Case Study: Portland, Oregon Bridge Bicycle and Pedestrian Improvements

Focus on the Steel Bridge

Prepared By: Andrea White-Kjoss, November 2010

Portland, with its metro area population of 1.5 million residents, has come to be known as a city that excels at increasing bicycling and walking by providing people with the built environment for it. Daily bicycle traffic on four of the Willamette River bridges has increased from a total of 2,855 before 1992 to over 16,000 in 2008, partly due to improved bicycle-pedestrian facilities on the bridges.\(^1\) During that same period, Portland increased bicycle commuter trips from less than 1% to approximately 7%, the highest proportion of any major U.S. city and about 10 times the national average.\(^{ii}\)

The Portland bridges bicycle and pedestrian effort has been a major factor in Portland’s increasing bicycle use because of the crucial links these bridges provide into downtown. It also has been positive for pedestrians and people with disabilities.\(^{iii}\) And, because commuting trips are only a small proportion of overall trips (just 5% of bike trips and 14% of auto trips nationwide), the proportion of bicycles to vehicles is as high as 21% on some Portland bridges.\(^{iv}\)

The most dramatic and expensive improvements have had the most significant impact. Relatively low-cost improvements such as the blue bike markings in conflict zones, bike lanes on certain approaches, and signs were not as significant to increasing bike use as were the major cost items, such as providing a new shared-use path, widening the sidewalk, and replacing sidewalk surfaces and approaches. For example, bike use on the Burnside Bridge tripled when bike lanes were installed in 1993 (at a cost of $20,000), but has remained flat since that time at less than 1,000 daily cyclists. In comparison, bike use on the Hawthorne Bridge exploded to more than 3,000 daily cyclists because of the much-improved sidewalks and access improvements (at a cost of more than $1.3 million). Similar increases were seen on Broadway Bridge (a cost of $300,000) and Steel Bridge (a cost of more than $10 million) following improvements.\(^{v}\)

**A key to the heavy and increasing concentration of bicyclists on the Hawthorne, Steel, and Broadway bridges as opposed to the Burnside and other bridges is that on these three bridges’ spans, bicyclists are off-street on either wide sidewalks or shared-use paths, with bike lanes on the approaches.** In addition, the city added bicycle lanes to all streets connecting to the Hawthorne, Steel and Broadway bridges, overcoming a major hurdle in getting people to the bridges.\(^{vi}\)

The Steel Bridge

The Steel Bridge is a one-of-a-kind structure spanning the Willamette River in downtown Portland, carrying autos, buses, trucks, and light rail on the upper deck, and the tracks of the Union Pacific Railroad on the lower deck. Opened to traffic in 1912, the 800-foot long structure includes a 211-foot long, double-deck telescoping vertical lift span. The bridge is owned and operated by a private company, the Union Pacific Railway company out of Omaha, Nebraska.
In addition to being nearly 100 years old, the Steel Bridge is a complex site that accommodates auto and truck traffic as well as light rail. The I-5 and Union Pacific’s mainline tracks run directly parallel to the east bank and there are entrance and exit crossings to consider at the ends of the bridge.

Existing travel lanes and sidewalks on the upper deck were narrow and did not readily accommodate pedestrians or bicyclists. When the upper deck was reconstructed in 1984-1986 as a part of the MAX (light rail) project, it was determined that the upper deck sidewalks could not be widened due to weight concerns. That, and a desire to increase accessibility to the east bank of the Willamette River, and connectivity for non-motorized traffic between downtown Portland and the Lloyd District, Rose Quarter, and Oregon Convention Center, led the City pursue the addition of a pedestrian and bicycle crossing on the Steel Bridge. vii

**Project Elements**

The project includes three primary elements:

1. Westbank Connection – An extension of the river bank esplanade along the Tom McCall Waterfront Park to the west fixed span of the Steel Bridge.
2. Steel Bridge Crossing – The cantilevered pathway attached to the lower chord of the Steel Bridge fixed and lift spans, plus east and west approach spans. The lift span gate and signal provisions are unique to this project. At the each end of the lift span, two sets of gates are provided to prevent users from entering the pathway on the lift span when the bridge is raised to allow the passage of marine traffic. Standard pedestrian traffic signals, combined with a pre-recorded message, alert pathway users to clear the lift span. The pathway is also monitored by close-circuit TV, allowing the bridge tender to verify that the pathway is clear prior to raising the bridge.
3. Eastbank Connection – New on-grade pathways extending the riverfront Greenway Trail south to the Eastbank Esplanade mixed-use path, plus a series of ramps, stairways, and bridges that carry the pathway over the Union Pacific Railroad’s mainline railroad tracks at East Portland Junction. viii
Eastbank Connection: A series of ramps for bicyclists, stairways as shortcuts for pedestrians, and bridges that carry the pathway over the Union Pacific Railroad’s mainline railroad tracks at East Portland Junction.

A pathway width of 14 feet was selected to accommodate the anticipated mix of pedestrian, bicycle, and other non-motorized uses of the esplanade and the connections to the Overlook. The ramp and pathway system on the east bank provides landings at the junction points, to provide viewpoints for users who wish to observe the river, downtown Portland, passing trains, or simply to watch people go by. These landings also serve to provide additional space at the places where congestion due to merging traffic could be expected during periods of high use.\textsuperscript{x}

The pathway crosses over the Union Pacific Railroad via a two-span bridge structure that is approximately 180 feet in length. The main span is a steel truss approximately 142 feet in length. This structure type was selected for several reasons – it reflects the design of the adjacent Steel Bridge, it provides a design that improves the security of the facility, and it is capable of relatively economical span lengths without requiring intermediate piers within the Union Pacific’s right-of-way.\textsuperscript{x}

### Project Costs

**Construction Costs**

- General Items ............................................................. $900,000
- Westbank Connection ................................................. $60,000
- Steel Bridge Modifications .......................................... $2,600,000
- Eastbank Connection ................................................... $3,100,000

**Project Development Costs**

- Construction Cost ...................................................... $6,660,000
- Union Pacific Railroad Costs ................................. $710,000
- Design Engineering ................................................... $1,300,000
- Construction Engineering ......................................... $960,000

**Total Project Cost .........................................................** $9,640,000

Source: City of Portland, Office of Transportation
Conclusions
Conclusions from this case study are three-fold: 1) the Los Angeles Gateway Cities area most affected by lack of bicycle and pedestrian access to and across the port of Long Beach and Los Angeles has a similar population to the Portland Metro area; 2) the suggested zone of the Class I bicycle and pedestrian path leading to and on the Gerald Desmond bridge shows no more complex characteristics than that of the Steel Bridge in Portland (and may, in ways, be less complex), and 3) creating such world-class facilities does indeed create demand and fulfills existing needs that are going unmet.

Daily, thousands of new bicyclists and pedestrians safely enjoy the Steel Bridge path for commuting, recreation, and tourism.

References

1. Portland Bicycle Counts 2008, City of Portland
3. Birk, Mia. Alta Planning and Design. BIKESAFE #2: A Tale of Portland Bridges:
5. Birk, Mia. Alta Planning and Design. BIKESAFE #2: A Tale of Portland Bridges:
6. Birk, Mia. Alta Planning and Design. BIKESAFE #2: A Tale of Portland Bridges:
7. HNTB, Steel Bridge Bicycle and Pedestrian Crossing Project Overview, 2002.