CASE STUDY

Zinfra utilizes Octave Aspect Pipe Stress for detailed mine subsidence analysis

Key facts:

Company: Zinfra

Website: www.zinfra.com.au

Industry: Mining

Country: Australia

Octave products used: Aspect Pipe Stress *(CAESAR II)*

Key benefits:

- Accomplished efficient data entry and visualization necessary for configuring a piping system analysis model
- Rapidly created models and pinpointed potential problem areas
- Eliminated guesswork in model creation and design alterations
- Saved time leveraging automated code-compliance features

Zinfra, part of Zinfra Group, is a leading national service provider to the utility infrastructure sectors, delivering a comprehensive range of engineering, operations, maintenance and construction services within Australia. Services provided by Zinfra include engineering and design, project management, construction, civil, maintenance and asset operations.

Identifying goals

As part of its full suite of capabilities, Zinfra provides specialty engineering services for buried pipelines, including detailed analysis of the impact of future mine subsidence.

Mine subsidence can be defined as movement of the surface of the earth as a result of readjustments of the overburden due to the collapse or failure of underground mine workings, typically resulting in either sinkholes or troughs. Mining-induced subsidence can be managed through a combination of planning, preventative action and repair works.

Zinfra was engaged recently to work on two projects where its mine subsidence expertise came to the forefront – one in New South Wales and the other in Queensland. Both projects were situated on land that has been earmarked for future mining activity, which will occur underneath each project's respective pipeline. However, analysis also identified that both areas of land were vulnerable to mine subsidence.

Overcoming challenges

Given that prevention plays a major part in the management of mine subsidence, Zinfra identified from the start that its pipeline analysis would need to be both extremely accurate and highly detailed.

Both projects involved the design and construction of high-pressure pipelines compliant with Australian Standard 2885, which stipulates that the pipeline must be able to withstand future threats. Failure to comply with AS2885-1 can prove costly in the long run – especially if remediation works are required. Such works often involve excavating the pipeline and allowing the ground to move around it.

Given that the pipeline has to be exposed while this work occurs, safety of the workforce and community becomes an additional consideration.

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Andrew O'Neill
Engineering Manager, Zinfra

Realizing results

Zinfra conducted an evaluation which considered the experience of employees and contractors, in addition to the preferences of several key clients. As a result of this evaluation, Aspect Pipe Stress was chosen for the job.

Aspect Pipe Stress makes it easy to input and display all the data needed to accurately define a piping system analysis model. It evaluates the structural responses and stresses of piping systems to international codes and standards while enabling users to access and modify, if necessary, input element by element or globally.

Aspect Pipe Stress makes quick work of developing analysis models while clearly indicating areas of concern via color-coded stress models and animated displacements for any stress load case. Included are tools and wizards to help create expansion loops or view plant models, removing the guesswork from producing accurate analysis and recommending practical design changes.

According to Zinfra's Engineering Manager, Andrew O'Neill, it was crucial to "get things right" during the design phase of both mine subsidence projects, and Aspect Pipe Stresswas more than up to the task.

"Aspect Pipe Stress's level of detail, functionality and sophistication are integral to the successful completion of the design for both projects," said O'Neill. "The automated code compliance features were particularly useful and saved us an immense amount of time in the analysis phase."

Beyond mine subsidence analysis, Zinfra continues to develop its capabilities around overall pipeline design. Therefore, Aspect Pipe Stress's versatility and ability to handle a range of projects was another major selling point for the company.

"Our projects involve both above-ground piping and buried pipelines, as well as the transitions between the two," said O'Neill. "We needed a program that can model the stresses that result from those transitions and then create an accurate, detailed model.

"Aspect Pipe Stress really is the industry standard in pipe stress analysis software, and it provides an extra capability we can provide to our clients. It has become a selling point for us."

Moving forward

Zinfra intends to utilize Aspect Pipe Stress for all projects requiring pipeline design going forward. It is also in the process of evaluating the implementation of Forte 3DWorx (formerly CADWorx Plant Professional), Octave's plant design suite for small- to mid-sized projects.

"Given that Forte 3DWorx integrates seamlessly with Aspect Pipe Stress, we are exploring the efficiencies we could deliver for our clients by implementing the two as companion products," said O'Neill.

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.