

Use and Area Management of Railway Under-Viaduct Spaces and Underground Spaces near Stations

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Railway companies in Japan are more than simply railway operators—they are also developers of trackside real estate and providers of urban services for trackside residents. Running such combined businesses while keeping railway operations at the core of their activities is a key characteristic of Japanese railway companies.

To demonstrate combined utilization of railway spaces, this article introduces examples of effective use of under-viaduct spaces in the greater Tokyo area. It also considers use of diverse underground spaces near major stations that started with introduction of subways. Finally, it covers the future direction for providing even more amenity-rich railway spaces.

Introduction

This section presents a simple review of how railway under-viaduct spaces and station underground spaces came about. Japan's first railway was built in 1872 between Shimbashi and Yokohama. The line ran along the coast with some sections on embankments. During this introductory period, the expanding line was not welcomed by everyone, so tracks and stations in many cities were constructed away from urban areas. Even the west-side track of the Yamanote Line from Shinagawa through Shibuya and Shinjuku, which started loop operation in 1925, was built initially outside the urban area. And the private railways radiating from Yamanote



Ikebukuro Station encircled by department stores owned by railway companies

(JR East)

Line stations to the suburbs also ran through farmland. As a result, railways constructed in this early period ran mostly at ground level when terrain permitted without causing division of the city. But Yamanote Line from Ueno to Shimbashi was the exception. When a general railway network plan for Tokyo was first proposed in 1888, railway engineer Kaname Haraguchi and others insisted that urban tracks should be on viaducts. Therefore Yamanote Line sections running through the city centre were built on viaduct from the start.

As urban areas expanded rapidly during the post-WWII period, they swallowed-up the railways initially on the city outskirts, causing problems with many level crossings at road and rail intersections. Not only do level crossings cause accidents, they severely disrupt road traffic flows when closed for long periods at peak times, especially in urban areas.

The only comprehensive solution was grade separation of tracks and roads. Ordinarily, grade separation would be realized by putting in place structures for roads built after railways to go over or under the railway, but giving the railway a continuous viaduct structure or underground structure is more logical and economical than raising or lowering many roads in places with many level crossings close to each other. As a result, many such 'continuous grade separation projects' were implemented to move existing tracks mainly in urban areas on to viaducts, resulting in creation of under-viaduct spaces throughout the city. On the other hand, until 1960, there were many trams running on roads inside the Yamanote Line loop. Then increasing automobile traffic gradually caused congestion and tram service delays. Finally, all tram lines except one were eventually closed

and switched to subways or buses. With the building of the subway network, some stations on the Yamanote Line, such as Shibuya, Shinjuku, and Ikebukuro, where private railways serving the suburbs and subways serving the city centre intersect, developed into major stations. Consequently, commercial buildings and department stores operated by private-railway companies were built successively adjacent to major stations, and those station spaces formed combined station structures conjoined with surrounding buildings.

Combined Utilization of Under-Viaduct Spaces

Viaduct railways and under-viaduct spaces resulted from various developments, but all under-viaduct spaces are administered by railway operators to support railway facilities. In parts where viaducts intersect roads, the structural gauge (or minimum clearance outline) required by government laws on road design standards requires securing an overhead clearance of at least 4.5 m. In other words, under-viaduct spaces are railway-operator-owned voids with sufficient height to locate buildings. Of course columns are necessary to support railways running overhead, and the viaduct height decreases at transitions from elevated to ground-level sections, so not all spaces can be used. However, many locations have sufficient width and height for small buildings, and many under-viaduct spaces came to be used for various purposes. As an example, black markets (stalls occupying spaces illegally) sprung-up around stations after World War II, but the Tokyo government, police, fire department and others proposed a policy of removing stalls at the

behest of the post-war occupation administration in September 1949. Stalls in front of stations were helped to gain access to public land and the like, and station-front spaces in plazas and roads were cleared. At that time, some stalls moved to under-viaduct spaces of railways. Even today, the area around Kanda Station on the Yamanote Line is one example where there are many small bars and restaurants located under the viaduct near the station. Areas surrounding Ueno Station are another example. In order to help rehabilitate people relocating back to Japan from Asia after the war, some areas granted business rights for under-viaduct spaces to repatriated groups. The Ameyoko commercial district near Ueno Station is a remaining holdover,



The Ameyoko commercial district near JR Ueno Station

(Author)



Entrance to 2k540 under-viaduct commercial facility

(Author)

and such areas maintain a retro atmosphere that draws many tourists.

There are also modern moves to renovate and use under-viaduct spaces that have not been used as commercial spaces previously. The '2k540' commercial facility in the under-viaduct space between Akihabara and Okachimachi stations utilizes the length of railway viaduct facilities to operate a commercial facility in partnership with local handmade crafts businesses, drawing many customers.

Use of under-viaduct spaces created by relocating existing tracks on to viaducts in continuous grade separation projects requires usage plans produced by local governments under negotiation with railway operators. Due to the nature of these projects, the road authority (local or national government) leads the project and bears most of the expenses. However, the completed railway structure becomes the property of the railway operator, so use of the under-viaduct space is decided by negotiation. Ordinarily, local agencies are able to use up to 15% of the area of the

under-viaduct space free of charge (amount equivalent to taxes and public charges), but where that is secured is not always clearly expressed. Naturally, places near station ticket wickets see more customers, so railway operators attempt to place commercial facilities close to the ticket wicket to obtain high rents. Conversely, local governments want to place public facilities, such as bicycle parking lots, in convenient locations near stations. In the end, usage is adjusted through discussions involving local residents as well.

Usage is very diverse based on recent examples of use of spaces under continuous grade separation projects; common uses are as transportation nodes, administrative facilities, commercial facilities, bars and restaurants. Other uses include libraries, medical facilities, day-care centres, centres for the elderly and disabled, plazas, community terraces and cafés, disaster management warehouses, business incubation facilities, bicycle and car parking lots, and railway-operator-run bicycle sharing ports.



Interior of 2k540 (Crafts shops line under-viaduct passage.)

(Author)



Commercial facility in new under-viaduct space of Chuo Line (The interior design prevents the facility feeling like railway under-viaduct space.) (Author)



Under-viaduct space commercial facility near Ochanomizu Station on Chuo Line (The space under an old brick arch viaduct was renovated with a through passage in shops and along the river) (Author)



Exterior of stylish community café in under-viaduct space (Author)



Railway-operator bicycle sharing port

(Author)



Otemachi private-sector building passage (The naturally lit underground passage of a private-sector building is used for subway transfers.)

(Author)

Combined Utilization of Underground Space near Major Stations

This section covers underground spaces near major stations that are used in a combined manner. Looking at use of underground space with subways as an example, the tracks and stations are—of course—underground, and equipment

for operating lines and maintaining stations is often underground too. Passages and staircases are needed to reach the station platforms, and kiosks, commercial facilities and the like are located nearby in some cases. Pedestrian concourses are common at stations with multiple exits and stations where passengers change to other lines. These station concourses can extend under roads too.

Figure 1 Administrative Sections of Underground Spaces at Shinjuku Station



However, not all underground spaces near stations are administered by subway operators. In stations at Tokyo, Shibuya, Shinjuku, and Ikebukuro where multiple lines connect and many passengers board and exit trains, spaces administered by railway and subway operators, and underground pedestrian roads by local governments intertwine in a complex manner. Moreover, underground spaces of department stores run by railway operators, spaces administered by underground shopping mall companies, and underground passages of private-sector office buildings adjacent to stations connect and result in combined and complex spaces in terms of administration. Figure 1 shows the situation for underground space administered by various entities at Shinjuku Station.

In this situation, 'underground shopping malls' administered by underground shopping mall companies play a major role. These underground shopping malls are actually more than just shopping centres. Here shopping mall means spaces for shops, offices, and the like along with parking garages and pedestrian spaces (underground walkways, railway station concourses, etc.) under public spaces (for example, roads and station-front plazas). This definition was published in 1974 by the Central Liaison Council concerning Underground Shopping Malls organized by the then Ministry of Construction and Ministry of Transport (currently merged as Ministry of Land, Infrastructure, Transport and Tourism or MLIT), the Fire and Disaster Management Agency, and the National Police Agency. The nature of the definition is

clear from looking at the construction criteria of underground shopping malls. In the criteria, construction of underground shopping malls is limited to those that meet certain conditions and built along with public underground parking garages or public underground walkways. Specifically, it required that the garage floor area encompass more than half the total area if a public parking garage is present, and public pedestrian walkways to encompass more than half the remaining floor area.

In other words, underground shopping malls were for the purpose of securing underground public parking that was lacking in the city centre and for securing underground pedestrian walkways that cross under or run alongside roads. To achieve these goals, bodies constructing and administering malls meeting the specified conditions could build facilities under roads, such as shops and offices, that could be let. In other words, underground shopping malls were a type of public-private partnership (PPP) using spaces under roads. However, government notices on underground shopping malls were abolished in 2001 with decentralization and the Central Liaison Council concerning Underground Shopping Malls no longer exists. As a result, local governments decide whether or not to permit construction of underground shopping malls, but even today local governments separate 'underground shopping malls' from underground floors of buildings constructed on private property, such as department-store underground food halls. Underground shopping malls are strictly those where roads and commercial facilities are built in an integrated fashion by private-sector companies, occupying public underground spaces such as roads and station-front plazas.

A few such underground shopping malls constructed in the early 1930s merged with subway station concourses. They were constructed rapidly from about 1955 as post-war recovery projects came to an end. At that time, it was necessary to plan what to do about black market stalls illegally occupying places such as station-front plazas. Some shopping malls under roads and station-front plazas were built to relocate these stalls. In the late 1960s, many shopping malls under roads and station-front plazas were constructed more like modern shopping malls due to the impact of factors, such as high economic growth, rapid urban development, and skyrocketing land prices. However, regulations on underground shopping malls were strengthened in response to disasters, such as a gas explosion at a subway construction worksite in 1970 and a department store fire in 1972. In 1974, a basic policy on underground shopping centres was established, expressing the aforementioned definition of 'underground shopping malls' and guidelines for setting them up.

Underground shopping malls were simply built in areas

with demand for parking, public walkways, and commercial spaces, and the like, where sufficient rent to cover costs could be charged. Thus, combined underground spaces spread out underground around major stations in major urban areas, connecting underground shopping floors, and pedestrian passage spaces (concourses) constructed by railway operators as station facilities, underground floors of buildings alongside roads, and underground walkways. In day-to-day use, ordinary people find it hard to differentiate between underground shopping malls, railway facilities, road facilities, and building underground floors.

Combined Use of Spaces Joining Railways and City and Management of Areas

In April 2016, the MLIT Council for Transport Policy released a report on the future of urban railways in the greater Tokyo area. It covers quality improvement of station spaces in creation of next-generation stations, a major issue for railways in Greater Tokyo.

Specifically, it states that although urban railways in Greater Tokyo are quite substantial in terms of network density and service levels compared to other countries, the importance of stations as bases for urban development is increasing in addition to stations playing roles as transport network nodes. There is much room for improvement in areas such as lack of coordination between parties at stations. In the future, it will be important to create next-generation stations with the participation of many parties in unison with surrounding areas, and which are easy to understand, comfortable, and stress-free for all users. It will be important to create venues at individual stations under the lead of local public organizations and the like where related railway operators (and if necessary, administrators of facilities around stations) can share issues related to stations and work to solve issues while going through the PDCA cycle. For railway operators and personnel from areas around stations to work together to solve such issues, the station and city area must be managed to raise the value of the area as a whole.

It can be said that problems surrounding under-viaduct spaces and underground spaces near stations must be discussed by such mechanisms, starting with railways and the surrounding community considering problems and roles of under-viaduct spaces and underground spaces near stations, usable location, and land use of next-generation railways, stations and transport systems.

Such movements are underway in Shibuya, Shinjuku, and Toranomon.

The locations of railways at Shibuya Station is complex. Until March 2013, the terminal of the Tokyu Toyoko Line was on the second floor, and the JR East Yamanote and



Shibuya Station before renovation (The semi-cylindrical roofed building is the old Tokyu Toyoko Line Shibuya Station.)

(Author)



Common guide signs in Shinjuku Station

(Author)

Saikyo lines ran parallel on the second floor from distant platforms. The Tokyu Corporation department store was sandwiched between Shibuya Station and the tracks with the Ginza subway line location on the third floor above-ground part of the department store. Underground, the Hanzomon subway line crossed the JR East lines. Due to this complex layout, it was decided to relocate the Tokyu Toyoko Line underground to connect with the new Fukutoshin subway line on its east side.

This relocation provided an opportunity to discuss major renovations to Shibuya Station, resulting in a series of projects now underway to build five high-rise structures above the lines and around the station. The JR East Saikyo Line platform will be relocated so it is parallel with the redesigned island platforms of the Yamanote Line. The Ginza subway line platform will be relocated over Meiji Avenue and renovated, and a plaza will be built in the space over the JR lines on the fourth floor. To achieve these goals, a council was set up chaired by a university professor where parties such as the railway operators, Shibuya Ward, the Tokyo Metropolitan Government, and local representatives meet to discuss plans. An area management organization has already started activities.

At Shinjuku Station, a council for Shinjuku terminal has been launched for related parties to meet. Efforts are being made to make Shinjuku Station easier for people to navigate using unified maps and common guidance signs as well as to enhance barrier-free pedestrian flows, and expand free wi-fi access areas.

A project is also underway to construct a new subway station near Toranomom where the Hibiya subway line and loop road No. 2 intersect; the station design is being considered together with plans for redevelopment of adjacent areas to achieve an integrated design from the start. The discussions cover how to smoothly move from subway ticket gate to above ground, how to build an easy-to-understand and attractive underground space, and what types of activities are expected near the station.

Efforts to view the station and city together result in more combined railway-related spaces that go beyond use of individual under-viaduct spaces and construction of passages as railway infrastructure. This method of treating the station and the city as a whole is expected to grow even more in the future.

Railways are important facilities used by many people every day to support urban activities, but space for these facilities and space near stations is very valuable yet limited for both railways and cities. Therefore, expectations for diverse and combined use of these spaces will probably increase in the future.

Railways, their stations, and the city must work as one to secure space required for future communities and foster

diverse and combined management increasing the quality and value of the community as a whole. ■

Further Reading

Fujiki TDC, *Tokyo Sengo Chizu: Yami Ichi Ato wo Aruku* [in Japanese] (Jitsugyo no Nihon Sha, Ltd., 2016)

Masakazu Ishigure, *Sengo Tokyo to Yami Ichi* [in Japanese] (Kajima Institute Publishing Co., Ltd., 2016)



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