



Tata Steel has introduced a faster and safer maintenance process for its furnace's gas cleaning system.

THE CONTEXT



The gas cleaning system of a basic oxygen furnace (BOF) converter includes a movable hood with water-cooled tubes. Some 320,000 cubic metre of gas is released during the BOF steel-making process, which passes through this hood at high temperatures and is indirectly cooled by it. Since the tubes thin out quickly, the hood needs to be changed after every 4,000 batches of steel production. This is a cumbersome and hazardous process and requires 15 days downtime.

THE INNOVATION



In order to change the movable hood, workers used overhead and movable cranes, winches and other equipment within the close confines of a 55-metre-high multi-storey building earlier. Most of their time went in manoeuvring the equipment. Plus, the process was hazardous. The Tata Steel team explored an entirely new pathway for replacing the hood. This was done by making a small structural modification to lift the 5.5-metre-long, 20-tonne hood along a six-metre-long passage. It also ensured that instead of handling it multiple times, the hood was lifted and placed at the assembly point at one shot. The team designed the entire process so that the task could be completed in 10 days and more safely too.

KEY CHALLENGES

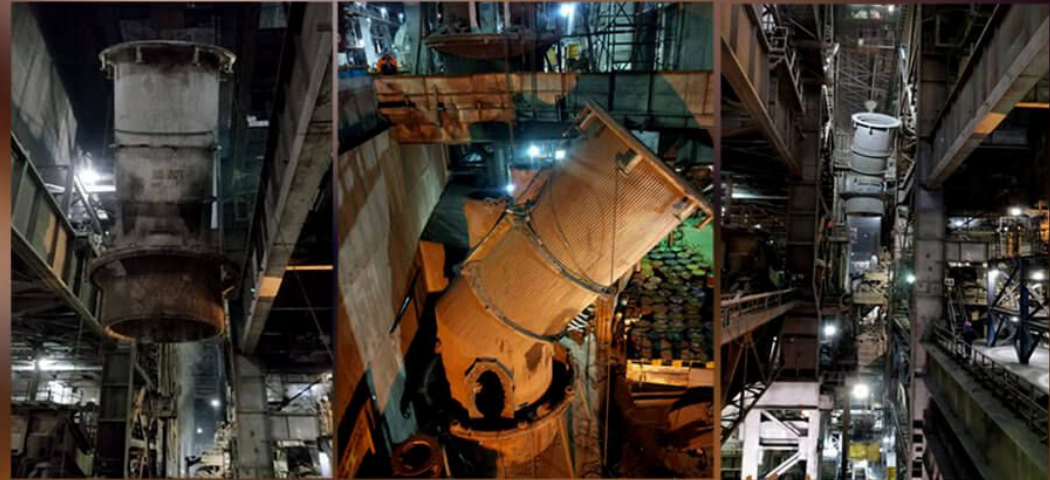


TO LIFT THE L-SHAPED HOOD FROM ZERO TO 40 METRES AND ALONG A PASSAGE WITH HARDLY ANY CLEARANCE WITH AN OVERHEAD CRANE

The team made a small modification in the structure to facilitate this. The best crane operators, riggers and supervisors were selected and trained for the operation by making them practise on a specially fabricated dummy replica. In addition, the communication system between the workers across all floors was strengthened to better manage the entire operation.

TO TRANSFER THE HOOD OVER AND ABOVE A RUNNING CONVERTER AND A 21-METRE-LONG OXYGEN LANCE THAT OBSTRUCTED THE PATH

The team decided to keep the lance at the lowest position and stop operations for 30 minutes as otherwise, there was a possibility of the running converter facing a breakdown, which could, in turn, pose a safety hazard.



THE IMPACT



The new process has resulted in a savings of

₹32 CR

on a conservative estimate since by reducing the downtime by five days, the plant can now produce an additional 4,500 tonnes of steel. In addition, the enhanced safety of the entire operation has boosted the workers' morale.