

Caterpillar

8826 W. Rt 24, Bldg. D
Mapleton, IL 61547

SO2 Blending System Case Study

By

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November 1999

GENERAL

The Caterpillar Mapleton Foundry began operation in 1978. They are a high production shop specializing in gray iron castings, primarily engine blocks and heads, for heavy industrial and power generating applications. The foundry uses a wide range of sand binder technology including Phenolic Urethane No-Bake, Phenolic Urethane Cold Box, Epoxy Acrylic Cold Box, Hot Box, Shell, and Furan No Bake.

Chemical Binder Systems Used:

- Phenolic Urethane No-Bake
- Phenolic Urethane Cold Box
- Epoxy Acrylic Cold Box
- Hot Box
- Shell
- Furan No-Bake

CASTING METAL TYPES

- Gray Iron

MELTING FACILITIES

- 2-5mw Electric Arc Furnaces
- 2-65 ton Induction Furnaces

SAND FACILITIES

CORE PROCESSES

- Epoxy Acrylic Binder

MOLDING PROCESSES

- Green Sand
- Phenolic No-Bake

CLEANING FACILITIES

- Tumbleblast
- Auto Grinding

HEAT TREATING

- Stress Relieve

PROJECT OBJECTIVE

- Improve Process Repeatability
- Reduce Environmental Problems
- Improve Machine Productivity

ORIGINAL PROBLEMS

- Inaccurate/Inconsistent Vaporizing of SO₂ Liquid
- Adding Excess SO₂ for Process
- High PPM Exposure Levels

SOLUTION

- Number of SO₂-N₂ Blending systems by MT Systems 2
- Goals Better cores, less residuals
- What Was/Is The Number of Core Machines 15

RESULTS AND BENEFITS

- Reduced average SO₂ Levels
- Reduced core scrap
- Increased productivity by reducing purge time
- Lower environmental PPM exposure levels
- Better scrubber efficiency
- Ability to change gassing pressure at each machine
- Gives consistent gas pressure through entire cycle
- Better gas flowability through cores
- Built in reliable safety features
- State of the art process control

MONETARY SAVINGS/PAYBACK/JUSTIFICATION

- Better competitive position in the market place
- Improved environmental exposure levels
- Increased machine productivity
- Lower air compressor energy usage
- Lower purge cycle times