

StepFire™ controlled tunnel kiln substantially increases product quality

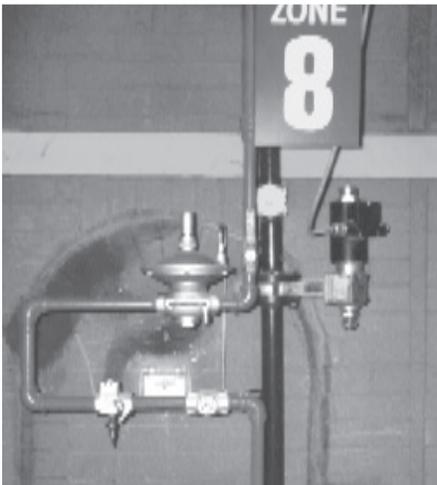
Background

General Shale in Somerset, VA added StepFire control to their brick tunnel kiln, with a focus on increasing production and reducing fuel consumption. General Shale hoped to run a more efficient kiln and at the same time realize an improvement in their product quality.

This study documents a two-thirds reduction in the number of damaged or below standard bricks exiting the kiln during normal production. For General Shale this reduction represents a significant increase in net production that was accomplished while simultaneously reducing fuel consumption.

Initial Conditions

The natural gas burners as originally installed operated on thermal turndown, with a fixed rate of combustion air and modulated fuel. The average production rate for brick was 32.5 cars per day with fuel consumption at 4.25 MCF/MBE. Average brick losses attributed to damage or quality were 3% of production.



*StepFire™ Control System
with Tempest Burners*

Installation

StepFire was installed on half of the existing Tempest burners and the remainder were operated at a fixed rate. This approach was taken to provide optimum performance while keeping their investment to a minimum.

General Shale installed:

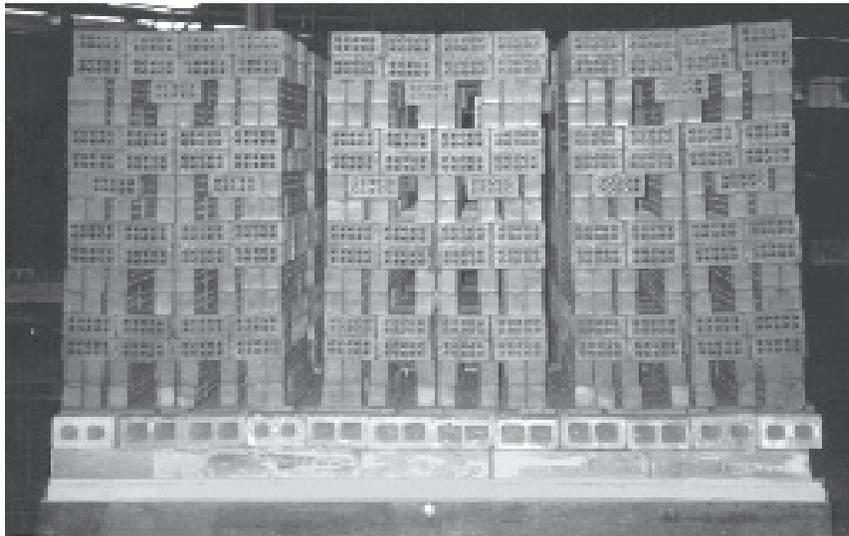
- An A-B SLC 5/04 PLC to provide StepFire™ logic.
- StepFire™ control of 41 burners in 8 temperature control zones.
- StepFire™ control based on P.I.D. temperature.
- #8351A-T Furnace Pressure Controller.
- Operator interface for entering operating parameters and to permit manual operation.

Results

The installation's greatest success is in the increase in the product quality that is directly attributable to the use of StepFire. This improvement in product quality is documented by the decrease in the number of unuseable bricks exiting the kiln. Previous to the installation of StepFire, General Shale was experiencing a loss rate of 3%. Since the installation of North Americans control systems, this number has dropped to less than 1%. With a present production rate of 50 million bricks per year, this represents an annual increase of 1 million saleable bricks, with no increase in overhead.

In addition, fuel consumption dropped dramatically, from 4.25 MCF/MBE to 3.70 MCF/MBE. This amounts to a minimum of 15% in fuel savings which is directly attributable to the on ratio StepFiring of 50% of the burners, as opposed to operating all of the burners with constant air while varying the amount of fuel.

Ultimately, General Shale realized an overall production increase of between 5 and 10%, which is quite significant when considering that this increase was effected while producing higher quality bricks with less fuel.



A significant reduction in damaged or broken bricks were the direct result of improved temperature uniformity.