

LBID-151

RECEIVED
LAWRENCE
BERKELEY LABORATORY

DEC 20 1979

LIBRARY AND
DOCUMENTS SECTION

For Reference

Not to be taken from this room

LBID-151 a.1

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

LAWRENCE RADIATION LABORATORY - UNIVERSITY OF CALIFORNIA		MID 1111	SERIAL M5439	PAGE 1 of 1
ENGINEERING NOTE				
AUTHOR R. Meuser	DEPARTMENT Mech	LOCATION Berkeley	DATE Dec 5 1979	
PROGRAM - PROJECT - JOB High-Field Magnet Development				
Structural Analysis				
TITLE Deflections of a Thick Ring with Multipole-Magnet-Like Loads.				

In a previous note (Ref 1), formulas for stresses were presented for surface normal and shear forces varying as $\cos n\theta$ and $\sin n\theta$. With the stresses known, the deflections can be calculated from the formulas given in (Ref 2), namely:

$$u = \frac{r}{E} \left\{ \begin{aligned} & [(-n+2)A, r^{n-2} - nB, r^n + (n+2)C, r^{-n-2} + nD, r^{-n}] \\ & + D [(-n-2)A, r^{n-2} - nB, r^n + (n-2)C, r^{-n-2} + nD, r^{-n}] \end{aligned} \right\} \cos n\theta$$

$$v = \frac{r}{E} \left\{ \begin{aligned} & [(n+4)A, r^{n-2} + nB, r^n + (n-4)C, r^{-n-2} + nD, r^{-n}] \\ & + D [nA, r^{n-2} + nB, r^n + nC, r^{-n-2} + nD, r^{-n}] \end{aligned} \right\} \sin n\theta$$

(Note: These have been translated from the nomenclature used in Ref. 2 into that of Ref. 1 and rearranged. Apparently there is an error in formulas as presented in Ref 2; the stresses, Hook's Law equations, and deflections are not compatible. The above equations are correct.)

The constants A_1, \dots, D_1 are evaluated from the loads using the formulas in Ref. 1

Ref 1 Eng. Note. M5255, Meuser, Oct 23 1978

Ref 2 Handbook of Engineering Mechanics, W. Flugge, 1st. Ed. (1962) pp. 37-17, 18.

This report was done with support from the Department of Energy. Any conclusions or opinions expressed in this report represent solely those of the author(s) and not necessarily those of The Regents of the University of California, the Lawrence Berkeley Laboratory or the Department of Energy.

Reference to a company or product name does not imply approval or recommendation of the product by the University of California or the U.S. Department of Energy to the exclusion of others that may be suitable.

TECHNICAL INFORMATION DEPARTMENT
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720