ENERGY CONSERVATION THROUGH VARIOUS MEASURES
POWER SAVING THROUGH IMPLEMENTED MEASURES

1. STAGEWISE FURNACE IMPROVEMENT.

2. IVR COMPRESSOR.
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STAGE – I : MAXIMISE UTILISATION OF 550 KG INDUCTION FURNACE

Utilisation Proportion 65: 35
Utilisation 65% & Opr. Effi. 97%

Utilisation Proportion 80: 20
Utilisation 35% & Opr. Effi. 90%

Utilisation Reduced Upto 20%

Utilisation Increases Upto 80%

BEFORE

AFTER

550 KW / 500Kg

350 KW / 500Kg
## RESULTS:

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Months melts (550kg/melt)</th>
<th>550kw melts (nos)</th>
<th>350kw melts (nos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65% &amp; 35%</td>
<td>1100 melts</td>
<td>715</td>
<td>385</td>
</tr>
<tr>
<td>80% &amp; 20%</td>
<td>1100 melts</td>
<td>880</td>
<td>220</td>
</tr>
</tbody>
</table>

Every month power saved – 3135 kwh / Rs – 21318 (kwh@ Rs 6.8)
STAGE - II: EQUAL DISTRIBUTION IN LADLE

Ladle A
Melted Mat. 290 Kg.

Ladle B
Melted Mat. 260 Kg.

BEFORE

IMBALANCE METAL DISTRIBUTION BETWEEN LADDLES

Ladle A
Melted Mat. 275 Kg.

Ladle B
Melted Mat. 275 Kg.

AFTER

EQUAL DISTRIBUTION OF METAL 275 KG EACH VARIENCE 2%

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THEME:

LEVEL MARKING ON LADDLE LINING
RESULTS:

**BEFORE**

- STRESS DURING LADDLE HANDLING
- RETURN MET. 25 Kg. & 10 Kg. RESP.

**AFTER**

- EASY LADDLE HANDLING
- RETURN MET. 25 Kg. BOTH.

**LADDLE A**
- Before: Struggling to handle
- After: Easy handling

**LADDLE B**
- Before: Struggling to handle
- After: Easy handling
RESULTS:

- Benefits of equal distribution of metal
- Consistent metal quality because of correct proportion of inoculation.
- Daily 450kg saving in returned metal hence 260kwh saving in energy
- Monthly saving in energy 260kwh*26 = 6760kwh

6760kwh*Rs 6.3 = Rs. 42588/-
POURING LADDLE WITHOUT COVER
(HEAVY LOSS IN METAL TEMP. DUE TO RADIATION)

POURING LADDLE WITH CERAWOOL COVER
(MIN. LOSS IN METAL TEMP. DUE TO RADIATION)
Energy Benefits

- 20°c reduction in tapping temp. saving in electricity
- 9kWh /melt

Every month energy saving
- 9kWh*45melts*26days = 10530kWh
- 10530kWh*Rs6.3 = Rs.66340/-
Further improvement in prevention of heat loss

USE OF RHA ON METAL

USE OF CERAWOOL COVER AFTER RHA COVERING
Further improvement in prevention of heat loss

- Use of rice husk ash on the metal. (RHA is the best heat insulating material easily available at very cheap rate) as a primary cover & cerawool as a secondary cover.
- Because of RHA we got further reduction of 10-15°C in temp. loss
- Tapping temp. reduced by 10°C. Energy saving of 5kwh / melt considering 45 melts per day energy saving for the month:
  \[5\text{kwh} \times 45\text{melts} \times 26\text{days} = 5850\text{kwh/ per month}\]
  \[5850\text{kwh} \times Rs\ 6.33 = Rs\ 37230/-\]
- Use of RHA has increased life of cerawool almost double.
STAGE – IV : USE OF RHA ON METAL

A
Temp. of furnace metal

B
Temp. after one minute

C
Temp. after one minute with rice husk ash – rise in temp
Case Study – Air Compressor VFD

Replacement of inefficient air compressor by energy efficient air compressor with VFD

Capacity: 514 cfm
Purpose: Compressed air supply
FAD: 210 cfm
Baseline: 0.429kW/cfm
Proposed: 0.166kW/cfm
Saving potential: 116,000kWh/yr
Investment: 7.61 lakh INR
Simple payback: 1.0 year
POWER SAVING THROUGH PROPOSED MEASURES
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TITLE: IGBT FURNACE
REPLACEMENT OF VIP C TRACK BY IGBT POWER TRACK
PURPOSE: TO INCREASE EFFICIENCY OF FURNACE

CAPACITY: 550 KW ACTUAL USED 375 KW

INVESTMENT: 21 LAKH
SAVING POTENTIAL: PREVIOUS POWER CONSUMPTION 680 TO 700 UNIT /MT & CURRENT 620 TO 630 UNIT /MT FOR LIQUID METAL SO SAVE 70-80 UNIT /MT IN Rs.80 unit*6.3/-=504/mt.
Monthly: 200 MT *504/- = 100800/-

PAYBACK: 1 YEAR
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TITLE: REACTIVE AUTOMATIC POWER FACTOR CONTROLLER

PURPOSE: REPLACEMENT OF FIXED CAPACITOR PANEL TO APFC FOR HARMONIC FILTER.

• BASELINE: INITIAL HARMONIC 7 % & BY APFC IT REDUCED UPTO 4 %.
• SAVING: INITIAL KVA CONSUMED UPTO 20000 UNIT & REDUCED BY 14000 UNIT WITH APFC. IN Rs.14000*6.3/-=88200/--monthly.
• INVESTMENT: 6 LAKH.
• PAYBACK: 6 MONTH.
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TITAL: ADDITIONAL MOULDING LINE.

PURPOSE: 1. TO INCREASE BOX WEIGHT.
2. FURNACE HOLDING TIME REDUCED
3. 100% UTILIZATION OF FURNACE CAPACITY.
4. REDUCED COLD START OF FURNACE.

SAVING: 1. POWER SAVING THROUGH 100% UTILIZATION OF BOTH FURNACE
2. HOLDING OF FURNACE REDUCED.
3. COLD START OF FURNACE REDUCED.

INVESTMENT: 23 LAKH

PAYBACK: 1 YEAR.
TITAL : Replacement of existing 350 kw crucible with modified crucible with increase of INDUCTANCE (XL)

PURPOSE : Power saving through increase furnace voltage 800 v to 1000 v by INDUCTANCE (XL).

INDUCTANCE INCREASED BY INCREASING COIL LENGTH (COIL TURN) & REDUCTION IN COIL THICKNESS.

SAVING : CURRENTLY POWER CONSP. 670-690 UNIT /MT & IT WILL BE REDUCED UPTO 620-630 UNIT /MT.

SAVE MONTHLY = 50 UNIT /MT*175 MT (MONTHLY PROD)*6.3 = 55125/-

PAYBACK : 1 YEAR.

<table>
<thead>
<tr>
<th>PARTICULAR</th>
<th>OLD COIL</th>
<th>NEW COIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>COIL TURN</td>
<td>16 nos.</td>
<td>18 nos.</td>
</tr>
<tr>
<td>Coil thickness</td>
<td>1.5”</td>
<td>1.2”</td>
</tr>
</tbody>
</table>
TITAL : REPLACEMENT OF EXISTING POWER LAMP OF MERCURY 400 W BY LED LAMP OF 80 W.

PURPOSE: TO REDUCE BY POWER CONSUMPTION.

BASELINE: 80 W LED.
TOTAL NO. OF LAMP IN UNIT 23 NOS

LIFE: 5 YEAR WARRANTY.

SAVING: 0.3 KW POWER / LAMP /HR. THEREFORE 0.3 KW*24 HR (DAILY)*26 DAYS = 187 UNIT / LAMP MONTHLY i.e. 187*6.3 =1180/-*23 nos = 27140/-

INVESTMENT: 14000/- PER LAMP

PAYBACK: 1.5 YEAR.