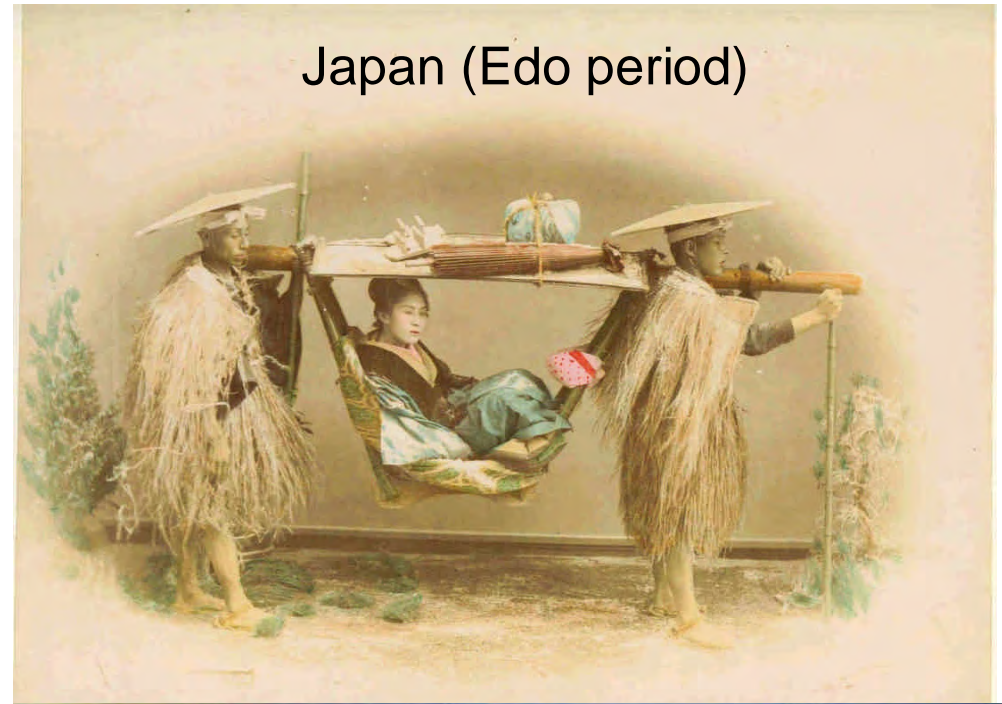


History of transport

Europe (before 1835)



Japan (Edo period)



Edo period

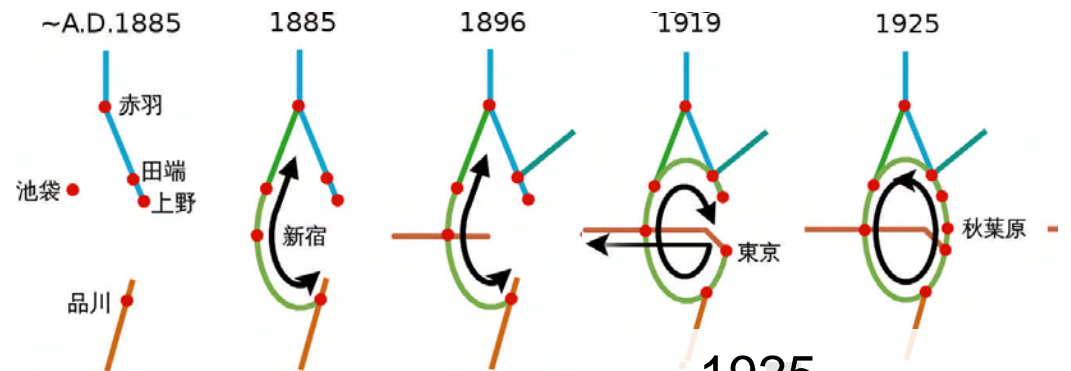
Period of Ukiyo-e



1835 First
Railway line in
Germany



1871 First railway line in Japan
Shinbashi - Yokohama



1925
Yamanote line



Ikebukuro Tojou-Line 1947-03



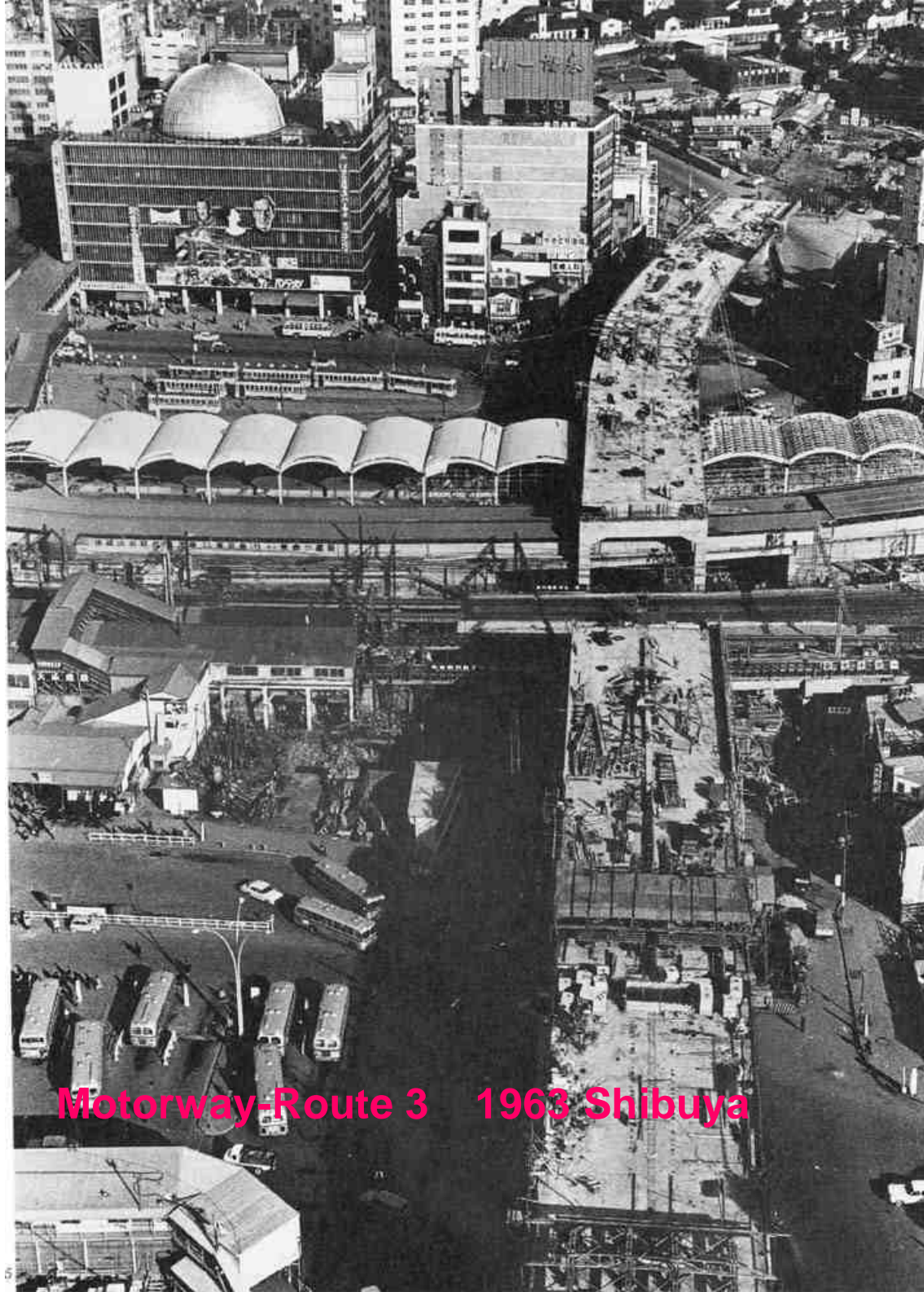
Yamanote-Line 1946



Kobe 1945



1945-10-27



Motorway-Route 3 1963 Shibuya



Tokaido-Line 1972
Shinkansen since 1964

Foto & © Mainichi Shinbun

History of Tokyo Metro

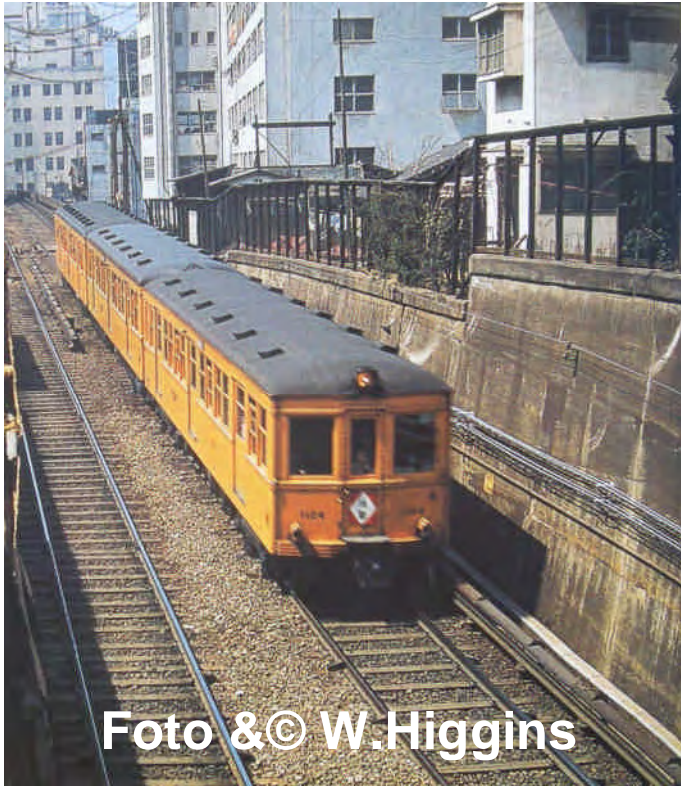


Foto & © W.Higgins

Ginza Line
opened 1927-12-30
“first underground railway in East-Asia”



Maronuchi Line 1957
Hibiya Line 1964-08-24
Asakusa Line 1964-12
Chiyoda Line 1969/1978
.....



Foto & © W.Wunderlich

Oedo Line 2000-12-12
12号 平成12年12月12日
Nanboku Line 1994/2001
Fukutoshin Line 2008

-> **“Kaizen” = continuous improvement of transport system**

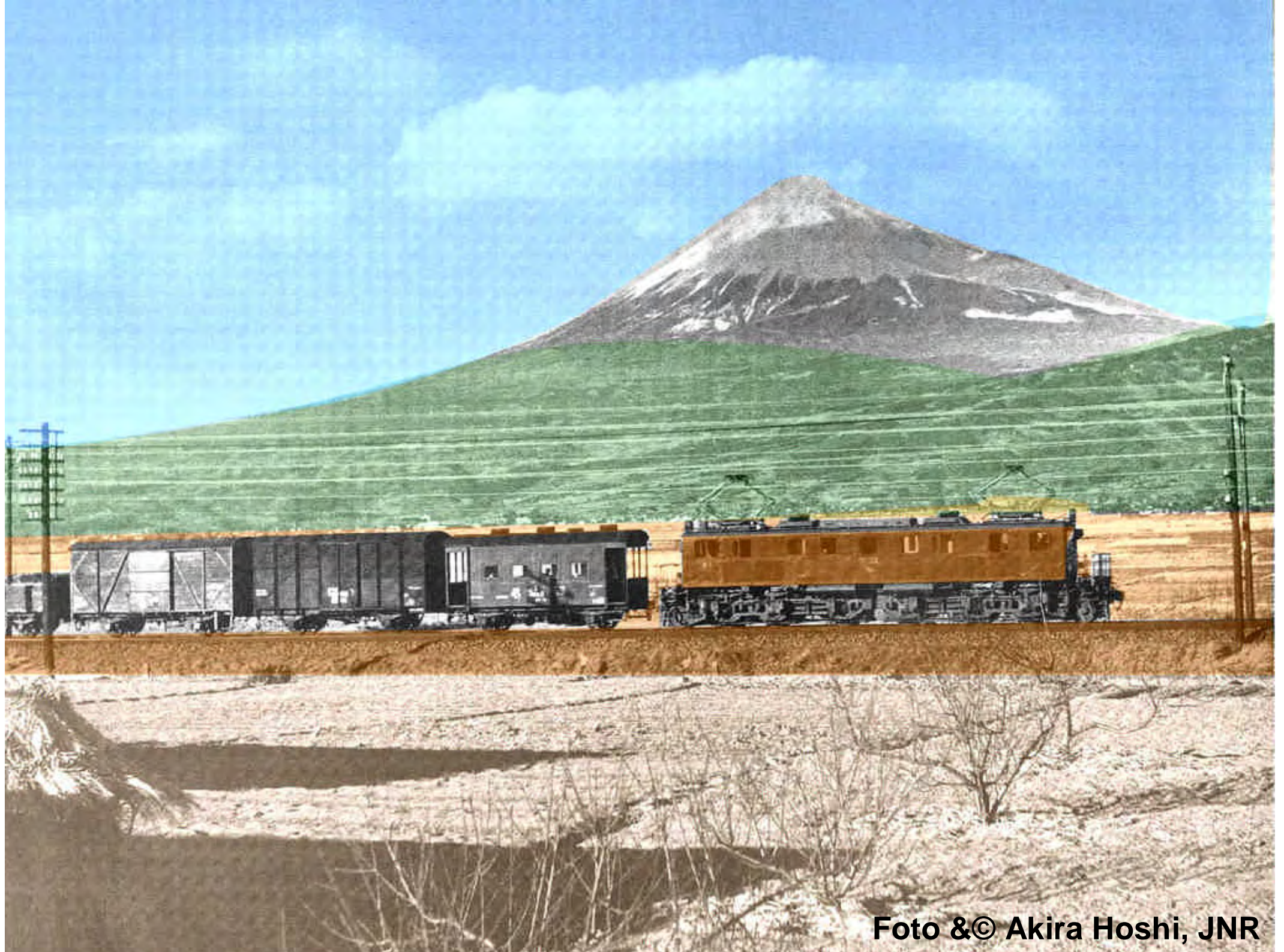


Foto &© Akira Hoshi, JNR



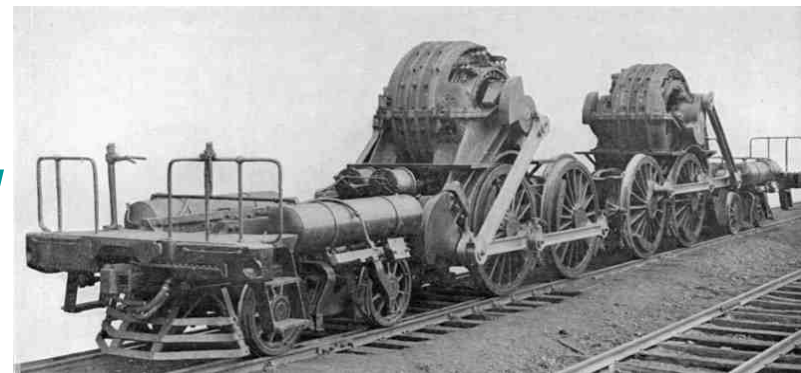
Japan 1939年
111 t, 1560 kW
172個

“Crocodile”
locomotive

Motor + Gear box



Suisse 1919年
128 t, 1650 kW
33個



Austria 1926年
114 t, 1800 kW
16個

New Induction motors
fixed on axis 1990

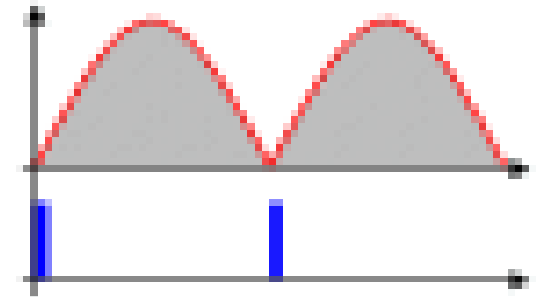
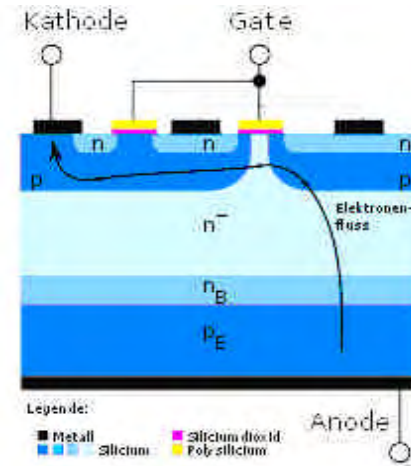
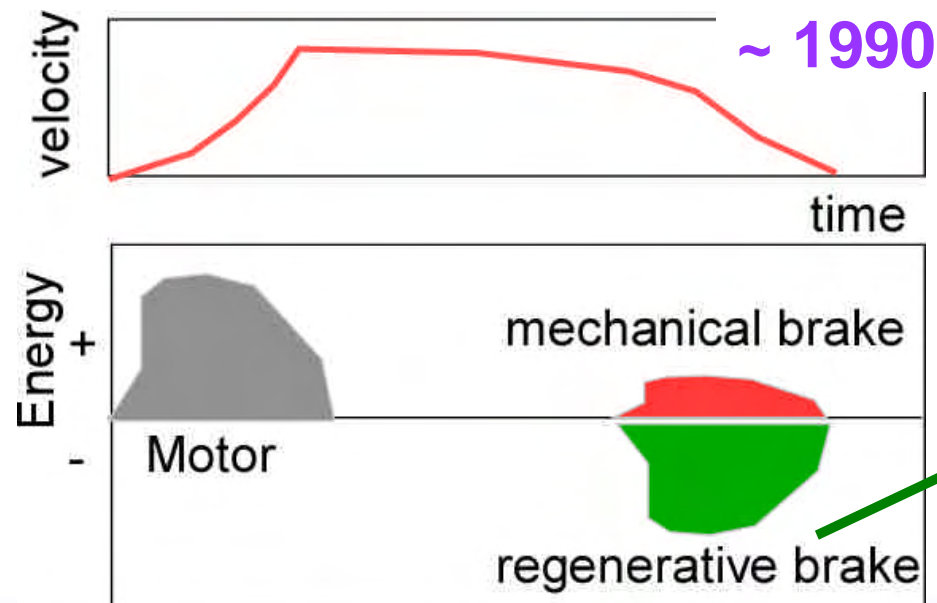
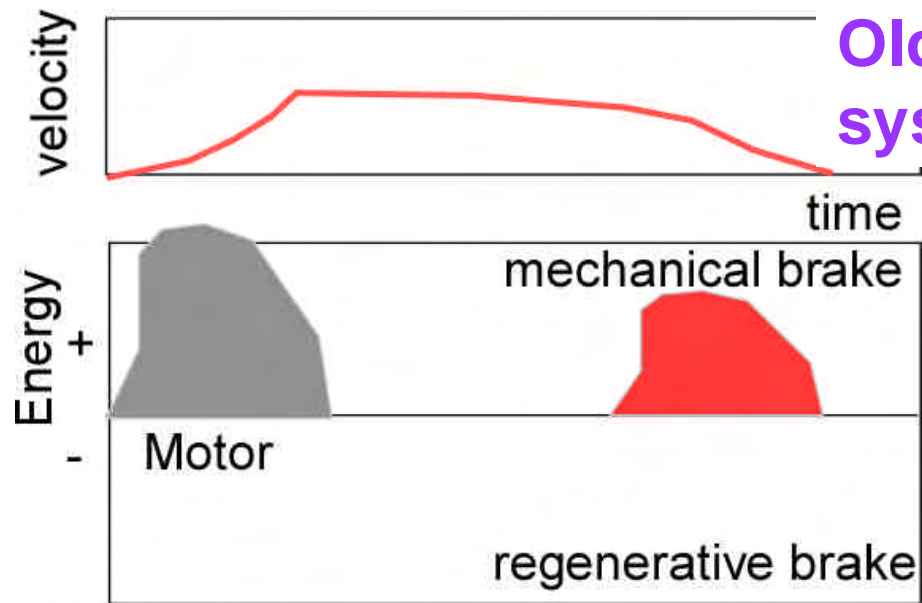


German 1940年
118 t, 3300 kW
200個



Brake system

Old system



Electrical brake with thyristor technology gets energy back !!

Re-Use of energy !

How can weight of cars be reduced?

- Reduce number of equipment which is not needed.
- Simplify construction by modular design



Connection between suburb lines and subway



Tousei / Chuo 1978



Touyo / Tousei 1996



Jouban/Chiyoda 1978



Nanboku / Toyoko 2004



Hanzomon / Isesaki 1990



Romance Express 2008

Cooperation between different railway companies



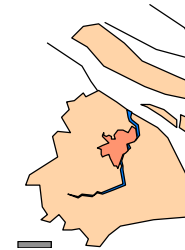
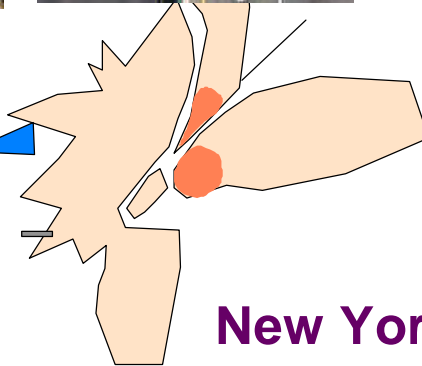
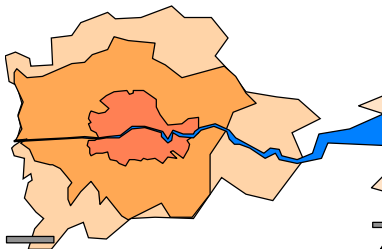
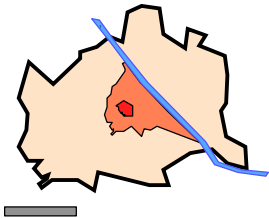
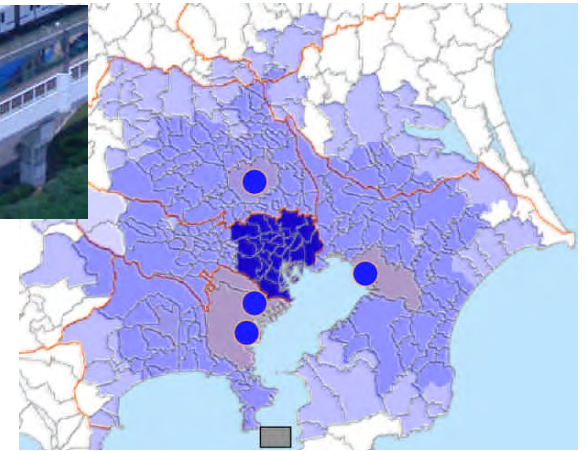
Foto & © W.Wunderlich

Separation of slow and fast trains, instead of 2, 4 or 6 tracks



Foto & © W.Wunderlich

Comparison with other metropolitan areas



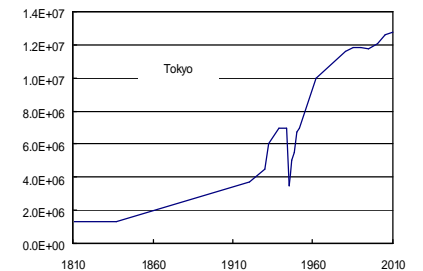
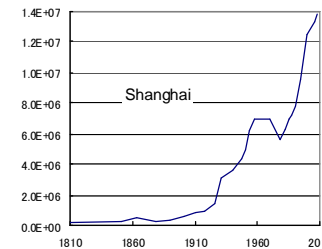
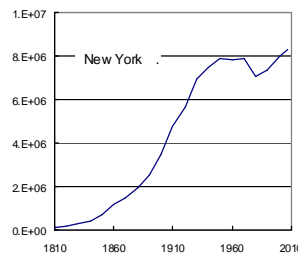
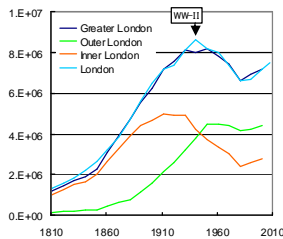
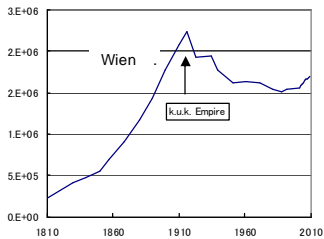
Wien
Dense tram network

London
reactivation of closed lines

New York
best network in USA, but..

Shanghai
9 new lines in 2 years

Tokyo
Fastest, densest net



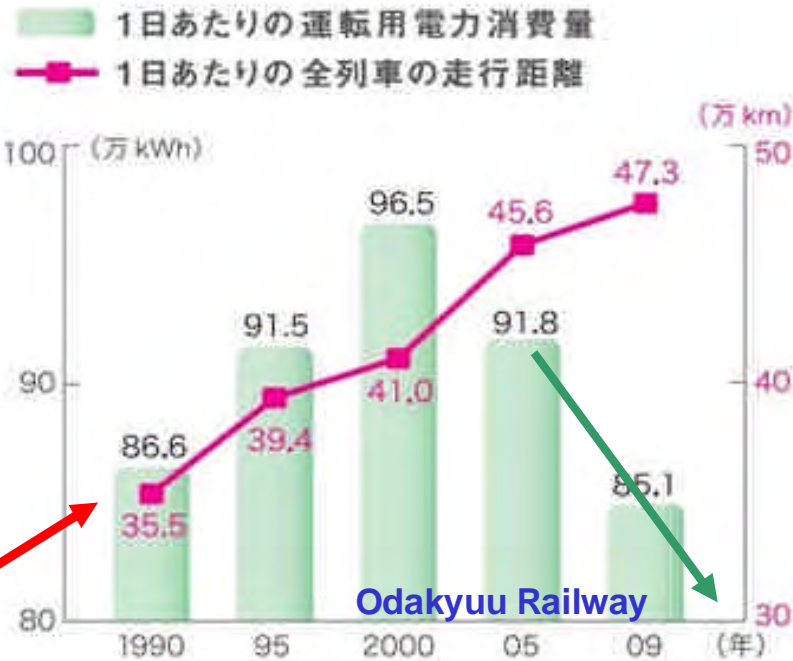
Population development in history

Population and density

Pop.	2.42	12.87	19.75	16.65	34.67
Core	1.96	7.55	8.36	13.89	8.88
Dens.	1500	1130	1109	3216	4049
C.Dens.	4110	4863	10452	7170	14400

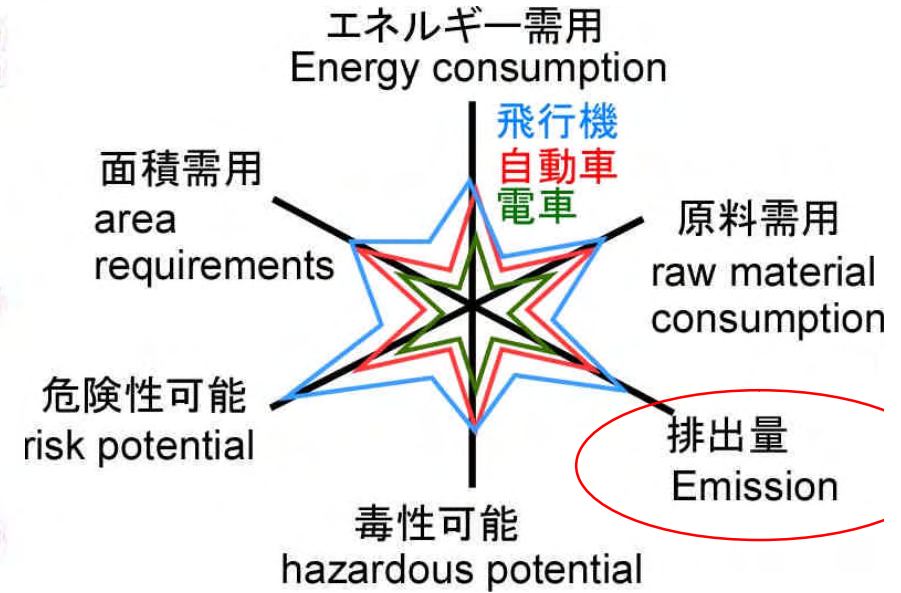
Rail transport is environmental-friendly

-> Eco-Train



Increasing train travels

Energy reduction



Rail wins against car and plane also in all other criteria



Thank you for your attention.