

TUNNEL KILN ENGINEERING STUDY

Problem: One of our clients owns a 60 year old tunnel kiln that had not been operational since 2011 and wanted to begin using the kiln for extra capacity and for reheating scrap parts for potential re-use. However, when they tried to re-light the kiln, they detected the presence of a significant amount of gas leaking out of the kiln and into the plant. After numerous attempts to locate and seal the gas leak, they were unable to reduce the leak to a safe level.

Solution: After investing many internal hours to address the gas leak with little results, the client decided to hire PTS for an engineering study to investigate the issue and recommend a solution. We began with a data gathering visit where we collected photos of the kiln, drawings and schematics, and talked to plant engineering, operators, and maintenance personnel to discuss the history of the kiln, their suspected causes of the issue, and their previous unsuccessful attempts to solve the problem. After an initial investigation, we returned to take air flow measurements at each burner and each air blower, along with observing a burner light up and the resulting flame.



During the investigation, we found that the kiln utilizes burners that are likely original to the kiln. They do not have spark ignition, meaning they must be lit by manually lighting a starter flame inside the kiln. This means that the kiln is empty during light up, leaving an escape route through the bottom of the furnace for the excess gas from the burner. After researching modern burners and performing combustion calculations, we wrote a report recommending that the client replace at least 4 of the existing burners with new modern burners that recirculate excess products of combustion rather than releasing them into the kiln. The modern burners can also be spark ignited from outside the kiln, allowing the kiln to be filled with its insulated carts during light up, effectively sealing the escape route. By recirculating the excess gas and insulating the bottom of the kiln, the client would be able to reduce their gas leak to a safe level to resume operation of the kiln.

In addition, we provided information and pricing estimates for the replacement burners, further upgrades to the combustion system and controls to meet today's NFPA 86 safety standards, and all installation costs for the system upgrade. While the client decided not to immediately complete the upgrade, they are now armed with enough information to budget for a future upgrade when the need arises to return the kiln to operation.