

**An Investigation on 4 units of Isomer Column Cooler Fin Fan High Vibration Problem at Buthanol Plant, Optimal Chemicals, Paka, 2007**

The IC Cooler fan high vibration problems were investigated. Based from the Modal analysis and Finite element analysis on the IC Cooler fan, the main structural frames had generated unexpected lower natural frequencies and mode shapes in the operating region of the IC Cooler fan. In conclusion, these problems are classified as a structural dynamic problem.

ODS analysis revealed the movements of the IC Cooler fan mainly due to the flexible structure. Currently, the vibration level recorded at DCS on the structure ranging from 14mm/sec to 20mm/sec. Although, observation of the IC Cooler fan operation shape showed relatively large deflection on the motor support; but it was the secondary effect caused by the structural frame movement. These secondary effects of the fan motor support movement that had caused usually caused the alarm to trigger.

From Modal analysis, it indicates a number of low and close natural frequencies to the excitation frequencies namely; the fan shaft speed and blade passing speed. Modeling the IC Fan Cooler fan support using Finite Element Analysis had successfully revealed all the modes of vibration and established a correlation with the Modal analysis results.

From the above analyses, structural dynamic modifications were performed by introducing three additional C-channels, I-beams and plates to shift the natural frequencies away from the said excitation frequencies. Performing these modifications had managed to control and shift the natural frequencies away.

Hence, it is strongly recommended that the structural frame beams to be rectified / strengthen by the additional C-channel and I-beams. The recommended C-channels for stiffening are calculated as per the structural dynamic modification using FEA.

Original	SDM
5.5Hz	8.3Hz
18.7Hz	19.6HZ
22.6Hz	>36.0Hz
30.7Hz	33.2Hz

