

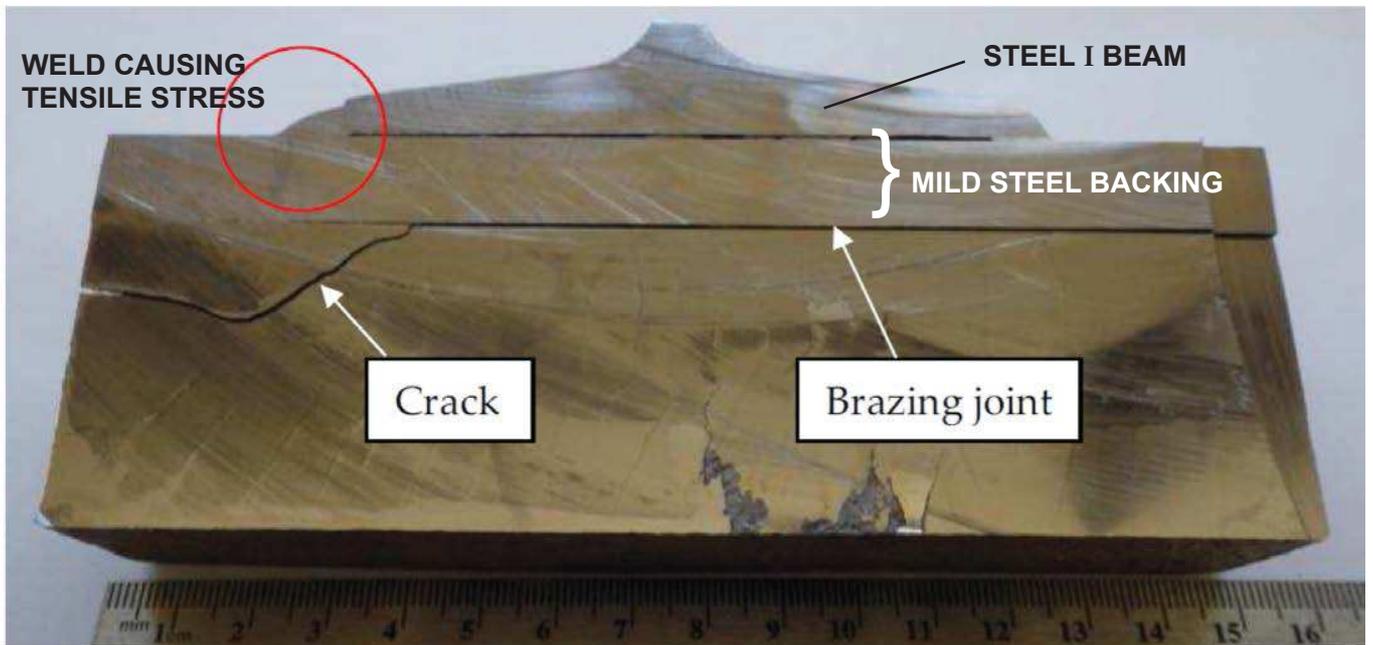
# RCFA For Mining Industry

Root Cause Failure Analysis (RCFA) is the systematic investigation of the construction, application, and history of a failed component, equipment or system to determine the failure mechanism and underlying cause. RCFA may be employed for legal, insurance, safety, environmental or production reasons. Once a failure occurs, one can determine the basic cause(s) and recommend changes necessary to reduce or eliminate the risk of reoccurrence.

The XPS Materials Technology Laboratory, located in the XPS Centre in Falconbridge, is the only failure analysis and materials testing laboratory in Northern Ontario. Having investigated over 1,000 cases, the XPS Materials Technology group has extensive

from large residual tensile stresses from welds between a steel I-beam and the steel backing plate during fabrication by the manufacturer. These stresses were the result of the joint design, welding procedure and execution of the weld. Furthermore, there were many defects which originated in the brazing operation between the steel backing plate and white cast iron. Improvements were recommended in fabrication procedures (minimize heat input, smaller weld bead, control of inter-pass temperature, welding sequence) and quality assurance during fabrication.

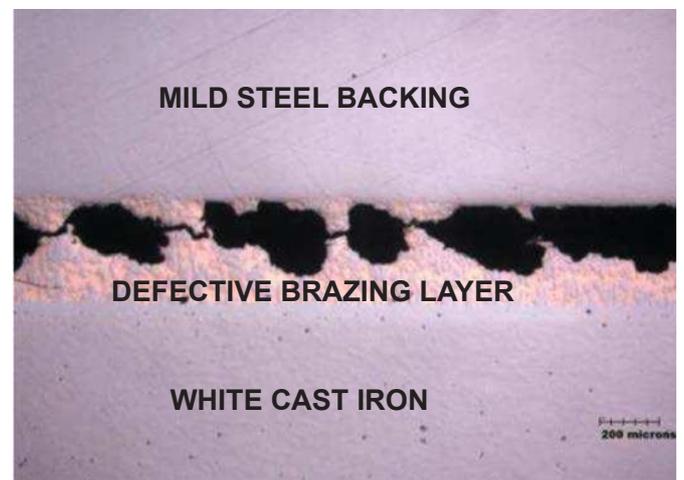
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*Cracking of White Cast Iron Liners*

experience in metallurgical root cause failure analysis in machinery use in mine sites, concentrators, smelters, leach plants, acid plants and electrolytic refineries. Our field and laboratory experience allows us to make and implement practical recommendations to mitigate failures together with site expertise and suppliers. In this regard, our field experience in particular gives us a significant advantage over many other metallurgical failure analysis labs. Recommendations may include changes in materials of construction or design, fabrication or construction procedures, quality assurance during fabrication and/or construction, inspection plans during operation as well as maintenance and operating procedures.

In one example, white cast iron liners mounted onto mild steel backing plates cracked during the installation process for a mining wear application. Through RCFA, XPS Materials Technology engineers and technicians determined that the failure resulted



*Defective Brazing Layer from White Cast iron to the Mild Steel Backing*