

Rolled in scale seminar course

1. Basic knowledge on features of scale in HSM operation
 - a. Three kinds of Oxide
 - b. Hardness of oxide and steel
 - c. Generating speed of scale
 - d. Effect of Si, Ni and Cu at reheating furnace
 - e. Removability of rolled in scale depending on content and temperature
2. Descaling
 - a. Evaluation of descaling capability: pressure, water volume, nozzle type, distance, nozzle arrangement, number of headers
 - b. HSB and rougher descaler
 - c. FSB
 - d. Interstand descaling
 - e. Ultra high pressure descaling
3. Work roll
 - a. Roll surface black scale or black oxide layer
 - b. Heat transfer to WR from rolled material and effective way to cool WR
 - c. Mechanism of WR deterioration and generation of roll banding and rolled in scale
 - d. Introduction of HSS roll
4. Roll cooling, strip cooling, roll gap cooling and lubrication rolling
 - a. Roll cooling Necessary amount and distribution among stands and between entry and delivery
 - b. Strip cooling
 - c. Roll gap cooling
 - d. Lubrication rolling
5. Approach to find the causes of rolled in scale
 - a. Find the size, type and their distribution in longitudinal and transverse directions as well as top or bottom surface.
 - b. Deformation behavior and temperature distribution and transient from reheating furnace to finisher
 - c. Precise inspection at pickling line: You can surely find all types of rolled in scale here.
 - d. Use of Parsytec system
 - e. The timing of ON-OFF of descalers, strip coolant and roll gap cooling
 - f. Evaluation of the effectiveness of lubrication rolling: Loads were really reduced? Bottom surface was really lubricated?
 - g. Find rolled position in finisher rolling campaigns as well as rougher rolling campaign.
 - h. Study contents and rolling temperature.
 - i. Ask research laboratory to use equipment for analysis, such as light microscope, SEM, EPMA and so on.
 - j. Measure the actual descaling pressure during rolling.
6. All types of rolled in scale, their causes and countermeasures
 - 6-1. Real rolled in scale
 - a. Scattered sands scale or salt and pepper scale
 - b. Comet scale
 - c. Spindle scale
 - d. Line scale
 - e. Dragged mark scale
 - f. Band scale
 - g. Big wave scale
 - h. Fish scale type scale

- i. HSS roll type scale
- j. Red scale
- k. Roll component scale
- l. Edge scattered sands scale
- m. Rougher roll scale
- n. Cu scale or Cu scab
- o. Wood grain shallow scale

6-2. Non-real rolled in scale found at cold rolling

- a. Scale pressed into steel surface at subsequent lines such as pickling line
- b. Attached scale particle after finisher stands
- c. ROT table roller scratch
- d. Rust hole by water

7. Actual training in rolled in scale problem at your HSM and pickling line

- a. Training in specific rolled in scale that you suffer at your HSM