

# Universal Design for Railways —Accessibility for Everyone

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## Introduction

The universal design (UD) concept was proposed in the USA 20 years ago and is now being applied throughout Japan as a guiding principle in barrier-free transportation, including railway trains and stations. For full application, the UD concept should be adopted as an important element at the master plan stage, giving special consideration to the elderly and disabled.

The term 'UD' has become a modern buzzword in Japan where UD principles are being applied to homes, motor vehicles, electric appliances, stationery, daily goods, fashion, etc.

Japan's Ministry of Economy, Trade and Industry (METI) recently established the Kyoyo-Hin Foundation, an organization promoting common-use goods. At the local government level, the Shizuoka prefectural government has established an

office for UD within its planning department to promote UD throughout the prefecture, whether for municipal facilities or for government stationary envelopes. In 2000, the national government enacted the 'Barrier-Free Transportation Law' leading to the installation of escalators and lifts in many railway stations.

Professor Ron Mace of North Carolina State University in the USA was the first person to advocate UD concepts in 1985. He defined UD as the design of products and environments that can be used by people of all ages and abilities to the greatest extent possible without the need for adaptation or specialized design. His seven UD principles are summarized on pp.32–37 in this issue of *JRTR*.

Even though the UD principles were 'born' in the USA, they are now applied more in Japan than in the USA, especially for product development. In Europe, the UD concept is generally called 'Design for All.'

## Experience in Stockholm

When I was in Stockholm more than 25 years ago, I boarded a subway train and unknowingly sat down in a priority seat for disabled people and I remember being told off! The seat did feel different and when I compared it with the other seats I realized it was 8-cm higher and had a grip on the window side. Also, a sign in Swedish indicated the seat was for disabled people. I found this unusual, because in Japan in those days most train seats for the disabled were identified only by a label or different coloured upholstery. However, today, many Japanese trains have UD features incorporated right from the earliest design stage (Table 1).

Several Japanese tramway operators, including Hiroshima Electric Railway in Hiroshima City have introduced extra-low-floor trams and some of this rolling stock has been constructed using Japanese technology only. Since light rail trains are now being run over existing railway lines, hopefully this trend toward accessible light rail transit will grow.

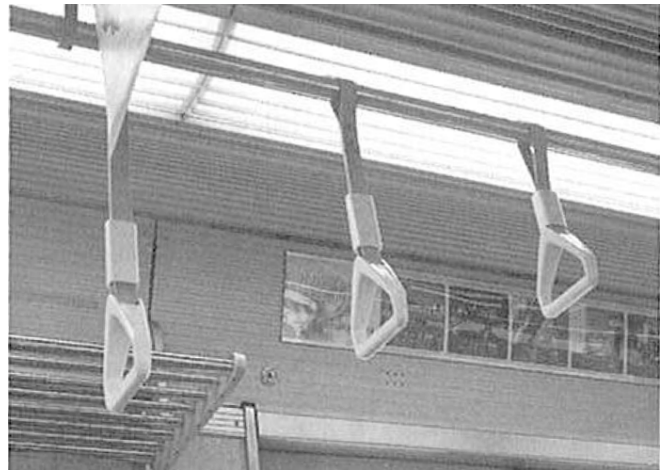
When I participated in a symposium on Rail Travel for the Disabled in Dortmund, Germany, several years ago, someone asked me whether disabled passengers in Japan can go unassisted to the restaurant car. I answered that almost no Japanese trains even have a restaurant car—instead, it is common for passengers to buy a boxed lunch, which we consider convenient because we can eat it at our own seat. My answer caused some laughter, because in Europe it seems that the general idea is for everyone, whether disabled or not, should be able to move about to other cars, including the restaurant car and first-class cars. Some time ago in Japan, one might have seen priority seating for disabled people in smoking cars, but ordinary and first-class cars rarely had enhanced features for disabled people.

Table 1 Train UD Features

Seats	Armrests on both sides for easy push up to stand Grips on side wall Higher seats Larger seat area separated from neighbours Grip on top of seat
Hand straps	Rings at different heights Accessible straps and rings
Baggage racks	Installed lower
Doors	Wider openings Signs or illuminated indications on floor level Narrow gap between carriage and platform Audible warning when doors open and close Easy-to-read indications for semi-automatic doors (easy Japanese <i>hiragana</i> letters instead of difficult <i>kanji</i> characters)
Toilets	Large Device for ostomy patients Baby chair
Others	Lifts for wheelchair users Large easy-to-read signs on trains LED or LCD information panels Multilingual public address system Wheelchair berths Braille indications (car numbers, door positions, etc.) Separate smoking and non-smoking carriages



Disabled priority seat with armrests on both sides on Kintetsu Series 21 cars (Author)



Hand straps at different heights on Kintetsu Series 21 cars

(Author)

Private compartments on the Series 100 shinkansen were once often used by families travelling with a baby, because travel in a regular carriage with a crying infant could prove embarrassing if neighbouring business people cast a disapproving look. If conventional trains in Japan had compartments for small groups and families, like in Europe, Japanese mothers would have an easier time travelling by train.

Although foreigners travelling in Japan find shinkansen fascinating, I sometimes see them having difficulty with bulky luggage due to lack of a baggage section. More recently, special express rail-air links in Japan are offering user-friendly space for luggage, and hopefully future shinkansen cars will do so too. However, some UD features are now quite common in train stations. For example, up escalators are installed even when there are just 10 steps to climb, and down escalators are no longer rare. Similarly, double handrails on staircases are becoming fairly common.

New rail systems in particular are now more likely to plan accessible features at the design stage. For example, on the Nanakuma Line operated by Fukuoka City Transportation Bureau, the maximum gap between trains and the straight platform edge is  $52 \pm 2$  mm and the maximum level difference is 5 mm. These features would never have seen the light of day if the master plan had not stipulated them.

### Best Practice at Central Japan International Airport

Central Japan International Airport opened in Nagoya in February 2006 is a good example to introduce novices to UD concepts. The airport master plan called for an airport terminal based on UD, accessible to everyone. Part of the design work was assigned to associations for disabled people who held a total of 151 study sessions and on-site inspections. Their work often involved bridging the gap between requirements for vision-impaired people and requirements for people with walking difficulties. In some cases, group members could not agree, suggesting that UD issues may have their own complications.

At any rate, the associations were instrumental in ensuring the airport has no stairs at all from the airport train station to the boarding gates. The station platform has safety doors and baggage carts are available for passengers exiting the train, a great advantage for people with large suitcases. Once they exit the wide ticket wickets, travellers wheel their carts directly to the check-in counters. Signs and information boards are at wheelchair eye level for easy checking of arrival or departure information. The moving walkways are wide enough for travellers to walk past wheelchairs. In the public washrooms, users can take their baggage into the stall and place it

in a dedicated area. A play area for small children has been constructed near the boarding gates where they can make as much noise as they want while waiting for departure.

After several months in actual use, I hear that some facilities have encountered various problems and requests from users while the airport terminal operator has said that UD requires continuous, long-term organization and commitment.

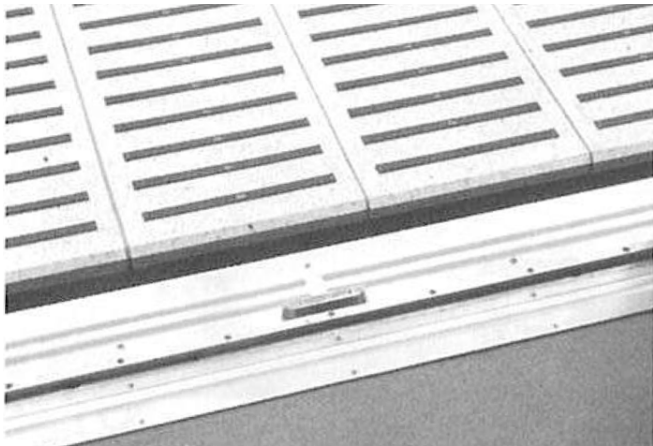
### Wide UD Applicability

Universal design principles can be applied not only to railway facilities and passenger carriages but also to operation of facilities and customer services.

Railways in Greater Tokyo operate world-renowned through services linking JR East, private lines and subways. The Yamagata and Akita shinkansen also run on narrow-gauge railway lines. Other user-friendly features include:

- Different trains travelling in the same direction but to different destinations use the same platform, letting passengers change trains easily.
- Kyushu Shinkansen passengers can make connections from the same platform at Shin Yatsushiro Station.

As in the EU, these approaches could also be used for easy transfer between different modes. The configuration of Central



Narrow gap between train and platform, and illuminated floor exit indication on Meitetsu Series 2000 cars (Author)



Departure board at easy-to-read height in Central Japan International Airport (Author)

Japan International Airport's transportation services permits this for travellers using multiple transportation modes (train, bus, taxi, private cars using a parking lot, and even a high-speed ferry). Similarly, the introduction of prepaid cards, such as *Surutto Kansai* and *Passnet*, which provide access to the services of different transport operators without requiring multiple ticket purchases, has made transferring from one operator to another easier. If IC cards (like JR East's *Suica* card) become more common, travellers could use a single card for all modes.

Railway information boards have evolved from LED to LCD panels, a great advance providing much more information. However, the quality of that information still needs consideration. For example, the Series 231 cars on Tokyo's Yamanote Line indicate scheduled arrival times at all stations around the loop, as well as the locations of the station staircases. However, this information is presently only in Japanese and English.

Likewise, brochures offering accessible rail travel tips and information for disabled people should be published in Japan, as they are in Europe. One European railway, for example, explains everything from ticket purchase methods and enhanced onboard amenities to the location of station toilets for the disabled. Major stations operated by Germany's Deutsche Bahn AG (DB AG) are almost sure to have an information counter near the entrance, a big help for first-time users of the system. The contradiction of running about trying to get information on

the location of the information counter is seen in too many stations elsewhere.

### Door-to-Door Continuity and Uniformity

A traveller's itinerary starts at home and ends at the destination. No matter how complete the UD amenities may be along the route, if a disabled person has difficulties when transferring to a similar or different mode of transport, the result is inconvenience and dissatisfaction. Designers must plan for continuity and uniformity. Signs often differ from line to line, sometimes within the same building. Of course, transport operators have the right to originality as a way to compete, but some uniformity should be maintained for presenting information. The recent common station numbering system introduced in Japanese cities is a great help to foreigners and others unaccustomed to travelling by rail. But good design includes aesthetics, productivity and functionality, which basically means accessibility to everyone. Thus, functionality may simply be an essential part of UD. Therefore, excellent design must incorporate functionality.

Because Japan's population is aging rapidly, we need a stronger commitment to UD, beginning at the master plan stage, and every project should incorporate UD principles as a prerequisite.

### Motivated Staff

A guide from a travel agency specializing in overseas travel for disabled people wrote that when she guided several Japanese disabled clients in wheelchairs in Thailand, they discovered that although amenities for the disabled were rare, travelling was much better than in Japan thanks to the friendly way they were greeted in Thailand and local hospitality. In the final conclusion, no matter how well infrastructure meets UD requirements, little is gained if staff are not motivated to welcome people needing those amenities.

Perhaps empathy and commitment lie at the heart of universal design. ■

### Further Reading

Y. Kawauchi, *Universal Design: The True Meaning of "Barrier Free,"* Gakugei Shuppan Sha Co., Ltd.



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