

\* 1, 1, 1, 1, 2

# Development of micro fatigue tester using linear motor

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Key words : Fatigue Tester, Microstructure, Measurement, Natural Frequency, Linear motor

1.

Fig.1

3D

, bio  
가

IT,

2.2

가

40Hz

base

가

(Level mount) 6  
500N 가

Nastran

Fig.2 FE model 및 1st mode 해석결과를 나타내고, 표2는 4차모드까지 고유치 해석결과를 나타내었다.

가

가,  
가

가

가

가

가

가 가 /

[1-5].

( , , )

(a) FE model & boundary condition (b)1st mode  
Fig. 2 FE analysis

Table 1 Result of FE analysis

Mode	Natural Freq.
1st Mode	74 Hz
2nd Mode	112 Hz
3rd Mode	220 Hz
4th Mode	265 Hz

TI. DSP  
가

6

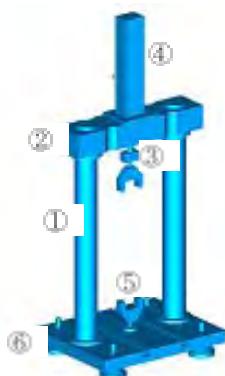
Fig.3

가

2.1

2.

(column type)



- ① Column
- ② Cross head
- ③ Load cell
- ④ Linear motor
- ⑤ Grip
- ⑥ Base

Fig. 1 3D Model of fatigue tester

table2,3

가

,가 (40Hz)

Table 2 Result of FE analysis

Analysis num.	Height of base plate	column diameter
Case 1	1	1
Case 2	1	2
Case 3	1	3
Case 4	2	1
Case 5	2	2
Case 6	2	3

Table 3 Result of FE analysis

Factor	Level		
	1	2	3
column diameter(mm)	70	60	50
Height of base plate(mm)	38	30	

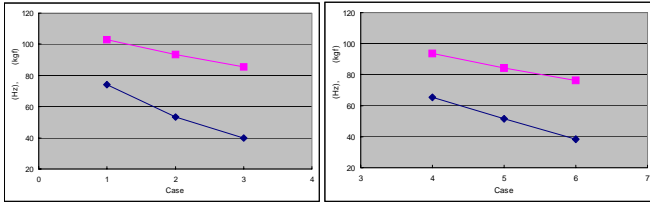


Fig. 3 Change of natural freq. for design variable

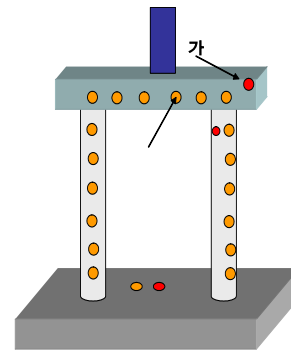


Fig. 7 Modal experiment

3.

Fig.5

TI 32bit DSP  
bumpless

Fig.6

PC



Fig. 8 Result of modal test

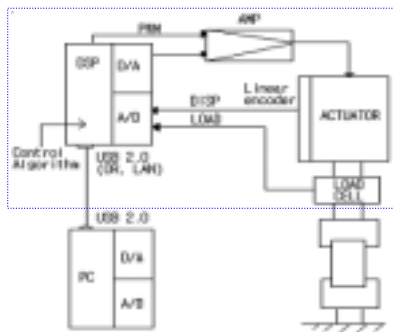


Fig. 4 Schematic diagram of control system

Table 4 Specifications of fatigue tester system

Orientation	Vertical
Displacement	100 mm
Position resolution	5 $\mu$ m
Load	Max. 500 N Min. 0.001 N
Frequency	Up to 40 Hz
Weight	110 Kg
Dimension	450×360×708 mm

5.

( , , )



Fig. 5 Controller & fatigue testing software

4.

Fig.6

PULSE , 2

Fig.7



Fig. 6 Micro fatigue tester

interferometric system

laser

가

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