Cement Production Effects on Human health with Respect to Cement Lifecycle Assessment

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Abstract
Increasing climate change challenges due to human activities has made new insight to reduction environmental loads of industrial processes. Not only construction sector uses almost the half of industrial usage energy but also releases a significant amount of waste and pollutant material to the environment. Cement production as the main material in the construction sector is one of the most pollution reason which needs to reduce its impacts on the total environment. From this point of view, human health takes an important role in cement production studies since many of the cement industry has direct and indirect effects on human health, especially in industrial cities. Producing the enormous amount of respiratory organics and inorganics pollutant during the overall cement lifecycle. In this novel study, the affects of cement production have been studied using life cycle assessment tool.

Keywords: cement production emissions, cement production effects, human health effected by cement production, Life Cycle Assessment (LCA) of cement.

Introduction

Climate change is one of the greatest challenges facing humankind today. Human-induced carbon emissions are the major greenhouse gas emissions that drive anthropogenic climate change. Carbon emissions can be generated by fossil fuel combustion, industrial production processes, waste treatment and land use change [1]. Cement is one of the most polluting industries: 5% of the world's total emission of greenhouse gasses is caused by cement production [2]. Cement production is known to contribute to the greenhouse effect due to the emission of CO2 gas during the clinker manufacturing process [3]. The production of cement is a rather complex process which includes a high amount of raw materials (e.g., limestone, marl, clay, and iron ore), heat, electricity and different fuels (petroleum coke, coal, fuel oil, natural gas or different wastes). Modern cement production pyro-processing involves calcination and sintering processes that generally take place in a rotary kiln. The objective is to create clinker (aggregate alite nodules) from the raw mix (ground limestone mixed with clay or shale). Modern cement industries use both wet and dry rotary kilns [4]. Due to this increasing danger of catastrophic global environmental change and other aspects of environmental mismanagement have given rise to concerns about economic development exceeding the Earth's carrying capacity. In order to reduce these effects many international organizations and developed countries have proposed various ideas and initiatives such as green growth, green economy, green transformation, green structural transformation, sustainable transformation, and green industrial policy Green transformation refers to processes within industries and/or companies that lead to reduced environmental change impact [5]. The most important result of the cement production is human health effects in 2012 World Health Organization (WHO) reported that worldwide non-communicable diseases are the leading cause of mortality which accounts for 82 % of deaths and among those non-communicable diseases chronic respiratory diseases, asthma, and chronic obstructive pulmonary diseases accounted for 4 million or 10.7 % deaths [6].

There is a wide variety of research for this industry at different aspect zones. [7], this paper summarizes and reviews the literature on the usage of different types of alternative fuel and their impacts on the cement plant performance. This study suggests alternative fuels to reduce the overall CO2 emission and other air emissions such as NOX, SO2, and dust. [8], this paper presents a study on the utilization of stone coal vanadium slag in preparing cement clinker. The hydrates and hydration mechanism of the cement were analyzed in this study by means of the hydration heat analysis, X-ray diffraction (XRD) and the differential thermal gravity (DTG) analysis. [6], this study was conducted to assess the prevalence and associated factors of chronic respiratory symptoms among cement factory workers in Dejen town, 2015. [9], the objective of this report is the assessment of changes in fractional exhaled nitric oxide (FENO) across the shift which performed among cement production workers and controls. FENO was used as a possible marker of eosinophilic inflammation in the airways. In addition, the relations between personal total dust exposure and FENO changes across the work shift were examined.

All the previous studies have the good point to use in cement industry but the aim of this novelty