

## CHAPTER VI



### SUGGESTION FOR FURTHER WORK

In order to pursue the study of engine characteristics further, the following suggestions should be of some value.

(1) The main problem encountered in the study is directly concerned with instrumentation. The octave filter set, a type of spectrum analyzers, employed here has very limiting capability to identify frequency constituents. It is a proportional type filter having bandwidth 71% of centre frequency thus it cannot give information at any particular frequency but rather a collective information of all frequencies in the bandwidth. The remedy to this deficiency is to acquire a constant bandwidth filter having narrow band of 2 Hz. It would be useful not only for vibration problem but also noise problem too.

(2) The results of fourth mode vibration indicate large discrepancies between experiment and theoretical values probably due to the effect of vibratory system. Thus for further work of this nature, it is suggested that the numerical values of damping and spring stiffness should be determined for the system.

(3) The results of engine performance characteristic indicate wide variations from manufacturer's published data, hence the ancillary apparatus for engine testing such as air inlet and exhaust outlet should be redesigned for the internal combustion engine laboratory. The new system should conform to an acceptable standard such as JIS, DIN or ASTM.

(4) The author made a conclusion from experimental evidence that larger gas force is responsible for higher level of vibration as the load increases. It can be proved by providing an external source of engine driving such as using a variable speed

motor which can turn the engine at any speeds with engine not firing. It is also necessary to make another arrangement for measuring pressure-crank diagram when engine is firing. The instruments would include a few accelerometers with multi-channel recorder to record acceleration at different points such that vibromotive moment can be calculated. With this set up, the following quantities can be obtained namely inertia force, inertia moment, gas force and gas torque. These will reveal a lot of information regarding engine vibration.

(5) In view of the fact that if the problem of vibration cannot be solved at the source, the next best thing is to isolate the harmful or nuisance vibration from adjoining parts, hence, vibration isolators that produced in Thailand should be an interesting subject to study because technical information from local manufacturers are hardly available.