ENERGY INTEGRATION OF PULP AND PAPER MILL BASED ON THE NEW PINCH TECHNOLOGY AND DYNAMIC SIMULATION FOR SAVING ENERGY

B.Farhanieh [1], A.Mozafari[2] and M.Fani[3]
[1]school of Mechanical Engineering, Sharif University of Technology,
P.O.Box 11365-9567, Tehran,Iran
Email: bifa@sharif.edu
[2]school of Mechanical Engineering, Sharif University of Technology,
P.O.Box 11365-9567, Tehran,Iran
Email: mozafari@sharif.edu
[3] school of Mechanical Engineering, Sharif University of Technology,
P.O.Box 11365-9567, Tehran,Iran
Email: fani@mehr.sharif.edu

ABSTRACT

Thermal pinch or heat exchange network (HEN) analysis is a well-known process energy analysis technique which has been applied at energy systems. Berntsson and Stromberg (1996) developed new Composite Curves for use in a targeting and options scanning in retrofitting. The aim of this development has been to create Pinch Technology based methods, with which the general problems with process integration in Retrofit can be treated. New Pinch Technology based curves for retrofitting of heat exchanger networks have provided a graphical representation of existing HEN, including heaters and utility levels, from which semi-quantitative conclusions can be drawn. The methodology involved a typical process study combined with process simulation, conventional pinch analysis and modified design heuristics. Then two programs were developed, which if implemented would attain the simultaneous mill objectives of reduced steam usage during winter operation and reduced effluent temperature during summer operation.

The manufacture of pulp and paper is highly energy intensive .The industry is also under increasing pressure to reduce its impact on the environment. The object of this paper has therefore been to study the possibilities to save energy in Mazandarans pulp and paper mill an Iranian mill with a capacity of 600 tons/day. New Pinch technology has been used for integrating the evaporation plant with the rest of the process.

In this paper, two different models, new pinch technology and a dynamic process simulation are utilized and coordinated to find solutions in the analyzed energy system Pulp and paper processes, involve a great deal of heat transfer by mixing. Classical thermal pinch analysis is not obvious to apply for stream mixing ;there are some assumptions for drawing a table for process and utility streams including their heat load, initial and target temperatures and CP values. For Dynamic simulation CADSIM Plus Code has been used .CADSIM Plus is a process simulation software which can create a dynamic model for the plant, so it enables user to see at a glance how any change will affect the rest of the process. This paper has investigated the interaction of these two methodologies.