

PACKAGE ID - 000805SPARC00 SANDOSE

KWIC TITLE - Sandia Total Dose Estimator Using Mass
Sectoring of 3-D CAD Models

AUTHORS - Turner, C.D.
Sandia National Labs., Albuquerque, NM (United States)

Ackermann, M. R.
Sandia National Labs., Albuquerque, NM (United States)

LIMITATION CODE -COPY **AUDIENCE CODE** - LIM

COMPLETION DATE - 09/01/1994 **PUBLICATION DATE** - 09/01/1994

DESCRIPTION - SANDOSE is an optional module for the Ballistic Research Laboratory CAD (BRL-CAD) package, Release 4.0 [1]. BRL-CAD is a moderately-advanced primitive-based, solid-modeling package which is available (including source code) from the Ballistic Research Laboratory. The purpose of SANDOSE is to estimate total radiation dose at specific locations in a BRL-CAD model. The radiation source is assumed to be omnidirectional. The code is integrated directly into the BRL-CAD solid model editor and is operated using a simple graphical user interface. Several diagnostic tools are available to allow the user to analyze the results, including graphical, color-coded intensity displays of sector rays. These displays are useful for qualitative analysis of shielding alternatives. Any model created using BRL-CAD can be analyzed with SANDOSE.

PACKAGE CONTENTS - Media Directory; Software Abstract; Description and User Guide; Media Includes Source Code, Auxiliary Material, Sample Problem Input Data;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - SANDOSE uses the well-known mass-sectoring technique [2,3] to sample the model, using ray tracing techniques over 4 pi steradians around the dose point of interest, thus assuming omnidirectional radiation. The dose contribution from each sector is found in a 1-Dimensional dose vs. depth curve (kernel), generated by rigorous radiation-transport techniques on a series of solid aluminum spheres for the given radiation environment. The depth for each sector is computed by summing all areal densities encountered by a ray through that sector. The code computes the ray sampling spatial distribution such that all sectors subtend equal solid angle and therefore contribute equally to that dose.

COMPUTER - SUN SPARC

OPERATING SYSTEMS - SunOS4.1x (UNIX)

PACKAGE ID - 000805SPARC00 SANDOSE

PROGRAMMING LANGUAGES - C, X-windows, SUN DevGuide (for graphical use interface)

SOFTWARE LIMITATIONS - Based on limited validation using several benchmark problems, results can be expected to fall between a 10% underestimate and a factor of 2 overestimate of the actual dose predicted by rigorous radiation transport techniques. However, other situations may be encountered where the results might fall outside of this range.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - User interface, graphical diagnostic tools, solid-model based geometry

RELATED SOFTWARE - BRL-CAD, CEPXS/ONELD [4] for computing kernels, SUN DevGuide for graphical user interface.

OTHER PROG/OPER SYS INFO - BRL-CAD is required to utilize SANDOSE, along with SUN DevGuide Software Libraries for the graphical user interface.

HARDWARE REQS - SUN SPARCstation, accelerated color graphics, 16MByte RAM.

TIME REQUIREMENTS - For full satellite model, some homogenized, 500 sectors per dose point, up to 5 seconds per point on SPARCstation2.

REFERENCES - The Sandia Total-Dose Estimator: SANDOSE, Description and User Guide.

ABSTRACT STATUS - Submitted 4/11/95. Released AS-IS 8/3/95.

SUBJECT CLASS CODE - J

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
S CODES
RADIATION DOSES
SHIELDING
COMPUTER-AIDED DESIGN

EDB SUBJECT CATEGORIES -
990200 663600

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS