



Mechanical subgroup lead
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Which Hat do I Wear Today?


- Small Wind Turbine Owner
 - Endurance S250
- Wind Turbine Dealer/Installer
 - Great Rock Windpower
Martha's Vineyard, MA
- Consultant to a Manufacturer
 - Subcontractor to Endurance Wind Power
 - Installation Trainer
 - Climb and Rescue Trainer



Has this been figured out yet?



What are these guys up to?

**WINDWARD**
ENGINEERING

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ENDURANCE S-250

In 2007, Windward Engineering completed a three-year effort to design, build and test a residential, grid-connected wind turbine as part of a Department of Energy (DOE) contract to evaluate a small turbine over-speed protection system. That effort resulted in a commercial product – the Endurance S-250 – and a new company: Endurance Wind Power, Inc.

A Voluntary Beta Tester



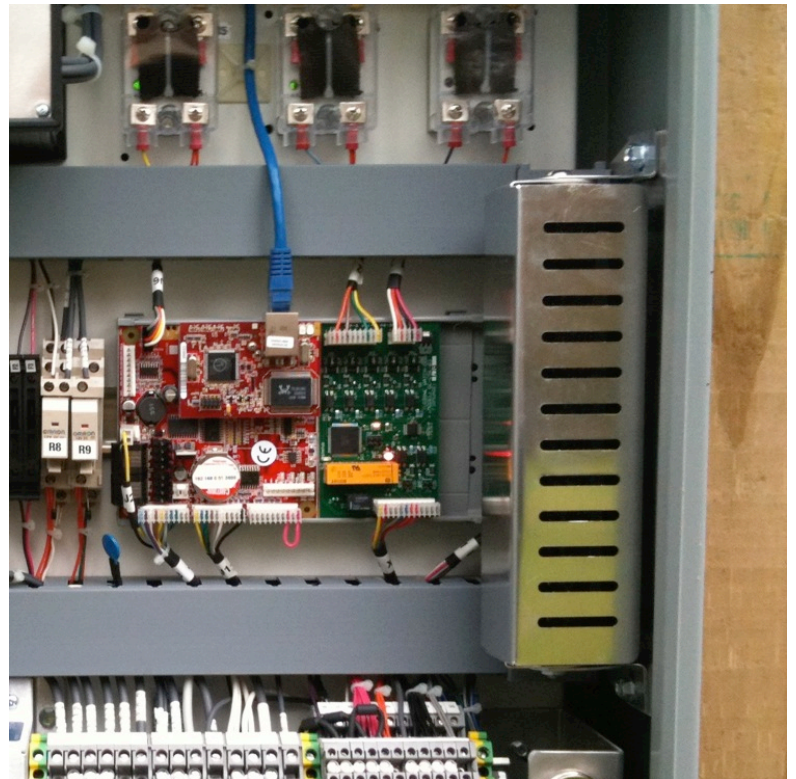
Somebody's got to do it

- Hat Change!
- Incentives & cost of energy
- Desire to reduce impact
- If Gary can do it...



Tracking-Testing-Improving

- Tracking Performance
- Worked with EWP Improving the Products



Another Hat Change



Learn By Doing

- DFMEA
Brainstorming
- Testing for
Sound
Amplification
- Proof Testing
- Tour Blade
Manufacturing
(now in Asia)



Input from Dealers is Important

- It doesn't always arrive all pretty
- Manufacturers claims are not always accurate
- My “Grease Test”



Installer Input can Affect Change

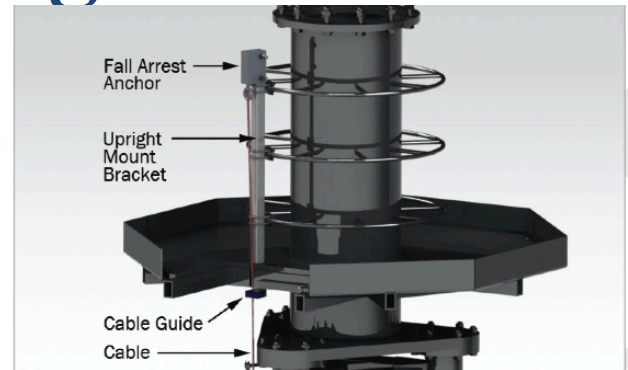
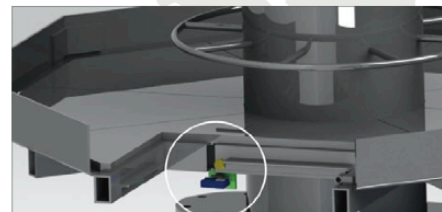


Figure 8. Parts of the Fall Arrest System

2. Attach the first locking cable guide beside the slot cut into the face of the latch frame.
If you have an older model lattice tower and have not already modified it, see *Figure 7* in a 2011 or Earlier Lattice Tower.

Note: If you are modifying an older model lattice tower, you will require a mounting bracket order to attach the cable guide. This part can be ordered directly from EWP.



I was wrong! It has been figured out.

- What works IS understood
- Products are constantly improving
- We don't need breakthrough technology in basic wind turbine design.
- Manufacturers need funding and support to make well-made, tested and proven machines to be even better for less money

What Needs to Change?

- We already have:
 - Turbines that produce well
 - Turbines with high reliability
 - Turbines with high availability
 - Turbines that are quiet
 - Turbines that are safe
 - Turbines that last
 - Easy to service
 - Turbines that are affordable

We Want it All!

We want every turbine we purchase, or sell, or service, to have all of these qualities.

I look forward to working together to bring SMART ideas to our turbine manufacturers

Thanks for being here!

I Hate Rust!

