where R_a is the radial position where τ_{rz} becomes equivalent to τ_0. The value of τ_0 is considered to be one-half of the effective stress $\bar{\sigma}$ at any given stage of strain. The limits of integration are taken as shown since the shear stress is zero at the wafer axis, and increases with increase in radial position. The computer program used in solving this problem first calculates the shear stress τ_{rz} at the top surface of the wafer, and then runs a comparison check between τ_{rz} and τ_0 at ten equally spaced intervals across the wafer. If τ_{rz} is less than τ_0 at all radial positions, then R_a is set equal to R_t and equation (52) reduces to (51), thus eliminating the need of equation (51). Combining the known stress equations with (52), and performing the indicated integration yields the results shown in equation (53).

$$\frac{2}{3} hc\ (3a_2 - 4a_1)\ (\tfrac{1}{3} R_a^3 + \sigma_0 N_a)$$

$$+ \frac{1}{4}\sigma_0(R_t^2 - R_a^2) + \frac{1}{2}b\Big[(K_t \bar{\varepsilon}_t - K_a \bar{\varepsilon}_a)/8\alpha_t$$

$$+ M(L_t - L_a)\Big] = f F_t/2\pi \qquad (53)$$