

## Tokyo International Air Terminal Corporation

× Mitsubishi Heavy Industries Transportation Equipment Engineering & Service Co., Ltd.

The Haneda Airport New International Flight Passenger Terminal opened on October 21, 2010. Aiming for a user-friendly airport, Tokyo International Air Terminal Corporation, which handles the terminal's construction, management and operation, opted for the introduction of 21 units of the world's first universal design passenger boarding bridges that have eliminated steps.



## Universal design bringing comfort in boarding and disembarking aircraft

Passenger boarding bridges (PBB) connect aircraft with airport terminal buildings, allowing passengers to embark and disembark. The world's first universal design types can now be seen among these bridges that support comfortable sky journeys. Recently your reporter, Hiromi Hasegawa, visited their home, Haneda Airport New International Flight Passenger Terminal, to find out more.

Passenger Boarding Bridge



With regular international services now resumed after an interval of 32 years, hopes are high for Haneda Airport New International Flight Passenger Terminal to become an international hub airport close to the city center. Only 15 km away from the center of Tokyo, it is literally minutes away — at the quickest just 13, from Hamamatsucho and Shinagawa stations.

I was met by Tokyo International Air Terminal Corporation's Senior Vice-President Mitsuhiro Saito, and Yohei Yoshida, Director Facilities' Planning. "With the opening of the new terminal, Haneda is now linked to 18 cities around the world, and we are anticipating seven million travelers a year. We are planning for 30,000 day-time and 30,000 night-time international arrivals and departures annually," said Mr. Saito. The airport operates round-the-clock, with flights to East Asia, including China and Korea from 6 a.m. to 11 p.m., and flights to Europe,

America and Southeast Asia in the late night and early morning hours.

The pair took me on a tour of the newly opened terminal. A monorail ran in front of my eyes at the third-floor departure lobby; from the station to the airline check-in counters takes approximately one minute, and not a single step in sight. The smooth journey continues even further, with no change in levels between the departure procedures area and the departure concourses and gate lounges. "Haneda is going to become more globalized, and we will see a lot of passengers from all over the world. We put the priority on actual customers really feeling it is a good airport," said Mr. Saito, with a smile.

From the boarding gate, we headed toward the PBBs. A big feature of the New International Flight Passenger Terminal is the adoption of universal design concepts

It's not just a passageway.  
It is an important airport function.



The overlapping tunnel sections have eliminated floor level changes, making the walk flat and easy. "Safe for everyone, including children and the elderly," according to Mr. Yoshida.

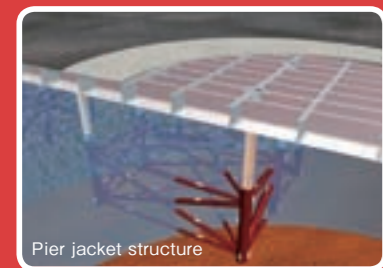


**MHI participated in the construction for Haneda Airport's D runway**

The opening of the New International Flight Passenger Terminal also marked the start of shared use for Haneda Airport's D runway. Built offshore, out over the ocean, the airport's fourth runway gives consideration to the surrounding environment with a hybrid structure made from a combination of reclaimed and pier sections that do not dam up the flow of the Tama River.



The pier section occupies one-third of the runway and has an area of 520,000m<sup>2</sup>. Forming its base are steel unit structures called jackets, which cover piles driven into the ocean. Among those jackets are 50 in the upper section which were made at the Yokohama Machinery Works. Concrete slabs up to 47cm thick are laid on top of the steel jackets. Those slabs are able to tolerate even the weight of a 400-ton jumbo jet. Also, the runway surface has 20 cm-thick pressure-resistant pavement that supports giant tires.



Pier jacket structure

The steel jackets must be able to support these loads, and also endure 100 years of use. MHI supported the D runway behind the scenes, and played a role in its construction. Aircraft leaves here to fly all over the world.

for the airport facilities, equipment and services. "It's not just barrier free; it is universal design. We thought about everyone, not just people with disabilities. It's important that it be easy for everyone to use, even children and the elderly. So in order to realize that, we created a committee in which various users participated, and reflected their opinions in all aspects." said Mr. Saito.

The introduction of the PBBs was part of that, but it had also been a desire of Mr. Saito's for many years. Apparently, PBBs have to be extended or retracted to match a variety of aircraft, which structurally results in changes in level, something that had until now been dealt with by using ramps. I suddenly remembered the gentle slopes I had experienced when boarding aircraft over the years.

"Passengers move with the flow in PBBs and they don't tend to watch where they walk. The future will see more elderly passengers, so the slopes are a cause for concern. We were always thinking about how we could eliminate level changes." said Mr. Saito.

Actually walking along a PBB with no slopes was easier than I had imagined, and I also had a sense of spaciousness. It was a strange sensation being shown the PBB being extended and retracted, with the ceiling and walls seeming to move while the floor didn't. It was because the floor is extended and retracted by a different mechanism all of its own.

Next we went outside to the aircraft parking apron. Under the spreading sky, a giant PBB extending horizontally

from the terminal building caught my eye. From the outside, it was easy to see the three tunnel-shaped passageways of different widths joined together like a sliding telescope.

"We had repeated test-runs and checks before we opened for business, just to be absolutely sure," said Mr. Yoshida. "What we liked most about these PBBs," added Mr. Saito, "was that they solve a difficult problem with a very simple structure."

"Simple means fewer malfunctions. A PBB is an airport function and not just a passageway. An airport function is, in short, something required to get aircraft off the ground with no delays. If a PBB breaks down and cannot be used, then aircraft embarkation and disembarkation cannot take place. When that happens, it leads to boarding gate changes and flight delays, and that's something we must avoid as much as possible. So we give it a lot of attention. That's how important PBBs are." said Mr. Saito.

Aircraft fly in and out of airports on a tight schedule. Somewhere at the heart of that is the kind of enthusiasm and attention to detail that will not overlook even a small level change in a PBB. Bearing that in mind, there can be no doubt that airports will only become more user-friendly and comfortable in the future.



(Top) Floor gutters on both sides are hidden underneath the floor, making for a more spacious passageway.  
(Bottom) Universal design PBBs were the realization of a five-year dream for Mr. Saito.



**We developed PBBs with the idea that they are "hospitality spaces"**



**Director, Mitsubishi Heavy Industries Transportation Equipment Engineering & Service Co., Ltd.  
Toshiro Fushiya**

PBBs have a number of tunnels sliding to extend and retract, so changes in level are structurally unavoidable. How to get rid of the level changes was a constant source of worry for us. We were determined to improve this product with new technology, and made sketches of structures everyday until we finally came up with the basic concept of combining a moving walkway with a slat conveyor.

The passion of our personnel saw it completed in the unprecedented time of just one year, but its development wasn't without its trials and tribulations. Haneda Airport is one of the busiest airports in the world and demands a durability that can keep pace with severe use. PBBs also can't afford any malfunctions, so operation and maintenance have to be kept as simple as they are currently. Those were the kinds of tough obstacles we overcame. Originally, we started as a maintenance company, so our strength was in being able to get expert maintenance staff in from the assembly stage and have their opinions fed back into the structure.

PBBs have been around for half a century. The completely new concept of universal design has now been born in something that people thought couldn't be improved anymore. PBBs aren't just passageways; they are the hospitality space that greets passengers as they take their first step off an aircraft. We developed PBBs with comfort and safety in mind for everyone.

Airports can't just switch to something new immediately, so we are looking into refurbishing existing equipment in the future. We want to make these PBBs more common and see them in use around the world.