Construction Scheme of Shinkansen

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# Types of the Shinkansen

<table>
<thead>
<tr>
<th></th>
<th>Status</th>
<th>Date of initial plan</th>
<th>Date of revised plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Tokaido Shinkansen Sanyo Shinkansen (Built as extensions to the network of non-Shinkansen lines)</td>
<td>-</td>
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</tr>
<tr>
<td>②</td>
<td>Tohoku Shinkansen (Tokyo-Morioka) Joetsu Shinkansen</td>
<td>1971</td>
<td>1971</td>
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<tr>
<td>③</td>
<td>Five Projected Shinkansen Lines</td>
<td>1972</td>
<td>1973</td>
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<tr>
<td></td>
<td>· Hokkaido Shinkansen (Aomori-Sapporo)</td>
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<td></td>
<td>· Tohoku Shinkansen (Morioka-Aomori)</td>
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<td></td>
<td>· Hokuriku Shinkansen (Tokyo-Osaka)</td>
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<td></td>
<td>· Kyushu Shinkansen (Fukuoka-Kagoshima)</td>
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<td></td>
<td>· Kyushu Shinkansen (Fukuoka-Nagasaki)</td>
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<td></td>
<td>· Maglev (Tokyo-Osaka)</td>
<td>1973</td>
<td>2011</td>
</tr>
</tbody>
</table>
Construction Scheme of the Shinkansen (1)

(1) Tokaido and Sanyo Shinkansen

- Built as an addition to JNR Tokaido services to ease congestion
- Funded using loans, including financing from the World Bank

- This line covered the most densely-populated areas in Japan.
- The profit was enough to return the loans within 7-8 years of the start of operations.
The success of the Tokaido Shinkansen led to demands to the service to be extended to other regions. In 1970, the “Nationwide Shinkansen Construction Act” was passed in order to create a nationwide transport network contribution to the equal growth of all Japan’s regions. The law also established the Japan Railway Construction Public Corporation.

- The majority of the construction expenses were funded by loans.
- Construction was greatly delayed due to problems purchasing land and objections from local residents (Tokyo-Omiya).
- Construction costs were also higher than expected due to difficulties including the construction of long tunnels through mountainous regions.

The profit was not large to return the loans.

The construction cost placed a heavy burden on the Japanese National Railways (JNR).
Construction Scheme of Shinkansen (3)

(3) Projected Shinkansen

- JR East
- JR West
- JR Kyushu
- Under Construction
- Planned line
- Planned line (Maglev)

Tohoku Shinkansen
Hokuriku Shinkansen
Hokkaido Shinkansen
Kyushu Shinkansen

- 1997: Construction start of Tohoku Shinkansen
- 2002: Construction start of Hokuriku Shinkansen
- 2010: Construction start of Hokkaido Shinkansen
- 2011: Construction start of Kyushu Shinkansen
- 2015: Construction start of Kyushu Shinkansen
- 2016: Construction start of Hokkaido Shinkansen

Sapporo
Shin-Hakodatehokuto
Shin-Aomori
Morioka
Sendai
Nagano
Tokyo
Shin-Osaka
Kanazawa
Nagoya
Kagoshima-Chuo
Nagasaki
Hakata
The Tohoku and Joetsu Shinkansen constructed during the JNR era relied mainly on loans to fund construction, which caused severe problems for the finances of JNR.

- A construction-operation separation scheme was introduced.
  - Construction funds were supplied by the local and central government
  - JRTT (the constructor) loaned the tracks and facilities to JR (the operator) with JR paying a leasing fee, capped at the size of its profits, to JRTT.

**Funding**

- Central Government
- Public Works Expense
- Local Authorities
- Leasing Fees
## Summary of Shinkansen Project Scheme

<table>
<thead>
<tr>
<th></th>
<th>Governments</th>
<th>JRTT (Builder and Owner)</th>
<th>JR (Operator)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction cost</td>
<td>O</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Completion of</td>
<td>—</td>
<td>O</td>
<td>—</td>
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<tr>
<td>construction</td>
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<tr>
<td>Rolling Stock cost</td>
<td>—</td>
<td>—</td>
<td>O</td>
</tr>
<tr>
<td>O&amp;M cost</td>
<td>—</td>
<td>—</td>
<td>O</td>
</tr>
<tr>
<td>Ridership</td>
<td>—</td>
<td>—</td>
<td>O</td>
</tr>
</tbody>
</table>
Five Conditions For Starting Construction

Secure prospect of stable financing

Profitability on income and expenditures
(benefits the finances of operating body on average over 30 years)

Investment benefits \((\text{profit} \div \text{cost} > 1)\)

Consent of JR as the business entity

Consent of local governments along the railway line to separating management of parallel conventional line

Work can only start when all of the above conditions have been agreed.