

1. History of ITS Development

1.1 Solution to Road Traffic Issues Worldwide

Outcome

1. Japan's roads were devastated in World War II. In the 60-plus years since, Japan has been extending and improving its road network in order to modernize.
2. The construction of a network of roads linking seaports and major cities has enabled Japan to achieve impressive economic growth at an unprecedented pace. Nevertheless, growing road traffic outpaces new road extensions and is causing acute traffic problems, including accidents and congestion, as well as environmental degradation. These problems are now global concerns.
3. To solve these problems, we are continuously improving roads with Intelligent Transport Systems incorporating information technology.

Roads and the Revitalization of Japan

Roads in Japan have been rapidly extended since World War II, partly in response to proposals in the Watkins' Report (1956) issued by an American group that had surveyed Japan's roads. Road transport in Japan subsequently grew to match the growth in the GDP. Today, roads transport more than 50% of all freight (ton/km) and around 60% of all passengers (person/km), underpinning Japan's economic and civic activities (Figs. 1 and 2). Road construction, which eats up massive amounts of investment and lags behind vehicle traffic growth. Despite intensive efforts in the 62 years since World War II, the ring roads that were to circumscribe metropolitan areas only do so in a piecemeal fashion and impede economic activities.

Road Conditions in Post-war Japan



Note: Conclusion of Watkins' report: "The roads of Japan are incredibly bad. No other industrial nation has so completely neglected its highway system."

Figure 1. Shift in Shares for Transport Modes

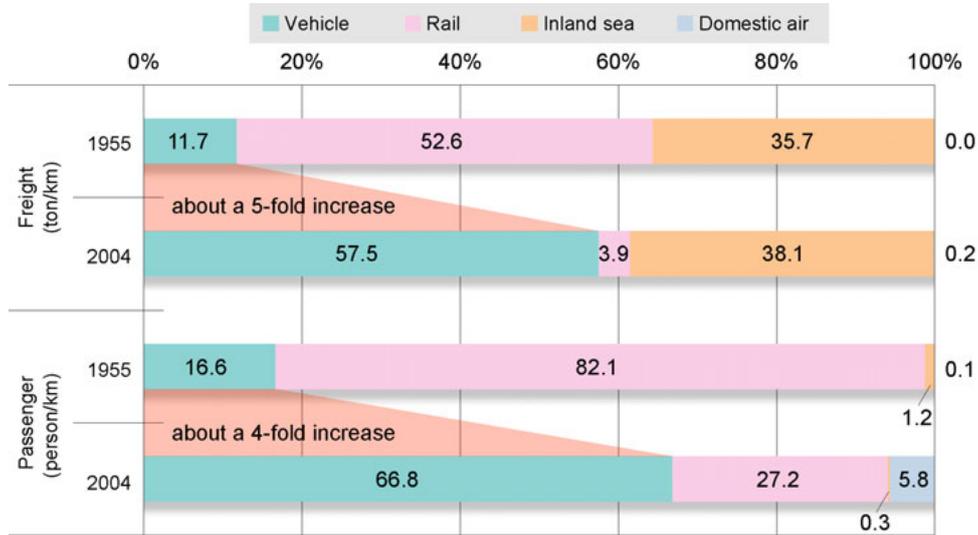
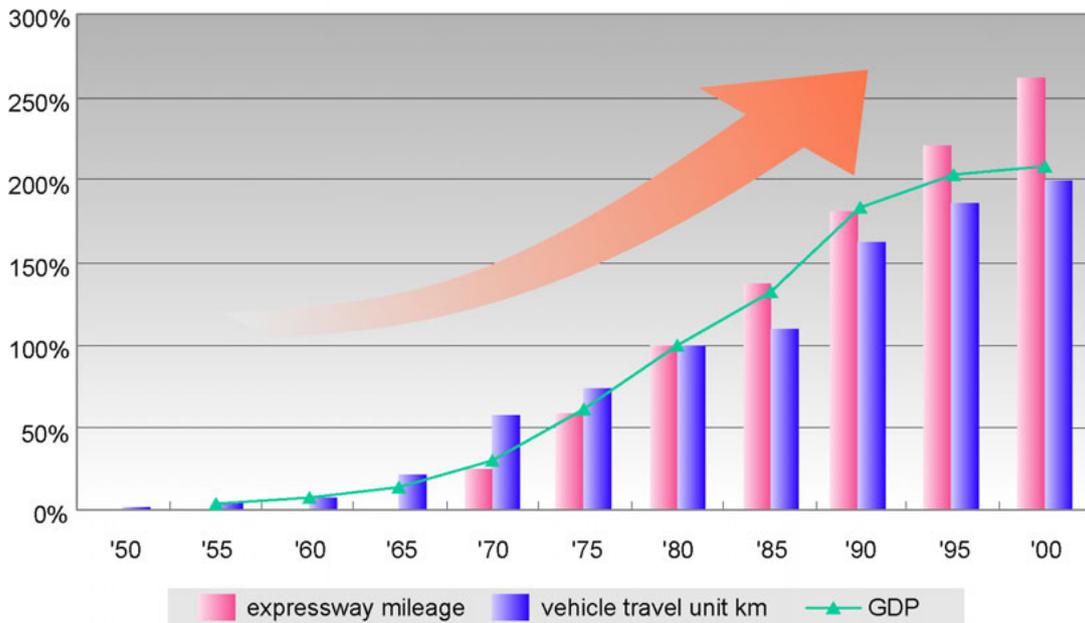


Figure 2. Road Extensions and Vehicle Travel Units (km)

	'50	'55	'60	'65	'70	'75	'80	'85	'90	'95	'00
Expressway mileage (100km)	-	-	-	1.89	6.38	15.19	25.79	35.55	46.61	56.77	67.47
Vehicle travel unit km (100 million unit km)	38	121	282	822	2260	2863	3891	4284	6286	7203	7757
GDP (billion JPY)	-	8597.9	16680.6	33765.3	75298.5	152361.6	246266.4	327433.2	449997.1	499984.2	513170.2

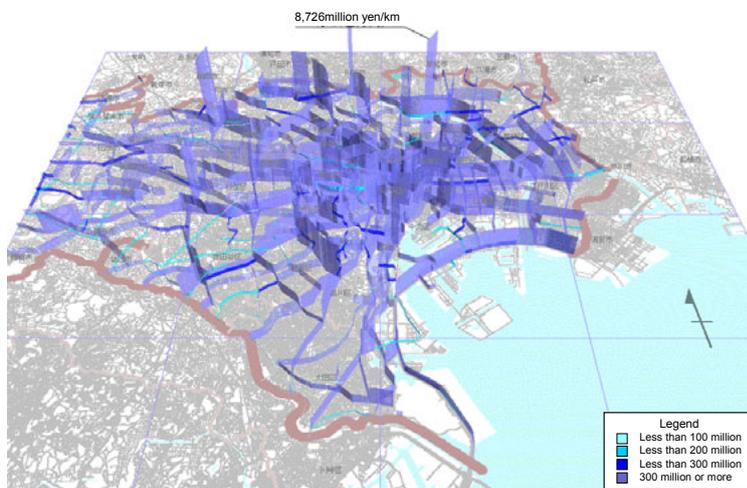


Sources: Cabinet Office HP: Road Traffic Economy Bulletin
Road Statistics Annual Report

Road Traffic issue (congestion & vicinity environment)

The growing number of vehicles, which is making congestion serious in metropolitan areas, is outpacing road extension efforts in Japan. A basic flaw in vehicle traffic is that drivers cannot easily avoid congestion that quickly forms in one direction (Figs. 3 and 5). Once it forms, it takes considerable time to disperse. Congestion causes as much as JPY 12 trillion in national economic losses per year. Annual time lost due to congestion has reached thirty hours per driver, which is equivalent to JPY 90 thousand (Figure 4). Twenty percent of Japan's carbon dioxide emissions stem from automobile use, while the fuel wasted due to congestion exceeds ten percent of total vehicle consumption. Significant anticipation is mounting for a reduction in carbon dioxide emissions through the mitigation of congestion (Figs. 6 and 7).

Figure 3. Congestion in Metropolitan Tokyo



Source: Ministry of Land, Infrastructure and Transport, Road Bureau HP

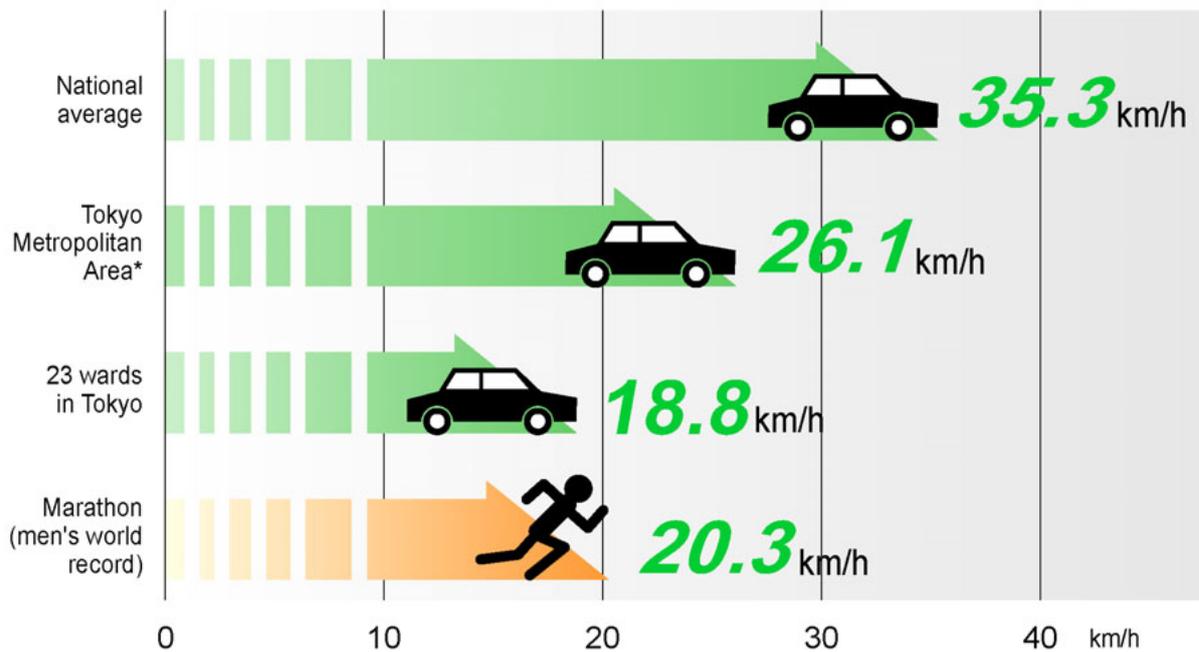
Figure 4. Congestion Losses



Source: ITS HANDBOOK 2006-2007

Figure 5. Comparison of Mean Travel Speed During Peak Hours

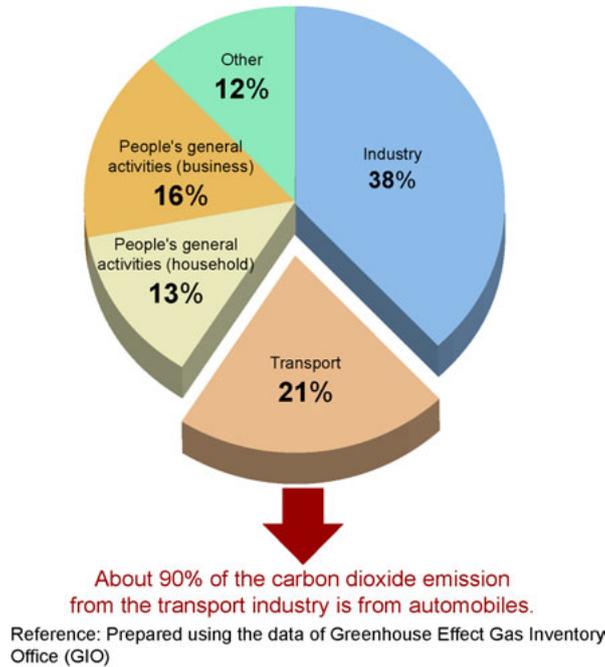
Comparison of average travel speed during congestion (2005)



Note: The Tokyo Metropolitan Area consists of Tokyo City and Kanagawa, Saitama, and Chiba Prefectures
Reference: Road Traffic Census 2005

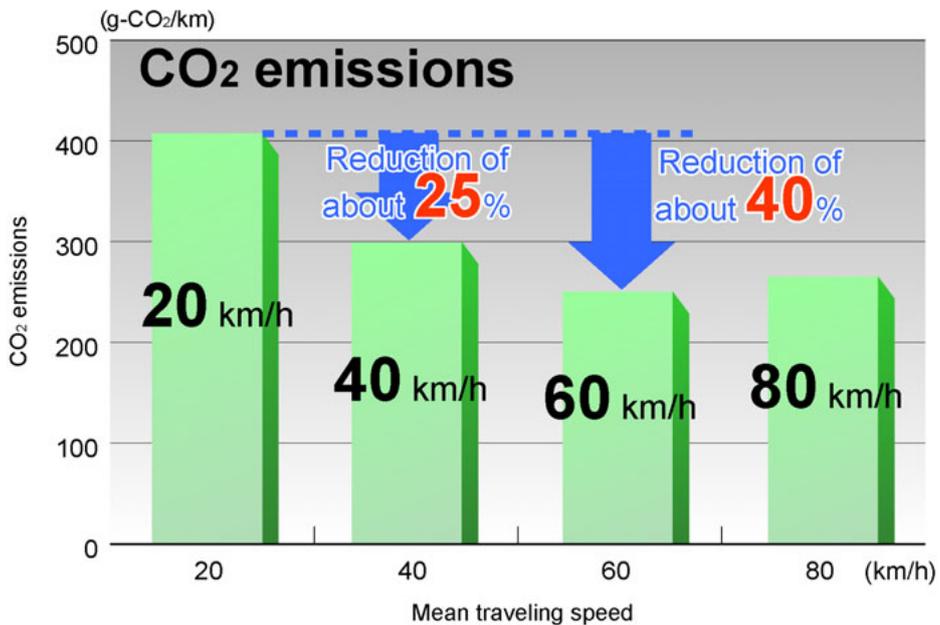
Source: ITS HANDBOOK 2003-2004
ITS HANDBOOK 2006-2007

Figure 6. CO₂ Emissions in Japan (2004)



Source: "ITS HANDBOOK 2006-2007"

Figure 7. Travel Speed and CO₂ Emissions Volume



Note: CO₂ emissions from an average automobile calculated from data for commercial, ordinary, gasoline, and diesel vehicles in 2000
Reference No. 141 of the National Institute for Land and Infrastructure Management, "Basis of automobile emission coefficient calculations"

Source: ITS HANDBOOK 2006-2007

Accident Rate

The traffic accident rate remains at a certain level due to unavoidable human actions. The increasing number of vehicles on the roads creates even more upward pressure on these statistics. As a counter-measure to prevent accidents derived from human error, road service operation of expressways and some specially designed roads, which allow for less weaving and fewer intersections, have been implemented, resulting in a decrease in the accident rate to just one third the cases recorded on ordinary roads. It shows that restricted service operations can significantly eliminate potential hazards.

The decrease in traffic accidents in Japan has passed through the following phases. In the initial phase in the 1970's, the conjunction of economic growth and increased use of vehicles increased the traffic accident cases. The counter-measures taken then were to place signals and use intensive congestion relief measures, which successfully decreased the accident cases. In the 1980's again, further economic growth increased accident rates. Since that time, measures such as the compulsory use of shoulder and seat belts, airbags, etc., have saved lives. Even so, up to 8,000 lives are lost each year in accidents (Figure 8).

Traffic deaths in January 2003 were half the level of those in 1970, when record high death tolls spawned the term, "traffic war." In 2003, Prime Minister Junichiro Koizumi issued his Talks by the Prime Minister on the Effort to Reduce Traffic Accidents by Half, in which he said, "...the traffic toll will hopefully be reduced by half in a decade." New IT Reformation, which was released in January 2006, states the intention to have "a world class safety transport system" and aims to reduce annual traffic deaths to less than 5000 using safe-operation assistance systems through cooperation with road infrastructure.

Figure 8. Transition in Number of Fatalities, Casualties, and Accidents

