

## Control of Combustion Oscillations in Premixed Combustor —An Experimental Investigation of Combustion Oscillations at Operation Conditions—

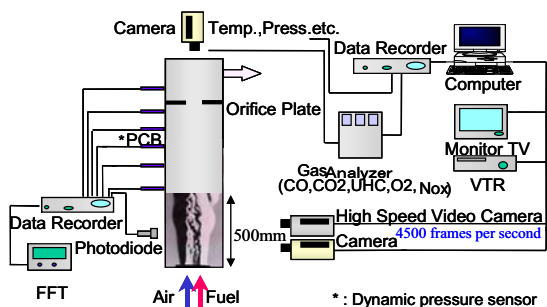
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### 1. Introduction

Recent regulation on NOx emission is promoting the use of lean premix combustion for gas turbines. But, occasionally the premix operational experience has been accompanied by combustion oscillation. This paper describes the characteristics of combustion oscillations which has been derived from simulating a can type gas turbine combustor.

### 2. Experiments

Figure 1 shows system for the measurement of combustion oscillation. Test combustor consists of a diffusion fuel nozzle at the center and concentric single swirler in which air(or air-fuel premixed gas) is supplied. High frequency response pressure transducers(PCB) are mounted at the combustion tube wall. To visualize the combustion flames, quartz glass tube is placed instead of metal tube. High speed video camera and photo diode are used to analyzed the relations between flame behaviors and pressure fluctuations. Tests are performed under atmospheric pressure with using natural gas fuel.



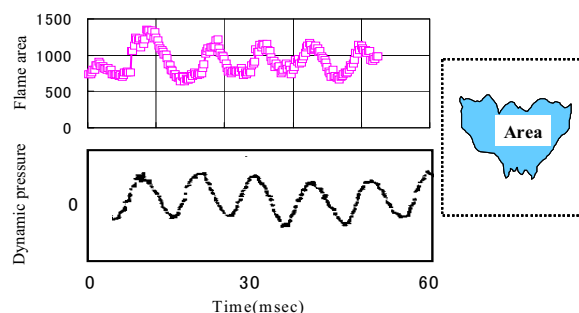
**Fig.1 System for the measurement of combustion oscillation**

### 3. Results and Conclusions

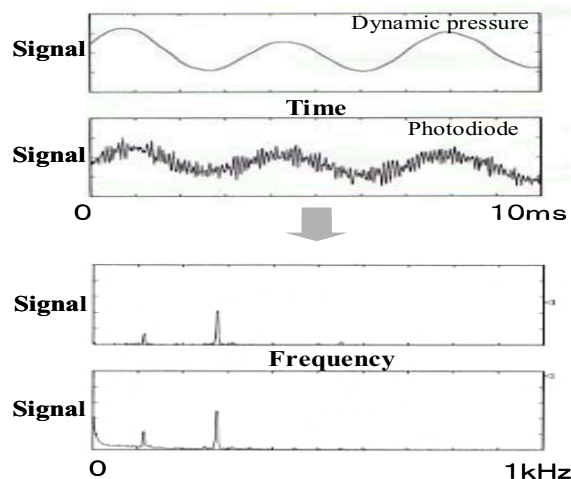
Dynamic pressures become strong with premixed fuel ratio and combustion temperature.

Figure 2 shows the relations between dynamic pressure fluctuations and flame behaviors. The flame moves periodically with the dynamic pressure, and the amplitude of the flame fluctuation is proportional to that of the dynamic pressure.

Figure 3 shows the signals of the photodiode and the dynamic pressures. The intensities of flame light and the dynamic pressure fluctuate with the same phase difference. And, the dominant frequencies are the same (270Hz) for both dynamic pressure and photodiode.



**Fig.2 Relations between dynamic pressure fluctuations and flame behaviors**



**Fig.3 signals of the photodiode and the dynamic pressures**

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