




Terrestrial Photogrammetry

Applied for Dynamic Deformation Measurement of a Transmission Tower under Fatal Performance Testing

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Buildings | Communications | Energy | Industrial | Resources | Transport | Urban Development | Water



Background

Transpower NZ Ltd

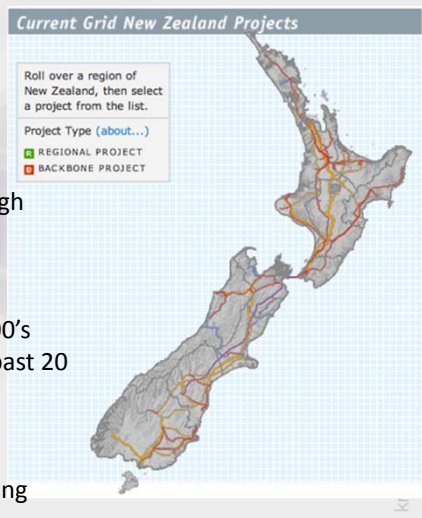
- Government owned National Electricity Transmission Agency
- Operate the National Grid and providing wholesale power


Wahine Storm of 1968

- Seven transmission towers failed due to high lateral wind affect

Investment in National Infrastructure

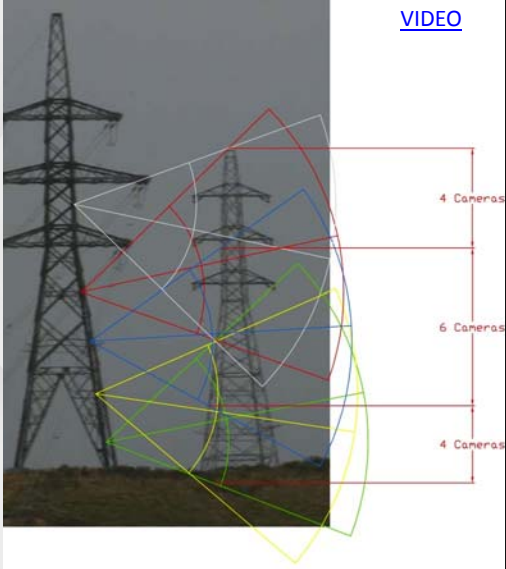
- Low investment through 1980's, 90's and 00's
- Significant change in generation over the past 20 years
- Geothermal and wind are now noticeable contributors
- Programme to heighten utilization of existing infrastructure




 **Project – Tower pull over test**


- Recent upgrade left redundant tower
- Opportunity to simulate an “in-situ stress to failure” test
- Seeking to understand the capability of the tower
 - Design vrs Actual Performance
 - Environmental factors
- Outcomes to inform maintenance programme

[VIDEO](#)



 **Challenges**

- Rural site, weather, terrain
- Large establishment and planning effort
- Complex monitoring
 - Tower structure > 30 m height
 - Unknown vulnerabilities
 - Foundation variables
- Health and Safety risks
- Network integrity risks





Survey Response – Terrestrial Photogrammetry

- Several options developed, reviewed and discarded
- Result – Commercial package, short learning curve, highly configurable – Photomodeler
 - Robust 3D models from overlapping images
 - Auto-registration targets
 - Manual feature extraction post processed

Accurate, Quick, Affordable 3D Modeling and Measuring of Real-World Objects and Scenes




knowledge into value



System

- Automatically recognized targets
- Custom sourced dot tape along tower elements
- White spheres for surface and underground deformation determination
- Live focus and field of view for remote camera establishment
- 11 cameras synchronized at 1Hz for the duration of the test cycles
- Static control targets established within the photographic model but outside the influence of movements



 **CPG Outcome**

- A bespoke solution that meet client budget and quality requests
- Huge amount of reference material that continues to feed research aspects of the towers performance
- Lessons on consumer equipment vulnerabilities and limitations with respect to time and skill sets getting configuration rigged



 **CPG Questions?**

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