History of transport

Europe (before 1835)

Japan (Edo period)
Edo period

1835 First Railway line in Germany

1871 First railway line in Japan
Shinbashi - Yokohama

Period of Ukiyo-e
1925 Yamanote line
Motorway-Route 3  1963 Shibuya

Tokaido-Line 1972
Shinkansen since 1964

Foto & © Mainichi Shinbun
History of Tokyo Metro

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

Hibiya Line 1964-08-24
Maronuchi Line 1957

Asakusa Line 1964-12
Chiyoda Line 1969/1978

Oedo Line 2000-12-12
Namboku Line 1994/2001
Fukutoshin Line 2008

12号 平成12年12月12日

-> “Kaizen” = continuous improvement of transport system
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

~ 1990

Motor

Mechanical brake

Regenerative brake

Energy

Time

~ 1990

Motor

Mechanical brake

Regenerative brake

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

Hanzomon / Isesaki 1990
Jouban / Chiyoda 1978
Tousei / Chuo 1978
Touyo / Tousei 1996
Nanboku / Toyoku 2004
Romance Express 2008
Cooperation between different railway companies
Separation of slow and fast trains, instead of 2, 4 or 6 tracks
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.