SHORT COMMUNICATION: IMPROVED MOUNTING SYSTEM FOR AN ANCIENT BRONZE TORSO OF A YOUTH

BJ FARRAR

ABSTRACT—In 2009 a life-size bronze torso was loaned to the J. Paul Getty Museum by the Georgian National Museum in Tbilisi, Republic of Georgia, for "The Golden Graves of Ancient Vani" exhibition. An examination of the torso and the existing mount determined that the mounting system had deteriorated over time and become inadequate: it lacked secure support of the object, did not distribute the weight well, was visually distracting, and provided little seismic protection, a particular concern during the exhibition at the Getty Villa in Southern California. A new mounting system was designed and used to address these concerns. This article describes the design criteria, fabrication, and assembly steps for that new mount. The new mounting system, which was composed of internal structural supports that evenly distributed the weight of the object and therefore enhanced the overall safety of the torso, addressed the seismic concerns and provided an improved visual presentation.

TITRE—L'amélioration du système de montage pour un bronze ancien représentant le torse d'un jeune homme RÉSUMÉ—En 2009, un torse en bronze de grandeur nature a été prêté au *J. Paul Getty Museum* par le Musée national de la Géorgie à Tbilisi, en république de Géorgie, pour l'exposition "*The Golden Graves of Ancient Vani*" (Les tombes remplies d'or de la ville ancienne de Vani). Un examen du torse et de son support avait déterminé que le système de montage s'était détérioré au fil du temps. Il était devenu inadéquat, n'offrant plus un appui sûr pour l'objet, ni une distribution égale du poids; aussi il était trop apparent et offrait peu de protection séismique, ce qui était particulièrement problématique pour l'exposition à la *Getty Villa* en Californie du sud. Un nouveau système de montage a été conçu pour corriger ces problèmes. Cet article décrit les critères de conception, la fabrication, et les étapes d'assemblée pour le nouveau support. Le nouveau système de montage, composé d'appuis structurels internes qui distribuent également le poids de l'objet et augmentent la stabilité du torse, répond aux soucis d'activités séismiques et permet une meilleure présentation visuelle.

TITULO—Sistema de montaje mejorado para el torso antiguo de bronce de un joven RESUMEN—En el 2009 el Museo Nacional de Georgia en Tbilisi, República de Georgia, prestó un torso de bronce de tamaño natural al Museo J. Paul Getty para la exhibición "Las tumbas doradas de Vani Antiguo". Un examen del torso y del montaje existente determinó que el sistema de montaje se había deteriorado a través del tiempo y era inadecuado: carecía de soporte seguro para el objeto, no distribuía bien el peso, era distractor visual y proporcionaba poca protección sísmica, lo cual es de especial preocupación durante la exposición en la Villa Getty en el sur de California. Se diseño un nuevo sistema de montaje para solucionar estas inquietudes. Este artículo describe los criterios de diseño, fabricación y los pasos de ensamblaje para el nuevo montaje. El nuevo sistema de montaje, compuesto de soportes estructurales internos que distribuían uniformemente el peso del objeto y por lo tanto aumentaron la seguridad en general del torso, respondió a las inquietudes sísmicas y proporcionó una presentación visual mejorada.

TÍTULO—Sistema aperfeiçoado de montagem para um antigo torso em bronze de um jovem RESUMO—Em 2009, um torso em bronze de tamanho natural foi emprestado para o *J. Paul Getty Museum* pelo *Georgian National Museum* em Tbilisi, República da Geórgia, para a exposição "Os Túmulos de Ouro da Antiga Vani". Um exame do torso e do suporte existente concluiu que o sistema de montagem tinha se deteriorado e se tornado inadequado: o suporte do objeto não era seguro, não distribuía bem o peso, atrapalhava visualmente, e provia pouca proteção sísmica, uma preocupação especial durante a exposição na *Getty Villa* no Sul da Califórnia. Um novo sistema de montagem foi desenhado e usado com base nessas preocupações. Esse artigo descreve os critérios de design, produção, e as etapas de fabricação para aquela nova montagem. O sistema novo de montagem, composto por suportes estruturais internos que distribuíam uniformemente o peso do objeto e, portanto, melhorou toda a segurança do torso, abordou as preocupações sísmicas e proporcionou uma melhor apresentação visual.

1. INTRODUCTION

In July 2009, the exhibition "The Golden Graves of Ancient Vani"[1] was displayed at the J. Paul Getty Museum at the Getty Villa. Among the many objects in the exhibition was a life-size bronze torso of a male youth, commonly referred to as the Vani torso.[2] Although the precise production date of the torso has not been determined, it likely dates to the second century BC and is thought to have been produced in the ancient kingdom of Colchis, in what is today the Republic of Georgia. The object was discovered in 1988 during excavations at the site of the ancient city of Vani.

When the object arrived at the J. Paul Getty Museum at the Getty Villa, the condition of the torso and its mounting system was closely examined by members of the Getty Museum's Department of Antiquities Conservation staff[3] and Nino Kalandadze, conservator at the Georgian National Museum in Tbilisi, Republic of Georgia.

The torso (fig. 1), which measured 105 cm in height, 45 cm in width, and 25 cm in depth (41 × 18 × 10 in.), with an approximate weight of 47 kg (105 lb.), was in relatively stable condition on arrival at the Getty Villa. The only area of notable concern was a fracture on the frontal area that extended from the groin up to the proper right abdomen, probably having occurred in antiquity (fig. 2). Although the fracture was significant, it was determined to be stable.

The initial examination of the existing mounting system (fig. 3a), which traveled inside the torso, revealed that it was loose-fitting. In addition, a visible section of the mount in the proper right leg cavity appeared to have been previously adhered to the object but had become detached. The team quickly determined that the existing mount inadequately retained the object for display in a seismic zone and could potentially compromise the safety of the torso.

The initial discussions considered various measures that could be taken to reduce the movement of the existing mount inside the torso and to increase the stability of the object-mount assembly while on display. Unfortunately, many of the mount components could not be fully accessed; specifically a section of the mount in the proper right leg could not be removed easily. This constraint limited the options available to improve the stability of the object-mount assembly and fully address the seismic concerns of the Getty Villa site. In addition, the team had to address the aesthetic issue of an exposed section of the mount in the proper right thigh, which over time and through movement had become a visual distraction.

Because of the limitations for improving the existing mount, the Getty Museum's Department of Antiquities Conservation staff proposed the old mount be removed from the torso and replaced with a new mounting system. Fortunately, the objects being lent from the Georgian National Museum for the exhibition had arrived at the Getty Villa a month before the scheduled installation of the exhibit, which allowed sufficient time to remove the old mount and design and fabricate a new mounting system. Working closely with Kalandadze, the Department of Antiquities Conservation staff developed a new mount design by addressing the following goals:

1. To provide multiple areas of contact within the object, distributing the weight evenly over the mass of the torso.
2. To prevent the new mounting system from making contact with the fracture or applying pressure to the area surrounding the crack.
3. To incorporate multiple cast resin interfaces that align with the interior surface of the object, which would provide even support, reduce unwanted movement when installed, and minimize possible abrasion to the interior of the object where in contact with the mount.
4. To address the seismic concerns of the Getty Villa and Republic of Georgia sites.
5. To be easily reversible, allowing full access to the interior of the torso.
6. To minimize any visual disruption to the final presentation of the installed torso.

Preparations had been made in advance of the exhibition to display the torso on new display furniture that would complement the Getty Villa's exhibit design. Because the functionality of the old mount was unknown before the arrival of the torso at the Getty Villa, provisions had been made to incorporate a Getty-designed base isolator under the display furniture to diminish the forces of a potential earthquake on the object.

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Fig. 1. Torso, unknown, Colchian, second century BC, bronze, 105 × 45 × 25 cm (41 × 18 × 10 in.). GNM: 2:996-43, Georgian National Museum in Tbilisi, Republic of Georgia.

Fig. 2. Detail of the fracture.

2. THE PREVIOUS MOUNT

Manufactured sometime in the last two decades (1988-2008), the previous mount consisted of two vertical steel support rods, hexagonal in cross-section and approximately 2 cm across with a wood horizontal shoulder support (fig. 3b). Each hollow leg cavity accommodated a single vertical rod, which terminated at the upper end into the wooden support within the shoulder area of the torso. For unknown reasons, only the proper right vertical support was mechanically fastened to the wooden shoulder support, whereas the proper left vertical support had a slip-fit friction connection, which contributed to the overall instability of the object-mount assembly. The bottoms of both vertical supports were reduced in size to a round, 1-cm cross-section approximately 10 cm in length. These sections were originally threaded and would have allowed a mechanical connection to the display surface; however, now many of the threads were damaged and could not be used. This damage resulted in a loose, slip-fit connection between the mount and the display surface.

The only elements that retained the existing mount within the torso were blocks of wood glued to the vertical steel support post in the lower section of the proper right leg and covered with a green wax fill to complement the patina of the object and disguise the exposed mount section. At some point the blocks of wood may have been adhered to the torso in this area, which might have aided in keeping the various parts of the mount in place within the object. However, now that the wood blocks were separated from the torso, considerable movement occurred in all the mount components, causing the wax fill to flake off, thereby creating a visual distraction. Even though the detached section of the mount was loose, it was trapped inside the proper right leg

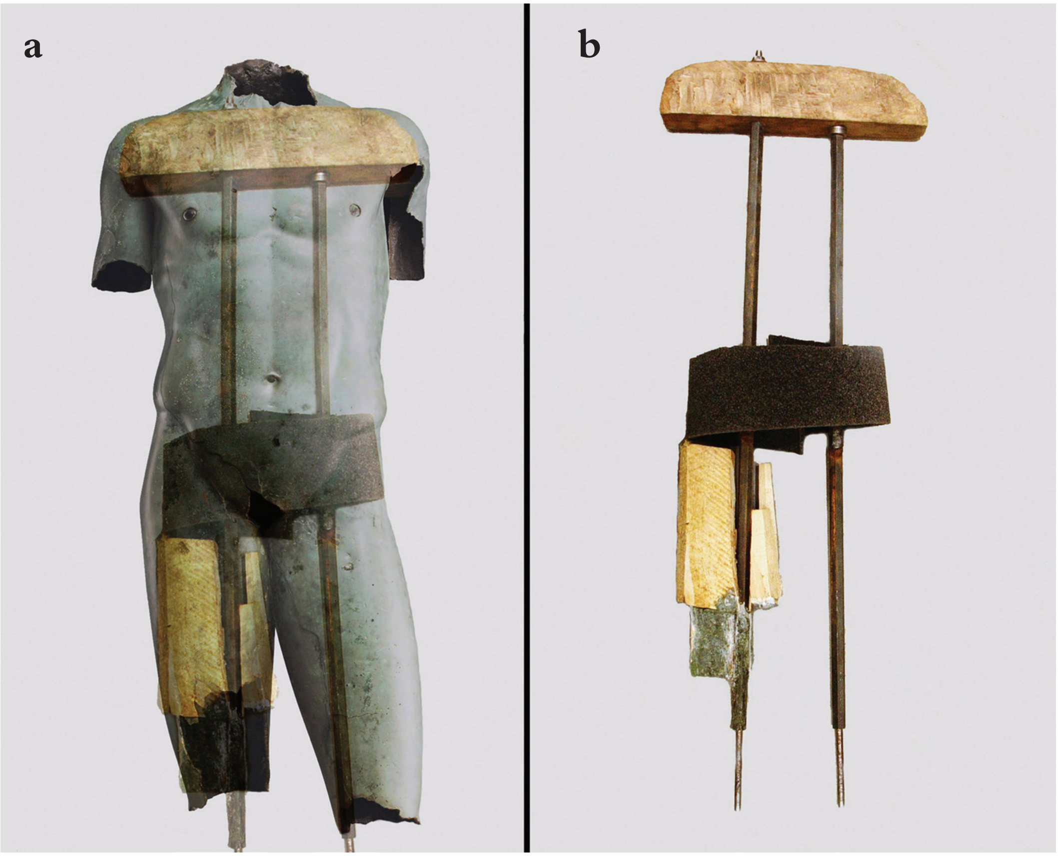

Fig. 3. Original mount inside the torso shown superimposed on the image of the torso (a) and after removal (b).

cavity because of the tapering of the leg section. Consequently, the removal of the original mount from the torso was difficult and risk-laden.

3. REMOVAL OF THE EXISTING MOUNT

The proper left vertical support was easily removed from the object. It had a slip-fit connection to the shoulder support that was accessible from the opening in the proper left leg. The wood shoulder support was trapped inside the torso because of the proper right vertical support, which had to be removed first. This removal process required extra caution because the support was adhered to wood blocking in the lower section of the proper right leg cavity. Because the opening in the leg cavity was smaller than the wood block assembly, some of the wood had to be removed first to allow the remaining mount assembly to pass through the proper right leg opening. Therefore, a section of the wax fill was removed to expose the wood underneath. This removal process revealed multiple pieces of wood blocking that had been glued together around the steel vertical support. Two sections of wood blocking were targeted for removal, thereby allowing enough clearance for the remaining blocks of wood to pass through the opening in the proper right leg. One block had a minimal amount of glue, which attached it to the other blocking, and it was easily separated from the assembly. The other block was shaved away using a knife and wood chisel to reduce its size. Great care was taken to minimize any applied force or vibration to the torso during the process. Once the size of the wood blocking had been reduced, the

Fig. 4. New internal mount system superimposed on the image of the torso, showing placement of the shoulder support, midlevel support, and vertical mounting rod protruding from the proper left leg.

proper right vertical support was unfastened from the shoulder support and carefully removed. At this point, the shoulder support could be accessed from the neck opening in the torso, oriented to a vertical direction, and removed from the object.

With the removal of the existing mount, unrestricted access to the interior of the torso was now possible, which provided an excellent opportunity for a thorough examination of the interior of the object. An examination of the interior revealed that there were areas of abrasions on the interior surface of the object in contact with the loose-fitting mount components. It is likely that most of the specific areas of abrasion were due to repeated installation and deinstallation of the torso with a loose mounting system. The degradation and instability of the material that make up the mount may also have contributed to the problems.

4. NEW MOUNT DESIGN

The new mount was designed to hold the object much in the same way as the original support, with most of the torso's weight being supported at the interior of the shoulder area. Unlike the former mount, the new design incorporates a midlevel component that is designed to retain all the mount sections in place once they are fully assembled and to transfer the weight of the torso from the shoulder support to a single vertical support passing through the proper left leg cavity (fig. 4). For ease of installation, each component of the mount was designed to fit through the large opening in the proper right leg cavity (fig. 5a) and assembled in sequence. The various mount components were assembled inside the object, starting with the shoulder support and working from the midsection (fig. 5b). Simple and safe assembly and disassembly were key factors in the new mount design.

Because the new mount was designed to remain installed inside the torso under normal conditions, aluminum was used to reduce the overall weight of the mount. However, steel was used for the vertical support and a section of the midlevel support, where strength and rigidity were crucial.

The new mount design incorporated cast PhillySeal R resin putty interfaces at all contact points. When molded to the interior surface of the object, these interfaces provided an intimate fit between the mount and the torso. This fit minimizes possible movement of the torso on the mount, which increases the stability of the object and reduces the chance of abrasion to the interior of the object. In addition, when all of the interfaced mount components are assembled in the torso, it effectively traps the mount assembly in place within the object because of the irregular interior surface of the object. To reduce further the chance of abrasion, the interfaces were covered with a thin suede polyethylene felt, providing a padded barrier (figs. 6a, 6b). Casting of the interfaces was performed after the shoulder and midlevel support metal components had been fabricated.

The shoulder support uses a 10-mm-thick aluminum plate, which was cut to the appropriate shape of the shoulder cavity. The plate was drilled and tapped with two holes to accommodate the vertical supports that connect the shoulder component to the midlevel component (fig. 7). Two M10 stainless

Fig. 5. New mount being installed, showing a component of the midlevel support being inserted through the proper right leg opening (a) and a view of the interior of the torso through the leg opening, where the midlevel support is being assembled inside the torso cavity (b).

steel threaded rods, in conjunction with 25-mm outside diameter, thick-walled aluminum tubing for additional rigidity, connect the shoulder support to the midlevel support. This connection transfers the weight of the torso from the shoulder support to the main vertical support in the proper left leg via the midlevel support. It also creates a unified assembly that is secured within the torso by the cast interfaces on the midlevel support plates (fig. 8).

The resin putty was applied to the ends of the shoulder support plate to line up with the shoulder cavities of the torso. The resin was held back toward the neck opening to reduce any visible element. Multiple layers of polyethylene food wrap were used to cover the resin as a protective barrier before the shoulder support was inserted into the torso. Once the shoulder support was in the desired position within the torso, twill tape was used to tie the support to a large foam block through the neck opening, which kept it in place while the resin cured. The two vertical supports were then attached to the shoulder support plate, which provided a method of adjusting the plate to the proper alignment for connecting to the midlevel support (fig. 9) before the resin cured.

The midlevel support is constructed of four 10-mm-thick aluminum plates, which are mechanically fastened to a central aluminum plate 13 mm thick (fig. 10a). The central plate is structurally stiffened with an attached 20-mm-thick steel bar (fig. 10b). The steel bar is also the connection point for the main vertical support that runs through the proper left leg (and optional secondary vertical support for the proper

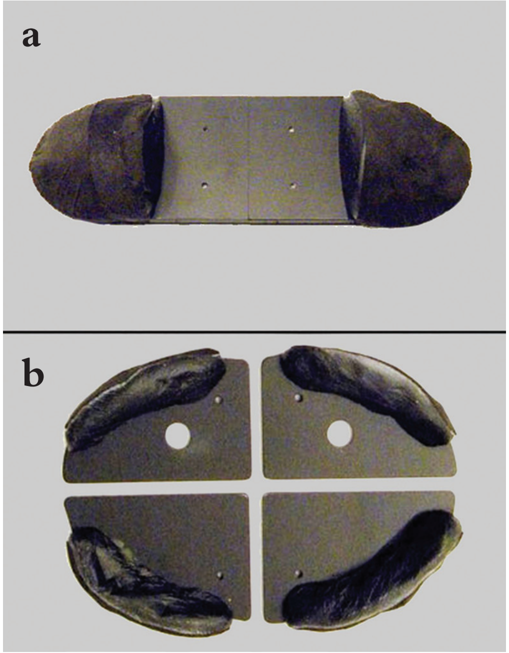

Fig. 6. Components of the internal support structure: shoulder support, with suede polyethylene felt (a), and four aluminum plates of the midlevel support, with interfaces and suede polyethylene felt (b).

Fig. 7. Shoulder support with threaded rods and aluminum tubes.

right leg). The shape of the midlevel support was first fashioned in cardboard, which was easy to cut and trim to the appropriate size to reflect the interior shape of the torso. The cardboard template was cut into quarters, and approximately 10 mm was removed between each segment. The removal of the material reduced the overall dimension of the template, which would later allow enough room to accommodate the resin putty interfaces. Each template segment was transferred to a piece of 10-mm-thick aluminum plate and the shape was cut out. On the basis of the dimension of the original cardboard template, a smaller, generalized shape was made that would fit through the proper right leg opening. This shape would be transferred to a 13-mm-thick aluminum plate that would become the central plate and used for the main connection surface for the individual interfaced plates. A series of holes were drilled in the central plate and then transferred to each of the four plate segments to provide a mechanical attachment.

The process of casting the midlevel interfaces had to be done in steps, one plate at a time. Because of the limited access to the inside of the torso, the plates had to be assembled inside the object. A generous amount of resin was applied to each of the four segment plates, extending past the edge of the plate that would be closest to the surface of the object, to ensure that the resin achieved maximum coverage with the contacted surface of the object. Again, multiple layers of food wrap were used as a protective barrier between the surface of the object and the resin. To start, the shoulder support and connecting rods had to be in place inside the torso. Then the central plate and one segment plate containing resin putty were positioned. When the proper alignment was achieved, the resin putty was checked for even contact with the interior of the torso, and the segment plate and the central plate were then securely connected together and fastened to the vertical supports to the shoulders. This process maintained the proper position of all the mount components. Once the resin had cured, the assembly was removed and another plate with resin

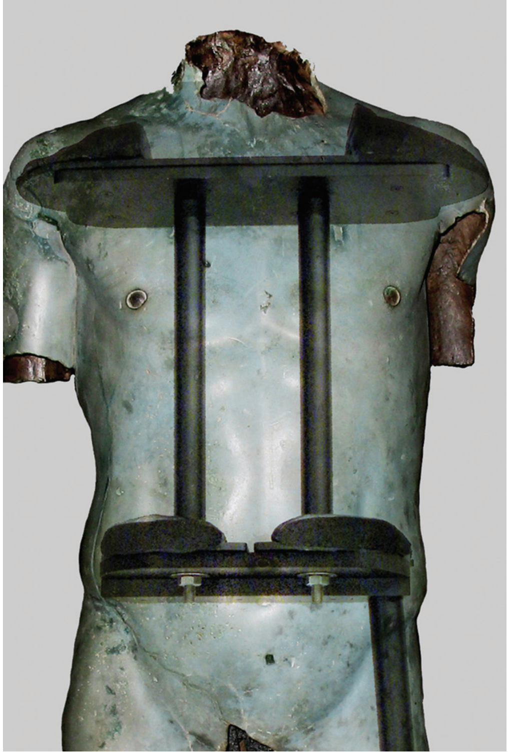

Fig. 8. Detail illustration showing the connection of the shoulder support to the midlevel support, superimposed on the image of the torso.

was added to the assemblage and reinstalled inside the torso. Great care was taken each time the midlevel support was reassembled to maintain the proper position within the object. During the reassembly, each of the interfaced plates had to be loosely connected to the central plate first, so the proper position of every section could be aligned with the interior surface of the torso (figs. 10c, 10d). Once properly located, each of the plates could be securely fastened to the central plate. This process continued until each of the four plates had cast interfaces.

The mount was designed to support the torso using a single vertical support that attaches to the steel section of the midlevel support. An M16 stainless steel threaded rod was used in conjunction with a 40-mm outside diameter × 1.5-mm stainless steel tube to provide the main vertical support (figs. 11a, 11b). A flanged finish washer was attached to the end of the tube to distribute the load of the vertical support to the display surface. The stainless steel tube, when placed over the threaded rod, acts as a stiffening element and increases the rigidity of the main vertical support. Designed as a mechanical fastener, the threaded rod extends approximately 15 cm past the end of the stainless steel tube and secures the mount to the display furniture from the underside of the display surface (fig. 11c). Rigidity is achieved in the main vertical support when the stainless steel tubing, which is sandwiched between the midlevel support and the display furniture, is put into a slight compression as the retaining nut is tightened.

The mount was designed to support the torso using a single vertical support rod in the proper left leg in conjunction with a base isolator while on display at the Getty Villa. However, future exhibitions would exclude the use of an isolator to provide additional support; an optional second vertical support that extended from the proper right leg was fabricated (fig. 11d).

The relationship between the main and second vertical supports and the midlevel support determines the overall orientation of the object. One of the major challenges of the new mount design was to fulfill the desired orientation of the torso decided by the curator. This was a challenging task because the attachments of the vertical supports to the midlevel support were not at a 90° perpendicular connection. The appropriate angle was hard to determine without the mount installed in the torso and the assembly vertical. Several attempts were made until the proper angle was found, and each attempt required some modification to the steel component of the midlevel support.

5. NEW DISPLAY FURNITURE

To meet the requirements of the exhibition design, new display furniture had been designed for the torso before the arrival of the artwork. Because the functionality of the existing mounting system was unknown before the arrival of the torso, the new display furniture was designed to be connected to a Getty-designed base isolation system (Podany 2008) while the torso was on display at the Getty Villa. The base isolator was designed to absorb a significant portion of the expected horizontal ground motion forces during an earthquake that might otherwise be transmitted through the building to the object. The new furniture was designed as a structural support

Fig. 9. View of the interior of the torso through the leg opening, showing the foam blocking used under the vertical supports to adjust the proper alignment of the shoulder support while casting the interfaces.

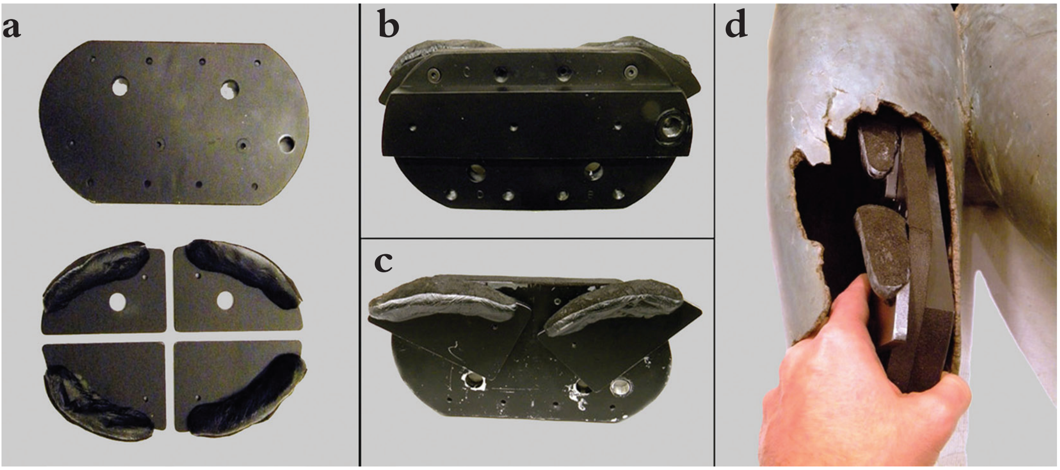

Fig. 10. Details of assembly of mid-level support: support components, showing the four interfaced plates and the central connection plate (a), and view of the bottom of the steel support section on the midlevel support assembly (b). The vertical rod connecting to the external base attaches at the threaded hole bear the right end of the plate: top view of the midlevel support, with two of the interfaced plates loosely installed onto the steel base plate (c), and the midlevel support with loosely installed interface plates being inserted through the opening in the proper right leg (d).

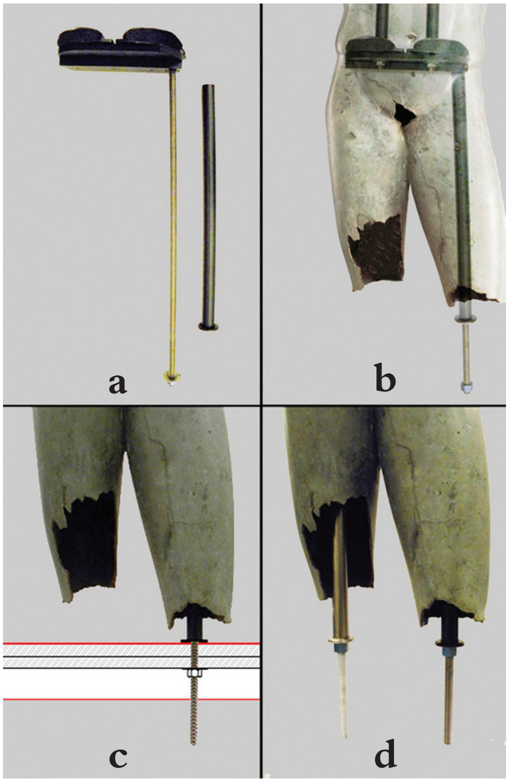

Fig. 11. Connecting the internal mount to the base: the midlevel support, threaded rod, and steel support tube (a); the midlevel support and main vertical and main vertical support rod shown superimposed on an image of the torso (b); schematic showing attachment of vertical support to the exhibition furniture (c); and torso mount shown with optional second vertical support protruding from the proper right leg (d).

Fig. 12. Finished display with the torso installed on the new mounting system and display furniture (with base isolator). On display in *The Golden Graves of Ancient Vani* exhibition, J. Paul Getty Museum at the Getty Villa, 2009 (Ellen M. Rosenbery, Getty Museum, 2009).

with full access to its interior. This design allowed for a secure mechanical fastening of the object-mount assembly to the display furniture and the furniture to the museum building.

The new mounting system was designed to integrate fully with new furniture, but a modification was made to the furniture design to increase stability of the object-mount assembly. A 3-mm-thick steel plate, painted to match the furniture, was added to the top of the pedestal. Unlike soft plywood, the steel plate provides a rigid surface for the mount connection, thereby reducing the possibility of any deformation of the display surface by the main vertical support.

At the close of the exhibition, the new display furniture (without the base isolator) was included with the shipment of the artwork back to the Georgian National Museum to be used in conjunction with the new mounting system for the future display of the torso.

6. CONCLUSION

This project provided a unique opportunity to address an existing mounting system that over time and with multiple installations was no longer functioning to display this magnificent artwork safely. The deficiency of the existing mount to reduce the risk of damage to the object during any potential seismic activity became increasingly apparent during the initial evaluation of the mount. There were

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also aesthetic issues with certain elements of the mounting system that were visually distracting to the museum viewer.

Normally, the schedule for preparing an exhibition that incorporates loan objects often restricts the amount of time needed to address a project of this complexity. Consequently, conservators and mountmakers often find themselves compromising and accommodating existing and perhaps less than ideal mounts for exhibition for the sake of expediency. Fortunately, with this exhibition, the loaned objects arrived at the Getty Villa with sufficient time to undertake this project. Working closely with visiting conservator Nino Kalandadze, the Getty team designed and fabricated a mounting system for the torso that not only enhanced the visual display of the object but, more importantly, also will contribute to the long-term preservation of this superb antiquity (fig. 12).

ACKNOWLEDGMENTS

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NOTES

1. Organized by the Institute for the Study of the Ancient World at New York University in partnership with the Ministry of Culture; Georgian National Museum, Tbilisi; and the Vani Archaeological Museum.

2. Acquisition no. GNM: 2:996-43, Georgian National Museum in Tbilisi, Republic of Georgia.

3. Jerry Podany, senior conservator, Department of Antiquities Conservation, J. Paul Getty Museum; Jeffrey Maish, associate conservator, Department of Antiquities Conservation, J. Paul Getty Museum; BJ Farrar, mountmaker, Department of Antiquities Conservation, J. Paul Getty Museum; McKenzie Lowry, mountmaker, Department of Antiquities Conservation, J. Paul Getty Museum; and David Armendariz, mountmaker, Department of Antiquities Conservation, J. Paul Getty Museum.

REFERENCE

Podany, J. 2008. *Advances in the Protection of Museum Collection from Earthquake Damage: Papers from a Conference Held at the J. Paul Getty Museum May 2006*. Los Angeles, CA: J. Paul Getty Museum.

SOURCES OF MATERIALS

Interface resin
PhillySeal R resin (no longer in production)
ITW Philadelphia Resins
130 Commerce Dr.
Montgomeryville, PA 18936
215-855-8450
Fax: 215-855-4688

Suede polyethylene felt barrier
Benchmark Exhibit Supplies
PO Box 214
Rosemont, NJ 08556
609-397-1131
Fax: 609-397-1159
www.benchmarkcatalog.com

Hardware
McMaster-Carr
PO Box 4355
Chicago, IL 60680-4355
www.mcmaster.com

AUTHOR BIOGRAPHY

BJ FARRAR is a mountmaker in the Department of Antiquities Conservation at the J. Paul Getty Museum in Los Angeles, California, where he has worked since 2002 specializing in seismic mitigation of collections. From 1997 to 2002, he was a senior preparator in the Getty Museum Preparations Department. Before working at the Getty Museum, he worked at the Seattle Art Museum from 1989 to 1997 as a mountmaker/preparator. He has presented several times at The Advances in the Protection of Museum Collections from Earthquake Damage symposium series. He is a cofounder of the Mountmaking Forum and has presented at several of their conferences. He has taught multiple mountmaking workshops and has consulted privately for numerous museums and private collections. Address: Antiquities Conservation, J. Paul Getty Museum, 1200 Getty Center Dr., Suite 1000 V, Los Angeles, CA 90049; bjfarrar@getty.edu.

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