

ABSTRACT

The boiler at a palm oil factory belonged to PT Sawit Sumbermas Sarana Tbk serves as a steam. The steam produced by the boiler is later used as a turbine torque in order to generate electricity. The electricity generated by the turbine is the utilized for domestic needs and the processes in the factory. In addition to turbines, the steam yielded by the boiler is also used to boil the oil palm fruits and heats the processing result of palm oil (crude palm oil and kernel) that it will neither rot nor turn moldy. The type of Boiler possessed by PT Sawit Sumbermas Sarana Tbk is water tube boiler having the capacity of producing steam by 27,200 kg/hr. The boiler was made in 2005 by Vickers Hoskin (M) SDN. BHD. In its operation, the boiler has several problems that may hamper the machine's work performance, one of which is the crust. The crust is a solid layer originating from dissolved solids, bonded strongly between those minerals themselves, and between the metal surfaces. The formation of the crust occurs due to Ca^{2+} , Mg^{2+} , and the effects of evaporation gas. The crust forming spots in boiler mostly take place in the header. Factors affecting the crust formation are water and fuel. In the present research, the crust takes place on the wall surface of furnace. The testing process undertaken to find out the elements contained in the crust employed Scanning Electron Microscope (SEM) testing method in order to determine the structure of the crust and Energy Dispersive Spectroscopy (EDX) to find out the element content found in the crust. The testing with these two methods was conducted by cutting the parts of the crust with a size of 10 mm x 10 mm. The comparison was fireproof stone in which the crust stuck. Based on the testing results, the element content in the crust formed on the surface of furnace wall is comprised of 58,46 % oxygen (O), 34,44 % silicon (Si), 10,46 % carbon (C), 3,70 % calcium (Ca), 3,27 % kalium (K), 2,03 % phosphorus (P), 1,82 % magnesium (Mg), 1,39 % iron (Fe), and the last is 1,37 % aluminum (Al).