

**16<sup>th</sup> December 2011**

**Exchange of Ideas with Private Companies**

- Agenda
- Presentation by MOR Staff : Study Tour of HSR in Japan
- Sumitomo Metal : Sumitomo Railway Products
- Nabtesco Corporation : Railroad Products Company
- Nippon Signal : Signaling System for High Speed Rail
- Kawasaki : Technical Introductions of Kawasaki's High Speed EMU Trains

**Exchange of Views with Japanese Private Companies**  
**Regarding High Speed Railway in India**

~ *JICA Needs Survey on High Speed Railway Technology and Skills in India* ~

**【Dec. 16 14:00~18:30 Placed: JICA Tokyo International Center】**

**1. First Session ... Presentation & Discussion with Japanese Industries**

No	Time		Contents	Speaker
1	14:00 ~	14:05	5 min. Opening Remarks	Mr. Mikio HATAEDA, Deputy Director General, South Asia Department, JICA
2	14:05 ~	14:10	5 min. Explanation of the High Speed Railway Survey Conducted by JICA	Mr. Motoyuki TAKAHASHI, Director (India, Bhutan), South Asia Department, JICA
3	14:10 ~	14:40	30 min. Presentation by the Delegation from India	Mr. XXX XXX, Ministry of Railways
4	14:40 ~	14:55	15 min. Q & A	—
5	14:55 ~	15:15	20 min. Presentation by Japanese Company 1	Mr. Kohei Suzuki Assistant Manager, Railway Products, Forging & Casting, Steel Logistics Equipment Dept., Sumitomo Corporation
6	15:15 ~	15:20	5 min. Q & A	—
7	15:20 ~	15:30	10 min. Break	—
8	15:30 ~	15:50	20 min. Presentation by Japanese Company 2	Mr. Tsekin Lai Railroad Products Company, Nabtesco Corporation
9	15:50 ~	15:55	5 min. Q & A	—
10	15:55 ~	16:15	20 min. Presentation by Japanese Company 3	Mr. Yuta Nagashima Overseas Division, The Nippon Signal Co., Ltd.
11	16:15 ~	16:20	5 min. Q & A	—
12	16:20 ~	16:40	20 min. Presentation by Japanese Company 4	Mr. Masashi Ishizuka Associate Officer, Rolling Stock Company, Kawasaki Heavy Industries, Ltd.
13	16:40 ~	16:45	5 min. Q & A	—
14	16:45 ~	16:55	10 min. Q & A (for the whole program)	—
15	16:55 ~	17:00	5 min. Closing Remarks	Mr. Masataka NAKAHARA, Director General, South Asia Department, JICA

**2. Second Session ... Reception**

No	Time		Contents	
1	17:00 ~	18:30	90min Reception	JORSA

## STUDY TOUR OF HSR IN JAPAN

### Presentation by the Indian Railways Delegation

16 Dec 2011

## CONTENTS

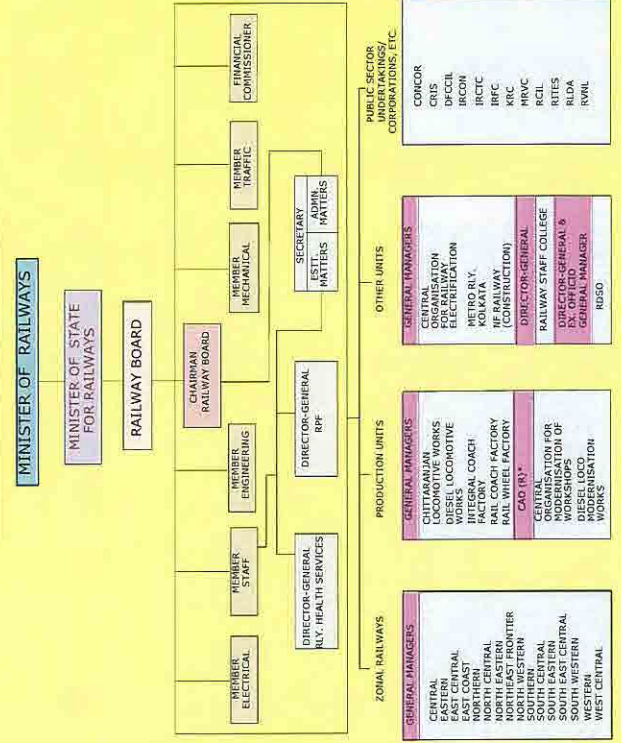
- Overview of Indian Railways
- Proposal of HSR in India
- HSR Japan – The Study Tour Perspective
- Way Forward

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## Overview of Indian Railways

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### ORGANISATIONAL STRUCTURE



\* Chief Administration Officer (Railways)

## ORGANISATIONAL STRUCTURE

### 3 tier Management

- Apex – **Chairman and Members**, Railway board
- Middle -16 zones headed by **General Managers**
- Lower -68 divisions headed by **Division Railway Managers**

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## NETWORK AND RESOURCES

### Production Units

- **Integral Coach Factory**, Perambur, (1400 coaches per annum)
- **Rail Coach Factory**, Kapurthala, (1500 coaches per annum)
- **Diesel Locomotive Works**, Varanasi, (250 diesel locomotives per annum)
- **Chittaranjan Locomotive Works**, Chittaranjan, (220 electric locomotives per annum)
- **Rail Wheel Factory**, Yelahanka (190000 wheel discs, 50000 axles per annum) and,
- **Diesel Loco Modernisation Workshop**, Patiala. (Rebuilding of 108 locomotives per annum)

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## NETWORK AND RESOURCES\*

- Predominantly 1676mm(BG) gauge
- 63,974 Route Km
- 18,893 Electrified Route Km( 30% of total route km)
- 7,083 Stations
- 8,889 Locomotives
- 2,19,900 wagons & 57,500 passenger cars including EMU's
- 2 Passenger Car Manufacturing Units, 2 Locomotive Manufacturing Units, 1 Wheel and Axle Plant and 1 Locomotive Rebuilding Plant
- 55 Workshops for Repair of Rolling Stock and Manufacture of Parts
- 124 hospitals & 586 Health Units (Includes 5 speciality hospitals)
- 1.4 Million Employees

\* AS on 1.4.2011

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## NETWORK AND RESOURCES

### Central Organisations under MoR

- Central Organisation for Railway Electrification, Allahabad
- Central Organisation for Modernisation of Workshop, New Delhi
- Research, Design and Standards Organisation, Lucknow

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## NETWORK AND RESOURCES

### Public Sector Units/Corporations/Registered Societies

1. Bharat Wagon and Engineering Company Ltd.
2. Centre for Rail Information Systems.
3. Container Corporation of India Ltd.,
4. Dedicated Freight Corridor Corporation of India Ltd.,
5. Indian Railway Catering and Tourism Corporation Ltd.,
6. Indian Railway Finance Corporation Ltd.,
7. IRCON International Limited,
8. Konkan Railway Corporation,
9. Kutch Railway Corporation Ltd.
10. Mumbai Rail Vikas Corporation,
11. Pipavav Railway Corporation Ltd.,
12. Rail India Technical and Economic Services Ltd.,
13. Rail Land Development Authority,
14. Rail Vikas Nigam Ltd.,
15. Railtel Corporation of India Ltd.,

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## NETWORK AND RESOURCES- CONSTRAINTS

- o IR's main trunk routes viz., the GQ and the diagonals which form 16% of the network but carry 58% of the freight traffic and 52% of the passenger traffic are badly saturated
- o Since 1950-51, freight output and passenger output have gone up by 11 times and 9 times while route kms have gone up by only 1.2 times
- o Common infrastructure for passenger and freight traffic hampering resource optimisation
- o Multigauge network causing bottlenecks and losses
- o Inadequate capacity for production of required number of electric locomotives, diesel locomotives and passenger coaches
- o Need for Resource Generation

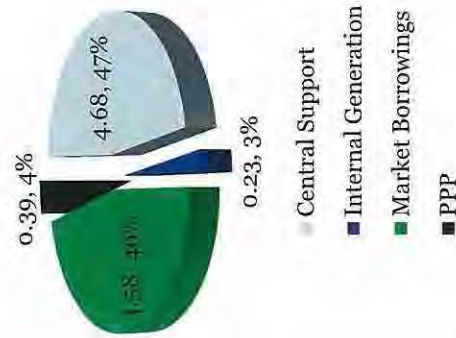
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## INDIAN RAILWAYS: ROLE

- o Lifeline of the nation carrying 40% of freight and 20% of passenger traffic of the country
- o Carried 922 mt of freight traffic and transported more than 7 billion\* originating passengers in 2010-11
- o 11,000 + trains per day including 9,500 + passenger trains
- o Carried 66% of all coal, 82% all fertilizers, 60% of all iron-ore, 45% of all cement, 22% of all POL and 17% of all Foodgrains transported in the country

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## RESOURCE MOBILISATION & ALLOCATION FOR ANNUAL PLAN 2011-12 (BILLION US DOLLARS)



Plan Heads	Allocation
Rolling Stock	3.07
New Lines	2.12
Metro Transport	1.44
Doubling	1.20
Track Renewals	0.81
Lease Payment	0.77
Investment in PSUs	0.56
Gauge Conversion	0.55
Electrification	0.22
Road Safety	0.44
Workshops incldg. PUs	0.37
Passenger Amenities	0.24
Signalling & Tele	0.24
Traffic facilities	0.23
Others	0.54
<b>Grand Total</b>	<b>12.81</b>

## XII PLAN (2012-17)

Railways XII Plan is under preparation

***Government of Indian Proposes to Invest One Trillion Dollars in Infrastructure in the XII Plan***

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## Proposal of HSR in India

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## VISION 2020 OF RAILWAYS

Broad category	Short Term Target (2010-11-2011-2012)	Long-term Target (2012-2013-2019-20)	Total Target
Doubling (including DFC)	1000 kms	11000 kms	12,000kms
Gauge conversion	2500kms	9,500kms	12,000kms
New line	1000kms	24,000kms	25,000kms
Electrification	2000kms	12,000kms	14,000kms
Procurement of wagons	33909	255227	289136
Procurement of diesel locomotives	690	4644	5334
Procurement of electric locomotives	555	3726	4281
Procurement of passenger coaches	6912	43968	50,880

## HIGH SPEED CORRIDORS

- o Development of high speed rail corridors has been proposed through PPP in the Railway Budget Speech of the Hon'ble Minister for Railways for the Financial Year 2010-11
- o Vision 2020 of Indian Railways: Completion of High Speed Corridors of 2000 kms.

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## CORRIDORS SELECTED

1. Delhi-Chandigarh-Amritsar (450 km approx.)
2. Pune-Mumbai-Ahmedabad (650 km approx.)
3. Hyderabad-Dornakal-Vijayawada-Chennai (664 km approx.)
4. Howrah-Haldia (135 km approx.)
5. Chennai-Bangalore-Coimbatore-Ernakulam (649 km approx.)
6. Delhi -Agra-Lucknow - Varanasi – Patna (991 km approx. )

*As a first step pre-feasibility studies for the above projects are being carried out. Some studies have been started and rest are in the process of award.*

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## Present Status of Pre-Feasibility Studies

SN	Name of the Corridor	Status of tender	Remarks
1	Pune-Mumbai-Ahmedabad	Awarded to M/s Systra, M/s Italffer and M/s RITES Limited.	Report submitted to the Ministry of Railways. State Govt. of Gujarat has paid their share for the pre-feasibility study.
2	Delhi-Chandigarh-Amritsar	Offer under finalisation	-
3	Delhi-Agra-Lucknow-Varanasi-Patna	Awarded to M/s McDonald.	Inception report and Interim Report No. I & II submitted.

## WAY FORWARD

### Constitution of National High Speed Rail Authority

1. An autonomous body for implementation of High Speed Rail Corridor projects.
2. Planning, standard setting, implementing and monitoring these projects.

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4	Howrah-Haldia	Awarded Consortium of INECO, PROINTEC, Ayesa.	M/s M/s M/s	Inception report and Interim Report No. I & II submitted.
5	Hyderabad-Dornakal-Vijaywada-Chennai	Awarded Consortium of Parsons Brinkerhoff India Pvt. Ltd. And two other Japanese firms.	M/s	Tender awarded on 2.12.2011.
6	Chennai-Bangalore-Coimbatore-Ernakulam-Thiruvananthapuram	Tenders opened on 31.10.2011 and are under evaluation.	M/s	

# HSR Japan

## A Study Tour Perspective

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### THE NETWORK & ORGANISATION

- “Shinkansen” – The Brand
  - Many entities, One Brand
- The Organisation – Public & Private – alignment of Objectives and Goal
  - (Manufacture, Operations, Maintenance & Research)
  - Customer Focus – Safety, Punctuality, Comfort, Speed and Capacity
  - Environment friendly – Emissions, Noise
- Central & Local Government Support

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### SHINKANSEN - A STUDY TOUR PERSPECTIVE

- Dedicated Network
- Dedicated Organisation
- Infrastructure and Operations
- Integrated Supply Chain
- Creating value for customers
- Continuous Innovation

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### INFRASTRUCTURE AND OPERATIONS

- Creating Infrastructure – JR TT
- Separation of Operations
  - Privatisation and division into six private companies of the Japanese National Railway thus fostering efficiency in operations
  - Focused and lean structure for Operations through region based Organisations (East, Central, West, Kyushu)
  - Creating Mini Brands within “Shinkansen” to foster efficiency and dedication in operation ( Tokaido, Sanyo, Tohoku, Joetsu)

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## INTEGRATED SUPPLY CHAIN

- Backward
  - Specialised Manufacturers, Suppliers (Hitachi, Kawasaki, Toshiba, Nippon... et al.)
  - Robust Maintenance Organisations aligned towards efficient operations
- Forward
  - Creating value beyond travel – The Life style Business ( retail, restaurants, vending machines, shopping centers, hotel chains, advertisement, sports and leisure...)

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## Way Forward

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## INNOVATION – THE HALLMARK

- Sinkansen Series – creating new milestones
- New Technology – scaling new heights
  - Construction
  - Rolling stock Manufacture (eg. FSW, PMSM, Bolsterless Bogie, Wt Reduction)
  - Operations and Control (COSMOS)
  - Maintenance
  - Passenger services – Suika
- Innovative Operation
  - Coupling and de-coupling
  - Mini Shinkansen

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## WAY FORWARD ...

- Financing Model – The crux
  - The core business?, Extent of Government Support, private participation? Profitability of Business Units, Revenue from exports? Etc.
  - Viability of different business units, Transportation Vs. Lifestyle Business
- Maintenance aligned towards operations – details
  - Frequency of 4 mins, upto 14 trains per hour, less than 1 min average delay...
- Adopting technology to Indian Conditions: Cost/Benefit of state of art technology.
- Government policies
  - Competition
  - Land acquisition
- Choice of Speed ( 200, 300, 400 kmph etc.)

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*Arigato Gozaimasu*

## SUMITOMO RAILWAY PRODUCTS



### SUMITOMO METAL INDUSTRIES, LTD.

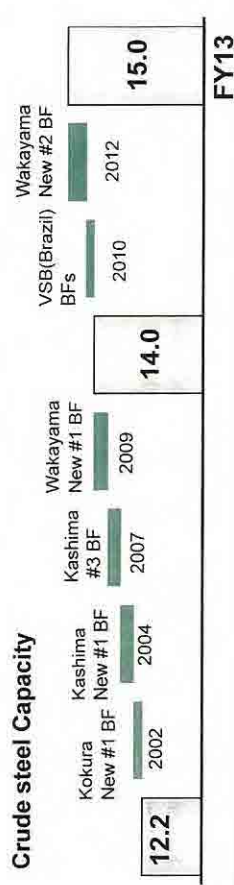
Railway, Automotive and Machinery parts Company

## Sumitomo presentation contents

1. Sumitomo Metals Company Profile
2. Sumitomo Railway Products
3. Advantages of Sumitomo wheelsets
4. Supply records to global market including India

## Sumitomo Metals Company Profile

- Foundation : 1897
- Number of employees : 22,597
- Sales : \$14.0 billion (FY2010)
- Crude steel Capacity : 14.0 million tons (Consolidated base)



SUMITOMO METALS

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## Sumitomo Metals Portrait

- ⊕ Kashima 8.0 million tons (Steel sheets, plates, structural steels, welded pipes)
  - ⊕ Wakayama 4.5 million tons (Seamless pipes, slabs)
  - ⊕ Kokura 1.5 million tons (Specialty steel)
  - ⊕ Osaka (Railway parts, crankshafts)
  - ⊕ Steel tube works (Seamless pipes)
  - ⊕ Naoetsu (Titanium, stainless)
  - ⊕ Brazil (VSB : Seamless pipes start up 2010)
  - ⊕ Vietnam (CSV : Steel sheets start up 2012)
- 



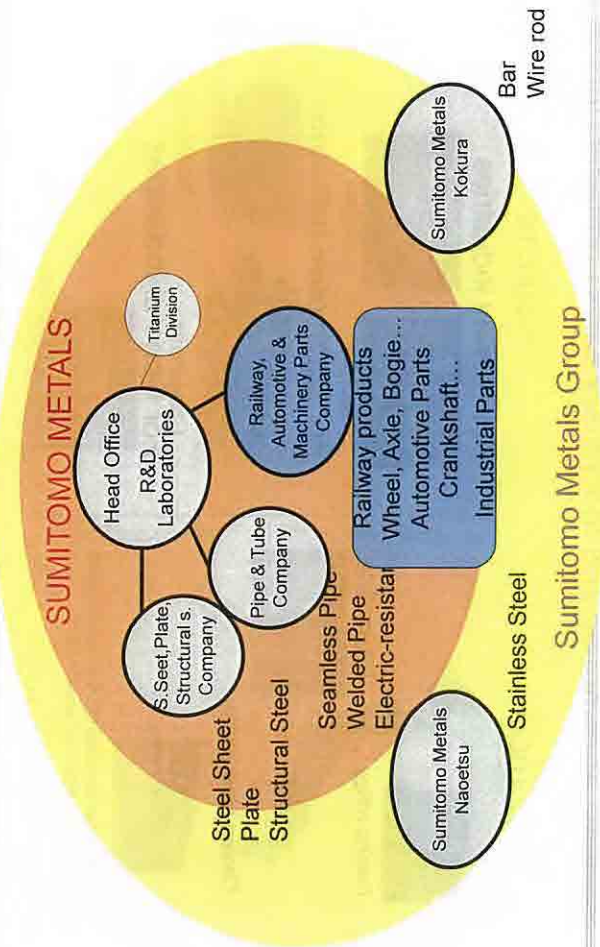
Customer penetration ratio: The percentage of sales tonnage of products where we are the number one or number two supplier to customers.

SUMITOMO METALS

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## Companies of Sumitomo Metals



## Railway, Automotive and Machinery parts Company Outline



## Osaka Steel Works Summary

History	OSW was founded in 1901. Railroad products have been manufactured since 1920
Area	560,000 m <sup>2</sup>
Employee	approx. 1,100 persons
Certification	ISO9001, ISO14001, AAR, RSSB, DB

### HIGH PERFORMANCE FACILITIES FOR FORGING



High speed forging presses for crankshafts



High speed forging presses



Precise forging presses for wheels and axles



## Railway Products Business

Exclusive supplier of Railway wheels, higher market shares of components such as Bogies, Driving Gear Unit in Japan

Products	Domestic Share
Wheels & Axles	100%
Gear Unit	60%
Bogie Truck	25%
Coupler	80%

Products	World Share
High-speed railway wheels	30%

## Wheelsets and components for conventional speed train

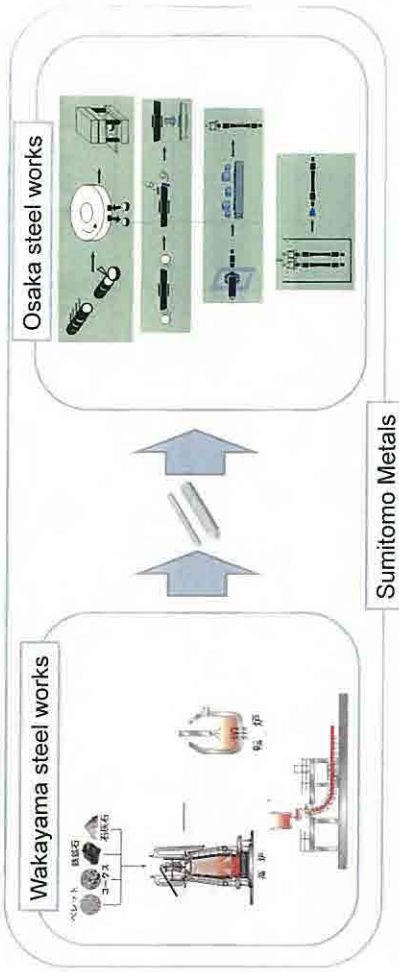


## Wheelsets and components for high speed train



## Advantages of Sumitomo wheels and axles

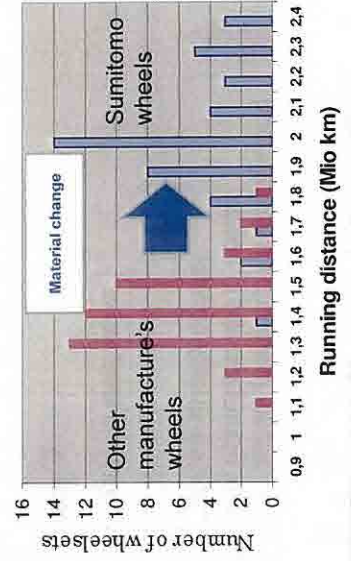
- High quality materials for wheels and axles manufactured in house
  - Rigorous quality control
- ↑
- High quality products
  - Stable supply



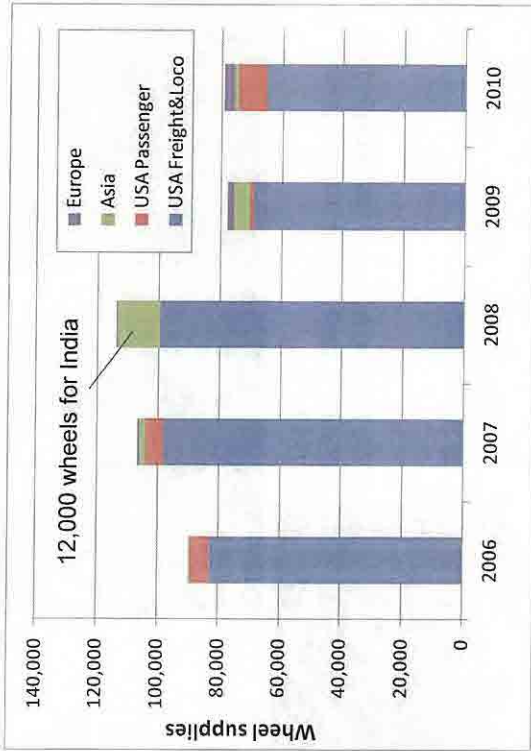
## Sumitomo Wheel advantages - A best practice by our high level expertise

A customer had an issue of uncomfortable vibration of cars caused by unroundness of railway wheels.

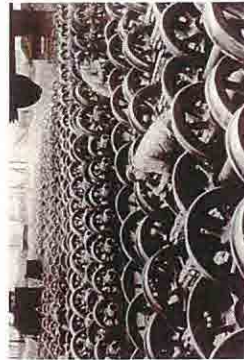
Sumitomo has investigated the reason and proposed a solution by changing material of wheels. As a result, the customer obtained successful benefits !!



## Supply records of wheels to global market

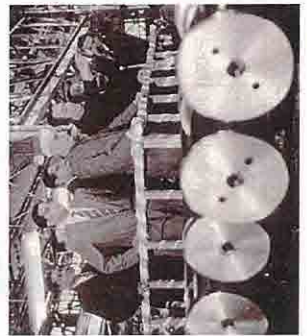


## Our relationship with India



300,000 wheelsets were supplied to India around 1950's.

We had the honor of receiving India's Prime Minister Nehru to our manufacturing plant in 1957.



1901: Sumitomo started production of cast steel at Sumitomo Steel Foundry.



2010: Steel converter at the Kashima Steel Works

Thank you for your attention.

**SUMITOMO METAL INDUSTRIES, LTD.**

Railway, Automotive and Machinery parts Company



# Nabtesco Corporation

## RailRoad Products Company

*The Nabtesco Group, with our unique motion control technology, will provide safety, comfort and a sense of security in daily lives as well as any form of transportation*

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## Agenda

1. Corporate Profile
2. Company Profile
3. SHINKANSEN with Nabtesco Products
4. Supply Record

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## 1-1. Corporate Profile

- Company Name Nabtesco Corporation
- Established September 29, 2003
- Address 7-9, Hirakawacho 2-chome, Chiyoda-ku, Tokyo 102-0093, Japan
- Capital 10 billion yen
- Representatives President & CEO: Kazuaki KOTANI
- Employees\* Consolidated 4,057
- Consolidated subsidiaries\*
  - Japan: 14 (other 6 equity-method affiliates)
  - International: 27 (other 2 equity-method affiliates)
 (\*as of September 2011)

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## 1-2. Precision Equipment

**Precision Reduction Gears**

**Features**  
high positioning accuracy, high rigidity

No.1

Approx. 60% world market share for joints of industrial robots

No.1

Approx. 60% domestic market share for machine tool ATCs  
(ATC = Automatic Tool Changer)

Servo actuator

Water transfer unit

Rapid retooling machine

Vacuum gauge

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### 1-3. Transport Equipment

**Railroad vehicle**  
**Brake Systems**  
 Nabtesco: 50% (No.1), Others: 50%  
 Approx. 50% domestic market share

**Door Operating Systems**  
 Nabtesco: 70% (No.1), Others: 30%  
 Approx. 70% domestic market share

**Commercial vehicle**  
**Wedge Chambers**  
 Nabtesco: 70% (No.1), Others: 30%  
 Approx. 70% domestic market share

**Air Dryers**  
 Nabtesco: 85% (No.1), Others: 15%  
 Approx. 85% domestic market share

**Marine vessel**  
**2-stroke Main Engine Control Systems**  
 Nabtesco: 60% (No.1), Others: 40%  
 Approx. 60% domestic market share (Approx. 40% world market share)

**Products and Applications:**  
 Brake Operating Unit: Disk operating system for railroad vehicle  
 Wedge chamber for commercial vehicle  
 Air dryer for commercial vehicle  
 Main engine variable control system for marine vessel  
 Main engine digital governor for marine vessel  
 Main engine control unit for marine vessel

### 1-5. Industrial Equipment

**Automatic doors**  
 Nabtesco: 50% (No.1), Others: 50%  
 Approx. 50% domestic market share for building automatic doors (top share in the world)

**Platform Screen Doors**  
 Nabtesco: 95% (No.1), Others: 5%  
 Approx. 95% domestic market share (accumulated total)

**Packaging Machines**  
 Nabtesco: 85% (No.1), Others: 15%  
 Approx. 85% domestic market share for automatic filler/sealer machines for retort pouch foods

**Products and Applications:**  
 Control velocity joint processing machine  
 Forming machine  
 Star Climber for Wheel Chair  
 Electrically assisted wheel chair  
 Intelligent prostheses knee joint

### 1-4. Aircraft and Hydraulic Equipment

**Flight Control Actuation Systems (FCA)**  
 One of the four major players of FCA manufacturing (major FCA supplier to Boeing Company)  
 Expanding business into engine accessories and electric power generation

**Traveling Motors for hydraulic excavators**  
 Nabtesco: 100% (No.1), Others: 0%  
 100% market share for domestically-produced aircrafts

**Traveling Motors for hydraulic excavators**  
 Nabtesco: 30% (No.1), Others: 70%  
 Approx. 30% world market share

**Products and Applications:**  
 B777 Allaron, B777 Flaparon, B777 High-Voltage Electric Power Unit  
 Traveling motor for small to mid size excavator  
 Traveling motor for large size excavator  
 Control valve  
 Drive unit for wind turbine generator

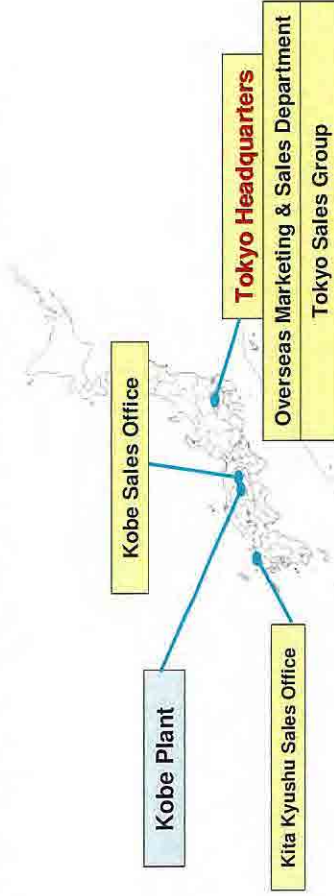
### Agenda

1. Corporate Profile
2. Company Profile
3. SHINKANSEN with Nabtesco Products
4. Supply Record



## 2-1. Railroad Product Company Profile

- Established : March 5, 1925
- President : Tsutomu (Ben) Sakamoto
- Number of Employees : 548 (as of September 2011)



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## 2-3. Kobe Plant

- Location : Kobe, Japan
- Products : All kinds of Equipments related to Brake and Door Systems for all types of Rolling Stocks
- Established : April, 1998
- Land Area : 27,000 m<sup>2</sup>
- Total Floor Area : Approx. 23,000 m<sup>2</sup>
- Number of Employees : Total 634 (as of September 2011)  
147 (Engineering, R&D)  
487 (Others)



## 2-2. Railroad Product Company Profile (history)

- 1925 : Establishment of Nippon Air Brake Co., Ltd.  
Got the first order from Ministry of Railways for Brake System
- 1953 : Developed Door Engine and Window Wiping Device
- 1955 : Exported Brake System and Door Engine to Argentina
- 1958 : Developed synthetic Brake Shoe
- 1960 : Developed Brake System for the Shinkansen  
Start manufacturing synthetic Brake Shoe
- 1964 : Developed Door Engine for the Shinkansen
- 1992 : Name changed to NABCO, Ltd.
- 1995 : Hanshin Earthquake caused extensive damage to Kobe Plant
- 1998 : Start operating current Kobe Plant
- 1999 : Acquisition of ISO9001
- 2002 : Establishment of branch office in Beijing
- 2003 : Establishment of Nabtesco Corporation
- 2004 : Acquisition of ISO14000
- 2005 : Establishment of Nabtesco Railroad Products (Beijing) Co., Ltd.
- 2011 : Establishment of Jiangsu Nabtesco KTK Railroad Products Co., Ltd.

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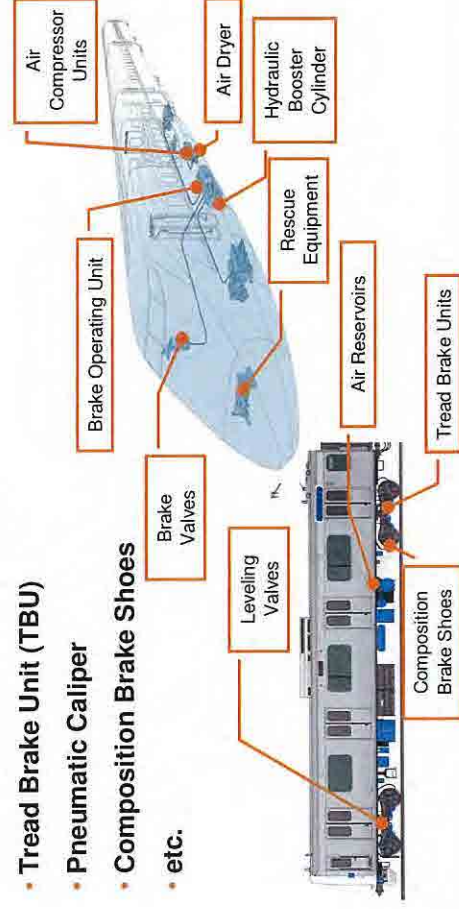
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## 2-4. Main Products of Nabtesco

Brake System :

- Brake Operating Unit
- Air Compressor and Air Dryer
- Tread Brake Unit (TBU)
- Pneumatic Caliper
- Composition Brake Shoes
- etc.



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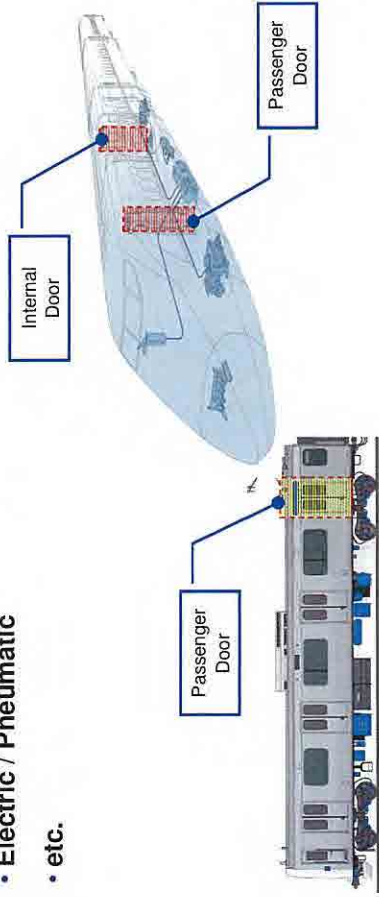
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## 2-5. Main Products of Nabtesco

### Door System:

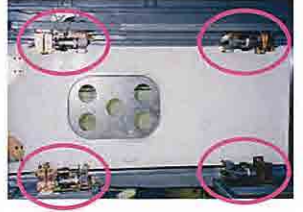
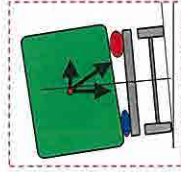
- Internal Door / Passenger Door
- Pocket Sliding Type / Plug Type
- Electric / Pneumatic
- etc.



## 2-6. Main Products of Nabtesco

### Other Products for High Speed Train:

- Tilting Control Unit (For N700)
  - ◆ By tilting train with air suspension, tilting control unit allows faster and more comfort for curves.
- Air Tightness Device
  - ◆ To minimize noise, vibration and change of air pressure near passenger doors, air tightness devices are applied to high speed trains.



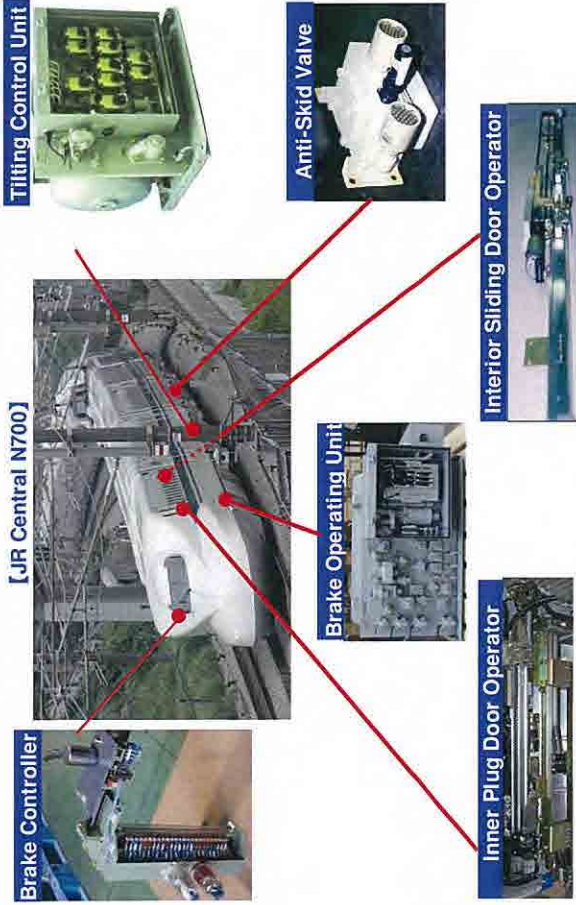
## Agenda

1. Corporate Profile
2. Company Profile
3. SHINKANSEN with Nabtesco Products
4. Supply Record

## 3-1. SHINKANSEN with Nabtesco Product



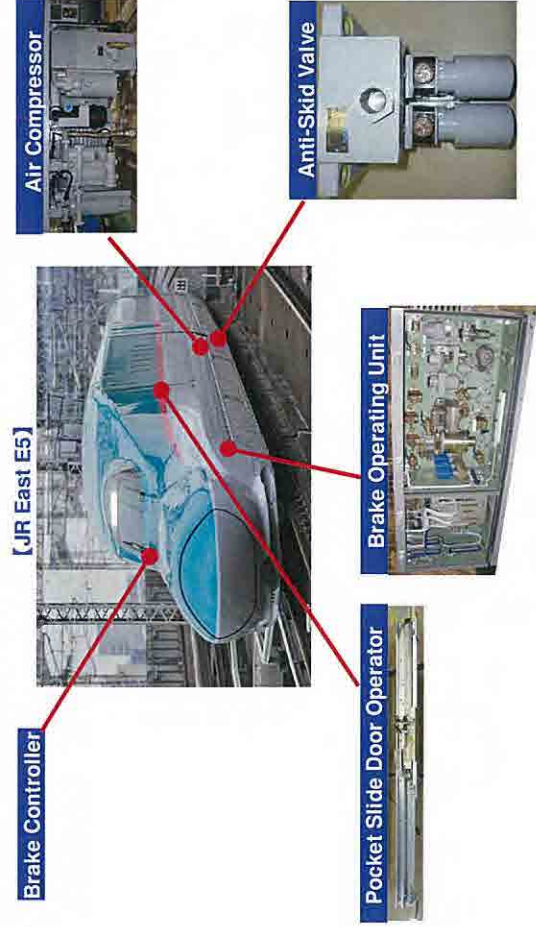
### 3-2. SHINKANSEN with Nabtesco Product



### Agenda

1. Corporate Profile
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### 3-3. SHINKANSEN with Nabtesco Product



### 4-1. Supply Record in China

Nabtesco is the official BRAKE & DOOR supplier for 200~350 km/h semi-high and high speed EMU known as China SHINKANSEN "CRH2"



2006 - 2007:	480 cars
2007 - 2010:	480 cars
2008 - 2010:	480 cars
2009 - 2011:	1,920 cars



For City Transit market such as Beijing, Wuhan, Chongqing and Changdu, Nabtesco supplied BRAKE for over 2,200 cars.

### 4-2. Supply Record in Taiwan-Korea

**Taipei-Metro #1** (216cars) **Brake**

**Taiwan Shinkansen** (360cars) **Door** **Brake**

**Daegu-Metro #1** (216cars) **Brake**

**Seoul-Metro #4** (170cars) **Brake**

**#7 & 8** (226cars) **Brake**

**Busan-Metro #2** (336cars) **Brake**

**TRA Tilling Train** (24cars) **Door** **Brake**

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Nabtesco will keep making progress by searching local partners, and get prepared for business chances in India.

# Thank you for your attention !

Railroad Products Company

# Nabtesco

### 4-3. Supply Record in Others

**Egypt/Cairo Metro #1 line** **Door**

**Automated people Mover (APM)** **Door**

**Automated people Mover (APM)** **Door**

**Automated people Mover (APM)** **Door**

**Venezuela/Caracas EMU** **Brake**

**Queensland Rail** **Brake**

**Singapore Mass Rapid Transit (SMRT)** **Door**

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