

Building 113/114 Overview

Physical Description

Building 113/114 stands on the south side of 20th Street. The earliest remaining structure on site, it was designed by Civil Engineer Dr. D. E. Melliss.¹ The eastern portion was completed in 1885, and the western, in 1886.² The two structures were joined by a connector in 1914.

This two-block long industrial structure consists of the two original unreinforced brick buildings, and the central reinforced concrete connector. Building 113/114 measures 492' long by 175'-6" wide by 62' tall, and contains 89,686 square-feet of floor space. Both brick structures have high gable roofs with monitors, projecting piers, arched windows and simple corbelled cornices. A lower, double gable section extends the western portion south creating an "L." While the two sides of the building are similar in form, scale, and materials, they differ in terms of fenestration, bay width, and rooflines.

Building 113 includes all of the 81,964 square-foot area beneath the high, single gable as well as the northern portion of the double gable structure (including an 8,800 square-foot mezzanine); Building 114 comprises only the 7,722 square-foot area beneath the southern gable of the double gable portion.

The eastern portion originally housed the blacksmith and boiler shop. It stands under a single gable roof with an original central, venting monitor and two, slightly later strip skylights along the northern and southern roof slopes (these show up in the 1899 but not the 1886 Sanborns). The long, north and south elevations are eleven bays wide. Each bay contains a single arched wood multi-lite window. The short, east elevation is seven bays wide, with a corrugated metal-clad shed addition, built in 1941, abutting the southern end (Building 23).³ Like the long elevation, each bay has one arch-topped, multi-lite wood window. In addition, a high, arch-topped window penetrates each of the three central bays.

The connecting structure is similar in style to the roughly contemporaneous steam power house across the street (Building 102). It is classically detailed, with a large, arched central opening and flanking steel sash windows. Cast cartouche ornaments top each of the four piers and a dentiled cornice completes the wall.

The western portion, which originally housed the machine shop, sits beneath a high and broad, nine-bay wide single gable, and two lower and smaller three-bay gables. The primary (north) elevation has eleven bays. Most bays feature three arched window openings at both the first and second story; however, the central bay has five arched windows at each level, and an infilled brick arch between the first and second levels, indicating that this may have once been the primary entry for his building. The arched windows are multi-lite wood sash.

The west elevation is fifteen bays wide. A corbelled band continues across this elevation at the same level of the north-elevation's cornice, visually dividing the elevation into two stories. Beneath the larger, nine-bay gable, the three northern-most bays feature paired, arched windows similar to those at the north elevation. The three central bays have a single larger arched window in each bay, with four arched windows at the second level. The last three bays beneath the wide gable, as well as the six bays under the lower, double gabled portion, each have a single multi-lite arched window, narrower than those in the central bays.

¹ Machine Shop, Union Iron Works Original Drawings 1882-1884, Tube #900, J. Porter Shaw Library; "*San Francisco Call*, January 24, 1884, p. 5/7.

² Bethlehem Steel General Plan, 1945.

³ This shed addition is Building 23. "Testing and Boiler House."

The east elevation of the double-gabled portion features three arches. A single monumental arch stands beneath the northern gable; its lower portion has been infilled, while the upper retains multi-lite wood window sash. A central pilaster divides the southern gable façade into two bays; each of these has a single, arched multi-lite wood window, extending only halfway down the wall. At the lower portion, a loading door accesses the building, centered beneath the pilaster. Smaller, 12-lite wood windows flank the loading door.

The interior beneath the main, high-gabled portion of Building 113 is a clear span space with machinery and free-standing office enclosures at the connector. A railroad track bisects the space transversely. Attached to the exposed steel truss ceiling are two 30-ton bridge cranes marked either with the numbers “7” or “8,” which appear to date to 1896. Two 5-ton bridge cranes span the south bay of the eastern portion and may also date to the late 1890s. Two 20-ton bridge cranes span the south bay of the western portion and may also date to 1896.⁴ Jib cranes are attached to the steel columns in the central bay and project from the north and south walls in the eastern half. Several pieces of large equipment remain; footprints of additional removed machinery are also visible. A concrete pit with a maze-like layout of concrete walls slices through the eastern end of Building 113; it allowed workers access to the underside of equipment. This pit was likely added after the period of significance, as it does not appear on the 1945 Plan or any of the earlier Sanborn maps.

End-grain wood blocks, roughly six inches square and covered with asphalt, pave the floor. The building’s walls are unreinforced brick, with one concrete section. A mezzanine hangs over the north side of the western half. It is accessed at the east end by an iron staircase and on the west by an iron spiral staircase. Small wood-framed, free-standing, one-and-two story single-room office enclosures stand within and adjacent to the connector. These sheds have varying ceiling heights and multi-lite steel sash windows. A sign on one of these enclosures reads: “Notice to Employees: Machine Shop No. 1 & No. 2. All employees must return all tools to the tool crib when finished with job...only the tools that were originally issued with tool boxes are to be kept out.” Another sign reads: “The Machine Department has worked ____ days without a disabling injury.”

The interior of Building 114 is separated from that of 113 by a brick masonry fenestrated wall. Building 114 measures 200’ long by 40’-6” wide and contains approximately 8000 square-feet of floor space. The floor is asphalt-paved, and walls are unreinforced brick, except for the south wall, which is board-formed concrete (probably dating from 1917 when the adjacent Building 115 was constructed). The ceiling is an exposed steel structure, which in this case includes five, four-sided caged trusses. A skylight sits over the western end. Rail lines run across the center of the building transversely, connecting to both Buildings 113 and 115. There are also 10 ton cranes, and several curbs and platforms that once held ovens, furnaces, and other foundry-related equipment.

Historic/Current Use

Building 113 changed functions and floor plans several times between its construction in mid-1880s and WWII. The western portion of Building 113 originally housed the Machine Shop, while the eastern portion contained the Blacksmith and Boiler Shops. By 1945, the entire Building 113 served as a Machine Shop, with Building 114 serving as the Foundry Furnace Building. The buildings are not currently in use.

Machine shops have historically been considered part of a shipyard Engineering Department, along with the Blacksmith Shop, Pipe Shop, Boiler Shop, Foundry, and Pattern Shop. According to a

⁴ Plans of The San Francisco Yard, Bethlehem Steel Company, Shipbuilding Division 1944-1945, Sheets 45 and 46.

Bethlehem Steel Co. manual, produced for new employees in World War II, shipyard engineering work included a ship's propulsion and auxiliary machinery, steering apparatus, and all piping.⁵

Building 113 was designed as a multi-purpose building, with a functional division between the eastern and western portions. In the late 1880s most of the western portion was devoted to the Machine and Erecting Shop, with car tracks crossing the floor. The eastern portion had a Blacksmith Shop in the north half and a Boiler Shop in the southern portion. There was also a small, two-story management office and drawing room in the northeast corner of the western (machine shop) portion of the building. That was the main shipyard office until 1896. Other shipyard offices were located in the basement of the Boiler Shop in the eastern portion. The southwest corner of the Machine Shop had a brass foundry, copper shop, and tool room. An engine room was at the southeast corner of the machine shop.⁶

A simple description of the function of the Union Iron Works' Machine Shop appears in an 1885 report on shipping and ship building in San Francisco. It offers an invaluable description of the shipyard in its first years of operation: In this shop engines, large or small, can be put together complete, then picked up by an overhead traveling crane, placed upon a car, and taken to the wharf, where a set of steam shears, with a capacity of 100 tons in a single piece, again picks it up and puts it in a vessel in the position required.⁷

The western portion of Building 113 was divided by four rows of cast-iron columns into five bays: four of them were 40' by 200', and one was 55' by 200'. In the 1880s the erecting shop used two bays, each equipped with overhead hydraulic traveling cranes. Three of the bays contained operating machinery.⁸

According to the Hopkins' report, the machine shop equipment was considered state-of-the-art in 1885. The shop had a planer that could "plane a surface twelve feet wide and twenty-six feet long, fitted with six cutting tools, suited for planing and cutting any type of machinery." The lathe department had a lathe that could "turn a shaft 49 feet long, or a crank shaft, such as is used in compound marine engines... the most complete tool of its class in the United States." The shop's largest boring mill could "turn thirty feet in diameter and ten foot face, or it will plane a surface thirty feet long by ten feet wide. The machine will also perform boring, planing, slotting, drilling and key-seating... It combines all the modern tool improvements known up to 1884, and is said not to be excelled by any similar machine in the world." The machine shop also had "one of the largest hydraulic presses in the world, for pressing in crank pins and pressing on crank plates."⁹

Engine House/Boiler Room (western portion of Building 113)

A 40' by 80' engine house and boiler room (no longer extant), with a 120-foot high octagonal chimney, was adjacent to the southeast end of the machine shop. It was described in detail by a reporter for the *San Francisco Call*, who visited the shipyard in January 1884:

⁵ Bethlehem Steel Co. Shipbuilding Division (1942), 16, 43-44.

⁶ Sanborn Map Company, Vol. 5 (1886), sheet 153; General Plan: Machine Shop, Union Iron Works Original Drawings 1882-1884 Tube #900, J. Porter Shaw Library; Hopkins 1885, pp. 35-37; *San Francisco Call*, July 26, 1896, p. 10/2.

⁷This 1885 report was prepared by three prominent San Francisco business groups: The Manufacturers' Association, the Board of Trade, and the Chamber of Commerce. Lead author was Caspar Hopkins. Hopkins 1885, p. 36.

⁸ Hopkins 1885, p. 35; *San Francisco Call*, January 24, 1884, p. 5/7.

⁹ Hopkins 1885, pp. 35-36.

In the [engine house] will be a condensing horizontal engine.... There are also a separate engine for the electric light machines, an air compressor, and pumps for the accumulator for supplying hydraulic power throughout the establishment. In the boiler room there are two boilers of the Dickie patent... The chimney is a handsome octagonal structure, 120 feet high and 6 feet internal diameter. The roof of the engine building is an iron tank two feet in depth, in which will be cooled the water from the condensers of the main engine, thereby saving considerable expense, as by this method only about 800 gallons of water per day will be required.¹⁰

The reporter further noted that “Those living in the neighborhood of the works will be pleased to hear that the furnaces are claimed to be absolute smoke-consumers.”

Tool Room/Blacksmith Shop (western portion of Building 113)

The 1884 *San Francisco Call* article and the 1885 Hopkins report both describe a small tool room adjacent to the southwest end of the machine shop; however, the 1886 Sanborn Map shows a small blacksmith shop in this location¹¹

Brass and Copper Shops (western portion of Building 113)

Adjoining the south end of the tool room/blacksmith shop was the brass foundry and copper shop. The brass foundry was described in 1900 as a very busy shop; Union Iron Works made a great deal of brass work, such as valves and marine fittings that most shipyards bought from special manufacturers. In 1900 it had an overhead electric crane of 12 tons capacity, as well as hardening furnaces, tempering and babbitting furnaces, and hydraulic cranes.¹²

The 1914 Sanborn Map shows an enlarged and reconfigured Brass Foundry in the southwest corner of Building 113. A 1916 article in *International Marine Engineering* cites a new brass foundry among the many improvements at the shipyard under new Bethlehem Steel management.¹³

Offices in the Machine Shop (western portion of Building 113)

The offices of Irving M. Scott and his brother, Henry T. Scott, general manager and president, respectively, of Union Iron Works, were described in the *San Francisco Call* newspaper in 1892:

Blue prints and lithographs hang on the walls and are standing in rolls in nearly [every shelf] of the office of Irving M. Scott, the president of the Union Iron Works... Mr. Scott's office has three sections, one an outer room for his employees, one for himself and his brother, Henry T. Scott, and another adjoining the latter one, containing a long table and cases full of drawings. The last-mentioned room is for consultations of a mechanical nature, and the long table is for the purpose of spreading out the drawings. The desk of Mr. Scott is a double flat one, and is occupied by the two brothers, one on each side. Between them is the paraphernalia necessary to complete the furniture of a writing-desk, and most days a lot of letters, pamphlets, price lists or circulars.¹⁴

¹⁰ *San Francisco Call*, January 24, 1884, p. 5/7.

¹¹ Hopkins 1885, p. 37; Sanborn Map Company, Vol. 5 (1886), sheet 153.

¹² *Marine Engineering* (January 1900), 14; Hopkins 1885, p. 37.

¹³ Sanborn Map Company, Vol. 6 (1913), sheet 593; *Marine Engineering* (March 1916). Pam File, Union Iron Works, J. Porter Shaw Library, no page number.

¹⁴ *San Francisco Call*, November 25, 1892, p. 6/1.

Other shipyard offices occupied the basement of the boiler shop before the mid-1890s. By 1896 these machine shop offices were described as “inconvenient and in such a scattered location that bookkeepers, draughtsmen and clerks were compelled to work by gaslight during the daytime.”¹⁵

Most of the shipyard offices were relocated to a new office building (Building 104) in 1896. The 1899 Sanborn Map shows that the old two-story machine shop offices in the northeast corner of Building 113 were converted to a tool room and electrical department, with a small office space remaining in the northeast corner.¹⁶

By 1914 the offices in the northeast corner of Building 113 had apparently been removed; the Sanborn Map of that year shows no demarcation of space in the northeast corner. This map does show a new mezzanine at the north side of the building’s western half.¹⁷

The Boiler House (eastern portion of Building 113 in 1885)

The boiler shop, in the southern half of the buildings eastern section, was used for construction of ship’s steam boilers. According to the *San Francisco Call*, the building’s eastern half, housing the boiler shop and blacksmith shop, was the first completed building at the Union Iron Works shipyard. It was described on January 24, 1884, as “ready for occupancy, and the machinery is being placed in position with all possible haste, the probability being that in about two weeks the shop will be in running order.”¹⁸

The boiler shop had hydraulic machines for riveting, planing, and shearing; bending machines for shaping or bending iron, rollers for rolling iron or steel boiler plates, and heating furnaces for plates. It also had smaller equipment such as angle iron shears and punches. A railroad connected to an overhead hydraulic traveling crane which moved through the entire length of the building, for efficient and cost-effective movement of work and materials.¹⁹

The Blacksmith Shop (eastern portion of Building 113 in 1885)

The Blacksmith Shop, in the north half of the building’s eastern section, had three steam hammers as well as other tools for forging work, and a system of hydraulic cranes. In 1900 the blacksmith shop had 24 fires, and hydraulic jib cranes for handling heavy work under the hammers.²⁰

Alterations to the Plan of Building 113

By 1899 the building’s internal functions and plan had changed. The Erecting Shop had been moved from the western (Machine Shop) portion to the south half of the eastern portion, taking the place of the Boiler Shop. In 1899 the eastern portion was shared by the Forge Shop in the north wing and erecting shop in the south. The Boiler House was moved from the east wing to the southeast corner of the western half of the Machine Shop, where the Engine House had been located in 1886. The offices in both halves of the building were relocated to the newly erected Building 104, constructed in 1896. This arrangement also appears on the 1905 Sanborn Map update.²¹

In 1914, a connector building joined the eastern and western halves of Building 113. By 1914, the Boiler House and Forge were no longer part of the Machine Shop complex. A new Bolt and Rivet

¹⁵ *San Francisco Call*, July 26, 1896, p. 10/2.

¹⁶ Sanborn Map Company, Vol. 5 (1899), sheet 543.

¹⁷ Sanborn Map Company, Vol. 6 (1913), Sheet 593.

¹⁸ *San Francisco Call*, January 24, 1884, p. 5/7.

¹⁹ Hopkins 1885, pp. 38-39; *San Francisco Call*, January 24, 1884, p. 5/7.

²⁰ Hopkins 1885, p. 40; *Marine Engineering* (January 1900), 15.

²¹ Sanborn Map Company, Vol. 5 (1899), sheet 543; Sanborn Map Company, Vol. 5 (1905), sheet 543.

Shop was located in the north half of the building's eastern portion, where the Forge Shop stood in 1899 and 1905. The Erecting Shop remained in the south part of the eastern portion.²² The 1936 Sanborn map shows the same basic layout as the 1914 Sanborn Map.

The Foundry Building, Building 114

Foundry workers made metal castings of tools or machinery based on drawings produced by shipyard draftsmen, and machine part forms produced by the pattern shop. In the foundry, molders worked with several large cranes and cupolas (round furnaces) capable of melting tons of iron, large core ovens, and pits for making castings of molten iron or steel in almost any size and shape. In the late nineteenth century, the molds were mostly constructed of sand, although some loam was used.²³

The 1886 Sanborn Map shows that the south end of the foundry had several functional features: a core room with core ovens at the southwest corner, three cupolas (round furnaces) on an iron floor in the center of the south end, and a coke shed at the southeast corner. The coke shed does not appear on the 1899 Sanborn Map.²⁴

There are no signs of shipyard development south of Building 114 on the 1886 Sanborn Map. From 1899-1905, however, the open space south of the foundry had a rail line, a Flask Storage Yard behind the Foundry's western portion, and a scrap iron yard behind its eastern portion.²⁵

Foundry Molding Pit and Core Ovens

The main molding pit for making the largest metal castings was 14 feet in diameter and 14 feet deep. A second pit was 9 feet in diameter and 10 feet deep. The foundry had four core ovens for drying cores from a few ounces to 20 tons, and an overhead traveling crane covering the whole space of the foundry floor "so that a casting may be run from or to any part of it."²⁶

Foundry Cupolas

Hopkins describes the three foundry cupolas as capable of making castings weighing 60 tons in three hours. The cupolas had a hydraulic lift to carry up iron, coal, and coke.²⁷

Hopkins admired the shipyard's system of car tracks that facilitated movement of materials within buildings. In the foundry, "the car track delivers the iron, coal, or coke, or takes the material from the cupolas without any additional cost for handling or transportation, and also enters the foundry at two points convenient to the overhead cranes."²⁸

Building 113/114 was used by BAE Systems for ship repair work until 2001 when it was abandoned because of structural problems. Building 113/114 is currently not in use.

Integrity

This building retains a very high level of integrity. It is a contributor to the historic district because of its associations with the earliest Union Iron Works period through World War II. Building 113/114 was one of the original buildings constructed on the site and is a necessary element in understanding

²² Sanborn Map Company, Vol. 6 (1913), sheet 593.

²³ Blum 1989, pp. 98, 110.

²⁴ Sanborn Map Company, Vol. 5 (1886), sheet 153; Sanborn Map Company, Vol. 5 (1899), sheet 543; Hopkins 1885, p. 37.

²⁵ Sanborn Map Company, Vol. 5 (1886), sheet 153; Sanborn Map Company, Vol. 5 (1899), sheet 543; Sanborn Map Company, Vol. 5 (1905), sheet 543.

²⁶ Hopkins 1885, p. 37.

²⁷ Hopkins 1885, p. 37.

²⁸ Hopkins 1885, p. 38.

the layout of the site. It is the only extant example of the American Round-arched style, used for the original construction of the yard and is an essential component of the district's ability to represent industrial architecture from the 1880s through 1945.