

Running head: THE EMPTY THREAT OF ABANDONED MILLS

Executive Analysis of Fire Service Operations in Emergency Management

The Empty Threat of Abandoned Mills

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*Appendices Not Included. Please visit the Learning Resource Center on the Web at <http://www.lrc.dhs.gov/> to learn how to obtain this report in its entirety through Interlibrary Loan.*

CERTIFICATION STATEMENT

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### Abstract

Connecticut has experienced fires at old abandoned mills. These situations tax local resources and place their citizens at risk. This research was conducted to seek solutions to this hazard. The action research method was used. The problem is that abandoned mills place local citizens and public safety officials at great risk. The purpose of this research was to assess the problem, gather information, develop an evaluation tool and means to deliver the information to local officials. The questions used to guide this research were (1) What are the differences between, unoccupied, vacant and abandoned structures? (2) What problems are associated with abandoned mills? (3) How extensive is the problem of abandoned mills in Connecticut? (4) What can be done to mitigate the risk? Subject areas that were researched included: (a) vacant buildings, (b) Connecticut mills, (c) risk management, (d) loss prevention and (e) risk evaluation. The results showed that these structures are a high risk to the community and to firefighters but little is done by the fire service to identify and evaluate these buildings. The potential for tragedy is apparent however the awareness of their dangers goes ignored by the fire service.

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### The Empty Threat of Abandoned Mills

The fire service is responsible for the safety from all types of hazards of both the general public and its own personnel. The first step to providing this protection is the identification of these hazards. Unoccupied, vacant and abandoned buildings fall into this hazard category. Estimates show that more than 10 civilians die and approximately 6,000 firefighters get injured every year responding to problems at these facilities (Jones, 2001b). According to the National Fire Protection Association (NFPA) one firefighter was killed in 2006 as a result of fighting a fire in a vacant building (Fahy, LeBlanc, & Molis, 2007). They go on to say that fires at these types of buildings are, on the average, more hazardous to firefighters than occupied structures. Fahy et al. (2007) found that during the years of 2001 -2005 on-duty firefighter deaths for vacant buildings were 9 per 100,000 structure fires. This figure does not include the World Trade Center deaths in 2001. According to Jones and White (2001) over 70% of fires in these buildings are incendiary in nature.

Kidd (1995) explains that buildings pose different hazards throughout their life cycle from construction to demolition. He believes they need to be continually protected, and that they are most at risk when empty. “Abandoned buildings present unique opportunities to the vandal and the arsonist and unique dangers to fire departments” (Loeb, 1993, p. 54). The issue is to identify these buildings and address the hazards (Jones & White, 2001). The Loss Prevention Council (1995) and Kidd suggests managing the shutdown, also referred to as putting the building to sleep.

Jones (2001b) does remark that secured and maintained vacant buildings don't pose as much of a threat to firefighters. In Ft. Lauderdale, Florida fires in abandoned

buildings dropped 83% after a program was initiated to identify, secure and safeguard these buildings (Weir, 1999).

The terms unoccupied, vacant and abandoned are used to describe empty buildings. For the purposes of this introduction they are interchangeable. The following research will identify the differences.

These structures are not limited to one type of occupancy. All and any type of building can become vacant. These include residential, educational, mercantile, places of assembly and industrial to name a few. This research will identify many common hazards associated with vacant buildings. It will specifically address structures that were once industrial mills.

In Connecticut the problem of abandoned mill structures places local citizens and public safety officials at great risk. The purpose of this research is to assess the problem, gather information, develop an evaluation tool and disseminate this information to local officials who are tasked with mitigating the associated risks. The action research method is used to develop the evaluation tool and means to deliver the information to local officials. This research consists of a literature review and two surveys.

The scope of this research is limited to the following questions.

1. What are the differences between unoccupied, vacant and abandoned structures?
2. What problems are associated with abandoned mills?
3. How extensive is the problem of abandoned mills in Connecticut?
4. What can be done to mitigate the risk?

*Background and Significance*

Connecticut was first settled by the Dutch and the English Puritans from Massachusetts (State of Connecticut, n.d.). Although its early economy was based on agriculture and trade, it soon began developing an industrial base. Even as a colony, English competitors were angry with the amount of production from Connecticut's factories (State of Connecticut).

The history of every region of the state reflects the development of mills and the villages that resulted from these industries. The southwest portion of the state created iron work mills, flour mills, and textile mills utilizing the European immigrant workforce (Stamford Historical Society, n.d.). Eli Whitney in 1799 received a federal contract for muskets and developed a system of interchangeable parts which was the beginning of the concept of mass production (State of Connecticut, n.d. & Connecticut Society of Genealogists, n.d.). The western portion of the state now known as the Waterbury, Bristol area developed brass mills (Connecticut Society of Genealogists). The central portion of the state was known for its paper mills and textile mills, and later under the management of Samuel Colt for its firearm production (Netstate, n.d.). The eastern portion of the state was known for its textile mills (New England Yarn and Pattern, n.d.). Huge mills were built to process cotton, wool, linen and silk utilizing the French-Canadian immigrant workforce (Penny, 2006). This industry was stimulated by the War of 1812 because of the embargo of foreign competition (Connecticut Society of Genealogists & New England Yarn and Pattern). Sievers (n.d.) states that the Connecticut General Assembly exempted cotton and woolen mills from taxation for a period of time.

For many reasons this industrial picture of the state started to change. The early mills were built along rivers in order to utilize the water for power. The reliance on water became second to the need for transportation, hence the move to get closer to the railroad line (O'Connor, 2005). O'Connor adds that the assembly line form of production replaced the old multi-storied factories. This moved the downtown factories out into the urban areas. According to Penny (2006) cheaper southern labor and the Great Depression caused about 200 mills to close in the eastern portion of Connecticut. This transformation was prevalent throughout the 1900s and to a smaller scale continues today.

The Connecticut small Town of East Haddam reflects this evolution. Located within the town is the Moodus River. Along two and a half miles of the river there were 15 textile mills constructed during the first half of the 1800s (Sievers, n.d. & Hayward's New England Gazetteer, 1839). Sievers states that (a) nine burned down, (b) one, a five story mill, was used as a chicken coop in the 1960s then torn down by the town in the 1980s, (c) one was torn down during urban redevelopment in the late 1960s, and two remain in use. At the time of this research the two mills identified by Sievers as in use, sit vacant.

Several other Connecticut municipalities have experienced fires in these mill buildings. Just over the state line in Worcester, Massachusetts 6 firefighters were killed in 1999 fighting a fire in a vacant mill building (United States Fire Administration, [USFA] 2006). In July 2006, an arson fire burned a vacant mill complex known as the Old Montgomery Building in Windsor Locks, Connecticut. (Sawyer, 2006) The vacant five story structure was a multitude of mill buildings that were built from 1864 to 1952 and now were attached to form one large structure. This fire took the combined efforts of

many mutual aid fire departments to extinguish. The Connecticut Department of Environmental Protection was called in to mitigate any hazardous runoff and airborne issues. The dollar loss was estimated at over 3 million. The outcry from the community was heard by Connecticut Governor M. Jodi Rell. She released the following statement to the press:

Governor Rell Calls for a Meeting to Generate Fire Prevention  
Methods for Local Abandoned Mills

With the goal of preventing any future fires in the 75 abandoned mills across Connecticut, Governor M. Jodi Rell has directed the State Fire Marshal's Office to convene a meeting of local fire marshals and law enforcement officials.

"I want a 'fire prevention checklist' to be created at this meeting and distributed to municipalities as soon as possible." Governor Rell said. "The recent Windsor Locks mill fire was one of the largest in recent history. Last year's mill fire in Plainfield caused millions of dollars in damage and sent pollutants into the air. Towns need to know the steps they can take now to prevent potential disasters later."

"Not only do these fires put tremendous burdens on local budgets – they put firefighters, emergency personnel and local residents in harm's way. If there is more that we can do to get the word out about prevention, then we must do it."

Last year, Governor Rell directed the Connecticut Department of Emergency Management and Homeland Security to conduct a survey to

identify where these mills are located and what serious threats exist at those sites such as hazardous materials.

Governor Rell requested that the meeting include fire marshals, local fire chiefs and local police chiefs. “Local officials are on the front lines of these horrific fires and their participation and input is crucial to the formation of a top quality checklist.” (L. Boyle, personal communication, July 31, 2006)

Currently there is no coordinated statewide approach to address the problems associated with abandoned mills. The Connecticut Department of Emergency Management and Homeland Security (DEMHS) attempted to quantify the problem as stated in the Governor’s press release. The survey revealed 75 vacant or abandoned mills.

The Connecticut State Building Code (2005) addresses buildings that are considered unsafe or which constitute a fire hazard. It directs the building official to require the building to be taken down or rendered safe. In section 115.1 it states, “A vacant structure that is not secured against entry shall be deemed unsafe” (p. 13). However these procedures take time to implement and the danger to the emergency responders and the general public lingers.

Using the action research method, this applied research project establishes a statewide approach by creating a fire prevention check list for abandoned mills and developing an agenda for a meeting of local officials. It takes up lessons learned from the USFA Executive Fire Officer Program course Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM). This research specifically uses

EAFSOEM materials regarding (a) risk assessment, (b) hazard identification, (c) vulnerability assessment and (d) the cascade effect of the risk (USFA, 2005).

This applied research project addresses three of the four USFA Operational Objectives, which are listed below.

1. Reduce the loss of life from fire in the age group 14 years old and below.
2. Reduce the loss of life from fire of firefighters.
3. To promote within communities a comprehensive, multi-hazard risk-reduction plan led by the fire service organization. (USFA, 2003)

### *Literature Review*

A literature review was conducted to gather information on vacant and abandoned buildings regarding (a) the identification of types of hazards associated with them, (b) the effects they have on a community, (c) the problems they pose to firefighters, (d) the geographic extent of the issue, (e) the relevance of the Connecticut mill problem, and (f) how others are addressing the issue. The literature review included (a) journal articles, (b) periodicals, (c) reports, (d) books, and (e) manuals at the Learning Resource Center of the National Fire Academy in Emmitsburg, Maryland. Internet searches also provided several websites of related data.

The general public expects some reasonable level of safety when it comes to the built environment. As far back as 2000 B.C King Hammurabi of Babylon recognized the need to develop rules to make buildings safe (Brannigan, 1988). This expectation of safety is relative to the life of the building, including when the building is unoccupied. Joyce (1993) goes as far to say, "These vacant and idle facilities demand as much attention to loss prevention as active facilities and in many cases, more protection is

necessary” (p. 13). The problem with vacant and abandoned buildings is that the building codes are ignored by the absentee or apathetic property owners which results in unsafe conditions for occupants and emergency responders (Dunn, 1988).

Vacant and abandoned buildings are a significant public safety issue according to Jones (2001b) and Jones and White (2001). They describe them as unsightly and a magnet for criminal activity. Rule (2000) adds that vacant and abandoned buildings (a) attract activities that are contrary to the community’s quality of life, (b) decrease property values, (c) allow rats and vermin to flourish and (d) propagate urban blight. Kidd (1995) and Garraway (n.d.) depict these properties as playgrounds in the eyes of the neighborhood children. Vacant and abandoned buildings are perceived as asking to be burned in order to right the wrong of their dilapidated state (Loeb, 1993). According to Jones (2001b), Schilling (2004), and the USFA (2006) these buildings are the origin for the broken window theory of social disorder which is predicated on the idea that from one broken window you can loose neighborhoods. Garraway describes it as contagious. This phenomenon encourages business to move out (Schilling). Vacant and abandoned buildings become locations for illegal drug activities including methamphetamine labs (D. Oliver, personal communication, May 19, 2007). Because of the above activities and the chance that the homeless have taken up residence in these vacant and abandoned buildings, the fire department cannot assume they are unoccupied (Jones & White, 2001).

Butler (1996) suggests that these buildings gradually deteriorate over time and are subject to on going vandalism and small fires. The trespassers who enter vacant and abandoned buildings to conduct this criminal activity can be a liability to the owners in an obscure fashion. The owner has responsibility to take care of the property, in legal

terminology, a duty of reasonable care (*Fire Prevention*, 1995, Kidd, 1995 & Everton, 2004). Everton goes on to state that the owner is legally responsible if they are aware that the building is being entered and nothing is being done to protect against the entry. It's a tort of negligence if the owner has knowledge of the trespass. In the eyes of the court, the owner's carelessness is perceived as a cause of the endured harm (Everton).

Fires in vacant and abandoned buildings are another liability for the owner. Damage to exposures (Everton, 2004) and injury to firefighters (*Fire Prevention*, 1995) can financially expose the owners. More relevant to this research is the risk of fire to firefighters responding to the incident. The fire in an unoccupied building grows undetected for longer periods of time before it is discovered (Jones, 2001b, Rosenthal, 2002, & Jones & White, 2001). The structures are inherently dangerous before the fire starts. The building may be structurally unsound (Coleman, 2004). This deterioration is due to age, weather and removal of or damage to structural components which may cause failure much earlier in a fire (Jones & White). This increases the chance of either the trespasser or firefighter being injured (Scanlon, 2000). Removal of equipment, wiring, piping, and heating/cooling systems create holes in floors and walls that allow a fire to quickly spread and raises the level of risk for fire fighter injury (Rosenthal & Jones). Fire protection systems are not operating. Buildings are vacated at minimal expense since the companies are already suffering from financial difficulty (Loeb, 1993). Jones and White, Jones, and the USFA (2006) identify several additional problems for firefighters which include (a) discarded hazardous materials, (b) open shafts and pits, (c) accumulation of waste, (d) maze-like compartments, (e) blocked egress, and (f) exposures.

In addition to firefighters managing the challenges create by these structures, communities on a whole must deal with public safety and other related issues associated with vacant and abandoned buildings. Some believe local leaders do not realize the degree of risk these buildings represent (Rosenthal, 2002). Other leaders associate the abandonment problem with older industrial communities (Schilling, 2004). Rosenthal, Kidd (1995) and *American Fire Journal* (2002) explain that these buildings attract the homeless, and youth, including runaways and gangs which lead to (a) graffiti, (b) trash and (c) vandalism. The Fire Prevention Council (1995) and the Scottish Environmental Protection Agency (n.d.) identify the illegal dumping of waste, known as fly tipping, to be associated with vacant and abandoned buildings. Ownerless abandoned buildings expose the jurisdictions that they are located in to potential environmental pollution and the associated high cost of mitigation (*Fire Prevention*, 1995). As the area economy declines due to these buildings, the problem proliferates across the jurisdiction (*American Fire Journal*).

These community issues are not provincial by any means. According to the National Center for Policy Analysis (n.d.) the Northeast portion of the United States has the highest concentration of abandoned buildings. However, the perils of vacant and abandoned buildings are not limited to the United States either. Butler (1996) states that approximately 2% of the fires in the United Kingdom occur in vacant buildings. He attributes the high level of damage at these fires to the lack of detection and sprinklers.

This literature review has focused on identifying the problems associated with vacant and abandoned buildings. The following takes those problems and explores solutions others have suggested to mitigate this phenomena. Jones (2001b) simply puts it

as identifying and attacking the problem of vacant and abandoned buildings. The first step is to triage the building for the appropriate strategy. How long has it been unoccupied? Can the building be (a) simply reopened, (b) rehabbed or renovated, or (c) should it be demolished (Scanlon, 2000 & Schilling, 2004)? Properly managing the building will reduce the risks associated with vacant and abandoned buildings (Kidd, 1995). Jones (2001b) suggests that preventing intruders and maintaining this level of security lowers the potential threat of fire in these structures. The first step is to identify the location and conduct a risk assessment of these buildings (Jenaway, 1994 & Loss Prevention Council, 1995). Jones (2001a, 2006) suggests a systematic approach comprised of the following steps: (a) Evaluate the structures, (b) develop preplans, (c) secure the buildings, and (d) develop overall multi-discipline strategies based on the assessments. This multi-discipline approach should encourage cooperation and receive input from the (a) chief elected official, (b) tax and assessment department, (c) economic development, (d) police department, (e) fire department, (f) public works, (g) building and fire inspectors, (h) health inspector, and (i) local citizen groups (Jones, 2001b). Jones and White (2001) and the USFA (2006) expanded on the strategy to mitigate the potential problems associated with vacant and abandoned buildings. They suggest municipalities (a) develop a process to identify and track these structures, (b) conduct risk assessments of the buildings, (c) initiate programs for governments to secure abandoned buildings, (d) develop a marking system to communicate hazards to firefighters, (e) monitor the security, make repairs promptly and remove graffiti (f) identify public and private sources for funding for securing, rehabbing or demolishing these structures, and (g) determine and enforce what authority the municipality has regulating these vacant and

abandoned buildings. Oliver (2007) takes these strategies and uses technology in order to reduce the risk from these buildings. In the Wilson, NC Fire Department he has the ability to view the 118 vacant commercial buildings through software like (a) geographic information systems, (b) global positioning systems, and (c) web based information sharing. These give him all the information he needs to evaluate the building and surrounding neighborhood. The buildings are color coded on the map as either (a) secured, (b) marginal, or (c) dangerous. This information is available to responding emergency resources. Jones (2001b) recommends if the municipality does not have the authority or the authority is inadequate, then pass a new law to regulate vacant and abandoned buildings. Jones proposes that the following be included in a local ordinance (a) criteria for securing building, (b) requirements for removal of combustibles and hazardous materials, (c) authorization for an inspection and evaluation practice, (d) requirements for posting no trespassing signs, (e) requirements for marking the hazard level of buildings, (f) requirements for fire protection systems, (g) outline owner's responsibilities, (h) establish fines and penalties for noncompliance, and (i) require posting of a performance bond by the owner.

The municipality, according to Schilling (2004), should be creative in encouraging owners to maintain their buildings with tax incentives and below market lending assistance. Rule (2000) blames local officials including the (b) building official, (c) fire marshal, (c) health officer, and (d) zoning officer, if buildings become abandoned and are not protected. Loeb (1993) states that it is important for a municipality to approach the owner before they vacate the building in order to establish a relationship between the two on how the building is going to be shut down. New Haven, Connecticut

has a program called AWAPS, Arson Warning and Prevention Strategy, that identifies buildings as they become unoccupied and before they are determined abandoned (Jones & White, 2001). San Gabriel, California's program, Operation Clean-up, required the owner in specific circumstances and as an alternative to demolishing the structure, turn the building over to the fire department for training and eventual demolition. This was done at no cost to the owner (Probert, 1958).

The municipality should work with the owner to reduce the risk to both the owner and the community before the building is closed down or as it is called, put to sleep. The owner is responsible for (a) isolating utilities, (b) securing the building from intruders, (c) minimizing sources of ignition, (c) minimizing attractiveness to trespassers, (d) retaining appropriate lighting and fire protection features, (e) assisting fire department with preplanning, (f) providing insurance company information and contacts, (g) compartimizing building if necessary by covering wall and floor openings, and (h) providing contact information about the key holder (*Fire Prevention*, 1995, Joyce, 1993, Kidd, 1995, Loeb, 1993, Loss Prevention Council, 1995).

As demonstrated above the municipality and the owner have a responsibility to the community to properly protect it against the problems associated with vacant and abandoned buildings. They also have an obligation to protect the emergency personnel dispatched to these facilities for fires and medical calls. The fire service has a responsibility to protect its personnel when responding to these buildings with their unique problems. According to Jones (2001b, 2006) firefighters need to be trained on how to fight these fires. Daniels (2005) equates this training to that of responding to hazardous material incidents. He suggests the low death rate at hazardous material

incidents is due to the fact that the fire service from day-one has endorsed and laid down the law on training requirements. Besides training, different methods should be used at the scene. Jones (2001b, 2006) believes (a) a risk/benefit analysis should be conducted before committing interior personnel; (b) utilization of technology such as thermal imaging equipment may be used; (c) limit the time of interior operations and assign specific tasks; (d) closely monitor interior operations; and (e) use all appropriate safety equipment including safety or hose lines for indicating the escape route.

In the attempt to draw together the problems of vacant and abandoned buildings as they pertain to Connecticut mills, very little was found during this literature review. Historical information that was provided in the background and significance section will not be reiterated here. However the information is valid for developing a foundation for the relationship to Connecticut abandoned mills. Fires that have occurred in Connecticut abandoned mills over the past twenty years exemplify the commonality of the problems. The old Royal Typewriter Company building in Hartford, CT burned in July 1992 (Chmielewski, 1993). He identified this old mill complex as containing holding pits of 20,000 gallons of number six oil and floors saturated with chloroform and trichloroethylene. Bradish (1995a) states it took four days to extinguish the American Thread Mill fire in Willimantic, CT in June 1995. Bradish (1995b) describes the resources needed and costs associated with the Ashland Mill fire on March 12, 1995 in Jewett City, CT. Five hundred firefighters from 40 fire departments responded to the scene. It resulted in (a) eight firefighter injuries, (b) over a 1 million dollar loss to the mill, (c) over a 300,000 dollar loss to the residences around the mill, and (d) over a 100,000 dollar loss to the fire departments. Discussions with investigators from the CT

Office of State Fire Marshal revealed that in 1988 a large mill burned in Putnam, CT that resulted in a multi-day environmental clean-up before state fire marshal investigators were allowed onto the scene (J. Butterworth, personal communication, July 28, 2007 & W. Lewis, personal communication, July 28, 2007). Lewis also identified mill fires from 2000-2001 in the Connecticut towns of Vernon, Baltic and Plainfield. He stated that a mill fire in Thompson, CT resulted in a fatality where a juvenile was playing in the abandoned mill when it caught fire. Another investigator from the CT Office of State Fire Marshal identified mill fires in Shelton and Derby, CT (J. Pierpont, personal communication, July 30, 2007). A mill fire in Plainfield, CT in April 2005 at the former InterRoyal Mill burned for two days resulting in the temporary closure of a nearby elementary school for potential exposure to environmental hazards (Baxter, 2005). Baxter (2007) reports the suspected arsonist was arrested 22 months later in January 2007.

At this point this should identify the areas outlined in the beginning of the literature review. The literature review influenced the development of this research paper in several ways. It substantiated the opinion that vacant and abandoned buildings pose unique problems to firefighters and their communities. It outlined responses to address the problems. It validated my belief that the issues associated with vacant and abandoned buildings are the same as those linked to Connecticut abandoned mills. It provided this research with information and material which will avoid having to reinvent the wheel. It demonstrated the need to go beyond the purpose of this research to simply find a fire service solution to the problem.

*Procedures*

A comprehensive literature review was conducted to gather information on (a) the identification of types of hazards associated with vacant and abandoned buildings, (b) the effects they have on a community, (c) the problems they pose to firefighters, (d) the geographic extent of the issue, (e) the relevance of the Connecticut mill problem, and (f) how others are addressing the issue. The literature review focused on (a) journal articles, (b) periodicals, (c) reports, (d) books, and (e) manuals at the Learning Resource Center of the National Fire Academy in Emmitsburg, Maryland. The subject matter was compiled as a result of an extensive review of over 30 journals, periodicals, reports, books and manuals.

Internet searches of over 10 websites also provided related data. This resource provided data on historical information regarding mills in the State of Connecticut.

The subject areas that were researched included (a) vacant buildings, (b) Connecticut mills, (c) risk management, (d) loss prevention, and (e) risk evaluation.

A questionnaire distributed to the CT fire service via the CT Commission on Fire Prevention and Control listserv and the CT Fire Marshal Association listserv. A total of 85 out of approximately 3,000 questionnaires were completed and tallied. This was a return of 2.8%. This questionnaire was designed to achieve an understanding of if the Connecticut Fire Service felt abandoned mills was a problem and did they address the issue in their jurisdictions. A copy of the questionnaire is attached as Appendix C. The results of the questionnaire are attached as Appendix D and reported in the Results section of this research paper.

A second questionnaire was developed and delivered to the members of the Prevention Advocacy Resources and Data Exchange (PARADE) listserv and former Executive Fire Officer Program classmates. This questionnaire was distributed to approximately 390 people. The number of completed questionnaires was 190 or 49%. The purpose of this questionnaire was to solicit information from state fire marshals and fire marshals in metropolitan areas. The information was to be used to identify if vacant and abandoned buildings are considered a problem and how big of a problem does the fire service believe they are. It was designed to compare different vacant and abandoned buildings with vacant and abandoned mill and factory buildings. It was also designed to gather information to compare national data against Connecticut data. A copy of this questionnaire is attached as Appendix A. The results of the questionnaire are attached as Appendix B and are detailed in the Results section of this paper.

An abandoned building evaluation checklist was developed out of this research and is attached as Appendix E. A smaller copy of a map of the State of Connecticut showing the locations of abandoned mills is attached as Appendix F. The brochure and agenda for the meeting that was conducted for Connecticut local officials is attached as Appendix G.

There were several limitations to this research. Additional time was needed in order to take the criteria developed for the evaluation check list and work with municipalities. There was very little information available regarding what the impact of Connecticut abandoned mills is having on the municipalities. The questionnaire was limited in what information could be retrieved on the subject.

More research is needed to be conducted regarding the problems abandoned mills have on other municipal agencies and how the team approach can solve problems. This research focused on the problems associated with the fire service as it pertained to abandoned mills. It did not address economic problems such as (a) property values, (b) taxes and (c) sale of properties. It focused on arson not other crimes such as (a) gang related activities, (b) drug use (c) vandalism and (d) prostitution. It did not research health department issues such as vermin and environmental pollution. It did not address financial resources needed to address the problems of abandoned mills.

### *Results*

The results are a culmination of the information attained through the literature review and the surveys.

What are the differences between unoccupied, vacant and abandoned structures? These terms are often used interchangeably when describing buildings. According to *Black's Law Dictionary* (1979) unoccupied means the lack of a habitual presence of human beings. Vacant means empty or unoccupied, and abandoned means to desert, surrender, forsake or cede; to give up or cease to use. *Webster's II, New Riverside University Dictionary* defines unoccupied as having no occupants or inhabitants. Vacant means not put to use or occupied and abandoned means to give up by leaving or ceasing to operate or inhabit (Soukhanov, 1988). Scanlon (2000) states that some laws consider vacant as no one is occupying the building and after five years it is then classified as abandoned. He states that at the time of reclassification the building can be tackled under the blight regulations. The subtle difference between the terms deals with the actions of the owner (Garraway, n.d.). He suggests that if the owner is still caring for the building

than it is vacant. If the owner does not maintain the building or there is no longer a viable owner then the building is abandoned. On the deterioration scale, abandoned is the worst case scenario (Jones, 2006 & USFA, 2006).

After conducting this research the term, unoccupied, does not appear to be a necessary distinction. The majority of the literature considered either vacant or abandoned or used the terms interchangeably. The questionnaire provided definitions for all three terms and then solicited information. It revealed that 28% considered unoccupied buildings as no problem verses vacant structures that registered at 8% as no problem and abandoned buildings at 9% considering them as no problem. Comparatively, the Connecticut mill questionnaire results were (a) 29% considered unoccupied buildings as no problem, (b) 13% felt vacant buildings are no problem and (c) 20% thought abandoned buildings are no problem.

What problems are associated with abandoned mills? The literature review produced a great deal of information. Many common problems were identified. The underlying theme is best summed up by Jenaway (1994) who states “An important point to remember is that the longer a facility lies vacant, the higher the probability that a suspicious fire or incident will occur at the property” (p. 38). The questionnaires attempted to gain information on how many jurisdiction regulate vacant and abandoned buildings. This would indicate that the municipality recognizes that they pose problems therefore the need to regulate. The results showed 94% who responded had some type of regulations in place, 51% being local ordinances. Approximately 56% felt the regulations were adequate and 44% thought the regulations needed upgrading. The Connecticut mill questionnaire exhibited a different picture with 53% having regulations and 47% having

no regulations. Out of the 47% having no regulations, 65% stated that they thought these buildings should be regulated.

How extensive is the problem of abandoned mills in Connecticut? According to the National Center for Policy Analysis (n.d.) the economic shift from manufacturing to services has made dinosaurs out of the old mills. Most respondents to the Connecticut mill questionnaire felt it was more than a slight problem for their departments. Approximately 30% answered that it was a moderate problem and 25% felt it was a high problem. In both cases abandoned mills compiled the highest percentages over all other types of occupancies. The question was asked as to the reason for these being identified as problems. Is it due to the quantity of these buildings in your jurisdiction or the level of risk associated with these buildings? The answers showed that 57% felt it was the level of risk, followed by 19% who said it was both. When asked if the agency they represent ever responded to a fire or medical emergency at an abandoned mill, 64% answered yes.

The literature review illustrated examples of the amount of resources needed to respond to these fires. It described utilization of (a) suppression forces, (b) environmental and health department resources, (c) investigation personnel, and (d) the associated financial losses. It also identified how the cascade effect of the hazard can involve the neighborhood and community.

Seventy-five abandoned mills were identified by the Connecticut Department of Emergency Management and Homeland Security. A map was created with these locations. A smaller version is attached as Appendix F.

What can be done to mitigate the risk? Although the literature review and the surveys provided a variety of ways to address the problems, the bottom line is that these

buildings need to be identified and evaluated before a comprehensive, multi-agency response can be launched. The USFA (2005) suggests a risk assessment be conducted including the assessment of what protective actions need to be taken and what resources are needed to complete the tasks. This evaluation should include a hazard identification process and vulnerability assessment. The literature review identified an evaluation form developed for the *Abandoned Building Project Toolbox*, (USFA, 2006). A guidebook was produced to assist evaluators with the form. The form is being adopted as part of the results of this research and is attached as Appendix E. The checklist will assist inspectors in evaluating each vacant and abandoned building. Once this is done the appropriate resources can be assigned to securing the building properly. The information can also be used for the preplan.

A seminar was put on by the Office of State Fire Marshal for local officials regarding abandoned buildings. A copy of the checklist and guidebook was distributed to everyone in attendance. Approximately 140 local officials attended. A copy of the agenda is attached as Appendix G.

### *Discussion*

The empty threat of abandoned mills is far from the truth. They are empty and they are a threat. This research has proven that. The threat is to everyone around them. The key to protecting the community is to identify and evaluate each building. Once they are tracked then the community can work on securing the building and either renovating it or demolishing it.

The fire department needs to become familiar with these mills and preplan. The questionnaire revealed a very low percentage of the respondents, 27%, are confident in

the data they have on these buildings. The Connecticut questionnaire was a little higher at 31%. Both questionnaires stated that 64% of their departments had responded to an emergency in a vacant industrial building. This means the fire service is not doing a good job preplanning these buildings even though they are an acknowledged hazard.

*Recommendations*

The CT Office of State Fire Marshal should raise the awareness level of fire officials regarding the hazards of abandoned mills. Another in-service program should be provided to the local fire marshals based on the same information distributed at the seminar in Appendix G.

A statewide building marking system should be required identifying how hazardous the building is. Fire personnel arriving at a fire in one of these mills would know whether or not an interior attack is advisable. This requirement should be promulgated as part of the state fire prevention code.

This research should be shared with the National Fallen Firefighters Foundation in an attempt bring attention to this empty threat.

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