

Modeling micro wind turbine blades after owl wings

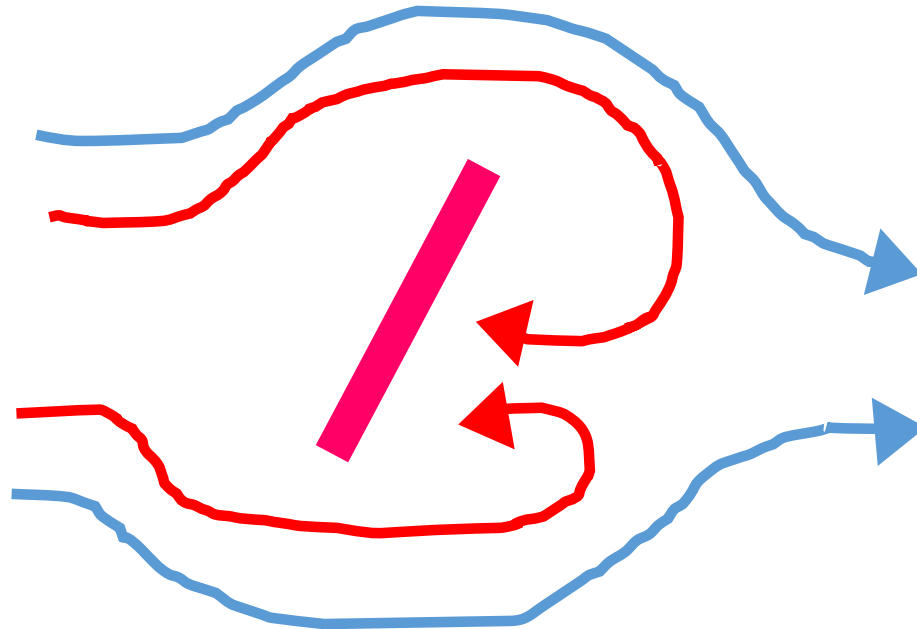


Group-1

Turbulence

→ The wind curling around the blade forms a vortex behind the blade.

We can't generate much energy!





The structure of owl wings



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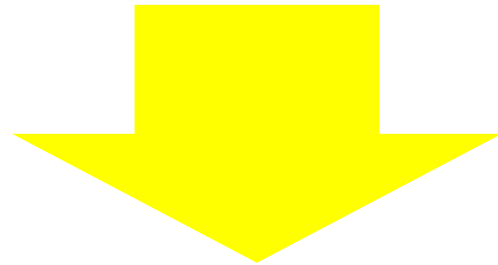


Many fine feathers



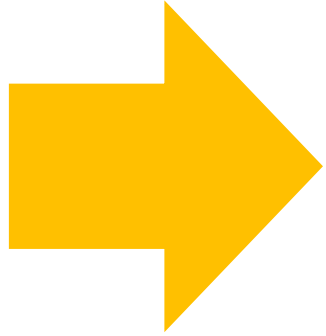
Hypothesis

**Owl wings can prevent turbulence,
Can they make the wind go in the same direction
and prevent vortexes?**



We can generate much more energy!

● Blades to reproduce the form of owl feathers

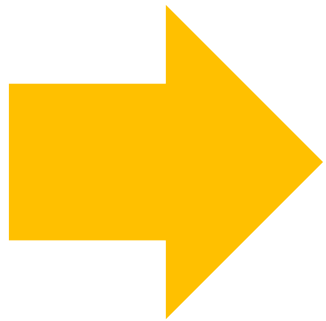


Stripe type



Keyboard type

● Plain blade

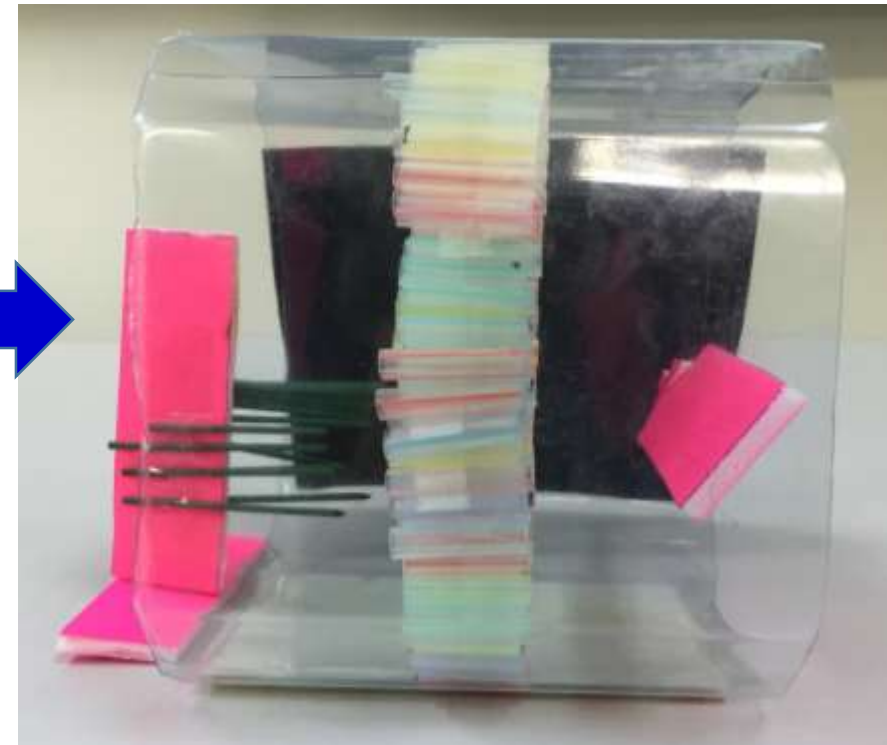


Normal type

Experiment 1

Purpose: To examine whether these blades reduce turbulence.

Method : To use smoke through straws to make **wind →
sure air flow was smooth.**



Result

- **Normal type**



Turbulence occurs
above and below
the blade

Result

- **Stripe type**



Turbulence reduced
above and below
the blade

Result

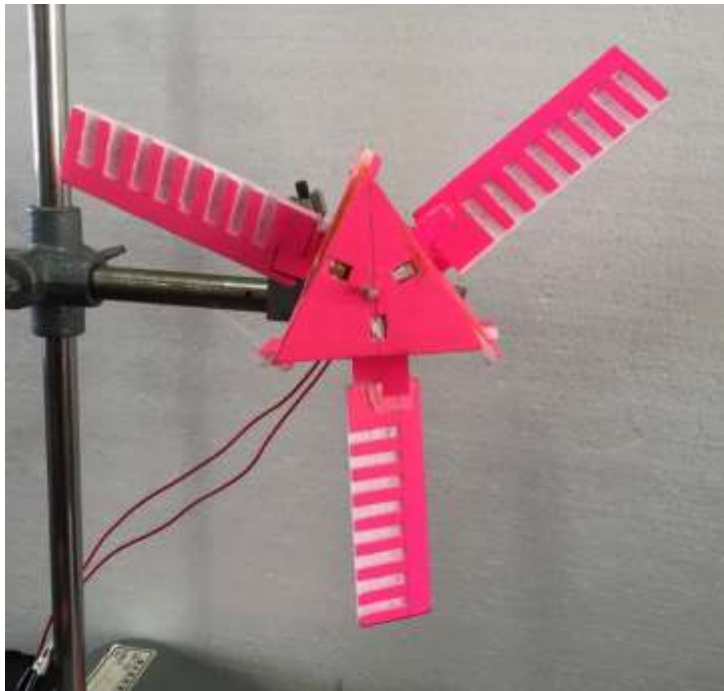
- **Keyboard type**



Turbulence reduced
above the blade

Experiment 2

To research the power generation ability of three wind turbines



Wind turbine

wind tunnel



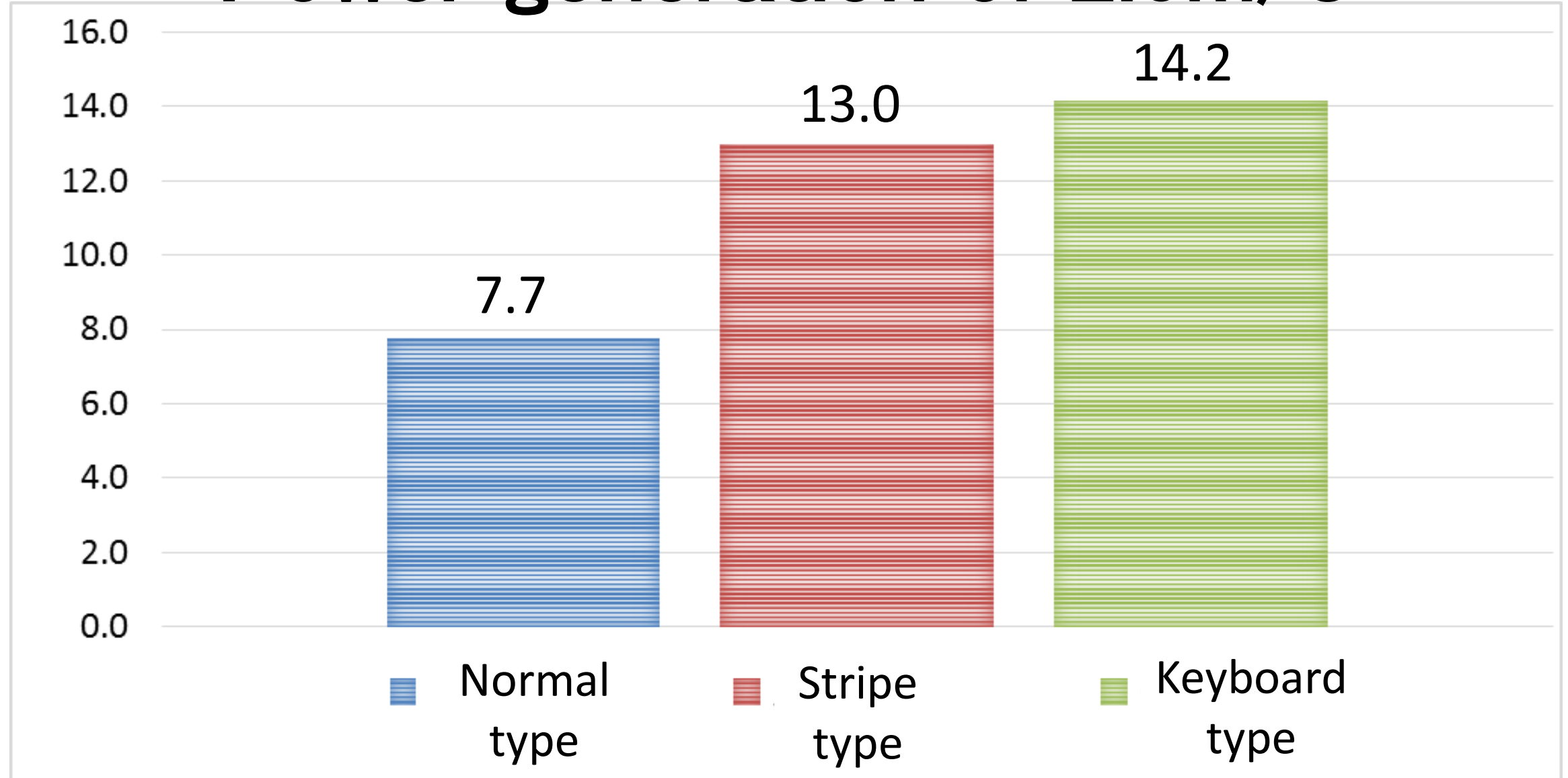
Experimental Method

1. We made the wind flow for 10 seconds
2. We took a 20 second break.
3. In this way, we repeated the experiment.

We experimented with power generation
at wind speed of **2m/s** and **3m/s**.

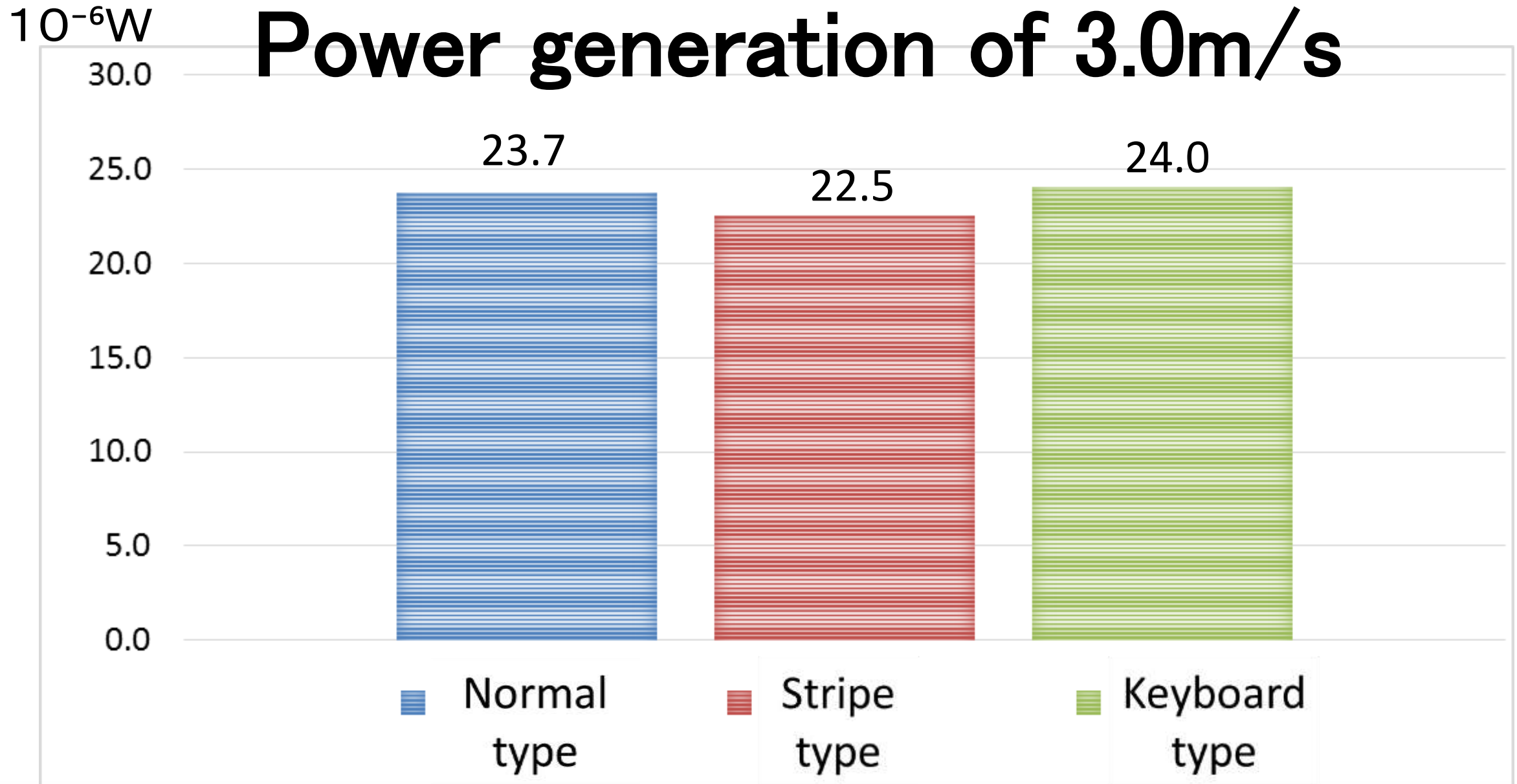
$10^{-6}W$

Power generation of 2.0m/s



Power generation rose greatly!

Power generation of 3.0m/s



all power generation values are similar.

Analysis section

Turbulence on the upper side of the wing affected the power generation.

**The keyboard type generated the most electricity ⇒
This design was the best blade
in this experiment.**

Summary

**Using owl-like blades
can prevent turbulence,
and we can generate
much more energy!**

Future challenges

- **To make a new blade design**
- **To research the cause of the amount of electricity generated not increasing at high speeds.**

References

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Thank you for listening

