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**ABSTRACT**

# VENTILATION OF ENCLOSED AREAS IN WASTE WATER TREATMENT PLANTS TO CONTROL EMISSIONS OF GASES AND ODORS

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Areas with high levels of gas and odor emissions are often enclosed to control gases and odors release to the open environment. These enclosed areas usually require ventilation to maintain the gas concentration levels to an acceptable value. This scenario of enclosed areas with high levels of gas and odor emissions are common at the first stage in waste water treatment plants (WWTPs).
This work analyses a WWTP that processes domestic and industrial sewage in Argentina. This WWTP has a first stage process where the incoming sewage is transported from a lower to a higher height using a system of several Archimedes screws. The characteristic flow sewage field velocity is high at the first stage. Therefore, the emission of hydrogen sulfide ($H_2S$) and odors are likely to be high. Concentration levels of $H_2S$ were measured at different settings of operation in the WWTP. The concentration measurements confirmed the high levels of $H_2S$ in the air and the need of enclosing the areas and provide a system of ventilation to alleviate the problem.
The purpose of the following study is to optimize the design of the ventilation system to mitigate the high levels of $H_2S$ concentration in the enclosed areas in order to minimize the corrosive impact of the $H_2S$ on the building structure and machinery.
The final design encompasses the existing buildings and areas where people work in the WWTP. The gaseous emissions in the system were characterized quantitatively in order to propose a ventilation system. Afterward, the system was modeled with Computational Fluid Dynamics (CFD) for different scenarios of operation of the WWTP to determine the efficiency of the design. The CFD model included the full set of buildings and the Archimedes screws of the WWTP.
It was observed that extraction of contaminated air directly from the main sources was not the best approach to lower the levels of $H_2S$ concentration. This pattern was noted in most of the scenarios under consideration. The CFD model helped to identify areas where the ventilation was less efficient, and it was used to guide wall protection.

Indicar la preferencia de tipo de presentación

☐ **Comunicación oral**

Indicar la sesión en la que los autores proponen presentar su trabajo:

☐ **Sesión III. Cálculo del impacto del olor. Modelos de dispersión de olores.**