



INFUB - 11th European Conference on Industrial Furnaces and Boilers, INFUB-11

Lime Shaft Kilns

Hannes Piringer*

Maerz Ofenbau AG, Richard Wagner-Strasse 28, 8027 Zurich

Abstract

The annual world lime production amounts to approximately 350 million tons. The most efficient and ecological way to calcine limestone and dolomite is the use of modern shaft kilns. The requirement to install new lime shaft kilns at a stagnating market growth is substantial because a significant amount of lime is still produced with outdated kiln models. More than three quarters of the world's lime production is high reactive lime. The PFR lime kiln has established itself worldwide for this type of product. This article compares the advantages of modern shaft kilns with other kiln models and explains the functional principle of such lime kilns. It also shows new innovative ideas and explains in which areas further research and development is still required in order to meet the growing demands of the market.

© 2017 The Authors. Published by Elsevier Ltd.
Peer-review under responsibility of the organizing committee of INFUB-11

Keywords: Lime kiln; shaft kiln; PFR lime kiln; HPS lime kiln; mixed feed kiln; annular shaft kiln; rotary kiln; calcining process; DEM simulation; CFD simulation; emissions from shaft kilns

1. Introduction

Although calcination of limestone and dolomite is basically a very simple process and calcination of limestone has been known for thousands of years, continued development of lime kilns is still necessary in order to comply with modern day requirements.

*Corresponding author. Tel.: +41 44 287 27 26,
E-mail address: hannes.piringer@maerz.com

The idea of this paper is to illustrate the following topics:

- impact of market requirements on lime burning technology
- importance of lime shaft kilns in comparison with other lime kiln types
- modern lime shaft kilns
- technical challenges and the need for research

This paper does not claim to be comprehensive, some parts are not based on scientific work but on experience, and some data is based on estimations only. The paper demonstrates the perception of the author, who has been responsible for the design and development of lime shaft kilns for many years.

2. World-wide use of lime in the main market segments

Lime and dolomitic lime (dolime) is used in many different market segments. Figure 1 shows the world-wide use of lime in the main market segments. These quantities as well as the product requirements are the basis for the design of new lime kilns.

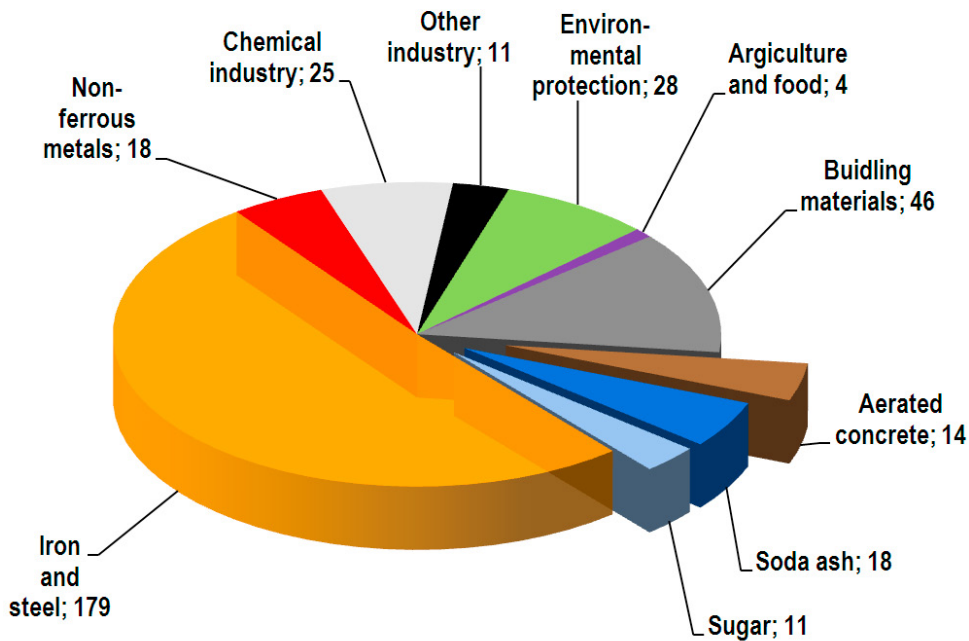


Figure 1: World-wide use of lime in the main market segments in millions of tons per year, (Source: USGS 2013 Minerals Yearbook)

Approximately 50% of the overall lime production is used for the iron and steel industry and therefore the growth of the lime market is significantly influenced by the steel industry. Today, the market growth is low or stagnating. However, as the lime industry is an old historically grown industry all different types of lime kilns are used to produce quicklime. Many of these existing lime kilns do not meet the present product and / or emission requirements. Usually the thermal efficiency of older kiln types is also not good enough. These are important reasons why the industry still needs more modern lime kilns.

Download English Version:

<https://daneshyari.com/en/article/5444979>

Download Persian Version:

<https://daneshyari.com/article/5444979>

[Daneshyari.com](https://daneshyari.com)