

Title

“Floating Bike Lanes” or Bicycle Accommodation along Part-time Parking

Background

The Embarcadero is a waterfront arterial in San Francisco that replaced a freeway heavily damaged by the Loma Prieta Earthquake of 1989. The roadway varies from 4-6 lanes (2-3 in each direction) and currently handles weekday traffic volumes of 40-50,000 vehicles per day.

After the roadway was constructed and while the area along the waterfront continued its evolution, it was determined in some areas that there was a need for on-street parking during non-peak traffic periods. During peak periods, there would be a tow-away restriction to uncover a third travel lane in each direction. While accommodation of bicyclists was intended along the length of the roadway, there was a problem with how to stripe or designate space for cyclists to use along the sections with part time parking.

One option was to stripe two rows of shared lane markings along each direction of the roadway, one along the curb to show where cyclists would ride when there was no parking allowed and the other further away from the curb for cyclists when parking was allowed. This was rejected on the basis that two rows of bicycle specific markings would be confusing to road users. Also, it is generally desirable to explore options which give cyclists their own striped space on the roadway prior to simply accepting shared lane markings in narrow lanes.

Countermeasure(s) implemented

To give cyclists a designated space along the section of roadway with part-time parking, the design shown in Figures 1 and 2 was finally chosen. When parking is allowed, cyclists use the space between the parked cars and the solid 4” wide white stripe, a space about 7’ wide depending how close cars park to the curb. When parking is not allowed, as shown in Figure 2, cyclists move to the right and use the 5’ wide shoulder. Motorists are able to use the third lane, which at 9’ 9” wide is narrow but wide enough to accommodate the generally slower traffic speeds one would expect during peak hours.

Prior to this design, there was some trial and error along the way. The 4” solid white line shown 14’ 9” from the curb in Figure 1 was initially further out at 15’ 6” and broken as a typical lane line would be. While this allowed for a 10’ 6” motor vehicle lane when no parking was allowed, it also created a wider space alongside the parked cars when parking was allowed, a space that looked like a typical travel lane but was actually too narrow to accommodate traffic. The result was motorists using the space and sideswiping parked cars and filling the space intended for cyclists.



Figure 1. “Floating Bike Lane” with Part-Time Parking when Parking is Allowed



Figure 2. “Floating Bike Lane” with Part-Time Parking when Parking is Not Allowed

To make the space between the first 4" wide lane line and the parked cars seem less like a travel lane to motorists when parking is allowed, the 4" wide white line was moved closer to the curb face. It was also made solid to discourage crossing and make the lane seem less like a travel lane. The parking T's, initially 7' from the curb, were relocated to be 8' from the curb and painted with longer stems. The placement was meant to further narrow the space by encouraging people to park their cars further from the curb while the longer stems were to make the space seem less like a travel lane. And finally, cross hatching was added in the 9' 9" space at the beginning of the floating bike lane sections to further discourage motorists from using the space when parking was allowed (see Figure 3). While this was all meant to make the space more narrow and less attractive to motorists when parking is allowed, it still remains wide and attractive to cyclists.



Figure 3. Cross-hatching at Beginning of "Floating Bike Lane" Treatment

Would these efforts to make the space less attractive to motorists when parking was allowed result in the space not being used by motorists when parking was restricted and they were expected to drive in the third lane? From observations, motorists use the 9' 9" wide third lane as intended when parking is not allowed. The theory is that while it is not a conventional looking lane, motorists, especially when traffic congestion reaches certain levels (like those found during peak hours), will use whatever reasonable space is available to them. An analogy is that the design works as a pressure release valve with the unusual looking third lane used only when traffic levels reach a certain level.

Use of signs associated with this unusual arrangement has been minimal. While it was tempting to try to sign these stretches to explain what is going on, initial sign designs were found to be either too complicated or incomplete. Though it was always an option if the roadway lane markings were not sufficient, it was determined that signage explaining the part time use of the space was actually not necessary. The only signs pertinent to the design are the tow-away signs (circled in Figure 1) and the merge sign used in the southbound direction where three full time lanes enter the section with the floating bike lane and narrow to two travel lanes when parking is allowed (see Figure 4). Bike route signs are also along this area.



Figure 4. Merge Sign at Beginning of “Floating Bike Lane” Treatment where Three Full-Time Lanes Approach Two Full-Time Lanes and One Part-Time Lane

There have been some calls to install bicycle markings on the street. But as mentioned earlier, two sets of markings would be necessary for cyclists as they shift from one space to another, resulting in a confusing arrangement. Cyclists tend to stay to the right, so when there is no parking allowed, they naturally ride in the 5’ wide shoulder. When parking is allowed, they ride in the space between the parking and the 4” solid white stripe.

Evaluation

While there has not been a quantitative evaluation of the design, observations indicate the space is now working as intended. Feedback from cyclists, motorists, and employees of the Port of San Francisco along the Embarcadero has been utilized throughout the process. Initial feedback and observations are what yielded the modifications to the design, while the current good feedback and lack of negative feedback has reflected observations that the design basically works. The primary comment heard currently is that there should be pavement markings for cyclists, but the potential confusion caused by trying to mark a shifting space would likely outweigh any benefits.

Results

The result of this trial and error process to accommodate cyclists along a roadway with part time parking is shown in Figures 1 and 2. If this approach is used, the key is to not make the space between the parked cars and the first 4” lane line too wide. With the 4” lane line initially at 15’ 6” from the curb, the space was wide enough to attract motorists when parking was allowed. This 15’ 6” width resulted in sideswipes with parked vehicles and motorists in the space intended for cyclists. Another key is to ensure that traffic levels are reasonably accommodated when parking is allowed so that there is less temptation to try to use the space intended for cyclists.

Conclusions and recommendations

Based on observations, generally good feedback from cyclists, and lack of significant negative feedback, the current design is considered effective. While not perfect, with its slightly confusing, unorthodox design, it successfully accommodates cyclists, part-time on-street parking, and motorists needing additional capacity during peak hours. And it does so with minimal signage, leading one to conclude that while the design is unorthodox, it uses fairly predictable road user behavior to its advantage. Cyclists naturally tend to stay to the right and motorists will use a space even if it is not clearly for their use if traffic congestion reaches certain levels and the space is reasonably accommodating.

Costs and funding

Costs of the final design are typical of basic striping and signage projects. However, the amount of restriping and trial and error did add to the final cost. Costs were not tracked.

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