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It's About Money, Not Air

01/01/2015

Acme Cement Company
1000 Clinker Lane
Anywhere, USA
Attn: Mr. Charles Smith

Subject: Analysis of Feasibility Study

Thank you very much for your time in providing information regarding the operation of your air system. I believe we have a good understanding of the problems in the plant faces and come to the conclusion that it is possible to eliminate the moisture and the overheating problems while reducing the operational costs as part of a ROI project. Furthermore, there is ample evidence of an ROI project with significant cost reductions that does not include the centralization of the system you were advised to do.

Please find following our thoughts specific to your air system and how to optimize its operation.

Minimum Objectives of the Study

1. Provide the financial basis for a compressed air improvement project based on an acceptable ROI. This will include financial pro formas (before and after) and a detailed action plan for the plant showing project cost and savings.
2. Baseline the current demand of the system detailing the demand as well as the current compressor configuration's ability to meet that demand.
3. Establish the potential reduction in demand through optimization of the points of use while maintaining or increasing the current levels of productivity. The only reductions in demand that will be considered will have a good ROI. The cumulative effects of these demand reductions will be reflected in a projected operation of the system at the new levels incorporating the boiler project and the reductions in demand.
4. Discover the root cause for the moisture issues as well as the overheat problems in the individual compressors.
5. Begin the detailed engineering process that will communicate to Metals R Us and its potential subcontractors and vendors the specific actions required to eliminate these issues.

Preliminary Estimate of Savings

1. Productivity Gains –
    a. No money is assigned to the cost of the FK pump nuisance shutdowns since the plant was uncomfortable with assigning a value to this. However, there is a definite cost associated with this and there is every reason to believe that the problem can be eliminated.
    b. The plant estimated that the annual cost of coal mill shutdowns due to freezing conditions was $20,000 per year. This can be eliminated.

2. Operating Costs – Current Operating Costs are Estimated at $450,000 – 550,000 per year.
    a. Operating cost reductions are estimated as follows
        i. $125,000 in energy costs
        ii. $25,000 per year in repair and maintenance of compressors, dryers and filters.
        iii. The $80,000 in rentals and diesel fuel are highly likely to be completely eliminated
        iv. The improvement in air quality would eliminate the quarterly replacement of the Haver packing machine solenoid valve. This is expected to save $4800 per year.
        v. Air quality improvements as well as upgraded controls would be expected to increase the lifetime of many of the dust collectors in the facility. No value is assigned to this.
3. Capital Avoidance

a. The plant currently runs on eight compressors and has one older machine as a back up. While the plant was planning on replacing the back up compressor and one other compressor next fiscal year, the evidence suggests that two additional compressors can be put into back up. And it may be possible to put a third into back up part time. This would eliminate the need to replace compressors next fiscal year and several years beyond that.
b. The current plan to consolidate four compressors into a new compressor room is unnecessary since the goal of coordinated control is achievable leaving them in their current locations. This will save at least $100,000

Supporting Evidence

1. FK pump shutdowns are determined by the proper setting of the shutdown switch. The conveying pressure is supposedly 10 psig while the feed pressure is 65 psi according to the plant. This is higher than the recommended pressure. One additional item that would be checked is the impact a local air lance might have on it. We have seen utility connections for 0.75" air lances close to the FK pump regulator effectively stealing air from the seals themselves.
2. The plant currently has desiccant dryers which should provide a -40° dewpoint. The coldest it gets in Anywhere is -8° F. If the dryers were operating properly, no moisture would form any day of the year.
3. There are quite a few applications with potential demand reductions. These include
    a. Air slides assists – The plant indicated that there was one of these on full time.
    b. Bearing cooling – There are at least three alternate solutions to straight compressed air to cool a hot bearing. All cost far less to operate and do an equal or better job
    c. Dust collectors – It sounds as if some of the controls on the dust collectors could use some tuning. In addition, we suspect that there are some dust collectors where upgrading the controls to clean on demand is financially justifiable.
    d. The barrier air on the cooler and kiln camera is an unknown at this point. We often find excess air pressure applied here in an effort to prevent lenses from burning up. The plant was unaware of the current pressure settings so the audit would provide that detail.
4. The distribution system is fairly well understood, yet the pressure problem in the finish mill exists. The audit would perform concurrent logging in the compressor rooms and various points of use to determine pressure drop throughout the facility. Multiple locations in the packhouse would be included to insure the root cause of the FK Pump shutdowns is understood.
5. The supply side has some obvious and not so obvious potential savings
    a. The compressors are all in local control. Coordinating their behavior could easily reduce operating costs by 5-10%.
    b. The two tower compressors are running in upper range modulation. Which while it is reliable, does have an energy penalty associated with it. By combining these two compressors with the rest of the plant compressors, the effective storage will increase which would allow these compressors to operate load no load without any reliability concerns.
    c. The packhouse compressors are also isolated. By combining these and the tower compressors, the plant will go from three trim compressors at any one time to only one compressor plant wide in a trim mode. As you stated, you are fully aware that the more trim compressors means the more inefficiency in the system.
    d. The current dryers appear to be set in fixed time mode rather than in dewpoint dependent switching mode. In addition, the main air system is a candidate for blended drying which adds redundancy to the drying system while reducing its energy cost by one third to one half.

Cost of Study
Given all of the cost considerations, our opinion is that a study of supply and demand is warranted with a cursory confirmation of pressure drop throughout the facility. There is also value in finalizing the piping diagrams as well as performing a leak studies given all that we heard regarding the leak load at this facility.

We anticipate X man days on site and Y man days off site. The cost for this is $ and terms are Net 10.

Timing of Study and Project
Your audit is scheduled with a verbal commitment followed by a written purchase order. Our audit team is typically booked 6-8 weeks in advance. The most important step is grabbing the temperature data for all the compressor rooms while we are in the hot season. I made arrangements that should you go forward with the audit, that CAC will have someone visit the facility in early August to begin that analysis. We assume that it will be fairly obvious what the problems regarding moisture and compressor overheating is. The individual who would do this is also the individual responsible for much of our detailed engineering. He would measure the dewpoint exiting all the compressors, examine the model numbers and temperatures and review the condensate drain system for each compressor room. This should allow us to narrow down the primary causes of the problems.

Assuming that the root causes are clear, the detailed engineering could begin prior to the completion of the audit so that any quick fixes could be implemented prior to the completion of the audit. For example, if one of the separators on and after cooler has a failed automatic drain, that dream could be replaced relatively quickly without impacting the quality of the audit.

While this is not an ordinary approach, given the magnitude of the problems and the urgency, this seems to be the most intelligent approach to us. If Metals R Us has any other ideas, we would certainly be glad to entertain them.

Please do not hesitate to call should additional information be required. We are available to answer any questions regarding this system and our audit process. We look forward to working on your behalf in the future.

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Paul Edwards

Attachments:
1. Suggested Scope of Work
2. Terms and Conditions
3. Customer Responsibilities