MECHANICAL ENGINEERING DEPARTMENT
UNITED STATES NAVAL ACADEMY

EM423 - INTRODUCTION TO MECHANICAL VIBRATIONS

GENERAL DATA SHEET

MATERIAL PROPERTIES

	Steel	Aluminum alloy	Brass	Nickel alloy
E kN mm^{-2}	210	70	105	207
G kN mm^{-2}	81	26	39	79
K kN mm^{-2}	175	69	117	182
Poisson's Ratio,	0.30	0.33	0.35	0.31
Density, kg m^{-3}	7843	2720	8410	8580

RELATIONSHIP BETWEEN THE ELASTIC CONSTANTS

$$G = \frac{E}{2(1+n)}; \qquad K = \frac{E}{3(1-2n)}$$

CONVERSION FACTORS

By definition	Hence, approximately
1 ft = 0.3048 m	1 m = 3.281 ft
1 in = 25.4 mm	1 mm = 0.039 37 in
1 lb = 0.453 592 37 kg	1 kg = 2.205 lb

MOMENTS OF INERTIA

Rectangular section: $I = \frac{bh^3}{12}$

Polar moment of inertia for a circular cross section: $I_p = J = \frac{p\,d^4}{32}$