Current Status of the New Shinkansen Lines

Summary

New Shinkansen Lines are five lines proposed in 1973 under the Nationwide Shinkansen Railway Development Act. So far, five sections approximately 550km in length in 3 lines have been operating including the Hokuriku Shinkansen (Takasaki -Nagano). Recently, five section approximately 770km in length in 3 lines, which are the Hokkaido Shinkansen (Shin-Aomori – Shin-Hakodate-Hokuto and Shin-Hakodate-Hokuto – Sapporo), Hokuriku Shinkansen (Nagano – Kanazawa and Kanazawa – Tsuruga) and Kyushu Shinkansen (Takeo-onsen – Isahaya and Nagasaki), have being under the construction. This article reports the outline and situation of the five sections.

1. New Shinkansen Lines

"Nationwide Shinkansen Railway Development Act (NSRDA)" was entered into force in May 1970. The purpose of this Act is to strive for the development of nationwide Shinkansen network with consideration that the establishment of high-speed transportation network acts an important role for the comprehensive and universal development across the country, thereby contributing to the development of the national economy, expansion of the life area of citizen, and promotion of the regions.

Under the Act, the Shinkansen Lines are constructed after the decision of basic plan and development plan. In January 1971, after enforcement of this Act, the first basic plans were decided to construct the Tohoku Shinkansen (Tokyo – Morioka) and Joetsu Shinkansen (Tokyo – Niigata). In 1982, those lines started operation.

The New Shinkansen Lines are five lines, which are the Tohoku Shinkansen (Morioka City – Aomori City) Hokkaido Shinkansen (Aomori City – Sapporo City), Hokuriku Shinkansen (Tokyo Metropolitan area – Osaka City), Kyushu Shinkansen Nagasaki route (Fukuoka City – Kagoshima City), and Kyusyu Shinkansen route (Fukuoka City– Nagasaki City), and they were proposed by the development plan decided in November 1973 through the second in June 1972 and third basic plan in December 1972 decided after the first basic plan.


This section, as shown in Fig. 1, from Shin-Aomori the start point of the Hokkaido Shinkansen to Shin-Hakodate-Hokuto is approximately 148km in length. Figure 2 shows construction type ratio. Approximately 82km of 148km in length, Seikan Tunnel and before and after its section, which has been operated since 1988, is used as shared section with the Shinkansen Line and conventional line. This means approximately 66km in length is expansion construction section. This work started in April 2005 and the completion will be the end of fiscal 2015. At the beginning of service, maximum running speed will be 140km/h in the shared section.

Currently, the tunnel lining work is complete and completion of civil engineering works in expansion section is upcoming. In the future, main construction works are going on in the works of facilities like a track, electricity and machine equipment and architecture like a station building. Photo 1 shows that electrification and track laying works are progressing at Amida viaduct of expansion section in Aomori Prefecture.

As shown in Fig. 1, this section, which is a part of the Hokkaido Shinkansen (Aomori City – Sapporo City), is 212km in length between Shin-Hakodate-Hokuto and Sapporo. Its construction started in June 2012.

Structure type ratio is shown in Fig. 2. As shown in Fig. 2, 76% of the total expansion section, about 160km in length, is tunnel section. Each tunnel is a relatively long tunnel such as 10 tunnels more than 5km including the longest Oshima tunnel of 26.5km in length.

Currently, we are proceeding with center line measurement, geological survey, design consultations and land acquisition (as of October 1, 2013, land acquisition rate of 1%).

4. Progress in the Hokuriku Shinkansen (Nagano – Kanazawa)

This section, in the Hokuriku Shinkansen that is the start in Takasaki station, is 231km in length from Nagano to Hakusan Car Maintenance Center (Fig. 3) and Fig. 4 shows its construction type ratio.

Civil engineering works such as tunnels, bridges and viaducts has been completed all so far, and station buildings has been almost finished.

In addition, construction work of electricity, machine, and track, and verification process of facilities had been completed in advance between Nagano and Kurobe-Unazuki-onsen. From December 2013, the actual train running test using the Shinkansen Line has been performing. The works in the section from Kurobe-Unazuki-onsen to Hakusan Car Maintenance Center is in progress toward the end of fiscal 2014 (Photo 2).

5. Progress in the Hokuriku Shinkansen (Kanazawa – Tsuruga)

This section from Kanazawa to Tsuruga, as shown in Fig. 3, is 114km expansion miles, and it was started construction in June 2012. Structures of viaducts and bridges are responsible for 68% of expansion range as shown in Fig. 4. The civil engineering work of the part of the viaduct section at Fukui Station (approximately 0.8km in length) had been completed in February 2009 after starting in advance in April 2005.

Currently, we are proceeding with the land acquisition (as of October 1, 2013, 1% land acquisition rate) with center line survey, geological survey and design consultations. In construction, tunnel excavation work is prepared to start at the Okunoro engineering section (about 5km in length) of the longest Shin-Hokuriku Tunnel (about 20km in length), which was ordered at the beginning.

6. Progress in the Kyushu Shinkansen (Takeo-onsen – Nagasaki)

This line has 67km expansion miles and among them tunnel sections account for 61%, as shown in Fig. 5 and 6. Shin-Nagasaki Tunnel about 7.5km is the longest tunnel and this line’s feature is that short tunnels within 1km in length reach 29 tunnels of total 39 tunnels.

Currently about 40% of both the land acquisition and construction start has been progress as the whole. About 60% of excavation work of tunnels between Takeo-onsen and Isahaya was completed in advance. The construction work at the Chiwata River Bridge was ordered in first is progressing as shown in Photo 3. On the other hands, at the section between Isahaya and Nagasaki the survey, land acquisition and design have been promoting and Shin-Nagasaki Tunnel work ordered with two sections divided into, is preparing for excavation.
The New Shinkansen Lines are a transportation mode with a low environmental impact, contributing to the activation of the interchange among regions and balanced development of the country. We must continue to construct safe railway facilities with superior in economy and quality based on our skills and experiences.

Fig.5 Route map of the Kyusyu Shinkansen

Fig.6 Structure type ratio of the Kyusyu Shinkansen

7. Conclusion

The New Shinkansen Lines are a transportation mode with a low environmental impact, contributing to the activation of the interchange among regions and balanced development of the country. We must continue to construct safe railway facilities with superior in economy and quality based on our skills and experiences.