Supoch Sudkornrayuth 2008: Analysis on the Operations of a Combined Cycle of an R-123 Heat Pump and a LiBr-H_2O Absorption Refrigeration. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Mr. Tanet Aroonsrisopon, Ph.D.
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This thesis studied on the simulation of a combined cycle for a heat pump and an absorption chiller. The cycle started by putting in an electrical power to drive a compressor in an R-123 heat pump cycle. After that a hot coil would release heat output in which only some of it would be transferred to a generator in the LiBr-H_2O absorption chiller with a 12,000 Btu/hr absorption chiller. The remaining heat output was used for making hot water. Moreover, the heat output that release from the absorber and the condenser of the absorption chiller, would then be transferred to the cold coil of heat pump for maximizing the benefit from total energy input.

In this research, EES program had been used to analyse the maximum coefficient of performance of combined cycle. From the simulation results, the temperatures at the hot coil and cold coil should be 194 $^{\circ}$F and 86 $^{\circ}$F, respectively. Whereas temperatures at the generator, the condenser, the evaporator and the absorber would be 176 $^{\circ}$F, 95 $^{\circ}$F, 55 $^{\circ}$F and 95 $^{\circ}$F, respectively. This resulted in the COP values for the absorption chiller at 0.834, the heat pump at 4.76, the cooling at 1.71, the heating at 2.71 and the combined cycle at 4.42. The key advantage of this combined cycle is that the electricity from the compressor alone could generate both cooling and heating within one system. This result in heat and power saving. Thus, the concept is good in financial and environmental stand point of view.

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