SUMMARY: Emergency management has come a long way in the last 20 years, and certainly since the Newcastle earthquake of 1989 and the Nyngan flood of April 1990. Planning now includes dissemination of information, provision for warning and evacuation, ensuring speedy mobilisation of personnel, provision of equipment and post disaster activities; it also involves definition of roles and coordination of the efforts of agencies such as the emergency services, police, ambulance, fire services, volunteer agencies and defence service personnel should they be needed.

In recent years the potential for terrorist attacks has been added to the list of long-recognised disasters, and the creeping impact of climate change has begun to exacerbate many weather-related disasters.

While in many disasters there is potential for damage and destruction of heritage assets, most post-disaster action is at present aimed at rescue and return to normality. Despite its advances, disaster planning still doesn’t include mechanisms for assessing and conserving vulnerable heritage assets. Consequently, their preservation becomes the lowest priority of disaster-related activities, with ‘these unique resources … at the mercy of local, state and federal agencies’.

A response plan is therefore required that is integrated into emergency services’ plans and manuals to safeguard heritage assets. The plan must recognise that the necessary decision-making requires the expertise of heritage professionals and cannot be left to emergency personnel that lack the required knowledge. The plan should be championed in each State and Territory by its heritage agency, and when disaster occurs, managed by it in a co-operative manner within the emergency service framework.

A register should also be prepared of skilled heritage personnel who can be called on in an emergency; it should be kept up-to-date and categorized according to capabilities.

It is the heritage community’s responsibility to pursue the introduction of such reforms.

1. INTRODUCTION
Society’s infrastructure including heritage assets is potentially subject to damage and destruction from a host of possible disasters. These might be classified as:

- Natural:
  - earthquake
  - landslip
  - flood
  - storm
  - fire
  - hail
  - wind
  - lightning
  - coastal storm surge and erosion
  - undermining
  - decay/deterioration of materials
- Accidental:
  - explosion (e.g., Longford natural gas plant)
  - road, rail, maritime, or aircraft accident
  - structural collapse
  - erection and construction failure
- Man-caused:
  - willful damage
  - terrorism
  - mine subsidence
  - large scale collapse of infrastructure

Climate change is already exacerbating many of the natural disasters.

Apart from the generally recognised disasters, the rise of international terrorism and Australia’s recent involvement in overseas conflicts may have significantly heightened the likelihood of terrorist attack on our soil. This brings with it the potential for damage to major structures (many of heritage significance) such as bridges, dams, power stations, communications networks, tunnels, major buildings, stadiums etc; any place where it will cause significant disruption and/or loss of life.

While some disasters are more likely and/or are of more concern than others, the potential for threat to heritage structures of the rest should not be ignored, and management measures should be universally applicable, although differing in detail as necessary.

At present most post-impact action is aimed at rescue, safety (removal of threat to life, other structures and services) and return to normality. While much attention
is now paid to pre-disaster planning, in the post-disaster phase
‘... the preservation of historic resources becomes the lowest priority of disaster-related activities’ ... ‘these unique resources are at the mercy of local, state and federal agencies’;

‘Alternative preservation strategies are needed to complement the post-disaster public safety recovery and construction methods already in place during the disaster period’.

2. CLIMATE CHANGE
Climate change is already exacerbating the severity of climate-related disasters such as flood, storm, wind, bushfire and coastal flooding and erosion.

The Intergovernmental Panel on Climate Change (IPCC) brings together 2500 of the world's climate scientists either as lead authors of various parts of its reports or as reviewers who read and comment on drafts; it produces five-yearly assessment reports. The IPCC is acknowledged by almost all governments (even Australia's) as the oracle on climate change. After the scientists have finalised the detailed reports, intense negotiations begin over the crucial 'summary for policy makers', with fossil-fuel lobbyists trying to ensure that uncertainties are accentuated and conclusions watered down.

The following summary of climate change based on current projections is adapted from Scorcher – the dirty politics of climate change:

The Third Assessment Report (of the IPCC) published in 2001 stated inter alia that climate change is...expected to intensify the El Nino phenomenon, resulting in more severe droughts in Australia and more frequent and intense bushfires.

The Fourth Assessment Report (2006) warned that if greenhouse gases continue to be emitted at or above current rates, the consequences will be far-reaching. In perhaps the most likely scenario, the globe will warm by 3°C or more and sea-level rise will be in the range of 0.35 to 0.43 metres by the end of the century. The IPCC projects sharp reductions in snow cover, the disappearance of Arctic sea ice in summer and more frequent heatwaves and floods. Ominously, it noted that due to uncertainty about their magnitude, positive feedback effects in the climate system were excluded from consideration in the report. These feedback effects could see the Earth warming much more quickly and with almost unimaginable consequences.

Droughts are expected to become more frequent and prolonged...And while many regions will experience an overall drying, when the rains do come they are more likely to come as a deluge, so that floods are also expected to increase in frequency and magnitude in most regions of the world...

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has become one of the world's leading research agencies examining climate change. It projects (for Australia) that ... Rising sea levels will lead to higher storm surges, more frequent coastal flooding and damage to coastal ecosystems, including beaches being washed away... Fire researchers are anticipating more days of high and extreme fire danger over much of the continent in coming decades.

Thus in terms of natural disasters and their potential impact on heritage assets, Australia can expect:

- rising sea levels with more frequent coastal flooding;
- higher storm surges and damage to coastal development;
- an increase in frequency and magnitude of storms and of mainstream and stormwater flooding;
- increased bushfires; and perhaps,
- damage to structures due to changes in soil moisture and salination.

3. POST-IMPACT CONSERVATION FAILURES
Following are three diverse instances where failure to have in place and/or to effectively implement appropriate post-impact conservation measures, resulted in loss of heritage assets.

3.1 Newcastle Earthquake
The 1989 Newcastle earthquake is a lesson from the past; apart from the devastation of Darwin by cyclone Tracy it was perhaps the most dramatic experience in recent memory of damage to structures in Australia, and certainly to historic and heritage ones.

In respect of damage to heritage assets, there was virtually no experience of how to react, no laid down procedures and insufficient knowledgeable heritage personnel to manage what was a large and unexpected crisis.

Naturally, the Government’s concern at the enormous damage to its infrastructure (predominately hospitals, schools and other public buildings) was to ensure safety and to return services to normal as soon as possible. The pressures including political, on government authorities and government-engaged structural engineers and architects were therefore immense. As a consequence, the evaluation of heritage structures and conservation of

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their values with the potential delays in remediation, were afforded lower order priority, although they were not entirely ignored.

There were also pressures from opportunistic agencies anxious to take advantage of damage to repairable, but unwanted historic structures, to have them condemned as structurally unsound and incapable of remediation, and to therefore have them demolished. The author personally refused one such proposal and gave similar instructions to project personnel.

Also, few engineers, sub-professionals and emergency personnel that were rushed in to assist in that rare and chaotic situation were experienced in heritage conservation.

In such a climate the advantages of having appropriate pre-determined policies and procedures in place, and a pool of heritage personnel to call on are obvious.

3.2 The Iraq War
The Iraq war started on March 19, 2003. Before it began warnings by archaeologists of the danger to museums and their contents caused the US Defence Department to set up an internal website to alert the military and war planners. Even so, a defence spokesman later claimed that no assurances were given to archaeologists guaranteeing the safety of a single building.

In the event wildly exaggerated claims of looting and damage to museums were reported in the press and broadcast accusingly by archaeologists. When it later proved that the looting was far less devastating than originally represented, the damage to the credibility of the archaeologists was a factor in preventing the public taking them seriously over the very real looting that occurred on remote sites across the country.

The damage to remote archaeological sites continued such that by mid 2007 the US Defence Department was moved to take more direct action. On 20 June in quoting a Washington report, the Sydney Morning Herald reported that:

‘THE US Defence Department is sending new decks of playing cards to troops in Iraq and Afghanistan this time showing some of the country’s most precious archaeological sites instead of the most-wanted former regime officials. (It is) ... part of an awareness program so they can help preserve the heritage of those countries.

It is aimed at making troops aware that they should not take home artefacts and should avoid damaging historic sites. This occurred after the 2003 invasion ... when US troops built a helicopter pad on the ruins of Babylon and filled their sandbags with archaeological fragments from the ancient city.

In another program US pilots have received training in recognising and identifying ruins, cemeteries and other sites so they do not accidentally bomb them.‘

As described in a report by Dr. John Curtis of the British Museum, the damage to Babylon was far more extensive than mentioned in the newspaper article.

In essence, while there had been recognition of the potential for looting and damage, there was neither determined effort to address it, nor effort to ensure the message got down to the commanders and their troops on the ground. Four years after the invasion the archaeological treasures of Iraq were still vulnerable to looters and to damage by uncaring and heritage-ignorant troops, who were also among the looters.

In this case, planning was inept and there was ineffective and uncommitted implementation.

Another lesson from the Iraq experience is that while the need for post-disaster planning should be strongly pressed with the relevant authorities, exaggerated and unsubstantiated claims of damage both potential and real, can impact on the credibility of the heritage community and can militate against effective counter measures.

3.3 Hurricane Katrina
Katrina, a Category 5 hurricane which hit New Orleans on 29 August 2005 flooded and devastated the city, killed over 1240 people and caused damage estimated at more than US $200 billion; it was the costliest tropical cyclone of all time. Much of New Orleans’ heritage also suffered. Homeland Security Secretary Michael Chertoff described the aftermath of Hurricane Katrina as ‘probably the worst catastrophe, or set of catastrophes’ in the country’s history, referring to the hurricane itself plus the flooding of New Orleans.

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http://www.meforum.org/article/609

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4 Dr. Curtis reported that in addition to the helicopter pad, parts of Babylon were levelled as parking lots for heavy vehicles, substantial damage was caused to the Ishtar Gate (one of the most famous monuments from antiquity), US military vehicles crushed 2,600-year-old brick pavements, archaeological fragments were scattered across the site, more than 12 trenches were driven into ancient deposits, military earth-moving projects contaminated the site for future generations of scientists, and damage was caused to nine of the moulded brick figures of dragons in the Ishtar Gate by people trying to remove the bricks from the wall.

5 http://en.wikipedia.org/wiki/Hurricane_Katrina
However, to quote *Time* magazine of 12 September 2005: ‘Katrina was in the cards, forewarned, foreseen and yet still dismissed until it was too late. That so many officials were caught so unprepared was a failure less of imagination than will, a realization all the more frightening in light of what lies ahead’.

‘The risk of devastation from a direct hit was well documented’.

In 2002 *The New Orleans Times-Picayune* newspaper ran a series on the risk, in which it predicted many of the events that happened in 2005, including the breakdown of the levee system.

“It’s only a matter of time before South Louisiana takes a direct hit from a major hurricane. Billions have been spent to protect us, but we grow more vulnerable every day.”

“a scenario paralleling the actual event was used as a FEMA training exercise … Hurricane Pam category 3 storm. A report in Nature (Reichhardt et al 2005:175) soon after the event observes that “The similarities between Katrina and the Pam simulation are eerie.” The whole event down to many of the details was thoroughly well predicted and rehearsed”.

The disaster in terms of loss of life and property occurred despite Louisiana having a most comprehensive and detailed State Evacuation Plan.

As Handmer says: ‘Katrina brought the water, but officials organised the chaos’.

A significant contribution to loss of life and injury came from refusal to evacuate, lack of finance to evacuate (a euphemism for poverty), unavailable evacuation vehicles, inadequate road capacity for evacuating traffic and poor emergency response.

‘Not since the Dust Bowl of the 1930s or the end of the Civil War in the 1860s have so many Americans been on the move from a single event.’ (SanJose Mercury News).

However, even with detailed planning and the lessons from Katrina, with the approach 26 days later of hurricane Rita (a Category 3 hurricane, which made landfall … with windspeeds of 190 km/h and a storm surge of 3 m), ‘even with both sides open to evacuees, Houston’s I-45 (freeway providing 18 lanes) became a parking lot. Families trying to flee were lucky to move two kilometres an hour – perhaps the slowest evacuation in US history.’ (Caption to photograph in *Time* magazine 3 October 2005).

The message from this is that to be effective, planning must ensure appropriate implementation mechanisms, rehearsal of evacuations, acknowledged responsibilities, co-ordination between agencies and proper leadership; that is the plans must be translated into the required action.

On 23 October 2005 in the aftermath of Katrina, *The New York Times* reported on the demolition of housing stock in New Orleans (Attachment C). There, where estimates of house demolition ranged from 30,000 to 50,000, it was feared the city's preservation-review process would be abandoned allowing bulldozers to plough through some of the most historically significant neighbourhoods. Fortunately those fears ended when city officials promised that historic houses would get special consideration and that deluged neighbourhoods like the Lower Ninth Ward and New Orleans East would not be wiped out.

Complaints also arose that some people hired as inspectors including a retired art dealer and a hairdresser, were unqualified to make structural appraisals. As a result two dozen of the least qualified inspectors were dismissed.

So it would seem that although there was a preservation-review process it looked like being abandoned, and heritage structures were at risk from assessment by unqualified inspectors, until heritage preservationists took up the cudgels.

It would also appear that historic buildings were demolished with or without consent, as occurred in the 1989 Loma Prieta earthquake in California.

The message is clear that vociferous advocacy is required to save threatened heritage structures, and that ‘the price of conserving our heritage is eternal vigilance’.

4. A POTENTIAL DISASTER AREA - SYDNEY’S NEPEAN-HAWKESBURY FLOODPLAIN

The river is called the ‘Nepean’ down to its junction with the Grose River and the ‘Hawkesbury’ from there to the sea.

http://en.wikipedia.org/wiki/Hurrican_Katrina#Transportation_and_infrastructure


The relatively flat flood plain has been likened to a giant “bathtub”, fed by a number of tributaries (“taps”) and constrained at its downstream end by the narrow Sackville Gorge (“the plughole”), beyond Cattai Creek\textsuperscript{11} (map at Attachment A).

In other words, water flows into the valley much faster than it can flow out; accordingly flood waters rise more quickly than they would otherwise.

The highest recorded flood on the Hawkesbury River was in 1867, which has been assessed as being of a 1:280 annual exceedance probability (AEP). It peaked at 19.4m at Windsor Bridge\textsuperscript{12} and inundated the now historic settlements of Windsor, Wilberforce, Pitt Town and Riverstone (Attachment A). Of course the flood pre-dated the four water supply dams on the upper Nepean and its tributaries, and Warragamba Dam on the Warragamba, which joins the Nepean about 15 km upstream of Penrith.

The 1867 was 2m higher than the current assessment of a 1% flood at 17.3m. (A ‘major flood’ on the Hawkesbury is given as a 10% AEP flood reaching 12.2m at Windsor).

On the headwaters of the valley (upstream of Windsor) Warragamba Dam has in recent years been upgraded to make it safe against a probable maximum flood (PMF) of 1:10,000 to 1:100,000 AEP, the PMF at Windsor being 25.1m i.e. 5.7m above the 1867 flood level and 7.8m above the 1% level.

Despite the upgrading, in the event of a flood any reduction of levels downstream caused by Warragamba and the upper Nepean dams will depend on the storage levels at the time, backwater effects and the rate and duration of inflow; a reduction may not be substantial and where lives and property are at risk, should not be relied on unduly. (In making Warragamba safe, the NSW government elected to not build in a flood mitigation capability. Instead it opted to develop a floodplain management strategy for the area downstream).

The foregoing means that a far smaller flood than a PMF could inundate a much larger area than the 1867 and would place at risk of damage, heritage structures in the historic towns along the Hawkesbury and on its floodplain\textsuperscript{13}.

5. LESSONS FOR THE FUTURE

It is the nature of papers delivered after disaster events including those that affect heritage structures, to refer to the ‘lessons learnt’, but it is ventured that any learning is rarely widespread and is mostly confined to the few heritage professionals that were involved and a small number of others. To compound the problem, because of the potentially long interval between disasters, those who learnt the lesson may have passed on, or may not be around when the next disaster occurs i.e. the chance of retaining a collective memory is slim. This circumstance will continue unless positive action is taken to put in place appropriate procedures, including the on-going training and rehearsing of emergency services personnel, in perpetuity.

As part of their ‘learning’, Public Works Department engineers involved in relief and restoration after the Newcastle earthquake arranged for experienced, specialist advice from New Zealand, produced guidelines for earthquake design of government buildings and learnt weight to revision of the earthquake code. This addressed structural and design issues.

In respect of heritage conservation issues, a paper about the Newcastle earthquake experience was presented by three heritage engineers to the 1990 Engineering Heritage Conference\textsuperscript{14}.

However, it is not clear that since Newcastle, or in the light of the emergent terrorist threat, heritage agencies have developed let alone promulgated, policies and procedures for the evaluation and conservation of heritage structures in a post-disaster situation.

Nor has the often complained of problem been addressed that there is a paucity of heritage engineers, other professionals and trades-people, who can attend to heritage problems and care for damaged heritage structures.

\textsuperscript{11} D Snape, Project Manager, Warragamba Dam, Sydney Water Board and S Molino, Warragamba EIS, Mitchell McCotter & Assoecs. Warragamba Dam Upgrade Progress Paper.

\textsuperscript{12} All Hawkesbury flood levels are from the NSW State Flood Plan.

\textsuperscript{13} It would also place at risk the extensive development that has been and is still being encouraged on the floodplain (albeit to floor level guidelines) and the residents who are to be cared for by evacuation. In 2000 the strategy was predicated on a road-based evacuation of 50,000 people with 600 vehicles/hour/lane, not allowing for major stoppages; it relies on roads raised for the purpose, plus a new viaduct from Windsor to Mulgrave at the 1% level. While the evacuation timing and planning has been well done by the SES, there are numerous uncertainties that can impact on its effectiveness. Having regard to the potentially lengthy period between major floods in the area, the rate of turnover of properties and the consequent ignorance of flood behaviour, the known reluctance to evacuate, the need for on-going education and periodic rehearsals etc, there must be serious doubt about the effectiveness of evacuation plans in the long term.

The website of the Australian Government’s Emergency Management Australia has changed since this paper was first drafted; it is now not easy to search and no references can be found about protection of heritage assets during a disaster or emergency. While definite conclusions cannot be drawn on the subject, it would seem little has been done in developing relevant response guidelines in Australia.

Until action is taken to develop a pool of heritage professionals, and until an emergency response plan is put in place to conserve heritage structures when disasters occur, whether they be natural or man-caused, the structures will also be at risk from well-meaning emergency personnel. In such a circumstance it is unreasonable to complain when public-spirited but heritage-ignorant people roll up their sleeves and do their best.

6. GUIDELINE MODEL

In his paper *The first ten days: emergency response and protection strategies for the preservation of historic structures*¹ (Attachment B), Milford Wayne Donaldson suggested ‘emergency response and protection strategies that should be implemented within the first ten days following a seismic event for the preservation of historic buildings …’

Although the strategies refer only to seismic events and relate to American practice, they provide a useful model for the development of Australian strategies and guidelines.

In summary (and suitably rephrased), Donaldson’s strategies that could be applied to the Australian situation are:

1. A knowledgeable team of conservation and heritage professionals familiar with older construction methods should be "on-line" and aware of the locations of the historic resources on a regional basis.

2. They should have permission to assess the damage to historic structures and should be able to report directly to the owner with recommendations for restoration or stabilisation, and provide cost estimates.

3. Information brochures should be available for disaster personnel describing policies, laws and ordinances applicable to historic buildings and structures. Recommended information should be at least the following:
   - Agreements between emergency services, and the State heritage authority.
   - Emergency services hazard mitigation policy statement.
   - Relevant State heritage authority policies and guidelines.
   - The local disaster response ordinance with emphasis on historic structures.
   - Standards and guidelines for the rehabilitation of historic buildings.

4. All decisions that could result in demolition or a significant loss of historic fabric should receive a second opinion from qualified personnel.

5. Promote the shoring and stabilisation of "imminent hazards" by initiating a working collaboration with emergency services. Attempt should be made to salvage all historic fabric and to store it in the resource, including loose or fallen pieces.

6. Promote the sale of an historic building to an interested party where an owner does not want to restore it. For state-owned historic buildings the Government Architect and the heritage authority must be involved in the review process.

7. A separate and distinct damage assessment placard should be provided for placement on historic assets. Recommendations should always include permanent protection from inclement weather and potential aftershocks.

8. Establish a detailed response repair ordinance for the historic buildings within the region, including permanent seismic strengthening methods to mitigate "imminent threats" to life, safety and damage to adjacent properties.

7. PROPOSED ACTION

Before disasters occurs plans should be in place to rescue damaged heritage structures and save them from well-meaning emergency workers and professionals with little heritage knowledge and/or appreciation.

Such plans should be integrated into emergency plans and manuals so there will be recognition of the need for careful evaluation of damage to heritage structures by trained personnel. However, the plan and any response need to be championed by the relevant state/territory heritage agency and when disaster occurs, managed by it within the emergency management system.

There should be a hierarchy of plans – National, State and local – with the latter cross referenced to heritage inventories, both State and local government.

A register should also be prepared of skilled heritage personnel (including from New Zealand and other overseas countries) who can be called on in an emergency, and it should be kept up-to-date and be categorized according to capabilities.

Accordingly, it is recommended that the State and Territory Heritage Chairs take a leadership role in initiating a national dialogue on disaster preparedness and emergency response for the conservation of heritage, with the appropriate Commonwealth authority and other heritage agencies. They should:
• propose the preparation and promulgation of policies and guidelines along the lines of those in Milford Donaldson’s paper;
• request stakeholder agencies such as the members of the National Cultural Heritage Forum Australia15 in addition to emergency agencies, to participate in the development of disaster preparedness and emergency plans to safeguard heritage, and in the preparation of skills registers; and
• institute workshops in collaboration with the relevant heritage and emergency management agencies to develop basic skills and understanding in the conservation of heritage, on a continuing basis so they will be sustainable.

The process outlined above would
• facilitate establishment of a relationship between heritage agencies and emergency managers
• ensure heritage conservation interests are incorporated in emergency management plans, and
• facilitate heritage agencies receiving appropriate warnings of predictable natural disasters such as floods.

It should be expected that museums, libraries, art galleries and like repositories that are vulnerable, will have or develop their own disaster asset management plans to lift and remove to safety their treasures when an emergency such as flood threatens. However, implementation may require the help of emergency services, and so they should also develop a relationship with emergency managers and ensure their needs are built into emergency management plans. (A workshop about disaster mitigation for cultural collections was held in San Francisco in April 200416).

Relationships, knowledge, mutual support and help would also be facilitated by establishment of the special interest network on natural hazard mitigation that was proposed by Dirk Spennemann and David Green at the 1995 Management of Disaster Mitigation and Response Programs for Historic Sites symposium held in San Francisco. It would provide an ‘on-going exchange of information and … a repository of relevant data’. Professor Spennemann advised that the network was being developed at the time of writing this paper.

8. CONCLUSION
In conclusion it must be asked: for whom does the bell toll?

If we have a real concern that heritage assets should be protected from disasters and that if they are damaged they are properly cared for and conserved, the heritage community has to take the initiative to make it happen.

We can’t expect emergency personnel to have the knowledge or the interest; irrespective, their concern is primarily with other matters, so the responsibility is that of the heritage community.

If we don’t act to ensure an appropriate management system is in place and implemented we have no right to criticise owners, the heritage-ignorant professionals, and the public-spirited people who volunteer to help, but know little (or perhaps aren’t concerned) about heritage conservation.

The challenge is for the heritage community to pressure heritage authorities to engage with the emergency management agencies and have the heritage conservation chapters inserted into their planning and instruction documents.

Accordingly, the toll of the bell can either:
• be for us to change the system, or
• if we do nothing, it can sound the knell of heritage assets in disaster situations!

Figure 1. St Patricks Cathedral, Bunbury, 5 July 2005

Either way, and with apologies to John Donne17:

... never send to know for whom the bell tolls, it tolls for us!


16 Disaster Mitigation for Cultural Collections, April 19-21, 2004, San Francisco. Conservation Center for Art and Historic Artifact Workshop Series

17 John Donne (1572 – 1631), Dean of St Paul’s. Devotion 17
9. ACKNOWLEDGEMENT
Grateful acknowledgement is made of the valuable advice and comment provided on this paper by Mr Chas Keys. Mr Keys was the Deputy Director General of the NSW State Emergency Service from 1997 to 2004.

10. ATTACHMENTS
A. (Hawkesbury) Valley Inundation for the 1867 flood on record. Warragamba Dam Upgrade Progress Paper.

11. FURTHER READING
1. Wayne Donaldson’s paper was presented at a three day symposium held in San Francisco from 27-29 June 1995; Management of Disaster Mitigation and Response Programs for Historic Sites: A Dialogue. The proceedings of the symposium were first found on the website http://life.csu.edu.au/~dspennem/Disaster_SFO/SFO_Disaster_TOC.html.

The contents are:

Preface: David W. Look and Dirk H.R. Spennemann

Intergovernment cooperation on the national and local level

The government’s responsibilities for the preservation of private and public cultural resources at federal, state and local levels, Cherlyn Widell

Memorandum of Agreement and Programmatic Agreements in the disaster context, Lisa Katchka

A helping hand, Steade Craigo

The first ten days: emergency response and protection strategies for the preservation of historic structures, Wayne Donaldson

Cultural heritage and disaster management in Tucson, Arizona, Alex Kimmelman

The role of federal disaster relief assistance to local communities for historic preservation, Jorge Alfaro

Seismic safety and rehabilitation

Seismic safety of existing federal buildings Diana Todd Seismic safety of existing buildings, Ugo Morelli

Cultural heritage management and California’s State Historical Building Code, Robert Mackensen

Architectural issues in the seismic rehabilitation of masonry buildings, Randolph Langenbach

National guidelines and commentary for the seismic rehabilitation of buildings, Daniel Shapiro

The Secretary of the Interior's standards for rehabilitation pertinent to cultural resources affected by disasters, Stephen A. Mathison

Case study: earthquakes. Steade Craigo

1994 Northridge Earthquake: case study, Los Encinos State Historic Park, Garnier Building, Thomas A. Winter

Floods and cyclones

Conservation management and mitigation of the impact of tropical cyclones on archaeological sites: examples from Tonga, the Marshall Islands and Australia, Dirk H.R. Spennemann

Case study: floods Disaster recovery response to Tropical Storm Alberto, Daryl Barksdale

Flood case study: Stillwater, Nevada, Alice M. Baldrica

Communication and training

Natural disaster mitigation and cultural heritage: a course proposal, Dirk H.R. Spennemann

A special interest network on natural hazard mitigation for cultural heritage sites, Dirk H.R. Spennemann and David G. Green

The proceedings have also been published in bound form as Disaster Management Programs for Historic Sites edited by Dirk H. R. Spennemann of the Johnstone Centre, Charles Sturt University, Albury NSW and David W. Look of the US National Park Service, Regional Office, San Francisco. ISBN 1-893076-00-8

Figure 1
Valley Inundation for the
1867 Flood on Record

From Warragamba Dam Upgrade Progress Paper
(with addition of four localities by M N Clarke)
The first ten days: emergency response and protection strategies for the preservation of historic structures

MILFORD WAYNE DONALDSON, FAIA

Architect, Milford Wayne Donaldson and Associates

The majority of all decisions for the disposition of earthquake-damaged historic structures are made within the first ten days of a declared national emergency. The devastating effects of the 17 January 1994 Northridge earthquake on historic buildings showed once again that strategies for the preservation of these unique resources are at the mercy of local, state and federal agencies. Alternative preservation strategies are needed to complement the post-disaster public safety recovery and reconstruction methods already in place during the disaster period. The declared emergency may last from 30 to 90 days.

Following the declaration of emergency by the President of the United States upon request by the Governor of the State, there is a myriad of federal, state and local laws, codes, ordinances and policies that are implemented within two to three days that set the stage for decision-making. Although local agencies begin search and rescue methods to protect life, the greatest threat to historic structures are policies set by the Federal Emergency Management Agency (FEMA) and the State Office of Emergency Services.

The ATC-20 red "unsafe" placards, the suspension of protection under the California Environmental Quality Act, conservative attitudes of liability conscious assessment volunteers unfamiliar with historical or older building construction, the rush to secure the "limited" FEMA funds for demolition and the unfortunate interpretation of "imminent threat" to bodily harm or damage to adjacent property continue to destroy historic buildings. In the case of historical structures, where damage following a moderate seismic event will always be present, the attitude is that a damaged building is dangerous and should be demolished. Many damaged historical buildings are torn down to be replaced with a "replica". Unfortunately, the concept of replication is becoming popular, even amongst the preservation community.

For federally funded projects, the "Section 106" process does not become effective until after 30 days of the declaration of an emergency. The administration time required by the State Historic Preservation Officer (SHPO) is overwhelming and the staff cannot service the number of requests. In the case of the Northridge Earthquake, SHPO contracted with a private firm to oversee and review over 2,000 applications under Section 5028 of the State of California Public Resources Code. However, the determination of "imminent threat" continues to be made at the local level and usually within five to seven days the decision to remove the threat has been finalised.

Throughout the last 12 years, there has been a great deal of effort and understanding for the preservation of historic buildings of the various local, state and federal agencies. However, the greatest protection comes from education and preparedness of the local decision makers. Since there are few historic structures noted on local, state or national registers within California, it may be possible to predetermine the disaster response methodology far in advance of the event. At the very least, the local city or county disaster ordinance should identify the procedures of dealing with historic buildings and be prepared with an updated list of the historic structures within the region.

The emergency response and protection strategies that should be implemented within the first ten days following a seismic event for the preservation of historic buildings are the following:

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1. A knowledgeable team consisting of a preservationist, structural engineer and preservation architect familiar with older construction methods should be "on-line" and aware of the locations of the historic resources on a regional basis. The structural engineer and architect should be registered as a Disaster Service Worker with the Office of Emergency Services. This team should be in addition to the County's Department of General Services Historic Resources Team.

2. Permission should be obtained to assess the damage to the historic structure from the local agency in charge of disaster recovery and the assessment team should be allowed to report directly to the owner the recommendations for restoration or stabilisation and provide cost estimates.

3. Informational brochures should be available for local disaster personnel describing policies, laws and ordinances applicable to historical buildings. Recommended information should be at least the following:
   - National Preservation Act, Section 106 process.
   - Programmatic Agreements (if available) between FEMA, Office of Emergency Services, SHPO and the National Advisory Council for Historic Preservation.
   - Joint FEMA/Office of Emergency Services Section 406 (Stafford Act) Hazard Mitigation Policy Statement.
   - State Historical Building Code and the State Historical Building Safety Board's jurisdiction and appeal process.
   - Section 5028 of the California Public Resources Code and related California Environmental Quality Act issues.
   - California Seismic Safety Commission's Seismic Retrofit Incentives for Local Government.
   - The Local Disaster Response Ordinance with emphasis on historic buildings.
   - The Secretary of the Interior's Standards and Guidelines for the Rehabilitation of Historic Buildings.

4. All decisions regarding demolition, partial demolition or repair methods resulting in a significant loss of historic fabric to the historical resource should receive a qualified second opinion.

5. Promote the shoring and stabilisation of "imminent hazards" by initiating a working collaboration with the Urban Search and Rescue Team through the US Army Corp of Engineers and Office of Emergency Services. FEMA provides reimbursement of engineering fees and material costs for temporary measures. Attempt to salvage all historic fabric and store in the resource, including loose or fallen pieces.

6. Promote the transfer of sale to an interested party if an owner does not want to restore his/her historic building. Unfortunately, the State Building Seismic Program recommends replacement of an historical building when the retrofitted cost exceeds the Benefit Cost Ratio of 120% of the new cost. Although this percentage is much better than the 60% normal building profile, many of the retrofit cost estimates are not made by knowledgeable persons with extensive experience in retrofitting historic buildings. For state-owned historic buildings, the Division of the State Architect and the SHPO must be involved in the review process.

7. A separate and distinct damage assessment placard for historic resources should be provided. Recommendations should always include permanent protection from increment weather and potential aftershocks. With publicly-owned historic buildings, the process to initiate repair may take as long as 12 to 16 months.

8. During the discussion of the retrofit methodology the engineer should note that the program is to reduce hazard to life. Damage during a moderate seismic event should be expected at definite locations within most historic and older structures.

9. Establish a detailed response repair ordinance for the historic buildings within the region, including permanent seismic strengthening methods to mitigate "imminent threats" to life safety and damage to adjacent properties.

10. Provide guidance for the sensitive mitigation of hazardous materials during the disaster assessment. The removal of asbestos-containing materials, lead-based paints, pigeon dung, bat guano and other health hazards have resulted in the removal of the historic fabric during the "clean-up" phase.

In summary, during the "crisis management” phase following a seismic event, the preservation of historic resources becomes the lowest priority of disaster-related activities for local, state and federal agencies. The programmatic responses and mandated processes are intact and generally not subject to change. The best way to implement preservation programs is to become part of the process and quickly provide educational information and qualified assessment personnel within the first ten days following the disaster.
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Thousands of Demolitions Are Likely in New Orleans

By ADAM NOSSITER

NEW ORLEANS, Oct. 22

As crews begin inspecting thousands of rotting houses and preservationists begin efforts to save them, city and federal officials say that 30,000 to 50,000 of the city's houses will probably have to be demolished.

That number, though smaller than some earlier predictions, nonetheless represents more than a quarter of the city's housing stock. A few weeks from now, when giant track excavators begin tearing into homes that once sheltered families and nest eggs, the city will experience one of the most painful moments of its ordeal.

"Really, the whole scope of this thing is hard to get your mind around," said Allen Morse, who will be in charge of the demolition effort for the Army Corps of Engineers. "It's going to be a huge task."

Already the dreaded bright red-orange stickers blaring "unsafe" have begun to proliferate on houses, signaling what is becoming a passionate debate over the extent of the demolition.

Of the city's 180,000 houses, 110,000 were flooded, city officials say, and half of those sat for days or weeks in more than six feet of water. If up to 50,000 homes are beyond salvaging, many of the others could be saved with expensive repair jobs, but large numbers of homeowners may not have the resources to rebuild. As a result, the number of demolitions could soar beyond 50,000.

The Corps of Engineers is being careful not to make predictions about the scope of the job. "The word 'demolition' is not even being discussed around here," said Kelley Aasen, the corps official in charge of the mammoth task of inspecting every house in New Orleans for obvious structural damage. "It's triage, right now."

Yet as building inspectors fan out around the city, taking the first steps in deciding the fate of flooded homes, a picture is beginning to emerge on the Corps of Engineers map: red dots are sprouting in the Lower Ninth Ward, and the area below Lake Pontchartrain is a field of yellow, meaning structural damage is suspected. Houses marked with either color face a tenuous future.

By midweek, about 30,000 inspections had been completed, with 7,000 houses tagged yellow and 700 red, corps officials said. Most of the hardest-hit areas have not yet been inspected.

The process has not been without hiccups. The Shaw Group, the construction company that is providing many of the inspectors to the corps, provoked complaints this week from the corps and city building officials that some people hired as inspectors, including a retired art dealer and a hairdresser, were unqualified to make structural appraisals.

By Friday, a corps official said Shaw had responded to the complaints, dismissing two dozen of the least qualified inspectors.

City officials say it will probably not be necessary to destroy entire neighborhoods, speaking instead of city blocks. There had been earlier discussion of ending the city's preservation-review process and allowing bulldozers to plow through some of the most historically significant neighborhoods in New Orleans. That idea aroused consternation. But those fears ended when city officials promised that historic houses would get special consideration and that deluged neighborhoods like the Lower Ninth Ward and New Orleans East would not be wiped out.

"There's a recognition that the New Orleans housing stock is really pretty sturdy, and there should not be the necessity for wholesale demolition once thought," said Camille Strachan, a trustee emeritus of the National Trust for Historic Preservation and a New Orleans lawyer. "I think that as the hysteria subsides along with the water, there will be a lot more rational decisions made."

But questions remain about a process that is certain to change the face of this city for good. No one is certain when the demolitions will begin in earnest, what will happen to houses without flood insurance or whether New Orleans homeowners, facing the demolition squad, will resist en masse.
Already, flashpoints have emerged in the complex interplay of municipal vision, homeowner rights and federal mandates. Some of these conflicts hark back to age-old fights here between developers and preservationists; some are brand-new, reflecting the changed, browned-over landscape in large parts of this city.