

# Remarkably reducing the resources of maintenance

## Tension measuring device of catenary and messenger wire



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### Background of Technology Development

- Excessive deflection of the catenary caused by an abnormality in the catenary tension control device may cause a large arc between the power collecting facility and the catenary, making it impossible to supply adequate power to the train
- Since manually checking the condition of the catenary tension control device is inefficient maintenance, it is necessary to develop a tension measuring device that can detect the catenary tension in real time and transmit the result to the office

### Technology Overview

- Technology that remotely senses the tension state of the catenary measured remotely to determine in real time whether there is an abnormality in the catenary and messenger wire tension control device

### Technology Realization

- Tension measuring device configuration
  - Main controller for measurement
  - Sensors (wire tension, displacement and ambient temperature)
  - Data transmission (wireless communication using LTE)
  - Power supply (battery and solar cell)

### Characteristics of the Technology Developed

#### The limitation of existing technologies

- The abnormality of the tension control device is checked indirectly by manually measuring the displacement due to the weight of the catenary and not the tension of the catenary and messenger wire
- Manual maintenance of the tension control device requires a lot of manpower



#### Characteristics of the technology developed

- The main controller and data transmission unit of this technology
  - Real-time measurement, calculation and wireless data transmission
  - Automatic driving and wireless communication connection
- Tension measuring sensor unit
  - Measuring up to 10 tons (measurement accuracy within 0.5%)
  - Easy to install the sensor because it uses the existing H-beam pole bolt hole in the field



[Catenary and messenger wire]



## Technology Readiness Level

TRL1	TRL2	TRL3	TRL4	TRL5	TRL6	TRL7	TRL8	TRL9
Basic principles and experiment	Technology concept formulated	Experimental proof of concept	Component and/or system validation in lab	Performance test of trial manufactured goods	Performance test of pilot-level prototype	Reliability evaluation of pilot-level prototype	Certification and standardization of prototype	Commercialization

※ TRL 8 : Certification and standardization of prototype

## Application Fields of Technology

Tension measuring device of catenary and messenger wire

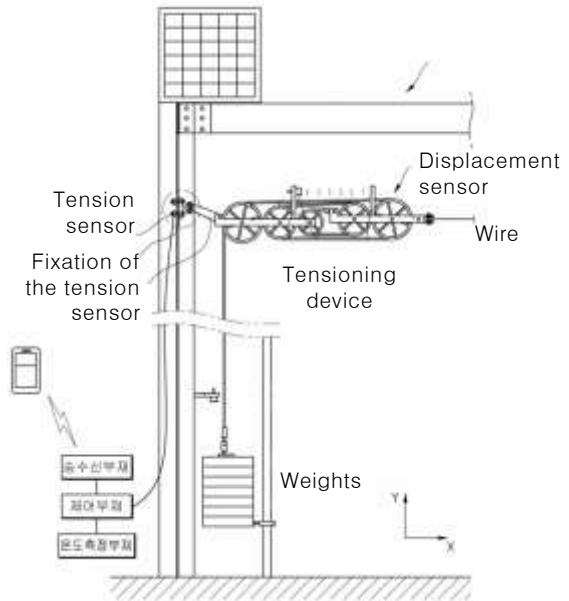
## Main Drawings and Photos



[Displacement measuring sensor]



[Tension measuring sensor]



[Diagram of tension measuring device]

## Current State of Intellectual Property Rights

No.	Patent Name	Date of Application	Patent No.	Note
1	Tension Measurement Device and Method	2014-10-14	10-1574325	Registered