

## ABSTRACT

An analysis, with experimental results, for the transient response of a packed bed thermal storage unit is presented. The analysis is in one dimension and considers the influence of both axial and radial thermal dispersion for arbitrary time and variations in the inlet fluid temperature.

The main motivation for these experiments was to investigate the effect of bed size, bed material, and the Reynold number ranging from (50-500), on the dynamic response to an input step, of fixed packed bed system.

The process has been identified by two different methods, and suggested to give a first order behavior with time delay.

Two different methods were used to solve the dynamic models of the packed bed (partial differential equations), the first method was based upon Laplace transformation solution, while the second method was based upon a numerical solution, for estimating the axial and radial thermal dispersion. A clear comparison is achieved between the experimental and the theoretical data, which give a minimum value of variance.