International exchanges, especially the binational relationship with the Netherlands, have influenced United States bicycle and pedestrian planning. By incorporating Dutch bikeway design features into United States design manuals, further improvements to design and safety can be realized. Effective planning and design of bicycle facility networks improves safety, reduces barriers for users, enhances access, and improves the overall transportation system.

In 2019, the U.S. Census Bureau estimated that 805,722 workers in the U.S. regularly bicycled to work, up from 665,000 in 2007.1

The United States has also learned “Sustainable Safety” design principles from the Netherlands, which are based on the idea that infrastructure should be designed to accommodate human error and place a strong emphasis on cyclist and pedestrian safety.

Seven Principles of Bicycle Network Design

- **Safety**: The frequency and severity of crashes are minimized and conflicts with motor vehicles are limited.
- **Comfort**: Conditions do not deter bicycling due to stress, anxiety, or concerns over safety.
- **Connectivity**: All destinations can be accessed using the bicycling network and there are no gaps or missing links.
- **Directness**: Bicycling distances and trip times are minimized.
- **Cohesion**: Distances between parallel and intersecting bike routes are minimized.
- **Attractiveness**: Routes direct bicyclists through lively areas and personal safety is prioritized.
- **Unbroken Flow**: Stops, such as long waits at traffic lights, are limited and street lighting is consistent.

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Illustration of Bikeway Selection in Practice on Rural Roads


**Resources**

- The Dutch Approach to Bicycle Mobility: Retrofitting Street Design for Cycling [https://international.fhwa.dot.gov/pubs/pl18004/](https://international.fhwa.dot.gov/pubs/pl18004/)
- NHBI Bicycle Facility Design web-based training [https://www/nhbi.fhwa.dot.gov/course-search?sf=0&course_no=140180](https://www/nhbi.fhwa.dot.gov/course-search?sf=0&course_no=140180)