Structural Evaluation Report
October 12th 2007

CTE/Environmental Protection Agency
Halaco Engineering Company
Oxnard, CA

DMJM DESIGN | AECOM

Introduction & Scope

CTE/AECOM has contracted DMJM/AECOM to provide this structural evaluation report to help clarify the existing buildings condition at the site. The buildings have significant observable indications of structural damages that prompted concerns by the EPA to obtain the professional opinion of a Structural Engineer on the building's structural integrity and future performance.

Our scope of work is to perform a visual inspection of the existing structures and present our findings with recommendations in a written report. Our scope does not include the review of any structural or related documents, as they were not available to us. No structural analysis was performed because it is beyond our scope of work.

All findings are based on observable details and conditions of the building during a site visit conducted on October 4th 2007. The EPA & CTE/AECOM do not have original building plans, and there is no precise knowledge of the building's age. Howeve, through observation of construction features and anecdotal information, DMJM believes the buildings were built in the 1960's or 1970's.

Site & Building Description

The Halaco site is located in coastal Ventura County at 6200 Perkins Road, Oxnard, CA 93033. The site consists of two main buildings and several miscellaneous minor structures. Halaco Engineering Company operated a secondary metal smelter at the site from 1965 to 2004, recovering aluminum, magnesium, and zinc from shredded cans, machine shop borings, radiators, aircraft wheels, dross from primary smelters, and other scrap materials. The site includes an 11-acre parcel containing the former smelter and an adjacent 26-acre waste management area where wastes were deposited.[1]

The Foundry building is a pre-engineered metal building (PEMB) approximately 40,000 sq. ft. in size. The main frames run North-South, and the bay spacing is approximately 25 ft. o/c with X-bracing consisting of tie rods between bays. A 7 ft. tall CMU wainscot wall exists around ¾ of the perimeter of the building, with horizontal metal girts above the wall supporting the exterior vertically spanning metal panel and plywood sheathing. The roof girts and tie rod X-bracing span between the steel frames. An attached concrete shear wall building wraps around the west side of the PEMB building to the north side. This building appear to be connected at certain locations to the PEMB and encloses a small interior office with a mezzanine. The roof of this concretes building consists of pre-cast concrete double – T beams. There are several openings in the floor slab for pits that vary in depth and area. Some of the pits are covered with steel plates. Wall and column foundations were not visible.

The Filter Press building is a combination of a PEMB and full height load bearing CMU walls. The CMU walls cover ¾ of the building with different openings. There are steel

columns on the north side of the building with horizontal girts that support a metal panel. The roof girts and tie rod X-bracing span between the steel frames. There are several openings in the floor slab for pits that vary in depth and area. Wall and column foundations were not visible.

Several pieces of mechanical & operational equipment are still in the buildings. Various stand-alone CMU buildings exist around the larger buildings on the site and appear to have housed electrical and maintenance operations. There are perimeter site walls and interior walls that appear to have been used for bins. A series of silos supported on steel legs exists on the south side of the Filter Press building. Various steel pipes run around the main buildings at different heights and are supported by a variety of methods. A canopy exists on the north side of the site with cantilevered steel and concrete columns supporting a cantilevered metal deck.

Observations and Findings

Foundry Building

- The exterior vertically spanning metal wall panels were observed to be shredded and/or missing. See Exhibit A.
- A few X bracing tie rods, which are part of lateral load resisting system, appear to be sagging. This indicates that they are not tight and will not provide the tension resistance they are designed for in resisting lateral loading during a seismic or wind event. Thus, the lateral load will be redistributed into a different method of resistance until failure occurs in those engaged elements. Other tie rods are cut or corroded excessively. See Exhibit B.
- The 6 ft high wainscot wall along the north face was badly damaged and warped out of plane approximately 18 inches along a 100 ft length of wall. The damage most likely occurred from impact loading from moving equipment against the interior push wall. This impact must have also caused the lateral deflection of the PEMB columns. See Exhibits C & F.
- All roof beams and columns appear to be intact and show no other signs of distress other than for rust.
- Some pieces of the metal roof panels are shredded and/or missing. See Exhibit D.
- The canopy cover at the east of the building appeared to be in good condition and there were no observed structural damages.
- The concrete roof T-beams appear to be in good condition and there were no observed structural damages except on the west exterior face of the building; the concrete was weathered and the exterior joist stirrups are exposed. See Exhibit E.
- Several structural steel columns were observed to be rusted through with less than 25% of the section remaining. Other columns were warped and do not appear to be structurally sound in any way. See Exhibit F.
- Several cuts were made in the concrete shear walls for mechanical penetrations. These openings appear to be too large and require justification to show soundness. Cracking and wall spalling near some of these openings has occurred.

- At other concrete walls, existing openings were widened near the base. This was probably caused by impact due to the jagged edge of what is remaining. See Exhibit G.
- Wood panels and other exterior CMU walls were observed to have excessive damage and significant inadequacies in their attachments and consistency.

Filter Press Building

- Extreme vertical and horizontal shear cracking was observed on all corners and upper portions of CMU walls. Some cracks are so severe that the face shells of the CMU block are ruptured off and may fall at any moment. These wall damages mostly occur at the corners of the building, near the roof, and at various locations along the walls. See Exhibit H.
- At the exterior corners of the building the vertical jamb bars, which resist tension during wall overturning, are completely exposed, as the face shells had ruptured off. Most likely the shear failure of the wall occurred during past seismic activity or wind event where the lateral load transferred into the shear walls from the roof diaphragm induced a shear force into the wall which was greater than that which the wall could resist, thus shear failure of wall occurred. This same failure condition appears slightly at other openings in the walls. See Exhibit I.
- Minor horizontal and vertical cracking was observed on the rest of the exterior and interior faces of the CMU wall. In some places, this cracking runs the full length and height of the wall. It is unknown whether or not the walls are solid grouted. At some locations along the walls, face shells are not engaged and are obtuse.
- A gap was observed at the roof joist connection, between the steel plate and the CMU wall on the east side of the building.
- All roof beams and columns appear to be intact and are performing other than for rust.
- Some pieces of the metal roof panels are missing.
- At the north face, no method of lateral resistance was observed. There is only a 10' tall wainscot CMU wall and horizontal wall girts above spanning to the steel building column. Most of these girts appear to be intact and are performing. They are meant to support vertically spanning 1x12 wood panels; however, some panels are missing and some girts are missing or are warped and are no longer supporting the panels.
- At the top of the large door opening on the east interior face, a bent steel lintel beam was observed. The warping deflection appeared to be greater than 3 inches.
- At the top of the north and south CMU walls, the top course of the CMU wall is withered away and rebar is most likely exposed, though not observed.
- A structural steel girder which supports the roof framing members was observed to be failing in lateral torsional buckling, with out of plane deflections greater than 8 inches. See Exhibit J.
- A structural steel column was observed to be rusted through with less than 25% of the section remaining. S ee Exhibit K.
- A large (approx 18" X18") square cut was observed in a roof beam. See Exhibit L.

General

- Throughout the site, most steel beams, columns, girts, metal deck, tie rods, bolts, and exposed rebar are extremely corroded and rusted.
- Most steel covers over floor pits appear rusted and are potentially corroded to a point where the thickness of the material is reduced and the structural capacity of the section is decreased at the mid span for bending resistance and at the connections to the top of the pit for shear resistance. This may be potentially dangerous for someone to walk on.
- Signs of lack of structural maintenance are obvious, e.g., no protective coating of metals and no reattachment of loose or shredded wall and roof panels. These could be blown off the building and would be dangerous to someone walking by if in flight.
- What seems to be a fort or look-out tower of some kind exists on a large rusted pipe (greater than 30" in diameter) on the outside of the Filter Press building. The fort consists of steel panels, tube columns, and metal panels and is somehow attached to the pipe below. This is an extremely unsound and unstable structural modification for use and for people walking below. "Make-shift" stairs and various metal panels were observed to form a walkway from the roof of one of the smaller CMU maintenance buildings to the "fort."
- There are many violations of current code standards for safety at walkways near pits inside and outside of the buildings.
- Several large pipes (greater than 30" in diameter) were observed to have no adequate means of support laterally and sometimes vertically. In other locations, the supports are "make-shift" and/or dangerous for people walking underneath the pipes and the supports.
- Silos and their supports appear to be intact and are performing structurally. The paint or protective coating on the silo columns appears to have mostly protected them from corrosion with minor rust visible. Minor corrosion was observed on the anchor bolts.
- Damaged windows and doors were observed.
- Some perimeter site walls have deflected out of plane and the top course has been weathered enough to expose the rebar.

Recommendations

Several failures have occurred in the main vertical and lateral load resisting systems. Furthermore, various component and cladding elements are inadequately supported and pose a significant threat to safety. Retrofit of the existing structures is not feasible due to the age of the structures and extent of structural damage observed.

Due to the excessive structural damage and inadequacies cited above, and the extreme unsafe nature of the conditions of the buildings, we strongly recommend the demolition of these buildings and other site structures as soon as possible to avoid any injury and/or possible loss of life.

The comments and statements contained in this report are based upon a limited visual inspection of the buildings' exposed components and do not include observations of all details of the structural

system. We did not review the existing structural drawings and calculations, nor was there a structural analysis performed. The findings and recommendations in this report represent conditions at the time of the inspection and were prepared in accordance with generally accepted professional engineering principles, practice, judgment and knowledge of how similar structures have performed in the past. Please be reminded that this report may not be construed as a guarantee or warranty of the future performance of the structure under normal or adverse conditions.

We are pleased to provide this professional engineering service to you. Please do not hesitate to contact us if you have any questions.

Jeremy David Livermore, P.E.
Project Engineer

Shafiq Alam, S.E.
Principle Engineer/Assoc. Vice President

References

1. EPA website information:
http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/f868f63587f9dc6a882573290078b56b/8a2af6079bfdaa53882572530031974e!OpenDocument

Appendix & Photos

Exhibit A

Exhibit B.1

Exhibit B.2

Exhibit C

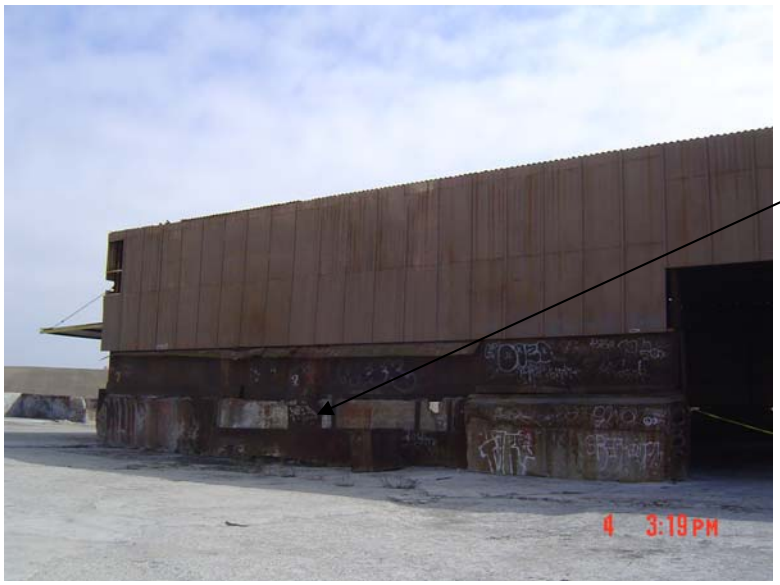

Exhibit D

Exhibit E

Exhibit F

Exhibit G

Exhibit H.1

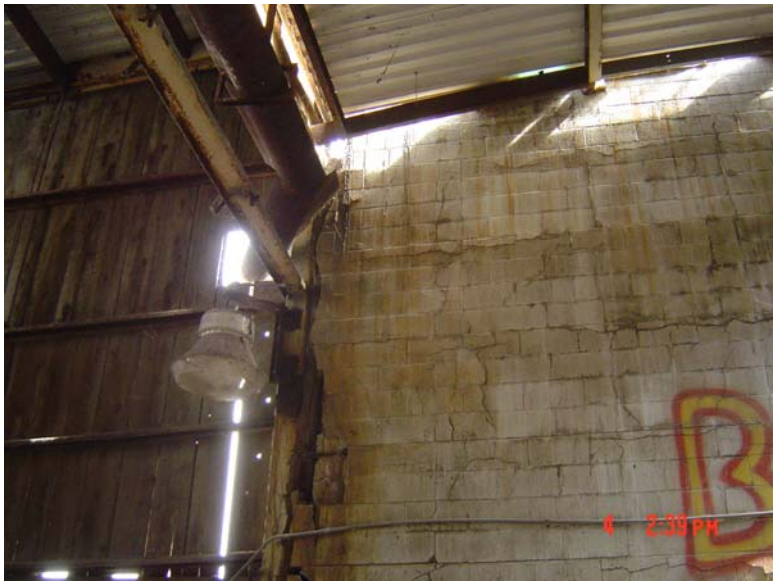

Exhibit H.2

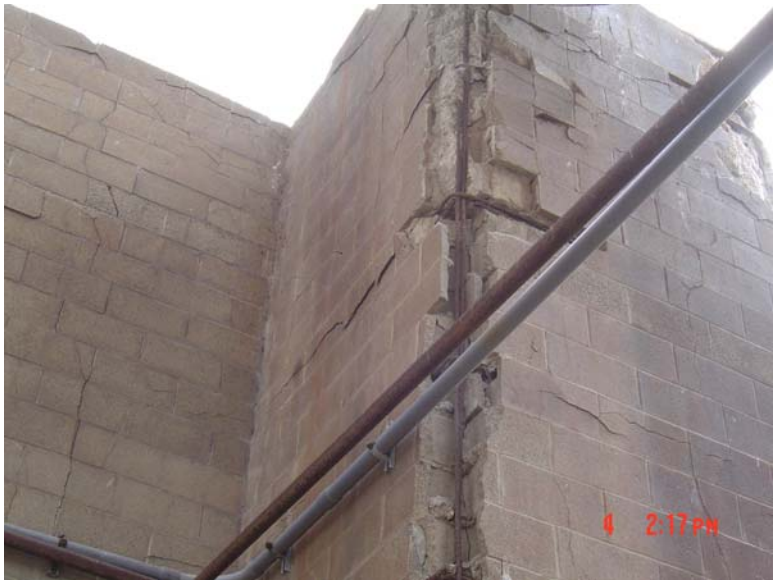

Exhibit H.3

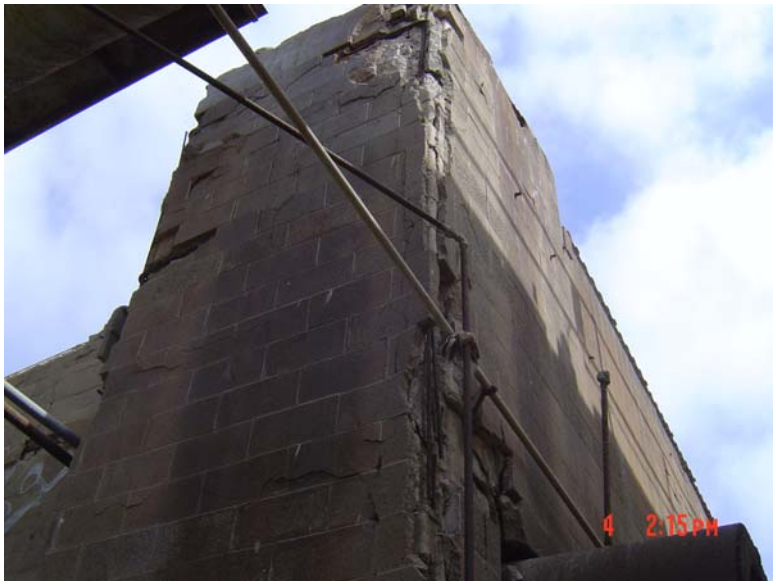

Exhibit I

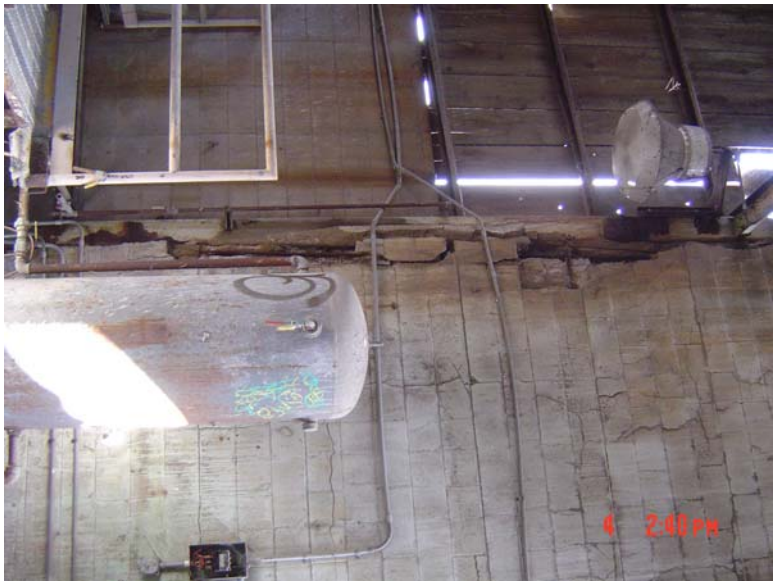

Exhibit J

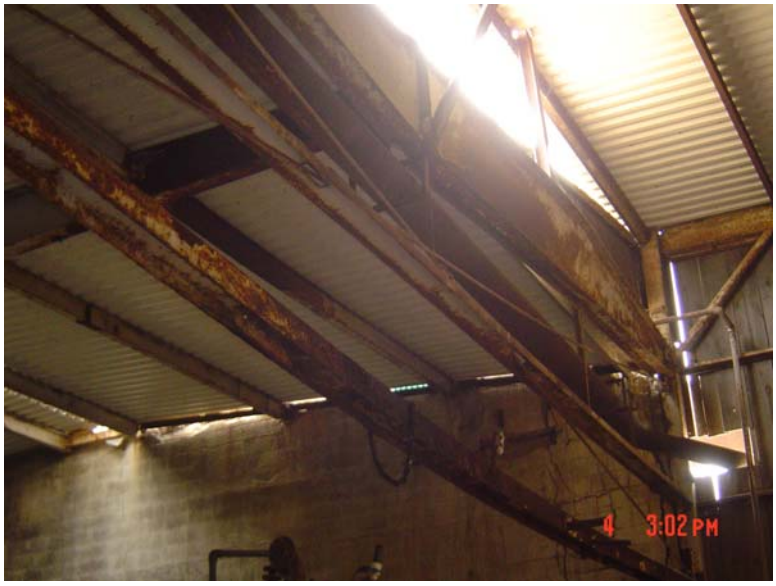

Exhibit K

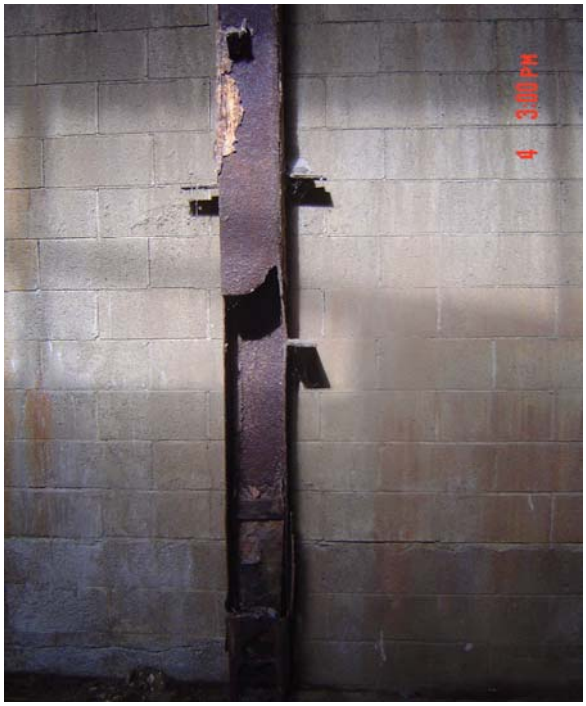

Exhibit L