



**WEL COME**

# **BHARTIYA SUGAR PUNE ANNUAL CONVENTION-2017**

**On 28<sup>th</sup> & 29<sup>th</sup> July, 2017**

**Venue:**

Shahu smarak Bhavan, Market yard, Kolhapur

**PAPER ON-**

**"FINE TUNING OF SUGAR, CO-GEN AND DISTILLERY COMPLEX FOR IMPROVEMENT IN PERFORMANCE, RESULT, AVERAGE CRUSHING RATE, BAGASSE SAVING, EFFICIENCY, POWER EXPORT AND REDUCE STOPPAGES WITH MODIFICATIONS, ALTERATION AND CHANGES"**

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**(Chairman)**

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**Shreepur , Tal-Malshiras,**

**Dist- Solapur,**

**State -Maharashtra**

## PAPER ON-

# "FINE TUNING OF SUGAR, CO-GEN AND DISTILLERY COMPLEX FOR IMPROVEMENT IN PERFORMANCE, RESULT, AVERAGE CRUSHING RATE, BAGASSE SAVING, EFFICIENCY, POWER EXPORT AND REDUCE STOPPAGES WITH MODIFICATIONS, ALTERATION AND CHANGES"

### **Background :-**

With study, observation, modification, changes & alteration in last three offseason & season we have achieved following goals after joining Shree Pandurang SSK Ltd, Shreepur in off-season 2014.

- ❖ Reduction in 95% stoppages.
- ❖ Increase in average crushing rate by more than 500 MT.
- ❖ Increase in bagasse saving by 6 to 8 thousand MT per season for making self dependant to run further Co-gen and Distillery during off-season for 50 days.
- ❖ Saving of 400 KW power with some interchanges of pumps and motors.
- ❖ Saving of 6 to 8 lac liters of water per day.

# **MILL SECTION :-**

- ❖ Replaced fix type leveller by 80 knives swing type leveller.
- ❖ Prepared cane equalizer in between leveller & fiberizer for uniform & equal feeding to improve overall performance of mill, boiling house, boiler and co-gen.
- ❖ Provided Nuts to TRPF teeth to increase feedability & crushing rate.
- ❖ Increased all feed roller meschart grooving depth & width to improve juice drainages, crushing rate & results of milling station.
- ❖ Rotary screen washing water collected & taken on fourth mill to reduce imbibition water & steam requirement.
- ❖ Stopped practice to apply cold water for mill bearing cooling and in mill juice tray to save water & keep clean environment.
- ❖ Fine tuning and resetting of ACFC done to achieve uniform cane feeding and performance.

## **BOILER SECTION :-** *For increasing average steam generating capacity, efficiency,*

*reducing down time & fluctuations to improve bagasse saving & ultimately power export.*

- Old & outdated steam traps were replaced with thermodynamic steam traps to reduce steam loss due to condensation.
- All soot blowers under repair & not in operation were replaced, modified, changed position.
- We replaced previous fire side chemical with technically proven Thermact B fire side chemical for proper combustion of bagasse and avoid super heater jamming for prolonging cleaning period.
- Short circuit & Cold air leakages near goose nose & side walls of WIL co-gen Boiler were arrested by new refractory & aluminum cladding.
- For increasing boiler efficiency hot air temp of FD air was increased by reducing thickness of air heater tube from 3.25mm to 2.64mm with carbon steel for better heat transfer.
- Stopped SA & pneumatic spreader fan inlet cold air, instead of that hot air given by heating it from F.D. hot air duct.
- Sitson Boiler ID fan was replaced with higher capacity fan to improve steam generating capacity.
- Changed bio-gas connection from WIL Boiler to sitson boiler & provided hot air to inlet of blower fan.
- Stopped frequent tripping of bagasse feeder by increasing its torque by replacement of suitable chain-sprockets & avoiding loose connection.
- To provide continuous & uninterrupted bagasse supply to sitson boiler we provided bypass bagasse sliding gate.
- Sitson Boiler flue gas short circuit behind mud drum of 1 mtr. X 5 mtr. leading to heavy unburnt loss was arrested by closing this loop hole by MS plate.

# **CO-GEN & ELECTRICAL -**

**Changes/Alterations/Modifications done to reduce Co-gen. electrical down time & Co-gen tripping modified scheme.**

## **At 10 MW Co-gen Power house : - Problem ----- Remedy**

- Frequent tripping of turbines & Co-gen export --- Faulty and duplicate (CT) was replaced with new Pragati make in 11 kv HT Distribution panel wherever necessary.**
- When 10 MW Export trip, Generator breaker was also tripping and total system dark out--- In generator and export side relay Co-ordination done with related software and new programmable relay setting done.**
- Due to generator earth fault problem generator was always tripping ---- Separate Additional earth pit provided for generator neutral earthing and generator body earthing.**

## **At 9 MW Co-gen Power house : Problem ---- Remedy**

- ❖ **When export trip generator breaker also trip and total 9 MW Co-gen plant dark out---**
  - **New relay (Numerical relay) replaced for 9 MW, 11 kv generator (7 SJ Siemens make) with new hard wiring and new setting.**
  - **In export side old electromagnetic type relays were replaced with new numerical electronic relay (Alstom make) with new relay setting.**
- ❖ **When total system dark out due to grid problem turbine also trip due to COP (Control oil pump) Supply failure----3 Phase UPS system provided to start immediate this pump within 5 sec.**
- ❖ **When Co-gen ACW (Auxiliary Cooling water pump) trip then total 9MW Co-gen trip due to safety interlocking-----Separate supply provided only for ACW pump.**
- ❖ **For 3 MW power house breaker and jaw heating problem-----In 3 MW, 440 V generator set LT breaker replaced with new C-power, 4000 AMP, L&T make Breaker (2 Nos).**

# SUGAR AND CO-GEN INSTRUMENTATION :-

- Fine tuning of ACFC with multi set point to Equipment load.
- Mill Auto Imbibition water controlled by sensing second and third mill load and output fed to Pneumatic Control.
- Individual Mill Speed automation: According to bagasse height in Donnelly Chute and by sensing load on the mill motor.
- It is observed frequent tripping of export and further this lead to Dark-out of 9 MW Co-gen plant; this problem resolved by making fine tuning in Woodward Governor and correct calibration of HP Governing Valve.
- For Single entry S.S. condensers pans ----- condenser automation for all pans were provided for power saving, Water saving & uniform vacuum.
- Provided automation at various sections like Mill, Boiler, PRDS station and Boiling House to get proper and efficient work done without manual intervention.



# **BOILING HOUSE : -**

## **1. To arrest huge stoppages and frequent maintenance of all three sugar hoppers ---**

***We succeeded to reduce 99% maintenance and stoppages of hopper.***

- ❖ We balanced the eccentricity in the driving shaft by opposite side weight for minimizing jerks and vibrations.
- ❖ Provided SS 2mm strip alternatively in between two wooden strips
- ❖ Reduced over hanging weight distance for the Rory removing screen from middle tray.
- ❖ Proper sheet of connecting rod near middle tray fitting brackets by sander paper and good alignment and stopper check nuts provided. Used practice to use connecting rod after oil quenching & clamping after one year.

## **2. Sugar dust collector**

- ❖ Proper sizing and cross section area of branch line of the suction pipes were studied and corrected.
- ❖ Provided new additional 15 suction points at grader & other places which were necessary.
- ❖ Increased the capacity of blower fan as per no. of points and maintaining proper & equal vacuum at all branch pipes.
- ❖ Proper & modified water spraying arrangement with pipe and nozzles was provided in venture & wet scrubber to arrest all sugar dust particles in the sprayed water.
- ❖ Proper & complete closing all the points attached to grader, elevator, silo, Sugar weighing machine & hopper by air proof cloths and rubbers.

# **ELECTRICITY/POWER SAVING IN SUGAR PLANT & ALLIED UNIT**

- Provided planetary gear boxes wherever necessary.
- Provided VFD Drives wherever necessary.
- By readjustment of pumps, stopping running stand by pumps which was a bad practice for safe working & considering 60 to 70% overflow of water near pump station of main reservoir, distillery water supply tank, factory service water tank & factory reservoir we saved around 200 HP power

# WATER SAVING & CONSUMPTION REDUCTION STEPS

*We have saved around 8 lac liters of water per day by*

- ❖ Proper recirculation of water to avoid wastage.
- ❖ Avoiding wastage of water through leakages.
- ❖ Excess hot water condensate in sugar was reused by cooling in three stage cooling tower in series & reused it to distillery after processing it in CPU unit.
- ❖ All taps & cocks in toilet, bath room & urinary were replaced by push type cock to avoid wastage of water.
- ❖ Stopped the practice to apply cold water externally for mill bearing cooling
- ❖ Mechanical seal fitted to all juice, syrup, hot & cold water pumps to avoid wastage & leakage of water & juice.
- ❖ For gland cooling of juice pumps where ever necessary, we used spray pond inlet water through injection header.
- ❖ All applied cooling water was taken in re-circulation.
- ❖ All type of water leakages in sugar plant through pipe, flange joint, pin hole, drain valve, steam trap were arrested.
- ❖ New Farm pond of 1.5 Crore liter was constructed & rain water, road water was saved & re-used for distillery & co-gen.
- ❖ All sugar godown rain water was collected by rain water harvesting scheme around 3 to 4 crore liters in one raining season.

## Year wise Comparative Sugar & Cogen progress Data (From 2013-14 to 2016-17 )

Sr.No.	Particulars	Previous Season- 2013-14	Season-2014-15	Season-2015-16	Season-2016-17
1	Working Days	163	183	136	74
2	Total Crushing ( M.T)	8,86,374	10,78,775	8,12,715	4,47,686
3	Total Stoppages (Hrs.) {Mechanical,Electrical, No cane, Rain, Cleaning }	209.00	69.00	27.00	0.00
4	Average crushing Rate/24Hrs.(M.T.)	5,447	5,907	5,986	6,077
5	Capacity utilization %	121.06 %	131.27 %	133.04 %	135.05 %
6	Steam % Cane	42.43 %	40.65 %	39.94 %	39.79 %
7	Total Bagasse Saved (Balance) M.T	8,036	20,940	15,642	8,678
8	Avg Bagasse Saved, per Day in M.T	49.30	114.43	115.01	117.27
9	Avg Bagasse Purchased in Year	6000 to 8000 M.T From 2007-08	0.00	0.00	0.00
10	Total Export	4,20,68,681	5,24,48,013	3,93,33,360	2,24,15,060
11	Avrage export per day	2,58,090	2,86,601	2,89,215	3,02,906
	Avgrage export in MW/Hr	10.75	11.94	12.05	12.62
12	Export per ton of Cane KWH/TCH	47.46	48.61	48.39	50.07
13	Off season Cogen & Dist Op. Days	10	33	34	20
14	Total Bagasse Sold in M.T	0.00	489.56	849.94	95.36



***THANK YOU!***