

ELEVATED CYCLE PATH: IS IT SUITABLE FOR BANGKOK, THAILAND?

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ABSTRACT

This paper shows suggestions to develop the elevated cycle path in Bangkok, Thailand. Previous bicycle-related studies in Thailand as well as various completed and successful sky lane projects from other megacities were reviewed. Subsequently, difficulties and potentials to promote bicycle usage in Thailand were identified and grouped into eight key issues consisting of 1) Weather conditions, 2) Number of cyclists, 3) Unsafe conditions, 4) Standard and Regulations, 5) Thai peoples' undesirable values, 6) Bicycle facilities, 7) Limitation of the project area and Connectivity to local business, and 8) Economically feasible but not in finance. Furthermore, while the introduction of elevated bike lane projects in Bangkok will alleviate some problems, it will exacerbate financial difficulties. Finally, some policy-related recommendations for the development of elevated cycle paths in Thailand were introduced.

KEYWORDS: Elevated Bike Lane, Elevated Cycle Path, Sky Lane, Sustainable Transportation.

1. Background

Non-motorized transport modes are often considered an essential element of the sustainable transport system. These include walking, cycling, rickshaws, animal-drawn carts, and rollerblading or skating. Cycling is widely recognized as an environmentally friendly and healthy mode of transportation. Moreover, cycling is an individual mode not only short but medium-distance travel with low costs and high efficiency in the use of road space [1,2].

However, many studies [3-7] point out some limitations to implementing bicycle paths and encouraging cycling in Thailand. The problems are the extremely hot and rainy weather conditions in Thailand, the unsafe condition, and the very high risk of road accidents to cyclists due to lack of bicycle paths, no separated bike lanes, and facilities, etc. while the classic problem is the limitation of the existing roadway to widen or make standard cyclist path, etc.

According to the limitations of land acquisition for road widening designed for a bike lane, many cities planned to build the grade separation bikeway to ensure safety and mobility for cyclists. For example, The Bay Bridge Trail is a 2.2 miles bicycle and pedestrian elevated path from Oakland to Yerba Buena Island that opened in September 2013 [8]. Norman Foster introduced a blueprint for an airborne cycleways network in London in 2014, called “Sky Cycle” 140 miles of elevated, car-free, 50-foot-wide bike paths which can connect six million people, accommodating 12,000 riders an hour [9].

In 2015, the Nelson Street Cycleway is a cycleway (and in some sections, a shared pathway for walking and cycling) in Auckland, New Zealand. Stage 1 of the project was opened on 3 December 2015, and Stage 2 opened in December 2017. The last part of the route to the waterfront is still incomplete as of 2019. Once completed, the route will give access from Upper Queen Street to the Auckland CBD and the cycleway along the waterfront [10]. In 2016, one of the Sky Cycle project’s leaders said that the \$10.7 billion infrastructure project was still in the works, but there are no visible signs of progress [11]. In 2016, Melbourne also considered constructing a \$100 million elevated bicycle superhighway, which would separate cyclists from motorists in the central business district by building out a network of bike corridors in the sky [12]. In 2017, Davies [13] showed that BMW wants to build networks of Elevated Cycling Paths called the E3 Way—that are for elevated, electric, and efficient. In 2019, Seoul would like to create a safer cycling infrastructure in the city. There are currently around 900 kilometers of ground-level bike lanes in Seoul. However, only the paths along the Han River Park — around 260 kilometers — provide a continuous and safe path separated from vehicles and pedestrians [14].

For Thailand, according to some limitations to implementing normal cycle paths, in 2014, the Expressway Authority of Thailand (EXAT) [15] studied the feasible to develop a bicycle network master plan along the area under the 207.9 km of expressway with some elevated sections within the standard of operation and the convenience to the travel need of daily activities’ area user in which the project can support convenience, easiness, safety and

economical uses; then, it can also support the daily bicycle use practically under the concept of "Bicycle Expressway" (See Figure 1). Moreover, in 2019, Smart City Innovative Research Academy (Scira) under King Mongkut's Institute of Technology Ladkrabang has come up with an idea it calls "The Sky cycle Project". The project proposes the construction of a 21 km elevated bicycle route that will run parallel with the Airport Rail Link (ARL) which starts from Phaya Thai BTS station and terminates in Lat Krabang [16] (See Figure 2). However, both elevated bike path projects in Thailand are still not implemented.



Figure 1 "Bicycle Expressway" a pilot bicycle route along the expressway (Ramindra - Rama 9 – Ratchadapisek Rd.), Bangkok. [15]



Figure 2 "The Sky cycle Project" elevated bicycle route that will run parallel with the Airport Rail Link (ARL). [16]

2. Completed and Successful Sky Lane Projects

There are not so many places that have successfully made elevated bike paths. In the Netherlands, the cities of Eindhoven and Veldhoven have lifted cyclists above a busy intersection without harm since June 2012. Hovenring, this stylish roundabout replaced the former level crossing here, which could not cope with growing traffic. Eindhoven City Council refrains from cyclist underpasses and wanted a separate-level roundabout, they asked Dutch bridge specialists to investigate possible solutions. A circular cable-stayed bridge soon was the best choice [17]. Copenhagen’s “Cykelslangen”, “Bicycle Snake” in Danish, is just 721 feet long but allows the city’s many bikers to pedal over a waterfront shopping area, instead of pushing through its crowds of pedestrians, elevated 5.5 meters above ground level at its highest point, the Bicycle Snake has replaced what used to be an uncomfortable bicycle trek down two steps of stairs, followed by a slow, cautious ride through crowded pedestrian plazas [18].

From Oakland to Yerba Buena Island, the Bay Bridge Trail is a 2.2-mile elevated bicycle and pedestrian path. It is a part of the San Francisco Bay Trail. To ensure user safety, the 15.5-foot-wide path has one lane in each direction for bicyclists and an outside lane designated for pedestrians. The total bicycle and pedestrian usage of this link are both more than 420,000 trips since November 2016 [8]. The detail of the monthly distribution of bikes and pedestrians is shown in Figure 3.

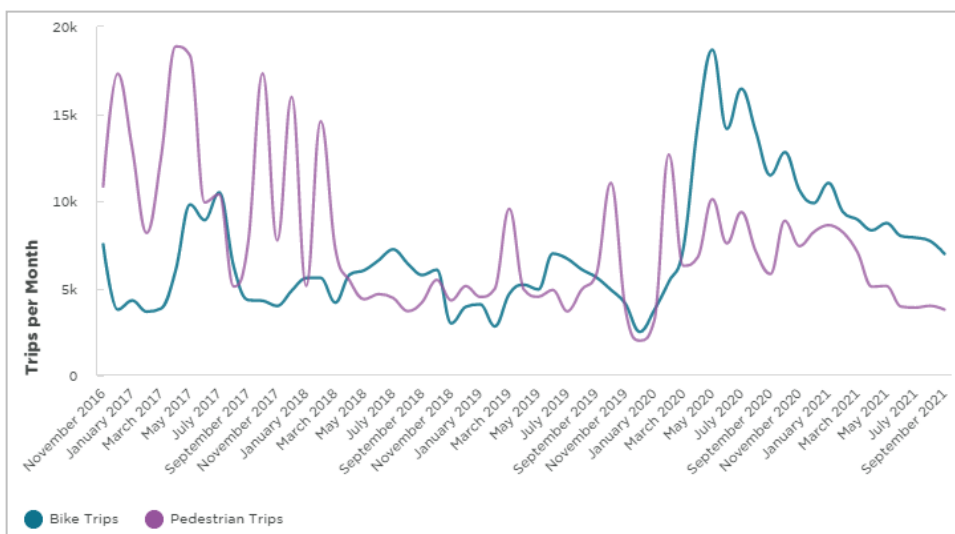


Figure 3 Monthly bike and pedestrian traffic on San Francisco-Oakland Bay Bridge [8]

In 2016, Rio de Janeiro, Brazil opened the new Avenida Niemeyer bicycle lane which runs along the Atlantic coastline. Rio has the most extensive network of urban bike lanes in Latin America and is attempting to finish construction on other lanes linking more parts of the city to the area where the Olympic Park is located. The Rio 2016 Olympic Games began in August [19, 20]. In January 2017, Xiamen, in southeast China, opened the world's longest example, which connects to small side bridges with parking for bicycles, service facilities, and access to shopping centers and bus stations at the same height as the cycle path [21]. Figures 4 to 11 show the physical geometry of the above sky lane projects.



Figure 4 "Sky Cycle" of London [9]



Figure 5 Xiamen's elevated bikeway [21]



Figure 6 “Hovenring” in the Netherlands [17]



Figure 7 “Cykelsangen” (Bicycle Snake Bridge) in Copenhagen [18]



Figure 8 “Under the C” Seoul, Korea [14]



Figure 9 "The Pink Bike Path" Nelson Street Cycleway, New Zealand [22]



Figure 10 Avenida Niemeyer, Rio, Brazil [20]



Figure 11 Bicycle "superhighway", Melbourne's west, Australia [23]

3. Problems and Suggestions of Bicycle Path Implementation in Thailand

Several studies have been conducted in other countries to investigate the problem of using bicycle lanes. However, due to the limitations of Bangkok, study areas may cause some other specific problems. Therefore, a review related to the problem of bicycle usage in the Bangkok area was reviewed. According to the literature of earlier bicycle studies in Bangkok, Thailand [3-6, 24-34], problems and suggestions for bicycle path implementation in Thailand could be summarized into eight groups, as shown in Table 1.

Table 1 Problems and Suggestions to implement cycle path in Thailand

Issues	Detail of Problems	Suggestions
1. Weather conditions	- Hot and rainy weather makes short possible biking distance.	- Make beautiful, covered bike paths with trees or roofs.
2. Number of cyclists	- Not so many bicycle users in daily travel for work or school trips. - No bicycle user statistics are collected. - The normal distance for work and school trips is much greater than the possible biking distance.	- Promote daily non-motorized travel. - New Mixed land use planning. - Promote electric bicycles and Personal Mobility Vehicles (PMV).
3. Unsafe conditions	- No separation from motor vehicles (using the same lane). - No continuity of the bike lane (a lot of traffic conflicts, and obstructions) - The bad pavement of the sidewalk - No lighting	- Provide more safety by making a continuous and separated bicycle network (elevated/underground) with good pavement and lighting.
4. Standard and Regulations	- No laws and regulations for cyclists. - No standard of bicycle facilities design.	- Develop and improve special laws and regulations for cyclists. - Develop standards and guidelines for bicycle design.

Table 1 Problems and Suggestions to implement cycle path in Thailand (continued)

Details	Problems	Suggestions
5. Thai people's undesirable values	<ul style="list-style-type: none"> - The private car is the most popular mode even on short-distance trips. - Low priority of cyclists compared to other modes. 	<ul style="list-style-type: none"> - Give priority to walking and cyclists. - Promote other road users to change their cultural attitudes to ride a bicycle.
6. Bicycle facility	<ul style="list-style-type: none"> - Safe parking area. - Lack of fix and repair shop. - Not enough public bathrooms. 	<ul style="list-style-type: none"> - Provide more bicycle facilities along with the network.
7. Limitation of project area and connectivity to local business	<ul style="list-style-type: none"> - In CBD, it is hard for land acquisition to build bike paths. - Some concept routes seem too far from CBD. For the suburban area, there are not so many activities and users. 	<ul style="list-style-type: none"> - Sky lane development. - Select a suitable location to connect with communities and businesses. - Make better connectivity with other private and public transportation systems such as The Metropolitan Rapid Transit (MRT), Bangkok Mass Transit System (BTS), Airport Rail Link (ARL), Expressway, bus, train, canal, riverboat, etc.
8. Economically feasible but not in finance	<ul style="list-style-type: none"> - Most projects required a lot of budgets for investment. - Not so much direct benefit due to fewer bicycle users in daily travel. 	<ul style="list-style-type: none"> - Provide investment budget from other sources such as Oil Fuel Fund (OFF), car-toll fee, congestion charge, or revenue from advertisement and rents space for commercial development, etc.

4. Discussion and Conclusion for Elevated Cycle Path Development in Thailand

Nowadays, many megacities are interested to promote bicycle travel, a non-motorized transport, for healthy, safe, and environmental sustainability development. Consequently, the

concept of an elevated bike lane is also introduced in Bangkok, Thailand according to the limitation of land acquisition and extreme traffic jams in Bangkok.

However, consistent with the literature, problems, and suggestions to encourage bicycle usage were found and summarized into 8 groups as follows: 1) Weather conditions, 2) Number of cyclists, 3) Unsafe conditions, 4) Standard and Regulations, 5) Thai peoples' undesirable values, 6) Bicycle facilities, 7) Limitation of the project area and connectivity to local business, and 8) Economically feasible but not in finance as shown in Table 1.

For Bangkok, some conceptual projects of elevated cycle lanes [15, 16] were introduced to lessen the problems of the unsafe conditions, land acquisition, weather conditions, the design standards, together with the development of related facilities for cyclists such as safe parking, public bathrooms, storage lockers, etc. Although the improvement in elevated cycle infrastructure and facilities can encourage more biking. However, the grade separation will lead to exacerbating financial problems.

On the other hand, some policy-related suggestions from earlier research [34-40] could be implemented in Thailand. For example, the local government, Bangkok Metropolitan Administration (BMA), should provide comprehensive policy approaches empowering all levels (society, city, neighborhood, and individual) and promote plans to increase bicycle usage such as bike-sharing campaigns, tax reduction for cyclists, cash incentives for employees instead of parking fees, and electric bike promotion, etc. Moreover, BMA should select a suitable location to connect with communities and businesses and make an alliance between the public and private sectors to take part in partnership in activities. For example, a pilot project involving the private sector to participate in bike-sharing, private bathrooms, private bicycle service and maintenance, private tunnel connection, etc. Furthermore, the office of transport and traffic policy and planning (OTP) and the Department of Land Transport (DLT) should develop and improve special laws and regulations to prioritize and protect cyclists.

Besides that, Hull and O'Holleran [38] pointed out that funding is the major factor to encourage best practices. The Netherlands, Cambridge, and Edinburgh governments spend 45, 17, and 6.5 to 8.0 USD per person on cycling provision. Hence, the Government of Thailand also should allocate the budget for the subsidy from income resulting from other sources such as congestion charges, increased excise taxes, or Oil Fuel Fund (OFF), toll fees, or revenue from advertising revenue, and rents space for commercial development,

etc. Hence, there will obtain a continuous and sufficient amount of budget. This will help to continuously prepare a project as design, build, operation and maintenance without compromising the quality of service.

Lastly, BMA, as the local government, should assist in the development of community bike paths surrounding the pilot project area in order to achieve the bicycle network completeness, and cooperate with other agencies concerned with public transportation to help in developing the travel connections in case of the bicycle paths connect through the public transportation such as MRT, BTS, ARL, bus, train, canal, and Chao Phraya riverboat, etc.

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