

# Active Facts:

## *Ramps & channels to link bikes & trains\**

Over the last 20 years, a growing number of transit systems have begun to cater to bicyclists. This has become particularly common among bus-based systems — more than 470 bus agencies in the U.S. have outfitted their buses with front-mounted bike racks.<sup>1</sup>

More recently, rail-based transit systems have begun to accommodate bicyclists, as well. Leaders in the movement include systems like the Bay Area Rapid Transit system (BART) in the San Francisco area, Metro in Washington DC, Denver's RTD, New Jersey Transit Rail, Chicago's CTA, and TriMet in Portland (OR).<sup>2</sup>

One common barrier with rail systems is elevation. Light or heavy rail tracks are often higher or lower than

the street system. As a result, bicyclists may need to go up or down to take their bikes to the trains.

Many bicyclists carry their bikes over their shoulders or bounce them up and down stairs. Some stations have large elevators, but for a bicyclist in a hurry, this option may not work. Escalators are generally avoided altogether.

In new rail stations, the best way is to provide wide and gently sloped paths that direct bicyclists to bike parking, ticketing, and loading areas with clear sight lines and separation from car parking and loading areas and congested pedestrian routes. Of course, bicycle parking and access *should not be less convenient than car parking and access!*

*One common barrier keeping bicyclists from taking their bikes on passenger trains or light rail is elevation.*

*Many stations are higher or lower than the street, forcing bicyclists to take their bikes up or down stairs...*

*What can be done? Turn the page and see!*



Photo: John Williams

*Historically, transit and bicycle systems often passed over or under each other. Potential linkages between the two modes were seldom realized. That's no longer the case. Many transit agencies now see the benefits of bringing bicyclists on board.*



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## Page 2: *Ramps & channels to link bikes & trains*

### ■ ADDING CHANNELS & RAMPS

In many existing transit stations, retrofitting bike access can be a challenge. One approach is to revamp staircases with special features on the sides, so that bicyclists can wheel their bikes safely up and down. Design specifics vary widely but the basic concepts are simple. The most common designs involve adding *channels* or *ramps* to the stairs.

A *channel* is made of stock steel and has one or two sides to guide the bike's wheels and keep them from straying. The photo (upper right) and illustration show custom "*stairchannels*" designed for BART.<sup>3</sup>

Some channels, however, are made of "U" shaped stock (the wheels go between the sides of the "U") or even "L" shaped steel angles (the upright of the "L" goes next to the outside and the bike leans against the bicyclist for stability).

According to Cycling England's *Design Portfolio, B.10 Wheeling Ramps*, "Where steel sections are used it is essential to provide a non-slip surface in order that the tyres of the bicycle may grip the ramp on the descent."

*"Where space is narrow, it is most important to have an upward wheeling ramp. A ramp at both sides of the staircase is important so that it is easy to get up and down the staircase with the bicycle."*

— *Collection of Cycle Concepts, Danish Road Directorate, 2000*



Photo courtesy of Bay Area Rapid Transit

*The San Francisco region's Bay Area Rapid Transit system has installed steel channels to guide bike wheels up and down the stairs. Channels make taking bikes to the trains and bike parking much easier. At right is a cross-section of a BART channel.*

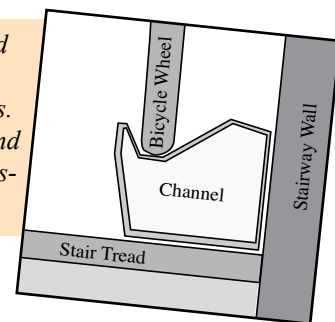


Photo courtesy of Michelle Mowery, Los Angeles DOT

*This aging Los Angeles staircase was retrofitted with an L-shaped steel channel (painted red for visibility). According to L.A. DOT Bicycle Program Coordinator Michelle Mowery, they put a channel on just one side to reduce the risk of trip and fall injuries on the narrow stairway. As a rule, channels on both sides will reduce conflicts between up and down bike traffic. Mowery tested the ramp with a folding bike and has seen "everything from a road bike to a beach cruiser with balloon tires use it without problem."*

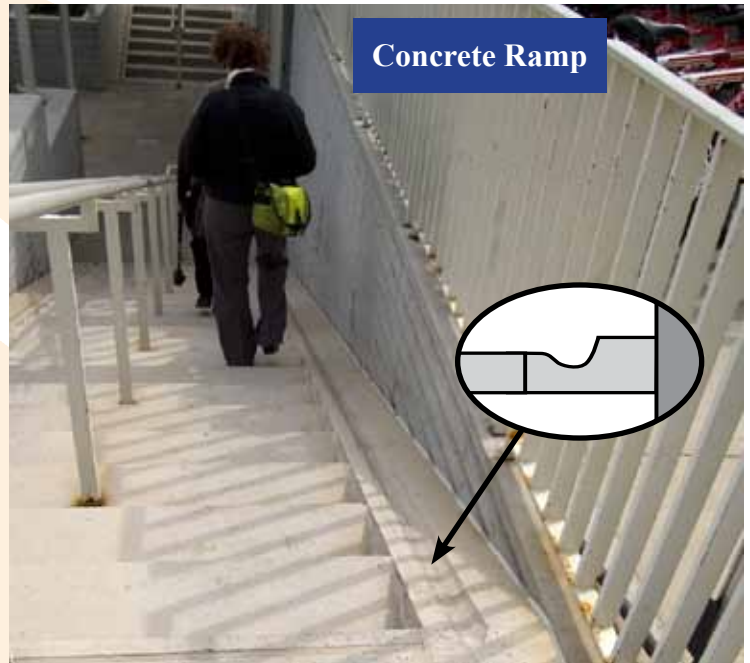
# Page 3: *Ramps & channels to link bikes & train*

A *ramp*, unlike a channel, is typically a sloping concrete surface that follows the angle of the stairs (photo at right). Bicyclists steer their bikes to keep them from slipping. A ramp may have a groove in the surface or raised outside edges to help.

At this point, there are no U.S. standards for channels or ramps, nor is there any generally-accepted guidance from national organizations. This situation may change over the next few years, however.

*“Where the wheeling ramp is formed in concrete it may be preferable to fill in the gap between the channel and the edge of the step.*

— Cycling England, Design Portfolio, B.10 Wheeling Ramps

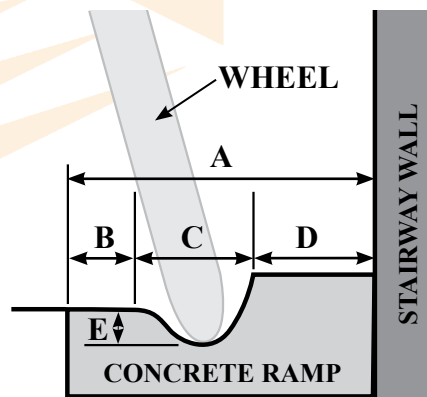


Stairs at the McDonald's Cycle Center in Millennium Park, Downtown Chicago. There are concrete bike ramps on both sides with handrails in the center. Note the groove in the ramp.

## ■ CHANNEL AND RAMP DIMENSIONS

U-shaped channels should be wide enough to keep the sides from conflicting with wheels. According to Cycling England, they should be 100 mm (4 in) wide and 50 mm (2 in) tall. These dimensions allow for the bike's wheel leaning without conflict. Extra wide channels are rare but Cycling England suggests U-shaped channels be no wider than 200 mm (8 in).

Ramps should be relatively narrow. According to the Danish Road Directorate's "Collection of Cycle Concepts"<sup>5</sup> (2000), a width of 300 mm (12 in) is appropriate. If many bike tourists are expected, the ramp may be 500mm-600 mm wide (20-23 in). However, they caution to "not use broad wheeling ramps on stairs with a modest or moderate slope because cyclists will cycle down broad ramps, and this can be dangerous." See the illustrate at right for a diagram of a concrete ramp.



$$A = B + C + D$$

$$B = 30-50\text{mm (1.2-2 in)}$$

$$C = 80-120\text{mm (3.1-4.8 in)}$$

concrete ramp preferred;  
metal channel: min: 100mm (4 in.); max: 200mm (8 in.)

$$D \geq 200\text{mm (8 in)}$$

$$E = 30\text{mm (1.2 in)} - 40\text{mm (1.5 in)}$$

(with metal channel)

After Cycling England's "Design Portfolio B.10 Wheeling Channels" diagram.

This diagram gives general dimensions for the elements of a concrete ramp with a groove to guide the bicycle's wheels; some steel channel dimensions are also included. Note the extra width (D), to keep bikes away from the wall without leaning at a severe angle. Lowering the inside section (E) helps with this as well.

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## ■ SLOPE

The slope for a ramp or channel must match that of the stairs. The current Dutch, Danish, and English design guides recommend a maximum slope of 25%. The English guide allows 34% for a retrofit.

Some staircase ramps have a gentle slope (see photo at right). For example, Dutch staircases that serve bicycle parking garages and other popular bicycle destinations often have a 20% slope;<sup>6</sup> these are quite easy to navigate.

Others can be too steep to safely use (see below). At a certain slope, it is easier and safer to carry the bicycle.

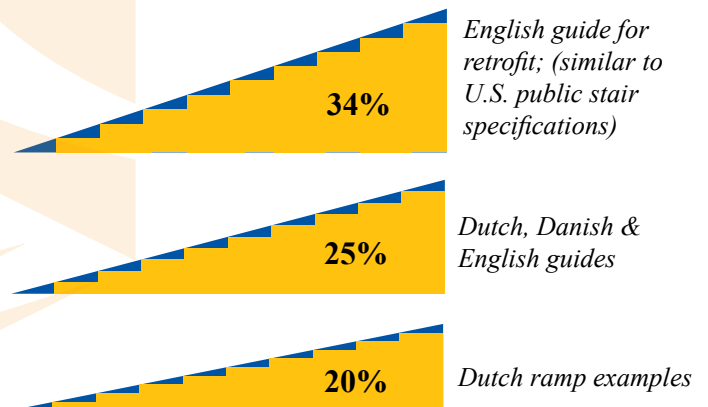


*Stairs with a pair of concrete ramps in the Dutch city of Breda, south of Rotterdam. The gentle grade makes handling a loaded bicycle easier.*



*Bicyclists find carrying their bikes is easier than using channels or ramps on steep staircases like this one.*

*Photo courtesy of Howard Boyd, Birmingham, England*



*The percent slope is figured by dividing the rise by the run. For an example, a ramp that meets the maximum Danish slope would go up 1 foot for every 4 horizontal feet — a slope of 25%.*

*Stairs should not have a gradient of above 25 degrees; otherwise the bicycle will be difficult to wheel upwards and to control on the way down.*

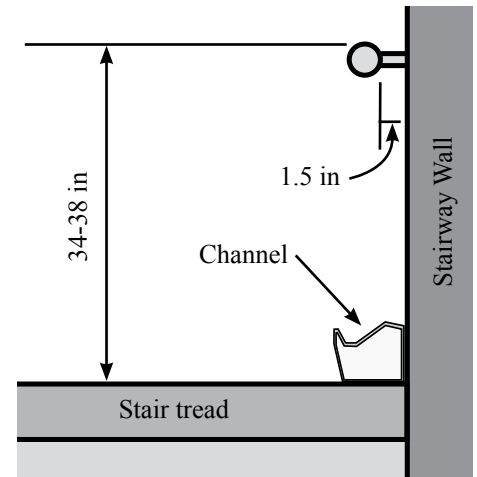
— Cycling England, Design Portfolio, B.10 Wheeling Ramps

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## ■ HAND RAILS

For pedestrians, particularly for those with disabilities, sturdy hand-rails on stairways must be taken into account when locating bicycle features. According to the *Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)*,<sup>7</sup> the top of the “railing gripping surface” must be 34-38-inches above the stair nosing.

In addition, the ADAAG requires the railing must be 1.5 inches from the wall. These details are important because they are not optional. In addition, the narrow space between the face of railing and wall helps keep the railing out of the way of the bikes.



## ■ STAIR LANDINGS

Channels should be stopped at landings and continued on the next run of stairs. This makes sense in any case, but it is particularly important for landings where the stairs turn. According to the *Cycling England Design Portfolio, B.10 Wheeling Ramps*, “No particular benefits have been identified by continuing channels across landings especially if they are sited close to the wall or banister.”



Courtesy of the City of Saskatoon

## ■ WHEN & WHERE *NOT* TO USE CHANNELS, RAMPS & STAIRS

Considering a structure just to keep bicyclists from crossing a busy street? (see photo) If so, think twice, especially if it means folks will have to go up and down to get where they want to go. *Bicyclists are like drivers: they don't like to go out of their way.*



from FHWA “Designing for Pedestrian Safety” course

*This bicycle/pedestrian overpass includes stairs (right side of the photo) and fences to discourage people from crossing at grade. A “Complete Streets” approach would create a more people-friendly street and would probably reduce traffic speed and danger.*

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## FOOTNOTES:

- 1 *Conversation with SportRack representative; company website is here: [www.sportrack.com](http://www.sportrack.com)*
- 2 *Bikes on Transit Database <http://tinyurl.com/yzbpzby>*
- 3 *BART Bicycle Access and Parking Plan; Bay Area Rapid Transit District; 2002; Download pdf here: <http://tinyurl.com/ydpke39>*
- 4 *"Design Portfolio B.10 Wheeling Channels" Cycling England, U.K. Dept. for Transport. <http://tinyurl.com/yh2ov77>*
- 5 *"Collection of Cycle Concepts;" Danish Road Directorate; 2000 <http://tinyurl.com/yzb93pz>*
- 6 *Fietsberaad, a Dutch centre for cycling policy. has a good video about bike ramps, follow this link <http://tinyurl.com/y9584ya> Once there, click on "Free guarded parking facility underneath Zutphen train station square" to see numerous wheeling ramps*
- 7 *"Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities;" The U.S. Access Board <http://tinyurl.com/34n8e>*

## OTHER RESOURCES:

*"Record 25 - Design Manual for Bicycle Traffic," CROW, the Netherlands <http://tinyurl.com/yat8ztm>*

*"How can we accommodate baby strollers and bicycles on outdoor staircases?" Q&A page on the Pedestrian and Bicycle Information Center website <http://tinyurl.com/y96warx>*

*For more info on the BART system's bicycle channels, contact Laura Timothy, Manager of Access Programs at <[ltimoth@bart.gov](mailto:ltimoth@bart.gov)> .*

*"Bicycles on BART Survey and State of Bicycle Access and Amenities on BART Report," by the SF Bicycle Coalition & Livable City; Nov. 2009. <http://tinyurl.com/ybmtqws>*

## GOOD SEARCH TERMS!

*Searching the internet for more info? Try these: Wheeling ramp; wheeling channel; stair channel; BART channel bicycle; Bicycle channel stairs*



National Center for Bicycling & Walking  
[www.bikewalk.org](http://www.bikewalk.org)  
Active Living Resource Center  
[www.activelivingresources.org](http://www.activelivingresources.org)  
Contact us at: [info@bikewalk.org](mailto:info@bikewalk.org)

## ■ THANKS TO:

*Many people shared information for this Fact Sheet: Melissa Anderson, Bob Byers, John Cinatl, Don Cook, Sheree Davis, Steven Faust, Peter Furth, Dave Holladay, Tom Huber, Michael Jackson, Soren Jensen, Steve Jorgensen, Dwight Kingsbury, Peter Lagerwey, Bob Laurie, Josh Lehman, John Luton, Sheila Lyons, Heath Maddox, Roberta McLaughlin, Tim Mitchell, Michelle Mowery, Michael O'Loughlin, Milly Ortiz-Pagan, Don Pflaum, Philip Pugliese, Sharon Roerty, Byron Rushing, Warren Salomon, Ryan Snyder, Dan Stewart, Alex Sully, Lois Thibault, Laura Timothy, Piep van Heuven, Charlie Zegeer, and Martin Zimmerman.*