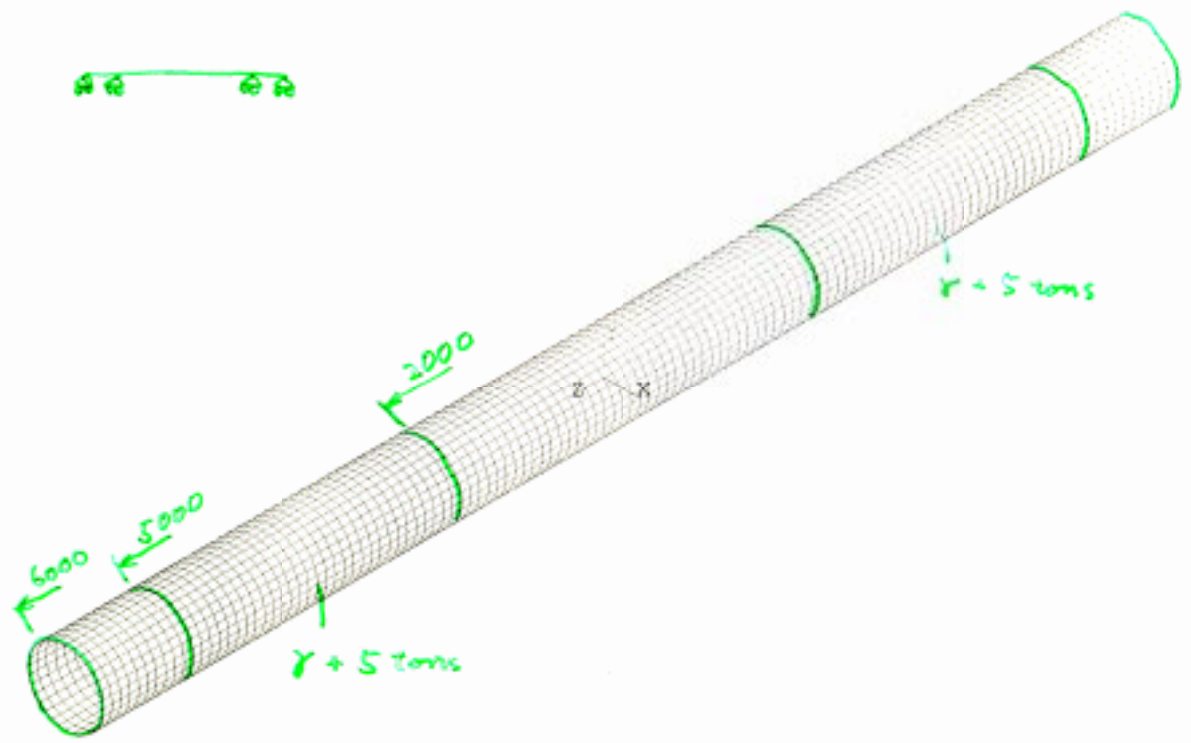


ANSYS 5.4
JUL 16 1999
12:51:07
NODAL SOLUTION
STEP=1
SUB =1
TIME=1
SEV (AVG)
PowerGraphics
EFACET=1
AVRES=Mat
DMX =.123866
SMN =.242E-03
SMX =.539627
■ .004456
■ .033954
■ .063451
■ .092949
■ .122447
■ .151944
■ .181442
■ .21094
■ .240437
■ .269935
■ .299432
■ .32893
■ .358428
■ .387925
■ .417423
■ .446921
■ .476418
■ .505916
■ .539627

変位: ~0.1mm

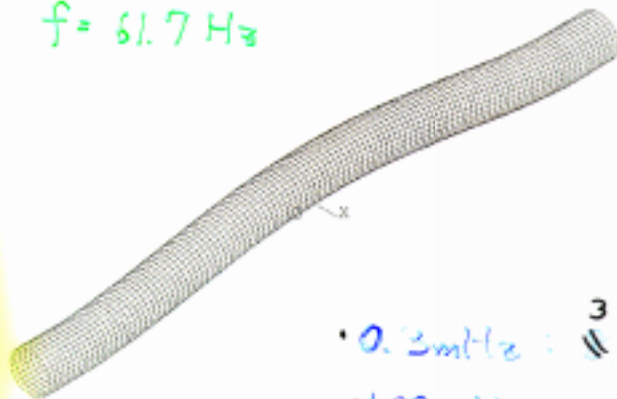
1

• Element



• 1 次.

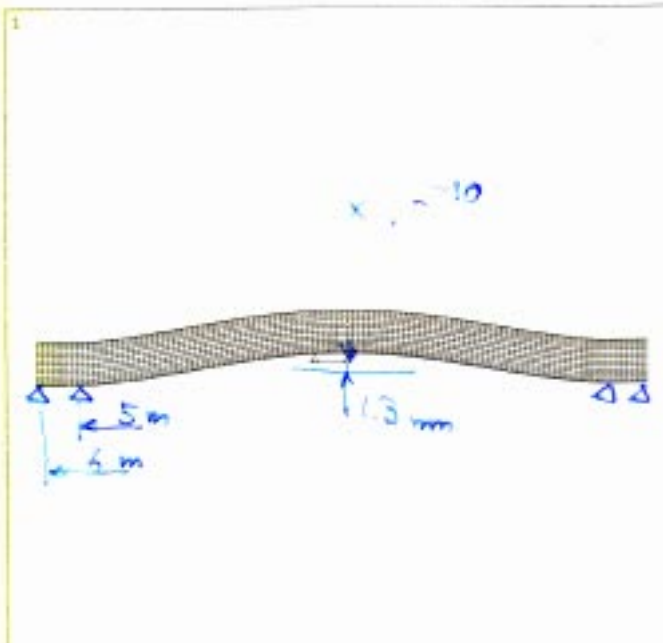
$$f = 61.7 \text{ Hz}$$



• 0.3 m/Hz : 3
• 1.00 m/Hz : 1
• 1 Hz : 10 nm

```
JUL 15 1999
21:39:06
DISPLACEMENT
STEP=1
SUB =1
FREQ=61.696
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.258

OSCA=476.856
KV =1
YV =1
ZV =1
DIST=4990
XF =-.025129
YF =-298.436
PRECISE HIDDEN
```



```
ANSYS 5.4
JUL 15 1999
21:40:03
DISPLACEMENT
STEP=1
SUB =1
FREQ=61.696
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.258

OSCA=476.856
KV =1
DIST=6600
XF =-.025129
YF =-298.436
PRECISE HIDDEN
```

2. 次

$$f = 61.8 \text{ Hz}$$

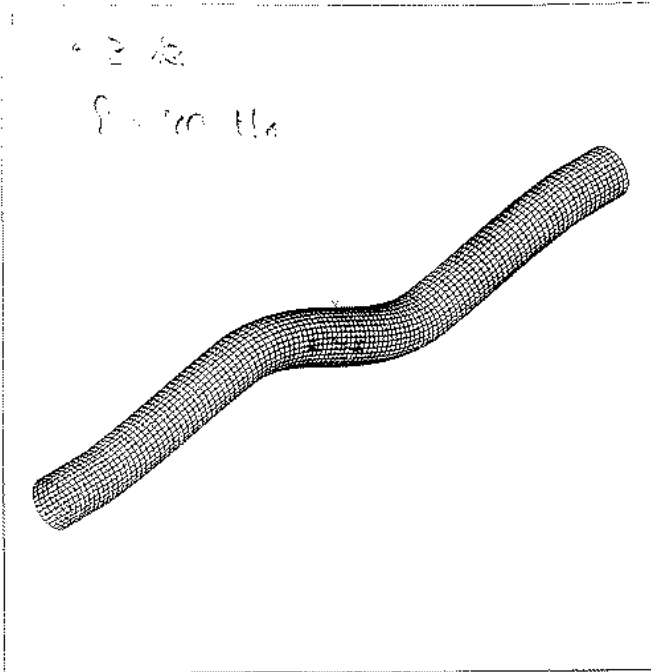


```
ANSYS 5.4  
JUL 15 1999  
21:40:47  
DISPLACEMENT  
STEP=1  
SUB =2  
FREQ=61.85  
PowerGraphics  
EFACET=1  
AVRES=Mat  
DMX =1.26  
  
DSCA=476.053  
XV =1  
YV =1  
ZV =1  
DIST=5223  
KF =299.384  
YF =.020212  
PRECISE HIDDEN
```

1



```
ANSYS 5.4  
JUL 15 1999  
21:41:30  
DISPLACEMENT  
STEP=1  
SUB =2  
FREQ=61.85  
PowerGraphics  
EFACET=1  
AVRES=Mat  
DMX =1.26  
  
DSCA=476.053  
YV =1  
DIST=6600  
KF =299.384  
YF =.020212  
PRECISE HIDDEN
```

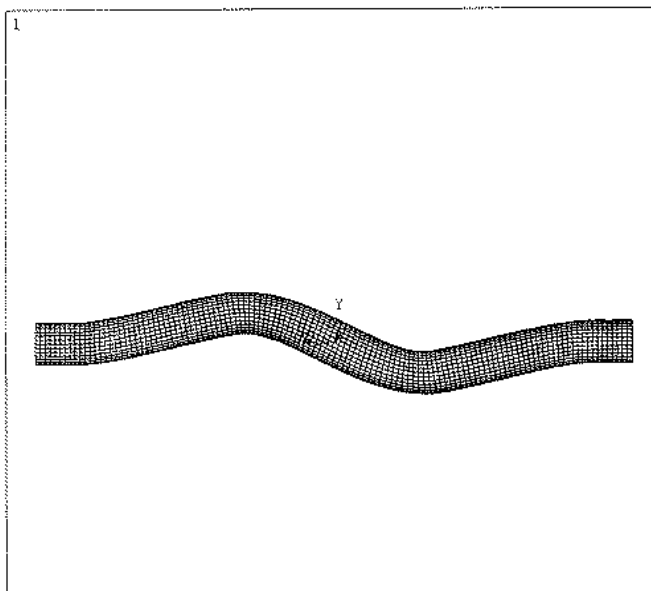


```

ANSYS 5.4
JUL 15 1999
21:42:29
DISPLACEMENT
STEP=1
SUB =3
FREQ=69.998
PowerGraphics
EFACET=1
AVRES=Mat
DMX =.901302

DSCA=665.704
XV =1
YV =1
ZV =1
DIST=4990
XF =-.057569
YF =-.027041
PRECISE HIDDEN

```

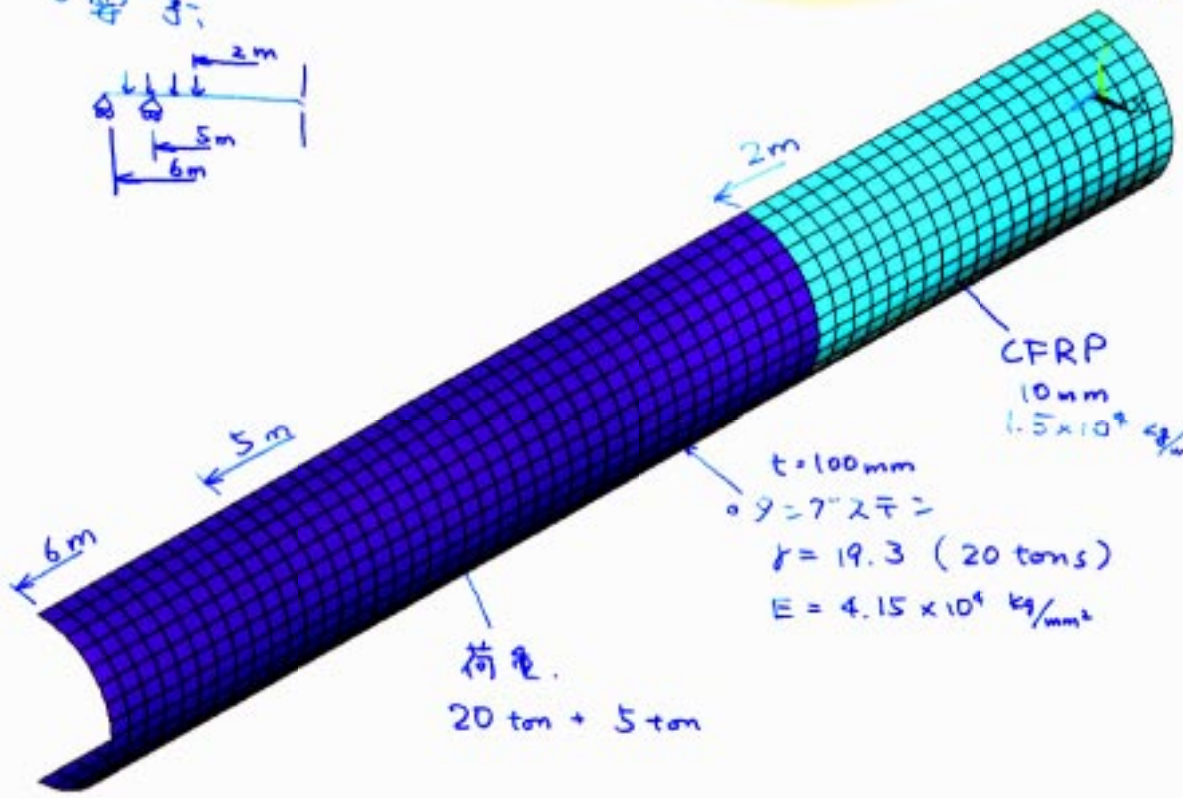
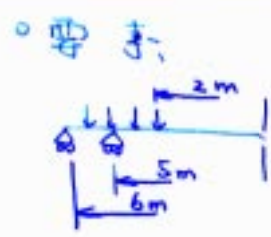


```

ANSYS 5.4
JUL 15 1999
21:43:15
DISPLACEMENT
STEP=1
SUB =3
FREQ=69.998
PowerGraphics
EFACET=1
AVRES=Mat
DMX =.901302

DSCA=665.704
XV =1
DIST=6600
XF =-.057569
YF =-.027041
PRECISE HIDDEN

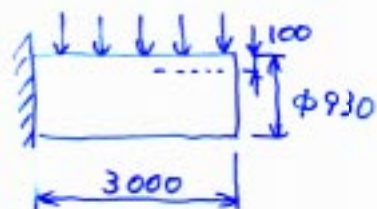
```



荷重.
20 ton + 5 ton

$t = 100 \text{ mm}$
 $\gamma = 7.27 \text{ } \Rightarrow$
 $\gamma = 19.3 \text{ (20 tons)}$
 $E = 4.15 \times 10^4 \text{ kg/mm}^2$

CFRP
10 mm
 $1.5 \times 10^4 \text{ kg/mm}^2$



$$\delta = 19.3 + 5 \text{ tons}$$

$$m = 25100 \text{ kg. } (l = 4000)$$

$$\text{变位: } \delta = \frac{pl^4}{8EI} = \frac{ml^3}{8EI}$$

$$\text{固有振数: } \omega = \frac{1}{2\pi} \sqrt{\frac{k}{m}}, \quad k = \frac{m}{\delta}$$

$$I = \frac{\pi}{64} (d_o^4 - d_i^4)$$

$$= 2.28 \times 10^4 \text{ mm}^4$$

$$E = 2.1 \times 10^5 \text{ MPa}$$

$$E = 4.15 \times 10^4 \text{ mm}^2$$

$$\delta = \frac{25100 \times 3000^3}{8 \times 4.15 \times 10^4 \times 2.28 \times 10^4}$$

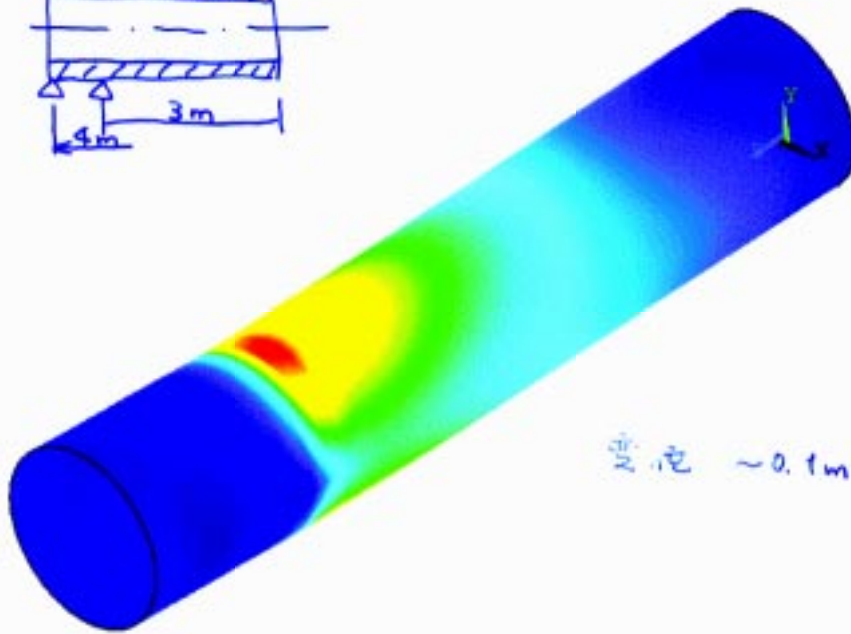
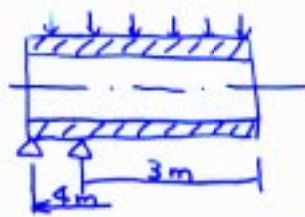
$$= 0.09 \text{ mm}$$

$$\omega = \frac{1}{2\pi} \sqrt{\frac{8 \cdot 8EI}{ml^4}}$$

$$= \frac{1}{2\pi} \sqrt{\frac{9800 \cdot 8 \cdot 4.15 \times 10^4 \times 2.28 \times 10^4}{25100 \times 3000 \times 3/4}}$$

$$= 60.8 \text{ Hz}$$

。ノックステアにけ。(片持ち)

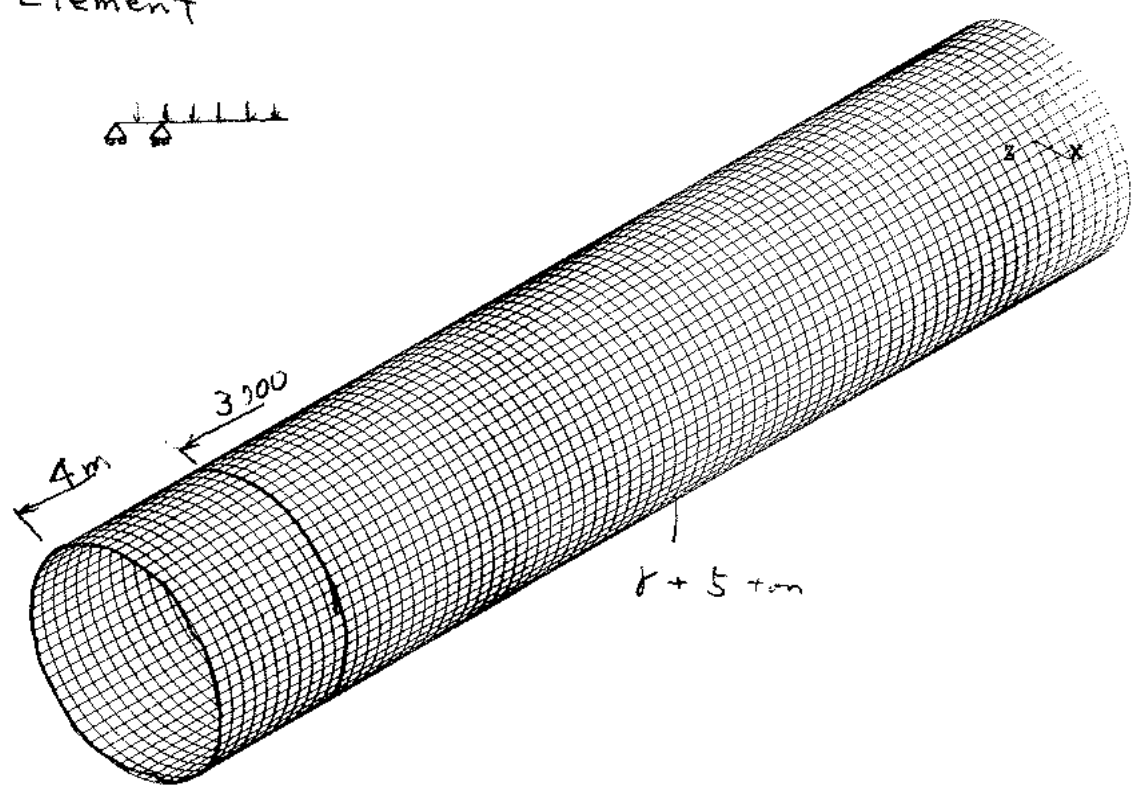
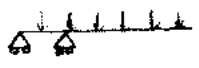


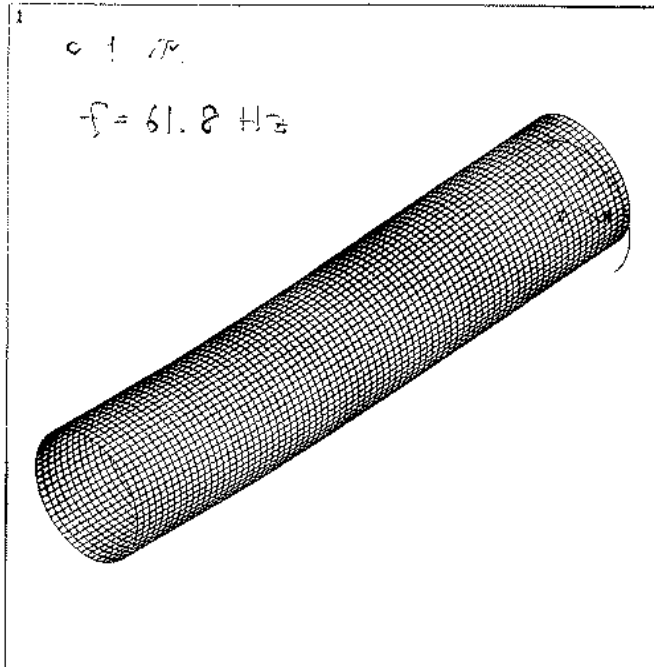
最大応力 ~ 0.1mm

ANSYS 5.4
 JUL 16 1999
 13:07:47
 NODAL SOLUTION
 STEP=1
 SUB =1
 TIME=1
 SEQV (AVG)
 PowerGraphics
 EFACET=1
 AVRES=Mat
 DMX =.094991
 SMN =.001158
 SMX =.542662
 .005388
 .035002
 .064615
 .094229
 .123842
 .153456
 .183069
 .212683
 .242296
 .27191
 .301523
 .331137
 .36075
 .390364
 .419977
 .449591
 .479204
 .508818
 .542662

1

Element



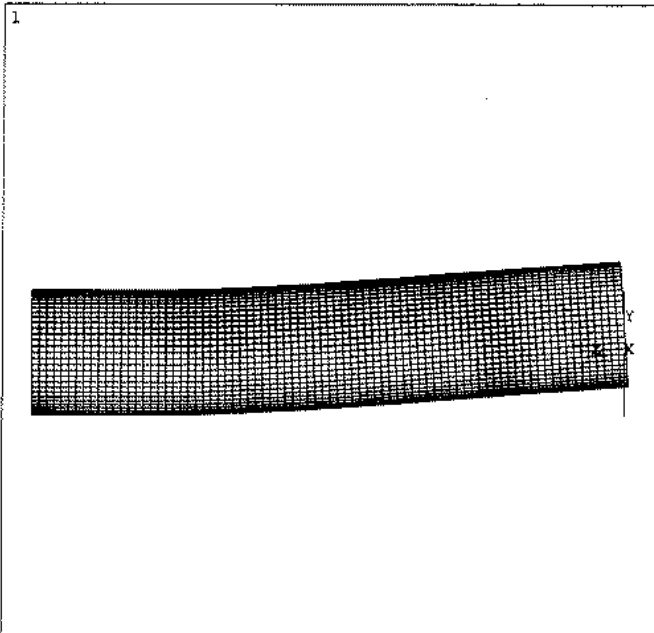


```

ANSYS 5.4
JUL 16 1999
12:40:44
DISPLACEMENT
STEP=1
SUB =1
FREQ=61.756
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.33

DSCA=150.379
XV =1
YV =1
ZV =1
DIST=1889
XF =.136E-04
YF =98.291
ZF =1986
PRECISE HIDDEN

```

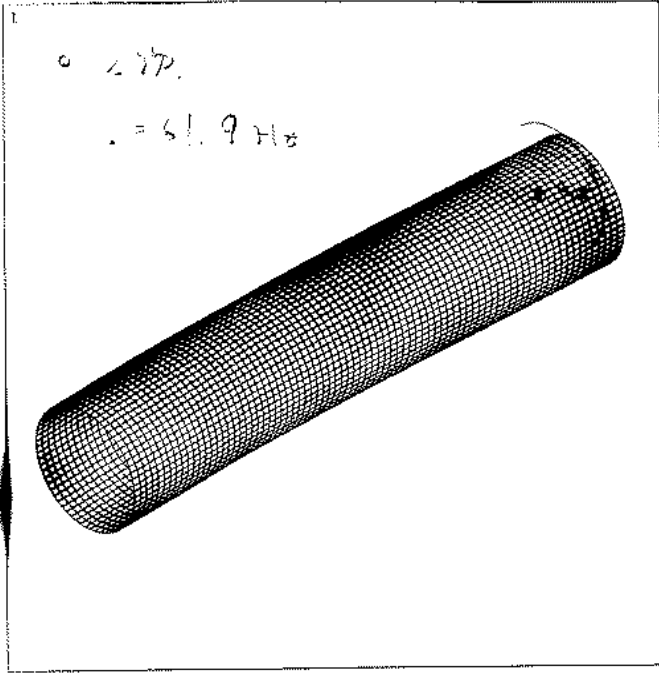


```

ANSYS 5.4
JUL 16 1999
12:42:08
DISPLACEMENT
STEP=1
SUB =1
FREQ=61.756
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.33

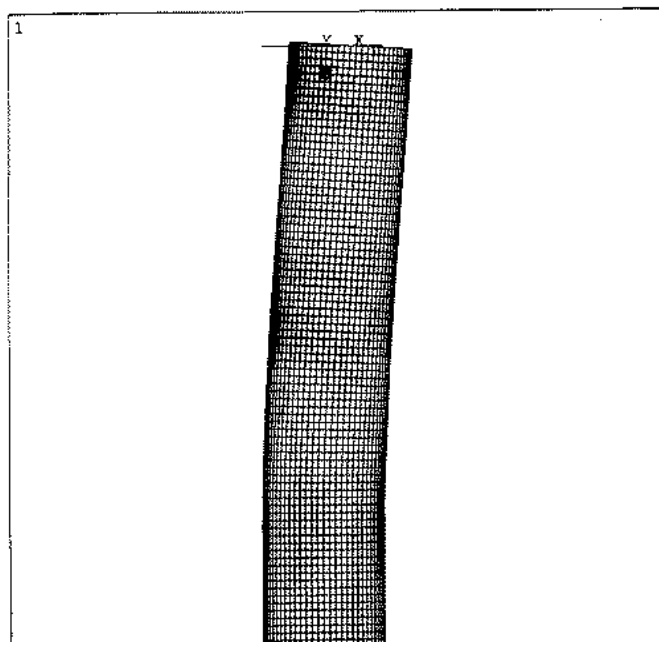
DSCA=150.379
XV =1
DIST=2216
XF =.136E-04
YF =98.291
ZF =1986
PRECISE HIDDEN

```



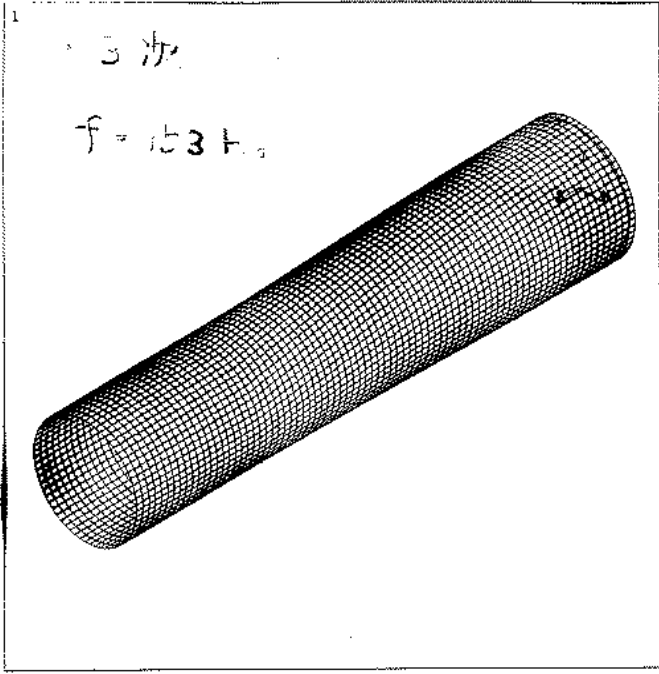
ANSYS 5.4
JUL 16 1999
12:43:16
DISPLACEMENT
STEP=1
SUB =2
FREQ=61.887
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.331

DSCA=150.232
XV =1
YV =1
ZV =1
DIST=1967
XF =98.655
ZF =1986
PRECISE HIDDEN



ANSYS 5.4
JUL 16 1999
12:44:17
DISPLACEMENT
STEP=1
SUB =2
FREQ=61.887
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.331

DSCA=150.232
YV =1
DIST=2216
XF =98.655
ZF =1986
PRECISE HIDDEN

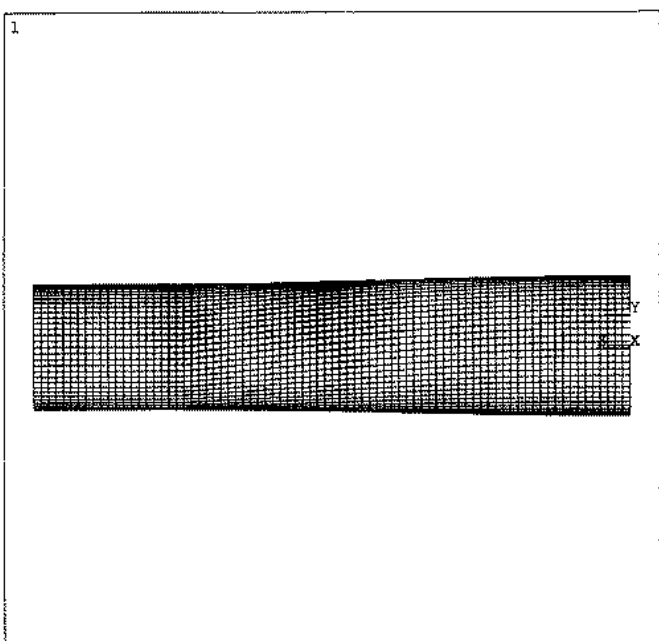


```

ANSYS 5.4
JUL 16 1999
12:45:24
DISPLACEMENT
STEP=1
SUB =3
FREQ=152.593
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.021

DSCA=195.903
XV =1
YV =1
ZV =1
DIST=1878
XF =.724E-03
YF =.741E-03
ZF =2000
PRECISE HIDDEN

```



```

ANSYS 5.4
JUL 16 1999
12:46:23
DISPLACEMENT
STEP=1
SUB =3
FREQ=152.593
PowerGraphics
EFACET=1
AVRES=Mat
DMX =1.021

DSCA=195.903
XV =1
DIST=2200
XF =.724E-03
YF =.741E-03
ZF =2000
PRECISE HIDDEN

```