Evolution of the Tokaido Shinkansen for 50 Years

and

The Chuo Shinkansen using the SCMAGLEV

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A Couple of Memorial Days

October 1, 1964
- Opening of the Tokaido Shinkansen

October 1, 2014
- Semicentennial of the Tokaido Shinkansen

October 17, 2014
- Approval of the construction of the Chuo Shinkansen between Shinagawa and Nagoya
Our Mission

Area: 23.7%
Population: 59.9%
GDP: 64.4%

Sources:
Area/Statistical Reports on the Land Area by Prefectures and Municipalities in Japan, Geospatial Information Authority of Japan
Population/Basic Resident Registration, Ministry of Internal Affairs and Communications
GDP/Annual Report on Prefectural Accounts, Cabinet Office, Government of Japan

JR Central market area
Other

JR Central’s Operating Area

Nagoya
Osaka
Tokyo

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Technological Innovation in the Tokaido Shinkansen


1st generation rolling stock
- Steel carbody
- Conventional bogie
- DC motor

2nd generation rolling stock
- Aluminum alloy carbody
- Bolsterless bogie
- AC induction motor (VVVF control, regenerative braking)

Series 0 Series 100 Series 300 Series 700 Series N700 N700A

Commercial speed
- 210km/h
- 220km/h
- 270km/h
- 270km/h (Sanyo section: 285km/h)
- 270km/h (Sanyo section: 300km/h)
- 285km/h (Sanyo section: 300km/h)

- Bogie vibration detection system
- Body-inclining system
- Cruise control system

- Body-inclining system
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Energy Efficiency of the Shinkansen Rolling Stock

Comparison of Electric Power Consumption by the Tokaido Shinkansen Rolling Stock Type

220km/h

100%

270km/h

91%

73%

84%

66%

68%

51%

Series 0 (1964)
Series 300 (1992)
Series 700 (1999)
Series N700 (2007)
N700A (2013)

△32%
△49%

*Simulation of traveling from Tokyo to Shin-Osaka
The Tokaido Shinkansen’s Environmental Friendliness

CO2 Emissions of the Tokaido Shinkansen are 1/12 those of airplanes

Energy Consumption per seat

Tokaido Shinkansen (Series N700 “Nozomi”) 90MJ/seat (*1)

Airplanes (B777-200) 746 MJ/seat (*2)

CO2 Emissions per seat

Tokaido Shinkansen (Series N700 “Nozomi”) 4.2kg-CO2/seat (*1)

Airplanes (B777-200) 50kg-CO2/seat (*2)

1/8

1/12

*1.Calculation based on running performance (JR Central figures) Series N700 “Nozomi” (Tokyo~Shin-Osaka)
*2.Calculated by JR Central while referencing ANA’s Annual Report 2011 B777-200 (Haneda~Itami・Kansai Airport)
1. Railways have the outstanding characteristic of being mass transportation mode with superior environmental friendliness and JR Central has dramatically improved the superior qualities of railway.

2. The Chuo Shinkansen that employs the SCMAGLEV will enable us to enhance the transportation capacity and offer multiple routes for preparation for risk.

3. The Tokaido Shinkansen and Chuo Shinkansen contribute to global environmental conservation.
Natural Disaster

The power supply is automatically shut down and emergency brake is applied to stop the train.

Epicenter

Detector

P-wave

S-wave

Communication lines

Source: HALEX Corporation HP
http://halex.co.jp/blog/jousuke/20141110-4643.html
Countermeasures for Snow

Heavy Snow Area (Sprinklered)

Ground Camera
(Detecting snow accretion)
- Device
- Picture
  (Snow accretion)

Onboard Camera
(Detecting blowing snow)
- Device
- Picture
  (Blowing snow)
Train Punctuality

- No passenger fatalities or injuries due to train accidents such as derailment or collision in commercial train operations during 50 years of service.

- Annual average delay 0.6 minutes / train (1987~2013)

Average Delay

JNR 1972~1986
Ave. 3.1 min./Train

JR Central

Ave. 0.6 min./Train