



PUYAT VINYL PRODUCTS, Inc.

Steam Leak Survey, Leak Repair and Replacement of Worn-out Gaskets

SUMMARY OF THE OPTION

Puyat Vinyl Products Inc. (PVPI), one of the leading vinyl tile manufacturers in the Philippines located on the island of Luzon. The company produces 4,930 tons of vinyl tiles for flooring along with its accessories, including glue/adhesive and floor care/wax. The company incurred high energy losses in the steam distribution system due to leaks in the valves, flanges, and on the water header, which were caused by worn-out gaskets. Following a leak survey and replacing all worn-out gaskets, 6,515 liters of fuel oil, 18 tons of CO₂ emissions and 73 m³ of water were reduced each year. The option cost only US\$ 100, savings were US\$ 3,198 per year and therefore the payback period was less than a month.

KEY WORDS

Chemicals, Philippines, Boilers, Steam Distribution & Utilization, Leaks, Gaskets

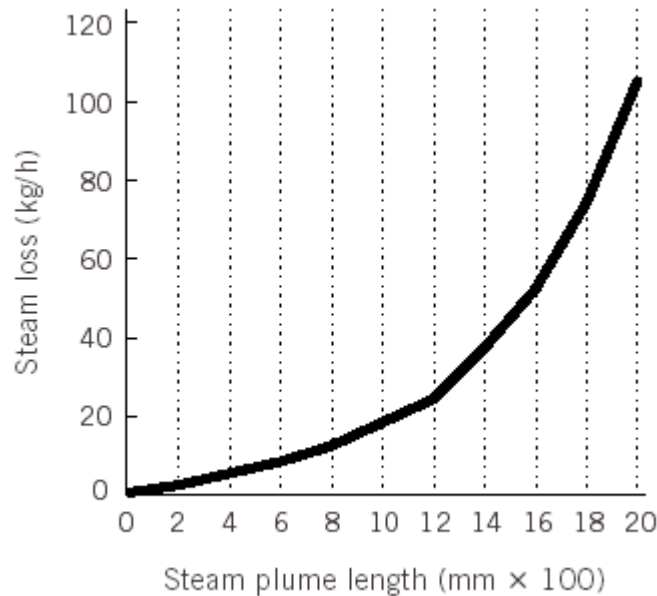
OBSERVATIONS

The plant is presently using a one unit packaged type fire tube boiler with a capacity rating of 2,500 lb steam/hr to produce steam with a maximum working pressure of 9 bars for its production process. It uses diesel as a fuel and consumeds about 156,524 liters per year based on 2003 fuel consumption data. At present, the cost of steam is about US\$ 0.00231/kg.

During the boiler and steam distribution system assessment, it was observed that there were leaks on several valves, flanges and on the water header. It was found that worn out gaskets on valves and flanges was the cause of steam leaks. The hourly steam loss was estimated using the length of the steam plume (see table below), which is the distance from the leak to the point at which water condenses out of the steam. Figure 1. provides a rough estimate of steam loss based on plume length of steam.

Table 1. Identified Leak Points and Corresponding Steam Loss

| | | Plume length, mm | Estimated Steam Loss, kg/hr |
|----|---|---------------------|--------------------------------|
| A. | Leak at flange (gasket for replacement) 1. 2 spots @ 8.2 bars (at pressure relief valve) 2. 1 spot @ 8.2 bars (at distribution valve) | 130 & 150 80 mm | 2.0 & 2.2 1.4 |
| B. | Leak at water header @ 8.2 bars | 150 mm | 2.2 |
| C. | Leak at flange gasket at loop | 76 mm | 1.0 |
| D. | Valve near rotocure line | 76 mm | 1.0 |
| | TOTAL | | 9.8 |



Steam leaks contributed to direct heat loss in the steam distribution system. To compensate for the high heat loss, the company was generating steam that was higher than the production requirement.

OPTIONS

The Team recommended that the company replace the worn out gaskets to eliminate the leakages. The replacement was already implemented resulting to a big savings in fuel oil as well as reduction in CO₂ emission.

RESULTS

Financial benefits

- Investment: US\$ 100
- Annual operating costs: not determined
- Annual cost savings: US\$ 3,198
- Payback period: 18 days

Environmental benefits

- Annual fuel savings: 6,515 liters of diesel oil
- Annual GHG emission reduction: 18 tons CO₂
- Annual water saved: 73.4m³ (9.8 kg/hr X 7,488 hr)

FOR MORE INFORMATION

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