

**SHREE PANDURANG SAHAKARI SAKHAR KARKHANA LTD.,
SHREEPUR**

TAL - MALSHIRAS, DIST - SOLAPUR

BEST CHIEF ENGINEER AWARD



BEST CHIEF ENGINEER

AWARD

2017-18

After this, 6 additional years in Pandurang we have done double work than this.

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Annexure – I

- 1. Name of applicant** : Mr. Rajendra Baburao Patil
Age : 52 Years
- 2. Qualification** : 1. D. M. E / AMIE (Part I)
2. Boiler Proficiency - Second Class
3. Boiler Proficiency - First Class
4. Sugar Engg Course, VSI, Pune
- 3. No of Year Continuous Service as a Chief Engineer**
- A. Present factory -**
- a) Number of Years of Continuous Service in Present factory
: **3.1 years**
- b) Present Designation : Chief Engineer
- c) Plant Capacity : 4500TCD
- B. Other factories -**
- a) **At Rahuri SSK Ltd**, Rahuri, Dist -Ahamadnagar as Dy Chief Engineer and I/c Works Manager, during expansion of the plant from 4000TCD to 5000TCD - **02 Years** i.e. from August 2000 to June 2002.
- b) **At Sadashivrao Mandlik Kagal Taluka SSK Ltd**, Hamidwada, Dist Kolhapur - **03 Years** i.e. from June 2002 to May 2005.
- c) **At Athani Farmers Sugar factory Ltd.** Dist Belguam - **06 Years** i.e. from May 2005 to June 2011, Expansion of plant from 2500TCD to 5000TCD along with modernization, 24MW Co-generation, 45KLPD Distillery.
- d) **At Hutatma Kisan Ahir SSK Ltd**, Walawa, Dist - Sangli - **03 Years** i.e. from June 2011 to July 2014 done the modifications, alteration and changes to remove errors and mistakes to reduce stoppages, losses and improve crushing rate, results, performance and bagasse saving.

Total 17 Years continuous Service as a Chief Engineer and carried out tremendous modifications, modernization, expansions, alterations, changes and additions of ultra modern units for improvement in performance, results, crushing rate, bagasse saving, power export and reduced stoppages, steam consumption, power consumption and required manpower with automation and modern Instrumentation. Also erected and commissioned modern distillery and Co-generation Projects.

ANNEXURE – II

4. Innovation in plant and machinery / operation / maintenance leading to significant and incremental performance output during last three seasons.

While undertaking the charge at Shree Pandurang S. S. K. Ltd. As Chief Engineer there was huge burden of excess cane availability in Plant area. The plants operation was not up to mark and frequency of stoppages at sugar mill and cogeneration side was at extreme end. Also boiler efficiency and steam to fuel ratio was at lower side hence the bagasse saving was very low and we had no other alternative but to purchase around 8000 MT bagasse from outside source to run the distillery and cogeneration during off season. Also there was huge scope to reduce electrical and co-gen down time. During its previous season the average crushing rate was around 5400 TCD per day. The 9 MW and 10 MW Co-gen units was disturbed due to frequent MSEB supply failure. The Management was intended to reduce down time and improve performance so that we can crush around 11.0 Lac MT of Sugar cane without purchasing bagasse with minor modifications and rectifications so the task was to do everything right without any additional financial burden.

For first crushing season I concentrated on various operational problems within plant to improve production rate.

MILL SECTION :-

1. Production losses by TRPF & Donnelly Chute system were attained through proper investigation of problems & remedies. The TRPF drive teeth were provided with nut welding, correct mill alignment, ACFC setting, Improved Juice drainage and providing prepared cane equalizer for uniform and smooth feeding and increase the crushing rate lost in cane carrier speed fluctuations.
2. Imbibitions percentage and juice drainage was increased by increasing meschart grooving depth and width also changes made in grooving angle.
3. Centralized Mill Lubrication System upgraded from oil to grease to reduce cost and pollution burden on ETP.
4. Hydraulic rams were modified to accommodate imported Terracide sealing.
5. Mill head stock, side cap, bearing housing, taper wedges fitting portion etc. reconditioning to correct standard size which due wear and tear were made oblong and uneven.
6. Mill Roller Journal repaired by cold rolling method so life of roller shaft and bearings increased.
7. Rotary Juice screen washing water collected and reused for mill imbibition water (50Tone/Day) by screening and additional pipeline.

8. Replaced 48 knives fix type leveller by 80 knives swing type leveller for improvement in PI and reduced fluctuations of cane carrier due to overloading.
9. Designed prepared cane equalizer and fitted in between leveller & fiberizer for uniform & equal feeding to improve overall performance of mill, boiling house, boiler and co-gen.
10. 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.

1. Old & outdated steam traps were replaced with thermodynamic steam traps to reduce steam loss due to condensation.
2. All soot blowers under repair & not in operation were replaced, modified, changed position.
3. 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.
4. Short circuit & Cold air leakages near goose nose & side walls of WIL co-gen Boiler were arrested by new refractory & aluminum cladding.
5. 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 carton steel for better heat transfer.
6. Stopped SA & pneumatic spreader fan inlet cold air, instead of that hot air given by heating it from F.D. hot air duct.
7. Sitson Boiler ID fan was replaced with higher capacity fan to improve steam generating capacity.
8. Changed bio-gas connection from WIL Boiler to sitson boiler & provided hot air to inlet of blower fan.
9. Stopped frequent tripping of bagasse feeder by increasing its torque by replacement of suitable chain-sprockets & avoiding loose connection.
10. To provide continuous & uninterrupted bagasse supply to sitson boiler we provided bypass bagasse sliding gate.
11. 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.

BOILING HOUSE SECTION :-

1. A massecuite continuous pan was modified for capacity & heating surface and was successfully put in operation for C massecuite.
2. Use of live steam i.e. 8ATA steam for sulphur melting and superheated wash water stopped by using heat recovery system and Electric heaters to superheated for wash water.
3. For power saving purpose in sugar factory boiler, mill and boiling House we are using VFD and Planetary gearboxes at various places.

4. Single entry S.S. condensers for pans were in operation in the factory with no automation for vacuum control. at that time vacuum 26" of mercury a 'A' pan and 27" of mercury for B & C pans could never be obtained. As a result, viscosity of process fluid remained high and the desired exhaustion at pan station could not be achieved. In order to overcome this problem Condenser automation system installed and this condenser automation system ensued the following benefits to the factory.
5. Clear Juice pressure filtration system was installed for improvement in sugar color and reduced ICUMSA.
6. Grit Separator system was installed to reduce scaling at evaporator and improve heat transfer.
7. For Sugar dust collector we made following modifications.
 - a. Proper sizing and cross section area of branch line of the suction pipes were studied and corrected.
 - b. Provided new additional 18 suction points at grader & other places which were necessary.
 - c. Increased the capacity of blower as per no. of points and maintaining proper vacuum at all branch pipes.
 - d. Proper & modified water spraying arrangement with pipe and nozzles was provided in ventury & wet scrubber to arrest all sugar dust particles in the sprayed water.
 - e. Proper complete closing & making air leak proof all the points attached to grader, elevator, silo, Sugar weighing machine & hopper by air proof cloths and rubbers.

Thus we found increase in sugar dust collection bags to 12 quintals per day in place of previous 03 quintals

Water Conservation in the factory

We have saved around 6 to 8 lac liters of water per day by

1. Proper recirculation of water.
2. Avoiding wastage of water through leakages.
3. Excess hot water condensate in sugar was cooled in three stage cooling tower in series & reused it to distillery after processing it in CPU unit.
4. All taps & cocks in toilet, bath room & urinary were replaced by push type cock to avoid wastage of water.
5. Stopped the practice to apply cold water externally for mill bearing cooling
6. Mechanical seal fitted to all juice, syrup, hot & cold water pumps to avoid wastage & leakage of water & juice.
7. Wherever necessary for gland cooling of juice pumps we used spray pond inlet water through injection header line instead of applying fresh cold water .
8. All cooling applied water was taken in re-circulation i.e. boiler feed pump, compressor, vacuum pumps etc.
9. All hand washing & cleaning water cocks & pipes were blocked & only one single push type tap was given to workers.
10. All type of water leakages in sugar plant through pipe, flange joint, pin hole, drain valve, steam trap were arrested.

11. New Farm pond of 1.5 Crore liter was constructed & rain water, road water was saved & re-used for distillery & co-gen.

At the end of crushing season the results of our efforts were impressive. The average crushing rate was up & was increased from 5447 TCD to 5907 achieved record crushing figure of 10.78 lac tons. Also bagasse saving was more than 20,000 Tone and we were able to run co-gen and distillery at our own bagasse. Also total stoppages was reduced tremendously and came down from 209 Hrs to 69 Hrs including cleaning, raining and No cane.

The 10 & 9 MW Co-generation unit run at full capacity throughout the crushing season & power export was increased from 4.20 Crore Units to 5.20 Crore Units due to reduction in Co-gen, Electrical and mechanical stoppages.

ANNEXURE – III

5. Implementation of advanced instrumentation and automation and improvements achieved through it

I have been very keen towards the role of Automation in operation of any process industry. Have always tried to implement every type sophisticated automation in plants under my control.

At Pandurang SSK during last three years with kind help of our MD & Governing Body, I have been able to implement decent scheme of plant automation.

Sugar and Co-gen Instrumentation:

1. Fine tuning of Auto Feed Control System with multi set point to Equipment load are given and accordingly loop output fed to Cane carrier and First mill rake carrier.
2. Improved PLC based Condition Monitoring system provided for Zero mill Planetary gearbox.
3. Mill Auto Imbibition controlled by sensing second and third mill load and output fed to Pneumatic Control.
4. Individual Mill Speed automation: According to bagasse height in Donnelly Chute and by sensing load on the mill motor, its speed varies automatically & thereby kept constant load on individual mill. Due to this system milling efficiency improved.
5. It is observed frequent tripping of export and further this lead to Dark-out of Co-gen plant; this problem resolved by making fine tuning in Woodward Governor and correct calibration of HP Governing Valve.
6. Single entry S.S. condensers for pans were in operation in the factory with no automation for vacuum control. at that time vacuum 26" of mercury a 'A' pan and 27" of mercury for B & C pans could never be obtained. As a result, viscosity of process fluid remained high and the desired exhaustion at pan station could not be achieved. In order to overcome this problem Condenser automation system installed and this condenser automation system ensued the following benefits to the factory.
7. Vacuum could be maintained at the desired level throughout the pan strike.
8. Hourly requirement of injection water could be brought down from 2400 m³ to 1800 m³.
9. Power consumption at the condensing and cooling system could be brought down to 10.67 KWH/T/Hr.
10. We provided automation at various sections like Mill, Boiler, PRDS station and Boiling House to get proper and efficient work done without manual intervention. Safety Interlock will help to avoid the accidents. Also the system works very efficiently with low power consumption that further leads to get better efficiency.

ANNEXURE – IV

6. Implementation of very recent technology based machinery/ plants showing substantial improvement in juice extraction and co-generation

At Pandurang SSK Ltd, during last three years we have implemented many modern technologies & trends in sugar manufacturing process...

Some of the major to list here are

1. Up gradation of cane preparatory devices to latest trend of swing type leveler & tipped swing type fiberizer.
2. Prepared cane Equalizer.
3. Use of planetary gear boxes as mill reduction gearing.
4. Use of rope coupling for mill drive.
5. Up graded Grease based Centralized lubrication system for Mills.
6. DCS based Mill Automation.
7. Clear Juice pressure filtration and greet separator installed.
8. Use of Direct contact Juice Heaters for Juice hating.
9. Continuous film type sulphur burner in place of batch type.
10. Use of Automation to Continuous Pan.
11. Modifications in 2200 mm heavy duty hopper to reduce down time and frequent maintenance.
12. We are going to install Mechanical circulators for A Batch Pan to reduce dropping time of pan.
13. Modification in Sugar Silo, Automatic weighting & bagging station with Silo level monitoring and addition of bag printing Machine to Sugar conveyor.
14. We have installed Dense Phase Ash Handling System for Boiler ESP to improve dry ash collection & hence reduction use of water in Ash conveying also manpower for Ash handling reduced.
15. We have installed Integrated Evaporation system for Distillery Unit to reduce steam consumption and quantity of spent wash.
16. We have installed CPU at Distillery Unit to reuse second body and excess condensate water from sugar cane after processing in CPU and reusing it for distillery process.
17. We have installed Online Monitoring System for Sugar ETP, Boiler stack and Distillery unit to monitor Pollution norms set by CPCB and MPCB.
18. We have upgraded Boiler ESP to improve ash collection efficiency and hence reduction in SPM of stack to control Pollution norms set by CPCB and MPCB.

ANNEXURE – V

7. Technical performance improvement during last three seasons.

Sr No	Description	2014-2015	2015-2016	2016-2017	
i	Capacity utilization	167.109	150.095	132.240	
ii	RME (Mittal)	96.14	96.04	95.77	
iii	Bagasse % cane	26.85	26.79	26.80	
	a	Pole % Bagasse	1.92	1.96	1.94
	b	Moisture % Bagasse	49.890	50.054	50.172
	c	Bagasse Production	289794	217725	119966
	d	Bagasse consumption for sugar process	221883	164497	91068
	e	Bagasse saving on % Cane	8.380	8.190	7.690
iv	Hours Lost on % of available hours (Total)		0.820	2.160	1.020
	a	Mechanical Stoppage	0.000	1.130	0.180
	b	Electrical Stoppage	0.000	0.000	0.050
	c	Cleaning	0.820	1.030	0.790
v	Knowledge of Boiling house process and equipment	Please refer Boiling House of Annexure II All the Systems included here are maintained knowledge-fully by us.			
vi	Maintenance of Automation and Instrumentation.	<ul style="list-style-type: none"> • We have an well trained expert staff to maintain DCS as well as Instrumentation and Automation system. • We have an Comprehensive AMC with M/s Honeywell, and they are providing uninterrupted services for our DCS system. • We have an Comprehensive AMC with M/s Emerson Network Power Pvt Ltd, and M/s Hitachi Hirel for DCS UPS System. They are providing uninterrupted services for our UPS system. • We have an AMC with M/s PCI, they are providing uninterrupted services, that helps us maintain pest free environment at our DCS control room and TG set surroundings 			
vii	Year wise store consumption Ruppes per MT of cane for last three years.	2012-13	2011-12	2010-11	
		154.44	188.82	193.67	

	Lubricant, oil and Grease in Kgs/ 100 qntles of cane.			
viii	Lubricant oil in liters	0.239	0.675	0.533
	Grease in Kg	0.037	0.011	0.016
ix	Effort put in improvement in Capacity utilization, conservation of steam and power	<ul style="list-style-type: none"> • Almost every modern trend in sugar manufacturing technology has been adopted at our plant, e.g. HT drive for fiberizer, Tipped cane preparatory devices, AC motor driven mills, TRPF for mills, Rotary Juice screen, High pressure boilers, best efficiency turbines, Direct contact juice heaters, Continuous sulphur burners, continuous pans, sugar silo, automatic bagging, etc. • Use of VFDs wherever possible to save electricity & to reduce drive motors overloading. • Increase/Optimization in use of Imbibition water percentage. • Effective use of modern automation technologies. 70% plant operation is controlled though Honeywell make Distributed Control System. Balance 30% plant sections have been provided with discrete automation systems. • Statistical analysis of production figures, consumables usage & decision making accordingly. • Minimizing plant down time by undertaking preventive maintenance measures & using redundant system provisions. • Extensive in house training programs for man power. • Excess condensate was used for washing, various cooling applications as mill bearing external cooling, gland cooling & in plant domestic use after three stage cooling process. • As result of our these efforts during last 02 years expansion & modernization of plant and machinery has been done for crushing rate increase from 3500 to 6000 TCD & existing co-gen plant capacity increase from 09 MW to 19 MW without any downtime during crushing season. • And Pandurang SSK has stand First in recovery of sugar % cane in Solapur District for last four seasons. 		
x	Measure taken for conservation of water for sugar factory			
xi	Special effort put into reduced cash conversion cost of sugar processing			
xii	Unusual problems faced during season with regard to machinery and equipment measures taken for achieving normalcy and improved efficiency	Annexure V(a)		
xiii	Electrical energy exported kWh/MT Cane.		55.04	43.48

ANNEXURE – V (a)

7 - XII – Unusual problems faced during season with regard to machinery and equipment, measures taken for achieving normalcy and improved efficiency

Mills –

1. Our last mill of 33" x 66" size its feed roller crown side bearing was worn out and also Gun metal was deposited on roller journal, hence a huge stoppage of around 72 Hrs was required for complete dismantling of mill to remove feed roller, repair of same journal, replacement of bearing and reassembly of mill again with mill setting, but we bypassed the mill and without stopping crushing and without using mill house crane, we removed this feed roller by accepting challenge and determination and refitted it also in running mill condition by using all engineering technique and practice. this is first challenging experiment done in indian sugar industry which has saved around 1.5 Crore of our sugar complex having co-gen, distillery and sugar.
(Note : I have submitted and presented a separate paper on this subject at DSTA and SISSTA).
2. Vibration Monitoring , Oil sampling of power turbine, Mill lubrication were analyzed for smooth operation.
3. Conventional ram 'O' ring system is replaced by imported Teflon rings which is absolutely no maintenance for last three crushing seasons.
4. Proper spares part management.
5. Maintaining proper logbook, checklists and assure entries of regular interval.
6. Identification of equipment with excessive maintenance cost, indicating the need for corrective maintenance, operator training and replacement of absolute equipments.
7. Improved safety and quality conditions
8. Introducing static collars for top rollers failure of top roller flanges avoided.
9. Centralized lubrication installed in mills Consumption of lubricants has come down to 50% than conventional system.

Boiling House

To arrest huge stoppages and frequent maintenance of all three sugar hoppers-We succeeded to reduce 99% maintenance and stoppages of hopper.

1. We balanced the eccentricity in the driving shaft for minimizing jerks and vibrations.
2. We used stainless steel 2mm strip alternatively in between two wooden strips to avoid un-balance and jerks and reduce 98% breakage of wooden strips
3. For the Rory removing screen on the second hopper, the excess over hanging weight and load was reduced by taking Rory screen back towards middle tray, resulting in no breaking of connecting rod hence forth.
4. proper sheet of connecting rod near middle tray fitting brackets were taken by sander paper and good alignment and

stopper check nuts provided resulting in smooth operation and lower maintenance .

5. On site balancing of all centrifugal machines
6. Vibration monitoring of machines twice in a year
7. Safety audit and energy audit carried out every year.
8. The use effective preventive maintenance system we can maximize production and reduce the cost. It will defiantly improve the quality working condition of the plant which reduces down time, reduce in equipment redundancies minimize energy consumption and increases the profit.

Boiler Section -

1. For sitson boiler flue gas was short circuited behind bottom mud drum flue gas duct due to fabrication fault during erection is arrested with closed MS plates which increased efficiency of boiler and ultimately bagasse saving.
2. Our Texmaco boiler (55TPH) its economizer coil was got punctured before 3 week of ending season. We collected and diverted this pressured water splinter by inserting 3/4" GI pipe inside the flue gas ducting and run the boiler without stoppage for further 3 weeks, thus saved crushing loss, bagasse loss and power export loss by avoiding 16 Hrs Boiler stoppages.

Co-gen & Electrical -

Measure taken to reduce electrical down time & Co-gen tripping.

In Mill Section:-

Problem: *Frequent tripping of cane leveller motors & overloading of fiberizer also resulting in stoppages, frequent cane carrier control and hampering crushing rate.*

Remedy: Old 187 kW leveller motor replaced by new as 300 kW (Total 2 Nos.) with starter ARS (Automatic Rotor Starter with slip Regulator) Also fix type leveller replaced by swing type leveller.

At 10 MW Co-gen Power house : -

Problem: *Frequent tripping of turbines & Co-gen export*

Remedy: Faulty and duplicate current transformer (CT) was main cause and were replaced with new of Pragati make in 11 kv HT Panel at 11 kv Gen. Feeder, Export Feeder, Bus Coupler Feeder, Mill Transformer Feeder No.1&2, Fiberizer, Distillery, Trash Cutter 2.5 MVA & 4.15 MVA Transformer Feeder

Problem: *When 10 MW Export trip, Generator breaker was also tripping & Total System dark out.*

Remedy: In Generator & Export side relay Co-ordination done with related software and new programmable relay setting done.

Problem: *Due to Generator earth fault problem Generator was always tripping.*

Remedy: Separate Earth Pit provided for Generator Neutral Earthing and Generator body earthing providing Neutral Earth pit 3 Nos and Body Earth Pit 4 Nos.

At 9 MW Co-gen Power house -

Problem: *When Export trip Generator Breaker also trip and total 9MW Co-Gen plant Dark-out.*

Remedy: 1. New relay (Numerical relay) replaced for 9 MW, 11 kv

Generator. (7 SJ Siemens Make) with new hard wiring and new setting.

2. In export side old electromagnetic type relays were replaced with new numerical relay (Alstom make) with new relay setting.

Problem: *When total system Dark-out due to grid problem turbine also trip due to COP (control oil pump) supply failure*

Remedy: 3 Phase UPS system provided which results in turbine always running when total system Dark-out and hence time saved for turbine start-up from initial stage .

Problem: *When Co-gen ACW (Auxiliary Cooling water pump) Trip then total 9 MW Co-gen trip due to Safety interlocking*

Remedy: Another supply arrangement provided only for ACW pump. hence time saved for turbine boiler tripping avoided

Problem: Due to Generator earth fault problem Generator was always tripping.

Remedy: Separate Earth Pit provided for Generator Neutral Earthing and Generator body earthing providing Neutral Earth pit 3 Nos and Body Earth Pit 4 Nos.

Problem: *For 3 MW Power house Breaker & Jaw heating Problem.*

Remedy: In 3 MW, 440 V Generator set LT Breaker replaced with new C-power, 4000 Amp, L&T make. Breaker (2 Nos).

ANNEXURE – VI

8. Major expansion/ modernization/ rehabilitation programs undertaken

During period of last three years we undertook following modernization & capacity improvement work in plant.

MILL:

- a. Cane Carrier – width & length increased, size becomes 1980mm X 65mtr.
- b. Up gradation of existing fiberizer. – No of hammers increased by 16 now and now 144 hammers are there. Fiberizer anvil modified to split type. 2000HP HT motor is being used as drive for fiberizer.
- c. Zero mill – Additional 40 x 80 driven by AC VFD mill installed with rope coupling and planetary gear box.
- d. Installed Modern AC VFDs for old 33 X 66 mills.

BOILER:

1	Type of boiler used (Grate firing / fluidized bed etc.,)	Water wall tube, Dumping grate firing
2	Make of boiler	Sitson India Pvt Ltd
3	Specification standards	
4	Heat transfer area (Attach IBR certificate)	1210 m ²
4	Boiler rating and parameters	
	Design steam flow (TPH)	25TPH
	Main steam pressure (kg/cm ²)	45kg/cm ²
	Steam temperature at super heater outlet °C	440°C ± 10

STEAM TURBINE:

1.	Type of turbine	Back pressure steam Turbine		
2.	Make of turbine	Siemens		
3.	Specification standards	Impulse-Reaction Turbine		
4.	Turbine parameters	Pressure	Temperature	Flow
		kg/cm ²	°C	TPH
	Main steam parameters	45	440	67
	Back pressure parameters	1.2	126	67

ALTERNATOR:

1.	Generator rating and parameter	
	KVA	12500
	Voltage	11
	Current	665
	Power Factor	0.8
	Speed	1500
	Make	TDPS
	Specification standard	IS4722

BOILING HOUSE:

- 1) S. K.- 4000 m2.
- 2) Quad. Body – 3500 m2,1200 m2
- 3) D.C.H – 2 nos.
- 4) Dorr – 36 x 20
- 5) Pan – 60 MT – 2 nos.
- 6) Batch Type centrifugal Machine 1750 Kg/charge – 1 nos.
- 7) Heavy duty sugar grass hopper- 2200 mm – 4 nos.
- 8) Sugar Grader 35 MT/hr – 1 nos.

As a result of this work we could manage to get crushing rate of 6000 TCD in season 2011-12.

The 10 MW Co-gen is commissioned & is operational with full capacity & 45 KLPD Distillery in also commissioned and is in operation in this crushing season.

ANNEXURE – VII

9. Detail information of co-generation project

At Pandurang SSK we have two separate co-gen units....

A. 9.0 MW Extraction cum Condensing route Co-generation

BOILER:

1	Type of boiler used (Grate firing / fluidized bed etc.,)	Water wall tube, Travelling grate
2	Make of boiler	WIL
3	Specification standards	
	Heat transfer area (Attach IBR certificate)	2908 m ²
4	Boiler rating and parameters	
	Design steam flow (TPH)	55TPH
	Main steam pressure (kg/cm ²)	66 kg/cm ²
	Steam temperature at super heater outlet °C	480 °C ± 10

STEAM TURBINE:

4.	Type of turbine	Extraction cum Condensing steam Turbine		
5.	Make of turbine	Siemens		
6.	Specification standards	Impulse-Reaction Turbine		
4.	Turbine parameters	Pressure	Temperature	Flow
		kg/cm ²	°C	TPH
	Main steam parameters	66	480	55
	First Extraction	8	190	15
	Second Extraction	1.5	135	33
	Condensate flow (Design)	0.09	42	30

ALTERNATOR:

2.	Generator rating and parameter	
	KVA	11750
	Voltage	11
	Current	617
	Power Factor	0.8
	Speed	1500
	Make	TDPS
	Specification standard	IS4722

CONDENSER :

3.	Condenser rating specification	
	Type	Surface, Shell & tube Type
	Steam flow	29.1 TPH
	Design Vaccum	- 0.9 kg/cm2
	Cooling Water flow	2000 m3/hr
	Cooling Water temperature, In/Out	32 °C / 40°C
	Make	Siemens

B. 10.0 MW Back Pressure route Co-generation**BOILER:**

1	Type of boiler used (Grate firing / fluidized bed etc.,)	Water wall tube, Dumping grate firing	
2	Make of boiler	Sitson	Texmaco
3	Specification standards		
	Heat transfer area (Attach IBR certificate)	1210 m2	2165 m2
4	Boiler rating and parameters		
	Design steam flow (TPH)	25TPH	55TPH
	Main steam pressure (kg/cm ²)	45 kg/cm2	45 kg/cm2
	Steam temperature at super heater outlet °C	440 °C ± 10	440 °C ± 10

STEAM TURBINE:

7.	Type of turbine	Back pressure steam Turbine		
8.	Make of turbine	Siemens		
9.	Specification standards	Impulse-Reaction Turbine		
4.	Turbine parameters	Pressure	Temperature	Flow
		kg/cm ²	°C	TPH
	Main steam parameters	45	430	67
	Back pressure parameters	1.2	126	67

ALTERNATOR:

4.	Generator rating and parameter	
	KVA	12500
	Voltage	11
	Current	665
	Power Factor	0.8
	Speed	1500
	Make	TDPS
	Specification standard	IS4722

ANNEXURE – VIII

10. Technical papers presentation

I have presented technical paper at STAI 2009, Udaipur.

Topic : Cane field residues as support fuel for cogen boiler at Pandurang Co-operative Suagr factory - A success Story.

Date : 26-29 August 2009 .

Chief Delegates : Hon. Dr. Abdul Kalam, Ex. President of India.

Looking at importance of the subject & topic of paper organizers at STAI scheduled the paper presentation is plenary session.

As subjected in my presented paper, we at Pandurang SSK have been using the cane trash utilization as supplemental fuel successfully from last three years.

Implementation of the procedure at our plant has benefited farmers in following ways...

1. Saving of expenses incurred in trash burning.
2. Left out trash converts into manure and improves soil health.
3. Good sprouting in ratoon.
4. Prevent biological and physical losses of soil.
5. More earthworm activities improve soil texture.
6. Multiplication of nitrogen fixing and phosphate solubilizing bacteria.

ANNEXURE – IX

11. Human Resource development & Housekeeping

During last three and half years we have implemented many programs in view to improve available man power's abilities & work enthusiasm.

Programs dedicated to technological improvement, moral enhancement, safety measures awareness, social awareness.

Successfully completed programs includes...

A. Training program for supervisors & operators at

1. M/s. VSI.
2. M/s. Honeywell.
3. M/s. Emerson.
4. M/s. Siemens.
5. M/s. Woodward.
6. M/s. Triveni.
7. M/s. Danfoss.

B. Attending conference & seminars conducted by

8. M/s. Polycab.
9. M/s. ABB.
10. M/s. L&T.
11. M/s. KEL.
12. M/s. Kirlosker-Ebara.
13. M/s. Forbes Marshall
14. M/s. KSB.

C. Programs conducted at Plant Site.

15. Series of lectures for Mind Power Improvement.
16. Maintenance demonstration & training for SKF Bearings.
17. Fire fighting & extinguisher usage & demo programs.
18. Emergency & First Aid procedures training program.
19. Boiler operations & safety awareness lectures
20. Water management lectures.
21. Carrier guidance lectures program.
22. Cultural gathering.

During last three and half years we have started & implementing various housekeeping procedures as below...

1. Floor cleaning with dry bagasse instead of water.
2. Regular check up of all glands, flanges, joints, pumps, valves, etc. for leakages & enforce immediate repairs so as not allow juice, water, syrup, molasses OR sugar tickle from any where.
3. Using nozzles & spay for washing & rinsing operations would reduce water consumption.
4. Reduction of number of taps in plant so as to save water as well as reduce water spillage.

For the piece of mind and for the sack of health of workers, factory arranged two three times class of Yogas. This classes were helpful for the workers while he has actual doing work in factory.

The set up of Music school for the purpose of children of worker with the class of karate is being provided by the factory.

Harvesting labors migrated down to from their native places during the crushing season with their families. The factory had provided sugar school for the harvesting labors children. The books and uniforms to them supplied by the factory.

The workers working at various sub departments like boiler, mill, workshop, instrumentation and electrical were having a facility to attend short term training program organized by VSI Pune. We observed that after attending this short term training skill of worker has been improved. The workers who want to appear for the various courses by VSI nomination is given to them along with pay leaves and expenditure etc.

We have installed RO plant for drinking water purpose for Shreepur village at nominal cost.

For Engineering, Agriculture and Manufacturing department the factory has provided technical library.

ANNEXURE – X

12. Mention your view to improve the health of sugar industries in Maharashtra

Maharashtrian sugar industry has come up from long time and we contribution of efforts from people of many field, political, finance, institution, technical committees/ chambers and many many individuals. Looking at present working structure of this industry still there is lot of work to be done.

A. Harvesting and transport optimization –

We all know that proper harvesting time (age & crop condition) as well as time between harvesting & crushing has major roll in extraction. I suppose proper harvesting time calculated on cane variety and pole in cane should be done for every cane harvesting labour team & program should be made accordingly. So that there will be minimum lead time between harvesting and actual crushing. Also care should be taken that plant will get cane of same variety same age.

In order to reduce lead time we can go for cane harvester and suitable can transport arrangement.

B. Process from cane to sugar

Every technical and managerial body at sugar plant should always take care of following points to minimize production cost, losses and to increase the productivity & product quality.

1. Power saving : Use VFD's, avoid belt drives, use of planetary gear boxes instead of worm gear box.
2. Efficiency : Use high pressure boiler and mating turbines, use nylon runners for chain.
3. Automation : Maximize use of automatic system instead of manual control so that you can have better control on process parameters as temperature, pressure, speed, flow, head etc.
4. Maintain minimum down time/ Avoid break down by doing preventive measures as balancing, ultrasonic testing, in time replacement of consumable items. Attend maintenance schedule of all equipment at individual level.
5. Keep good housekeeping and plant environment.
6. Use equipments with optimized/ adequate suitable to your plant requirement.

C. Adoption of advanced technology –

There are many inventions, modifications going on in this field. We should always be keen and alert to adopt this technologies and changes at our plant. Some noticeable new technologies arrived during last decade are rotary screen, nylon runner, tip type fibrizer hammer, swing type leveler, two roller mill, planetary gear box, continuous pan, DCH, DCS, ESP and list goes on.

I hope there is a lot of potential in our technocrat to improve this process. I always wish to be part of this process.

ANNEXURE – XI

13. Additional information

Establishment of Allied Industries & By- Products.

1. In 2010-11 we at Pandurang SSK under leadership of Hon. Chairman & MD geared up for establishing 45 KLPD Molasses based distillery unit.

I looked after this project as Chief Technical Personnel.

We executed the erection of plant in just six months & commissioned plant March 2011.

2. We also executed boi-gas plant of 500 m³/day, effluent evaporation plant as well as compost plant during 2010-11.
3. We also established trash briquet-ting plant of 50 tons/day during 2011-12.

Under my tenure at Pandurang SSK has received following Awards from reputed Institutions.

A. Vasantdada Sugar Institute, Manjari, Pune

Best overall performance sugar factory – 2008-09

Best Technical Efficiency Award – First Prize (Central Zone) 2008-09.

The most innovative sugar factory in Maharashtra - 2009-10.

B. National Federation of Co-operative sugar factories, Delhi

Best Technical Efficiency Award

high recovery area – second Prize 2010-11.