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A Guide for
UNIFORM INDUSTRIAL HYGIENE CODES OR REGULATIONS
FOR THE USE OF FLUOROSCOPIC SHOE FITTING DEVICES

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In April 1949 the American Conference of Governmental Industrial Hygienists adopted "A Guide for Uniform Industrial Hygiene Codes or Regulations" prepared for the guidance of those interested in bringing about greater uniformity in regulations concerning those conditions in work places which might affect the health or well being of the working population. This "Guide" is general in nature and its provisions deal with environmental factors which are common to most work places. Since there are many operations, processes or problems which require special consideration, the Committee on Industrial Hygiene Codes of the A.C.G.I.H. is preparing supplements in such cases to be incorporated into the general code.

Associated with the use of shoe fitting fluoroscopic devices are potentially harmful effects for both salespersons and customers. There is much evidence to show that exposure to radiation may cause injury to health; consequently, it is generally agreed that irradiation of any part of the human body for non-medical purposes should be strictly prohibited. In consideration of this belief, this "Guide" has been designed to minimize the amount of radiation to which persons are exposed during the use of fluoroscopic shoe fitting devices. The A.C.G.I.H. does not recognize either the necessity or the desirability of using these devices in the fitting of shoes, nor does it intend to imply that long range effects will not result from the repeated use of such equipment. More definite data may result from further experience with this type of equipment, and as such data are developed they will be applied in the interest of protecting the public from excessive radiation.

Preface - Continued

The most satisfactory solution to this problem lies in the area of public health education. Therefore, the A.C.G.I.H. urges that colleagues in the child health, school health and health education phases of public health as well as those in medical practice and others concern themselves with this subject.

The Committee on Industrial Hygiene Codes

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GUIDE FOR UNIFORM INDUSTRIAL HYGIENE CODES OR REGULATIONS

FOR THE USE OF FLUOROSCOPIC SHOE FITTING DEVICES

PART I

INTRODUCTION

Sec. 1 Scope:

- (a) The purpose of these regulations is to provide specific provisions to minimize health hazards associated with the use of shoe-fitting fluoroscopic devices.
- (b) New installations of fluoroscopic shoe fitting devices shall not be put into operation until inspected by the authority to insure that the provisions of this code have been met.

Sec. 2 Definitions

- (a) Lead equivalent. The thickness of lead affording the same protection under the specified conditions, as the material in question.
- (b) Milliroentgen (mr). One one-thousandth of a roentgen.
- (c) National Electrical Code. The Standard of the National Board of Fire Underwriters.
- (d) Primary radiation. Radiation coming directly from the tube target.
- (e) Roentgen (r). The International Unit of quantity or dose of X-rays or gamma rays. That quantity of X- or gamma radiation such that the associated corpuscular emission per 0.001293 g. of air, produces, in air, ions carrying 1 e.s.u. of quantity of electricity of either sign.

- (f) Shall is construed to mean mandatory.
- (g) Should is construed to mean advisable.
- (h) Stray radiation. Radiation not serving any useful purpose.
It includes direct radiation and secondary radiation.
- (i) Useful beam. That part of the primary radiation which passes through the aperture, cone, or other collimator.

PRIMARY X-RAY BEAMS

Sec. 3 Exposure

- (a) The exposure to the useful beam, measured on the base of the foot opening, shall not exceed 0.7 roentgen per viewing of children's shoes.
- (b) Two other beam intensities may be provided, one to permit exposures of not more than 0.8 roentgen per viewing of women's shoes and the other to permit exposure of not more than 1.0 roentgen per viewing of men's shoes.

Illustration

The above exposures are approximately equivalent to 8 roentgens per minute primary beam intensity for 5 seconds for children; 10 roentgens per minute primary beam intensity for 5 seconds for women and 12 roentgens per minute primary beam intensity for 5 seconds for men. This provision makes it possible to increase the viewing time by decreasing the primary beam intensity.

Sec. 4 Filtration

- (a) The floor of the foot opening shall be provided with a sheet of aluminum at least 1 mm. thick and of dimensions equal to or greater than the floor. This aluminum filter shall be protected from wear by a layer of other material and shall be installed in such a fashion that its thickness can conveniently be determined.

Sec. 5 Control

- (a) An automatic timer shall be provided that will limit the operation of the X-ray tube so that exposures do not exceed the limits specified in Sec. 3.

- (b) If means are provided for making fittings at three intensities as listed in Sec. 3 (b), the words CHILDREN, WOMEN AND MEN shall be posted to designate the lowest, intermediate and greatest intensities respectively.
- (c) Only authorized salespersons shall be permitted to operate shoe fitting fluoroscopic devices. The starting mechanism shall be so designed as to prevent operation by other persons.
- (d) The fluorescent viewing screen shall be covered with leaded glass having a lead equivalent of at least 1.5 millimeters for 65 kilovolts peak.
- (e) The total exposure time for any one customer in any one day shall be restricted to 5 fittings.
- (f) The operator shall not use his own feet or hands for demonstrating X-ray fluoroscopy. Children's feet shall not be held in position by any person while the device is in operation.
- (g) The customer shall have shoes on BOTH feet at the time of a fluoroscopic examination.
- (h) All customers should be questioned regarding dates and numbers of previous exposures to limit the total number of X-ray shoe fittings to 20 per year.
- (i) Each salesperson shall operate the device for his own customers.
- (j) Operators shall report promptly any defects in the device to a responsible company official.

PART III

STRAY RADIATION

Sec. 6 Control

- (a) The X-ray tube shall be so shielded and the cabinet so constructed that stray radiation is reduced to less than 12-1/2 milliroentgens per hour at all positions within 6 inches of the cabinet and at viewing ports at eye level, except at the foot opening.
- (b) The foot opening in the cabinet shall be so constructed and shielded that stray radiation at a distance of 10 feet forward shall not exceed 12-1/2 milliroentgens per hour.
- (c) The machine shall be located as far as possible from frequently occupied areas. Employees who work in one location only, such as cashiers and wrappers, shall not be stationed in front of the foot opening. Employees who do not spend their time in one location, such as salesmen, shall not regularly perform duties within ten feet in front of the foot opening.

WARNING AND INSTRUCTIONS SIGNS

Sec. 7

- (a) A warning placard to be furnished by the authority shall be conspicuously posted on at least two sides, including the customer's side, of each fluoroscopic shoe fitting device.

This placard shall be worded as follows:

WARNING

EXPOSURE TO X-RAY MAY BE HARMFUL. CUSTOMERS MUST NOT OPERATE THIS MACHINE. LIMIT FOR EACH CUSTOMER: 5 X-RAY SHOE FITTINGS PER DAY, YEARLY TOTAL NOT TO EXCEED 20 FITTINGS.

ELECTRICAL SAFEGUARDING

Sec. 8

- (a) All metal non-current carrying parts shall be grounded in accordance with the applicable requirements of the National Electrical Code.
- (b) An interlocking switch shall be provided on any door or panel giving access to high voltage components. This switch shall operate to break the electrical circuit whenever the container is opened.