PREVENTING THE PROBLEM.

DAVID LAING, MOLE•MASTER, USA, REVEALS THAT WHERE SILO INSPECTIONS AND SILO CLEANING ARE CONCERNED, SAFETY SHOULD BE THE PRIMARY FOCUS.

Scheduling a silo inspection can be compared to scheduling a trip to see the doctor or dentist. You know you need to do it. You know it is possible that you might discover a problem before it becomes a problem, or at least before it becomes too serious. But then, what if there really is a problem? That can be expensive, scary, and time-consuming. When things are going ok, it

is easy enough to adopt an 'if it ain't broke don't fix it' attitude. Gerry Lynskey, SE, PE, principal at SSI Consulting, encounters this kind of attitude quite often. "Sometimes we run into a case where an owner has previously inspected the structure, and they may have felt that it did not look too bad, so they let it just float out of their minds," Lynskey explains. Mole•Master also tends to experience resistance when suggesting periodic inspection and maintenance.

A silo cleaning, by the same token, is like having a cavity removed. A problem exists and it needs to be fixed before it gets worse or leads to other more serious issues. The temptation, however, is to see how long that problem can be ignored. Mole•Master has encountered situations where a company has tried to fix issues themselves and have converted a fairly easy problem into something much more time-consuming and expensive.

When a company does move ahead with a silo inspection or silo cleaning, speed may seem like the most important factor. The priority for most owners is to get everything up and running as quickly as possible. The fact is, however, safety should always remain the top priority where silo inspections and silo cleaning are concerned.

Safety corresponds to silo inspection and silo cleaning in two ways. There is a commitment on the part of facilities to make sure their employees are as safe as possible at all times, and then there is making sure that silo inspections and silo cleaning are performed as safely as possible.

A culture of safety in trying times

Many companies today, unfortunately, feel that they can get by without regular inspections and cleaning. Constant guideline updates from MSHA, OSHA, and other organisations can seem like a series of expensive hoops to jump through versus ways to increase safety for workers. Lynskey notes that on some occasions, engineers are contacted to testify during court cases after a silo has collapsed. In these cases the engineer often has to confirm that had the company invested in a silo inspection, the collapse and perhaps the ensuing tragedy, could have been avoided entirely. MSHA in particular has become well aware of the dangers inherent in cement silos and kilns, and they are increasing pressure on owners to make sure these structures are as safe as possible. Often, this can be an uphill struggle.

Many of the concrete silos in use around the world today were built in the 1950s and 1960s. A lot has changed since these structures were erected. Lynskey points out that there was not as much knowledge about silo behaviour in the 50s and 60s so many silos designed and constructed at that time did not take into account many of the precautions that would be incorporated today. Similarly, there was not as much of an understanding about how material moves in a silo. The way silos are being used has changed, and the original infrastructure is no longer as efficient – or as safe.

Increasingly, concrete silos in particular are showing their age. Owners are calling engineers and contractors with concerns about bulging walls or even protruding steel that indicates a fallen roof beam. Sometimes the issue is that material that is stored in one silo is seeping into another vessel, indicating a leak in the silo. Even with seemingly obvious symptoms like this, sometimes companies think they can sneak through and continue using these structures. The increased pressure from MSHA is not the only reason to pay more attention to these silo symptoms.

A reputation for being proactive and dedicated to safety makes employees and customers feel more comfortable. Nobody wants to be associated with a company that suffers a preventable tragedy. That creates bad PR for everyone involved. The issue is not just inspections and maintenance. A company's culture needs to evolve so that dedication to safety becomes the norm, inside and outside the corporate walls.

Committing to regular inspections and maintenance is a key step, but it is also essential to make sure that these types of projects are carried out safely.

Communication is the path to a safely executed job

Whether the task is inspecting a silo or cleaning a silo, the first step is to make sure the owner of the facility understands everything about what is to occur. Communication needs to be a wide-open, two-way street. The owner needs to have clear expectations, including what the downtime will be and how the process will work. The engineers doing a silo inspection or the contractors completing the silo cleaning also need to have clear expectations. Has the storage vessel been cleaned out? Have the dimensions of the access opening been confirmed? Does that opening actually work or has it been locked up to do build-up? Engineers and contractors need to be clear on all of these details before the job begins, and facility owners need to understand that once the project begins, if the silo needs to be cleaned out or if the opening is not working, this will cost time and money that could easily have been saved.

Communication between engineers and contractors is also essential. Before a silo inspection begins, the engineer may want an experienced contractor to produce safe rigging for entry into the silo. Working with an experienced contractor, such as Mole•Master, is beneficial not just because years of experience help projects run more smoothly, but also because a full understanding of what is required

during a silo inspection allows the rig provider to offer the best, safest solutions for the project. For instance, Mole•Master provides engineers with rigging equipment that helps access all nooks and crannies of a silo and offers proprietary rigging equipment. Once the inspection and/or cleaning is in progress, all parties need to make sure preventative measures are in place to avoid slips, trips, falls, falling material, falling equipment, and other hazards.

Inviting a team of engineers and contractors who are equally dedicated to safety can also help you ensure that if there is a decision to be made, they will guide you towards the best path for your facility and your workers.

Safe silo inspections and safe silo cleaning go hand in hand

A smooth working relationship between the silo cleaning contractor and the engineer who is inspecting the facility is helpful and increases effectiveness. The processes of silo inspections and silo cleaning often overlap. The engineer may find that the silo or vessel is actually too clogged to inspect, or perhaps he or she has the feeling that there are some unstable areas that would not be safe to work around. If that is the case, silo cleaning may be necessary before the inspection process can continue. The advantage of conducting a silo cleaning at this stage is that potential dangers have already been identified, which will help to make the silo cleaning process even safer. Usually the roof beams need to be cleaned of dust before they can be inspected properly. The importance of safety during the cleaning process is emphasised by Mole•Master, which provides OSHA and MSHA safety training to the engineers.

A facility may be tempted to draft current employees to engage in inspection or cleaning work. Hiring engineers and contractors outside of the company's payroll is important, however. A professional engineer will not have a vested interest in passing over any problems that become visible. He or she will want to make sure the job is done right and will provide an honest evaluation, whether the owner likes the results or not. Additionally, an engineer will be able to tell where potential problems exist, not just where problems are already surfacing. This is significant because prevention ultimately saves money over time. Asking a construction contractor to do a silo inspection can work, but contractors do not always understand silo behavior, and it is in their best interest to find issues that they can fix. Similarly, a professional cleaning contractor will be able to work with the engineer to identify the safest entry points, potential problem areas, and can help avoid on-site hazards.

A silo inspection usually begins with a visual evaluation of the silo's exterior. The naked eye will be used first, followed by the use of binoculars to get a close-up look at any potential problem areas. Vertical cracks on the exterior are clear signals of serious problems, and Lynskey notes that these visual cues in particular can be a warning that the silo walls are weakened.

Next, the interior of the silo needs to be inspected. This is a key point where communication between the owner, the engineer, and the cleaning contractor is essential. If the silo has been cleaned out already, access can occur from the bottom. If the silo has not been cleaned out, the engineer will enter from the top and all work will occur above the build-up area for safety. Once inside, the inspector will go inside the silo and hit the silo wall in various places with a hammer. If there is a dull sound and/or vibration, this can be a sign of delamination, meaning that the steel support beams are separating from the concrete wall structure, which can eventually lead to a collapse.

After the inspection is completed, the engineer will take all photos and samples back to a lab for evaluation. In some cases, engineers have asked Mole•Master to drill through certain troublesome areas so that the interior of the structure can be seen more clearly. Sometimes this helps to clarify exactly how severe the problem may be. Shortly thereafter, a report will be presented together with recommendations.

The worst case scenario after a silo inspection is finding out that the storage vessel is simply not stable enough to continue to be used. It may need serious repairs, or it may need to be replaced entirely. While this is a frightening outcome, certainly, it can also mean that several lives are being saved. Had work continued on that silo, the roof or the walls easily could have collapsed, causing unnecessary tragedy.

Prevention is the safest path

Silo inspections and maintenance can seem more like expensive hassles rather than helpful tasks that pave the way to success. However, regular silo maintenance, performed safely, can prevent ratholes, bridging, and arching inside storage vessels. Regularly scheduled silo inspections can identify weaknesses in beam pockets and other facets of the silo before those problems become too severe. While the investment in these processes may seem expensive, the problems they prevent not only are more costly financially, but those problems can even result in the tragic loss of life. A commitment to safety, not just during these projects but every day, shows employees, customers, and competitors that the company is dedicated to doing things right. What better message is there to send than that? Mole•Master has always worked under the adage, 'safety is a way of life.' The same can and should hold true for facility owners.