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Thermodynamic Cycle Using Cyclopentane for Waste Heat Recovery Power Generation from Clinker Cooler Exhaust Flue Gas

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Abstract : Waste heat recovery from Pre Heater exhaust gases and Clinker cooler vent gases is now common place in Cement Industry. Most common practice is to use Steam Rankine cycle for heat to power conversion. In this process, waste heat from the flue gas is recovered through a Heat Recovery steam generator where steam is generated and fed to a conventional Steam turbine generator. However steam Rankine cycle tends to have lesser efficiency for smaller power plants with less than 5MW capacity and where the steam temperature at the inlet of the turbine is less than 350 deg C. further a steam Rankine cycle needs treated water and maintenance intensive. These problems can be overcome by using Thermodynamic cycle using Cyclopentane vapour in place of steam. This innovative cycle is best suited for Heat recovery in cement plants and results in best possible heat to power conversion efficiency. This paper discusses about Heat Recovery Power generation using innovative thermal cycle which uses Cyclopentane vapour in place of water- steam. And how this technology has been adopted for a Clinker cooler hot gas from mid-tap.

Keywords : clinker cooler, energy efficiency, organic rankine cycle, waste heat recovery
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