

Photo 1: On-site inspection

**Review of Past and Current Inspection and Maintenance Practices at the
Watts Towers**

Prepared for:

State of California – Department of Parks and Recreation

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Summary

I examined the Watts Towers from the ground and from a 135 foot boom truck. I also reviewed the Conservation Handbook, maintenance records, and correspondence related to inspection, maintenance and restoration of the Towers, and interviewed site staff.

While the Towers are in no imminent danger there is observable deterioration. Some of the cracking and losses cause some concern about the long term needs of the Towers.

Recommendations are made to improve the inspection procedures, site maintenance, documentation, and visitor control.

Recommendations are also made on some specific issues.

Introduction

Since their completion the Watts Towers have undergone numerous maintenance, repair, and restoration treatments, utilizing a variety of different materials and techniques. At present the City of Los Angeles Cultural Affairs Department is responsible for their maintenance. Over the last years critical voices have been raised about the inspection and maintenance practices of the City, prompting the Department of Recreation and Parks to order an independent third party review by a conservation scientist (Frank D. Preusser, PhD) and a structural engineer (John Kariotis, PE).

Review Process

The review was carried out by

- reviewing the Watts Towers Conservation Handbook;
- reviewing extensive correspondence from 2002 to present, relating to the current preservation practice;
- interviews with the on-site conservator and other site staff;
- sample preservation worksheets supplied by the site staff;
- and a site visit on 9 July 2003, inspecting the towers from the ground and from a 135 foot boom truck.

This review addresses mostly materials science aspects in relation to the preservation of the Towers as a work of art. Structural issues will be addressed by the engineer's report.

Causes of Deterioration and Damage

A complex sculpture such as the Towers is exposed to a great variety of environmental threats (physical, chemical, and biological), that require attention when assessing the inspection and maintenance protocols. Among them are:

- thermal and hygric stresses, leading to expansion and contraction of elements of the towers, which in turn can lead to cracking and loss of individual decorative elements;
- wind pressure can lead to similar physical stress in the higher structures;

- wind driven rain and dust/sand can physically erode the surface;
- water (rain, fog, condensation) intrusion through cracks and losses can lead to corrosion of the reinforcing irons, leading to staining and to spalling of the concrete, which can ultimately affect structural stability;
- water can also dissolve the binder in the different plasters used in the construction and subsequent restorations; this usually leads to a weakening of the plaster and sanding;
- urban air pollution facilitates dissolution processes and also leads to soiling;
- biological activities (bacteria, algae, lichen, grasses, higher plants) can cause physical and chemical damage due to their roots and chemical excretions;
- inherent vice is a built in cause for damage due to choices of wrong materials and or techniques in the manufacture can be frequently observed in outdoor sculpture and other works of art;
- previous preservation/restoration measures using inappropriate materials and/or techniques are a frequent cause for observed damage or losses;
- natural disasters such as earthquakes can lead to losses and even catastrophic failures;
- vandalism, ranging from souvenir hunting (taking little pieces out) to serious defacing of a monument is a major concern in most sites;
- Visitor impact, ranging from touching of decorated surfaces to the abrasion of the floors and climbing on monuments, is often under estimated until serious damage is observed.

Observations

The situation at the Towers is quite complex due to its construction and the numerous, often undocumented, interventions in later periods. It can be quite difficult to determine in observed changes are in original material or in later repairs and restorations.

Cracking and Other Openings in the Skin

One can observe cracks of varying width throughout the monument (photos 2 to 4). Some of them are clearly in repaired areas and are probably partially due to faulty craftsmanship or the choice of inadequate materials.



Photo 2: crack in higher elevation



Photo 3: crack in lower elevation



Photo 4: crack in lower elevation

In many cases it is not possible - without spending days or weeks going through the documentation - to determine with certainty if a crack is new, old and re-opened, or old and never filled during restoration.

At present the cracks appear not to pose an immediate threat to the stability of the monument, but since they provide access to water and pollutants (with possible corrosion of the iron underneath) they should be carefully observed, and ultimately closed in the appropriate manner.



Photo 5: separation of modern re-pointing



Photo 6: cracking and water access in plaster

Separated re-pointing (photo 5) should be replaced since it provides access of water and pollutants behind the tiles and other decorative elements.

Areas of lost decoration (photo 6 and 7) should be filled and/or sealed. Floor cracks (photo 8) should be immediately repaired before the problem gets more serious.

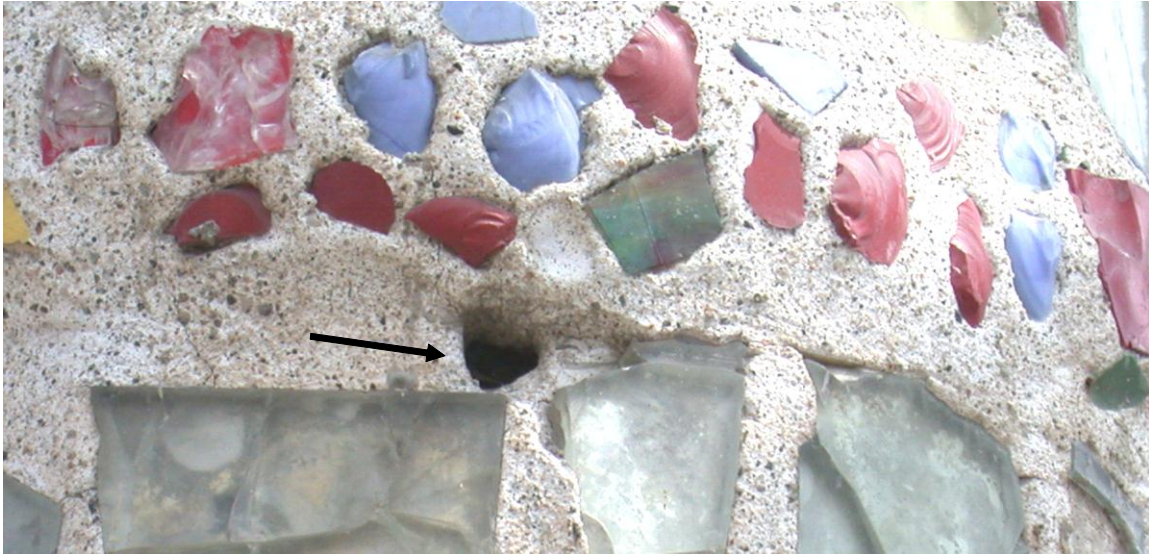


Photo 7: opening providing water access



Photo 8: cracking of floor

Plaster Erosion

The original plasters and the restoration plasters of the different periods also show to varying degrees erosion by wind and water (photo 9).



Photo 9: eroded plaster



Photo 10: lost decoration



Photo 11: re-attached decoration lost (wrong adhesive)



Photo 12: fallen decorations on the ground

Loss of Decorative Elements

It was not possible during the review period to obtain reliable quantitative information about the rate of loss of decorative elements (photos 6, 7, and 10 to 12). While some stated that pieces fall from the towers on a regular basis, others say that it is not very frequent. It will be important to monitor this issue and enter the information (as far back in time as possible) about time and location into a database to determine if there is a pattern and/or an increase in frequency. This could point to a larger problem. The detachment of decorations is to a large degree an inherent vice since many of the materials do not adhere well to cement. Fallen pieces (photo 12) should be well documented and stored until they can be re-attached.



Photo 13: plants growing close to the wall

Plants

All plants (photos 13 and 14). should be mechanically (no chemicals) removed from the proximity of the monument. There should be no irrigation close to the monument and a drainage system should be considered.



Photo 14: plants in proximity of the wall



Photo 15 corroded iron anchor and mismatched patching

Iron

Iron screws and nails (photo 15) should be removed and, if needed, replaced with stainless steel. When the iron cannot be replaced (photo 16) it should be

thoroughly de-rusted, painted, and sealed so that water cannot penetrate between the iron and the plaster.



Photo 16: corroded iron door with plaster fill



Photo 17: chewing gum

Visitors

Visitors put stress on any monument and frequently cause damage. At the Towers visitors walk on the decorated floor, climb on the lower parts of the monuments, touch the monuments, spill drinks and food, and even chewing gum (photo 17). The tour guides need better training, didactic signs have to be improved, and rules established (like no food, no drink, no chewing gums).

Elevated walkways or mandatory footwear protection could further improve the situation.

Tidying up the site and the work and storage areas would also help increase the respect of the visitors for the site.

The Conservation Handbook

I reviewed the latest edition of the "Conservation Handbook for Rodia Towers in Watts", which was last revised on 20 March 1992, and "Watts Towers Conservation and Repair Treatment" (Appendix) which is basically a checklist derived from the Handbook (the List). While the handbook is still valid in most parts it does not take into consideration the experiences of the past 11 years of ongoing repair and maintenance, nor the concerns that have been raised in recent years.

Both documents concentrate on the treatment of areas where damage has re-occurred, and are quite weak in their treatment of the need for regular inspections, both in terms of type of inspection, frequency, and documentation requirements. The List for example specifies under step 43 digital cameras that are completely outdated and should be replaced with higher resolution equipment. Similarly 7x50 binoculars are prescribed, which is by far not sufficient.

As mentioned above, the list of approved materials and methods should be re-visited, taking the experiences of the last 11 years into consideration. The treatment worksheets and the computer database should also be reviewed for the possibility of providing more and easier accessible data.

Conclusions and Recommendations

Based on my observations I came to the conclusion that the Watts Towers are not in any imminent danger, but still undergo slow deterioration which, at some point could become serious.

The basic treatment and maintenance program is quite solid but can use review and improvements. Part of the suggested improvements will be certainly dependent on a review of the staffing and funding levels. Considering the size of the monument and the number of problems that are still apparent I consider the project understaffed, both on the technician and the professional level. I have no information about the operational budget and can therefore not comment on it

In this context I can make the following recommendations:

- Develop a more comprehensive inspection and monitoring program. At this point I consider a yearly thorough inspection from a 135 foot boom truck advisable. If after the first years this seems excessive, the inspection interval can be extended. Some key areas which are most likely to show changes should receive intense documentation with more detailed scaled photographs. A simple crack monitoring program (e.g. with Plaster of Paris bridges) should be started to determine if there is any active movement.
- Review the list of approved materials and methods in light of the experiences of the past decade and revise it accordingly.
- Review the Treatment Work Sheets and the computer database with the goal to improve data access.
- Develop a sub-database on the loss of decorative elements both in terms of date and location. If available, data from previous years should be entered as well. This will allow to determine if these events are random or if there is a pattern in terms of location, season, or weather. It will also allow to determine if the number of these events per month is constant, declining down, or increasing.
- Plan and budget for improved photographic and observational equipment
- Review the staffing and the operational and equipment budgets.
- Continue repairing cracks and fill in losses; re-point areas where the pointing is failing; repair the concrete floor.
- Remove all iron screws, nails, and wires from the walls and, if needed, replace them with stainless steel. Iron features that cannot be removed/replaced should be thoroughly de-rusted, coated, and sealed to prevent water penetration.
- Since water and pollution penetration is one major concern I suggest to carry out a test with a water repellent on one of the smaller structures.
- Clear the site perimeter from plants (mechanically, not chemically); keep irrigation away from the site perimeter and consider measures to improve site drainage.
- Develop didactic signs and rules for visitor behavior (e.g. no climbing, no touching, no food and drink, no chewing gum); provide training for the tour guides in the physical protection of the site.

- For the protection of the decorated floors consider either elevated wood floors, or supplying the visitors with footwear protection that they can pull over their shoes and return after their visit.
- Improve the appearance of the work and storage areas to signal to visitors the importance of the site.

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President