

Basic Trend of Stuck Traffic in Winter Season

(Research period: FY2017 to FY2019)

IKEHARA Keiichi, Senior Researcher, KAWASE Haruka, Research Engineer, TKAHASHI Ayumu, Guest Research Engineer, KOBAYASHI Hiroshi (Ph.D.), Head,
Road Safety Division, Road Traffic Department

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1. Introduction

In recent years, heavy snow has been causing large-scale stuck traffic and long-time suspension of traffic, and such traffic hazards due to local heavy snow often occurred in areas other than snowy areas. A case where a car got stuck ("stuck car") on a national management road occurred at 4,578 spots across the country for the period from FY2011 to FY2016 (including minor incidents), which are broken into (i) 34% for the region of Tohoku Regional Development Bureau, (ii) 18% for Hokuriku Regional Development Bureau, (iii) 14% for Hokkaido Development Bureau, (iv) 13% for Kanto Regional Development Bureau, (v) 11% for Chugoku Regional Development Bureau, and others. However, occurrence greatly varied according to fiscal years and was greatly affected by local heavy snow in the regions other than the top three.¹⁾

Considering these situations, NILIM has been grasping characteristics based on data analysis and on-site hearings concerning the occurrence of stuck traffic and organizing causes, issues, etc. as useful information for other regions. Based on results of this organization, NILIM has been studying the direction leading to solution by adopting a road structure resilient to stuck cars, etc. such as wide shoulder and climbing lane from the viewpoint of winter road management.

2. Trend of occurrence and countermeasures in Tohoku, Hokuriku, and Hokkaido

In the jurisdictions of Tohoku and Hokuriku Regional Development Bureaus and Hokkaido Development Bureau ("Tohoku, Hokuriku and Hokkaido") where stuck traffic occurs every year, we conducted questionnaire and hearing surveys in fiscal 2018 by extracting spots where stuck traffic frequently occurs in order to grasp the trend of occurrence and content of countermeasures.

Fig. 1 organized the weather conditions of the spots where we conducted the questionnaire survey, and Fig. 2 organized the main generating factors. The weather conditions of the spots are characteristic in the air temperature of winter and distribution of precipitation, and generating factors have a trend according to the characteristics of weather conditions. When seen in the ascending order of average air temperature, stuck traffic often occurs in Hokkaido due to obstruction to vision or snowdrift, which would be greatly affected by low temperature or wind as well

as snow on roads. Stuck traffic often occurs due to snowfall and road surface freezing in Tohoku, and due to snowfall in Hokuriku. As characteristic measures, delineators are introduced at a high ratio in Hokkaido, automatic spraying equipment has been partially introduced in Tohoku, and snow-melting pipes has been introduced in part in Hokuriku. In all of three regions, the introduction rate of chain attachment/detachment area is high but there is a problem of stuck traffic due to no chain attachment. As an effective measure, climbing lanes are highly evaluated in all the three regions, which is probably because slow expansion of damage even in case of stuck traffic is evaluated.

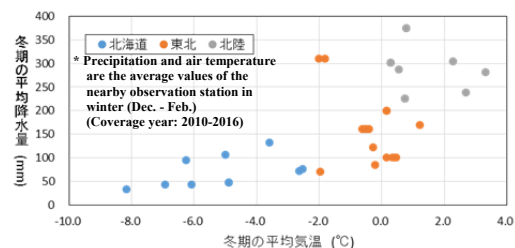


Fig. 1: Weather conditions of surveyed spots (air temperature and precipitation in winter)

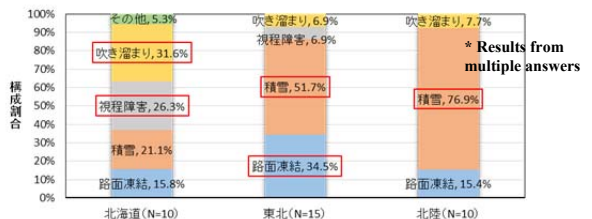


Fig. 2: Main generating factors of stuck traffic (Hokkaido, Tohoku, Hokuriku)

3. Future summarization policy

We reported the outline of the occurrence trend and countermeasures in Tohoku, Hokuriku, and Hokkaido. We continue to organize the conditions and effects of application focused on measures based on road structure etc. and summarize results as information useful for introduction in other regions. In addition, for prevention of damage expansion, introduction of wide shoulders, as well as climbing lanes, would be effective in realizing snow-resistant road structure. We also intend to study measures for introducing these measures from a preventive viewpoint.

References: 1) IKEHARA Keiichi, KAWASE Haruka, KOBAYASHI Hiroshi, "Occurrence Trend of Stuck Traffic in Winter Roads", Civil Engineering Journal, April 2019 (under contribution)