

Suwapha Sornprom 2014: A Study and Analysis for Air Quality Impact and Thermal Comfort in Working Area Case Study: Electrical Assemble Factory. Master of Engineering (Safety Engineering), Major Field: Safety Engineering, Faculty of Engineering. Thesis Advisor: Assistant Professor Apichart Chaengbamrung, Ph.D. 194 pages.

The objective of this thesis is to study and analyze for air quality impact and thermal comfort in working area of the case study: electrical assemble factory. This study is divided into 2 parts : air quality and thermal comforts.

For air quality, the dust quantity, the dispersion of toluene, tin and carbon dioxide gas were determined. The results showed that the dust quantity and the dispersion of toluene and tin on the second floor of the production plant were within the safe limit for operator's health. However, it was found that the quantity of carbon dioxide gas exceeded the standard limit of 1000 ppm for hours per day. This poor indoor air quality caused by inadequate ventilation which was the most influential factor. Suggestion for air quality improvement was to install additional 2,108 cfm ventilation fans together with existing ones to generate 2,790 cfm ventilation capacity.

For thermal comfortable. the factors involved were room temperature, relative humidity, and wind velocity. The values of temperature and relative humidity in the observed area were plotted on a Psychrometric chart to evaluate the comfortable condition in each period of time. It was found that there were problems in some points mainly related to temperature discomfort even though the data collecting was done in November which was during winter and the ventilation fans were not switched on. From the cooling load calculation based on the hottest condition in April and adding the ventilation factor which was consistent to air quality, it was found that the main cooling load came from the air ventilation, followed by the cooling load through outside structure of the building. The improvement was made by considering the load from building structure rather than the inside ventilation as the number of ventilation fans were needed to dilute accumulating carbon dioxide. However, after improvement, the cooling load from building structure be reduced by only 5.66 %, thus the increase in the capacity of refrigeration unit from 27 tons to 50 tons was required while compared with 53 tons of refrigeration capacity for the case of no insulation.

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Thesis Advisor's signature