A fail-safe design for X-ray safety shutters

The purpose of any safety shutter device is to help minimize radiation exposure to personnel. Many such devices for analytical X-ray work may fail in a mode with great potential for injury. We present a design that may be used to modify any existing mechanical or electromechanical system that utilizes a gate which blocks an aperture to control exposure.

Our system is of 'fail-safe' design, as defined in the National Bureau of Standards Handbook 111 (American National Standards Institute, 1972): One in which all reasonable anticipated failures of indicator or safety components will cause the equipment to respond in a mode ensuring that personnel are safe from exposure to radiation. The system has visible indicators that make the user aware that a particular failure has occurred; in addition, X-ray generation ceases.

For illustrative purposes only, an older-version shutter manufactured by the Charles Supper Company of Natick, Massachusetts, is shown in Fig. 1(a).* Modifications have been made to obtain a positive signal for indication of shutter status by mounting hermatic feed-through solder terminals (glass insulated, gold plated over nickel Kovar contacts) at each end of the gate-arm travel. Alternatively, a press-fit teflon feed-through may serve as well. The gate-arm contact points are also gold over nickel plated.

*Editorial note: The Supper shutter system is only one of many similar units available. Though the authors' comments relate to this one system, others may have comparable shortcomings.

Fig. 1. (a) Plan view of a shutter device illustrating the use of the design. Minor additional mechanical modifications are indicated. (b) The electronic diagram for the design. and (c) the logic.
The use of either glass or teflon insulators compromises the shielding integrity of the inner shutter wall and, if the wiring is to be protected from scatter, additional shielding may be added. The outer shutter wall, if it is intact, protects the user. The electronic circuit (Fig. 1b) depends on normally open contacts so that a relay failure terminates X-ray production. Fig. 1(c) illustrates the system logic.

WILLIAM E. CRAMER
Department of Physics Electronic Group
University of Illinois at Chicago Circle
Chicago Illinois 60680 USA

STEPHEN GUGGENHEIM
Department of Geological Sciences
University of Illinois at Chicago Circle
Chicago Illinois 60680 USA

ELI A. PORT
Radiation Safety Services Inc.
827 Simpson Street
Evanston Illinois 60201 USA

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Reference

Crystallographers

This section is intended to be a series of short paragraphs dealing with the activities of crystallographers, such as their changes of position, promotions, assumption of significant new duties, honours, etc. Items for inclusion, subject to the approval of the Editorial Board, should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England).

Professor B. Kamenar, Laboratory of General and Inorganic Chemistry, Zagreb University, Yugoslavia, was elected President of the European Crystallographic Committee in August 1981, to succeed Dr O. Kennard who had been President since 1975. Professor G. S. D. King, Laboratory for Crystallography, The Catholic University of Leuven, Belgium, was elected Vice-President and Professor P. T. Beurskens, Department of Inorganic Chemistry and Crystallography, University of Nijmegen, The Netherlands, was re-elected Secretary.

International Union of Crystallography


Division of Acta Crystallographica

Beginning with Volume 39 in January 1983, Acta Crystallographica will be published in three sections:

Section A - Foundations of Crystallography
One Volume, six parts per year

Section B - Structural Science
One Volume, six parts per year

Section C - Crystal Structure Communications
One Volume, twelve parts per year

The new Section C will also incorporate the journal Crystal Structure Communications, which was founded by the X-ray crystallography group at the University of Parma and has up to the present been published by the University of Parma.

An Editorial giving the reasons for the new division of Acta Crystallographica has been published in the January issues of Acta Crystallographica. Sections A and B [Acta Cryst. (1982), A38, 1; B38, 1].

Deposition of Crystal Data

At its meetings in Ottawa, August 1981, the Commission on Journals decided that only Titles and Abstracts will normally be printed for Crystal Data from the midlle of 1982, i.e. for manuscripts received after 1 April 1982. All other parts of the contribution will be deposited with the British Library Lending Division. Copies will be available through the Executive Secretary, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England.

The papers will continue to be refereed. In addition, where appropriate, the data will be checked by the Joint Committee on Powder Diffraction Standards (JCPDS) before publication and assigned a JCPDS reference number, which will be published as part of the Abstract. This will mean that the powder pattern will be included in the Powder Diffraction File at the earliest stage possible.

Where appropriate, a Crystal Data contribution must in future give as much of the information as possible described in "Standards for the Publication of Powder Pattern Data" [J. Appl. Cryst. (1981). 14, 216-217]. In particular, the title and Abstract should include: the name (given in the correct IUPAC form) and (if applicable) the mineral name and locality, the chemical purity, the chemical formula, space group (if known), the unit-cell parameters, the volume of the unit cell, Z, the measured and X-ray densities, measurement technique and conditions, radiation used and a description of the powder data and other data deposited. The unit cell parameters, the volume of the unit cell and the measured density should each be accompanied by their e.s.d.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.


The proceedings of the 1980 Scanning Electron Microscopy Conference held in Chicago from 21 to 25 April are published in four parts. Most of the papers of interest to physical scientists and SEM users in general are contained in part I. The papers in part II are of general interest to biologists but a few of these should also be of interest to physical scientists. Parts III and IV contain papers on biological applications, late papers and papers which were not presented at the conference.

Each part includes a related subject index and a major subject index which also includes some relevant papers in other parts.