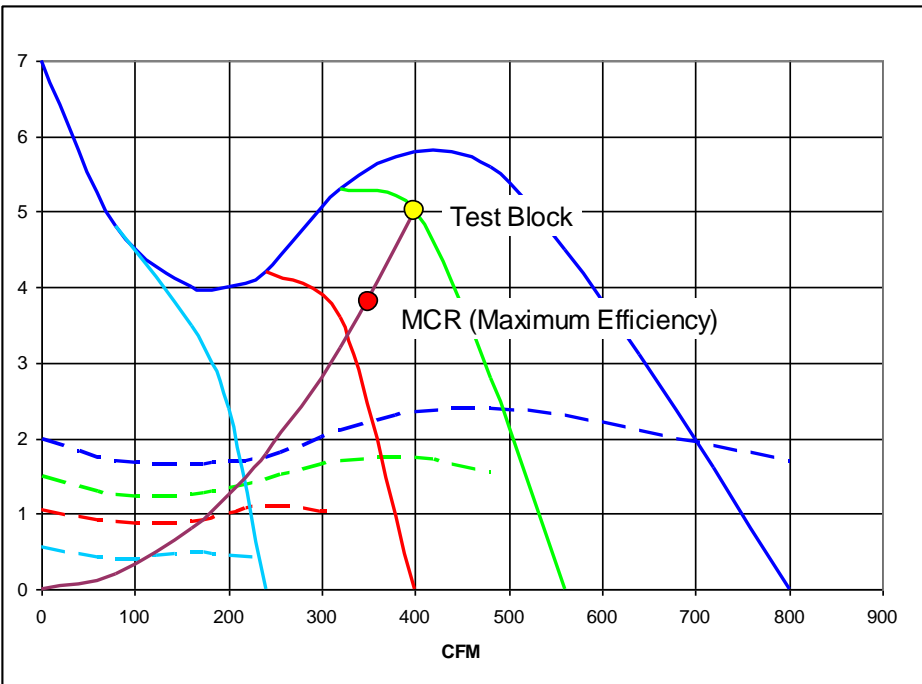


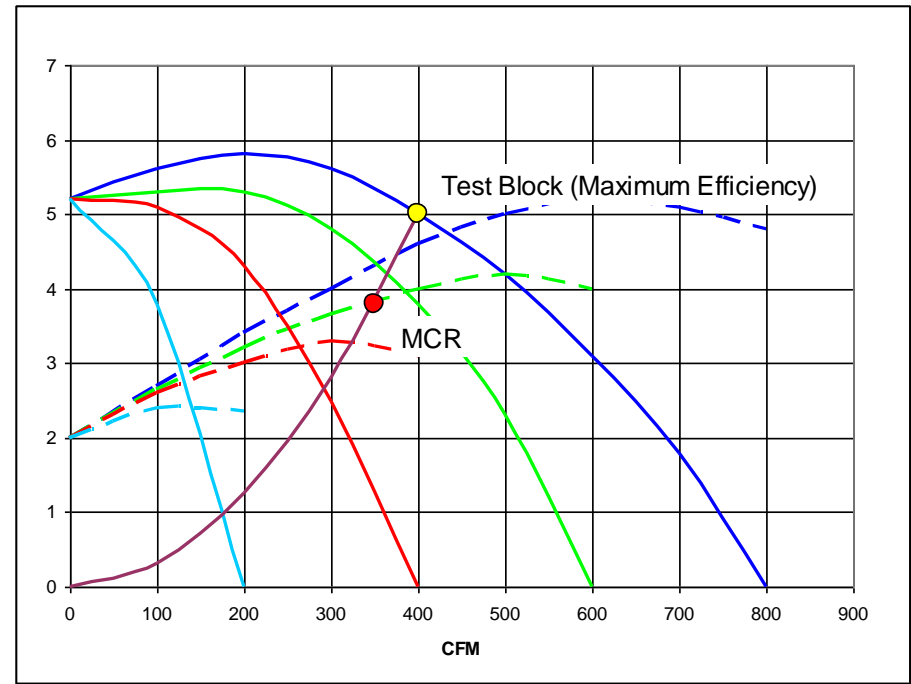
Expected Load Model for the Unit & Control Method

- There is a difference between where the area of peak efficiency occurs for Axial fans and Centrifugal fans,
- Peak Efficiency for Axial fans occurs with the blades in a partially closed position, meaning the fan can be selected to have it's maximum efficiency at MCR condition, while still being able to achieve TB condition at a somewhat lower efficiency
- Peak Efficiency for a centrifugal fan occurs with Fan controls in the open position at design speed, meaning the maximum efficiency for a centrifugal fan occurs at TB condition if using VIV's or inlet dampers.

Axial Fan with Blade Pitch



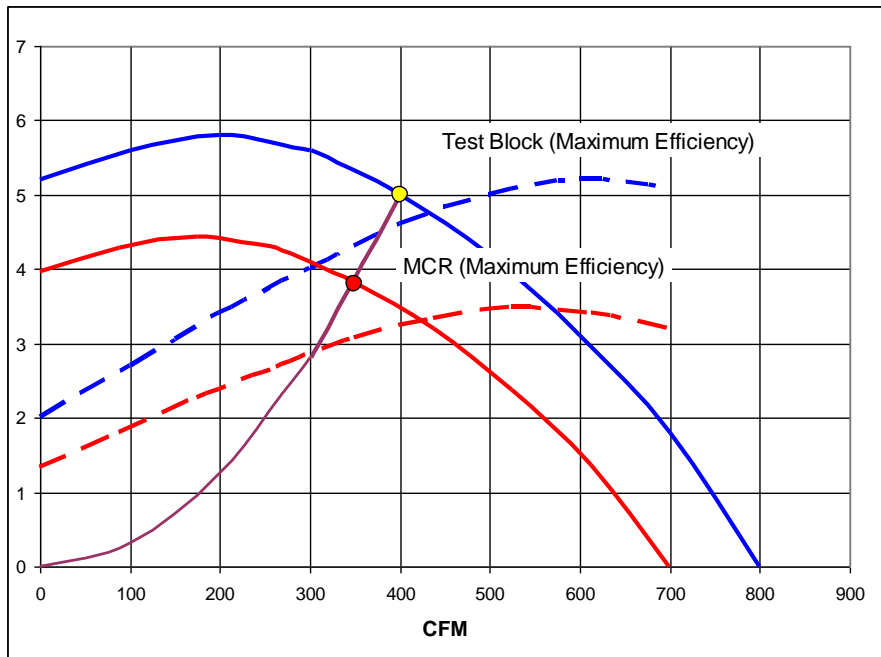
Centrifugal Fan with VIV's



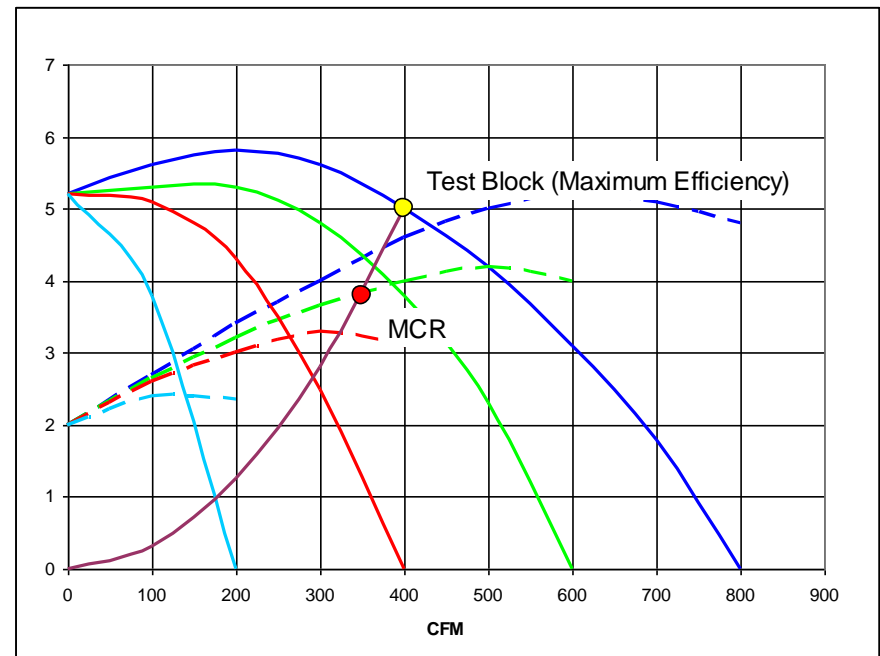
Expected Load Model for the Unit & Control Method

- If variable speed is used to control the fan, the fan efficiency can be maximized at all load points, for applications on a parabolic system

Centrifugal Fan with Variable Speed



Centrifugal Fan with VIV's



Expected Load Model for the Unit & Control Method

- The various methods of controlling the output of a fan result in varying efficiency at different load points, as well as different first cost and maintenance requirements.
- Controls with the lowest part load efficiency also tend to have the lowest cost, and vice versa.
- Base loaded Units , whose output does not vary significantly over time, will generally favor Fans with lower cost controls, such as single speed centrifugal fans with variable inlet vanes
- Units that have regular wide load swings over time will generally favor fan controls that offer the best efficiency at part load, such as variable pitch axial fans, or variable speed centrifugal fans.

Efficiency Comparison

