Developing a Risk Assessment for the Japanese Institute of Anatolian Archaeology

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INTRODUCTION

A risk assessment is a key strategy document used in preventive conservation to identify the major threats to an artifact collection and also formulate positive solutions for how these risks can be managed. It will often form the basis for an emergency preparedness plan and can help to raise awareness within an organization of the issues that threaten the collection. An effective risk assessment will assist senior management to make informed decisions when planning development and distributing funds. This article describes how a risk assessment was developed for the Japanese Institute of Anatolian Archaeology's facilities in Kırşehir province, Turkey (JIAA). The methodology used to carry out the risk assessment was based on a system of classifying risks developed Canadian Museum of Nature (CMN), specifically tailored to include criteria relevant to the JIAA.

BACKGROUND

Archaeological excavations can present particular challenges to emergency response as they frequently operate in remote locations, with seasonal staff, and with varying degrees of administrative reliance on local ministries (McIlwaine 2006, p.7). Currently, the JIAA is in the process of transitioning from a seasonal archaeological excavation to a year-round research facility (with an on-site museum and climate controlled storage facilities) and these developments make preventive conservation goals increasingly important and achievable. The recurrence of enduring problems in an old storage building during the 2010 excavation season raised awareness of the resources and procedures available within the JIAA to cope with disasters and profiled the need for future disaster planning (McIlwaine 2006, p.6). The inauguration of new buildings within the institute makes this an opportune time to initiate this planning In addition; the location of the JIAA within a high risk earthquake hazard zone highlights the need for a coherant disaster policy.

METHODOLOGY

On commencing the project, the researcher looked for a customizable template that could be used to survey risks at JIAA. A review of the conservation literature revealed many discursive accounts on the significance of risk assessment in addition to technical/mathematical methods of quantifying risk. These kinds of articles prevailed over practical recommendations for how to survey risk. Hence it was necessary to adapt a risk assessment survey for the JIAA from numerous resources.

The risk assessment was divided into three stages: a disaster review, an environmental review and a risk assessment survey of specific buildings within the institute. These stages allowed the history of the institute, the environmental/regional influences and current risk factors in specific buildings to be brought together to develop a comprehensive picture of disaster preparedness at the institute.

Disaster review: A record of past accidents, disasters, emergencies and close calls that had occurred at the institute and in the local area was compiled by interviewing personnel and reviewing former conservation reports (Heritage Collections Council 2000, p.17). Based on historical evidence, this helped to identify some of the major risks for the JIAA and

Table 1 Disaster review template

DATE	LOCATION	EVENT	FRACTION AFFECTED	OUTCOME	EVALUATION OF RESPONSE EFFORTS

provided perspective on the success of past disaster response efforts (Heritage Collections Council 2000, p.17). The information was organized in a table adapted from the Australian Heritage Collection Council's publication '*Be Prepared: Guidelines for small museums for writing a disaster preparedness plan*' (2000, p.17) (See *Table 1*).

Environmental review: The purpose of the environmental review was to collate information about weather patterns, geological risks and natural disasters that the area may be subject to (Heritage Collections Council 2000, p.18). Ideally, an environmental review would best be carried out with advice from a local meteorological board, weather bureau or emergency services. However, the researcher's attempts to contact relevant organizations in Turkey were unsuccessful and the data for this section was drawn from staff knowledge and literature research. Recommendations were made for the JIAA to become familiar with any commercial or industrial operations in the area that could present a risk of fallout, gas explosions or pollution (McIlwaine 2006: p.8).

Risk assessment survey: Fundamental to risk assessment are the interrelated concepts of hazard and risk. In basic terms, a hazard is something that

Table 2 Agents of deterioration and hazards: as used in the risk assessment survey

AGENT OF DETERIORATION	HAZARD
Physical forces Type 1	Earthquake Structure collapse
Physical forces Type 2	Dropping artifacts Damage while handling and positioning artifacts
Physical forces Type 3	Distortion or damage from poor support Constant vibration
Fire Type 1 Type 2	Electrical fire Arson Lightening strike Arc welding (during building construction) Discarded cigarettes
Water Type 1	Flood Burst pipe Burst river Melting snow
Water Type 2	Roof leaks Plumbing leaks Air conditioning malfunction Sprinkler head malfunction
Water Type 3	Rising damp
Criminals Type 1	Major theft
Criminals Type 2	Isolated instances of theft or vandalism
Criminals Type 3	Embezzlement by staff or frequent users of the collection
Biological agents	Mould infestation Pest infestation
Contaminants Type 1	Fallout from nearby industrial facility or transport accident Gas leak: explosions
Contaminants Type 2	Use of a corrosive cleaner, the occurrence of dust during construction etc.
Contaminants Type 3	Off-gassing (emission of chemical gases and vapours) from storage and display materials
Light and UV radiation	Fading of colours, structural damage etc
Incorrect temperature Type 2	Fluctuations
Incorrect temperature Type 3	Higher or lower than ideal
Incorrect relative humidity Type 2	Fluctuations
Incorrect relative humidity Type 3	Higher or lower than ideal
Custodial neglect Type 1	Collection abandonment/not undertaking preventive upkeep: cessation in environmental monitoring, condition surveys, housekeeping etc
Custodial neglect Type 2	Loss of artifacts or artifact data: loss or destruction to labels, inconsistent record keeping, power failure resulting in data loss.
Custodial neglect Type 3	Inappropriate handling practices Failure to ensure easy access for staff, students and researchers so that they may carry out their duties or research

has the potential to cause harm and a risk is the likelihood of that eventuating (Ashley-Smith 1995, p.7). The purpose of the survey was to identify, in each building, risks to the collection against a list of hazards. Four buildings in the institute were prioritized as candidates for the risk assessment survey due to the artifact storage, treatment and processing activities that take place there.

The list of hazards were drawn from a classification system developed by the Canadian Museum of Nature (CMN) that uses the nine agents of deterioration initially proposed by Stefan Michalski with an additional tenth ('custodial neglect') (Dorge 2002, p.29; Waller 1995, p.21) [1]. Specific hazards are grouped under each agent of deterioration and classified according to the following types:

Type 1: Rare and catastrophic,
Type 2: Sporadic and intermediate in severity,
Type 3: Constant and gradual. (Waller 1995, p. 22)

For example, earthquake and damage from poor support (i.e. to artifacts in storage or on display) are hazards listed under the agent of deterioration: physical forces. Earthquakes are classified as a Type 1 hazard and damage from poor support as Type 3. As is demonstrated by the Type 3 classification, conditions that have a constant or gradual impact on the collection were considered alongside more catastrophic events such as earthquakes, major theft and floods. Table two shows the list of hazards included in the JIAA's risk assessment survey, classified according to the CMN system.

The above list was compiled by making additions and subtractions to the CMN's original list that better reflected the specific context of the JIAA[2]. These issues were ascertained during the disaster review, additional literature research and brainstorming with conservation team members. While conservation based risk assessments tend to focus solely on risks to the collection, the JIAA's risk assessment was expanded to include risks to human health and safety. The health and safety categories included are laid out in *Table 3*.

The agents of deterioration, health and safety issues were then compiled into a survey format (See *Table 4*).

[1] Waller describes the list of risks provided by the CMN as 'illustrative not comprehensive' (1995, p.12)

[2] Waller describes the list of risks provided by the CMN as 'illustrative not comprehensive' (1995, p.12)

Table 3 Health hazards included in the risk assessment survey

HEALTH AND SAFETY	HAZARD
Health and safety Type 1	Immediate exposure to a toxic substance (e.g. spilling acid on human skin)
Health and safety Type 2	Electrical shock Drinking tap water Cuts and stabs from working with sharp tools and implements Tripping hazards Heat stroke Insect and animal related illnesses (bites, stings etc.) Heavy lifting Unsafe evacuation procedures
Health and safety Type 3	Ergonomic and repetitive strain injury Long term exposure to a toxic substance (e.g. inhaling solvent fumes).

Table 4 Survey format (example provided)

AGENT OF DETERIORATION	HAZARD	FRACTION SUSCEPTIBLE AND POTENTIAL IMPACT	RISKS THAT INCREASE THE SEVERITY OF THE HAZARD	RECOMMENDATIONS
Physical Forces Type 2	Dropping artifacts Damage while handling and positioning artifacts	Handling and transporting artifacts from storang or the museum to the conservation laboratory	Conservators identified a number of hazards while shifting artifacts from the museum to the conservation laboratory. These included having to navigate a large number of steps, stepping over the stone walls of the museum and walking over grassed areas and uneven surfaces. The use of a trolley is not feasible due to the number of uneven surfaces, steps and walls. The risk is increased when carrying heavy or bulky objects.	1. In situations where large numbers of artifacts need to be moved to the labs, transporting them by car will reduce the trip and transport hazards experienced by conservators. 2. Providing examination stations in storage areas and the museum will eliminate the need to transport large numbers of objects. 3. All staff, researchers and students working with artifacts or samples associated with the movement of artifacts should be trained in appropriate handling, storage and transportation. Teams to assist each other spotting, Designating individuals to open doors etc

IDENTIFYING RISKS

'Inferring risk of deterioration from data at any level is based on a theoretical framework of environmental conditions that are suitable or unsuitable for the preservation of objects.' (Taylor 2005, p.129).

The survey was trialled in the first building with the rest of the conservation team accompanying the researcher. Risks were identified based on cause and effect rationale that informs the conservation profession, the varied expertise and experiences of each individual in the team, active signs of deterioration and literature research (Taylor 2005, p.129).

While conducting the remainder of the surveys the researcher found that a digital SLR camera, measuring tape, clip board with a printed copy of the survey, gloves and a torch were useful to have available. Floor plans, when available, were also very useful for marking out features of interest.

RISK MANAGEMENT: RECOMMENDATIONS

Due to the amount of data generated by the risk assessment, it was not feasible to provide exhaustive recommendations for each issue. Therefore an emphasis was placed on providing provisional, 'low-tech' recommendations that would be achievable in the short term. Advice was provided as to how these provisional recommendations could be developed further and, where necessary, the particular kind of expertise the issue would benefit from (i.e. consultation with an engineer). The recommendations can be summarised under the following categories of risk management: training, allocation of resources, re-location, recovery/disinfection, ongoing maintenance and housekeeping, policy implementation, monitoring and further consultation with relevant professionals (i.e. construction professionals, engineers).

DISCUSSION

The time taken to develop and complete the assessment was greater than the conservation department had anticipated. In its aim to identify "total risk" to collections, the CMN's system of identifying risk is comprehensive (Waller 1995, p.12). Similarly the data produced by the JIAA's risk assessment was extensive and could have the potential to overwhelm readers. Time constraints prevented the researcher from quantifying the risks in a manner that could assist the reader to 'understand the relative significance of all risks to collections' (Waller 2005, p. 16) [3]. However, while assessing and quantifying 'total risk' is valuable, these may be more feasible activities for larger institutions to complete. Given the JIAA's risk assessment was prompted by the need to develop an emergency preparedness plan, a more focused risk assessment that concentrates on Type 1 and Type 2 risks could have been more time efficient.

CONCLUSION

The risk assessment developed a comprehensive portrait of risks to the archaeological collections associated with the JIAA. Conservation literature provided guidance on how to classify the hazards however a method and format for surveying risk had to be developed independently. Overall the project was successful it its aim to identify potential emergency issues that are vital for future disaster planning.

One of the projects achievements was the general enhancement of learning by all those involved in the process. Collaborative and team-work activities: brain storming, problem solving and the individual expertise of each team member contributed to a shared knowledge of the risks the collection is vulnerable to and systematic ways of ameliorating them.

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[3] Waller discusses quantification activities for Type 1 or catastrophic risks as "... not an area in which most conservators have expertise and, therefore, help must be obtained from experts in areas such as security and fire control." (1995, p. 13)

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