TOWARD THE NEW GEOMETRIC DESIGN STANDARD FOR THE 21ST CENTURY IN JAPAN

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On January 23, 1993, the Ministry of Construction of JAPAN asked experts for advice "Toward the New Geometric Design Standard for the 21st Century in Japan". The Road Council responding to his request released the final report on this theme on November 10, 1994.

The report defined the needs and ways to change existing uniformed roadway construction conducted across the nation so that various general public needs can be met. The emerging social changes should be appropriately satisfied, focusing significantly on mobility.

The appropriate deployment of roadway networks which interconnect the Expressways and local streets are required to make the most of advantages offered by the features and functions inherent in the Expressways and streets.

To this end, individual roadway construction should proceed to meet the local needs created by cultural and historical circumstances.

The final report concluded that unique ideas that can fulfill these needs should be reflected in the new geometric design standard for the 21st century in Japan.

INTRODUCTION

The basic architecture of the Highway Structure Regulation, the basis for planning and design of whole road, has not changed since 1970 when it was fully revised.

However, 25 years after, the life style depending on the automobile has been established. One vehicle is owned for every two persons, and a driving license is held for every two persons.

The increase in motor vehicle use has brought about severe social problems: traffic congestion has become severe, the traffic accident rate has become higher, and cars have damaged the environment. The poor quality and shortage of roads have detracted from the attractiveness and the uniqueness of Japanese cities.

At the present time, feeling of obtaining abundance and an improved living environment are expected, the framework of the society becomes borderless due to the transformation by international relations and the rapid aging at a pace seen nowhere else in the world. We are expected to search for ways to establish a society providing every citizen with a feeling of obtaining abundance and with the thought of Japan as a country in the 21st century, in the limited period of time and under severe economic restrictions.

To support efforts to achieve this goal, on January 26, 1993, the Minister of Construction asked the Road Council to consider the issue, "Toward the New Geometric Design Standard for the 21st Century in Japan." The Road Council issued two interim reports on July 23, 1993: "A Road System to Restore Human Rights and to Create a Good Environment" and "A Road System to Meet the Needs of Improved Physical Distribution." The Council issued the final report on November 10, 1994.

PERSPECTIVE OF THE REPORT

The Road Council compared and analyzed road planning concepts and system standards of Europe and America and, based on the June 1992 Road Council report titled, "Road Improvement to Create a Comfortable Society," deliberated the issues from the following four perspectives.

1. Appropriately cooperate with public traffic organizations through "modal mix" and at the same time, emphasize regional characteristics and various road utilization by road users including elderly and disabled persons.
2. From the viewpoint that roads are "public space to support people and their daily activities," reorganize the functions of roads including spatial functions such as organization of urban space and the provision of refuge space.
3. To effectively utilize existing road space, conduct road planning that accounts for traffic demand management and other administrative measures.
4. In response to the diversification of the roles implement the road projects in various ways including the introduction of new technology.

As a result of this approach, the final report anticipates the "shape of roads in the new age," as it looks into everything from road-planning to the use and management of roads including the existing stock; describes efforts to integrate roadways; roadside zones and town-planning; and considers coordination with other concerned administrative agencies.

GIST OF THE REPORT

(1) Establishment of a New Road Planning Scheme

Create a more effective road system by allowing each category of road from trunk roads carrying traffic over long distances to small district roads carrying traffic through residential neighborhoods to fill their own particular functions more effectively. (See Table 1)

1. To improve trunk roads connecting different regions of the country by stressing speed service, providing sufficient lanes for safe driving at prescribed speeds,

and building grade-separated intersections at all major intersections.

2. To improve neighborhood roads, establish road systems where pedestrians and cars can coexist by, wherever necessary, lowering the speed of cars through the use of bottle-necks, speed humps, and the like. (Figure 1)

TABLE 1 New Road Categories Based on Road Functions (Proposed)

Road Category			Features of the Road Determined by its Functions
Roads used for wide-area or regional travel	Roads which emphasize speed service of cars	Roads exclusively for motor vehicle use	Roads especially designed for through motor vehicle traffic with full access control
			Roads which emphasize through motor vehicle traffic with partial access control
			Multi-function roads equipped for parking and side road access in addition to through motor vehicle traffic
Roads primarily used for travel within a district			Roads which give traffic functions such as pedestrian traffic priority over through motor vehicle traffic
		Pedestrian routes Cycling paths	Roads for cyclists and pedestrians, but closed to motor vehicle traffic

Roads whose width etc. is determined primarily to create urban space or form beautiful landscapes	Roads especially designed to provide space functions (100-meter-wide roads)

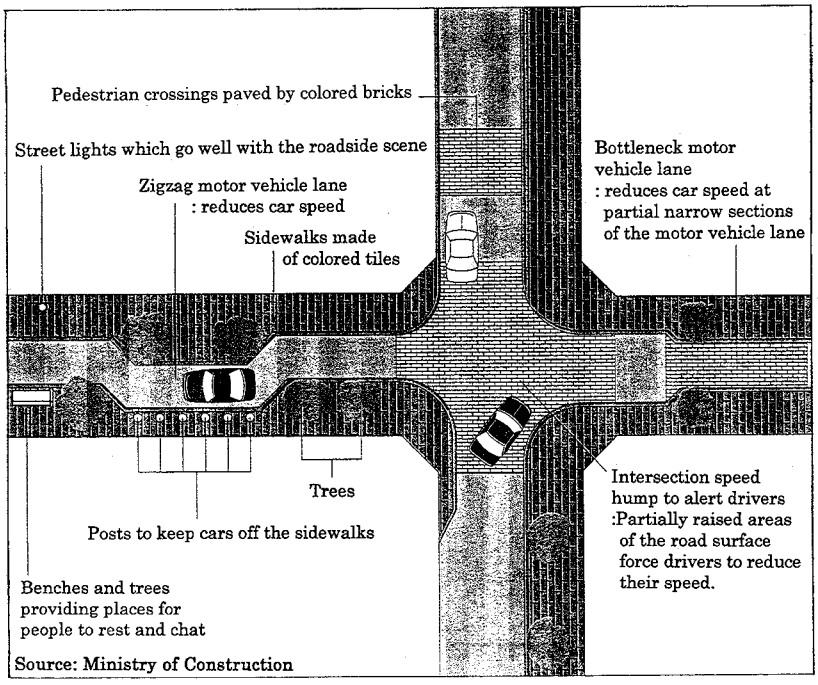

FIGURE 1 District Roads Shared by Motor Vehicles and Pedestrians

3. To improve roads that symbolize the cities in which they are located, for example, those passing in front of railway stations where they play a pivotal role in city planning, provide them with space-creation functions by, for example, building plazas etc. as part of the development and beautification of the urban setting.

(2) Guaranteeing Mobility

1. Establish the number of lanes in each planned road taking account of the characteristics of the traffic that will use the road (holiday traffic volume, proportion of heavy vehicles, peak characteristics, etc.)
2. Take care not to create bottlenecks at signalized intersections, tunnels, sags, railway crossings, and the like.
3. Make sure that roads can still be used during construction work or after an accident by widening the width of their shoulders, etc., without reducing the number of lanes. (Figure 2)
4. Design road systems that accurately reflect safety measures that have been devised in response to the nature of traffic accidents as clarified by analytic research into traffic accidents.
5. To improve freight distribution, promote modal mix measures, enlarge design vehicles, and create wide-area freight distribution networks
6. In order to improve the usability of public transportation, improve facilities at junctions between various types of public transportation systems, and improve the usability of bus services.

(3) Road Planning That Restores Human Rights and Benefits Elderly and Handicapped Person

1. Provide pedestrian space along with motor vehicle space, and form networks of these pedestrian spaces. In addition, plan their width, gradient, and mount-up height with consideration for the way they will be used by the elderly, handicapped persons, and other types of pedestrians.
2. Provide cycling space along with motor vehicle and pedestrian space, and form networks of these cycling spaces.
3. To respond to the growing number of elderly drivers using the road, wherever necessary, create roads wider than necessary and with unnecessarily generous alignment to suit the driving practices of elderly drivers.

(4) Creation of a Good Environment

1. Promote the planting of natural vegetation along roads in order to utilize road space as urban green belts.
2. Provide road systems carefully planned as ecosystems (eco-roads) in areas where a rich natural environment should be preserved.

(5) Promotion of Attractive Town-Planning and Regional Planning

1. Promote systematic road improvement so that roads will form the framework of cities.
2. Promote individualistic road design that values the free expression of regional concepts and reflects each region's history and culture by, for example, designing alignments that incorporate natural scenery and historical structures as roadside scenery, using pavement made from local materials, and integrating the design of roadside facilities.
3. Form regional centers built around interchanges, service areas, parking areas and at "Michi-no-eki"(road stations).
4. Make use of public space and open land in the roadside to design roads integrated with the roadside.

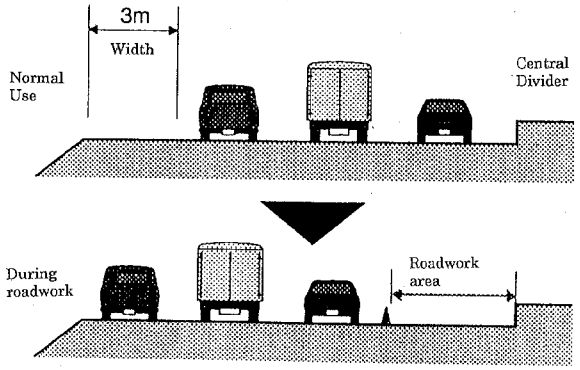

FIGURE 2 Providing for Construction and Accidents

(6) Introduction of Superior Management Methods and New Technologies

1. To support the introduction of advanced information facilities and to use the roadway space appropriately, provide common tunnels for power lines (CC Box), and promote the construction of the infrastructure for an information highway network.
2. Encourage the provision of facilities to rebroadcast radio signals inside tunnels, PHS (personal handy phone) relay stations, and other information infrastructure elements.
3. Improve traffic demand management by providing HOV lanes (lanes for the exclusive use of cars with more than one passenger), and parking areas to encourage car sharing.
4. Promote research and development on the technology for next-generation road traffic systems and physical distribution systems, and reflect the results appropriately in new roads.
5. Promote the construction of economical maintenance systems and the development of new technology that can contribute to reductions in the overall cost of everything from road construction to road maintenance, including the cost borne by road users.

(7) Promotion of Effective Road Improvement

1. Correctly identify the needs of the people and of each region, and carry out systematic and prioritized varied road investment and road improvement to provide road systems suited to the roles and the functions of each and every road.
2. Enact long term overall road network plans for each region of Japan, carry out priority investment suited to the needs of each region, and promote systematic and effective improvements to the network.

FUTURE ISSUES

The measures recommended by this report go beyond the road system itself to deal comprehensively with roads, their ideal form and utilization for example. At the same time, it is the first such report to reach the level of road planning found in present-day America and Europe. For this reason, the Ministry of Construction will, in line with the recommendations of the report, provide new road system standards and other needed systems at the same time as it carefully studies road investment priorities in order to push ahead steadily and efficiently with the task of planning the road system that will serve Japan in the twenty-first century.