**GMR CSYM - Pseudo Logic**

**Table of Content**

[1.Pile-Wise Data Entry 2](#_Toc10288)

[2.Coal Feeding Decision Logic 3](#_Toc21908)

[3.Summary of All Pile Stacking Coal 4](#_Toc4574)

[4.Blending Logic 4](#_Toc11537)

1. **Pile-Wise Data Entry**

In the **coal yard management system**, each sub-pile (e.g., A1 to 4D) is tracked for detailed data related to coal stacking and reclaiming. This allows supervisors to monitor the coal quality and quantity at a granular level.

**Input Parameters for Each Sub-Pile (A1 to 4D):**

* **Source Details:**
  + Wagon, Trucks
* **Record the following information:**
  + STACKING DATE
  + RAKE NO
  + SPUR
  + SUB PILE
  + TOP/BOTTOM
  + STACKING QNTY
  + GCV
  + RECLAIM DATE
  + RC-QNTY

**Derived Parameters Calculation:**

* **AVAILABLE QUANTITY:**
  + Available qnty = stacking qnty - reclaim qnty
* **AGING:**
  + Aging = today's date - stacking date
* **GCV and Quantity Calculations:**
  + **TOP GCV:** If stacked at the top, use the provided GCV.
  + **TOP QNTY:** If stacked at the top, use the stacking quantity.
  + **BOTTOM GCV:** If stacked at the bottom, use the provided GCV.
  + **BOTTOM QNTY:** If stacked at the bottom, use the stacking quantity.
* **Coal Quality Classification:**
  + **Coal above 3000 GCV: AVAILABLE QNTY if GCV > 3000**
  + **Coal between 3000-3300 GCV: AVAILABLE QNTY if 3000 ≤ GCV ≤ 3300**
  + **Coal between 3300-3500 GCV: AVAILABLE QNTY if 3300 ≤ GCV ≤ 3500**
  + **Coal above 3500 GCV: AVAILABLE QNTY if GCV > 3500**
* **Output Calculations:**
* **AVAILABLE QUANTITY:** Sum of all calculated available quantities.
* **PILE WTD GCV:** Weighted average GCV from available quantity.
* **TOP GCV:** Average GCV for coal stacked at the top.
* **TOP QNTY:** Sum of all top-stacked coal quantities.
* **BOTTOM GCV:** Average GCV for coal stacked at the bottom.
* **BOTTOM QNTY:** Sum of all bottom-stacked coal quantities.
* **MAX AGING:** Maximum aging value among all piles.
* **AVERAGE AGING:** Average of aging values greater than 0.
* **Coal > 3000 GCV:** Sum of quantities where GCV > 3000
* **Coal 3000-3300 GCV:** Sum of quantities where 3000 ≤ GCV ≤ 3300
* **Coal 3300-3500 GCV:** Sum of quantities where 3300 ≤ GCV ≤ 3500
* **Coal > 3500 GCV:** Sum of quantities where GCV > 3500

**2.** **Coal Feeding Decision Logic**

This section outlines the logic behind determining whether to feed coal directly from the stockpile, blend coal to achieve a desired GCV, or suggest stacking. The decision is based on several factors such as coal quality, the percentage of coal in the yard, and the incoming coal quality.

Coal feeding decisions are based on several thresholds derived from coal quality and yard conditions.

**Feeding Criteria:**

1. **Direct Feeding (Low GCV Coal):**
   * **Condition:**
     + Incoming coal GCV is less than the Upper Control Limit (UCL).
     + Incoming coal GCV is greater than the Lower Control Limit (LCL).
     + Percentage of coal in yard above 3500 KCAL is less than 10%.
   * **Result:** Returns 1 if all conditions are met, otherwise returns 0.
2. **Direct Feeding (Good Quality Coal):**
   * **Condition:**
     + Incoming coal GCV is between 3500 and 4000.
     + Percentage of coal below 3100 KCAL is greater than 70%.
   * **Result:** Returns 1 if all conditions are met, otherwise returns 0.
3. **Direct Feeding (Low Quality and Low Quantity Coal):**
   * **Condition:**
     + Incoming coal GCV is between 2300 and 3000.
     + Percentage of coal above 3500 KCAL in the yard is greater than 80%.
   * **Result:** Returns 1 if all conditions are met, otherwise returns 0.
4. **Blending with Direct Feeding (Coal Within Range):**
   * **Condition:**
     + Incoming coal GCV is between the LCL and UCL.
     + Percentage of coal in yard above 3500 KCAL is greater than 10%.
     + Blending possibility is available.
   * **Result:** Returns 1 if all conditions are met, otherwise returns 0.
5. **Blending with Direct Feeding (Coal Out of Range):**
   * **Condition:**
     + Incoming coal GCV is either greater than UCL or less than LCL.
     + Blending possibility is available.
   * **Result:** Returns 1 if all conditions are met, otherwise returns 0.
6. **Stacking (No Feeding or Blending Suggestions):**
   * **Condition:**
     + All coal feeding decision results are false.
   * **Result:** Suggests stacking as the fallback.

**3.Summary of All Pile Stacking Coal**

This section helps in calculating the total coal inventory in the yard, including both stacked coal and incoming coal, to keep track of the total stock.

**Spur-Wise Stacking:**

* **Calculation:**
  + Calculate the number of spurs utilized for each pile based on input spur numbers.
  + If any sub-pile uses more than 2 spurs, trigger a warning.

**Coal Quantity and Quality Pile-Wise:**

* **Calculation:**
  + Calculate the coal stock across all piles, including coal arriving by trucks.

**Last Coal Rake GCV:**

* **Input Parameters:**
  + Sample Collection Date, Rake No, SIDING NO, ARBG.C.V (kcal/kg).
* **Derived Parameters:**
  + Determine how many spurs are being used and the amount of coal in those spurs.

**4.** **Blending Logic**

**Input Parameters for Blending:**

* All pile summary values, quantity and GCV for top and bottom, and aging.

**Derived Parameters:**

* **Quantity Top:**
  + If top quantity exceeds 1000, take pile top quantity.
  + Otherwise, sum of top and bottom quantities.
* **GCV Top:**
  + If top quantity exceeds 1000, take pile top GCV.
  + Otherwise, take weighted average GCV.
* **GCV Bottom:**
  + Use bottom GCV from the pile.
* **Aging:**
  + Average aging of the pile.

**Blended GCV Calculations:**

* **Blended GCV @20%:**
  + Weighted sum of incoming coal GCV and top pile GCV if top quantity exceeds 20% of 3700.
* **Blended GCV @15%:**
  + Weighted sum of incoming coal GCV and top pile GCV if top quantity exceeds 15% of 3700.
* **Blended GCV @10%:**
  + Weighted sum of incoming coal GCV and top pile GCV if Blended GCV @20% exceeds 10% of 3700.

**Blending Possibility:**

* **Conditions:**
  + If **Blended GCV@20%** is between LCL and UCL, return the value.
  + Similarly for **Blended GCV @15%** and **Blended GCV @10%**.
* **Blending Possible:**
  + If the sum of all possible blending GCVs is greater than 0, returns 1, otherwise 0.

**Priority Calculation:**

* **Priority Based on Aging:**
  + Check if **Blending Possible** equals 1 and if the difference between average aging and pile-wise aging is greater than 0.
  + If true, return 1, otherwise 0.
* **Priority for Bottom Coal Approach:**
  + If the difference between GCV of bottom and top is greater than 100, return 1.
  + Otherwise, return 0.
* **Final Priority:**
  + Calculate priority based on **Blending Possible**, **Priority Based on Aging**, and **Priority for Bottom Coal Approach**.

**5. Reclaiming Logic**

 **Calculate blending Priority:**

* Sum up blending possibility, aging priority, and bottom coal approach priority.
* If blending is not possible, set priority to 0.

 **Rank by AVERAGE AGING:**

* Rank entries within each priority group, with higher aging getting a higher rank.

 **Reclaiming Priority:**

* Convert ranking into priority scale (highest aging gets priority high, decreasing accordingly).