

The most innovative & challenging experiment in India for saving - 1.5 Crore

Subject: - Paper on "To remove feed roller of last mill, repair it and fit back on the position, without using Mill house crane & without stopping crushing/mill operation."

Background:-

In Cane sugar industry there is vast scope to reduce stoppages, down time by very careful, perfect overhauling and maintenance during offseason & proper preventive maintenance during season. To make changes, alterations, modifications in off season by studying and finding out proper, perfect solution and remedy on the faced problem & stoppages during the season.

In our factory during last season we observed our last mill No 5, Size 33 "x 66 ", it's feed roller's crown side bearing failure. Needed to take huge stoppage for dismantling mill & TRPF remove feed roller (weight 14 ton) at last, repair & replacement of bearing & re-assembly of mill. As our factory is a sugar complex having sugar, co-generation & Distillery plant, we could not afford such a huge stoppage of around 68 to 72 Hrs. leading to huge loss of whole complex around more than Rs. 1.5 Crore during above stoppages.

Actual Total Work Quantum to carryout above work.

- To dismantle tail bar coupling, oil piping, water piping, top & Discharge scrapper.
- To dismantle Mill hydraulic rams, discharge chute, top & discharge rollers.
- To remove TRPF Rollers & guards, mill side cap, rake carriers & its drive shaft.
- To remove feed roller with mill house crane & take it in mill house lathe machine, for polish cut of journal& replacement of bearing.
- To fit repaired feed roller on the position & re-assembly of discharge roller, discharge chute of mill.
- Setting of mill & trash plate, Assembly of top roller, TRPF with guard, hydraulic ram, tail bar coupling.
- Oil piping, Water piping, empty trial of mill & to put mill in running operation.

The times span of 68 to 72 hrs. Required to carry out above overall work was as below.

- a) To dismantle all mill with TRPF & finally to remove feed roller after removing rake carrier and its drive shaft for fitting wire ropes to lift the roller with mill house crane-24 Hrs. (Min.)
- b) To dismantle both bearing. To take - 2 polish cut (rough & smooth) to roller journal, to take seat and fit new bearing liner and assembly of mill roller. - 20 Hrs. (Min.)
- c) To fit the feed roller in mill head stock & Do assembly of mill, TRPF & Resetting of rollers and trash plate, Oil, Water piping, empty running trials of mill - 28 Hrs. (Min.) Total Stoppage around 68 to 72 Hrs. (Min.)

But we decided immediately to start the crushing operation on remaining four mills by fitting bypass chute for 5th mill and remove only feed roller for repair without dismantling overall mill assembly. It was not possible to hold and lift the feed roller b4y the mill house crane as crushing operation and rack, rake carriers were running and no proper space for

wire rope fitting to hold the same roller. But we decided to accept this challenge of difficult task. In my Previous factory without mill house crane had removed taper wedges below mill feed roller for machining purpose with the help of chain block, screw jack, rope & chain.

The technique & steps used for this task & operation during running mill tandem.

a) The feed roller was binded with discharge roller at both end i.e. square & pintal end by using chain & wire rope. So that it will not slide down from taper wedges after removing side caps.

b) The Feed roller was hold vertically at the both crown & off side with two 10 ton. Capacity chain block mounted on top of head stock. So that it will slide down slowly after removing side caps.

c) As roller was needed to take down to floor from bottom portion of head stock the both feed side caps were removed and taken away to make space for unloading the feed roller .

But sliding it towards mill house slab concrete platform, after unloading was a **big challenge & question**, where to rest the feed roller near juice tray after unloading and how to take it away?? But when you have strong determination to accept the challenge god helps and gives solution on the problem like **"Will will find the way if we have strong determination & will power"**.

d) The new concept & idea came in our mind and we filled all juice tray & surrounded area with loose bagasse and made it compact as concrete floor by strocking it with heavy weight along with water spray.

e) Then we decided to put one MS Plate of size 1M x 2M x 12mm thick for unloading the roller on it as bottom bagasse portion was made compact

f) The roller was rested at center of the MS plate which was kept at horizontal.

g) We made rectangular channel frame (4") on MS plate around the roller rested portion, so that roller will not move & slide down from the plate while pulling the roller along with ms plate by using some device and idea.

h) Our aim was to pull out the roller along with ms plate at least 2.5 to 3 Meter so that it can be lifted with mill house crane. Hence considering to suit this condition the concrete slab portion near off side head stock was filled with bagasse baled to match the compact bagasse level. This made space was also insufficient as we were unable to pull out the roller when mill floor concrete slab portion ends.

i) Hence another one baled bagasse depo off size 2.5 meter x 3 meter x 2 meter height was made from ground floor portion to match the compact bagasse level on the mill concrete slab floor and it was supported with MS plate not to slide baled while pulling the roller.

j) We decided to take round hole of 1 meter dia. on factory building wall to enter mobile crane Boom inside factory for pulling the MS plate along with roller outside mill housing. As boom end mobile crane distance was too much only 25% power of boom was possible to utilize.

Hence in spite of boom of mobile crane we decided to use chain block power for pulling out the roller.

k) Thus we had now confidence to pull out this roller out of mill head stock with chain block and mobile crane boom by sliding the ms plate on compact bagasse & finally we achieved our target to pull out roller out of mill head stock.

l) Now it was easy to bind and lift the roller with mill house crane to roller grooving lathe machine.

m) Now the feed roller was repaired by taking journal cut and replacing bearing with new one.

But real challenge was how to put it inside mill head stock from compact bagasse depo as it was very difficult to pull it out at initially and more than 3 hours' time was consumed for pulling it outside mill head stock. It was 5 times difficult to put it back near bottom of mill head stock.

Return Journey of Feed Roller

a) Again we used idea to make this bagasse platform more compact and sturdy and to give 6" slope (in 15 feet length) to compact bagasse towards crown side mill head stock.

b) We decided that feed roller kept on framed MS plate can be easily slide by placing 1.5 inch dia. rolling pipe in between compact bagasse platform and MS plate.

c) By this idea and arrangement within 5 minutes we take roller on sliding plate at bottom of mill head stock. Here we used mobile crane boom power for pushing roller and plate inside the mill head stock.

p) With hard efforts and using chain blocks we fitted feed roller at its position, also side caps were fitted and pinned with this chain block. Remaining work was also completed and mill was kept running empty for trial and then taken online after removing bypass chute.

q) During this operation our crushing was going on with 6000 MT per day with 40" x 80" zero mill and remaining 33" x 66" three mills with TRPF, without affecting any crushing. Co-generation and distillery production.

I think this is the first experiment in Indian sugar industry, which was successfully completed with hard work and great determination. This will be the guide line to save huge loss and stoppages to other factories in India where such mill bearing problem will arise. Hence i decided to give paper on this subject in this convection.

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Thanking you,

Yours Faithfully

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