Experimental insight on the role of flow velocity and separation distance on smoldering combustion

Rakshantha M, Yeleti Bunny Venkat and Vinayak Malhotra
SRM Institute of Science and Technology, India

The smoldering processes that are occurring in nature has accompanied by the presence of air which affects the regression rates. Smoldering accompanied by air is the leading cause of deaths in residential fires and a source of safety concerns in space and commercial flights. Smoldering wildfires destroy large amounts of biomass and cause great damage to the soil, contributing significantly to atmospheric pollutant and greenhouse gas emissions. One aspect which has not been addressed in the field of smoldering combustion is the way the smoldering regression rates are affected by the presence of air at a certain velocity. This paper attempts to synthesize a comprehensive view of smoldering combustion accompanied by air at certain velocities. The source of air in this study is placed at selected distances from the fuel. This separation distance between the source of air and the fuel, the velocity of the flow and the surface orientation of the fuel are the important parameters investigated in this work. As the velocity increases, the regression rate is expected to rise. The results are noted with the help of an experimental setup. Incense sticks were used as fuel and uniform horizontal ignition across the width was ensured. The effect of the air velocities on the fuel is examined in terms of variation in regression rates of fuel. The regression rate is investigated in normal gravity environment of 21% oxygen concentration. This study will be helpful in determining the time required to control the smoldering combustion process which is the reason behind most of the fires including the on flight fires in aircrafts. At present, this experimental study is carried out to obtain the effect of flow velocity on smoldering regression rates.

Biography
Rakshantha M is pursuing Aerospace Engineering at SRM Institute of Science and Technology. She has done internship with an aerospace industry and has innate technical understanding, and has valuable experience with 3D modelling through CAD/CAM/CFD training. She has worked on a water rocket project and has succeeded in launching it. Yeleti Bunny Venkat is an undergraduate student in Aerospace engineering from SRM Institute of Science and Technology, India. He is in his third year of study.

Rakshanthamohan@icloud.com
bunnyyeleti@yahoo.com

Notes: