



Engineering Sciences Section – 2005

C25 Analysis of Case Factors in a Surface Mine Electrocutation

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After attending this presentation, attendees will understand the application of engineering judgment.

This presentation will impact the forensic community and/or humanity by identifying innovative techniques, critical thinking, and application of engineering to judgments and conclusions in forensic sciences.

In late November 1999, a 44-year-old dredge operator working a gravel pond from a small metal boat, was electrocuted when he tightened a chain clamp around one phase of an energized 440 Volt, 3-phase dredge service power conductor fed from a corner-grounded delta transformer. The operator was in the process of clamping the dredge rubber discharge line to a metal section of pipe when the power conductor was drawn up with the chain clamp. The operator had a total of two years and four weeks mining experience, all at this mine, as a dredge operator, yet had not received electrical safety and hazard recognition training in accordance with Mine Safety Health Administration regulations (MSHA) 30 CFR Part 48.

After struggling for some time to get the chain clamp to seat, the operator hit the chain clamp handle with a pipe to get the chain's clamping teeth to seat into the chain links. The chain clamp finally seated and the operator began to tighten the clamp.

An assistant on the boat reported that he then heard the operator make grunting noises while shaking violently. Recognizing that the operator had contacted a power line, the assistant failed in his attempt to push the operator free, and fearing for his life, entered the water and swam to a nearby floating stanchion. The assistant climbed onto the float and reportedly experienced "tingling" sensation, and when he looked back, observed arcing in several locations.

This paper provides an analysis of case factors used in a professional negligence and wrongful death case on behalf of the Plaintiff against two defendants, the mine owner (employer) and an electric contractor tasked in performing annual safety inspections of the mine facility as required by MSHA. This analysis shows that both the employer and the contractor had ample knowledge of substantive electric risk, and provides an axiomatic breakdown of case factors shown to be recurring in such incidents. This analysis evaluates system grounding deficiencies, deficient personnel training and personnel protective equipment policies and procedures, and in general, a grossly deficient system architecture. Additionally, this paper identifies impacts of federal regulatory policies, while evaluating rulemaking politics and enforcement of the provisions of the 1977 Mine Safety and Health Act.

Electrocutation, Grounding, Surface Mine