



 **9th INDES 2020**
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The 9th International Innovation, Invention
& Design Competition
INDES2020

17th May – 10th October 2020

GABION STYLED WATER FILTRATION CAGE

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ABSTRACT

For indigenous people in Bekok, Johor they rely on the waterfall as their main water supply. During the rainy season, however, the water quality deteriorated and it became unsuitable for human consumption and usage. Therefore, the most effective solution is by introducing the gabion styled water filtration cage. The filter was installed at the Takah Pengkoi waterfall water intake. The objective of the product is to reduce the turbidity of water. The cage has two layers of filtration. The first layer consists of large gravels and it helps to prevent large trashes from entering the cage. The second filter is equipped with sand and small gravels. It serves to filter smaller particles from entering the cage such as sand, silts, and other sediment loads. After testing both upstream and downstream of the filter cage, the result of the water quality index (WQI) increased by 2.75%. It indicates that the filter managed to reduce the turbidity thus improving the quality of water. This benefited almost 500 of indigenous peoples in this area where they can enjoy cleaner and higher quality of water. Subsequently, this product can be used in other rural areas that encounter a similar problem.

Keywords: indigenous peoples, water quality, filtration cage, water quality index, Bekok

1. INTRODUCTION

Indigenous people in Bekok rely on the waterfall for many purposes and one of the most important ones is water resources for water supply in their community. Populated by nearly 500 people, Bekok waterfall serves as the main water supply in which the earth dam was constructed far upstream by the locals to act as a manmade reservoir. The water quality at this intake is generally good but without proper water filtration, the quality gets worsen especially after a rainfall event. The supplied water turned to murky and cloudy because of the sudden increase of suspended solids matter. This, in turn, leads to health problems, if consumed, due to the presence of higher numbers of bacteria and viruses. To rectify this, a simple and robust water filtration system called Gabion Styled Filtration Cage is designed primarily to provide a filtration treatment for the indigenous peoples populated in a remote area.

2. METHODOLOGY

The prototype filter system was created to solve the problem of water quality in Kg. Kudong, Bekok, Johor. The filtration system comprises two cages where the larger cage acts as a primary filtration to remove larger suspended particles such as leaves, dead branches, and gravel. The subsequent filtration process occurred in the smaller cage which is located inside the larger cage. The filter media for the smaller cage is made up of fine sand retained at a sieve size of 1.18 mm which capable to filter out fine particles such as silt and sand. The filtration cage requires less maintenance as the steel mesh can be cleaned easily with minimum

men power. The size of the cage is 3 m long and 1 meter wide and it is made from stainless steel to prevent corrosion. The cage was installed at the water intake of Takah Pengkoi Waterfall located in Kg. Kudong, Bekok, Johor. Several water parameters were examined to analyze the effectiveness of the cage such as turbidity, BOD, COD, SS, color, and AN. These parameters are important in determining the Water Quality Index (WQI) (Ramakrishnaiah, 2009; Loukas, 2010; Bartram & Balance, 1996).

3. RESULT AND DISCUSSION

The effectiveness of the cage was measured based on its capability in optimizing the parameter of water, especially for the turbidity. The turbidity of water was decreased by 26 % after passing through this filtration cage thus proved that this prototype was effective in decreasing the value of turbidity. However, other parameters show slight improvements such as BOD, AN, and pH. As the Water Quality Index (WQI) considers all these parameters, therefore, the value of WQI after the filtration process only increased by 2.75% compared to the condition of water before the filtration process. The comparison of each parameters were shown in Figure 1.

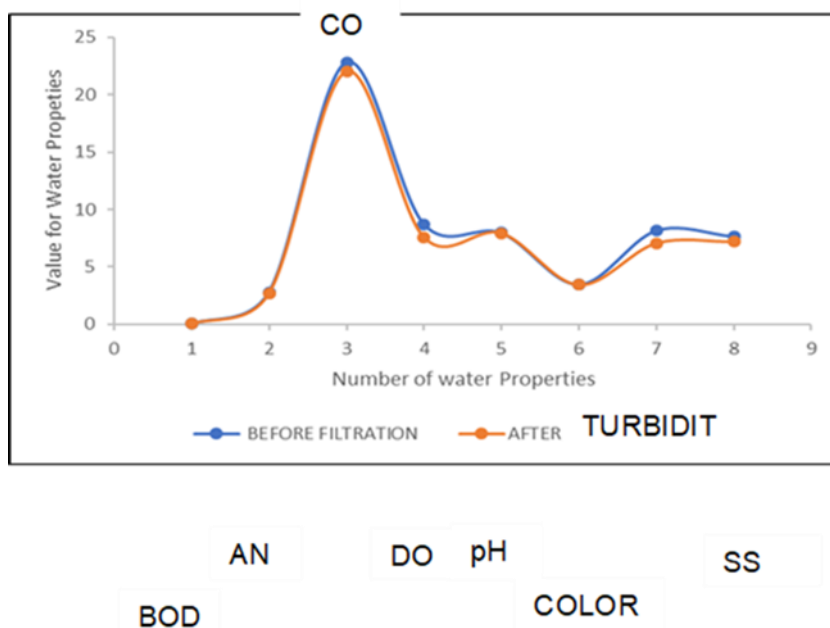


Figure 1. Comparison between each of water parameters before and after filtration process

4. CONCLUSION

As a conclusion, this prototype was effective in improving the physical properties of water, especially in turbidity. However, it still needs further treatment process to make sure that the water is fully treated and become more palatable.

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Surat kami : 700-KPK (PRP.UP.1/20/1)
Tarikh : 30 Ogos 2022

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Kelulusan daripada pihak YBhg. Profesor dalam perkara ini amat dihargai.

Sekian, terima kasih.

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