

IMPRESSIVE AMENITY SPACES AND STRUCTURAL ENGINEERING

Human beings live through a variety of situations: sometimes happy, and sometimes sad; sometimes on top of the world, and sometimes in the doldrums. People also visit many places and meet many people in their lives.

In times of peace, we spend most of our childhood near our birthplaces, growing up guided by the tender hand of our mothers. After entering school, we sometimes go to places far away on school excursions or family trips. And we may go further than usual for family events such as weddings and funerals. In high school, we gradually put some distance between ourselves and our family, making trips with friends more often. On entering university or getting a job, we may start a new life away from our hometown. We come to often make business trips, and we travel abroad as well as domestically. As adults, we commute between home and workplace every day, regardless whether we live in a big city or in a rural town.

People move about using various modes of transport throughout their lives, from buses, the most familiar system, to even airplanes and large passenger ships on occasion. Transport systems that are well maintained, support people's activities, and make them more prosperous are one of the important features of a peaceful civilized society. Above all, railway transport systems from streetcars and subways to high-speed rail transport without doubt play the most important role. And, to use a transport system, people need a place to get on and off, be it an isolated bus stop on a rural mountain road, a large terminal station like Tokyo or Rome, or an international airport in New York or Chicago.

Even for uses other than as transport systems, people gather at such spaces every day and are impressed at their first visit to them. They are a source of memories for many people. As for myself, I lived in Takasago on the Keisei line after moving from Osaka to Tokyo at the age of three in the postwar confusion. I still have a memory deep down of "a view with many tracks like a rail yard." Later I lived near Ogikubo on the Chuo line when I was at elementary school. I remember that the No. 8 Ring Road crossed the Chuo line at a level crossing; and sometimes steam locomotives would straddle the crossing, preventing it from opening much of the time as they went in and out of the station. Since the No. 8 Ring Road was not paved yet at that time, it was difficult to walk in the mud when the snow was melting. The small wooden station building with a steep roof at the south exit of the Ogikubo station brings back memories. While it may be hard to imagine, as Ogikubo is today a major station in Tokyo, just one station attendant could handle the ticket gate. The station building at the north exit was large, but I do not remember it well.

In rural areas at that time, steam locomotives ran on single tracks. I felt it interesting that the train crew would toss something like a small leather bag suspended under a large metal ring onto a spiral metal pole when the train arrived at the station. That was done to hand off the right-of-way to the train that would depart in

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Profile

- 1946 Born in Okayama prefecture
- 1970 Completed master's course at Department of Architecture and Building Engineering, Graduate School of Tokyo Institute of Technology
- 1970 Joined Nikken Sekkei Ltd. (left company in 1981)
- 1982 Associate professor at the Department of Architecture and Building Engineering, Tokyo Institute of Technology
- 1989 Professor at the Research Laboratory of Engineering Materials, Tokyo Institute of Technology
- 1991 Guest professor at Massachusetts Institute of Technology (four months)
- 2003 Vice chairman of Architectural Institute of Japan (to 2005)
- 2005 Professor at the Integrated Research Institute and Head of Structural Engineering Research Center, Tokyo Institute of Technology
- 2006 Member of Science Council of Japan



Fig: Departure lobby of Charles de Gaulle Airport in Paris

the opposite direction. That way, there could be no head-on collision.

The height of train platforms in Japan matches the floor height of rolling stock, so we can easily get on and off. I do not remember the height of platforms of rural stations at that time, but the height might have matched from the beginning in Japan. In Europe even today, the height of station platforms of intercity railways is lower than car floors. That causes much trouble when passengers with large baggage get on and off.

One kind of platform that I found intriguing was the type used in London in the 1970s. Since taxis drove up to platforms, passengers could get in directly from trains. I don't think they have that system in London now, but the difference in transport systems nation by nation certainly increases the pleasure of travel.

Among subway stations, I find Harvard station in USA quite interesting. It is on the line from Boston via the rear of Massachusetts Institute of Technology, passing through the center of Harvard University. The station is located on a gentle slope and passengers can arrive at platforms via a long slope instead of stairs. The subway in Paris is also interesting, because passengers can arrive at platforms through tunnels following guidance panels. London's underground has many contrivances according to the individual station. In one station, there is a large elevator that can accommodate almost all the passengers of a train. Every one of such ideas impresses me.

After the privatization from Japan National Railways to Japan Railways, stations in Japan have become more attractive, increasing the pleasure of travel. But regardless of their age, I hope some stations such as Harajuku station in Tokyo to be kept as they are. Tokyo station in Marunouchi is of course important. It is being improved to incorporate a seismic isolated structure, and its roof will be reconstructed in the style of the original construction. I am looking forward to the completion very much. The well-designed transfer bridge of Yotsuya station and the new east exit of Shinagawa station are also easy-to-use and beautiful. As for construction with con-

sideration to earthquake resistance, it is interesting that a two-story hotel has been built with a suspension type seismic isolated structure under the elevated section beyond Maihama station on the Keiyo line. The technology is wonderful in that achieves not only safety against earthquakes but also isolation of train noises from above and impact noises. Since the hotel is the nearest to Tokyo Disney Resort, I heard that it is always full with young visitors to the amusement park. As there are many elevated sections of railway all over Japan, I think that this technology can be applied widely.

Among newer stations, the tent structure of Motosumiyoshi station on the Tokyu Railways Toyoko line is very good looking. The combination of appropriately sized spans that make good use of the characteristics of the tent structure and the supporting structure is very bright and beautiful. While not a railway station, the terminal building of Charles de Gaulle Airport in Paris from which Air France and Japan Airlines planes depart, as in the shown picture, is perfectly beautiful. When I visit Paris on other carriers, I pass through the cylindrical corridor and underground passage to arrive at the platform of this terminal building by escalator. I never forget the moving impression at arriving there. It is a wonderful platform as if one could fly to another world from there. It has a truss structure using an appropriately thin steel frame upon which a glass roof rests. There are louvers above it to block direct sunlight, but it is a wonderfully bright and open structure.

I have written my memories of transport systems here, but one thing we should never forget is to secure the safety of transport systems against major earthquakes. Safety against heavy rain and wind is also important. But as earthquakes occur suddenly and unpredictably, we need to be prepared for them at all times. While difficult to achieve in Japan with its many steep mountains and little level ground, the most important factor in designing and construction is to select a site on firm ground. But that is difficult for railways and roads that extend almost linearly tens and hundreds of kilometers without break. Tunnels need to be built and large bridges are required. As those are lower than buildings, it is relatively easy to construct them with rigidity, but there are many other difficulties to overcome. The sites for stations likewise cannot be selected freely.

Under such difficult conditions, engineers at JR work on new design and construction of new structural buildings and introduces new technologies such as seismic isolated structures and passive controlled structures. Vitruvius, a Roman castle architect, pointed out strength, usefulness and beauty as three importance points for designing in his book "De architectura". If not strong, a building is no good even if it is useful; if not strong and useful, a building is no good even if it is beautiful; but if not beautiful, a building cannot be called architecture. As we use them every day, transport systems are important; and stations where we get on and off are important spaces for people. So, I hope JR will create strong, useful and beautiful spaces all over Japan.