C2C Care/MayDay 2025: So Now What? Dealing with Materials after a Disaster

Recovering and Caring for Artifacts after a Disaster: Lessons from the 9/11 Memorial Museum

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May 06, 2025

9/11 MEMORIAL & MUSEUM

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Preparation of Chelsea Jeans for New York Historical Society [James Estrin/The New York Times]

Considerations for Maintaining Hazardous Materials

- ✓ Hazardous materials can be exhibited safely with the appropriate investment of resources
- ✓ Objects should be considered individually within collection context
- ✓ Hazards should be considered against the object's meaning
- ✓ Removal of an artifact or the hazardous components can be the ethical choice
- ✓ Stakeholder viewpoints are valuable
- ✓ Communication between collection and safety professionals is critical

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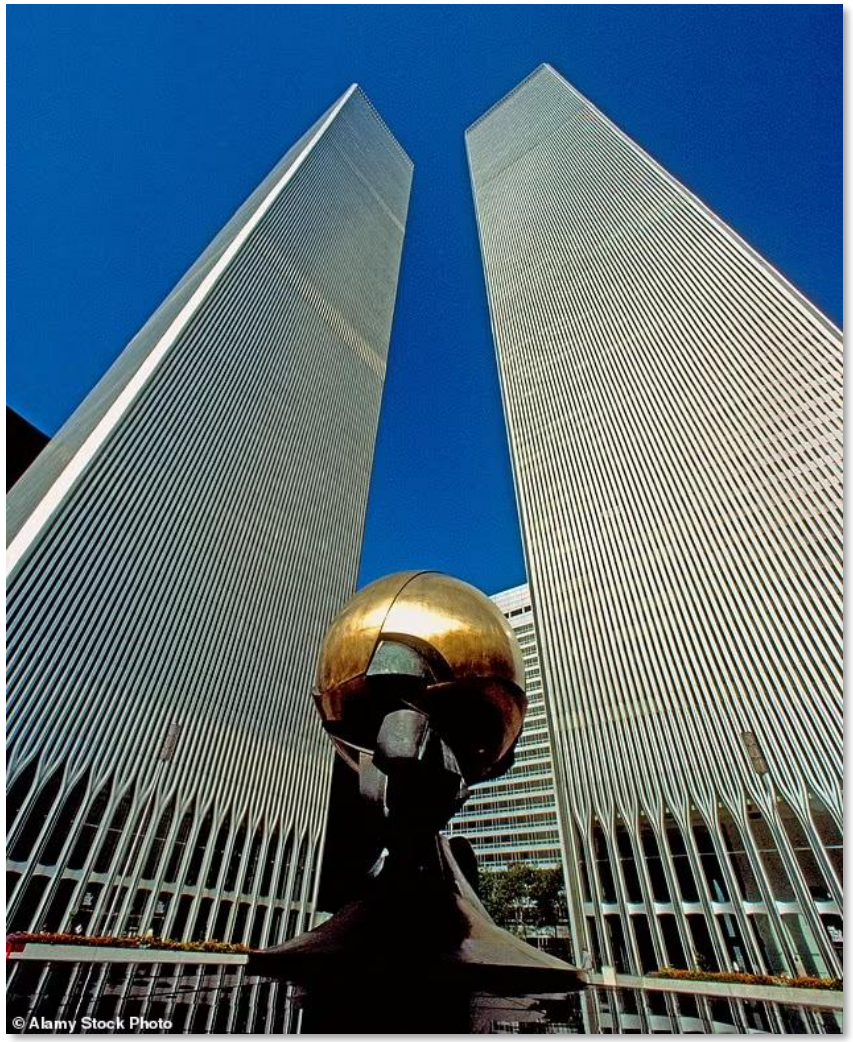
SEPTEMBER 11, 2001



The Sphere (Große Kugelkaryatide N.Y.) cast bronze sculpture by German artist Fritz Koenig on the Austin J. Tobin Plaza of the World Trade Center

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SEPTEMBER 11, 2001

Ground Zero site in 2002
Image: Mario Tama/Getty Images

https://projects.voanews.com/ground-zero/

FRESH KILLS LANDFILL, STATEN ISLAND

Credit: Video Clips, Objects and Memory

Vehicles Collected A Fresh Kills Landfill On Nearby Staten Island, NYC

Image: NYC EMS Watch

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FRESH KILLS LANDFILL, STATEN ISLAND

Health & Safety Network

Health and Safety in Emergency Response (2016)

An emergency is defined as a serious situation or occurrence that happens unexpectedly and demands immediate action. Preparing for an emergency response, whether resulting from a natural disaster or a building facilities failure, is an important aspect of collection care. Policies for response should be included in an organization's disaster plan and should address not only the procedures to recover collections but the health and safety of the responders.

Any time collection caretakers are called upon to respond to an emergency, it is important to remember that not all stages of an emergency demand rapid response—the recovery and assessment of cultural property will be a secondary response. Access to cultural properties will only be allowed once immediate threats to life and health are cleared.

Always put the health and safety of individuals first, otherwise, you put the entire response effort at risk. With every experience in an emergency response, greater insight is gained into those accumulated best practices that promise to improve both personal skills and lasting contributions to the knowledge of emergency response.

The following topics should be taken into consideration while preparing for and performing emergency response and will assist in protecting the individuals involved, allowing the project to run smoothly and will also benefit everyday practice.

Before You Sign On

Careful and considered personal assessment and preparation will help ensure that response efforts are successful.

- Evaluate your fitness to respond, including: your general health, physical stamina and emotional strength. Remember that common health conditions like high blood pressure may make you ineligible to wear certain protective devices. If in doubt, consult with a physician or with health and safety staff at your own institution.
- Consider what arrangements would need to be made for life at home to function in your absence (e.g., responsibilities for children, ill or aging relatives, pets, etc.). Check that your health and legal directives are current.
- Check that your immunizations (Tetanus, Hepatitis A, Hepatitis B) and medical evaluation are up-to-date. See www.cdc.gov for additional information.
- Keep your annual respirator fit testing up-to-date.
- Contemplate whether you can work patiently and with sensitivity in an unpredictable setting relying on individuals under great stress who may have difficulty succinctly conveying essential information.
- Evaluate the contributions you could make in light of your training, experience and skill set; know what role is expected of you.

COMMMUNITY EMERGENCY RESPONSE TRAINING

Involvement in community emergency response training (CERT) is an excellent means of acquiring a fundamental understanding of an emergency response system focused on people. CERT covers basic first aid and incident command structure. Information on CERT (including finding the CERT program nearest you) is available at: www.fema.gov/community-emergency-response-teams

Before You Leave For the Site

Though it may seem counterintuitive, slow down when responding to cultural property emergencies. The collection caretaker's role is not to rush in and rescue, depleting energy and making ill-informed decisions. By first gaining information about custodial priorities and concerns, collection personnel will be able to make reasoned and informed choices about how a response may best proceed.

Learn as much as you can about site conditions so that you know what supplies and equipment may be necessary.

Access and Accommodation

- Is the location accessible? Have roads been closed?
- What kinds of arrangements can be made for transportation and lodging?
- Can food, gas and other supplies be acquired locally?
- Is there clean water and is it safe to drink?
- Are restrooms and shower facilities in working order?
- Can you and your vehicle obtain appropriate identification to allow passage to restricted areas?
- Have curfews been set and can you accomplish your work within a limited time span?
- Are repair facilities and vehicle fuel available?
- What are the viable transportation routes?
- Is new information about the site's vicinity available? (via personal contact, internet, radio, etc.)
- Are there reliable means of communication?

Site Working Conditions

- Is information about an institution's collections and facilities available?
- Are floor plans, emergency plans, chemical inventories and other relevant data available for review?
- Are you responding to a fire, flood or hurricane or other emergency?
- What are current and anticipated weather conditions?
- What are anticipated temperatures inside and outside?
- Is there standing water or mud?
- Does the site have electrical power?
- Is there a working communication system
- Is there an established level of Personal Protective Equipment (PPE) required for site entry?

Custodial Priorities

- Is the staff at the site ready for you?
- Confirm who will meet you and who will have keys?
- Will the equipment you need be available? Can you make all equipment compatible?
- Is there working space within the location or will you be removing objects to be cared for elsewhere?

https://tinyurl.com/HSEmergResp

Vehicles Collected A Fresh Kills Landfill On Nearby Staten Island, NYC

Image: NYC EMS Watch

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FRESH KILLS LANDFILL, STATEN ISLAND

Dr. Jan Seidler Ramirez at Fresh Kills, c. 2002

Currently Executive Vice President of Collections & Chief Curator, 9/11 Memorial & Museum

Vehicles Collected A Fresh Kills Landfill On Nearby Staten Island, NYC

Image: NYC EMS Watch

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HANGAR 17, JFK INTERNATIONAL AIRPORT

A 2008 Tour of Hangar 17 and the Artifacts of 9/11

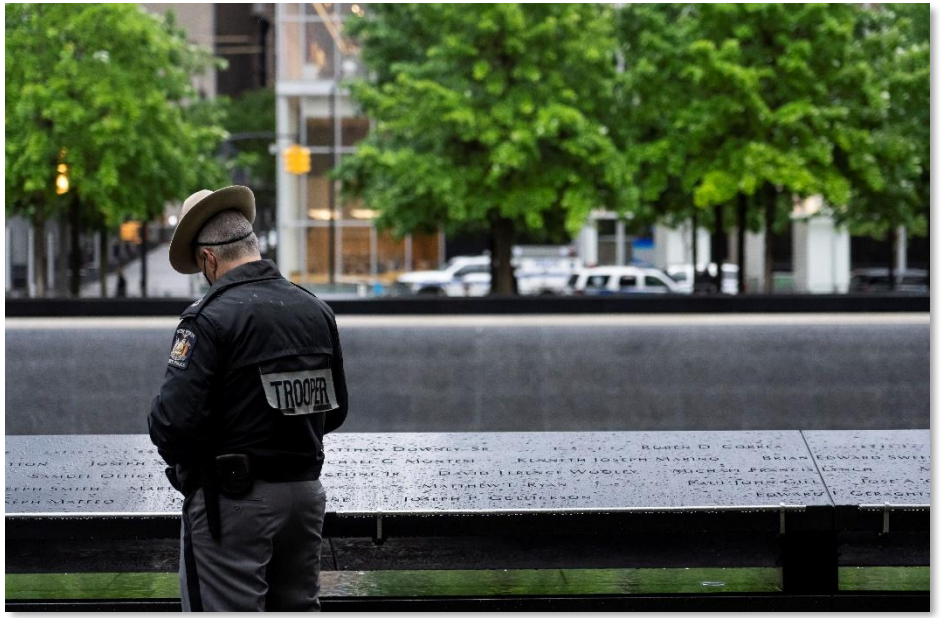
Jan Ramirez, chief curator of the September 11 Memorial Museum, gives a tour of Hangar 17 at JFK Airport, where hundreds of artifacts from the 9/11 attacks had been stored. Some would eventually be shown in the museum, the rest donated to communities in all 50 states and 10 foreign countries, where they were put on display.

https://www.youtube.com/watch?v=7-71HvAjOgo

https://wtc.art/artwork/alexandar-calder/

MEMORIALIZING SEPTEMBER 11, 2001

World Trade Center with Memorial & Museum
Image: Jin S. Lee (9/11 Memorial & Museum)

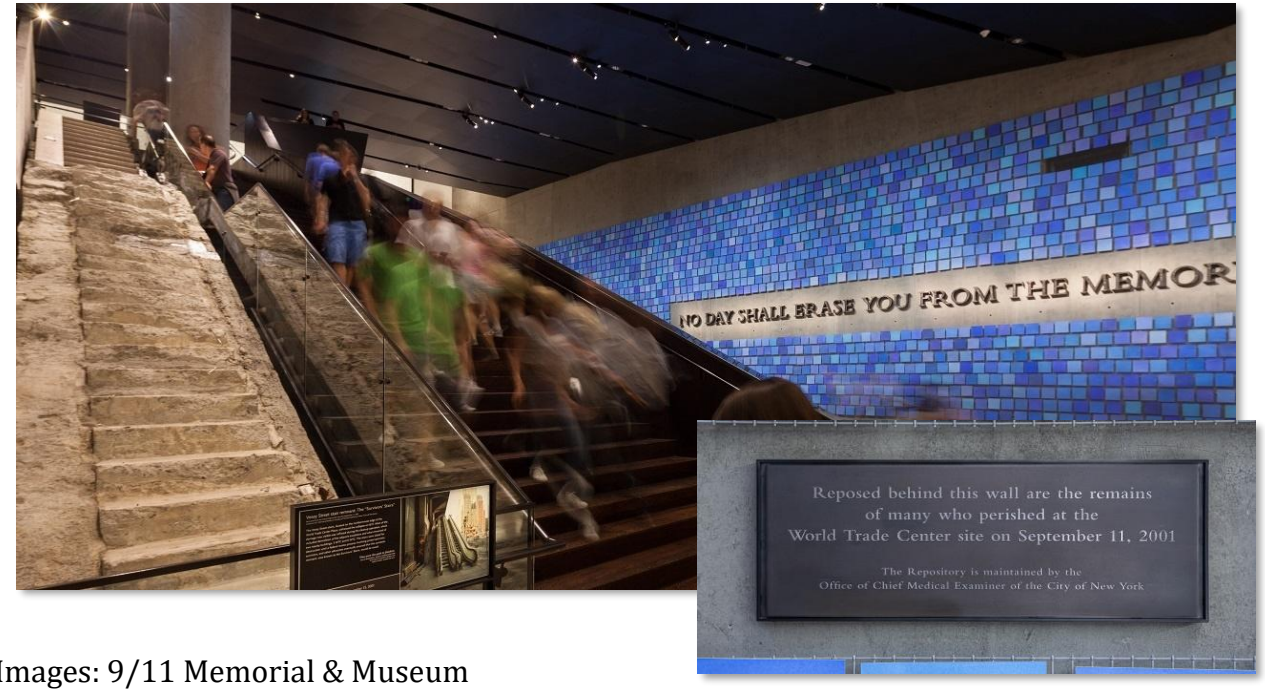


MEMORIAL POOLS

The names of victims are inscribed on bronze parapets, grouped by the locations and circumstances in which victims found themselves during the attacks

MEMORIAL GLADE

Dedicated in 2019 to the hundreds of thousands of people who were exposed toxins resulting in thousands of illnesses and deaths



Images: 9/11 Memorial & Museum

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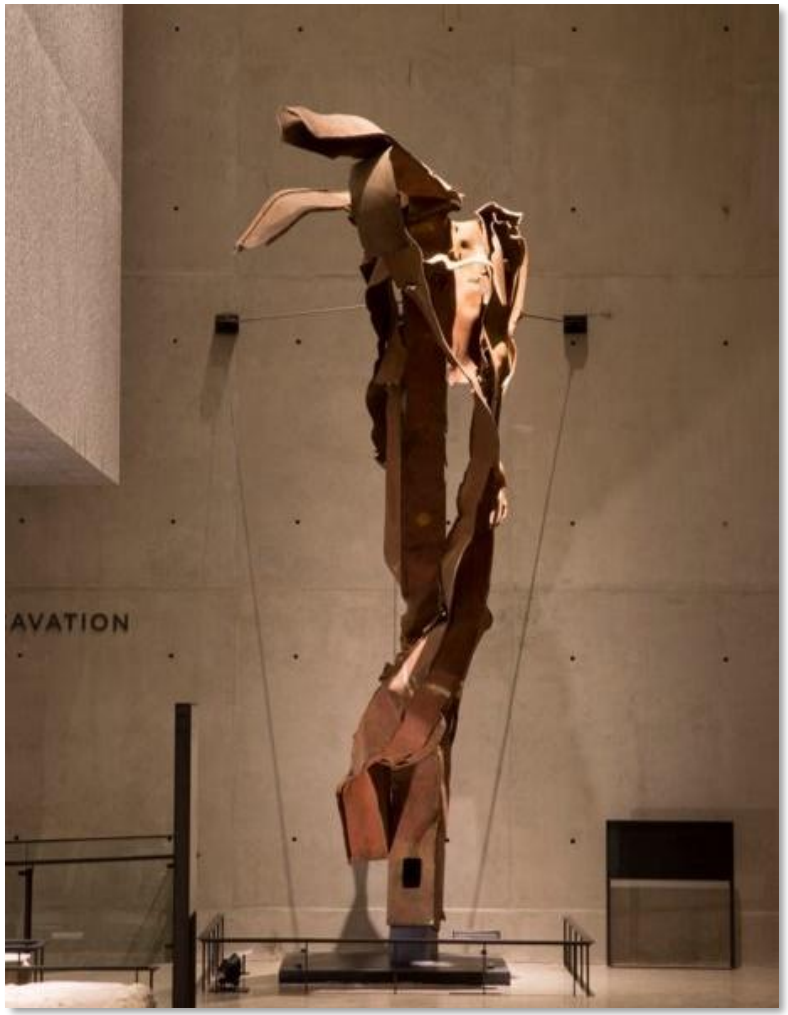
MUSEUM COLLECTIONS

- Recovered Artifacts
- Tribute Items
- Built Heritage
- Fine Art
- Books & Manuscripts
- Digital Images
- Archives
- Print Images
- Ephemera
- Oral Histories



C.2009.310.2
Impact Steel
Damage sustained from the impact of Flight 11

C.2011.1039.2
Recovered items belonging to
Andrea Lyn Haberman

A native of rural Wisconsin, 25-year old Andrea Lyn Haberman worked as an administrative assistant to a senior executive for Carr Futures. She was attending meetings at the firm's NYC offices in the World Trade Center as her first business trip and time in New York. Andrea was on the 92nd floor of the North Tower.

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Photo By
Det.Greg Semendinger
NYC Police Aviation Unit

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SUPERSTORM SANDY: OCTOBER 22, 2012

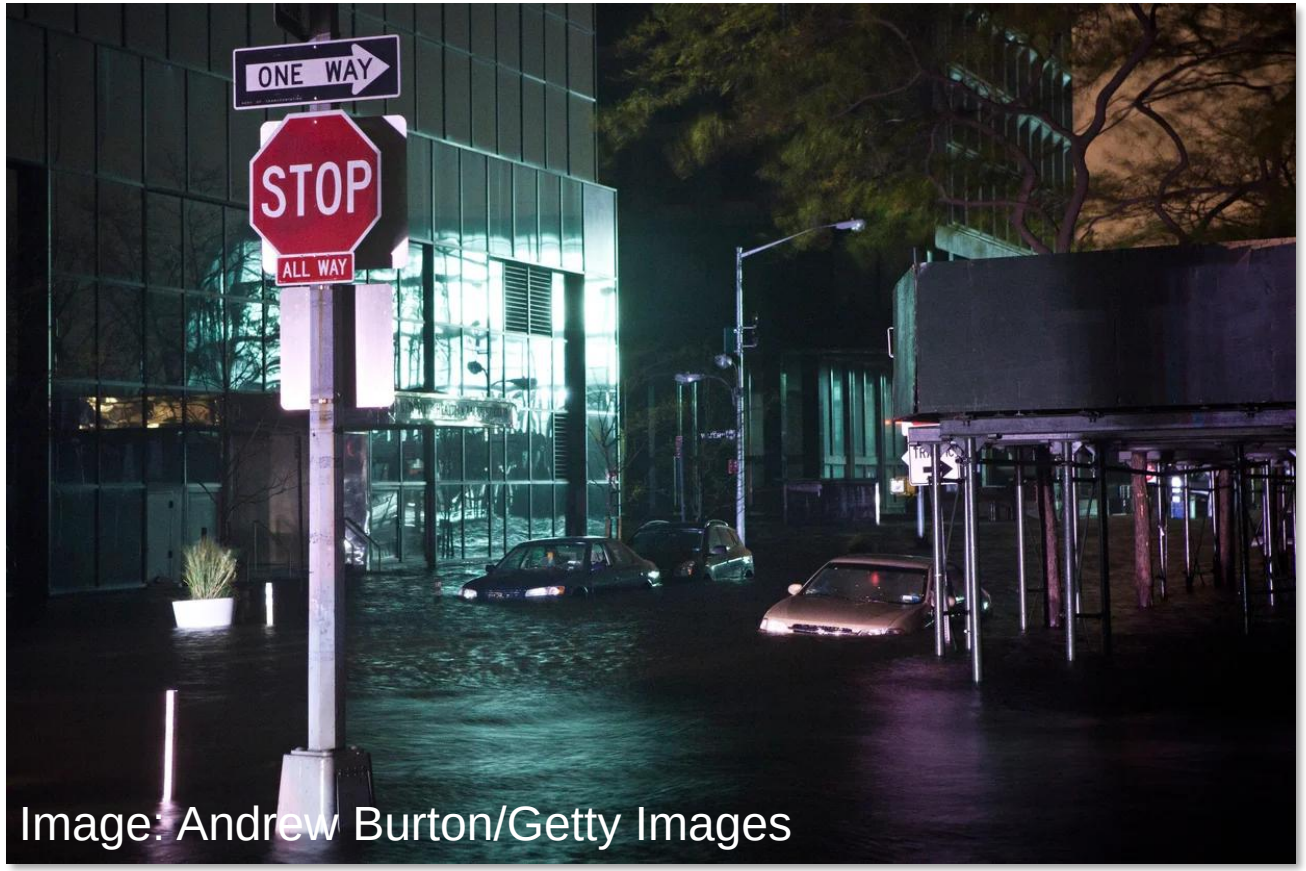


Image: Andrew Burton/Getty Images

A flooded street in the Financial District on Oct. 29, 2012

Sea water floods the Ground Zero construction site on Oct. 29, 2012

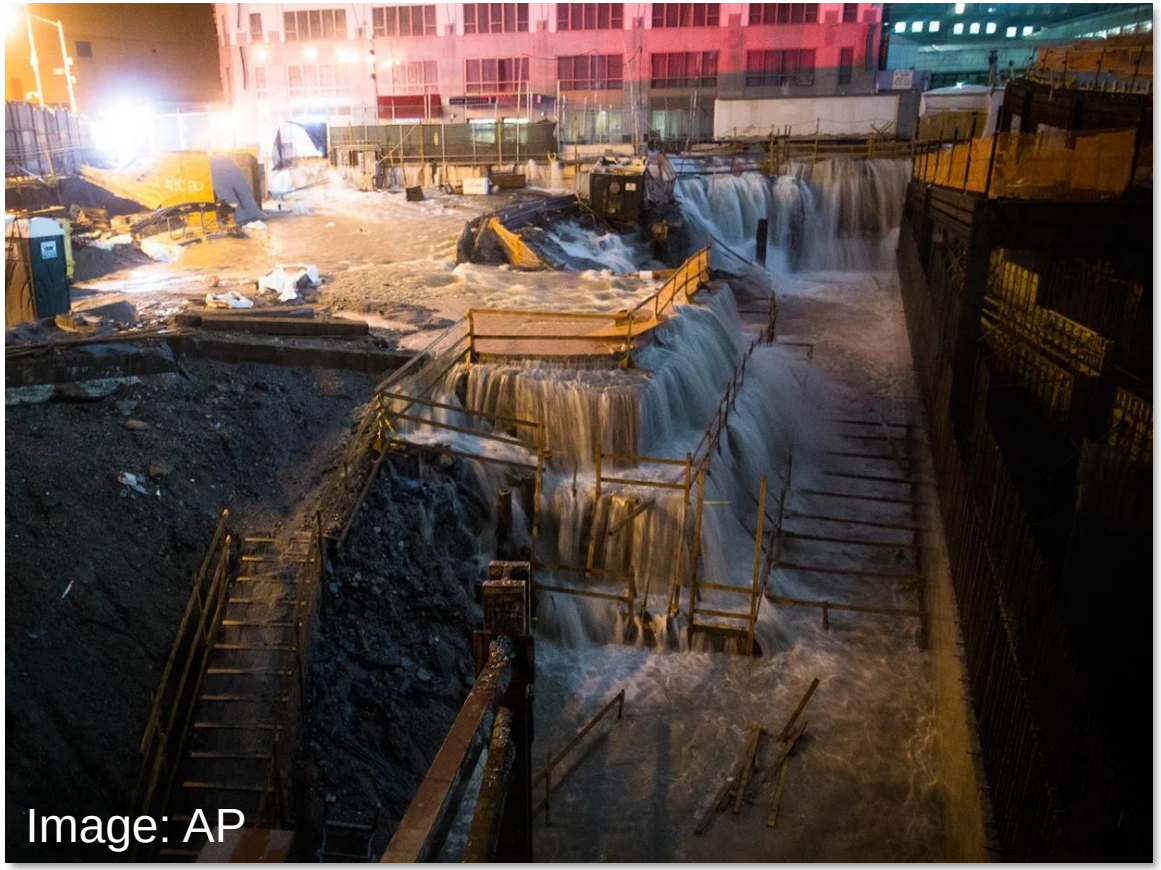
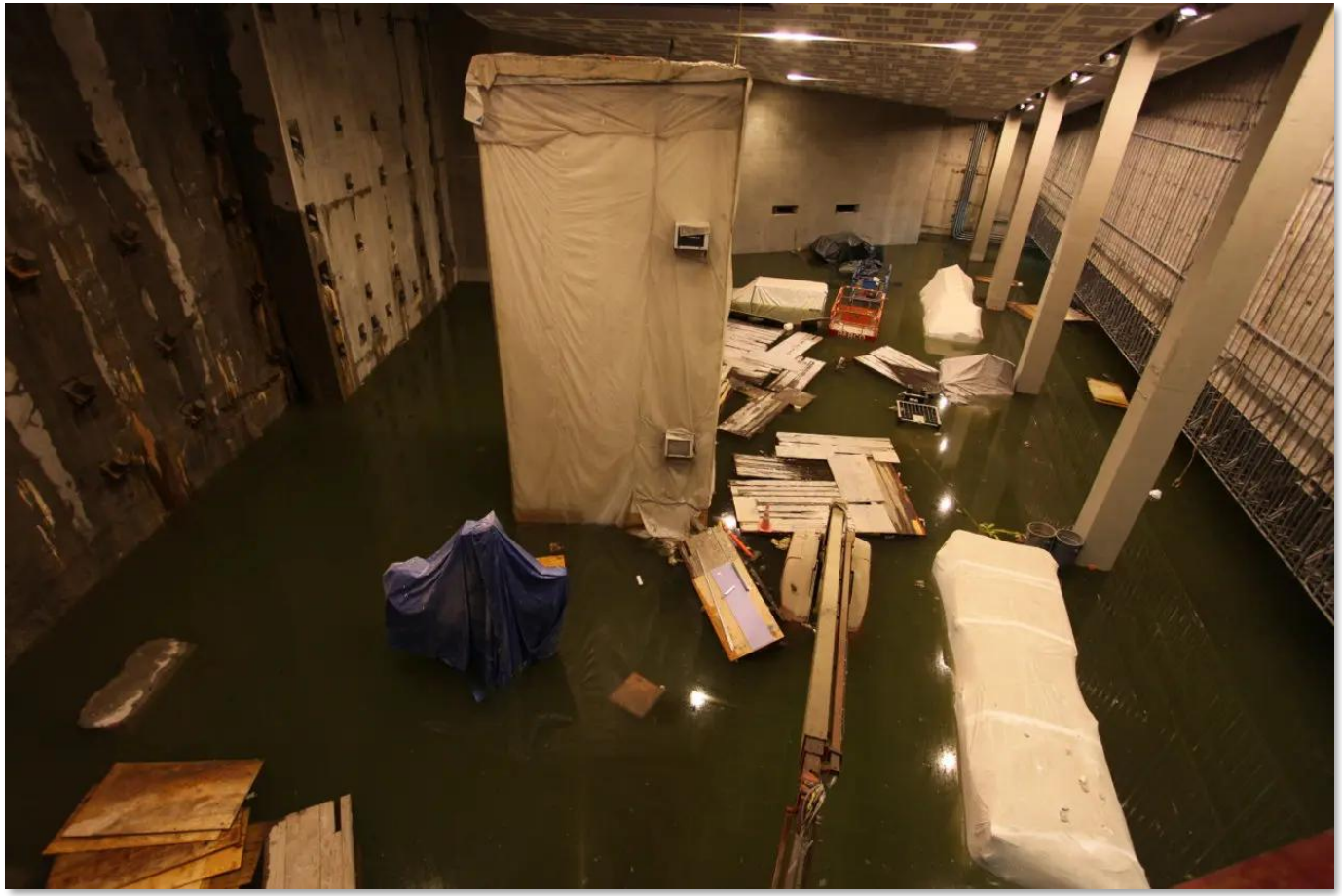
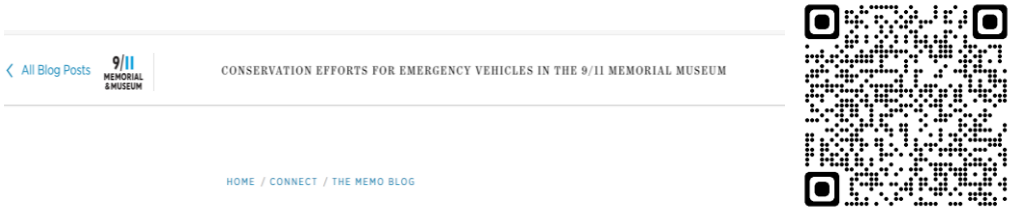


Image: AP

SUPERSTORM SANDY: OCTOBER 22, 2012



Flooding of Foundation Hall during the installation of large artifacts following Superstorm Sandy



HOME / CONNECT / THE MEMO BLOG

Conservation Efforts for Emergency Vehicles in the 9/11 Memorial Museum

PHOTO OF LADDER 3 WITH EMERGENCY CREW MECHANICS ROY CAULKIN AND NICK SACCAS. IMAGE: MAUREEN MERRIGAN.

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EVALUATING HEALTH & SAFETY CONCERNS

AIC

The American Institute for Conservation of Historic & Artistic Works

December 7, 2001

Dear NYRAC Member,

In an effort to help guide conservators in handling objects contaminated with dust that contains hazardous components from the World Trade Center disaster site, we are providing you with this packet of information. Enclosed you will find four documents, compiled and sponsored by the AIC Health and Safety Committee and Arts Crafts and Theater Safety (ACTS), by the Smithsonian Institution Office of Safety and Environmental Management (OSEM) and the Smithsonian Center for Materials Research and Education (SCMRE). These documents address some of the special conservation and safety issues that are required in dealing with dust that may be contaminated with potentially hazardous materials.

Much of the specific information about individual contaminants changes frequently as more information becomes available. Federal agencies (OSHA, EPA) are conducting air monitoring on an almost daily basis in Lower Manhattan. Most test results generally indicate low airborne concentrations of hazardous materials outside of the Ground Zero work area itself. However, some or all of these materials are presumed to be still present in the settled dust in a wide range of concentrations depending on the location of the building/work site or home site in relation to the WTC, whether the building had been or still is open to the environment (i.e., windows blown out), prevailing winds, and the degree to which the building interiors had been decontaminated since the collapse.

It is important to keep in mind that the air sampling data is only relevant for those working in the area where sampling has been done. The documents included in this packet are specifically designed to help conservators who are primarily concerned with the composition of the settled dust to which they will be exposed when it is disturbed during their work.

Experts acknowledge that no one knows how all these substances in combination, even when each individual chemical is below regulatory concern, will affect people. A number of occupational physicians are reporting respiratory problems and adult onset asthma in people living or working as far as seven blocks from Ground Zero. And a number of official health studies are now underway which may cause us to make changes in our recommendations and in this document.

It is hoped that the distribution of these documents will help disseminate information about appropriate safety precautions for handling and cleaning objects of cultural patrimony, and that this information will, in turn be passed to the general public so that they too can make informed decisions about cleaning their most precious possessions.

We would like to thank SCMRE and the Smithsonian Institution for their help in coordinating efforts to produce these documents and for their time and consideration in mailing these packets.

Lisa Goldberg, Chair, Health and Safety Committee, AIC
Monona Rossol, President, ACTS

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WORLD TRADE CENTER DUST
SAFE WORK PRACTICES FOR CONSERVATORS

Based on data available as of 12-6-01

Monona Rossol, President, *Arts, Crafts and Theater Safety*
Kathryn Makos, CIH, *Smithsonian Institution Office of Safety and Environmental Management*

IDENTIFICATION OF HAZARDS

The dust created from the collapse and subsequent fires at the World Trade Center (WTC) is unlike any you will have encountered in the past. The WTC collapse pulverized 210 floors of the building's cement, glass windows, insulation (asbestos and fiber glass), and other building elements. The fire is now the longest burning commercial building fire in United States history. Smoke from this fire contains the products of incomplete combustion of thousands of plastic computers, miles of vinyl coated wiring, acres of flammable carpet, tons of office furniture, reservoirs of hydraulic oil and other fuels including some contaminated with polychlorinated biphenyls (PCBs), and more.

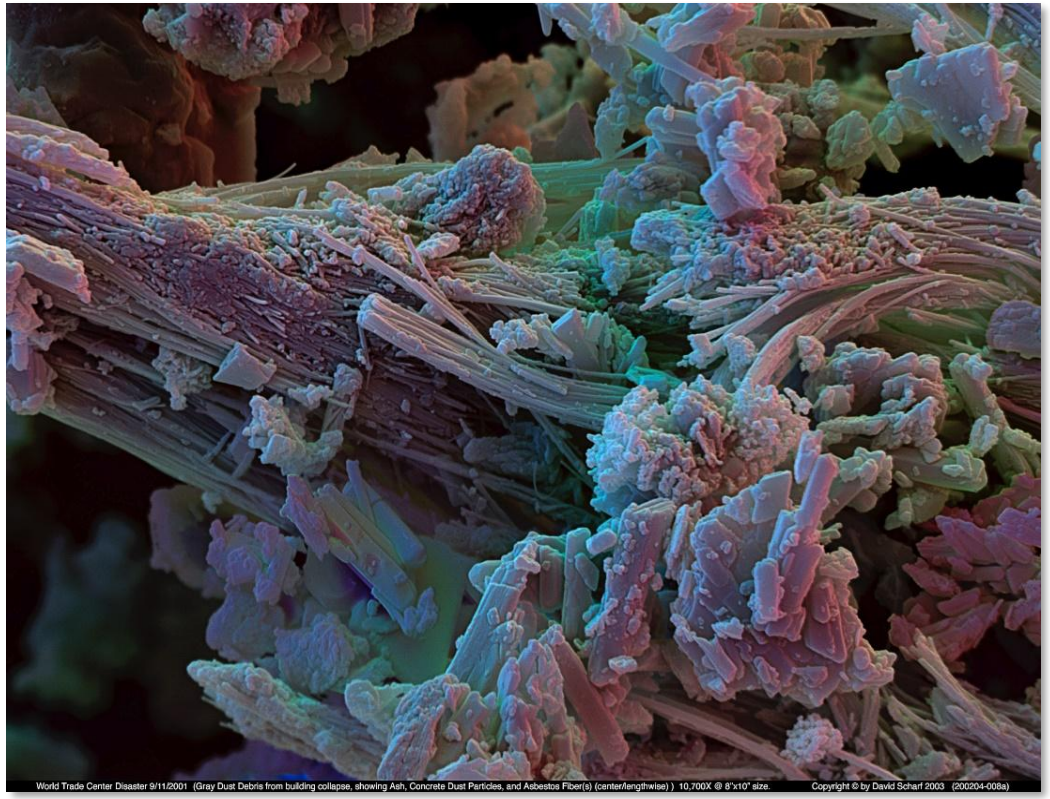
EVALUATING HEALTH & SAFETY CONCERNS

Dust collected for analysis of composition (C.2012.132.1)

Some contaminants identified in WTC Dust:

- **Heavy metals (e.g. lead)**
- **Asbestos**
- **Man-made vitreous fibers (glassy fibers)**
- Cement
- Plaster
- Wood and paper fibers
- Plastics
- Polychlorinated biphenyls (PCBs)
- Dioxins

CONTAMINENTS OF POTENTAL CONCERN (CoPC)



SEM image of WTC Dust (C.2016.86.1.1, David Scharf)

Dr. Paul Lioy (Rutgers University/Robert Wood Johnson School of Medicine) and **Dr. Lung Chi Chen** (NYU School of Medicine) with **TRC Environmental Corporation** help create a plan for testing and working with objects potentially coated with the hazardous elements of its dust.

DECISION MAKING HAZARD CONTROL

Health & Safety Priorities

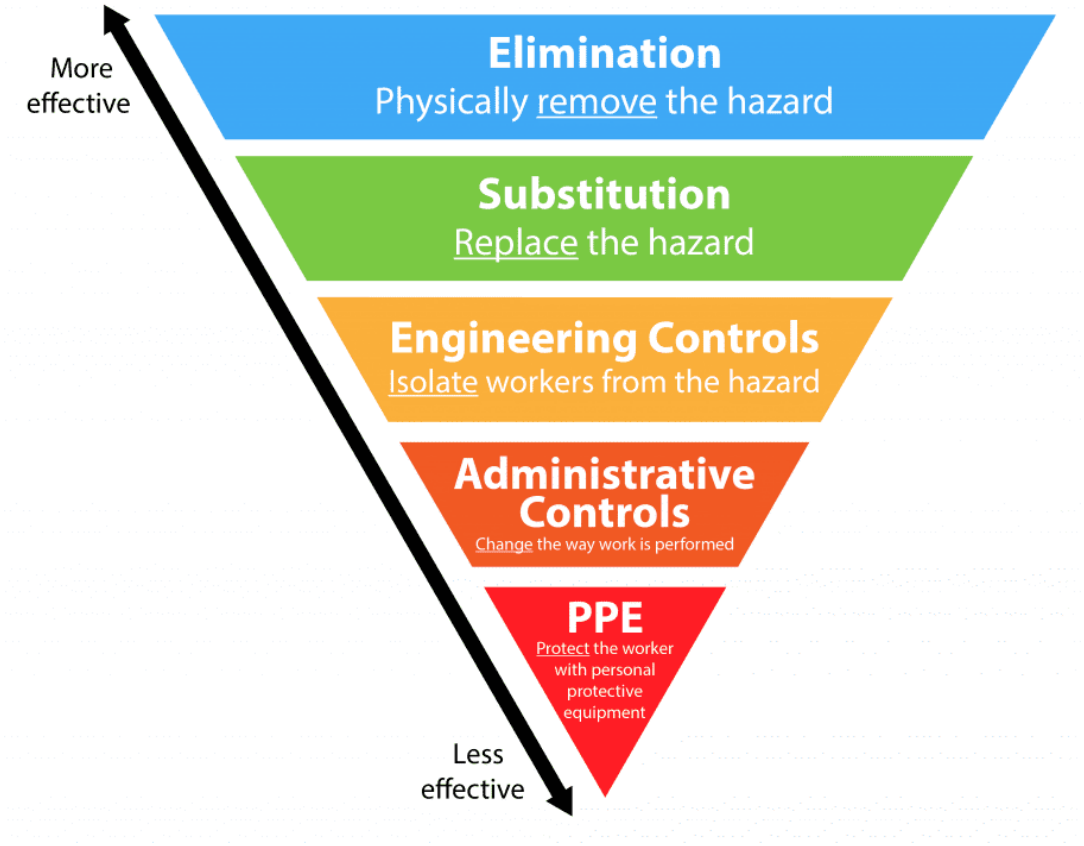
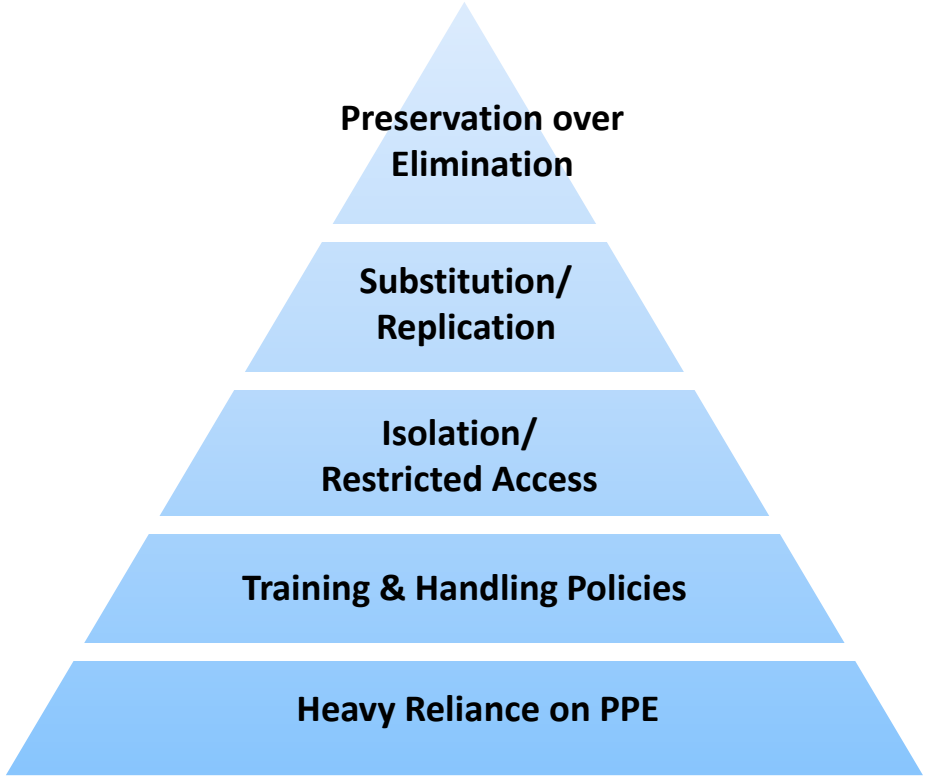


Image: CDC



Collections Priorities

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Image: Kerith Koss Schrager

Exposure Control at the 9/11 Museum: Elimination

FDNY Ambulance (C.2011.179.24)

Vehicles Collected at Fresh Kills

Sifting debris from Ambulance

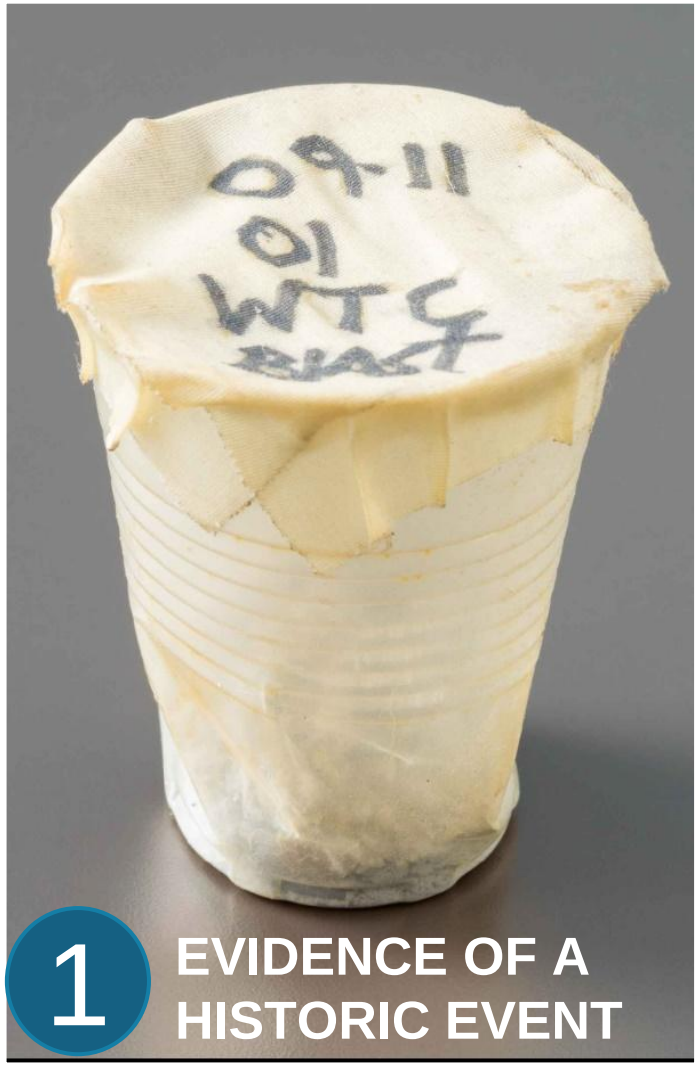
Fresh Kills Landfill, Staten Island (Spring 2002)

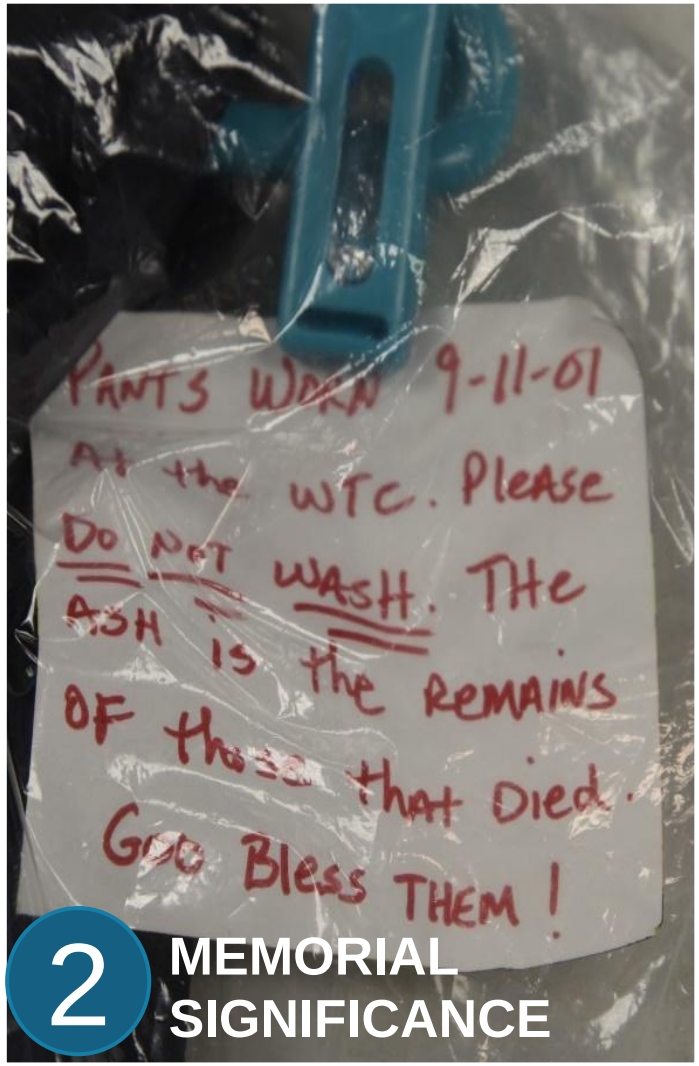
Hangar 17/JFK Airport (December 2011)

Current Exhibit at 9/11 Memorial & Museum

Images: National September 11 Memorial & Museum

Significance of WTC Dust





Images: National September 11 Memorial & Museum

Image: NYC OCME

Exposure Control at the 9/11 Museum: Isolation

Vitrined Objects

Historical Exhibition, 9/11 Memorial & Museum
Recovered papers, floppy discs, glass, and steel

Chelsea Jeans Installation
9/11 Memorial & Museum

Images: National September 11 Memorial & Museum

Administrative & Engineering Controls/PPE

Initial Sample Results			Verification Sample Results			
Asbestos	MMVF	Lead	Asbestos	MMVF	Lead	
Criteria: >1% (1)	Criteria: 52 str/cm² (2)	Criteria: 250 µg/ft² (3)	Criteria: >1% (1)	Criteria: 52 str/cm² (2)	Criteria: 250 µg/ft² (3)	Cleaning Method
ND <1%	27.28	**366**	No cleaning necessary, as approved for no contact with visitor possible			
ND <1%	14.51	**390**	Conservation cleaning only – no contact with visitor possible			
ND <1%	**2,263.43**	39	NS	18.14	NS	HEPA vacuum, wet wash, HEPA vacuum, re-test
NS	32.34	**410**	NS	NS	48	HEPA vacuum, wet wash, HEPA vacuum, re-test
NS	**262.27**	28	No cleaning necessary – artifact encased			
NS	**82.63**	160	NS	38.10	NS	HEPA vacuum, wet wash, HEPA vacuum, re-test
53.0% Chrysotile	10.78	28	NS(4)	NS	NS	Asbestos abatement, encase
NS	**183.23**	82	NS	ND	NS	HEPA vacuum, wet wash, HEPA vacuum, re-test
ND <1%	**97**	81	NS	5.44	NS	HEPA vacuum only, re-test
NS	**1,661.65**	7.1	No cleaning necessary – artifact encased			
ND <1%	**1,122.74**	12.0	No cleaning necessary – artifact encased			

All artifacts recovered from the crash sites are considered hazardous until cleared through analytical testing for Contaminants of Potential Concern (CoPC)

CoPC artifacts are isolated and placed in specialty storage housing and labelled as hazardous (yellow stickers)

All CoPC artifact handlers receive hazardous materials training and must follow specific handling protocols

Administrative & Engineering Controls/PPE

Initial Sample Results			Verification Sample Results			
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https://synergist.aiha.org/20210607-hazard-or-artifact

Considerations for Cleaning Hazardous Materials

Access:
Would removing hazardous materials increase access to a collection that is otherwise not available for exhibition or research?

Identification & Training:
Do staff have the appropriate knowledge to identify the hazards and training to conduct cleaning or handle the hazards safely?

Resources:
Are the appropriate staffing, funding, equipment and time available to handle and maintain the hazards?

Interpretation:
Does removing the hazard affect the interpretation of the artifact?

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RESOURCES

Koss Schrager, Kerith and Andrew Wolf. 2023. "'Never Forget': Examining Changes in the Materiality and Preservation Practices at the National September 11 Memorial & Museum, New York," *Journal of the Institute of Conservation*, 46(3), 164-179. https://www.tandfonline.com/doi/full/10.1080/19455224.2023.2250840

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