

Developing Alternative Recovery Technology of Waste Heat in Automobile Factory

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Abstract : Pre-treatment of automobile paint-shop procedures are the preparation of warm water rinsing tank, hot water rinsing tank, degreasing tank, phosphate tank. The conventional boiler steam fuel is natural gas, producing steam to supply the heat exchange of each tank sink. In this study, the high-frequency soldering economizer is developed for recovering waste heat in the automotive paint-shop (RTO, Regenerative Thermal Oxidation). The heat recovery rate of the new economizer is 20% to 30% higher than the conventional embedded heat pipe. The adaptive control system responded to both RTO furnace exhaust gas and heat demands. In order to maintain the temperature range of the tanks, pre-treatment tanks are directly heated by waste heat recovery device (gas-to-water heat exchanger) through the hot water cycle of heat transfer. The performance of developed waste heat recovery system shows the annual recovery achieved to 1,226,411,483 Kcal of heat (137.8 thousand cubic meters of natural gas). Boiler can reduce fuel consumption by 20 to 30 percent compared to without waste heat recovery. In order to alleviate environmental impacts, the temperature at the end of the flue is further reduced from 160 to 110°C. The innovative waste heat recovery is helpful to energy savings and sustainable environment.

Keywords : waste heat recovery system, sustainability, RTO (Regenerative Thermal Oxidation), economizer, automotive industry

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