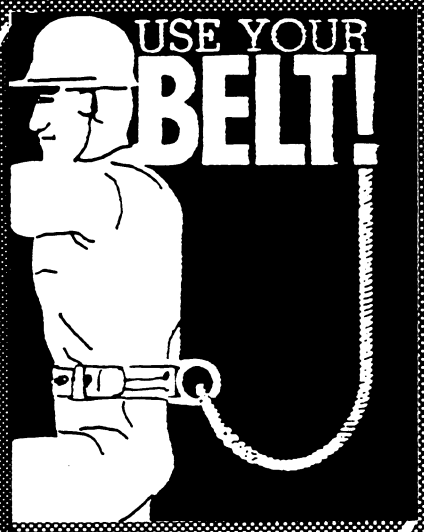
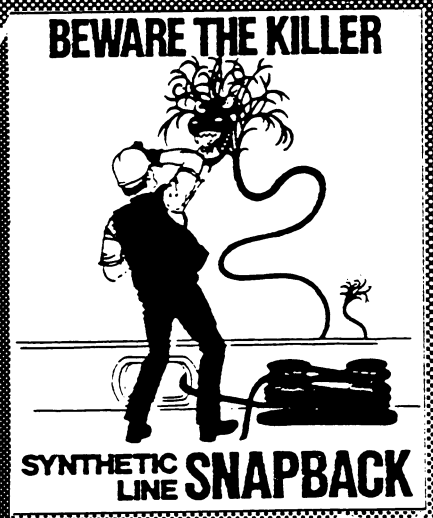
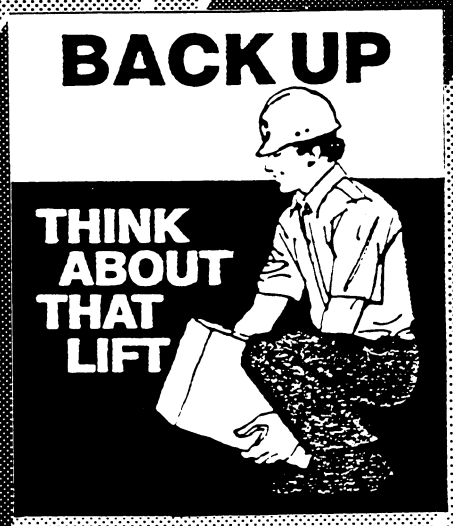


SAFETY



PILEDRIVERS



278
Book 1

NORTHERN CALIFORNIA PILE DRIVERS J. A. T. C.

PILE DRIVER – BRIDGE BUILDER

Course of Instruction

Year	Quarter	Code	Title
1	1	278	Worker Safety & Tool Skills
	1	279	The Apprentice & The Trade, Construction Math
	2	280	Pile Driving Technologies: Tools, Equipment, Materials, & Rigging
	3	281	Concrete & Formwork
	4	282	Welding I • Plate (1F, 2F, 3F, 4F)
2	1	283	Pile Driving – Land & Water (Introduction)
	2	284	Welding II • Plate (1G, 2G)
	3	285	Pile Driving – Land & Water (Advanced)
	4	286	Wharfage & Marine Structures
3	1	287	Cranes & Welding III • Plate (3G,4G)
	2	288	Structural Blueprints & Layout Instruments (Introduction)
	3	289	Intro To Modern Bridge Building Methods & Advanced Structural Blueprints
	4	290	Falsework & Heavy Timber Framing
4	1	291	Advance Formwork & Shoring for Pile Driving & Bridge Building
	2	292	Welding IV • 3G & 4G Certification
	3	293	Dive Tending & Semi–Automatic Wire Feeders
	4	294	Welding V • Pipe (2G, 5G, 6G)

PILE DRIVERS
BRIDGE BUILDERS
SAFETY

OXYACETYLENE
CUTTING & BURNING

The Northern California

Pile Drivers

J.A.T.C

By: J. McNamee

Second Edition© 12–11–89 w/Bill Heinz
Third Edition© 3–5–92 w/Bill Heinz

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Dedicated to the Memory of John A. Oleksy,
Familyman...Friend...Big Heart...Big Scotsman...Pilebutt
Born: 02–05–57
Job Fatality: 08–08–85

opeiu–3–afl–cio–211/llr 12–1–89, 3–1–92
opeiu–3–afl–cio–211/dkp 3–27–91

UNIT 78 – PILE DRIVER – BRIDGE BUILDER SAFETY,

TABLE OF CONTENTS

CLASS MATERIALS

Pile Driver Apprenticeship Class

NORTHERN CALIFORNIA PILE DRIVERS J.A.T.C.

UNIT 78 – WORKER SAFETY & TOOL SKILLS

The information below details the books, supplies and tools needed to participate in and complete this scheduled apprenticeship class.

➪ YOUR BOOKS & CERTAIN REQUIRED ITEMS MAY BE PURCHASED AT:

Carpenters Apprenticeship Training Center
2350 Santa Rita Rd., Pleasanton, CA
☎ (510) 462–9644

Mondays: 8:30 am – 12:00 noon
Tuesdays: 8:30 am – 10:00 am

➪ THE FOLLOWING BOOKS ARE REQUIRED TO COMPLETE ASSIGNMENTS:

1. ***Welding, Cutting, & Heating Guide***, Victor Equipment Co., 1988 ($0.50*)
   (This book will also be used in later classes so keep it accessible and in good condition)

(*Approximate cost of book)

➪ YOU ARE REQUIRED TO BRING THE FOLLOWING TOOLS/SUPPLIES TO CLASS:

(It is suggested that you now **begin** to assemble your hand tool collection by purchasing at least **one tool per week** until you have collected all the tools listed in the ***Pile Driver Apprentice Tool List.***)

*1. Safety Glasses (OSHA Cert.) ($5.50)
2. Hard Hat, Work Boots & Clothes
3. Leather Palm Gloves
4. Pocket Tape (16 ′ long min.)
5. 8 point Cross –Cut Saw
6. 24″ – 30″ Stripping Bar
7. Tri–Square/Combination Square
8. Framing Square
9. 22 oz. Rip Claw Hammer
10. Carpenter Pencil
11. Carpenters Coveralls (bib) and/or...
12. Nail Bags w/2 Pouches
13. Burning Goggles/Glasses (w/#5 lens)
14. Torch Striker

(* Available in Training Center Book Store...Mondays & Tuesdays only)

➪ WEAR CLOTHING THAT YOU WEAR TO WORK:

For your personal safety : tank tops or sleeveless shirts, shorts or cut–off pants, and soft topped or soft soled shoes are **not** permitted while attending classes. **Safety glasses are required** during all manipulative lessons.

PILE DRIVER - APPRENTICE TOOL LIST*

Minimum of tools required before dispatch as Pile Driver should include:

1. 20 or 22 oz. Straight Claw Hammer
2. Pocket Tape (16' long minimum)
3. 12" Adjustable Wrench
4. 8" Lineman's Pliers (side cutters)
5. Lumber Crayon/Keel/Carpenters Pencil
6. Pair Leather Palm Gloves
7. Rigging belt with appropriate tool holders or pouches similar to the following:
   - Spud Wrench or Wrench Holder
   - Hammer Holder
   - Tape Holder
   - Pliers Keeper
   - Nail Pouch
   - Utility Pouch

Optional tools for dispatch as Pile Driver:

1. Pair Bib Overalls (i.e. Carhartt™ or equal), may replace rigging belt
2. Fold-back Knife - "Buck™ " style, lock back
3. 12" Adjustable spud Wrench, may replace 12" adjustable wrench & bull pin
4. Torch Tip Cleaner
5. Torch Striker
6. Pair Rubber Rain Boots

Minimum of tools required before dispatch as Bridge Builder, Pile Driver/Framer, or Dock-Builder should include:

1. Tool Box
2. 8-Point Crosscut Saw
3. Framing Square
4. 24"-30" Level
5. Pocket Tape (16' long minimum)
6. 22 oz. Framing Hammer
7. 24"-30" Stripping Bar
8. Carpenters Bib Overalls or Carpenters Apron with leather pouch
9. 12" Adjustable Wrench
10. 8" Linemans Pliers (side cutters)
11. Carpenters Pencil
12. Chalk box with White Chalk
13. 100' (minimum) String Line
14. Cat's Paw Nail Puller
15. Combination Square

Optional tools for dispatch as Bridge Builder/Framer:

1. Set of Wood Chisels - ½", ¾", and 1 ½"
2. 100' Tape
3. 3/8" Ratchet-Socket Set
4. Hacksaw
5. Set Screwdrivers
6. Pair Pliers
7. Framing Axe
8. Pea Shooter
9. 5/16" Allen Wrench (for air drill chucks)
10. Slick (if available)
11. Adze (if available)

Minimum of tools required before dispatch as Welder:

1. Welding Hood (to fit Hard Hat) w/#10 Lens
2. Safety Glasses (OSHA Certified)
3. Welding Jacket or Cape Sleeves
4. Welding gloves (All Leather, Long Gauntlet)
5. Chipping Hammer
6. Wire Brush
7. Vice Grips (#11)
8. 12" Adjustable Wrench
9. Burning Goggles w/#5 Lens
10. Torch Striker
11. Torch Tip Cleaner
12. Tape Measure (20' long minimum)

Optional tools for dispatch as Welder:

1. Torch Tip Nips
2. 12" Layout Square
3. Bevel Square
4. Tri-Square or Combination Square
5. 24" Level
6. Torpedo Level
7. Wrap-Around (4" x 48")
8. Chalk Box with White Chalk

Failure on the part of the apprentice to obtain these required tools could result in:

1. A delay in wage re-rates until requirements are met.
2. Possible job termination for failure to supply proper hand tools.

*You are encouraged to purchase one (1) tool a week to spread out the cost. Tools required for specific classes (listed in class notice) are **mandatory** and must be in your possession.

Opeiu-3-afl-cio-211/llr Revised 10/11/11 JMc/rh

Form 139-PD

PILE DRIVERS GRADING AND EVALUATION SCHEDULE

Grading

A uniform weighing system will be used as follows:

1. Class Participation and Attitude **5%**
2. Topic Quizzes **30%**
3. Manipulative Lessons **35%**
4. Final Exam **30%**

Assignment of grades will be as follows:

A = 100% – 92

B = 91 – 81

C = 80 – 73

D = 72 – 68

F = Less than 68%

Assignment of numerical evaluations will be as follows:

0 = Unsatisfactory

1 = Below Average

2 = Average

3 = Above Average

4 = Outstanding

5 = Excellent/Superior

Dot (•) Demerits valued at minus two (–2) points each will be assessed as follows:

17 = Repeating an unexcused class absence

17 = 4+ hours/week missed (+ repeat class)

10 = Unacceptable Brotherhood conduct

2 = Failure to make effort to perform

2 = Disruptive behavior

1 = Every 15 minutes of late arrival

Criteria for Evaluation

1. Safety
2. Accuracy
3. Following Directions
4. Fitting and Fastening
5. Speed
6. Plan Reading
7. Terminology
8. House Keeping

COURSE OBJECTIVES:

Upon the completion of this Unit, the student should be able to demonstrate knowledge of approved job site safety practices as outlined in the State of California Construction Safety Orders and be able to develop an awareness of the often inherently dangerous work processes associated with bridge building and piledriving on land and marine–based operations. In addition, the student should demonstrate the ability to safely use and maintain all hand tools required to be in his/her possession during the first six (6) months of apprenticeship as outlined on the *Piledrivers Apprentice Tools List.*

In addition, the student will also demonstrate the ability to safely and efficiently use contractor supplied tools from the following tool groups.

1. Hand Tool Group
2. Electric Tool Group
3. Engine–Driven Tool Group
4. Pneumatic Tool Group
5. Oxyacetylene Group
6. Powder Actuated Tool Group

SPECIFIC OBJECTIVES:

Upon completion of this Unit the student should be able to:

1. Have an awareness of general job site safety hazards, some of the causes of accidents, what constitutes an unsafe act, and pre–job safety planning.
2. Understand the structure, function and the employers' and the employees' relationships and FED/OSHA and CAL/OSHA.
3. Safely and efficiently manipulate the required hand tools enumerated in the student Tool List.
4. Begin a proficiency to safely and efficiently manipulate the following hand and power tools supplied by the contractor.

    I. Hand Tool Group
        (1) The Peavey
        (2) The Framing Axe
        (3) The Cable Come–a–long
        (4) The Sledge Hammer

    II. Electric Tool Group
        (1) The Portable Electric Drill
        (2) The Portable Electric Circular Saw

(3) The Rotary Hammer and Hammer Drill

(4) The Electric Impact Wrench

III. Engine–Driven Tool Group

(1) The Gasoline Chain Saw

(2) The Diesel Air Compressor

(3) The Multi–Purpose Cut–Off Saw

IV. Pneumatic Tool Group

(1) The Rivet Buster/Chipping Gun

(2) The Pneumatic Multi–Vane Drill Motor

(3) The Pneumatic Impact Wrench

V. Oxyacetylene Group

(1) The Oxygen–Acetylene Cutting Torch

5. Become familiar with the numerous safety pitfalls associated with bridge building.
6. Establish, beyond any doubt, that piledriving operations on land have some specifically and inherently dangerous work processes which must be constantly addressed in order for work to proceed safely.
7. Further establish that marine–based piledriving operations present a new set of parameters for work processes and safety considerations which must be constantly addressed for work to proceed in a orderly and safe fashion.

FIRST AID & CPR REQUIREMENT

The Northern California Pile Drivers Joint Apprenticeship and Training Committee (JATC) has determined that training in First Aid & CPR is essential, not only to the maintenance of safety standards in our industry, but also to each individual in our program.

Therefore, it is **mandatory** for all students to successfully complete an *American Red Cross Standard First Aid* and *Cardio–Pulmonary Resuscitation (CPR)* course at a certified, outside agency. A list of these agencies, along with the necessary form for your partial or full reimbursement, is contained on the following several pages.

It is also the intention of the Pile Drivers JATC., that this requirement be met **within three (3) months** after you get your first job or job dispatch. Upon providing proof to your apprenticeship coordinator (in the form of officially signed *American Red Cross First Aid* and *CPR cards*), your obligation is complete and you may qualify for a re–rate.

Apprentices who fail to comply with this requirement will not be re–rated beyond 2nd (second) period and will be cited to appear before the Northern California Pile Drivers Joint Apprenticeship and Training Committee to be considered for cancellation from the program.

.278 PRE–TEST

This quiz is designed to focus attention on the unit of instruction to be studied during this week. The questions are used as a means of testing for previously gained knowledge and to identify subject matter to be learned.

TRUE OR FALSE: Circle the ***(T)*** or ***(F)*** in front of the numbered statement to indicate that you believe the question to be true (correct) or false (incorrect).

T F 1. Job safety is the total responsibility of the employer.

T F 2. A worker who reports an unsafe working condition and refuses to work in that environment is subject to job dismissal.

T F 3. The California Labor Code provides that if a worker is hurt as a result of his/her own negligence, his/her disability benefits may be reduced significantly.

T F 4. All broken or unsafe ladders should be discarded or destroyed.

T F 5. The cost for treatment and benefits paid to a worker injured on the job is covered by the "Occupational Safety & Health Act".

T F 6. A handbook of safety regulations and specifications, controlled and enforced by CAL–OSHA, which pertains specifically to the building and construction trades is called "Construction Safety Orders".

T F 7. The letters OSHA stand for "Occupational Safety & Health Act".

T F 8. The worker who is injured on the job and does not file and injury report at the time of injury may have difficulty in collecting his Workmen's Compensation benefits.

T F 9. Always use the leg muscles when lifting heavy material.

T F 10. Gloves should be worn when handling materials that are liable to cause injury.

T F 11. It is considered good practice to wear gloves when operating power tools.

T F 12. Defective power equipment should not be used.

T F 13. Electric power tools should be raised or lowered by their cords.

T F 14. Wood ladders should be protected from the weather by applying a coat of paint.

T	F	15.	Plastic safety goggles may be worn over a worker's regular glasses.
T	F	16.	The employee must supply his/her own safety hats and goggles.
T	F	17.	A worker must supply his/her own devices for ear protection when working under excessively noisy conditions.
T	F	18.	Operating power tools without the required blade guards for short periods of time is permissible.
T	F	19.	It is considered dangerous to wedge the guard back on a portable electric saw for compound miter cuts.
T	F	20.	Double insulated power tools need not be unplugged when changing bits or blades.
T	F	21.	You should stand under loads, when landing them, to let the operator know where they go.
T	F	22.	A 20–22 oz. hammer is generally considered to be a good weight hammer to be used for all around carpentry/piledriving work.
T	F	23.	Every tool box should contain a ripping bar or wrecking bar.
T	F	24.	A "Cats Paw" is used to nail in confined places.
T	F	25.	High work over water does not require workers to use safety belts.
T	F	26.	Tag lines should be used on all long and/or awkward loads.
T	F	27.	A combination square and a try–square are identical.
T	F	28.	A sliding "T" bevel is used to transfer angle layouts.
T	F	29.	Operators of powder actuated tools are required to have a qualified license.
T	F	30.	A 12 point saw is suitable for rough framing work.
T	F	31.	Auger bits are sized in $^{1}/_{16}$ inch increments.
T	F	32.	Dust marks should be worn when cutting of concrete piles.
T	F	33.	The worm drive portable circular saw had the blade on the operator's left.
T	F	34.	Oxyacetylene bottles should always be laid flat on the ground during use.

T	F	35.	"Keel" is a trade term used to describe Carpenters Crayon.
T	F	36.	On marine projects, life vests must be worn at all times.
T	F	37.	Power tools have replaced the use of many traditional hand tools.
T	F	38.	You should never work under the hammer unless the operator is out of the seat.
T	F	39.	The two foremost causes of serious accidents and injuries are: (1) human error, and (2) equipment failure.
T	F	40.	High speed twist drills are used with the rotary hammer drill.

PILE DRIVERS
BRIDGE BUILDERS
SAFETY

PART 1.

The Northern California

Pile Drivers

J.A.T.C

This topic is planned to provide answer to the following questions:

- **What are the basic causes of accidents?**
- **What can be done to prevent accidents?**
- **What are the responsibilities of employers and employees under OSHA?**
- **What is CAL/OSHA?**

The Importance of Safety

Every employee owes it to themselves, their family, their co–workers, and their employer to work in the safest manner possible. Unless safety principles and practices are faithfully observed every day, the time and effort that an apprentice puts forth in learning their trade could become a tragic waste. Taking the time now to learn about job safety can mean the difference between life and death or between living a normal, productive life and having to struggle for a decent living as a result of a physical handicap.

"Accidents are caused, for the most part, by unsafe conditions, unsafe acts, or some combination of these two hazards."

By their very nature, occupations within the construction industry are extremely hazardous, and an employer or an employee who lacks concern for on–the–job safety contributes toward an increased possibility of accident or death on the job.

The obligations of employers and employees in California are expressed in the Constitution of the State of California, the California State Labor Code, and the state Safety Orders. Employers must provide safe working conditions, protective equipment, and proper maintenance of all equipment; but the final responsibility for safe working practices rests with the worker. The California State Labor Code provides that a worker who is hurt because of willful failure to observe reasonably enforced safety rules or negligence in using safety devices may have the benefits to which he would normally be entitled reduced significantly.

This topic and those that follow on safety are designed to help the apprentice Pile Driver – Bridge Builder become aware of some of the hazards of the trade, become safety minded, and to use reasoning powers to recognize dangerous situations.

Causes of Accidents

An accident is an unplanned and unforeseen occurrence that interferes with or interrupts the orderly progress of an activity. Although by this definition accidents do not necessarily involve injury or death, in fact they all too often do. Accidents that do occur should be analyzed to determine what steps should be taken to ensure that they do not happen again.

Accidents are caused, for the most part, by unsafe conditions, unsafe acts, or some combination of these two hazards.

Unsafe Conditions

Unsafe conditions on the job site may be present in the form of equipment that is poorly designed, or constructed, improperly installed, or badly maintained. Unguarded saws, defective or wrong hand tools, makeshift scaffolding, poor housekeeping, and inadequate lighting are common factors that make for unsafe working conditions.

"Sooner or later, a piece of defective equipment will injure of kill someone."

Unsafe equipment is, without a doubt, an "accident waiting to happen." It's not a question of how it will happen but when it will happen. Sooner or later, a piece of defective equipment will injure of kill someone. This is particularly true in the Pile Driving Industry where workers are surrounded by large, powerful machines. Here, a crane boom collapse or a wire rope failure has usually resulted in one or more fatalities. In our industry it is extremely critical that unsafe equipment be repaired or replaced immediately.

A related, and equal (or more) dangerous situation, is equipment failure. Complex machinery such as cranes and hoists need to be diligently maintained to prevent this equipment from approaching a sudden failure situation. Sudden equipment failure is generally an avoidable occurrence but it has happened in the past and will continue to happen in the future. Crews working around heavy equipment need to remain alert to odd sounds and sudden movements at all times.

Unsafe Acts

Unsafe acts are violations of safe working practices. Wearing loose–fitting clothing on the job, operating machinery without the required guards or in an improper manner, throwing instead of carrying materials, lifting or carrying with the back bent, not paying attention, and engaging in horseplay on the job are all examples of unsafe acts.

Unsafe conditions and unsafe acts are both threats to the worker's safety, but the majority of construction accidents are caused by a combination of these hazards.

An experienced crane operator may have a momentary lapse of concentration when swinging the crane (unsafe act) and forget that he or she placed the rig too close to the overhead power lines (unsafe condition). A power saw with an unguarded blade is not likely in itself to cause an accident, but a sever injury can result if a worker disregards the unsafe condition of the machine and as a result gets a hand in the way of the blade.

"Crews working around heavy equipment need to remain alert to odd sounds and sudden movements at all times."

Prejob Safety Planning

Although a great deal of time and money have been spent by safety oriented organizations to improve accident–prevention efforts

on the job site, prejob planning continues to be of the utmost importance in providing for the safety of those involved with a construction project. This planning is a cooperative effort and demands the participation of the contractor, the union representative, and the workers. During the prejob planning, an attempt is made to establish rules for safety on the particular project, to anticipate problems that could arise, and to determine appropriate methods for protecting the persons involved with the job and the job site.

In providing checks on the effectiveness of accident–prevention efforts on the job site, those persons responsible for prejob planning should be sure to provide for a program of strict compliance with all requirements of the *Construction Safety Orders*.

California's Industrial Safety Orders

The Division of Occupational Safety and Health of the California State Department of Industrial Relations establishes minimum standards of safety, or safety orders, for all phases of industrial activity. The *General Industry Safety Orders* are general in application; the *Construction Safety Orders* apply specifically to building construction. Proposed safety orders or revisions of safety orders are adopted only after they have been fully studied by safety engineers, labor leaders, employers, workers, and other interested persons and have been approved by the Occupational Safety and Health Standards Board.

The *Construction Safety Orders*, which are published in convenient handbook form, include safety regulations and specifications that affect every worker and employer in the construction industry. An apprentice Pile Driver – Bridge Builder should have and should become familiar with the state's *Construction Safety Orders*, and he should know the "Safe Practices and Operations Code" in Appendix A of that handbook.

The Williams–Steiger Occupational Safety and Health Act of 1970

In passing the Williams–Steiger Occupational Safety and Health Act of 1970 (OSHA), the federal government declared safety on the job to be everyone's responsibility. The purpose of OSHA, which became effective in 1971, is to preserve human resources and to ensure so far as possible that every worker in the nation will have safe and healthful working conditions. This law applies to all states and U.S. territories, but it provides that the states may develop their own plans for meeting the requirements of the law.

Responsibility of Employers

The Williams–Steiger Act requires that every employer furnish all employees a place of employment that is free from recognized hazards that might cause serious injury or death. The act further requires that employers comply with the specific safety and health standards issued by the U.S. Department of Labor.

Responsibility of Employees

In accordance with the provisions of the Williams–Steiger Act, each employee must comply with safety and health standards, rules, regulations, and orders issued under the act and applicable to their personal conduct.

Administration of the Williams–Steiger Act

The administration and enforcement of OSHA are vested primarily in the Secretary of Labor and the Occupational Safety and Health Review Commission, a quasi–judicial board of three members appointed by the President. Research and related functions are vested in the Secretary of Health and Human Services.

Enforcement of OSHA

The law permits the Secretary of Labor to enter into an agreement with any state to allow the state to continue to enforce its own safety and health standards for a specified time until its plan for development and enforcement of occupational safety and health standards is approved. California was among the first of the states to receive approval of its plan and is now enforcing it.

Keeping Informed

A convenient reference guide for the Williams–Steiger Act is available from any regional office of the Department of Labor's Occupational Safety and Health Administration.

The California Occupational Safety and Health Act of 1973

In accordance with provisions of the Williams–Steiger Act, permanent management of health and safety programs by an individual state is contingent upon the Department of Labor's approval of state plans to implement programs as effective as those required by the federal legislation. Such a plan was provided in California with the passage of the California Occupational Safety and Health Act of 1973 (CAL/OSHA). The CAL/OSHA plan became fully operational in 1976.

Responsibility of Employers

Each employer in California shall furnish employment and a place of employment that are safe and healthful for all employees. The employer shall furnish and require the use of necessary safety devices and safeguards and shall adopt and use work practices and processes that are adequate for the safety and health of all employees.

Responsibility of Employees

Each employee, as well as each employer, must comply with safety and health standards and with all rules, regulations, and orders that are applicable to their own actions and conduct.

Administration of the California Occupational Safety and Health Act

The administration of the CAL/OSHA plan is the responsibility of the California Agriculture and Services Agency, and all authority to make and enforce rules is vested in the California State Department of Industrial Relations through its Division of Occupational Safety and Health.

A complete text of the California Occupational Safety and Health Act is available from the Division of Occupational Safety and Health, 525 Golden Gate Ave., P.O. Box 603, San Francisco, CA 94101.

The California Workmen's Compensation Law

In California as in most other states, a workmen's compensation law provides

benefits not only for the worker whose industrial injury results in temporary or permanent disability but also for surviving dependents if a worker's death is the result of an industrial injury. An industrial injury is any injury or disease, including damage to artificial limbs, dentures, and medical braces, that is the result of one's work or working conditions. Benefits are payable regardless of who was to blame for the accident.

The basic purpose of the California workmen's compensation law is to ensure that an employee who suffers an industrial injury and those who depend upon this person will have adequate means of support while they are unable to work and that provision will be made for any medical treatment they may need as a result of the injury. A system of worker's compensation insurance is employed for this purpose.

Medical Benefits

Under the worker's compensation law, all medical treatment a worker may need as a result of an industrial injury must be provided for by the employer or their insurance carrier. An injured worker is entitled to receive all medical, surgical, and hospital services and supplies necessary to cure or relieve the effects of the injury, including nursing care, such items as crutches and artificial limbs, and reasonable transportation expenses incurred during treatment. Expenses for examinations, X–rays, and laboratory tests are also included.

Temporary Disability Benefits

A worker who is disabled for more than three days after the date of injury can receive weekly disability benefits to help offset lost earning power during the remainder of the time of disability. Payments normally begin on the fourth day after the injury; however, if the injury results in a disability lasting longer than 21 days or necessities hospitalization, payment is made also for the initial three days of disability.

Permanent Disability Benefits

A worker who is permanently disabled by an on–the–job injury can receive compensation for a specified period and up to a certain maximum amount per week, depending on previous earnings and the rating assigned to their disability by the California Division of Industrial Accidents. A worker rated 70 percent or more disabled can receive a lifetime pension after the period of their regular weekly benefits expires.

Death Benefits

Under the law, certain benefits are available to survivors of a worker whose industrial injury results in death. These benefits include a burial allowance and a substantial death–benefit payment to the worker's widow, dependent children, or other specified dependents.

Keeping Informed

For additional information about the workmen's compensation law, contact any office of the Division of Industrial Accidents. Division offices are located in many cities throughout the state.

Apprenticeship and Safety

A major goal of all apprenticeship programs is to provide the apprentice with the knowl-

edge and skills needed to work safely in their trade. Much time, effort, and money will be devoted to making an apprentice Pile Driver – Bridge Builder a skilled journeyman, all of which will be wasted if an industrial accident cuts short the apprentice's career and perhaps their life.

The apprentice is expected to learn how to work safely; to study the laws governing safety; to understand the principles upon which safe work practices are based; and to conduct business at all times with due consideration for their own safety and that of fellow workers.

The apprentice should keep in mind that accidents do not just happen. Accidents are caused by people, and they happen most often to people who fail to work in a safe manner.

CHAPTER 1 ~ SAFETY IN THE CONSTRUCTION INDUSTRY

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. The obligations of employers and employees in California with regard to safety in employment are given in the state Constitution, the state Labor Code, and the state [1]_____ [2]_____ .

2. Accidents are caused for the most part by unsafe [3]_____ , unsafe [4]_____ , or a combination of these hazards.

3. Meetings held on the job site at least every [5]_____ [6]_____ days to discuss job safety are called tailgate or tool box meetings.

4. Minimum standards of safety are established for all phases of industrial safety by the Division of [7]_____ [8]_____ and [9]_____ of the California State Department of Industrial Relations.

5. In passing the Williams–Steiger Occupational Safety and Health Act of 1970, the federal government declared that on–the–job safety is the responsibility of [10]_____ .

6. The responsibility for administering the Williams–Steiger Act rests with the Secretary of [11]_____ .

7. For a state to be permitted to assume full responsibility for management of its health and safety programs, the state's program must be at least [12]_____ [13]_____ [14]_____ the program required by federal legislation.

8. Benefits under the California workmen's compensation law to workers and/or their dependents include temporary and permanent disability benefits and [15]_____ and [16]_____ benefits.

9. To receive a lifetime pension after the period of weekly benefits expires, a worker must be rated at least [17] _____ percent disabled.

10. Anyone known to be under the influence of [18] _____ [19] _____ should not be permitted on the job while in that condition.

11. Employees should be alert to see that all guards and other protective devices are in their proper places and adjusted, and they should report any deficiencies to the [20] _____ or [21] _____ .

12. No person should use a file as a punch or pry or a screwdriver as a [22] _____ .

13. Electric portable tools should be lifted by a [23] _____ , not by their power cord.

14. Repairs or adjustments to machinery should not be made while the equipment is in [24] _____ .

15. A worker whose regular duties do not include operating machinery or equipment should not attempt to do so without special [25] _____ .

Chapter 2 – General Safety And Responsibility

This topic is planned to provide answer to the following questions:

- **What are the responsibilities of the Employer concerning safety ?**
- **What are the responsibilities of the Employee concerning safety ?**
- **What are the basic essential personal safety devices used in the Construction Industry ?**
- **What are the fundamental job site housekeeping rules ?**
- **What are the general safety guidelines for construction equipment ?**

INTRODUCTION

Despite the safety laws passed by the various States and the safety precautions taken by employers, the injury rate for Pile Drivers ranks among the highest in the building trades. Why is that? Experience shows that "Accidents are made – they don't just happen".

Accident investigations have shown that far too often accidents have been caused by a lack of understanding of the hazards involved on the job being done or indifference and carelessness on the part of the worker. Many craftsmen seem to feel that safety is solely the employer's responsibility; therefore, he does little, if anything, to protect himself.

When an accident occurs, we tend to say, "It couldn't happen to me." But how many realize that, on an average, four men are injured every sixty seconds on the job...that every hour fifteen men lose their lives. If these disabling and fatal accidents are to be prevented, each one of us must become safety conscious and take an active part in safety programs. It is imperative that every craftsman and apprentice learns all there is to know about safety and then follows the safety rules religiously.

Accidents are an economic loss to the employer and employee:

To the employer:

- The loss of trained manpower.
- The cost of training new men to take the place of the injured.
- Insurance costs.

To the employee:

To the injured worker, however, falls the greater loss. Not only are his earnings reduced during the period of time lost through an accident (the loss may extend over a period of many years), but he suffers physically, and in many cases his loved ones are also made to suffer through reduced finances.

MANAGEMENT'S RESPONSIBILITY

To insure an effective safety program management must: (1) set up a practical plan for accident prevention, and (2) instruct the superintendents and foremen in company policies pertaining to accident prevention, and impress upon them the fact that they:

1. Must comply with and enforce State safety codes and regulations.

2. Shall seek advice and assistance from local and State safety inspectors in establishing good preventive accident programs.

3. Are responsible for the prevention of accidents.

4. Shall analyze their jobs, thus anticipating possible safety hazards, and take necessary steps to assure safe conditions.

5. Shall inspect and approve all equipment as well as ramps, scaffolds, etc., before permitting them to be used by workmen.

6. Shall make daily safety inspection of the job, noting any unsafe conditions and correcting them immediately.

7. Shall instruct all employees on company safety policies.

8. Shall enforce safety regulations.

9. Shall investigate each employee and assign him to jobs within his physical and psychological capacity.

10. Shall analyze accidents within their jurisdiction and recommend corrective procedures to prevent recurrences.

11. Shall attend regular safety meetings of the company for the purpose of discussing possible safety hazards and precautions to be taken.

12. Shall keep accurate accident records and make required written reports to the main office of accidents in which the employee requires medical attention.

13. Shall constantly seek new means of improving job safety.

14. Shall require the job steward to be trained in first aid and shall take all necessary precautions to eliminate all hazardous conditions on the job.

EMPLOYEE'S RESPONSIBILITY

Job safety is also the responsibility of all workers and it is essential and important that safe work habits be developed and practiced at all times. Among these safe habits that must be thoroughly understood and practiced are:

1. Tools and equipment shall never be placed where they can cause someone to fall or trip or endanger those working below.

2. Everyone within the working area where heavy materials are being hoisted or handled should be alerted.

3. A worker should exercise caution when stepping.

4. A worker should look out for the safety of fellow workers.

5. A worker should look out for the safety of fellow workers.

6. Horseplay shall not be permitted. A worker shall not be interfered with when he is doing a job.

7. Tripping hazards shall be removed. The foreman shall be informed of any hazards.

8. Alcohol or drugs shall never be brought on or used on the job.

Personal Protective Equipment

1. **Hard Hats**: Shall be worn at all times on any construction site. The employer generally furnishes hard hats.

2. **Eye Protection**: Safety glasses, goggles, and/or full face shields shall be worn where eyes are exposed to flying objects, dust, sand, etc. The employer shall furnish eye protection if it's necessary.

3. **Foot Wear**: It is the employee's responsibility to wear and maintain adequate work boots that add support, protection, and minimize back strain.

4. **Respiration Protection**: Dust masks and/or respirators shall be worn when exposed to dust, fumes, vapors, or other toxic and harmful contaminants. The employer shall furnish respiration protection when necessary.

5. **Hand Protection**: It is the responsibility of the employee to provide adequate gloves to protect against hot metals, sharp objects, etc. If rubber gloves are required to handle toxic chemicals the employer shall provide same.

6. **Clothing**: It is the responsibility of the employee to provide safe and effective clothing to protect against general exposure. If special protective clothing is required, it shall be furnished by the employer.

7. **Safety Belts**: Shall be worn and used at all time when working aloft. The employer shall provide safety belts when required.

8. **Personal Flotation Device**: Life vest shall be worn at all times when working over water hazards. It is the responsibility of the employer to provide personal flotation devices.

House Keeping

1. Well defined aisles and walkways shall be provided on all construction jobs, and kept free of any tripping hazard.

2. Rubbish and scrap material shall be disposed of in properly marked receptacles or bins and cleared from the job site daily.

3. Scrap receptacles and bins shall be conveniently located.

4. Scrap wood, nuts, nails, and pieces of wire shall be picked up to prevent tripping.

5. Soft drink bottles shall not be left on window sills or porches. Crates for their disposal shall be provided.

6. Garbage cans for lunch scrap disposal shall be conveniently located.

7. Old paint cans and drums which contained inflammable liquids are fire hazards. They shall be tightly capped or plugged and removed from the premises as soon as possible.

8. Extension cords, electric cable, welding leads, air lines, water lines, etc., shall be kept clear of the working area and aisles by means of troughs or hooks located on trees, poles, etc., to prevent and eliminate tripping hazards.

9. Form and structural materials shall be neatly piled as soon as possible.

10. Nails shall be turned down or removed from lumber and materials.

11. Oily rags, waste paper and other flammable materials shall be kept in tightly closed metal containers.

12. All work areas shall be well lighted to prevent accidents.

13. The clean–up crews provided shall be large enough to keep the job policed the clean.

General Construction Equipment

1. Never permit the operation of construction equipment without some means of signaling or warning nearby workers of the operator's intentions.

2. Never operate or permit to be operated a defective piece of equipment.

3. Do not permit unauthorized personnel to ride moving equipment.

4. Never be careless when getting on, off, or working around moving equipment.

5. Never work or walk under skips, buckets, etc.

6. Never enter or stand in a confined area when loads are being raised or lowered.

7. Never ride on a load or in a sling.

8. Never grab or hold onto a cable or rope as it is being pulled through a set of sheaves.

9. Never leave a piece of equipment if the engine is running.

10. Never use or permit the use of equipment for any purpose other than that for which it was designed.

11. Never attempt to lubricate, clean, repair, or refuel any piece of equipment while it is in motion.

12. Never operate a piece of equipment in a thoughtless or careless manner.

13. Always keep in place all guards over moving parts of equipment. Never remove except for repairs or adjustments, and then only after power is off.

14. Never operate cranes near power line without proper and adequate supervision.

15. Never overload construction equipment.

16. Always insist on proper maintenance.

Cranes

1. Never overload.

2. Do not operate on uneven ground.

3. Do not permit boom to contact high tension wires.

4. Keep job within safe boom radius.

5. Keep loads within capacity of crane.
6. Watch out for breaking cables.
7. Watch out for dropping or slipping of material.
8. Never walk under a lift.
9. Never walk in line of crane travel.
10. Watch out for swinging boom
11. Always stay clear of operating crane.
12. Never permit the crane to block an exit.

CHAPTER 2 ~ GENERAL SAFETY AND RESPONSIBILITY

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. When an accident occurs, we tend to say, [1]_____.

2. It is imperative that every [2]_____ and [3]_____ learns all there is to know about safety and then follows the safety rules religiously.

3. Management must comply with and enforce State safety [4]_____ and [5]_____ .

4. Job safety is also the responsibility of all [6]_____ and it is essential and important that safe work habits be developed and practiced at all times.

5. [7]_____ shall be worn at all times on any construction site.

6. [8]_____ and [9]_____ material shall be disposed of in properly marked receptacles or bins and cleared from the job site daily.

7. Never permit the [10]_____ of construction equipment without some means of signaling or [11]_____ nearby workers of the operator's intentions.

8. [12]_____ shall be turned down or removed from [13]_____ and [14]_____ .

9. [15]_____ use or permit the use of equipment for any purpose other than that for which it was [16]_____ .

10. Never operate cranes near [17]_____ lines without proper and adequate supervision.

Chapter 3 – Safety and the Hand Tool Group

This topic is planned to provide answer to the following questions:

- **What tools should a Pile Driver–Bridge Builder have?**
- **What can be learned about a Pilebutt from the quality and condition of his tools?**
- **What should a Pilebutt know about tools?**
- **What safety precautions should be observed in the use of hand tools?**

SELECTION AND CARE OF HAND TOOLS

In selecting hand tools, the apprentice Pilebutt should exercise great care. The selection, quality, and condition of a worker's tools are quite often a good indication of the quality of work that the worker will produce.

"Even when used properly, a dull or damaged cutting tool is as dangerous as a sharp cutting tool used improperly."

Wise selection of tools includes purchasing *good quality, well–designed, well–balanced* tools. A tool that appears to be a bargain may prove to be unbalanced or deficient in some other way, and the apprentice could develop incorrect habits or be injured while learning to use it.

Hand tools that are incorrectly used or that are poorly maintained are dangerous. A worker is in danger of being injured by the tool she or he is using if it is the wrong tool for the job, if it is the right tool used in the wrong way, or if it is a defective tool. A majority of industrial injuries involve a worker:

1. Being struck by the tool being used or by a tool being used by another worker
2. Being struck by chips from a tool or from the material it is used upon
3. Being struck by a tool that has come off its handle, such as an axe, or hammer head
4. Stumbling over or being cut or hit by a tool carelessly left on the floor or on a scaffold

Cutting, shaping, or shaving tools need particular care in their selection and maintenance. Even when used properly, a dull or damaged cutting tool is as dangerous as a sharp cutting tool used improperly. The misuse of sharp tools and the forced use of dull tools are among the most prevalent causes of personal injury on any job.

Even high quality tools will not yield satisfactory results if they are not cared for properly. An important aspect of good tool care is storing tools in a proper place, such as a toolbox, pouch, chest, or cabinet. Tools should be cleaned, oiled, sharpened, filed, and so forth as needed.

As the apprentice progresses through the training program, he/she will have to use

many tools. Employers, supervisors, and journeymen on the job are good sources of advice about which tools you should purchase.

TOOL REQUIREMENTS

Under the terms of your union contract, you are required to supply specific hand tools needed to do the work. The union agreement also specifies the type of tools the contractor is obliged to provide. Some of the types of tools the contractor must supply are:

- Large Hand Tools (ie. peavies, come–a–longs, large pry bars, large wrenches, etc.)
- All Power Tools (ie. electric, pneumatic, hydraulic, etc.)
- All Engine–Driven Equipment (ie. chain saws, compressors, trucks, etc.)
- All Hot Work Equipment (ie. oxyacetylene outfits, welding machines, etc.)

Generally speaking, the contractor will supply any tool which is big, expensive, or specialized .

"Adding one new tool each week to your basic set is a good practice which we encourage you to follow."

The types of tools needed by an apprentice Pilebutt are spelled–out in the *Pile Driver–Bridge Builder Apprentice Tool List* which can be found in Fig. 3–1 on page 18.

PILE DRIVER – BRIDGE BUILDER APPRENTICE TOOL LIST*

Minimum of tools required before dispatch as Pile Driver should include:

1. 20 or 22 oz. Straight Claw Hammer
2. Pocket Tape (16' long minimum)
3. 12" Adjustable Wrench
4. 8" Lineman's Pliers (side cutters)
5. Lumber Crayon/Keel/Carpenters Pencil
6. Pair Leather Palm Gloves
7. Rigging belt with appropriate tool holders or pouches similar to the following:
   - Spud Wrench or Wrench Holder
   - Hammer Holder
   - Tape Holder
   - Pliers Keeper
   - Nail Pouch
   - Utility Pouch

Optional tools for dispatch as Pile Driver:

1. Pair Bib Overalls (i.e. Carhartt™ or equal), may replace rigging belt
2. Fold back Knife – "Buck™ " style, lock back
3. 12" Adjustable Spud Wrench, may replace 12" adjustable wrench & bull pin
4. Torch Tip Cleaner
5. Torch Striker
6. Pair Rubber Rain Boots

Minimum of tools required before dispatch as Bridge Builder, Pile Driver/Framer, or Dock–Builder should include:

1. Locking Tool Box
2. 8–Point Crosscut Saw
3. Framing Squire
4. 24"–30" Level
5. Pocket Tape (16 long minimum)
6. 22 oz. Framing Hammer
7. 24"–30" Stripping Bar
8. Carpenters Bib Overalls or Carpenters Apron w/leather pouch
9. 12" Adjustable Wrench
10. 8" Linemans Pliers (side cutters)
11. Carpenters Pencil
12. Plumb Bob
13. Chalk Box with Chalk
14. 100' (minimum) String Line
15. Cats Paw Nail Puller
16. Combination Square

Optional tools for dispatch as Bridge Builder/Framer:

1. Brace and 5 Auger or Wing Bits 3/8", 7/16",1/2", 5/8", & 1"
2. Set of Wood Chisels–1/2", 3/4"and 1 1/2"
3. 100' Tape
4. 3/8" Ratchet–Socket Set
5. Hacksaw
6. Set Screwdrivers
7. Pair Pliers
8. Framing Axe
9. Pea Shooter
10. 3/16" Allen Wrench (for air drill chucks)
11. Slick (if available)
12. Adze (if available)

Minimum of tools required before dispatch as Welder:

1. Welding Hood (to fit Hard Hat) w/#10 Lens
2. Safety Glasses (OSHA Certified)
3. Welding Jacket or Cape Sleeves
4. Welding Gloves (All Leather, Long Gauntlet)
5. Chipping Hammer
6. Wire Brush
7. Vice Grips (#11 R, 2 pair)
8. 12" Adjustable Wrench
9. Burning Goggles w/#5 Lens
10. Torch Striker
11. Torch Tip Cleaner
12. Tape Measure (20' long minimum)

Optional tools for dispatch as Welder:

1. Torch Tip Nips
2. 12" Layout Square
3. Bevel Square
4. Tri–Square or Combination Square
5. 24" Level
6. Torpedo Level
7. Wrap–Around (4" x 48")
8. Chalk Box w/White Chalk

Failure on the part of the apprentice to obtain these required tools could result in:

1. A delay in wage re–rates until requirements are met.
2. Possible job termination for failure to supply proper hand tools.

*You are encouraged to purchase one (1) tool a week to spread out the cost. Tools required for specific classes (listed in class notice) are mandatory and must be in your possession.

Fig. 3–1 Pile Driver–Bridge Builder Apprentice Tool List

Every apprentice should have a set of basic hand tools with the intention of adding more specialized tools to their personal tool inventory as time and money permit. Adding one new tool each week to your basic set is a good practice which we encourage you to follow.

SAFE WORKING PRACTICES

General Safety Rules

To attain the greatest degree of safety and efficiency with hand tools, every worker in

the construction industry should do the following:

- Know how to use these tools in all situations.
- Care for and maintain tools correctly.
- Keep informed about new tools and their uses.

Specific Safety Rules

The foundation of good safety practice is built upon a knowledge of basic safety principles and rules. However, to be of practical value, these general rules must be made specific; that is, they must be related to actual conditions on the job.

The safety rules provided in the apprentice's textbook and in the *Construction Safety Orders* are fundamental to the safe performance of tasks by all workers in the Pile Driving trade. Among the specific rules that should be emphasized, however, are the following:

1. Always focus your full attention on the work you are doing with any hand tool.

2. Use the right tool for the job. Use not only the proper tool, but also the correct size. Use good quality tools and use them for the job they were designed to accomplish.

3. Learn how to use the tool properly. Study your tools—learn the safe way of working with each tool. Don't force a tool or use tools beyond their capacity. Don't be afraid to ask questions on the proper and safe use of a tool.

4. Keep tools in their best condition. Always inspect a tool before using it. Do not use a tool which is in poor or faulty condition. Use only safe tools. Cutting tools should be sharp; tool handles should be free of cracks and splinters and should be fastened securely to the working part.

5. Keep each tool in its place. Each tool should have a designated place in the tool box or tool belt. Do not carry tools in your pockets unless the pocket is designed for that tool. Keep pencils in the pocket designed for them — do not place pencils behind your ear or under your hat or cap.

6. Where appropriate, secure work with a clamp or vise.

7. When using sharp–edged tools, cut away from the body. Keep your feet or free hand behind the direction of the cut in case that tool should slip.

8. Keep sharp–edged tool away from the edge of a bench or work area. brushing against the tool may cause it to fall and injure a leg or foot.

9. When carrying edged and/or sharply pointed tools such as axes, peaveys, pile poles or large chisels, carry with the cutting edge or point down and outward from your body.

10. Keep tools sharp and clean. Dull tools are dangerous. The extra force applied in using dull tools often results in losing control of the tool. Dirt and/or oil on a tool may cause it to slip on the work and may cause injury.

11. Always use a handle on a file. Otherwise, the tang (pointed end) may cut into the palm or your hand or wrist.
12. Do not strike hardened metal or tools with a hard–faced hammer. Chips of metal may break loose and cause injury.
13. Batter–heads of metal tools may be kept ground smooth and square to avoid mushrooming. When the head of a tool that has been allowed to mushroom is struck, bits of metal often break loose causing serious injuries.

TOOLS AND SAFETY ACCESSORIES REQUIRED FROM THE HAND TOOL GROUP

The Hand Tool Group can be divided into seven (7) categories which groups the tools according to their common purpose:

1. Safety Accessories
2. Layout – Measuring – Marking Tools
3. Cutting – Shaping – Shaving Tools
4. Driving – Striking – Chopping Tools
5. Fastening – Joining Tools
6. Boring – Auguring Tools
7. Clasping – Prying – Separating Tools

It is important for you, the apprentice, to understand that, within these general categories, each individual tool has a specific purpose and no tool should be used for any purpose other than what it is designed to do.

Following is an listing of each tool required to be in the possession of all journeyman Pile Driver – Bridge Builders when reporting to work (apprentices should have the basic tools on their first job and all these tools before they turn–out). Also included is a brief description along with any necessary safety information associated with each hand tool.

SAFETY ACCESSORIES

Make certain that a task can be done safely before attempting it. When in doubt, take whatever steps may be necessary to ensure the safety of all concerned.

Wear proper clothing, including a "hard hat" in areas where falling or flying material may be a hazard. Steel–capped shoes offer protection against dropped objects, and thick–soled shoes can protect against stepping on nails or other items that can cause punctures. Do not wear clothing that fits loosely. Wear a shirt when working in the sun. Serious accidents, burns, and even skin cancer can result from exposure to the sun.

Be sure that tools carried in overalls or in a tool pouch have protected edges.

Hard Had

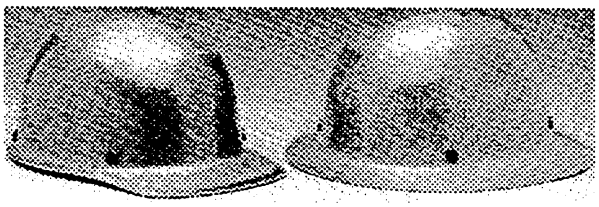


Fig. 3–2 Hard Hats (cap & hat styles)

It goes without saying ... a hard hat is required equipment on any construction jobsite. A worker not wearing a hard hat who suffers a head injury, may forfeit any legal claim for the injury.

Safety Glasses/Goggles

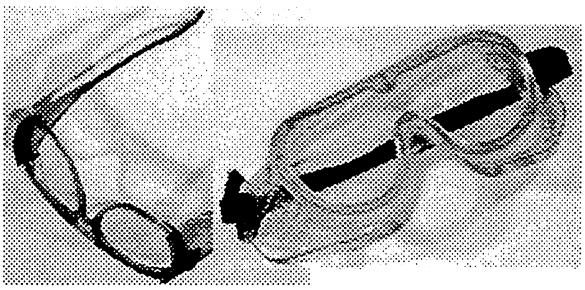


Fig. 3–3 Safety Glass & Goggles

To be worn on jobs at all times. There are many different versions and styles available, however, to be effective they should say OSHA or ANSI Approved.

Work Gloves (leather)

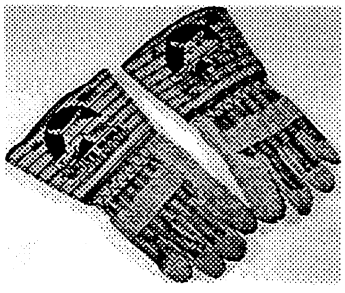


Fig. 3–4 Leather Palm, Large Gauntlet Gloves

Leather palm work gloves are manditory when handling rigging or wire rope and when working around steel.

LAYOUT–MEASURING–MARKING TOOLS

Fig. 3–5 Pocket Tape (16')

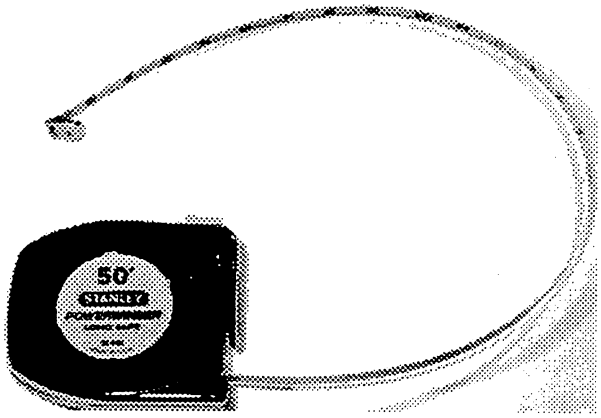
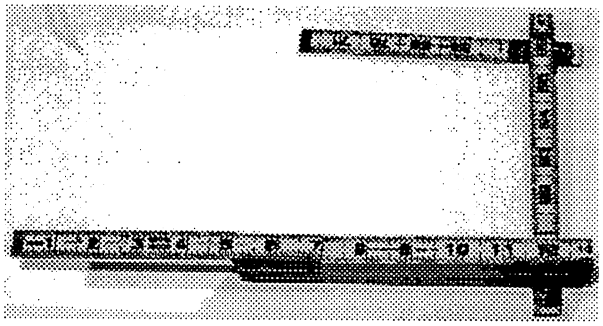


Fig. 3–6 50' Reel (long) Tape



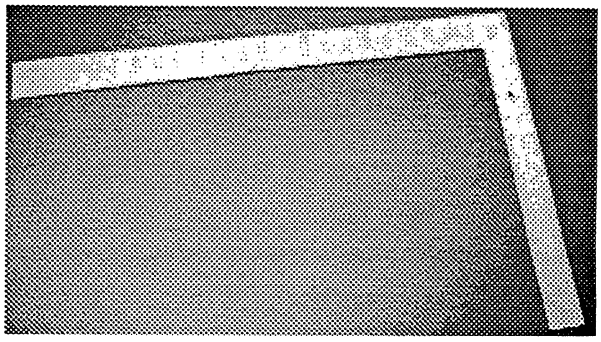


Fig. 3–9 Framing Square

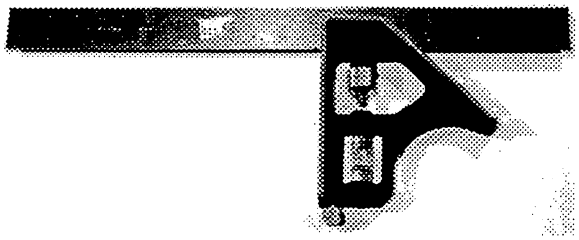


Fig. 3–10 Combination Square

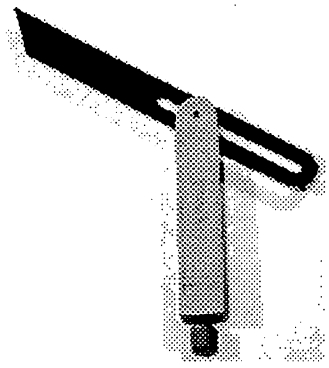


Fig. 3–11 Bevel Square

LAYOUT–MEASURING–MARKING TOOLS (Con't)

Fig. 3–12 24" – 36" Framing Level

Fig. 3–13 Torpedo Level

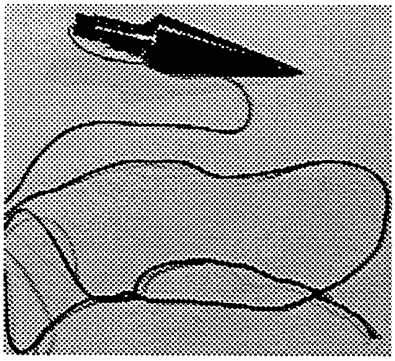


Fig. 3–14 Plumb Bob

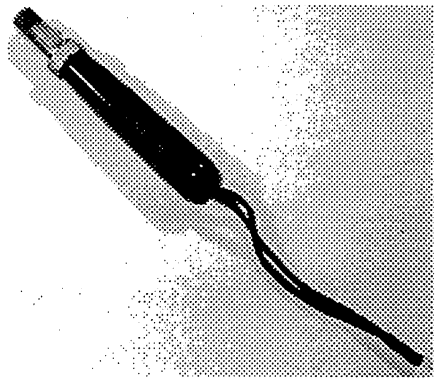


Fig. 3–15 Lunber Crayon & Holder

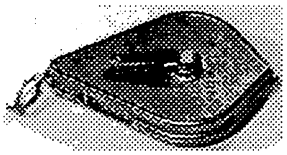


Fig. 3–16 Chalk Box

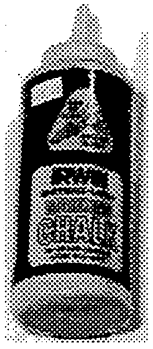


Fig. 3–17 Chalk Box Chalk

CUTTING–SHAPING–SHAVING TOOLS

Use a vise or a clamping device to hold small materials being chiseled or being worked on with a screwdriver, utility knife, or the like. Holding the material with one hand and chiseling with the other is a dangerous practice.

Keep fingers away from the area of cutting, drilling, or chiseling.

Do not use fingers to check sharpness of tools, use paper.

Fig. 3–18 8 – 10 Point Cross–Cut Saw

When using a saw, be sure that it is the correct saw for the job; that the teeth are sharp and set properly; and that the material being cut is properly held by a sawhorse, bench, or other means.

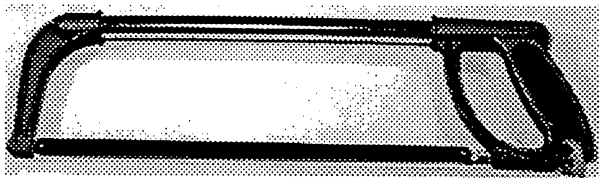


Fig. 3–19 Hack Saw

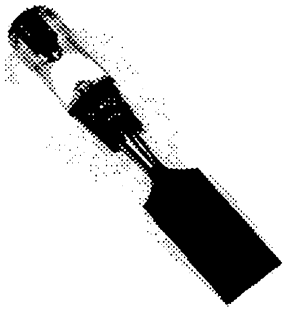


Fig. 3–20 Wood Chisel

Work away from the body or limbs when using a sharp–edged tool, such as a chisel.

Fig. 3–21 Utility (razor) Knife

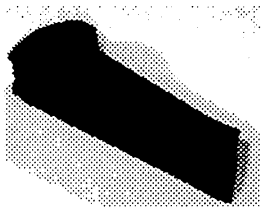


Fig. 3–22 Surform™ Plane

Fig. 3–23 Sheet Metal Snips

DRIVING–STRIKING–CHOPPING TOOLS

Do not strike hardened metal or tools with a hard–faced hammer. Chips of metal may break loose and cause injury.

Batter–heads of metal tools may be kept ground smooth and square to avoid mushrooming. When the head of a tool that has been allowed to mushroom is struck, bits of metal often break loose causing serious injuries.

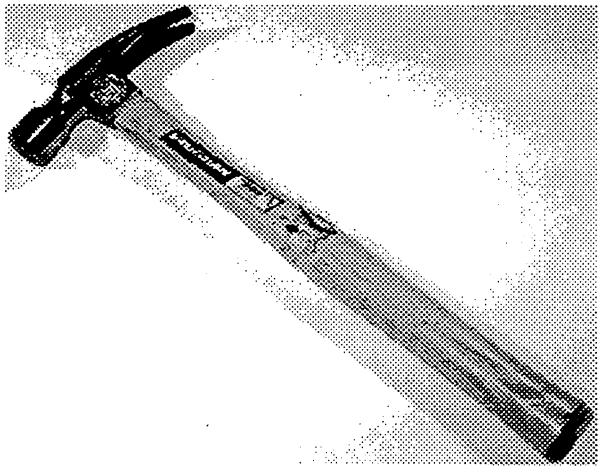


Fig. 3–24 22 oz Rip–Claw, Milled Face Framing Hammer

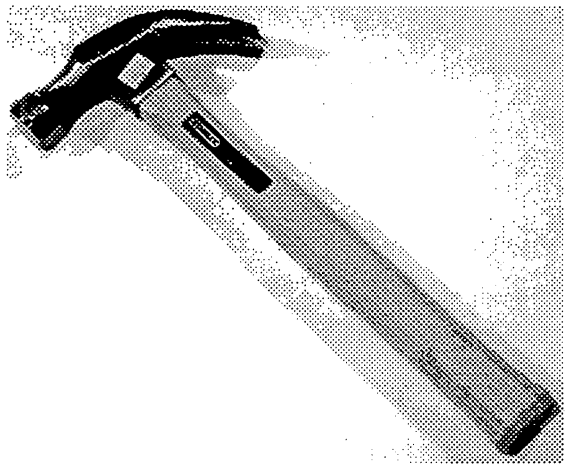


Fig. 3–25 16 oz Curved–Claw, Smooth Face Finish Hammer

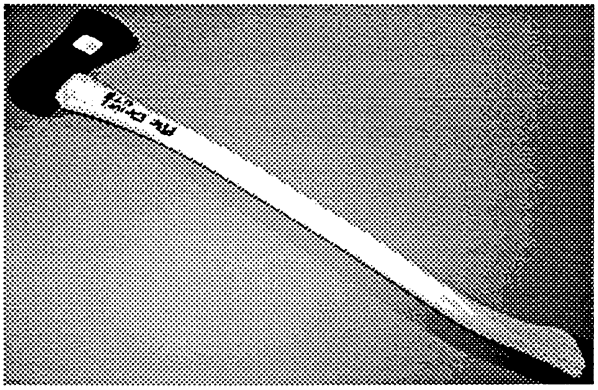


Fig. 3–26 32 oz – 48 oz Framing Axe

FASTENING–JOINING TOOLS

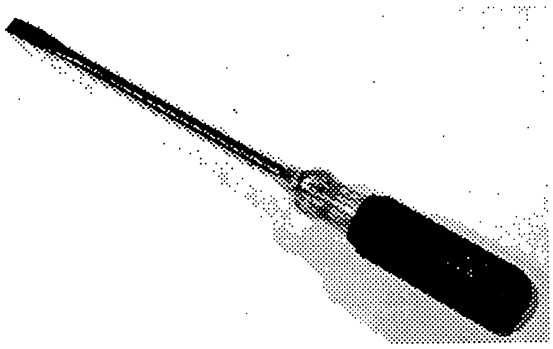


Fig. 3–27 Screwdriver

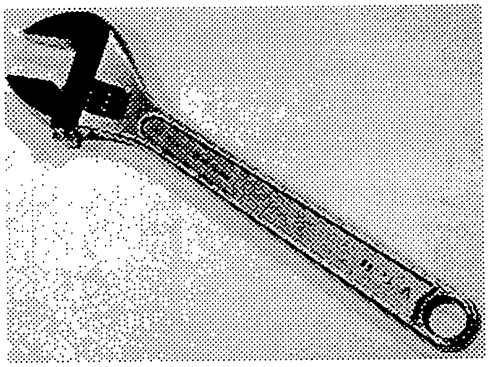


Fig. 3–28 12" Adjustable (Cresenf™) Wrench

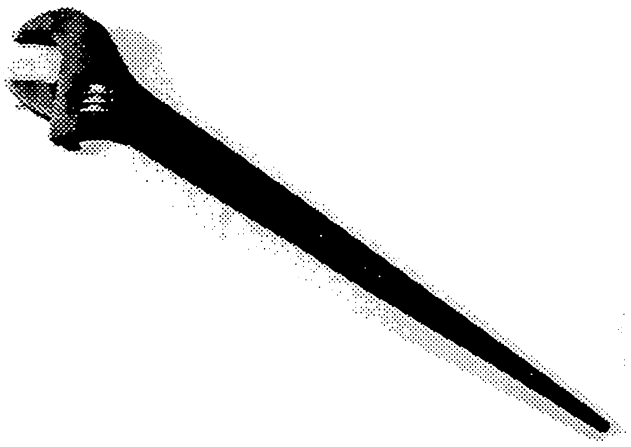


Fig. 3–29 Adjustable Spud Wrench

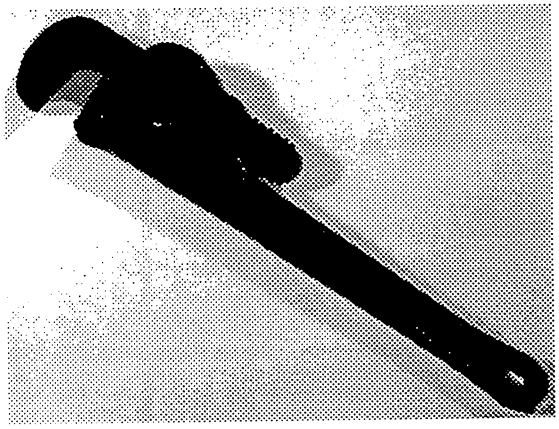


Fig. 3–30 Pipe Wrench

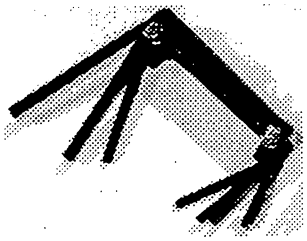


Fig. 3–31 Nest of Hex (Allen) Wrenchs

BORING–AUGURING TOOLS

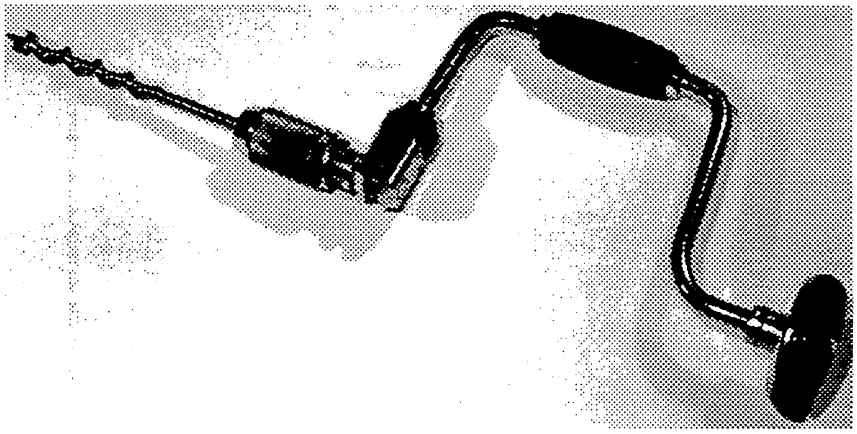


Fig. 3–32 Brace w/Wood Boring Bit

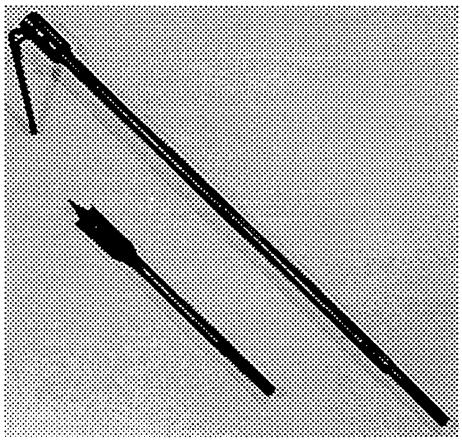


Fig. 3–33 Wing Bit w/Extension

CLASPING–PRYING–SEPARATING TOOLS

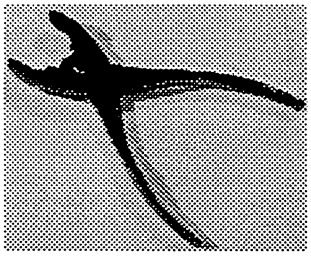


Fig. 3–34 Combination Pliers

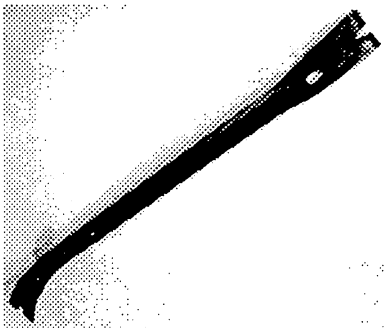


Fig. 3–36 Stripping/Pry Bar

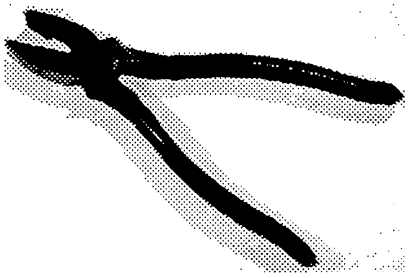


Fig. 3–35 Lineman's Pliers (Side Cutters)

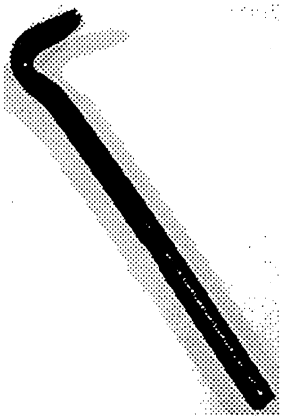


Fig. 3–37 Cat's Paw (Nail Bar)

SOME TYPICAL CONTRACTOR–SUPPLIED HAND TOOLS

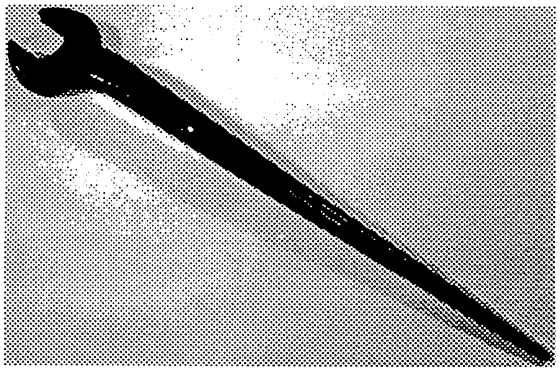


Fig. 3–38 Fixed Spud Wrench

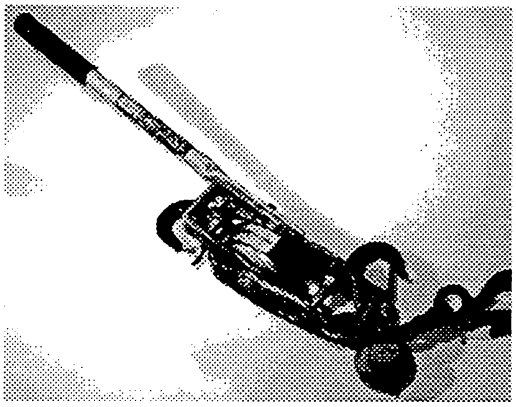


Fig. 3–39 Cable Come–A–Long

Fig. 3–40 Warehouse/Wrecking Bar

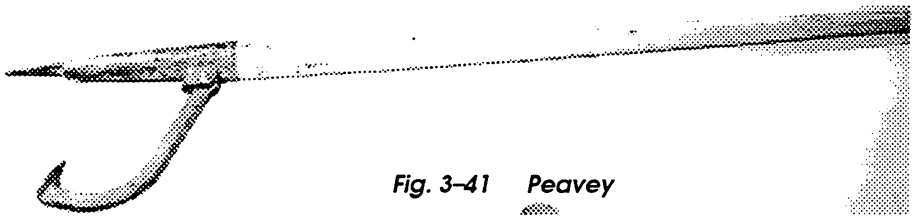


Fig. 3–41 Peavey

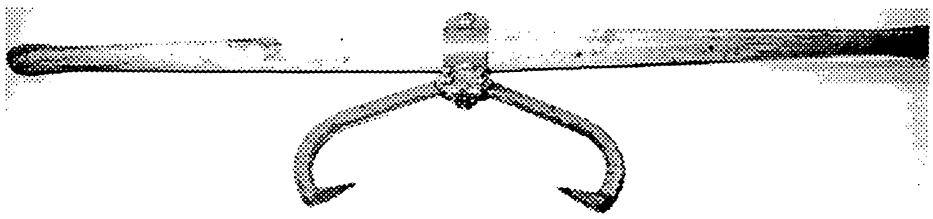


Fig. 3–42 Timber Carrier (Sweede Hook)

CHAPTER 3 ~ SAFETY WITH HAND TOOLS

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. The handle of a hammer should be securely set in the [1]_____ of the hammer.

2. A hammer should never be used to strike a surface of hardened [2]_____ .

3. A screwdriver that has a [3]_____ or split handle should not be used.

4. A screwdriver used around electrical work should have a handle that is [4]_____ .

5. The safest arm motion to use when working with a wrench is a [5]_____ motion.

6. A file should always be equipped with a [6]_____ .

7. The safest way to carry a wood chisel is with the cutting edge held [7]_____ .

8. A worker who must use pliers to clip wire ends should wear [8]_____ .

9. Pliers used as a [9]_____ can easily slip and cause injury to the user.

10. A piece of [10]_____ , not the fingers, should be used to check the sharpness of a plane iron.

11. Wrenches should not be used with a handle extension or a [11]_____ .

12. If a chisel is to be struck by someone other than the holder, the holder should use [12]_____ or some similar device to hold the chisel.

13. Chisels should be held in such a way that the [13]_____ of the holder will be protected if the hammer misses the head of the chisel.

14. Before metal is cut with a tin snips, all [14]_____ should be removed from the metal with a file.

15. Tools carried in overalls or in a tool pouch should have [15]_____ edges.

Chapter 4 – Safety with Electrical and Air (Pneumatic) Tools

This topic is planned to provide answer to the following questions:

- **What are the power tools most commonly used in the construction industry?**
- **What are the best sources of information available to workers in the construction industry regarding the safe operation of power tools?**
- **What safety practices should be followed in the operation of power tools?**

BASIC POWER TOOLS

The demand placed upon the construction industry in the United States for mass production of housing has contributed greatly to the development of a variety of tools powered by electricity, air, gas, or some type of powder charge. Among the power tools with which a carpenter must be most familiar are several types of saw, nailers, staplers, planes, routers, drills, and sanders. Detailed information about these and other types of power tools and information about safety in the use of power tools is presented in the study assignment for this topic.

SAFETY PRINCIPLES

Operators of any type of power tool must be constantly alert to the dangers inherent in working with such instruments. The threat of injury to the operator is great, but this threat can be significantly reduced if the operator will follow these general rules:

1. Use proper equipment.
2. Use tools correctly.
3. Make sure tools are in good condition.
4. Know, understand, and observe faithfully all the safety precautions relating to the use of power tools. Some excellent sources of this information are the manufacturer's operating instructions; the safety orders and safety bulletins published by the Division of Industrial Safety; and the publications of the construction industry.
5. Use common sense

Safety with Electric Tools

Some specific rules that should be emphasized for the safe operation of electric tools are the following:

1. Be sure that the amperage at the circuit breaker or source is correct.
2. Be sure that the voltage being used is correct. Most portable electric tools operate on 120 volts.
3. Be sure that plugs are the right type.
4. Be sure that power cords, including any extension cords, are of the proper gage wire.
5. Make certain that electric tools with metal housing are always grounded when in use. Individually covered grounding wires are green.

6. Be sure that tools considered safe without grounding, such as those constructed of high–impact plastic, conform to all safety regulations.

7. Have an expert do any work on an electrical system that you do not completely understand.

8. Never cut off the grounding blade of a three–prong grounding cap or plug.

9. Disconnect an electric tool when making any adjustments to it.

10. Be sure that cutting tools are sharp.

11. Have and use proper eye–protecting devices on jobs that involve possible danger to the eyes.

12. Wear clothing that is comfortable but that is not so loose as to be caught in a power tools that is in operation.

13. Make certain that all guards are in place and that they are operating correctly.

14. Maintain a stable position that prevents a loss of balance when operating an electric tool.

15. Be sure that electric tools, especially the larger ones such as a table saw or radial arm saw, are properly set up.

Safety with Air–Powered (Pneumatic) Tools

Many of the rules for working safely with electric tools can also be applied to working with air–powered tools. Some additional rules to be emphasized for the safe operation of air–powered tools are the following:

1. Be sure that all connections are the proper ones and that they are in good condition.

2. Make certain that hoses are of high quality and that they are capable of carrying the required air pressure.

3. Be sure the air pressure being used is that required for the tool.

4. If working with a portable compressor, know how to operate the compressor, know how to interpret the gages, and be sure that the compressor has the required pressure controls.

5. Check hose and the pneumatic tools to see that they are in good condition and that the safety devices work.

6. Wear eye protection (safety glasses and face shield)

7. Never point an air hose at anyone or yourself or play with the hose while discharging air. The high air pressure can severely injure you or your fellow workers.

8. Always tie hose connections together with tie wire before turning on air to tool

9. Disconnect tool from air supply before doing maintenance on any air tool.

Safety with Powder–actuated Tools

A number of the rules already given for working safely with electric tools and pneumatic tools are applicable to working with powder–actuated tools. However, three specific rules that are applicable only to

working with powder–actuated tools and that should be emphasized are the following:

1. *Do not* operate a powder–actuated tool unless qualified to do so.

2. *Do not* operate a powder–actuated tool unless in possession of an operator's card certifying qualification with the tool being used. Possession of such a card while operating the tool is required by law.

3. Protective devices used on powder–actuated tools must be mounted perpendicular to the barrel of the tool.

CHAPTER 4 ~ SAFETY WITH ELECTRICAL AND AIR TOOLS

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. Protective devices used on powder–actuated tools must be mounted [1]_____ to the barrel.

2. If requested to do so by a safety inspector, the operator of a [2]_____ [3]_____ tool must show his operator's card.

3. A portable electric handsaw must be equipped with a [4]_____ that protects the operator from the exposed portion of the blade.

4. A [5]_____ [6]_____ saw must never be used for ripping unless it is properly equipped with an anti–kickback device.

5. A radial arm saw must be set up so that the blade can return automatically to the [7]_____ of the table.

6. All electrically powered equipment with metal housing must be properly [8]_____ .

7. If an individual covering is provided for the grounding wire of a portable electric tool, the covering can be recognized by its [9]_____ color.

8. When changing the blade on a power saw, the operator should always [10]_____ the power cord.

9. A table saw must be equipped with a [11]_____ that covers the blade to at least the depth of the teeth.

10. When using a table saw for ripping, the operator must make certain that a [12]_____ is directly behind and in line with the blade.

11. Any person ripping narrow pieces on a table saw must use a [13]_____ [14]_____ to move the pieces to the blade.

12. The guards on power saws must not be prevented from working automatically by [15]_____ [16]_____ , or other devices.

13. A pneumatic nailer or stapler that operates at more than [17]_____ psi must be equipped with some type of safety device to prevent accidental discharge.

14. No person should be within [18]_____ feet of a person who is operating a pneumatic nailer or stapler.

15. Operating a pneumatic tool on a roof with a slope that exceeds one–third pitch requires the operator to wear a [19]_____ belt with a [20]_____ line attached.

This topic is planned to provide answer to the following questions:

- **What should a Pilebutt know about safety in various areas of a particular job site?**
- **What are some safety considerations involved in working in and around excavations, openings, railings, and barriers?**
- **What are considered safe shoring and falsework practices?**
- **What are some safety precautions necessary around hot work?**
- **What are some of the do's and don'ts when working around cranes?**

EXCAVATIONS, TRENCHES, AND EARTHWORK

The responsibilities of a Piledriverman in general on the job site often includes preparing work areas for himself and for fellow workers and making these areas safe and secure. The work that a pilebutt does in such cases is especially important to those workers who must carry out their duties in some type of trench or excavation.

The primary danger to pilebutts in a trench or excavation is that the earth banks around them may collapse and cover them. Protection against such earth movement, however, can be provided in the form a specially constructed shoring system, which is usually designed by engineers on the job site and constructed by pilebutts.

Pilebutts must also have knowledge about various types of shoring systems, including the approved methods of guarding excavations and trenches. Knowledge about the use of ladders and lifelines and about the recommended means and methods of entering and leaving trenches and excavations is also essential for a piledriverman.

BINS, BUNKERS, HOPPERS, AND MATERIAL STORAGE

A pilebutt may be called upon to build bins, bunkers, or hoppers for storing his or her own work or for tools and equipment, of for other workers within the realm of piledriving.

"Getting help in carrying a heavy load and keeping the back straight are among the rules that every worker who must perform lifting operations should know and remember."

The knowledge that a pilebutt must possess with regard to storing materials must not be limited to just that. The nature of pilebutt's work makes it essential that he or she know the proper methods for stacking various materials; the heights to which various materials can be stacked safely; and, in the case of certain materials, the number of units that may be stacked safely.

The pilebutt should know about lifting materials by hand, like all other workers, should be careful to follow all recommended procedures. Each year many injuries occur

when many workers attempt to lift materials in an improper manner.

Getting help in carrying a heavy load and keeping the back straight are among the rules that every worker who must perform lifting operations should know and remember.

STANDARD RAILINGS

Whenever railings are required on a job site such as a cofferdam, pilebutts will build them. The requirements for railing construction are not great in number, but they are specific. These requirements cover such topics as methods of construction; location; materials to be used; use of toe boards for additional protection; height; distances from the edge of a platform; and additional screening or barriers. (See page 34 of Reference Sheets.)

RAMPS, RUNWAYS, STAIRWELLS, AND STAIRS

In general, on fishing piers, some docks and wharves over water, a pilebutt will have to utilize his or her knowledge of the requirements related to the construction of ramps, runways, stairwells and stairs. This set of regulations will include how wide these items or areas may be, what guardrail protection is required, and what material may be used for construction.

Other regulations deal with the maximum allowable length of stairs without a landing, the use of toe boards, illumination of a stairway, protection at a stairwell, and the maintenance of stairs and ramps in a debris–free condition. (See page 26 of Resource Sheets.)

ACCESS AREAS

Access areas include stairs, ramps and elevators. Some requirements with which a pilebutt must be familiar are those pertaining to the width of a stairway, the maximum allowable vertical rise of a stairway before a landing must be installed, and the maximum allowable length of a ladder to be used in an access area. (See page 22 of Resource Sheets.)

OPENINGS

Special consideration must be given on any job site to the safety of you and other workers around openings in floors and walls. Elevator shafts and openings in concrete forms may also present special safety problems on a job site.

Planks, railings, barriers and warning signs are among the safety and warning devices that may be used around such openings.

SCAFFOLDS

Scaffolds are pieces of equipment that pilebutts and other construction workers depend on greatly for safety on the job. The two (2) types of scaffolding with which you should be familiar are the wood–frame scaffold and a tubular type of steel scaffold. Steel scaffolds are usually built and placed by scaffolding firms that specialize in building such items, however, pilebutts will sometimes have to do it.

The knowledge that a pilebutt has about scaffolds and their construction should cover

at least the following: material approved for use; width and length of planking; restrictions placed on the use of various types of scaffolding; aspects of inspection of lumber used; nail schedules; prohibited types of scaffolds; qualifications of builders of scaffolds; removal of bracing; loading; and access to scaffolds. (See page 40 of Reference Sheets.)

LADDERS

The ladders used on a construction project may or may not be built on the job. It might be bought from a firm that specializes in ladders. For his or her own safety and that of other workers, a pilebutt should be knowledgeable in the following areas about ladders: required dimensions; height limitations; acceptable materials; restrictions for working on ladders; methods of keeping the base of a ladder must extend above the landing it serves; required size of the landing area at the top of a ladder; and the proper methods of using extension ladders. (See page 24 of Reference Sheets.)

FALSEWORK AND VERTICAL SHORING

For most of the pilebutts who work in bridge building or overhead concrete work should become familiar with the requirement of design loads; spacing between falsework and spacing between shoring legs. Pilebutts should also know that there are three basic types of shoring: wood, tubular and pipe. The wood is nailed or bolted together. The tubular will be pinned or bolted together and the pipe will most likely be welded by a certified welder. (See pages 81–83 in the Resource Sheets. Also pages 38–39.)

HOT WORK

Hot work will include cutting and heating with the oxygen–acetylene equipment and will also cover welding. A pilebutt will not only need to know how to use a torch cutting outfit, and how to weld, but he or she will have to know all the safety aspects involved in doing so. There are strict guidelines set down for the pilebutt to follow and it is highly recommended that he or she learn what they are and remember them and follow them to the letter.

CRANES

All the work that is controlled by the piledrivers, divers, carpenters, bridge and dock builders will most likely utilize a crane or overhead lifting device.

To drive pile you need a crane; to set shoring you need a crane; to get material to where it is needed you will need a crane; it would be safe to say that on just about all job sites that have pilebutts on them you will find a crane or an overhead lifting device that resembles a crane. Pilebutts do not operate the crane or heavy equipment on the job site. However, there are several things that a pilebutt should know about cranes or should have some safety knowledge about them. To make things even safer then what they are and to help the operator of the crane, you should read pages 65–72 in the Resource Sheets.

ANALYSIS

The greatest part of a pilebutts time on the job site is taken up with construction and

erecting a wide range of items. Building cofferdams; erecting heavy lift equipment; erecting piledriving equipment to drive piling; constructing forms for concrete pours, and installing a system of shoring on bridges are all examples of such tasks that pilebutts need to perform.

In activities of construction and/or erection, as in all other phases of a pilebutts work, the safe and successful completion of the job depends both on the worker's knowledge of applications, restrictions and requirements and most of all his manipulative skills.

Short–cuts to safe working practices do not exist. Only through determined effort to learn all that he can about the piledriving trade and through willingness to practice faithfully what he or she learns can an apprentice pilebutt become an efficient and proficient journeyman piledriverman. And only in this way can he or she ensure safety for himself/herself and other workers on the job site.

CHAPTER 5 ~ GENERAL JOB SITE SAFETY

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. A system of sloping or [1]_____ is used to prevent earth banks from collapsing and covering workers in a trench or excavation.

2. Any person required to perform lifting operations should take care to keep his back [2]_____ when lifting.

3. A temporary railing should not be less than [3]_____ inches or more than [4]_____ inches in height above the platform it serves.

4. The principal types of scaffolds found on a job site are a [5]_____ –frame scaffold and a tubular type of scaffold constructed of [6]_____ .

5. The lumber used to construct a scaffold must be able to support at least [7]_____ times the maximum load that will be placed upon it.

6. The side rails of a ladder used to provide access from one floor to another must extend [8]_____ feet above the landing that the ladder serves.

7. A worker must use a [9]_____ [10]_____ when the required work exposes him to the hazard of falling from a height greater than 15 feet or one [11]_____ above the ground, a water surface, or a continuous floor level below.

8. Use of a safety net should be considered if a worker must perform his duties at a height greater than [12]_____ feet above the ground, a water surface, or a continuous floor level below.

9. The tipping, slipping, or collapsing of a pile of lumber can be prevented through the use of [13]_____ or [14]_____ in the pile as needed.

10. A wooden ladder should not be [15]_____ in any manner that would conceal the grain structure of or any defect in the wood.

11. Diagonal bracing and lacing must be capable of resisting [16]_____ per lineal foot of floor edge or [17]_____ of total dead load, whichever is greater.

12. Falsework plans must be available at the [18]_____ .

13. Provide suitable [19]_____ , water containers, water hoses, sand, etc. in the work area.

14. When [20]_____ and [21]_____ are not in use, they shall be protected so that they cannot make electrical contact with employees or [22]_____ objects.

15. An operable [23]_____ is required on any crane which could fall over backwards.

16. Damaged/defective slings must be [24]_____ from service immediately.

17. Avoid operations that expose employees to overhead [25]_____ .

Chapter 6 – Hazards of Pile Driving on Land

This topic is planned to provide answer to the following questions:

- **What should a Local #34 Pile Driverman know about general safety in this Industry?**
- **What are some of the identifiable hazards associated with Job Mobilization?**
- **What are some of the major safety considerations when working in driving crews?**
- **How does safety enter in to the correct handling of materials, equipment, and pile types?**
- **What are the specific California and Federal Safety Codes associated with our industry?**

INTRODUCTION

The following information is being presented to you, the student, and an "entry–level" craftsperson being exposed to this trade for the first time. Initially, you should try to develop an understanding that Piledriving is a unique trade – vastly different from all other trades. Very few trades encompass a spectrum of work assignments as diverse and challenging as piledriving. As an inductee into the Piledrivers, Divers, Carpenters, Bridges, Wharf, and Dock Builders, you can begin to realize, from just this title alone, how large an area of skills you will eventually possess.

Along with these diverse work assignments comes an equal variety of inherently dangerous situations which require constant vigilance on the part of each and every piledriver worker. As was previously stated, the two (2) main causes of construction accidents are: (1) Human error, and (2) Equipment failure. As a correlation to the fact, a great number of accidents in the piledriving field are related to the nature of our work and can be attributed to some of the following conditions:

Fact: 75% of piledriving work occurs above eye–level (over your head), in leads, on trestles, on bridges, on crane hooks. Result: Danger of being struck by falling objects is extremely high. Prevention: Look up.

Fact: ALL of our work is done around or in conjunction with the largest, most powerful machines made by man (i.e., cranes, piledriving hammers, forklift, deck winches, heavy–lift water rigs, tug boats, etc.) which are often worked to capacity limits. Result: Danger of equipment failure is extremely high. Prevention: Never entrust your faith in a piece of equipment. Pay particular attention to uncommon sounds. Never stand under suspended loads.

Fact: By industry standards, rigging in the piledriving field (ie. load types, and load weights) are generally the heaviest and most hazardous of any in the construction industry. Result: If any failures occur, the resulting accident will develop very rapidly. Prevention: Develop and awareness of the task at hand. Openly discuss "worse–case scenarios" with other crew members. Always!! Plan your escape rout in advance.

Fact: A great deal of our work is done in subterranean and submarine structures such

as: trenches, caissons, cofferdams, pile footings, etc. Result; Danger of burial from collapse is possible. Prevention: Never work in unshored trenches, unsheathed caissons, or embraced cofferdams, particularly if the perimeter of the excavation is trafficed by large equipment or loaded with heavy materials or spoil piles.

These are just a few of the major considerations that require pilebutts to stay constantly alert. The key to safe and successful job operation is proper planning, knowledgeable supervision, constant communication between crew members, and personal awareness.

All construction projects have a schedule of successive events which generate the project through various phases. In order to be more specific about safety associated with piledriving, we will use the major work phases of a typical piledriving job as an outline and list the major safety consideration that occur within each phase.

JOB MOBILIZATION

Job mobilization is the 1st phase of any piledriving job. It usually involves the first move into an area where basic site preparation has been done for construction. Generally, on new construction, the piledrivers are the first basic construction craft on the job after the earth work has been done.

Equipment Arrival

1. Traffic control must be maintained when heavy cranes, forklifts and trucks arrive on surface streets – the general public must be monitored and protected.
2. Be cautious of construction and vehicular traffic movement.
3. Be certain that job site roads and/or ramps are adequately compacted to accommodate heavy–laden trucks.
4. Be sure staging and rigging–up areas have adequate room for heavy equipment assembly.
5. Be extremely cautious of the movements of heavy–class equipment.
6. Be certain that adequate supervision is provided when rigging–up delicate loads (boom sections) and awkward loads (crane tracks, lead sections, crane accessories).
7. Inspect all chokers and rigging accessories before use.
8. Never use choke hitching on booms – always cradle these loads to avoid chord and lacing damage.
9. Use tag lines at all times to avoid load twisting and hazardous boom collisions.
10. Use dunnage and blocking at proper points to evenly support boom and lead sections.
11. Never stand under any loads.

Rigging Up (Crane & Leads)

1. Inspect all wire rope and crane accessories before use.
2. Never crawl under boom sections that are being pinned up...walk around.
3. Always use only one (1) signalman on rigging–up procedures.

4. Never place fingers in boom pin holes.

5. Maintain sure footing and balance on top of boom section.

6. Never pull crane lines along the top of booms alone. Rule of Thumb: Two (2) workers pull line down boom as one (1) worker pulls slack off drum.

7. Never wear loose or torn clothes while working in the draw–works of a crane.

8. Be sure lines are reeved correctly around and/or through rollers and over proper sheaves.

9. Be extremely cautious of loose pendant lines draped across tops of boom sections.

10. Exercise extreme caution when pinning–up gantry assemblies.

11. Stay clear of uprighted, freestanding counterweights.

12. Never boom–up cranes without proper weight applied to crane lines so they will not overhaul.

13. Be sure all crane line attachment devices (headache balls, beckets, hooks, swivels, clamps) are fastened correctly.

14. Never stand between the tracks and the house of a crane.

15. Make sure the connection between the boom–tip and fixed leads (boom tip connector) is secure.

16. Be positive about hammer line, pile line and whip line positions when reeving–up leads – be sure to reeve below line guards.

17. Never stand under raising leads.

18. Never stand behind the back of fixed leads.

19. Never attempt to rig–up swinging leads unless supervised.

20. When the piledriving configuration is assembled (crane, leads and hammer) and stood up, be sure to realize the potential for falling objects.

21. Never for any reason stand under a suspended piledriving hammer.

MATERIALS – HANDLING & STORAGE

The materials on a typical piledriving job will most likely consist of either: (1) Pre–cast, prestressed concrete pile, (2) Steel sheet pile, (3) H–pile, (4) Pipe pile, or (5) wood pile.

The handling of the pile is critical in order to avoid damage. The storage is important to avoid costly and repetitive relocation of pile stacked in areas where installation and/or access is targeted.

Pile Handling

1. When unloading lone (70′–0″ +) pre–cast, prestressed concrete pile from trucks, avoid using picking eyes – instead use chokers positioned at specified picking points.

2. When unloading steel sheet pile, stack in lifts of 5 to 7 pile per lift.

3. Handle H–pile individually to avoid damage.

4. Never roll wood pile off of a truck where they have the possibility to crack.

5. Never step between unbraced stacks of wood pile or pile pile – they may shift and trap you.

6. Always use tag lines on pile handled by cranes.

Material Storage

1. It is extremely critical to stack pre–cast, prestressed concrete pile level by using built–up dunnage to avoid stress cracking. When stacking layers of pile, be sure the dunnage is aligned vertically. Stack all heads facing the same direction.

2. Stay clear of forklifts handling concrete pile with picking beams these loads are awkward and dangerous.

3. Never step between rows of concrete pile when the forklift is laying them out.

4. Never place fingers or hands between blocked–up sheet pile.

5. When handling H–pile with shake–out hooks, never place hands or fingers on web next to hooks.

6. Always block or chink the outside bottom pipe or wood piles which support a built up stack of pile.

WORKING ON PILEDRIVING CREWS

1. Always wear (a) hard hat, (b) safety glasses, (c) hearing protection, (d) leather work gloves, (e) good work boots, (f) protective clothing (coveralls, long–sleeve shirts, etc.) and (g) rigging belt with proper tools on ALL piledriving jobs.

2. STAY ALERT!! and ADDRESS YOURSELF TO THE WORK AT ALL TIMES.

3. No horseplay

4. LOOK UP!.....LOOK DOWN

5. Stay our of the Bight!

6. Never place yourself in a position you can't get out of.

7. Mentally anticipate disasters and mishaps – plan escape routes.

8. Be particularly aware of odd or unfamiliar sounds.

9. Openly discuss possible catastrophes with crew members. talk about "what could happen if..." and how each of the crew will react.

10. Never place any part of your body under a piledriving hammer you're not willing to lose!!

11. Never stand anywhere around the leads where the operator can't see you.

12. Stay away from the front of crane tracks and between tracks and house.

13. One and only ONE! signalman on a piledriving crew.

14. Never get in the leads without a safety belt – AND USE IT!!

15. Never! fully trust an operator of any equipment, with whatever length of experience. Human error is a condition that can effect anyone, anytime!!

WORKING WITH PRE–CAST, PRESTRESSED CONCRETE PILE

The particular hazard associated with driving pre–cast, prestressed concrete is their basic fragility in any other than a true palm position. Pile laid and stacked unevenly may develop cracks which could cause pile collapse or "blow–up" when driving. This is a dangerous situation not only because of falling concrete, but, more importantly, because the hammer is firing. This situation develops very rapidly and if immediate action is not taken, the hammer line could snap or the leads and boom could even collapse.

1. Never!! guess at the number and spacing of picking points for lofting concrete pile. These points are standardized and tailored to the type, length, and cross–sectional dimension of the pile. The foreman should always be consulted on proper picking points.

2. Never! stand at under a raising concrete pile.

3. Never! stand at either end of a raising concrete pile.

4. Never! stand between the rig and a raising concrete pile.

5. When maneuvering the bottom of concrete pile to capture the head in the bonnet or insert, watch out for falling concrete scale, chips, and spalled pieces.

6. Falling cushion blocks are a confirmed killer. Generally, the ropeman is the responsible "look–out" for dislodged or knocked–off cushion blocks. If a cushion block should begin to fall he should yell (in no uncertain terms) HEADACHE!! OR BLOCK!!

7. Never stand in front of a pile that is being guided into the gates.

8. Never place hands or arms between the pile and the leads.

9. Never stand in front of leads that have a pile trapped in the gates.

10. Never stand near the tracks of a crane or between the tracks and the house.

11. Watch the swing of the crane.

12. Never ride a piledriving hammer or ANY load.

13. Never tie–off on the hammer rails of leads.

14. When fastening cushion blocks in bonnets or inserts: one man holds it up, one man nails it in from back, and one man nails it in from front – a three (3) man job to be done fast!.

15. Never use a pile choker on a hook – use a shackle.

WORKING WITH STEEL SHEET PILE

The primary hazards associated with sheet pile installation are generally directed toward the "stabber" or high man on the sheets.

1. Always work sheets off of stirrups that have been fabricated to your inseam length (Length of stirrup formula = In-seam length minus 3″ or 4″).
2. Always use a ladder or boatswain's chair to reach sheet tops – never climb up.
3. Never stab sheets in high winds.
4. Always use tag lines on sheets set–up for lacing.
5. Always strike suspended sheets with a sledge hammer, to remove rust and scale, before send–up.
6. Always use sheet pile shackles when stabbing sheets – not pin shackles.
7. Never allow hydraulic hoses on vibratory hammers to tangle or kink.

WORKING WITH STEEL PIPE & H–PILE

Steep pipe and/or H–pipe are generally used in situations when the tip elevation of pile is uncertain. This condition gives rise to a situation that calls for pile sections to be spliced. A spliced pile section is simply an extended length of pile welded to a driven or installed length(s) of pile. After the splice is welded, piledriving continues until tip elevation or appropriate bearing is achieved.

1. Never attempt to perform welding operations without: (a) a proper welding hood and lens, (b) protective clothing (welding leathers and welding gloves), (c) adequate ventilation for the exhaust of vapors, fumes, and gases.
2. Suspend electric welding operations during inclement weather (rainstorms) unless proper shelter is provided.
3. When welding on plated materials such as Zinc galvanized, proper ventilation or respirators should be provided. This is to avoid a condition called Zinc Chills, a flu like malady, caused by breathing fumes and gases from moltent zinc plating.
4. When lofting steel pipe or H–pile always wear leather gloves.
5. Never place hands or fingers between the leads and the pile.
6. If pile are to be spliced – leave 2′ – 3′ exposed – for welders to perform splice–welding at a realistic elevation.

SUBTERRANEAN OPERATIONS

Since a great deal of piledriving work is to create and/or secure structural foundation systems, a preponderance of our skills our buried and out–of–view. Therefore, as pilebutts, we spend a great deal of time constructing or gaining access to subterranean entries. Subterranean penetrations are susceptible to a variety of hazards – specifically: (1) natural ground movement (soil pressure), (2) hydrostatic pressures (the force of water plus soil pressure) and, (3) the effects of surcharge loading (weight of adjacent structures exerting gravitational loads on an excavation). There are five (5) basic subterranean structures which we will

investigate: A. Trenches, B. Caisson (vertical bores), C. Tunnels (horizontal bores). D. Cofferdams, and E. Sheepile/ Lagging Walls.

Trenches – (CAL/OSHA Construction Safety Orders, Article 6, Sections 1540, 1541 and 1542)

1. Qualified people shall determine location of underground installations and utilities before trenching begins.
2. Never enter excavations over 5′ in depth unless proper shoring, sloping of ground or benching has been performed.
3. Spoil material should be placed no less than 2′ from the edge of the excavation.
4. Ladders or ramps shall be provided to workers in excavations of 4′ or greater.
5. Excavations adjacent to existing structures are forbidden unless proper shoring, underpinning, or bracing is provided for same.
6. Brace–shoring installation shall always proceed from the top, or surface, down and removed in opposite fashion.
7. Excavations over 20′ must be engineered.

Caissons

1. All caissons shall be properly barricaded.
2. Never enter a caisson over 5′ deep that has not been bagged, shored, or cased.
3. Proper ventilation shall be provided to workers in all shafts.
4. Prior to entry into exploration shafts, atmosphere tests must be performed to determine oxygen deficiencies and/or dangerous air contamination.
5. Adequate ascent and descent mechanisms shall be provided to all workers in shafts.

Tunnels

1. Tunnels or horizontal bores are not within the piledriving jurisdiction.

Cofferdams

1. Never descend into cofferdams over 20′ deep constructed from cantilever (unbraced) sheet pile walls.
2. Struts, walers, and bracing shall be installed in cofferdams as excavation proceeds.
3. Walers shall be securely welded before cut–loose from crane lines.
4. Struts shall be fitted with wedging material at contact points to create safe and efficient removal.
5. During disassembly, all lower struts, walers, and bracing in cofferdams shall be removed first.
6. Sufficient ladders, ramps, catwalks, scaffolds, shall be provided to workers in cofferdams.

Sheet Pile/Lagging Walls

1. Shall have walers connected to deadmen, soil anchors, grouted tendons or

other tie–back systems to counteract hydrostatic soil and surcharge pressures.

2. Rakers, or interior support kickers, shall occur at adequate spacing to counteract hydrostatic, soil, and surcharge pressure.

3. Installation of lagging shall proceed along with excavation.

4. Proper and adequate site de–watering shall be administered on an as–needed basis to prevent flooding and/or instability to the excavation.

5. Permanent sheet pile walls shall be equipped with a proper coping or cap.

GENERAL MAINTENANCE

Maintenance on piledriving equipment is important for three very fundamental reasons. First, it prevents downtime through breakdown prevention. Second, it provides an opportunity to inspect non–working equipment. Third, it reduces the hazards of equipment failure and, consequently, serious accidents.

Crane Maintenance

Although usually performed by the oiler, or operating engineer assistant, some parts of the crane are generally the pilebutts territory.

1. Lines on drums are to be kept in proper winding bays at all times.

2. Never put or leave anything on the tracks.

Lead Maintenance

1. On production piledriving jobs, lead head sheaves, rooster sheaves, etc. shall be greased and inspected at least once per week.

2. In the course of top–side greasing the following functions shall be performed by the attendant worker on descent: (a) inspect head sheave guards, (b) inspect head sheave and bushing wear, (c) inspect head fairlead operation where applicable, (d) inspect two–part hammer line dead–end where applicable, (e) inspect head section pin points (check for missing keys), (f) inspect general condition of lines, (g) inspect pin points of joined lead section, (h) grease and inspect rooster sheaves for wear, (i) grease and inspect boom tip, (j) inspect boom tip connector, (k) observe condition of ladder, (l) inspect line/hammer connection, (m) inspect spotter/lead connection.

Hammer Maintenance

1. Make sure proper fuel levels are maintained.

2. Never allow a piledriving hammer to exhaust lubricating oil from the oil reservoir.

3. Always maintain proper oil levels in piston reservoir (located on top of piston – assessable with a large, female allen (hex) plug and factory knocker wrench)

4. Always re–torque hammer bolts during maintenance to minimize falling hazards.

5. Pay particular attention to lead guild bolt tightness.
6. Maintain hammer shut–off (kill) rope in good condition.
7. Always periodically re–torque driving head (primary) straps.

EXCERPTS FROM THE *"CONSTRUCTION SAFETY ORDERS"* REGARDING PILE DRIVING

ARTICLE 12. PILE DRIVING

1600. Pile Driving

(a) When conditions are such that a worker might logically be expected to work or be under the hammer, the hammer shall be secured in the leads by means of an adequate chock, toggle, or other device to safely support the hammer.

EXCEPTION: Where it is necessary for a worker, momentarily, to lean through the leads to spot a pile under hammer, it is not required that the hammer be secured in the leads.

(b) Steam hose leading to a stem or jet pipe shall be securely attached to the hammer with an adequate length of at least 1/4–inch diameter chain or equivalent rated capacity wire rope to prevent whipping in the event the joint of the hammer is broken. Air hammer hoses shall be provided with the same protection as required for steam lines.

(c) Safety chains, or equivalent means, shall be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected.

(d) Wherever it is necessary for workers to work aloft on pile drivers in normal operation, working platforms shall be provided.

Such platforms shall be of sufficient size so that the worker can easily avoid contact with the hammer. It shall be surrounded on all sides, except between the hammer leads, with a railing or guard line 42 inches to 45 inches in height. Guard lines shall be drawn taut and shall be at least 3/8 inch wire rope, or 1 inch Manila rope or equivalent. If rigid railing are used, they shall be constructed in accordance with provisions of Section 1620, Article 16, with the exception that pipe or structural steel railings may be used if of equivalent strength.

(e) Precautionary measures shall be taken which will prevent tools, materials, and equipment from falling off elevated platforms. There shall be a toe board at least 3 1/2–inches high on all sides of the platform in accordance with Section 1621 (b).

(f) Fixed leads shall be provided with ladder, and adequate rings, or similar attachment points, so that the loft worker may engage the safety belt lanyard to the leads. If the leads are provided with loft platform(s), such platform(s) shall be protected by standard guardrails.

(g) Stirrups shall be provided for use on sheet piles or a mechanical device shall be used to guide the pile into place. If a worker is required to go aloft on sheet piling, the worker shall use a ladder or be carried up in a boatswain's chair.

(h) The worker shall not ride the hammer.

(i) Where work is to be performed, walkways at least 20 inches in width shall be provided across piles or other open work with the exception of those piles on which the driver is standing.

(j) Where a drop hammer is used for driving piling other than sheet piling, a driving head or bonnet shall be provided to bell the head of the pile and hold it true in the leads.

(k) Ring buoys shall be provided in accordance with Article 13 and located where readily available at intervals not exceeding 200 feet on all structures over water under the course of construction.

Where workers are concentrated in groups, there shall be additional ring buoys consisting of not less than 1 additional buoy for each 25 workers in that area. Portable standards or equivalent means to hold the ring buoys in plain view

shall be provided. Life saving boats shall be provided in accordance with Article 13.

(l) All floating rigs, with the exception of small work rafts or pontoons, shall be equipped with at least 2 ring buoys.

(m) In every crew there shall be a designated signaler, and the engine operator or winch operator shall receive signals from no other except, however, that when a worker is aloft, the hammer shall not be moved except on the signal of the worker aloft.

NOTE: For recommended standard hand signals, see Plate C–11.

(n) All deck engines, not operated by an operator on the throttle that is within the reach of the spool tender.

(o) Every hoisting drum used on a pile driver that uses a dog and ratchet arrangement to hold it in position shall be equipped with an adequate dog. This dog shall be readily visible from the engine operator's station or shall be provided with a directly connected and positive telltale device which will be visible.

(p) No arrangement of counterweights or springs on the dog shall be permitted which will allow the dog to be automatically disengaged either by relieving the load or rotating the drum.

(q) Stop blocks shall be provided for the leads to prevent the hammer from being raised against the head block.

(r) When the leads must be inclined in the driving of batter piles, provisions shall be made to stabilize the leads.

(s) Steam line controls shall consist of two shutoff valves, one of which shall be a quick–acting lever type within easy reach of the hammer operator.

(t) Guys, outriggers, thrustouts or counter–balances shall be provided as necessary to maintain stability of the piledriver rigs.

(u) All employees shall be kept clear when piling is being hoisted into the leads.

(v) When steel tube piles are being "blown out", employees shall be kept well beyond the range of falling materials.

(w) When driving jacked piles, all access pits shall be provided with ladders and bulkheaded curbs to prevent material from falling into the pit.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY:

1. New subsections (q)–(w) filed 5.21.75; effective thirtieth day thereafter (Register 75, No. 21).
2. Amendment filed 9–9–85; effective thirtieth day thereafter (Register 85, No. 37).

1601. Methods of Unloading Wood Piles

(a) Hand Unloading From Trucks and Trailers. The following method shall be used in unloading wood piles from a truck or trailer when the load is to be rolled off one side by hand. This method shall not be attempted unless trucks and trailers are equipped with bunk chocks arranged so as to be released from the side opposite that from which the load is to be dumped, and at least 2 binder chains encircle the load of piles. Binders shall be arranged so that their release is accomplished from the side opposite that from which the load is to be dumped.

1 Piles shall be prevented from coming off the wrong side of the vehicle by tilting the vehicle body so that the unloading side is approximately 10 inches below the opposite side or by securely bracing the load on one side with at least 2 timber shores, 4 inches by 6 inches in cross section, or material of equivalent strength. In tilting the vehicle, advantage may be taken of sloping ground or a special device may be used.

2 Chocks and binders are to be released from a safe position after the requirements of Order 1601 (a) (1) have been compiled with.

3 If skids are used, they shall be in place before the binders or chocks are released.

4 When it is necessary to use peaveys to remove the last piles from the truck or trailer, the workers shall work from the ends of the load and shall stand clear of the area exposed to rolling piles.

(b) Power Unloading From Trucks and Trailers. If power is to be used, the following method of rolling the load off one side shall be followed in unloading piles from a truck or trailer, unless an equally safe power method is used in which no individuals are exposed to the hazard of rolling or falling piles:

1 Before the load is released, a bridle from the source of power shall be passed over the load from the unloading side, then passed under the load and the 2 ends secured at separate points to the unloading side of the vehicle or to dead men. After it is pulled taut, the chocks and binders may be released from a safe position, additional power being applied as necessary to complete unloading.

2 All requirements and limitations for unloading by hand, as described under Order 1061 (a), shall be followed, with the exceptions of (1) and (2).

(c) Hand Unloading From Flat Cars. The following method shall be used in unloading piles from a flat car when the load is to be rolled off one side by hand:

1 Skids shall be set on the unloading side of the car and secured to the car or to the bolsters under the piles. The upper end of the skids shall be below the lower layer of piles.

2 At least 2 shores not smaller than 4–inch by 6–inch timbers shall be braced against the side opposite the unloading side of the load, with the upper end of the shores secured to the car stakes or wedged against a pile in the second or third layer from the top. These shores shall be set near each bolster.

3 Car stakes on the unloading side shall be notched approximately 1/4 of their thickness just above stake pockets.

4 Binder wires or straps shall be cut on unloading side, with the exception of the top and bottom wires or straps which shall be cut from the opposite side after the other cutting is complete.

5 When it is necessary to use peaveys to remove the last piles from the flatcar, the workers shall work from the ends of the load and shall stand clear of the area exposed to rolling piles.

(d) Power Unloading From Flat Car. The following method of rolling the load off 1 side shall be followed in unloading piles from a flat car, unless an equally safe power method is used in which no individuals are exposed to the hazard of rolling or falling piles.

1 Skids shall be set on the unloading side and secured to the car or to the bolster under the load.

2 A bridle from the source of power shall be passed over the load from the unloading side, then passed under the load and the ends secured to the unloading side of the car and a strain taken on the line.

3 Car stakes on the unloading side shall be notched approximately 1/4 if their thickness just above the stake pockets.

4 Binder wires or straps shall be cut on the unloading side with the exception of the top and bottom wires or straps which shall be cut from the opposite side after the other cutting is complete.

5 Additional tension may thus be applied to the bridle from the power source so as to remove the load.

NOTE: Authority cited: Section 142.3, Labor Code, Reference: Section 142.3, Labor Code.

HISTORY:

1. Amendment filed 9–9–85; effective thirtieth day thereafter (Register 85, No. 37).

CHAPTER 6 ~ HAZARDS OF PILE DRIVING ON LAND

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. [1]_____ of piledriving work occurs above eye–level [2]_____ , in leads, on trestles, on bridges, on crane hooks.

2. Never [3]_____ your faith in a piece of [4]_____ . Pay particular attention to uncommon sounds.

3. Generally, on [5]_____ , the piledrivers are the [6]_____ basic construction craft on the job after the earth work has been done.

4. Be certain that adequate [7]_____ is provided when rigging–up delicate loads (boom sections) and awkward loads (crane trucks, lead sections, crane accessories.

5. When the piledriving configuration is assembled ([8]_____ , [9]_____ and [10]_____) and stood up, be sure to realize the potential for [11]_____ objects.

6. When unloading lone (70′–0″ +) pre–cast, prestressed [12]_____ pile from trucks, avoid using picking eyes – instead use [13]_____ positioned at specified picking points.

7. Stay clear of forklifts handling concrete pile with picking beams, these loads are [14]_____ and [15]_____ .

8. Never! fully trust an operator of any equipment, with whatever length of experience. Human [16]_____ is a condition that can effect [17]_____ [18]_____ .

9. Excavations adjacent to existing structures are forbidden unless proper [19]_____ , underpinning or [20]_____ is provided for same.

10. Although usually performed by the oiler, or operating engineer assistant, some parts of the crane are generally the [21]_____ territory.

11. Always [22]_____ hammer bolts during maintenance to minimize falling hazards.

12. Maintain hammer [23]_____ (kill) rope in good condition.

13. Always periodically [24]_____ driving head (primary) straps.

Chapter 7 – Hazards of Pile Driving on Water

This topic is planned to provide answer to the following questions:

- **What should a Local #34 Pilebutt know about general safety in the Marine Industry?**
- **What are some of the identifiable hazards associated with Marine Construction?**
- **What are the specific California and Federal Safety Codes associated with Marine Construction?**

INTRODUCTION

The similarity between driving pile on land and driving pile on water based operations is shared by only ONE factor...that is the actual, mechanical, piledriving operation. In the preparation for this function and the disengagement from this function...the similarities abruptly end. Simply stated, a pilebutt who has spent 25 years driving pile on land (landlocked), would have a difficult time adjusting to a marine–based, production piledriving job. The reason is simple. Piledriving on marine–based operations expands the dimension of our craft into an exotic and, even more, specialized endeavor – exposure to the whims and quirks of Mother Nature – on the seas of the world. As a trade and craft we enjoy the privilege of mastering the accomplishments of ancient mariners who were bent on harnessing the mysterious powers of nature from the beginning of time.

At the core of all marine piledriving lies the nautical aspects of seamanship, marine procedures, nautical terminology, and, of course, a whole new set of safety aspects unique to this realm. As inheritors of this trade, you will learn to become proficient and work safely on both land and water operations.

As an apprentice, your initial contact with marine–based piledriving operations will be limited. These General Safety suggestions are presented as a basic preview to piledriving on water. More detailed marine safety conditions will be pursued in the more advanced piledriving curriculum which you will encounter in your second apprenticeship year.

EXCERPTS FROM THE *"CONSTRUCTION SAFETY ORDERS"* REGARDING PILE DRIVING ON WATER

ARTICLE 13. WORK OVER OR NEAR WATER

1602. Work Over or Near Water

(a) The following safety devices shall be provided for and used by employees at those locations where the danger of drowning exists:

EXCEPTION: Where employees are continuously protected by railings, nets, safety belts or other applicable provisions of these Orders.

1 Personal Flotation Devices. Employees shall be required to wear U.S. Coast Guard approved personal flotation devices of a type that will support an unconscious person's head above water.

2 Ring Buoys. U.S. Coast Guard approved 3–inch ring buoys with at least 150 feet of 600 pound capacity line shall be readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.

3 Lifesaving Boats. One or more lifesaving boats, either manually or power–operated, shall be provided and readily accessible at all times. Lifesaving boats shall be properly maintained, ready for emergency use and equipped with oars and oarlocks attached to the gunwales, boathook, anchor, ring buoy with 50 feet of 600 pound capacity line and two life preservers in accordance with Section 1602(a) (1) and (2). Oars are not required on boats that are powered by an inboard motor.

(a). Where, because of swift current, lifeboats cannot be used, a line shall be stretched across the stream with tag lines or floating planks trailing in the water at intervals not to exceed 6 feet. If this is impracticable, some, other arrangement for providing life lines near the water surface shall be provided.

5 Where men are concentrated in groups, there shall be additional ring buoys consisting of not less than one (1) additional buoy for each 25 men in that area. The use of portable standards to hold the ring buoys in plain view is recommended. A boat is normally required by Article 13, Section 1602, for general use and also for emergency use.

6 All floating rigs, with exception of small work rafts or pontoons, shall be equipped with at least two (2) ring buoys.

7 On deck, the master or designee shall be in direct charge of any heavy gear handling or other hazardous operations.

9. A safe access shall be provided and used for embarking on board any vessel.

10. When hazardous or flammable cargo is being worked, "No Smoking" shall be strictly enforced on the dock, barge and vessel.

11. Shields or covers shall be installed where practical around all exposed moving mechanical parts.

12. All working surfaces, including decks, shall be kept clean and clear of tripping or slipping obstacles.

13. Sufficient exterior lighting shall be provided when working on deck at night.

14. All loose gear shall be properly secured prior to getting underway.

15. Electrical arc welding being conducted in the immediate vicinity of crewmen and/or dock workers shall be properly screened so as to prevent eye injuries. A fire watch shall be established as necessary.

16. Appropriate respiratory protection shall be worn where applicable.

17. Hard hats shall be worn by all crew members in designated shoreside areas, during

loading, unloading or making and breaking tows and where overhead danger exist and at all other times deemed advisable.

18. Hearing protection devices shall be worn when entering or working in or around areas where noise levels threaten damage to hearing.

19. Eye protection shall be worn where the danger of getting foreign objects in the eyes or flash burns exist.

20. Safety meetings shall be conducted on a regular basis and logged.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY:

1. Renumbering of subsections (a)–(c) to (d)–(h) and new subsections (a)–(c) filed 5–21–75; effective thirtieth day thereafter (register 75, No.21).
2. Repealer of Article 13 (Section 1602) and new Article 13 (Sections 1602–1603) filed 5–3–78; effective thirtieth day thereafter (Register 78, No. 18).
3. Amendment of subsection (a) (3) filed 9–9–85; effective thirtieth day thereafter (Register 85, No.37).

1603. Walkways

(a) When dredge discharge pipe lines are used as walkways, they shall be provided with a flat surface walkway at least 12 inches wide, anchored to the pipe line to prevent displacement. A railing providing at least a single rail or taut rope 42 to 45 inches high shall be provided along one side. When rope is used, it shall be at least as strong as $^{3}/_{4}$–inch diameter Manila or at least $^{3}/_{8}$–inch diameter wire rope, or equivalent.

(b) Catwalks or platforms shall be at least 20 inches wide with railings provided at all locations over bodies of water more than 4 feet deep. Plank for such use at those locations subject to immersion shall be rough sawn and treated to resist rot. Railings shall be installed in accordance with the provisions of Section 1620.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY:

1. Amendment of subsection (a) filed 9–9–85; effective thirtieth day thereafter (Register 85, No. 87).

CHAPTER 7 ~ HAZARDS OF PILE DRIVING ON WATER

STUDY GUIDE

INSTRUCTIONS: Determine the correct work for each numbered blank in the sentence and write it in the blank space provided.

1. The similarity between driving pile on land and driving pile on water based operations is shared by only [1]_____ factor...that is the [2]_____, mechanical, piledriving operation.

2. At the core of all marine piledriving lies the nautical aspects of [3]_____, [4]_____ procedures, [5]_____, terminology, and, of course, a whole new set of [6]_____ aspects unique to this realm.

3. Personal [7]_____ Devices. Employees shall be required to wear U.S. Coast Guard approved personal flotation devices of a type that will support an unconscious person's head [8]_____ water.

4. Where, because of [9]_____ current, lifeboats cannot be used, a line shall be [10]_____ across the stream with tag lines or floating plants trailing in the water at intervals not to exceed [11]_____ feet.

5. All working surfaces, including [12]_____, shall be kept clean and clear of [13]_____ or slipping obstacles.

6. Safety [14]_____ shall be conducted on a regular basis and [15]_____.

Chapter 8 – Hazards of Bridge Building

This topic is planned to provide answer to the following questions:

- **What should a Local #34 Bridge Builder know about safety in this Industry?**

All the bridges that cross over water in California were built by Pile Driver people. All other bridges, like overpasses, were constructed by crews made up of mostly Pile Driver people.

It's not hard to figure out that most of our work, (about 70%) is bridge work that is done by Local 34 Pile Drivers, Divers, Bridge, Wharf and Dock Builders whether they are journeypersons or apprentices. Our union, Local 34, covers the 46 Northern Counties of California. This opens a vast area for our work to be performed in, either piledriving or bridge building or a combination of both.

This topic will cover some of the hazards that may incur while working on bridge type structures.

Since all bridges span something (ie.water, canyons, freeways, cities, other bridges) there will be obvious occurrences of several types of hazards.

1. When working on the outboard side of the bridge, you should stay within the handrail system or wear safety belts.

2. Never refill gas powered tools over a wooden deck or soffit. Spillage could be come a fire hazard.

3. Use oxyacetylene equipment only in designated areas.

4. Construct handrails where needed. (See OSHA handbook.)

5. While working on scaffolding, make sure scaffold planks are of the proper grade.

6. While working on bridge beams, columns and access ladders, use your safety belt.

7. On your safety belt, make sure the lanyard is in good condition; your life may depend on it. NEVER attach any tools such as torch strikers, snaps, swivels, caribeaners, etc. to your safety belt "D"–Ring!!!

8. While erecting shoring of any kind, make sure there isn't anybody below you. If somebody is going to work below you, let them know you are above them. (Hang on to your tools and hardware.)

9. While working under the structure, watch for falling objects.

10. While placing concrete in a previously constructed formwork section, never go under the area where the concrete is being placed (it could collapse).

11. Never use damaged ladders or stairwells.

12. Always use two (2) people to move larger concrete forms (4′ x 8′).

13. Bend all nails over in loose lumber or pull them out.

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