

Modelling in Risk



Risk in dam safety is an unseen but ever-present companion, one requiring great attention and significant resource.

The biggest challenges in risk are in repeatability, capture and communication. Why? Because assessing risk is like completing an abstract 1000-piece jigsaw with hidden pieces. Our practitioners not only need to understand the unknowns and the spatial interactions of features which influence risk - but also to communicate those findings to peers, expert reviewers, or boards of diverse thinkers.

When working in an environment of high uncertainty and limited knows across a large and diverse spatial volume, 3D models become a powerful way of communicating information – but these can be cost prohibitive with specialist software and steep learning curves limiting accessibility, and thus value.

Lyndon has over a decade developing systems specifically designed for 3D modelling of dams and water assets. These systems were designed from the ground up by a dam safety engineer working on dams and hydropower projects and were written specifically to solve problems on water infrastructure projects.

Starting with a common, low cost and highly capable 3D modelling software, Lyndon has developed simple yet highly effective plug-ins for combining and interpreting critical engineering information in 3D space. The systems include the ability to build up models from historic and design data, fully customisable geological and geotechnical display methods, animation of complex time-based surveillance datasets – and even parametric engineering analysis in 3D space - presented in a clean model that allows users to focus on the things that matter.

Lyndon has published multiple papers and been the recipient of four national and international industry awards for his work. He believes the ability to visualise our power and water assets, understand their design features in context and effectively communicate these to boards or decision makers is often overlooked, and he is thrilled to offer his modelling expertise to the wider market.

Our Capability

MODELLING FROM HISTORIC INFORMATION

3D is a naturally intuitive form for presenting information. Reduced cost of ongoing review, better analysis and a creative platform to explore ideas for current and future generations.

What we bring: We have specialised tools for import, digitisation and combination of 3D data. Drawings can be brought to life, geotechnical information, mechanical plant, instrumentation, historic photos and more can be combined in 3D space and made accessible even by PDF.





TIME SERIES ANIMATION / AUTOMATION

Complex 3D movement can be a precursor to failure. The ability to automate and re-visualise changes in an asset with time enables quick, cost-effective analysis, communication and ability to mitigate.

What we bring: With parametric data handlers we can automatically regenerate models without manual work. Generating frames over a period allows us to load data, press play – and watch a fast-forward version of our assets behaviour over time. This can include phreatic behaviour, deformation or seepage all in a 3D and geological context.

FOUNDATION DETAILING

Almost 40% of dam failures worldwide are attributed to foundation conditions. Foundations will always contain unknowns - and its critical to SEE what we know - and what we don't.

What we bring: We have a custom built, easy to use and fully customisable user interface that enables visualisation of a wide range of data types in 3D space. These include boreholes, CPT's test data, SPT tests, shear velocity – as well as 3D modelling tools and sectioning capability which interface seamlessly with a highly capable, low cost and east to use general CAD package.



TREVALLYN DAM - TASMANIA

PARAMETRIC ENGINEERING ANALYSIS

In dams and hydropower we complete significant analysis to ensure the safety of our assets. We undertake multiple detailed calculations to identify points of weakness or lowest FOS to help zone in on areas requiring more detail requiring significant cost.

What we bring: Using custom parametric scripts, we can

anchor sensitivity - new, or existing assets. Once a model is prepared, our systems allow rapid screening, and sensitivity

analysis on an entire structure.

section, cut, and integrate analysis directly into 3D space. Be it

PARANGANA DAM – TASMANIA

INTEGRATED DESIGN

Design of dams and hydropower structures is an iterative process. Each step, from identifying options to detail requires design to identify what information is required then data collection which impacts that design. This can be a major source of both cost, and delays in large dams and hydropower projects.

What we bring: We assemble unique data handling, drawing, and design techniques for each site giving users control of critical inputs such as stripping depth, batter slope or filter widths. Our models update from start to end based on design input changes greatly reducing the cost and time implications of a typical design process.



Why Choose Us

We are a specialist engineering consultancy, with modelling capability – not the other way around. Having been an asset owner on Australia's largest water portfolio, a consultant and as an engineer Lyndon understands risk, asset management and most of all understands engineering. Our models are specifically designed for dams to solve problems we know are common, because we have been there. We can tailor models to suit a project, or client needs and can guarantee long term value in all work we do.

Standard Familiarity



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