

## **Earthquake Damage Mitigation for Collections: virtual workshop**

Across the world earthquakes have caused enormous loss and damage to heritage collections in museums, historic houses and places of worship. Much of that unfortunate damage and loss can be avoided through proactive mitigation measures, many of which are low in cost and straightforward. This series of web based work shops will explore earthquake damage mitigation for collections on display and those in storage. Beginning with a discussion of the nature of earthquakes and progressing through the process of determining a collection's seismic vulnerability, methodologies for evaluating the potential responses of objects to earthquake ground shaking and guidelines to establish the level of risk management desired. The workshops will be completed with illustrations of practical earthquake mounts, restraints and supports, from simple and low cost to more technologically advanced base isolation systems.

### **Instructors:**

#### **Jerry Podany**

Jerry Podany joined the Department of Antiquities Conservation at the J. Paul Getty Museum (California) in 1978, serving as Department Head/Senior Conservator from 1984 until his retirement in 2016. He was elected for two terms as President of the American Institute for Conservation (1999–2003) and for two terms as President of the International Institute for Conservation (2006–2012). Mr. Podany continues to consult, lecture, and publish internationally on earthquake damage mitigation for collections and on emerging social and technological issues that affect the future sustainability of heritage preservation. He developed a series of conferences in Turkey, Greece, Japan, Italy and China addressing the protection of collections from earthquake damage in each of those countries. Mr. Podany is the author of *When Galleries Shake: Earthquake Damage Mitigation for Museum Collections* (Getty, 2017).

and

#### **McKenzie Lowry**

McKenzie Lowry specializes in seismic mount making. He received a Bachelor of Arts in Art Studio at the University of California Davis in 1985, and a Master of Fine Arts in Painting and Drawing from Washington State University in 1987. In 1997 he joined the Antiquities Conservation staff at the J. Paul Getty museum, and at his retirement in 2021 he held the title of Senior Mountmaker for the department. In 2007, McKenzie and his colleagues developed the Mountmaker's Forum to address the modern concerns of mountmaking for art objects. The Forum has continued to hold meetings since then every two years. He has presented numerous papers internationally outlining the Getty's broad approach to mountmaking for art and artifacts.

## **WORKSHOP GENERAL OUTLINE**

### **Session One (3 hours)**

#### **Introduction**

#### **Brief Review of the Nature of Earthquakes**

What are the forces and where do they originate?  
Definition of some terms (acceleration, velocity, displacement, magnitude, natural frequency, etc.)

#### **Determining the Level of Hazard**

- Statistical Seismic Hazard Analysis (Deterministic SHA and Probabilistic SHA)
- The worst case scenario\*

## **Building Response**

- Nature of the structure

## **Object Response**

- Move with the building
- Vibrate or “chatter”
- Rock or “walk” (if suspended: swing or bounce)
- Overturn
- Fall from support plane
  
- How are these responses determined
  - common sense
  - modelling and shake table testing
  - computer aided analysis
  
  - Source of damage or loss
    - vibration
    - impact collision
    - transferred forces
  
  - Types of damage
    - structural fracture
    - deformation
    - abrasion

## **Discussion**

### Session Two: 2.5 hours

## **Introduction**

### **Vulnerability Survey**

- Non structural hazards
  - false walls, panels, ceiling tiles, pipes, ducts, lighting, etc.
- Collateral hazards
  - explosions, floods, landslides, fires, loss of security, loss of power, civil unrest
- Collection response (common sense with some mathematics attached)
  - how will objects respond to the worst case scenario

### **The Hard Decision:** the degree of vulnerability reduction

- Planning for small to moderate earthquake events in the relatively short term
- Planning for large destructive earthquake event in the relatively long term
- What amount of damage and loss is acceptable?

### **Seismic Damage Mitigation:**

- Priorities: what will determine them
  - value (for example: monetary or cultural/religious, scientific)
  - complexity of mitigation needed
  - resources to complete the mitigation

## **Tracking Progress and Reviewing the Project**

- Maintaining and expanding the progress

## **Discussion**

### Session Three: 4 hours

## **Seismic Mount Making: approaches, methods and materials**

### **Introduction and Basic principles (what are you trying to prevent?)**

### **Materials and reversibility**

### **Caution with surfaces and strength of materials**

### **Mount design and construction (issues to purpose and aesthetics)**

- For objects on display
  - static mount/support/restraint types and approaches
  - non-static: allowing some motion (sliding and base isolation)
- For objects in storage
  - packing, restraint and associability in storage
- **Discussion**