Potential Level (PL) Analysis: A Proactive SIF Prevention Approach Enabled Best-In-Class Safety Performance During Refinery Turnaround 2025

Akhil Pradeep
HPCL Mittal Energy Limited, India

Aman Chopra
HPCL Mittal Energy Limited, India

Abstract

During complex refinery turnarounds, traditional lagging indicators—TRIR, LTIFR, and LTIs—offer limited predictive value in preventing serious incidents. Although large number of near misses, unsafe acts and conditions are reported at the base of the safety triangle, conventional analysis treats all observations uniformly, despite only a small fraction having the potential to escalate into Serious Injuries or Fatalities (PSIF). Aligning with the Campbell Institute's guidance on SIF prevention, HMEL adopted a Potential Level (PL) Analysis framework to distinguish high-potential events from routine low-risk findings.

Daily PL-based reviews of all safety observations enabled identification of approximately 10% high-potential cases, triggering targeted audits, enhanced field supervision, focused leadership communication, and precise resource deployment across the turnaround. This predictive and data-driven approach—integrated through leadership briefings, unit-level communication, worker engagement via TBTs, and continuous improvement—created a resilient safety ecosystem. This predictive approach resulted in 5.1 million safe man-hours, zero LTIs (LTIFR 0.00), and a TRIR of 0.98, well below the HMEL target (<1.47) and the best in HMEL's turnaround history. Benchmarking with the M/s AP-Network (Global TA consultant) data demonstrated safety performance better than one-tenth of global averages, establishing PL Analysis as a scalable, proactive model for SIF prevention.

Index Terms

Potential Level (PL) Analysis, Potential for Serious Injuries or Fatalities (PSIF) Prevention, Refinery Turnaround Safety, Predictive Safety Analytics