The free-free conditions were simulated suspending the beam with springs introducing an extra natural frequency, reasonably lower than the first resonance in bending vibration. Nevertheless the suspension system gave some troubles in visualising the two nodes at the first resonance. Other mode shapes can be seen quite clearly and the resonance frequencies values are not too far from the theoretical results. The data of the beam are:

$L = 1.275$ m $\qquad A = h \text{ x } b = 0.01 \text{ x } 0.075$ m $\qquad I = \dfrac{bh^3}{12}$

$\rho = 7800 \text{ Kg m}^{-3} \qquad E = 2.1\times10^{11} \text{ Nm}^{-1} \qquad \upsilon = 0.3$

[2] Ernst Florens Friedrich Chladni was a German physicist. Chladni's technique, first published in 1787 in his book, "Discoveries in the Theory of Sound", consisted of drawing a bow over a piece of metal whose surface was lightly covered with sand. The plate was bowed until it reached resonance and the sand formed a pattern showing the nodal regions.

$f_n = \dfrac{\omega_n}{2\pi}$	Theoretical [Hz]	Experimental [Hz]
n=1	32.80	32.25
n=2	90.44	88.50
n=3	177.30	173.50
n=4	293.08	287.50
n=5	437.82	430.00

Table 1. First five natural frequencies in bending vibration

RESULTS

hexa		20x8		error	'P:2		error	Theory	Experimental
EigenSolve:	7	4.70E+05	109.11	2.33	4.25E+04	32.83	0.00	32.80	32.25
EigenSolve:	8	2.76E+06	264.55	1.93	3.24E+05	90.65	0.00	90.44	88.50
EigenSolve:	9	3.60E+06	302.03	0.70	1.25E+06	178.21	0.01	177.30	173.50
EigenSolve:	10	4.19E+06	325.66	0.11	2.33E+06	243.09	-0.17	293.08	287.50
EigenSolve:	11	1.40E+07	595.99	0.36	3.45E+06	295.69	-0.32	437.00	430.00
Hexa 2nd order mesh 20x8								Theory	Experimental
EigenSolve:	7	4.25E+04	32.83	0.00				32.80	32.25
EigenSolve:	8	3.24E+05	90.65	0.00				90.44	88.50
EigenSolve:	9	1.25E+06	178.21	0.01				177.30	173.50
EigenSolve:	10	2.33E+06	243.09	-0.17				293.08	287.50
EigenSolve:	11	3.45E+06	295.69	-0.32				437.00	430.00
Hexa element="p:2" 40x8					Hexa element="p:4" 20x8				
EigenSolve:	7	4.25E+04	32.81	0.00	4.25E+04	32.81	0.00	32.80	32.25
EigenSolve:	8	3.23E+05	90.49	0.00	3.23E+05	90.45	0.00	90.44	88.50
EigenSolve:	9	1.24E+06	177.54	0.00	1.24E+06	177.33	0.00	177.30	173.50
EigenSolve:	10	2.33E+06	243.08	-0.17	2.33E+06	243.08	-0.17	293.08	287.50
EigenSolve:	11	3.41E+06	293.77	-0.33	3.39E+06	293.18	-0.33	437.00	430.00
Hexa element="p:2" 50x20					Hexa element="p:2" 100x6				
EigenSolve:	7	4.25E+04	32.81	0.00	4.25E+04	32.81	0.00	32.80	32.25
EigenSolve:	8	3.23E+05	90.47	0.00	3.23E+05	90.45	0.00	90.44	88.50
EigenSolve:	9	1.24E+06	177.43	0.00	1.24E+06	177.34	0.00	177.30	173.50
EigenSolve:	10	2.33E+06	243.08	-0.17	2.33E+06	243.08	-0.17	293.08	287.50
EigenSolve:	11	3.40E+06	293.46	-0.33	3.39E+06	293.20	-0.33	437.00	430.00
Tetra 2nd Order 100x12x3					Tetra Linear Order 100x12x3				
EigenSolve:	7	4.25E+04	32.81	0.00	1.89E+05	69.13	1.11	32.80	32.25
EigenSolve:	8	3.23E+05	90.46	0.00	1.44E+06	191.01	1.11	90.44	88.50
EigenSolve:	9	1.24E+06	177.39	0.00	2.44E+06	248.68	0.40	177.30	173.50
EigenSolve:	10	2.33E+06	243.08	-0.17	5.53E+06	374.15	0.28	293.08	287.50
EigenSolve:	11	3.40E+06	293.34	-0.33	1.53E+07	621.59	0.42	437.00	430.00