6. KRIGE, G.J., DEVY, S.D., NAPIER, L.G.D., and READ H.J. Refurbishment of the Western Areas Gold Mine North Division Main Shaft. Colloquium on Shafts. Johannesburg, The South African Institute of Mining and Metallurgy, 1989.
7. WARBURTON, G.B. The dynamical behaviour of structures. Oxford, Pergamon International Library, 1976.
8. THOMAS, G.R. Design guidelines for the dynamic performance of shaft steelwork and conveyances. Revision 3. *SDRC Project* No. 11964, Johannesburg, Chamber of Mines Research Organization, 1990.

$$r = \frac{\omega_t}{\omega_n} \leq 0,4$$

$$\frac{\pi V}{L_t + L_c}\frac{3}{2}\sqrt{m_c\left(\frac{1}{2k_s} + \frac{L_t^3}{192EI_x}\right)} \leq 0,4$$

$$\frac{V}{L_t + L_c}\sqrt{m_c\left(\frac{1}{k_s} + \frac{L_t^3}{96EI_x}\right)} \leq 0,12. \quad [21]$$

Step 2. Calculate slamming force.

The slamming force should be calculated using the method given by Thomas[8], with the stiffness modified as described in equation [19].

Conclusion

A numerical solution technique has been used to develop a computer program that models the behaviour of conveyances passing through a shaft tower that is isolated from the shaft walls to avoid the problems that would otherwise result from high strains in the surrounding rock. A simplified analytical procedure, and a parametric study using this program, have led to a proposed design procedure, that enables the design engineer to predict the maximum lateral forces, and the adequacy of any particular tower length and stiffness. ◆

Book Review

Minerals Handbook

Minerals Handbook 1994–95: Statistics and analyses of the world's minerals industry, by P. Crowsons, Basingstoke, Macmillan, 1994 ISBN 0 333 60931 X. £85. Available from Macmillan Direct Ltd., Houndmills, Basingstoke, Hants, RG21 2XS, UK.

Review prepared by Theo J. Oosthuizen, Information and Educational Programmes Division, Mintek

The seventh edition of the Minerals Handbook contains data for fifty commodity groups, including uranium, gold, chromium, manganese, and aluminium. The data has been updated to include annual figures for 1991–92. The handbook contains sufficient basic data on all aspects of the minerals and metals included to allow informed debate on mineral policies, and gives reasonably comprehensive introductions to each material covered.

The introductory summary tables are followed by separate sections on each of the commodity groups. These tables bring together data contained in the detailed sections, and summarize aspects of the mineral industries that influence public policy. The individual sections on each mineral follow a broadly common format, and include tables on reserves, mine production, refinery/smelter production, various production capacities, and consumption. End-use patterns, the value of annual production, substitutes, and technical possibilities are also dealt with, and average prices between 1988 and 1993 are also tabulated. The book is not intended as a substitute for other statistical publications, but is an excellent introductory guide for the non-specialist.

One major drawback of the handbook is that, the title of the book indicates that statistic are correct up to 1994–95, all the production figures are to the end of 1992, and those for prices to the end of 1993. ◆