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Influence of Different Materials on the Mechanical Aspects in the Design of Cyclone Gasifier

Abstract

Cyclone gasifier is used as the energy conversion system for the biomass. The design and material selection for the cyclone gasifier is important, which affect the strength of the gasifier during the operation. This research aims to investigate the effect of the various materials to the mechanical aspects (i.e., stress, strain and displacement) of the cyclone gasifier. The mechanical aspects analysis is carried out by using the finite element (FE) based software. The stress, strain and displacement of the cyclone gasifier's structure was analyzed for various stainless steel materials (i.e., ferritic (FSS), AISI 316, 1023 CSS, 201 ASS and AISI 4130). The finite element analysis revealed the use of 201 ASS experienced highest stress (221 MPa). Lowest strain and displacement were found on 201 ASS and 1023 CSS, respectively. These research findings are expected to be used as the reference for the engineer in the material selection process for the design and fabrication of cyclone gasifier.