

# Full-scale Test Facilities for Snow-storm Damage to Overhead Transmission Lines (Abbreviated name: Kushiro Test Line)

## Background

In order to reduce snow-related accidents which lead to wide-scale power outages, evaluation of the effects of countermeasures for wet snow accretion with strong wind and galloping on snow accreted multi-bundled conductors are important. For verification of the effectiveness of the measures and clarification of the physical

process of snow-storm damage, full-scale test facilities were constructed in the Otanosike area of Kushiro city, Hokkaido, where frequent snow accretion is assured with strong north-northeast winds when low pressure systems pass through the southeast shore of eastern Hokkaido in winter.

## Outline

The facilities consist of two main towers to support four and two-bundled conductors, and another smaller tower to support single conductors. Ongoing remote observation is performed using various meteorological instruments and network cameras placed at the towers and on

an observation pole, which enable the observers to monitor and record data successively at our own laboratory. Moreover, DC voltage is applied to two of the single conductor lines to evaluate influence of the heat generation of the conductors by flowing current to snow accretion.

## Specifications

[Tower design condition]

Upper arm (400 m in span, 40 m in height): four-bundled conductors  $\times 2$  lines, ACSR810 mm<sup>2</sup> conductor or less

Middle arm (400 m in span, 31 m in height): two-bundled conductors  $\times 2$  lines, ACSR1160 mm<sup>2</sup> conductor or less

Lower arm (300 m in span, 25 m in height): single conductor  $\times 5$  lines\*, ACSR810 mm<sup>2</sup> conductor or less

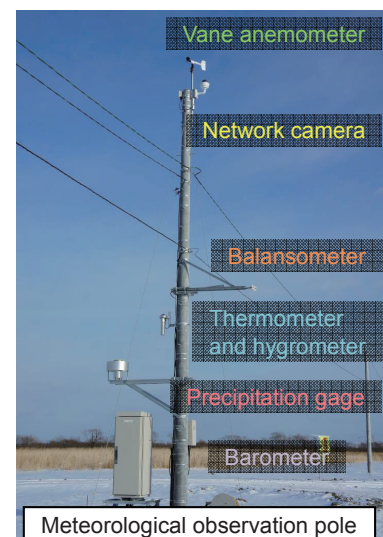
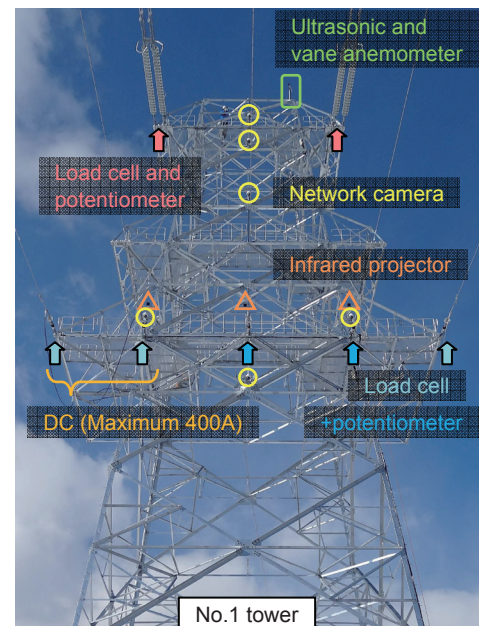
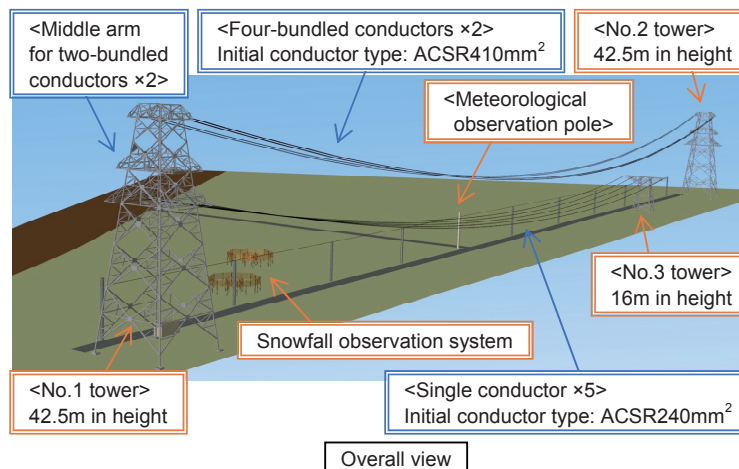
\*Difference in support level is 9 m. A DC voltage is applied to provide current up to 400 A for the two lines.

[Observation items]

Wind direction and speed (vane type and ultrasonic type), temperature, humidity, atmospheric pressure, amount of snowfall (tipping bucket type and weighing bucket type with double fence), radiation balance (long and short, upward and downward), drop size distribution and velocity of falling snow, conductor tension, support angle of conductor (horizontal and vertical direction), image (network camera and spacer camera), displacement of conductor at the target, surface temperature of conductor

### [Location and date of installation]

Otanosike area in Kushiro city / March, 2014



Full-scale test facilities for snow-storm damage to overhead transmission lines