

ACTIVE MOBILITY IN CITIES:

TEN DESIGN PRINCIPLES

Active mobility presents multiple benefits and is becoming increasingly important for enhancing liveability in our urban environment. Cities can thus be designed to further support walking and cycling, instead of prioritising cars. The Centre for Liveable Cities and Urban Land Institute embarked on a joint study in 2014 on “Creating Healthy Places through Active Mobility”. The study, which culminated into a publication of the same name, distilled ten design principles for making cities more walkable and bikeable. **Remy Guo** elaborates.

A Paradigm Shift Towards Creating Cities for People

In order for cities to become walkable and bikeable, a fundamental change is needed in how they are designed. This calls for nothing less than a paradigm shift away from the motorist-centric urban planning prevalent in the last century. A new design ethos is required, prioritising the safety and needs of pedestrians and cyclists.

But giving greater priority to these more vulnerable road-users does not mean that drivers’ needs should be overlooked. Each street has its own context, and the priority given to different road-users should vary to

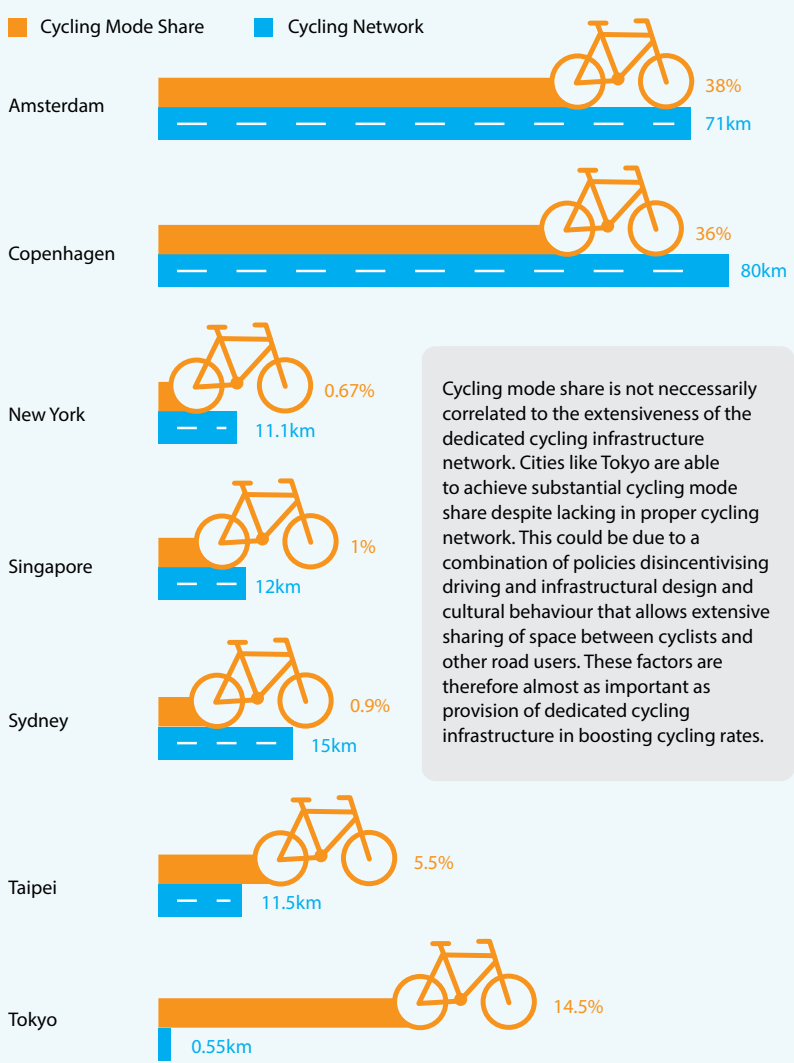


Each street has its own context, and the priority given to different road-users should vary to reflect this.

reflect this. For instance, on residential or downtown streets, the ‘soft traffic’ created by pedestrians and cyclists should be prioritised over motorised traffic. On highways with fast-moving traffic, motorised traffic should take precedence. This approach allows for a greater diversity of mobility options.

CYCLING MODE SHARE VERSUS CYCLING NETWORK*

*Cycling network per 100,000 people



More Than Just Bicycle Lanes and Footpaths

The notion of walkable and bikeable cities is often equated with the provision of bicycle lanes and wider sidewalks. However, a comparison of cycling rates and total cycling networks in cities across the world shows that infrastructure provision alone does not always result in a higher incidence of active mobility. For instance, while the leading cycling cities of the world – Copenhagen and Amsterdam – are well provided with dedicated cycling infrastructure and high cycling rates, the popularity of cycling is high in cities like Tokyo, where similar infrastructure is lacking. This suggests that other factors can be just as important in contributing to a successful cycling culture.



01

Ten Ideas to Make Cities More Walkable and Bikable

1. Make it Convenient and Efficient

A comprehensive and well-connected network of footpaths and bicycle lanes makes door-to-door travel more convenient and efficient. Fenced developments should be discouraged to minimise unnecessary detours for pedestrians and cyclists. In Singapore, through-block links are stipulated as a condition for certain land sales to ensure round-the-clock pedestrian corridors through these developments. This promotes connectivity within the city.

Public transit systems should make it as convenient as possible for people to complete their journeys on foot or bicycle. Effective cycling connections can be a viable alternative to last-mile challenges

01 YouBike, Taipei City's bicycle sharing system.

02 Ease and flexibility in transferring between different modes encourage active mobility.

03 Through-block links in Singapore, such as this one in Bugis, provide 24-hour pedestrian corridors through developments, e.g. from a Mass Rail Transit (MRT) station through a shopping mall. This enhances convenience for the commuter.

and can help alleviate the need for bus feeders at rail transit stations. For a hot and humid tropical city such as Singapore, good transit integration can encourage people to cycle for the first or last legs of longer commutes which may be too uncomfortable to complete by bicycle.

For cities that are starting to promote active mobility, a well-conceived bicycle sharing system can be effective, by providing convenient access to bicycles for short-distance trips as an alternative to motorised modes of transport.



03

02





2. Provide Dedicated Spaces for All

To encourage more people to adopt active mobility and enhance travel efficiency for all road-users, dedicated infrastructure in the city is essential. The provision of dedicated infrastructure has also been shown to generate tangible results in increasing walking and cycling rates and – if implemented correctly – enhancing safety for all road-users. In New York, the fivefold increase in its cycling network from 119 miles to 561 miles between 1997 and 2009 corresponded with a 221% increase in commuter cycling rates. The popularity of cycling later increased by another 29%, following a further 42% increase in the cycling network.

3. Ensure Visibility at Junctions

Accidents often occur when pedestrians and cyclists are caught in the blind spot of a driver's peripheral vision. Junctions are particularly problematic because drivers have to look out for oncoming vehicles in addition to pedestrians and cyclists before proceeding. In the Netherlands, this is addressed by designing junctions and roundabouts with ample space to allow drivers to stop if necessary to avoid pedestrians and cyclists.

Cyclists generally travel at higher speeds than pedestrians, so drivers have less time to react if they encounter a cyclist unexpectedly. Painted cycling lanes can help to direct a driver's attention to the presence of cyclists. However, such lanes are best limited to danger areas such as junctions, in order to retain its intended impact.

⁰¹ Painted cycling paths at junctions in Copenhagen increase visibility.

⁰² Dutch junctions are designed to optimise continuous movement for cyclists.

⁰³ Continuous sidewalks in Copenhagen.





02

4. Maintain Continuity of Movement

Pedestrians and cyclists often find their journeys interrupted by traffic junctions. This reduces travel efficiency and can also make journeys irksome, particularly outdoors in the tropics.

In the Netherlands, junctions are designed to provide a high degree of continuous movement for cyclists. This is achieved by continuing cycling lanes through junctions in the form of bicycle crossings, and also by consciously creating gentle bends in the cycling lanes around junctions. Sharp bends that require cyclists to stop or slow down are avoided. Protected cycling lanes and junction designs allow cyclists to cycle through red lights safely, minimising the number of stops a cyclist has to make.



03

Continuous sidewalks in cities such as Copenhagen and Amsterdam challenge the typical hierarchy between cars, pedestrians and cyclists at minor intersections. Instead of pedestrians and cyclists having to stop and watch out for cars, continuous sidewalks require cars to stop and watch out for pedestrians or cyclists before moving through an intersection. This prioritises the right-of-way for pedestrians and cyclists at minor intersections and slip lanes, allowing for greater continuity of movement.



01



02

5. Keep it Slow

To make comfort and safety a priority for pedestrians and cyclists, motorised traffic speeds have to be kept low, especially in areas with high foot and bicycle traffic. In Tokyo, speed limits are heavily regulated: on smaller neighbourhood roads speeds are capped at 20 kilometres per hour to 30 kilometres per hour. This allows pedestrians and cyclists to share these roads even without dedicated cycling lanes or footpaths. Speed limits are also prominently painted on the road, prompting drivers to slow down, giving them more time to react if necessary.

The benefits of slower street traffic are best exemplified by the Netherlands' *woonerf*, or

living streets, where traffic-moderating features are designed to limit speeds in residential areas to 12 kilometres per hour. This allows cars, cyclists and pedestrians to share the streets safely.

Shared streets are also common in Asian cities where traditional street stalls are common. The constant high volume of pedestrian traffic through such streets forces cars to slow down despite the lack of traffic-moderating design interventions. In the absence of street kerbs, these areas also allow for pedestrians and cars to negotiate for space in a flexible manner without compromising on safety, since motorised speeds are kept low.



...motorised traffic speeds have to be kept low...[t]his allows pedestrians and cyclists to share these roads even without dedicated cycling lanes or footpaths.

03



6. Prioritise At-grade Crossings

People tend towards the path of least resistance. Making crossings simple and direct minimises the effort required for pedestrians and cyclists to complete their journeys and enhances the continuity of movement. Overhead bridges and underpasses, especially at non-arterial roads, can create 'mini-highways' that inconvenience pedestrians and cyclists.

In Seoul, efforts have been made in recent years to make the city more pedestrian-friendly. In its Gwanghwamun Pedestrian Belt, underpasses have been replaced by at-grade crossings to create direct connections for people. Doubly wide pedestrian crossings are also commonly found in Seoul, allowing crowds to cross the road comfortably.

Many high-density cities, such as Tokyo and Taipei, have diagonal crosswalks that bring all motorised traffic to a stop at junctions with high pedestrian volumes during peak periods. This enables safe and direct crossings for pedestrians and cyclists alike.



People tend towards the path of least resistance. Making crossings simple and direct...enhances the continuity of movement.

7. Ensure Consistency in Design Standards

Consistent design standards and traffic codes throughout the city can help road users anticipate traffic conditions. For example, consistently locating bicycle lanes on one side of the road helps pedestrians and cyclists easily recognise designated paths. Drivers will also be able to anticipate the direction from which cyclists may approach, reducing road accidents. Signage systems should also be rendered more consistent and user-friendly and help to communicate traffic conditions.



05



04

01 Shared street in 's-Hertogenbosch, the Netherlands.

02 Shared street in Taipei.

03 Scramblewalk in Shibuya, Tokyo.

04 Diagonal crosswalk in Taipei.

05 Consistent design standards in Copenhagen make the system intuitive.



01



...addressing weather conditions is vital for making active mobility more comfortable and appealing.



02

8. Make it Comfortable and Appealing

As pedestrians and cyclists are exposed to the elements, addressing weather conditions is vital for making active mobility more comfortable and appealing. In Copenhagen, cycling tracks are cleared of snow before roads in winter, to enable cycling even during inclement weather.

In hot and humid Singapore, an extensive programme to plant large shady trees along the streets has helped make walking and cycling much more comfortable and appealing.

9. Mixing Up the Uses

Studies show that compact, mixed-use urban environments can encourage people to walk and cycle. Mixed-use developments can reduce the distance of daily commutes and provide convenient access to essential goods and services. With a greater variety of activities and services, such environments can create a more engaging journey for walking and cycling. This also promotes social interaction and increases traffic for local businesses, helping to reinforce the positive aspects of walking and cycling within a community.

01 Snow clearance for cycling lanes in Copenhagen ensure that cycling is possible in winter.

02 Trees planted along sidewalks help provide shade to pedestrians and cyclists.

03 The Toa Payoh Town Centre in Singapore, which provides a variety of goods and services to the Toa Payoh residential district.

10. Close the Loop with End-of-Trip Amenities

End-of-trip amenities contribute significantly to the convenience and comfort of active mobility. Research on commuting behaviour in Washington D.C. has shown that the provision of showers, lockers and bicycle parking at work can increase the likelihood of people cycling to work by almost five times. In tropical cities, the heat and humidity make shower facilities and drop-and-go laundries at workplaces even more crucial to reduce discomfort after walking or cycling to work.

End-of-trip amenities are generally best integrated with destination developments. Building and planning guidelines, as well as green building certification programmes such as the Leadership in Energy & Environmental Design (LEED) programme in the United States, or the BCA Green Mark scheme in Singapore, can encourage developers to provide adequate bicycle facilities. The Australian city of Brisbane is one of the most proactive in providing

such amenities. Its Cycle2City commuter cycle centre, completed in 2008, offers secure bicycle parking spaces, lockers, showers, fresh towels and spare bicycle parts in Brisbane's CBD for a fee of between A\$5 to \$7 per day. Bicycle parking is commonly provided as a public amenity.

In Tokyo, innovative underground public parking carousels can be found at train stations. Their Eco Cycle system lets cyclists deposit their bicycles at ground level. These are then taken underground by mechanical lifts and stored for protection against the elements and theft. The system also thereby eliminates bicycle clutter from street level, freeing up more space for pedestrians and public activities – a boon for high-density cities scarce on space.



Remy is Senior Assistant Director at the Centre for Liveable Cities, where he is involved in planning and development related research. Prior to joining CLC in 2013, Remy was a practicing urban designer and architect in the private sector, and completed various local and overseas projects ranging from district level master plans, urban design proposals, to architectural construction projects.

03



Download the e-version of this book at:



http://www.clc.gov.sg/documents/books/active_mobility/index.html