

SEASCAPES

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SEA's 2003 Engineering Excellence Award!

Systems Engineering Australia Pty Ltd (SEA) has again been honoured by Engineers Australia with what are now consecutive Engineering Excellence Awards within the Queensland Division. This year's award was made jointly to SEA and Powerlink Queensland in the hotly contested category of *Reports, Procedures and Systems* for the "Wind Storm Risk Model" study conducted over the period 1999 to 2002.

The sophisticated wind risk study addressed tropical cyclone and severe thunderstorm wind loading for Powerlink Queensland, the operator and owner of the extensive \$2.5B electricity power distribution system across Queensland. Powerlink has experienced a number of transmission line structural failures in the 8,000 km network over a period of

time, mainly thought to be caused by severe thunderstorms and/or tornadoes in SE Queensland. Powerlink's efforts in understanding their risks began with funding special wind engineering studies by the University of Queensland on thunderstorm wind characteristics and associated risks during the 1998-1999 period. The award-winning study with SEA re-examined these risks using its MIRAM insurance risk model for thunderstorms in SE Queensland and also considered tropical cyclone impacts on the distribution network across the whole State.

A special feature of the SEA study was the use of GIS mapping techniques to assemble model descriptions of over 28,000 transmission towers from 146 separate power distribution lines. The risk model processed this data into



ENGINEERS AUSTRALIA
Queensland Division
Engineering Excellence Award 2003
Wind Storm Risk Study
(Jointly with Powerlink Queensland)

2,370 separate straight power line segments to accumulate the wind risk across the State. Satellite and topographic data processing was provided by Geomage Pty Ltd in Brisbane.

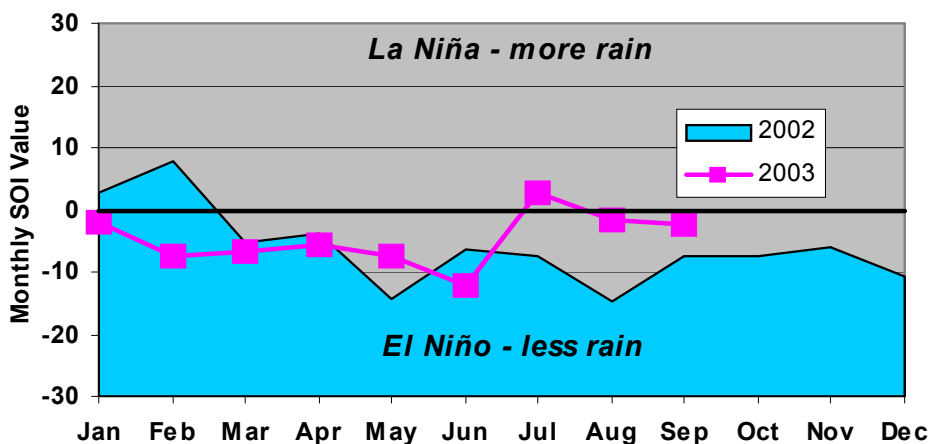
The results are now being used by Powerlink to consider their exposure to wind risk and to develop long-term mitigation strategies. The SEA risk

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Neutral Season Outlook Continues

The early indicators for 2003/04 as a near-neutral ($-10 < SOI < 10$) climate season have persisted and strengthened. Ocean temperatures across the equatorial Pacific are very similar to long term climatological mean values. All numerical climate models now predict neutral conditions for the coming Southern Hemisphere summer period. Based on past experience, neutral seasons have resulted in much higher numbers of tropical cyclones in the South-Western Pacific basin near Queensland when compared with drier EL Niño seasons.

[Data and comments based on Bureau of Meteorology sources.]



SEASCAPES

SEASCAPES features the developing risk assessment capabilities of Systems Engineering Australia Pty Ltd (SEA).

Our services include coastal, ocean and offshore engineering, statistical analysis of tropical cyclone data, quantitative estimation of insurance losses, cyclone wind, wave and storm surge modelling, flood risk assessment and severe thunderstorm downbursts, hail and tornadoes. We do investigations, analysis, consulting, peer review and research.

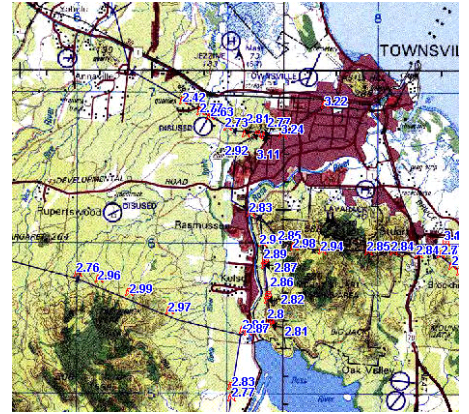
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study results have been incorporated by Powerlink into a fully integrated, dynamic software package that evaluates wind risk, topographical influences and exposure. The package is linked to Powerlink's database of GIS information on its overhead transmission line network and mapping database. Key features and benefits of the in-house system include:

- A dynamic design model that can be used to evaluate wind storm risk impacts on existing transmission lines. Knowing these impacts may assist Powerlink to realise long-term potential cost savings associated with future transmission line failures;
- The ability to pinpoint areas on the network that are at higher risk, or that require upgrading, to ensure reliability of electricity supply to customers;



- The capability to improve the future design of transmission lines in Queensland, and possibly worldwide.

Due to the advanced capabilities of the wind risk model, other major international transmission organisations, such as EDF in France and Hydro One in Canada, have expressed an interest in adopting the

Economic Impacts of Enhanced Greenhouse Climate Change

SEA recently assisted CSIRO Atmospheric Research in a study for the Australian Greenhouse Office (AGO), designed to estimate the long term economic impact to Australia of potential climate change due to enhanced Greenhouse conditions. The SEA component consisted of estimating the possible changes in patterns of catastrophic insurance losses due to the impacts of tropical cyclone winds and storm surge. The SEA analyses will be combined with estimates from many other groups to include the possible effects of other natural hazards such as drought, flood and bushfires.

SEA Commissioned to Prepare WMO Guidelines on Wind Speeds

Dr Bruce Harper of SEA has been commissioned by the UN World Meteorological Organisation (WMO) to prepare a set of guidelines for adjusting wind speed estimates for tropical cyclone conditions on the basis of different averaging periods. Although the WMO standard for wind averaging is 10 minutes, many nations also employ local standards for forecasting and warnings based around other periods such as 3, 2 and 1 minute. The guidelines will review the existing science of wind speed variability in tropical cyclones and provide a practical method for adjusting wind speeds between the various national standards.



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Some of the SEA Clients Since 1996

Tropical Cyclone Risks:

- RACQ Insurance
- CGU Insurance
- Suncorp Metway Insurance
- Aon Group Australia Limited
- Powerlink Queensland
- Geoscience Australia
- CSIRO Atmospheric Research

Severe Thunderstorm Risks:

- Suncorp Metway Insurance
- Macquarie University, NHRC
- Powerlink Queensland

Flood Risks:

- RACQ Insurance, QLD

Coastal and Ocean Hazards:

- Woodside Energy Ltd, WA
- Dept Natural Resources, VIC
- Dept Natural Resources and Mines, QLD
- EPA, QLD
- Dept Infrastructure Planning and Natural Resources, NSW
- Commonwealth Dept of Transport and Regional Services
- GHD Pty Ltd
- Bureau of Meteorology
- Kvaerner E&C Australia

Multi-Hazard Studies:

- Dept Emergency Services, QLD
- Bureau of Meteorology / GA

Research:

- RPI, Bermuda.
- James Cook University CTS

Guidelines:

- World Meteorological Organisation

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