

## Suppliers' Tips

# How should I evaluate whether to repair or replace my storage vessel?

Often the decision to either repair or replace comes down to dollars. Having a professional evaluation is a good starting point. Note that while this answer primarily addresses shop-welded vessels, the following points could apply to many different storage options.

Visually evaluate the vessel's condition, asking the following questions: Are there signs of corrosion in the support skirt or columns? Is the coating (if there is one) in good condition? Are there any dents or deformations from flow problems, venting issues, or accidents? Has the material being stored changed in type or bulk density? Have modifications been made to the vessel that weren't approved by the design engineer or manufacturer? Is the current capacity adequate, or is more required? Is the foundation sturdy? Is the anchoring system intact? Is everything still plumb and level? Also consider the site conditions: Is the vessel accessible? Can it be worked on safely?

The vessel's age will help determine whether the design conforms to current building and construction codes. Many older vessels in good physical condition aren't going to meet today's standards because of code changes or changes to industry best practices. Ultrasonic thickness testing is helpful if you suspect the vessel shell has been thinned by corrosion or abrasion. This will also confirm whether the thickness of your shell material is adequate for your application.

Once you have a list of items to address, you can use that to obtain an estimate for repairs and can then compare that estimate to the cost of a new vessel. Sometimes, you have few options. For example, if your vessel is in the middle of a building with floors all the way around and no good way to remove and replace it, repair may be your only option. If your vessel has stored dangerous materials and the repair process could create an unsafe working environment, replacement may be your only option. If onsite repairs aren't permitted or are cost-prohibitive, a structurally sound vessel could possibly be sent back to the manufacturer for refurbishing.

In any case, getting a professional opinion sooner rather than later is critical. A new vessel — or even a thorough refurbishing of an existing vessel — is an investment, but it can improve your operation and is less costly than the downtime and restoration associated with a vessel failure.

*Mandy Landwehr, QCIQA manager, Imperial Industries, 715-359-0200*

The evaluation process for storage vessel repair or replacement can be very complex and may involve many factors. Always consult a qualified professional, who will consider the vessel's age, the severity of any deficiencies, the effects of preventative maintenance or lack thereof, and the vessel's operational requirements. After a complete and thorough assessment, the inspector should be able to recommend the safest and most economical repair plan, along with

several alternative plans, taking into consideration the customer's schedule limitations and operations restrictions. I recommend using a company with extensive experience, knowledge, and resources to ensure that you receive the most operationally and financially viable recommendations.

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Whether to repair or replace a storage vessel depends on many interrelated variables, such as cost, implementation time, associated maintenance, functionality, and safety.

**Costs.** Be sure to consider all the costs associated with either repairing or replacing the vessel. For example, in many cases replacing a storage vessel is cheaper than repairing it, but if upstream and downstream equipment needs to be removed to install the new vessel, this can add to the replacement costs.

**Implementation time.** Be sure to evaluate the implications of downtime and production loss. Repairing the vessel may seem easier, especially if the repair work isn't very complex, but some repair work, such as welding in a coal storage vessel, requires the vessel to be taken out of service for a prolonged period.

**Associated maintenance.** While you may determine that repairing the vessel is the best option after considering costs and other factors, remember that a repaired vessel will have a mix of old and new components. These old components will require a higher level of attention and maintenance than a new vessel would to ensure that the structure remains safe over its extended life.

**Functionality.** Reliably discharging the stored material is critical to your process, so functionality needs to be a factor when deciding whether to repair or replace the vessel. While the costs will be greater for either option if your application requires modifications to operate effectively, the improved material flow can drastically offset these costs.

**Safety.** Any engineering project has associated risks, but the risks associated with repairing a vessel can often be much higher than those associated with replacing a vessel. This is because repair projects require workers to work in confined spaces, at elevated work stations, in difficult weather conditions, and while operating heavy equipment.

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