

CHAPTER 14

SAFETY

Section I. GENERAL

14.1.1 Introduction

Construction work generally is inherently hazardous. Roof work, whether it be new construction, maintenance or repair, because of its nature, ranks high in the incidence of accidents. While it is true that accidents may occur in spite of measures taken to prevent them, a well-defined program to prevent accidents always pays dividends. Accident prevention is closely tied in with efficiency. The contractor whose equipment is always in order; who attempts to predetermine the hazards of each particular project; and plans accordingly for the prevention of accidents, will not only encounter fewer accidents, but will also operate more efficiently. While this is not intended to be a complete manual on safety precautions in roofing, observance of the following suggestions will go far to prevent common accidents. Good reference works on safety in the construction field are:

(1) "Manual of Accident Prevention in Construction," published by the Associated General Contractors of America, Inc., 1957 E Street, NW Washington, DC 20006.

(2) "American Standard Safety Code for Building Construction," ANSI A10.2-1944, published by the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

(3) General Safety Requirements, EM 385-1-1, 1 March 1970, (Corps of Engineers, US Army).

14.1.2 Storage and Handling of Materials

(1) Segregate materials as to kind and size and place them in neat, orderly piles that are safe against falling. (See instructions under each type of roofing material.)

(2) Place warning signs in daytime and red lights on and around materials stored in walkways or streets at night.

(3) Do not store combustible materials inside of buildings. Cellular plastic roof insulations are combustible unless labeled noncombustible by Underwriters or other acceptable laboratory with

not more than 25 flame spread and 50 smoke generation ratings.

14.1.3 Ladders

(1) Test all ladders to determine whether they are strong enough to carry the intended loads.

(2) Construct wood ladders of straight-grained materials free from defects. Avoid painted ladders since the paint may serve to conceal defects.

(3) Mark metal ladders with signs cautioning against use around electrical equipment.

(4) Provide ladders with nonslip bases and fasten at the top when possible.

(5) Place the foot of a ladder not more than 1/4 its length away from the vertical plane of its top support.

(6) Extend ladders leading to landings or walkways at least 36 inches above the landing and fasten so that they cannot slip. Avoid splicing ladders whenever it is possible.

(7) Construct "chicken" ladders or crawling boards at least 10 inches wide and 1 inch thick, to which are nailed cleats, 1½ inches wide and 1 inch thick, extending the width of the board. The board should extend the full length from the ridge to the eaves and should be fastened securely to the ridge so that it cannot become loose. Make each section of double boards as a single board, with the sections straddling the roof, with the hinge bolt resting on the ridge-pole.

(8) Provide a catch platform or life line on roofs pitched more than 3 inches per foot.

14.1.4 Scaffolds

(1) Design scaffolds to take the maximum loads to which they will be subjected.

(2) Protect the edges of all scaffolds with railings and toe boards.

(3) Do not use scaffolds for the storage of material except that being used currently. Clean scaffolds daily of all rubbish.

(4) Provide a catch or scaffold platform, extending at least 2 feet beyond the eaves and

equipped with a guard rail, on roofs without parapet walls, where the slope is greater than 3 inches per foot and the distance from ground to eaves is more than 20 feet. A life line of manila rope securely fastened to a safe anchorage may be substituted for the platform.

14.1.5 Roof Brackets

(1) Form triangular roof brackets from three pieces of 2 x 4 inch lumber, with the diagonal member sloped to match the pitch of the roof, and

the horizontal member level to support the roof plank. Many roofers prefer patented metal roof brackets.

(2) Support roof brackets by ropes fastened to a hook securely hooked over the ridgepole of the roof, or to roof members on the other slope of the roof, or by means of pointed projectors driven their full length into the roof framing or deck. Metal roof brackets are generally fastened by 8d or larger nails driven through a slot in the bracket and into a roof rafter.

Section II. HEATING AND HANDLING BITUMINOUS MATERIALS

14.2.1 General

Mount heating kettles on firm, level, noncombustible foundations. Keep them at least 3 feet from any combustible materials, and keep one or more suitable fire extinguishers within 50 feet of each kettle. See that kettles in use are constantly attended and adequately protected from personnel, vehicles, and other equipment. Each kettle should be provided with a closefitting lid which can be closed at once if the heated material flames.

14.2.2 Precautions

The following precautions should be observed when operating bituminous heating kettles:

(1) Material must be thoroughly dry before it is added to heated contents of kettles. Add material

by sliding it into kettles, not by dropping it.

(2) Do not add any inflammable substance to thin or dilute material being heated. Shut down kettle burners when refueling and if heated material bursts into flame.

(3) In handling hot substances, use hoisting gear heavy enough for the loads imposed. Brace all gear securely. In hoisting and handling hot substances, be careful not to endanger workmen nearby or below.

(4) Require all persons handling hot substances to use proper foot and leg protection, gloves, goggles, and any other necessary personal protective equipment.

(5) Do not permit workmen to stand under swinging loads.

Section III. SHEET METAL WORKING

Section IV. FIRE PREVENTION AND OTHER SHOP PRECAUTIONS

14.3.1 Tools and Equipment

The tools and equipment used in handling and working sheet metal are dangerous because of the nature of the work and should not be used by inexperienced personnel. Sheet metal itself is dangerous because of its physical properties and chemical composition. The edges and corners can easily inflict injuries, and many metals or their protective coatings are toxic and can cause serious infections or blood poisoning. Fumes generated by the burning of flux and protective coatings during soldering, welding, and cutting operation are often toxic. Some safety precautions are illustrated in figure 56.

14.3.2 Precautions

The following precautions should be observed when operating equipment and working with sheet metal:

(1) Jewelry and loose clothing should not be worn.

(2) Goggles and gloves should be worn during welding and grinding operations.

(3) Treat all cuts, scratches, and burns immediately to prevent infection and possible blood poisoning.

(4) Protect uncovered skin when handling acids. When diluting acids, always pour acid into water, never water into acid. Keep acids in closed, sealed, clearly-labeled containers.

(5) Power tools should only be operated by experienced personnel.

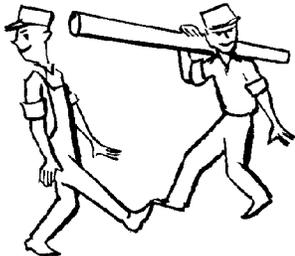
(6) Power equipment should have safety guards in place at all times.

(7) Have both hands free when ascending or descending a ladder. Transfer tools and equipment with a rope or similar device.

(8) Use only the safest solvent available for the work to be done.

(9) Welding, soldering, and burning should only be done in well ventilated areas and away from flammable liquids and materials.

Safety



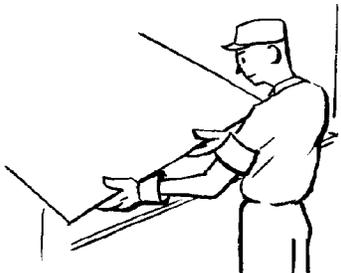
BE ALERT AND PAY ATTENTION TO THE JOB



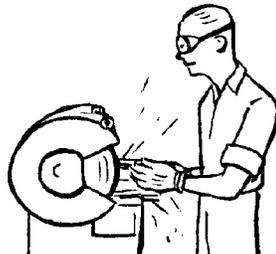
GET INSTRUCTION HOW TO OPERATE



KEEP SHARP TOOLS OUT OF POCKETS



WEAR GLOVES FOR HANDLING SHARP EDGES



WEAR GOGGLES WHEN NECESSARY



KEEP TOOLS REPAIRED AND DRESSED



KEEP SHOPS NEAT AND ORDERLY



KEEP FLOORS AND GROUND CLEAR OF TRASH



REPORT ALL DANGERS



CLIMB SAFELY



USE SAFETY DEVICES



... AND ALWAYS BE SAFETY CONSCIOUS

Figure 56. Precautions that reduce accidents.

Section IV. FIRE PREVENTION AND OTHER SHOP PRECAUTIONS

14.4.1 General

Workshops by their nature are potential fire and safety hazards. Shop personnel must know and comply with all fire prevention measures as issued by the installation fire marshal. Personnel should be familiar with all available fire fighting apparatus, evacuation procedures, and safety practices.

14.4.2 Precautions

The following precautions should be observed at all times:

(1) Flammable liquids must be kept covered when not in use, and when used they must be kept away from fire, flame, and sparks. Fumes from flammable liquids are often toxic and explosive, and their use should be restricted to well-ventilated areas. Wherever possible use nonflammable and nontoxic solvents for cleaning.

(2) Rags contaminated with oil and grease must be cleaned or destroyed daily to prevent spontaneous combustion or accidental ignition.

(3) Machinery and surrounding areas must be kept clean and free of metal shavings and trimming. Oil and grease dripping from

machinery accumulates in dirt and metal filings creating a fire hazard. Metal trimmings and pieces of scrap metal present a safety hazard to personnel.

(4) Tools and equipment should be returned to the racks and containers provided for them. Cluttered work areas increase the working time of a job, subject tools and equipment to abuse, and create a safety hazard.

(5) Provisions should be made for collection and disposal of scrap metal. Adequate bins should be placed near cutting and trimming machines and workbenches.

(6) Gas and gasoline heaters are a constant source of danger. Soldering iron heaters should be turned off when not in use. The odor of gas or gasoline around heaters indicates the presence of a leak. All sources of ignition must be eliminated until the leak is repaired.

(7) Hot soldering irons are a potential fire and safety hazard and must not be placed on flammable materials or where personnel can accidentally come in contact with them. Stands or holders should be provided for hot soldering irons.