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# TRANSPORT, ROADS AND TRAFFIC

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## 1 Introduction

Japanese roads are controlled using route numbers, for example, National Route No. x or Prefectural Route No. y, and the route numbers of main roads are familiar to, and widely accepted by, Japanese citizens. Route numbers are also used in urban expressways, including the Tokyo Metropolitan Expressway and the Hanshin Expressway, as a means of identifying routes within a complicated network.

Meanwhile, inter-city expressways, whose construction began with the opening of a section of the Meishin Expressway in 1963, have been referred to by route names, such as the Tomei Expressway and the Tohoku Expressway, instead of route numbers. While this posed no particular problem when there were only a few routes, today arterial high-standard highways have reached a total length exceeding 11,000 km, allowing drivers to choose the best route among multiple routes in an extensive network. This has brought about the need for road signs that are easier for users to understand.

In addition, road signs readily understood by people whose native language is not Japanese are necessary to cope with the recent sudden increase of foreigners visiting Japan and driving rental cars on Japanese expressways. Road signs in expressways outside Japan generally rely on numbering based on alphanumeric designations as a universal code that anyone can understand without depending on the language of a specific country.

Given these circumstances, the Ministry of Land, Infrastructure Transport and Tourism (MLIT) set up the Expressway Numbering Exploratory Committee in April 2016 to create road signs easily understood by all users of Japanese expressways by combining the currently used route names with route numbers. In October 2016, after much debate, the committee announced the Proposal for Realization of Expressway Numbering.

The following sections outline the concept of the ex-

pressway numbering system based on the proposal, as well as initiatives aimed at implementing numbering as a follow-up to the proposal.

## 2 Routes Covered by the Expressway Numbering System

To provide easy to understand guidance on expressways throughout Japan, it is preferable to apply numbering to as many routes expected to be used consecutively as possible. Numbers were therefore assigned to all routes in arterial high-standard highways (planned length of approximately 14,000 km), which constitute the framework supporting the expressway network.

Routes other than arterial high-standard highways deemed to require seamless indications for users, including regional expressway networks that supplement the arterial high-standard highway network and routes that provide access to major airports, harbors, and tourist sites from the arterial high-standard highway network, were also numbered. Examples of routes that supplement the arterial high-standard highway network include the Keiyo Road, the Daisan Keihin Road, and the Tokyo Bay Aqua Line in the Tokyo metropolitan area, as well as the Keiji By-pass, the Second Keihan Road, and the Second Shinmei Road in the Kansai area. Examples of roads that provide access to major airports, harbors, and tourist sites include the Nikko Utsunomiya Road and the Oita Airport Road.

Conversely, urban expressways that were already numbered, such as the Tokyo Metropolitan Expressway and the Hanshin Expressway, were excluded from the new Expressway Numbering System because they were already widely recognized by users.

## 3 Expressway Numbering Concept

### 3.1. Basic Concept

Basic expressway numbering systems used outside Japan include the schemes below.

- (a) Odd numbers are assigned to routes that run north-south, and even numbers to routes that run east-west.

Used in Germany, the US, and Korea.

- (b) Numbers are assigned sequentially clockwise, using a city as the hub.

Used in France and the U.K.

- (c) Numbers are assigned in conformity with national route numbers.

Used in the U.K. in combination with (b).

Viewed in the context of roads in Japan, schemes (a) and (b) would be difficult to adopt because of the long, narrow, and arched land shape. Therefore, scheme (c) was considered a suitable basis.

### 3. 2. Numbering Rules

The rules for numbering expressways were defined as follows. Numbers indicating an expressway start with an “E” to distinguish them from general roads and urban expressways.

#### 3. 2. 1. Routes Parallel to a Single- or Double-Digit National Highway

Expressways running parallel to the single- or double-digit national highways representing the structural layout of the nation are assigned the number of the corresponding highway to indicate the substitutability of those expressways and highways and maintain ease of use for current users.

Examples: E8: Hokuriku Expressway

E9: San-In Expressway

E17: Kan-Etsu Expressway

E18: Joshin-Etsu Expressway

#### 3. 2. 2. Routes Grouped with (in the Same Family as) A Single-Digit National Highway

The suffix “A” is appended to the same number for parallel routes with substantially the same start and end points which, along with the parallel national highway are considered to form a family.

Examples: E1: Tomei Expressway, Meishin Expressway

E1A: Shin-Tomei Expressway, Isewangan Expressway, Shin-Meishin Expressway

E2: Sanyo Expressway

E2A: Chugoku Expressway, Kanmon Expressway

E3: Kyushu Expressway

E3A: Minami-Kyushu Expressway

E4: Tohoku Expressway

E4A: Tohoku-Jukan-Expressway Hachinohe Route (Ashiro-Aomori)

#### 3. 2. 3. Circular Routes

The route numbers of circular routes in the Tokyo and Nagoya metropolitan areas are prefixed with a “C” (for circle) instead of an “E” at the to be distinguish them from other expressways. The numbers are assigned based on consistency with existing urban expressway circular routes.

Examples: Tokyo metropolitan area

C3: Tokyo-Gaikan Expressway

C4: Metropolitan Inter-City Expressway (Ken-O Expressway)

Nagoya area

C2: Nagoya Daini Kanjo Expressway

C3: Tokai-Kanjo Expressway

#### 3. 2. 4. Routes Numbered by Collectively Viewing Routes That Run Parallel to a Single- or Double-Digit National Highway as One

- (a) The Hokkaido Jukan Expressway (Hakodate-Wakkanai) is assigned the number “5” because it is part of the main expressway layout of the nation and Hokkaido (corresponding to National Routes 5, 37, 36, 12, and 40).

- (b) Expressways that generally match the direction of single- or double-digit national routes within the same region are considered parallel routes and given the number of that national route even it is not adjacent to the relevant expressway.

Examples: E39: Asahikawa-Monbetsu Expressway

E41: Tokai-Hokuriku Expressway

- (c) If the parallel national highway has a three-digit number or is a route in which the national highway route number of the parallel national highway is assigned to another route, and there is an adjacent double-digit national highway, the relevant national route number is extended.

Examples: E32: Tokushima Expressway, Kochi Expressway (Corresponds to National Routes 192 and 32)

E54: Onomichi Expressway, Matsue Expressway (Corresponds to National Routes 184 and 54)

### 3.2.5. Other Routes

(a) Other arterial high-standard highways are numbered from north to south starting at number 59.

Examples: E65: Shin Airport Expressway (Narita Airport)

E76: Setouchi Shimanami-Kaido Expressway

(b) Other routes that are not arterial high-standard highways are numbered from north to south starting at number of 80.

Examples: E81: Nikko-Utsunomiya Road

E88: Keiji By-pass

E89: Second Keihan Highway

E97: Oita Airport Road

## 4 Design of Route Symbols

In an effort to present uniform expressway route symbols, various elements, including legibility, differentiation from route symbols used on other roads, and appropriate use of colors (blue for general roads and green for expressways) were evaluated, resulting in the design proposals shown in Figures 1 and 2.

Since the current expressway names are already thoroughly familiar to local residents, replacing the current route names with new route numbers on traffic signs could cause confusion among users. Therefore, traffic signs show both the route names and numbers, and giv-



Fig. 1 Design of route symbol of Tomei Expressway and Meishin Expressway<sup>(1)</sup>



Fig. 2 Design of route symbol of Metropolitan Inter-City Expressway (Ken-O Expressway)<sup>(1)</sup>

en the layout shown in Figure 3.

## 5 Follow-Up to the Proposal

Based on the proposal announced in October 2016, MLIT prepared a proposed order for the partial revision of the order on road signs, demarcation lines, and road markings. The measure addresses actions such as creating new signs with expressway route numbers and to change the indications for expressways on the traffic signs on general roads (to include the expressway number). After receiving public comments, the order was issued and came into force in February 2017.

The opening of the Ken-O Expressway (section between the Sakai Koga and Tsukuba Chuo junctions) in February 2017 marked the first time that the expressway numbering system was actually used and traffic signs with expressway route numbers were revealed to users.

Expressway traffic signs will be gradually installed, with priority given to routes that provide access to three major metropolitan areas, the main international airports,



Fig. 3 Example of signs at expressway entrances<sup>(1)</sup>

and the Tokyo Olympic and Paralympic Games venues, as well as major sightseeing tour routes. This task is expected to be mostly completed by 2020. Traffic signs on city streets near the junctions of the above routes will also be upgraded.

Furthermore, countries all over the world use expressway numbering in various fields such as maps, route searching, sightseeing site guidance, car navigation systems, and traffic information on accidents or congestion.

It is hoped that such applications will become available in Japan as well.

#### References

- (1) MLTI, <http://www.mlit.go.jp/road/sign/numbering/index.html>
- (2) Hirawa, Expressways and Automobiles, Vol. 60, No. 2, pp. 34-37 (2017)