



Winter Road Management in Japan

The flexibility to adapt to the changing climate

Panel

1

Winter lifestyles and attractions



Panel

2

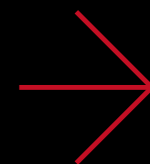
Snowy and cold regions and their winter climate



Panel

3

Snowmelt disasters from climate change



1

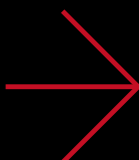
Winter lifestyles and attractions

Modes de vie et attractions en hiver

Estils de vida i atractius hivernals

Voice Guide

Next



Sapporo Snow Festival



(Sapporo, Hokkaido Pref.)

Streetcar track snow sweeper



(Sapporo, Hokkaido Pref.)

White Illumination



(Sapporo, Hokkaido Pref.)

Aizu Painted Candle Festival



(Aizuwakamatsu, Fukushima Pref.)

Winter Circus



(Taisetsu - Furano Route Scenic Byway Hokkaido, Hokkaido Pref.)

The Festival of 108 Lights



(Uonuma, Niigata Pref.)

2

Snowy and cold regions and their winter climate

Les régions froides et enneigées et leur climat en hiver

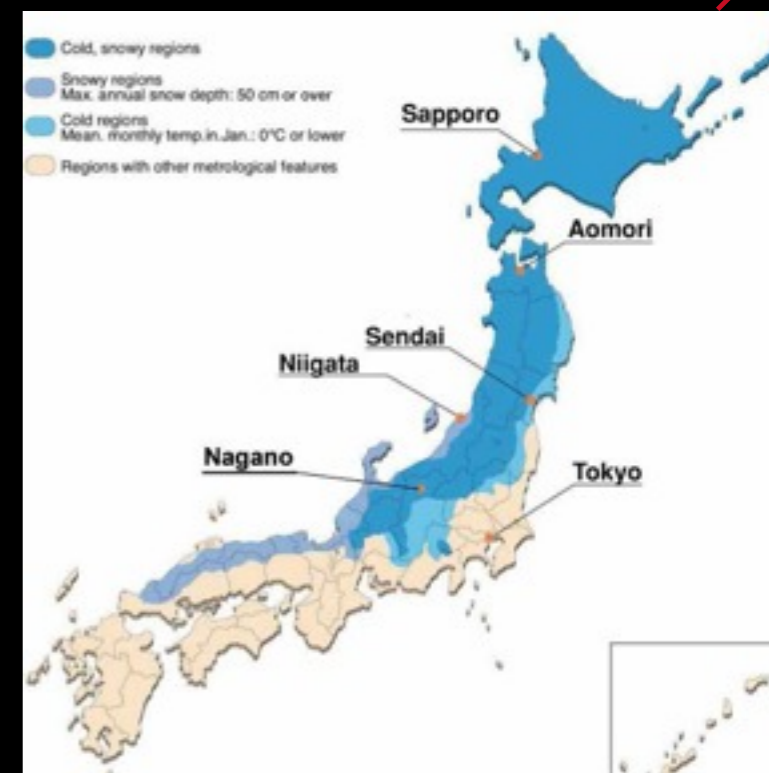
Les regions fredes amb neu i el seu clima hivernal

Voice Guide

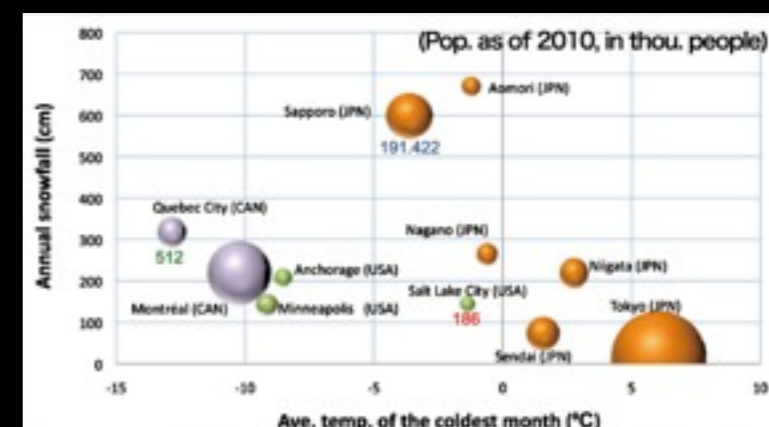
Information



A national highway running through a mountainous area (Route 49, Fukushima Pref.)



Snowy and cold regions in Japan

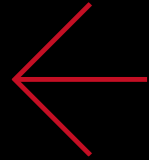


Annual snowfall, avg. temp. of the coldest month and population of cities around the world

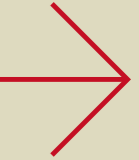
For further information:

National Highway and Risk Management Division, Road Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo, Japan 100-8918
FAX: +81-(0)3-5253-1620
E-mail: "road_bureau_info" followed by "@mlit.go.jp"
URL: <http://www.hrr.mlit.go.jp>

Back



Next



3

Snowmelt disasters from climate change

Catastrophes entraînées par la fonte des neiges provoquée par le changement climatique

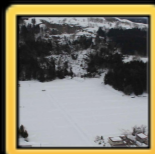
Catàstrofes provocades per la fusió de la neu causada pel canvi climàtic

Voice Guide

Next

Snowmelt-induced landslide (Joetsu, Niigata Pref., March 2012)





Landslide outline

Address:

Chinai, Kokugawa Itakura-ku, Joetsu, Niigata Prefecture

Date:

March 7, 2012

Event scale:

150 m width, 500 m long, 20 m deep.

Estimated volume of sliding soil: 750,000 cubic metres

Landslide scale:

120 m width, 250 m long, 7 m deep

Estimated volume of sliding soil: 210,000 cubic metres

Geology:

tertiary deposit; Soil type: fine-grained clay

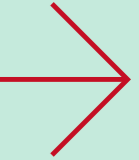
Damages:

complete destruction of four houses and seven buildings,
closure of 1.5 km of prefectural highway due to mud flow,
filling of several agricultural watercourses with mud

Back



Information



For further information:

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

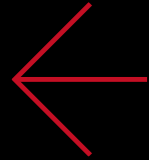
#1 Niigata Misaki Government Building

FAX: +81-(0)25-280-8917

E-mail: "chiiki-douro" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

Back



Panel

4

The recent winter
climate



Panel

5

Avalanches and
blizzards



Panel

6

Responses to com-
plex winter natural
disasters



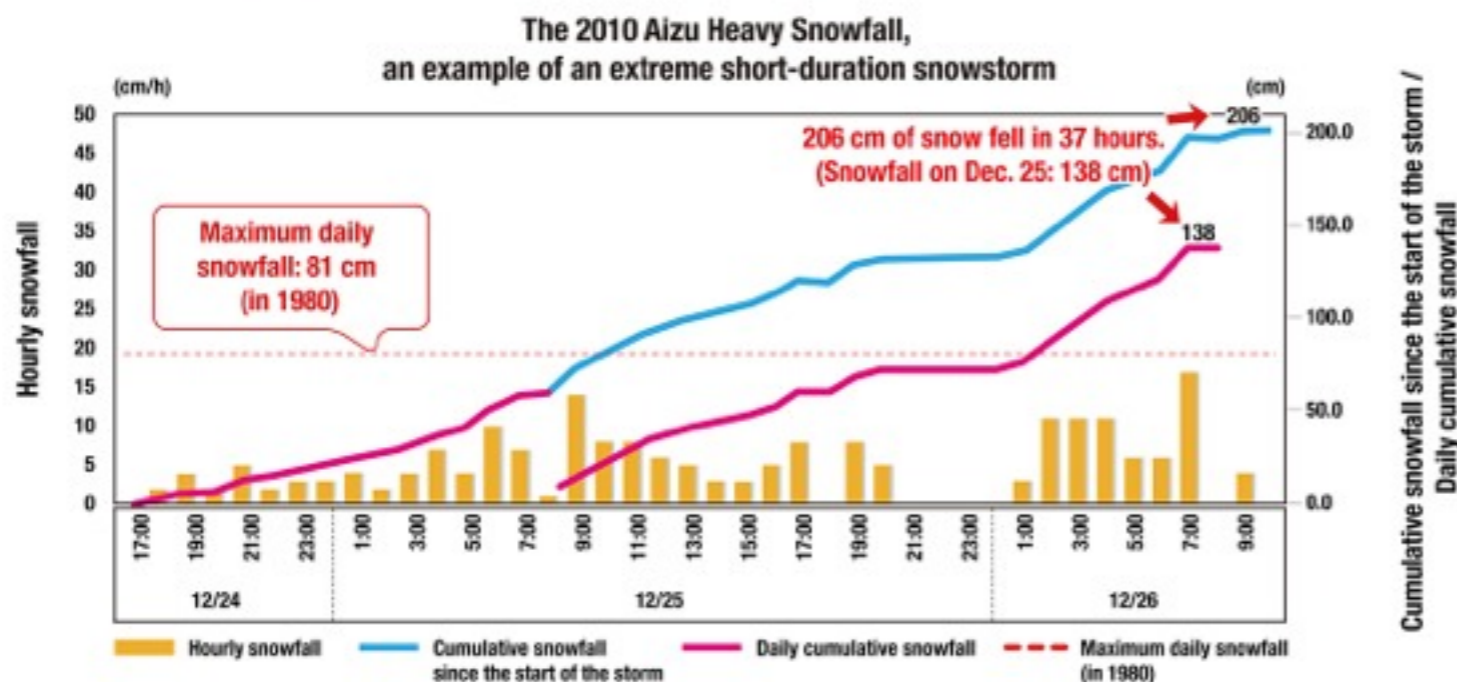
4

The recent winter climate Changements climatiques récents Canvis climàtics recents

Voice Guide

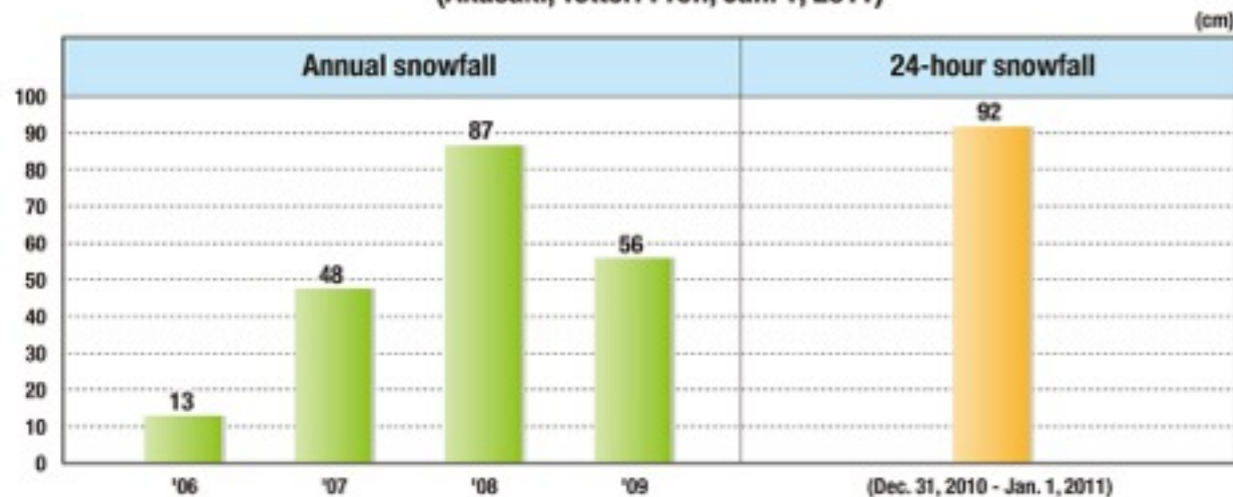
Next

Increases in extreme short-duration snowfall events



Cumulative snowfall since the start of the storm /
Daily cumulative snowfall

The 2011 Tottori Heavy Snowfall: A single day of snowfall exceeded the recent maximum annual snowfall (Akasaki, Tottori Pref., Jan. 1, 2011)



4

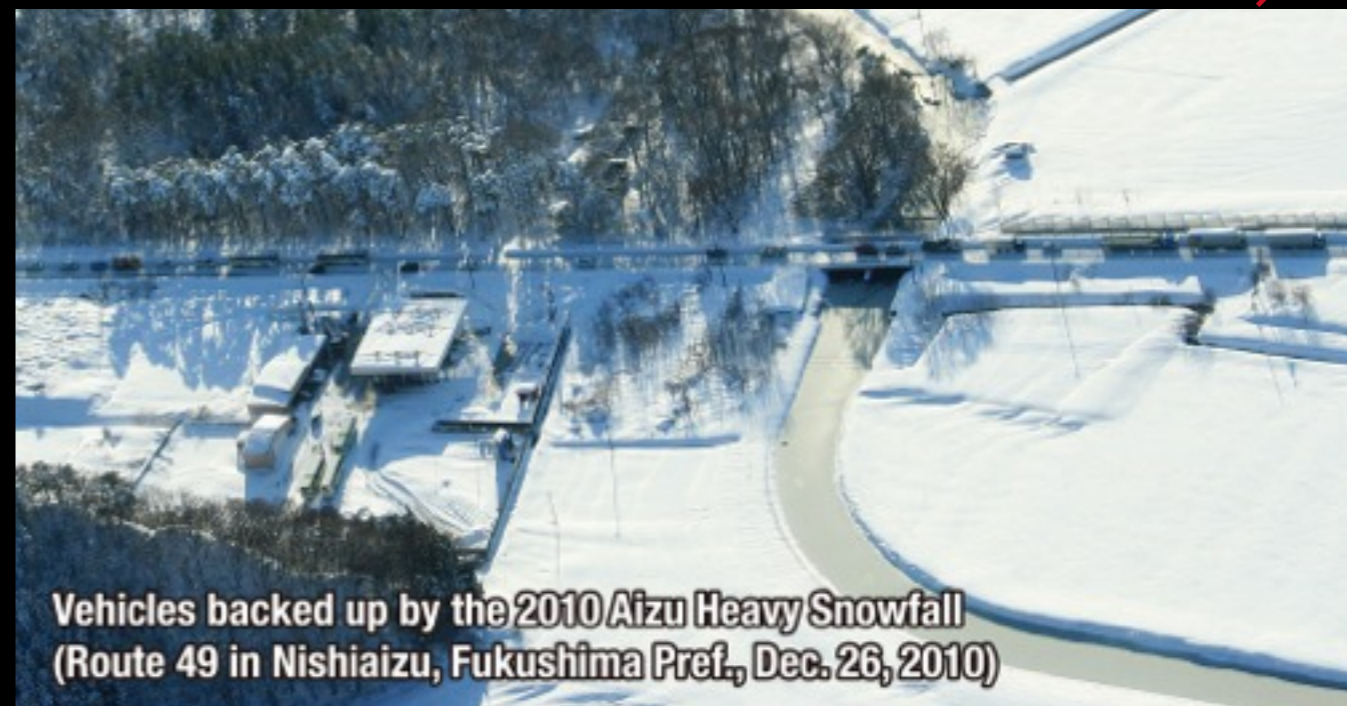
The recent winter climate Changements climatiques récents Canvis climàtics recents

Voice Guide

Information →



The 2010 Aizu Heavy Snowfall
(Route 49 in Nishiaizu, Fukushima Pref., Dec. 26, 2010)



Vehicles backed up by the 2010 Aizu Heavy Snowfall
(Route 49 in Nishiaizu, Fukushima Pref., Dec. 26, 2010)



The 2008 Central Hokkaido Blizzard
(Naganuma, Hokkaido Pref., Feb. 24, 2008)



Rescuing vehicles buried in snow
(Naganuma, Hokkaido Pref., Feb. 24, 2008)

For further information:

The 2011 Tottori Heavy Snowfall

National Highway and Risk Management Division, Road Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo, Japan 100-8918
Fax: +81-(0)3-5253-1620
e-mail: "road_bureau_info" followed by "@mlit.go.jp"
URL: <http://www.mlit.go.jp>

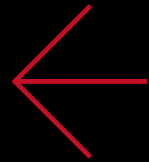
The 2008 Central Hokkaido Blizzard

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
c/o Incorporated Administrative Agency Public Works Research Institute
Civil Engineering Research Institute for Cold Region
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602
Fax: +81-(0)11-590-4048
e-mail: "gijutusoudan" followed by "@ceri.go.jp"
URL: <http://www.ceri.go.jp>

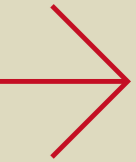
○The 2010 Aizu Heavy Snowfall

Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 9-15, Futaba-cho, Aoba-ku, Sendai, Miyagi Prefecture, Japan 980-8602
Fax: +81-(0) 22-225-6988
e-mail: "doukan3" followed by "@thr.mlit.go.jp"
URL: <http://www.mlit.go.jp>

Back



Next



5

Avalanches and blizzards

Avalanches et blizzards

Allaus i blizzards

Voice Guide

Information



An avalanche has blocked the highway
(Komatsu-Torigoe-Tsurugi Arterial Prefectural Road
in Hakusan, Ishikawa Pref., Feb. 7, 2011)



Rescue
(Ozora, Hokkaido Pref., March 3, 2013)



The 2013 Blizzard in the Eastern and Okhotsk Regions of Hokkaido
(Abashiri, Hokkaido Pref., March 4, 2013)

For further information:

An avalanche occurred on Komatsu-Torigoe-Tsurugi Arterial Prefectural Road

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

Fax: +81-(0)22-280-8917

e-mail: "chiiki-douro" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

The 2013 Blizzard in the Eastern and Okhotsk Regions of Hokkaido

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau

Ministry of Land, Infrastructure, Transport and Tourism, Japan

c/o Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

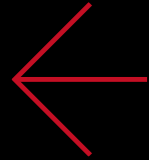
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

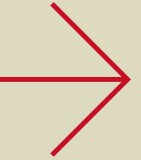
e-mail: "gijutusoudan" followed by "@ceri.go.jp"

URL: <http://www.ceri.go.jp>

Back



Next



6

Responses to complex winter natural disasters

Réponses face aux catastrophes naturelles complexes en hiver

Respostes davant de les catàstrofes naturals complexes a l'hivern

Voice Guide

Information

The Great East Japan Earthquake (M9.0) of March 11, 2011

Route 45 after the disaster



Photo: Naofusa Shibazaki

(Kirikiri in Otsuchi, Iwate Pref., March 16, 2011)

The Northern Nagano Prefecture Earthquake (M6.7) of March 12, 2011

Earthquake-induced landslides and snowslides



Landslide

A mixed flow of mud and snow

A huge volume of snow that flowed onto the road

A hut carried by the mud and snow flow

(Tsunan, Niigata Pref.)

STEP 1

Obstacles were cleared from the inland north-south arterial route (Route 4 and the Tohoku Expressway) within 24 hrs. after the earthquake.

STEP 2

Obstacles were cleared from the 11 east-west routes within 48 hrs. and from an additional 4 east-west routes within 4 days.

STEP 3

Obstacles were cleared from 97% of Route 45 on the Pacific Coast within 7 days.



The swift removal from roads of obstacles left by tsunamis

Removing obstacles left by tsunamis from roads



(Kesennuma, Miyagi Pref., March 14, 2011)

The destruction of a snowshed by a surface landslide on the slope behind the shed



(Sakae, Nagano Pref.)

Photo: Snow and Ice Research Centre, National Research Institute for Earth Science and Disaster Prevention

For further information:

The Great East Japan Earthquake (M9.0) of March 11, 2011

Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 9-15, Futsuka-cho, Aoba-ku, Sendai, Miyagi Prefecture 980-8602

Fax: +81-(0)22-225-6988

e-mail: "doukan3" followed by "@thr.mlit.go.jp"

URL: <http://www.thr.mlit.go.jp>

The Northern Nagano Prefecture Earthquake (M6.7) of March 12, 2011

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

Fax: +81-(0)25-280-8917

e-mail: "chiiki-douro" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

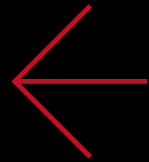
Snow and Ice Research Centre, National Research Institute for Earth Science and Disaster Prevention

Address: 187-16, Maeyama, Suyoshi, Nagaoka, Niigata Prefecture, Japan 940-0821

Fax: +81-(0)25-835-0022

URL: http://www.bosai.go.jp/seppyo/index_e.html

Back



Panel 7

Winter road management policies



Panel 8

History of snow- and ice-control machinery and facilities

Heavy snowfall events, snow- and ice-control policies and social background	Year	Technologies developed
Many roads are closed in winter	Since 1800	Use of open conduits for snow removal (Hokuriku region)
	Until 1948	Hand-made v-plows attached to Japan-made tractors and for carriageway snow removal
Establishment of the Ministry of Construction (former MLIT)	1948	Various types of Japan-made machinery
Implementation of the first carriageway snow removal as a national project (Hokkaido Pref.)		
Enactment of the 1956 Act on Special Measures concerning Maintenance of Road Traffic in Specified Snow Coverage and Cold Districts	1956	Pump-up snow-blowing machine
Establishment of a national snow removal subsidy system for relevant highways to revitalize winter activities of people and businesses in cold, snowy regions		
Widespread adoption of mechanical carriageway snow removal		
Introduction of national snow removal projects in the Hokuriku and Tohoku regions	1956	
The 1961 Heavy Snowfall Research on avalanche measures and snowfences under national assistance	1961	Groundwater snow-melting (Pref.)
		Electric road heating (Iwate Pref.)
The 1963 Heavy Snowfall Studies of snow removal machinery	1963	Traditional collector snow

Panel 9

Multi-governmental collaboration



Panel 10

Responses to winter and to snow disasters



7

Winter road management policies

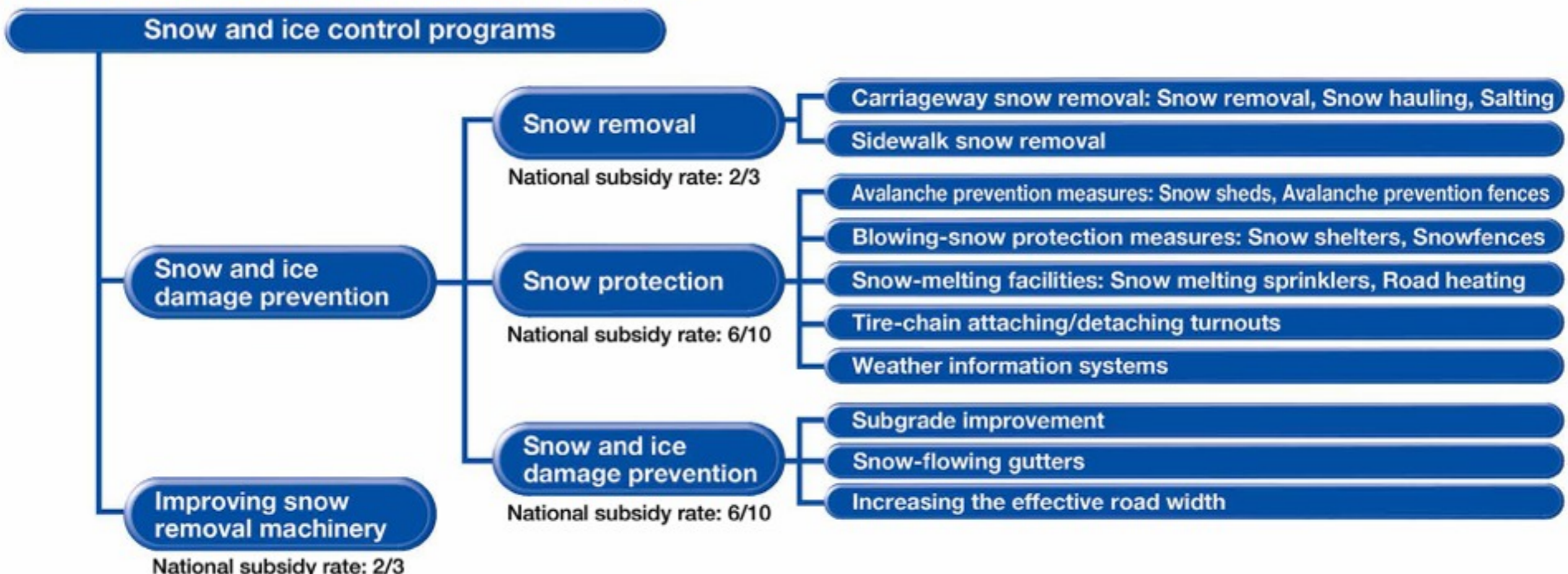
Politiques de gestion des routes en hiver

Polítiques de gestió de les carreteres a l'hivern

Voice Guide

Information

Policies for winter road control in Japan



National assistance to local governments for extreme snowfall events

● Materials and personnel

- Dispatching a disaster information liaison officer to the municipalities
- Providing snow removal machinery normally used by the regional bureau of the MLIT
- Dispatching Self Defence Forces for disaster relief operations at the request of the prefectural governor

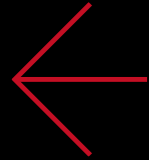
● Finances

- Example: In FY2011, the average cumulative annual snowfall around Japan was 150% of the annual average for the latest five years.
- A total of 10.5 bil. yen in contingency special financial assistance was provided to 275 municipalities for municipal road snow removal (subsidy rate: 1/2).
- In addition to the normal subsidies, a total of 5 bil. yen in additional snow removal subsidies (subsidy rate: 2/3) was provided to the relevant prefectures.

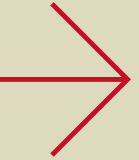
For further information:

National Highway and Risk Management Division, Road Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo, Japan 100-8918
Fax: +81-(0)3-5253-1620
e-mail: "road_bureau_info" followed by "@mlit.go.jp"
URL: <http://www.mlit.go.jp>

Back



Next



History of snow- and ice-control machinery and facilities

Histoire des machines et équipements de contrôle de la neige et du verglas

Història de les màquines i els equipaments per controlar la neu i el gel

Voice Guide

Information

Heavy snowfall events, snow- and ice-control policies and social background	Year	Technologies developed/introduced
Many roads are closed in winter	Since 1800	Use of open conduits for snow disposal (Hokuriku region)
	Until 1948	Hand-made V-plows attached to U.S.- or Japan-made tractors and earthworks machinery for carriageway snow removal (Hokkaido Pref.)
Establishment of the Ministry of Construction (former MLIT) Implementation of the first carriageway snow removal as a national project (Hokkaido Pref.)	1948	Various types of Japan-made snow removal machinery
Enactment of the 1956 Act on Special Measures concerning Maintenance of Road Traffic in Specified Snow Coverage and Cold Districts Establishment of a national snow removal subsidy system for relevant highways to revitalize winter activities of people and businesses in cold, snowy regions Widespread adoption of mechanical carriageway snow removal	1956	Pump-up snow-flowing gutter (Niigata Pref.)
Introduction of national snow removal projects in the Hokuriku and Tohoku regions	1958	
The 1961 Heavy Snowfall Research on avalanche measures and snowfences under national assistance	1961	Groundwater snow-melting sprinkler (Niigata Pref.) Electric road heating (Iwate Pref.)

Scroll

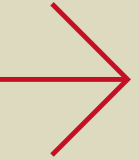
For further information:

National Highway and Risk Management Division, Road Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo, Japan 100-8918
Fax: +81-(0)3-5253-1620
e-mail: "road_bureau_info" followed by "@mlit.go.jp"
URL: <http://www.mlit.go.jp>

Back



Next



9

Multi-governmental collaboration

Coopération multi-gouvernementale

Cooperació multigovernamental

Voice Guide

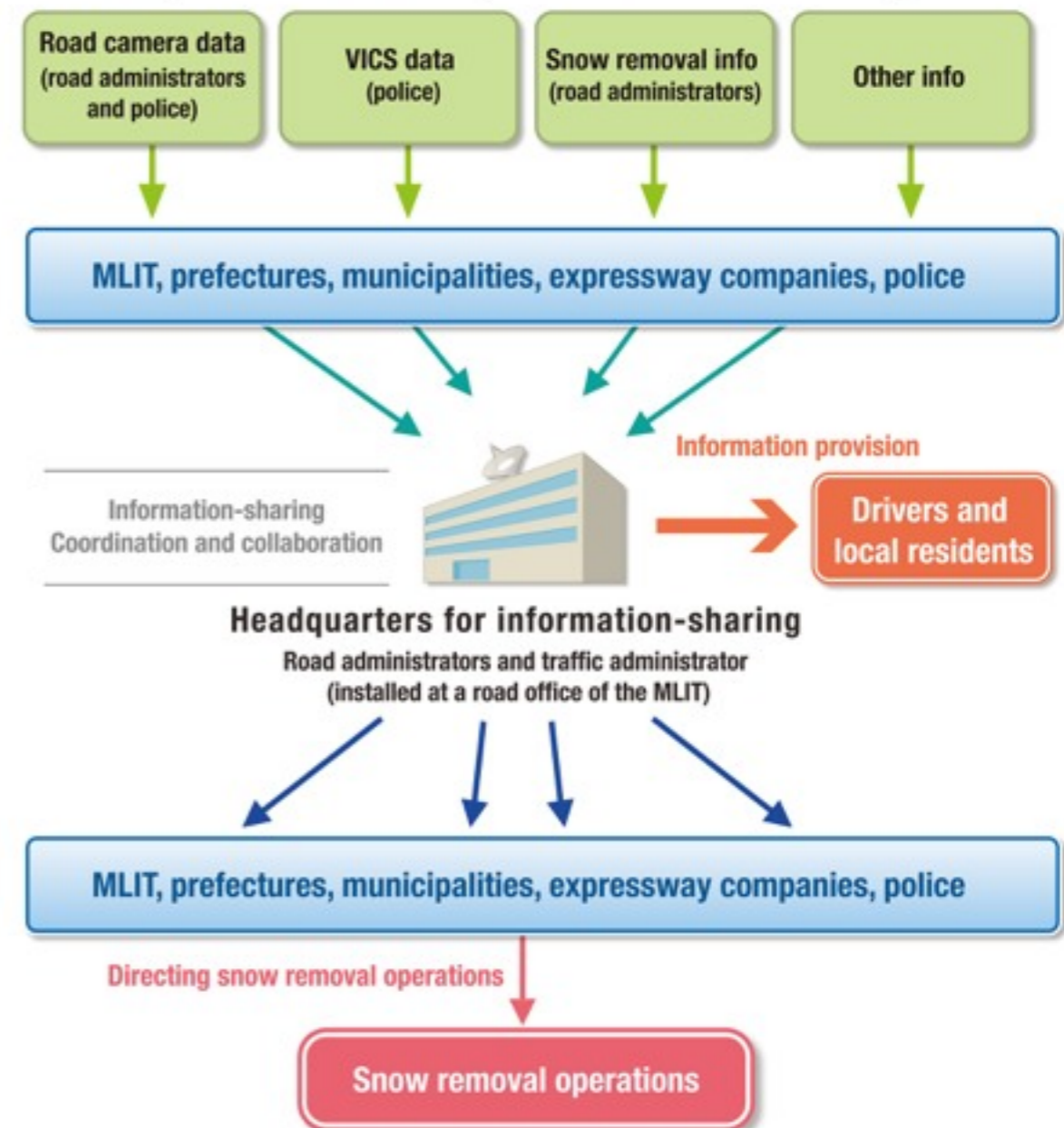
Information →

Headquarters for multi-governmental information-sharing



A road office of MLIT

Organization of the headquarters for information-sharing



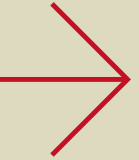
For further information:

National Highway and Risk Management Division, Road Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 2-1-3, Kasumigaseki, Chiyoda-ku, Tokyo, Japan 100-8918
Fax: +81-(0)3-5253-1620
e-mail: "road_bureau_info" followed by "@mlit.go.jp"
URL: <http://www.mlit.go.jp>

Back



Next



10

Responses to winter and to snow disasters

Réponses face aux catastrophes hivernales et neigeuses

Resposta davant de les catàstrofes hivernals i amb neu

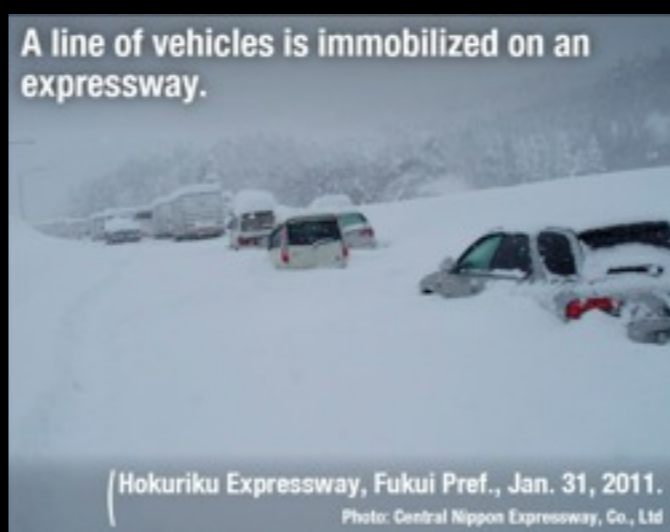
Voice Guide

Information

Echelon ploughing on the Tomei Expressway



A line of vehicles is immobilized on an expressway.



Relief supplies are delivered by snow mobile



A vehicle that cannot climb the slope blocks traffic.



The development of a small crawler snowblower capable of operating in deep snow



Provisioning *Michi-no-ekis* (roadside rest areas) as disaster response bases and relief shelters



For further information:

Expressway snow removal and snowfall disaster responses

International Team, Central Nippon Expressway Co., Ltd.

Address: 2-18-19 Nishiki, Naka-ku, Nagoya, Aichi Prefecture 460-0003

Phone: +81-(0)52-222-3679

Fax: +81-(0)52-222-3633

e-mail: "k.okamoto.ac" followed by "@c-nexco.co.jp"

URL: <http://global.c-nexco.co.jp/en>

A small crawler snowblower

Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 9-15, Futsuka-cho, Aoba-ku, Sendai, Miyagi Prefecture 980-8602

Fax: +81-(0)22-225-6988

e-mail: "doukan3" followed by "@thr.mlit.go.jp"

URL: <http://www.thr.mlit.go.jp>

Michi-no-eki Asahi

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

Fax: +81-(0)25-280-8938

e-mail: "doukan" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

Back



Panel 11

Information provision to expressway users



Panel 12

Information dissemination for road users



Panel 13

Information dissemination for road administrators



11

Information provision to expressway users

Offre d'informations aux usagers des autoroutes

Les informacions destinades als usuaris de les autopistes

Voice Guide

Next

Weather radar, current weather conditions, weather warnings, DoraCon Ups/Downs

Rain cloud radar



Rain cloud radar

Cautions issued for the expressway



Cautions issued for the expressway

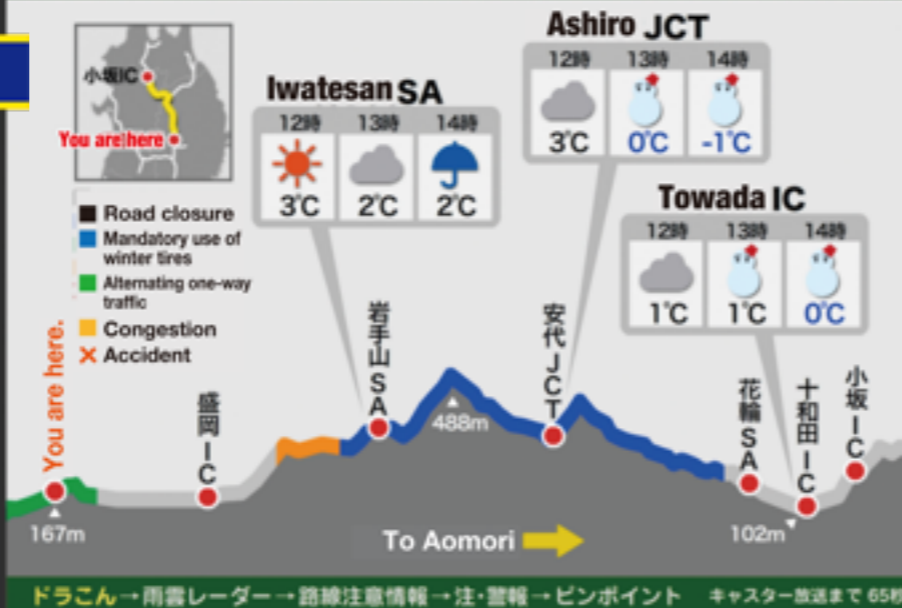
Current info on the expressway



Current info on the expressway

Information provision view

Dorakon Weather & Traffic Info



Accident closure: Kunimi-Shiroishi

Notice (moving captions): Road closures, emergency info

Dorakon Traffic Info



Notifications

平成26年3月31日まで
継続します

※現在対象となっている方や
ご利用方法等に変更はありません

Area-wide traffic info



Road traffic info



Snow and ice control operations



Today's weather

Notifications / Road safety educational videos

Caution! Strong winds and blowing snow in the afternoon!

Wind speed will exceed 15 m/s
Snowstorm Warning issued

Caution! Snowstorm ahead!

Notification

Thank you for your understanding regarding snow removal

低速走行の
ご協力をお願いします。

Road safety educational videos

Dedicated information terminal



11

Information provision to expressway users

Offre d'informations aux usagers des autoroutes

Les informacions destinades als usuaris de les autopistes

Next



For further information:

International Department, East Nippon Expressway Co., Ltd.

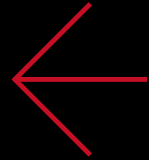
Address: New Kasumigaseki Bldg., 3-2, Kasumigaseki 3-chome
Chiyoda-ku, Metropolitan Tokyo 100-8979

Fax: +81-(0)3-3506-0355

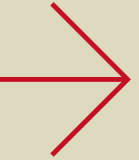
e-mail: "International" followed by "@e-nexco.co.jp"

URL: <http://www.e-nexco.co.jp/company>

Back



Next



12

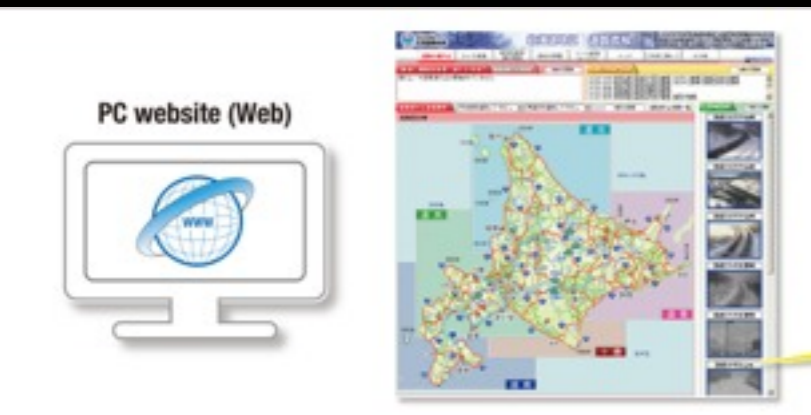
Information dissemination for road users

Diffusion de l'information aux usagers de la route

Difusió de la informació als usuaris de carreteres

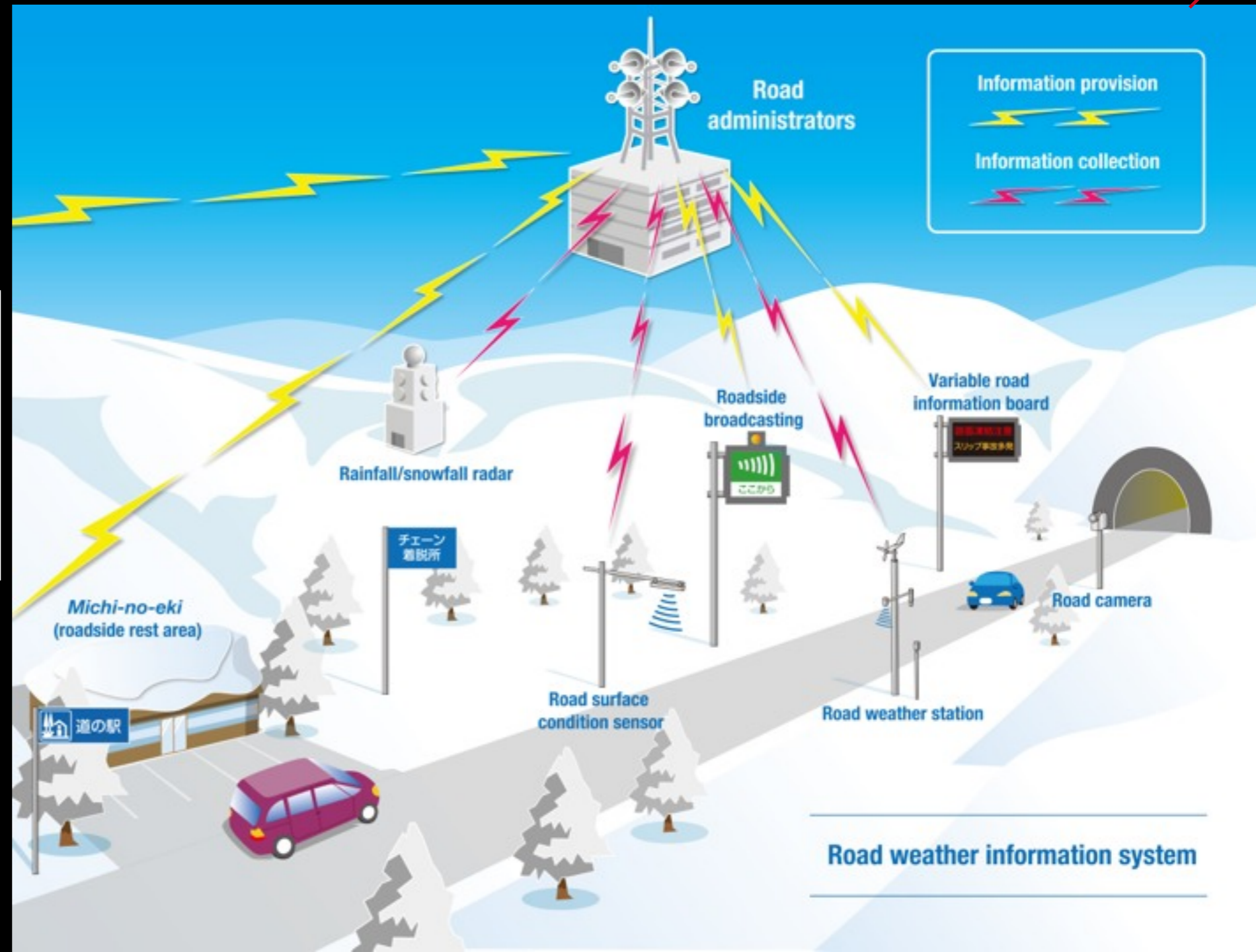
Voice Guide

Information →



The provided information includes the following:

- Road closure info
- Mountain pass info
- Info on roads blocked by incapacitated vehicles
- Road visibility info
- Road camera images



For further information:

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau

Ministry of Land, Infrastructure, Transport and Tourism, Japan

Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

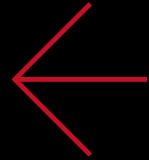
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

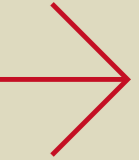
e-mail: "gijutusoudan" followed by "@ceri.go.jp"

URL: <http://www.ceri.go.jp>

Back



Next



13

Information dissemination for road administrators

Diffusion de l'information aux gestionnaires de la route

Difusió de la informació als gestors de carreteres

Voice Guide

Information



The Winter Road Friction Monitoring System

Information provision to PCs (Web-GIS)



The continuous friction tester



Weather information

Snowfall



Visibility (snowstorm)



Temperature



The Winter Maintenance Support System (Road Ice Forecast System)

Road surface temperature estimation



Ice risk assessment



Forecast at a road weather station



Road camera images



For further information:

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau

Ministry of Land, Infrastructure, Transport and Tourism, Japan

Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

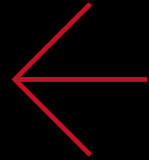
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

e-mail: "gijutusoudan" followed by "@ceri.go.jp"

URL: <http://www.ceri.go.jp>

Back



Panel 14

Resident-government
partnership

Panel 15

Awareness-raising

Panel 16

Mobile data
collection systems

Panel 17

Efficient deployment
of snow removal
machinery



14

Resident-government partnership Partenariat habitants/gouvernement Partenariat entre habitants i govern

Voice Guide

Information

Winter Volunteer Support Program



Resident volunteers fill PET bottles with sand.



Sanding by a passing pedestrian



(Sapporo, Hokkaido Pref.)

Small sidewalk snowblowers are lent free of charge.



(Route 8 in Tsubata, Ishikawa Pref.)

Roadside snowpiles are removed by collaboration between the government and a local group, so that tourists can see the ice flows.



The ice-covered Sea of Okhotsk

(Route 334 in Shari, Hokkaido Pref.)

For further information:

Small sidewalk snowblowers are lent free of charge.

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801
#1 Niigata Misaki Government Building

Fax: +81-(0)22-225-8938

e-mail: “doukan” followed by “@hrr.mlit.go.jp”

URL: <http://www.hrr.mlit.go.jp>

Resident volunteers fill PET bottles with sand.

Snow Removal Planning Section

Snow Management Office, Construction Bureau, City of Sapporo

Address: North 1 West 2, Chuo-ku, Sapporo, Hokkaido, Japan 060-8611

Fax: +81-(0)11-218-5141

e-mail: “yukikei” followed by “@kensetsu.city.sapporo.jp”

URL: <http://www.city.sapporo.jp/kensetsu/yuki/plan>

Local Collaborative Road Management

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

c/o Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

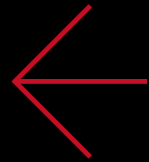
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: 81-(0)11-590-4048

e-mail: “gijutusoudan” followed by “@ceri.go.jp”

URL: <http://www.ceri.go.jp>

Back



Next



Posters to raise drivers' awareness of winter driving



Tips for walking on slippery winter roads for tourists



Inspecting to see whether chains are properly installed



Disseminating information on road weather and on road blockages by ill-prepared vehicles

A variable road information board



For further information:

Tire chain inspection

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801
#1 Niigata Misaki Government Building
Fax: +81-(0)22-225-8938
e-mail: “doukan” followed by "@hrr.mlit.go.jp"
URL: <http://www.hrr.mlit.go.jp>

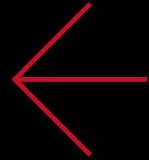
Tips for walking on slippery winter roads for tourists

Winter Life Promotion Council, Sapporo, Japan
Address: 2-17, North 11 West 2, Kita-ku, Sapporo, Hokkaido, Japan 001-0011
e-mail: “koroban” followed by “@tsurutsuru.jp”
URL: <http://www.winter-life.jp>

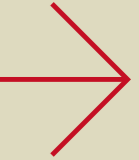
Disseminating information on road weather and on road blockages by stuck vehicles

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan
Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801
#1 Niigata Misaki Government Building
Fax: +81-(0)22-225-8938
e-mail: “doukan” followed by "@trr.mlit.go.jp"
URL: <http://www.hrr.mlit.go.jp>

Back



Next



16

Mobile data collection systems

Systèmes de collecte mobile de données

Sistemas de col·lecta mòbil de dades

Voice Guide

Information

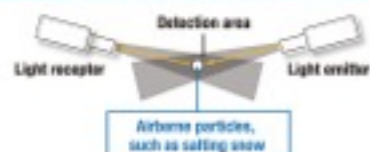
Visibility observation vehicle



Vehicle for measuring effective road width



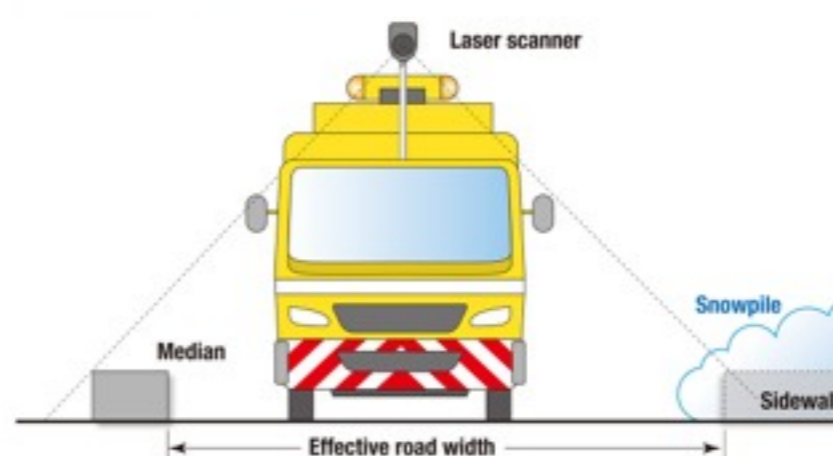
Sidescatter visibility meter



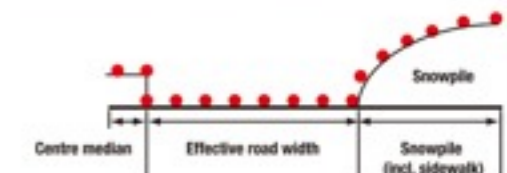
System configuration



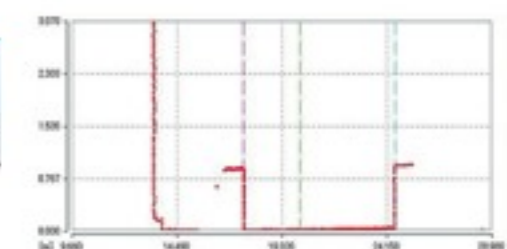
System configuration



Laser scanner measurement points



Measurements



For further information:

Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

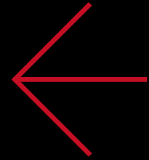
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

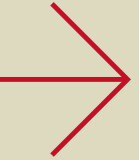
e-mail: “gijutusoudan” followed by “@ceri.go.jp”

URL: <http://www.ceri.go.jp>

Back



Next



17

Efficient deployment of snow removal machinery

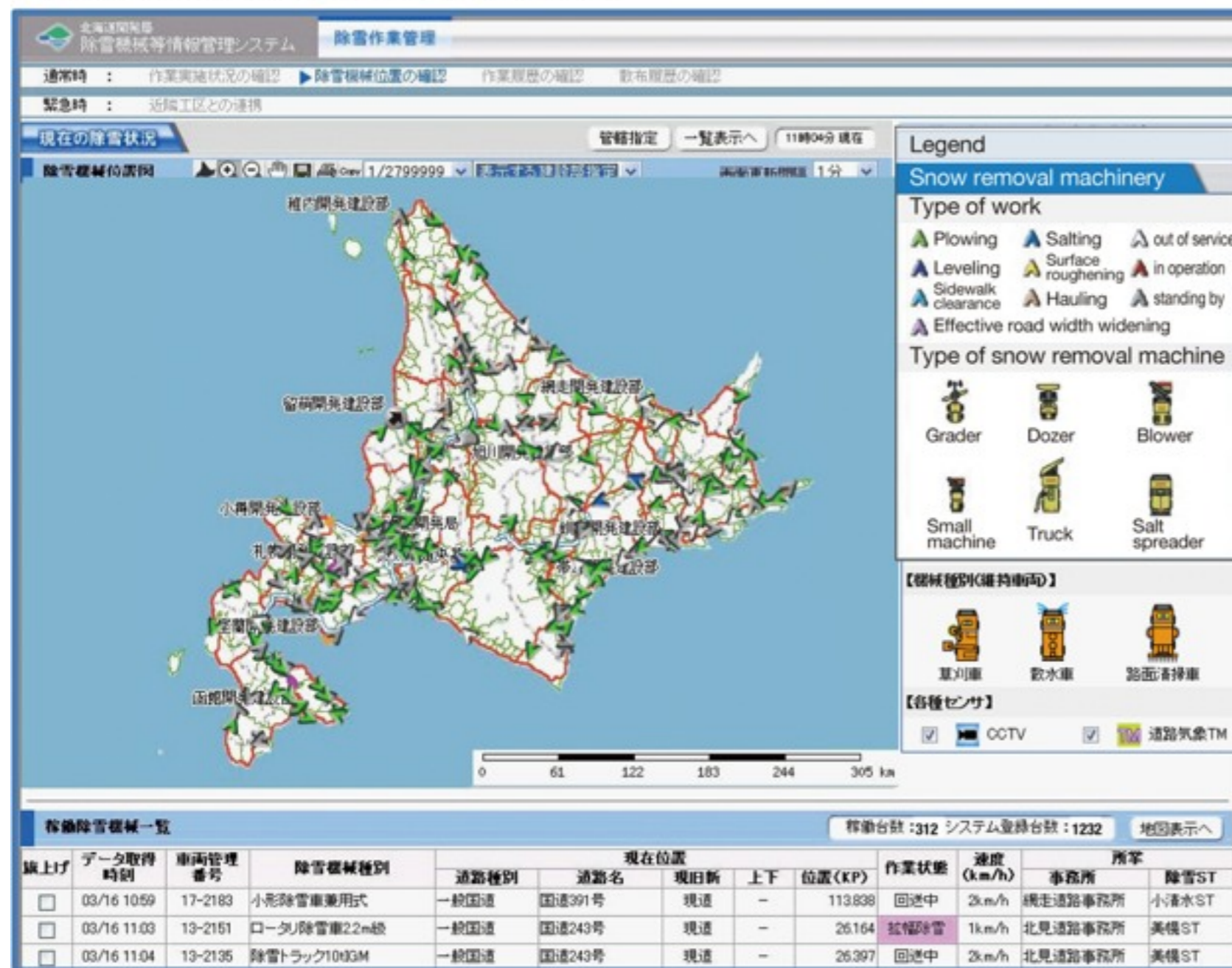
Déploiement efficace des équipements de déneigement

Desplegament eficaç dels equipaments llevaneu

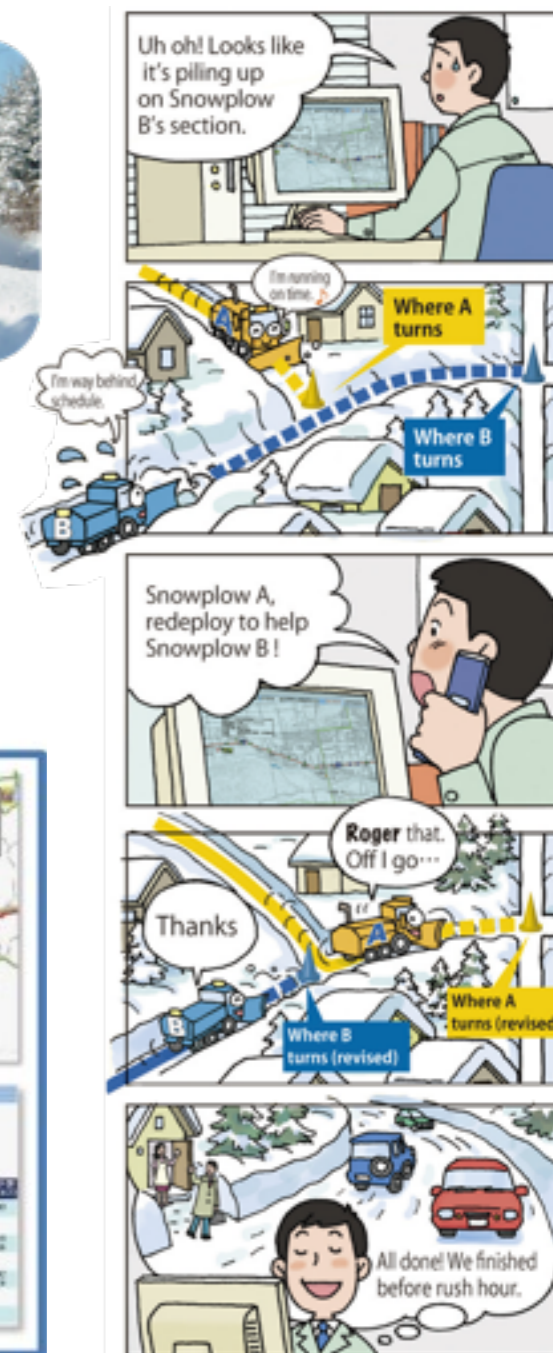
Voice Guide

Information

The Snow Removal Machinery Management System



Real-time tracking of snow removal vehicles



For further information:

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
Incorporated Administrative Agency Public Works Research Institute
Civil Engineering Research Institute for Cold Region

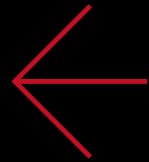
Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

e-mail: “gijutusoudan” followed by “@ceri.go.jp”

URL: <http://www.ceri.go.jp>

Back



17

Efficient deployment of snow removal machinery

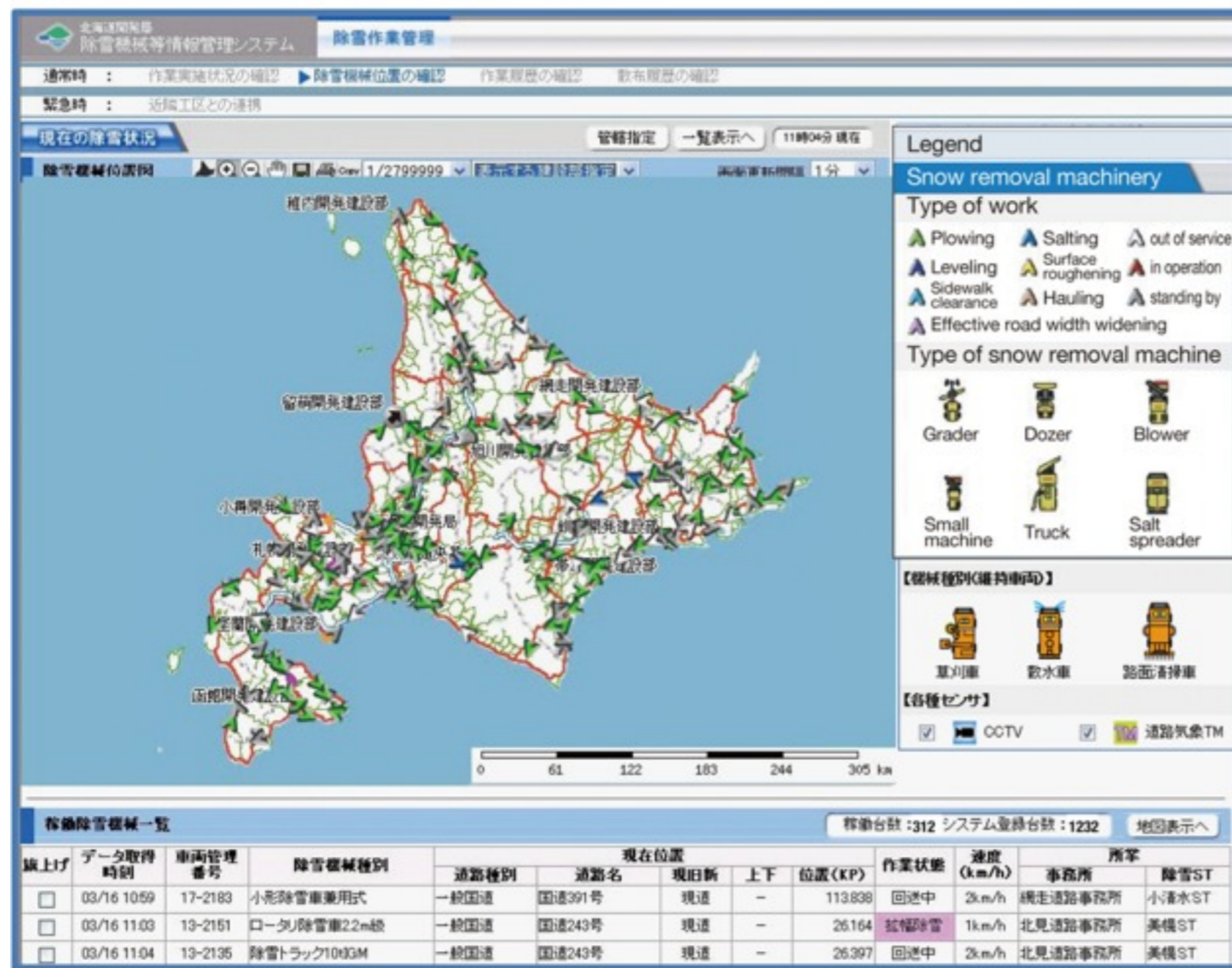
Déploiement efficace des équipements de déneigement

Desplegament eficaç dels equipaments llevaneu

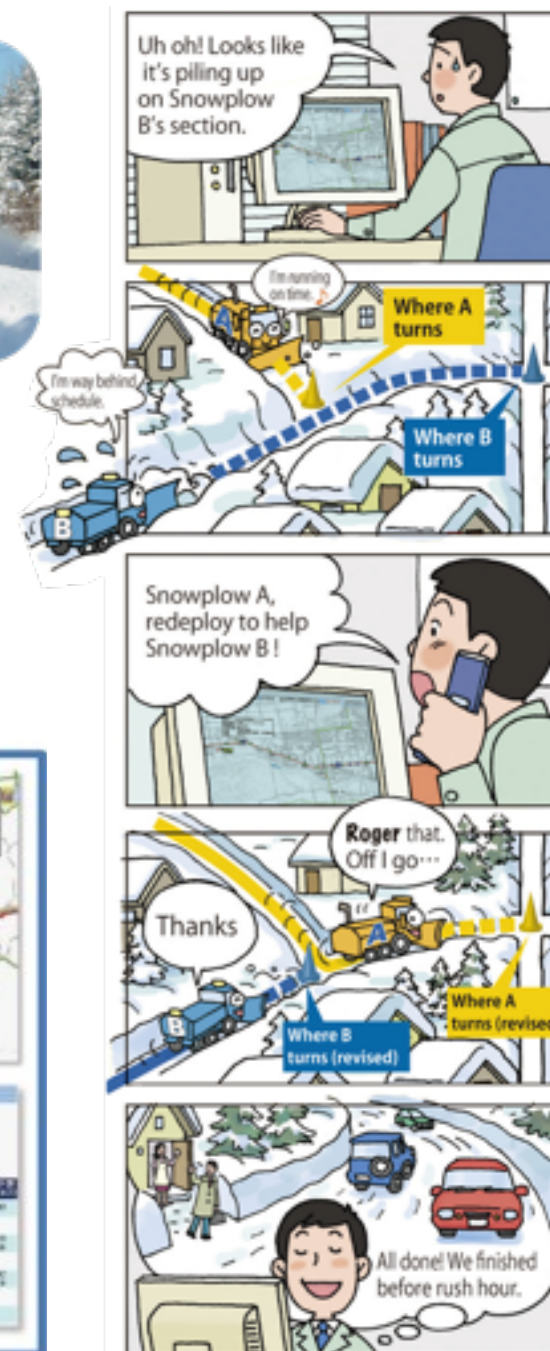
Voice Guide

Information

The Snow Removal Machinery Management System



Real-time tracking of snow removal vehicles



Panel
18

Snow-melting
facilities



Panel
19

Wind-powered
and hot-spring road
heating



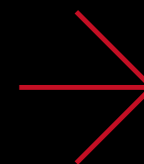
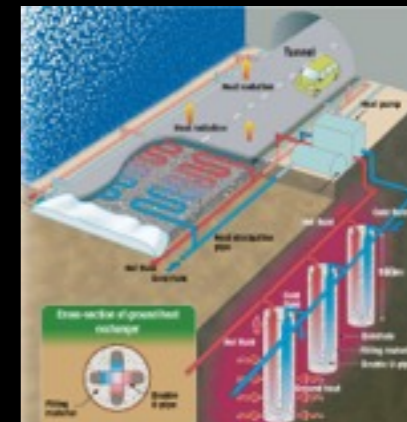
Panel
20

Ground-source
road heating



Panel
21

Heat-pump
road heating

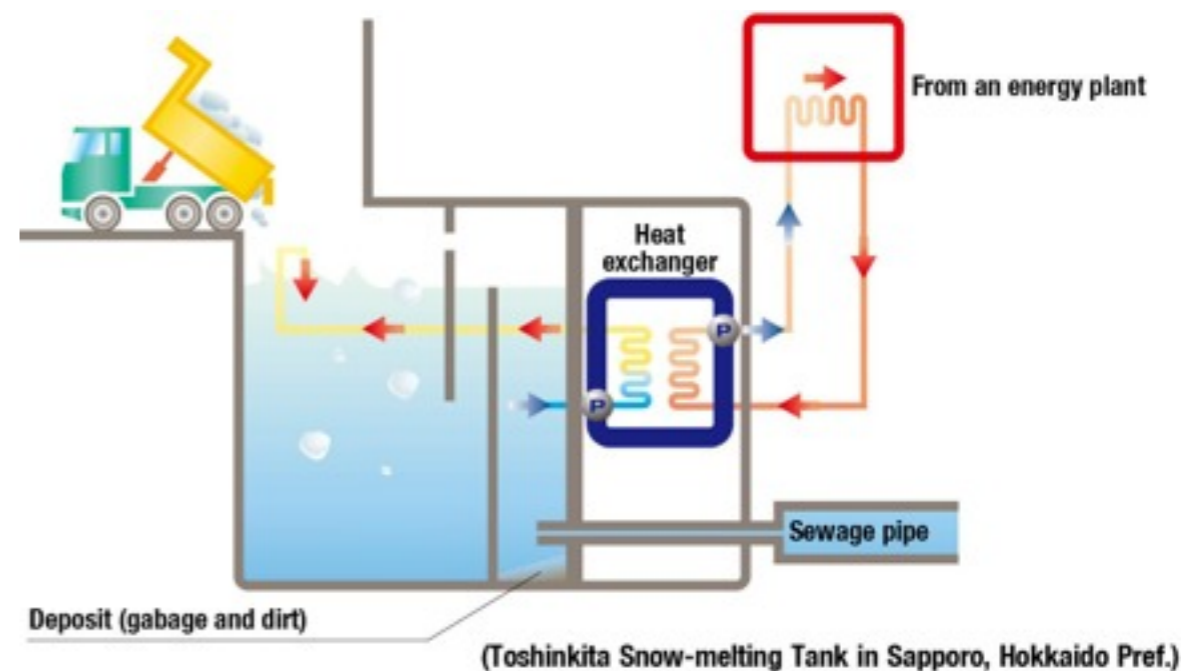


18

Snow-melting facilities Équipements de fonte de la neige Equipaments per a la fusió de la neu

Voice Guide

Information



For further information:

Snow-melting sprinklers

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

Fax: +81-(0)25-280-8938

e-mail: "doukan" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

Snow-flowing gutters

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau

Ministry of Land, Infrastructure, Transport and Tourism, Japan

c/o Incorporated Administrative Agency Public Works Research Institute

Civil Engineering Research Institute for Cold Region

Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

e-mail: "gijutusoudan" followed by "@ceri.go.jp"

URL: <http://www.ceri.go.jp>

A snow-melting tank uses the residual heat from a centralized urban heating system.

Snow Removal Planning Section

Snow Management Office, Construction Bureau, City of Sapporo

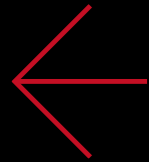
Address: North 1 West 2, Chuo-ku, Sapporo, Hokkaido, Japan 060-8611

Fax: +81-(0)11-218-5141

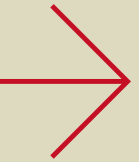
e-mail: "yukikei" followed by "@kensetsu.city.sapporo.jp"

URL: <http://www.city.sapporo.jp/kensetsu/yuki/plan>

Back



Next



Wind-powered and hot-spring road heating

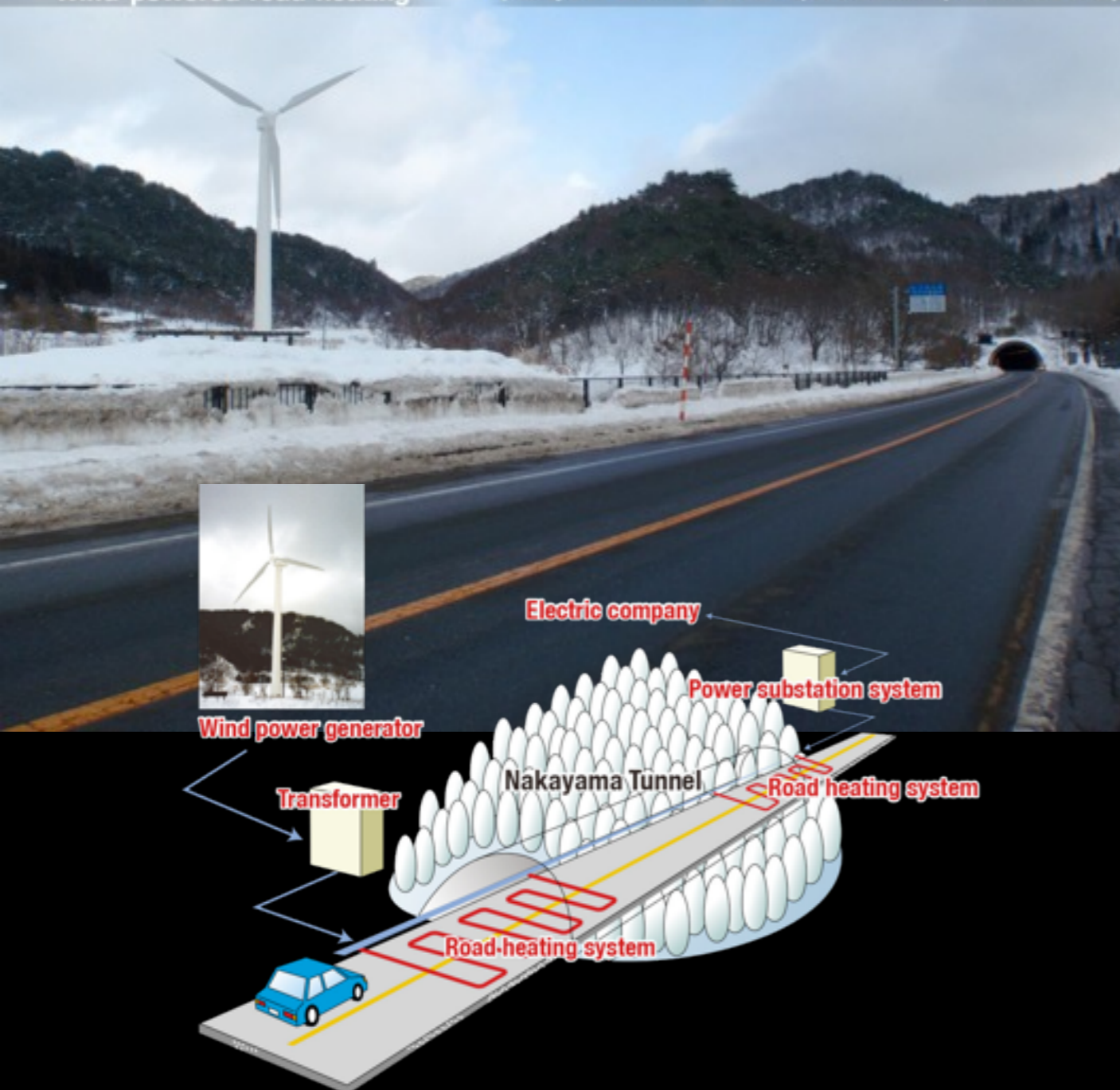
Chauffage de la chaussée à partir de l'énergie des éoliennes et des sources chaudes
Escalfament de la calçada amb energia d'aerogeneradors i fonts d'aigua calenta

Voice Guide

Information

Wind-powered road heating

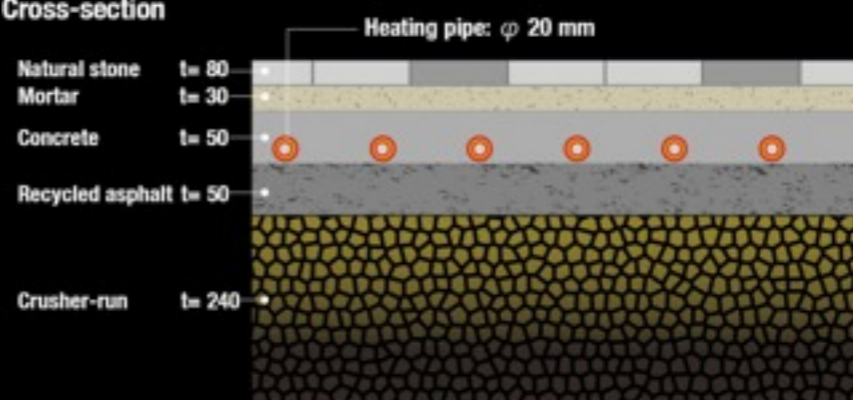
(Nakayama Tunnel on Route 49, in Inawashiro, Fukushima Pref.)



Hot-spring road heating

(Jozannkei Onsen Resort in Sapporo, Hokkaido Pref.)

Cross-section



Hot-spring water pipe

For further information:

Wind-powered road heating

Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 9-15, Futsuka-cho, Aoba-ku, Sendai, Miyagi Prefecture 980-8602

Fax: +81-(0)22-225-6988

e-mail: "doukan3" followed by "@thr.mlit.go.jp"

URL: <http://www.thr.mlit.go.jp>

Hot-spring road heating

Snow Removal Planning Section

Snow Management Office, Construction Bureau, City of Sapporo

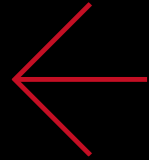
Address: North 1 West 2, Chuo-ku, Sapporo, Hokkaido, Japan 060-8611

Fax: +81-(0)11-218-5141

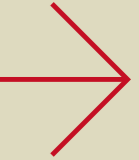
e-mail: "yukikei" followed by "@kensetsu.city.sapporo.jp"

URL: <http://www.city.sapporo.jp/kensetsu/yuki/plan>

Back



Next



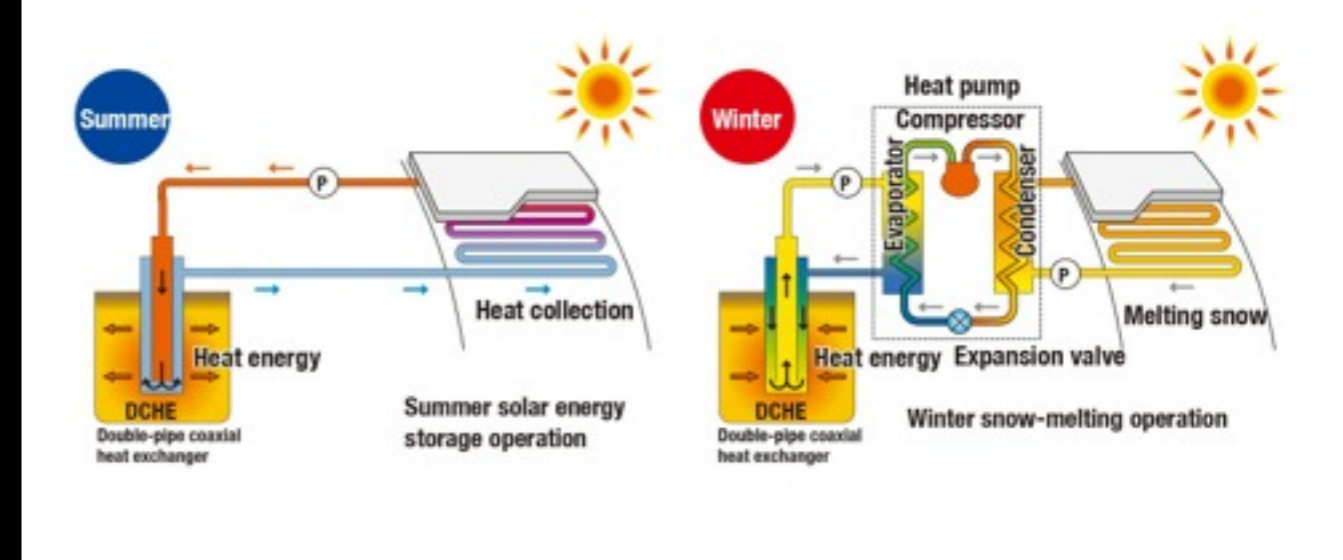
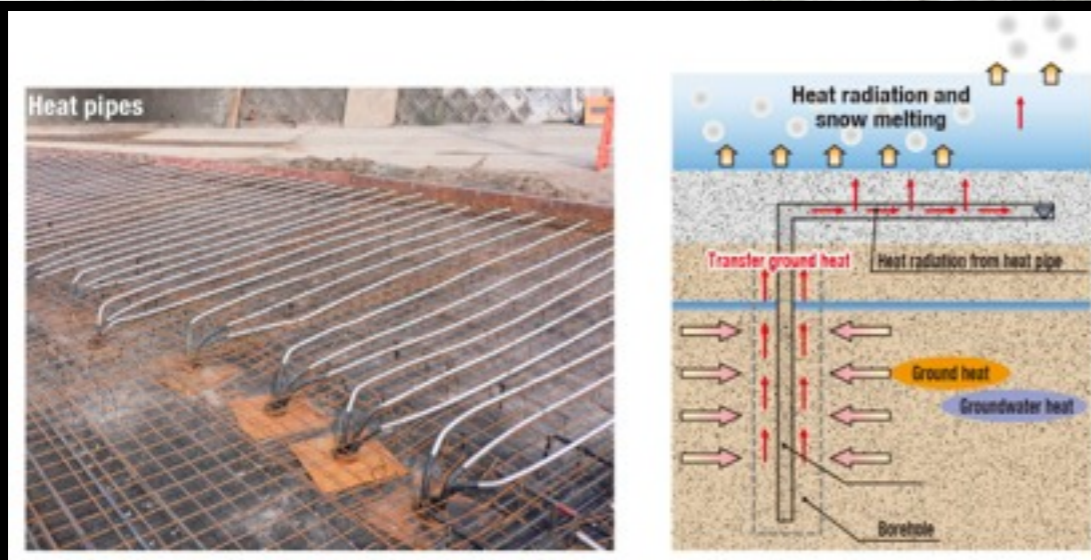
20

Ground-source road heating

Chauffage de la chaussée par pompe à chaleur géothermique
Escalfament de la calçada amb una bomba de calor geotèrmica

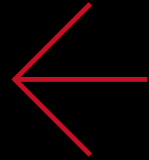
Voice Guide

Specifications →



Specifications

Back



Information



Ground-source heat-pipe road heating

Installation site: Benten IC on Niigata Bypass of Route 8, Niigata, Niigata Prefecture

Design conditions:

Design snowfall: 1.5 cm/h

Thermal load: 124 W/square metres

Facilities:

Borehole: $\phi 100$ mm \times 11 m - 20 m deep \times 131 holes

Heat pipe: PE-sheathed corrugated heat pipe

Diameter: $\phi 26.5$ mm

No. of units: 393 units

Installation interval: 200 mm

Area of road heating: 257.1 square metres

Solar and ground-source direct road heating

Installation site: Sidewalk on Route 4, Aomori, Aomori Prefecture

Design conditions:

Design snowfall: 1.9 cm/h

Ambient air temp.: -3.4 °C

Snow temp.: -3.4 °C

Snow density: 70 kg/cubic metres

Wind velocity: 4.0 m/s

Thermal load: 211 W/square metres

Facilities:

Double-pipe coaxial heat exchanger:
150 m ℓ \times 8 units

Heat pump output: 22.5 kW \times 2 units

Thermal output: 130 kW (65 kW \times 2 units)

Area of road heating: 659 square metres

For further information:

Ground-source heat-pipe road heating

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

Fax: +81-(0)25-280-8938

e-mail: "doukan" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp/>

Solar and ground-source direct road heating

Tohoku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

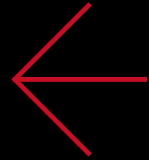
Address: 9-15, Futsuka-cho, Aoba-ku, Sendai, Miyagi Prefecture 980-8602

Fax: +81-(0)22-225-6988

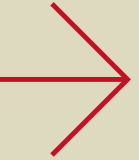
e-mail: "doukan3" followed by "@thr.mlit.go.jp"

URL: <http://www.thr.mlit.go.jp>

Back



Next



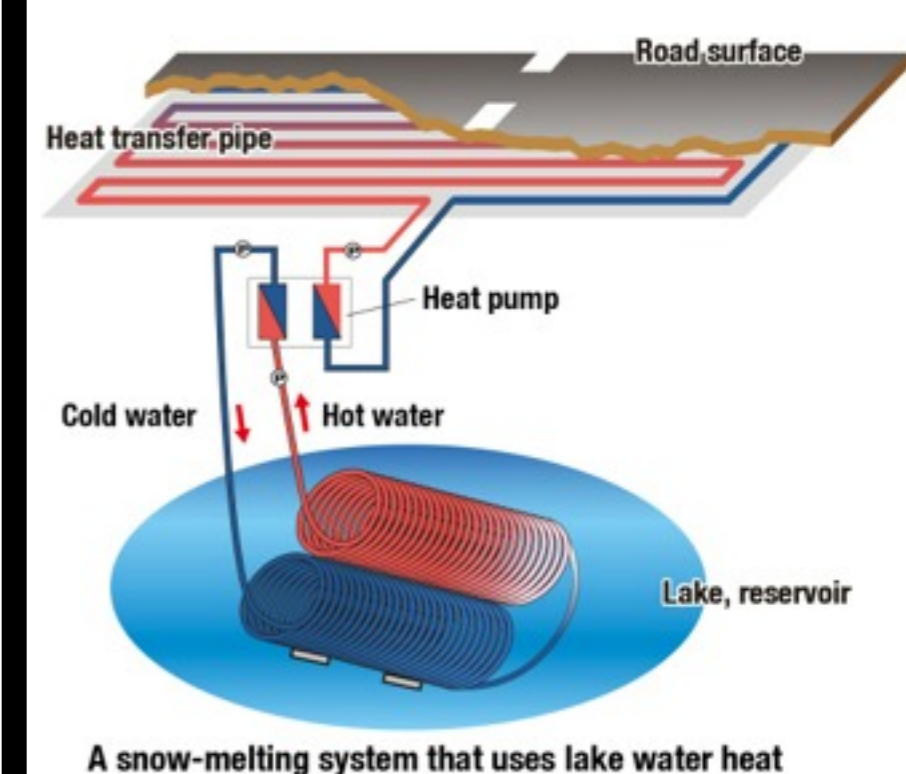
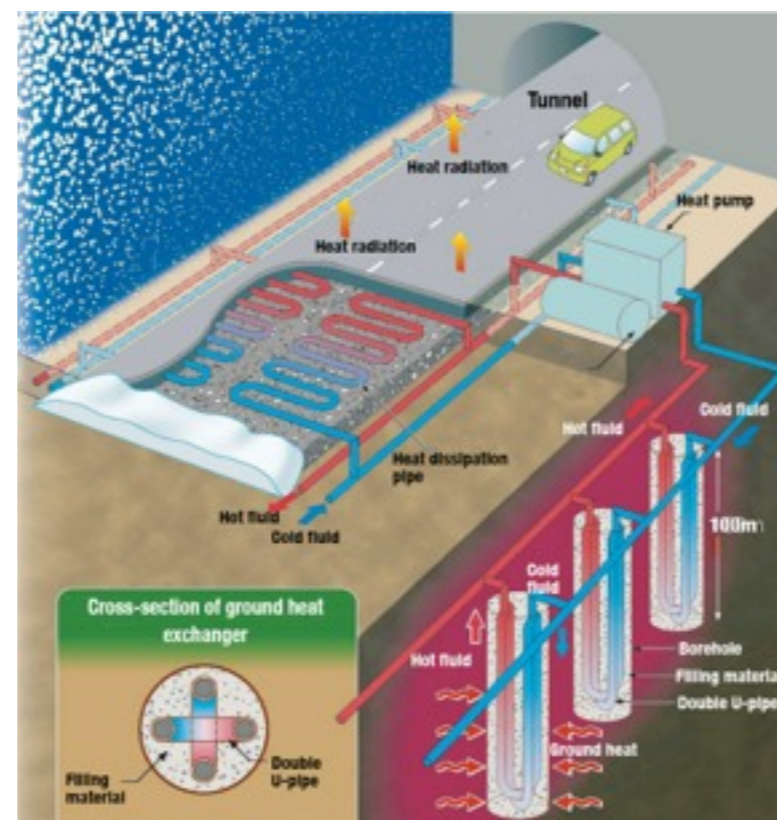
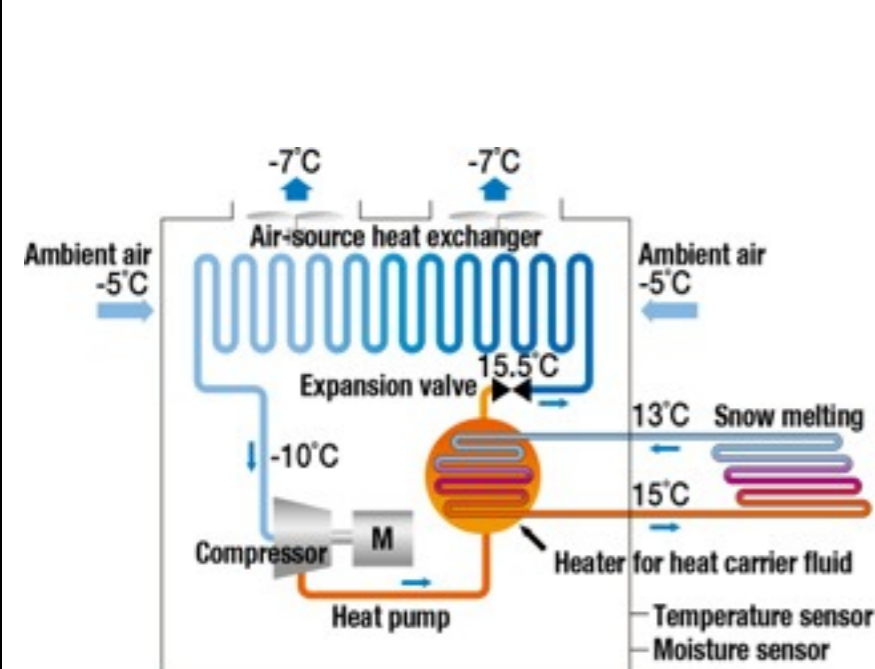
Heat-pump road heating

Chauffage de la chaussée par pompe à chaleur

Escalfament de la calçada amb una bomba de calor

Voice Guide

Specifications –



Air-source heat-pump road heating

Installation location: Route 7 in Odate, Akita Prefecture

Design conditions:

Design hourly snowfall: 0.68 cm/h (capable of melting 15 cm of snow in 22 hours daily)

Ambient air temp.: -7.0 °C (City Hall and Nagakura sections),

-5.0 °C (Ariura and Saiwaicho sections)

Snow temp.: -7.0 °C

Snow density: 80 kg/cubic metres

Wind velocity: 2.0 m/s

Thermal load: 140.7 W/square metres (City Hall and Nagakura sections)

Facilities:

Air-source heat pump: 143 kW (City Hall section)

200 kW (Nagakura section)

260 kW (Ariura section)

142 kW (Saiwaicho section)

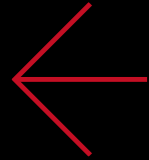
Area of road heating: 1,158 square metres (City Hall section)

1,872 square metres (Nagakura section)

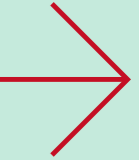
3,032 square metres (Ariura section)

1,616 square metres (Saiwaicho section)

Back



Next



Ground-source heat-pump road heating

Installation site: Sekiyama Tunnel on Route 48 in Tone, Yamagata Prefecture

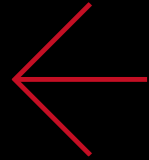
Design conditions:

Design snowfall: 2.4 cm/h
Ambient air temp.: -6.1°C
Snow temp.: -6.1°C
Snow density: 60 kg/cubic metres
Wind velocity: 3.8 m/s
Thermal load: 200 W/square metres

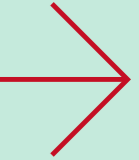
Facilities:

Compressor: 42 kW
Plate-type heat exchanger
Circulation pump for heating pavement: 353 ℓ /min X 22 mAq X 5.5 kW X 1 unit
Main pump: 535 ℓ /min X 14 mAq X 3.0 kW X 1 unit
Heat storage tank: 17 cubic metres
Borehole: φ165 X 100 m deep X 18 units
Area of road heating: 700 square metres
CO2 reduction: 46% reduction compared with electric coil system

Back



Next



Lake water-source heat-pump road heating

Installation site: Inawashiro Lakeside on Route 49 in Inawashiro, Fukushima Prefecture

Design conditions:

Design snowfall: 2.05 cm/h

Ambient air temp.: -5.7°C

Snow temp.: -5.7°C

Facilities:

Heat collection: heat exchanger loop coils $\phi 25$ mm X 100 m/coil = total 200 coils

Heat source:

Water cooled heat pump: heating capacity of 80 kw X 4 units; 65 kw X 4 units

Circulation pump (heat source): 3.7 kw X 4 units; 2.2 kw X 2 units; 1.5 kw X 2 units

Circulation pump (hot water): 0.75 kw X 8 units

Circulation pump (heat release): 3.7 kw X 4 units; 1.5 kw X 4 units (alternate operation)

Heat storage tank: 3,000 ℓ X 4 units

Area of road heating: 480 m X 2 lanes (area: 3,040 square metres)

Heating method: Circulating hot water ($\phi 15$ X 150 mm)

Pavement: asphalt pavement

Control system: Two-element control: moisture sensor + surface temperature

Back

Information

For further information:

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801

#1 Niigata Misaki Government Building

FAX : +81-(0)25-280-8917

E-mail : "chiiki-douro" followed by "@hrr.mlit.go.jp"

URL : <http://www.hrr.mlit.go.jp>

Back





Avalanche and
snowstorm
countermeasures



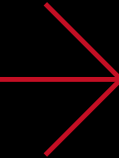
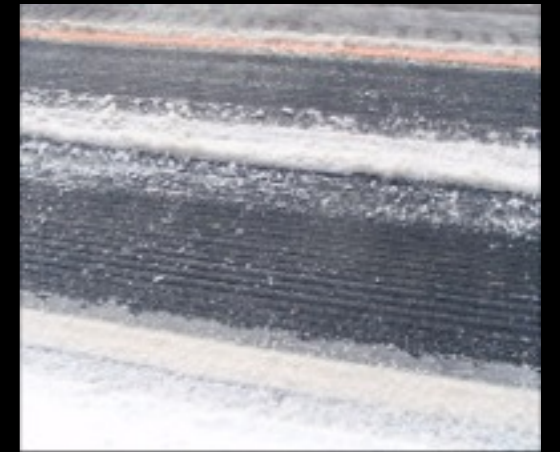
Snowstorm
countermeasures



Snow and ice control
at tunnels



Freeze-resistant
pavements



22

Avalanche and snowstorm countermeasures

Mesures de lutte contre les avalanches et les tempêtes de neige
Mesures per lluitar contra les allaus i les tempestes de neu

Voice Guide

Information

Snowshed



(Lake Shikotsu on Route 453 in Chitose, Hokkaido Pref.)

Parking shelter



(Route 238 in Sarufutsu, Hokkaido Pref.)

Avalanche control fence



(Nakayama Pass on Route 230 in Sapporo, Hokkaido Pref.)

Solid barrier preventing snow from blowing up from the valley side



(Nakayama Pass on Route 230 in Sapporo, Hokkaido Pref.)

For further information:

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
c/o Incorporated Administrative Agency Public Works Research Institute
Civil Engineering Research Institute for Cold Region

Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

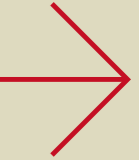
e-mail: "gijutusoudan" followed by "@ceri.go.jp"

URL: <http://www.ceri.go.jp>

Back



Next



23

Snowstorm countermeasures

Mesures contre les tempêtes de neige

Mesures per lluitar contra les tempestes de neu

Voice Guide

Information

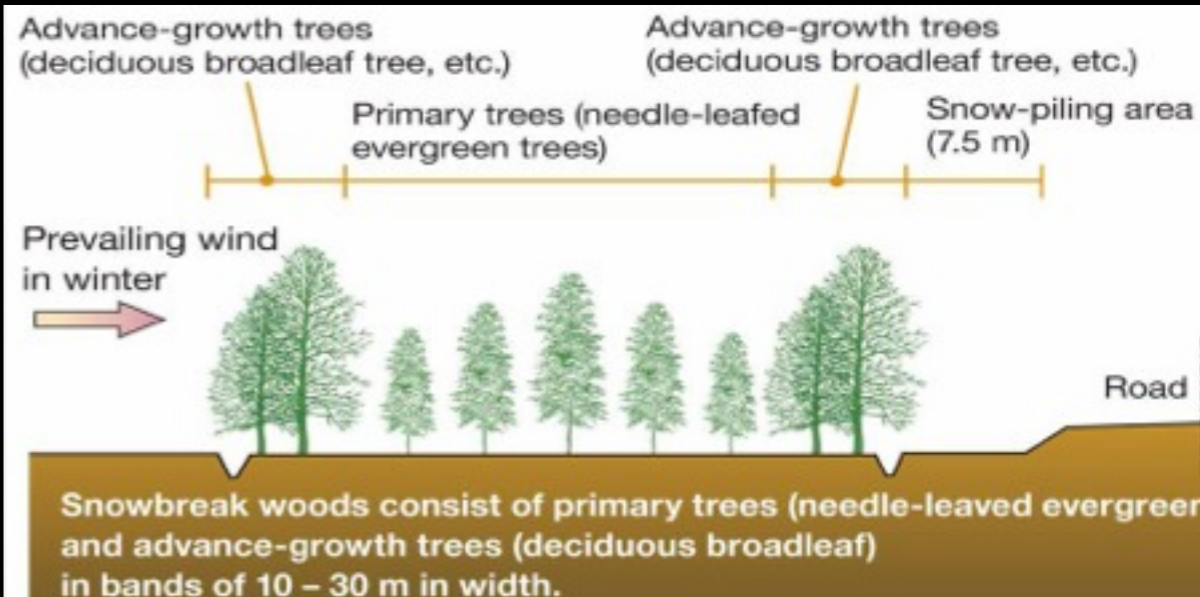
Light-emitting arrow-shaped delineators



Snowbreak woods



Snow fence



For further information:

Road Maintenance Division, Construction Department, Hokkaido Regional Development Bureau
Ministry of Land, Infrastructure, Transport and Tourism, Japan
c/o Incorporated Administrative Agency Public Works Research Institute
Civil Engineering Research Institute for Cold Region

Address: 1-43 Hiragishi 1-jo 3-chome, Toyohira-ku, Sapporo, Hokkaido, Japan 062-8602

Fax: +81-(0)11-590-4048

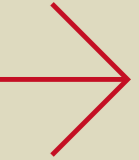
e-mail: “gijutusoudan” followed by “@ceri.go.jp”

URL: <http://www.ceri.go.jp>

Back



Next



Snow and ice control at tunnels

Contrôle de la neige et du verglas dans les tunnels
Control de la neu i el gel als túnels

Voice Guide

Information

A far-infrared snow-melting system for tunnel portals



(Tokai-Hokuriku Expressway)



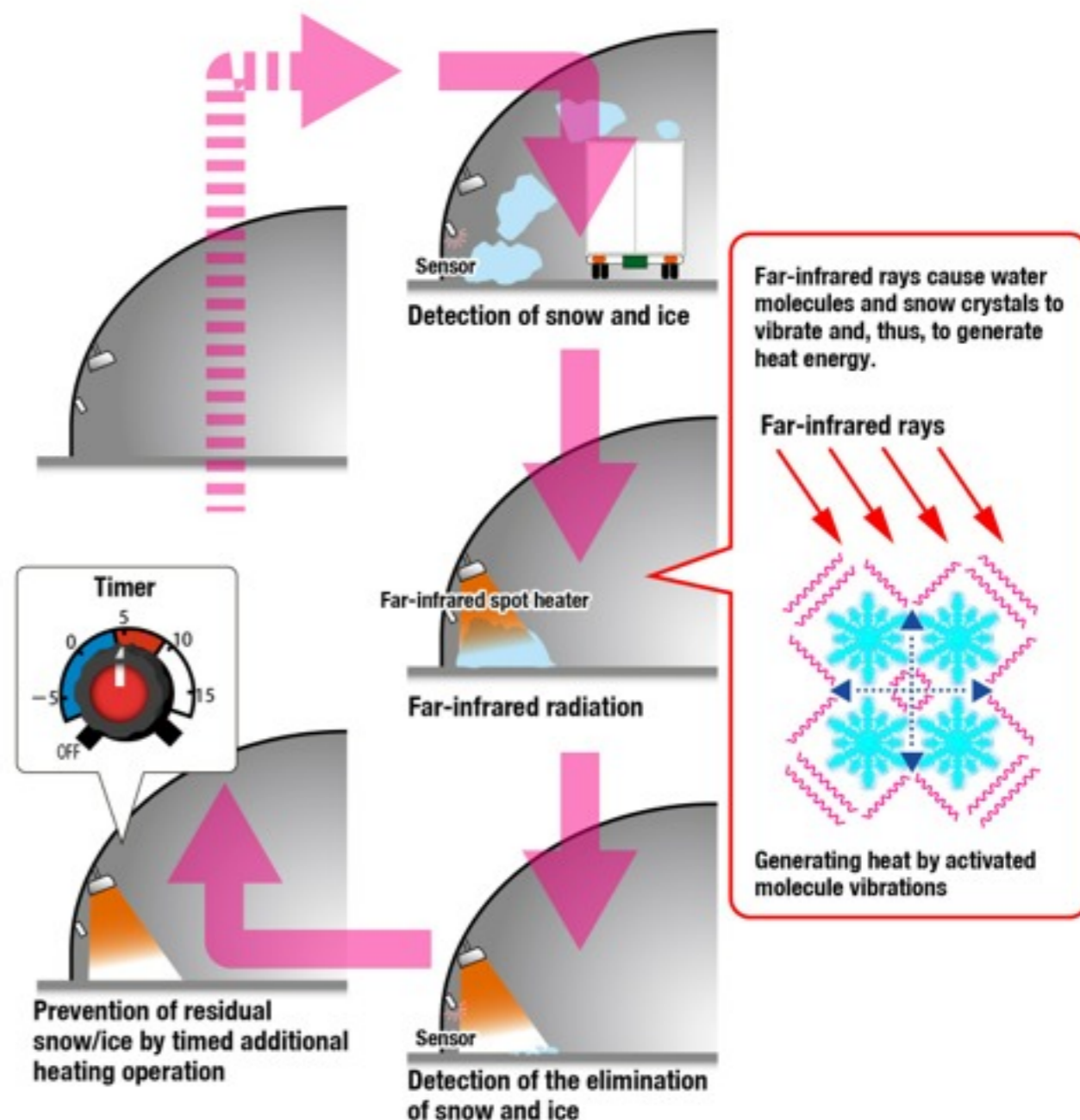
Start: Snow depth of 60 cm



10 hours later: Snow depth of 30 cm



17 hours later: Snow depth of 10 cm



For further information:

International Team, Central Nippon Expressway Co., Ltd.

Address: 2-18-19 Nishiki, Naka-ku, Nagoya, Aichi Prefecture 460-0003

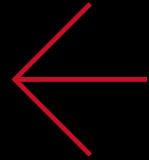
Phone: +81-(0)52-222-3679

Fax: +81-(0)52-222-3633

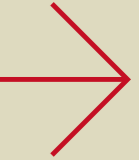
E-mail: "k.okamoto.ac" followed by "@c-nexco.co.jp"

URL: <http://global.c-nexco.co.jp/en>

Back



Next



25

Freeze-resistant pavements

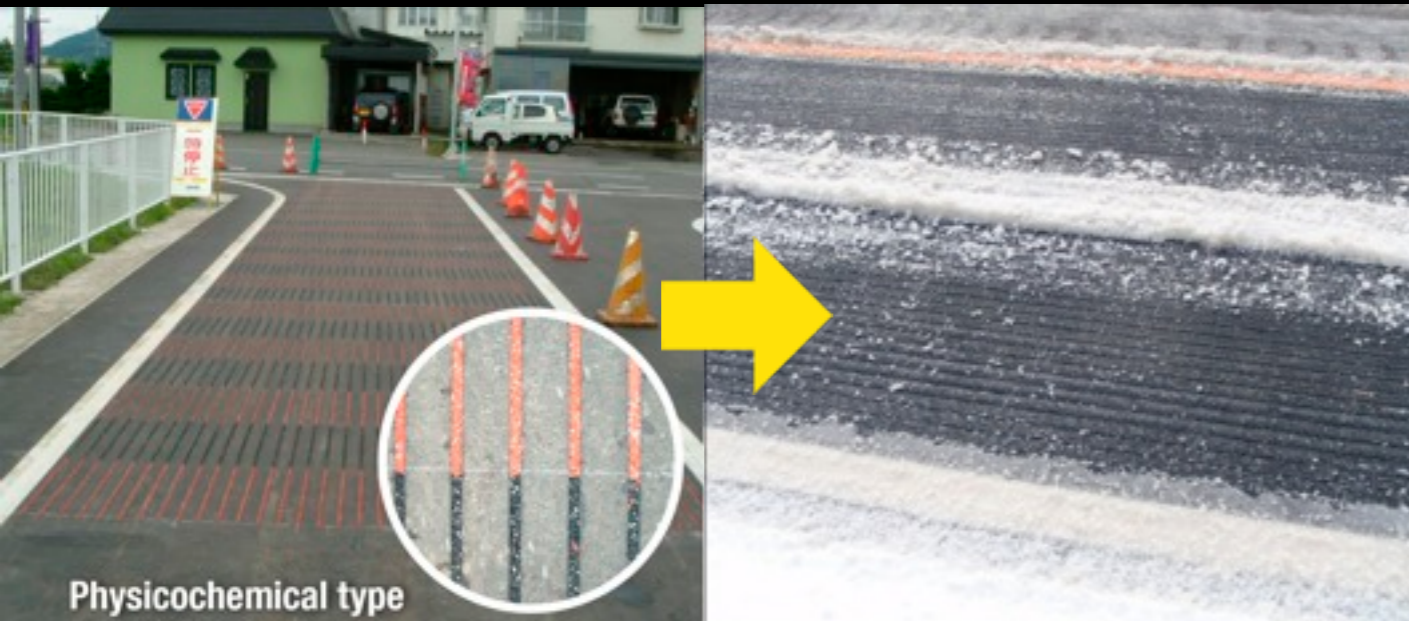
Chaussée résistante au gel

Calçades resistentes a les gelades

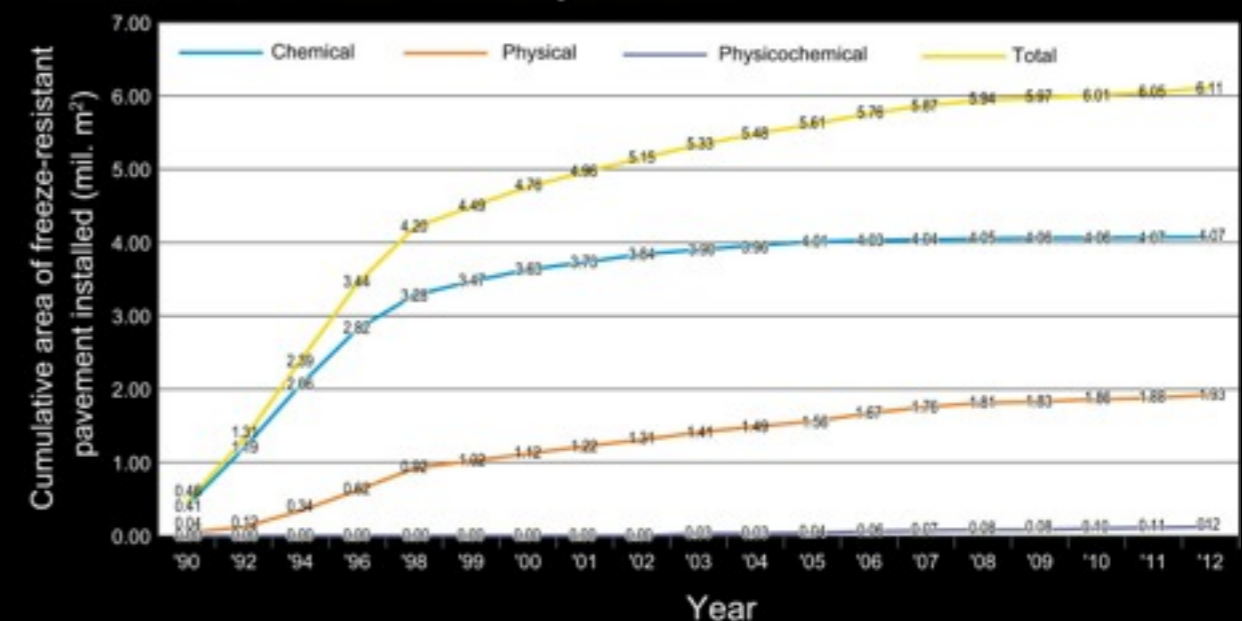


Voice Guide

Information



Increased use of freeze-resistant pavements



Method for Evaluating the Freeze-Resistance of Pavements

Ice adhesive strength test procedure

STEP-1 Prepare specimen

Shape the specimen; clean its surface.

STEP-2 Check room temp.

The low-temp. room should be -5°C .

STEP-3 Cure specimen (4h)

Immerse the nonwoven fabric of the test device in water and leave it for 4 h to freeze onto the specimen.

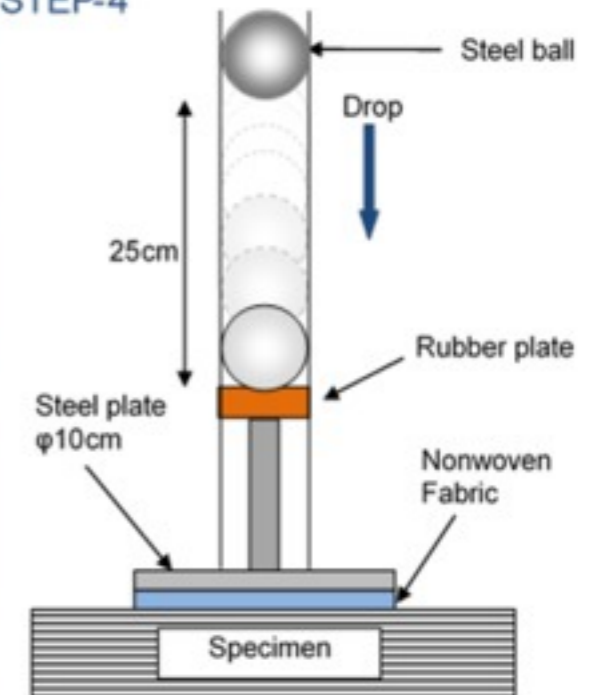
STEP-4 Drop steel ball

Drop a steel ball to give an impact to the specimen.

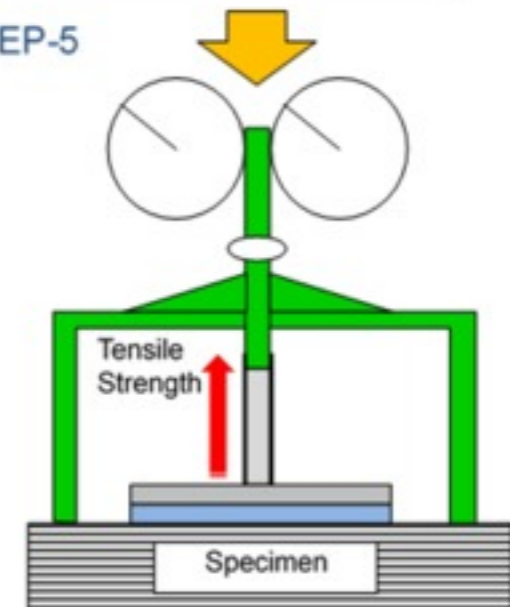
STEP-5 Perform ice adhesive strength test

Set the specimen at the tester to measure the ice adhesive strength.

STEP-4



STEP-5



For further information:

Freeze-resistant pavements

Japan Road Contractors Association, Inc.

Address: Tokyo Kensetsu Bldg., 2-5-1, Hachobori, Chuo-ku, Tokyo, Japan 104-0032

e-mail: "info" followed by "@dohkenkyo.or.jp"

URL: <http://www.dohkenkyo.com/english/>

Method for Evaluating the Freeze-Resistance of Pavements

Road Pavement Technology Research Association

Address: c/o Toa Road Corporation Research Laboratory 315-126, Kaname, Tsukuba, Ibaraki Prefecture, Japan 300-2622

Phone: +81-(0)29-877-4150

Fax: +81-(0)29-877-4151

e-mail: "t_hirato" followed by "@toadoro.co.jp"

URL: <http://www.touketsu-giken.com>

Back



Panel
26

Rotary snowblower



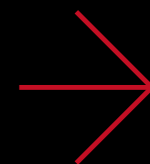
Panel
27

Measures to address
the shortages of
skilled operators



Panel
28

Onboard salinity
sensor



Rotary snowblower

NICHIO
日本除雪機製作所

26

Turbine à neige
Turbina llevanteu

Voice Guide

Next

HTR605



HTR306



HTR53



HTR146



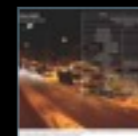
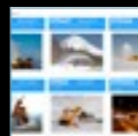
HTR407



HTR265L



NICHIO



For further information:

NICHIJO MANUFACTURING Co., Ltd.

Head office/plant

4-38, Inaho 3-jo 6-chome, Teine-ku, Sapporo, Hokkaido, Japan 006-0033

TEL : +81(0)11-681-3115

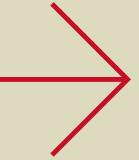
FAX : +81(0)11-682-1326

URL : <http://www.nichijo.jp>

Back



Next



Measures to address the shortages of skilled operators

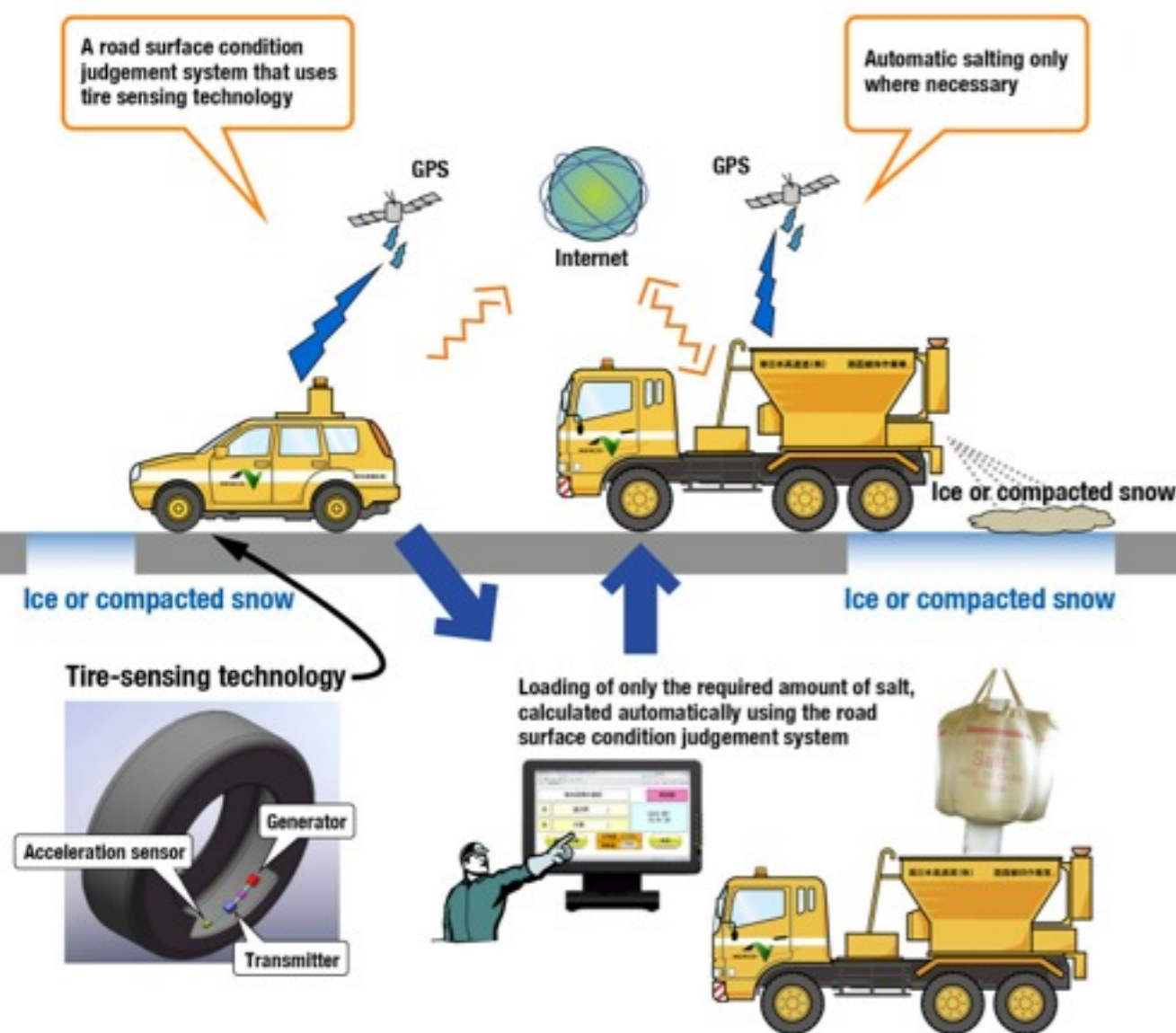
Mesures de lutte contre la pénurie d'opérateurs qualifiés

Mesures per lluitar contra la manca d'operadors qualificats

Voice Guide

Specifications

Automatic salting-control system using a road surface condition judgement system



Source: Nexco-Engineering Hokkaido Co., Ltd.

The easy-to-operate "Block Free" rotary sidewalk snowblower



Technologies developed

Automatic following of road unevenness



A dial for setting the driving speed according to the snow depth. This keeps snow from blocking the auger.



Resident groups that take part in the Volunteer Support Program use the blower.

The easy-to-operate 'Block Free' rotary sidewalk snowblower

Back

• Patents

(1) Automatic road surface unevenness following device for snow removal machines

Patent No. 4442730 (January 22, 2010)

(2) Automatic speed control of rotary snowblower to conform to the snow depth

Patent No. 4553154 (July 23, 2010)

• Specifications

Type of machine: Small rotary snowblower

Dimension: 4.7 m long x 1.0 m wide x 2.0 m high (when operating)

Weight: 2.5 tons

Passenger capacity: 1 person

Engine: Water-cooled diesel engine

Rating power: 30 kW

Drive system: All-wheel drive

Max. snow removal capacity: 200 ton/h

Chuting distance: 0 - 12 m

Max. snow removal width: 1.0 m

Max. height of snow to be removed: 0.8 m

Max. operating speed: 15 km/h

Information

For further information:

The easy-to-operate 'Block Free' rotary sidewalk snowblower

Hokuriku Regional Bureau, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Address: 1-1-1, Misaki-cho, Chuo-ku, Niigata, Niigata Prefecture 950-8801
#1 Niigata Misaki Government Building

FAX: +81-(0)25-280-8809

E-mail: "kikai" followed by "@hrr.mlit.go.jp"

URL: <http://www.hrr.mlit.go.jp>

Automatic salting-control system using a road surface condition judgment system

Nexco-Engineering Hokkaido Co., Ltd.

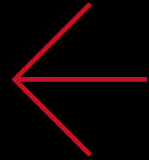
Address: 3-20, Higashi-Sapporo 5-jo 4-chome, Shiroishi-ku, Sapporo, Japan 003-0005

FAX: +81-(0)11-842-3274

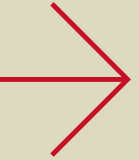
E-mail: "eng.ho" followed by "@e-nexco.co.jp"

URL: <http://www.e-nexco-engiho.co.jp>

Back



Next



28

Onboard salinity sensor

Capteur de salinité embarqué

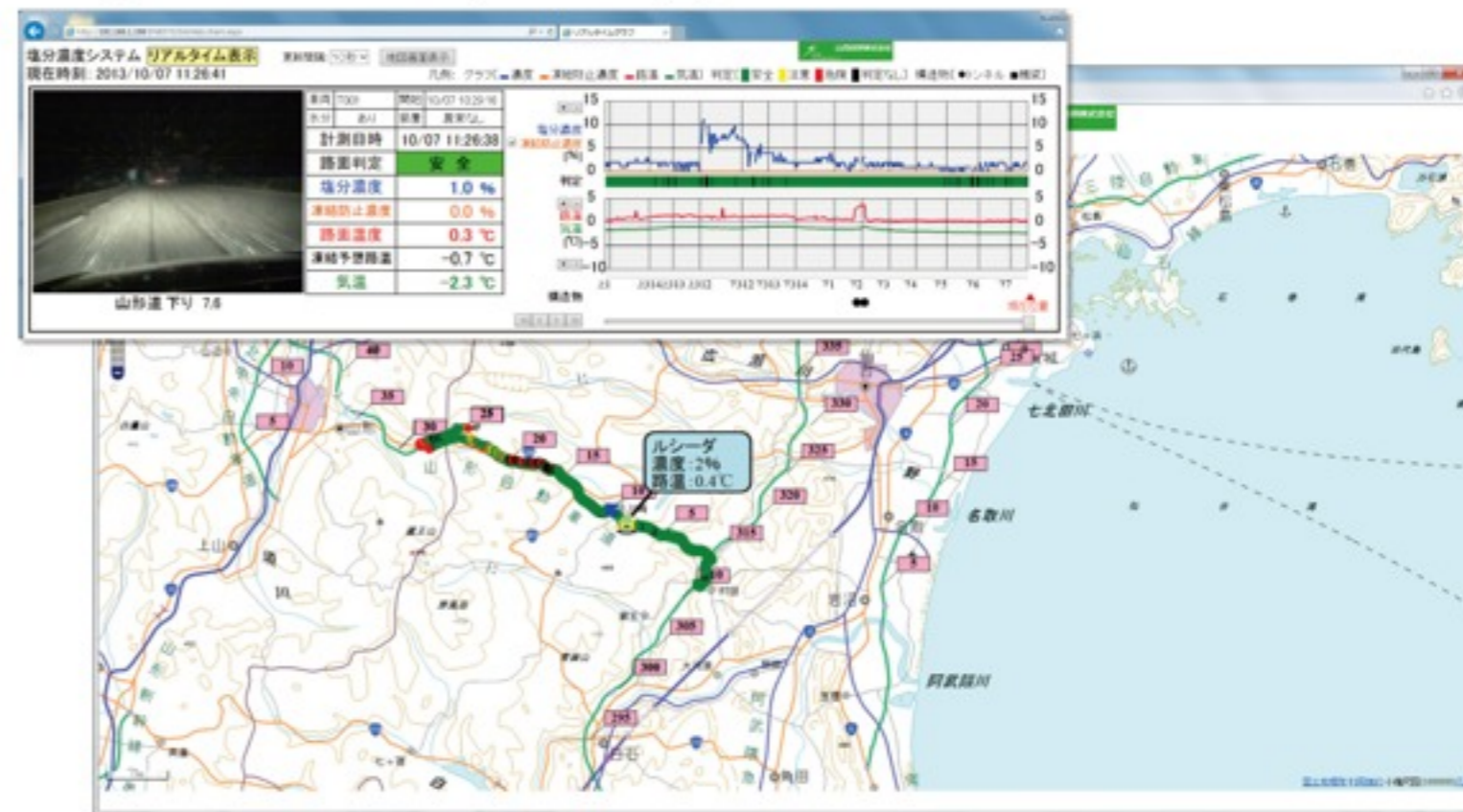
Captador de salinitat embarcat

Voice Guide

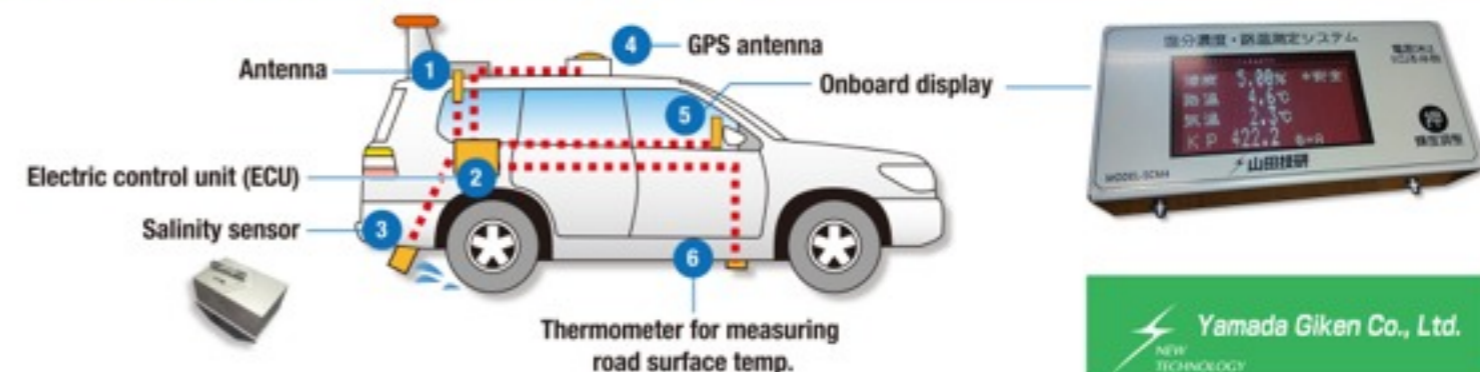
Specifications →



Salinity and road surface temperature display



Configuration of the onboard salinity measurement system



Salinity sensor specifications

Information

Detection method	Optical reflection index measurement
Subject of measurement	Sodium chloride. Calcium chloride and magnesium chloride also can be measured.
Salinity measurement range	0 – 20% (resolution: 0.25%)
Dimensions and weight	Salinity sensor: 120 mm x 180 mm x 130 mm; 3 kg Road surface thermometer: 74 mm x 120 mm x 84 mm; 1 kg
Salinity measurement accuracy	Error* in the field: < +/- 3% Error indoors: < +/- 1% Notes: 1) *Relative error. When the true value is 10%, the value indicated maybe between 7% and 13%. 2) 0.25% maybe indicated even when salinity is 0%.
Measureable surfaces	Sufficiently wet asphalt, concrete, porous asphalt, and some other wet surfaces. (Measurement not possible on dry road surface, gravel, dirt, compacted snow, ice and dry snow.)
Voltage	DC12V(±10%)/DC24V(±10%)
Power consumption	< 120 W (Sensor: 90 W incl. 60 W of heater; ECU: 30 W)
Data storage	USB memory, SD card
Design conditions	a) Sensor (outside vehicle): Operating temp.: -15 to 30°C; humidity: 40 to 90% Rh; Storage temp.: -35 to 70°C b) ECU (inside vehicle): Operating temp.: 0 to 50°C; humidity: 40 to 90% Rh; Storing temp.: -10 to 70°C
Waterproofing	Sensors: water-jet proof (JIS C0920 Class 5); however, not proofed against the water jets of a highpressure vehicle washer ECU: no waterproofing
Durable life	ECU and road surface thermometer: 4000 hours (about 5 years; under the assumption of 4 hr / day X 200 day/year). Salinity sensor: ditto. Preseason inspection needed. Optical device needs to be replaced every 30,000 km of driving.
Limitations	Sufficient moisture is needed on the road surface, because the sensor's optical measurement depends on the reflection index of water.

Back

For further information:

Yamada Giken Co., Ltd.

Address: Hanando Minami, Fukui, Fukui Pref. 918-8015 Japan

FAX: +81-(0)776-36-0623

E-mail: “suya” followed by “@yamada-giken.co.jp”

URL: <http://www.yamada-giken.co.jp/index.php>

Back

