Effectiveness of Use of D-Kay Cleaner in The Wooden Furnitures Industry in Padang City in 2023

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ABSTRACT

The main problem of workers' health is respiratory disorders, which is certainly related to the air quality in wooden furniture. The wood processing industry is a very rapidly growing industry and is widely absorbed by the polywood, sawmill, and furniture industries. As well as potentially causing air pollution in the workplace in the form of wood dust. Because about 10 to 13% of sawn wood will be sawdust. Occupational respiratory diseases, according to the results of The Surveillance of Work Associated and Occupational Respiratory Disease (SWORD) research conducted in the UK, found 3300 new cases of occupational lung disease. The purpose of this study is to determine the usefulness of products and the effectiveness of innovative *D-Kay Cleaner* products in the wood furniture industry, so that they can be utilized by the wider community. *D-Kay Cleaner* will be an easy and acceptable medium for the public in carrying out respiratory prevention. In the *D-Kay Cleaner* testing process, tool manufacturing was carried out starting from oil bottle experiments, welding boxes, and used. box. The innovation of the *D-Kay Cleaner* tool uses the principle of a vacuum cleaner. But the difference is that the tools and materials for making it are more economical, and use a layer of mask as a filter. Therefore, it is necessary to develop d-kay cleaners on the scale of wood furniture workers to reduce the amount of wood dust produced, and can reduce the negative impact of respiratory disorders.

Keywords— *D-Kay Cleaner*, respiratory disorders, wooden furniture

INTRODUCTION

The Sustainable Development Goals (SDGs) set in New York on September 25 2015 contain 17 goals and 169 development targets which are expected to address the lagging development of countries throughout the world, both in developed and developing countries. One of the 17 goals of the 9th Sustainable Development Goals (SDGs) is industry, innovation and infrastructure (Musri, 2020). According to WHO data in 2010, it is estimated that 2 million people throughout the world are routinely exposed to wood dust while working (Indriyani et al., 2017). And 10% - 13% of the wood processing process will be in the form of wood dust (Nafisa et al., 2016). WHO data shows that 5% of work-related deaths are caused by lung disease caused by exposure to dust particles in the workplace.

A major problem with the worker's health is respiratory disorders, which doubtless have to do with the air quality at the wooden furniture. Wood dust is a dangerous chemical. Exposure to wood dust has negative impacts on human health such as dermatitis and allergic respiratory reactions. Types of activities that tend to result in high exposure to wood dust over a long period of

time are machine operation, sanding, furniture before planting, carpentry work, wood processing operations, dust from dust-in-bag systems, and household work. (Ma'rufi, 2017)

According to the ILO, 21% of 100% of occupational deaths are caused by respiratory diseases (Medyati et al., 2023). According to WHO, dust measuring 0.1-5 or 10 microns is very dangerous for the respiratory tract and generally the type of dust that can enter and stick to the respiratory tract is PM10. PM 10 is a solid and liquid particulate matter floating in air with a media value of 10 microns aerial diameter size. The Ministry of Health indicated that the size of harmful dust ranged from 0.1 to 10 microns. (Primasanti & Herawati, 2022)

Occupational respiratory diseases, according to the results of The Surveillance of Work Related and Occupational Respiratory Disease (SWORD) research conducted in England, found 3300 new cases of work-related lung diseases (Hutama, 2014). Based on the West Sumatra Industry and Trade Service (2016), the number of industries in West Sumatra is 2149 and according to data from the Padang City Manpower and Industry Service, the wood processing industry is 138 industries. The Padang City Department of Manpower and Industry recorded 138 industries processing wood into furniture with the largest number of industries in Koto Tangah District (29 industries) and in Kuranji District (14 industries).

According to the Health Office, data on respiratory diseases in the city of Padang always ranks at the top with the number of cases in 2018 being 53,218 cases and in 2019 being 84,655 cases. The research Intention is to find out the use of the product and the effectiveness of the innovative D-Kay Cleaner product in the wooden furniture industry in the city of Padang.

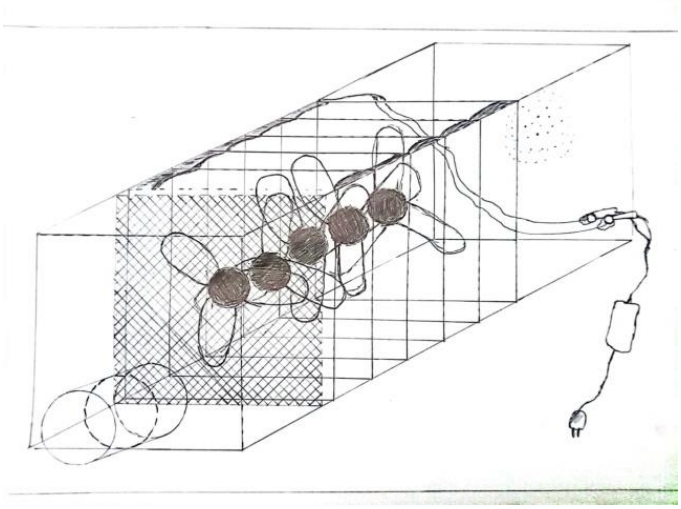
And the innovation is needed to protect workers and the community in preventing respiratory problems caused by wood dust in the furniture industry so that it can be utilized by the wider community. This can also reduce the danger of wood dust sticking to furniture industry workers and the public.

From this, it is necessary to treat wood dust because it can disrupt the respiratory health of wooden furniture workers and the surrounding community. The processing of furniture industry waste such as wood dust is usually not given much attention by workers and the community itself. Based on the description above, encourage researchers to conduct research with the title Use of D-Kay Cleaner in the Wooden Furniture Industry in Padang City in 2023.

METHODS

The name of the innovative product created is D-Kay Cleaner which is made using simple and easily available tools and materials. The implementation of the D-Kay Cleaner is that it is used in the suction process. The process of suctioning stuck wood dust using the D-Kay Cleaner tool can be used on a scale for wood furniture workers. The tools needed to make this D-Kay Cleaner tool include markers, glue gun, cutter, pliers, scissors, wire mesh, pipe ruler, printer adapter cable, 4

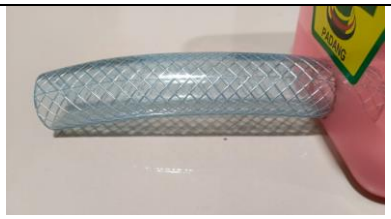
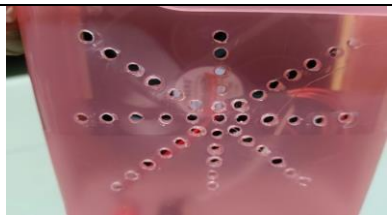
mm bolt, screwdriver, bolt nut, 12 V CPU fan, plug connector, used box, and binding terminal plug, solder. And the materials needed are duct tape, hot glue, mask layer, cables, chopsticks, and soldering tin.



Picture 1 The product design

The steps to make D-Kay Cleaner are make a container from wire mesh to act as a filter for the mask layer which can be replaced like a slot, then make inlet and outlet holes and a hole for the binding terminal plug and install it. Then assemble a series of 5 CPU fans and connect the CPU fan cable with a cable to be connected to the binding terminal plug, After that, connect the printer adapter cable and plug connector, and connect it to the binding terminal plug then plug it into an electric current. D-kay cleaner is ready to use.

Table 1 The Parts of Tool D-Kay Cleaner

No	Parts of Tool	
1.		
2.		

No	Parts of Tool	
3.		

RESULTS AND DISCUSSIONS

In the D-Kay Cleaner testing process, to assess the wood dust suction indicators for wooden furniture workers and test the effectiveness of the D-Kay Cleaner, it was carried out by making tools starting from experiments with oil bottles, welding boxes, and used boxes. The results obtained are a reduction in the level of air pollution from wood dust that sticks to the wooden furniture industry. Then, reduce the impact of respiratory problems on workers during processing of raw materials. The D-Kay Cleaner tool innovation uses the vacuum cleaner principle. However, the difference is that the tools and materials for making it are more economical, as well as using a mask layer as a filter.

Potential sources of pollutants that produce PM10 dust come from wood processing production activities into furniture itself. Activities that have the potential to produce dust include the gardening process, and sanding wood.

Table 2 Three Experiments the Innovation of D-Kay Cleaner

No	Experiment	Information
1.		For the first experiment it was made of a less sturdy plastic container and the process was by connecting dynamo wires, batteries, and switches. But for the filter is made of a layer of mask. And the manufacture of the fan is made from old cans.
2.		In the second experiment, using a used welding box container that is quite sturdy and the fan is from a CPU fan measuring 8 x 8 cm. For the process by connecting cables to the CPU fan, battery, and switches.. But for the filter using a very thin cloth

No	Experiment	Information
3.		Then in the third experiment, the container used from a sturdy used box and a CPU fan measuring 12 x 12 cm. And for the process by connecting the CPU fan and charger adapter cable with a terminal binding plug and plug connector connector, and prepare a container for a filter made of a layer of masks in the form of slots. So its use is by plugging the cable into the electric current.

The innovation of the D-Kay Cleaner tool uses the principle of a vacuum cleaner. But the difference from the tools and materials for making is more economical than the price of a vacuum clener. And prepare a container for a filter made of a layer of masks in the form of slots so that air quality can be tested in the place of furniture industry workers. While vacuum cleaners only use HEPA filters as materials commonly used to filter dust in vacuum cleaners.

This D-Kay Cleaner tool is very useful on the scale of wood furniture workers, because it can prevent workers from respiratory problems and reduce air pollution around the wooden furniture workplace so that wood dust that was originally disturbing can be resolved. It can prevent workers from a great risk for the accumulation of wood dust in the respiratory tract. Of course, the problem of air pollution and respiratory problems using D-Kay Cleaner will be the solution.

CONCLUSIONS

Based on the analysis, new innovations are needed in dealing with air pollution, reducing respiratory problems in wooden furniture workers which originate from wood dust that sticks to the D-Kay Cleaner tool. D-Kay Cleaner will be an easy and acceptable medium for the public in the process of preventing respiratory problems caused by wood dust. D-Kay Cleaner will be patented to provide benefits to society. And even tools in the manufacture of a d-kaycleaner are readily available to the public. The d-kay cleaner is patented to give public benefits. Therefore, the need for d-kay cleaner development on the scale of wooden furniture workers to reduce the amount of wood dust produced, and it can reduce the negative effects on respiratory disorders that are caused on human health.

As for some Suggestions for this product, it needs a partnership in a d-kay cleaner with a mechanic for perfection of tools, a need for socialization of respiratory prevention on a furniture worker's scale, a need for d-kay cleaner equipment to be a log dust container. Then the spoon-speed sensor that hopefully could be redeveloped as the product is made economically and from items that are readily available.

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