The value of mentoring

Agricultural Chemicals & Mining

Situation

As part of a reliability improvement initiative with a major agricultural chemicals company, we were providing Reliability Centered Maintenance training, facilitation and mentoring services. Multiple sites were involved throughout Canada and the USA and each took a slightly different approach. Some stayed close to the recommended implementation approach, while others did not. One major point of departure from what is recommended was the mentoring of newly trained RCM facilitators. One operation mentored its facilitators and had a long string of successful analyses. Others opted to let the facilitators muddle through their first analyses without help, but had us review the results. They were not that good! Mentoring was eventually used and it helped sort those out.

At one operation a phosphate mine the produced raw materials for a chemical plant that was nearly 2,000 km away. After providing analyst and facilitator training we mentored a new facilitator through his first RCM analysis project on a “magnetic separator” system. At the mine the ore body contained a high concentration of phosphate mixed with a large concentration of iron. Iron concentration wasn’t sufficient to be profitable but the phosphate could be processed and used as fertilizer (a higher margin product). The separator was chosen for the pilot project because it has been so problematic.

Solution

The separator system was designed to apply an electro-magnetic field across a flowing stream of crush ore deflecting iron out of the stream while allowing phosphates (non-magnetic) to continue on for further processing. The system had never worked well. It was supposed to leave no more than 5% iron (by weight) in the resulting phosphate stream but had never managed to get the concentration below 25%. Worse still, the system had been a maintenance night-mare. Leaking particulates (dust) damaged elastomer seals and coated nearby equipment with dirt, upsetting air cooling and making the entire surrounding area dirty. This was a miserable part of the operation in which to work and no doubt the airborne dust was hazardous to health.

In RCM we identify the functions of the assets. In doing so, we examine each part of the asset and ask about its function, adding functions to the list that are not already covered as a result of examining other components. In doing this we questioned the presence of a large water supply pipe that was attached to the system. Apparently it had never been used.

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Site personnel were unaware of its intended use so we contacted the equipment supplier. The supplier expressed surprise that we had been operating the system "dry" for roughly 8 years. The system was intended to work on a slurry, the crushed ore being suspended in a water stream as it passed through the magnetic field. That error in operating practice dated back to cost cutting that occurred during commissioning activities as the project to install the system had been late and over its budget.

A field service representative was scheduled to attend commissioning but was cancelled due to the travel costs (he was coming from Europe). The technical manual for the system was provided by the supplier, in German. No one at the site knew German and so the manual was put on a shelf and ignored. Commissioning was largely then a matter of guesswork – sadly they guessed wrong.

Without the water flow, abrasion and wear out were high. The small ore particles damaged elastomers and dust covered everything in the building, reducing heat transfer at finned surfaces and getting into both mechanical and electrical apparatus. Reliability in the part of the plant was abysmal. Even worse, the separation being achieved was far less than it should have been. Without a solution the mine shipped ore to the chemical plant (by rail) with roughly 25% of the product being iron ore which was not needed and in fact acted as a "poison" in the downstream chemical processing.

The impact on shipping costs was tremendous – roughly 25% of what was shipped was not needed, and it was heavy. One in four trains could have been avoided if this problem hadn't existed. The impact downstream was also big. The chemical plant still had to remove the iron, so they built a separation plant (roughly $100 million) to achieve what the separator at the mine could not.

The analysis revealed all this, led to some managers being quite embarrassed and of course a correction to the operating practices. Dust and contamination were all but eliminated, reliability in the ore processing plant improved, product was now on-spec for shipping and the separation plant 2,000 km down the rail line could be decommissioned.

In all likelihood, had the mentoring not been done, the mine's newly trained facilitator would have missed that opportunity. It's far too easy, when you are familiar with a system and its operation to accept that it is being done correctly and not dig too deeply with your questions. After all, many systems are indeed built with redundant functionality that is often forgotten. An experienced mentor did not allow that to happen, the root of the problem discovered and corrected.

Reflection and Results

It is not uncommon for capital projects and modifications to run out of time and budget. It is also not uncommon for the financial managers to put a rush on and push for cost cutting. The return on capital invested is at risk of those problems are not resolved. Arguably they are looking for a short term gain with that approach, return on assets might be more appropriate, but that's another discussion.

The field personnel did their best with limited knowledge and a manual they couldn't read. They got it wrong and no one noticed. The result was a cascade of problems leading to higher operating costs, higher shipping costs and the need for a large capital infusion in a sister plant, 2,000 km away.

It's easy to blame "cheeping out" at the start, but the problem goes deeper. Poor project controls led to the project being late and over budget. Commissioning activities, like user training, and acquisition of spare parts, are easy targets for the accountants. Failure to get useful documentation was another

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problem – no one has responsibility for asset information management. And by not examining what the maintenance program should have been using Reliability Centered Maintenance, the problems they were creating for themselves went unnoticed until the consequences of those problems became unbearable and a corporate led initiative brought a fresh set of eyes to the site.

Several years later the mine eventually reached end of life and was closed, but the lessons it has taught are highly valuable. To this day we use this example in our training and we've become proponents of asset management, preferring to look at ROA instead of ROI in evaluating value from physical assets. We also insist that our clients use mentoring, or we refuse to train facilitators. The mentoring, although it is an added cost, is a big money earning in the longer term.

To learn more

If you are considering Reliability Centered Maintenance, you will want to talk to us. We've been doing it since before our company was formed. In fact our principal has been doing it since the 1980's – before the first books and standards were even written. We know what works and what doesn't. There is more to RCM than meets the eye and we are happy to share out insights.

We also use mentoring and coaching in the areas of planning and scheduling, coaching for maintenance leadership and management. With mentoring you are learning new things. With coaching you are learning how best to apply what you've already learned. Both have their place and both achieve results. Both can be done face to face, or remotely via phone or video call. It is best if the mentor/coach and the one being helped have a personal connection, so beginning with some sort of face-to-face engagement is best, but once that is established, so long as the subject is willing, remote methods work very well.

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