

History of Roads in Japan

Japan is a country comprised of four major islands and numerous minor islands. It is configured as a crescent shape and situated to the east of the Asian continent in the Northwestern Pacific Ocean. Of its 378,000 square km of land, about 70% is comprised of mountainous terrain. It is inhabited by more than 120 million people.

It is a country that has achieved harmony between its traditional culture from ancient eras and its modern society with advanced technology. Yet, Japan's fascinating natural environment is one that changes from season to season.

The history of land transportation in Japan began over two thousand years ago and can roughly be categorized into the following four eras: 1) Age of People and Nature (ancient times until the Meiji Restoration in 1867), 2) Age of Modernization (from the Meiji Restoration until the 1950s), 3) Age of High Efficiency Networks (from the 1950s to the present day) and 4) Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads.

I. Age of People and Nature

(ancient times until the Meiji Restoration in 1867)

After the Reformation of the Taika Era (645 C.E.), an elaborate central government system was established. A new road network was developed at this time that connected Honshu (the largest island) to Shikoku (the smallest of the four main islands) and then continued all the way down to Kyushu (the southernmost and third largest island). This nationwide public road network was called “Seven Roads” and was composed of To kaido, Tosando, Hokurikudo, San-indo, San-yodo, Nankaido and Saikaido (‘-do’ in Japanese means ‘road’). Ever since the Seven Roads were first established during this age, they have continued to serve as the backbone for transportation routes in Japan.

(User-friendly Roads in Early Times)

An “Eki” (meaning station) was located at each interval of 16km along a road and would provide necessary services for the officials and people of high rank who travelled that road on their journeys.

The Shogunate, established in 1603 C.E., specified that the five major highways should be about 11m wide and secondary roads should be 5.5m wide. The roads were to be filled with gravel and cobbles to a depth of 3cm and topped with sand after treading them down.



Numazu-juku as depicted by Hiroshige
Source: National Diet Library

(Road Construction with Consideration for People and Scenery)

The Hakone Road was already paved by 1680 C.E. Japanese surface transportation routes were developed primarily for people and horses, because horse-drawn carriages were not common prior to the Meiji Era (~1868 C.E.). For this reason, roads were usually in good condition since damage caused by traffic was not severe and maintenance was relatively easy to complete. Road cleaning and other regular maintenance was not performed by the Shogunate or the government of feudal clans, but by roadside residents on a voluntary basis. This implies that there was a general understanding that roads were not the exclusive property of the overlords, but considered to be “public property”.



Nihombashi in the Meiji Era
Source: National Diet Library

2. Age of Modernization

(from Meiji Restoration to the 1950s)

After ending two hundred years of isolation, the revolutionary government of the Meiji Era (1868-1912 C.E.) quickly started modernizing the surface transportation system by importing new technologies from Europe. Unlike China and Europe, Japan did not have a history of horse-drawn carriages as a method of transportation. It was thus impossible to transform the ancient roads, designed strictly for the passage of people and horses, into modern roads in a single step.

The beautifully maintained pre-modern roads of the Edo Era began to deteriorate under the burden of modern horse-drawn carriages and human-powered vehicles (or rickshaws). The slow improvement of roads can be partially attributed to the decision by the Meiji Government to give rail and sea transportation higher priority over roads. This decision was intended to allow Japan to catch up with the advanced nations of the West as quickly as possible.

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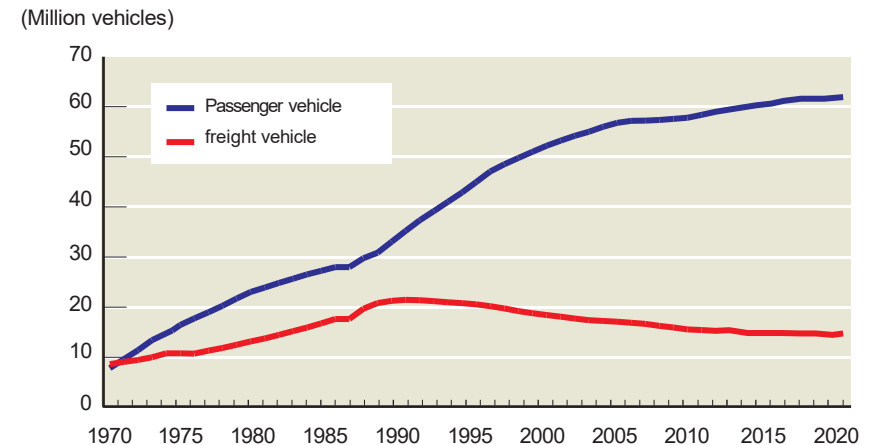
3. Age of High Efficiency Networks (from the 1950s ~ today)

(Arrival of the Motorization Age)

Automobiles proliferated quickly as the Japanese economy recovered from hardship after the war and the standard of living improved. Only 130,000 vehicles were registered at the end of World War II, but the number increased rapidly, reaching 500,000 vehicles by 1951, then doubling to one million in 1953, and doubling again to two million in 1957.

However, Japan's road system in those days was truly terrible. Only two-thirds of national Highway Route 1, supposedly the major arterial highway connecting Tokyo with Osaka, was paved. The Japanese Government at that time accepted Mr. Watkins' proposals and immediately put them into practice. Thus, road improvement in Japan moved into high gear, propelling the nation into the high economic growth era of later years.

■ Change in number of registered vehicles



The state of roads in the mid-1950s was as “incredibly bad” as Watkins wrote in his report.

3. Age of High Efficiency Networks

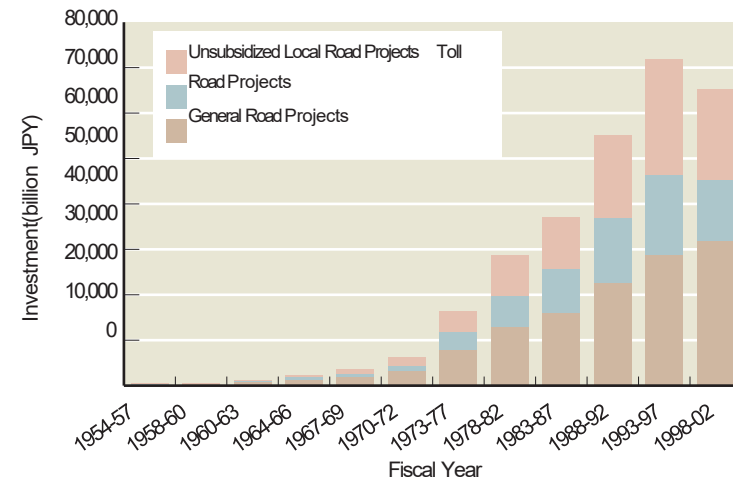
(The Five-Year Road Development Program, Toll Road System and Tax Revenue System with Earmarks for Roads) (from the 1950s ~ today)

Since the public works budget, under the general revenue scheme, was insufficient in meeting the ever-increasing road traffic demand, two new financing systems were introduced : the toll road system and the tax revenue system with earmarks for roads.

The former “Act on Special Measures concerning Road Construction and Improvement”, which was enacted in 1952, introduced the toll road system and enabled the national and municipal governments to borrow sufficient funds to develop roads.

In 1953, the “Act on State’s Tentative Financial Measures for Road Construction Projects” was enacted and thus ushered in a new tax revenue system with earmarks for roads. This measure secured stable financial resources for the long-term development of roads, including the 1st Five-Year Road Development Program and the subsequent 11 programs that followed.

■ Investment change in the Five-Year Road Development Program



April 1968
Vehicles driving from Okazaki IC to Komaki IC after the opening ceremony of the Tomei Expressway
(Photo: Mainichi Shimbun)

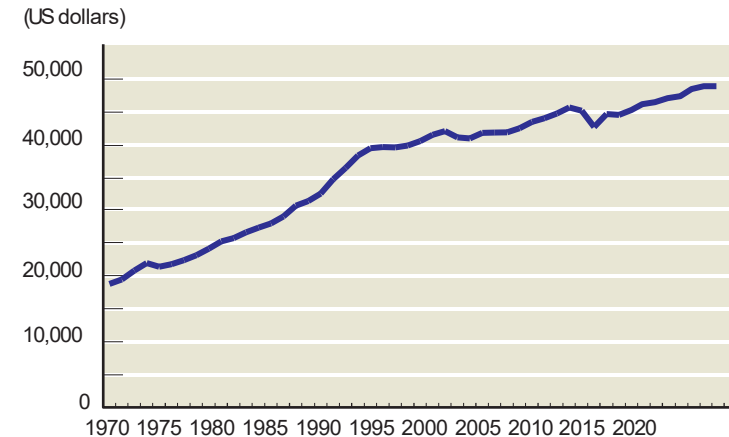
4. Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads

By the beginning of the 21st century, Japan entered an age of declining birthrates and an aging population (the national population has been declining since it peaked in 2008). While road development is slowing down, utilization of existing road networks and improvement of asset management is becoming the focus of current programs.

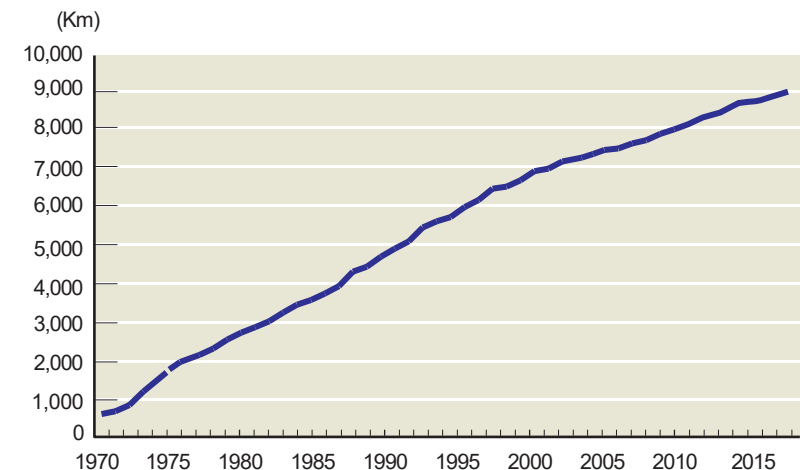
(Strategies for Aging Road Infrastructure)

The majority of roads and bridges were constructed in the high-growth period of the Japanese economy and will be 50 years old in the next 10 years. To maintain the safety of this aging infrastructure, periodic investigation and database management, as well as systematic repair work, are required.

■ Change in real GDP per capita



■ Change in total length of expressways



4. Age of Optimal Maintenance and Management for Maximum Utilization of Existing Roads

(Preparing for Natural Disasters)

The Great East Japan Earthquake in March 2011 forced the reevaluation of the importance of road networks in the face of large-scale natural disasters. As an earthquake-prone country, disaster prevention measures, including improvement of bridges' quake resistance, have been deemed necessary after the repeated experience with these disasters. In addition, it is necessary to enhance road networks to guarantee alternative routes in the event of road closures after a large-scale disaster and in order to add disaster prevention functions to existing roadside service facilities.

(Improvement of Road Service Provisions using Intelligent Transport Systems (ITS))

Since the 1990s, ITS technologies have provided various services, including car navigation systems and Electronic Toll Collection (ETC). Even now, the technologies are evolving to meet the demands of road infrastructure and the automobile sectors. In the road infrastructure sector, dynamic traffic guidance, warning messaging and vehicular controlling technologies are being studied as part of road-to-vehicle and/or vehicle-to-vehicle communication systems.

The advancement of technology is going to integrate road infrastructure and automobiles into a new synthetic transportation system and will provide a breakthrough solution for traffic congestion, traffic accidents and environmental pollution, all of which have been major issues since the modernization of the road system began.