



Research & Development

Important role in improving
EFFICIENCY and COMPETITION
with other transport modes

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International Practicum on Implementing High-Speed Rail in the United States

R&D Centers in JR Group



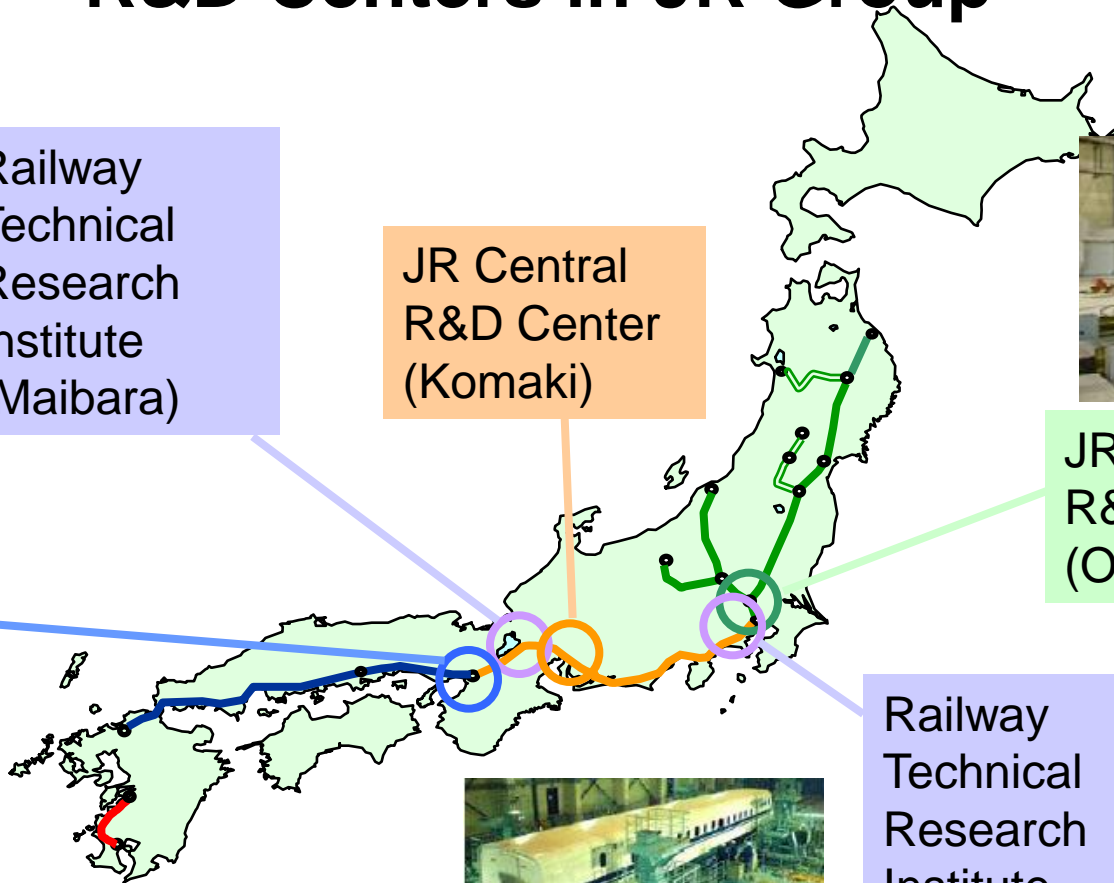
Railway
Technical
Research
Institute
(Maibara)

JR Central
R&D Center
(Komaki)



JR East
R&D Center
(Omiya)

JR West
Safety
Research
Center
(Osaka)



Railway
Technical
Research
Institute
(Kunitachi)





Importance of R&D in O&M Sector

➤ Acquisition of field data

We collect the field data on our track and operate endurance tests.



➤ Meeting the challenge of cost reductions

We endeavor to reduce our maintenance and investment costs



➤ Accumulation of know-how

We accumulate know-how that can boost motivation for our engineers





Purpose of R&D in O&M sector

➤ **Maintaining Zero-Fatality Record**

Safety is a top priority.



➤ **Benefitting Company and Public**

We have a duty to solve environmental issues.

We have to pursue cost reduction.



➤ **Preparing for the Future**

We can accumulate know-how to prepare for the future.





History of R&D in Shinkansen

➤ Maintaining a Zero Fatality Record

Topic: Evaluating Operational Safety



When we increase speed, we have to ensure safety.

So we carry out both simulation tests and field tests to evaluate operational safety and prevent derailment.

JR Speed Record for Test Running

1972 Max. 178mph (286km/h)

1993 Max. 265mph (425km/h)

1996 Max. 276mph (443km/h)



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History of R&D in Shinkansen

➤ Benefitting Both Company and Public

Topic: Noise Evaluation

When we increase operating speed, we have to evaluate noise impact.

So we test measures for reducing noise along the tracks and set appropriate and decided the operating speeds.



JR Operating Speed

1990 Max 171mph(275km/h)

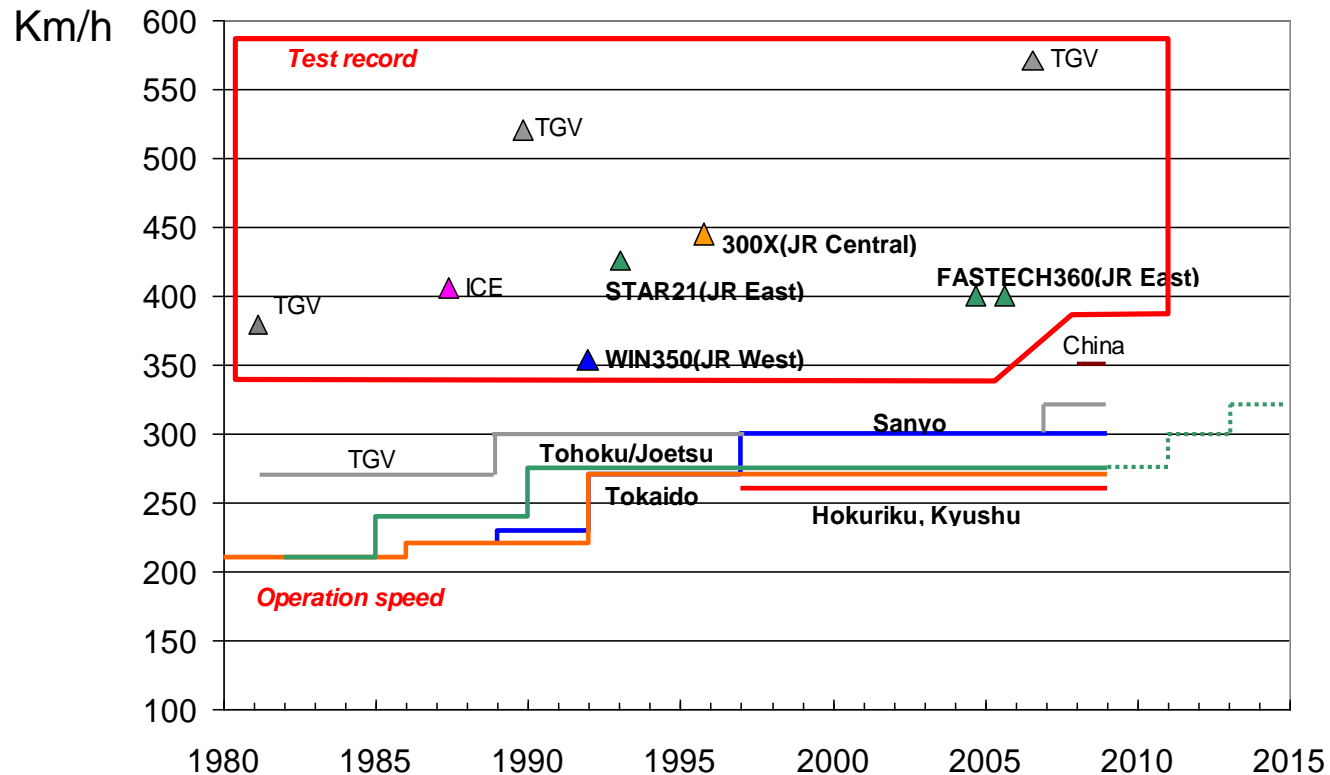
1997 Max 287mph(300km/h)

2012 Max 200mph(320km/h)





History of Speed-up in Shinkansen





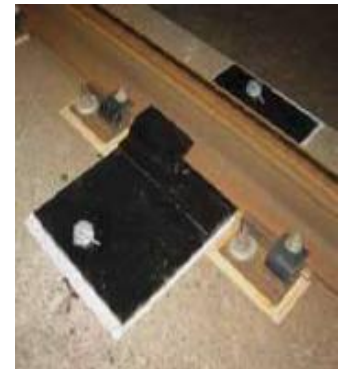
State-of-the-Art R&D in Shinkansen

➤ Maintaining a Zero-Fatality Record

Topic: Prevention of Secondary Disasters

When an earthquake occurs, we must prevent any secondary disaster.

So we have developed measures to prevent derailment.





State-of-the-Art R&D in Shinkansen

➤ Benefitting Company and Public

Topic: Noise Reduction

One of the most difficult technological issues is noise reduction.



We developed measures to reduce noise so that we could increase operating speed.

JR East decided that the operating speed should be 200 mph in 2007, and will operate at 200 mph in 2012.



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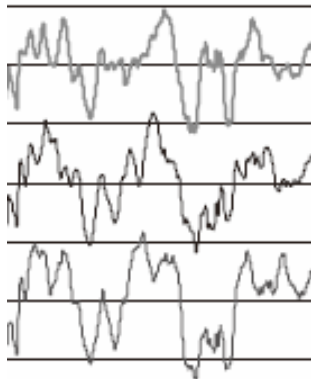
State-of-the-Art R&D in Shinkansen

➤ Benefitting Both Company and Public

Topic: Maintenance Cost Reduction

It is difficult for suppliers to pursue maintenance cost reduction.

So we evaluate measures for track maintenance to increase speed.





State-of-the-Art R&D in Shinkansen

➤ Preparing for the future

Topic: Fostering the development of bogie experts

It is important for rail operators to cultivate experts in key technologies such as bogie technology.

So we have created an expert team in R&D Center who can evaluate the bogie design using our bench test facilities and our operating track.





Summary

➤ Importance of R&D in O&M sector

Acquiring field data. Working to reduce costs.
Accumulating know-how.



➤ Suggestions

We believe that the key to success in high-speed projects is for the operator (Amtrak) and the track owner (freight rail, heavy rail, commuter Rail) to meet R&D challenges independently and autonomously.

In these endeavors to meet R&D challenges, we think it is important for Amtrak and track owners to be supported by APTA and AAR .

We think it is very useful for APTA and AAR to attend UIC high-speed rail activities.



International Practicum on Implementing High-Speed Rail in the United States



**Thank you very much
for your attention**



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