Neighborhood Traffic Circles – Portland, Oregon

Site and Treatment Description

Portland has been installing neighborhood traffic circles since the 1980's, with dual objectives of reducing intersection crashes and lowering speed. They have been installed only at intersections involving local streets and minor collectors, and have often been installed in a series along a street. For example, on NE 24th Avenue, there are neighborhood traffic circles at three successive intersections about 550 ft apart beginning at Tillamook St.; on NW 25th Avenue, there is another series of three, about 500 ft apart, at every other intersection beginning at Marshall St. SE Lincoln Street, a neighborhood greenway (that is, a signed bike route following neighborhood streets), had neighborhood traffic circles installed roughly every 700 ft starting at 46th Avenue.

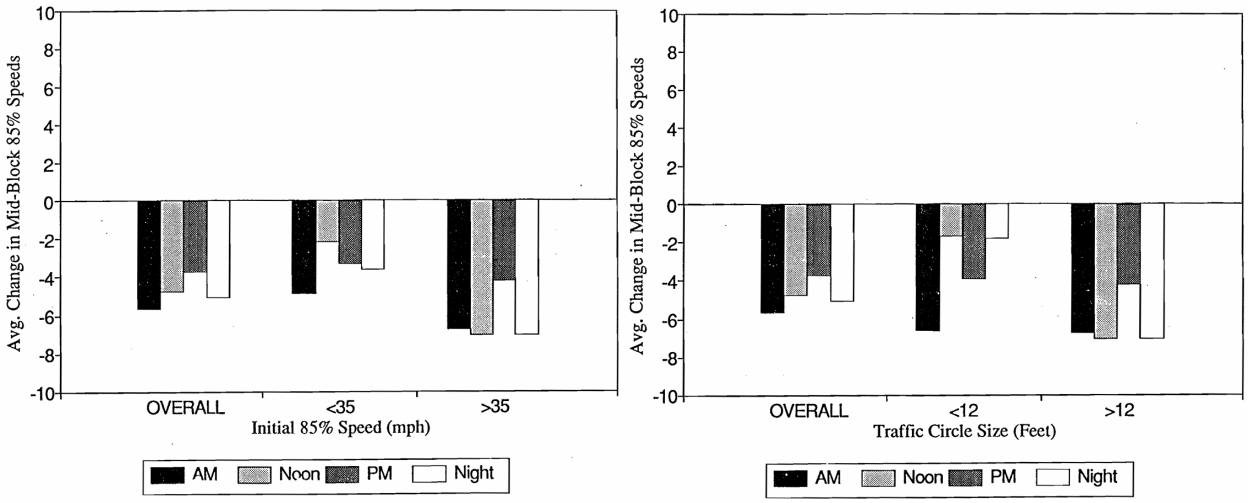
Traffic circles at NE 24th @ Brazee and SE Lincoln @ 55th (Google).

Many of Portland's older neighborhood traffic circles had a diameter less than 12 ft including the apron, and thus, on Portland's 36 ft wide streets, offered a rather clear path for thru traffic except when there are parked cars close to the circle. Circles built after 1994 include a larger apron.

Changes in Speed, Volume, and Crashes

Comparing 3 years before installation with 3 years after for 19 neighborhood traffic circles installed between 1986 and 1990, changes in average daily traffic (ADT) were found to be insignificant. Crashes at intersections with traffic circles fell by 58%, while crashes at untreated nearby intersections increased by 6% (Portland Bureau of Traffic Management, 1992).

Speed results from the same study are all based on measured 85th percentile speed. On average, speed midway between circles fell by 5 mph where baseline speed was greater than 35 mph, and by 3 mph where baseline speed was less than 35 mph (see Figure 2). Further analysis showed that the traffic circles had nearly no impact on people driving at lower speeds, but primarily pushed those driving faster than 35 mph to a lower speed. They also found that circles with diameter greater than 12 ft were more effective at reducing speed than smaller circles.



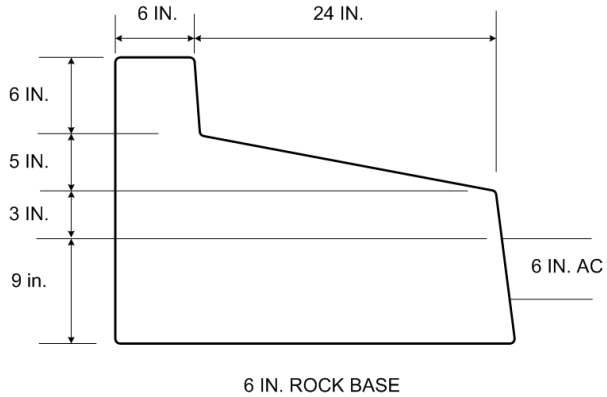
Change in 85th percentile speed midway between neighborhood traffic circles by time of day, initial speed, and traffic circle diameter. Portland Bureau of Traffic Management, 1992.

Emergency Response Impacts

In 1995, the City of Portland did numerous test runs with fire equipment on two streets with a series of neighborhood traffic circles to measure their effect on response time (Atkin and Coleman, 1997). When driving at a desired speed of 25 mph, they found that traffic circles impose an average delay of 3.1 seconds per circle. (The impact varied from 1.2 to 4.8 seconds, depending on the vehicle type.) When the desired speed was 30 mph, added delay was 4.5 s per circle.

Design and Specifications

Figure 3 shows a profile of the curb and apron used for Portland's neighborhood traffic circles since 1994. It includes a 3 inch curb to the apron, a 2-ft wide apron with a steep cross-slope of almost 20%, and then a 6 inch curb to the small inner circle.



Profile of curb / apron used at neighborhood traffic circles.

Support Story

The City of Portland began its Neighborhood Traffic Management Program in the 1980s in response to citizen demands for safer neighborhood streets, inspired mainly by the experience of Seattle (neighborhood traffic circles) and Europe (speed humps, traffic diverters, and other treatments). The fire department has been supportive of neighborhood traffic circles because they are used only on local streets and don't slow fire equipment much. Portland gets little snow, and so snow clearance has not been a concern.

Other Issues

There have been some single-vehicle crashes with curbs or small trees in the traffic circles, especially at night. In response, the City of Portland now installs advanced traffic circle warning signs with an advised travel speed, and retroreflective "three arrow" regulatory signs on each approach.

The City learned that vegetation in the circle sometimes blocked the driver's view of the far-left corner of the intersection. In response, visibility was improved by cutting vegetation back and improving lighting to achieve 0.2 footcandles.

There have been some complaints of pedestrians feeling uncomfortable when crossing the street because the circles push vehicles to the outside, but weren't slowing them down as much as desired. This has been addressed by adding an apron which large vehicles can mount but is uncomfortable for cars to mount. The aprons also improve their circle's conspicuity because the apron is light in color.

Future Plans

In the last decade, citizen demands for safe speeds on local streets have grown. The speed limit has been reduced to 25 mph on residential streets and to 20 mph on neighborhood greenways. As a result, the City has relied mainly on speed humps rather than neighborhood traffic circles as the preferred speed control treatment for local streets, because speed humps are less expensive and can be installed every 250 to achieve effective speed control. For example, while Lincoln Street SE has long had a series of neighborhood traffic circles about 700 ft apart, they were not achieving the target speed of 20 mph for a neighborhood greenway, and so several speed humps were recently added (one is visible in Fig. 1). Neighborhood traffic circles are now considered mainly as an intersection safety treatment rather than a speed control treatment, and are not installed frequently.

References

Atkin, C., Coleman, M., 1997. The Influence of Traffic Calming on Emergency Response Time. Inst. Transp. Eng.

Portland (OR) Bureau of Traffic Management, 1992. Peer Review Analysis of the Traffic Circle Program. City of Portland.