

“Cycle Tree”: Multi-Level Mechanical Bicycle Parking System†

1. Introduction

Illegally parked bicycles in areas around city train stations have become a social issue, as they make it difficult for pedestrians to walk safely and are also a cause of traffic congestion and other problems. As countermeasures, cities have constructed bicycle parking lots and remove illegally parked bicycles. However, this problem is becoming increasingly serious due to the lack of space for construction of bicycle parking lots near train stations.

The multi-level mechanical bicycle parking system “Cycle Tree” introduced in this paper achieves a high bicycle storage capacity due to its multi-level structure and offers outstanding safety and convenience not found in conventional bicycle parking. This revolutionary system solves the various problems described above by effectively utilizing the limited space around train stations.

2. Outline of Cycle Tree

Cycle Tree is an elevator-slide-type mechanical storage system which raises/lowers bicycles to their storage level and stores bicycles on storage racks in the storage facility. Bicycles which are to be parked are set in an



Photo 1 Above ground bicycle parking system



Photo 2 Under ground bicycle parking system

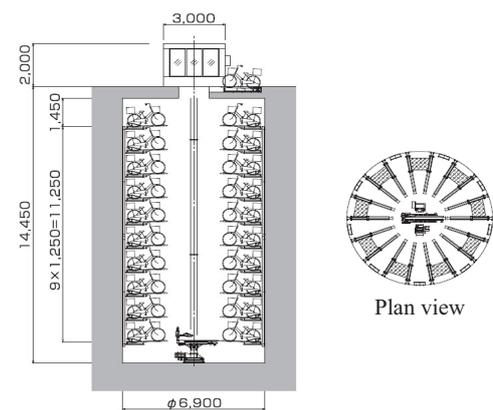


Fig. 1 Schematic view of under ground bicycle parking system

unlocked condition, and the front wheel is grasped by the axle holder of the parking machine. Both above-ground and underground systems are available.

Recently-constructed Cycle Tree systems include the Noborito Station North Side Bicycle Parking Lot (**Photo 1**) in Kawasaki City as an example of an aboveground system and the Hirai Station South Bicycle Parking Lot in Edogawa City, Tokyo as an underground system (**Photo 2**). A schematic view of an underground bicycle parking system is shown in **Fig. 1**.

3. Features of Cycle Tree

The main features of Cycle Tree are as follows.

- (1) Cycle Tree is scalable from its basic configuration with one block to multi-block systems.

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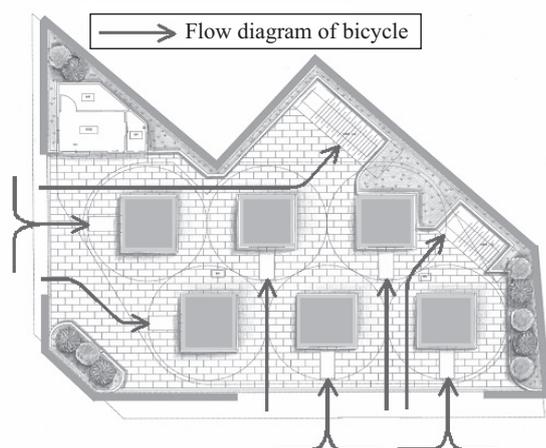


Fig. 2 Example of ground floor plan



Photo 3 IC tag

The combination and layout of the facilities can be arranged freely, as required by the siting, site shape, legal regulations, and other conditions. As a result, the maximum storage efficiency, considering economy, can be realized even in limited spaces. An example of a layout with an efficient flow plan is shown in **Fig. 2** (ground floor plan).

- (2) Simple and speedy entry/exit are realized by combining the Cycle Tree system with IC tags.

Simple, speedy entry/exit were realized by a composite system by combining IC tags (**Photo 3**) attached to the bicycles and a mechanical bicycle parking system, which is the first of its kind in Japan.

As a result, the time required for detection of bicycle entry can be reduced to only 5 seconds, enabling smooth, pleasant use even in busy periods during morning and evening commuting hours.

- (3) High safety is secured by a “man-machine separation” type system.

Cycle Tree features a “man-machine separation”



Photo 4 Entry operation

type entrance/exit structure (**Photo 4**) which does not allow users or others to enter areas where moving machinery is used, including exit door areas. The system is also equipped with various sensors and safety devices to completely ensure the safety of users.

- (4) Extensive supply record.

JFE Engineering has a sales record exceeding a total bicycle parking capacity of 11 000 and holds a 60% share of this market. Cycle Tree has received a high evaluation from local municipalities, which are the company’s main customers.

4. Conclusion

In recent years, there has been a new recognition of bicycles as a pollution-free means of transportation which is both environment-friendly and healthy. From the viewpoint of reducing loads on the global environment, the use of bicycles is being promoted, particularly by the national government, and town-building which enables easy use of bicycles is beginning to take concrete form. With this background, realization of bicycle parking which is in harmony with urban space and offers users excellent convenience is now expected.

JFE Engineering is Japan’s No. 1 supplier of multi-level mechanical bicycle parking systems (based on total bicycle parking capacity). Based on this record and making full use of various advanced technologies, JFE Engineering will propose and construct new “Cycle Tree” systems which offer even higher reliability, convenience, and safety in the future, as part of this company’s contribution to building a sustainable society.

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