



History of Successful Assessment

CASE STUDY 1

PROBLEM: Wear of components leading to the repair and replacement of filler bars on rotary kilns, resulting in a need for a lubricant to lubricate the filler bars on a riding ring of a rotary kiln in a safe and effective manner.

REQUIREMENTS: Design a lubricant that was in a form to allow or provide for the ease of application/accessibility to apply a lubricant in between the filler bar sections, with the dimensions of 1 ½ inches by 6 inches, and coat the surface area with a depth of two to five feet, at temperatures reaching 700 plus degrees Fahrenheit.

PREVIOUS PRODUCT/METHOD: A concoction of a carrier composed of water, diesel fuel, oil and a mixture of graphite which requires a laborious preparation time prior to application. The application method is a pressurized sprayer which is time consuming and inefficient. This method also created a safety hazard for the individual applying it as well as environmental concerns. This method required 1 to 2 men and takes at least 30 minutes to apply every other day for each riding ring on the kiln.

C&C SOLUTION & IMPLEMENTATION: Alan Lockett designed and formulated a specialty product that would provide ease of application, effective coating of the lubricant in the appropriate area of concern and ultimately enhance worker safety and reduce application time. The resulting product known as Easy Bar is unique in composition resulting in patents and usage by several industries throughout the world.

UPTIME & DOLLARS SAVED BY C&C SOLUTION: Cost savings were realized immediately in extending replacement part life up to 50% while reducing maintenance costs. Labor costs are lowered by reducing a 20 minute application job performed by 1 or 2 workers, two or more times per week for each tire, *down to less than 1 minute a week for each tire*. Savings to repair filler bar weld fractures, and replacement of filler bars is \$20,000 to \$60,000 per tire section.



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CASE STUDY 2

PROBLEM: At a large utility company, their turbine oil's performance characteristics were out of specification resulting in the accumulation of foam and emulsified water being present in the oil circulation system. This ultimately compromised the lubrication of the turbine and system.

PREVIOUS PRODUCT/METHOD: The root cause of the problem was the current practice of adding an engine oil supplement to the turbine rotor shaft and bearing assembly to "facilitate" alignment and rotation of the turbine rotor during annual maintenance and overhaul service. The combination of the engine oil supplement with the turbine oil resulted in diminished lubricant performance. The turbine oil's characteristics to dissipate foam and separate water were compromised to the extent that excessive foaming and emulsified water were being circulated throughout the system. This contributed to additional concerns and problem in the operation of the system

C&C SOLUTION & IMPLEMENTATION: C&C determined the problem was the "standing" lubrication practice utilized in the plants industry wide for years. BAL-200 is created by C&C Oil to fix the lubrication issues created by the mixing of the engine oil supplement and the turbine oil. BAL-200 is developed to be applied to the turbine rotor shaft and bearing during the annual maintenance repair and overhaul. Additionally when BAL-200 is mixed with the turbine oil, the performance characteristics of the turbine oil did not diminish. Currently BAL- 200 has been adopted by turbine manufacturers Siemens, Westinghouse, GE, Mitsubishi and ABB for use in-conjunction with turbine maintenance and overhauls.

UPTIME & DOLLARS SAVED BY C&C SOLUTION: BAL-200 reduces production time lost during turbine maintenance which with a large steam turbine can generate revenues of \$1,000,000 per day. BAL-200 eliminates the need to dispose and flush-out 8,000 gallons of contaminated oil in the circulating system and the cost of replacement oil of \$40,000.00 plus.



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CASE STUDY 3

PROBLEM: Rusting of the gear set on a coal pulverizer in power utility plant. The gear box was sent out for maintenance, repair and then returned for storage until it was put into service. Prior to installation of the equipment for service an inspection of the gears found the rust had taken place on the surface of the gears.

C&C SOLUTION & IMPLEMENTATION: To keep the gears from rusting while the unit was in storage for periods of six to twelve months, C&C Oil reformulated the lubricant. C&C Oil's customized solution allowed for the same lubricant product to be used for storage and operation while not requiring removal prior to installation and use in service.

UPTIME & DOLLARS SAVED BY C&C SOLUTION: Overall cost of repair and maintenance of the gear set is \$300,000. Rust would contaminate the lube oil system and shorten the life of the gear box and the lubricant.



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CASE STUDY 4

PROBLEM: Steam turbine with excessive volume of emulsified water present in the lube oil system raised high level of concern. After their maintenance team at the plant filtered the oil with a unit designed to remove contaminants and water, there remained too much water to safely shut the turbine down without doing damage to the turbine.

NEEDS / REQUIREMENTS: To remove the water present in the oil system sump (six thousands gallons) while in operation to a point where the turbine could be shut down without harming the turbine and thus allowing maintenance to address the source of the water contamination.

C&C SOLUTION & IMPLEMENTATION: C&C Oil's solution was to provide an additive supplement to the turbine oil reservoir. This additive would effectively break up the oil and water emulsion, separating the water from the oil to allow for removal of the water from the system's sump. This allowed for the turbine to be shut down without damage to the turbine.

UPTIME & DOLLARS SAVED BY C&C SOLUTION: Potential Costs to repair damage to the turbine \$100,000.00's (plus loss of generation revenue of \$500,000.00 to \$1,000,000.00 per day).