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XIII INTERNATIONAL WINTER ROAD CONGRESS

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SUSTAINABLE WINTER SERVICE FOR ROAD USERS

Securing the wintertime traffic flow by means of multi-vehicle snow removal

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WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE
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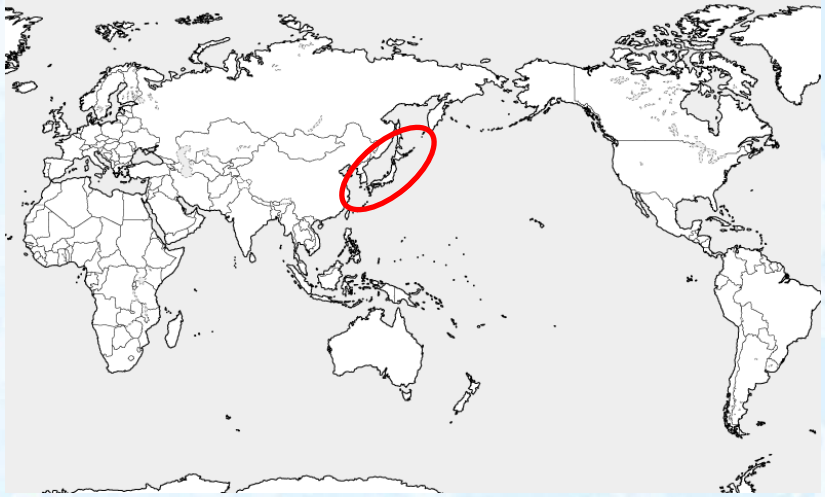
NEXCO 東日本

General Info. of E-NEXCO:
East Nippon Expressway Co., Ltd

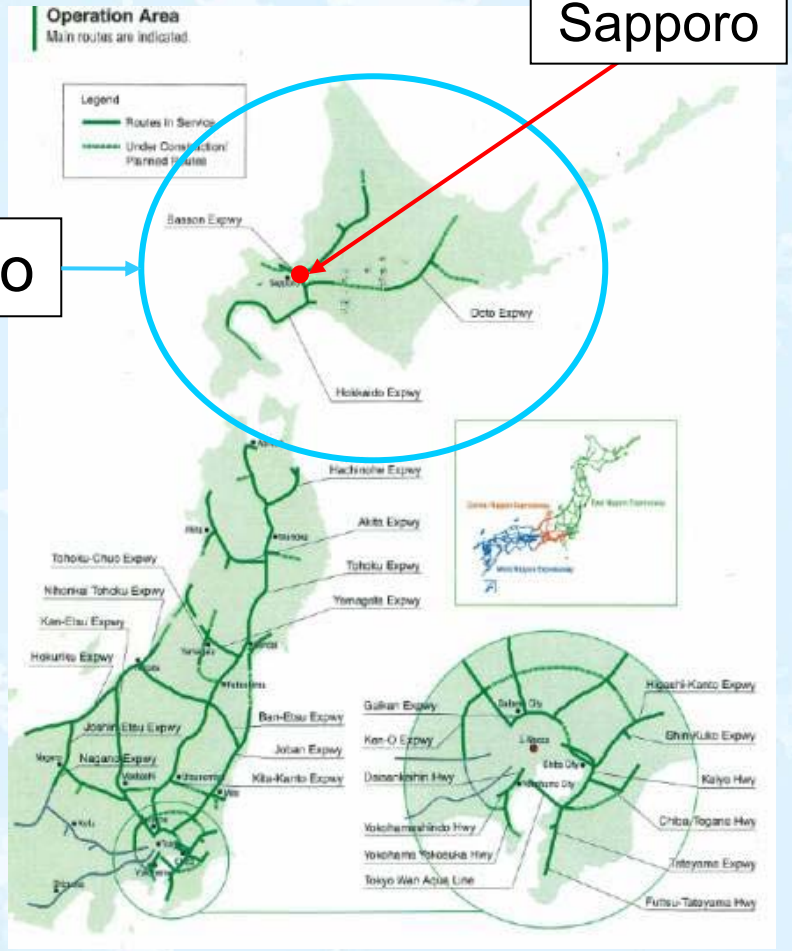
E-NEXCO. East Nippon Expressway Co.,Ltd.

Management and construction of expressways in the North of Japan

- ✧ 3,544 km in service
- ✧ 324 km under construction



Japan location map



Area in management and under construction

Characteristics of Sapporo and the Expressway

- Characteristics of Sapporo

1) 42 degrees N; it has an annual snowfall of as much as 5m

2) A population of some 1.9 million

- Characteristics of the expressway

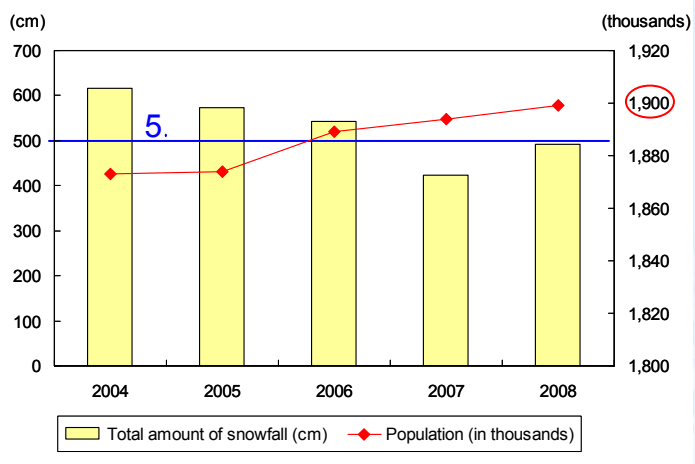
1) A continuous elevated bridge approximately 20 km long

2) Double-deck construction, the expressway running parallel to the national highway

3) Short distances between interchanges (approximately 2.3 km on average)

4) The volume of traffic at its maximum is roughly 45,000 vehicles per day between interchanges.

5) Traffic volume is concentrated in the daytime hours



Changes in the population of Sapporo and total amount of snowfall

Problems in management of the roads in winter

1) Restrictions on operating time

Heavy traffic makes daytime snow-removal operations impossible for fear of causing congestion and accidents

2) Road structure making disposal of snow impossible

Double-deck structure with the national highway running in parallel below makes snow disposal by throwing off the bridge impossible

Removed snow that has been piled onto the shoulder of the bridge would often overflow into the traffic lane

3) Longer road closures due to removal of snow from the shoulder

To reopen the road in the event of a road closure, it would be necessary to haul away the snow from the shoulder. This would lead to an extended road closure.

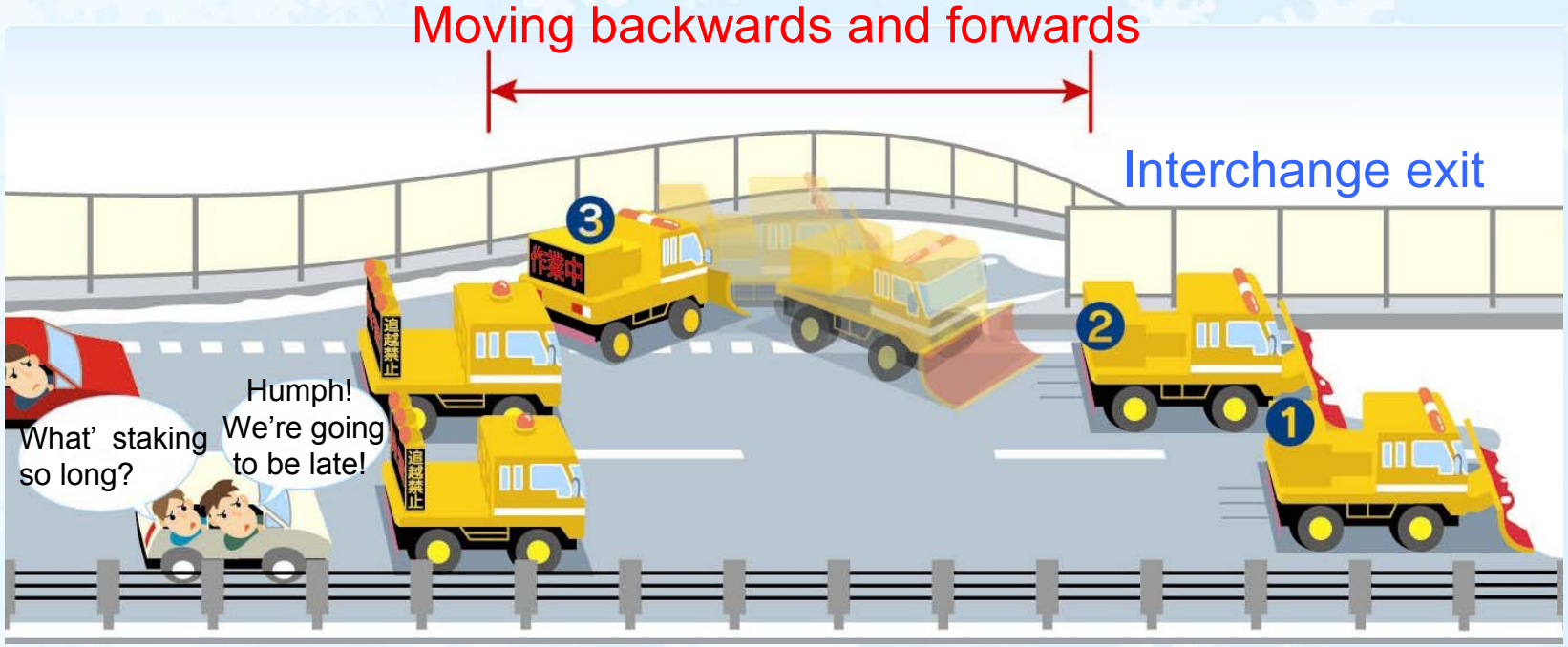
4) Increase in road closure meter hours and loss in income

As a result, road closure meter hours in 2005 amounted to 8600km hours and the loss in income from this has been estimated at roughly 100 million yen

To improve this situation, we introduced “high-speed snow removal operations” and “effective snow hauling operations”.

High speed snow removal operations
Introduction of the multi-vehicle snow-removal method

- Old method of snow removal



A formation of 3 snow removers and 2 traffic sign vehicles

While the snow remover is clearing the snow on the ramp, the other snow removers stand by.

Speed is roughly 5 to 30 km/h (Time needed to complete operations, approximately 120 minutes.)

High speed snow removal operations
Introduction of the multi-vehicle snow-removal method

- Multi-vehicle snow removal

- A formation of 7 snow removers and 2 traffic sign vehicles
- While snow remover ① is clearing the snow on the ramp, the other snow removers continue their work.
- Speed is roughly 30 to 40 km/h(Time needed to complete operations, approximately 40 minutes.)

High speed snow removal operations.
Introduction of the multi-vehicle snow-removal method

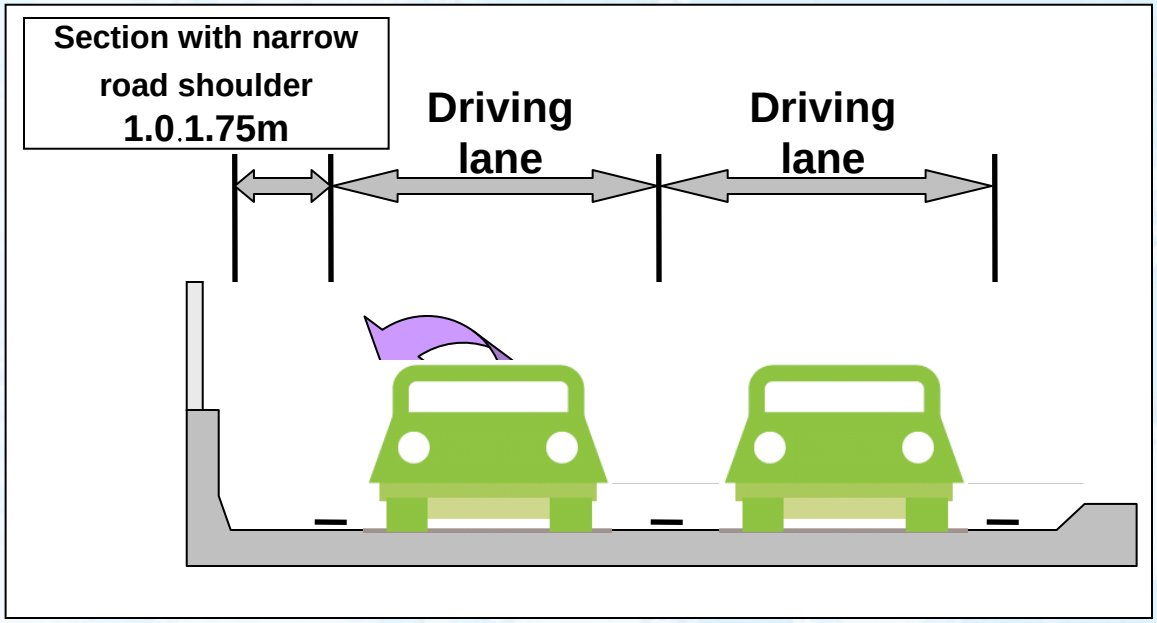
- Multi-vehicle snow removal operations

a.Start of operations

b. Front part of the formation

Effective snow hauling operations.
Introduction of scheduled snow hauling operations

- Situation of snow hauling in the past



.Piled snow fills the width of the road shoulder

.Road closure due to snowfall

.Snow removal operations

.The snow on the road shoulder blocks the traffic and the road closure cannot be lifted

.Snow hauling operations

.The road closure is lifted

.As a result,
the road is closed for longer periods of time
and the incidence of road closure rises.

Effective snow hauling operations.
Introduction of scheduled snow hauling operations

- Introduction of scheduled snow hauling operations

snow hauling operations

Dump trucks Summoned.Put on hold

Enabling scheduled snow hauling operations

Introduction of scheduled snow hauling operations
.Operations were carried out as and when the total snowfall was roughly 30 cm .

Elimination of road closure time caused by snow hauling

2004.33hr
2005.85hr

2006.2007.0hr

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Effective snow hauling operations.
Introduction of scheduled snow hauling operations

- Scenes of snow piled on the shoulder and snow being hauled away

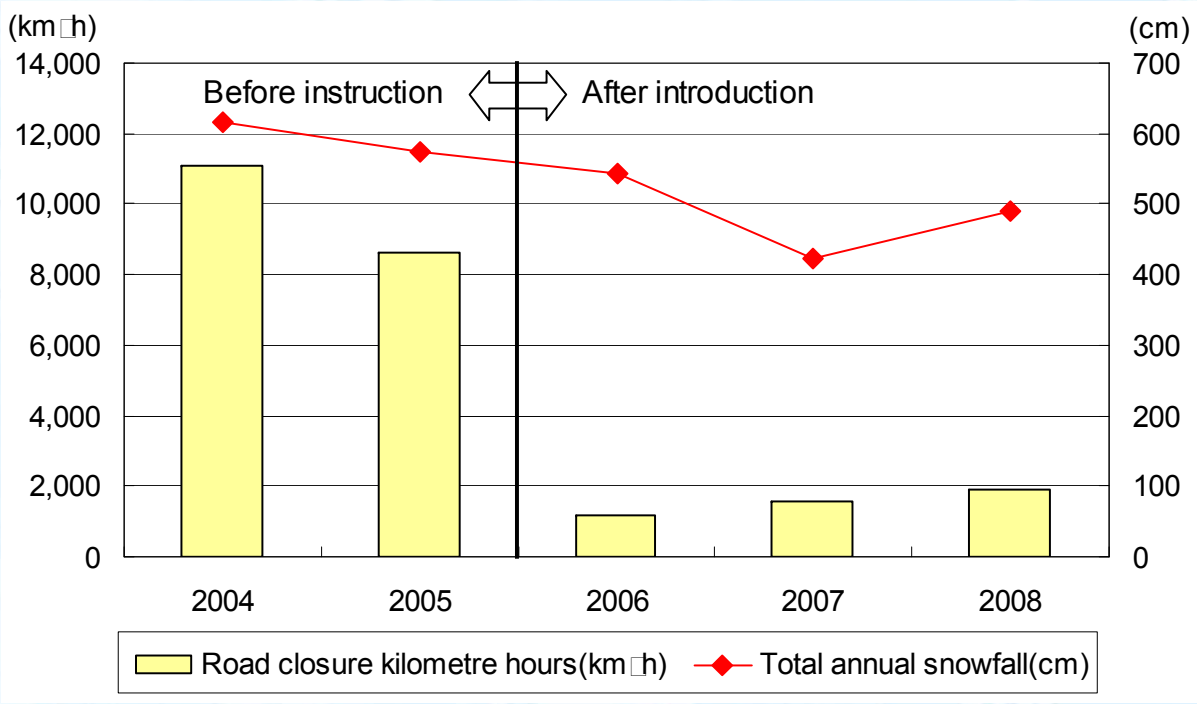
a.Road shoulder before the introduction of the new strategies

b.Road shoulder after the introduction of the new strategies

c.Snow hauling operations

Results of the introduction of these strategies (1)

- Road closure kilometer hours and total annual snowfall

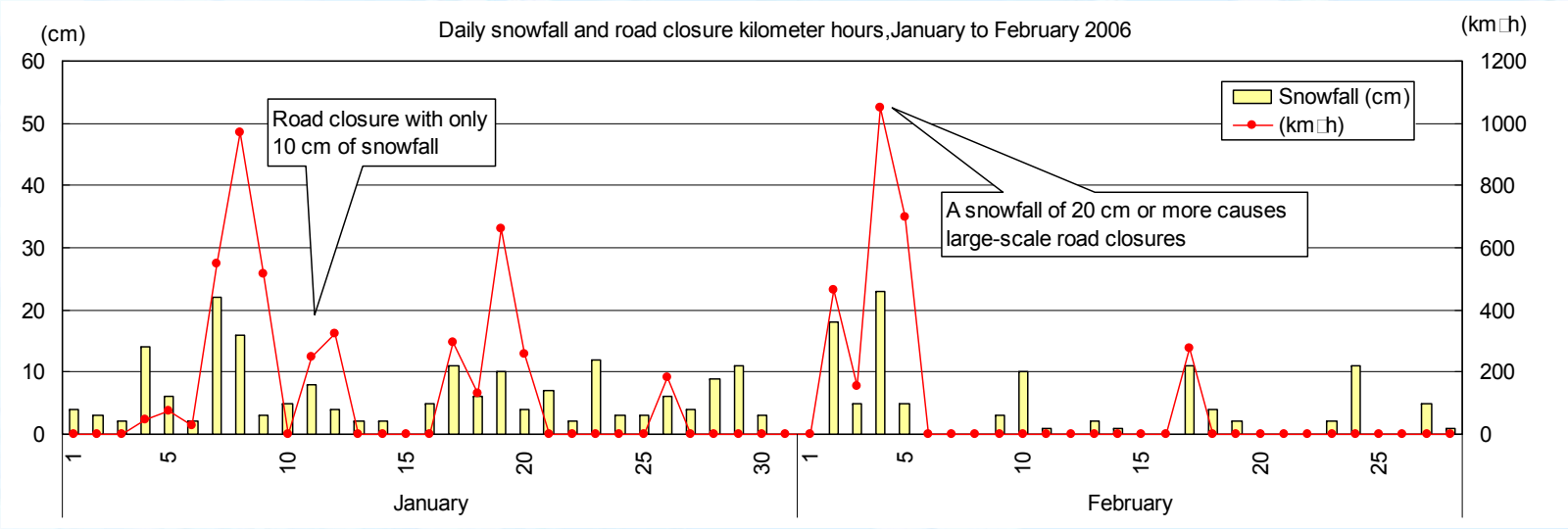


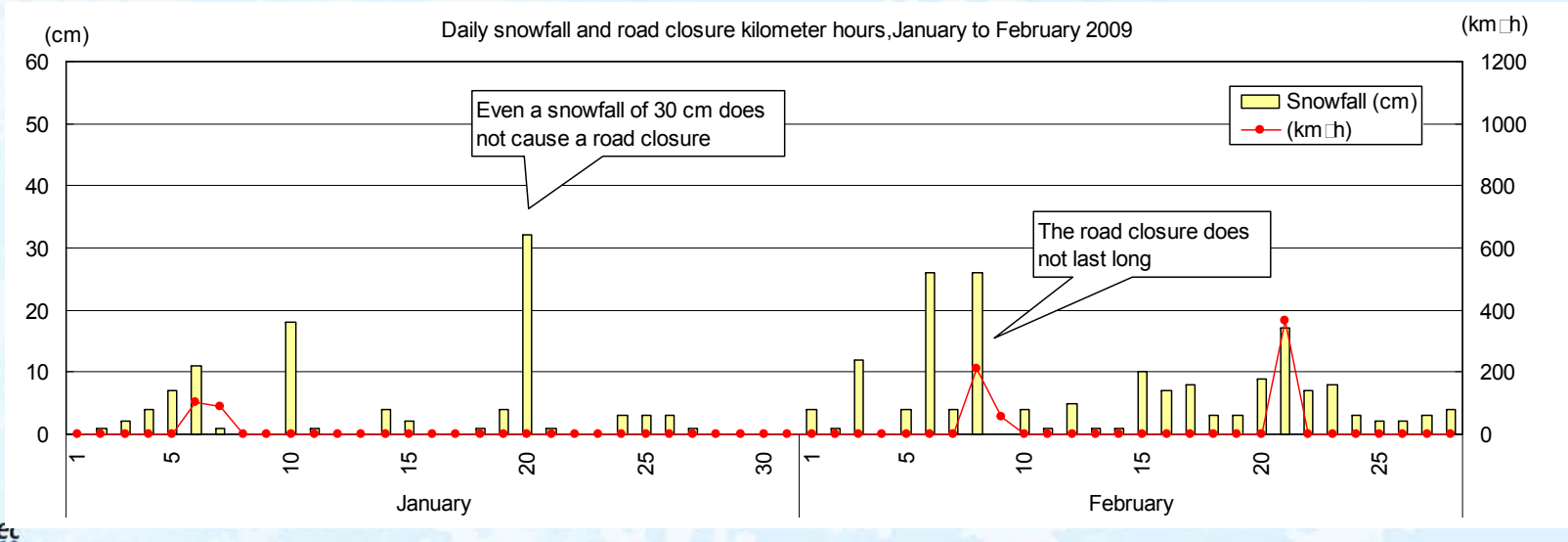
While there was a drop in total annual snowfall of about 20% before and after the introduction, the road closure kilometer hours fell about 80%.

This implies that the road closure kilometer hours have significantly declined.

Results of the introduction of these strategies (2)

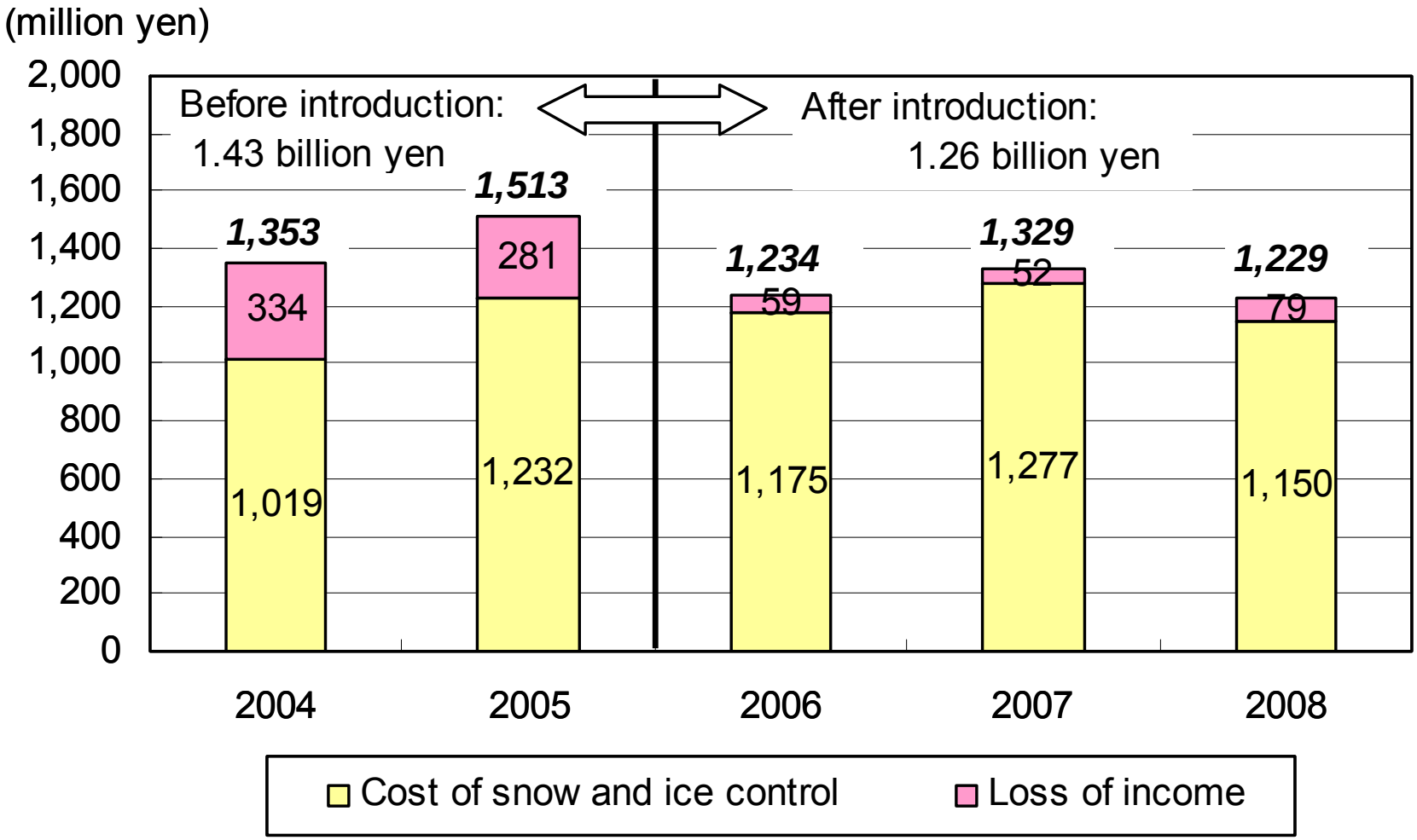
- Daily snowfall and road closure kilometer hours in January and February, before and after introduction of the strategies





Results of the introduction of these strategies (3)

- Changes in the cost of snow and ice control and loss of income



Conclusion

- The “multi-vehicle snow removal” enabled snow removal operations in the daytime hours on an expressway of a major city within the section with a continuous elevated bridge.
- The “scheduled snow hauling” contributed to the reduction in the period of road closure and improvement of driving safety.
- The two strategies that I have explained in this presentation have achieved great effects after many trials and errors in implementation.
- We at E-NEXCO are committed to continue our efforts in future to secure a safe and comfortable road environment.

Thank you for your kind attention.

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Results of the introduction of these strategies

- Comparison between 2006 and 2009 (January and February)

	[illegible]	[illegible]	Reduction rate
Snowfall	293[illegible]	274[illegible]	[illegible]
Days of road closure	[illegible] days	[illegible] days	▲[illegible]
Road closure when daily snowfall exceeded 10cm [illegible] Days of road closure/Days when snowfall exceeded 10cm [illegible]	[illegible] days/[illegible] days [illegible]	[illegible] days/[illegible] days [illegible]	▲[illegible]
Total road closure kilometer hours	[illegible],[illegible] km [illegible]hr	[illegible] km [illegible]hr	▲[illegible]
Average road closure kilometer hours	[illegible] km [illegible]hr	[illegible] km [illegible]hr	▲[illegible]

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Results of the introduction of these strategies

- Changes in the incidence of accidents in wintertime

(totals for November to March)