INDUSTRIAL PROCESS CASE STUDY

D&D INDUSTRIAL COATINGS – PROCESS UPGRADE

Existing Condition

Several processes were targets for energy improvements. Wash lines, power ovens, compressed air heat recovery ,compressed air usage efficiency, booth exhaust and plant heating..

The challenge was to make all these processes more efficient while maintaining production requirements and improving plant working conditions.

HEAT CAPTURED OFF POWDER FINISHING FURNACE OUTLET

All the heat from the power line furnace was flowing freely into the plant through the conveyer outlet. A system was designed to utilize an air curtain which kept 60% of the escaping heat from leaving the curing box. This also had the dual effect of pulling heat off the ceiling and de-stratifying the plant for winter heating. The furnace had a modulating burner which was able to adapt and lower gas usage immediately..

EXHAUST MODULATION ON CUSTOM SPRAY BOOTHS

There were individual spray booths with a combined 75 HP of exhaust that were running continuously regardless of weather the booth was being used. Tower created a system where as when the operator was finished he hung his spray gun on a hook that was attached to a limit switch. The limit switch was connected to a VFD on the blower motor that would slow down the exhaust over a time delay sequence that was adjustable. During the off time the operator would switch parts and prep the new part for spraying. This reduced exhaust energy and heat losses during the winter over 75%.

WASH LINE EXHAUST AND TEMPERATURE CONTROL

The wash line control was not automated and the temps would go from 105– 135 F which was over set -point. This wasted heat, water and treatment. A new control was added to control the system properly. The exhaust was used to keep steam from existing but was set too high. Tower added a VFD and lowered the exhaust speeds to balance.

THERMS PER MONTH BASED ON RECOVERY ALONE

DATE	2015	2016-17	SAVINGS
11/6/16	6242	3297	$1,530.91
12/6/16	7424	4392	$1,„825.20
1/6/17	8621	6406	$2,„074.52
2/6/17	12687	6432	$4,275.60
3/9/17	10158	5163	$2,742.04

FOUR MONTH SAVINGS: $12,448

Note: Savings based on current cost of gas

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FACILITY CASE STUDY

HEAT RECOVERY OFF COMPRESSORS USED FOR MUA AND PLANT HEATING

The plant had no dedicated MUA system to balance all the exhaust and all the compressed air heat was being discharged to the outside all winter. The 2– 50HP units had a ductwork system installed with controls to optimize outside air and utilize the heat to balance the plant. The recovered heat then was directed to a nearby area for parts drying to speed production. The compressor room itself also was controlled to prevent freezing in winter.

KWH SAVINGS FROM EXHAUST MODULATION AND COMPRESSOR IMPROVEMENTS

DATE	2015	2016-17	SAVINGS/MONTH
2/9/17	28812	18683	$ 1457.00
3/9/17	32089	18982	$ 1743,77
4/9/17	28294	20836	$ 1143.47
5/9/17	28548	19402	$ 1416.07
6/9/17	25373	16464	$ 1450.88

FIVE MONTH ELECTRICAL SAVINGS: **$ 7211.14**

Note: Project was starting and savings were accelerated during progress

Combined 5 Month Saving **$ 19,659.00**

PROJECTED RETURN ON INVESTMENT AFTER GRANTS: YEARLY

125%

10 YEAR PROJECTED SAVINGS

$ 369,617.00+

Heat recovery off the 2– 50HP compressors was added to add MUA and heat to the plant in winter. Both compressors were integrated in the system which also controls room temps to a min of 40F and automatically uses the heat when temps drop below 50F outside.

Custom Controls Added

Tower added automated damper controls to control compressor room to control room temps during the winter when off. This eliminated the use of kerosene heaters all winter to prevent freezing the compressors.

Wash Line Air Curtain Added

The existing hot water wash line had exhaust on both ends to keep the warm humid air from escaping into the plant. Tower designed a air curtain to contain the warm air mitigate warm air and looses to the outside. This lowered both water heating requirements and water looses through evaporation and exhaust. Since the exhaust had no MUA interior heated air from the facility was also saved. This is a triple payback.

Compressed Air Efficiency:

Engineered nozzles and air knives were added to blow off guns and conveyers to mitigate wasted air use.

Sand blasting tips were also worn out and using 50% more air then needed. Replacement tips also reduced the amount of expensive sand being used and allowed for a more accurate blast targeting and noise reduction.

Compressed air flow regulator:

A flow regulator was added to the plant to lower plant from 125 PSI that was used before. The use of air is mostly blow off and sandblasting that only required 80 psi but the set-point of 125 was used due the storage losses when short term high volume air was used.

Now the storage tank is set to 115 and the plant load is set to 80 allowing the single compressor to store energy– this cut the use of a second compressor almost entirely.

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