



Funding a Systematic Approach to Steel Structure Life Extension

How to Use Capital Funding to Build System Resilience, Reduce Risk, and Save Money

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Summary

Steel does not last forever. A significant percentage of the steel utility structures in service are over 40 years old, an age at which the cumulative effects of corrosion begin to take their toll. Traditionally, utilities have not included below-grade assessments in their maintenance programs, resulting in unseen and unidentified hazards. These facts, combined with environmental impacts, have put America's steel transmission structures, and the country's power grid, at increasing risk.

Utilities need to execute a steel asset assessment and structural reliability and resiliency program across their systems to identify and rehabilitate potentially dangerous structure conditions. Historically, these types of programs have been treated as maintenance, but the lack of available operations and maintenance (O&M) dollars has made it challenging for utilities to consistently execute best-in-class assessment and remediation programs. How can utilities fund what needs to be done to alleviate the serious risk posed by aging steel structures?

One solution is to consider capitalizing the program costs of steel structure best-in-class assessment and remediation. These are capital investments that make systems more resilient, extend the life of the steel structures, reduce financial and public relations risk, and avoid the staggering cost of premature asset failure and replacement.

Steel structure assessment and remediation results in structures that are more resilient in weather events, last significantly longer, and cost less to maintain. The outcome is an improved and longer lasting asset that clearly meets the Generally Accepted Accounting Principles (GAAP) and IRS definitions of betterment. If investments result in betterment, the appropriate accounting approach is to capitalize the cost of those investments, and depreciate the capitalized costs over the life of the asset. Such programs are a very cost effective alternative to leaving structures in place to fail and then dealing with the huge replacement costs and necessary line outages that accompany such replacements.

Successful Capitalized Programs

Utilities have successfully capitalized multiple types of assessment and remediation programs that extend the life of a structure in a meaningful way, including coating system applications, installation of cathodic protection systems, and steel component and concrete foundation rehabilitation, among others.

Programmatic, circuit-based approaches have also been capitalized which include identification and remediation of additional (above-grade) sub-standard system components identified through an overhead or climbing inspection.

Another method is to implement a consolidated system rehabilitation program covering annual costs for inspection, coatings, restoration, engineering, and replacement. Utilities typically capitalize comprehensive engineering studies that result in building new facilities. Likewise, utilities may also capitalize the engineering studies that are necessary for structure and circuit restoration. Those studies might also include the cost of collecting environmental

and structural information gathered during the engineering survey. A utility's overall strategy can include one or more program components depending on system or circuit conditions, specific needs, and historical funding practices for other T&D system rehabilitation programs.



IRS Rules in Support of Capitalization

The IRS states that taxpayers must capitalize restorations under certain conditions. One of these conditions is if the restoration is for the replacement of a part or a combination of parts that comprise a major component or a substantial structural part of a Unit of Property (UOP). Another condition is if the work returns a UOP to its ordinarily efficient operating condition if the property has deteriorated to a state of disrepair and is no longer functional for its intended use.

Benefits of Capitalizing Steel Structure Assessment and Remediation

Proactive assessment and restoration programs reduce or defer the capital required for structure replacement, and therefore over time, result in a net reduction in costs to rate payers.

Everyone wins when utilities use a structural reliability and resiliency program to extend the life of a steel transmission structure for 20 or more years, versus replacing it at a cost that can reach into the hundreds of thousands of dollars, or worse, experiencing a catastrophic failure.

Through the effective use of capitalization for system life extension programs, utilities and customers can benefit from:

- The flexibility to fund other T&D maintenance program priorities
- Long-term reduction in Present Value of Revenue Requirements (PVRR) which is a measure of long-term savings to the ratepayer

Conversely, ineffective capitalization can drive sub-optimal asset management decisions. Suboptimal inspect-only programs that focus only on the overhead structure and associated components may increase volatility in future replacement CapEx requirements. More efficient programs include assessment of the structure in the transitional and

below grade zones where corrosion is actively taking place. Ineffective capitalization also reduces flexibility in capital rationing and asset investment planning.

Effective capitalization of structure assessment and restoration provides an alternative way to take advantage of current favorable regulation and market conditions, instead of a large-scale asset replacement program. Proactive strategies, which delay otherwise-required replacements, diversify capital investments in transmission, and help keep overall spend at a sustainable level.



Capitalizing and Depreciating the Funds Needed for a Systematic Approach to Steel Structure Assessment and Rehabilitation

To assist utilities in their efforts to capitalize essential steel asset management programs, Osmose lends members of its Solutions Consulting team to consult, plan, and help guide the process. Having supported the approach with utilities' wood assets with data that documents program life extension benefits, Osmose now applies its experience to help utilities effectively document and support the case for steel asset management capitalization.

For instance, Osmose worked with a large Midwest utility to file a plan with their commission that allowed them to recover the costs for steel structure assessment and rehabilitation as part of a comprehensive T&D infrastructure improvement plan funded via a rider or cost tracker on customer bills.

Projects that are eligible for the program also include line and structure replacements, the installation of new transformers and substations, and other capital expenditures to replace aging transmission and distribution system infrastructure.

Twelve other major investor-owned utilities, including some of the largest utility holding companies, are funding all or a portion of their assessment and remediation programs with capital, ranging from structure assessment with coatings, to cathodic protection, to structural or foundational rehabilitation.



GAAP Capitalization Requirements

The GAAP rationale is that capitalization results from improvements to existing assets if future economic benefits result from the expenditure. If so, then the improvement is a betterment, should be treated as a capital expenditure, and should appear on the balance sheet as an asset. Future economic benefits occur if any of the following conditions are met:

- The service life of an asset is extended over that which was originally estimated.
- The quality of output expected from an asset is improved.
- The expected quantity of output from an asset is increased.
- The costs associated with operating the asset are reduced.

Recently updated IRS regulations, which include capitalization rules for tangible personal property¹, no longer phrase the betterment test in terms of expenditures that “result” in a betterment, but instead note that capitalization is required for amounts that are “reasonably expected” to materially increase one of the four outcomes.

Post-acquisition expenditures classified as betterments should be capitalized, added to the cost of the long-lived asset, and then depreciated over its useful life.

The IMPACT of Corrosion on Steel Structures

Corrosion activity can occur in three general areas on a steel structure:

1. The **above-ground (atmospheric) zone** of a structure can easily be visually inspected on the ground, by air, or by climbing without excavation. Few structural failures are attributed to corrosion in the atmospheric zone.
2. The highest-risk zone for corrosion to occur is the **transitional zone** (12 inches above ground line area to 18 inches below) where oxygen levels in the soil are highest, coupled with frequent water and debris movement just above grade. A typical groundline inspection will include excavation of the pole or tower leg 18 inches below grade to assess corrosion activity. If corrosion is found, a deeper excavation will be performed until good steel is found.
3. The **below-grade zone** (18 inches below ground line and deeper) is at a lower risk of corrosion damage because of the decrease in oxygen levels. The portions of the steel structures in the transitional zone typically deteriorate faster than the atmospheric or below grade zones due to constant exposure to sub-surface moisture, oxygen, alkalis, and other environmental conditions. Osmose inspection data on thousands of structures shows that while galvanization is effective at mitigating the impact of atmospheric corrosion, it is less effective below-grade over time. Specifically, corrosion can initiate with an accumulation and permeation of moisture and corrosive compounds at the galvanized coating interface.

Depending on where a utility’s structures are located, different climate conditions and different soils impact steel differently. Utilities need highly qualified experts to analyze the assets’ condition and to engineer and apply solutions.

Capitalized betterment investments result in fulfilling a fundamental accounting objective of matching the recovery of assets through book depreciation over the years the asset will be in service. The matching principle extends to ratemaking as well, by assuring that the ratepayers that benefit from the remediation program will pay for it, rather than expensing it currently and potentially burdening today's ratepayers with the full cost of the remediation and allowing future ratepayers to enjoy the benefits

of the remediated steel structures with no cost to them. Having future customers share in paying for those costs is fair and reasonable. The Federal Energy Regulatory Commission (FERC) has provided capitalization guidance for betterment investments in its case law. The next section will highlight FERC's guidance in three of its orders.



Relevant FERC Case Precedents

Relevant FERC case precedents supporting capitalization decisions on analogous programs or program components are generally consistent with GAAP rules for capitalization, confirming the validity of the approach.

Novinium, Inc.'s² capital accounting treatment was approved by FERC for URD cable injection, "provided the company used the product to extend the useful life of its segments beyond their original estimated useful lives." Related cases filed by utility companies have allowed for comprehensive capitalization of all related "construction costs," including the inspection, when the determination that injection is required has already been made (at the program level).

Waverly Light & Power³ sought and achieved a ruling on the accounting treatment for retro-filling in-service transformers with a bio-based dielectric coolant that extends the useful life of the transformer. The ruling contains a key explanation of O&M versus capital accounting treatment for replacements of minor items of property. It's considered a maintenance expense if no betterment principle is met, and considered a capital expenditure if significant life extension is achieved (based on original asset useful life).

For IMCORP, FERC⁴ ruled that "the cost of underground cable assessments may be capitalized subsequent to the determination that a one-time major rehabilitation project must be undertaken and that the project will extend the overall electric cable system's useful life beyond the original estimated



service life." Both inspection and remediation costs may be capitalized as long as costs associated with a defined program are not the result of an asset failure. A thorough mitigation and remediation strategy is a defined program whose primary purpose is to preempt and avoid asset failures. This case precedent is particularly relevant for one-time transmission line upgrade or uprate projects which also include a below-grade assessment and structure or foundation rehabilitation.

Betterment for Steel Structures

Steel structures that are candidates for rehabilitation are often near the end of both their accounting and originally estimated useful lives. If such a steel structure is not remediated, the only other available option to ensure reliable, ongoing circuit performance is replacement, at a significant cost.

Structural rehabilitation materials used for structure restorations are made from newly-fabricated components with equivalent or better properties/coatings versus the structure's original design. In addition, by completing a structural or foundation rehabilitation project, current engineering and code requirements are used which often exceed the code requirements in place when the structure was initially built, providing more support to the business case for capital funding.

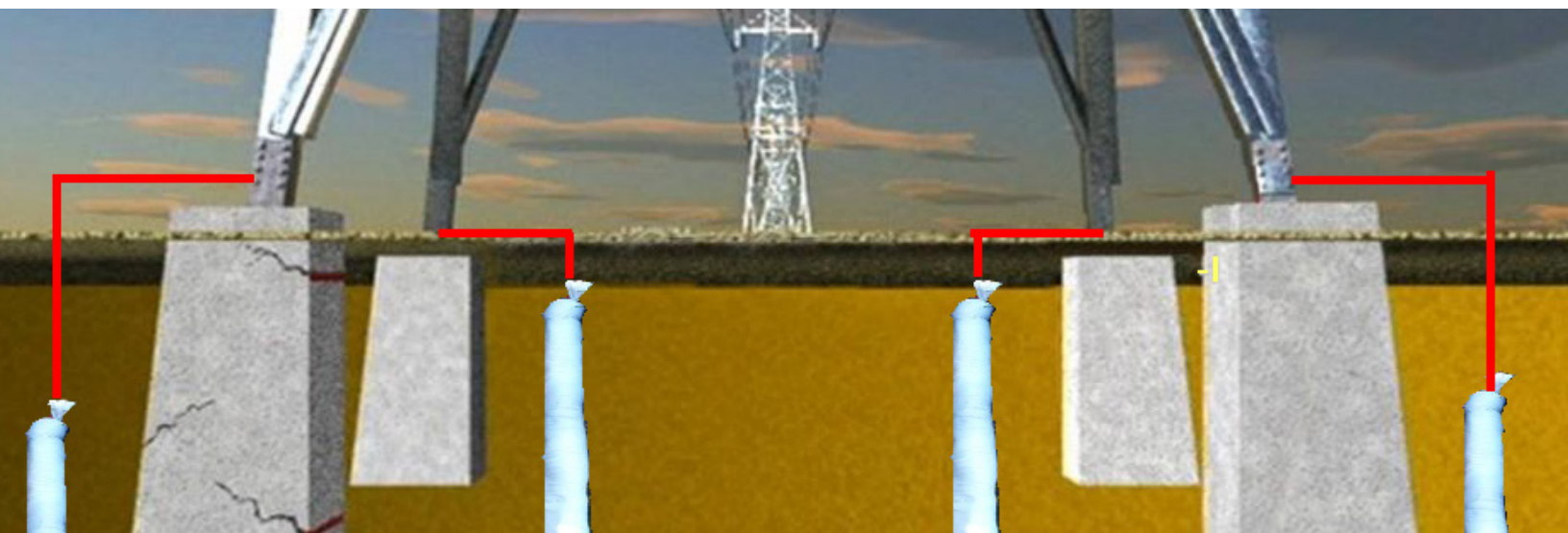
In many cases, the impact of corrosion at the groundline is the only significant problem with the structure or foundation that affects its remaining

service life (see sidebar on page 6 for more information on the impact of corrosion). The rehabilitation of the primary "at-risk" component (e.g., the corroded leg or foundation), the application of protective coatings on serviceable legs, or the installation of cathodic protection enables the steel structure to remain in service for many more years than originally estimated, and enables the utility to avoid or significantly defer the high cost of replacement.



Extending the Life of Steel Structures: Rehab vs. Replacement

Osmose regularly partners with utilities to develop and execute effective steel asset life extension programs. Osmose applies corrosion and structural engineering expertise to not only extend the life of these complex systems but also to upgrade them up to current-day standards. Osmose's assessment and remediation framework brings efficiencies of scale to utilities but is not a rigid formula – the approach is customized to each utility system's complex and unique needs as well as historical T&D program funding practices.



Change Management Activities

A successful capitalization program requires internal change management activities including:

- Document the case for changing the accounting treatment based on the documented life extension impacts of coatings, structural or foundation rehabilitation, or cathodic protection installation.
- Establish a mechanism to track the inspection (O&M) versus remediation (capital) costs separately.

A separate account may be necessary to simplify tracking and depreciation of project-related costs

- Determine if any regulatory filings are recommended (i.e., program pre-approval, rider, or cost tracker)
Option to change internal accounting treatment but defer regulatory filing until future rate case
- Determine if an adjustment to depreciation rate(s) is to be considered

Osrose staff can work together with a utility's operations and finance teams to support the entire change process.



Conclusion

A utility's T&D assets are part of a complex and interconnected system, and their condition changes based on the impact of environmental conditions and the passage of time. Properly evaluating and restoring structures to increase the reliability of this system and its assets is much more affordable than replacement. Utilities can delay the enormous cost of replacement, while reducing risk and increasing system safety.

Understanding asset economics is important. Utilities can benefit from a trusted advisor continuously reviewing these issues to help make an assessment and remediation program supportable and affordable. Osmose works with utilities across the country to help make the business case for capitalization and obtain necessary program funding.

To learn more about capitalizing your steel assessment and restoration program, contact Osmose.



Sources

1. IRS T.D. 9636, (September, 2013)
2. FERC Docket No. AC08-143-000 (September, 2008)
3. FERC Docket No. AC11-2-000 (February, 2011)
4. FERC Docket No. AC09-27-000 (March, 2009)
5. IRS T.D. 9564, REG-168745-03 (December, 2011)





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To find an Osmose representative in your area,
call 770.631.6995 or email steel@osmose.com

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