

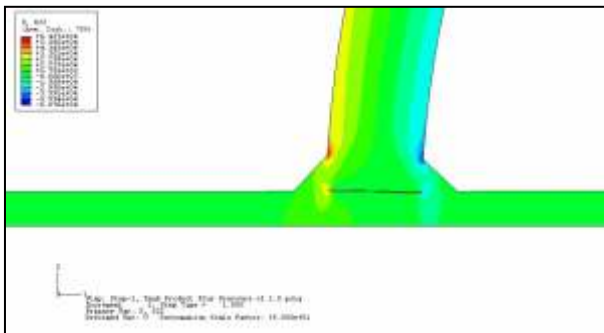
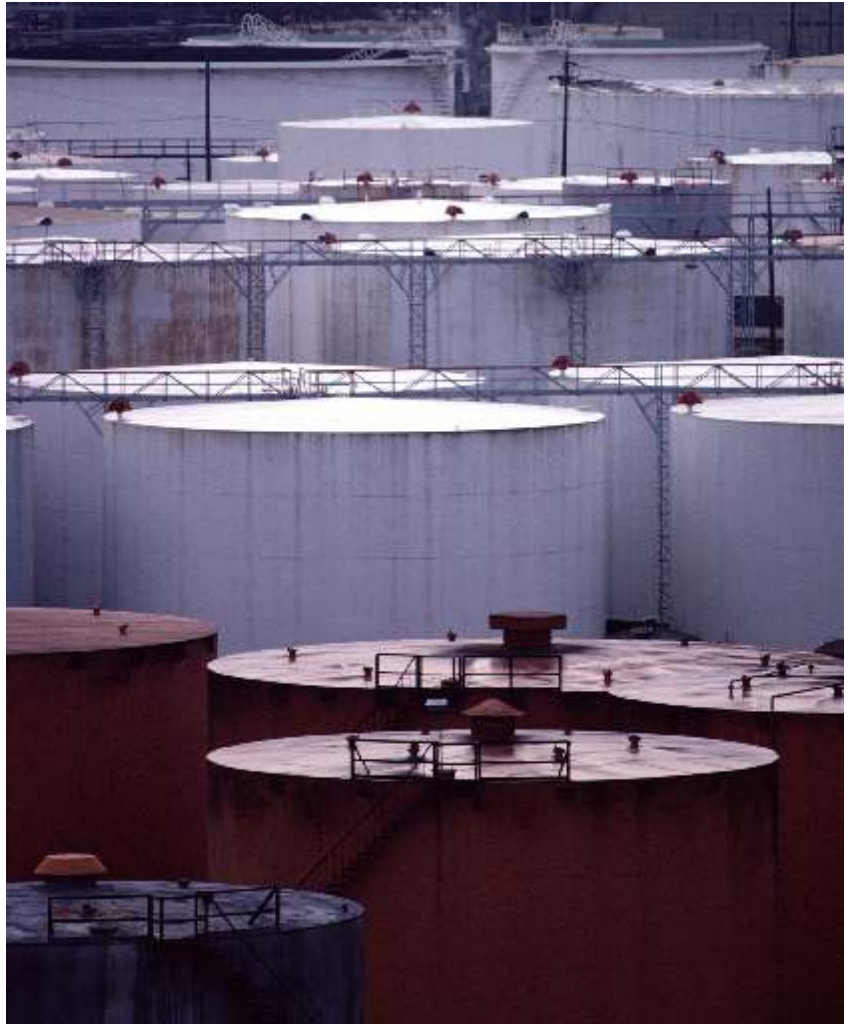
Owners Choose E²G for Tank FFS & RBI

Industry leaders

The Equity Engineering Group, Inc (E²G) is the recognized leader on services and support for aging infrastructure. Our company pioneered the use of Fitness-For-Service (FFS) technologies applied to Aboveground Storage Tanks (AST), developing the standards upon which the technology is based. As project manager of the API's Risk-Based Inspection (RBI) User Group, we've developed the current API RBI software which includes a comprehensive AST module. Our engineers have also been involved in the development of AST bottom and shell settlement procedures found in the current edition of API RP 653, Tank Inspection, Repair, Alteration, and Reconstruction.

Technical excellence

Along with developing RBI technology and software, our engineers were the principal developers of the landmark API RP 579, Recommended Practice for Fitness-for-Service and were principal authors of the new Fitness-for Service standard API 579-1/ASME FFS-1. They were also the principal authors of API RP 571, Damage Mechanisms Affecting Fixed Equipment in the Refining Industry. These documents form the basis for most FFS assessments performed in the U.S. as well as in many other countries. Our expertise in both FFS and RBI allows us to apply the right resources to meet your aboveground storage tank needs, and in unique situations, we can focus the combined effort of both our FFS and RBI tools on your tank concerns.



Stresses at Corner Joint Used for Hydrotest Exemption

Cutting-edge client servicing

Our ThinkTank service provides the link between developing technologies and our clients' multifaceted aboveground storage tank problems. We helped write the standards, so we know how to use these technologies to their fullest potential. And because we've worked in plant environments, we know you need practical recommendations in a timely manner.

VCESage software tank module

E²G's VCESage™ analysis program includes modules that provide tank design and FFS tools, which inspectors and engineers can use to evaluate tank designs and many types of common tank damage.

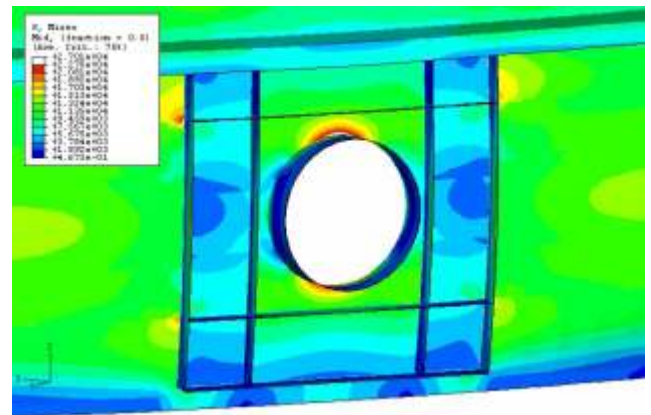
ThinkTank Services

The suite of ThinkTank assessment services can be implemented on a single tank, a plant's or terminal's entire tank population, or at a corporate level, depending on the type of assessment needed. Examples of the types of assessments performed include:

- RBI assessments to develop optimized inspection plans or to evaluate an extension of the inspection interval.
- FEA of the tank(s), flexibility analyses of piping, and the appropriate FFS analyses for the damage mechanisms identified.
- Audits of site or corporate tank programs, including a review of design, inspection, maintenance and operations data and procedures
- Review and revision of company design, maintenance and inspection specifications for tanks; or supplying E²G's VCEPractices™ tanks specification.
- Comprehensive assessments of critical tanks, such as refrigerated tanks, including an RBI assessment of the tank(s) and associated piping and pressure vessels, FEA and FFS evaluation, an evaluation of the tank's foundation design and pressure relief design and the development of inspection plans.
- Evaluation of tank hydrotest exemptions.
- Design of tank repairs for specific damage, such as settlement.

A predictive analysis ensures tank availability

A client's acid storage tank was built out of Monel, but used external carbon steel bands to reduce the required Monel thickness. The tank included an aluminum and fabric dome roof that would gain weight as polymers from the product adhered to the fabric. The tank had general shell thinning and there was some concern with the increasing roof weight load. Due to the tank's unusual geometry, Level 3 API 579 FFS analyses were required. We were able to determine the minimum required thickness for each of the tank's shell courses and a maximum permissible roof weight, so that the Owner knew when repairs or roof cleaning were required. The figure (right) is of local stresses at one of the reinforced manways.



Stresses at Manway of Banded Acid Tank Nozzle

E²G's ThinkTank Assessments Improve Your Bottom Line

ThinkTank FFS Assessments improve plant or terminal reliability by:

- Utilizing FFS techniques to avoid expensive tank outages and extend tank life
- Providing cost effective designs for tank repairs
- Employing settlement expertise to avoid costly releveling
- Performing FFS Assessments in lieu of costly or impractical hydrotests

E²G combines its FFS and RBI expertise to optimize tank inspection plans for refrigerated products such as ammonia and liquefied hydrocarbon gases. Our methodology:

- Utilizes the API RBI Tank Module to plan inspections and avoid more frequent, internal inspections based on older practices
- Provides a tank inspection plan for your plant or terminal, employing resources where they are needed most
- Provides tank inspection plans for refrigerated products such as ammonia and liquefied hydrocarbon gases

Contact Us

For more information on E²G products and services, please check our website at www.equityeng.com or contact Greg Alvarado at gcalvarado@equityeng.com and 281-537-8848 or Gary Frantz at gprantz@equityeng.com and 281-414-5039.

Smart Technology for Aging Infrastructure

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