
GDDKiA
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Winter Road Management of Japan

Topic 5-11 Winter service organization

1. The Environment Surrounding Snowy Areas in Japan

- The amount of snowfall in Japan is more than that of other cold countries

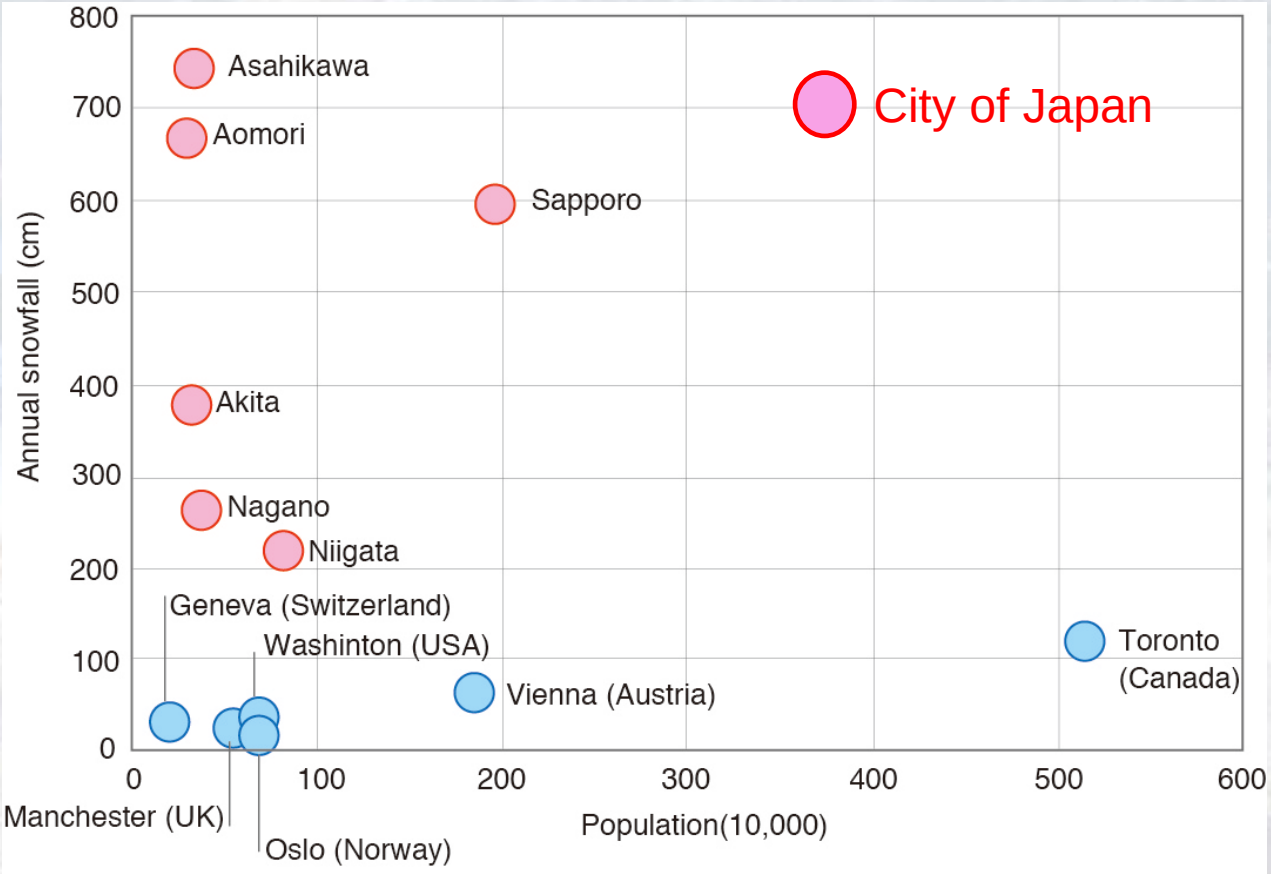


Fig. 1 Cities in the world and cumulative amount of snow

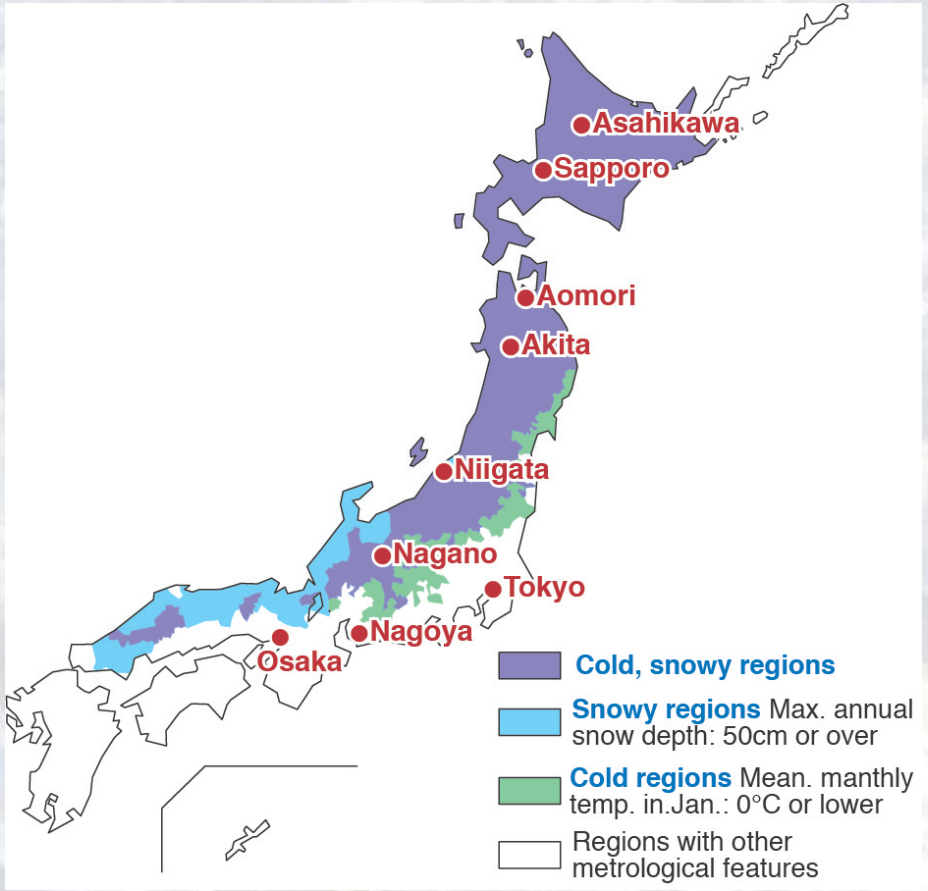


Fig. 2 Snowy regions and cold regions in Japan

1. The Environment Surrounding Snowy Areas in Japan

- Increase of abnormal snowfall phenomena

Since 2010, the heaviest snow accumulation has been recorded at 32% of weather observation points

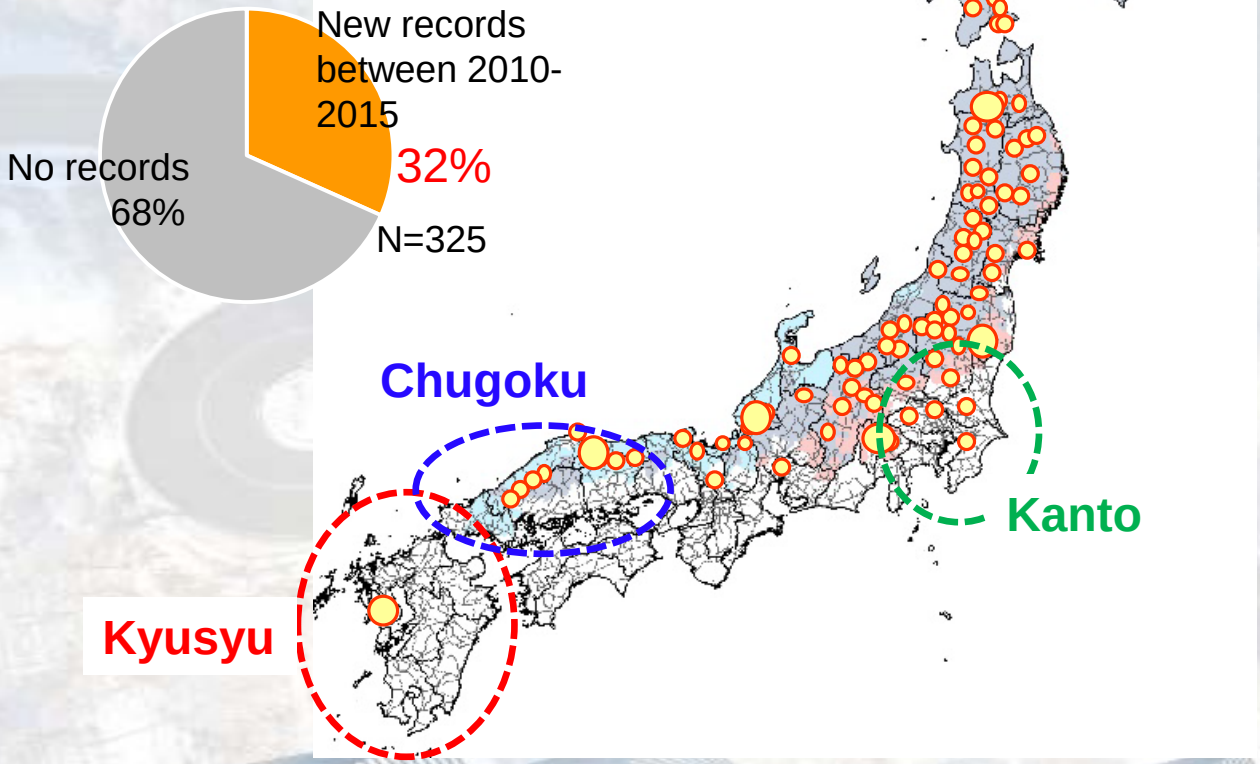


Fig. 3 The points where the heaviest snow accumulation has been recorded in the observation history since 2010

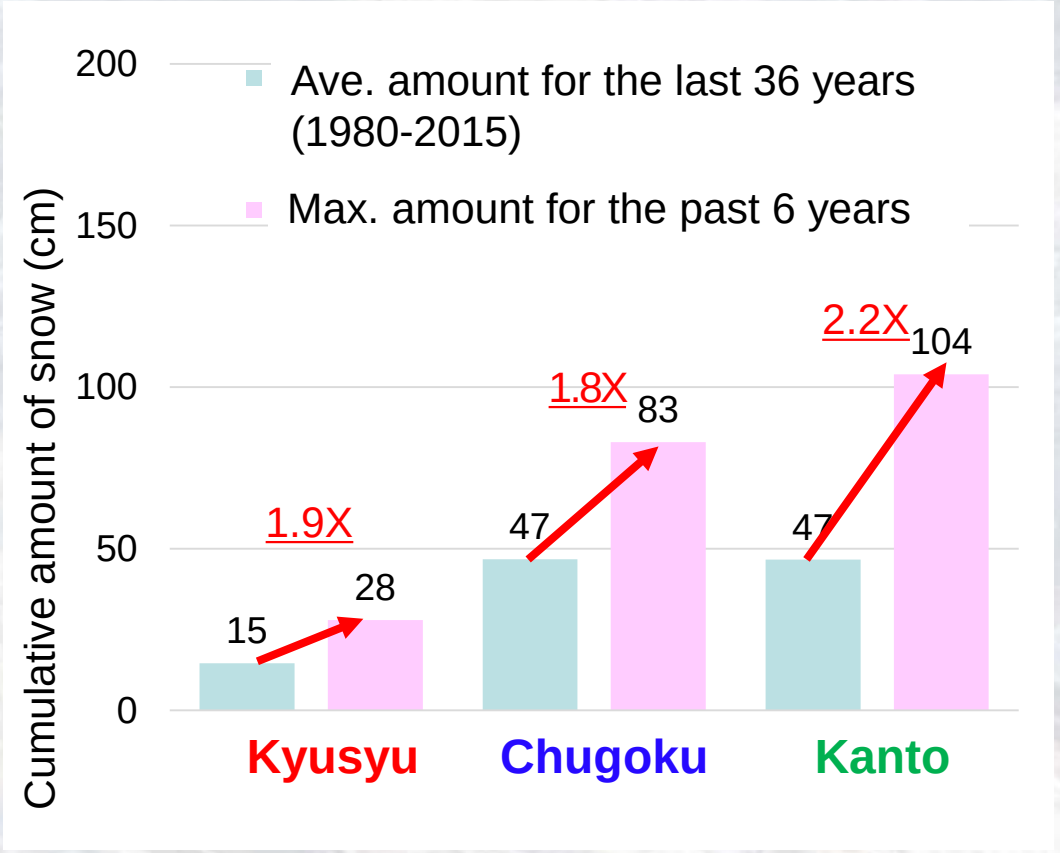


Fig. 4 The ave. snowfall amount for the last 36 years and the max. snowfall amount in the past 6 years

Source: Created from weather statistical data (JMA)

- **2. Challenges in the Winter Road Management**
  - Heavy snowfall causes issues on roads in recent years.

Photo 1 Traffic issues on rural roads (2017.2)

Source: The Asahi Shimbun Digital, 2017.1.24

Photo 2 Traffic issues on an expressway (2017.2)

3. Efforts for Winter Road Management in Japan

Winter road management strategy in Japan

	Understanding situation	Preparation / organization	Snow removal	Public relations
Before Snow Season	**Grasping of Weakpoint** Past tasks Stuck sections Priority sections CCTV invisible sections	**Preparation** Making preparations (disaster prevention action plan) Training Cooperation with related organizations Support to wider area	**Plannning** Understanding of the ability of equipment Snow removal plan	**Early warnings** Preparation for public information Announcement of the risk of snow road and wearing winter tires
Snowfall Season (Heavy Snow)	**Stronger monitoring** Monitoring by CCTV (Road surface, stuckde vehicles) Position monitoring for snow plows by GPS	**Share with stakeholders** Reorganization Request for support Liaison dispatch Cooperation with private companies	**Effectiveness** Utilization of GPS and CCTV Minimizing traffic hazards using road closure Application of Basic Act on Disaster Control Measures Operation STOP & GO	**Information on changing events** HP, information board, SNS, TV, radio, michi-no-eki Information and Goods to stuck vehicles

3. Efforts for Winter Road Management in Japan

- Under a revised law, vehicles stuck in snow can be removed without the driver's permission.

  Revised Basic Act on Disaster Control Measures in 2014:

  For vehicles blocking emergency vehicles, the road administrator obtains power to remove the vehicle when a driver is absent

	Expressway	National Road	Local Road
Number of specified sections	6	5	1
Number of vehicles being removed	73	23	0

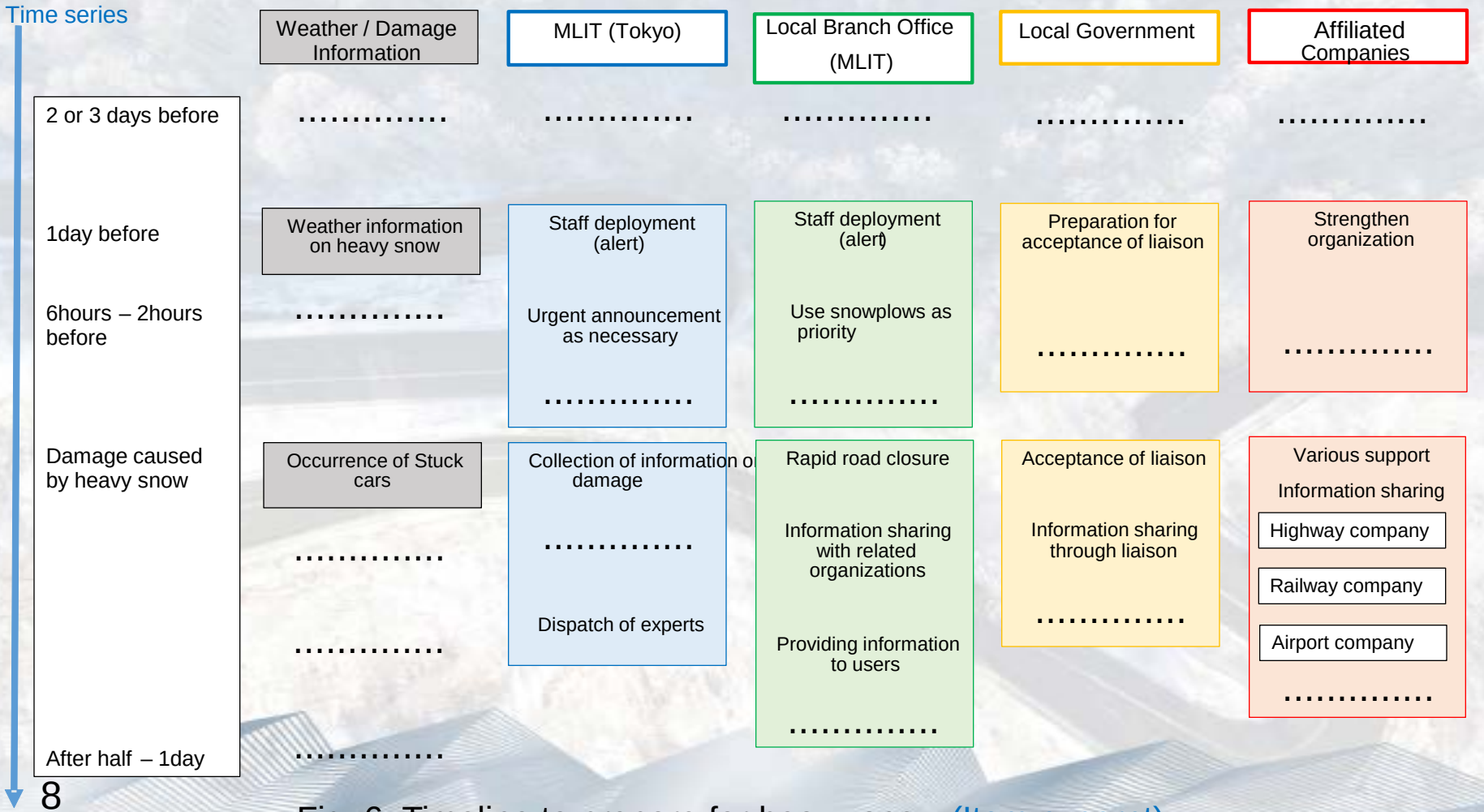
Fig. 5 Result of vehicle forced movement in the fiscal 2016

Photo 3 The track stuck in snow being towed by a tug vehicle

3. Efforts for Winter Road Management in Japan

3.1 Snow Removal Operation

Preparation of **Timeline** (Snow disaster prevention action plan)



- Estimation of situation and damage to minimize it by heavy snowfall
- Preparation of a **chronological timeline** for a road administrator to organize disaster-prevention actions

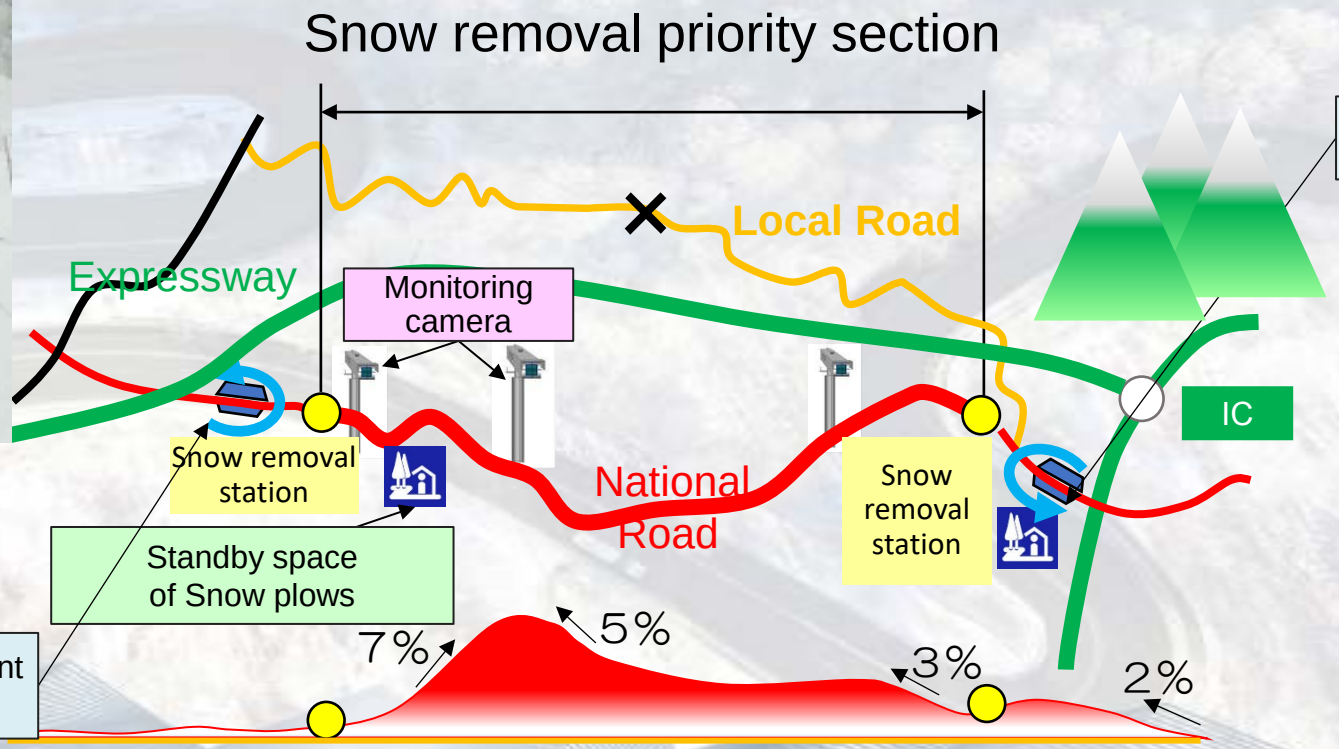
Fig. 6 Timeline to prepare for heavy snow (Item excerpt)

3. Efforts for Winter Road Management in Japan

3.1 Snow Removal Operations (for heavy snowfall)

- Understanding of locations where vehicles are likely stuck due to heavy snow
- Selection of sections where snow removal must be done as priority to prevent vehicles from being stuck

Photo 2 Evacuation Point (U-turn point)

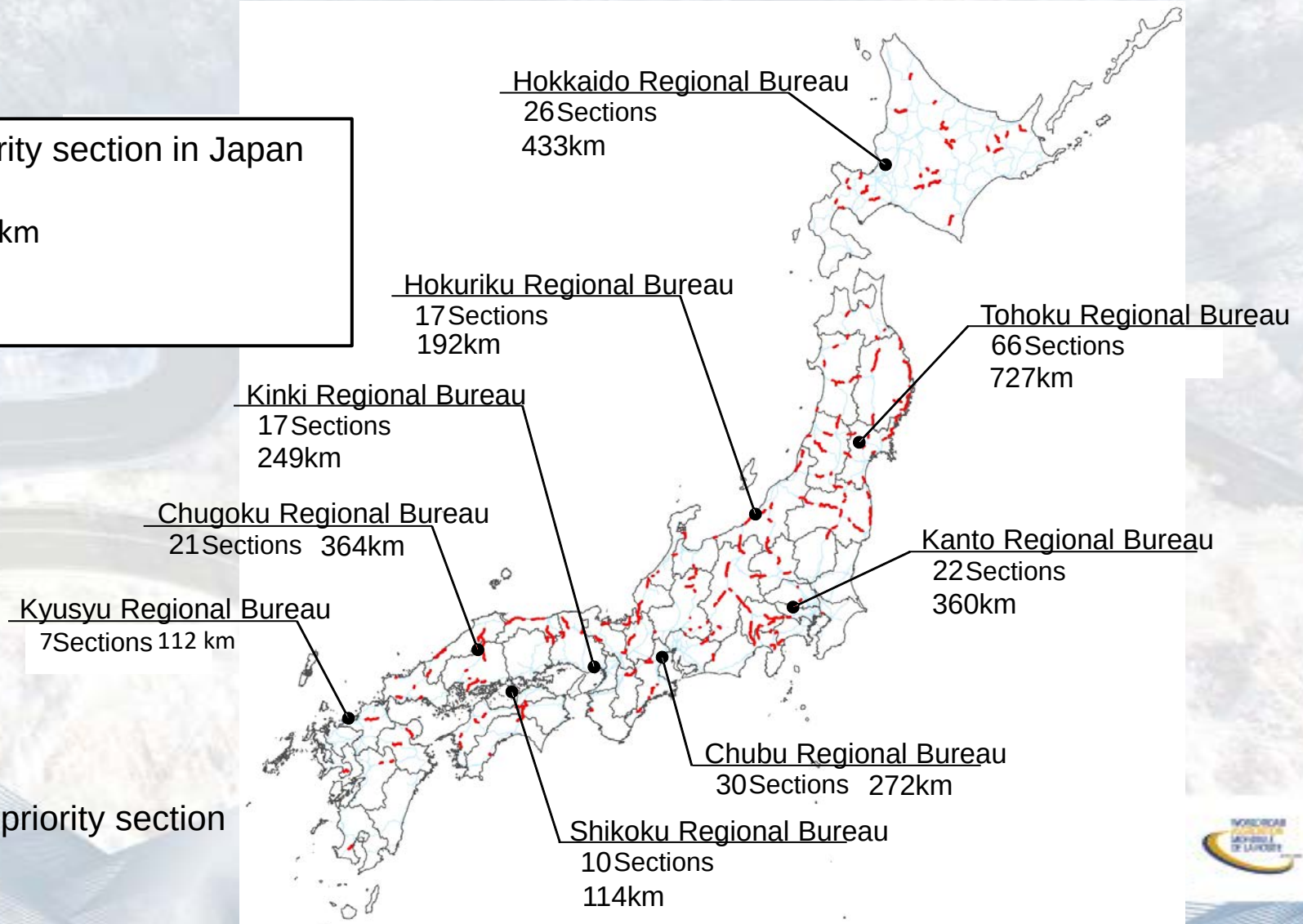


3. Efforts for Winter Road Management in Japan

3.1 Snow Removal Operations (for heavy snowfall)

Snow removal priority section in Japan

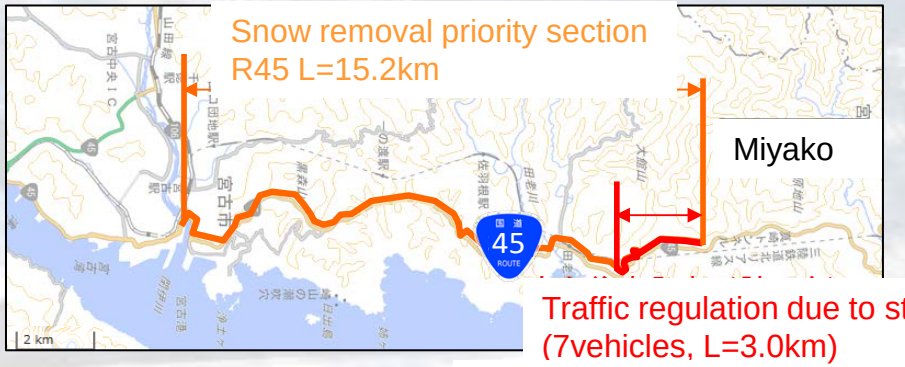
214 Sections 2,801km
(2017.12)



3. Efforts for Winter Road Management in Japan

- In little snow areas usually, we will select the new snow removal priority section based on the experience of stuck

In this national road, we closed the road for 100 minutes and removed 7 vehicles due to stuck in 2017. Based on this experience, we have set it as the new snow removal priority section.



Traffic regulation due to stuck
(7vehicles, L=3.0km)

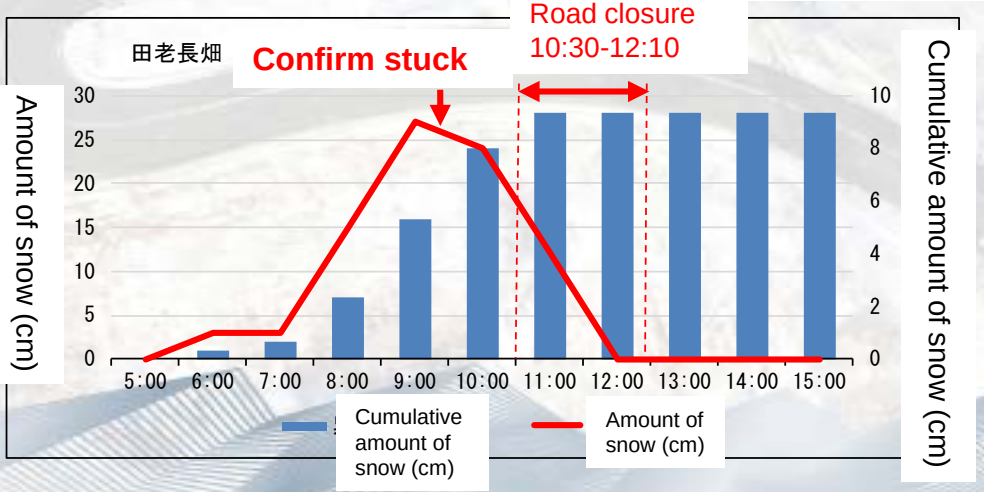


Fig. 6 Snowfall situation at the point

Flow of concentrated snow removal

Stuck vehicles

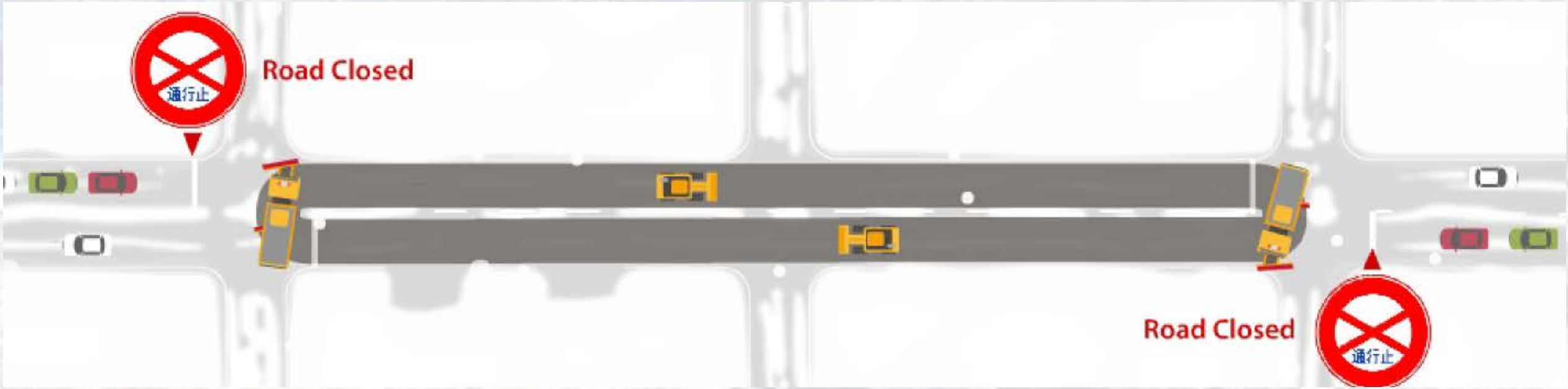
Vehicle traction

Concentrated snow removal

Cancellation of road closure

- # 3. Efforts for Winter Road Management in Japan
  - ## 3.1 Snow Removal Operations
  - Good practice of snow removal operation (Operation STOP and GO)

    - Reduction of time for road closure
    - Collaboration of multiple snow plows

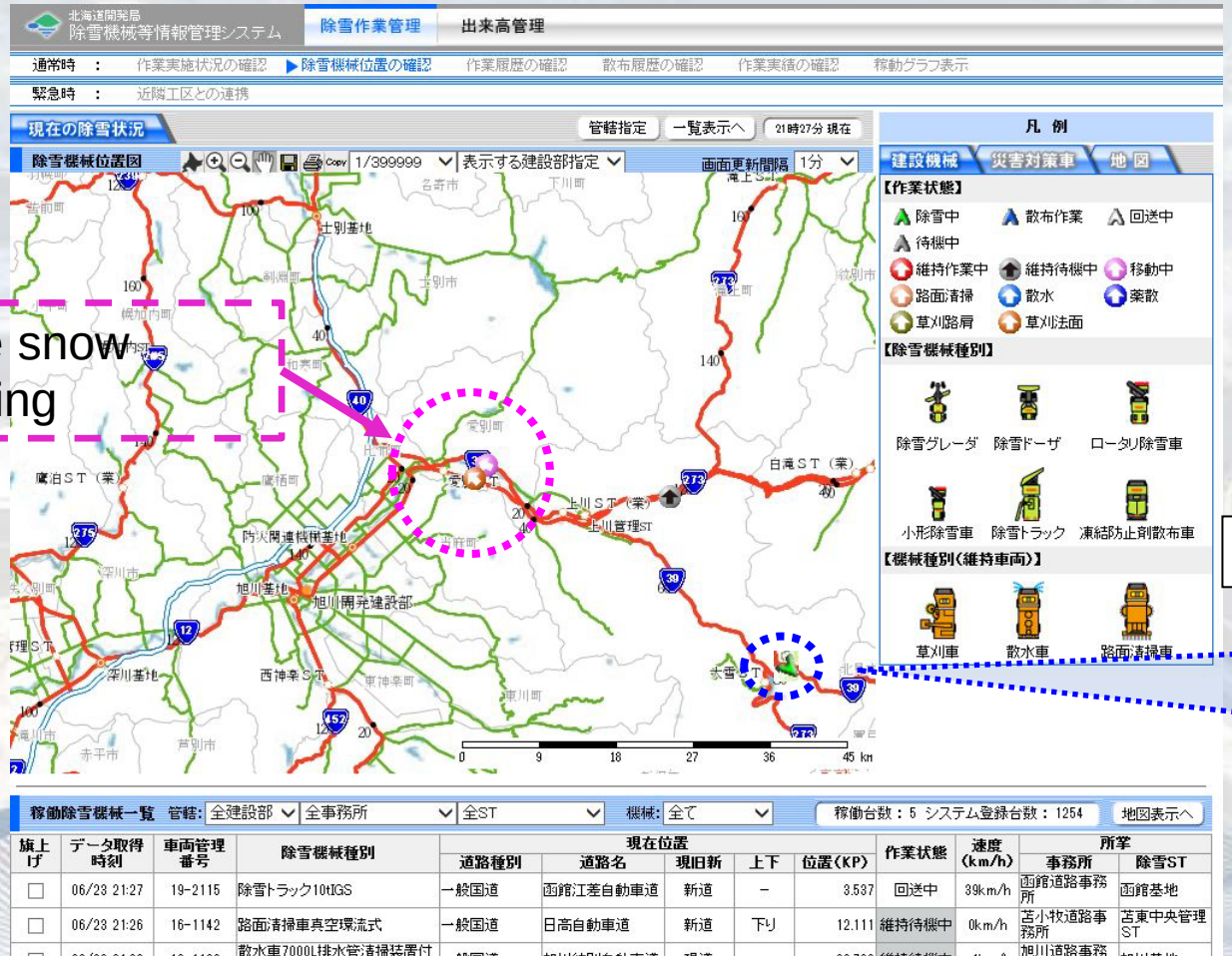


3. Efforts for Winter Road Management in Japan

3.1 Snow Removal Operation

- Location determination of snow plows using GPS
  - Checking the location of snow plows in real time
  - Understanding of works in progress; e.g. Snow removal, Spraying, Waiting, Site Work, …

It shows where snow plows are moving



Information is updated every one minute

Check the route name, KP, work content

Showing snow plows removing snow

larger image

稼働除雪機械一覧 管轄: 全建設部 全事務所 全ST 機械: 全て 稼働台数：5 システム登録台数：1254 地図表示へ

旗上げ	データ取得時刻	車両管理番号	除雪機械種別	現在位置 道路種別	道路名	現旧新	上下	位置(KP)	作業状態	速度(km/h)	所管 事務所	除雪ST
□	06/23 21:27	19-2115	除雪トラック10tIGS	一般国道	函館江差自動車道	新道	－	3.537	回送中	39km/h	函館道路事務所	函館基地
□	06/23 21:26	16-1142	路面清掃車真空環流式	一般国道	日高自動車道	新道	下り	12.111	維持待機中	0km/h	苫小牧道路事務所	苫東中央管理ST
□	06/23 21:26	16-1141	散水車7000L排水管清掃装置付	一般国道	旭川道路事務所							

3. Efforts for Winter Road Management in Japan

- 3.2 Public Relations
- Emphasizing the importance of the use of winter tires using various media

Emphasizing the importance of the use of winter tires

Specifying steep sections

Fig. 7 Distribution of enlightenment posters

Demonstration

Experience

Panel Display

Ride Experience

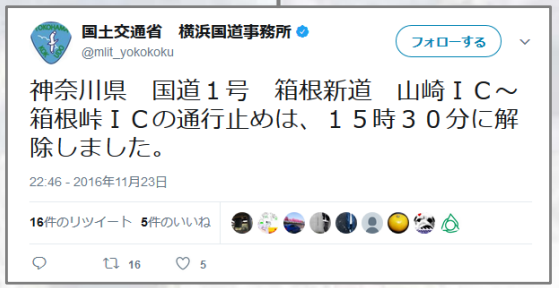
Photo 4 Winter Preparation Event

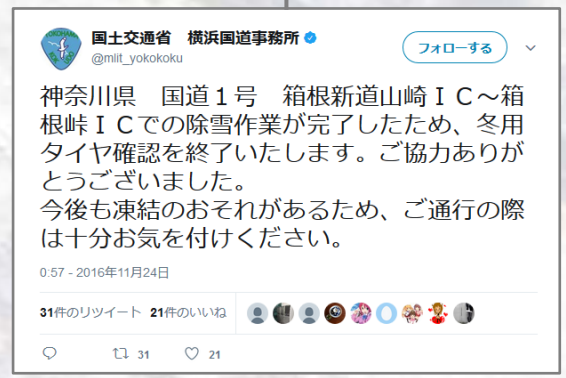
3. Efforts for Winter Road Management in Japan

3.2 Public Relations (the provision of information to road users)

- Snow road information distributed on twitter for road users

Snowfall → **Snow accumulation** Notice of winter tire regulation → **Traffic jam due to stuck vehicles** → **Road Closure** → **Road closure finishes** → **Completion of the check of winter tires**





Source: Yokohama highway office, MLIT

4. Response to Snow Damage between 2016-2017

- The heaviest Snowfall in Tokyo in 54 years
- Emergency press announcement to be made when a disaster is expected due to heavy snow

→ This reduces a traffic volume

Emergency announcement on heavy snow by MLIT 2017.1.12

- Heavy snow will continue around the coastal areas of the Japan Sea on the date of the 15th, and blizzard is also expected.
  From the 14th till 15th, an extremely heavy snowfall is forecasted over the coastal areas of the Pacific Ocean from eastern through to western Japan.

- Avoid your vehicle from getting stuck due to heavy snow or heavy blizzard.

- Do not drive unless necessary. Use winter tires and chains at earliest possible when driving.

- At the Regional Bureau where heavy snow is expected, we plan to respond to road traffic securely on a 24-hours basis.

Mass media reaction

Weather information is released on TV, Twitter etc.

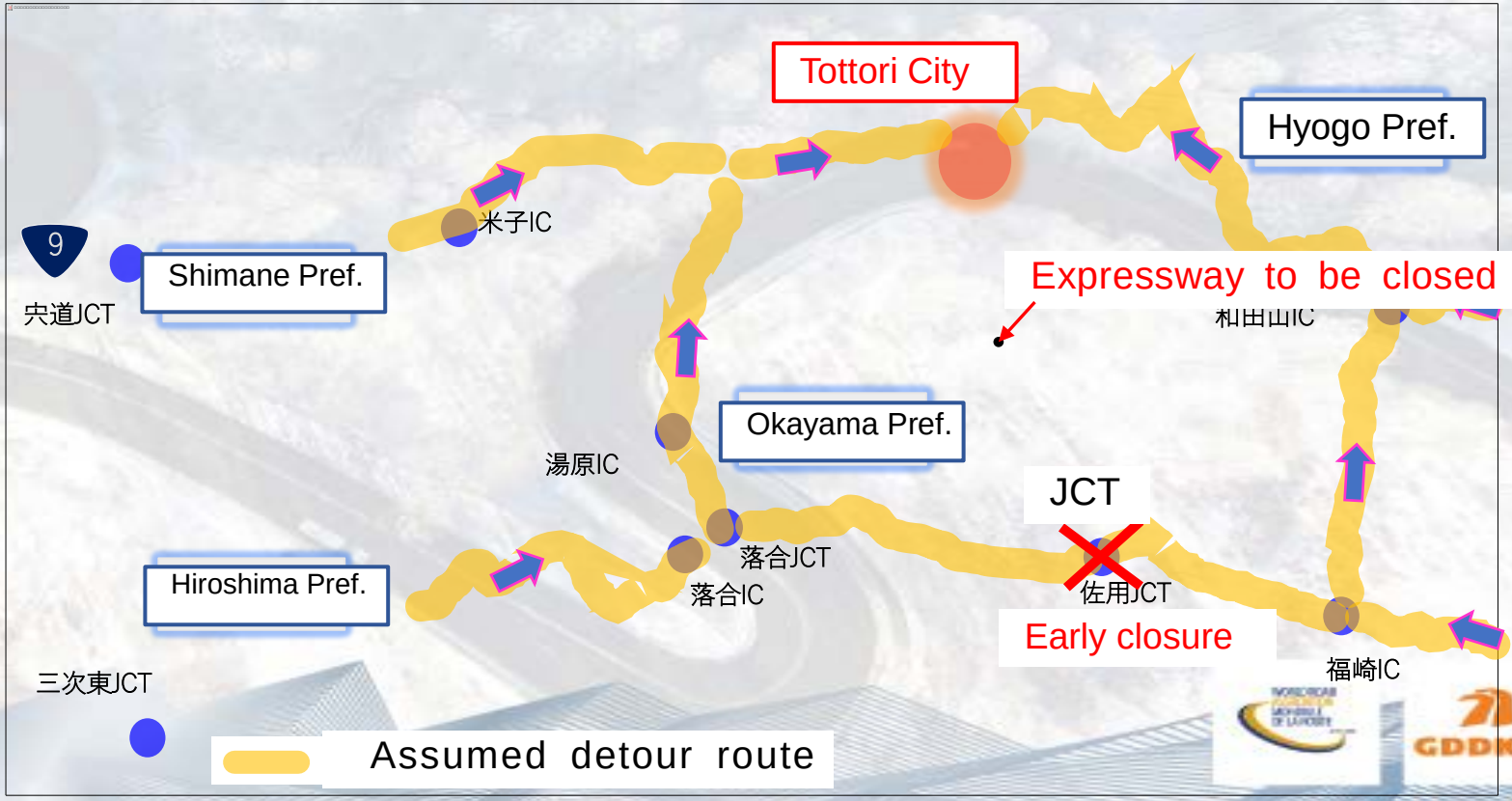
TV NEWS

5. Future Initiatives

- Snow plows to be able to cover wider areas
- Information on detour routes to be provided to drivers

In order to minimize the impact on traffic from snowfall, it is needed to strengthen the snow removal systems to wider areas and to set detour routes in wider areas.

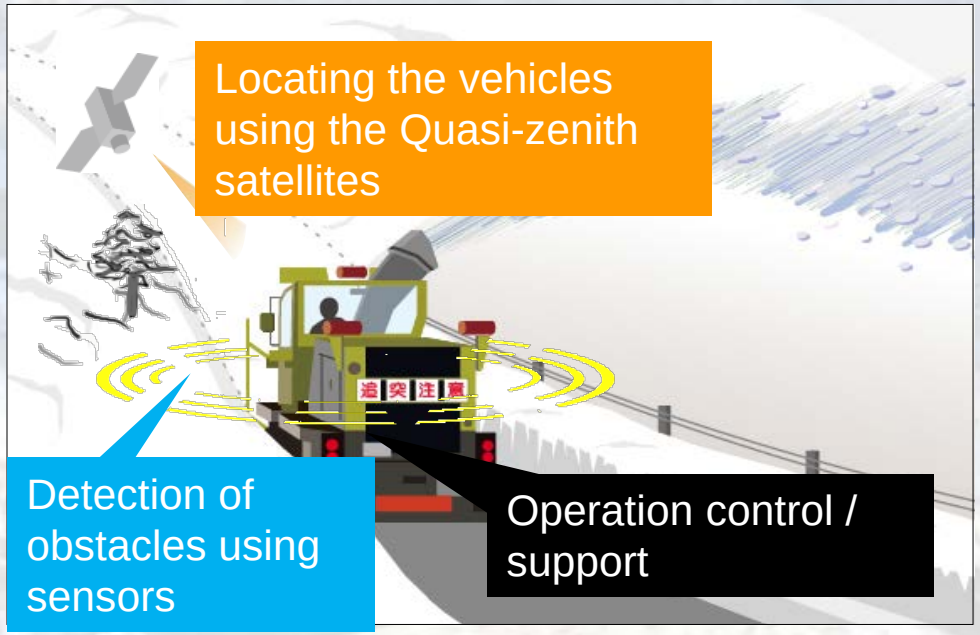
Snow removal activities supported by other Regional Bureau



5. Future Initiatives

- Technical advancement for snow plows

Vehicle upgrade



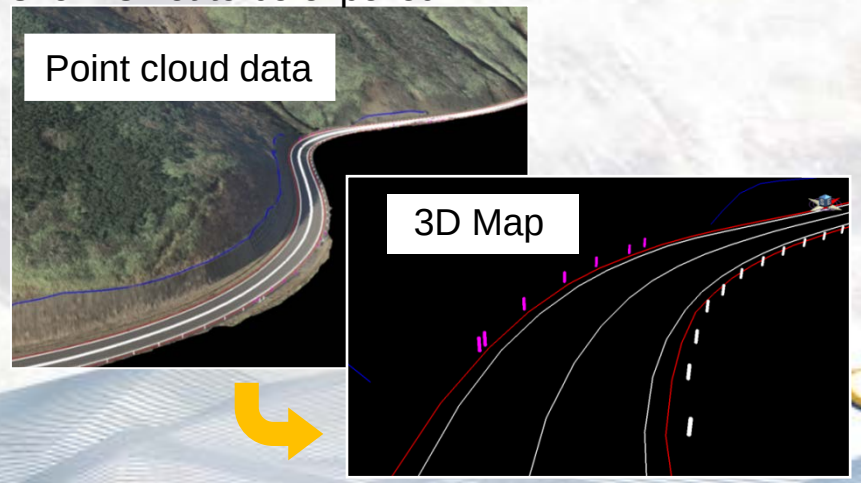
- Development of guidance function to prevent lane departure
- Introduction of a system to mitigate work operation by quasi-zenith satellite and 3D Map
- Study on the automatic operation by snow plow using automatic driving technology etc.

Quasi-zenith satellites

- We plan to start the services using four satellites system in April 2018.
- The error range of satellite positioning will be reduced to 6cm from the current 10m.

3D Map

- The map developed using point cloud data that are obtained by a mobile mapping system.
- The map indicates the centerline, curbs and road accessories, as well as the locations of obstacles and where snow is not to be expelled.



Thank you for your attention

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