A Steel Mill Reforged:  
A Design Proposal for a New Technology Center in Harrison, NJ

by
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Submitted in partial fulfillment of the requirement for the degree
Master of Science in Historic Preservation

Graduate School of Architecture, Planning and Preservation
Columbia University
May 2013
ACKNOWLEDGEMENTS

First and foremost, I would like to thank Belmont Freeman for his guidance and support as my thesis advisor and studio professor. I would also like to thank Jorge Otero-Pailos, for always challenging me to think more broadly and critically and for expanding my ideas of the possibilities of decay. For always being straightforward and saying what needs to be said, I also wish to thank Françoise Bollack.

A big thank you to my parents, for your love and for putting up with me during seven straight years of higher education. Last but not least, I am grateful for all of my colleagues in the Historic Preservation Program and the rest of GSAPP who offered advice, lunch, or an encouraging word in times of stress. Without all of you this would not have been possible.
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ABSTRACT

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The town of Harrison, NJ was founded in 1840. It quickly became an industrial center because it is situated near major rail facilities and possesses a large waterfront, making it ideal for manufacturing and trade. Harrison was nicknamed the “beehive of industry” by President Howard Taft in 1912.

One such complex of industrial buildings occupies a site directly south of the PATH station near the Passaic River. Originally built at the time of World War I as the Crucible Steel Company, the buildings have had many different tenants in the last fifty years. Most of the buildings are currently vacant, with two large shed buildings used to park cars for commuters and soccer game attendees. However, plans for a new residential community and mixed-use facilities on this and adjacent lots threaten the future of the buildings and the industrial heritage of Harrison. Many of the surrounding factories have already been torn down in the last ten years to make way for development, including a soccer stadium that opened in 2010. Panasonic is currently constructing a 58,000 SF technology center on the site beside the existing buildings.

Instead of tearing everything down and making a bland corporate environment, why not adapt the existing structures to preserve and continue to use them? The buildings on this site are architecturally and historically significant, and today’s companies stand to gain from reusing them rather than constructing new ones. They can be adaptively reused as part of a new technology complex that would preserve the historic use and character of both the individual building and the town of Harrison. This design proposal will attempt to prove that the reuse of early twentieth-century industrial buildings for the modern technology sector is not only feasible architecturally, economically, and environmentally, but can also yield a superior workplace environment for the tenant corporation, its employees, and the surrounding community.
HISTORY OF HARRISON

The town of Harrison, NJ was founded in 1840. The 1.2-square-mile town is in Hudson County close to New York City, Newark, and Newark Liberty International Airport.

It quickly became an industrial center because of its favorable location, situated near major rail facilities and possessing a large waterfront that made the town suitable for trade. President William Howard Taft visited Harrison in 1912 during his re-election campaign. During his speech he told the crowds, “You have reason to be proud of this Hive of Industry,” coining the town’s motto as the “Beehive of Industry.”

Most of the manufacturing activity took place in the southern third of the town’s borders, close to the Passaic River. Some of the companies located in Harrison included Edison Lamp Works, Worthington Pump and Machinery, the RCA Company, the Peter Hauck Brewery, Driver-Harris Company, Otis Elevator, Hartz Mountain, Nopco Chemical, and Hyatt Roller Bearing. Production in Harrison reached a peak during World War II. The town had only about 14,000 residents, but 90,000 workers commuting in daily.

Most of Harrison’s industry had moved out by the 1960s. Between the mid-1970s to the 1990s, the town lost over $150 million in property tax income. Harrison’s industrial area was very quickly becoming unused and deteriorating.

President William Howard Taft visits Harrison, 1912
http://www.townofharrison.com/history.html

Harrison Avenue, 1915
http://www.townofharrison.com/history02.html
HISTORY OF THE SITE

One highly significant complex of industrial buildings occupies a site directly south of the PATH station near the Passaic River. They were built around the time of WWI for Crucible Steel. The Crucible Steel Company of America was formed in 1900 when thirteen smaller companies using the crucible method of production merged to work more efficiently. The Crucible Steel branch in Harrison, first named the Atha Works, made steel and ordnance for the war effort. A 1918 Sanborn map of the site shows a rolling mill, annealing building under construction, turbine station, storage building, forging hammer shop, steel pickling plant, chipping building, reservoir, hammer shop, office, machine shop, gun barrel shop, storehouse, offices and laboratories building, and research building. Farther down on the site, later separated by a road, was a tin shop, hammer shop, open hearth building under construction, treating building, vacant building, pipe cutting and fitting building, hydraulic plant, substation, storage building, and an unnamed building. The whole plant was surrounded by a ten-foot-high brick wall.

A New York Times article from 1922 indicates that the Crucible Steel plant was used for locomotive repairs when production slowed after World War I. After the Second World War, the Atha Works shifted its production from predominately weapons and ammunition to specialty cold rolled steel operations. The plant consolidated with the Spaulding & Jennings plant in Jersey City as well as a department from Syracuse, NY to be renamed the Spaulding Works. Part of this transfer involved a $3.2 million expansion and renovation to the site, which took place over three years and was completed in 1949. Later in that year, the Spaulding Works produced the world’s widest range of cold rolled alloy, stainless, and high-carbon steel specialties, and was the “center of Crucible’s special products manufacturing and development activities for the production of magnets, precision castings, cast alloy tools and alloy welding rods.”

Sometime after the 1950s, Crucible Steel left Harrison. Some of the buildings were occupied by Guyon Pipe Company for a time. The buildings have had many different occupants in the last fifty years, used mostly for metal and plastics manufacturing. As industry left Harrison, the buildings on the site were abandoned. Since the late 1990s, many have been demolished. Almost all of the remaining buildings are currently vacant.

Plans for a waterfront redevelopment plan on this and adjacent lots threaten the future of the factories and the industrial heritage of Harrison. The land on which the factories stood fifteen years ago is primed for development, including a residential community and mixed-use facilities. The Red Bull soccer stadium opened nearby in 2010. Panasonic is constructing a new 58,000 SF technology center on the site just north of the remaining industrial buildings.

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Closeup of 1918 Sanborn map showing the site
http://sanborn.umi.com/
Location of site
*Google Maps, 2012*

Aerial view of the site
*Bing, 2012*
Aerial view of site, date unknown
*Images of America: Harrison, Ray and Karen A. Floriani*

Billet workers using Little David grinders on site, date unknown
*NYPL online*
Rendering of proposed waterfront redevelopment plan, site circled

*Advance Realty*
Rendering of proposed Panasonic Technology Center
http://www.njbiz.com/article/20121012/NJBlZ01/121019936/0/spotlight/Panasonic-breaks-ground-on-Harrison-tech-complex

Panasonic Technology Center under construction, January 2013
Photo by author
EXISTING CONDITIONS

Two large shed buildings (the former rolling mill and annealing building of Crucible Steel) are used to park cars for commuters and overflow for soccer game attendees. These are connected by an insertion not original to the complex. A smaller structure, not shown on the 1918 Sanborn map, is connected to the north of the rolling mill and is also utilized for parking. These three buildings are the focus of this thesis, in particular the rolling mill, the largest remaining building on the site.

The rolling mill is a one-story brick building approximately 240' x 400' in plan. The walls are brick and the structure is of steel. The roof is sloped with a raised monitor, rising to a peak of about 118'. Large openings in the brick walls let in abundant light. The interior space is completely open, with no intermediate columns or walls between the two walls. The floor surface is concrete. The most prominent features are the large steel trusses.

Despite being almost one hundred years old and currently unconditioned and unused, the essential parts of the shed are in good condition. However, there are a number of original elements missing. The window glass is gone, and only some of the openings have mullions. There is visible water damage on some of the brick and the material is cracked or missing in some places. The steel is rusted, although it appears to be structurally sound. The walls show evidence of changes over time, with concrete masonry unit (CMU) infill of doors and windows, especially on the east façade.
EXISTING CONDITIONS

View of rolling mill looking northwest

*Photo by author*

View of site looking south (rolling mill back left, annealing building back right)

*Photo by author*
EXISTING CONDITIONS

Interior view of rolling mill looking northeast

*Photo by author*
EXISTING CONDITIONS

Interior view of rolling mill looking south

Photo by author

Interior view of rolling mill looking east

Photo by author
EXISTING CONDITIONS: WATER DAMAGE

Northeast corner of rolling mill
Photo by author

Brick pier on east facade of rolling mill
Photo by author
EXISTING CONDITIONS: MISSING WINDOWS

Window openings on north facade of rolling mill

*Photo by author*
EXISTING CONDITIONS: RUSTED METAL

Window openings on east facade of rolling mill
*Photo by author*

Steel column inside rolling mill
*Photo by author*

Steel lintel on south facade of rolling mill
*Photo by author*
EXISTING CONDITIONS: BRICK DETERIORATION - CRACKING

East facade of rolling mill
Photo by author

Southeast corner of rolling mill
Photo by author

East facade of rolling mill
Photo by author
EXISTING CONDITIONS: BRICK DETERIORATION - MATERIAL MISSING

Bottom of window opening on east facade of rolling mill

Photo by author

Edge of window opening on east facade of rolling mill

Photo by author
EXISTING CONDITIONS: BRICK DETERIORATION - MATERIAL MISSING (CONT.)

Northeast corner of rolling mill
*Photo by author*

Base of east facade of rolling mill
*Photo by author*
EXISTING CONDITIONS: LACK OF INSULATION

Interior view of tin roof of rolling mill

Photo by author

Double wythe brick walls of rolling mill

Photo by author
EXISTING CONDITIONS: CMU INFILL

East facade of rolling mill
Photo by author

East facade of rolling mill
Photo by author
EXISTING CONDITIONS: GRAFFITI

Southeast corner of rolling mill

*Photo by author*
EXISTING CONDITIONS: POOR CONDITION OF DOORS

Entrance doors on north facade of rolling mill
*Photo by author*

Interior view of door on south facade of rolling mill
*Photo by author*

Loading dock on northeast corner of rolling mill
*Photo by author*
PROGRAM

The program is for a hypothetical research, manufacturing, distribution, and service center for a technology company. It is based on the size and requirements of the Panasonic facility being constructed adjacent to the existing buildings, but adapted to fit the given space.

- (3) Lab space – 12,500 ft²
- (6) Office space – 25,000 ft²
- Service center/Customer display – 1,420 ft²
- Tech repair center/testing facility – 2,940 ft²
- Daycare center – 3,800 ft²
- HR/business office – 375 ft²
- Reception desk – 145 ft²
- Computer service office – 340 ft²
- (2) Conference room – 940 ft²
- Training/large lecture room – 940 ft²
- Cafeteria – 3,490 ft²
- Kitchen – 750 ft²
- (2) Women’s room – 610 ft²
- (2) Men’s room – 550 ft²
- (3) Unisex bathroom – 95 ft²
- Storage – 1460 ft²
- (2) Janitor closet – 55 ft²
- Receiving/loading – 4,175 ft²
- Mechanical – 1,740 ft²
- Electric – 310 ft²
Total: 61,600 ft²

Other Amenities:
- Playground – 3,490 ft²
- (4) elevators
- Display/event space (unconditioned) – 6,280 ft²
- Eating terrace/garden (unconditioned) – 7,690 ft²
- Running track – 990’ loop
- (2) tennis courts
- Basketball court
- Garden space – 4,700 ft²
DESIGN PROPOSAL

- Design Objectives
  - Retain as much existing building fabric as possible
  - Leave existing material as-is in state of decay, aside from stabilization for safety
  - Retain the experience of the large volume of the original space
  - Provide opportunities to bring people closer to the trusses and experience the space in different ways than are currently available

- Proposal Description

These buildings should be saved because they are architecturally significant with their vast open steel structure and historically significant as part of Harrison's rapidly disappearing industrial past. The new design saves the building by becoming part of a larger technology complex. Instead of being used only briefly by commuters parking their cars, the building can be a centerpoint for the community.

The proposal for reuse is for the former rolling mill shed building to be adapted into a new technology center. The program is similar to the Panasonic Technology Center being constructed nearby and would include offices, labs, and a repair and testing center as well as associated support services and amenities. The amenities could be shared between the new center and Panasonic, as well as any other companies or even residents of the housing that will be built in the future.

The design concept is that of new “guts” being contained inside the existing skin. The existing walls and roof will provide protection from sun and rain for the new program inserted within. The new spaces are individual conditioned pods with heated walkways in between. This allows workers to have a variety of views out to the larger space plus interact with the huge existing volume as they move between areas. The pods are a steel structure clad in glass and aluminum panels.

The existing is embraced as a ruin, leaving materials as they currently are whenever possible. Rather than restoring the building back to a significant point in time, all the layers of history are embraced. The existing shell is left open – window openings will not be glassed in, and the walls have openings at ground level that would not be locked, leaving the space open to the public. The concrete floor, where not penetrated by the new, will remain as-is with parking lines and stains. The steel and brick with be cleaned and repaired only to the extent that safety issues are concerned.

The front entrance leads into a lobby space with trees and a fountain with seating. Dominating this view is a large egg shape of chrome-plated metal containing two conference rooms and a lecture hall. This provides a focal point for the central aisle of the complex and an impressive place to hold meetings. Further back in the middle is a tower containing bathrooms, a reception room, business/HR office, and computer service office. To the west are three three-story pods of equal size. These contain the main work spaces – labs on the ground floor and offices above. The east aisle has the correlating services: a repair center, testing facility, mechanical, storage, and loading/receiving are on the ground level. The second floor has a cafeteria and a connecting outdoor terrace/garden space with tables, benches, and trees. Above
everything at the level of the trusses are a running track and a large platform for events or displays that looks over the garden terrace.

One of the advantages of adapting an existing building like this one is that the tenant gains extra sheltered space for amenities for free. The proposed design includes a basketball court, two tennis courts, and a garden. A daycare center is designed to mimic the diagram of the technology complex on a smaller scale and also uses the same materials, except the aluminum panels are bright blue and red. There is a playground adjacent to the daycare, and both are visible to the parents from the walkways around the office spaces.
FIRST FLOOR PLAN

1. Laboratory
2. Fountain
3. Women's Room
4. Men's Room
5. J.C.
6. Reception
7. HR/Business Office
8. IT office
9. Daycare Center
10. Tennis Court
11. Service Center/Customer Display
12. Tech Repair Center/Testing Facility
13. Mechanical
14. Storage
15. Electric
16. Receiving/Loading
17. Playground
18. Basketball Court
SECOND FLOOR PLAN

1. Office
2. Conference Room
3. Training/Lecture Room
4. Women's Room
5. Men's Room
6. J.C.
7. Cafeteria
8. Kitchen
9. Bathrooms
10. Eating Terrace
11. Eating Terrace/Garden
THIRD FLOOR PLAN

1. Office
FOURTH FLOOR PLAN

1. Promenade
2. Display/Event Space
3. Running Track
A) LONGITUDINAL SECTION THROUGH ROLLING MILL

B) LONGITUDINAL SECTION THROUGH ROLLING MILL
DIAGRAM OF SUN PENETRATION
SOUTH SIDE - NOON

SUMMER
SPRING/FALL
WINTER

DIAGRAM OF SUN PENETRATION
EAST SIDE - 9 AM

SUMMER
SPRING/FALL
WINTER

N 25' 50'
-45-
The lab and office pods have glass walls facing into the central aisle, providing views out for the workers and at the same time making the work activities visible to passers-by. The transparency is made possible because the shed shields from the sun. The side walls are sheathed in aluminum panels, protecting from the direct sun and creating stair corridors. Trees in the entrance area provide a transition between the exterior and the new complex; they receive plenty of sun from the large south-facing openings. The existing concrete floor surface will be retained with its parking lines.
The conference egg, dramatically suspended overhead, is sheathed in chrome-plated metal panels. Directly below is a fountain and seating in the same shape. This area acts as a gathering space in imitation of a town square for workers and the public. The reception desk is centrally located behind the fountain area.
The new pods are a variety of forms and heights, creating a different visual experience from each location. The pods on the east side are lower in height so more light can enter the space, and users can occupy the rooftop for lunch or breaks. Spaces that need little light, like the mechanical and storage rooms, are on the ground floor where there are no existing openings.
The pods on the west side are three stories to reach above the level of the connecting wing that exists between the two Crucible Steel shed structures. The new pods here create a corridor down the length of the rolling mill. On the second level, workers walk along a catwalk underneath the main trusses. On the third level, the catwalk runs alongside the gantry box beam. All the walkways have radiant heating pipes to provide comfort in the winter.
The catwalk on the second level runs under the existing gantry box beam and connects the office spaces. From here, one can look out over the complex to the garden terrace or into the daycare. Traveling between the different building components becomes an enjoyable experience, much more so than in the typical office building corridor.
The garden terrace is accessed from either the cafeteria or via a catwalk across from the second-level offices. It provides an outdoor space for eating or relaxing in nice weather. The ground surface is gravel and glass pavers that let in light to the receiving area below. Up in the treetops overlooking the terrace is a platform for events or special displays.
On the top level, a running track circles the shed space and also provides a promenade down the center of the space through the trusses. The event platform is also at this level, accessed by two catwalks leading across from the stairs and elevators. The existing trusses serve as the support structure for both the track and the platform. The monitors in the roof of the shed are opened up for light, ventilation, and HVAC exhaust.
Exterior view looking north

From the exterior, the central conference egg and the pods inserted to the east and west are framed by the openings in the existing shell, providing a glimpse of the new life that inhabits the historic rolling mill. The roll-up garage doors that exist at the base level remain open for free pedestrian access.
The Crucible Steel buildings stand out amongst a sea of uniform, flat-roofed residential and commercial buildings. The historic industrial buildings can become a center of interest and cultural continuity within the new development planned for the site.
CONCLUSION

The Crucible Steel industrial buildings are architecturally and historically significant and should be preserved. By reusing them as part of a new technology complex, they are preserved as one of the few remaining industrial structures in Harrison. The proposed design enables the visitor to appreciate the existing shell more than before; the juxtaposition of the old and new enhances both. Accepting and even highlighting the state of decay of the existing rolling mill helps achieve this by its contrast with the new. While this may be an untraditional approach, it is one that should be considered more often when rehabilitating industrial structures.

The addition of a new technology complex addresses the needs of Harrison’s redevelopment plan without ignoring the history of the site. The high tech industry can be seen as the equivalent of last century’s manufacturing operations, so it makes sense to combine this new use with a building used for steel production. The change in corporate America has left many previous industrial buildings abandoned and falling into ruin, but just because the type of work has changed doesn’t mean that significant buildings should be demolished. This thesis offers an example of how a steel mill can have a new life, bringing the past and the present into productive harmony.
BIBLIOGRAPHY

Advance Realty. “Riverbend District Harrison, NJ.” 15 October 2012

Caroom, Eliot. “Panasonic plan might give Harrison a break from bad news.” The Star-Ledger
   12 June 2012. 10 September 2012

   15 October 2012

Floriani, Ray and Karen A. Images of America: Harrison. Portsmouth, NH: Arcadia

“Harrison Waterfront Redevelopment Plan.” New Jersey Future. 15 October 2012


Leir, Ron. “Panasonic plans ‘R&D’ facility in Harrison.” The Observer Online 6 June 2012. 10

Parker, Kevin. “Groundbreaking for Panasonic Corp of North America’s Technology Center in
   Harrison, N.J.” citybizlist New York 11 October 2012. 15 October 2012


“Special Steel Products Flow From N.J. Unit.” Pittsburgh Post-Gazette 20 May 1949. Google
   News. 25 April 2013.

Proquest. 15 October 2012.

Town of Harrison Department of Construction and Engineering. Harrison, NJ. Block 151, Lot 5.02.