FUJIKURA COMPOSITES

Hall 3, stand 3-167

Blade Protective Sheet

for wind turbine blades

Background

Generally, wind turbine blades are rotating at quite high speed.
So, they can be caused some serious damage by flying objects such as sand, raindrop and hailstone.

Fujikura can offer Blade protective sheet with highly protective properties to give blades erosion resistance and prolong the maintenance duration.

Blade Protective Sheet for wind turbine blades

This is the rubber-coated fabric sheet,
which is our original **composites technology**.

— Top polymer layer *: 0.4 mm
— Reinforcement fabric layer: 0.3 mm
— Adhesive layer: 0.5-0.7 mm

* Highly hydrogenated Nitrile Butadiene Rubber （＝HNBR）

Total thickness: 1.2－1.4 mm
Weight: 420g/ 1 blade (3 meters length installation)

Products properties

- Weather and ozone resistance
- Good electrical properties
- 4 shapes based on the expansion view analysis

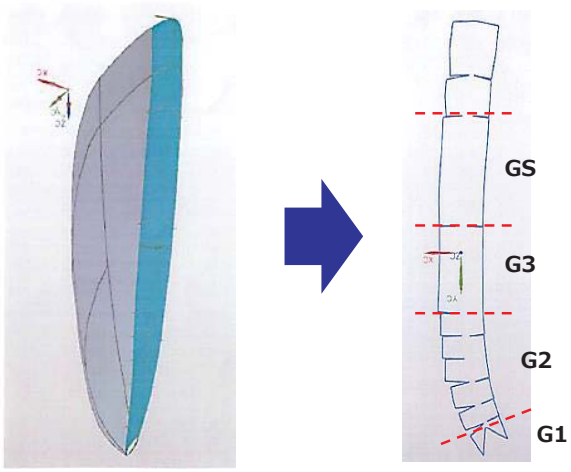

Fig 1. Expansion view analysis

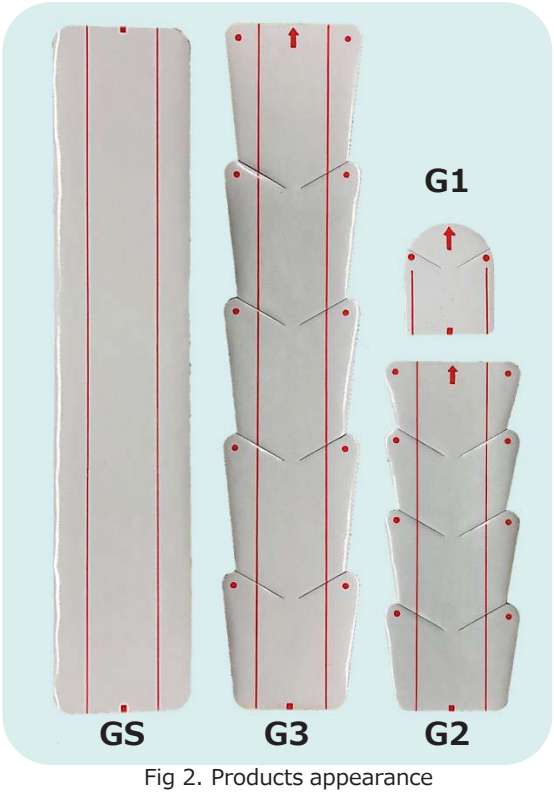

Fig 2. Products appearance

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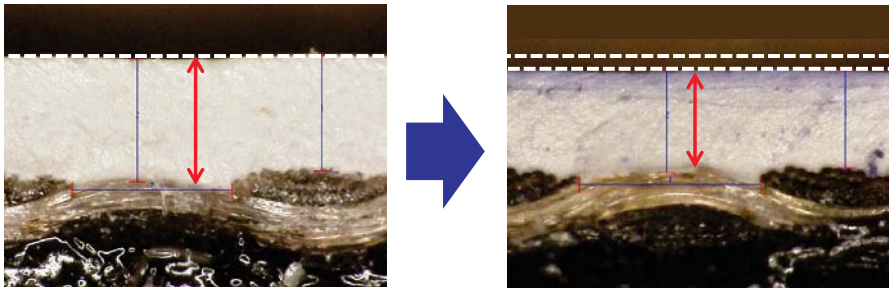
Products performances Durability for 6 years & Noise

1. Durability

The top rubber layer of sheet was worn away approximately 10% on actual wind turbine for 6 years. Then, the protect function was not lost and wind turbines are still operated now (ongoing operation for 9 years).



Initial thickness: ave. 400 μm

6-years later thickness:
approx. 360 μm

9-years later samples
will be collected
in October, 2020.

Fig 3. The cross section view of the sheet (x 175)

2. Noise

Steps by overlapping slits, and roughness on sheets may make a noise, but there is no any trouble report from the customers as well.
It does not show significant difference of noise no protection or with sheets by the wind tunnel test.

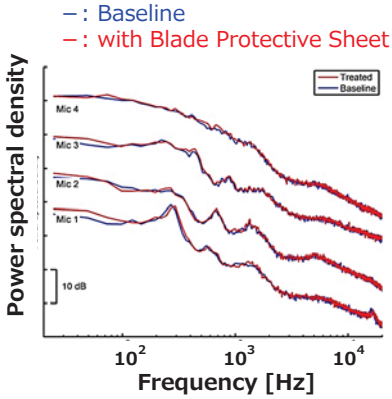


Fig 4. Noise displacement
with Blade Protective Sheet

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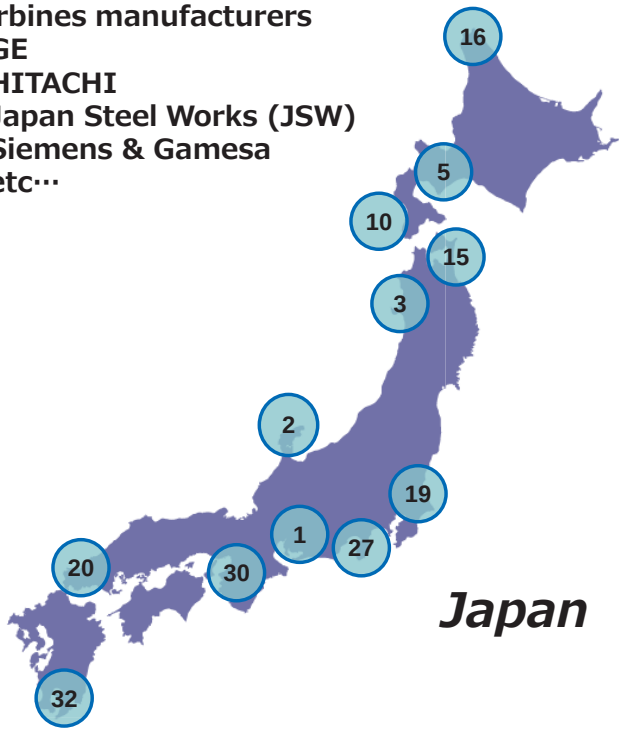
Installation results in December, 2019

Turbines manufacturers
- **GE**
- **HITACHI**
- **Japan Steel Works (JSW)**
- **Siemens & Gamesa**

etc…



- **In Japan: 180 WTGs**
- **In the world: 4 WTGs**

- Greece, Crete: July, 2018
- South Korea: October, 2018
- China: October, 2019