

Inline Detection of Surface Defects in Garret Line of SBM

SBM (Special Bar Mill) is one of the Mills for rolling rounds in Straight and Coil form. The input for SBM is received from SMS2 in the form of 150 x 150 Sq.mm blooms. The blooms are received into furnace and rolled to required sizes. Output of different sizes from 20 mm to 45 mm in Straight and Coil form are produced in SBM as per customer requirement.

Mill Automation in tune with a diverter ensures bar diverts to coil line or Straight line. To facilitate Coil production, SBM has Socket ways, 3 garret coilers, 3 coil extractors, 2 rotating plat forms, 2 two walking beam tunnels, 2 coil tilters, hooks conveyor system, 3 compactors and 2 discharging beds. Material in rolling line enters the socket way. A socket way consists of set of fixed guides and roller guides with diverter switches in between to automate bar in to Right, Center and left garret coilers.

With the all the automation properly set in, the bar enters coil line production at around 870 degrees C – 950 degrees C. This bar gets into coil form in garret coiler and will be placed on Walking beam tunnel using extractor and rotating platform set up. Once it enters the walking beam tunnel, it moves through a hop movement and reaches out of the tunnel and gets loaded on to hook which is ready for loading at the other end of the tunnel. The rolling material which enters the coil line at 850 deg. C is available for physical verification, only after it gets loaded on to hook. Till that time it is not available for manual access.

The issue concerned here is with quality of rolled material. Whole rolling line involves numerous sets of rolling elements and static elements. A wear out or any other technical problem in the line can change physical properties of the material. Physical non-conformities like scratch marks, dents and other problems may appear on the rolled material due to different technical issues in rolling line.

At present, these problems can be verified only after the coil is loaded on to hook and the hook travels to an accessible area. During continuous rolling there will be around 45 coils in each Walking beam tunnel (and two tunnels are there). So if a coil on hook is found quality defective, in all probability it implies 45 coils behind it are defective. Depending on source location of defect, there may be 90 defective coils behind on defect coil.

Present mill set up limits our ability to inspect defects inline, so that we can identify the defect in early stage and take necessary corrective action.

We are in need of a technical solution to identify above defects inline so that corrective actions can be taken in time, there by preventing large number of quality defectives.