

Keys to Obtaining a Quality Pipeline Coating: An Engineer's Point of View

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Cost-cutting measures in the pipeline industry have led to the implementation of a number of well-intentioned purchasing initiatives that are having an adverse effect on the quality of pipeline coatings. The purpose of this article is to identify and discuss some of these commercial aspects and why they are adversely affecting the quality assurance/quality control of pipeline coatings.

such as initial cost, life expectancy in the specific application, ease of application, construction damage resistance, compatibility with cathodic protection (CP), and physical characteristics, adequate coatings choices exist to ensure that extended design lives can be obtained.

However, there are a growing number of industry stories of new pipelines requiring five times the expected level of CP, or of relatively new coating system failures.¹⁻⁴ These stories include new pipelines having to be monitored by in-line inspection or direct assessment, and major operating companies rehiring coating applicators that provided substandard pipeline coatings on previous projects, with knowledgeable people expecting the same substandard results.

On several occasions, the author has reviewed the coating specifications of projects that have experienced catastrophic coating failures. While the specifications have had some differences, they all should have been adequate. Upon further investigation, the author found that critical aspects of the specifications were not followed, and the justifications for the deviations were of a commercial nature. The causes of these deviations have occurred often enough that the author has noticed several recurring themes. As in any cause/effect situation, once the sources of problems are identifiable, they can then be addressed.

Discussion

In the past, pipeline project procurement was relatively routine. Sources of supply were identified, proposals were solicited and evaluated, and low bids were thoroughly reviewed and amended until they were satisfactory to the purchaser. Ample time and technical support were available to procurement, and pipeline procurement personnel were generally specialized and experienced in their unique product needs. Responsible and authoritative inspectors made sure that the work was done in accordance with the specifications, and performance penalties were realistic and enforced. Pipeline coatings were understood to be a critical factor

Today, the technical aspects of pipeline coatings are well understood. The pipeline industry has well-developed and proven standards regarding surface preparation, evaluation and selection of coating characteristics, application and inspection of coatings, and handling and field repair of coating damage. While engineers have to juggle the pros and cons of various coating system parameters,

in the life expectancy of the pipeline investment.

Modern pipeline projects are generally larger, and financial and commercial requirements have become the driving force in most decisions. Technical and procurement outsourcing and the implementation of a number of purchasing initiatives are having an adverse effect on the quality of pipeline coatings. Identifiable, recurring root causes include:

- 1) a failure to limit the applicator bidders list to qualified vendors;
- 2) a lack of appreciation of the value of qualified inspection;
- 3) the negative implications of "just in time" purchasing;
- 4) the negative implications of "local content;"¹
- 5) the negative implications of revolving management/engineering personnel; and
- 6) the attitude that "it will be someone else's problem."

LIMITING THE APPLICATORS BIDDERS LIST TO QUALIFIED VENDORS

It should go without saying that only qualified coating applicators should be allowed on this list. This qualification should include a combination of facility inspections and personnel evaluations, demonstrated past performance with references, and financial evaluations. Facility inspections and personnel qualification evaluations should be considered the project engineer's responsibility, but are seldom given the priority they deserve. Project management of other types of projects routinely inspect vendor facilities. The criticality of this process is seldom as important to a project as the performance of a coating is to a pipeline. Purchasing department personnel are best suited for checking on the financial health of a bidder, but again, this is seldom judged to be important. The author knows of several projects where remedial or corrective actions were not possible to get from nor expected of the vendor because of the vendor's financial condition. The importance of controlling this bid-

ders list cannot be overstated; failure to do this is the leading cause of catastrophic pipeline coating failures. "Opening up" the bidders list often appears to save a project money, but the cost savings are generally a result of the purchase of substandard work.

QUALIFIED INSPECTION

The appreciation of qualified inspection with authority equal to the responsibility of the task has fallen out of favor in recent years. In general, it is now common to use fewer inspectors and/or have the inspectors performing multiple tasks. This is the case even if the inspectors are well qualified—they can be in only one place at a time. "Low bid" contractors understand what this means. The author knows of one current, major international project where inspection was generally eliminated in favor of post-construction testing and correction. Needless to say, the project personnel are now living with what they have decided are "acceptable" coating problems. After all, delaying a project schedule or putting the contractor out of business (if the source of the problems can be identified at this time) is not acceptable.

When the author questions an early-stage project about the lack of emphasis on inspection, he is always told that the project specifications will prevent any problems. When he informs the project management that recent, problem projects had similar specifications to theirs, the author is reassured that he is unduly concerned. Project management may then rely on the "Revolving Management/Responsible Engineer" or the "It's Their Problem" rationales discussed further below.

JUST-IN-TIME SCHEDULING/ PROJECT SCHEDULE

Project contractors have come to learn that they have a great deal of leverage in the battle to obtain project acceptance of marginal quality work when there is insufficient time to allow for corrective action. That, coupled with the purchasing theory that money is saved when materials are ordered as late as is practical, limits the options of an inspector or engineer who

is trying to enforce the attention to detailed specifications, especially for critical remedial work. Without the fear of having to rehandle and recoat pipe at a later date, a "low bid" coating applicator is much less concerned about doing the work right the first time.

LOCAL CONTENT

As unrealistic as it may seem, the author finds that it is almost a universal assumption by project management and purchasing departments that pipeline coating application is simple, and if they can do nothing else for a project, local in-country contractors can coat the pipe of an international project. They can—if they follow the specifications. Too often, however, the local work force is inexperienced and untrained, and equipment is substandard.

REVOLVING MANAGEMENT/ RESPONSIBLE ENGINEER

For several years, the author was contracted to an operating company that was known for its corporate and financial innovations. Managers changed every couple of budget cycles and no one was held responsible for the results of deferred or canceled maintenance. The author now finds similar situations in long-lead projects. Project decision makers change often enough that unless the basis for decisions is remembered or recorded, the decisions are subject to reinterpretation and/or reversal. This lack of consistency and accountability leads to a lack of enforcement of the basic project specifications.

IT'S THEIR PROBLEM

On today's pipeline coating projects, the author seldom has a problem with client specifications being unnecessarily stringent. More often, the problem is getting project management to follow their own company specifications. In order to save money, they will ignore their own company's "lessons learned" and follow courses of action that their operating and maintenance procedures forbid. When the author points out that an action is contrary to the company's

own specifications, and that its operating unit personnel will probably incur expenses in correcting a project action, he is told that it is operations' problem. Apparently, project management is rewarded based upon apparent cost savings rather than for actual value created.

Summary

In summary, the pipeline industry knows "technically" how to obtain quality pipeline coatings. There is no mystery or magic. Project engineering and design departments simply need an adequate level of responsibility and authority. Moreover, project management needs the proper motivation. Project decisions need to be based on lessons learned and what project histories have shown. Surface preparation, coating application, pipe handling, and coating repair specifications must be followed and enforced. It is that simple.

Because pipeline coating failures are "financial" issues rather than "safety" issues, it is unlikely that coating failures will lead to new regulations—similar to what happened with the Operator Qualification and Mechanical Integrity initiatives.

When the author was contracted to the large operating company mentioned earlier, company personnel were constantly directed to perform tasks at the lowest possible, current-day cost. There was no concern for quality or future cost savings (after all, the facility in question might be owned by another operator the following year, the thinking went) and many times it became necessary to spend extra time and funds correcting earlier "cost-saving" actions.

References

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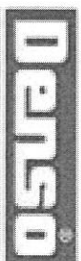
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