SLURRY BATCH MAKING

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PURPOSE:

To describe the step-wise order of addition and slurry making in the crutcher. This document details the slurry making process. Crutcher formulations /recipes downloading at Crutcher start up, materials order of addition (OOA) and Crutcher Batch Cycle.

SCOPE:

The Crutcher operation is a complex blending of solids (Bulk and Minor) and liquids (Bulk and Minor) characterized by physical transformation and chemical reactions to produce blown powder detergent with the continuous aid of a mechanical stirrer called Agitator.

RESPONSIBILITY:

- Control room operator/ Back up- Confirms the right fill level in the Liquid day tanks and ensure right recipe is selected before crutching starts
- Designated Materials dosing personnel- Loads bulk solid materials, prepares remelt for Crutcher operation.

POTENTIAL RISK

- Splash
- Burns
- Eye/Skin irritation
- Dust inhalation

REQUIRED PPE:

- Eye goggles
- 3M Nose mask
- Latex and cotton gloves.
- Protective Clothing

PROCEDURE:

A. Measures:

a. Homogeneous Crutcher Mix
b. Target Crutcher Mixture Moisture (CMM)
c. Target Crutcher Mixture Temperature (CMT)
d. Materials composition compliance

e. Zero Crutcher solidification incident

f. Minimal MU Losses

g. Effective Change over procedures and weight control.

B. PRE-CRUTCHING OPERATIONS

1. Prior to start-up of the Crutching operation, Control room operator pumps Caustic Soda, HLAS and Sodium Silicate from tank farm to the Hold Tank/silos in level 0 to prescribed level in the Hold Tank/silo via the SCADA.
2. The control room operator confirms the level in the silo to be at "hi-hi" from the ODOS SCADA in control room.
3. The control room operator selects and starts the minor liquid for the selected formulation to crutch.
4. The control room operator selects the recipe / formulation by pressing batch recipe, click the recipe/formulation name and click download on the Crutcher SCADA graphic user interface (GUI).
5. Control room Operator cross-checks additions weight set-points versus recipe composition defined on the batch recipe display with the Crutcher BPR Sheet to ensure consistency and avoidance of recipe input errors or sequence of operation violations.

C. CHANGE OVER FROM FORMULATION A TO B: HOW TO CHANGE FORMULATION ON NEW CRUTCHER SCADA SYSTEM WITHOUT CHANGING SET POINTS FOR MATERIALS:

6. Crutcher Operator Completes actions/change over tasks or actions in Crutcher change over checklist.
7. While last batch of previous formulation is being transferred, put the Crutcher SCADA on "Change-Over" mode
8. Immediately the last batch finish transferring, the Crutcher system will stop. Select the "batch recipe" button on SCADA GUI, click and scroll to the formulation you want to change to, and click enter. The formulation will now be "green". Then click the "Download" button to download the set points of new formulation to the software. Ensure to check correctness of SPs for each material by comparing with the BPR.
9. Ensure to have changed the SP of minor liquids on ODOS SCADA
10. Click "Crutcher" button to go back to the Crutcher control screen. Click on the "change-over" button to revert to "run-non-stop" mode.
11. As soon as the first batch of new formulation start dosing, change the "run-non-stop" button back to "change-over" so that the first batch of new formulation will be on hold when completed until you are ready to transfer, by this time, the slurry of previous formulation in ageing vessel must have been sprayed to less than 6%.
12. Now change the "change –over" button to "run-non-stop" to transfer the first batch of new formulation.

D. HOW TO EDIT SET POINT IN A RECIPE AND DOWNLOAD TO SOFTWARE

13. Click "Batch recipe button" on SCADA and select the recipe name to edit.
14. Click "edit" and then click "Upload" button. The set point for each material will be displayed to the right.
15. Edit/change the SP e.g. water or Remelt and click enter after any change to SP.
16. Click the "save" button and then click the "Download" button to download to software.

E. TO VIEW THE SET POINTS FOR MATERIALS IN A RECIPE

18. Click "Batch recipe button" on SCADA and select the recipe name to edit
17. Click "edit" and then click "Upload" button. The set point for each material will be displayed to the right to view
18. Click the "save" button.

F. CRUTCHING OPERATION

19. Control room operator commences Crutcher Cycle by selecting the automatic run mode on the crutcher SCADA.
20. The control room operator selects the recipe/formulation by pressing batch recipe, clicks the recipe/formulation name and click download on the Crutcher SCADA.
21. Control room operator click the start batch button on SCADA screen. This will activate the phase manager to automatically start and manage the phase sequence of the crutching operations/components
22. Dust extraction fan Rotoclone will start automatically.
23. Water valve will open automatically.
24. Control room operator starts the pit water pump 2 or 1 from the QS1 panel to add the amount of water prescribed in the Crutcher BPR Sheet. The water auto valve will automatically close once the set point for water is reached and stop the pit water pump.
25. Crutcher agitator will start automatically at 35 RPM.
26. Control room operator clicks the Automatic button on ODOS page to set ODOS mode to Automatic.
27. Caustic and HLAS valves opens automatically and followed by caustic and HLAS pumps to dose the required set points for both materials. The pumps and valves will stop automatically on reaching the set points.
28. Silicate valve opens and followed by silicate pump to dose the set value. The pump and valve will stop automatically on reaching set point
29. The phase manager detects dose readiness for minor liquid (EW Base) and opens the minor liquids (EW base) dose valve automatically.
30. Carbonate valve and screw start automatically to dose the set value. The screw stops on reaching set point. The Screw conveyor runs on low speed. The speed option can be selected.
31. The phase manager send signal which doses dry scrap.
32. Dry Scrap is then dosed automatically as required based on set point derived from the re-blend matrix.
33. Sulphate screw starts automatically after phase manager signals completion of dry scrap addition, to dose the set value for sulphate. The screw stops when SP is reached. The Screw conveyor switches from High speed to Low speed intermittently as controlled by the VFD.
34. After completion of Sulphate addition, the phase manager activates dosing of remelt. The remelt auto valve is then opened from the Scada by the CRO to collect the required quantity of remelt.

35. There are stabilization and waiting times between dosage of different materials. The phase manager waits for waiting time of the last material to elapse before it begins to transfer. Note that the waiting and stabilization times are not flexible nor editable. For any need to edit contact the PC&IS personnel.

36. The below crutcher addition and process condition data are automatically pulled to quality window. If there is a failure of the QW system the BCP system is immediately activated.
    a. Batch number
    b. Setpoint and actual dosage for all materials
    c. Batch end time
37. When batch is completed, the system checks the Ageing vessel level. If less than 75%, it automatically opens crutcher discharge valve KV63.6 and starts the Slurry transfer pump to transfer the slurry from crutcher to ageing vessel.
38. The sat lab operator must go to crutcher floor to take slurry sample for CMM analysis when the batch is half transferred. Wear eye goggles, latex and cotton gloves.
39. The pump continue to run until the crutcher weight is less than 50kg OR the 'High level' alarm is issued by the Ageing vessel level sensor. In this instance, the valve and pump shut off automatically.
40. Next batch will start automatically. If making change to running recipe is necessary, put the system on change over before transfer is completed and edit the recipe after transfer is completed then start a new batch. See PRD-MSG 06.01, Line clearance and changeover

G. CRUTCHER PROCESS CONDITION MONITORING

a. Agitator Current
b. Agitator RPM
c. Slurry Temperature
d. Material dosage
e. Order of addition (Water>Caustic & HLAS>Silicate>minor liquids>Carbonate>minor solids>Dry scrap> Sulphate>Remelt)

H. AUTO/MANUAL SWITCH/INTERVENTION- EMMERGENCY ACTION DURING CRUTCHING OPERATION

41. The slurry batch making should be done on automatic mode. In the event where it is necessary to stop a batch on auto and complete it on manual.
42. Inform the Process engineer (PE), Line Manager and ODM for alignment, risk and mitigation plan.
43. Click the manual button on the SCADA GUI.
44. The system can now be manually operated by operator's command and sequence.
45. Never transfer an uncompleted slurry batch to the Ageing vessel or spray into the Tower. Drain through the Crutcher drain valve to the pit.
46. Now manually operate the Crutcher by starting the Agitator and set the RPM and Rotoclone.
47. Start the material dosing valve, pumps, & screws and use the totalizer as reference to decide quantity dosed and when to stop the dosage.
48. The current order of addition is as stated in the batch production records (BPR).
49. If the quality of the slurry needs to be checked, open the manhole on top of the crutcher to view the contents. Close the steam injection into the crutcher, wear eye goggles, 3M nose mask (if solids have been added), cotton gloves and protective clothing.

DEFINITIONS:

Crutcher: The Crutcher is a Cylindrical Stainless Steel vessel fitted with a dished bottom located on Level 6.00 m. Its ancillaries include an Agitator motor driving an Agitator comprised of horizontal baffles fitted to a solid shaft, manhole, in-feed chutes for solid and liquid raw materials, vapors extraction chute and vapors extraction

fan, Load cells, an automatic discharge valve, solid materials (Carbonate and Sulphate) in-feed chutes and a SCADA control screen on level 3m in control room.

GUI: Graphic User Interface.

Start batch button: This a SCADA screen GUI button.

Stop batch button: This a SCADA screen GUI button.

Abort batch button: This a SCADA screen GUI button.

Phase Manager: This is the GUI for viewing batch sequence and batch status.

Batch recipe: This is the set up/configuration page for viewing, editing, saving and uploading formulation recipes.

SP: Set Point.

GUI: Graphic User Interface

SCADA: Supervisory Control and Data Acquisition

Reason for Update:

VERSION 1: Change in SOP numbering to meet I-Quality standard from MSG 0907.3 to PRD-MSG 01.01

VERSION 2: Change procedure to capture automatic dosing for dry scrap.

VERSION 3: 2 years review and re-approval; call out to put ODOS on Automatic mode to enable HLAS dosage into the Crutcher

VERSION 4: Updated to comply with Veeva SOP standard

VERSION 5: Updated to comply with 12 charring hardpoints- Never spray an incomplete batch into the Tower. Basic Crutching StepUp card updated to qualify on how to handle an incomplete slurry batch.

End Of Procedure

SOP RELATED ATTACHMENTS

Attachment 1: Training & Qualification

Attachment 2: Model Answers

Attachment 3: Basic Crutching Step up card

Attachment 4: Intermediate Crutching Step up Card