

High Impact Low Frequency Events and Emergency Restoration System Structures

September 2020



Extreme Weather Events are Becoming More Common



Derecho producing Shelf Cloud

Since 1980...

- Floods and other hydrological events have increased by >400% (+200% alone since 2004)
- Extreme temperatures, >200%
- Droughts, >200%
- Forest fires, >200%
- Storms, 200%

“Low Frequency” events are no longer uncommon

Hurricanes and Cyclones



Effects of a Warmer Climate* on Category 4 & 5 Storms

- They become more common
- They intensify more quickly
- They produce more rain
- They move more slowly, increasing flooding

Studies** predict Category 4 & 5 storms will increase by

- 42% in Atlantic basin
- 64% in south Indian basin
- 200% in north Indian basin
- 335% in northeast Pacific

Transmission Lines and Extreme Weather Events

Severe weather often leads to the collapse of one or more towers



Proper resilience planning for such events must include Recovery

Quick Recovery of Downed Towers Requires:

Immediate availability of material

- But stocking structure material for any type, or voltage, tower is expensive and difficult

A complete package of material

- Insulators, hardware, etc. are also required

Pre-staged material

- During an emergency, gathering supplies from multiple locations is slow and prone to error



Damage from Hurricane Michael
Bay News 9

Utilities developed the ERS concept in the 1980's to address these needs.

Emergency Restoration System (ERS) Structures



ERS structures are Universal. They are:

- Standardized and interchangeable
- Modular and suitable for any voltage and tower type
- Reusable

ERS structure are complete. They include:

- Structure components
- Line hardware
- Anchors, guy wire, tools, etc.

ERS structures are ready. They are:

- Pre-packaged in standard shipping containers
- Ready for deployment within hours of a tower collapse

We already own ERS. Now What?



Conduct Regular Field Training

- Ensures familiarity with ERS
- Speeds installation
- Ensures safety

Conduct Regular Inventory Review

- Parts can go missing over time
- Maintaining ERS kit inventory reduces wasted time during emergencies

Review contingency plans

- Do you have enough ERS structures

Example Use of ERS

Salt River Project (SRP) is a utility in the southwest USA

They experienced two “low frequency” microburst storms in one month

First event destroyed four 500kV towers

Second event destroyed three 500kV towers



SRP Delivering water and power™

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ERS were on hand due to Contingency Planning

LINDSEY EMERGENCY RESTORATION STRUCTURE (ERS) TOWER ASSEMBLY



Pre-trained crews had lines operational in 8 days

INSULATOR & CONDUCTOR INSTALL



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ERS made lines operational in 5 days from 2nd event

ENERGIZED



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Observations and Summary

Are there really “Low Frequency” weather events anymore?

- Extreme weather events are becoming more common and more severe

The chance of transmission tower collapse from extreme weather is high

ERS structures were designed by utilities as “no regrets” investments to:

- Speed restoration of collapsed towers
- Reduce inventory and maximize flexibility
- Ensure complete “kits” can get to the site quickly

It's important to keep crews trained





For more
information visit
lindsey-usa.com/ers

Or email
info@lindsey-usa.com

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