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Journal of Mathematics in Industry

Volume:

2

Issue:

3

Date:

Wednesday, October 24, 2012

DOI:

<http://dx.doi.org/10.1186/2190-5983-2-3>

Avoiding the formation of rings in rotary kilns is an issue of primary concern to the cement production industry. We developed a numerical combustion model that revealed that in our case study rings are typically formed in zones of maximal radiative heat transfer. This local overheating causes an overproduction of the liquid phase of the granular material, which tends to stick to the oven's wall and to form rings. To counteract for this phenomenon, we propose to increase the amount of secondary air injected to cool the oven. Experimental validation at the plant has confirmed that our solution is indeed effective. For the first time in years, the kiln has been operating without unscheduled shut-downs, resulting in hugely important cost savings.

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