

The Bill of Rights Goes to Spain

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It was not until late in 1991 that the government of the United States decided to send a copy of the Bill of Rights to Expo '92. The United States Information Agency (USIA) had been given a small budget to create a pavilion at one of the most lavish world fairs in history. Expo '92 was springing to life on a large site in Seville, Spain. Many handsome and imaginative national pavilions were being built. The architectural plans for the U.S. Pavilion were unimpressive and subject to wide criticism. Believing that a star quality exhibit was needed to avert national embarrassment, USIA prevailed upon the state of Connecticut to lend its ratification copy of the Bill of Rights. This is one of the 14 original copies on parchment, which in 1789 were sent to each of the 14 states for approval prior to formal ratification. Connecticut agreed to loan its copy with the stipulation that the Northeast Document Conservation Center examine and treat the document and approve its method of display.

The Bill of Rights arrived at NEDCC in January 1992, less than three months before it was to leave for Spain. Measuring 34" x 28", the Bill of Rights is executed on parchment in a brown writing ink, probably iron gall. On its arrival it was in good condition except for fold marks, draws and minor cockling. The skin was relatively thin and bore several translucent areas, probably the result of earlier treatment with excessive moisture.

To flatten the parchment, we placed it in a damp pack humidity chamber until it became soft and supple, about 2 1/2 hours. The chamber contained alternating layers of damp and dry blotters with plastic screening directly above and beneath the document. The parchment was then placed between sheets of polyester web with blotters in a standing screw press. Very light pressure was used.

After several weeks in the press, the document was ready for mounting. The Bill of Rights was to be exhibited in an almost upright position on a cloth-covered aluminum screen surrounded by a deep cloth-covered mat. It would be sealed in a 3/4" thick Plexiglas module that in turn would go into a large free standing exhibition case. Our method of mounting had to satisfy several criteria. It had to provide security for a long journey and for six months on exhibit. In addition the mounting technique had to be unintrusive and attractive and of course easily reversible. In choosing a technique, we kept in mind a

worst case scenario: potential failure of equipment, improper handling and dramatic changes in temperature and relative humidity.

We chose a variation of the string or thread mat. With this mounting, developed by Christopher Clarkson,¹ Lengths of twisted linen thread are attached at intervals to the edges of the parchment. The threads are extended away from the parchment providing even tension all around. The other ends of the strings are secured to the edges of a rigid mat or frame.

Animal skin will expand in a humid environment and contract when the air is dry, producing a taut, drummed effect. The string mat is particularly appropriate for mounting parchment because the twist in the strings will respond in a complementary manner. With increased humidity both the skin and the string fibres expand, but the expansion of the fibres increases the twist and actually shortens the length of cord. With decreased humidity, the skin contracts and the string untwists and lengthens. The string mat is therefore theoretically self adjusting, preventing the parchment from becoming slack or overly taut.

The cord we chose was Barbour's 5-ply unbleached Irish linen and the adhesive was Jade 403, a polyvinyl acetate (PVA) emulsion. Other conservators such as Clarkson² and Pickwood³ recommend starch paste. This adhesive, they point out, bonds weakly to parchment and would fail under stress so that the skin would not suffer undo pulling. We found that PVA, although considered a "strong" adhesive, also bonds weakly to skin. Using a test sheet of modern parchment the same weight as the Bill of Rights, we attached cords with three adhesives: wheat starch paste, pure Jade 403 (PVA), and Jade 403 diluted 1:1 with water. The cord adhered with pure PVA released more easily than the others when pulled back on itself. No moisture or solvent was needed. The cord attached with paste was the most difficult to remove. In the attempt, some skinning of the parchment occurred. When the pure PVA was removed, it left no visible residue. There appeared to have been no penetration of the skin by the adhesive.

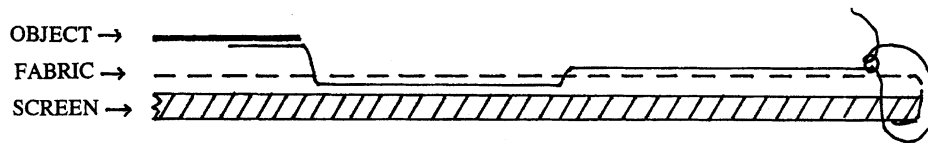
In addition, the pure PVA emulsion, which contained less water than the other two adhesives, caused the least amount of swelling and distortion. The PVA dried so quickly that no noticeable cockling occurred, even when

no weight was applied on drying. This was a desirable trait since the thin skin of the Bill of Rights would easily show the impression of a cord adhered with weight. Inspection with the binocular microscope after removal of the PVA showed no disturbance of the parchment surface as well as no adhesive residue.

Prior to attachment, the ends of the 5-ply linen cords were teased out to form fans about 3/8" long. Adhesive was applied to these ends and each string was secured with pressure from a bone folder applied through Reemay. The cords were placed every three to four inches at all edges.

The mount was a heavy aluminum screening covered with a natural linen. The cloth, from Testfabrics, Inc., of Middlesex, New Jersey, was pH neutral and chemical free. Using a long curved needle, we guided each cord under the cloth, then laterally between the cloth and screen. The thread mount worked especially well with this cloth covered backing because the cloth allowed us to conceal the threads.

The cords emerged about 2 inches from the document and were twisted to allow more give and take during possible humidity changes. Finally they were looped around the edge of the mount and tied (see diagram below).



The deep cloth-covered mat was put in place. It allowed the edges of the document to be seen but covered the exposed part of the strings.

Our next task was to install the mounted document in the exhibit module, which had been sent to NEDCC from the fabricator, Maltbie and Company. This capsule was essentially a sealed Plexiglas box which was to go inside a larger exhibition case. The relative humidity within the capsule was to be controlled by silica gel panels mounted behind the document.

The module had been designed by Staples and Charles, exhibition designers, with input from Steven Weintraub. Before we placed the mounted document in the capsule, it, the capsule and the silica gel panels were allowed to rest in the controlled environment of our storage room for several days. The module was then assembled in the storage room and bolted securely in place so that a sealed environment was created. A small sensor for reading temperature and relative humidity had been installed inside the module. Temperature and relative humidity were monitored on a daily basis for the duration of the exhibition.

The module was placed in an ethafoam lined export

case, custom made by the fabricator, Maltbie and Company. This was packed in a wooden crate, which we had to rebuild so the document would ride in a horizontal position.

The crate was bolted to the floor of a "reefer" owned by the Sea-Land Company. This reefer (i.e. refrigerated container) was 40 foot long and was equipped with sophisticated temperature and humidity controls. The document was the only occupant of this large container, where it remained until its arrival in Spain. The container was loaded onto a Sea-Land truck; taken under police escort to Elizabeth, N.J.; loaded onto a Sea-Land container ship; taken to Algeciras, Spain; and finally trucked to Seville. The document was sent by sea because the Sea-Land Company was one of the corporate sponsors of the American Pavilion. At first we objected to this method of travel because of its lengthy duration. A meeting with Sea-Land representatives, however, convinced us that both security and climatic stability could be maintained for the entire trip. But as is so often the case, the initial decision had been made without input from a conservator.

The container carrying the Bill of Rights arrived in Spain approximately 2 weeks later. A Sea-Land truck brought it to the American Pavilion. The Bill of Rights

Exhibit was housed in one of two previously used geodesic domes that made up much of the U.S. Pavilion. The module was unpacked and placed in a free standing

case designed for it by Staples and Charles. The Bill of Rights was exhibited in an upright position with a slight incline. Temperature inside the case was cooled by two 80 watt Supercool thermoelectric cooling units (model AA-080-24-22). Temperature and relative humidity inside the capsule were monitored by a Panametrics hand-held programmable thermohygrometer hooked up to the sensor inside the capsule. Staff at the American Pavilion took readings twice daily.

Use of the Plexiglas capsule microclimate did succeed in keeping the relative humidity fairly constant but was less successful with temperature control. The relative humidity readings varied between 40% and 43%. In August, after four months, the monitor failed and was replaced with another Panametrics unit. Because this had been calibrated differently, it gave higher readings, but again the variation was no more than 3%. Temperature was another story. During the six month exhibition period a temperature variation of 57° to 80°F was recorded inside the capsule. The average was 60° to 70°F. The temperature in the exhibition area fluctuated even more. The temporary nature of the thin skinned dome and its systems was no match for a southern

Spanish summer with blistering mid-day heat and relatively cool nights. Because of the large surface area of the exhibit case, especially the large acrylic face (a poor thermal insulator), the case could not stabilize temperature. The two Supercool units were not capable of offsetting the external thermal load, which was significantly higher than estimated.

The Bill of Rights exhibit contained other historic documents and books loaned by various institutions and individuals. They were shown in smaller Kiosk cases. The cases containing rare or artifactually significant objects were outfitted with thermoelectric cooling units and silica gel. With the Kiosk cases, these systems were ineffective initially. Two sets of readings are compared below. Case #2.2 was identical in construction with case 4.1. Case 2.2 contained a Supercool AA-080-24-22 thermoelectric cooler to regulate the temperature and an ARTEN silica gel system to regulate the relative humidity. Case 4.1, which did not contain rare material, had no climate control equipment and no silica gel system. An ARTEN thermohygrometer was placed inside each case to monitor the temperature and relative humidity in the air space surrounding the documents.

	<u>Case 2.2</u>	<u>Case 4.1</u>
RH range	45-55%	45-56%
7 day variation	2%-6% RH	2%-6% RH
Temperature range	58°-75°F	59°-82°F
7 day variation	6°-10°F	5°-10°F

Case #2.2 did not perform better than case #4.1. Case 2.2 ranged from 45% to 55% relative humidity throughout the course of the exhibit. While the temperature in case 2.2 varied from 58°F to 75°F, the relative humidity in case 4.1 ranged from 45% to 56% and the temperature was 59°F to 82°F.

The performance of the silica gel system and the ineffectiveness of the cooling apparatus can be attributed partially to the design of the showcases. The deck of each case was designed to fit tightly to the Plexiglas enclosure. Only a small slot had been provided in the rear of the case for air exchange between the silica gel and cooling apparatus in the base and the documents above. This slot had been covered by fabric during the fabrication of each case. The access doors had no gaskets.

In early July with the onset of hot weather Steven Weintraub went to Spain to retrofit the cases. He installed a small fan in the Bill of Rights case. This kept air moving over the front of the Plexiglas capsule between it and the display face, where heat was entering through the Plexiglas. The fan, an EBM 2 3/8" crossflow blower (model number EQR6-38), did help control the heat build-up somewhat but did not solve the problem of unacceptable temperature fluctuations.

In each Kiosk case Weintraub opened and enlarged the slot connecting the bonnet and base. A small fan and an EBM single inlet blower (model number G2E108) were installed in each to move the air from the cooler toward the bonnet. Ductwork was provided in the base for this equipment. The access door was gasketed. These improvements did help somewhat to control the atmosphere within the cases but, given the unstable environment within the geodesic dome and the poor insulating properties of the acrylic bonnet, optimum conditions were impossible to achieve.

The Kiosk cases and their contents were a last minute addition to the Bill of Rights exhibit. Even though the exhibition designer and the case fabricator were highly respected, the cases did not give adequate protection. The lesson is well known to conservators; advanced planning is necessary with input from a conservator from the earliest stages of design development.

After six months, Expo closed on Columbus Day, October 12, 1992. It had been decided to return the Bill of Rights by air. The different shipping arrangements occurred because Continental Airlines, a corporate sponsor as well as Sea-Land, had demanded a piece of the action. Because the Maltbie export case was too large to ride in the cabin of a commercial airliner, a new case was designed. This had to be considerably smaller and light enough to be carried by one person. The sides of the case were made of 1/8" Luan plywood; the corners were reinforced with heavier wood braces. The case was lined with 1" esterfoam. Although the case was lightweight, the document within was protected by a tough folder made of six layers of double-walled Archivart Multi-Use Board. We believed that this heavy folder inside a Marvelseal envelope would provide an adequate buffer against temperature and humidity fluctuations during a short trip. The document was wrapped in acid-free glassine and placed in the Multi-Use Board folder. The folder was enclosed in an envelope of Marvelseal, a barrier film that is completely impervious to both moisture and gases. Marvelseal is a laminate of aluminum foil, polypropylene and polyethylene. Three sides of the Marvelseal envelope were heat-sealed prior to the journey. Since such sealing equipment was presumed to be unavailable at Expo, the fourth side was closed with Frame Sealing Tape (sold by University Products).

The uneventful journey home was followed by examination of the document at NEDCC. No changes, dimensional or otherwise, were observed. The document, which still had the strings attached, was remounted in the module and returned to Connecticut, where it was exhibited at the State Museum in Hartford.

NOTES

¹ Christopher Clarkson, "Preservation and Display of Single Parchment Leaves and Fragments," *The Conservation of Library and Archive Materials and the Graphic Arts*, Cambridge (England), 1980, pp.113-119.

² *Ibid.*, p.118.

³ Nicholas Pickwoad, "Alternative Methods of Mounting Parchment for Framing and Exhibition," *The Paper Conservator*, London, Institute of Paper Conservation, vol.16, 1992, pp.78-85.

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