders operating in the area. Warren (2006) feels the local community should determine the agency. Picozzi (2006) states the Fire Department, Public Works and Police Departments should all work together for damage assessment. Sullivan and Armstrong (2006) state the Fire Department should be the agency responsible. “We are going to be operating in those areas before any other agencies, so we should be able to provide the first reports” (Armstrong, 2006).

EAFSOM student manual (2005) describes damage assessment as the “gathering of information related to the impact of an event, or series of events, on life and property within a defined area” (SM 6-3). Damage assessment is further separated as immediate and post incident. Immediate assessment is described as a rapid assessment of the damages in an area and is performed during the initial or active part of the incident. The immediate damage assessment is compared to a size up normally performed by a fire company arriving at an incident. It is usually started by the first unit arriving on the scene making a rapid visual assessment of the situation. The importance of this damage assessment is critical for several reasons; determining the impact of the event, deploying resources and the proper utilization of limited resources.

Business concerns also have a need for damage assessment. Keyes (2002), Bell (1991) and Warwick Public Library ([WPL], 1992) describe damage assessment as one of the most important strategies in a disaster. Personnel must be trained to perform damage assessment adequately. Timeliness and accuracy of the assessment is noted for prioritizing the needs for recovery. Also noted is the staging of personnel so damage assessment can begin immediately after the disaster.

The process should have a means to account for all damage before deploying resources. Procedures should be spelled out detailing what information is needed, how it will be received, how it will be tracked and what the information flow will be (Bell, 1991). Pre-formatted forms are recommended for consistency in gathering of that information. Norman (1998) reinforces this by stating that actions must be based on sound information derived from a proper decision-making process.

The WPL (1992) recovery plan has a damage assessment procedure listed. The plan discusses the importance of documenting and photographing (prior to, also) the incident, staff rotations, allocation of resources and other topics of concern. In its procedures it describes when the building is safe to enter. It also reviews “rules of thumb”(p.10D.3) for calculating the damage area. “Establish as semblance of order”(p.10D.3) is detailed as one of the twenty steps to gaining control of an incident. The statement “A disaster of this magnitude will probably be beyond your institution’s ability to cope” (p.10D.4), recognizes that they may be overwhelmed by the incident and details how to prepare for that outside assistance.

“Damage assessment plays a vital role during the initial minutes and hours of disaster response operations”(McEntire, D.A., Cope, J. 2004, P.5). It should be one of the first activities and allows you to establish priorities and acquire necessary resources to handle the disaster. Also noted are the several types of damage assessments that are conducted. Initial damage assessment is described as being performed by the fire department immediately after the disaster to evaluate safety concerns and mobilize resources. Referred to as drive through assessment, observers view damages in specific areas for a quick appraisal of the damage. Aerial damage assessment is also conducted

using airplanes. Preliminary damage assessment gathers data and information in preparation for a disaster declaration. Site damage assessments are used for facilities by all organizations. It is an up close visual or walk through of a building to assess damage. Technical damage assessments come later and are used to identify amounts of reimbursement. During the Paso Robles Earthquake in California, one thing noted was the knowledge of standard operating procedures (SOP) especially in the use of standard marking symbols for buildings and searches.

Preparing for outside agencies coming in to assist is an important consideration for the damage assessment process. FEMA Urban Search and Rescue (USAR) (FEMA, 2003) and Rhode Island USAR (RI, 2003) state that if the local emergency responders have identified search opportunities it greatly reduces the task forces work load, and allows them to start operating with out having to conduct their own initial assessment.

The Structural Engineers Emergency Response Plan (SEER) Manual refers to the Applied Technology Council (ATC) plan for disaster response. ATC-20 was designed for evaluating buildings exposed to a seismic event and is used now for damage assessment from other means. Again noted is a uniform system for the marking of damaged structures as part of the rapid damage assessment of structures (SEER, 2003). It also states that communities not normally exposed to natural disasters may not have a plan to deal with widespread damage.

Bell (1991) and Naum, Fitzpatrick (2003) summarize the importance of damage assessment nicely. It should be one of the first activities and allows you to establish priorities and acquire necessary resources to handle the disaster. For a community, to operate without a predetermined system for damage assessment in place, it is almost

impossible to complete a coordinated, comprehensive, timely search of an area. Incident command is unable able to identify and prioritize the incident parameters, nor the magnitude of the incident.

Standard operating procedures or standard operating guidelines (SOG) provide a measurable standard about how we operate during an emergency. They provide direction and define how we operate at an incident in a safe, efficient manner (IFSTA, 1998).

Fifty eight (98%) of the WFD respondents stated they had not received any training in rapid damage assessment. In answer to question 4 (table 1, WFD Survey) when asked if they were familiar with the follow terms; 69 % of the WFD answered no to initial damage assessment, 76 % no to rapid damage assessment and 69 % answered no to windshield survey. Armstrong, Picozzi, Sullivan, and Warren (2006) state that no training is provided for personnel in how to perform a rapid damage assessment.

This standard provides a consistent point of reference that all members of the organization can train to. Three main objectives specified for incident scene management are life safety, incident stabilization and property conservation. Under the phases of scene management, scene assessment is the first step in size up. IFSTA refers to size up as an ongoing process describing; what has happened what is happening, what is likely to happen and the resources needed to respond. It is part of a process to locate, isolate and mitigate an incident using objectives, strategies and tactics. National Fire Protection Association

IFSTA (1998), NFPA (2002) and Edwards (2000) talk about organizational goals and identify a standard operating procedure as specific as to how a fire department will

operate in a given situation. NFPA (2002) says standard operating procedures should be in place or developed to reduce injuries.

Along with guidelines, training and planning are essential areas for successful damage assessment. Brunacini (1997) states that excellent fire service performance is a direct result of long- term planning. It is up to the organization to take control of that plan. Team coordination and interpersonal contact also defines the success of the operation. USA (2002) discusses a similar view about training as a unit. The development of skills and proficiency and the use of a recognized standard is the most effective way to train. Standards must be enforced and followed for a successful outcome. These standards are what your people are held accountable to. Defining standards for an operation makes sure all personnel are working together in a safe, timely, coordinated and efficient manner. Your SOG is what you base your skills level training on (IFSTA, 1998). USA (2002), calls this “Appropriate doctrine. “Soldiers have no time to learn non standard procedures”(p.1-2).

EAFSOM student manual (2005) describes damage assessment as the “gathering of information related to the impact of an event, or series of events, on life and property within a defined area (SM 6-3). EAFSOM (2005) describes damage assessment as immediate and post incident. Immediate assessment is described as a rapid assessment of the damages in an area and is performed during the initial or active part of the incident.

Naum and Fitzpatrick (2003) discuss a three step process dealing with the rapid assessment of the area, identification and location of affected structures and identification of buildings that require a more detailed analysis. McEntire (2002) discusses three types of damage assessment; rapid or initial damage assessment, windshield survey and

preliminary damages assessment. Gordon (2006) plan has three phases; pre-storm activation, response and post storm recovery (Damage assessment is covered under the response phase). County of Los Angeles (1996) earthquake policy for damage assessment has several stages; personal safety, site survey, primary jurisdictional and secondary jurisdictional. The Fort Walton Fire Department hurricane plan has several steps to damage assessment that start with the assessment of the fire department. One other type of damage assessment is an assessment snapshot (Dayton, 1995).

(WFD fire fighters were asked about terms regarding damage assessment. In regard to damage assessment, 41 (69%) were not familiar with the term rapid damage assessment, 45 (76%) were not familiar with the term initial damage assessment and 41(69%) were not familiar with the term windshield survey.)

To properly assess a situation requires a plan. Part of that plan is establishing priorities. Norman (1998) speaks about a fire fighters responsibility to gain knowledge to perform new tasks. In the performance of those tasks, actions must be based on sound information that comes out of a decision making process based on their understanding and appreciation of fire fighting principles.

The immediate needs of damage assessment should detail a process. The first step will be a site assessment, noting any personnel injury, damage to structure or equipment. The next step should be the area immediately surrounding the facility, noting the general condition of the area. The next step will be a windshield survey, where crews operate in their district to note any damages and report back information before taking any actions.

The key to an effective organizational structure is in the flow of information to the command post” (Coleman, 2001, p.9). Incident command must have an understanding of

the resources that are required, available and under what time constraint they will operate in. You have to know what you need and where to get it.

Part of that damage assessment is the collecting of information. Cole, Ewell, Ferguson (1993) believe a survey should be easy to use by a fire officer, having minimal training requirements and a format requiring no booklet for review. The form used should be a narrative form with descriptions for each classification of damage. In contrast, Dayton (1995) and FairfaxCounty (1993) use forms that are based on rating areas and buildings, assigning a percentage to the damaged area.

NFA (1995) and Klem, Conroy, Tokle, Vawter, Dowty, Sachs (1989), discuss resource allocation and the modifying the normal apparatus dispatch during times of a large scale emergency. CountyofLA (1996) and Smith (1989) talk about the dispatch priorities that are established in their disaster plan. Both discuss the screening and prioritizing of calls for life threatening emergencies. Both discuss the need to reduce their normal dispatch due to high call volume and limited resources.

To summarize, any time a community experiences a large- scale emergency or disaster, it will be confusing and overwhelming for the local responders. A standard approach to rapid damage assessment needs to be performed accurately and in a timely manner to minimize the loss of life, properly assess the dangers and damages, prioritize the needs, allocate limited resources and acquire outside agency support. To properly assess a situation requires a plan. Part of that plan is establishing priorities. Fender (2003) found that fire fighters normally operate based on previous experience, making decisions based on generalities due to the unknown nature of an emergency.

## Recommendations

This report should be the first step in how the Warwick Fire Department prepares for a large-scale emergency. This plan should be part of an all hazards damage assessment plan that can be utilized for most of the large-scale emergencies that we would be expected to respond. It should be based upon existing policy and procedure, not just something for the big one.

The Warwick Fire Department should review, modify, update and implement this rapid damage assessment procedure within six months of it being submitted (Appendix A). For this to be accomplished, several other issues need to be addressed.

The local district inspection program needs to be reinstated. This will allow information to be gathered and prioritized so that the local fire companies will be aware hazards in their first response district that are vulnerable to dangers identified in the Hazard Mitigation Strategy for the City of Warwick.

The Warwick Fire department will provide training for its personnel in the rapid damage assessment process standard operating guideline.

The Warwick Fire Department will provide training to other agencies in the City of Warwick who would be responding during a large-scale disaster.

The City of Warwick needs to update annually the Emergency Operations Plan for the city. Several changes have already occurred that will impact the way the plan is implemented.

The City of Warwick Fire Department needs to develop a plan for the operation of the Emergency Operations Center for the city of Warwick. The EOC will soon be housed at the Fire Department Headquarters, under the operation of the Fire Chief. As a part of

this plan, an exercise should be conducted annually, where the EOC is placed into operation, with representatives from the agencies who would be operating in the EOC during an emergency.

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## Appendix A

<b>WARWICK FIRE DEPARTMENT OPERATIONS MANUAL</b>	
STANDARD OPERATING GUIDELINE FOR <b><u>Rapid Damage Assessment</u></b>	ORIGINAL: 9/17/06 REVISED: PAGES: 2  <b><u>P.1</u></b>

**Purpose:** The purpose of this procedure is to establish a guideline for conducting a rapid damage assessment following a major incident or disaster.

**Scope:** This guideline applies to all Warwick Fire Department Personnel

### Procedure

1. Emergency Operations Center will be activated
2. Emergency Action Plan will be initiated
3. City will be divided into operating areas.
  - a. All communications will go through the Battalion Chiefs, not Fire Alarm. Companies will report to their Battalion Chief
  - b. Normal districts will apply. Battalion one will cover Stations 1,5,8 and 9. Battalion 2 will cover Stations 2,3,4,6 and 7
  - c. If Battalion 3 district is implemented, it will cover Stations 2,7 and 8
  - d. All calls will be routed through the Battalion Chiefs
  - e. Battalion Chiefs will report to the Operations Chief
4. Site survey will be completed by Station Officers, reporting to the Battalion Chiefs
  - a. Personnel will be assessed for injuries
  - b. Vehicles and equipment will be assessed for damages
  - c. Station and facilities will be assessed for damage
5. Snapshot survey will be completed of the area immediately surrounding the stations.
  - a. This is a visual survey noting general condition of the area
  - b. Stations with aerial apparatus will set up aerial for a birds-eye view
  - c. Information will be relayed to district Battalion Chief.
6. Windshield survey will be conducted as soon as conditions allow.
  - a. All fire apparatus will proceed out to their primary response district.

<b>WARWICK FIRE DEPARTMENT OPERATIONS MANUAL</b>	
STANDARD OPERATING GUIDELINE FOR <u><b>Rapid Damage Assessment</b></u>	ORIGINAL: 9/17/06 REVISED: PAGES: 2  <u><i>P.2</i></u>

- b. Multi- company stations will divide the response district based upon hazards identified per the district inspection program
    - Exception- Station 9. One crew from Station 9 will proceed to the Community College of R.I. This will afford a birds eye view of the city. Report to be made to Battalion 1. Status of back up radio equipment will be verified also.
  - d. Road conditions will be noted with major problems reported; i.e. wash outs, cave ins, access blocked, etc.
  - e. Hazardous Material emergencies will be reported- natural gas leaks, industrial facility tanks leaking, etc
  - f. Utility conditions will be noted- wires down, water leaks
  - g. Companies will assist at any life- threatening emergency they encounter. The priority is the completion of the windshield survey.
7. All information will be recorded on the Rapid Damage Assessment Form



Appendix C

**WARWICK FIRE DEPARTMENT**  
140 VETERANS MEMORIAL DRIVE  
WARWICK, R.I. 02886

8 August 06

Dear Chief,

As part of a research project I am conducting for the Executive Analysis Of Fire Service Operations in Emergency Management Course at the National Fire Academy, I am reviewing how the City of Warwick responds to a disaster situation. I am conducting interviews with management personnel of the agencies who are most likely to be responsible for assessing the initial damage that the city would experience.

Your participation would be greatly appreciated. Thank you for your valuable input.

Sincerely,

Francis Colantonio, Jr.  
Battalion Chief  
Warwick Fire Department

Appendix D

**Interview Questions**

Colonel Stephen McCartney

Warwick Police Department

Chief of Department

Interview: August 8, 2006

Warwick, R.I.

20 Minutes

1. Are you familiar with the term rapid damage assessment or windshield survey?

Yes, damage assessment is detailed in the Cities Emergency Operations Plan. I am not familiar with the term windshield survey.

2. What department should be responsible for conducting a rapid damage assessment?

The Department of Public Works, fire inspectors and building department should be the agencies for conducting damage assessment. The police department should be responsible for any security issues that may arise.

3. What information should be included on a rapid damage assessment form?

For the Warwick Police, security risks should be detailed. Also, in our plan we have various mobility levels depending on the nature of the emergency.

4. Do you feel that the department responsible for conducting rapid damage

assessment has all its personnel trained in damage assessment procedures?

Damage assessment policy is detailed in the City Emergency Operations Plan and the City Hazard Mitigation Strategy. I am sure that these agencies are trained in their duties according to the plans.

5. Has your department conducted any training with other departments in regard to rapid damage assessment

We have been involved with several tabletop exercises. Most recently several agencies in the city have been involved with the airport for a certification drills that they are required to perform. Also, the school department and these some of these same agencies are involved with a disaster drill that will be taking place in October.

Appendix E

**Interview Questions**

David Picozzi

Warwick Public Works Department

Director

Interview: August 10,2006

45 Minutes

1. Are you familiar with the terms rapid damage assessment or windshield survey?  
I am not familiar with either of these terms.

2. What department should be responsible for conducting a rapid damage assessment?

The fire department, public works and the police department should all work together for damage assessment. Prior to Hurricane Gloria in 1985, all these agencies were staged at fire stations to respond to areas determined to be at risk. This procedure is not written in any of our plans.

3. What information should be included on a rapid damage assessment form?

I am not sure exactly what information specifically should be on it but some notation about the status of utilities; water, natural gas, electricity, should be noted.

4. Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?

Public Works has no damage assessment procedures noted. I would like to see the information that is presented in this report for our possible use. I do not know if any other departments has a damage assessment procedure.

5. Has your department conducted any training with other departments in regard to rapid damage assessment?

No, we do not conduct training with any other departments for damage assessment procedures. We do need a plan to acquire equipment that we may need; cranes, buses, barricades, etc.. We also need to develop memorandum of understanding(MOU) to acquire these assets if needed. In preparing for a disaster, the Emergency Operations Center should have a weather station similar to the one we have in Public Works to track any incoming weather.

Appendix F

**Interview Questions**

Edmund Armstrong

Warwick Fire Department

Assistant Chief, Operations

Interview: August 10, 2006

30 Minutes

1. Are you familiar with the terms rapid damage assessment or windshield survey?

Rapid damage assessment is a survey of an area to assess the damages in the area.

2. What department should be responsible for conducting a rapid damage assessment?

The Warwick Fire Department should be the agency to conduct the rapid damage assessment of the area. We are going to be operating those areas before any other agencies, so we should be able to provide the first reports.

3. What information should be included on a rapid damage assessment form?

Find out what areas are damaged, the amount of damage and the severity of the damage. We should use some kind of check list. We have no procedure for performing this triage. We would be looking at getting basic information.

4. Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?

I feel we are the department that should be providing damage assessment. and we have no training in how to do it.

5. Has your department conducted any training with other departments in regard to rapid damage assessment ?

No. Not with any other department. The Warwick Fire Department should be in charge of the process and conducting the training. Some other agencies that we would need to contact are Human services and some of the groups responsible for the shelters in the city.

Appendix G

**Interview Questions**

Kevin M. Sullivan

Warwick Fire Department

Chief of Department

Interview: August 10, 2006

45 Minutes

1. Are you familiar with the terms rapid damage assessment or windshield survey?

Yes, to assess the area for damages during an emergency.

2. What department should be responsible for conducting a rapid damage assessment?

The fire department should be the agency responsible for conducting a rapid damage assessment.

3. What information should be included on a rapid damage assessment form?

The level of destruction to all building in each fire companies district.

Report back to fire alarm the amount of damage; total, partial, none.

4. Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?

No. Our department has not been provided training for its personnel in regard to rapid damage assessment.

5. Has your department conducted any training with other departments in regard to rapid damage assessment?

No. We have not participated in any training with other departments in regard to rapid damage assessment.

Appendix H  
**Interview Questions**

Robert Warren

Director

Rhode Island Emergency Management Agency  
(RIEMA)  
Cranston, R.I.

Interview; August 21, 2006

45 Minutes

1. Are you familiar with the terms rapid damage assessment or windshield survey?  
Familiar with it. Each Emergency Management Agency (EMA) should have it. It should be in the command structure. We should have a way to pass it from Emergency Operations Center (EOC) to EOC. Every discipline should perform some type of damage assessment. You have to have a way of prioritizing your calls. Issues to look at will also be some of your environmental concerns, some of these areas may allow some preplanning. Part of the state plan is to have the utility companies in the state EOC.
2. What department should be responsible for conducting a rapid damage assessment?  
It will be up to the local community to decide which department performs damage assessment.
3. What information should be included on a rapid damage assessment form?  
Immediate needs; roads, hospitals, infrastructure. Evacuation /evacuee information. Environmental damage- short/long term. Assessment should reflect established priorities.

4. Do you feel that the department responsible for conducting rapid damage assessment has all its personnel trained in damage assessment procedures?  
No. We need to look at training involving all disciplines. Other agencies to consider are insurance companies as the second tier. Also, Coastal Resources Management needs to be involved.
  
5. Has your department conducted any training with other departments in regard to rapid damage assessment?  
RIEMA has conducted no training. Some issues to consider are substantial tree damage, especially in the northern area of the state. If a category 3 hurricane were to strike our state, they anticipate what would equal three years worth of debris from that one storm.