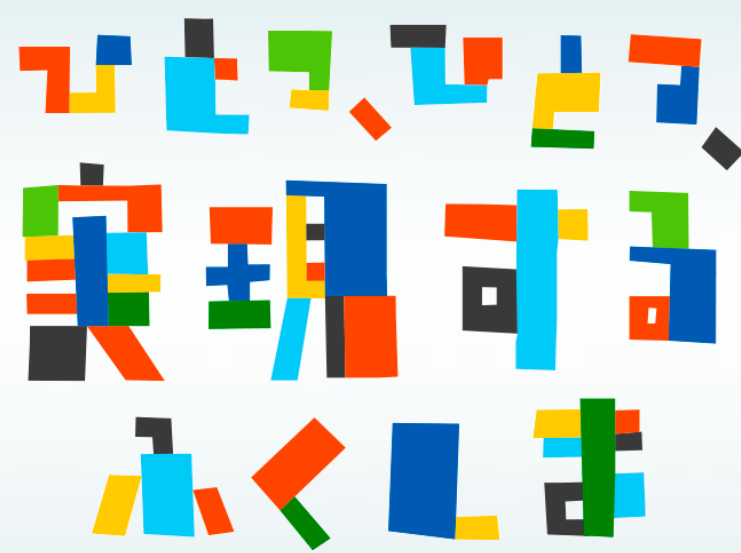
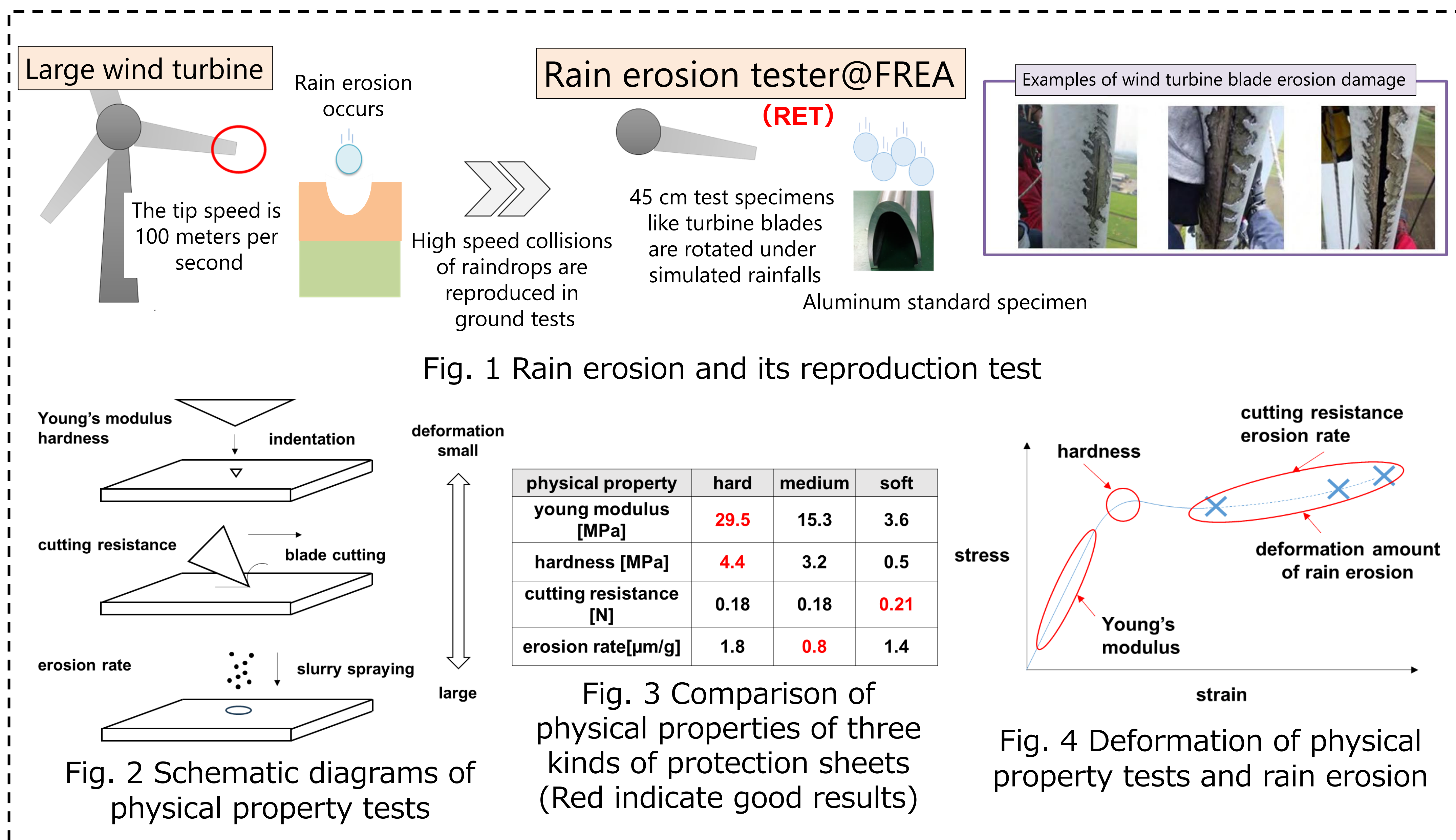




Characterization of Leading-edge Erosion Mechanisms and Development of a Unified Evaluation Method for Wind Turbine Blade Protective Materials



Background · Purpose

Wind turbine blades are exposed to sunlight, lightning, rain, and other environmental factors that cause surface degradation. With the expansion of offshore wind power generators and increasing turbine size, “rain erosion” has become a critical issue, occurring when high-speed rotating blades repeatedly impact raindrops and suffer surface damage. The application of blade protection materials is now widely adopted. However, the erosion mechanism is not yet fully understood, and systematic development guidelines are lacking. This study aims to elucidate the erosion progression mechanism and establish unified guidelines for material improvement and evaluation.

Research Contents

To elucidate the progression mechanism of rain erosion, we obtained physical properties related to the stages of rain erosion progression for multiple protective material test specimens with different hardnesses, and also investigated the progression mechanism.

Summary

To develop a blade protection material with high erosion resistance, we compared the physical properties of three types of protective materials with different hardness levels. Next year, we will continue our research to identify more appropriate physical property evaluation parameter by utilizing computer simulation technology.