TABLE 1.

Material	$\frac{1}{E_0}\frac{dE}{dp}$ ($10^6 cm^2/kg$)	
	According to equation (2)	Experimental data
Aluminium	7.15	7.2
Copper	2.69	4.3
Steel	2.24	2.3

Differentiating equation (1) and bearing in mind that in the range of pressures up to 5,000 kg/cm² it is possible with sufficient accuracy for practical purposes to substitute for the real values

$$\frac{1}{E}\frac{dE}{dp}, \quad \frac{1}{G}\frac{dG}{dp},$$

$$\frac{1}{K}\frac{dK}{dp} \quad \text{and} \quad \frac{G}{K}$$

their usual values

$$\frac{1}{E_0}\frac{dE}{dp}, \quad \frac{1}{G_0}\frac{dG}{dp}$$

$$\frac{1}{K_0}\frac{dK}{dp} \quad \text{and} \quad \frac{G_0}{K_0},$$

finally for the coefficient of Young's modulus we get:

$$\frac{1}{E_0}\frac{dE}{dp} \approx \frac{1}{3+\frac{G_0}{K_0}}\left(3\frac{1}{G_0}\frac{dG}{dp}+\frac{G_0}{K_0}\frac{1}{K_0}\frac{dK}{dp}\right), \quad (2)$$

where

$$\frac{1}{G_0}\frac{dG}{dp} \quad \text{and} \quad \frac{1}{K_0}\frac{dK}{dp}$$

are the coefficients of the shear and the bulk moduli respectively.

The relationship of the bulk modulus to the pressure can be calculated using Bridgman's semi-empirical formula that applies to many solids in the range of pressures up to 10,000 kg/cm²

$$-\frac{\Delta V}{V} = ap - bp^2, \qquad (3)$$

where a and b are material constants, of the orders of magnitude 10^{-7} cm²/kg and 10^{-12} cm⁴/kg² respectively; p is the pressure (in kg/cm²).

From equation (3) in the zero approximation we get

$$\frac{1}{K_0}\frac{dK}{dp} \approx -a + \frac{2b}{a}. \qquad (4)$$

The necessary experimental data concerning the magnitude:

$$E_0, \; K_0, \; G_0, \; \frac{1}{G_0}\frac{dG}{dp} \quad \text{and} \quad \frac{1}{K_0}\frac{dK}{dp}$$

for calculation according to equation (2) are given in Table 2. A comparison of the experimental values of the pressure coefficient obtained by us

$$\frac{1}{E_0}\frac{dE}{dp}$$

with the values calculated according to equation (2)

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