

**STRUCTURAL STABILIZATION WORK
FOR ASBESTOS ABATEMENT
AT THE

QUINCY SMELTER SITE

FRANKLIN TOWNSHIP, MICHIGAN**

Prepared by:

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I hereby certify that the structural inspection work and the report of recommendations contained herein were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Michigan.

George A. Kiiskila, Jr., P.E.

Registration No.

Date

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INTRODUCTION

The following report is a summary of the inspection work and recommendations made for the structural stabilization work necessary for the safe abatement of identified friable asbestos at the Quincy Smelter Site in Franklin Township, Houghton County, Michigan. This report has been assembled as part of a comprehensive report being prepared by Weston Solutions, Inc. for the entire asbestos abatement project required by the U.S. Environmental Protection Agency (EPA).

SCOPE OF WORK

U.P. Engineers & Architects, Inc. (UPEA) was retained by the Keweenaw National Historical Park (KNHP) to assist the EPA and it's consultants and subconsultants (Weston Solutions, Inc. and Metcalf & Eddy) to assess the Quincy Smelter site for safe asbestos abatement.

As referenced in the Weston Solutions, Inc. Work Plan for the project, the UPEA structural engineer's primary responsibilities were to:

1. Conduct a cursory assessment of each building containing asbestos and determine if safe entry can be made by the EPA Weston and Metcalf & Eddy. (Some buildings allowed for safe entry, some for partial entry, and some allowed no entry).
2. Assess the buildings in terms of what the necessary structural stabilization work will be required in order to safely remove asbestos. Also, estimate the cost of such stabilization work; while providing cost options if such stabilization work can be varied in nature.

EQUIPMENT AND INSPECTION PROCEDURES

The required equipment (PPE) for the inspection work of the insides of the building was Level C as listed in the Weston Work Plan, and Level D for the outsides of the buildings.

The inspection procedure included: careful entry the building doorways by UPEA structural engineer first on buildings of questionable structural integrity. After UPEA's cursory review of building, access was allowed to Weston and Metcalf & Eddy in only the areas of the building that UPEA deemed safe to be in on that particular day and time. Entry of the buildings on December 7 and 8, 2004 was more favorable than other days because the temperatures were moderate (approx. 35°F); no precipitation falling, and virtually no wind. The calm day allowed the assessment team to circulate through the site without the danger of falling debris, such as metal panel blowing off of wall or roof; or the Building No. 6 chimney stack being blown over.

The hand tools used for the inspections consisted basically of a flashlight and a 2-foot long iron workers pick bar. The pick bar is used for determining the extent of rot and rust in beams, columns and other structural members.

GENERAL BUILDING CONDITIONS
(Of Buildings Containing Asbestos to be Abated)

The buildings on the site ranged in condition from excellent to very poor (collapsed). The attached map of the buildings shows which building will require structural stabilization work necessary for safe asbestos abatement. Please note that this is not the only structural stabilization required for all the buildings on the site. It is only in the areas where friable asbestos is being abated.

The majority of the structural stabilization work items are:

1. Housekeeping: Removing debris and moving items to prevent trip and fall hazards, and fire hazards.
2. Remove loose roof panels and ceiling debris: Which prevents items from falling on top of workers.
3. Providing temporary bracing for walls, roofs, heavy piping, etc; again to prevent items from falling on workers.

The other major item of concern, which must be the very first item of structural stabilization that needs to be address, is the stabilization of the BUILDING NO. 6 Chimney Stack. Because this stack is such a prominent feature of the Quincy Smelter site, it must be preserved if at all possible and practical. We believe that it is possible to rebrace and stabilize it. Of course, since the stack is in such poor condition, it must be repair/stabilized first because the stack creates a potential danger zone of collapse for a 200-ft. radius. This would prevent asbestos abatement work in several of the surrounding buildings.

RECOMMENDED OUTLINE OF STRUCTURAL STABILIZATION WORK FOR ASBESTOS ABATEMENT

Building No. 2 (Dockside Warehouse)

4. Brace bottom of 2nd floor hoisting shed at east end.
5. Remove portion of east side shed collapsed roof enough to remove six (6) drums and any other materials.

Building No. 3 (Laboratory/Assay Office)

1. Patch/Stabilize top of brick chimney.
2. Stabilized top of steel chimney and braces on top of roof.
3. Repair pushed-in and rotted wall at south side of lower shed.

Building No. 5 (Casting Plant)

1. Remove all rusted-through roofing metal, cupola windows and any other loose overhead materials prior to asbestos abatement.
2. Reattach loose steel wall panels.

Building No. 6 (#5 Reverberatory Furnace Building)

1. Chimney stack stabilization/repair (top and bottom)
2. Remove all rusted-through roofing metal, cupola windows, and any other loose overhead materials prior to asbestos removal.
3. Reattach loose steel wall panels.
4. Existing catwalks to be shored or evaluated at time of removal for structural soundness.

Building No. 7 (Reverberatory Furnace Building)

1. Miscellaneous masonry patching for stabilization only.
2. Stabilize 3 ft. dia. boiler pipe on north half of building.
3. Removal of all loose and rusted-through roofing metal, cupola windows, and other loose overhead materials prior to asbestos removal on northside of building.
4. Repair all loose stone lintel along the walls of the building. Rebuild the stone window lintel in southwest corner.

Building No. 11 (Cooper Stock)

1. Patch hole in floor boards in loft.
2. OSHA constructed handrail for stairs.

Building No. 13 (Limestone Bins)

1. No asbestos removal required on inside of bins.
2. Remove any loose materials from walls prior to asbestos removal around outside of building along the south side.

Building No. 14 (Briquette Plant)

1. Stabilize settling/failing sections of the floor and columns with temporary steel jack posts on concrete blocking on south half of building.
2. Remove loose and rotted materials on second floor and roof.
3. Provide temporary bracing (struts) to support north wall of building into 2nd floor of south half of building.

Building No. 15 (Crushing Plant)

1. Remove any loose material that may fall on workers or impede contractor traffic during asbestos abatement.
2. Open boarded-up door on south wall of building that is used as an emergency exit.
3. Open up door from Building No. 14 on east wall.

Building No. 16 (Pump House Addition)

1. Provide temporary supplemental pipe support for the two larger diameter pipes prior to any asbestos abatement. This may be done from the floor or from the roof structure. Leave temporary pipe supports in place after project is complete.

Building No. 17 (Cupola Building)

1. Temporarily restrict usage of the south half of the building for contractor movement and removal of materials.
2. Clear the doorway openings on the west wall of the north room for material removals and movement of contractor personnel. This will require all the stabilization work to be done in BUILDING NO. 18 prior to work in this BUILDING NO. 17.
3. Check pipe supports prior to any asbestos abatement. Provide supplemental pipe support if necessary.

Building No. 18 (Boiler House)

1. Clear debris in boiler house and pathway for both doorways in Building No. 17.
2. Remove all loose and rusted-through metal roof panels, and other debris overhead that may fall.
3. Stabilize the top masonry stone of the east wall, including window lintel in southeast corner on upper floor.
4. Provide temporary bracing for the east and west walls, using an adjustable steel struts or similar. These braces shall be left-in-place after project is complete.
5. Check pipe supports prior to any debris removal below or asbestos removal. Provide supplemental pipe support if necessary. Remove pipe if impractical to provide support. Leave additional pipe supports after project completion.

Building No. 19 (Baden Hausen Boiler Building)

1. Remove any loose debris, wood planking from above.
2. Remove all debris on floor for housekeeping purposes, so these materials do not cause a tripping hazard or fire hazard during asbestos abatement.
3. Remove and relocate all the spare wooden doors stored in the entry way. Move to dry secure location on-site.

Building No. 20 (Machine Shop)

1. Check and patch/brace chimney above roof on northwest side of building.

Building No. 25 (Barn)

1. Check cables attached to north walls use to brace the swaying Building No. 26 to the north. Monitor these cables, and remove them if they are affecting the lateral stability of this BUILDING NO. 25. Brace BUILDING NO. 26 independently on it's own north side.

Trestle (Exterior)

1. Removal all loose, rotted or broken ties and rails from trestle throughout entire work zone where asbestos abatement is being done.

**COST ESTIMATE FOR RECOMMENDED STRUCTURAL
STABILIZATION WORK FOR ASBESTOS ABATEMENT**

Building Number	Building Name	Stabilization Item No./Description		Estimated Cost	Remarks
No. 2	Dockside Warehouse	1.	Brace 2 nd Floor Hoisting Shed	\$ 2,000.00	
		2.	Remove portion of east side shed roof/brace wall	\$ 5,000.00	
No. 3	Laboratory/ Assay Office	1.	Patch brick chimney	\$ 800.00	
		2.	Stabilize steel chimney	\$ 200.00	
		3.	Repair wall lower shed south	\$ 800.00	
No. 5	Casting Plant	1.	Remove roof panels/debris	\$ 20,000.00	
		2.	Wall panels reattach	\$ 8,000.00	
No. 6	#5 Reverberatory Furnace Building	1.	Chimney stack stabilization	\$ 200,000.00	(See options next page)
		2.	Remove roof panels/debris	\$ 20,000.00	
		3.	Wall panels reattach	\$ 8,000.00	
		4.	Catwalks shored/evaluated	\$ 5,000.00	
No. 7	Reverberatory Furnace Building	1.	Masonry patching	\$ 2,000.00	
		2.	Stabilize 3 ft. boiler pipe	\$ 3,000.00	
		3.	Remove roof panels/debris	\$ 20,000.00	
		4.	Repair stone lintels	\$ 3,000.00	
No. 11	Cooper Stock	1.	Patch hole in attic floor	\$ 100.00	
		2.	OSHA handrail on stairs	\$ 200.00	
No. 13	Limestone Bins	1.	--	\$ 0.00	--
		2.	Remove loose materials	\$ 1,500.00	
No. 14	Briquette Plant	1.	Stabilize 2 nd floor	\$ 22,000.00	
		2.	Remove loose material 2 nd floor	\$ 6,000.00	
		3.	Temporary north wall bracing	\$ 15,000.00	

Building Number	Building Name	Stabilization Item No./Description		Estimated Cost	Remarks
No. 15	Crushing Plant	1.	Remove loose material	\$ 1,500.00	
		2.	Open up doorway south wall	\$ 1,500.00	
		3.	Open door to Building No. 14	\$ 150.00	
No. 16	Pump House Addition	1.	Additional support for pipes	\$ 2,000.00	
No. 17	Cupola Building	1.	Restrict access to south side	\$ 500.00	
		2.	Clear doorway openings	\$ 1,000.00	
		3.	Supplemental pipe support	\$ 1,000.00	
No. 18	Boiler House	1.	Debris removal	\$ 5,000.00	
		2.	Remove roof panels	\$ 15,000.00	
		3.	Stabilize top of masonry	\$ 12,000.00	
		4.	Temporary wall bracing	\$ 10,000.00	
		5.	Supplemental pipe support	\$ 7,500.00	
No. 19	Baden Hausen Boiler Building	1.	Remove loose debris above	\$ 2,500.00	
		2.	Remove floor debris	\$ 2,000.00	
		3.	Move stored material at entry	\$ 1,000.00	
No. 20	Machine Shop	1.	Check/patch/brace chimney	\$ 500.00	
No. 25	Barn	2.	Sway bracing relocate	\$ 1,500.00	
-----	Trestle (Outside)	3.	Remove ties/rails from top	\$ 20,000.00	
TOTAL ESTIMATED COSTS				\$ 427,250.00	

CHIMNEY STACK STABILIZATION OPTIONS

OPTION NO. 1 - STABILIZATION	
Mobilization (Cranes) =	\$70,000.00
New Guy Wires & Anchor Blocks (2 sets) =	45,000.00
Restoration Welding =	20,000.00
Temporary Banding (Clamping) =	50,000.00
Steel Base Repairs =	15,000.00
CONSTRUCTION SUBTOTAL =	\$200,000.00
OPTION NO. 2 - REMOVAL OF CHIMNEY TO ROOF AND CAP IT	
Mobilization (Cranes) =	\$60,000.00
Debris Removal (Lower Material to Grade) =	60,000.00
Material Handling and Storage (Landfill Costs) =	20,000.00
Cap Top of Stack or Roof =	20,000.00
Steel Base Repairs =	10,000.00
CONSTRUCTION SUBTOTAL =	\$170,000.00

APPENDIX I

APPENDIX II