

APPENDIX C

SAFETY**C-1. General**

Commanders and unit leaders at all levels are responsible for protecting and preserving Army personnel and equipment against injury, damage, or loss. This appendix discusses general safety (applicable to all units when in a field environment) and specific safety considerations for dental units. Functions of the Department of Defense (DOD) Federal Hazard Communication Training Program and the US Army Environmental Hygiene Agency (USAEHA) are also discussed.

C-2. Safety Policy and Program

An effective safety program is essential to any unit. Leaders must stress the importance of constant vigilance to detect potential hazards and reduce or eliminate these hazards.

a. Policy. The safety policy of the Army is to reduce and keep to a minimum accidental manpower (and monetary) losses, thus providing more efficient use of resources and advancing combat effectiveness.

b. Program. The unit safety program should be designed to cover all operations and take into consideration all conditions peculiar to the specific operation of the unit. Implementation of the program includes the establishment of a safety organization consisting of a unit safety officer responsible for the supervision and coordination of all unit safety activities, and other personnel as required to assist him (see AR 385-10).

C-3. Responsibility for Accident Prevention

a. Commander. The unit commander is responsible for ensuring that all activities of his unit are conducted IAW established safety rules for determining causes of accidents, and for seeing that corrective action is taken immediately to prevent their recurrence. He must be aware of and enforce all safety regulations promulgated by higher headquarters. If a deviation from an established safety rule is desired, it is his responsibility to request permission for the deviation. The unit commander appoints the unit safety officer (see AR 385-10).

b. Unit Safety Officer. The unit safety officer, with the concurrence of the commanding officer and within his guidelines, develops directives, policies, plans, and procedures for the safety program.

c. Supervisors. Supervision is a method of preventing accidents through continuous instruction and guidance in the development of good working habits. Supervisors are in a position to observe working conditions and the hazards to which operating personnel are exposed.

d. Individuals. All personnel should be made to realize that safety rules have been established for their protection. It is their responsibility to follow all instructions and to use all safeguards when using equipment, machinery, and tools.

C-4. Principles of Accident Prevention

An effective safety program depends on the proper application of the following principles of accident prevention:

a. Stimulation of Interest. Emphasis on safety must be vigorous and continuous, and it must originate with the unit commander. Group discussions, safety meetings, bulletin board notices, posters, and recognition of individuals for participation create interest in the safety program.

b. Fact Finding. This refers to the assembly of information bearing upon the occurrence and prevention of accidents. For each accident, the following facts should be determined:

- (1) Who was injured and what was damaged.
- (2) The time and place where the accident or injury occurred.
- (3) The severity and cost of the accident or injury.
- (4) The nature of the accident or injury.
- (5) Measures that can be instituted to guard against future recurrences.

c. *Corrective Action Based on Facts.* Any corrective action that is adopted should be based on available and pertinent facts surrounding the accident or injury. Near accidents also should be reported with all available information so that hazards and unsafe procedures or conditions can be eliminated. Similarly, any procedure or condition which might be dangerous should be reported so that remedial action can be instituted.

d. *Applicability.* Practicable safety controls should be provided in all planning, training, tactical operations, professional activities, and off-duty activities.

e. *Safety Education and Training.* The objectives of safety education and training are to develop the individual's safety awareness so he performs his tasks with minimal risk to himself and to others.

f. *Inspections.* The purpose of safety inspections is to eliminate the cause of accidents through specific, methodical procedures.

C-5. Safety Plan

Many items that can be included in any safety plan are listed below, but the list is neither all-inclusive nor restrictive. Certain conditions or geographical areas may require guidance to conform with those needs. Precautions for certain medical/dental procedures or equipment are included here.

a. *Accident Reporting.* Basic to any safety plan is accident reporting. A definite procedure should be established that emphasizes prompt and complete reporting of all accidents or injuries (AR 385-40). The unit commander, or his designated representative, should investigate all accidents or injuries to determine the causes and take corrective action to prevent their recurrence. Any accident resulting in damage to equipment should be reported immediately. Continued operation of damaged equipment can subsequently result in injuries to personnel.

b. *Safety Color Code Markings and Signs.* Safety color code prescribes the use of color combinations that are effective in preventing accidents

and in improving production, visual perception, and housekeeping. The code defines the application of colors for such specific purposes as the uniform markings of physical hazards, showing the location of safety equipment, identifying fire-fighting equipment, and designating colors to be used if local conditions warrant the use of color coding (AR 385-30).

c. Fire Prevention.

(1) A unit fire plan or fire SOP should be included in the safety program. It should contain fire prevention guidance and information on what to do if fire occurs.

(2) **NO SMOKING** signs should be posted wherever fire hazards exist. Smoking should be permitted only in designated safety areas. Fire-fighting equipment should be available and all personnel should be familiar with its location and operation. This equipment should be inspected frequently to determine if it is serviceable and operative. Fire drills should be conducted often enough for all personnel to be familiar with the procedures. Guard personnel should be alert to fire hazards at night. Gasoline, oil, paint, and other flammables should be stored in approved locations and in authorized containers. Oxygen and acetylene tanks must be stored separately and apart from other flammables (see paragraph C-10).

d. *Generators.* Generators in the field produce the same potential electrical hazards that are found with electricity at permanent installations and demand the same precautions. Personnel working around generators or electrical wiring should remove rings and watches. Generators should be grounded and not refueled while they are in operation. Generators used in dental treatment areas should be located to reduce, as much as possible, their noise in the operative area.

e. *Housekeeping.* Professional and administrative areas must be kept clean and orderly at all times. Hazards to personnel and equipment can be eliminated or controlled by enforcing high housekeeping standards.

f. *Heaters.* When heaters are used, they should be watched closely for potential tent fire. Spark arrestors or flue guards on stove exhaust pipes

and metal shields in stovepipe openings in tents should be used when heaters are in operation.

g. Vehicle Operation. Army Regulation 385-55 contains guidance on government vehicle operation.

h. Weapons and Ammunition. Continual command emphasis should be directed toward training each individual in the unit in the handling of weapons and ammunition. Training should begin when an individual joins the unit. Commanders should ensure that all medical/dental personnel are briefed on the handling of weapons which accompany patients to the treatment facility. Weapons of unit personnel should be cleared and placed on safety until required otherwise. Army Regulation 190-11 and FM 19-30 provide guidance on the physical security of weapons and ammunition.

C-6. Accident Investigation and Reporting

a. Investigations. Accident investigation is necessary for accident prevention. Investigation seeks to determine the cause of accidents by finding the elements and sources from which accidents develop. Corrective measures may then be instituted.

b. Reporting. In accordance with AR 385-40, the Army accident reporting system provides for the initial reporting of accidents at unit level. This is done to notify the higher echelon of command that a mishap has occurred; to record information that will identify causes and corrective actions, indicate trends, and provide a basis for formulating future plans; and to evaluate progress in accident prevention.

C-7. X-ray Protective Measures and Standards

a. General. Every possible safety precaution must be used when exposing radiographs. If all safety rules are strictly adhered to, dental personnel should receive virtually no radiation and the patient's exposure will be minimal.

b. Dental Personnel Protection and Standards.

(1) Radiation monitoring. Army Regulation 40-14 prescribes monitoring practices for Army personnel. It requires all x-ray technicians, or other personnel who are likely to take x-rays as part of their normal duties (dental specialists and dental officers), to wear a dosimeter or film badge. When deployed, the radiacmeter IM-9/PD is used to monitor the amount of whole body radiation received by individuals involved in x-ray operations.

(2) Radiation standards. For the personnel operating dental x-ray machines, the level of radiation must not ever exceed an accumulated whole body dose, in rems, of five times the number of years beyond age 18 (for example, the whole body dose for a 20-year-old person must be no more than 10 rems). Personnel should never receive more than 3 rems in any 3-month period. X-ray personnel dose monitoring records based on IM-9/PD readings should be maintained by the unit NBC NCO and incorporated into overall radiation exposure files (see Chapter 9).

(3) Protective shielding. Protective shielding available to dental units is limited to a lead apron for the patient and a portable lead-lined screen to protect the operator. Passive protective measures such as location and arrangement of the x-ray equipment will therefore play an important role. Fixed dental facilities use lead shielding to protect those working in the area where dental x-rays are taken. However, the potential of finding lead-lined facilities in a deployed environment is limited. Therefore, deployed units must use buildings of opportunity or assigned tentage.

(a) Buildings of opportunity.

- When using field dental x-ray apparatus in a building of opportunity, a major consideration is the location of a room or an isolated area where access can be easily controlled. This area should have at least one, preferably two, walls common to the building exterior. Adjoining rooms should be unoccupied.

- The x-ray apparatus should be positioned to maximize the distance from the back of the x-ray tube head to the operator. The apparatus should be positioned so that the x-ray beam will not routinely be directed toward occupied space or heavily traveled passageways.

- The unoccupied area outside the building should be cleared of personnel for at least 50 feet from the x-ray head. This exclusion area should include all potential areas toward which the x-ray beam may be directed. The 50-foot exclusion area fulfills the requirements of TB MED 521 for both the Siemens and the hand-held field x-rays.

(b) *Tents.* Field x-ray apparatus should be placed in a separate tent located on the outer perimeter with a minimum clear area of 50 feet (radius). This area should be marked off using engineer tape and radiation hazard signs IAW unit SOP. Prior to operating an x-ray in a tent, check to ensure no one is in the exclusion area.

(c) *Lead shield.* In both situations the portable lead-lined screen contained in the DES, x-ray, should be placed between the operator and the patient with the operator standing immediately behind the screen.

(4) *Patient protection.* Use all means available to reduce the patient's exposure to ionizing radiation. The following practices will help:

- Take only those x-rays that are required for diagnosis and treatment.
- Avoid wrong exposures, improper exposure techniques, and faulty film processing techniques.
- Use a lead apron for each exposure.
- Check the patient's medical history.
- Use the most sensitive emulsion film available.

(5) X-ray system, dental, miniature (hand-held x-ray). The hand-held x-ray is safe for dental personnel to hold during use if the following guidelines are followed:

- The operator must keep the radiation shielding ring flat against the skin of the patient's face.

- The operator must stand so that his body is in line with the long axis of the x-ray tube.

If these precautions are followed, the operator is exposed to less than 0.004 mR/exposure. Therefore, an operator should be able to make 1,250,000 exposures a year, keeping the annual rate below 5 rems. Even though this system actually exposes the patient to less radiation than other dental x-ray systems, an important consideration is an exclusion area beyond the patient as discussed above.

C-8. X-ray Processing

When working with film processing chemical, personnel will use protective eyewear, gloves, and aprons.

C-9. Hearing Conservation

a. Technical Bulletin Medical 501 provides the guidance on units' hearing conservation programs.

b. Units will contact the preventive medicine activity of the area medical support activity for identification of noise hazardous equipment, job sites, and exposed personnel. This will be accomplished by conducting noise level surveys on field dental equipment (that is, compressors, generators, dental hand pieces, field laboratory equipment, and military vehicles). These data will be used for planning and prioritizing screening tests for those individuals exposed in their work environment.

c. Personnel identified in this survey will be entered in the hearing conservation program and monitored by the medical unit for response to noise exposure and adequacy of hearing-protective devices by periodic testing of hearing levels. Audiograms will be conducted annually, as a minimum.

d. Hearing protection will be issued to all unit personnel, and its use will be required when operating or in proximity to generators, compressors, field laboratory equipment and tactical vehicles 2-1/2 tons and larger. Areas around this equipment should be indicated by placing NOISE HAZARDOUS AREA, HEARING PROTECTION REQUIRED signs as directed in the unit SOP.

C-10. Compressed Gas Cylinders

All compressed gas cylinders should be considered full for handling purposes. They should never be dropped or struck by any object. While cylinders are being transported in vehicles, they should be restrained to prevent them from falling. Cylinders must be protected from dampness and excessive temperatures. Smoking is prohibited within 50 feet of oxygen cylinders. Valve protection caps must be installed on each cylinder. Oxygen should be stored in areas separated from flammable gases or flammable liquids by at least 50 feet. Gases used in dental laboratory procedures require caution in handling.

C-11. Flammable or Explosive Materials

These materials must be kept in approved safety containers and away from Bunsen burners or heating elements. Acids used in dental laboratory procedures should be stored in proper containers and used with caution.

C-12. Special Equipment

Individuals using high speed dental units and those working in the dental laboratory should use plano cylinder or prescription safety eyewear to prevent injuries to their eyes.

C-13. Scrap Amalgam

Scrap dental amalgam should be kept under silver-free or fresh x-ray fixer.

C-14. Department of Defense Federal Hazard Communication Training Program

Department of Defense Instruction Number 6050.5, October 29, 1990, directed the elements of DOD to

develop a training program to meet the requirements of the Occupational Safety and Health Act (OSHA) Hazard Communication Standard (29 C.F.R. 1910.1200). The OSHA issued this standard to ensure everyone's right to work in a safe and healthful environment. It requires that everyone understand the hazards of the materials they work with and know how to minimize these hazards. It also lists all hazardous materials along with their specific hazards.

C-15. United States Army Environmental Hygiene Agency

The USAEHA has the mission of looking out for the soldiers' welfare worldwide. It is an excellent source for advice and assistance in areas related to environment quality or occupational health. Any official Army safety representative (for example, unit safety officer) can request assistance from the USAEHA. Potential areas for assistance include, but are not limited to-

- Technical assistance on monitoring the use of ionizing radiation, telephone DSN 584-3526.
- Tactical unit hazardous waste management on-site visits, DSN 584-3651.
- Dental safety program on-site visits, DSN 584-2241.

The USAEHA also provides document review services which may be of assistance in evaluating a unit safety program.

C-16. Infection Control

Special precautions must be taken during dental treatment procedures to avoid the transmission of infections. Infection control, to include biological waste disposal, is covered in detail in Chapter 3.