The 2024 World Congress on
Advances in Civil, Environmental, & Materials Research (ACEM24)
19-22, August, 2024, The K hotel, Seoul, Korea

Study on spatial-temporal wind characteristics during a cooling process in complex terrain

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ABSTRACT

The complex wind field in mountainous areas brings great challenges to the wind resistance of long-span bridges. Although the long-term wind characteristics are widely researched in such areas, little attention has been paid to specific wind events, especially characteristics along the bridge. A type of wind events accompanied by cooling processes was reported on a bridge site in a deep-cutting canyon. This study focuses on the wind characteristics in this process with the help of anemometers arranged along the bridge. Cooling days are extracted by temperature drop at first and correlation between wind speed and temperature drop is found. Then several cooling processes are further obtained and a type one is analyzed comprehensively. The spatial-temporal evolution of wind characteristics and the difference in different stages of the cooling process are studied. Significant changes of wind field when the process starts are observed. Compared with original days, the wind speed is higher and turbulence is more intense in the process. Affected by the local terrain, both the mean and turbulence characteristics show stronger non-uniformity.

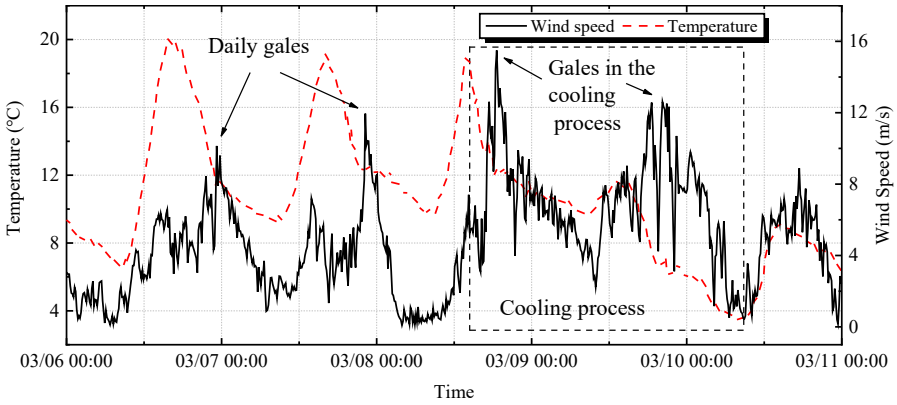

Fig. 1 Two kinds of gales in the bridge site

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