

HOW JAPAN DEVELOPED SHINKANSEN HIGH-SPEED TRAINS

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The episode of Japan with railways goes back to the year of 1872. For the construction of railways started in this year, asking technical assistance of England, Japan was using 1,067 mm rail gauge regarded as narrow, remained from that time. By the 1940s, passenger density experienced in Tokyo-Shimonoseki lines, brought up the connection of this line with a fast train line. At the same time, this line would use the standard 1,435 mm size of rail gauge. This fast train project has been named as “Shinkansen Fast Train” which means “Bullet Train” at that time.

Delayed because of the Second World War this project has been restarted in year of 1959 with the name of “Tokaido Shinkansen” and take the distance between Tokyo and Osaka in 3 hours with 200 km/h speed. Japan has believed in this plan is realistic and achievable. Yet, vehicle traction technologies, successful implementations in electrification and the knowledge obtained from aircraft technologies of the country will be helpful for the construction of such a fast train line.

The construction of the line took 5 years and it has been put into service on the date of October 1, 1964. Considering that opening of Tokyo Olympics organized on October 10, 1964, it is known that this date has a meaning for the country. When the line first taken into service, with a speed of 210 km/h taking 4 hours, the travel time decreased to 3 hours 10 minutes in 1965, 3 hours in 1986 and in present time decreased to 2.5 hours by increasing the speed of the train to 270 km/h.

After the success of Tokaido Shinkansen, in 1967, construction of Sanyo Shinkansen involving Shin-Osaka-Okayama line has been started and its launch actualized in 1972. On this line, a traffic control system named COMTRAC (Computer Aided Traffic Control) is used. Okayama-Hakata Line, providing service in the same region, on the other hand, launched in 1975 and connected Tokyo and Hakata in 7 hours.

Continuing fast train projects in the advancing years, Japan; in 1982 put into practice two other lines, Tohoku Shinkansen and Joetsu Shinkansen. During the construction phase of Tohoku Shinkansen, Research and Development Studies on decreasing the noise and resonance in Shinkansen trains originate significant scientific results. On the other side, the region where Joetsu Shinkansen will be in service is one of the regions receiving heaviest fall of snow in Japan, snow melting equipment installed alongside this line.

While 0 Series of trains have been used on Tokaido and Sanyo Shinkansen lines until that time in Japan, in abovementioned Tohoku and Joetsu snowy regions, it was started to put into service the 200 series of trains which are a modified version of 0 series of trains

By the year 1986, 100 series of trains which are a more comfortable version of 200 series of trains put into service on the lines of Tokaido and Sanyo Shinkansen. 100 series of trains are the most comfortable trains produced until that time and also have got the first double-deck wagon specification which is used at fast trains of the world.

Japan State Railways (JNR), privatized by transferring to three companies. The operation managements of three existing lines respectively; Tokaido Shinkansen line has been transferred to JR Central, Sanyo Shinkansen line transferred to JR West and Tohoku and Joetsu Shinkansen transferred to JR East Companies.

After privatization, the first plan in the agenda of grantee companies is to increase the speed of Shinkansen's. The first company wants to accommodate the technical developments practiced in Europe and Japan as pioneering became JR Central. 300 series of trains which have been put onto rails brought financial advantage to the company and covered Tokyo-Shin-Osaka line in 2.5 hours with 270 km/h speed. This new train has been named "Nozomi"

Developments have been experienced in other competing companies as well. While JR East Company reaches 425 km/h speed with STAR 21 train in 1991, the following year, JR West reached to 350 km/h speed with WIN 350 named train. In addition to this, JR Central Company, reached to 443 km/h speed with 300X named vehicle in 1996. The speed tests of these vehicles provide a technological basis for the train sets which were developed afterwards. Thus, JR East developed E2 Series of Sets, JR West developed 500 and 700 Series of Sets and JR Central Company developed N700 Series of trains.

The privatization of Japan State Railways in 1987, conducted to pass on standard rail gauge to be used in two new lines put into service in the years 1992 and 1997 besides giving acceleration on the abovementioned technological developments.

Following the Nagano Shinkansen launched to transport passengers to Nagano Winter Olympics in 1997, Morioka-Hachinohe line which is an extension of Tohoku Shinkansen launched in 2003. Again in year of 2003, on Tohoku line, with a drive performed with E2 Series of Set, 362 km/h speed has been reached and a record has been broken.

In conclusion, it is possible to say that, Japan Shinkansen system is a fast train passenger transportation system, continuing for more than 70 years, continuously updated and developed under the light of new technologies. The achievements of Japan by means of this technology make possible many innovations of the quality of cornerstones in railways sector.

On the other side, the first fast train projects in our country started on Ankara- Eskiflehir line in 2009 with Spanish CAF production fast trains.

Short History of Japan "Bullet Train", Shinkansen High-Speed Trains:

YEAR

ACTUALIZED

1941 Construction of fast train line having standard rail gauge on Tokyo-Shimonoseki line

1959 Tokaido Shinkansen construction has been started.

1963 256 km/h speed tested on Tokaido line.

1964 Tokaido Shinkansen 4 hour's line between Tokyo and Shin-Osaka has been launched.

1965 Travel time in Tokyo and Shin-Osaka has been decreased to 3 hours 10 minutes.

1972 Sanyo Shinkansen covering Shin-Osaka and Okayama line has been launched.

1975 Sanya Shinkansen covering Okayama and Hakata line has been launched.

1982 Omiya-Morioka line Tohoku Shinkansen and Omiya- Niigata line Joetsu Shinkansen have been launched.

1985 Ueno-Omiya line Tohoku/Joetsu Shinkansen has been launched. Operations of 100 Series of trains commercially started to yield profit.

1987 Japan State Railways (JNR) privatized and the operations of the lines transferred to 3 companies.

1991 JR Central's 300 Series Shinkansen sets reached to 325 km/h speed.

1992 The use of Tokaido Shinkansen of the 300 Series of train sets which are commercially yield profit, have been started and decreased the transportation time between Tokyo and Shin-Osaka to 2.5 hours with 270 km/h speed. Yamagato Shinkansen covering Fukushima-Yamagata line has been launched. JR West's experimental WIN 350 train reached to 350.4 km/h speed.

1993 JR East's STAR 21 experimental train reached to 425 km/h speed.

1994 E1 Series Sets used in Tohoku/Joetsu Shinkansen's were consists of double-deck wagons and started to yield commercial profits for the business owner.

1996 JR Central's experimental 300X sets, reached to 443 km/h which is the speed record in Japan.

1997 As part of Hokuriku Shinkansen, Takasaki and Nagano line has been launched. E4 Series Sets used in Tohoku/Joetsu Shinkansen's were consists of double-deck wagons and started to become yielding profits for the business owner.

1999 Yamagata Shinkansen covering Yamagata and Shinjo lines has been launched. At the same time, 700 Series Sets used at Tokaido/Sanyo Shinkansens

2000 700 Series of "Hikari Rail Star" sets used in Sanyo Shinkansen line came to a state of yielding profits for the business owner.

2002 Tohoku Shinkansen on Morioka-Hachinohe line has been launched.

2003 JR East's E2 Series trains reached to 362 km/h speed during test drives.

2007 The use of N700 Series of Shinkansen trains have been started in Tokaido/Sanyo Shinkansens and started to yield profits commercially to the business owner.

2010 On Hachinohe and Shin-Aomori line, Tohoku Shinkansen has been launched.

2015 Hokuriku Shinkansen which is covering Nagano-Kazawana line has been launched.