Structural Condition Surveys: How Assessments Can Actually Save Money

An ADF Engineering white paper written by Derek Jacobs, SE, PE

Structural Assessments Can Save you Money

Just like an annual doctor's appointment or routine car maintenance, a structural assessment can catch little issues before they become big problems. Many companies have systems in place that schedule Condition Surveys to occur on a 5- to 10-year interval; however, this guideline often goes unfollowed and unenforced.

What is a Structural Condition Survey?

A qualified Structural Engineer will perform a visual inspection of a pre-designated area of the facility and provide an assessment of the conditions. This assessment would then take the form of a findings report summary that will identify deficiencies, assign each item an urgency factor based on risk potential, identify repair concepts or if further engineering is needed, and provide an opinion of probable construction cost. Cost for a Structural Condition Survey can vary based on the size and complexity of the areas under review. But their expense is offset when used as a method to target critical deficiencies over non-critical ones, or at worst when compared to the alternative of a claim or incident.

Issues can be identified into one of the following categories:

- Design Deficiency – Members missing or inadequate to provide a safe load path
- Construction Deficiency – Items out plumb, missing bolts, low quality materials, or poorly placed rebar
- Overload Added – Framing areas that are loaded beyond their design capacity
- Altered or Use Damaged Structure – Members that are fatigued or have been altered as part of a renovation without proper engineer review
- Deteriorated Structure – Rust damage to steel or concrete spalling due to corrosive environments, water incursion, or freeze-thaw cycles
- OSHA Deficiency – Safety violations per current OSHA codes and standards
- Structural Damage due to Act of Nature – Fire, wind, earthquake, flood, or settlement damage

Keeping Small Issues Small

Many issues can be mitigated by proper maintenance. For example, deterioration to steel members from rust damage or corrosive environments can be often times be halted with a proper cleaning and a fresh coat of paint. A Structural Condition Survey can help the client distinguish when this solution would be sufficient or when the damage has progressed to the point that further steps need to be taken. Also, for large facilities that may need to budget their maintenance costs for the year, a Condition Survey lists issues by priority giving the plant manager an important scheduling tool so that maintenance can be focused on catching the most critical items first.

Focus on What's Important

An example of how critical a Structural Assessment Survey can be: Imagine a facility with a limited annual maintenance budget. Among other items scheduled for repair, there are two areas that show signs of corrosion; the steel beams of an equipment access platform and a section of metal roof deck. There is only enough funding to repair one of these areas this year. The maintenance director, not having any structural experience decides to replace the platform since it is used every day, while the roof is hardly ever visited. Months later, a technician walking across the roof to perform maintenance on an HVAC unit falls through the corroded section of roof and is killed. A Structural Assessment Survey would have noted both of these areas in the report and would have concluded in their findings that the steel beams of the platform showed only minor surface corrosion with no section loss and could have been addressed at a later date, while the section of roof decking was completely eaten through and in immediate need of repair.

Structural Survey Findings Don't Come with Fines

A Structural Condition Survey includes a review of OSHA critical items such as ladders, stairs, guardrails, and fall protection systems. Violations regarding these items are in the perennial Top 10 list of most frequently issued citations. As of Jan 2, 2018, penalty amounts are listed on the OSHA webpage as $12,934 per violation. OSHA codes and standards are constantly being updated and improved, and while it is true that many of these changes come with a "grandfather clause", that is not true for all of them, and for some older sites, these clauses have long since expired. Sometimes these issues are not due to revised codes, but to the fact these systems where never properly engineered in the first place. Correcting these items not only could prevent a serious injury or death, but it's also better to be caught by a Structural Survey rather than an OSHA inspector who could issue a penalty for each violation.

Conclusion

The time and costs needed to have a Structural Condition Survey performed are minor when compared to those from dealing with a structural failure that stops production or an injury claim from a worker due to a breakdown of a safety system. Plant maintenance is a fact of life for all production facilities. Whether it is damage from the elements, the materials used in the processes, or simply general wear and tear, scheduling and budgeting for these repairs is essential to keep the business running. The Structural Condition Survey is a critical resource for planning a targeted approach to spending these funds efficiently.

About ADF Engineering

ADF Engineering is a leading provider of process engineering and facility engineering solutions for the food, feed, fuel, and bioscience industries. We have a reputation for providing cutting edge, high quality and cost effective engineering solutions to industrial clients throughout the United States and Canada, as well as, across the globe including China and Australia. We understand that every project is unique, therefore, having a strong set of core competencies combined with experience is essential to our success. ADF assembled a sizeable team of extremely talented engineers in all critical engineering disciplines at three strategic U.S. locations. Contact the author at (937) 847-2700 x128, or visit us on the web at www.adfengineering.com.

About the Author

Derek Jacobs, SE, PE, has more than 12 years of experience in industrial and commercial structural engineering. Derek is a principal at ADF, where he manages a structural engineering team of engineers and designers, and oversees design and constructability on a wide range of structural projects.