

ROSA LOWINGER & ASSOCIATES

CONSERVATION OF SCULPTURE +ARCHITECTURE

Chain Reaction, Paul Conrad – Santa Monica

Interim Notes – November 18, 2011

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Introduction:

The following is a summary of the findings from the examination of Chain Reaction in November 2011. Rosa Lowinger & Associates carried out initial work to prepare the sculpture for inspection by engineers. This report documents the work carried out that week and what is proposed for the next steps.

Work carried out to date:**NOVEMBER 15, 2011:**

Conservators Dave Harvey and Christina Varvi of Rosa Lowinger and Associates arrived onsite in Santa Monica to begin work on Paul Conrad's "Chain Reaction". Conservators met with Malina Moore & Jessica Cusick of the City of Santa Monica's Cultural Affairs Division and Ron Takiguchi, City of Santa Monica Building Official, to review the planned course of action for the day. The goal was to remove sections of brass chain links and fiberglass for strength/durability testing by the city/county engineers.

At an earlier meeting, a 2'x3' section at the base of the sculpture had been selected by the City engineer for removal and was marked off with blue tape. An additional "path" leading up to this area was marked off with blue tape (for chain removal only) in order to allow conservators and engineers easier access to the selected test area above, mitigating damage to the chains.

Prior to removing any material, conservators used green tape to number each chain link within the selected areas. These areas were carefully photographed in order to accurately re-position the links once they are re-installed. After initial photo documentation was completed, conservators attempted to remove the chain links from the fiberglass surface. Photos were taken of specific areas before any material was removed.



Image: Selected areas for brass link removal with labeling system.

The brass chain links are primarily attached to the fiberglass surface with tack screws originating from within the piece. Around the base of the sculpture, there are numerous repairs to secure loose brass links. The majority are steel screws inserted from above, securing one-to-two brass links to the fiberglass surface. There is also some copper wire connecting two or more links together.

Conservators were easily able to remove four steel screws as well as some copper wire, all previous repairs. The screws were retained and labeled, indicating which links they connected. The copper wire was not labeled since it was cut and cannot be re-used. However, samples were retained, should the City engineers want to test its strength/durability.

The majority of the visible screw heads had been previously cut off or were severely corroded and/or stripped to the point where they could not be removed with a screwdriver or power drill. Conservators removed the heads of two screws using a Dremel and then attempted to slip the brass links over the shank and thread. Unfortunately, this was not possible in either case since the screw shank/thread had corroded and was fused to the brass link(s). Conservators then attempted to cut the shank/thread in between the brass links and/or the bottom link and fiberglass, but there was not enough space between the two surfaces to fit a Dremel, or other cutting tool, without damaging the links. Conservators then attempted to gently pry the links from the surface of the fiberglass, using a small crowbar padded with foam. This attempt was also unsuccessful in liberating the links and was abandoned in fear of cracking/breaking the fiberglass if continued and excessive force was used.



Image: Corroded screw.



Image: Limited or no space between materials in order to cut the screw.

Ultimately, it was determined that the links could not be safely removed from the surface of the fiberglass. Even if one could cut the steel screws used for repairs, it would be extremely difficult to detach the links due to the tack screws inserted from within the sculpture. Pursuing further attempts would have surely damaged the piece.

Malina, Jessica, and Ron were notified of our decision and returned to the site to discuss alternatives. The group questioned whether the conservators could cut the fiberglass with the chains still attached. They were advised that this would be highly detrimental to the integrity

of the sculpture and that it would hopefully be a last resort. As an alternative, Dave Harvey suggested that a 2" x 8" piece of fiberglass (a dimension previously requested by the city/county engineer) be removed from a "bald" area further up on the sculpture for the time being. This would enable the engineers to begin some of their testing and create an opening through which they could insert a borescope and decide whether or not removing the 2'x3' panel is absolutely necessary. Furthermore, there is an area along the edge, about 1' to the left of the 2'x3' selected area where several of the chain links were loose and only connected by copper wire. Mr. Harvey suggested the conservators move the links in this area as much as possible to create another cutting option for the engineers to examine the interior of the sculpture. The engineers could examine this area and decide whether or not a cut in this location would be beneficial to their needs, specifically testing the concrete foundation. The group agreed with both of Mr. Harvey's suggestions.



Image: Area cleared & marked for 2"x8" cut.



Image: Area cleared for potential cut, pending engineer approval.

Before moving any of the chain links, they were also labeled and photographed to ensure they will be accurately re-positioned at a later date. In preparation for the cut, Mr. Harvey measured and marked a 2" x 8" strip on the fiberglass surface. To remove the fiberglass, he made four cuts using a diamond blade Rotozip spiral saw. Malina and Jessica were present when the cut was made and witnessed sparks emanating from the sculpture while Mr. Harvey was cutting. After the cut was made, Mr. Harvey removed the fiberglass section, finding that it was only about 1/8" thick. Behind the fiberglass was a plastic/bituminous sheet backed with paper, followed by a burlap-like cloth. All of these were fitted over a large-gauge chicken wire. The sample was wrapped in acid-free tissue paper with all layers intact. Mr. Harvey retained the sample to review with the engineers the following day.



Image: Layers below fiberglass surface after cutting.



Image: Interior structure of sculpture.

Wire cutters were used to remove the chicken wire from the 2"x8" probe. Using a flashlight, conservators, as well as Malina and Jessica, were able to quickly inspect the interior of the sculpture and take several photographs. It appears that the chicken wire was formed over a stainless steel armature, which is connected to the central "flag pole". From our limited observation, it appears that the stainless steel armature had welded connections and did not exhibit any sign of rusting. Minimal surface corrosion was observed on the central "flag pole". After observing the interior, all parties agreed that no further cuts would be made until the engineers were on site and reviewed the sculpture.

All open areas were covered with duct tape to prevent water intrusion.

November 16, 2011:

Further work was carried out by Dave Harvey and Rosa Lowinger to prepare the sculpture for inspection. An additional 5" x 5" cut was made at the base of the sculpture to allow for core drilling of the foundation. Additional 1" holes were drilled to allow for inspection of the interior.

On this same day the team also inspected the upper level of the piece. We found a removable panel on the East side of the mushroom cloud. The panel was wired in place using copper wire in approximately 5 locations. The chains at the upper level were found to be primarily attached with wire rather than screws. The wire was clipped to allow for removal of the panel. This panel with its accompanying chains was removed and given to Malina Moore and Jessica Cusick for storage at the City offices. Initial inspection of the interior was done using a borescope by Andrew Tan of Twining, Inc inspection and testing engineers. Initial findings showed that the interior mild steel has numerous isolated areas of corrosion on ferrous metal components. The upper structure on the mushroom cloud was documented as being well built to specifications far more rigorous than those shown on the original document.

All open areas were covered with duct tape to prevent water intrusion. The open panel on the top mushroom was covered with tarp and duct tape.

November 18, 2011:

Engineers Andrew Tan and Larry Brugger met with conservator Rosa Lowinger at the site along with Ron, Malina, and Jessica.

A core drill was used to drill a sample of the foundation. The foundation was found to have two tiers. The topmost tier is approximately 5" deep and consists of a concrete with a medium and some large size aggregate. Below this is a second foundation- which was cored to a depth of 8.5". The foundation is actually deeper; however the coring material was insufficient to probe further. The second core contained substantially bigger aggregate than the upper portion. These core samples are being tested for compression strength.

Mr. Tan also employed a more powerful borescope to inspect areas of the foundation plate that affixes the central column to the plate and the concrete foundation. The initial results indicated that there is substantial corrosion and pitting of the anchor bolts that hold the base plate in place. Moreover, there is no way to determine how deep these bolts extend into the foundation itself.

Next Steps:

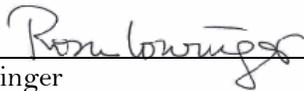
The engineers feel that it is essential to enter the bottom portion of the sculpture in order to gain more information on the following matters:

1. The length and condition of the anchoring bolts.
2. The condition of the welds on the steel structure.
3. The thickness of the base plate.
4. The actual depth of the foundation.

In addition, the engineers would like to find out more information on the upper level on the following matters:

1. The condition of the welds.
2. How the top is attached to the central pole.

Rosa Lowinger concurs that given the corrosion seen on the anchor bolts that treatment is warranted. Therefore, removal of a panel at the bottom is unavoidable. All effort will be made to carry this out in as systematic and non destructive a method possible. The removal of the panel will be scheduled by Monday to be carried out either right before or right after Thanksgiving.



Rosa Lowinger

November 15, 2011

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