DESCRIPTION OF PROPOSED EXPENDITURE

This proposal is for a six-chamber single cell die oven that would be used for the Sutton Press.

NECESSITY FOR EXPENDITURE AND RESULT EXPECTED

We purchased a small two-chamber single cell die oven and started using it on August 19th and it has fulfilled all expectations. It has reduced scrap, reduced die breakage, improved production and even saves time on super hot orders due to the short heat up time compared to a convection oven.

The purpose of the single cell oven is to gain the ability to more evenly heat dies before they are loaded into the press. A more evenly heated die would increase recovery by reducing scrap, reduce the amount of dies that are broken, and improve the surface finish of extrusions.

A single cell die oven is much different than the convection chest style ovens that we currently use. A six-chamber single cell die oven has six single ovens that heat only one die at a time using radiant heat. The heating time of a single cell for our die sizes is 1.5 hours or shorter compared to 4 to 8 hours of our current convection oven. The single cell oven heats the die more evenly and than the convection oven that depends on airflow.

Typically when a die is loaded into the press a shorter starter billet is used and the first billet through the die is scrap. The metal flow is uneven and if it's a multi-hole the leads are sometimes off meaning that they are different lengths and this creates problems using the puller. Either the puller has to pull with more tension or the fast piece does a roller coaster motion and goes off the table. After the first billet these problems are reduced and generally by the third billet everything is leveled out and they are producing good material. These problems are due to an unevenly heated die.

Essentially what happens is that the first billets bring the die up to temperature and then the flow is better stabilized. So if we have an evenly heated die we can eliminate the starter billet that is shorter than the desired billet length and do away with the first and sometimes the second billet being scrap. With a properly heated die this would help die correction and produce better information, eliminating a lot of time and wasted effort correcting for die heat variation.

Sutton

Starter Billets saved from starting an evenly heated die
5 Billets per Shift x 14” Average Billet

70” of Billet x 4.876 lbs/in. for 8” Billet of Aluminum
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341 lbs.

Now calculating the cost of aluminum per pound

$0.13 Difference in price of Aluminum of Log versus Scrap
+$0.2275 Variable Cost per pound

$0.3575 Cost of Aluminum per pound

Using the Cost and amount of saved pounds
$0.3575 x 341 lbs

$121.91 saved per shift

340 Working Days x 2 Shifts per Day
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680 Shifts x $121.91

$82,899 savings per year from saved starter billets

This would eliminate starter billet scrap and therefore increase recovery.

Another factor to consider is it would reduce the amount of dies that are broken every year. There are on average 100 dies broken every year on almost always with the first billet. Other plants that are using a single cell die oven have reduced the die breakage in half after converting away from the convection oven.

40 Dies per year saved for all dies heating by single cell ovens - Sutton

Of these dies there are approximately 75% that are solids costing $400 each and 25% that are hollow dies that cost $1500 each.

40 Dies x $675 Average cost per die

$27,000 Saved from reduced Die Breakage

Another factor that we need to consider is plugged dies. Dies most commonly plug on the first billet and this is due to insufficient heat. So far on the new single cell oven there have been absolutely no dies plugged. The number of plugged dies have dramatically decreased since the new oven was installed on August 19th of this year. The attached table shows even a decrease

of the amount of plugged dies in August and definitely September thru November. Here's some savings from the included table:

5,468 lbs of scrap due to plugged dies in July
-1,528 lbs of scrap in October for the Sutton

3940 lbs saved x $0.13 Difference in Billet and Scrap Cost

$512.20 Saved per month x 12 mth/yr

$6,146 Saved from Plug Die scrap pounds per year

Also, we should look at how much time is spent when a die is plugged, from the attached table:

4.7 hours of downtime for the month of July
-3.1 hours of downtime for the month of October

1.6/30 Days in the month

= 0.05 hr which equals 3 minutes a day that is spent on dealing with a plugged die.

Lately the Sutton has been producing 2,700 lbs per hour. So therefore this is a potential loss of 135 pounds every day due to a plug die.

A six chamber single cell die oven would replace one convection oven on the Sutton Press and therefore would enable all dies to run through single cells. The proposed new oven creates the possibility for a quicker turn around on hot orders. It also would reduce the number of plugged dies, which not only waste billet but also press time.

The final thing to consider is the improvement of surface finish. When H13 steel is left in a die box for over 4 hours it begins to oxide. Not just one part of the die oxidizes after long periods of time; it oxidizes all parts including the bearing of the die which comes in contact with the aluminum. This oxidation creates die lines and other imperfections. With a quick heating single cell die oven, those dies heated by this oven would not have time to oxidize and would have better surface finish.

The total saved from starter billet scrap, die breakage and plugged die scrap.

$82,899 Starter Billet
+$27,000 Die Breakage
+ $6,146 Plugged Die

$116,045 Savings per Year for Sutton side