DBOOK

ATED MASS LOADS

M CROSS SECTION, IN.⁴

ID/SEC

FIXED-FIXED CENTER LOAD

$\omega_n = 8\sqrt{\frac{3EI}{ml^3}}$

FIXED-FIXED OFF-CENTER LOAD

$\omega_n = \frac{1}{ab}\sqrt{\frac{3EIl^3}{mab}}$

ENTRATED MASS LOADS

²/IN.

QM CROSS SECTION, IN.⁴

AD/SEC

ED-HINGED ITER LOAD

$\frac{48EI}{(m+0.5m_b)l^3}$

FIXED-FIXED CENTER LOAD

$\omega_n = 14\sqrt{\frac{EI}{l^3(m+0.375m_b)}}$

BEAM SECTIONS

(S a-a)

E

THIN WALL CIRCLE

$I = \frac{\pi d^3 t}{8}$

ELLIPSE

$I = \frac{\pi d_2 d_1^3}{64}$

BEAMS OF UNIFORM SECTION AND UNIFORMLY DISTRIBUTED LOAD

ANGULAR NATURAL FREQUENCY $\omega_n = A\sqrt{\frac{EI}{\mu l^4}}$ RAD/SEC

WHERE E = YOUNG'S MODULUS, LB/IN.²

I = AREA MOMENT OF INERTIA OF BEAM CROSS SECTION, IN.

l = LENGTH OF BEAM, IN.

μ = MASS PER UNIT LENGTH OF BEAM, LB-SEC²/IN.²

A = COEFFICIENT FROM TABLE BELOW

NODES ARE INDICATED IN TABLE BELOW AS A PROPORTION OF LENGTH l MEASURED FROM LEFT END

	1	2	3	4	5
FIXED-FREE (CANTILEVER)	A = 3.52	0.774 A = 22.0	0.500 0.868 A = 61.7	0.356 0.644 0.906 A = 121.0	0.500 0.926 0.279 0.723 A = 200.0
HINGED-HINGED (SIMPLE)	A = 9.87	0.500 A = 39.5	0.333 0.667 A = 88.9	0.25 0.50 0.75 A = 158	0.20 0.40 0.60 0.80 A = 247
FIXED-FIXED (BUILT-IN)	A = 22.4	0.500 A = 61.7	0.359 0.641 A = 121	0.278 0.500 0.722 A = 200	0.409 0.773 0.227 0.591 A = 298
FREE-FREE	0.224 0.776 A = 22.4	0.132 0.500 0.868 A = 61.7	0.094 0.644 0.356 0.906 A = 121	0.277 0.723 0.073 0.500 0.927 A = 200	0.060 0.409 0.773 0.227 0.591 0.940 A = 298
FIXED-HINGED	A = 15.4	0.560 A = 50.0	0.384 0.692 A = 104	0.529 0.294 0.765 A = 178	0.429 0.810 0.238 0.619 A = 272
HINGED-FREE	0.736 A = 15.4	0.446 0.853 A = 50.0	0.308 0.616 0.898 A = 104	0.471 0.922 0.235 0.707 A = 178	0.381 0.763 0.190 0.581 0.937 A = 272

node 1 2 3 4 5

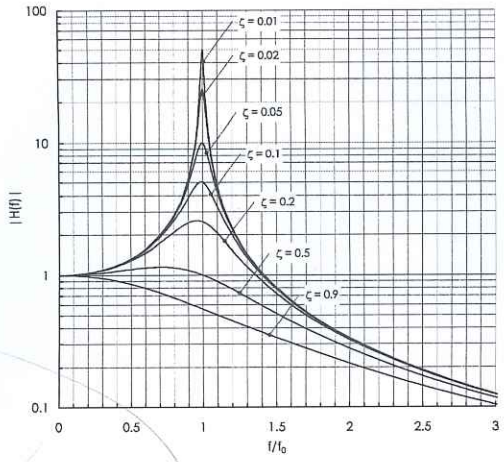

Figure 7 — SDOF dynamic amplification factor.

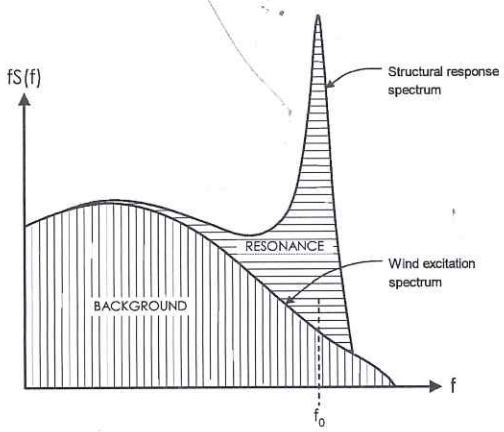

Figure 8 — Background and resonance contributions to response spectrum.