

## MATERIAL MORSELS

Reviews with a materials angle.

# Pittsburgh: A Meal of Steel and a Taste of Aluminum

## Materials Walking Tour

Daytime Stroll (see map)

[1]–[2]–[3]–[5]–[6]–[7]:

~1.6 miles/~2.6 km

With a “Glass” Diversion [4]

*In 1749, two French explorers wrote about a point in Western Pennsylvania where three rivers met. They did not know then that these rivers would become famous trading waterways, occupied by Americans who hammered, sweated, and forged to create industrial history: Pittsburgh, the Steel City.*

Until 1980, Pittsburgh, Pennsylvania, ruled as the most productive steel-making city in the world. Its major steel production began in 1873 when Andrew Carnegie established Edgar Thompson Works, the first steel mill near Pittsburgh. The city produced steel for famous U.S. structures such as the Brooklyn Bridge and the Empire State Building. However, steel is not the only material that welds Pittsburgh into industrial history.

Before steel production, the United States depended on Pittsburgh for glass. At one time, 62 glass factories decorated



View of “the Point” and downtown Pittsburgh, Pennsylvania, from Mt. Washington. Courtesy of Kristin Wilson.

the South Side neighborhood. Aluminum is also an important material in the city’s history. In 1888, 15 years after the birth of steel in Pittsburgh, the Pittsburgh Reduction Co. pioneered the production of aluminum. Later, that company became the Aluminum Company of America, better known as Alcoa.

You can see firsthand how these materials contribute to Pittsburgh’s infrastructure and history on a short walking tour of the city, beginning with one of the city’s many bridges, the Smithfield Street Bridge.

From downtown Pittsburgh, walk to the foot of Mt. Washington—Pittsburgh’s old Coal Hill—by crossing the Monongahela River via the Smithfield Street Bridge

([1] on the map). This bridge, designed by Austrian engineer Gustav Lindenthal, was built in 1883 and restored in 1995. Made of 13 steel lenticular trusses, steel chords, pier posts, diagonal bars, and other wrought-iron parts with steel rivets, the bridge is Pittsburgh’s oldest. It stretches 1,184 feet and is currently painted its original colors, blue and cream. In 1933, the city reconstructed the downstream deck with aluminum; this Pittsburgh-supplied metal decreased the bridge’s weight by 675 metric tons, and later by another 97 metric tons after a subsequent replacement in 1967.

Once over the bridge, step into Station Square [2]. Here, you will find Bessemer Court, named after the 10-ton Bessemer converter, built in 1930, that sits between a lively fountain and the Monongahela River. The converter is a huge, pear-shaped, steel and clay container in which steel was synthesized by the Bessemer process, patented by Sir Henry Bessemer in 1856. Until this innovation, metallurgists made steel by heating wrought iron with charcoal for extended periods.

Using the Bessemer method, a worker could quickly make tons of steel by blowing air through molten pig iron in a pressurized converter to drive off impurities and excess carbon. Workers knew when they had successfully made steel by the color of the flame rising from the converter, a method that was usually accurate to within 10 degrees. The Bessemer process was the most widely used steel-making process until it was gradually superseded by the open-hearth process, invented in 1864. In early planning, Pittsburgh considered using Bessemer steel for parts of the Smithfield Street Bridge, but did not do so after the material failed stress-strain testing.

Next to the Bessemer converter, you



will find the Refractory Brick Press, built in 1941. This Boyd Model "X" Mechanical Toggle press was used to mold refractory brick at an extreme pressure. Looking above these two contraptions, you will not miss Pittsburgh's first blast furnace, a looming structure made in 1859 to smelt pig iron.

If you are ready for lunch, consider the Hard Rock Café, Bar Louie, Red Star Tavern, or one of the numerous restaurants and shopping spots in Station Square. Indulging in the Pittsburgh spirit, you can eat at the Grand Concourse, a restaurant that once was the Pittsburgh & Lake Erie Railroad terminal. Here, you can gaze at an attractive array of high ceilings, marble, brass, mahogany, and stained glass. Afterward, you may wish to peruse the Freight House Shops beside the rusty steel railroad.

Next, return to the Smithfield Street Bridge to continue your walk toward Mt. Washington and turn right onto Carson Street, where you will see the Monongahela Incline [3] on your left. Enter the small wooden building and take the 635-ft historic cable car to the top of Mt. Washington. This steel incline was first built in 1870 and renovated with a steel structure in 1882. The one-way fare of \$1.75 is a bargain given the opportunity to observe Pittsburgh's skyline while ascending the steep 369-ft elevation at 6 mph.

At the top of the hill, view old pictures of the Mt. Washington mines, early industries, and the incline. There are also artifacts including an Otis Elevator Controller, used from 1935—when the steam engine was replaced by an electric motor—to 1994. Also at the top, you can overlook Pittsburgh's Golden Triangle. Locate "the Point," where the three rivers meet, a large fountain surges, and, on some evenings, fireworks hover. Locate

the tall, striped, glass building topped with six points, looking like a castle of glass. This is PPG Place [4], the Pittsburgh Plate and Glass Industries (established in 1883 as PPG Co.) building. It is comprised of one million square feet of glazed, Solarban 500 clear reflective glass and steel. Also locate the black U.S. Steel Tower, the tallest building in Pittsburgh, which you will soon visit.

Come back down the incline and cross the Smithfield Street Bridge toward downtown. (For an excursion, you can return to Station Square for the Rivers of Steel Tour, which will take you to the Edgar Thomson Works, the grounds of the 1892 Battle of Homestead, the Carrie Furnaces, and much more. Note that this tour must be prearranged—see Web site [www.riversofsteel.com](http://www.riversofsteel.com).)

Continue up Smithfield Street and turn right onto Sixth Ave. At 425 Sixth Ave., you will see the Alcoa Building [5]. This skinny skyscraper, designed by Harrison and Abramovitz in 1953, was revolutionary in its 30-story, aluminum waffle structure. The building has no scaffolding, but has 6-ft-wide metal panels with 8-in. inverted pyramid cut outs.

Next, continue along Sixth Ave. toward Grant Street. At 600 Grant Street, you cannot miss the U.S. Steel Tower [6], which used to be called the USX Tower. In 1970, U.S. Steel considered constructing this black, triangular tower to be the world's tallest building. Although not the tallest in the United States, the U.S. Steel Tower is the tallest skyscraper between New York and Chicago, reaching 841 ft. In designing this building, architects Harrison and Abramovitz were the first to use liquid-filled fireproof columns. The liquid consisted of a mixture of water and antifreeze. Also, the architects decided to use a steel called COR-TEN, which rusts in an attrac-

tive reddish-brown color. However, Pittsburgh rain often hydrolyzed the iron oxide to a black tint and washed it into the road, which also stained the building across the street for years.

Now, continue along Grant Street, turn left onto 11th Street, and turn right onto Smallman Street. At 1212 Smallman Street, enter the Senator John Heinz Pittsburgh Regional History Center [7]. This 200,000 sq ft museum and research facility features Glass: Shattering Notions, an exhibit of glass pieces produced in Pittsburgh before the steel frenzy. Also, you will find the Blum Collection, which is a collection of metal decor by Blumcraft, a company founded in Pittsburgh by Hyman Blum in 1908. There you will see a large hinge, cellar doors, fire escapes, and other aged steel and aluminum pieces. Also, you will see an etched aluminum box lined with velvet. This aluminum box, given to the Center by Alcoa, holds the company's first pieces of aluminum.

Now that you have tasted some of Pittsburgh's wrought-metal history, you just may be hungry for a bit more—and perhaps some German cuisine and quality ale. We recommend that you spend an evening at Penn Brewery (which hosts Café Scientifique—[www.cafescipgh.org](http://www.cafescipgh.org)), a restaurant and microbrewery located in the former Ebhart and Ober Brewery, Pittsburgh's oldest. To visit this historic brew works, where beer has been made since 1848, take a taxi to 800 Vinial Street on Pittsburgh's North Side. There, you can examine the authentic German brew-house, a stunningly shiny, entirely copper structure. And, of course, you can take it easy in a historic Deutschtown setting, as steelworkers have done for years.

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