
The Nippon Kan Curtain

Encapsulation and Installation of an Asbestos Stage Curtain

Summary

This article is an expansion of a talk I gave at the WAAC conference in Palm Springs in 2012. While it is a treatment synopsis for a specific object, I hope that a description of the treatment and administrative process of dealing with an asbestos cultural object will be informative for conservation professionals encountering this material in objects or architectural environments related to their work.

Asbestos

Asbestos occurs as a fibrous mineral and is categorized into several types. Once these fibers are airborne, they are very dangerous as lung irritants. All asbestos types are characterized by a fibrous structure, usually occurring as veins of soft or fluffy silicate material in a harder rock matrix. The extraction, milling, and commercial processing of asbestos, and its application and subsequent degradation in products and building materials, is an ongoing health threat. Asbestos has been mined since at least 100 B.C.E. and has been documented since that time for both its health risk and its useful properties, namely strength, surface area, lightness, non-flammability, and lubrication.

The industrial use of asbestos in the U.S. reached its highest point by the mid-20th century, where it found its way into roughly 3000 American products. It was eventually banned in the U.S. by the last quarter of the 20th century after increased examination of its health threats, culminating in a Federal settlement to the Libby, Montana class action suit. While the attached legislation stipulated that mining and production of asbestos would stop that year, existing stocks and materials were in permitted to be used until 1986.

Asbestos continues to be mined and processed into products worldwide, with varying degrees of oversight on environmental release and public safety. In the U.S. it continues to be legally processed into non-friable products such as tires, brake pads, cement, and laminates.

Asbestos is a lung irritant as opposed to a toxin. The fibers of asbestos are extremely light and fracture into smaller and smaller spicules. A single fiber will remain airborne for hours. In a hermetically sealed room, a fiber requires >80 hours to settle 9 feet.

With this loft duration and with ambient air circulation, the fibers can be inhaled readily to lodge deep at the back of the lungs, where they embed and ultimately generate malignant tumors and asbestosis. The primary cancer type, mesothelioma, is nearly always fatal and has a latency period of as long as twenty years. The respiratory threat is not restricted to the asbestos worker or the building inhabitant. Fibers can be carried on clothing or equipment to other environments and transmit the risk of inhalation to other persons.

The Curtain

The object I treated was an asbestos stage fire curtain, measuring 17 by 35 feet and weighing 156 lbs. The curtain had

been painted and repainted with a gridwork of numerous advertisements, in varying paint types, primarily friable and powdery distemper and poorly bonded oil. With heavy metals and silicates in mind I took numerous paint samples as well as thread samples. The composition of the textile was 83% chrysotile asbestos and 17% cotton.

In subsequent reading I learned that asbestos fire curtains are common and indeed continue to be used, though at this time they are required to be encapsulated to prevent fiber release as they stay rolled, ready to be dropped, from the top of the proscenium.



The Nippon Kan

A rough translation of *Nippon Kan* might be “Japanese Community House.” This entity, established in Seattle’s Japantown in 1909, served as a hub for the Japanese population in Seattle and included housing, business interests, a community hall, travel agency, and bank. The main hall of the Nippon Kan contained a stage as a location for travelling shows, many from Japan, and a site for weddings, banquets, and community and business functions.

The stage curtain was painted with advertisements for businesses in Seattle, mostly Japanese. Advertisement was paid by subscription. If the business did not continue to pay for the advertising space, the section would be painted out or replaced by a new subscriber. The result is a layered series of advertisements in Kanji and HIRAGANA, with graphics. Many of the surfaces have deteriorated to reveal traces of underlying businesses.

The Nippon Kan was closed in 1942 after the Japanese attack on Pearl Harbor, and most of the Japanese population of Seattle was interned for the duration of World War Two. Nearly all of the businesses advertised were closed, and Seattle’s Japanese community would never regain the coherence and economic presence it had in Seattle prior to the war.

The Wing Luke Museum

Named after the Washington State Assistant Attorney General who proposed it, the Wing Luke Asian Museum was

founded in 1967 to register the immigrant experience of all Asian cultures in Washington. It was located in two smaller facilities until 2008, when it moved into the newly adapted Kong Yick Building, which had served as a tenement building, commercial presence, and Chinese family house. I was approached by the Wing Luke Asian Museum to stabilize and install the Nippon Kan Curtain there, in the Tateuchi Story Theater, as a fixed backdrop to the stage. As a document of the Japanese culture in Seattle the curtain was considered an important part of the museum's collection.

Project Administration: Personal and Environmental Protection

Washington State and Federal law require that all asbestos items and environments containing asbestos be treated in a regulated manner to eliminate fiber release to the environment and to fully protect associated asbestos workers against fiber release and inhalation. In Washington this is overseen by the State Department of Labor and Industries, which enforces the highest standards of compliance. By following their standards, I remained in compliance with those of other entities such as the Asbestos Hazard Emergency Response Act (AHERA) and the Puget Sound Clean Air Act.

Preliminary training consisted of a five-day asbestos supervisor course at a hazardous materials training company. This certification allowed me to work on the curtain on my own schedule, without supervision.

In Washington, asbestos workers also can take a three-day course. However, this would not allow me to work without supervision, which would have made the project unmanageable logistically, as an asbestos supervisor would need to be present any time I was in the work enclosure. A similar but more intensive ten day asbestos contractor course was also available. However this represented more training and consisted of more administrative aspects of asbestos project maintenance and record keeping than were necessary for the project.

After the course and associated testing was completed, I was cleared to work on the curtain. Asbestos certification must be renewed annually.



The Work Enclosure

In addition to contracting my conservation service, the Wing Luke Museum contracted an asbestos abatement contractor to create a compliant work enclosure within an empty warehouse in downtown Seattle.

The working enclosure consisted of visquene walls and an area of roughly 1500 square feet, which allowed room to work on the curtain flat on the ground, and adjacent floor space to accommodate tubes, work bridge, materials, mock-ups, and a consolidant preparation area. The enclosure was fully sealed at all seams, kept at negative pressure, with two apertures: an entry/exit door with small shower and decontamination room at the outside and an exhaust at the other end.

The exhaust was fitted with large fans, two-stage HEPA filtration, and an exhaust tube which exited the building. The exhaust fans and negative pressure were maintained continually for the duration of the project as prescribed by law. While I focused on the curtain, the asbestos contractor maintained the enclosure, performed periodic release tests, and provided trainable personnel for steps requiring help, such as turning the curtain when necessary.

Personal Protection

Personal protection equipment consisted of a disposable hooded tyvek worksuit with feet, taped at the wrists over nitrile or latex gloves. Half-face organic vapor respirators were used, with HEPA prefilters worn at all times in the work enclosure. In keeping with regulations, periodic air samples were taken from both the ambient and breathing zones to register asbestos fiber release while working with the material. This release was found to be minimal at all times, including at the early vacuuming and turning phases.

All materials entered the enclosure one way, and could not be removed until the project was complete, the enclosure was cleared for fiber release, and those materials were decontaminated by thorough wiping with wet cloths. All waste generated during the project –asbestos thread trimmings, wet rags, tyvek suits, fabric scraps- was kept in specialized, pre-labeled hazardous waste bags, sealed, recorded and disposed appropriately in hazardous waste sites.



The Nippon Kan Curtain, continued

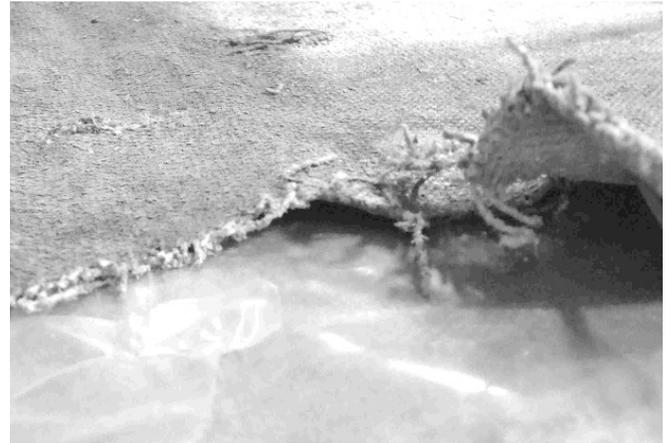


Treatment

Testing and selection of materials

Once compliance was satisfied, the curtain could be unwrapped and testing of materials could begin. The asbestos abatement industry uses two categories of encapsulants, those which saturate the matrix, and those which bridge, or form a film across the top of the matrix. The challenge was to find an adhesive which would successfully bind the asbestos fibers, as well as bind the highly friable pigments in an optically acceptable manner. I decided to apply an encapsulant which would saturate the entire matrix.

Current policy does not stipulate what resins or paints are used as asbestos encapsulants, provided that the selected material provides ongoing protection against fiber release and can be shown by aggressive release tests to hold fibers in place. This allows the asbestos abatement and mitigation industry to select from a range of bridging and penetrating encapsulants, including paints, polymers, commercially prepared proprietary resins, etc. The absence of material specification allowed me to select legally from a range of conservation adhesives which would meet the same safety criteria.



The Nippon Kan Curtain, continued

Using a mockup, I tried familiar conservation adhesives, primarily Jade PVA adhesives, the BEVAs (especially 371), and Aquazol. I rejected animal and cellulose type adhesives as being too water-dependent, too hygroscopic, and potentially too pest-nutritive at the quantity involved. I eventually selected Aquazol for its lack of odor, slight hygroscopic properties, control of application, minimal toxicity, and potential reversibility. Such reversibility would consist of a tissue membrane over the surface and suction behind, gradual flushing of solvent through the front, with extraction through the reverse.

After trying various application methods, including spray and brush, I settled on a paint roller, as careful application did not disrupt surface properties and allowed uniform control of quantity and penetration. As long as the quantity of consolidant in the roller was correlated carefully to the intended application zone, and the application was limited to a single pass in one direction without rerolling or other reworking, the powdery pigments and deteriorated paint films stayed in place and were not removed or redistributed.

Cleaning

The curtain was rolled out, face up. I vacuumed the front gently to remove a heavy layer of dust, free pigment, and asbestos. While this step inevitably removed some free pigment and previously fully dislodged paint fragments, the appearance of the images and text remained unchanged and loss of paint material was not perceptible. This was also a necessary step for compliance, which required that I remove free asbestos fiber whenever possible.

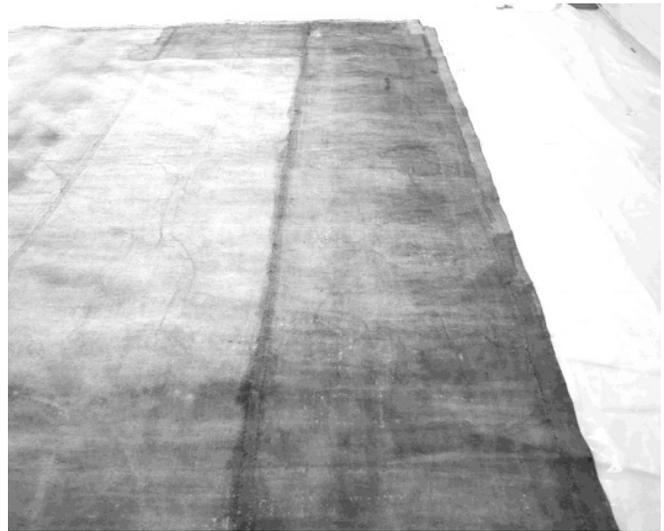
After the front was vacuumed, the curtain was rolled face down using sonotubes, and the reverse was vacuumed vigorously to remove a heavy dust layer and as much free asbestos fiber as possible from the reverse. It was then re-rolled back to face up in preparation for surface consolidation.

Consolidation

I applied two thin layers of Aquazol 50 to bind the front surface without disturbing the optical properties of the original paint layers. Two applications were necessary due to the varying porosities of different paint zones to ensure pigment and asbestos binding. After drying, swab tests showed very good pigment binding regardless of paint type, and no variation in sheen from original paint surfaces.

Successfully binding the front required 1.5 pounds of Aquazol solids, melted in a crock pot double boiler in a combination of distilled water and ethanol.

After these applications were dry, I rolled the curtain back to face down, and applied a heavier application of Aquazol 500 and 200 to the reverse, to penetrate the thick fabric and bind fibers. Saturation of the reverse and successful asbestos binding required 5.5 pounds of Aquazol solids. The combined Aquazol solids in the curtain totaled 7 lbs. This was shown by aggressive release testing to be adequate. The curtain remained flexible, slightly saturated in color but without a sheen or film visible on either side.

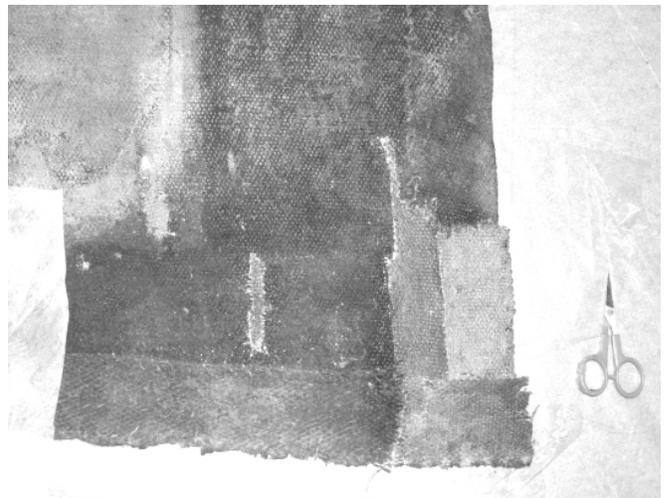


Considering the small exhibition space and potential for public contact, I applied a layer of BEVA film to the entire reverse and kept the mylar release layer for this product in position. This would ensure a complete barrier to any asbestos fibers which might dislodge from the reverse.

Loss Compensation

As the curtain had been rolled up and down during its use at the Nippon Kan, it had developed large weak zones and losses along the top. The fabric was quite coarse and woven in a manner such that similar surfaces were impossible to replicate with materials other than the original.

After backing the losses with Hollytex, I created inlays by tracing the losses and finding corresponding sections of folded seams at the reverse of the curtain, where I trimmed and re-grafted fabric into the losses. The absences in the source seams were replaced with folded and shaped Sunbrella fabric of the same depth to be sure the plane and climatic response in these areas would remain the same.



The Nippon Kan Curtain, continued

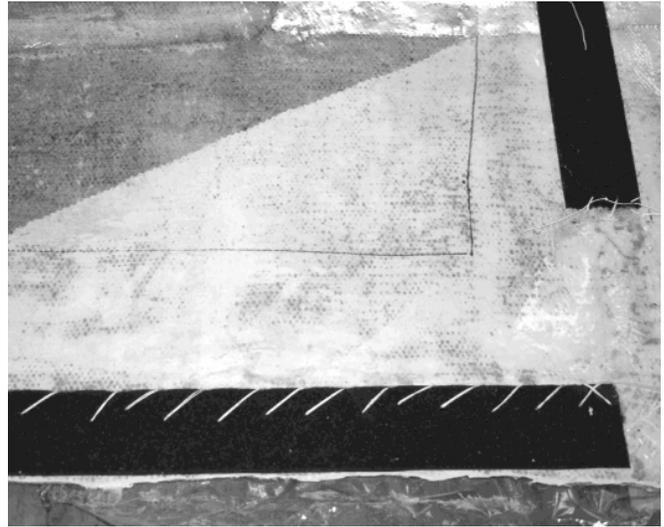
Preparation for hanging

At 156 pounds, weight distribution was important. I applied a thin layer of polyester fabric to the top of the curtain. This piece of fabric also contained 8” “reachers” which extended downward onto the seven vertical seams crossing the curtain. These seams also served as columns where I glued and stitched the wooly side of Velcro in sections measuring 2” x 12”. A horizontal, 4” strip of Velcro was applied along the heavy double seam top of the curtain, as a primary weight support.

Hanging

The prepared curtain was rolled face inward onto a reinforced, 18” sonotube, and driven to the museum. There, we raised it into position on three coordinated lifts to the top of the back wall of the stage, where the top edge was stuck onto the strip of hook Velcro which had been screwed into position there.

As the curtain was gradually lowered, hook Velcro sections were screwed to the wall. This method of applying the final hang points allowed for minor sag-based adjustments and satisfactory tension maintenance as the curtain was unrolled down the wall.



A final protection for the curtain consisted of a 5’ glass wall placed in front of the bottom of the curtain. As the stage is narrow, this permitted protection of the curtain and the public from accidental contact.

