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A Mini Review on Toxic Substance in Building Paint

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Abstract:- Paint is used especially in building to impart colour and to increase its aesthetic value. Commercial building paint comprised of binder, solvent, pigment and additives. Workers in paint industry is exposed to numerous hazard during and after painting process which is due to the composition of the building paint. This paper intended to discuss on different types of toxic substances used in building paint.

Keywords:- *Toxic, Paint, Environment.*

I. INTRODUCTION

The aesthetical value of a building has been significantly increase by the application of paint on the surface. Paint industries are dominated by China, Europe and North America [1]. Since the twentieth century, government has outlined the requirement that needs to be complied for building paint due to environmental concern related to hazard by paint industry [2]. Since then, the development of a greener paint has been widely conducted. Some components in building paint are toxic to living organisms and environment [3]. This has led to an interest in a safer and a more environmental friendly paint.

II. COMPOSITION OF PAINT

The basic composition of the paint comprises of binder, solvent, additives and pigment. Each element has a significant role in the paint formulated. Binder helps to hold all of the component together and adhering it to the surface of interest. Solvent acts as the vehicle or diluent for the paint to be able to be painted while pigments give the paint colour. Additives is added to increase the value of the paint. Each of the main components play a major role in the performance of the building paint. However, some of the paint composition are reported to be harmful to human health and environment [4].

A. Pigment

Titanium dioxide (TiO2) is a fine white powder, commonly used in paint. TiO2 is widely used due to its high hiding power and can be easily incorporated in the paint formulation [5]. TiO2 is also chosen over other compound due to its opacity and whiteness which result from its refractive index (RI). TiO2 is however has risen a concern in term of health as it promotes chronic inflammation. An oxidative stress has also been associated with TiO2 contamination that will stimulate cellular and DNA damage in human [6].

Apart from TiO2, lead (Pb) has also been incorporated in paint as pigment and drying agent, corrosion resistant [7]. Lead based paint became a major threat to human if the paint deteriorates due to weather or aging process. The paint flakes can enter the respiratory system and cause a lead accumulation in the body system. Lead contamination especially among children may result in severe headache, auditory problem and brain damage [8].

B. Volatile Organic Compounds (VOC)

VOC is associated with the solvent used in the paint composition. Solvent in paint acts as diluent that dissolve all of the paint component together. Solvent will be evaporated and lost to the surrounding when paint dries up. VOC is not only found in paint but also in glue, gasoline, stationery and also in cosmetics [9]. VOC are often related to health problem due to the presence of benzene ring that is carcinogenic. Minor effect of VOC exposure is headache, irritation in the eyes, nose and throat. Prolong exposure to VOC may result in damage in kidney and liver and the central nervous system. Acetone, benzene, xylene and toluene are usually used in building paint to speed up the drying time [10].

C. Additives

Fungicide is widely used in building paint as part of additives to combat the growth of mould and fungus on the surface painted [11]. Mould and fungus that grow on painted surface reduce the aesthetical value of the building. Chlorothalonil is one of fungicide used in building paint. Fig. 1 shows the chemical structure of cholorothalonil [12].

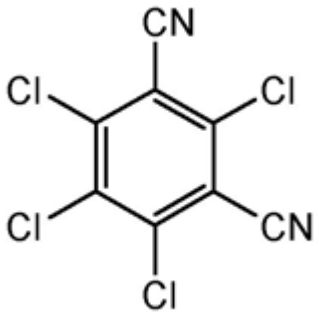

Fig 1:- Chemical structure of chlorothalonil

Chlorothalonil may cause irritation in eyes and skin. Breathing of chlorothalonil into the respiratory system may cause cough, irritate nose and lungs and also causing phlegm. Repeated exposure may cause skin rash and nose bleeding [13].

III. NON-TOXIC BUILDING PAINT

A non-toxic or low toxic building paint use a lower impact component in the paint composition. A non-toxic paint usually has a low VOC by using a greener and safer solvent as the vehicle in the paint composition but still retaining its fast drying properties [14]. However, to achieve a low VOC paint, some parameters such as method of paint application to allow the alteration to be made. A lower VOC paint is usually applied by using synthetic roller because it can produce a more uniform thickness of the paint applied. A safer fungicide such as natural fungicide has also been incorporated to reduce the toxicity of paint [15].

IV. CONCLUSION

In a conclusion, there are a lot more other options for a greener paint formulation. A thorough study need to be conducted to develop an environmental friendly building paint for the sake of human health and minimizing the environmental impact.

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