

Optimization of Protective Measures to Control PM Emissions in Areas Near the Cement Factory. Case Study: Antea Cement Factory in Borizane, Albania

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Abstract:

The cement production industry is one of the most polluting activities worldwide. The Antea Cement Factory in Borizane, Kruje, Albania, has been operating for nearly 19 years, utilizing local limestone and shale. This operator produces various types of cement. Health issues of residents and environmental problems suggest issues with protective measures. This article highlights the need to optimize protective measures to control PM₁₀ levels around the factory, depending on dispersion due to weather, climate, geology, and topography. According to the Source-Pathway-Receptor (SPR) concept, PM₁₀ emissions in four stacks, climate conditions, and terrain were analyzed. The AIRMUD program assessed their dispersion. The study concluded two dispersion scenarios. The first scenario, good dispersion of PM₁₀ concentrations within the norm during months with cool temperatures, wind speeds ≥ 3 m/s. The second scenario, low dispersion of PM₁₀ levels exceed the European norm ($40 \mu\text{g}/\text{m}^3$) during high-temperature months with winds ≤ 2 m/s, southwest direction toward populated areas. Long-term exposure may link to increased bronchial, cardiac, and cancer risks. Minimizing PM₁₀ levels with cost-effective protective measures is essential, especially in months with winds ≤ 2 m/s.

Keywords:

cement factory, PM₁₀ dispersion, protective measures, environmental impact, human health impact.