

## Non Implemented Case Study– Energy Conservation Measure

<b>Measure</b>
Use of blower air instead of compressed air for agitation
<b>Equipment</b>
Compressed air system
<b>Industry / Sector</b>
Minerals
<b>Year of Implementation</b>
-
<b>Cost Benefit Analysis</b>
o Type of Measure: Short term
o Annual Energy Savings: 2.78 lakh kWh
o Actual cost savings: Rs.9.73 lakh
o Actual investment : Rs. 3.00 lakhs
o Payback: 4 months
<b>Implementation Highlights</b>
<ul style="list-style-type: none"> <li>☞ Simple measure</li> <li>☞ Energy saving potential up to 50% and reduction in maintenance problems.</li> <li>☞ Initially the measure was appreciated by the plant but not implemented due to various reasons, such as: <ul style="list-style-type: none"> <li>⦿ The implementation requires sufficient down time of the equipment, which stops the production of the down stream and upstream for a considerable time.</li> <li>⦿ The compressors were recently procured by the plant, hence not interested in replacement.</li> </ul> </li> <li>☞ Promised implementation the measure, when the compressors used find application elsewhere and sufficient down time is available.</li> </ul>

### Summary

Use of blower air in place of compressed air for agitation will save energy up to 50%.

**Background**

In a mineral unit, plant has slurry basins and cells for mixing and blending of minerals before sending the slurry for filtration.

Plant has four reciprocating compressors to generate compressed air, which are used for agitation. During the normal operation only one or two compressors are operated.

The present consumption of compressed air in basins and cells is estimated at 1150 m<sup>3</sup>/h and the corresponding power consumption is measured at 72 kW. The compressed air generating / operating pressure is about 0.6 kg/cm<sup>2</sup>g. The condition of the piping network was bad and requires complete revamping of the system to reduce the leakage in the system.

**The specifications of the compressors are:**

Compressor application	Agitation
No. of compressors	4
Make	KB
Type	Reciprocating, single stage
Rated pressure kg/cm <sup>2</sup>	7
Rated FAD m <sup>3</sup> /min	21.04
Motor rated kW	134
Operating hours/day	24

**Suggestion:**

Use of roots blower air for agitation is more energy efficient when compared with the compressed air, since the efficiency of blowers is much higher than compressors when these are operated at very low pressures.

Energy savings are estimated at by keeping the operating pressure constant and increasing the air quantity by 25%.

The proposed parameters are:

Pressure of blower air : 0.6 kg/cm<sup>2</sup>  
 Air quantity : 1450 m<sup>3</sup>/h

**Techno-economics:**

Present power consumption	: 72 kW
Proposed power consumption by blower at 0.6 kg/cm <sup>2</sup> g & 1450 m <sup>3</sup> /h is estimated at	35 kW
Specific power	: 24.5 cfm/kW
Power savings	: 37 kW
Operating hours of basins & cells	: 7500
Annual energy savings	: 2.78 lakh kWh
Cost savings	: Rs. 9.73 lakh
Investment required	: Rs. 3.0 lakh
Payback period	: 4 months

**Principle**

Compressed air is probably the most expensive form of energy available in a plant. Compressed air is also clean, readily-available, and simple-to-use. As a result, compressed air is often chosen for applications in which other energy sources are more economical. Users should always consider more cost-effective forms of power before considering compressed air.

Many operations can be accomplished more economically using alternative energy sources. For example, plants should:

- ◆ Use air conditioning or fans to cool electrical cabinets instead of compressed air vortex tubes;
- ◆ Apply a vacuum system instead of creating a vacuum using compressed air venturi methods that flow high pressure air past an orifice;
- ◆ **Use blowers instead of compressed air to provide cooling, aspirating, agitating, mixing, or to inflate packaging;**
- ◆ Use brushes, blowers, or vacuum systems instead of compressed air to clean parts or remove debris;
- ◆ Use blowers, electric actuators, or hydraulics instead of compressed air blasts to move parts;
- ◆ Use low pressure air instead of compressed air for blow guns, air lances, and agitation.