Chapter 1- RESPONSIBILITIES

Section 1: EMPLOYEE RESPONSIBILITIES

All employees are responsible for their own safety. In addition, they have a responsibility to their family, fellow workers, the community and the State of Indiana. Therefore, they must observe safe practice rules and instruction relating to efficient performance of work. Safe and efficient operations are reached only when all employees are safety-conscious and keenly alert both mentally and physically. Employees are charged to:

- **Comply with the supervisor's instructions.**
- **Be thoroughly knowledgeable with and comply with contents of this manual that relate to assigned duties.**
- **Work in a safe, productive manner and maintain safety awareness at all times.**
- **Properly operate and maintain assigned vehicles/equipment and report defects.**
- **Report all accidents and injuries immediately.**
- **Wear proper clothing and required protective clothing and equipment.**
- **Maintain themselves in proper physical condition to safely perform work.**
- **Use good common sense, both on and off the job. INDOT and families suffer in case of accidents or injuries.**

Section 2: SUPERVISORY RESPONSIBILITIES

A supervisor is equally responsible for the safety of their employees and for their work. Supervisors will ensure that their employees have a thorough knowledge of the contents of this manual. NO JOB IS SO IMPORTANT OR URGENT THAT TIME CANNOT BE TAKEN TO DO IT IN A SAFE MANNER.

It is the supervisor's responsibility to ensure that vehicles and equipment are properly operated, maintained and that damage is minimized. Equipment will be treated as if it were individually owned.

Don't use defective equipment. Equipment will not be used if its condition poses a hazard to any employee, the public or when continued use may cause further damage.

Supervisors will analyze work in advance to determine the safest and most economical way to perform each operation. They will also be responsible for ensuring that every effort is made to protect the safety of all INDOT employees.

It is the supervisor's responsibility to ensure that workers are properly trained and to assign qualified workers to jobs for which they have been trained, so that all tasks can be carried out in a productive and safe manner.

Supervisors will ensure that new employees assigned to unfamiliar work receive specific instructions regarding possible hazards that may be encountered and provide advice as to how to best deal with these situations.

It is the supervisor's responsibility to see that department safety regulations, as outlined in the Safety Policy and the Safety Manual, are complied with at all times.

When a supervisor feels that a particular assignment will expose his/her workers to unusual hazards, he/she will report the condition to his/her supervisor and make plans to reduce the hazards or increase the protection.

Supervisors who fail to provide a safe working environment or whose negligent actions result in injury or property damage, may face disciplinary action or termination of employment.

Chapter 2- GENERAL SAFETY RULES

Section 1: INTOXICANTS AND NARCOTICS

Alcoholic beverages or illegal narcotics will not be brought onto the grounds owned or operated by the department. Such substances will not be transported in any vehicle owned by the department.

Supervisors will not allow an employee to commence work operations if the employee reports to work in an apparent intoxicated condition, or in a condition which, in the supervisor's opinion, might jeopardize the safety of any employee or the public.

Persons under the influence of any intoxicant or narcotic will not attempt to drive or operate a piece of equipment or vehicle owned by the department. Some prescribed drugs and over-the-counter (OTC) drugs may pose a hazard to safe operation of equipment.

Employees who are required to have a CDL to perform their job duties shall be required to take alcohol and/or drug tests. The tests shall be administered in compliance with the following situations:

- **If there is a reasonable suspicion that the employee is under the influence of alcohol or drugs (e.g., supervisor smells alcohol, employee's behavior indicates he/she has consumed intoxicants, etc.).**

- **If, in the course of performing INDOT driving duties, the employee:**

    a) **is involved in a fatal accident**
    b) **received a citation concerning an accident which requires either medical treatment away from the scene, or a vehicle to be towed from the scene.**

- **Randomly selected.**

- **Pre-employment.**

Section 2: WEATHER HAZARDS

It is the supervisor's responsibility to analyze weather-related conditions prior to and throughout the work day. If any weather condition(s) arise that poses serious health hazards to employees, the supervisor shall determine the necessary measures to reduce and/or eliminate those hazards. These measures can be, but are not limited to:

- **Increased number of breaks.**
- **Planned activities according to weather.**
- **Consult inclement weather charts.**

It is the employees' responsibility to wear proper clothing and maintain themselves in proper physical condition in order to safely perform work during dangerous weather.

HEAT EXPOSURE

Sunburn is common during the summer. If you follow a few simple precautions, time lost to sunburn can be reduced by:

- **Staying fully clothed while working.**
- **Wearing a safety hard hat or cap.**
- **Wearing lightweight, loose fitting clothes, except when loose fitting clothing could pose a hazard, i.e.: chipper and chain saw operation.**
- **Protecting exposed skin with sun block >= spf 30**

Beware of and know the symptoms of heat stroke, heat exhaustion and heat cramps when involved in strenuous activity in hot environments.

Heat Cramps	**Response**
Fatigue, confusion or painful muscle spasms in the legs, arms or abdominal areas.	**Stop exertion and move into the shade or a cooler location. Drink cool liquids.**
Heat Exhaustion	
Fatigue, confusion, clammy skin, nausea, excessive sweating, weakness, low blood pressure, rapid pulse, fainting.	**Move to a cool place with the legs elevated. Give cool liquid. If condition does not improve, seek medical attention.**
Heat Stroke	
Extremely high body temperatures, hot, dry, flushed skin, fatigue, confusion, collapse, unconsciousness.	**Seek medical attention immediately and cool the body down as quickly as possible.**

Take time to allow your body to adjust to high heat and high humidity environments before exertion begin.

If working in protective clothing and equipment, your chances of heat stress are greatly increased. In work environments of 85 degrees or above, employees shall not spend more than 15 minutes of any one (1) hour in an impervious suit unless cooling has been provided to the suit.

Be aware of temperature and humidity, and drink fluids with electrolytes at regular intervals.

Heat Index Chart (Temperature & Relative Humidity)

RH (%)	**Temperature (° F)**															
	90	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**103**	**104**	**105**
90	119	123	128	132	137	141	146	152	157	163	168	174	180	186	193	199
85	115	119	123	127	132	136	141	145	150	155	161	166	172	178	184	190
80	112	115	119	123	127	131	135	140	144	149	154	159	164	169	175	180
75	109	112	115	119	122	126	130	134	138	143	147	152	156	161	166	171
70	106	109	112	115	118	122	125	129	133	137	141	145	149	154	158	163
65	103	106	108	111	114	117	121	124	127	131	135	139	143	147	151	155
60	100	103	105	108	111	114	116	120	123	126	129	133	136	140	144	148
55	98	100	103	105	107	110	113	115	118	121	124	127	131	134	137	141
50	96	98	100	102	104	107	109	112	114	117	119	122	125	128	131	135
45	94	96	98	100	102	104	106	108	110	113	115	118	120	123	126	129
40	92	94	96	97	99	101	103	105	107	109	111	113	116	118	121	123
35	91	92	94	95	97	98	100	102	104	106	107	109	112	114	116	118
30	89	90	92	93	95	96	98	99	101	102	104	106	108	110	112	114

Note: *Exposure to full sunshine can increase HI values by up to 15° F*

FROSTBITE

When working in extreme cold, you expose yourself to frostbite. Frostbite is a great danger to the nose, cheeks, ears, toes and fingers. Often, a victim of frostbite is not even aware of the damage being done. Therefore it is important to know the symptoms and first aid treatment for frostbite.

Signs of Frostbite

The first sign of frostbite is reddening of the skin. It then turns blotchy white, gray or yellow. Finally, the skin becomes completely white and sometimes blisters. The body part may feel very cold or numb. In advanced stages of frostbite, there is no feeling at all in the exposed skin.

Frostbite victims also suffer from hypothermia or loss of body heat. Symptoms are shivering, loss of hand control, drowsiness and not caring about staying warm. Hypothermia victims need to get out of the cold immediately.

Treating Frostbite

Keep the victim as warm and dry as possible. Bring the victim inside to a warm place as soon as you can. Warm the frozen body part by putting it in warm (not hot) water, damp cloths or blankets. Check the water or cloth frequently to make sure it stays warm. Do not rub or move the frozen part. Place frostbitten part lower than the heart to increase blood flow.

Once the area is thawed, the victim should gently exercise the area. This will bring blood back into the injured part. Get medical attention as soon as possible.

Avoiding Frostbite

Maximum protection against cold is afforded by wearing at least three layers of clothing. The first layer next to the skin should be loose fitting wool, loose twill cotton or quilted thermal underwear. The second layer should be a medium weave, medium weight, one or two piece garment--again, not tight fitting. The outer layer should be wind-resistant and include a hood. Mittens are good protection for the hands.

Also, when working in the cold, wiggle your toes and fingers. If they are beginning to lose feeling, are tingling or painful, come inside and warm up.

Protect the eyes from the bright snow/sky combination by wearing dark colored glasses.

Be prepared to protect your lungs with a facemask or scarf when subjected to prolonged breathing of extremely cold air.

HYPOTHERMIA

When a person gets so cold that his or her body cannot warm up, it's called hypothermia. Hypothermia can be fatal, but its risks can be avoided and its effects minimized if you take precautions and use first aid quickly.

Dress warmly, stay dry and bring along extra dry clothes when working outside in cold weather.

Signs & Symptoms

Mild hypothermia	Severe Hypothermia
Shivering, loss of coordination, confusion.	**No longer shivering, stumbling, irrational behavior, slow, irregular heartbeat, low body temperature.**

Wind Chill Chart - F, wind in mph

Wind (mph)	**Temperature (° F)**												
	35	**30**	**25**	**20**	**15**	**10**	**5**	**0**	**-5**	**-10**	**-15**	**-20**	**-25**
5	32	27	22	16	11	6	0	-5	-10	-15	-21	-26	-31
10	22	16	10	3	-3	-9	-15	-22	-27	-34	-40	-46	-52
15	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51	-58	-65
20	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67	-74
25	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74	-81
30	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71	-79	-86
35	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82	-92
40	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84	-92

Wind speeds above 40 mph have little additional chilling affect

In using the table above, values of wind chill below -10° F are considered bitterly cold. Values of wind chill below -20° F are extremely cold -- human flesh will begin to freeze within one minute!

Treatment

Get help immediately. Remove any wet clothing and apply warm packs to neck, armpits and groin. If warm packs are not available, use your own body heat to warm victim.

Stay with victim and keep him or her warm until help arrives. If victim must be moved, do so gently, keeping the victim in the horizontal position.

Section 3: MISCELLANEOUS SAFETY TIPS

Horseplay, practical jokes and misuse of INDOT equipment may be cause for dismissal.

Work at a safe distance from others, especially when using hand tools.

Don't work close to operating equipment, unless required to assist the operator. If you have to work around operating equipment, face the equipment whenever possible.

When working on or adjacent to a highway, face the approaching traffic if possible. Look in both directions for traffic before crossing a road.

Supervisors will not assign or permit employees to work where there is a possibility that they may come into contact with activated power lines or cables.

Employees should be familiar with poison ivy and poison oak. Supervisors should warn their employees to use care when working around these plants. Employees allergic to insect stings or bites should report this to their supervisor before starting a job that might expose them to such hazards.

Drinking water must be obtained from approved sources. If drinking fountains are not available, drinking water should come from closed, sanitary containers. Single use cups will be provided. If this is not practical, each employee should drink from an individual portable water container, of the approved "thermos" type. Employees should always drink from separate cups or containers.

Chapter 3- OFFICE BUILDINGS AND LABORATORIES

Section 1: GENERAL

Office safety does not just apply to the clerk or the secretary in a nine-story office complex, but the small office at a work site or an office at a unit site.

Employees using mail carts, furniture dollies, hand carts or building service cleaning carts should not leave them unattended in passageways. When it is necessary to park them in the halls, they will be parked close to the wall, but never close to a doorway or hall intersection.

Employees shall report any broken, cracked or humped tile on floors or turned up corners on rugs, which constitute a hazard. The report should be made to the person in charge of building maintenance or their supervisors.

Employees shall be familiar with location of first aid supplies and emergency alarm stations. They should know the locations of fire extinguishers and be instructed in their use.

Do not use a razor blade for cutting paper. Be careful the edge of paper will cut. Do not use pins to fasten papers together.

Never remove a staple with fingernails.

Do not store sharp objects haphazardly in a drawer. Arrange the drawer's contents as neatly as possible. Store razor blades, thumbtacks and pins in closed containers.

Broken glass and other sharp objects should be wrapped in heavy paper, marked "broken glass" or "sharp objects", and placed beside, not in, the waste basket. Never clean up broken glass with bare hands.

Approach and open closed doors with caution to avoid having the opening door strike someone. Keep to the right in corridors and at corners.

Use the handrail when using stairs. Keep stairways clean and clear.

Section 2: OFFICE MACHINES, FURNITURE AND EQUIPMENT

Employees shall not operate a machine until they have been thoroughly trained to operate it safely. Supervisors will ensure that all machine guards are kept in place and that employees follow the safety instructions for the machine being operated.

Read instructions carefully before operating unfamiliar equipment.

Always check machinery for frayed or broken electrical cords before using the equipment.

If machinery sends off sparks, strong odor, smoke or feels tingly to the touch, immediately de-energize the equipment and report the situation to your supervisor. Be sure to post a sign warning others not to use the machine under any circumstances.

Keep liquids away from electrical office equipment.

Don't overload the electrical outlets in your office. Never break off the third prong on a plug so that it will fit into a two-prong receptacle.

Disconnect electrical equipment before repair or maintenance. Electrical machines shall be shut off and the electrical circuit disconnected before attempting to adjust or clean the machine. Only qualified personnel will make the adjustments.

File drawers will not be left open while unattended. The heaviest drawers will be at the bottom to avoid tipping the files. Employees should avoid opening more than one file drawer at a time. Always use the handle when closing file drawers.

Telephone and power cords should not be left loose on the floor, or in any other position that could cause someone to trip. Arrange to have them shortened or anchored to a desk or wall.

Hand-operated paper trimmers or "guillotine" type paper cutters will be used with the utmost caution. Never leave the blade in an upright position. Keep the guard in place at all times.

Broken veneer surface on desks and chairs will be repaired at once.

Swivel chairs, file drawers and other unstable office equipment will not be used as a means of climbing or reaching. Ask for help, if it is necessary to move office equipment or furniture or when it is beyond your physical ability.

When working with certain chemicals such as toner, ink from carbon paper or photocopier chemicals, take great care not to rub eyes. The use of gloves or other protective clothing may be necessary. Read all labels, the chemicals Material Safety Data Sheets (MSDS) and

ask your supervisor about any precautions that you should take before using these chemicals.

Avoid eyestrain from working at computers or working closely with various materials, by taking regular "eye breaks". This is done by looking up from your work and focusing on far away objects so that you can give your eyes a rest.

Section 3: LABORATORIES

The department shall ensure that the hazards of all chemicals, equipment, procedures and testing methods are identified, and that information concerning these hazards is transmitted to laboratory employees through the Chemical Hygiene Plan.

The Chemical Hygiene Plan provides information and instructions which will prevent chemical overexposure and, therefore, protect employees from adverse effects of hazardous chemicals.

Wear appropriate personal protective equipment whenever in the laboratory and chemical storage areas. Be sure that all persons, including visitors, also wear protection in these areas.

Avoid working alone in the building. Do not work alone if the procedures or chemicals have been designated as hazardous.

Do not eat or smoke in the laboratory. Do not store food in chemical storage refrigerators.

Laboratories shall be maintained in a neat and orderly manner at all times.

Keep waste in refuse containers and empty the containers daily.

Adequate ventilation, either natural or forced, will be provided in areas where volatile or toxic gases exist. Keep hazardous gases and vapors confined inside hoods.

Keep adequate protection between you and any apparatus in which there is a chance of a flash or explosion.

Stand to one side when opening doors of ovens containing explosive or highly flammable materials.

When Bunsen Burners or electric heaters are used, tables will be covered with nonflammable tops.

Use heavy asbestos gloves for handling hot pans or apparatus.

Where strong acid is used, tables will be covered with an acid-resistant coating. Rubber gloves must be used.

When nuclear gages are stored or used in laboratories they shall be used in accordance with the NRC regulations.

Unauthorized personnel will be kept out of experimental or storage rooms, unless under the guidance of laboratory personnel.

Laboratory personnel will be familiar with fire protective devices.

Respirators will be available for areas that may need them.

Wear goggles whenever there are chances of flying particles or splashes.

Do not pick up heavy samples or materials. Use carts or hand trucks whenever possible.

Bottles and containers shall be plainly labeled.

Clearly label chemical storage containers with name, C.A.S. # or initials, the date put into storage and targeted disposal date.

Do not drink from beakers as they may have contained poisonous substances.

The ends of glass tubing will be fire polished.

Electric heaters, rather than open flame burners, will be used in rooms where volatile liquids or gases are used.

When handling liquid chemicals, an eyewash station must be available for an employee's use within the room. No one should have to travel more than 25 feet to a station. For corrosive liquids, an eyewash station and shower are required. A 15-minute supply of water is required for eyewash stations. When an eyewash station or eyewash/shower is required and running water is available in the building, the eyewash station or eye-wash/shower must be permanently plumbed and connected to the running water.

Chapter 4- FIRST AID & CPR

Section 1: GENERAL

Effective first aid has saved many lives. Not all deaths result from major injuries. Untreated minor wounds and shock can cause death. By knowing the basic methods of emergency first aid, you may be responsible for saving a life. Following is Red Cross-approved information for dealing with emergencies.

Section 2: WHAT TO DO IN AN EMERGENCY

If you are present or arrive early at the scene of a serious accident, the following is suggested:

- **Remain calm at all times.**
- **Encourage others to be calm.**
- **Summon help.**
- **If a doctor, nurse or other trained first aid person is present, offer your assistance.**
- **If there is no qualified or trained first aid person present, assist as needed until one arrives.**

Although all emergency situations are not the same, there are several common procedures that will apply.

- **Do not move a victim unless absolutely necessary. Moving the victim could cause further injury. However, if the victim's position poses a life threatening situation, they should be moved to safety.**
- **Maintain an open airway and restore breathing if necessary**
- **Control bleeding.**
- **Treat victim for shock.**
- **If the victim is conscious, reassure them that aid is on the way. Never offer a diagnosis to the victim or converse with them regarding their condition. Information regarding the victim's condition should be left to qualified medical personnel.**
- **Make the victim as comfortable as possible while waiting for aid.**
- **Remain at the scene until emergency help arrives.**
- **Discuss details of the occurrence only with police or other qualified authorities. Give only factual information related to the accident.**

When you call for emergency aid, or when you send someone to call for aid, remember to give as accurate a location as possible--highway number and reference post, number of persons injured, type of injuries, etc.

If you do not know the number of emergency service for a particular location, dial "0" or "911" and tell the operator that you are making an emergency call. The operator will connect you with the proper authority.

Section 3: FIRST AID/CPR TRAINING

First aid/CPR training shall be provided to a selected number of personnel to ensure that in those situations where immediate medical attention is not available, individuals will be present to administer first aid until more qualified help arrives.

Section 4: FIRST-AID KITS

The department provides first aid supplies which are readily available to all employees. Managers and supervisors shall be responsible for ensuring that first aid kits are procured, inspected and maintained. First aid kits shall be placed in all INDOT facilities and vehicles. The size and the content of the kit shall be appropriate for the area.

Chapter 5- REPORTS & INVESTIGATIONS

Section 1: GENERAL

Some of the most important and essential aspects of an effective Safety Program are:

- **Properly defining accidents and injuries.**
- **Properly reporting all occurrences.**
- **Proper investigations accomplished by supervisory and other personnel.**
- **Determining what preventive and, if necessary, disciplinary actions may apply.**
- **Taking necessary actions to prevent similar occurrences throughout the department.**

Guidelines

An employee involved in a vehicle accident with private vehicles or persons shall not accept responsibility or blame on behalf of the department. Nor should the employee discuss it with anyone but his supervisor or a representative of the department, nor shall information about the accident be given to persons other than proper law enforcement authorities or Attorney General personnel.

Tort claim processing procedures shall be on hand in all department vehicles/equipment and provided to private persons involved in accidents with department vehicles/equipment.

Required Documentation

The intent of the Accident Reporting System is that whoever enters the information into the system has a completed and signed form to work from, and the employee should file this original document.

Original documents of the Vehicle Accident, Supervisor's Investigation, Estimate of Repairs, and injury reports shall be kept at the originating locations, at the subdistrict or district level with the required signatures.

Copies of all accompanying documents including police reports, vendor estimates of repair, attending physician reports, etc. shall be forwarded to the District Safety Director immediately upon receipt. The District Safety Director shall forward copies of these documents to the Central Office Safety Manager immediately upon receipt.

Section 2: DEFINITIONS FOR REPORTING AND POLICY REQUIREMENTS

Occurrence - A term used interchangeably to apply to accidents and personal injuries. All occurrence reports shall be completed utilizing the departments Electronic Accident Reporting System within seven (7) calendar days. Only authorized, properly trained employees shall enter occurrence reports.

Accidents - To be reported on Indiana Department of Transportation Vehicle and Equipment Accident Report (SF-39697) shall apply in the following situations.

- **Any collision or occurrence involving department vehicles/equipment and private vehicles, private property or when injury occurs. Such accidents shall be reported regardless of amount of damages to department vehicles or extent of damages to private vehicles or property. A police report is also required.**

- **Any occurrence involving one or more department vehicles/equipment regardless of amount of damage. A police report is also required if it involves damage in excess of $1,000 to both vehicles.**

- **Glass breakage from stones and other debris need not be reported.**

Note: *In the event of an accident contact the Indiana State Police. Additionally, Operator's Report of Accident shall be completed for the above types of accidents and sent to the State Police.*

Estimate of Repairs

All estimates of repairs are to be reported on SF- 39788.

If the vehicle is to be repaired at a department repair shop, only the shop estimate is required (SF-39788).

If the vehicle is to be repaired at a commercial repair facility, estimates from at least three (3) facilities are required.

If a vehicle/equipment has been damaged beyond repair (uneconomically repairable) in an accident, its estimate of worth just prior to the accident shall be reported. Equipment Section procedures should be followed in making this determination. SF- 39788 or other appropriate documentation should be used to report this value.

<u>Injuries and Illnesses--</u> are to be reported on Employer's Report of Injury/Illness of Employee SF-34401 (R8 5-96). The types of injuries that should routinely be reported are those injuries which:

- **Require or may require medical treatment.**
- **Result in time away from work.**
- **Require restricted work activity.**
- **The employee and/or supervisor feel should be reported.**

If medical treatment was required, a Report of Attending Physician SF-2118 (R/9-87) or other appropriate physician's report shall also be submitted.

<u>Supervisor's Report of Investigation</u> SF 39762 (R/2-88) shall accompany all occurrence reports. This form shall be completed by the immediate supervisor and should describe his or her version of what happened, why it happened and what can be done to prevent recurrence of the type. <u>Supervisors shall reference the INDOT Safety Manual to complete this form.</u>

The District Safety Director may also investigate those occurrences that are considered of such importance to warrant his/her personal investigation. Normally, investigations accomplished by the Safety Director will require special reporting procedures because of their detail. The Safety Director's investigations should be submitted through the District Director to the Central Office Safety Manager as soon as practical.

<u>OSHA 300-Log</u>

Additionally, any injuries or illnesses that meet the OSHA criteria for recordable cases shall be recorded using the OSHA 300-log:

<u>Recordable Cases</u>: INDOT is required to record information about every occupational death; every non-fatal occupational illness and those nonfatal occupational injuries which involve one or more of the following: loss of consciousness, restriction of work or motion, transfer to another job or medical treatment (other than first aid).

Note: *Refer to OSHA 300-log for instructions, definition, and criteria for recordable cases.*

Each district is responsible for keeping an updated OSHA 300-log. It is mandatory that the OSHA 300-log summary be posted from February 1 thru April 30 of each year. Failure to comply with any portion of the mandatory requirements of the OSHA 300-log is a violation of federal and state law. Please take the time to read and understand the

requirements of the OHSA 300-log that are written on the form. Additional questions should be directed at the District Safety Director or the Safety Manager.

GUIDELINES FOR DETERMINING PREVENTABILITY AND NON-PREVENTABILITY FOR ACCIDENTS

This guide is designed to assist in determining the preventability or other ruling on accidents. It covers the principal types of accidents and it can serve as a guide for consideration of each accident.

NON-PREVENTABLE ACCIDENTS

A non-preventable accident is an accident that did in fact occur, but the operator did everything that could reasonably be expected of him/her to prevent the accident.

Examples of Non-Preventable accidents:

A. Struck in Rear by Other Equipment

Non-Preventable if:

1. **Operator's vehicle was legally and properly parked.**
2. **Operator was proceeding in his or her own lane of traffic or designated route at a safe and lawful speed.**
3. **Operator was stopped due to existing conditions or was stopped in compliance with traffic sign or signal. The directions of a police officer or someone controlling traffic.**
4. **Operator was in proper position waiting to make turn.**

B. Struck While Parked

Non-Preventable if:

1. **Operator was properly parked in a location where parking was permitted.**
2. **Equipment was protected by emergency warning devices as required by federal and state regulations or if operator was in process of setting out or retrieving signals. These provisions shall apply to the use of four-way (4)-way flashers as emergency warning lights.**

PREVENTABLE ACCIDENTS

An accident is considered preventable when the INDOT operator fails to do everything that is reasonably expected of him/her to prevent an accident.

<u>Examples of Preventable accidents</u>:

A. Accidents at Intersections

Preventable if:

1. **Operator failed to control speed so that he/she could come to a safe, controlled stop.**

2. **Operator failed to check cross-traffic and wait for it to clear before entering the intersection.**

3. **Operator pulled out from side-street in front of oncoming traffic.**

4. **Operator collided with person, vehicle or object while making right or left turn.**

5. **Operator collided with a vehicle making a turn in front of him/her.**

6. **Operator disregarded traffic or pedestrian signal or warning devices.**

B. Striking Other Equipment in Rear

Preventable if:

1. **Operator failed to maintain safe following distance and have his/her vehicle under control.**

2. **Operator failed to pay attention to changing traffic conditions.**

3. **Operator failed to judge the correct speed of the vehicle ahead.**

4. **Operator misjudged rate of overtaking.**

5. **Operator failed to leave sufficient room for passing vehicle to get safely into the lane.**

C. Sideswipe and Head-On Collisions

Preventable if:

1. **Operator was not entirely in his/her proper lane of travel.**

2. **Operator did not pull to his/her right and slow down or stop for vehicle headed in his/her direction of travel when such action could have been taken without additional danger.**

D. Struck in Rear by Other Equipment

Preventable if:

1. **Operator was passing slower traffic near an intersection and had to make a sudden stop.**

2. **Operator made sudden stop to park, load or unload.**

3. **Vehicle was improperly parked**.

4. **Operator rolled back into vehicle behind while starting on a grade.**

E. Squeeze Plays and Shutouts

Preventable if operator failed to yield right of way when necessary to avoid an accident.

F. Backing Accident

Preventable if:

1. **Operator backing when backing could have been avoided by better planning of his/her route.**

2. **Operator backed into traffic stream when such backing could have been avoided.**

3. **Operator failed to get out of vehicle with obstructed rear vision and check path of backward travel.**

4. **Operator depended solely on mirrors when it was possible to look back.**

5. **Operator failed to periodically get out of vehicle with obstructed rear vision and recheck conditions when backing a long distance.**

6. **Operator failed to sound horn while backing in vicinity of personnel.**

7. **Operator relied solely on a guide to help him back.**

8. **Non operational back up alarm contributed to the accident.**

G. Accidents While Passing

Preventable if:

1. **Operator passing where view of road ahead was obstructed by a hill, curve, vegetation, traffic, adverse weather condition, etc.**

2. **Operator attempted to pass in the face of closely approaching traffic.**

3. **Operator pulled out in front of traffic while making a pass.**

H. Accidents While Being Passed

Preventable if:

1. **Operator failed to signal when pulling out from curb.**

2. **Operator failed to check traffic before pulling out from curb.**

3. **Operator failed to look back to check traffic if he was in position where mirrors did not show traffic conditions.**

4. **Operator attempted to pull out in a manner that forces other vehicle(s) to change speed or direction.**

5. **Operator failed to yield right-of-way to approaching traffic.**

I. Pedestrian Accidents

Preventable if:

1. **Operator did not reduce speed in area of heavy pedestrian traffic.**

2. **Operator was not prepared to stop.**

3. Operator failed to yield right-of-way to pedestrian.

J. Mechanical Defects Accident

Preventable if:

1. Defect was of a type that should have been detected in making pre-trip or en-route inspection of vehicle.

2. Defect was of a type that should have been detected during the normal operation of the vehicle.

3. Operator knowingly operated unsafe or unguarded equipment.

K. All Types of Accidents

Preventable if:

1. Operator was not operating at a speed consistent with the existing road, weather, and traffic conditions.

2. Operator failed to control speed so that he/she could come to a safe, controlled stop.

3. Operator misjudged available clearance.

4. Operator failed to yield right-of-way to avoid accident.

5. Operator failed to accurately observe existing conditions.

6. Operator was in violation of INDOT operating rules or regulatory agency, or any applicable traffic law or ordinances.

7. Operator failed to exercise due caution in loading/unloading operations.

8. Operator failed to properly use lights, flags or other warning devices for traffic control.

9. Accident was principally due to overloading of vehicle.

10. Operator lost control of his equipment, unless it was due to non-preventable mechanical defect or equipment.

GUIDELINES FOR DETERMINING PREVENTABILITY AND NON-PREVENTABILITY OF INJURIES AND ILLNESSES

Injuries on the job are the result of unsafe acts or conditions. Supervisors are responsible for safety of employees, equipment and the condition of the work place. By working together, employees and supervisors can prevent a significant number of injuries.

Injuries should be determined PREVENTABLE at any time an individual fails to do every thing that could have been reasonably expected of him/her to prevent the injury.

Use of Personal Protective Equipment (PPE) will prevent numerous injuries. This includes wearing hard hats, eye protection, ear protection, gloves, respirators, etc. These and other items are provided by INDOT and their use shall be required in accordance with established policies and procedures. Injuries resulting from a failure to wear required PPE should be determined preventable if wearing the proper PPE could have prevented the injury/illness.

Examples of Unsafe Acts that Cause or Contribute to Preventable Injuries:

Operating Without Authority:

This includes any unauthorized action such as jumping on a moving vehicle, operating someone else's equipment without permission or using hand or power tools, equipment or machinery for which the employee has not been trained, etc.

Failure To Secure:

This refers to tying down materials on a loaded vehicle/equipment. Failure to use proper lockout/tagout procedures for switches, valves or failure to shut off equipment when not in use, etc.

Failure to Warn:

This includes failure of any employee to signal properly, failure to place warning signs, barricades or other protective means within an area or failure to take any action necessary to let others know that there is a danger.

Operating At Unsafe Speeds:

This includes actions such as driving a vehicle or other equipment at above or below safe speeds for the current weather conditions, feeding or supplying materials into machinery too fast or throwing materials instead of carrying or passing them properly, etc.

Bypassing Safety Devices:

This includes: disconnecting, removing, plugging or blocking any safety device, failure to inspect equipment or vehicles before operating, failure to keep vehicle/equipment safety features in good repair, ignoring warning gauges, signals or signs, etc.

Using Unsafe Equipment:

This includes using hand or power tools, equipment or materials which have become defective through wear and tear, abuse or another unsafe manner, such as handling tools or objects improperly or insecurely, or using the wrong tool or equipment for a particular job.

Unsafe Loading:

Unsafe loading of materials or supplies on a vehicle, conveyor or other apparatus such as loading over the safe load weight limit, loading too high, or loading in such a way as to create a hazard to yourself, the equipment or others.

Unsafe Placing:

Unsafe placing refers to placing hands or power tools, equipment or other materials in such a position that they become a hazard or danger to others in the area. Such materials could roll, fall, or become an obstruction in the work place, aisles or other normal travel routes, It also refers to placing the hands in, on or between equipment or at dangerous points of operation.

Taking Unsafe Position or Posture:

1. **Lifting or carrying loads improperly.**

2. **Lifting with the body in a twisted or awkward position, walking or working in unguarded areas, riding on tail gates, running boards, fenders, bumpers of vehicles or riding in precarious positions, such as in loader buckets or in beds of trucks.**

3. **Entering confined spaces that are unsafe because of gases, temperature or exposed power lines.**

4. **Failure to use proper methods of ascending or descending when working in high places, standing in the line of travel of falling or moving objects.**

5. **Taking a position that obstructs the free movement of others, etc.**

Working On Dangerous or Moving Equipment:

This includes:

1. **Oiling, cleaning or adjusting equipment while it is in motion.**

2. **Working on electrically charged equipment without cutting off the power.**

3. **Getting on or off equipment while the equipment is in motion.**

4. **Welding or repairing equipment containing flammable or explosive substances without first cleaning and venting or unnecessary handling of materials while the materials are moving on conveyors or are on the equipment; etc.**

Lack of Guards:

This applies to:

1. **Operating power tools and equipment with broken or missing guards.**

2. **Working on hazardous places like platforms or scaffolds where no guardrails or toe boards are provided.**

3. **Working near power lines or explosive materials that are not fenced off or other danger points that are not safeguarded.**

Inadequate Guards:

Often a hazard that is partially guarded is more dangerous than if there was no guard at all. The employee, seeing some sort of guard, may feel secure and fail to take precautions he/she would ordinarily take if it were unguarded.

Defective:

Equipment or materials that are dull, worn, torn, cracked, broken, rusted, have sharp edges or are splintered or found defective in any manner shall be reported, repaired, replaced or removed from service. Any buildings, machines, tools and equipment that have been condemned or are in need of repair, shall have those problems corrected before any employee is allowed to use or enter them. If there is a question, supervision should be contacted.

Hazardous Arrangement:

Cluttered floors and work areas, improper layout of machines and other items used within the work areas shall be cleaned and corrected. Blocked aisles, fire exits, materials stored unsafely or piled tools and materials shall be removed or corrected.

Improper Illumination:

Insufficient or too much light in the work area can cause hazards. The arrangements of lighting systems that result in shadows are dangerous. Outside lighting is needed in yards, around buildings, work zones for night protection or for employees and safe movement of equipment.

Unsafe Ventilation:

The use of PPE is required when:

- **The concentration of vapors, dusts, gases and fumes can all add up to danger to the employee and the work area.**
- **The location has an unsuitable ventilation capacity, the ventilation systems have insufficient air changes or an impure air source used for air changes may cause employee danger.**

NOTE: *The above represent only a few of the many types of considerations in determining preventability vs. non-preventability for accidents and injuries. It is impossible to state all the various considerations that might apply in many situations. Considerations that have not been mentioned but are very important include common sense, adequate training for the job and an attitude regarding safety. Every effort must be made by supervisors and employees to ensure that all of these factors are considered in all aspects of work.*

Specific recommendations for preventative actions can be many and varied. Some examples of recommendations that may be appropriate are:

- **Additional training**
- **Better supervision**
- **Compliance with established procedure if procedures were violated**
- **Better utilization and enforcement of protective clothing and equipment policies**
- **Increased emphasis on specific safety concerns**
- **Selecting the right tools and equipment for the job**
- **Proper inspection and maintenance of vehicles**
- **Removal of accident prone individuals**
- **Modification of job procedures**
- **Controlling exposure through engineering principles**

There are many more types of preventative actions that can be cited and which should be routinely used, depending on the particular type of situation.

If the supervisor determines that disciplinary action or other corrective action is required, such action shall be taken and indicated on the investigation report. The degree of deviation from safety policies, procedure or accepted practices should be considered in determining if disciplinary action is to be taken. Disciplinary action shall be taken in accordance with the department work rules, if applicable.

Section 3: REPORTING AND INVESTIGATING FATAL AND SERIOUS INJURIES

General

As a minimum, the following requirements shall be adhered to when a serious accident/injury occurs. Serious injury shall be defined as an injury that requires hospitalization or results in a fatality. The following are steps that shall be used to report serious occurrences. However, contacts other than those mentioned here shall be made with discretion.

Guidelines

These are the minimum requirements:

Department person in charge at the job site will be responsible for initiating contact for emergency care. (i.e. radio subdistrict, etc.)

Any person receiving the call for help shall assume the responsibility for ensuring that emergency care has been dispatched to the scene. (Emergency phone numbers shall be readily available.)

Management personnel or designee will assume responsibility for ensuring that emergency care has been contacted and is on the scene.

Once emergency care has been dispatched, the person receiving the call shall immediately notify the appropriate District Director, Division Chief and District Safety Director. The Safety Director shall inform appropriate personnel and, when practical, go directly to the scene to investigate.

The District Director or their designee shall immediately notify the Central Office Public Affairs Office via e-mail or call (317) 232-5533. The Central Office Public Affairs Office shall notify the Commissioner, Executive Staff and the Central Office Safety Manager.

The supervisor for the management unit where the injured employee is assigned shall be responsible for notifying family members. Family members shall be contacted as quickly as possible. Discretion shall be exercised when notifying the family. Fatalities shall be

reported by a personal visit. It shall be the goal of the department to provide whatever assistance is reasonable to the family, i.e. provide initial transportation, compensation information and assistance, etc. All locations shall identify a person to be responsible for the personal visit.

The immediate supervisor should remain with the injured employee until family members arrive.

All media calls shall be forwarded to the Public Affairs Office at (317) 232-5115.

Only designated employees should communicate with the hospital.

The District Safety Director shall be responsible for investigating all accidents resulting in death and/or serious injury to department employees and coordinating the reporting of such accidents with other investigating agencies. A completed accident investigation report: including police reports, photos, statements, etc. shall be forwarded to the Central Office Safety Manager as soon as possible.

The District Safety Director shall be responsible for the notification of the Central Office Safety Manager immediately after an accident resulting in death and/or serious injury.

The Central Office Safety Manager shall be responsible for the notification of OSHA within eight (8) hours of an accident resulting in death and/or the hospitalization of three (3) or more employees.

Chapter 6- OCCUPATIONAL HEALTH & ENVIRONMENTAL CONTROLS

Section 1: GENERAL

Occupational health and environmental controls aimed at reducing employee exposure to airborne contaminants, materials or noise is of utmost importance in terms of employee safety and providing INDOT employees with a safe place in which to work.

Section 2: SANITATION

An adequate supply of FRESH drinking water shall be provided at all work places. Portable containers used to dispense drinking water shall be capable of being tightly closed and be equipped with a tap. Drinking water containers will be clearly marked "DRINKING WATER". Where single service cups are supplied, they will be provided in a sanitary container.

Non-drinking water will be clearly marked "NON-POTABLE" to indicate that the water is unsafe and not to be used for drinking or washing purposes.

It will be the responsibility of employees engaged in the application of paints, coatings, herbicides and other contaminants to have at least five (5) gallons of potable water at the work site.

Hand sanitizer and or hand cleaner shall be available to work crews.

If restroom facilities are not readily available, employees will be allowed to travel to the nearest restroom facility.

Section 3: NOISE EXPOSURE

When employees are subject to sound levels exceeding those permitted by OSHA, feasible administrative or engineering controls will be utilized. If such controls fail to reduce noise exposure to permissible levels, suitable personal protective equipment will be used.

Section 4: GASES, VAPORS, FUMES, DUSTS AND MISTS

Exposures by inhalation, ingestion, skin absorption or contact with any material or substance above the threshold limits for airborne contaminates will be avoided. Administrative or engineering controls will first be utilized to control exposure. When controls are not feasible, personal protective equipment will be used to keep exposure within acceptable limits.

Section 5: VENTILATION

At times, harmful dusts, fumes, mists, vapors or gases exist (or are produced in the work place) in quantities likely to be harmful to employees. When prevention or elimination of such hazards is not practical, the hazards will be controlled by general ventilation, local exhaust ventilation, or other effective means to ensure employee exposure will not exceed regulatory limits.

Section 6: SILICA DUST

Silicosis is a disease of the lungs in which the normal lung tissue is replaced by fibrous or scar tissue due to breathing air containing crystalline silica dust. Employees shall not be exposed to Silica dust beyond OSHA's permissible exposure limits. Silica dust may be produced by several maintenance operations. Recommended protective measures follow:

- **Sandblasting: Approved respirators or air filtration equipment should be used.**
- **Cleaning: When cleaning the interior of shops, sheds or other structures, dust should not be blown into the air. When sweeping, floors should be moistened or sweeping compound used.**
- **Jack hammering: Approved respirator should be worn by jack hammer operators if excessive dust conditions exist.**

Section 7: CARBON MONOXIDE

Exposure to Carbon Monoxide gas could be harmful if concentrations exceed OSHA's permissible exposure limits. Carbon Monoxide gas is not easily detected because it is odorless, colorless, tasteless and non-irritating. It gives no warning of its presence.

Common sources of Carbon Monoxide gas are internal combustion engine exhausts and fires. Areas in which Carbon Monoxide gas may be present shall have properly installed and functioning carbon monoxide detector(s) and also be kept well ventilated. When possible, exhaust ventilation units should be provided.

Section 8: ASBESTOS AND LEAD

The hazards of asbestos exposure may be found in vehicle brake dust, electrical wiring, acoustical plasters, thermal insulation (heating and cooling systems) and products that resist fire. Asbestos is taken into the body through the respiratory tract (nose & mouth) and through ingestion (mouth). Exposure to asbestos has also been associated with an increased rate of kidney, esophageal (throat), laryngeal and other types of cancers. Asbestos-related diseases might take up to 40 years after exposure to become evident.

The most effective way to protect employees is to minimize exposure through the use of engineering controls and good work practices. Employees will not be exposed beyond OSHA's permissible limits.

Lead exposures can arise from removing paint from surfaces previously coated with lead-based paint, such as vehicles and bridges.

Recommended preventive measures:

- **Whenever possible, use materials containing lead products in a moist condition to avoid inhalation of the dust.**
- **Care should be taken to avoid inhalation of lead fumes or dust formed on top of molten lead due to oxidation.**
- **Do not store food in a room containing lead products.**
- **Do not eat or drink on the job. Go a distance away, wash hands with soap and water and clean fingernails before eating.**
- **Do not carry tobacco or consume it on the job.**
- **Practice personal cleanliness.**

Section 9: SPRAY PAINTING

Vehicle painting, in which air spraying is performed, shall be conducted in approved facilities only. Employees shall be instructed to wear proper personal protective equipment adequate for the job being performed. Personal protection shall be but not limited to:

- **Approved respirators**
- **Coveralls**
- **Head covering**

Section 10: CHEMICALS (DERMATITIS)

When working with chemicals that can cause injury to the skin, proper precautions shall be taken. Solvents and other degreasing chemicals along with wet lime and cement particularly affect the skin. Some persons are more susceptible than others to the action of these materials.

Personal Protective Equipment shall be provided to minimize the worker's contact with these materials. If possible, keep the exposed parts of the body away from direct contact with any chemicals that could cause skin irritation.

When working with these materials, wash hands often and dry them thoroughly before returning to work. When the work is finished, wash the hands thoroughly with soap and warm water. Dry and apply lanolin ointment.

On cement work, surface finishers should be provided with kneepads that are impervious to moisture.

Section 11: EPOXY RESINS

Because they have unusual bonding strength, epoxies are now being used in many operations such as bonding new concrete to old concrete.

Epoxies are also used in splicing concrete pile sections, as a "cold-weld" system for joining structural steel components, and in many other applications where their peculiar attributes solve a repair or structural problem.

The use of epoxy materials often involves a mixture of compounds, many of which are toxic. The curing agent (particularly amines) and solvents are the principal health hazards, but resins are also toxic to a degree. Unless workers take proper precautions, they can develop skin rashes, severe itching, eye irritation and respiratory ailments. Tolerance to contact varies with the individual worker, but each additional over exposure will increase sensitivity.

The personal protective equipment needed by personnel working with toxic epoxy compounds varies with the epoxy and application. Trowelling with epoxy mortar may require only plastic or rubber glove protection. Workers using epoxies shall use proper personal protective equipment to limit exposure to skin.

Epoxies, particularly those containing solvents, should never be used without adequate ventilation. Confined fumes and solvent vapors could seriously irritate the eyes, lungs, and respiratory tract and may also cause a fire and explosion hazard.

Epoxies coming into contact with the skin should be washed off immediately with soap and water. One should not use a solvent to wash skin. Many solvents are irritants themselves and will not remove the epoxy. Solvents will thin the epoxy so that it covers a greater area of skin and penetrates more deeply.

Care should also be taken to see that other employees working adjacent to the mixing or application of epoxies are provided adequate personal protective equipment, or the operation should be isolated to minimize exposure to other workers.

Section 12: HOUSEKEEPING

Good housekeeping is one of the most important factors in enhancing safety, efficiency and fire protection. Good housekeeping guidelines include the following:

- **Walkways and working areas should be kept clean, dry and unobstructed.**
- **All spills should be cleaned up immediately.**
- **Aisles and exits should be free of unnecessary tools, parts and equipment.**
- **Extension cords and hoses (air, water, etc.) should be stored properly, when not in use.**
- **Materials and supplies should be stacked properly and only to a height that is stable.**
- **Stored items should not be stored so they overhang or protrude into work areas or aisles.**
- **In storage areas, items should not block heaters, exits or fire extinguishers.**
- **Trash containers shall be labeled, emptied regularly, and not allowed to overflow.**
- **Oily rags must be kept in a labeled, covered metal container to prevent fire hazards.**
- **Hand tools and other equipment should be stored so they will not fall or protrude into aisles or work areas.**
- **All containers shall be clearly labeled as to their contents and covered.**
- **All fire extinguishers, first aid kits, spill kits, breaker boxes, eye wash stations, emergency showers and other safety related items must not be blocked or obscured and shall be clearly identified.**

Section 13: HAZARDOUS MATERIALS

A. GENERAL

Materials can be hazardous in several ways:

- **Toxic: Most chemicals are toxic at some level of exposure. Fumes, dust and vapors from toxic materials can be especially harmful because they can be inhaled and passed quickly from the lungs into the blood, allowing the poisons to circulate throughout the body.**

- **Corrosive: Materials such as strong acids and bases can eat right through other substances - including clothing. If splashed on the skin or eyes, they can cause serious burns. Some of these materials can break down into poisonous gases, making them doubly hazardous.**

- **Explosive: Some materials can explode when they are exposed to heat or fire. Included in this category are flammable liquids and compressed gases, which could become explosive under certain conditions.**

- **Flammable: This category includes all materials that catch fire easily, burn rapidly, spread quickly and give off intense heat. Many materials used and stored in the work place are flammable, including solvents and lubricants.**

- **Reactive: These materials must be isolated, stored in special containers and used with extreme caution. Some can burn when exposed to air, water or mixed with other substances. It's important to note that reactive materials don't have to be near heat or flames to burn. They burn spontaneously and can give off vapors that can be hazardous if inhaled.**

To protect yourself when handling hazardous materials, you should always follow four

(4) simple rules:

1. **Pay attention to warning signs.**

2. **Read and understand all labels and Material Safety Data Sheets carefully before using the product.**

3. **Get additional information when in doubt.**

4. **Ask your supervisor whenever you have any questions about handling or working with any hazardous materials.**

If employees become ill during or after use of a hazardous substance, check the label for directions in handling the emergency. Get medical attention immediately.

Materials that are not usable shall be removed from the storage and work areas. These materials need to be sent to a hazardous waste holding area for proper disposal.

B. CONTROL AND STORAGE

Safe storage facilities are a must. Injuries can occur through container leakage and incompatibility of commonly stored materials. Strong oxidizers, flammable and explosive substances and highly corrosive materials need to be assigned special storage areas. They also should be separated from each other.

The amount of a hazardous material stored at a location in the work place depends on the following:

- **Relative hazard of the material**
- **Type and size of storage container**
- **Distance of the storage area from the work area**
- **Availability of ventilation and fire extinguisher**
- **System being used for drainage**
- **Waste collection, storage and disposal**

C. CONTAINER LABELS AND SPECIFIC HAZARDS

Hazardous chemical containers should be labeled clearly with precautions for safe use. Labels shall not be removed. If a label becomes illegible or mutilated, the Department's secondary labeling system shall be used. See chapter on Hazard Communications for specific label requirements. Label warnings are as follows:

CAUTION: **Be aware of possible hazards.**

WARNING: **Protect yourself from severe hazards.**

DANGER: **Follow all instructions precisely to avoid extreme and immediate hazards.**

POISON: **This word and/or the symbol of the skull and crossbones indicates that small quantities are hazardous, and may be fatal if swallowed, inhaled or absorbed through the skin.**

If the label has one of the four- (4) key warnings listed above, it should state clearly the specific kinds of hazards in using the contents.

D. DEFINITIONS

- **FLAMMABLE: Means the contents has a "flash point" below 100 degrees Fahrenheit. The flash point is the lowest temperature at which vapors can become ignitable, when mixed with air near the surface of the liquid.**

- **HAZARDOUS: Any chemical that is a physical hazard or a health hazard.**

- **EXTREMELY FLAMMABLE: Means that the substance can catch fire or explode very easily, even if its temperature is below the flash point.**

- **PRECAUTION: Keep flames or other sources of ignition away from any substance which may be flammable. Even if a container is labeled nonflammable, read the label anyway. If in doubt, treat the materials as flammable.**

- **CAUSES IRRITATION, MAY CAUSE ALLERGIC SKIN REACTION, AVOID CONTACT WITH SKIN, CAUSES BURNS, CAUSES SEVERE BURNS, and CAUSES SEVERE IRRITATION: All mean exactly what they say. Keep the substance off clothing, where it might later contact the skin. Anything that can damage the skin can more easily damage the eyes.**

- **TOXIC: Means POISON**

- **HARMFUL DUSTS or FUMES: Means they can injure, if inhaled.**

- **AVOID PROLONGED BREATHING OF VAPORS: Means that brief exposure may not result in harm, but a longer exposure may.**

- **OXIDANT or OXIDIZING AGENT: When oxidizers combine with combustible materials, the mixture may burn or explode without a source of ignition.**

- **USE WITH ADEQUATE VENTILATION: Means that you should either use the substance with forced ventilation (open windows or doors may not be enough), or use it outdoors. An industrial hygiene evaluation may be necessary to verify that ventilation is adequate.**

E. HAZARDOUS MATERIAL SPILLS ON THE HIGHWAY

Vehicles which carry hazardous materials have placards, shipping papers and/or individually labeled containers that identify the type of hazardous materials being carried. These materials can be chemicals, explosives and radioactive or other materials.

When employees encounter hazardous material spills on the roadway, they should follow all procedures outlined in Operating Procedure 20, found in the Field Operations Manual, unless otherwise trained and properly equipped to respond.

Employees who encounter spills will need to obtain as much information as possible from a safe distance.

Information should involve:

(a) Material identity

(b) Location (nearest crossroads, mile post, etc.)

(c) Quantity spilled

(d) Direction of flow if material is moving

(e) Whether spill has reached a waterway

Employees shall remain a safe distance from a "hazardous material spill" until the material has been identified. Employees are permitted to perform other necessary work at a safe distance from the spill, such as traffic control, until police arrive at the scene to take control.

Supervisors, radio operators and other authorized personnel shall have a current copy of the Federal Department of Transportation publication "HAZARDOUS MATERIALS, EMERGENCY RESPONSE GUIDEBOOK" readily available.

Chapter 7-WORK ATTIRE AND PROTECTIVE CLOTHING/EQUIPMENT

Section 1: GENERAL

Work attire and personal protective clothing/equipment (PPE) are only effective to enhance safety when properly worn and used. Employees operating machines, climbing ladders, handling material or doing shop or manual labor should wear clothes that are reasonably snug, particularly about the neck, wrists and ankles. There should be no loose cuff flaps or strings. Operators will not wear neckties, loose sleeves, jewelry, watches or loose long hair all of which may catch in power driven or other equipment. Employees assigned to shop and field activities will wear long trousers and a shirt at all times.

The department shall assess the work place to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment, and shall verify that the hazard assessment has been performed through a written certification.

The department shall ensure that all personal protective equipment (PPE) shall be of safe design and construction for the work to be performed.

PPE shall be regularly monitored for fit and effectiveness.

Protective clothing/equipment, respiratory devices and protective shields and barriers shall be used and kept in a sanitary, reliable condition.

At the discretion of the supervisor, employees may be required to wear safety glasses, safety vest, safety hats and/or work shoes while engaged in activities other than those specified in this manual.

Employees and their supervisors shall ensure that personal protective clothing/equipment is worn where hazards may be encountered capable of causing injury or impairment to the body.

Where employees provide their own protective equipment, the supervisor shall be responsible to assure its adequacy, proper maintenance and sanitation.

Defective or damaged PPE shall not be used.

It is the supervisor's responsibility to ensure that contaminated PPE which cannot be decontaminated is disposed of in a proper manner as to protect employees.

Training shall be provided for each employee who is required to use PPE. Each employee shall be trained to know at least the following:

- **When PPE is necessary;**
- **What PPE is necessary;**
- **How to properly don, remove, adjust and wear PPE; and**
- **The proper care, maintenance, useful life and disposal of PPE.**

The department shall verify that each affected employee has received and understood the required training through written certification.

It shall be the responsibility of the person in charge to ensure the use of all PPE. If an employee avoids or disregards an order to wear protective clothing or equipment required on a job, corrective or disciplinary action may be administered in accordance with the INDOT work rules.

Section 2: HARD HATS

All INDOT employees performing duties in which they are exposed to danger of head injuries from impact of flying or falling objects or from electrical shock and burns shall be protected by approved hard hats.

The supervisor in charge of the work site, work activity or project shall be responsible for determining whether or not hard hats are to be worn. This decision will be based upon careful evaluation of safety risk factors, weather conditions, proximity to roadway, probability of falling/flying objects, equipment and tools being used and other protection being provided, etc.

Employees who may be in any of the areas described above during the course of a day shall have a hard hat in his/her possession and immediately available for use.

Section 3: EYE AND FACE PROTECTION

All personnel shall wear protective eye and face equipment when there is a reasonable probability of injury that could be prevented by such equipment. Eye protection is required for, but not limited to, the following activities and equipment:

1. **Using air compressor/jack hammer**
2. **Sand blasting**
3. **Wire brushing**
4. **Abrasive grinding**
5. **Cutting torch**
6. **Welding and welding inspection**
7. **Spraying**
8. **Power drilling**
9. **Tree and brush trimming/chain sawing**
10. **Power brooming**

11. **Carpentry work**
12. **All mowing operations**
13. **Working around chipper**
14. **Working under equipment**
15. **Using hand grinders and certain construction equipment; and**
16. **Other activities/equipment which may pose hazards to the eyes.**

Each employee who wears prescription lenses shall wear protection that can be worn without obstructing the sight of the employee while engaged in operations that involve eye hazards.

No employee shall wear contact lenses where gases, vapors or other harmful materials are present which, when absorbed by the contact lenses, may harm eyes. Specifically, contact lenses shall not be worn under the following conditions:

- **Where arc welding is being performed.**
- **Where electrical arcs are customarily encountered.**
- **Anytime the employee is handling or is exposed to any material that is likely to injure or irritate the eyes.**
- **Anytime an employee is handling hazardous materials.**

Section 4: SHOES

Each affected employee shall wear protective footwear when performing INDOT work activities. All protective footwear worn on the job must comply with the American National Standards Institute's (ANSI) standard Z41, and the approval must be found on the shoe. Personnel affected include, but are not limited to field, shop, and warehouse personnel. Protective footwear is described as sturdy, hard toe and hard sole work shoes. Specifically excluded are tennis, fabric or similar shoes.

Section 5: GLOVES

Employees are required to wear the appropriate hand protection when their hands are exposed to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.

Employees working with drill presses, power saws and similar rotating machinery shall not wear gloves.

The selection of the type of glove to be worn shall be based upon an evaluation of the hazards associated with the activity being performed and the conditions present.
Types of gloves are as follows:

- **General Purpose Work Gloves**
- **Anti-Vibration Gloves**

- **Metal Mesh Gloves**
- **Chemical Protection Gloves**
- **Disposable Gloves**

Section 6: SAFETY VESTS T-SHIRTS & HATS

An INDOT issued hi-viz safety hat along with an INDOT hi-viz vest or T-shirt shall be worn at all times while engaged in operations upon or adjacent to a roadway or in a construction area. Discretion should be utilized, when operating a chipper or chain saw, and there is a possibility that the vest may become tangled in the equipment.

The T-shirt program shall be administered by the following criteria:

- **All field employees, including new and temporary employees, shall be issued (5) hi-viz T-shirts one time a year. No additional shirts will be issued between September 1 and May 1 of the following year.**

- **Employees included in the program shall be those who regularly wear a safety vest to perform their duties. Occasional, safety vest users should continue following normal procedures.**

- **Each employee will be responsible for laundering and maintaining his or her own T-shirts, and shall maintain a safe and presentable appearance.**

- **If an employee reports to work without the proper T-shirt, or the supervisor determines the shirt to be unfit for wear on the roadway, the employee will be required to wear a safety vest.**

- **Any time articles of clothing are to be worn over the T-shirt or if employees are engaged in nighttime operations or flagging, a safety vest is mandatory.**

- **Managers and supervisors will be responsible for determining if T-shirts are faded beyond reasonable usefulness regarding high visibility.**

- **Employees will be encouraged to restrict the wearing to actual work hours and sanctioned activities.**

- **T-shirts will not be altered in any manner.**

NOTE: *HARD HATS SHALL BE WORN IN LIEU OF HI-VIZ HAT IN ACCORDANCE WITH PROVISIONS OF SECTION 2 OF THIS CHAPTER.*

Section 7: SAFETY HARNESSES

Employees shall wear fall protection in accordance with Chapter 24 (Fall Protection) of this manual.

Section 8: WORK ATTIRE

All employees shall wear work attire appropriate for their job. For field personnel, guidelines are a shirt with a factory hemmed sleeve or blouse and long pants or trousers worn as intended. Tank tops, cutoff shirts and shorts are not considered appropriate work attire for field personnel. Office and other personnel should use good discretion in their work attire, with proper consideration for safety hazards in their jobs. Employees working around skin irritant materials such as detergents, creosote, tar, grease, insulating materials, etc., are required to wear suitable protective garments. It shall be the supervisor's responsibility to ensure that the clothing worn is appropriate for the job.

Section 9: HEARING PROTECTION

Hearing protection shall be used when sound levels are above OSHA's permissible levels. Operations where permissible levels may be exceeded include, but are not limited to:

- **Chainsaws**
- **Chippers**
- **Jack hammers**
- **Working around air compressors**
- **Concrete saws**
- **Other noise making machinery or areas**

If there is a question as to what operations involve excessive noise levels, supervisors should be contacted. In some cases, it may be necessary to have measurements made of noise levels for certain operations or working conditions.

Section 10: RESPIRATORS

Respiratory protection shall be worn, when an employee is exposed to airborne contaminants exceeding OSHA's permissible exposure limits.

Types of respirators are as follows:

- **Air-Purifying Respirators**
- **Supplied-Air Respirators**
- **Self-Contained Breathing Apparatus**

Note: *More information can be found in the Chapter on Respiratory Protection Program.*

Section 11: APRONS

Any employee who handles harmful materials and is not protected by other PPE shall wear aprons of the proper type for the work involved.

Section 12: CHAPS

Full length, properly fitting chainsaw chaps shall be worn by all employees while operating a chainsaw.

Chapter 8- VEHICLE AND EQUIPMENT OPERATIONS

Section 1: GENERAL

All drivers and operators of vehicles and equipment shall go through a driver improvement program, approved by the department, at least every three (3) years. All newly hired vehicle and equipment operators shall be required to attend an approved program as soon as possible after hire or within the first year. Additionally, any person involved in a preventable accident shall be retrained as soon as possible after the accident. These requirements will be accomplished by use of various training programs approved by the INDOT Safety Department.

Unauthorized persons shall not operate department vehicles/equipment. Further, unauthorized persons will not ride in department vehicles/equipment unless required by emergencies.

Only properly trained personnel shall operate equipment and vehicles.

Vehicles and equipment will be operated in compliance with the law and the directives of the department. They will not be driven or road tested at speeds in excess of the established speed limits, nor at speeds greater than is reasonable and prudent under the existing conditions.

Vehicle/equipment operators will reduce vehicle speed during periods of poor visibility caused by fog, smoke, rain or snow and will turn on the headlamps of their vehicles as an added precaution. When visibility makes operations unsafe, the vehicle will be stopped and parked clear of the traffic lanes and remain there until driving can be safely resumed.

No operator will start, stop, slow down, turn or back his/her vehicle without making certain that the movement can be done safely and using proper signals.

Heavy equipment operators should shift into lower gear before descending steep hills and will not disengage the gears and coast at any time.

An employee will not start the engine on self-propelled equipment unless he/she is seated in the driver's seat and is certain that the gears are disengaged.

If a heater or starting fluid is used for cold weather starting, be sure to follow the manufacturer's instructions or instructions of the supervisor. Since starting fluid is flammable, do not smoke when using it or puncture or burn the container. Dispose of the container according to manufacturer's instructions.

No more than three (3) persons are permitted to ride in the front seat of a vehicle and no one will interfere with the driver's control of the vehicle.

All large equipment equipped with West Coast type mirrors will also have convex mirrors installed. A separate convex mirror attached to the lower mirror arm is preferable.

A radiator cap will not be removed from an overheated radiator until the engine has been cooled and the water has ceased boiling.

When operating equipment for snow removal or sanding operations, caution will be exercised at all times. Snow removal or sanding operations will be in compliance with this manual and other directives issued by the department.

Section 2: SEATBELTS

The department recognizes the conclusive effectiveness of seatbelt use in reducing fatalities and severity of injuries resulting from motor vehicle accidents. Consequently, the department encourages all employees to use seatbelts while riding in private vehicles.

Approved seatbelts shall be installed by the manufacturer. All employees driving or riding as passengers in INDOT vehicles shall properly wear seatbelts whenever the vehicle/equipment is in motion. All worn or damaged seatbelts shall be replaced immediately.

The driver of the vehicle should remind all passengers to fasten their seatbelts.

It shall be the occupant's responsibility to ensure compliance with this policy. Failure to comply will result in appropriate disciplinary action in accordance with the department's disciplinary action policy.

The only exception to this requirement is that seatbelts will not be installed or worn on equipment not having Roll Over Protective Structures (ROPS). In cases where it is impossible to properly operate the equipment when wearing a seatbelt, i.e. grader, the belt may be temporarily unlatched.

Section 3: PRE-TRIP INSPECTIONS

All vehicle operators shall perform a vehicle safety inspection prior to the initial dispatch of the vehicle before each shift.

The procedures followed in conducting the inspection shall conform to those set forth on the INDOT Daily Vehicle Inspection Form. Operators shall report all safety defects or deficiencies to their supervisor by completing a Vehicle Repair Request. Vehicles with known safety defects or deficiencies shall not be operated.

There shall be a safety prop or block used underneath dump truck boxes for the protection of employees inspecting or repairing underneath. The prop or block will be of sufficient strength to support the weight of the box.

Vehicles and equipment shall be chocked whenever a vehicle is being serviced.

Section 4: PARKING

No vehicles/equipment will stop or park on the traveled portion of the roadway when it is practical to stop or park off the roadway, unless doing so is required in the line of duty.

Vehicles/equipment will not stop or park where it may interfere with the movement of other vehicles or be in close proximity to working operations. Vehicles/equipment will not be parked or left adjacent to the roadway in such a manner as to constitute a traffic hazard, nor will they be parked on a curve or hill where they will obstruct sight distances or parked with buckets up. Operators will not park vehicles/equipment without first setting the brakes. Chocks may be placed under the wheels as an additional precaution. Any vehicle being loaded or unloaded at a dock, with a forklift or mechanical handling equipment, will have both rear wheels chocked.

When parking non-motorized equipment (trailers, air compressors, tar kettles, arrow boards, etc.) that do not have brakes, the wheels should be chocked to prevent any movement.

Vehicle doors will be kept closed while the unit is in motion and will not be left open while the vehicle is parked.

No one will open the door of a vehicle, on the side available to moving traffic, unless and until it is reasonably safe to do so and it can be done without interfering with the movement of other traffic.

Section 5: VEHICLE TOWING

Extreme caution will be used when loading and unloading equipment on low boy trailers. Winches will be used to assist in the loading where available.

Equipment which is customarily towed will not be towed unless safety chains are used in addition to the regular tow bar or connector. The safety chains will be permanently attached to towed equipment and will be of sufficient strength to control the towed equipment in the event of tow bar failure. Chains, hooks and attachments will be kept in good repair and will be constantly inspected for weakened areas.

Operators will not tow a vehicle or piece of equipment which requires the use of the pintle hook or hitch without first securing the pintle with wire, cotter pin or other adequate means. In all ball and hitch type set-ups, the hitch and ball shall be of the size designed to be used with each other.

Red flags will be displayed on the extreme ends of a load which projects four feet or more beyond the rear of any vehicle/equipment.

Section 6: LOADING/UNLOADING AND TRANSPORTING OF LOADS

During loading and unloading of vehicles extreme caution will be taken to prevent injury. As a minimum the following shall be adhered to:

- **Eliminate backing as much as possible.**
- **No pedestrian traffic within the loading or unloading area.**
- **Stay inside the vehicle while loading or unloading, unless you are responsible for loading or unloading your own vehicle.**
- **No more than one vehicle in the loading or unloading area at a time.**
- **Follow the dedicated traffic pattern for the area.**
- **Follow proper backing procedures.**
- **Inside the dome, unload only one truck at a time.**
- **All loaders shall be operated in accordance with Ch. 8 Section 10.**
- **Designated loading/unloading areas will be established at every facility near domes and materials stockpiles.**
- **A load that exceeds the rated capacity of the equipment will not be lifted.**

All loads being carried by trucks or other vehicles/equipment shall be secured in such a manner that it will not fall from the vehicles or trailer.

Equipment or tools carried on vehicles will be placed securely in compartments or otherwise fastened, i.e., chains, shovels, mechanics' tools, etc.

Drivers will not permit a vehicle to be loaded beyond its capacity nor will they permit materials, equipment or miscellaneous gear to be loaded in any manner which would permit any portion thereof to extend beyond the fender line or to extend upwards to heights sufficient to strike overhead wires, garage doors, etc., or any way interfere with the vision of the operator.

Flags and other warning devices placed on department equipment will be in accordance with this manual and other department directives.

Section 7: RIDING ON VEHICLES

Persons will not ride in a truck bed unless essential because of job requirements. No one will sit on the edge of the truck bed, tailgate or trunk of vehicles.

Persons are not permitted to ride on the hood, running board or fender of any vehicle/equipment. No one is permitted to get on or off a vehicle while it is in motion.

Section 8: TRACTORS

Do not wear loose clothing while operating a tractor. Loose clothing can catch on moving parts.

Disengage the power take-off (PTO) when not being used. Use the PTO shield whenever equipment is in use. If you do not have a PTO shield, have one installed.

Always apply the parking brake, place the PTO lever in the "OFF" position and place the transmission in neutral prior to climbing off equipment if it must be left running.

Never hitch to the axle or other high points. Always hitch to the drawbar, take up the slack slowly and never jerk on chains or cables.

Engage the clutch gently, especially when going uphill. Jackrabbit starts are dangerous to both the operator and the tractor. Be alert for ditches, rocks or holes that might cause the tractor to overturn.

Be extremely careful when driving up an incline. A tractor can upset if the center of gravity moves behind the point where the rear wheels touch the ground. Try and back-up if it's absolutely necessary to get up the incline. If you get caught on a steep incline, back down very slowly and apply the brakes lightly. Weight on the front of the tractor will help in this situation.

Keep the tractor in gear when going downhill. This allows the tractor engine to serve as a brake. Some tractors may have "free wheeling" in their transmission drive. Make sure that this type of transmission is put in direct drive before attempting to use the engine as a brake.

Stop the engine before you get off the tractor unless the necessary precautions have been taken.

Roll over protective structures will not be drilled, welded on, added to or altered in any way. (Wire mesh to protect against flying objects is encouraged but will be attached by means other than the above.)

Section 9: BACKHOE

When operating a backhoe the following safety requirements shall be followed:

- **Do not allow anyone to ride on a backhoe**
- **Do not make mechanical adjustments when the backhoe is in motion.**
- **Do not attempt to repair or tighten hoses, when under pressure, or with the engine running.**
- **Do not operate the control levers when standing on the ground.**
- **Always use transport chains when transporting the backhoe.**
- **Watch overpass clearances, particularly when hauling the backhoe with a truck-trailer.**
- **Adequately chock the backhoe when it is detached from the tractor.**
- **Do not leave the tractor without first lowering the backhoe bucket to the ground.**
- **Be careful of bystanders when lowering the stabilizers and whenever operating the backhoe.**
- **To prevent upsets, be careful when swinging with a loaded bucket on hillsides.**
- **Do not get under a raised bucket and boom to grease or repair the backhoe.**
- **Watch out for overhead and underground high-voltage electrical lines.**
- **Be sure of gas and water locations before you start to dig. The utility company should be contacted to determine the location and depth of underground carriers.**

Section 10: LOADERS AND DOZERS

When operating loaders and dozers the following safety requirements shall be followed:

- **Never use the bucket to lift or transport personnel.**
- **Lower all attachments (blade or bucket) to the ground before dismounting from the machine.**
- **Don't get under the machine unless the engine is turned off and the parking brake is set and wheels are chocked.**

- **Make all adjustments and repairs, with the engine off and hydraulic systems not under pressure, except where instructions indicate otherwise.**
- **Make sure all pressure and temperature gauges are in proper range before operating the equipment.**
- **Don't allow chains, ropes or tools to lie on the floorboards when operating the machine.**
- **Don't allow the floorboards or mounting steps to become slippery with grease or oil.**
- **When mounting or dismounting equipment always face the machine and utilize the 3 point mounting technique.**
- **Always face or look in the direction that the machine is traveling.**
- **For travel speeds, raise the dozer blade approximately 15 inches off the ground and pitch back to afford maximum visibility.**
- **Don't travel with a loader bucket raised more than 3 feet off the ground.**
- **Don't make sudden stops with a raised or loaded bucket.**
- **Make sure the bucket does not pass over anyone.**
- **When servicing or transporting the loader, make sure center locking pin is in place.**
- **When operating the loader, use caution to avoid obstacles in the pivot area.**
- **Don't drive close to bank edges where there is soft footing or danger of collapse.**
- **Don't travel sideways on a slope with the bucket raised.**
- **Don't spin tires when digging - use higher gear or less throttle.**

Section 11: GRADE ALLS, MOBILE CRANES AND EXCAVATING EQUIPMENT

Standard operating signals will be agreed upon and used to direct all operations. Only one person will be permitted to give signals to the operator unless the load is being transferred to a point that is out of the signalman's sight. In such cases, a second signalman will be used.

Outriggers on rubber-tired cranes will be used when needed.

When cranes are being operated on soft ground, substantial mats should be laid down. Extreme caution will be used, when operating near the edge of an excavation.

Tag lines or guide ropes will be used on loads that are liable to swing or must be guided through a restricted space. Care will be taken to guard against injury to employees, structures, or scaffolds from swinging loads.

The hook will be directly over the load being lifted, in order to minimize strain on the crane and sliding of the load. A shackle or mouse hook should be used with swinging buckets. A bucket may strike an obstruction and be lifted off an open hook.

Cranes will be moved only when directed by a signalman. Workmen on the ground will be kept away from the boom or suspended loads and care should be taken to keep clear of the cab, when it is turning. No one is permitted to get on or off a moving crane.

Never operate closer than the OSHA required distances for overhead electric lines.

If a crane boom contacts an energized power line, the operator should stay with the machine until the boom is cleared. The only reason the operator will leave the machine is if a fire breaks out, then he/she should jump clear. Never climb down as you may form a contact between the machine and the ground.

Power should be cut off and all controls locked before the operator leaves the cab. Where practical, the boom should be lowered to the ground when leaving the machine overnight.

The operator will never leave the machine while a load is suspended.

Cranes will not be left near the edge of an excavation or in an area that may become impassable or unstable by rainfall.

The supervisor will also consider buried electrical conduits, ducts and gas lines as a serious hazard. The utility company should be contacted to determine the location and depth of underground cables.

Section 12: FORKLIFTS, LIFT TRUCKS, AND MOTORIZED HAND TRUCKS

Only trained and authorized operators shall be permitted to operate lift trucks. Documentation on training must be kept on file.

When a lift truck is left unattended, the forks shall be fully lowered, controls shall be neutralized, power shall be shut off and brakes set. Wheels shall be chocked, if the truck is parked on an incline.

Lift trucks, with or without loads, shall travel with the forks about 4 inches above the floor. Do not raise or lower loads while the lift truck is moving. Use the tilt control to keep the

load from spilling. If the load obstructs forward view, travel with the load trailing, always facing the direction of travel.

Never butt loads with the fork or with the rear end of the lift truck.

Make sure skids, pallets, etc., are strong enough for the load and that they are in good repair. Sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and whenever turns must be made. Turns shall be made smoothly and slowly to avoid spilling the load or causing a collision. Watch for blind spots around corners or materials. Avoid speeding, sudden stops and starts, quick turns and all other forms of reckless operation.

Do not exceed the rated capacity of the lift truck.

Always drive up and back down inclines to ensure stability.

No one shall be allowed to ride on a load or on the forks.

Before a lift truck boards a truck or trailer, the truck's wheels shall be chocked and the brakes set. A truck-restraining device may be used in lieu of wheel chocks.

Lift trucks in need of repair shall not be operated.

Lift trucks should be inspected daily before use. As a minimum, the following items should be checked:

- **Brakes: Foot, emergency, seat (if provided).**
- **Fluid levels: Hydraulic oil, engine oil, radiator coolant.**
- **Warning devices: Flashing or rotating lights, horns, back-up alarms.**
- **Head and tail lights.**
- **Tires: Look for cuts, breaks, improper inflation and signs of wear.**
- **Exhaust systems: Look for sparks, flames, leaks, etc.**
- **Hydraulic controls for operation and security.**
- **Steering for proper operation.**
- **Proper operation of gauges and instruments.**
- **Fuel leaks**

- **Battery connections**

- **Fire extinguisher mounted, charged and in good condition.**

Section 13: NON-MOTORIZED HAND TRUCKS

Non-motorized hand trucks are meant to be pushed, not pulled. An exception is the four-wheel truck, with swivel axle and tongue, which is designed for pulling and the motorized hand truck, which can be run either way. Never pull a four-wheel truck down an incline.

Watch where you are going when operating a hand truck and be sure of clearance so you won't injure your hands. When you leave a hand truck, put the handle up so it will not be a tripping hazard.

Do not overload a two-wheel hand truck. To make sure that the load is stable, place it so that the weight is on the axle and not on the handle. The same warning against overloading applies to the four-wheel hand truck. Never pile a load so high that it might fall or prevent you from seeing ahead.

Section 14: AIR COMPRESSORS

Safety glasses or goggles and hearing protection shall be worn when working with air compressors.

Before starting the air compressor, be certain all hand operated valves to pressure gauges are open.

Inspect air compressor tank gauge to make sure it is registering.

Check kick-off pressure to be sure it is normal.

Never attempt to adjust safety valve of kick-off.

Stand clear of hose connections and make sure they are secure before releasing full pressure to hose.

Close valve at compressor end of hose to release air before disconnecting hose from compressor.

All air hose connections shall be coupled with a safety chain or other approved device, in addition to the standard coupling.

Never use more than 30 psi of air to remove dirt and debris from the body.

The nozzle on sandblasting equipment should be periodically examined to make sure the screw threads are in good shape and not excessively worn so that they won't fly off under pressure.

Section 15: CONCRETE MIXER

To prevent tipping, the mixer must be set level and wheels chocked before operating.

All gears and rollers shall be properly guarded.

Cables, sheaves and gears shall be inspected before using mixer.

Before starting engine, place the control in neutral.

Stand clear of drum opening when the mixer engine is in operation.

The engine shall be shut off, when cleaning the drum, making adjustments or repairs.

Section 16: CHIPPER

The operator shall always wear gloves, hearing protection, eye protection, goggles or face shields while feeding the chipper. Anyone feeding brush into the chipper shall not wear a safety vest or any other loose fitting garments that may become entangled with the brush.

Never attempt to make any repairs or adjustments to the chipping unit while it is in motion. The ignition switch must be off, key removed and clutch disengaged.

Never allow anyone to stand directly in front of the exhaust chute while the unit is revolving.

Never throw sweepings or other foreign material such as stones, nails, etc. into the unit.

Do not attempt to force brush into the chipper, as the unit should feed itself. If it does not feed itself, push with another piece of brush.

The utmost care must be exercised while changing or setting the blades, cutter bar and pressure plate.

Always test-run the unit for a few minutes after a blade has been changed then re-tighten the blades.

Each day, prior to starting the unit, always check the tightness on the wedge locking bolts.

Do not attempt to feed small, short pieces of brush into the unit by hand. Use a longer piece of brush as a pusher.

Have all moving parts, grease fittings, etc. greased periodically to prevent overheating.

Park truck with feed chute alongside curbside of the road. If off road make sure to park on level ground.

On a truck-mounted chipper, do not shift power take-off lever while either the chipper or truck is in motion.

Check governor to make certain that it cuts out properly before starting the chipper each day.

Do not park in high weeds or grass. Continuous operation makes the exhaust pipe a fire hazard.

Clean chips from the motor, especially around exhaust manifold, to prevent fires.

Check coupling devices and safety chains on trailer and towing vehicle daily.

Do not leave chips in truck over weekend due to fire hazard.

Section 17: POWER WASHERS

Safety glasses or goggles and hearing protection shall be worn when working with power washers.

Always use washer in accordance with the manufacturer's operating procedures.

Never spray in the direction of yourself or another person.

Always use in a well ventilated area.

Always check the MSDS for the chemicals being sprayed.

Caution shall be taken when spraying due to flying debris.

Always check hoses for cracks and leaks. If leaks are detected, replace hose immediately.

Chapter 9- BACKING SAFETY

Section 1: GENERAL

INDOT shall make the elimination of backing accidents a safety priority. Drivers and operators of vehicles and equipment who have restricted vision to the rear shall be particularly careful when backing.

Section 2: GUIDELINES

Avoid backing whenever possible. Operations that can be effectively and safely done with no or a minimum amount of backing should be done in this manner. Backing should only be done when absolutely essential.

A ground guide shall be used if backing is required and there is obstructed vision to the rear. The only time it is permissible to back a vehicle, with obstructed vision without a ground guide is when the driver is alone and backing is essential.

When ground guides are not available, all operators shall personally ensure that it is clear to back prior to beginning backward motion. For vehicles having obstructed vision immediately to the rear, i.e. dump trucks, pick-up trucks with sign racks in the bed and other large vehicles, this will involve the driver/operator physically moving to the rear of the vehicle and ensuring that all is clear. Prior to, and after backing has commenced, side view mirrors shall be constantly checked to ensure that conditions remain safe for backing. For vehicles not having obstructed vision to the rear, i.e. sedans, pickup trucks, etc., the operator shall turn around and check the complete area surrounding the vehicle to ensure that it is safe to back. In all cases, operators shall also check for people or traffic approaching from the side. Back as soon as possible after checking conditions in the rear. If there is a delay in backing, personally recheck the rear of the vehicle. In all cases, ensure it is clear just prior to backing. Always back slowly and cautiously.

Operators shall warn others who may be near a backing vehicle/equipment, by sounding the horn and/or radio contact. Vehicles equipped with backup alarms shall have alarms in an operational condition at all times. If alarms are not operational, ground guides shall be used if available.

Continuing training programs shall be in effect to train operators and drivers on backing safety and to train personnel, who may serve as ground guides, on proper use of hand signals and other matters. Personnel designated to serve as operators of backing vehicles/equipment and ground guides should be responsible and realize the importance of their jobs and that their failure to properly do their jobs could easily cause serious accidents and injuries. Instructions for ground guides are provided in Section 4 of this chapter.

Back-up alarms shall be installed and serviceable on all vehicles/equipment requiring such alarms. This includes dump trucks, sign bucket trucks, paint striping trucks, stake trucks,

crew cabs and other trucks one ton or heavier. Other types of equipment that require alarms shall include graders, rollers, loaders, backhoes and other large equipment. Alarms shall be installed to the rear, facing rearward. All alarms shall operate automatically with any backward movement and will give suitable and audible sound alarms for the conditions and circumstances under which the vehicle/equipment are operated. The alarm shall provide suitable warning during the entire period of backward movement. All back alarms used on INDOT vehicles/equipment shall be non adjustable 112 dbs.

Supervisors and operators of vehicles/equipment equipped with backup alarms are responsible for inspecting and reporting defective alarms.

Section 3: FIVE PRINCIPLES TO BACKING SAFETY

GET THE WHOLE PICTURE: Walk around the vehicle to check your clearances, blind spots and the driving surface.

BACK FROM THE DRIVER'S SIDE: The safest position to back from is one that begins from the driver's side and is as close to the destination as possible.

BACK SLOWLY: When backing your vehicle, you must always consider speed. Backing rapidly may cause your vehicle to veer out of control and collide with objects on either side.

USE MIRRORS: When backing your vehicle, it is important to use both side view mirrors as often as possible. Mirrors help you check your clearances and help you spot unexpected persons moving into your path.

USE A GROUND GUIDE: Ground guides should be used whenever possible. The job of the ground guide is to warn you of pedestrians or other objects who are entering your path.

It is important to know and use the five principles of backing safety. You are responsible for the vehicle and what goes on around you when you take the driver's seat.

Section 4: PROCEDURES FOR GROUND GUIDES

Supervisors shall see that all of their employees, who may be called upon to act as ground guides for backing operations, are instructed in the proper methods. Supervisors shall ensure that these methods be employed at all times.

The methods to be used follow:

Employees giving directions to the driver shall:

- **Stand on the ground at the rear of the vehicle/equipment in clear view of the driver;**
- **Stand in full view of traffic, both vehicular and pedestrian;**

- **Stand in full view of the area where the vehicle is about to back;**

If all three conditions cannot be met, an additional guide shall be used.

Employees directing a truck in a backing operation must keep a safe distance between themselves and the backing vehicle so that they will not be struck by the vehicle they are directing. They must maintain a safe distance during the entire backing operation. They must stay in a path outside the width of the backing vehicle, where they are visible in the rear view or side mirror. They must also be mindful of oncoming traffic in both directions.

The ground guide must also consider the condition of the ground they are going to walk over. Plan to stop the backing vehicles several times during the backing maneuver. If there is any doubt in the mind of the employee providing the guidance to the driver about conditions in the area, the guide shall stop the driver and make them aware of the conditions.

Hand signals should be used instead of voice. Hand signals are as follows:

SIGNAL FOR TRUCK MOVEMENT

The palm of the hand shall face the direction toward which the vehicle shall move and the hand and arm shall swing as one from the elbow slowly in that direction.

SIGNAL TO STOP TRUCK MOVEMENT

The palm of the hand shall face the driver and the hand and arm shall be held rigid.

SIGNAL TO RAISE OR LOWER BED

Extend the arm with clenched fist with thumb up to raise the bed.

Extend the arm with clenched fist with thumb down for lowering the bed.

The driver/operator will only back the vehicle as long as the ground guide is in sight and he/she understands the instructions being given by the guide. If for any reason the ground guide is no longer in view, or there is confusion regarding the instructions, the vehicle will be stopped immediately and problem area corrected.

Chapter 10- TRAFFIC CONTROL

Section 1: GENERAL

Specific traffic control requirements are contained in the Indiana Manual of Uniform Traffic Control Devices and the Worksite Traffic Control Manual (WTCM).

A condensed version appropriate for INDOT use as a guide to the WTCM is the "Work Zone Safety Manual"*, Guidelines for Construction, Traffic, Maintenance, and Utility Operations*.

Personnel shall take every reasonable precaution to protect themselves and the public from accidents caused by work zone operations. Temporary traffic control shall be utilized when any activity work blocks the traveled portion of the roadway or shoulder and when work activities impede the flow of traffic. No one temporary traffic control set up can satisfy all situations.

There may be situations where a vehicle with warning lights displayed parked on the shoulder or side of the roadway will be the only traffic control that is required. I.e. a supervisor stops to inspect a damaged sign or an Engineer performing a Field Check.

In any case, when the only means of protection or warning is a vehicle with warning lights, the vehicle will be parked in a manner to minimize surprise or disruption to the public and the vehicle should be used as a barrier between on coming traffic and personnel. Personnel should position themselves far enough from the vehicle so to avoid being struck by the vehicle should it get hit.

At no time will personnel perform work on or near the traveled portion of the roadway without the appropriate traffic control.

Protection consists of two (2) phases:

- **Advance warning to the public of something out of the ordinary.**
- **Warning throughout the time that the hazardous condition exists.**

Warning and protective devices such as signs, flags and barricades will be displayed before work begins and will be maintained throughout the job.

Under extremely hazardous conditions such as clean up from tornadoes, floods, etc., use one or more of the following, if possible: flagger, watch person or the State Police, in addition to the regular warning devices.

Do not let unauthorized persons get too close to the work area. Do not let them touch moving parts and keep them away from vehicles, equipment, open excavations, heaters, hot materials, chemicals and similar conditions or locations.

Do not let unauthorized vehicles park within the limits of the worksite.

All traffic control devices shall be kept clean and legible.

Section 2: WARNING SIGNS

Place warning signs far enough in advance of the worksite, so that drivers can slow down before they reach the spot where people are working, when excavations or obstructions exist or where trucks or equipment are operating. The proper distance will vary because of the speed limit, type of roadway and surface, grades, curvatures and sight distance. When working on a hill or sharp curve, warning signs must be placed at the top of the hill, the point of curvature or right before the curve begins. This also applies to placement of flaggers.
Do not block the sight line vision of drivers with warning signs. Signs should be clearly visible and easy to read. If operations involve movement of employees or equipment along the roadway, move the signs with the work. Remove all warning signs when employees or equipment are not working, and when no obstruction or danger points exist.

Additional and more specific instructions for setting up warning signs are in the "Work Zone Safety Manual". Special problems in traffic control should be discussed with the supervisory personnel.

The department designates the type, size and color of warning signs. Signs will be so erected and/or constructed so they will not blow over or be damaged by the wind. Signs needing repair, repainting or re-lettering will be removed and replaced.

Section 3: TRAFFIC CONES

Traffic cones shall be orange in color, be a minimum of 28 inches high as identified in the work zone safety manual and kept as clean as possible.

Cones are used to channel traffic at the beginning of a stationary work zone, where a lane is closed for the necessary work. Cones shall be used, where conditions permit, to separate the work zone and the travel lane over the entire duration of the work zone.

At the end of the work zone, the cones should be placed to channel traffic back into the open lane.

Within the work zone, all equipment and personnel shall stay within the cone area.

During nighttime activities or during a permanent work zone area, the use of reflective cones and/or flasher barricades shall be used.

Work crews need to follow the current procedures for setting up cone tapers for work zones.

Traffic cones shall be placed to the rear and to the side of vehicles that are parked in the roadway, i.e. when crews are working on traffic lights within intersections.

Section 4: ARROW BOARDS

Arrow boards are used for additional advance warning and directional information when traffic must be shifted from one lane to another. They will be used in accordance with instructions in the WZSM.

Arrow boards, with lighted arrows should not be used on two-lane, two-way roads because of the implied right-of-way they create. Arrow boards should only be used where traffic can be moved to another lane without danger of oncoming traffic.

Flashing bars (without direction indication) may be used to provide additional advance warning on two-lane roads. Care should be used to avoid motorist confusion or conflict with other traffic control devices.

The most important criterion for arrow boards is recognition distance -- between the arrow board and the point where drivers can first see and understand the message. The minimum recognition distance requirement for a standard size arrow board is 1 mile.

For stationary lane closures the first arrow board shall be placed on the shoulder at the beginning of the taper for the lane closure with a second arrow board placed at the end of the taper within the coned off area. Additional arrow boards will be required for multiple lane closures.

Care must be taken in the placement of arrow boards to avoid driver confusion near ramps, median crossovers, and intersections.

For moving operations where a lane is closed, an appropriate number of arrow boards shall be placed between the last work vehicle and approaching traffic. The arrow board shall be placed on a separate vehicle from the work vehicle.

The vehicle assigned to pull the arrow board shall be a large dump truck and loaded with sand., gravel or other suitable material.

In areas of restricted sight distance the arrow board vehicle shall remain in a stationary position until the distance between it and the last work vehicle is greater than the required recognition distance, then the arrow board vehicle should close the gap. Hills, curves, and other obstructions may cause restricted sight distance.

Section 5: PROTECTION VEHICLES AND TRUCK MOUNTED ATTENUATORS (TMA)

A Protection Vehicle shall be a dump truck loaded with sand, gravel or other suitable materials, parked at an angle to traffic at the appropriate distance, as specified in the Work Zone Safety Manual.

A TMA shall be utilized in accordance with the recommendations in the Work Zone Safety Manual.

Protection Vehicles with a TMA shall be a dump truck or a two ton stake bed truck.

Protection Vehicles utilizing a TMA shall be ballasted in accordance with the TMA manufacturer's weight specifications.

Protection Vehicles with a TMA shall be parked parallel to traffic, with wheels turned away from traffic and shall contain an arrow board.
Caution shall be taken when transporting TMAs to and from the worksite. All operators shall ensure that the TMA is in the full upright and locked position.

Section 6: FLAGGERS

Flaggers will be used in accordance with the WZSM.

Flaggers should be even-tempered, but decisive and reliable. Flaggers are responsible for the safety and lives of the people at work as well as the traveling public. It is important that flaggers remain at the proper distance from the work. Flaggers should stand just outside of the approaching traffic lane, but near enough to the workers so that there is no doubt as to their purpose. This distance may vary depending upon road conditions, visibility and location in regard to curves and hills. The flaggers should position themselves so that approaching traffic can see them from a distance. They should be positioned with a stop-slow paddle visible from the traffic lane, but not jeopardizing their own safety. They must be ready to move clear if approaching traffic does not stop.

Flaggers shall use the following equipment and personal protective gear: portable radio hard hat or hi-viz soft cap (whichever is appropriate), safety vest, stop/slow paddle and flag when appropriate.

A flagger must never leave his/her post until properly relieved by another employee.

The crew supervisor is responsible for proper behavior of the flagger, regardless of the distance between the flag station and the work area. It is the supervisor's job to make sure that the flagger has been properly instructed in flagging procedures, is performing his/her duties properly, that he/she is alert, properly attired and courteous and he/she is periodically relieved of the flagging duties.

Requirements for Flagging Operations

Flagging operations are required in the following traffic situations:

- **When one lane is alternately used for both directions of travel.**
- **When the roadway is closed for a short period of time to accommodate specific, short-term operations.**
- **When traffic speeds need to be reduced and traffic control devices will not do it by themselves.**
- **When inadequate motorist sight distance does not provide sufficient advance warning of highway work activities.**
- **When opposing traffic flow needs to be handled at an intersection.**
- **When installing and removing traffic control devices.**
- **Other situations where variable conditions require the exercise of judgment.**

Flagger Station

The flagger must be alert at all times and be on their feet facing oncoming traffic. He/she must always stand in a highly visible location, but never directly in the path of oncoming traffic. Approaching traffic must have ample time to react to a flagger's directions. Generally, a flagger's station should be approximately 200-300 feet in advance of the work site. Factors such as visibility, speed limit, volume of traffic, road conditions, nature of road (hills, curves), the type of work being performed and the nature of the obstacle must be considered.

Generally, there should be a minimum of 500 feet of sight distance between approaching vehicles and the flagger. Whenever a flagger is used, the flagger's station must always be preceded by a "warning sign" of the presence of a flagger ahead. The sign shall be promptly removed, covered or turned away from traffic when the flagger is not in position.

Flaggers should stand on the shoulder, next to the traffic he/she is controlling, or in the closed lane. The flagger should have a safe escape route planned during any flagging operation.

Flagging Procedures

There are three (3) basic signals a flagger may use to communicate with traffic. They are as follows:

> **TO STOP: Face traffic, look directly at the driver, extend the paddle into the traffic lane. Use the raised free hand for added emphasis.**

TO PROCEED: Turn parallel to the road, turn the paddle to slow, use the free arm to motion traffic ahead for added direction.

TO ALERT AND SLOW: Face traffic, turn the paddle to slow, use the free arm in an up and down motion to indicate to the driver to reduce speed.

Section 7: SLOW-MOVING VEHICLE EMBLEM

Slow-moving vehicles will display a slow-moving vehicle emblem. These vehicles are described as those which are (1) pulled, (2) towed, (3) self- propelled or (4) horse drawn. This includes all vehicles that are not under normal circumstances moved, operated or driven at a speed greater than twenty-five (25) miles per hour. The emblem will be used in addition to any lighting devices.

Whenever a vehicle is moved, operated, or driven on a highway that is open for vehicular travel, the vehicle shall display a triangular slow moving vehicle emblem mounted as near as is practicable to the center of mass and at an approximate height of not less than three (3) and not more than five (5) feet from level ground or pavement surface. The emblem shall be mounted so as to be entirely visible from the rear, day or night. The emblem and the emblem's position of mounting on the vehicle must meet the specifications established by rules adopted by the Indiana criminal justice institute.

The use of this emblem is restricted to slow moving vehicles as described. The use of the emblem on any other type of vehicle or stationary object on or along the highway is prohibited.

Section 8: WARNING LIGHTS

The proper use of strobe lights, directional flashing lights and other warning lights is very important to the safety of the motorist and department employees. Proper use also means proper operation of the warning lights. Operation of warning lights, when not warranted, creates disrespect for the device by the motorist and reduces the effectiveness of the device, when actually needed.

Department employees should stop or park vehicles and equipment beyond the edge of the roadway and off the shoulder whenever practical.

Department equipment operators will use warning lights in accordance with the following rules:

- **Whenever it is necessary for any department vehicle to stop partially or entirely on the pavement surface.**

- **Whenever equipment is operated on rural interstate highways at speeds lower than 45 miles per hour. On other highways, at less than 35 miles per hour, four-way flasher lights will be operated.**

- **Rear facing amber and red lights, rotating beacons and/or high intensity warning lights will be used, when a department vehicle is parked on the shoulders and personnel are working on the pavement, shoulders or median. However, if the vehicle is not equipped with these types of lights, the directional lights, flashing simultaneously, will be operated. Red lights shall not be visible to the front of the vehicle.**

- **All vehicular lighting shall conform to INDOT Lighting Policy.**

Section 9: WORK ZONE SAFETY INSPECTIONS

Each District Safety Director shall be responsible for conducting work zone safety inspections and completing the work zone safety inspection report. Upon completion, the safety director will retain a copy of the report, which is to be kept on file, and send a copy of the report to the Central Office Safety Manager.

Chapter 11- ROAD MAINTENANCE OPERATIONS

Section 1: GENERAL

Operational procedures, regarding road maintenance operations, are contained in the Maintenance Field Operations Manual. Safety procedures contained in this chapter, supplement information contained in the Field Operations Manual. Protection vehicles, consisting of a dump truck loaded with sand, gravel or other suitable materials, will be utilized to the maximum extent practical on interstate and single and multi-lane highways as additional protection for work crews.

Section 2: MOWING OPERATIONS

Mowing equipment can be extremely dangerous to operate, if the simple rules of safety are ignored. Some important safety rules applying to all types of mowing equipment follow:

- **Do not operate a mower while other employees or pedestrians are within the range of objects that might be propelled by a high-speed blade. When possible, direct the discharge toward the ditch and back slope, rather than towards the roadway.**

- **Never attempt to unclog or adjust a running machine.**

- **Operators of mowing equipment will wear a hard hat or a hi-viz soft cap, protective footwear, eye protection, hearing protection (recommended), safety vests and shall be fully clothed with long pants. Sun-block and/or insect repellent use is recommended.**

- **Never wear loose clothing near the power take off (PTO) or rotating equipment.**

- **Mowers should be shut off, when crossing driveways and intersecting roads.**

Mowing with tractors:

- **Do not permit anyone other than the operator to ride on a tractor.**
- **Always shut off the engine, set the parking brake and disengage the PTO before getting off a tractor.**
- **Always drive the tractor at speeds compatible with safety, especially over rough ground, crossing ditches, on slopes, or when turning.**
- **Keep all PTO shields and safety guards in place. Any shields and guards that were purchased with the equipment should not be removed.**
- **Observe all motor vehicle laws. Mow with flow of traffic except on special circumstances or when your Supervisor grants permission.**
- **Slopes steeper than 3:1 shall not be mowed with conventional tractor type mowers. All mowing tractors shall be equipped with a fully functioning slope gage. On slopes less than 3:1 conditions may warrant delaying mowing operations until conditions improve.**

Mowing with push mowers and weed eaters:

- **Locate large rocks or similar objects;**
- **Clear debris before mowing;**
- **Stay off wet slopes;**
- **Disconnect the ignition wire when cleaning or replacing blades;**
- **Shut off the engine, when the mower is unattended, and allow engine to cool prior to refueling;**
- **Do not operate the motor at speeds in excess of the manufacturer's instructions;**
- **Keep all guards and shields in place.**

Section 3: HERBICIDE TREATMENT

Employees doing the actual operation, or coming into contact with spray materials, shall be trained to recognize potential hazards associated with the material and take the necessary precautions to avoid injury. Material Safety Data Sheets for chemicals being used will be on hand and complied with.

The hands and face should be washed before eating and lunches should be kept in closed containers away from contamination.

Clean and maintain clothing and protective equipment. DO NOT CARRY CHEMICALS HOME WITH YOU.

Do not handle, mix, or apply any chemical without adequate safety equipment (safety goggles, respirators, rubber gloves, etc.) as designated by the District Landscape Supervisors.

Carry a quantity of water sufficient for washing and flushing. DO NOT CARRY ANY DRINKING WATER OR FOOD ON THE SPRAY UNIT.

The operation and maintenance of the spray power equipment will be the responsibility of an employee who is well trained in its operational functions.

Fuel will only be added to the spray motor by means of approved dispensing methods or containers.

Surfaces on the spray tank and truck will be kept reasonably free from accumulation of spray material. This equipment must be washed off at least once daily during use.

An adequate platform and railings will be provided for the protection of nozzle operators.

Plates, pipes and hinges will be inspected daily for deterioration caused by the corrosive action of spray materials.

Hose connections will be inspected daily. A spray hose under pressure can cause serious injury if the hose becomes disconnected.

Section 4: BITUMINOUS PAVEMENT PATCHING AND REPAIRING

Listed below are some general safety rules applicable to patching and repairing with bituminous material.

When performing bituminous operations personnel shall wear a safety vest, hi-viz soft cap, protective footwear and gloves. Eye and hearing protection are to be worn on an as needed basis.

Material Safety Data Sheets for chemicals being used will be on hand and complied with.

It is recommended that burners be shut down during transportation to and from work site.

A dry-chemical fire extinguisher will be available while working with equipment that is being used to heat bituminous material or that have engines operating on connection with bituminous patching.

Smoking is prohibited near tank openings, vents, and refueling operations. Open flames and sparks will be kept away from spraying material to reduce the possibility of a fire.

Burners will not be left unattended while operating nor used in confined places. Kettles should not be used inside buildings.

Use a long-handled torch to ignite burners. Matches or lighters will not be used. If more than one burner is used and one is inside the other, the inner burner should be lighted first. Fuels will be allowed to ventilate before trying to re-ignite a burner.

For best results when heating material, units should be positioned cross wind, if possible. Material should not be allowed to overheat beyond recommended temperatures.

Equipment (kettles and distributors) will be checked each day of use for leaks, particularly around the fuel hoses. Leaking materials can create a fire hazard and should never be heated in a leaking tank.

Gasoline should never be used to clean equipment and tools.

When restarting, all tanks should be inspected before heating.

Tanks will be free of water before heating bituminous materials because it will bubble and cause overflow, thus starting a fire.

Hoses used to apply the material will be free of cracks, patches, and hook-ups and be secure to prevent hot material from spraying onto workmen, equipment or passing vehicles.

Kettles should be filled with care to prevent splashes of hot material, and small pieces must be eased-in rather than thrown or dropped. If a full barrel is added, lowering chains should be installed to permit the controlled lowering of a barrel.

Heating kettles should not be over filled. Maintain a level of at least five (5) to six (6) inches below the top of a kettle to allow for material expansion.

Thermometers will be kept in good working condition. Thermometers shall be checked daily before starting kettles and checked periodically during operations. Clean or repair if needed.

Open flames should not be permitted near the top of kettles and distributors.

Temperatures shall be monitored using thermocouples or thermometers. Over-heating will produce a blue vapor in kettles over bituminous. Flames should be turned down or off when such vapor is evident.

When moving kettles and distributors, the hook-up towing units will be secure, and safety chains should be attached to both the towed and towing unit. Slow, easy starts are a must for both truck-mounted and towed distributors and kettles.

In case of fire, all engines and pumps should be stopped and valves, lids, and vents closed.

When kettles and tanks are not being used or filled, cover all openings to prevent water from getting into a tank. A "foaming action" is an indication of water being present inside the tank.

Kettles, Distributors and other equipment with LP gas fuel systems mounted on them for purposes other than propulsion shall be permitted to be parked, serviced, or repaired inside buildings. The fuel system shall be leak free, and the container(s) shall not be filled beyond the limits specified. The container shut off valve shall be closed. The vehicles shall not be parked near sources of heat, open flames, or similar sources of ignition, or near unventilated pits.

Ladders will be available for employees to use when mounting tanks and they will be kept clean. Nonskid surfaces are desirable. Platforms and work areas will be kept free of bituminous materials and debris.

When using spray bars and hand held spray units, employees will insure that all personnel are away from material that may contact them.

Turning shafts, spindles, gears and devices will be guarded to prevent entanglement in the machinery.

Backing movements will be controlled with a ground guide directing movements of the vehicle.

In spot patching operations and where patching requires removal of part of the road surface, work will be confined to one-half (1/2) or (.5) of the roadway at a time and adequately protected. Only in extreme cases is it permissible to carry on patching operations over the full width of the surface.

If two or more closely adjoining patching jobs are carried out simultaneously, every effort will be made to lay out the work so that an adequate interval is maintained between the various crews and equipment. The length of the interval will depend upon the type highway, terrain and other conditions.

Section 5: TREE TRIMMING

Although tree trimming operations present many common hazards such as cuts and bruises from limbs and machinery, the principle causes of injury are:

- **Falling trees and falling limbs**
- **Improper working methods**
- **High-speed moving parts on power equipment such as chippers and chain saws.**

The following personal protective equipment shall be worn when engaged in tree trimming operations: Safety hard hats, chain saw chaps, hearing protection, face shields, gloves, and safety glasses with side shields or goggles.

The power company will be contacted to trim trees by their lines.

Before cutting or trimming a tree, it should be checked for structural weaknesses and inspected for the following hazards: dead limbs, overhead wires, etc. You must also ensure a safe felling area is available with adequate escape routes.

Loose clothing shall not be worn when operating a chipper. An exception to the Safety Vest Policy is also permitted for chipper operations.

When using hydraulic lifting devices to trim trees, the boom and associated equipment will not be depended upon for insulation. Operators will be warned not to raise and project booms over live conductors.

Section 6: SNOW REMOVAL AND ICE CONTROL

Maintenance Operating Procedures No. 2 contains detailed operational information on snow removal and ice control. This information supplements procedures therein.

The most important factor in employee safety during winter storm emergencies is operator training. Operators must know how to handle their vehicles and equipment on slippery roads and in near-blind conditions. Training, both in the classroom and in the field, is a must.

Work in a safe, productive manner and maintain a safe awareness at all times.

Properly operate and maintain assigned vehicle/equipment and report defects.

Lights and windows will be frequently cleaned during snow and ice removal operations. Working vehicles in traffic lane will use warning lights.

If it becomes necessary to stop a truck in the traffic lane, when plowing snow or spreading sand or chemicals, traffic will be warned:

- **By operating warning lights**
- **By using four-way flashers, or by using flares, if visibility distance is limited**

Plows should be stored blocked up at the exact height of the equipment so that they will not have to be lifted into place, when attached or detached.

When changing plow blades the following personal protective equipment shall be worn: eye protection, hearing protection, gloves and protective footwear. Jack stands, blade buddies and other approved mechanical lifting devices shall be utilized to prevent injury.

Operators will exercise care to prevent damage to signs, delineator posts, guard rails, bridge rails, mailboxes, or guideposts. Vertical posts should be mounted at each end of the plow that will be visible to the operator.

Suitable ladders shall be provided, on all snow removal vehicles, to enable safe movement up and down the spreader box. Hands should grasp the rails and <u>not</u> the rungs. Rings should be removed because of potential danger of being caught on the ladders.

When plowing bridges and overpasses, caution will be exercised to prevent snow from falling on roads underneath the overpass.

When stopping at intersections, be sure the plow doesn't extend into the intersection.

Stop, raise plow and shut off spreader when crossing railroad tracks.

Employees shall report accidents and injuries to their immediate supervisor.

Chapter 12- MAINTENANCE SHOPS AND YARDS

Section 1: SHOPS

General Rules:

Supervisors will hold regular safety meetings to keep employees mindful of the hazards in shop areas.

All shops, which have specific requirements for personal protective equipment (hard hats, eye protection, hearing protection, etc.,) shall be clearly marked.

Motor vehicles, while being driven in or out of garages or storage buildings, shall be driven at a low rate of speed and shall stop at the doorway before entering or leaving.

Extreme care must be exercised to guard against loose clothing or hands being caught in moving machinery.

Gasoline and diesel fuel shall not be used for washing motors, parts, or hands.

Extreme care must be used, when working with highly flammable materials; anyone not experienced with such materials shall not attempt to use or handle them unless under the supervision of a responsible person with knowledge in this area.

Dollies, wheelbarrows, rollers, etc., shall be stored with handles up when not in use, to avoid tripping hazards.

Safety Inspections:

All shop employees shall do the following:

Make daily inspections for fire and safety hazards.

Make sure that accumulations of combustible materials are removed to a safe place and slipping hazards are removed or absorbent material is used.

To prevent falls caused by slips or tripping over equipment, inspect work areas regularly and ensure that floors are free of oil and walkways are clear of tools or equipment.

Ensure that engines are run only when there is proper ventilation, and/or exhausts are vented to the outside to prevent carbon monoxide poisoning.

Mechanical Automotive Hoists:

Every mechanical automotive hoist should have a brake that will automatically hold twice the rated load at whatever level it may be when lifting ceases.

All lifts will have safety devices that hold the load independently of the lifting means at the maximum "up" position.

Hoists will never be used for vehicles beyond their capacity or to lift one end of the vehicle only.

The condition of lifts should be checked monthly. Leaks will be repaired and oil levels maintained on hydraulic lifts.

Controls on lifts should require continuous pressure from the operator and they should be far enough away so that the falling load will not strike the operator if the lift fails.

Persons should not stand in front of vehicles being driven onto the lifts. No person will remain in a vehicle being lifted.

No bystanders will be allowed near equipment being lifted.

Powered Grease Guns:

Employees should never put their hands over a grease gun nozzle because grease can be forced under the skin if the gun handle is pulled.

The tops of grease cylinders must be securely screwed or clamped in place to prevent blowing off under pressure.

Mounting Heavy Duty Tires and Rims:

Safety cages shall be provided for inflating high-pressure tires in shops.

Tire changing areas shall have the OSHA required poster prominently displayed.

Special rolling fixtures and power tools should be used for mounting and dis-mounting heavy-duty tires. Tires are heavy and manually handling them is not recommended. Tires with Calcium Chloride solutions in them must be handled mechanically.

When wheels are removed in shops, the remaining wheels should be chocked or other steps taken to prevent movement of the vehicle.

Jacks:

The rated load shall be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means.

Before jacks are used on vehicles, the jack and the vehicle will be firmly blocked against horizontal movement. All possibility of the jack slipping will be eliminated. The lifting head, on the jack, will be large enough to securely hold the part of the vehicle against the pressure being exerted. Bumper jacks should only be used on flat, level surfaces.

Special jacks and handling equipment are available, from equipment manufacturers, to handle massive drive shafts, transmissions and other parts, when mechanics work under trucks. Such heavy parts', including engines, clutches and brake drums should always be handled with jacks, dollies, hoists, cranes or forklift trucks.

At times, metal-to-metal contact between jacks and table hoists and the parts they contact might cause the parts to slip. Properly fitted wood blocks or suitable pieces of cloth should be used to separate metal from metal and increase the friction of contact.

Do not lean over a jack handle, while the jack is under a load.

Batteries:

Batteries should have all cells covered when they are lifted out. If necessary, help should be obtained to do the lifting. Handcarts should be provided for moving the batteries around the shop.

NO SMOKING will be permitted around charging batteries.

Eye washing facilities will be provided near the battery servicing area.

When batteries are installed and connected, or when "jumpers" are connected for auxiliary starting, the ignition must be turned off and the negative shall be the first to be disconnected and the last to be connected.

The following personal protective equipment may be appropriate when handling batteries: chemical goggles, face shield, neoprene gloves and a neoprene apron.

New and/or used batteries shall be stored on secondary containment pallets.

Moving Vehicles:

There is a possibility of being run over in shops and yards and employees should keep clear of moving vehicles.

No vehicle should ever be backed in or out of a shop without the assistance of a ground guide if one is available.

Mechanics will not work under vehicles, while lying on "creepers", if there is any danger that another vehicle will pass over the area where their legs are extended. If necessary, adjacent vehicles should be locked and tagged, or adjacent spaces should be blocked with barricades.

Mechanics will make sure that engines are not started and vehicles are not moved while they are working on vehicles by doing the following:

- **Remove the key or lockout the starting switch,**
- **Place a warning tag on the starting control or steering wheel,**
- **Chock wheels and all moving parts during maintenance.**

When mechanics must work on running engines, they will be careful to avoid moving parts. Fan blades should be guarded and mechanics must never make an adjustment near the fan without first shutting off the engine.

Steam burns often result when persons remove radiator caps. To avoid this, all vehicles should be equipped with a safety petcock, which should be opened to let steam bleed off before the radiator cap is removed. If a safety petcock is not provided, the cap should not be removed until the engine has cooled.

Compressed Air Equipment:

All shop employees should be familiar with the air compressor operating and maintenance instructions.

Rotating pulleys and belts on compressor and electric motors will be properly guarded.

On electric motor driven compressors, periodically check and replace any deteriorated flexible cords or plugs.

The drain valve on the air tank will be opened frequently to prevent excessive accumulation of liquid.

Air tanks will be protected by adequate safety-relief valves. These valves will be tested at regular intervals to be sure they are in good operating condition.

Beware of compressed air - it can be dangerous. Never use compressed air to blow dirt from your clothing or body.

The pressure will be reduced to 30 psi when used for shop cleaning purposes.

Section 2: YARDS

Housekeeping:

Materials will be stacked safely, in an orderly manner and properly labeled.

If possible, equipment and vehicles should be parked in a manner so the backing maneuver is eliminated or backed up against a fence when they are driven into a yard.

Aisles and walkways shall be kept clear of debris and other slipping or tripping hazards.

Where necessary, loading docks will be constructed and maintained for safety and convenience of handling heavy equipment or materials.

Storage areas will be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised as necessary.

Definite parking areas shall be designated for employees' personal motor vehicles.

Chapter 13 - MATERIAL HANDLING AND STORAGE

Section 1: GENERAL

Materials should be segregated as to kind, size, and length; they should be placed in neat orderly stacks which are safe from falling and well labeled. If the stacks are high, they should be stepped back as the height increases, and should be secured by cross piling or cross typing. Stacks of materials should be arranged to allow for passageways.

Materials placed on roads should be well guarded, have suitable warning signs in the day time, and have flashing lights on and around them at night.

When possible, work will be scheduled to avoid leaving materials on roads at night.

Section 2: LIFTING AND CARRYING

In spite of the increased use of machinery and equipment, much material is still moved by hand. The human body is subject to severe damage in the form of back injury or hernia, if caution is not observed in this handling process. Each worker will be instructed by his/her Supervisor in the proper methods of lifting heavy objects. Supervisors should also assign enough people to each lifting job.

Before attempting to lift by hand, employees shall ascertain whether additional help will be needed to safely lift the load and, if necessary, get additional help. Employees must never try to over-lift. If a big load must be lifted, help shall be obtained.

Always warm up your body before you lift any load. This is a good way to prevent muscle strains and pulls. Stretch your back with upward reaches and continue to loosen tight muscles with simple side and back bends.

The general rules for lifting are:

- **Place one foot along the side of the object to be lifted and the other foot behind it. You'll have greater stability, if your feet are comfortably spread with the rear foot positioned for the upward thrust of the lift.**

- **Keep your back straight and use the sit-down position. Remember, that means the back itself is straight, not necessarily vertical. A straight back keeps the spine, back muscles and organs of the body in correct alignment. It minimizes the compression to the spine and strain of abdominal muscles that can cause a hernia.**

- **Tuck your chin in so the neck and head continue the straight line formed by your back. Tucking in the chin also helps keep the spine straight and firm.**

- **Extend your fingers and hands around the object you're going to lift, using the full hand. Since the fingers alone have very little power, you need the strength of your entire hand.**

- **Draw the load close to your body, with your arms and elbows tucked into the side of your body. When holding your arms away from your body, they lose much of their strength and power. Keeping your arms tucked in also helps keep your body weight centered.**

- **Position yourself so the weight of your body is centered over your feet. This provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot.**

- **When carrying materials make sure that the load does not obstruct your view.**

- **Check all aisles and passageways before transporting your load.**

- **Never twist at the waist, instead turn entire body to place load.**

- **The person carrying a load always has the right of way.**

Section 3: STACKING AND PILING

Employees shall be trained on proper methods for stacking and piling of materials with mechanical machinery.

Each stack should have a firm foundation.

Round objects shall be blocked or bracketed so that they cannot roll.

Tiers shall be cross-piled or tied so that materials support each other, if possible.

Material shall be piled only high enough for safe lifting, handling, and storage.

Material shall be leaned away from aisles to prevent toppling.

Stacks shall be broken down from the top, with step backs or taper maintained.

Materials shall not be stored as to block aisles, fire escapes, fire protection equipment, electrical panels, and other safety equipment.

When a mechanical lifting device is used, the load shall be secured and workers shall stay out from under the load as it is lifted.

Employees shall watch for pinching conditions, splinters, slivers, and protruding nails.

Section 4: LUMBER

Employees who handle lumber shall wear the appropriate gloves to protect against splinters and abrasions.

In stacking lumber, pile foundations shall be designed and arranged to support maximum loads without sinking, sagging or permitting the piles to topple.

Piles that have become unstable shall be immediately made safe.

Cross-strips or cross piling should be used where the pile is more than four (4) feet high. The top of each pile should be kept as level as possible when lumber is being removed. Used lumber should have all nails removed before it is piled. Two persons should carry long boards and care should be exercised at corners and crosswalks.

Section 5: SACK MATERIALS

Sacked materials such as fertilizer, glass beads, Calcium Chloride and cement should be carefully stacked when placed in storage and carefully removed so as to keep the stacks in a stable condition.

Material will be stored so as not to create a hazard. Bags stored in tiers will be stacked, blocked, interlocked and limited to height so that they are stable and secure against sliding or collapsing.

When materials are removed from sacks and stored in a secondary container, the container shall be properly labeled.

Section 6: BARRELS

Barrels shall never be stacked more than two (2) barrels high.

Full barrels shall never be stacked on top of empty barrels.

Empty barrels shall be stored on their sides with the bungs or lids replaced and properly blocked.

Never use barrels to support equipment or heavy objects.

Barrels used as secondary containers must be properly labeled.

When removing the top of a barrel, a barrel cutter should be used instead of a cutting torch.

When handling barrels with mechanical equipment, use appropriate barrel handling equipment.

Section 7: PIPE AND ROUND POST STORAGE

All pipes, round wood or concrete posts will be carefully stacked and blocked at the end of the pile to prevent spreading or rolling.

When removing pipe, round posts or barrels from a stacked pile the top items will be removed first, and employees will do this while standing at the ends of the piles to safeguard themselves from injury in case the pile should roll.

Concrete culvert pipe 12 inches or more in diameter will be lifted and handled only by machinery. Persons guiding the pipe while it is in the air will not stand beneath the load or get into a position where the load could swing and crush them against a stationary object.

Whenever possible, a pipe hook should be used for lifting culvert pipe 12 inches or more in diameter. The hook should be of the proper size for the pipe being handled.

Section 8: CHAINS, ROPES, SLINGS, AND HOISTS

Special safety precautions apply to using and storing chains, ropes, slings and hoists.

Chain:

Chains shall be visually inspected to detect the following:

- **Bent links.**
- **Cracks in weld areas, in shoulders, or in any other section of link.**
- **Traverse nicks and gouges.**
- **Stretching - (total length of chain - inside of hook to inside of hook) if length changes from original, take out of service immediately.**

Chains shall be used according to grade type and the approved working load limits.

Alloy steel chain (Grade 80) is the only chain approved for overhead lifting. Carbon steel chains (Grade 30, 40, and 70) are used for many general utility purposes, but are not to be used for overhead lifting.

Never use a chain that is twisted or kinked. Twisted or kinked chains shall be discarded.

Never splice a chain by inserting a bolt between two links.

Do not use a hammer to force a hook over a chain link.

Do not use a chain over corners or edges if it can be avoided.

Sudden shifts and overloading shall be avoided. The weight of objects should be known before lifting or pulling. Objects should be lifted or pulled smoothly and gradually.

After connecting chains to the load stand clear and as far away as possible from the pulling vehicle and the load, for a distance at least equal to the length of chain being used. If the chain should brake under tension, the end of the chain could strike you.

Chains not in use should be stored in a rack or other suitable container. Do not let them lie on the ground or floor where they can be damaged.

Ropes – Wire:

Wire rope (cable) shall be used according to working load limits, manufacturer's instructions and recommended safety procedures. Wire rope shall be lubricated and inspected according to manufacturer's instructions.

Leather-palmed gloves shall be worn while handling wire rope and steel cable.

Wire rope and cables shall be inspected before and after each use and replaced if they are frayed, damaged or show signs of excessive wear.

Once a kink is formed in a cable it shall not be used for lifting, pulling or hoisting purposes.

The proper method of applying a clip to a cable is to always have the u-bolt over the short end and the clip over the part that carries the load. Clips shall be installed in accordance with manufacturer's recommendations. A thimble shall be used when wire rope or cable is to be looped.

Ropes – Fiber:

Ropes shall be inspected frequently for broken strands, cuts and worn or frayed spots. Unsafe rope shall be replaced.

Do not overload a rope. Once a rope has been overloaded, it has weakened and shall not be used.

Avoid shock-loading, jerking and over stressing rope.

Do not drag a rope across the ground, rough or sharp objects, or constantly across another rope.

Ropes should be dried thoroughly after use. Frozen or wet ropes should not be placed against a heat source for quicker drying.

Rope shall be coiled and properly stored in a dry place when not in use.

Slings:

All alloy steel chain slings shall have a permanent ID tag stating size, grade, rated capacity and reach.

All chain slings and chain sling components are required to be alloy steel (grade 80).

Items to be lifted must not exceed the working load limit of the sling.

The load shall be equally distributed between the legs of the sling. The sling assembly shall not be exposed to impact, rapid lifts or sudden stops.

Slings used in a basket hitch shall have the loads balanced to prevent slipping.

Employees shall be kept clear of loads being lifted and of suspended loads.

When using slings, avoid pinch points with hands and fingers.

Before using slings, they shall be inspected by a competent person. Additional inspections shall be performed during use, where service conditions warrant. A thorough inspection of alloy steel chain slings is required based on sling usage. However, the inspection interval shall not exceed 12 months. Written documentation of the thorough chain sling inspections shall be kept on file.

Increasing the angle between the sling leg and vertical increases the stress on each leg of the sling even though the load remains the same. The recommended maximum angle is 45 degrees.

Hooks:

Hooks shall be of the same or greater grade as the chain to which they are attached. Chains used for lifting shall be completely within a hook so that the chain cannot slip and the hook will not be bent. Do not place a load on the tip of the hook.

Hooks with throat openings 15 percent greater than original, or twisted 10 degrees out of line, shall be discarded and not used.

Safety gates should be used on hooks to prevent roll-out.

Hoist:

Scheduled detailed inspection of all hoists, with special attention to load hooks, ropes, brakes, and limit switches shall be performed each day before use. Additionally, hoists shall be inspected by a certified vendor annually and documentation kept on file at that location.

The safe load capacity of each hoist should be shown on the hoist body of the machine.

Loads should only be picked up only when it is directly under the hoist.

Hoists shall not be used to lift, support <u>or transport people.</u>

Chapter 14- FLAMMABLE GASES AND LIQUIDS

Section 1: GENERAL

New products and processes are being developed so rapidly that it is impossible to maintain an up-to-date listing of all flammable liquids and gases. Further, some substances may present little to no exposure under ideal conditions and very serious exposures under less favorable conditions. Material Safety Data Sheets (MSDS) shall be available for all hazardous materials.

Many adhesives, accelerants and solvents pose hazards as well. All liquids should be considered flammable unless their label clearly indicates otherwise. Conditions can change so rapidly that extreme care is necessary whenever flammable liquids or gases are being used.

Throughout this manual, the word "approved" appears numerous times. A good practical definition of "approved" is: suitable for the specific use intended as designated by a recognized testing laboratory, or conforming to appropriate specifications that have been established for such specific uses. When handling flammable liquids and gases the following shall apply:

> **Flammable liquid and gas storage areas will be located where public fire protection has access to the site.**
>
> **The telephone number of the local fire department and other emergency numbers will be posted at all telephones.**
>
> **Storage areas for flammable liquids or gases should be located away from equipment, materials or other structures that could become involved if a fire breaks out in the storage area.**
>
> **Structures to be used for the storage of flammable liquids or gases should be fire-resistant and located away from burning, welding and other operations involving the generation of heat.**
>
> **Structures to be used for the storage of flammable liquids or gases should be well ventilated.**
>
> **In every storage room, there shall be one clear aisle at least three (3) feet wide.**
>
> **Containers holding more than 30 gallons shall not be stacked one upon the other.**
>
> **Motors, switches and other electrical equipment (including light fixtures and bulbs) within such storage areas will be approved for these areas.**

Suitable fire extinguishers will be located within the area and adjacent to it. The outside extinguishers will be sufficiently distant to assure accessibility if a fire is to break out, but near enough to be useful.

Containers from which flammable liquids are dispensed will be grounded.

Flammable liquids and gases will be stored in containers providing positive identification of the contents. If there is any question as to the contents of a container, it should not be used until it has been positively identified and labeled.

The storage of flammable liquids and gases should be kept to the minimum needed. When there are more than 25 gallons of flammable or combustible liquids in any one building, it will be stored in approved nonflammable storage cabinets that are labeled "Flammable Liquids".

Not more than 60 gallons of Class I and Class II liquids, or more than 120 gallons of Class II liquids, may be stored in storage cabinets.

Personnel having access to storage areas should be trained in the characteristics of such substances, the exposures such characteristics create and the precautions that must be taken to avoid accidents.

Care must be taken when handling containers so that damage does not result and identification is not obliterated. Whenever positive identification is not possible, the contents will not be used.

Flammable liquids shall be stored in tanks, closed containers or approved safety cans.

Containers used for storing and dispensing flammable liquids will be approved for such use. Flammable liquids will never be dispensed into containers that are not approved.

If a container has once been used for one substance, it should not be used for another until it has been thoroughly purged. Pouring oil into containers that previously held gasoline has resulted in many fires.

Containers, nozzles and related dispensing equipment should be identified as to use, be of an approved type, stored to avoid damage and inspected regularly.

The distance between any two (2) flammable liquid storage tanks shall not be less than three (3) feet.

All above-ground storage tanks shall have a pressure relief venting device that will relieve excessive internal pressure caused by exposure to fires.

Pumps, containers and other dispensing equipment should be kept clean and free of contaminants.

Tools used in storage and dispensing equipment should be kept clean and free of contaminants.

The transfer or mixing of flammable liquids will only be done in well-ventilated areas. Personnel engaged in the handling of flammable liquids must be made aware of the importance of insisting that no sources of ignition be brought within the designated area. Damaged or faulty dispensing equipment or containers will be replaced or repaired immediately.

Materials that will react with water shall not be stored in the same room with flammable or combustible liquids.

Section 2: USE OF FLAMMABLE LIQUIDS AND GASES

Use only approved solvents for cleaning operations. Never use gasoline. Never use flammable liquids in the presence of welding, burning or other operations involving open flames, sparks or the generation of heat. Never use containers that do not positively identify the contents.

Vapors from many materials will ignite upon contact with an ignition source such as pilot lights, welding operations or lit cigarettes. This will be prevented with proper use of the material, adequate ventilation and removal of ignition sources.

All heat producing equipment will be cleaned, inspected and kept in good working condition to prevent accidental ignition.

Dispose of wiping rags, etc. in approved containers. Containers of flammable liquids should be returned to proper storage areas at the close of each day.

Many petroleum products are toxic and flammable. Avoid any prolonged contact with the skin. Most flammable gases and liquids are asphyxiates.

Do not use solvents or gasoline to clean your skin. Use a cleaner that won't burn your skin and plenty of soap and water.

Section 3: IF A FIRE SHOULD OCCUR

Your effectiveness in extinguishing a flammable liquid fire is dependent upon how well you have been trained before the fire breaks out. Because of the danger presented by fires in or around flammable liquid storage areas, an alarm should be sounded immediately and the local fire department called at once, and the building shall be evacuated in accordance with the emergency action plan. Always maintain a means of escaping and fight fires with your back toward a door.

Section 4: PURGING TANKS AND CONTAINERS

Tanks or containers that have contained flammable liquids or gases will be thoroughly purged before any repair work is attempted. The proper purging of tanks that contained flammable liquids or gases requires equipment seldom found at a maintenance shop. It is highly recommended that purging operations be done where adequate facilities are available, and trained personnel are employed. Purging can be accomplished either by steaming or by the use of inert gases.

Chapter 15- MACHINE GUARDING

Section 1: GENERAL

Mechanical action or motion is hazardous, but varies in degree. Rotating members, reciprocating arms, moving belts, meshing gears, cutting teeth and parts that impact or shear are all examples of the types of action and motion requiring guards. They are not peculiar to any one machine, but are basic to the mechanical devices used for productive purposes.

Any rotating object is dangerous. Even smooth, slowly rotating shafts, belts or pulleys can grip clothing, hair, jewelry and through mere contact, can force an arm, hand or your body into a dangerous position. Accidents due to contact with rotating objects are not frequent, but the severity of injury is usually high.

Machine design should permit routine lubrication and adjustment without the removal of guards. But when guards must be removed and the machine serviced, the INDOT Lock-out/Tagout Procedures must be adhered to.

No machine should be started and/or operated unless the guards are in place and in good condition.

Section 2: TRAINING

Safety training is necessary for new operators and maintenance personnel when any new or altered safeguards are put into service, or when workers are assigned to a new machine or operation.

Thorough operator training should involve instruction and hands-on training in the following:

- **A description and identification of the hazards associated with particular machines.**
- **The safeguards themselves--how they provide protection and the hazards for which they are intended.**
- **How to use the safeguards and why.**
- **How and under what circumstances safeguards can be removed and by whom (in most cases, repair or maintenance personnel only); and what to do (e.g., contact your supervisor) if a safeguard is damaged, missing or unable to provide adequate protection.**

Section 3: SPECIFIC REQUIREMENTS

Abrasive Wheels on Bench Grinders:

Abrasive wheels shall be used only on machines provided with safety guards. The safety guard will cover the spindle end, not flange projections, and will be mounted to maintain proper alignment with the wheel. The strength of the fastening will exceed the strength of the guard. The exposed area of the grinding wheel, and sides for the safety guards will not exceed more than one-fourth (1/4) of the entire wheel. Work rests should be kept adjusted close to the wheel, with a maximum distance of one-eighth (1/8) of an inch. Tongue guards shall be adjusted close to the wheel, with a maximum distance of one-fourth (1/4) of an inch.

Circular Saws:

Circular saws will be provided with a hood that covers the teeth of the saw at all times. The hood should adjust itself automatically to the thickness of, and remain in contact with, the material being cut.

Table Saws:

Circular saws will be provided with a hood that covers the teeth of the saw at all times. The hood should adjust itself automatically to the thickness of, and remain in contact with, the material being cut. A spreader and anti-kickback device will be provided. The exposed part of the saw underneath the table will be guarded. Push sticks shall be used when materials being cut are too small to be held safely by hand.

Radial Arm Saws:

The upper hood shall completely enclose the upper portion of the blade, down to a point that will include the end of the saw. In addition to a hood enclosing the blade, an adjustable stop should be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut. When used for ripping, a spreader and an anti-kickback device should be provided.

Drill Presses:

The V-belt of all drill presses, including usual front and rear pulleys, will be guarded to protect the operator from contact or breakage. All drill presses shall be mounted securely to the floor.

Ceiling Fan Blades:

All fan blades less than seven (7) feet above the floor or working level will be guarded. The guard will have openings no larger than one-half (1/2) of an inch.

The use of concentric rings, with space between them not exceeding one-half (1/2) of an inch is acceptable provided they are adequately supported.

Chapter 16- HAND TOOLS

Section 1: GENERAL

Working with hand tools presents a wide variety of hazards to employees. Therefore, all employees shall use required personal protective equipment. This may include, but is not limited to: eye, ear, hand, foot and face protection. If you need additional information on PPE guidelines, contact your supervisor or safety director.

Section 2: CARE OF TOOLS

Tools will be kept in a safe working condition. Supervisors, as well as INDOT employees, are responsible for the safe condition of tools and equipment used.

Protect tools against corrosion damage. Wipe off accumulated grease and dirt. Clean thoroughly with a non-flammable, non-irritating solvent when necessary and wipe dry. Lubricate moving and adjustable parts to prevent wear and misalignment.

Sharp tools improve accuracy and are safer to use than dull tools. Use an oilstone or grindstone for tool sharpening. If an abrasive wheel must be used for this task, grind only a small amount at a time, with the tool rest not more than one-eighth (1/8) of an inch from the wheel. Hold the tool tightly against the wheel to prevent overheating. Dip frequently in water to keep the tool cool--this retains metal hardness and the cutting edge. Eye protection must be used when sharpening tools.

When not in use, tools will be stored in suitable boxes, containers or hung on racks. Cutting edges will be protected and tools will not be placed where they might roll off benches or tables or be struck by someone passing by. Be sure that the storage areas are moisture-free to prevent corrosion. Heavier tools will be placed where they will not be tripped over. Sharp-edged and pointed tools shall not be carried in pockets.

All damaged or worn tools will be promptly repaired. Temporary, makeshift repairs are prohibited. Any tool that cannot be repaired on the job shall be red-tagged and sent to the appropriate shop or factory, not kept on the job. Discard tools that cannot be repaired.

Section 3: USING TOOLS

The weight, size and type of tool will be selected to fit the job at hand.

Do not substitute pliers for hammers, screwdrivers for pinch bars, chisels, etc.

Handles will be tightly fitted. Check wood handles carefully for splitting and cracking. Tighten with wedges as necessary.

Most hand tools are conductors of electricity. Use extreme caution in working around electrical circuits. Insulated and non-conducting tools will be used when working around electrical hazards and inspected frequently. Use non-sparking tools if flammable materials, explosive dusts or vapors are present.

Section 4: WRENCHES

Select the correct size and type of wrench for each job.

Do not extend the wrench handle with a pipe or other "cheater".

Never use a wrench as a hammer. Pipe or Stillson wrenches will not be used as monkey wrenches.

Keep jaw corrugations on Stillson wrenches sharp and clean.

Keep handles and adjusting screws on all wrenches in good condition.

Wrenches will always be placed on nuts with the jaw opening facing the direction that the handle will move. Pull, do not push.

Section 5: CHISELS

A chisel should be large enough for the job and should be driven with a hammer of sufficient weight.

Use the proper chisel for the materials being cut.

All chisels shall be held by a chisel holder.

Chisels being struck by others will be held by tongs or other devices.

Goggles will be worn when chipping.

Always chip away from yourself and protect others with screening.

Repair or replace mushroomed chisels and cracked or broken chisel handles.

When sharpening, maintain the original shape and angle.

Section 6: PUNCHES

A punch should be straight, suitable and heavy enough for the work. Punches should be accurately ground at all times.

Start the punch with light taps. Hold securely, especially on rounded surfaces.

When knocking out rivets and pins, begin with a starting punch. Finish with a pin punch.

Section 7: HATCHETS AND AXES

Hatchets and axes shall be in good condition and properly sharpened. Do not use hatchets or axes with cracked, splintered or badly worn handles.

Be careful to avoid the rebound of a hatchet or ax toward yourself or other employees.

When trimming a tree on the ground, keep the trunk between the swing of the tool and your feet and legs. Clear sufficient space for the tool movement.

Section 8: SCREWDRIVERS

Do not use a screwdriver as a chisel, pry-bar or for any other purpose than that intended.

Select a screwdriver to fit the size and shape of the screw being driven.

Do not grind the point to fit all sizes of screw heads. Keep the tip ground properly and squared across. Handles should fit the shank tightly.

Never drive a screw with a hammer.

Only screwdrivers with insulated handles shall be used for electrical work. Screwdrivers with blades or rivets extending through the handle shall not be used for electrical work.

Section 9: FILES

Use the proper type of file for the material being filed.

The correct way to hold a file is to grasp the handle firmly in one hand and use the thumb and forefinger of the other hand to guide the point.

The cut should be on the forward pass of the file.

Clamp small items securely when filing.

When teeth become clogged, clean them thoroughly. Clogged teeth may cause the file to slip, thereby exposing the hands to injury.

Files should be equipped with handles of proper size.

Tap the file into the handle by striking the handle on a flat surface.

Do not drive the handle on a file with a hammer.

Do not use files as pry bars or punches, etc. File metal is usually very brittle and will snap.

Section 10: HANDSAWS

Use a saw of proper shape and size with the correct teeth for the size of cut and material being sawed. Keep the teeth and blades properly set. Protect the teeth when not in use.

Hold the saw firmly and start the cut carefully and slowly to avoid blade jumping. When starting to cut, hold ripsaws at a 60-degree angle with the board and crosscut saws at a 45-degree angle. Place the fingers to the left of the cut mark with the thumb upright and pressing against the blade. Pull upward until the blade bites. Start with a partial cut and then set the saw at the proper angle.

Check the material being cut for nails, knots and other objects that may damage the saw or cause it to buck. Pieces being cut should be firmly held in place. If long pieces are being cut, a helper or a supporting bench should be used to prevent pinching at the cut.

Section 11: HACKSAWS

The blade should be selected for the material being cut. The blade teeth should point forward. Blades should be rigid and the frame should be properly aligned. Use strong, steady strokes directed away from you. The entire length of the blade should be used in a stroke. Hard materials should be cut more slowly than soft materials.

Thin, flat pieces should not be cut edge to edge. They should be securely clamped and cut so that several teeth are cutting at all times.

Straight cuts cannot be made with loose blades and crooked frames, which will cause the blades to bend, buckle, twist, bind or otherwise break and cause injury.

Section 12: PLIERS

Pliers should be used only when no other tool will do the job. Never use pliers as wrenches. Use cutting pliers only for cutting soft metal--never for hard metals or as a nail puller. Use insulated pliers for electrical work.

Section 13: PICKS

Eye protection shall be worn when using a pick.

Pick handles will be free of splinters, cracks and splits. The head will be firmly affixed to the handle.

Be sure that the areas in back and to the sides are clear when swinging.

When not in use, picks shall be hung or laid across a rack.

Section 14: PITCHFORKS, HOES, RAKES, AND SHOVELS

Pitchforks, hoes, rakes and shovels shall never be left lying around. Leaving these tools on the ground will cause a tripping hazard. Also, stepping on the teeth or blades will cause foot injuries.

When lifting with a long handled tool, grip one hand close to the load to lessen the strain on your back.

Handles shall be free of splinters, cracks and splits. The blade is to be kept sharp and free of jagged or split edges.

Section 15: JACKS

The rated load shall be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means.

Select the jack with a proper rating to raise and hold the load. Be sure that swivel heads and caps are in good condition and function properly.

Jacks shall have good contact on both base and load to prevent tipping or shifting of load.

Jacks will rest on a firm level foundation adequate to support the load. Be sure that the jack cannot tip and is in line with the vertical movement of the load. After raising a load, securely block it before removing the jack. It is advisable to shore-up a load that must remain in a raised position for any length of time.

Do not lean over a jack handle while the jack is under a load.

Lubricate jacks frequently, check fluid and store them where they are protected from moisture or damage. Inspect frequently and repair promptly.

Chapter 17- POWER TOOLS

Section 1: GENERAL

The majority of power tool injuries are caused by the improper handling and poor maintenance of equipment. The following applies to all types of power tools: safety equipment such as guards will be left in place. Hand, eye, face, ear and foot protection will be worn when needed. Only trained personnel will be permitted to operate power tools. Safety features will not be altered or removed.

Section 2: ELECTRIC TOOLS

Electric tools will be UL (Underwriters Laboratory) approved.

Insulating platforms, rubber mats, GFI Connectors and rubber gloves shall be used when working with electric tools in wet or damp locations. Waterproof cords, connectors and fixtures shall also be used.

No portable electric power tool shall be used if the operator must stand in water.

Power cables will be checked frequently for breaks in the insulation and defective cables repaired or replaced. When more than a single extension cord is connected to a power source, use twist-lock connectors. The sequence of connection will be from the tool - to the extension - to the power source.

Electric tools will be turned off when changing attachments, making minor adjustments or repairing.

Electric tools shall be properly stored when not in use.

Section 3: GASOLINE ENGINE-DRIVEN TOOLS

Gasoline engine tools will only be used in well-ventilated areas. Gasoline will be stored in a safe place and handled with caution.

Only properly labeled, UL approved safety cans which are equipped with flashback screens, vents and pouring spouts will be used. Never use glass containers. Engines will be stopped and cooled before refueling.

Section 4: CIRCULAR SAWS

Handheld circular saws shall be equipped with a fixed guard over the upper half of the blade and a movable guard covering the lower half of the blade. Both of these guards will be left in place. Blocking of the lower guard is prohibited. Small pieces being cut will be secured by bench clamps or by some other means.

Saw blades will be regularly checked and kept in good condition. The blade used will be as recommended for the material being cut. A saw will not be jammed or crowded into the work. Green or wet material will be cut slowly and with extra caution.

Operators exposed to dust, as when cutting concrete, tile, lead or stone exceeding OSHA's permissible levels, will wear approved respirators. Check all material being cut for nails, hard knots and other potential hazards.

Section 5: TABLE OR BENCH SAWS

The operating table and surrounding area will be kept clean and clear of all debris.

Blade guards complete with splitter and non-kickback attachment will be in place and will operate freely. The saw guard or fence shall never be adjusted while the saw is running.

When ripping short stock, use of a "pusher" stick is required.

The saw will be turned off when not in use and the blade lowered below the table. The switch should be locked to prevent unauthorized use.

The piece being cut will be firmly held against the back guide or fence.

All materials will be cut in a single, steady pass. It is dangerous to stop the saw before the cut is completed. If this is done, the blade will be turning freely and at full speed before the cut is resumed.

When cutting a warped board, be sure that it touches the table top at the line of the cut.

Block the blade before changing.

Section 6: RADIAL ARM SAWS

Radial Arm saws will have the upper half of the saw completely covered. A device will be provided to return the saw automatically to the back of the table when released. A limit chain or stopping device will be provided to prevent the saw from traveling beyond the front edge of the table.

If counter weights are used, they will be secured with chains or a cable fastened to the counter weights and enclosed so that they cannot fall on the operator or others if they break loose.

When ripping, an anti-kickback attachment will be provided and adjusted for the thickness of the lumber being cut.

Section 7: CHAIN SAWS

The supervisor will ensure that any employee permitted to operate a chain saw is qualified to do so.

No one except the operator will be allowed within a six (6) foot radius of a saw when it is in operation.

The engine will be shut off when moving a chain saw from one location to another and operator shall hold the handle with the cutter bar directed to the rear.

When starting gasoline operated chain saws with pull cords, the saw will be held firmly on the ground or on a solid object.

Hot saws will be permitted to cool for two (2) or three (3) minutes, before refueling. A hot saw will be placed on a log, stump or on bare ground rather than on dry litter.

Refueling will be done in an area free from flammable materials.

Chain saw operators shall not wear loose clothing. An exception to the safety vest policy is permitted for chain saw operators.

Chain saw operators shall wear approved eye, hearing, hand, foot and face protection, hard hat, chain saw chaps and fall protection (as needed).

Chain saws will be used with extreme caution because the cutting mechanism is unguarded.

When cutting always keep both hands on the handles. Do not cut anything above the level of the chest.

Section 8: DRILLS

Always provide a prick punch or pilot hole for the drill.

Always select the correct bit for the material being drilled. If the bit is long enough to pass through the material protect against damage or injury on the far side.

Small pieces will be secured to prevent spinning by the drill.

Care will be taken to prevent sleeves or other clothing from being caught and wound around the drill.

Run the drill at a proper speed; forcing or feeding too fast may result in broken or splintered drill bits and cause serious injury.

Section 9: PORTABLE GRINDERS

Impact goggles shall be worn when using a portable grinder.

Portable grinders will be equipped with hood guards.

Wheels will be inspected regularly. Cracked abrasive wheels will be discarded as they may fly into pieces and cause an injury.

The maximum rated RPM speed of the abrasive disc shall always be greater than the maximum RPM speed of the grinder.

Stand out of line of the wheel before starting a portable grinder.

Sparks from the grinders can cause fires. Do not use within 25 feet of parts washers, oxygen and acetylene cylinders, and battery charging areas. Also, remove all flammable liquids and combustible materials from the area.

Section 10: BENCH GRINDERS

Impact goggles shall be worn when using a bench or stand grinder, even though the grinder may have a glass shield.

Bench grinders should be equipped with eye shields and will have wheel, spindle and adjustable tongue guards.

Wheels will be inspected regularly and cracked wheels will be discarded.

Wheels of the proper rpm rating will be used. The maximum rated rpm of the abrasive disc shall always be greater than the maximum speed of the grinder.

Tool rests will be in place and properly adjusted. Make sure the wheel is stopped before making adjustments. Clearance between the wheel and the work rest shall be no more than one-eighth (1/8) of an inch. The clearance between the adjustable tongue guard and the wheel shall be no more than one-fourth (1/4) of an inch.

Note: All grinders designed for a fixed location shall be securely anchored to prevent walking or moving.

Section 11: SANDERS

The abrasive belt or disc cannot be guarded and the only way of avoiding injury is to use caution.

Operators shall wear safety goggles, hearing protection and dust masks.

Operators should move the sander away from the body when using.

Section 12: PNEUMATIC TOOLS

Pneumatic power tools will be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.

Safety clips or retainers on pneumatic impact tools will be securely installed and maintained to prevent attachments from being accidentally expelled.

Shut off the air supply and bleed the line before disconnecting any tools.

The use of hoses for hoisting or lowering tools is not permitted.

All hoses exceeding one-half (1/2) of an inch inside diameter will have a safety device at the source of the supply or branch line to reduce pressure in case of hose failure.

Operators of portable air tools such as jackhammers, air tamps, etc., shall wear required personal protective equipment.

Chapter 18- WELDING, CUTTING AND BRAZING

Section 1: GENERAL

Employees engaged in welding or cutting operations shall be knowledgeable in such operations, and shall keep in mind the safety of fellow employees, as well as their own safety at all times. All apparatus shall be handled strictly in accordance with the manufacturer's instructions, local and state fire codes and recognized safe practices.

Screens, shields or other safeguards shall be provided for the protection of persons and other materials that may be susceptible to sparks or rays. When others must work in the area, they shall be protected from the arc rays by screens or other adequate individual protection.

All hoses, gauges, connection tanks and leads shall be inspected before use. Defective equipment shall be repaired or replaced immediately.

Welders will warn other employees of the location of hot metals for their protection.

When welding or cutting lead, zinc, cadmium-coated, lead-bearing or other toxic materials, every effort shall be made for the removal of fumes (use of ventilation). If fumes continue to pose a health hazard respiratory protection should be utilized.

Section 2: FIRE PREVENTION & PROTECTION

Basic Precautions

- **If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.**
- **If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks and slag in order to protect the immovable fire hazards.**
- **If the above requirements cannot be met, the welding and cutting shall not be performed.**

Special Precautions

- **Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hose or portable extinguishers. The type of equipment available depends upon the nature and quantity of the combustible material exposed.**

- **Employee shall watch for fires for at least a one-half (1/2) hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.**

- **Cutting or welding shall not be permitted in areas not authorized by management, or in the presence of explosive atmospheres, or where explosive atmospheres may develop inside unclean or improperly prepared tanks, or in areas with an accumulation of combustible dusts.**

- **Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs shall not be done if the work is close enough to cause ignition by conduction.**

Welding or Cutting Containers

No welding, cutting or other hot work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned thoroughly as to make absolutely certain that there are no flammable materials present. Any pipe lines or connections to the drum or vessel shall be disconnected or blanked.

Section 3: PROTECTION OF PERSONNEL

A welder or helper working on platforms, scaffolds or runways shall be protected against falling through the use of railings, harnesses, life lines or some equally effective safeguards.

Personal Protective Equipment

Appropriate protective clothing is required for all welding operations and will vary with the size, nature and location of the work to be performed. Some suggested protective measures for welders and helpers are:

Flame-resistant gauntlet gloves, aprons, jackets, trousers or other protective garments shall be used as protection against heat and sparks.

Clothing will be free of oil and grease. Shirts should have full sleeves, no pockets and should be worn outside of trousers with the collar buttoned. Trousers should have no cuffs and extend well down to the safety shoe.

High quality welding helmets of glass fiber, vulcanized fiber, chromed leather or other suitable material should be worn. Hand shields are generally substituted for helmets on light, intermittent work. Employees assisting welders will also wear protective lenses to protect eyes.

Safety goggles or glasses will be worn under the helmet during chipping and cleaning. These goggles should have tinted lenses, which afford ultraviolet and infrared radiation protection.

Welding in Confined Spaces

Confined spaces are dangerous enough without the added danger of welding. Always consult your District Safety Director to determine whether or not welding and/or entry should be attempted in confined spaces. Once permission is given and procedures are followed, below are recommended steps:

- **All welding and cutting operations that are performed in confined spaces shall be adequately ventilated. If it is impossible to provide such ventilation, air-supplying respirators for this purpose shall be used.**

- **When welders and helpers are provided with air-supplying respirators, a worker shall be stationed outside of the confined space to ensure the safety of those working within. When welding or cutting is being performed in any confined space, the gas cylinders and welding machines shall be left on the outside.**

- **When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur and the machine shall be disconnected from the power source.**

- **Where welders must enter a confined space through a manhole or other small opening a method shall be provided for quickly removing them in case of an emergency. An attendant with a preplanned rescue procedure shall be stationed outside to observe the welder at all times and be capable of beginning rescue operations.**

- **Torch valves shall be closed and the fuel and oxygen supply to the torch positively shut off at some point outside the confined area whenever the torch is not being used for a substantial period of time, such as lunch or overnight. Where practical, the torch and hose shall also be removed from the space.**

Section 4: ARC WELDING

Welding equipment

Only standard electric arc-welding equipment such as generators, motor-generator units, transformers, rectifiers, etc., conforming to the requirements of the National Electrical Manufacturers' Association or the Underwriters' Laboratories, Inc. will be used.

Power circuits will be installed and maintained in accordance with the National Electrical Code. Check the voltage for which the machine is wired before connecting.

Electrode and ground cables will be supported so as not to create obstructions interfering with the safe passage of employees. The ground lead for the welding circuit will be mechanically strong and electrically adequate for the service required. An electrode holder of adequate rated current capacity, insulated against shock, shorting or flashing when laid on grounded material, will be used.

Operation and Maintenance

Before starting operations, all connections to the machine shall be checked to make certain that they are properly made.

There shall be no leaks of cooling water, shielding gas or engine fuel. Report any equipment defects or safety hazards to your supervisor and discontinue the use of the equipment.

Machines that have become wet shall be thoroughly dried and tested before being used.

Cables with splices within 10 feet of the holder shall not be used. Welders should not coil or loop welding electrode cable around parts of their body.

Cables with damaged insulation or exposed bare conductors shall be replaced.

All foot switches shall be guarded to prevent accidental operation of the machine.

Section 5: GAS WELDING AND CUTTING

Use only approved welding and cutting equipment. Anti-flashback valves will be used on both hoses. Avoid oil contamination of gauge connections. Welding and cutting equipment will never be left unattended with the valves in the open position. All compressed gas Cylinders shall be chained or securely fastened at all times. Personal protective equipment requirements identified in Section 3 of this chapter also apply to gas welding and cutting.

Storing Cylinders

Compressed gas cylinders will be kept away from excessive heat and are not to be stored where they might be damaged or knocked over and will be stored at least 20 feet away from highly combustible materials. Where cylinders are designed to have a valve protection cap, the cap will be in place except when the cylinder is connected for use. SAFETY CAPS WILL ALWAYS BE IN PLACE WHEN CYLINDERS ARE BEING TRANSPORTED IN A VEHICLE.

Compressed gas cylinders will be stored in a vertical valve-end-up position and SHIELDED FROM THE DIRECT RAYS OF THE SUN AND PROTECTED FROM ACCUMULATIONS OF ICE AND SNOW.

While in storage, oxygen cylinders will be separated from fuel-gas cylinders or combustible materials by a minimum distance of 20 feet or by a noncombustible barrier at least five (5) feet high. ALL COMPRESSED GAS CYLINDERS AND STORAGE AREAS MUST BE PROPERLY LABELED.

Cylinders shall be carefully stored so as to avoid possible destruction or obliteration of coloring, tags and other means of identifying the contents.

Empty cylinders shall have their valves closed and capped.

Using Cylinders

Cylinders will be placed in a rack, chained or otherwise positively secured against tipping over. They will be used in the order received from the supplier. When empty the valve shall be closed, capped and cylinder stored accordingly.

Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. The valve shall be opened while standing to one side of the outlet; never in front of it.

Compressed gas cylinder valves shall not be opened more than one and one half (1 ½) turns and preferably no more than three fourths (¾) of a turn.

Keep cylinders from contact with electric wires and shield them from sparks or flame from welding and cutting.

Do not allow storing of tools, materials or anything else on top of cylinders. While in use the valve key will be kept in place on the valve spindle.

Cylinders shall be kept free from oily or greasy substances.

A hammer or wrench shall not be used to open cylinder valves.

HANDLING AND TRANSPORTING CYLINDERS

Whenever a cylinder is being transported, remove the regulator and be sure that the valve protection cap is in place. Never use valves or caps for lifting. For raising or lowering use a suitable sling, boat, cradle, or platform. Always handle carefully, do not drop or jar. Cylinders should be moved by tilting and rolling on the bottom edge, do not drag or slide. When moving with a truck, be sure that the cylinders are securely held in place in an upright position.

Chapter 19- ELECTRICAL

Section 1: GENERAL

Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized.

Only qualified employees are permitted to work on or near exposed energized electrical parts.

Lockout/Tagout procedures shall be adhered to when performing maintenance or other service-type of activity on electrical equipment or machinery. Specific Lockout/Tagout procedures can be found in Chapter 31 of this manual.

Section 2: TRAINING

Employees shall be trained and familiar with the safety-related work practices that pertain to their respective job requirements.

Employees who are unqualified workers and have a job that might expose them to a risk of electric shock shall be trained in the following:

- **The risks of energized equipment.**
- **What tasks can only be done by qualified workers.**
- **What procedures to follow to protect themselves and others when working around electricity.**

Employees who are qualified workers (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in, and familiar with, the following:

- **The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.**
- **The skills and techniques necessary to determine the nominal voltage of exposed live parts.**
- **The procedures to follow when working on exposed live parts, or are near enough to them, to be exposed to any hazard they present.**

Section 3: SPECIFIC REQUIREMENTS

Wires will not be routed over or under other power lines, telephone lines or antennas. Weather tight connections will always be used in exposed areas. No electrical work will be performed on a hot line, except by qualified personnel.

Where flammable materials are present, electrical equipment capable of igniting them shall not be used unless measures are taken to prevent hazardous conditions from developing.

Electrical equipment and circuits will be plainly labeled especially when two (2) or more voltages are used. Switches and outlets will be grounded. They will be of the UL approved enclosed type.

Motors will be installed so that both the current carrying parts and the mechanical components are guarded to prevent persons from coming into contact with them.

To prevent overloading, circuits will always be provided with fuses or other devices. These devices will be of such size that they will operate at a point lower than the carrying capacity of the circuit. Additional loads above the normal should be placed in use only after a qualified electrician has checked the circuit to determine if the circuit can carry the extra load.

Switch boards, fuse cut-out panels, motor control equipment and other current carrying equipment will be grounded.

Regard all wires as live and dangerous. Do not permit objects being handled to come into contact with electrical lines.

A three (3) foot area shall be maintained at all times in front of all electrical panels, pull boxes and emergency shut-offs. It is recommended that this area be painted yellow.

Aisles or passageways leading to electrical panels will be kept clear and free of any obstructions.

Do not reach blindly into areas that may contain energized parts. Make sure that there is adequate lighting.

Keep conductive items such as watches, rings, steel wool, belt buckles, etc., away from exposed energized parts.

Section 4: PORTABLE ELECTRIC EQUIPMENT

All portable electric equipment shall be UL approved.

Portable electric equipment that does not have a three prong plug or is not double insulated shall be protected by GFCI.

This section applies to the use of cord and plug-connected equipment, including extension cords.

Portable equipment shall be handled in a manner that will not cause damage.

Inspect each piece of equipment before use for loose or damaged parts or insulation.

Remove damaged equipment from use immediately.

Use three-prong grounding extension cords with all equipment requiring three-prong plugs.

Match plugs with the outlets' and do not use adapters or break off the ground prong that could interrupt the grounding connection.

Use only specially approved tools for work in areas that are wet or contain flammable liquids.

Do not fasten cords with staples, nails or other means that could damage cord insulation.

Do not plug or unplug equipment with wet hands.

Section 5: SAFEGUARDS FOR PERSONNEL PROTECTION

Employees working in areas where there are potential electrical hazards shall be provided with and shall use, personal protective clothing and equipment designed to keep them safe from electrical hazards. Required PPE and other safe guards follow:

- **Nonconductive head protection such as hard hats and earmuffs with no metal parts.**
- **Safety glasses and face protection that help protect from electrical arcs or flashes or from flying objects resulting from electrical explosion.**
- **Protective shields, barriers and/or insulating materials to prevent employees from contacting live parts.**

- **Hand protection shall be adequate for the voltage present.**
- **Non-conducting protective footwear shall be worn when voltage is present.**
- **Employees working near overhead lines shall maintain a minimum safe distance of at least 10 feet.**
- **Insulated tools and handling equipment.**
- **Portable ladders shall have nonconductive side rails.**
- **Safety signs, safety symbols or accident prevention tags shall be used where necessary to warn employees about electrical hazards.**
- **Barricades shall be use where it is necessary to prevent or limit access to area.**
- **Attendants shall be used if signs and barricades do not provide sufficient warning and protection from electrical hazards.**

Note: Protective equipment shall be maintained in a safe, reliable condition and shall be periodically inspected or tested.

Chapter 20- WALKING AND WORKING SURFACES

Section 1: GENERAL

Many slip, trip and fall injuries are a direct result of non-compliance with OSHA and departmental guidelines for walking and working surfaces.
Proper safeguards and use of Personal Protective Equipment shall be used to perform assigned task.

Section 2: LADDERS

Types of Ladders

Always choose the right type of ladder for the job. One type of ladder will not suffice for all situations. The types of ladders and their uses are as follows:

- **Use a stepladder for reaching items on shelves, changing light bulbs or whenever you're trying to reach something over your head. Stepladders shall be of three types:**

  Type I- Industrial stepladder, 3 to 20 feet for heavy duty, such as utilities, contractors, and industrial use

  Type II- Commercial stepladder, 3 to 12 feet for medium duty, such as painters, offices, and light industrial use

  Type III- Household stepladder, 3 to 6 feet for light duty, such as light household use

- **Use a straight or extension ladder when the job allows you to anchor a ladder against a sturdy surface (e.g. a wall or roof).**

- **Use a nonconductive fiberglass ladder in areas where electrical safety is a concern.**

Guidelines

Ladders will be frequently inspected and maintained in good condition to ensure that the joints between the side rails, rungs and steps are tight, all hardware and fittings are securely attached and that the movable parts operate freely without binding or undue looseness.

Ladders with broken or missing rungs, broken steps, split side rails or other faulty or defective construction will not be used. When ladders with such defects are discovered they will be withdrawn from service, repaired or destroyed.

Ladders shall be kept clean and free from dirt and grease which might conceal defects. Do not paint ladders.

Portable metal ladders will not be used around energized electrical equipment or near transmission lines or where there is a chance of accidental contact with those lines.

The upper end of fixed or portable ladders will extend no less than 36 inches (3 feet) above a platform floor or other landing surface.

Portable ladders will be equipped with non-slipping bases. The feet will be level to prevent tipping sideways.

Carry ladders with the front ends high enough to avoid striking anyone in front of you.

Short ladders shall not be spliced to make longer ladders.

Ladders shall be placed so that the distance from the supporting surface to the base of the ladder is approximately one-fourth (1/4) of the length of the ladder to the support point.

Ladders will not be placed on boxes, barrels or other unstable bases to obtain additional height.

Be sure shoes are not greasy, muddy or otherwise slippery before climbing ladders.

Supplies to be used at the top of the ladder shall be raised with a rope, block and pulley, or by other means. Nothing will be carried which prevents the use of both hands in climbing or descending a ladder. Always face the ladder when climbing and descending. Use both hands to grip the side rails. Take ladder steps one at a time. Rings and jewelry should be removed to avoid snagging or catching on the ladder.

Reach only within safe limits. Do not reach out more than an arm's length from the side rail. Move the ladder if you cannot reach the desired work area normally.

Do not climb higher than the third rung from the top on a straight or extension ladder. Do not climb higher than the second step from the top on a stepladder. Never stand on the top rung of any ladder.

Two persons shall be used to raise a long ladder: one to brace the lower end, the other to lift the top.

Check the lock after the ladder is extended to be sure that the lock is properly seated.

Ample overlap shall be left between sections when the ladder is extended to avoid collapse because of stresses on lower sections. For two section ladders the following minimum overlaps are required:

Up to 38 feet - three (3) feet
38 feet to 44 feet - four (4) feet
44 feet to 55 feet - five (5) feet

A ladder will not be placed in front of a doorway unless the door is locked, blocked or guarded.

Ladders will be stowed so that they will not fall or be knocked over.

In order that defects may be readily discovered, wood ladders should not be painted but may be preserved with linseed oil, shellac or other transparent preservatives that will not conceal the condition of the wood.

When not in use wood ladders should be stored at a location where they will not be exposed to extreme conditions of heat or moisture and where there is good ventilation. They will not be stored near radiators, stoves, steam pipes, etc.

Ladders stored in a horizontal position will be supported at a sufficient number of points to prevent sagging and permanent set.

Section 3: SCAFFOLDS

Scaffolds are required for any work that cannot be safely done from the ground or by ladder. Front end loader buckets or any other equipment not designed to lift personnel shall not be used as a substitute for scaffolding or any other lifting device.

All scaffolds, ladders, machinery, equipment and devices will be inspected at frequent and regular intervals while in use. Any scaffold found damaged or weakened will not be used until replaced or repairs have been made.

Scaffolds will be constructed and maintained in conformance with Sections 1910.28 and 1910.29 of the Occupational Safety and Health Standards.

Section 4: FLOORS AND STAIRWAYS

All floors shall be cleared of any projections such as nails, bolts and cleats, which may be protruding. Floor openings shall be guarded by railings or barricades at exposed edges.

Floors in machine shops, repair garages and maintenance shops shall be kept free from oil and grease.

Machines and equipment shall be placed to provide adequate and safe passageways. Hand tools, jacks, carts, creepers and drop cords shall not be left lying around on floor areas, but shall be returned to their proper place.

Stairways will be kept clear of all material. Where it is necessary and advisable, stairways will be equipped with nonskid treads.

Employees should immediately report defective handrails, stair treads or other hazards on stairways. Broken or split treads or other serious hazardous treads on stairways will be properly replaced or repaired.

Every stairway of four (4) risers or more will be railed. Railings will not be less than 30 inches or more than 34 inches high, measured vertically from the upper surface of the riser, and a center rail will be installed. Railings will be maintained in a firm and secure condition. Stairways having both sides open will have a railing along each side.

Chapter 21- FIRE PROTECTION & PREVENTION

Section 1: GENERAL

All INDOT buildings, vehicles and equipment will have adequate fire protection equipment. Each supervisor is responsible for procuring, installing, inspecting and maintaining the fire extinguishers in his/her respective area. Division chiefs/district directors and sub-district managers will ensure that their employees are familiar with the use and care of the extinguishers. All personnel will comply with building evacuation procedures. Emergency evacuation plans shall be posted in all INDOT facilities.

Section 2: BUILDINGS

All maintenance shops and units will be equipped with an adequate amount of fire extinguishers. Fire extinguishers shall be at least 10 lbs. and shall be mounted so that the travel distance to the extinguisher does not exceed 50 feet. Extinguishers shall be mounted and carefully located so as to be accessible in the presence of a fire, without subjecting the employees to possible injury.

Toll Booths will be provided with at least one (1) five (5) -pound ABC fire extinguisher. Rest Area buildings and Toll Plazas shall be equipped with an adequate amount of fire extinguishers. Fire extinguishers shall be at least 10 lbs. and shall be mounted so that the travel distance to the extinguisher does not exceed 75 feet.

Extinguishers will be clearly identified with a sign marking its location and shall be securely mounted on a wall bracket. The top of the extinguisher shall not be more than five (5) feet from the floor.

Section 3: VEHICLES AND EQUIPMENT

All vehicles and equipment used to transport flammable and hazardous materials will be equipped with at least one (1) 10 pound extinguisher, rated 10 B:C or higher.

This extinguisher is required on, but not limited to, the following vehicles and equipment:

- **Oil distributor trucks.**
- **Oil distributor trailers.**
- **Tar kettles (should be carried in truck).**

One five (5) pound extinguisher rated 10 B:C or higher shall be on dump trucks and snow removal vehicles.

Extinguishers will be securely mounted in a bracket on or inside the vehicle/equipment.

Section 4: INSPECTION AND MAINTENANCE

The best time to stop a fire is before it starts. Even though buildings should be properly designed and constructed with fire safety features, periodic inspections are required. Supervisors will include periodic self-inspections in fire safety program.

Extinguishers will be inspected monthly to ensure that they are in their designated places, that they have not been activated or tampered with, and to detect any obvious damage, corrosion or other impairments. An extinguisher showing defects will receive a complete maintenance check.

Extinguishers will be thoroughly examined annually and if necessary, recharged, repaired or replaced.

Extinguishers removed for maintenance will be replaced by spare extinguishers during the period that they are gone.

Extinguishers will have a durable tag securely attached to show the inspection date and signature or initials of the person who performed this service.

Dry chemical extinguishers will be equipped with a pressure gauge or an indicator which is clearly visible without removing the extinguisher from the bracket.

Section 5: FIRE CAUSES AND PREVENTION

SOURCES OF IGNITION	EXAMPLES	PREVENTION
Electrical equipment	Electrical defects, generally due to poor maintenance, mostly in wiring, motors, switches, lamps and hot elements.	Follow the National Electrical Code. Establish regular maintenance.
Friction	Hot bearings, misaligned or broken machine parts, poor adjustment.	Follow a regular schedule of inspection, maintenance and lubrication.

Open flames	**Cutting and welding torches, gas and oil burners, misuse of gasoline torches.**	**Follow the established welding precautions. Keep burners clean and properly adjusted. Do not use combustibles near open flames.**
Smoking and matches	**Dangerous near flammable liquids and in areas where combustibles are used or stored.**	**Smoke only in permitted areas. Use prescribed receptacles.**
Spontaneous combustion	**Oily waste and rubbish.**	**Remove waste daily. Isolate stored materials likely to heat spontaneously.**
Hot surfaces	**Exposure of combustibles to furnaces, hot ducts/flues or electric lamps.**	**Provide ample clearances, insulation, and air circulation. Check heating apparatus before leaving it unattended.**
Static electricity	**Dangerous in the presence of flammable vapors. Occurs where liquid flows from pipes.**	**Ground equipment. Use static eliminators. Humidify the atmosphere.**

Chapter 22- FIRE EXTINGUISHERS

Section 1: GENERAL

The Indiana Department of Transportation shall, through training and inspections, strive to ensure that all fire extinguishers are always in an operable condition.

INDOT will provide training for designated fire extinguisher users and inspectors. Safety personnel shall be responsible for the implementing and training of the fire extinguisher program.

An adequate number of fire extinguishers of the correct type and size based on the hazards in the work place must be provided for all work areas.

Fire extinguishers shall not be blocked or obscured from view. Materials shall not be stored in front of or on fire extinguishers.

Section 2: INSPECTION REQUIREMENTS

Trained personnel will perform monthly and annual fire extinguisher inspections for the facility, vehicles and equipment for which they are responsible.

Monthly inspections shall consist of the following:

- **Proper location and accessibility.**
- **Necessary labels and tags.**
- **Operating instructions present on nameplate and legible.**
- **General condition of cylinder or shell and hoses.**
- **Seals and tamper indicators not broken or missing.**
- **Handle assembly for damage (pin in place).**
- **Pressure gauge reading in operable range or position.**
- **Hose assembly for leakage and tightness.**
- **Date and initial.**

Annual inspections shall consist of the following:

- **Proper location and accessibility.**
- **Necessary labels and tags.**
- **Operating instructions present on nameplate and legible.**
- **General condition of cylinder or shell.**
- **Seals and tamper indicators not broken or missing.**
- **Handle assembly for damage (pin in place).**
- **Pressure gauge reading in operable range or position.**
- **Hose assembly for leakage and tightness.**
- **Displacement or reposition of dry powder.**
- **Hydrostatic test date.**
- **Remove outdated tags or labels.**
- **Date and initial.**

Note: The fire extinguisher <u>must</u> be removed from service if any of the following are found:

- **Any deficiency in mechanical parts.**
- **Any deficiency in extinguishing agent.**
- **Any deficiency in expelling means.**
- **Outdated if non-rechargeable (12 years).**
- **If questionable in any way.**
- **Hydrostatic test is out of date.**

<u>Section 3: FIRE EXTINGUISHER CLASSIFICATION</u>

Fire extinguishers are classified to indicate their ability to handle specific classes and sizes of fires.

Labels on extinguishers indicate the class type and relative size of fire that they can be expected to handle.

Use the right extinguisher for the type of fire for which it is intended. The wrong extinguisher may spread the fire and/or be dangerous to the extinguisher operator. The four (4) types of fire extinguishers and their uses are as follows:

Class A Extinguishers

Used for ordinary combustibles such as wood, paper, some plastics and textiles where a quenching-cooling effect is required.

Class B Extinguishers

Used for flammable liquid and gas fires such as oil, gasoline, paint and grease.

Class C Extinguishers

Used for fires involving electrical wiring and equipment. Class C fires are essentially either Class A or Class B, but also involve energized electrical wiring and equipment. Therefore, the coverage of the extinguisher must be chosen for the burning fuel.

Class D Extinguishers

Used for fires in combustible metals such as magnesium potassium, powdered aluminum, zinc, sodium, titanium, zirconium and lithium. Persons working in areas where Class D fire hazards exist must be aware of the dangers in using Class A, B, or C extinguishers on a Class D fire, as well as the correct way to extinguish Class D fires. These units are not classified by a numerical system and are intended for a special hazard protection only.

Section 4: TRAINING

Inspector

The Safety Personnel shall arrange or conduct training for department employees who will perform fire extinguisher inspections.

User

All field employees shall receive training on portable fire extinguishers upon initial employment and at least annually thereafter. Employee shall receive training regarding the following items:

Fire extinguishers are effective only when fires are in the first stages and they are only as good as the operators using them.

Fire extinguisher training is intended to teach employees how to stop small fires from spreading out of control.

Instruction of employees in the use of fire extinguishers can best be shown by demonstrations.

Instructions in how to use extinguishers shall be posted near or on the extinguishers.

Employees should NOT attempt to fight a fire if the fire is spreading beyond the spot where it started. You should always fight the fire with your back toward an exit. If the fire spreads beyond your control -- DO NOT ATTEMPT TO FIGHT THE FIRE YOURSELF. CALL FOR HELP

To operate a fire extinguisher, remember the following steps and the word "PASS":

P - Pull the pin
A - Aim the nozzle at the base of the fire
S - Squeeze the handle
S - Sweep from side to side

Use the right extinguisher for the type of fire it is intended. The wrong extinguisher may spread the fire and/or be dangerous to the extinguisher operator.

Section 5: RECORD KEEPING

Documented dates of monthly and annual inspections shall be maintained on both the fire extinguisher tag and a separate log for each location.

Each location shall also maintain a copy of the training records for each person receiving inspector training as well as user training.

Chapter 23- ERGONOMICS

Section 1: GENERAL

Ergonomics is the science of fitting the job to the worker. Employees are most likely to work efficiently and accurately when their work environment contributes to a natural positioning of the body.

Ergonomic improvements can help employees feel better while they are working and they can minimize the probability of developing a Cumulative Trauma Disorder (CTD).

Tendonitis, carpal tunnel syndrome and lower back problems are the most common CTDs for employees.

INDOT employees will be trained to recognize situations that can contribute to cumulative problems, which will minimize chances of developing them.

Section 2: RISK FACTORS FOR CUMULATIVE TRAUMA DISORDERS (CTDs)

There are several factors that place employees at increased risk of developing a cumulative trauma disorder. They include:

- **Repetitive Motion - doing a job that requires performing the same movement continually.**
- **Excessive Force - doing a task that places extra pressure and strain on a particular part of the body.**
- **Awkward Posture - performing a function that places your body in an unnatural position.**
- **Working with vibrating tools.**
- **Working in a cold environment.**
- **Being in poor physical condition.**

There are a number of ways employees can reduce chances of developing a CTD:

- **Making sure wrists are in the best position when typing**
- **Adjusting chairs, materials and computer monitors correctly for employee height will make a significant difference in the amount of strain put on the back, neck and shoulders**

- **Knowing how to lift will help prevent back problems.**

Employees shall report any physical signs of ergonomic stress to their manager or supervisor. Physical signs are identified as follows:

- **Numbing, burning or tingling in fingers.**
- **Pain in wrists.**
- **Loss of grip or muscle weakness.**
- **Fatigue or abnormal tiredness.**
- **Pain in your back, legs, feet, neck or shoulders.**

Section 3: OFFICE ERGONOMICS

Sitting

Employees who have jobs that require them to sit most of the day may have problems with their back, neck, and shoulders. The following measures can be taken to help relieve the strain:

- **Select a sturdy chair with a firm, padded back that adjusts vertically and horizontally.**
- **Use a chair that swivels to avoid unnecessary reaching and twisting.**
- **Sit close to the desk to avoid slouching while working.**
- **Use a lumbar cushion or rolled towel if the chair does not support the lower back.**
- **Use a lumber cushion when driving and make sure the instruments and pedals can be reached without stretching.**

Computer Monitors or Visual Display Terminals (VDTs)

Many employees suffer from neck and shoulder problems because they spend hours working with a computer monitor or Visual Display Terminal (VDT) which is not in the best position for them. Correct placement of the VDT can relieve stress on the neck and shoulders.

Eye strain can also be a problem. Adjusting your screen for the minimum amount of glare and the best contrast will reduce the amount of strain on the eyes.

Monitor Position

You should be able to read the screen with your head up and facing forward. In order to do that, the monitor should be in front of you, rather than to the side, and it should be at eye level or a little lower.

If you wear bifocals, the monitor should be positioned low enough for you to be able to read the screen without tilting your head back.

The viewing distance to the monitor is also important. Position it so you can read it easily, without leaning forward or back in order to focus. Sitting for long periods with your neck pushed forward or back is a major source of neck and shoulder problems.

Minimizing Eye Strain

Reading from a VDT for hours at a time can be very hard on the eyes. The two (2) major sources of eye strain from working with a VDT are glare and poor contrast.

If glare is from lamps, repositioning them will help. If the glare is from window light, close the blinds to shut out the light and/or reposition the monitor.

Whatever the source of glare on your screen it can be reduced by turning your desk so the monitor is at an angle to the light source, or by attaching an anti-glare filter in front of the screen.

If you have a color monitor never use more than two or three colors and choose the colors that have good contrast - a light color on a dark background or a dark color on a light background.

Section 4: MATERIALS HANDLING ERGONOMICS

Lifting

Before attempting to lift by hand, employees shall determine whether additional help will be needed to safely lift the load.

Always warm up the body before lifting any load. This is a good way to prevent muscle strains and pulls. Stretch your back with upward reaches and continue to loosen tight muscles with simple side and back bends.

The general rules for lifting are:

> **Place one foot along the side of the object to be lifted and the other foot behind it. You'll have greater stability if your feet are comfortably spread, with the rear foot positioned for the upward thrust of the lift.**

Keep your back straight and use the sit-down position. Remember that means the back itself is straight not necessarily vertical. A straight back keeps the spine, back muscles and organs of the body in correct alignment. It minimizes the compression to the spine and strain of abdominal muscles that can cause hernia.

Tuck your chin in so the neck and head continue the straight line formed by your back. Tucking in the chin also helps keep the spine straight and firm.

Extend your fingers and hands around the object being lifted using the full hand. Since fingers alone have very little power you need the strength of the entire hand.

Draw the load close to your body with your arms and elbows tucked into the side of your body. When you hold your arms away from your body, they lose much of their strength and power. Keeping your arms tucked in also helps keep the body weight centered.

Position yourself so the weight of your body is centered over your feet. This provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot.

Tools

Tool Handles - To avoid using any more effort than is necessary employees shall use tools that reduce the amount of effort used to hold onto it. There are several factors that will improve gripping a tool:

- **Handle shall be sized right for hand - not too large or too small.**
- **Textured or cushioned handle.**
- **Flange at the base of the handle to keep hand from slipping.**

Handle shall also be long enough so the end does not put pressure on your hand.

Gloves - Gloves can also increase the amount of force you have to use to do a job. Many jobs require the use of gloves, but it is important to make sure they are not too large or too tight.

Power tools - Use power tools whenever they are available to reduce the amount of force you have to apply. As with any tool, try to use the lightest weight tool that will do the job.

Chapter 24- FALL PROTECTION

Section 1: GENERAL

INDOT shall provide and ensure that fall protection systems are available to all employees requiring protection from falls.

Training shall be conducted by a competent person for any employee who might be exposed to fall hazards.

All working/walking surfaces shall have the strength and structural integrity to safely support INDOT employees.

Section 2: SPECIFIC REQUIREMENTS

Employees shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall protection systems when the work is at six (6) feet above the adjacent level or less than six (6) feet above dangerous equipment. As a minimum, these systems should be used when working in the following situations:

- **Unprotected sides and edges.**
- **Leading edges.**
- **Hoist areas.**
- **Holes.**
- **Ramps, runways and other walkways.**
- **Excavations.**
- **Roofing work on low-slope roofs and steep roofs.**
- **Pre-cast concrete erection.**
- **Building construction.**
- **Wall openings.**
- **Walking/working surfaces not otherwise addressed.**
- **Work in Confined Spaces.**

Section 3: TRAINING REQUIREMENTS

INDOT shall provide a training program for each affected employee. Each employee shall be trained in the following areas:

- **The nature of fall hazards in the work area.**

- **The correct procedures for erecting, maintaining, disassembling and inspecting the fall protection systems to be used.**

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- **The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection to be used.**

- **The role of each employee in the safety monitoring system when this system is used.**

- **The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.**

- **The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.**

- **The role of employees in fall protection plans.**

When there is reason to believe that an employee who has been trained does not have the understanding and skills required, that employee shall be retrained.

Verification of training shall be through a written certification record. It shall contain the identity of the employee trained, date of training, and the signature of the trainer.

Section 4: FALL PROTECTION SYSTEMS

Fall Protection Systems shall be provided in accordance with the requirements of the OSHA Fall Protection Standards. Fall Protection Systems are as follows:

Guardrail Systems

Guardrail systems are barriers that are erected to prevent employees from falling to lower levels. The requirements for using guardrail systems are as follows:

- **The height of the top rail must be 42 inches above the walking/working level.**

- **When there is no wall or parapet wall at least 21 inches high, mid-rails, screens, mesh, or an equivalent material must be installed between the top edge of the guardrail system and the working surface.**

- **Guardrails must, without failure, withstand a 200-pound force applied within two (2) inches of the top edge in an outward or downward direction, at any point along the top edge.**

- **Guardrails may be constructed of wood, pipe, roping or wire.**

- **A chain, gate or removable guardrail section shall be placed around hoist areas to keep employees out when the area is not in use.**

- **Guardrails shall be used on the unprotected sides or edges of holes.**

- **Guardrails shall be erected along each unprotected side or edge of a ramp or runway.**

- **A guardrail system shall be inspected as often as needed to ensure that the system meets all strength requirements.**

Safety Net Systems

Safety net systems are used where it is not possible to use railings and toe boards, temporary floors, or other semi-permanent means of fall protection, and where safety belts and lifelines cannot be used. Work must not begin until the net is in place and can be tested.

Safety nets must extend eight (8) feet beyond the edge of the working surface and must be installed as close beneath the work surface as possible, but never more than 25 feet below the surface.

Safety nets must be installed so that if something falls into the net it will not touch structures or surfaces below.

The fall area between the working surface and the net must be free of obstructions.

Safety nets must be drop-tested on-site before use, after any repair, and every six (6) months.

The border rope of a safety net must have a minimum breaking strength of 5,000 pounds.

Safety nets must be inspected weekly for wear, damage and other deterioration and after any use that could affect the net.

Nets must be well maintained and carefully stored. They should not come into contact with chemicals or hot processes, which can damage their strength.

Personal Fall Arrest Systems

Personal fall arrest systems shall be used for the following:

- **Bucket and other platform lift operations.**

- **Roofing Operations.**

- **Building Construction.**

- **Bridge construction and high steel.**

- **Climbing and working on towers, utility poles and similar structures.**

- **Work in confined spaces like tanks, boilers, manholes and other enclosed spaces that may have a hazardous atmosphere.**

A properly-worn harness will help prevent serious injury from the forces exerted on the body when stopping a fall. Harnesses shall be constructed out of nylon or polyester webbing.

A lanyard is a flexible line of rope, wire rope or strap which generally has a connector at each end for connecting the harness to a deceleration device, lifeline or anchorage. All lanyards shall be used with a deceleration device built in or attached to absorb the shock. Lanyards must have a minimum breaking strength of 5,000 lbs.

A lifeline is a rope or wire rope suitable for one or more person(s) connected to an anchorage to which a lanyard is attached.

A personal fall arrest system shall:

- **Limit the maximum arresting force on an employee to 1,800 lbs when using a full body harness.**

- **Be rigged so that the employee cannot fall more than six (6) feet, cannot come in contact with a lower level, and is brought to a complete stop with a minimum deceleration distance of three and one-half (3 1/2) feet.**

- **Withstand two (2) times the potential impact of a worker free-falling six (6) feet or the free-fall distance allowed by the system, whichever is less.**

- **Be removed from service if used to prevent a fall.**

- **Be inspected before each use or if subject to impact.**

- **Not be attached to guardrail systems or hoists.**

- **Be rigged so that an employee can only travel to the edge of the working surface when in use at a hoist area.**

Note: Standard personal fall arrest systems are not designed to support an employee having a combined tool and body weight of 310 lbs or more.

Positioning Device Systems

A positioning device is similar to a personal fall arrest system and uses some of the same components. The difference is that a fall arrest system is designed to stop a fall, while a

positioning device is used to hold you in position so that you can not fall while you are working. Requirements for using a positioning device system are as follows:

- **Full body harnesses are to be used as a positioning device.**
- **A positioning device system must be rigged so that a worker cannot free fall more than two (2) feet.**
- **Anchorages must be able to support two (2) times the potential impact of an employee's fall or 3,000 pounds, whichever is greater.**
- **Connectors shall be drop forged, pressed, formed steel or a comparable material and corrosion-resistant with smooth edges to prevent damage to other parts of the system.**
- **Connecting assemblies must have minimum tensile strength of 5,000 pounds.**
- **D-rings and snap hooks must be tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or changing shape.**
- **Snap hooks must be of the locking type or compatible in size to other pieces they connect in order to prevent unintentional opening. (After January 1, 1998 only locking-type snap hooks can be used.)**
- **Full body harnesses are to be used as a positioning device system only and not to hoist materials.**
- **A positioning device system must be inspected before each use for wear, damage or deterioration and defective parts removed from use.**

Warning Line Systems

A warning line system is used in areas where work conditions make it impossible or would create a greater hazard to use other means of fall protection such as guardrails, personal fall arrest system or safety nets. It is defined as a barrier erected on a roof to alert employees to the fact that they are approaching an unprotected roof side or edge. Requirements for using a warning line system are as follows:

A warning line must be set-up around all edges of the roof work area as follows:

- **If mechanical equipment is in use at least six (6) feet from the roof edge, parallel to the equipment and not less than 10 feet from the perpendicular edge.**
- **When mechanical equipment is not in use at least six (6) feet from the roof edge.**

- **A walkway formed by two (2) warning lines must connect access points, materials handling, storage, and hoisting areas to the main work area.**

- **Rope, wire or chain can be used as a warning line and must have a minimum tensile strength of 500 lbs.**

- **The line must be marked every six (6) feet with a highly visible material.**

- **The line must be between 34-39 inches from the working surface.**

- **The posts that support the line must withstand at least 16 lbs of pressure without tipping over.**

- **The line must be firmly attached to the posts so that if it's pulled in one area, it doesn't take up the slack in another.**

- **Only those doing the roofing work are permitted between the roof edge and the warning line.**

Safety Monitoring System

A safety monitoring system is a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

A safety monitor shall:

- **Warn employees when it appears that they are unaware of a fall hazard or is acting in an unsafe manner.**

- **Be on the same walking/working surface and within visual sighting distance of the employees being monitored.**

- **Be close enough to communicate orally with the employees.**

- **Not have other responsibilities which could take the monitor's attention from the monitoring function.**

- **Not allow mechanical equipment to be stored or used in areas where safety monitoring systems are being used when employees are engaged in roofing operations on low sloped roofs.**

- **Not allow an employee, other than those engaged in the roofing work or an employee covered by another fall protection system, to be in the area protected by the safety monitoring system.**

- **Ensure that each employee working in the zone has been directed to comply promptly with the fall hazard warnings of the safety monitor.**

Covers

Covers are used to prevent employees from falling through holes in floors, roofs or other working surfaces. Requirements for using covers are as follows:

- **Roadway covers must support, without failure, at least two (2) times the maximum axle load of the largest vehicle that could cross the cover.**
- **Other covers must support, without failure, at least two (2) times the weight of workers, equipment and materials that could be placed on the cover at any given time.**
- **All covers must be secured so wind, equipment or workers cannot displace them.**
- **All covers (other than cast iron manhole covers or steel grates) must be color coded or marked with the word "HOLE" or "COVER".**

Protection from Falling Objects

Protection from falling objects lists the requirements for toeboards, guardrails and canopies that are used to protect employees below from being struck by falling objects. Requirements for protection from falling objects are as follows:

Toeboards must be:

- **Placed on the edge of the working surface (where workers, vehicles or equipment pass below) to catch tools or materials that may be dropped.**
- **At least three and one-half (3 1/2) inches high.**
- **Placed no more than one-fourth (1/4) of an inch above the working surface.**
- **Able to withstand a 50-pound force from a downward or outward direction.**

If tools or materials are piled higher than the toeboard, paneling or screening shall be added from the toeboard to the middle or top guardrail, whichever is best to protect the employees below.

Guardrail systems used as a protection from falling objects shall have openings small enough to prevent tools or materials from passing through.

In areas where overhand bricklaying is being done:

- **Only mortar and masonry materials can be stored within four (4) feet of the edge.**

- **The work shall be regularly cleared of broken materials and debris.**

Where roofing operations are underway:

- **Materials and equipment cannot be stored within six (6) feet of the edge, unless a guardrail system is in place.**

- **Materials stacked near a roof edge shall be stable and self-supporting.**

Canopies used to protect workers from falling objects shall be strong enough to prevent:

- **Collapse.**

- **Penetration of any items that fall on it.**

Section 5: CARE & INSPECTION

Care of Equipment

Keep equipment in the best condition possible.

Do not use equipment for hoisting materials or for any other purpose except fall protection.

After a fall arrest, do not use the equipment again until it has been inspected and approved by an authorized person.

Clean webbing and fiber rope by washing with a mild soap and water. Do not use solvents, bleach, or strong detergents. Let equipment air dry completely before using, but do not force dry, and do not hang it in direct sunlight.

Inspection

All fall protection equipment shall be formally inspected by an authorized person at least twice a year. The results of the inspection shall be documented and kept on file.

Employees are responsible for inspecting personal fall protection equipment every time they use it.

If equipment shows any signs of wear or deterioration, tag it out of service and get a replacement.

Webbing shall have no broken threads or stitches; brownish, hard shiny spots; mildew or accumulated dirt or grease.

Fiber rope shall have no knots, frayed areas or broken fibers, loss of diameter or accumulated dirt or grease.

Wire rope shall have no broken wires, kinks, or flattened, shiny areas; loss of diameter or accumulated dirt or grease.

Check all hardware, including thimbles on rope, grommets, D-rings, snap-hooks and buckles to make sure they are not bent, cracked, corroded or obviously worn.

Chapter 25- EXCAVATING AND TRENCHING

Section 1: GENERAL

All trenches and excavations that are located so as to create a hazard to employees shall be safeguarded or supported as necessary to safeguard employees working in or around such conditions.

Section 2: SPECIFIC REQUIREMENTS

Before opening any excavation area efforts shall be made to determine if there are underground utilities in the area, and these utilities shall be located and protected during the excavating operations.

The sides of all excavations and trenches more than five (5) feet deep shall be guarded by a shoring system, sloping of the ground, or other equivalent means.

In every trench four (4) feet or more in depth there shall be a means of egress (secured ladder, ramp, or stairway) located every 25 feet.

Where employees might be exposed to vehicular traffic, employees shall wear a safety vest. Signs, signals, barricades and/or flagmen may be required.

Employees are not permitted under loads handled by earth moving equipment.

All materials, tools, and equipment shall be stored at least two (2) or more feet away from the edge of the excavation.

Adequate precautions shall be taken to prevent exposure to hazardous materials in the air or dangerous environments.

Emergency rescue equipment must be available when a hazardous atmosphere exists or could reasonably be expected to exist.

If working in a bell bottom excavation, employees may be required to follow the work practices developed for confined spaces.

Employees shall not work in excavations in which there is accumulated water, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

Where the stability of adjoining buildings, walls or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Employees who are not required to be involved in the excavation shall stay out of the excavated area.

Remotely located excavations must be backfilled, covered or barricaded (wells, pits, shafts, etc.).

Daily inspections of all excavations shall be made by a competent person. If there is any evidence of possible cave-in, or slides are apparent, all work in the excavation site shall cease until the necessary precautions have been taken to safeguard the employees.

All employees shall be provided with, and required to use, personal protective safety equipment such as: hard hats, safety goggles, ear plugs and any other required safety equipment.

An extra shovel and other tools used for rescue shall be provided at the work site at all times.

If there is any evidence of a possible cave-in or a slide is apparent, all work shall cease.

The trench shall be refilled as soon as possible after the needed work has been preformed.

Care shall be taken with the movement of equipment and individuals around the open trench.

Individuals shall stay away from the open trench, at a safe distance from the edges of the trench and the equipment filling area, until the trench has been filled to a safe level.

Special care shall be taken when any individual has been buried in a trench past his waist. Individuals trapped in a cave-in shall not be moved until medical help has arrived, except if they are in danger of other injuries or death, or if further cave-ins are apparent.

Section 3: PROTECTIVE SYSTEMS

Protective systems are used as a method of protecting employees from cave-ins, from material that could fall or roll into an excavation, or from the collapse of adjacent structures.

Designing a protective system is a complex operation because of the factors involved. Some of the considerations that must be taken into account are:

- **Soil classification.**
- **Depth of cut.**
- **Water content of soil.**
- **Changes due to weather and climate.**
- **Superimposed loads (heavy equipment and materials).**
- **Vibrations.**
- **Other operations in the vicinity.**

Protective systems include:

<u>Sloping</u> - A method of protecting employees from cave-ins by sloping the walls back to an angle. The recommended angle of repose is 45 degrees. For every foot dug down, dig back one (1) foot (1:1 ratio). If water or vibration exists or the soil is unstable, the angle of repose is approximately 26 degrees (2:1 ratio).

<u>Shielding (trench boxes or trench shields)</u> - A structure that is able to withstand the forces imposed on it by a cave-in, and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either manufactured or job-built. Placement of the shield should rest near the bottom of the trench and extend approximately 18 inches above ground.

<u>Shoring system</u> - A structure such as an aluminum hydraulic, pneumatic/hydraulic, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins. Aluminum hydraulic, pneumatic/hydraulic and timber shoring shall only be used in trenches that do not exceed 20 feet in depth.

<u>Section 4: INSTALLATION AND REMOVAL OF PROTECTION</u>

Design of support systems, shield systems and other protective systems shall be selected and constructed by the competent person and shall be in accordance with the OSHA standards.

Whatever support system is used, employees shall always apply shoring by starting from the top of the trench or excavation and working down.

In installing shoring, care must be taken to place the cross beams or trench jacks in the true horizontal position and to space them vertically at appropriate intervals. The braces also must be secured to prevent sliding, falling or kick outs.

All materials used for shoring shall be in good condition, free of defects and of the right size. Timber with large or loose knots shall not be used.

Installation of the shoring shall closely follow the excavation work. The longer the trench is left unsupported, the greater the chance of a cave-in.

As soon as work is completed the trench shall be backfilled as the shoring is dismantled.

After the trench has been cleared workers shall remove the shoring from the bottom up, taking care to release jacks or braces slowly.

In unstable soil, ropes shall be used to pull out the jacks or braces from above.

Chapter 26- FIELD CONSTRUCTION ACTIVITIES

Section 1: GENERAL

The personal acts and conduct of employees assigned to construction projects will be in accordance with the spirit and intent of this Manual and Field Operations Handbook.

In the event that an employee is subject to hazards which are not covered by this manual, the contractor's safety requirements on the project will apply.

Personnel will keep themselves and equipment either in the clear or properly protected from the operations of the contractor.

Personnel are not required to inspect any work until adequate protection has been furnished.

Personal Protective Equipment appropriate to the work being done on the job site will be worn at all times.

Section 2: CONTRACTOR RESPONSIBILITIES

The contractor's responsibility to comply with the IOSHA Safety Standards as well as all other federal, state, and local laws, and shall be a topic to be discussed at all preconstruction conferences and documented in the minutes of the meeting.

The contractor and all subcontractors will be required to furnish the project engineer with Material Safety Data Sheets for each hazardous material generated, used, or stored on the project site. Such sheets shall be generated by each hazardous material manufacturer and shall be in accordance with Indiana OSHA requirements.

The contractor shall be responsible for proper handling, storage, transportation, and disposal of all hazardous wastes, hazardous substances, hazardous materials and special wastes.

All spills of hazardous wastes, hazardous substances, hazardous materials, special wastes or asbestos, caused by the contractor shall be cleaned up in accordance with applicable laws, regulations and rules.

If project personnel observe what appears to be an obvious violation of the safety standards, it shall immediately be brought to the attention of the contractor's job superintendent. All actions or incidents involving job safety shall be fully documented in the Project Engineer/Supervisor's Daily Report. A copy of the daily report, which documents the apparent violation, shall be sent to the district construction engineer within one day of the incident. It shall also be documented on this report if correction of the apparent violation has been initiated.

Upon receipt of the above referenced daily report, and the district construction engineer concurs with the apparent violation, the district construction engineer will prepare a memorandum for the district director's signature. The memorandum will be sent to: Indiana Division of Labor, Office of the Commissioner, Room W-195, IGC South, 402 West Washington, Indianapolis, Indiana 46204. This memorandum will outline the potential violation and a copy of the referenced daily will be attached to it. Copies of the memorandum and daily will be distributed to the contractor's superintendent, the contractor's home office, and Central Office's Operation Support Division, with copies of it being kept in the District. The memorandum will be prepared whether the violation correction has been initiated or not.

If the potential violation created imminent danger, state personnel shall not be permitted in the danger area. Further, the project engineer/supervisor shall immediately call the district office, who shall in turn contact the IOSHA Department of the Indiana Division of Labor by phone to be followed up with the above described memorandum informing them of the potential imminently dangerous violation. IOSHA will also be informed when, in our opinion, the potentially dangerous violation is corrected.

Although department personnel are not expected to constantly monitor the safety standards, are not to make judgments or interpretations of complex standards and are not to instruct the Contractor orally or in writing on how to correct a deficiency, proper training of the OSHA 1926 standards will help them to recognize obvious safety hazards.

If it is determined by the Division of Labor that a violation exists, the project engineer /supervisor will cooperate in seeing that the proper correction is made.

These instructions are applicable only to contractor's operations on highway projects.

Section 3: TRAFFIC CONTROL DEVICES

The safety of traffic control operations in construction areas should be a prime consideration from the beginning of construction until all work on the contract is complete. The primary objective shall be to safely expedite traffic flow with controlled speed, while providing room for the contractor to work effectively.

The proper construction and use of traffic control devices, including signs, barricades and lights shall be discussed at the pre-construction conference and checked continuously during the period of contract.

The project engineer/supervisor shall be responsible for strict and consistent enforcement of the specifications and regulations pertaining to erection and maintenance of all required signs.

Signs used only part-time such as "Men Working" and "Flagger Ahead" shall be covered or turned to the side when not required.

All signs, barricades and other protective devices shall be maintained in good condition.

Refer to the Indiana Manual on Uniform Traffic Control Devices (MUTCD) for additional information concerning traffic control and safety.

Section 4: STRUCTURE INSPECTION

Use extreme caution when working on girders and other narrow footings.

Be sure catwalks are supported on both ends.

During pouring operations be on the alert for loose ties and all other supports which may cause the forms to collapse.

Wash cement from body as soon as possible to prevent cement burns.

At no time should you be in close proximity of an operating pile driving hammer, except when the inspection requires it.

Section 5: PLANT INSPECTION

Take extreme care when climbing ladders to overhead bins.

Use gloves when sampling hot materials.

It is not good practice to climb onto sides of truck boxes to take samples. If you must climb up and down truck boxes, do not wear rings or other items that may catch on the box.

Department inspectors should not check the temperature of hot mix while the truck is under the hopper.

If it is necessary to inspect the interior of any barrel, tank or other container of bituminous material, empty or not, only a flashlight will be used for light.

Section 6: CONCRETE INSPECTION

When samples are taken of aggregate for concrete, or when concrete beams and cylinders are made, the safety rules for lifting will be followed.

Inspection around ready-mix trucks and finishing machines can lead to accidents and injuries. Department employees must stay away from truck lanes and backing vehicles.

Employees should keep exposed parts of their bodies away from direct contact with lime or cement, and should stay clear of areas below concrete spouts. Contact results in "burns", which may crack the skin and lead to infection. Employees working with concrete should wash and dry their hands at periodic intervals.

Section 7: USE OF EQUIPMENT

Drive within speed limits or as construction conditions allow.

Your car is not a truck. Avoid driving where your vehicle will be abused.

Close all doors and the trunk lid when moving vehicle.

Do not carry equipment or stakes on hood or trunk lid.

Check equipment periodically for leaky brakes, defective tires and faulty steering. Ensure all systems are kept in a safe operating condition.

Section 8: FIELD OFFICE REQUIREMENTS

- **A competent person designated by the employer to inspect the job site, materials and equipment and be able to identify existing and potential hazards and take corrective measures to alleviate the hazards.**
- **Form 300, OSHA Personal Injury Report, contact the Safety Office for data.**
- **OSHA poster is required.**
- **Written Hazardous Communication Program is required.**
- **An MSDS book with MSDS sheets for the hazardous materials at your location.**
- **Our written Safety Policy is required.**
- **Emergency telephone numbers posted at or near each telephone.**
- **A fire extinguisher inspected within a one year time frame.**
- **First Aid Kit.**
- **A person trained in First Aid and CPR at each worksite.**
- **Extension cords and flexible cords or cables may not be used as a substitute for fixed wiring.**
- **Hazardous materials outside the labeled mother container need a HMIS label.**
- **All refrigerators must be grounded.**
- **Stairways with more than three (3) risers need handrails.**
- **Stairway landings must have a 20 inch clearance from the swing of the door.**
- **Unused openings in cabinets, boxes and fittings shall be effectively closed.**
- **Breakers labeled in electric boxes, no open spaces.**
- **Horns and backup alarms on equipment.**
- **Temporary electric at least 10’ up or buried.**
- **Electrical cords checked for damage and if ground prong is missing.**
- **Light bulbs guarded.**
- **All written programs required by OSHA are available at the nearest Unit, Sub-district, or District site.**

Chapter 27- GROUND SURVEYING

Section 1: GENERAL

The party chief shall take every precaution to control traffic so it safely passes through the work area. After an area of protection is established the party chief shall review the results. If traffic patterns change during the work period, he/she shall again review control measures. If traffic control is not adequate, the party chief shall use enough additional controls to safely regulate traffic and provide a work area where hazards are minimized.

Section 2: RESPONSIBILITIES

The controlling safety rule is to stay as far from the traffic lanes as requirements of the survey permit.

All equipment shall be placed clear of pavement when not in use.

Whenever possible, survey parties should use offset lines to avoid working for unnecessary periods of time on the pavement.

Use offset lines for cross-sections and topography where traffic is above slow speed.

Personnel shall work on only one side of the roadway at a time unless required to work on the centerline. Only when absolutely necessary shall personnel work on both sides of the roadway simultaneously.

Vehicles for personnel will be legally parked, back from the edge of traffic lanes and preferably off the shoulder in rural areas. If working in areas where vehicles cannot be parked off the roadway, warning lights shall be displayed.

When working near or on the roadway, each crew member shall:

- **Ensure that proper warning and protection is provided by using standard warning signs, traffic cones and other traffic control devices.**
- **Listen and look before starting to cross a highway.**
- **Size up the situation before starting work, and decide in advance upon the safest course of action to follow in case of an emergency. A split-second decision might result in stepping into the path of a vehicle instead of getting out of the way.**
- **Face the direction of the approaching traffic as much as possible when working.**

Walk on the left side of the pavement, in the direction of approaching traffic, when it is necessary to walk on a highway for any appreciable distance.

Cautiously use surveying hand signals so they will not be mistaken for a flagger's directions to motorists, or use radios if available.

Common poison ivy and poison oak are two (2) of the poisonous plants that may be found during surveying. Proper work attire shall be worn to protect against the sun, poison plants, snakes, ticks (Lyme disease) and insect bites or stings.

When working in the vicinity of high-tension wires, extreme caution shall be taken to prevent contact with any survey equipment. Nonconductive rods shall be used whenever possible. A survey chain will not be thrown on or placed where wind or other conditions may move it into contact with electrical wires or constitute a hazard to traffic or other workers.

Section 3: PROPER WORK ATTIRE

All survey crew members shall wear Hi-viz safety apparel, sturdy hard soled work shoes (tennis shoes or other athletic footwear is strictly prohibited), shirt with a factory hemmed sleeve or blouse and long pants or trousers worn as intended. Tank tops, cutoff shirts and shorts are not considered appropriate work attire for field personnel. Employees should use good discretion in their work attire with proper consideration for safety hazards in their jobs.

It shall be the supervisor's responsibility to ensure that the clothing worn is appropriate for the job.

Section 4: TRAFFIC CONTROL

All traffic control used during ground surveying and other highway work situations shall conform to the provisions and specifications of the Manual on Uniform Traffic Control Devices (MUTCD) and the department's Work Zone Safety Manual. Crew chiefs shall not take the liberty to deviate from these minimum requirements. However, an effort to enhance the safety of department employees is permissible. A "SURVEY CREW AHEAD" sign may be used in place of a "ROAD WORK AHEAD" sign.

HIGH EXPOSURE AT HIGH TRAFFIC VOLUMES AND SPEEDS WARRANTS ALMOST ANY EXPENSE IN TIME, EFFORT AND COST TO REDUCE THE CHANCE OF ACCIDENT.

Chapter 28- CONFINED SPACE ENTRY PROGRAM

Section 1: GENERAL

The INDOT Confined Space Program has been designed with the safety and well being of all INDOT employees who enter confined spaces in mind.

The INDOT Confined Space Entry Program contains details of the entry permit system, classification of confined spaces, regular and alternate procedures for personnel to enter permit spaces, duties and training requirements for personnel involved in confined space operations, working with contractors, permits and forms associated with confined space entry and evaluation and the definitions of terms relating to permit space operations.

After the initial evaluation of a permit required confined space and identification of the hazards, a rescue team trained in the hazards present and equipped to respond in a timely manner is required and shall be available.

The INDOT Confined Space Entry Program shall be made available to employees and their authorized representatives.

This program shall be revised whenever a review of entry operations indicates that the permit space program may no longer adequately protect employees. Such revisions shall take place before subsequent entries are authorized. The following circumstances shall require a review of the permit-required confined space program:

- **Any unauthorized entry of a permit space.**
- **The detection of a permit space hazard not covered by the permit.**
- **The detection of a condition prohibited by the permit.**
- **The occurrence of an injury or near-miss during entry.**
- **A change in the use or configuration of a permit space.**
- **Employee complaints about the effectiveness of the program.**

INDOT Safety Personnel are responsible to ensure that the written program is reviewed and revised if necessary.

The success of the INDOT Confined Space Entry Program depends upon the cooperation of every employee involved in confined space operations.

Employees should observe the danger signs at all permit required spaces, never enter a confined space without properly certified training and authorization, and follow all

instructions on the entry permit. Active employee participation in the Confined Space Entry Program will result in the continued safety of all INDOT personnel as well as contractors.

Section 2: DEFINITIONS

Acceptable Entry Conditions: The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant: An individual with the sole purpose and assignment of remaining immediately outside the entrance to the confined space to render assistance to employees entering and working in the space.

Authorized Entrant: An employee who is authorized by the employer to enter a permit space.

Blanking or Blinding: The absolute closure of a pipe, line or duct by fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure to the pipe, line or duct with no leakage beyond the plate.

Body Harness: A harness with adjustable leg and shoulder straps and a D ring in the back for attaching a lifeline. A body harness is designed as part of a fall protection system to distribute the impact of a fall over a large area of the body. A body harness can also be used to pull an unconscious or disabled worker from a confined space.

Confined Spaces: Means a space that:

1) **Is large enough and so configured that an employee can bodily enter and perform assigned work; and**
2) **Has limited or restrictive means of entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry).**
3) **Is not designed for continuous employee occupancy.**

Other examples of confined or enclosed spaces include, but are not limited to: boilers, ventilation or exhaust ducts, sewers, lift stations, pipelines and open top spaces more than four (4) feet in depth such as trenches, tubs, catch basins and manholes. Specifying limiting dimensions can be misleading; air quality in the employee's breathing zone is the important factor.

Double Block and Bleed: The closure of a line, duct or pipe by closing and locking or tagging a drain or vent valve in the line between the two (2) closed valves.

<u>Engulfment</u>: The surrounding and effective capture of a person by liquid, or finely divided solid substance that can be aspirated to cause death by filling or plugging the respiratory system, or that can exert enough force to the body to cause death by strangulation, constriction or crushing.

<u>Entry</u>: The action by which a person passes through an opening into a permit required confined space.

<u>Entry Permit</u>: Means the employer's written authorization for employee entry into a permit required confined space under certain conditions, for a stated purpose, during a specified time. The entry permit is required to be completed prior to any entry into a confined space and must be maintained in a file for at least 90 days.

<u>Entry Supervisor</u>: The person (such as the employer, foreman or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations and for terminating entry.

<u>Hazardous Atmosphere:</u> Means an atmosphere that may expose employees to the risk of death, incapacitation, impaired ability to self rescue (that is, escape unaided from a permit space), injury or acute illness from one or more of the following causes:

- **Flammable gases, vapor, or mist in excess of 10 percent of lower flammable limit (LFL).**
- **Airborne combustible dust at a concentration that meets or exceeds its LFL;** ***Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet or less.***
- **Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;**
- **Atmospheric concentration for any substance for which a dose or permissible exposure limit is published in the OSHA standards and which could result in employee exposure in excess of its dose or permissible exposure limit;** ***Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self rescue, injury, or acute illness due to its health effects is not covered by the provision.***
- **Any other atmospheric that is immediately dangerous to life or health (IDLH).** ***Note: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets (MSDS) that comply with Hazardous Communication standard, published information and internal documents can provide guidance in establishing acceptable atmospheric conditions.***

<u>Hot-Work Permit</u>: The employer's written authorization to perform operations (riveting, welding, cutting, burning and heating) capable of providing a source of ignition.

<u>Immediately Dangerous to Life and Health (IDLH)</u>: Any condition within the confined space which poses an immediate threat to life, or which may result in an acute or immediately severe health effect or disablement.

Inerting: The displacement of the atmosphere in a permit space, by a noncombustible gas (such as nitrogen), to such an extent that the resulting atmosphere is noncombustible.

Lifeline: The retrieval line attached to the worker in a confined space, and used to remove an unconscious or disabled worker.

Lift Station (Pump Station): Lifts sewer water from gravity collection area into pumping station or wastewater facility.

Lower Flammable Limit (LFL): The minimum concentration of a combustible gas or vapor in air, which will ignite if an ignition source is present.

Manlift: A portable tripod, with winch and lifeline used in raising, lowering and/or positioning the worker in the confined space.

Non-Permit Confined Space: Means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Permit Required Confined Space (Permit Space): Means a confined space that has one or more of the following characteristics:

1) **Contains or has a potential to contain a hazardous atmosphere.**
2) **Contains a material that has the potential for engulfing an entrant.**
3) **Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.**
4) **Contains any other recognized serious safety or health hazard.**

Personal Protective Equipment (PPE): Any equipment worn by employees to protect the eyes, face, head and extremities. Examples of personal protective equipment include safety glasses, hard hats, respirators, gloves and protective clothing.

Qualified Person: An individual who is trained to recognize the hazard(s) of a confined space and how to evaluate those anticipated hazards.

Rescue Service: Means the personnel designated to rescue employees from permit spaces.

Retrieval System: Means the equipment (including a retrieval line, chest or full body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Self-Contained Breathing Apparatus (SCBA): A device that allows you to carry your own supply of clean air. This device must be worn during a confined space rescue. The self-contained breathing apparatus must have a minimum of thirty minutes of supplied air.

Section 3: CONFINED SPACE EVALUATION

Every confined space in the workplace shall be evaluated to determine if it is a permit-required confined space. This evaluation shall take place before the Confined Space Entry Permit is completed.

A Confined Space Evaluation Form shall be completed for every permit-required confined space and kept with the permit. This form indicates the location, potential hazards, control requirements for an acceptable entry, special instructions for entry, anticipated signs or symptoms of exposure, rescue information and anticipated classification of the space.

> **Note: In the absence of a completed form, a confined space shall be considered to be a permit-required space.**

A "DANGER --PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" sign shall be posted at all permit spaces. The sign's purpose is to inform employees of the existence, location and danger posed by permit-required confined spaces.

Confined space entry procedures shall be followed for permit spaces that exhibit multiple hazards.

Section 4: CONFINED SPACE HAZARDS

Because of the lack of air movement, the atmosphere (air) in a confined space may be extremely hazardous. This single characteristic of confined spaces can result in:

- **Oxygen deficient atmosphere.**
- **Flammable atmosphere.**
- **Toxic atmosphere.**

The following briefly describes these conditions and related hazards. (Also, see chart for "Common Gases Found In Confined Spaces" at the conclusion of this chapter)

Oxygen Deficient Atmospheres: An oxygen deficient atmosphere exists when there is less than 19.5 percent oxygen by volume, and should not be entered without an approved self-contained breathing apparatus (SCBA).

An oxygen concentration of 20.9 percent by volume is necessary for normal breathing.

Oxygen levels can increase and decrease within a confined space for a variety of reasons and can produce extremely hazardous work environments. The oxygen level can decrease because of such things as welding, cutting or brazing. It can also be decreased by certain chemical reactions such as rusting, or through bacterial actions such as fermentation. Oxygen is also decreased if displaced by another gas, such as carbon dioxide or nitrogen. Total displacement of oxygen by another gas such as carbon dioxide will result in

unconsciousness, followed by death. The following percents of an oxygen deficient atmosphere illustrate the effects on people:

- **20.9 percent normal breathing**
- **19.5 percent minimum for safe entry**
- **16 percent impaired judgment and breathing;**
- **14 percent faulty judgment and rapid fatigue;**
- **6 percent difficult breathing - death in minutes.**

<u>Oxygen Enriched Atmosphere</u>: Means an atmosphere containing more than 23.5 percent oxygen by volume.

<u>Flammable Atmospheres</u>: The oxygen in the air and a flammable gas, vapor or dust in the proper mixture can cause a flammable atmosphere. Different gases have different flammable ranges. If an ignition source such as a spark, an electrical tool, or a flame is introduced into a space containing a flammable atmosphere an explosion may result.

An atmosphere containing more than 20.9 percent oxygen or an oxygen enriched atmosphere (above 23.5 percent) will cause flammable materials, such as clothing and hair, to burn violently when ignited by an ignition source. Therefore, never use pure oxygen to ventilate a confined space. Always ventilate with normal air movement, usually from an adjacent outside source.

<u>Toxic Atmospheres</u>: Most substances, such as liquids, vapors, gases, mists, dusts, and some solid materials can produce toxic atmospheres and should be considered hazards in a confined space.

<u>Section 5: PERMIT SYSTEM AND ENTRY PERMIT</u>

Before entry of a permit space is authorized, an entry permit shall be prepared to document that the space is safe to enter. This permit shall be completed using the INDOT Confined Space Evaluation Form as a Guide. A copy of the INDOT Confined Space Evaluation Form and the Confined Space Entry Permit can be found at the end of this chapter.

Before entry begins, the entry supervisor identified on the permit shall verify that all necessary precautions have been taken and then sign the entry permit to authorize entry.

The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal so that the entrants can confirm that pre-entry preparations have been completed.

The duration of the permit may not exceed the time required to complete the assigned task or job on the permit.

The entry supervisor shall terminate entry and cancel the entry permit when:

- **The entry operations covered by the entry permit have been completed,**
- **A condition that is not allowed under the entry permit arises in or near the permit space (e.g., loss of ventilation, a facility or area emergency, etc.).**
- **Once the job is complete and all entrants have exited the space, the space is ready to be returned to normal service. The entry supervisor shall debrief personnel involved in the entry and cancel the permit. Any problems encountered during an entry operation shall be noted on the permit so that appropriate revisions to the permit space program can be made.**

Each canceled entry permit and confined space evaluation form shall be retained for at least one (1) year to facilitate the review of the permit-required confined space program.

The Central Office Safety Manager shall be responsible to review the permit-required confined space program and revise the Written Confined Space Entry Program.

Section 6: CONFINED SPACE ENTRY PROCEDURES

No confined space atmosphere is assumed safe. Always regard confined spaces as dangerous and entrants shall abide by the procedures outlined below.

Confined Space Entry Procedures

Regular procedures for entering permit spaces apply under any of the following conditions:

- **When multiple hazards are posed by a permit space.**
- **When it is necessary to enter the permit space to control or eliminate the hazards.**
- **When monitoring and inspection data do not exist.**

Alternate confined space entry procedures can be followed for entering a permit space when all of the following conditions apply:

- **When the only hazard posed by a permit space is an actual or potential hazardous atmosphere.**
- **When continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry.**

- **When the work to be performed within the space does not introduce any additional hazards (e.g., work with hazardous quantities of flammable or toxic substances and hot work are not permitted.**

- **When there is periodic monitoring and inspection data to support the first two points.**

Before entry of a permit space is authorized, an entry permit shall be prepared to document that the space is safe to enter. This permit shall be completed using the INDOT Confined Space Evaluation Form as a guide.

All pre-entry preparation activities specified on the permit shall be completed before entry is authorized. These preparations include, but are not limited to, the following:

- **Isolating the permit space.**
- **Lockout/Tagout, and try out all sources of electrical, pneumatic, mechanical, chemical, thermal, or radiation hazards.**
- **Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards.**
- **Providing pedestrian, vehicle, or other barriers as necessary to isolate the area and protect entrants from external hazards.**

Evaluate permit space conditions as follows when entry operations are conducted:

Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin except that if isolation is not feasible because the space is large or is part of a continuous system (such as a sewer). Pre-entry testing shall be performed to the extent feasible, before entry is authorized and, if entry is authorized, conditions shall be continuously monitored in the area where authorized entrants are working.

Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.

When testing for atmospheric hazards, test in this order:

<u>THE ORDER OF TESTING IS CRITICAL</u>.

1. **Oxygen**

2. **Combustible gases and vapors**

3. **Toxic gases and vapors**

At least one (1) attendant is required outside the permit space throughout the authorized entry for the duration of operations.

The permit space shall be evacuated immediately under any of the following conditions:

- **If the entrant or attendant detects a prohibited condition such as loss of communication.**
- **If the entrant recognizes any warning sign or symptom of exposure to a dangerous situation.**
- **If the attendant detects the behavioral effects of hazard exposure in an authorized entrant.**
- **If the attendant detects a situation outside the space that could endanger the authorized entrant.**
- **If the attendant cannot effectively and safely perform all the required duties.**

Section 7: RESCUE

Rescue services, whether INDOT-provided or third party-provided, shall comply with OSHA requirements regarding rescue.

- **Each member of the rescue service shall be trained in basic first aid and in CPR. At least one (1) member of the rescue service holding current certification in first aid and in CPR shall be available.**
- **Each member of the rescue service shall be trained in the proper use of personal protective equipment and rescue equipment necessary for making rescues from permit spaces.**
- **Each member of the rescue service shall be trained to perform the assigned duties.**

When entry will be made into an IDLH atmosphere or an atmosphere that can quickly develop into an IDLH atmosphere, rescue teams shall be on-site. For entries into confined spaces where the only hazards are mechanical, a response time of 10-15 minutes may be adequate.

To facilitate non-entry rescue, retrieval systems shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

- **Each authorized entrant shall use a full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level or above the entrant's head.**
- **The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that the rescue can begin as soon as**

the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical permit spaces more than five (5) feet deep.

If in the course of a permit space entry, an attendant becomes aware that an entrant needs assistance in escaping from permit space hazards, the attendant shall:

- **Summon rescue and other emergency services.**
- **Begin non-entry rescue procedures.**

Attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations and if another attendant has relieved them.

If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the workplace, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

Section 8: DUTIES OF CONFINED SPACE ENTRY TEAM

Note: Confined space entry team members shall only perform one (1) duty at a time. Team members may alternate from one duty to another if qualified.

Duties of Authorized Entrants:

Know the hazards that may be faced during the entry, including information on the mode, signs or symptoms and consequences of the exposure.

Properly use equipment required to safely enter the confined space including equipment for testing and monitoring, ventilating, communication, personal protection, lighting and ingress/egress.

Communicate with the attendant on a continuous basis, to enable the attendant to monitor entrant status and to alert entrants of the need to evacuate if necessary.

Alert the attendant whenever:

- **The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.**
- **The entrant detects a prohibited condition.**

Exit from the permit space as quickly as possible whenever:

- **An order to evacuate is given by the attendant or the entry supervisor.**
- **The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.**
- **The entrant detects a prohibited condition.;**
- **An evacuation alarm is activated.**

Duties of Attendants:

Know the hazards that may be faced during entry.

Be aware of possible behavioral effects of hazard exposure in authorized entrants.

Continuously maintains an accurate count of the confined space entrants.

Remain outside the confined space during entry operations until relieved by another attendant.

Communicates with authorized entrants as necessary to monitor entrant status and alert entrants of the need to evacuate if necessary

Order all entrants out of the space if a condition exists that is not allowed by the entry permit, could cause danger inside or if you must focus your attention on the rescue of other entrants from another space.

Summon rescue and other emergency services as soon as an emergency arises.

Be sure that only authorized entrants enter the space or the surrounding area.

Perform non-entry rescues as specified in the Rescue section.

Perform entry rescues ONLY if trained and equipped for rescue operations and if they have been relieved by a qualified attendant.

Monitor and protect the authorized entrants.

Duties of the Entry Supervisors:

Know the hazards that may be faced during the entry.

Verifies that the permit is filled out completely and all safety steps listed on it are taken, and then signs the form.

During the entry, the entry supervisor shall monitor conditions to make sure they stay safe throughout the work.

Terminates the entry if conditions become unsafe or the permit is cancelled, and orders everyone out of the space.

Removes any unauthorized individuals who enter or attempt to enter the permit space during entry operations.

Verify that rescue services are available and that the means for summoning them are operable.

When the work is finished the entry supervisor cancels the permit, concludes the operation and maintains canceled permits for a minimum of one (1) year.

Section 9: TRAINING REQUIREMENTS

INDOT shall ensure that each employee serving as authorized entrant, attendant or entry supervisor during any type of confined space operation shall be trained so that they have the understanding, knowledge, and skills necessary for the safe performance of their duties. This training shall include the following:

- **The operation of the permit system.**
- **The specific duties of each person involved in permit space operations.**
- **The hazards of confined spaces including information on the mode, signs or symptoms and consequences of exposure.**
- **The proper use of equipment required during permit space operations, including: testing and monitoring equipment, ventilating equipment, communication equipment, personal protective equipment, lighting equipment, barriers and shields, ingress/egress equipment (like ladders), rescue and emergency equipment used for non-entry rescue and any other equipment necessary for safe entry into and rescue from permit spaces.**
- **The importance of communication between entrant and attendant.**
- **The conditions under which the space should be evacuated.**
- **The procedures for summoning rescuers.**
- **The procedures to be used for a non-entry rescue.**

Employees who enter permit spaces to perform rescue services shall receive all of the training normally given to authorized entrants, attendants and entry supervisors. In addition, their training shall also include the following:

- **The proper use of any personal protective equipment or rescue equipment necessary for making rescues from permit spaces.**
- **The specific duties required for rescue personnel.**
- **Basic first-aid including CPR.**

  Practice making permit space rescues at least every 12 months, by means of simulated rescue operations, in which they remove dummies, mannequins or actual persons from the actual or representative permit spaces.

Training shall be provided to each affected employee:

- **Before the employee is first assigned permit space operations duty.**
- **Before there is a change in assigned duties.**
- **Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained.**
- **Whenever there is reason to believe either that there are deviations from the permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.**

The training shall establish employee proficiency in the duties required of authorized entrants, attendants, entry supervisors and rescue service members and shall introduce new or revised procedures, as necessary.

Once trained, each employee serving as authorized entrant, attendant, entry supervisor or rescue service member shall be certified. The certification shall contain each employee's name, the signatures or initials of the trainers and the dates of training. The certification shall be available for inspection by employees and their authorized representatives. A list of certified employees is to be kept with the INDOT Confined Space Entry Program.

CONFINED SPACE TRAINING CERTIFICATION

Location:

_____

Directions: Please complete each section with the requested information:

DATES	EMPLOYEE NAME	EMPLOYEE ID	TRAINER'S SIGNATURE

Section 10: TESTING REQUIREMENTS AND PROCEDURES

Testing Requirements

It shall be assured that each confined space be tested immediately prior to entry by a qualified person, using direct reading instruments, with remote sampling capability for the following conditions in this order:

1. **Oxygen level**
2. **Potential flammable hazard**
3. **Toxic materials known or suspected to be present**

The assigned attendant shall perform atmospheric testing during occupation at least once every hour or at more frequent intervals dependent on the possibility of changing conditions. Atmospheric test results must be recorded on the permit at least hourly.

The calibration of each atmospheric testing instrument shall be checked according to the manufacturer's instructions.

All testing equipment shall have "adequate" batteries or, if rechargeable, receive a full charge before being used to test atmospheric conditions in confined spaces.

Testing Procedures

The following steps must be followed in testing the confined space:

1. **Calibrate gas detectors in accordance with the manufacturer's recommendations.**

2. **Lower the gas detector probe into the confined space and take readings at the top, middle, and approximately six (6) inches above the bottom of the confined space--and again at the middle and the top as the probe is removed.**

3. **Readings should be recorded on Permit Entry Form.**

Section 11: WORKING WITH CONTRACTORS

1. **Contractors Working in Permit Spaces:**

If INDOT hires a contractor to perform work involving permit space entry, INDOT shall:

- **Inform the contractor that the workplace contains permit spaces, and that space permit entry is allowed only through compliance with the OSHA standard.**

-

- **Apprise the contractor of the elements including the hazards identified and INDOT's experience with the space that make the space in question a permit space.**

- **Apprise the contractor of any precautions or procedures that INDOT has implemented for the protection of employees, in or near, permit spaces where contractor personnel will be working.**

- **Coordinate entry operations when employees of more than one (1) employer are working simultaneously as authorized entrants in a permit space, so that employees of one (1) employer do not endanger the employees of any other employer**

- **Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.**

Each contractor retained to perform permit space entry operations shall:

- **Obtain any available information regarding permit space hazards and entry operations from INDOT.**

- **Coordinate entry operations with INDOT when both INDOT personnel and contractor personnel will be working in or near permit spaces.**

- **Inform INDOT of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.**

2. **Contractors Providing Permit Space Rescue:**

When INDOT arranges to have persons other than INDOT employees perform permit space rescue, INDOT shall:

- **Inform the rescue service of hazards they may confront when called on to perform rescue at any INDOT facility.**

- **Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.**

Confined Space Entry Permit

Date and Time Issued: _____ Date and Time Expires: _____
Job site/Space I.D.: _____ Job Supervisor:_____
Equipment to be worked on: _____ Work to be performed: _____

Stand-by personnel: _____ _____ _____

1. Atmospheric Checks: Time _____
Oxygen _____%
Explosive _____% L.F.L.
Toxic _____PPM

2. Tester's signature: _____

3. Source isolation (No Entry):	N/A	Yes	No
Pumps or lines blinded,	( )	( )	( )
disconnected, or blocked	( )	( )	( )

4. Ventilation Modification:	N/A	Yes	No
Mechanical	( )	( )	( )
Natural Ventilation only	( )	( )	( )

5. Atmospheric check after Isolation and Ventilation:

Oxygen _____%	>	19.5	%
Explosive _____% L.F.L	<	10	%
Toxic _____PPM	<	10	PPM H(2)S

Time _____
Tester's signature: _____

6. Communication procedures: _____
_____

7. Rescue procedures: _____
_____
_____
_____

8. Entry, standby, and back up persons:	Yes	No
Successfully completed required training?		
Is it current?	( )	( )

9. Equipment:	N/A	Yes	No
Direct reading gas monitor - tested	( )	( )	( )
Safety harnesses and lifelines for entry and standby persons	( )	( )	( )
Hoisting equipment	( )	( )	( )
Powered communications	( )	( )	( )

SCBA's for entry and standby Persons	**( )**	**( )**	**( )**
Protective Clothing	**( )**	**( )**	**( )**
All electric equipment listed Class I, Division I, Group D and Non-sparking tools	**( )**	**( )**	**( )**

10. Periodic atmospheric tests:

Oxygen	**____%**	**Time ____**	**Oxygen**	**____%**	**Time ____**
Oxygen	**____%**	**Time ____**	**Oxygen**	**____%**	**Time ____**
Explosive	**____%**	**Time ____**	**Explosive**	**____%**	**Time ____**
Explosive	**____%**	**Time ____**	**Explosive**	**____%**	**Time ____**
Toxic	**____%**	**Time ____**	**Toxic**	**____%**	**Time ____**
Toxic	**____%**	**Time ____**	**Toxic**	**____%**	**Time ____**

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor)

_____

Approved By: (Unit Supervisor)

_____

(Signature)

This permit is to be kept at job site. Return job site copy to Safety Office following job completion.

INDIANA DEPARTMENT OF TRANSPORTATION

CONFINED SPACE EVALUATION FORM

Part I

Yes __ No __ 1) is the space large enough so an employee can bodily enter and perform work; and

2) has limited or restricted means for entry and exit; and

3) is not designed for human occupancy?

If you answered Yes to all items in Part I continue to Part II.

If the answer is No in Part I, the space is not considered a confined space and no further action is needed.

Part II

Yes	No	
__	__	**1) Does the space contain or potentially contain a hazardous atmosphere?**
__	__	**2) Does the space have any materials that can trap or potentially trap, engulf, or drown an entrant?**
__	__	**3) Does the space have converging walls, sloped floors or tapered floor to smaller cross-sections which could trap or asphyxiate an entrant (Entrapment Hazard)?**
__	___	**4) Does the space contain any other recognized serious safety or health hazard.**

If any of the questions in Part II are checked Yes, the confined space is a permit-required confined space.

If all questions in pat II are answered no the space is not a permit required confined.

COMMON GASES

FOUND IN CONFINED SPACES

GAS	PHYSICAL CHARACTERISTICS	FLAMMABILITY LOWER EXPLOSIVE LIMIT (LEL)	TOXICITY THRESHOLD LIMIT VALUES (TLVs) % VOLUME
Carbon Monoxide CO	**Colorless Odorless**	**12.5%**	**.005%**
Carbon Dioxide CO_2	**Colorless Odorless**	**Non-flammable**	**.5%**
Methane CH_4	**Colorless Odorless**	**5%**	**Non-toxic**
Hydrogen Sulfide H_2S	**Colorless Rotten Egg Odor***	**4%**	**.001%**
Sulfur Dioxide SD_2	**Colorless Suffocating Odor**	**Non-flammable**	**.0005%**
Nitrogen Dioxide NO_2	**Brown Pungent Odor**	**Non-flammable**	**.0005%**

*** At high lethal concentrations, it cannot be smelled due to paralyzing action of the olfactory system.**

Chapter 29- HAZARD COMMUNICATION

Section 1: GENERAL

It is the policy of the Indiana Department of Transportation (INDOT) to ensure that the hazards of all chemicals found in the work place are identified and that information concerning these hazards is transmitted to employees to provide for their safety and health protection. This policy is implemented through the Hazard Communication Program.

Supervisors shall ensure that all chemical list, MSDS, consumer product list and labels are maintained and kept current.

Section 2: LIST OF CHEMICALS BY WORK AREA

A list of the hazardous chemicals used at each INDOT facility shall be the same as that on the container label and the Material Safety Data Sheet for that chemical. This list shall be maintained with Material Safety Data Sheets and available for review at all times.

Section 3: LIST OF CONSUMER PRODUCTS

Certain chemicals and chemical products available through retail outlets may be used at INDOT facilities, which present no greater duration or frequency of exposure than that resulting from normal consumer use; these products are defined as "consumer products". INDOT shall determine which chemicals and chemical products used in its facilities fit the description of consumer products. The consumer product list will be maintained and located with the list of Material Safety Data Sheets for each location.

Section 4: MATERIAL SAFETY DATA SHEETS (MSDS)

INDOT shall rely on the chemical manufacturers from whom it purchases chemical products to evaluate the hazards of the chemicals used in INDOT facilities. Material Safety Data Sheets, for chemicals used in the work place, are expected to be provided by all chemical manufacturers and/or distributors.

MSDS for each chemical used in an INDOT facility shall be maintained in the work area clearly marked and made readily available to all employees.

MSDS shall be maintained on file at Central Office for 30 years.

A list of terms found on an MSDS and their meaning is attached.

Section 5: LABELING PROCEDURES AND OTHER FORMS OF WARNINGS

INDOT shall, at all times, ensure that all hazardous chemicals on the job site are properly labeled.

All containers of hazardous materials received at INDOT facilities must be accompanied by a manufacturer's label. These labels will vary by manufacturer. Labels must contain information related to the critical components of hazard communication in terms of identity, health hazards, flammability ratings, reactivity, physical hazards and personal protective equipment recommendations. Manufacturer's labels meeting these requirements are sufficient and are permissible for containers in INDOT facilities. However, when materials are transferred from the mother (original) containers, or manufacturer's label becomes defaced or mutilated the following will apply.

All containers of hazardous materials at INDOT facilities that are originated through transfer from a mother container to a secondary container, or containers in which the manufacturer's label becomes destroyed shall have an HMIS label affixed.

The HMIS labeling system is a user-friendly format that utilizes basic colors and numeric patterns to provide necessary information. A zero (0) to four (4) rating is used to warn of the health, flammability and physical hazard of chemicals. Any questions regarding labels should be directed to a supervisor.

INDOT shall rely upon the manufacturers labeling system as the primary labeling system for INDOT.

Upon receipt of the MSDS for a chemical purchased from a retail supplier, the label information shall be compared to the information on the MSDS. Inquiry shall be made to the manufacturer or distributor regarding any discrepancies and a record of all written and telephone inquiries shall be maintained.

No INDOT employee shall purchase chemical products for use at a facility from local wholesale or retail establishments, unless the proper authority has approved the purchase in advance.

Labels shall be checked on a regular basis and any that are damaged or missing shall be replaced.

Section 6: NON-ROUTINE TASKS

A non-routine task is one for which employees have not received special training. In general, non-routine tasks are carried out on an infrequent basis, examples include: mixing or applying hazardous chemicals, cleaning equipment which contained chemicals, etc.

When a non-routine task is to be performed the hazards of the task and safe work practices shall be conveyed to the employees asked to carry out the task.

Section 7: PIPES AND PIPING SYSTEMS

The chemical contents (including petroleum) of piping systems in each work area shall be identified and information about the hazards of such chemicals shall be provided to employees.

Section 8: HAZARD COMMUNICATION INFORMATION

A copy of the INDOT written Hazard Communication Program shall be reviewed with all new employees.

A copy of the INDOT written Hazard Communication Program shall be located in each work area, readily accessible to employees who wish to read or review the program.

Section 9: HAZARD COMMUNICATION TRAINING PROGRAM

Training shall be provided for all employees at the time of their initial assignment to work areas where hazardous chemicals are present, whenever a new chemical hazard is introduced to their work areas and whenever the employee is transferred to a different work area where new chemical hazards are present.

Section 10: PROCEDURES FOR INFORMING CONTRACTORS OF CHEMICAL HAZARDS

Upon request, the contractor shall provide INDOT with an MSDS for each chemical being brought into the work area(s). Also, upon request INDOT shall provide the contractor an MSDS for each chemical that may be encountered by the contractor and his employees.

Section 11: PROCEDURES FOR INCIDENTAL SPILLS

Incidental spills shall be referred to as the release of a hazardous material on INDOT property, where we know the hazardous contents of the material and have the means to safely clean the spill up.

Should an incidental spill occur, the MSDS should be consulted to determine the safest method to use for clean up.

Should a spill occur outside of INDOT property or facilities, Operating Procedure 20, found in the Field Operations Manual, shall be adhered to.

TERMS FOUND ON MSDSs AND WHAT THEY MEAN

Acute Effect

Health effects with symptoms that develop rapidly after exposure and generally come quickly to a crisis. Also see "chronic".

Acute Toxicity Study

Investigation of the harmful effects resulting from a single dose or exposure to a chemical. Experimental animals are observed from one to three weeks.

ACGIH

***American Conference of Governmental Industrial Hygienists*; an organization of health and safety professionals from governmental agencies and universities engaged in occupational safety and health research. ACGIH develops, reviews and publishes recommended occupational exposure limits (TLV's) for hundreds of chemical substances and physical agents.**

Aerosol

An aerosol is dust, mist, smoke or fume that is present in air, and can be inhaled into the nose and lungs. Many aerosols (i.e. asbestos) are so small they can not be seen, but can be present in air at dangerous concentrations.

Air Contaminants

Most workplace air contaminants are chemicals and can be divided into (a) particulates and (b) gases or vapors. Particulates are dispersions of solid or liquid particles in air, and include dust, smoke, mist and metal fumes. Vapors are airborne dispersions of materials that are liquids or solids in air at ambient temperature (i.e. acetone vapor); gases are dispersions of materials that are gases at ambient temperature (i.e. chlorine).

Air Sampling

Determining quantities and types of air contaminants by collecting and evaluating a representative sample of air.

Ambient

Environmental surrounding i.e. ambient temperature is the temperature of the air around you.

ANSI

***American National Standards Institutes*; a privately funded, voluntary membership organization that coordinates the development of industrial standards. Many ANSI standards relate to safe design/performance of equipment - such as safety shoes, eyeglasses, smoke detectors, fire pumps, household appliances and safe practices or procedures - such as noise measurement, testing of fire extinguishers and flame arrestors, industrial lighting practices and use of abrasive wheels.**

Asphyxiate

A vapor or gas can cause unconsciousness or death by suffocation (lack of oxygen). <u>Simple</u> asphyxiates are harmful to the body only when they are so concentrated that they reduce oxygen in the air (normally about 21 percent) to dangerously low levels, nitrogen is a simple asphyxiate. <u>Chemical</u> asphyxiates, which include hydrogen cyanide and carbon monoxide, are dangerous at relatively low levels. They act by chemically interrupting oxygen use by the cells of the body.

ASTM

***American Society for Testing and Materials* is a voluntary membership organization with members from many agencies and industries concerned with materials. ASTM develops sampling and testing methods and investigates health and safety aspects of materials.**

Bonding

An electrical conductor that eliminates a potential electrical difference between objects. Bonding is effective only when the bonded objects are conductive. Bonding will not eliminate static charge, but will equalize the charge between the objects bonded so that a spark will not occur between them.

Boiling Point

The temperature at which a liquid changes to vapor at a given pressure, usually expressed in degrees Fahrenheit at sea level (760 mmHg, or one atmosphere). For mixtures, the initial boiling point or the boiling range may be given. Flammable materials with low boiling points present special fire hazards. Some approximate boiling points:

Propane	**-44°F**
Anhydrous Ammonia	**-28°F**
Butane	**31°F**
Gasoline	**100°F**
Allyl Chloride	**113°F**
Water	**212°F**
Ethylene Glycol	**387°F**

Burns

Thermal burns result from the application of too much heat to the skin. First degree burns show redness of the unbroken skin, second degree, skin blisters and some breaking of the skin, third degree, destruction of the skin and underlying tissues, which can include charring and blackening. Chemical burns result from contact with corrosive chemicals.

"C" or Ceiling

Maximum allowable workplace exposure limit for an airborne substance not to be exceeded even momentarily. Also see "PEL" and "TLV".

Carcinogen

A substance or agent that is known to cause cancer.

C.A.S.

***Chemical Abstracts Service* is an organization which indexes by number, information published in "Chemical Abstracts" thus providing a numerical index guide for all chemicals reported. Information about particular substances is now logged by C.A.S. numbers in various reference services.**

Central Nervous System

The portion of the nervous system consisting of the brain and spinal cord.

cc

***Cubic centimeter* is a volume measurement in the metric system, equal in capacity to one milliliter (ml). One quart is about 946 cubic centimeters.**

Chemical Family

A group of chemicals with similarities in structure. Example: acetone, methyl ethyl ketone (MEK) and methyl isobutyl ketone (MIBK) are of the "ketone" family, acrolein, furfural and acetaldehyde are of the "aldehyde" family.

CHEMTREC

***Chemical Transportation Emergency Center* is a national center established by the Chemical Manufacturers Association (CMA) to relay emergency information on specific chemicals to people responding to chemical transportation emergencies. CHEMTREC has a 24-hour toll free telephone number (800-424-9300).**

Chronic Effect
A health effect with symptoms that develop slowly over a long period of time, from low level repeated exposures or which recur frequently. Also see "acute".

Chronic Toxicity Studies
Animal studies that investigate the health effects resulting from repeated exposure to a chemical over a relatively long period of time, e.g. three (3) months to two (2) years.

COC
***Cleveland Open Cup*, a flash point test method.**

Combustible
Combustible liquids have a flash point of 100°F (37.8°C) or higher. Also see "flammable". Non-liquid substances such as wood and paper are called "ordinary combustibles".

Combustible Gas Indicator (explosion meter)
An instrument which samples air-gas mixtures and indicates the percentage of the lower explosive limit (see Explosive Limits).

Corrosive
A corrosive material is a liquid or solid that causes visible destruction of skin at the site of contact, also a liquid that causes severe corrosion in steel. Regulated by EPA as a hazardous waste.

Cutaneous Toxicity
See "Dermal Toxicity Studies".

Decomposition
Breakdown of a material or substance (by heat, chemical reaction, electrolysis, decay or other processes) into simpler compounds or elements.

Dermal Irritation
Chemical effects involving the skin such as rashes and blisters.

Dermal Toxicity Studies
Systemic health effects which result from chemical exposure of the skin, include effects that involve internal organs, not effects at the site of application.

Dermatitis
An inflammation of the skin from any cause. There are two (2) general types of skin reactions; primary irritation dermatitis and sensitization dermatitis. Primary irritation dermatitis is caused by irritants such as organic solvents and dilute corrosive materials. Sensitization dermatitis is an allergic response.

DOT
***U.S. Department of Transportation*, federal agency that regulates transportation of chemicals and other substances including specific warnings which must be used on labels and placards.**

EPA
***Federal Environmental Agency*, regulates laws regarding the environment.**

Epidemiology
The science that deals with the study of disease causation and transmission in the general population or specific sub-populations such as "chemical workers".

Evaporation Rate

The rate at which a particular material will vaporize (evaporate) as compared to a standard evaporation rate. The usual standard is normal butyl acetate (NBUA or n-BuAc), that is assigned an evaporation rate of 1.0. Rates for other solvents are classified as:

FAST evaporating if greater than 3.0 (which is 3x as fast as n-Bu-Ac). Examples: Methyl Ethyl Ketone (MEK) = 3.8, Acetone =5.6, Hexane=8.3.

MEDIUM evaporating if 0.8 to 3.0.
Examples: 95% Ethyl Alcohol = 1.4, MIBK = 1.6.

SLOW evaporating if less than 0.8.
Examples: xylene = 0.6, isobutyl alcohol = 0.6, n-butyl alcohol = 0.4, water = 0.3, mineral spirits = 0.1.

This is useful information in evaluating the health and fire hazards of a material.

FDA

***The U.S. Food and Drug Administration*, under the provisions of the Federal Food, Drug and Cosmetic Act, the FDA establishes requirements for the production and labeling of food and drug items.**

FIFRA

***Federal Insecticide, Fungicide and Rodenticide Act*; regulations administered by EPA which require that commercial poisons have health hazard warnings on labels and literature to protect users.**

Fire Extinguishers

Fire extinguishers may contain either liquid or dry chemicals, or gases (water, dry chemical, carbon dioxide, etc.). They are tested and rated to indicate their ability to handle specific classes and sizes of fires.

Class A Extinguishers: For ordinary combustibles, such as wood, paper and textiles, where a quenching-cooling effect is required.

Class B Extinguishers: For flammable liquid and gas fires, such as oil, gasoline, paint and grease, where oxygen exclusion or a flame interruption effect is essential.

Class C Extinguishers: For fires involving energized electrical wiring and equipment where the non-conductivity of the extinguishing agent is of prime importance.

Class D Extinguishers: For fires in combustible metals such as magnesium, potassium, powdered aluminum, zinc, sodium, titanium, zirconium and lithium.

Flash Point

The temperature at which a liquid will give off enough flammable vapor to ignite. There are several flash point test methods, and flash points may vary for the same material depending on the method used, so the test method is indicated when the flash point is given (105°PMCC, 200°TCC, etc.).

Flammable

A "flammable liquid" is defined by NFPA and DOT as a liquid with a flash point below 100°F (37.8°C). Solids that will ignite readily or are liable to cause fires under ordinary conditions of transportation through friction or retained heat from manufacturing or processing, and which burn so vigorously and persistently as to create a serious transportation hazard, are classified by DOT as "flammable solids". Also see "combustible".

Formula

The conventional scientific designation for a chemical. Water is H_2O, sulfuric acid is H_2SO_4 and sulfur dioxide is SO_2.

Fume

Tiny solid particles which form when metal is heated to a very high temperature and vaporized.

General Exhaust

A system for exhausting air containing contaminants from a general work area. Also see "local exhaust".

g

***Gram*, a metric unit of weight. One ounce U.S. (avoirdupois) is about 28.4 grams**

g/kg

***Grams per kilogram*, the dose used in animal toxicology tests, grams of substance dosed per kilogram of animal body weight. Also see "kg" (kilogram).**

Hazardous Material

In a broad sense, a hazardous material is any substance or mixture capable of producing adverse effects on the human health or safety.

The OSHA definition is:

The term "<u>hazardous material"</u> means a material which has one or more of the following characteristics:

- **(1) Has a flash-point below 140°F, closed cup, or is subject or spontaneous heating.**
- **(2) Has a threshold limit value (TLV) below 500 ppm for gases and vapors, below 500 mg/m^3 for fumes, and below 25 mppcf for dusts;**
- **(3) A single dose oral LD_{50} below 500 mg/kg;**
- **(4) Is subject to polymerization with the release of large amounts of energy;**
- **(5) Is a strong oxidizing or reducing agent;**
- **(6) Causes first degree burns to skin in short time exposure, or systemically toxic by skin contact; or**
- **(7) In the course of normal operations, may produce dusts, gases, fumes, vapors, mists or smokes which have one or more of the above characteristics."**

IDLH

***Immediately Dangerous to Life and Health*; conditions that could result in death or serious delayed health effects. To enter an IDLH area self-contained breathing apparatus must be worn.**

Incompatible

Materials which could cause dangerous reactions from direct contact with one another are incompatible.

Industrial Hygiene

The science and art devoted to the recognition, evaluation and control of those environmental factors or stresses, arising in or from the work, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or among the citizens of the community.

Ingestion

Taking in a substance through the mouth.

Inhalation

Breathing in a substance in the form of a gas, vapor, fume, mist, dust or smoke.

Inhibitor

A chemical that reacts with another substance to prevent unwanted chemical changes from occurring.

Irritant

A substance that causes an inflammatory response or corrosive damage to the eye, skin or respiratory system. Some irritants: most acids, acid gases, bases, ketones, alcohols, amines, metallic salts and chlorinated hydrocarbons.

Irritating

An irritating material, as defined by DOT, is a liquid or solid substance which upon contact with fire or when exposed to air gives off dangerous or intensely irritating fumes, vapors, mists or dusts (not including poisonous materials, see Poison, Class A and Poison, Class B).

kg

***Kilogram*, a metric unit of weight, about 2.2 U.S. lbs. Also see "g/kg", "g" and "mg".**

l

***Liter*, a metric unit of capacity. A U.S. quart is about 9/10 of a liter.**

LC

***Lethal Concentration*, concentration of a substance capable of killing.**

LC_{50}

***Lethal concentration* (50 percent); the concentration of material in air which can kill half of a group of test animals after only one administration lasting from one (1) to four (4) hours. The LC_{50} is expressed as PPM or mg/m^3 for gases, vapors, dusts and mists. If a time other than one (1) to four (4) hours is used, it is given.**

LD

***Lethal dose*, the dose (generally oral or by skin application) that will kill.**

LD_{50}

***Lethal dose* (50 percent); the single dose of material given by mouth, injection or on the skin, which studies have shown is capable of killing 50 percent of a group of test animals; usually expressed as mg/kg or g/kg.**

LEL or LFL

***Lower Explosive Limit or Lower Flammable Limit*, the lowest concentration of a vapor or gas (Lowest percentage of the substance in the air) that will produce a flash or fire when an ignition source (heat, arc or flame) is present. At concentrations lower than the LEL, the mixture it too "lean" to burn. Also see "UEL".**

Local Exhaust

A system for capturing and exhausting contaminants from the air at the point where the contaminants are produced.

m^3

***Cubic meter*, or stere, a metric measure of volume, about 35.3 cubic feet or 1.3 cubic yards.**

Mechanical Exhaust

A powdered device, such as a motor driven fan or air-stream venturi tube, for exhausting contaminants from a workplace, vessel or enclosure.

Melting Point

The temperature at which a solid changes to the liquid state. For mixtures, the melting range may be given.

Metal Fume Fever

An acute condition caused by a high exposure to the freshly generated fumes of metals, such as zinc, magnesium, or their oxides. Symptoms include fever, nausea, the shakes and other flu like symptoms.

mg

***Milligram*, a metric unit of weight. There are 1,000 milligrams in one gram (g) of a substance.**

mg/kg

***Milligrams per kilogram*, an expression of toxicological dose.**

mg/m^3

***Milligrams per cubic meter*, a unit for measuring concentrations of dusts, gases or mists in the air.**

ml

***Milliliter*, a metric unit of capacity, equal in volume to one cubic centimeter (cc), or about 1/16 of a cubic inch. There are 1,000 milliliters in one (l) liter.**

mmHg

***Millimeters (mm) of mercury (Hg)*, a unit of measurement for low pressures of partial vacuums.**

mppcf

***Million particles per cubic foot*, a unit for measuring particles of a substance suspended in air. Exposure limits for mineral dusts (silica, graphite, Portland cement, nuisance dusts and others), formerly expressed as mppcf, are now more commonly quoted in mg/m^3.**

MSHA

***The Mining Safety and Health Administration* of the U.S. Department of the Interior, the federal agency with safety and health regulatory and enforcement authorities for the mining industry.**

Mutagen

A substance or agent capable of altering the generic material (DNA) in a living cell.

NIOSH

***National Institute for Occupational Safety and Health*, a federal agency which - among other activities -tests and certifies respiratory protective devices and air sampling detector tubes, recommends occupational exposure limits for chemicals and assists OSHA and MSHA in occupational safety and health investigations and research.**

Occupational Disease (O.D.)

Bodily injury or health impairment resulting from exposure to conditions of the work and work area, materials, processes and equipment from absorption, inhalation or ingestion of disabling agents as distinct from trauma.

Odor Threshold

The lowest concentration of a substance's vapor, in air, that can be smelled. Odor thresholds are highly variable depending on the individual who breathes the substance and the nature of the substance. It is not a good indication of health hazard potential, since some highly toxic materials have no odor, and some harmless chemicals are very odoriferous (smelly).

Olfactory

Relating to the sense of smell.

Olfactory Fatigue

Loss of the ability to smell low levels of certain chemicals, the process of "getting used to" the background smell of a place.

Olfactory Paralysis

The complete loss of the sense of smell, caused by overexposure to specific chemical, i.e. hydrogen sulfide (H_2S) is especially dangerous because after moderate exposure the ability to smell even high levels is completely lost.

Oral

Taken into the body through the mouth.

Oral Toxicity

Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.

OSHA

***Occupational Safety and Health Administration* of the U.S. Department of Labor, federal agency with safety and health regulatory and enforcement authorities for most U.S. industry and business. Also see "MSHA".**

Oxidation

Reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent.

Oxidizer

DOT defines an oxidizer as a substance that yields oxygen readily to stimulate the combustion (oxidation) of organic matter. Chlorate (ClO_3), permanganate (MnO_4) and nitrate (NO_3) compounds are examples of oxidizers, note that all contain oxygen (O).

Oxygen Deficiency

An atmosphere having less than 20.8 percent oxygen, the percentage of oxygen found in normal air. When the oxygen concentration in air is reduced to about 16 percent, individuals may become dizzy, experience ear buzzing and have a rapid heat beat.

Oxygen Enriched

An atmosphere having more than 22 percent oxygen. In this type of atmosphere materials become hyper-flammable - i.e. will burn at lower temperatures.

PEL

***Permissible exposure limit*, an exposure limit established by OSHA, a regulatory authority. May be a time weighted average (TWA) limit or a maximum concentration exposure limit.**

pH

Means used to express numerically the degree of acidity or alkalinity of a solution with neutrality indicated as 7. Acids have low pH and bases have high pH.

Physical Hazard

Means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Percent Volatile

Percent Volatile by Volume, the percentage of a liquid or solid (by volume) that will evaporate at 70°F (unless another temperature is stated). Examples, butane 100 percent volatile: in time will evaporate completely. Some solutions are only 10 percent volatile, after the solvent evaporates, a non-volatile residue is left.

PMCC

***Pensky-Martens Closed Cup*, a flash point test method.**

Pneumoconiosis

A disease of the lung resulting from the continued inhalation of various kinds of dusts and other particles.

Poison, Class A

A DOT term for extremely dangerous poisons, poisonous gases or liquids so toxic that a small amount of the gas in the air is dangerous to life. Some examples, phosgene, cyanogen bromide, hydrocyanic acid and nitrogen peroxide.

Poison, Class B

A DOT term for liquid, solid, paste or semisolid substances - other than Class A poisons or irritating materials - which are known or presumed to be toxic to man so as to afford a hazard to health during transportation.

Polymerization

A chemical reaction in which the molecules of a solution combine to form very large molecules. In a hazardous polymerization this reaction occurs rapidly releasing large amount of heat. If polymerization may occur, an inhibitor can be added to prevent it from occurring at the wrong time, (i.e. during shipping). In many cases, the inhibitor is used up over time, so polymerization could occur in stored material.

ppm

***Parts per million*, parts (i.e. molecules) of chemical in a million parts (molecules) of air or liquid. Is a very low concentration as compared to percent, which is parts per hundred, and one part per hundred is 10,000 parts per million. Likewise, one ppm is 0.0001 percent.**

ppb

***Parts per billion*, as above, but is one molecule per one billion molecules. Is used to express extremely low concentrations. One ppb is 0.0000001 percent.**

psi

***Pounds per square inch*; a unit for measuring the pressure a material exerts on the walls of a confining vessel. For technical accuracy, pressure is expressed as psig (pounds per square inch gauge), or psia (pounds per square inch absolute). Psia equals gauge pressure plus sea level atmospheric pressure; psia = psig + 14.7 psi. Also see "mmHg".**

Reactivity

The tendency of a substance to undergo chemical reaction with the release or consumption of energy. Undesirable effects, such as pressure buildup; temperature increase, formation of noxious, toxic or corrosive by products may occur rapidly upon heating, burning or contact with other chemicals. Reactive solid waste may be regulated (by EPA) as hazardous wastes.

Reducing Agent

In a reduction reaction (which always occurs simultaneously with an oxidation reaction) the reducing agent is the chemical or substance which 1) combines with oxygen or 2) loses electrons to the reaction. See "oxidation".

Reproductive Hazard

Toxic effects involving the reproductive systems of males (reduced sperm count, reduced sex drive), females (changes in cycle, non-ovulation), and developing embryos or fetus (fetal loss or malformations).

Respiratory system

The breathing system, includes the lungs and the air passages to and within the lungs, plus the associated nerve and circulatory supply.

RCRA

***Resource Conservation and Recovery Act*, federal environmental legislation, administered by EPA, aimed at controlling the generation, treating, storage, transportation and disposal of hazardous wastes.**

Routes of Exposure

The ways that harmful materials enter the body: by mouth (oral), through the skin (dermal or cutaneous), the respiratory tract (inhalation), and eyes (ocular). Inhalation is the most common path, but dermal exposure can (with a few chemicals) allow great quantities to enter the body.

Sensitizer

A substance which on first exposure causes little or no reaction but which later may cause a significant response. Responses may range from weak to severe and are not limited to the original site of contact. Skin and respiratory sensitization is the most common form, also called an allergy.

SETA

Seta flash Closed Tester, a flash point test method.

"Skin"

A notation associated with some PELs or TLVs which indicates that the chemical may be absorbed by the skin, mucous membranes and eyes, and that this additional exposure must be considered part of the total exposure.

Solubility in water

The percentage of a material (by weight) that will dissolve in water at ambient (room) temperature. Terms used to express solubility are:

negligible	**Less than 0.1 percent**
slight	**0.1 to 1.0 percent**
moderate	**1 to 10 percent**
appreciable	**more than 10 percent**
complete	**soluble in all proportions**

Species

A biological type, on MSDS species refer to the test animals - usually rats, mice or rabbits - which were used to obtain the toxicity test data reported.

Specific gravity

The weight of a material compared to the weight of an equal volume of water, a measure of density or heaviness. If the same volume of material weighs eight (8) pounds and water 10 pounds, the specific gravity is 8/10 or 0.8. For insoluble materials, if s.g. is over one (1), the material will sink, if under one (1), the material will float.

Stability

The ability of a material to remain unchanged under expected and reasonable conditions of storage or use.

STEL

***Short term exposure limit,* ACGIH terminology. See "TLV-STEL".**

Synonym

Other name(s) by which a material is known. Methyl Alcohol, for example, is also called methanol and wood alcohol.

Synergistic

Instances where the simultaneous toxic effects of two chemicals are far greater than each one taken separately. The effects multiply. A good example; both smoking and asbestos exposure increase the chance of getting lung cancer, 12x and 5x respectively. The two together, asbestos workers who smoke, increase lung cancer incidence about 90x.

Systemic Toxin

Toxic chemical that affects liver or kidney function or blood manufacture. It does not refer to local skin burns, central nervous system effects or lung damage.

TCC

***Tag (Tagliabue) closed cup,* a flash point test method.**

Teratogen

A substance or agent to which exposure of a pregnant female can result in fetal malformations.

TLV

***Threshold Limit Value,* a term used by ACGIH to express safe workplace exposure limits. It is the airborne concentration of a material to which nearly all persons can be exposed day after day, year after year without adverse effects. ACGIH expresses TLV's in three ways and all three are to be met:**

TLV-TWA

The allowable Time Weighted Average concentration, averaged over on (8-hour) work shift.

TLV-STEL

The Short Term Exposure Limit, or maximum concentration for a continuous 15-minute exposure period. Only four such periods are allowed per day, and there must be at least 60 minutes between exposure periods.

TLV-C

The ceiling exposure limit - the concentration that should not be exceeded even instantaneously.

All see "Skin" relative to TLV's.

TOC

***Tag Open Cup,* a flash point test method.**

Toxicity

The sum of adverse effects resulting from over-exposure to a material or materials.

Toxic Substance

(OSHA Definition) - a substance that demonstrate the potential to induce cancer, to produce short and long term disease or bodily injury, to affect health adversely, to produce acute discomfort, or to endanger life to man or animal resulting from exposure via the respiratory tract, skin, eye, mouth or other routes in quantities which are reasonable for experimental animals or which have been reported to have produced toxic effects in man.

Trade name

The trademark name or commercial trade name for a material.

TSCA

***Toxic Substance Control Act,* federal environmental legislation, administered by EPA, for regulating the manufacture, handling and use of materials classified as "toxic substances".**

TWA

***Time Weighted Average exposure,* the airborne concentration of a material to which a person is exposed, averaged over the total exposure time - generally the total workday (8 to 12 hours). Also see "TLV".**

UEL or UFL

***Upper Explosive Limit or Upper Flammable Limit* of a vapor or gas, the highest concentration (highest percentage of the substance in the air) that will produce a flash or fire when an ignition source (heat, arc or flame) is present. At higher concentrations, the mixture is too "rich" to burn. Also see "LEL".**

Unstable

Tending toward decomposition or other unwanted chemical change during normal handling or storage. May generate heat as it decomposes, if this occurs readily can result in a dangerous situation.

Vapor Density

The weight of a vapor or gas as compacted to the weight of an equal volume of air. Materials lighter than air have vapor densities less than 1.0 (examples: acetylene, methane, hydrogen). Materials heavier than air (examples: propane, hydrogen sulfide, ethane, butane, chlorine, sulfur dioxide) have vapor densities greater than 1.0. All vapors and gases will mix with air, but the lighter materials will tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low places - along or under floors, in pumps, sewers and manholes, in trenches and ditches - and may flow in streams, creating fire or health hazards.

Vapor pressure

The pressure exerted by the vapor above a liquid in a closed container. VP increases as temperature increases, so standard temperatures are used. Vapor pressures reported on MSDS's are in millimeters of mercury (mmHg) at 68°F (20°C), unless stated otherwise. Three facts are important to remember:

1) Vapor pressure of a substance at 100°F will always be higher than the vapor pressure of the substance at 68°F (20°C).

2) Vapor pressure reported on MSDS in mmHg are usually very low pressure; 670 mmHg is equivalent to 14.7 pounds per square inch.

3) The lower the boiling point of a substance, the higher its vapor pressure.

Ventilation

See "general exhaust", "local exhaust", and "mechanical ventilation".

Warning Properties

The properties that "announce" that a chemical is present in the air, odor, vapor, color, stinging in eye, skin or lungs, etc. Toxic chemicals with poor warning properties, that is, can't be perceived even at toxic levels (i.e. carbon monoxide) are especially dangerous.

Chapter 30- EXPOSURE CONTROL

(BLOODBORNE PATHOGENS)

Section 1: GENERAL

The department shall educate all employees on how to protect themselves from on the job exposure to blood and other potentially infectious fluids.

Employees shall take the precautions necessary to protect themselves against the risk of coming into contact with blood or other potentially infectious materials.

Section 2: COVERED DISEASES

Among the more common blood-borne diseases that employees could be exposed to on the job are non-A hepatitis, non-B hepatitis, hepatitis B and delta hepatitis, as well as syphilis, malaria and human immunodeficiency virus. The two most significant are hepatitis B (HBV) and human immunodeficiency virus (HIV).

Section 3: TRANSMISSION OF VIRUSES

The pathogens, which can transmit these diseases, may be present in the blood and other body fluids such as saliva, semen and vaginal secretions. Pathogens can also be present in cerebrospinal synovial, pleural, peritoneal, pericardial, amniotic and any other fluids contaminated with blood.

These pathogens can enter and infect the human body through openings in the skin including cuts, nicks, abrasions, dermatitis or acne. Infection can also result from punctures or cuts caused by sharp contaminated objects such as needles, scalpels, broken glass, exposed ends of dental wires, or any other object that can puncture or cut skin. Infection can also gain access to the body through mucous membranes of the eyes, nose and mouth when these areas are touched with contaminated hands or implements.

The hepatitis B virus is particularly dangerous because it can survive on dried surfaces at room temperatures for an extended period of time. This means that a surface can be dangerously contaminated without any visible signs, if the work areas are not thoroughly cleaned immediately after being contaminated with infectious material. HIV has a much shorter survival span but is much more life threatening.

Section 4: EXPOSURE DETERMINATION CLASSIFICATION

The department shall classify tasks performed, in their areas of responsibility, according to the following exposure classification:

Positions Involving Exposure

Positions in which tasks performed involve a potential for mucous membranes or skin to contact blood, body fluids or tissues. Use of appropriate measures is required for every employee in these jobs. Positions include but are not limited to:

Rest Park Attendants
Waste Water Personnel
Laboratory Personnel handling Waste Water
Sewer Vac Crew Members
Building Maintenance Personnel and Custodians
Maintenance Workers (including transfers)
Toll Attendants
Mechanics
Heavy Equipment Operators
First Aid Providers

Section 5: UNIVERSAL PRECAUTIONS

Universal Precautions is an approach to infection control. According to the concept, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV and other bloodborne pathogens.

Universal Precautions provide the first line of defense against the risk of exposure to bloodborne pathogens. Universal Precautions shall be practiced at all times to reduce the risk, in the event of exposure, to infectious disease. Universal Precautions must be consistently used for all activities involving contact with blood, tissue, body fluids and equipment or materials, which may have been contaminated by these substances.

As a minimum, the following standards of practice are required of all employees when attending to an injured worker or working with the equipment which may have been contaminated with infectious material, or in the implementation of Universal Precautions.

Work Practice Controls

- **Wash hands; (or use antiseptic towelettes or hand sanitizer).**
- **Wear gloves.**
- **Wear impervious clothing.**
- **Wear a mask.**
- **Use mouth pieces and resuscitation masks.**

- **Handle sharp objects carefully.**
- **Post Universal Precaution signs.**
- **If contact occurs, flush mucous membranes in area of contact with water.**

Section 6: PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment includes, but is not limited to, gloves, gowns, laboratory coats, rain coats, face shields, masks, eye protection, mouthpieces, resuscitation bags, pocket masks or other ventilation devices, surgical caps or hoods, shoe covers or boots.

Appropriate equipment does not permit blood or other potentially infectious materials to pass through or reach the employee's work clothes, skin, eyes, mouth or other mucous membranes under normal conditions, and for the duration of use.

All affected employees shall use personal protective equipment to the extent judged appropriate based on any possibility of contracting an infection from bloodborne pathogens at work.

Section 7: STANDARDS OF PRACTICE

All Bloodborne Pathogen kits will contain: 1) latex gloves, 2) antiseptic towelettes, 3) mask, 4) impervious apron, 5) mouth piece and a red biohazard material bag to dispose of all waste generated at the scene.

First Aid and Bloodborne Pathogen kits shall be placed in the following locations:

- **Rest areas**
- **All INDOT facilities**
- **District offices**
- **Project field offices**
- **All Central Office Divisions**
- **All vehicles**

When working with trash or waste, Universal Precautions shall be taken as the first line of defense against occupational exposure to bloodborne pathogens. Therefore, at a minimum, all biological waste and any non-biological waste collected from locations in which bleeding has occurred, shall be considered and handled accordingly:

Gloves will be worn at all times when gathering, containerizing, transporting or destroying waste which has any chance of having been exposed to blood, other human fluids or tissue.

Do not overfill bags such that they cannot be easily and tightly closed without stretching the bags.
All bags will be tightly closed or sealed prior to being taken from the area in which the waste was generated. Sealed bags shall not be left in the area in which they were filled but shall be moved promptly to designated storage areas to await timely transportation to an approved destruction facility.

In work areas where there is a reasonable likelihood of exposure to blood or other potentially infectious materials, employees are not to eat, drink, apply cosmetics, smoke or handle contact lenses. Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets or on counter/bench tops, where blood or other potentially infectious materials are present.

As a minimum all INDOT facilities shall have a First Aid kit, Bloodborne Pathogen kit and a Sharps Container. These items shall also be included in INDOT vehicles used for litter pick up.

Section 8: HEPATITIS B VACCINATION

An employee assigned to a job, which has been classified as involving a risk or occupational exposure to bloodborne pathogens, shall be advised of the risk regarding current U.S. Public Health Service recommendations concerning HBV vaccination and shall be offered an opportunity to receive a Hepatitis vaccination.

If an HBV vaccination is recommended the employee may:

Receive the vaccination series, at no cost, during normal work hours no later than 10 working days after initial assignment to the job.

Waive the vaccination by signing a waiver form, understanding that HBV vaccination will be made available should the employee's decision change. A copy of this waiver form is at the end of this chapter.

Section 9: LABELING OF POTENTIALLY HAZARDOUS MATERIALS

All contaminated waste shall be placed in red disposal bags or sharps containers labeled biohazard and disposed of properly.

Section 10: OCCUPATIONAL EXPOSURE TRAINING

The Employee Safety Personnel will be responsible for providing training, in accordance with the OSHA Rule on Occupational Exposure to Bloodborne Pathogens. Training shall be conducted by Employee Safety Personnel or persons approved by Employee Safety Personnel.

No employee shall be assigned to a job or task determined to have an occupational exposure before completing the required Occupational Exposure to Bloodborne Pathogens training.

Training for all employees will be conducted prior to initial assignment to tasks where occupational exposure may occur. Training will be conducted in the following manner:

Training for employees will include the following:

- **The OSHA Standard for Bloodborne Pathogens.**
- **Epidemiology and symptoms of bloodborne diseases.**
- **Modes of transmission of bloodborne pathogens.**
- **INDOT Exposure Control Plan.**
- **Procedures which might cause exposure to blood or other potentially infectious materials at the facility.**
- **Control methods which will be used at the facility to control exposure to blood or other potentially infectious materials.**
- **How to select the proper personal protective equipment.**
- **Personal protective equipment available at this facility.**
- **Appropriate actions to take and who to contact in an emergency involving infectious materials.**
- **Procedure to follow if an exposure incident occurs.**
- **Post Exposure evaluation and follow-up.**
- **Signs and labels used at the facility.**
- **Hepatitis B vaccine program at the facility.**
- **General Employee Awareness.**

- **Interactive questions and answers with the trainer.**

All employees will receive annual refresher training. Additional training shall be provided for institution of new tasks or procedures that affect the employee's occupational exposure,

All supervisors are responsible for ensuring that any personnel having an occupational exposure have met the training requirements for assignments in which there is a risk of Occupational Exposure to Bloodborne Pathogens.

Training records shall be maintained in a manner that is easily accessible.

Section 11: MEDICAL RECORDS

Health and medical records for employees receiving vaccinations will be maintained on a confidential basis and shall not be disclosed or reported, without the employee's express written consent to any person within or outside the workplace. At the employee's request the Department shall provide the employee with a copy of his or her individual medical records.

Exception being:

> **Delivery to the Assistant Secretary (OSHA) or the Director (NIOSH) if requested and as required by OSHA Rules governing occupational Exposure to Bloodborne Pathogens.**
>
> **As required by any known local or state laws that may require disclosure without employee consent.**

These records shall be maintained for at least the duration of employment plus 30 years.

Section 12: REQUIRED RECORDS

In the event an occupational exposure to bloodborne pathogens incident occurs, the following records shall be maintained in the employee personnel file.

This record shall include only:

> **A copy of the employee's hepatitis B vaccination status and any medical records relative to the employee's ability to receive vaccination.**
>
> **A copy of all results of medical examinations, medical testing and follow-up procedures.**

The employer's copy of the required health care professional's written opinion as to the need for and status of employee's HBV vaccination. Recommendations for post exposure evaluation and follow-up on evidence that the employee has been informed of the results of the evaluation, and has been told about conditions that could result from exposure to infectious material.

A copy of the information that was required to be provided for the employee by an approved physician. Examples of this information would include a description of the incident, documentation of the route of exposure, circumstances under which exposure occurred, and results of the source individual's blood test, if available.

Note: All other findings remain confidential and shall not be included in the written report.

Section 13: OCCUPATIONAL EXPOSURE TRAINING RECORDS

Supervisors are responsible for ensuring that Occupational Exposure Training that has been completed is documented and available for review.

The following information shall be available regarding documented training.

The dates of all training sessions completed by the employee and the annual occupational exposure training expiration date.

The names of persons conducting the training.

Note: A record of instructor qualifications for each instructor must be on file.

The individual record of completed training shall become a permanent part of the employee's training record. Copies of the individual training records may be given to the employee at the time and shall be provided at the termination of successful employment.

Original individual training records shall be retained for not less than three (3) years following termination of employment. Individual training records of Occupational Exposure Training are releasable and can be transferred as required and regulated by OSHA.

INDIANA DEPARTMENT OF TRANSPORTATION

HEPATITIS B VACCINATION DECLINATION FORM

I, _____understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B Virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I wish to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at not charge to myself.

_____ _____
Employee Signature **Date**

_____ _____
Witness Signature **Date**

Chapter 31- THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Section 1: GENERAL

The department shall ensure that all machines and equipment are isolated from all potentially hazardous energy, and locked out or tagged out before employees perform any servicing or maintenance activities, where the unexpected energization, start-up or release of stored energy could cause injury.

Section 2: ENERGY CONTROL PROGRAM

The department has established a program consisting of energy control procedures and employee training.

Energy Control Procedures

Procedures specified in this written program shall be used by employees to control potentially hazardous energy when engaged in the activities covered in these procedures. The procedures clearly and specifically outline the scope, purpose, authorization, rules and techniques to be utilized for the control of hazardous energy and the means to enforce compliance including but not limited to the following:

- **A specific statement of intended use of the procedure.**
- **Specific procedural steps for shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy.**
- **Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them.**
- **Specific requirements for testing machines or equipment to determine and verify the effectiveness of lockout devices, tagout devices and other energy control measures.**
- **Specific identifiable lockout/tagout devices shall indicate the identity of the employee who applied the devices.**

Section 3: PERIODIC INSPECTIONS

INDOT will conduct periodic inspections of energy control procedures at least annually to ensure that the procedures and the requirements of this policy are being followed. The inspections will be conducted by an INDOT authorized individual other than the one(s) utilizing the energy control procedures. The periodic inspection shall be designed to

correct any deviations or inadequacies observed. Where lockout is used for energy control, the periodic inspection shall include a review by INDOT authorized person.

INDOT will ensure that the periodic inspections have been performed and will keep records of each inspection. The records shall identify the machine or equipment on which the energy control procedure was utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

Section 4: TRAINING AND COMMUNICATION

Employee Training

INDOT will provide training to ensure that the purpose and function of the energy control program is understood by employees, and that the knowledge and skills required for the safe application, usage, and removal of energy control devices are understood by the employees. The training shall include the following:

> **Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.**
>
> **Each affected employee shall be instructed in the purpose and use of the energy control procedure.**
>
> **All other employees whose work operations are, or may be, affected by this policy shall be instructed about the procedure, and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked out or tagged out.**

Employee Re-training

Re-training shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures. Re-training shall also be conducted whenever a periodic inspection reveals, or whenever INDOT has reason to believe that there are deviations or inadequacies in the employee's knowledge or use of energy control procedures.

Section 5: NOTIFICATION OF EMPLOYEES

INDOT will notify all affected employees of the application and removal of lockout/tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

Section 6: APPLICATION OF CONTROL

The established procedure for the application of energy control (implementation of lock-out/tagout systems procedures) shall cover the following elements and procedures and shall be implemented in the following sequence:

> **<u>Preparation of shutdown</u> - Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.**
>
> **<u>Machines or equipment shutdown</u> - The machine or equipment shall be turned off or shut down using the procedures required by this policy. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of equipment de-energization.**
>
> **<u>Lockout/tagout device application</u> - Lockout/tagout devices shall be affixed to each energy isolating device by authorized employees. Lock devices shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.**

<u>Section 7: STORED ENERGY</u>

Following the application of lockout/tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained and otherwise rendered safe. If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed or until the possibility of such accumulation no longer exists.

<u>Section 8: VERIFICATION OF ISOLATION</u>

Prior to starting work on machines or equipment that have been locked out, the authorized employee shall verify that isolation and de-energization of the machine or equipment has been accomplished.

<u>Section 9: RELEASE FROM LOCKOUT/TAGOUT</u>

Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be implemented by the authorized employee(s) to ensure the following:

> **<u>The machine or equipment</u> - The work area shall be inspected to ensure that nonessential items have been removed, and that machine or equipment components are operationally intact.**
>
> **<u>Employees</u> - The work area shall be checked to ensure that all employees have been safely positioned or removed. Before lockout/tagout devices are removed and before machines or equipment are energized, affected employees shall be notified that the lockout/tagout devices are being removed.**

<u>Lockout/tagout devices removal</u> - Each lockout/tagout device shall be removed from each energy isolating device by the employee who applied the device.

<u>Exceptions</u>

When the authorized employee who applied the lockout/tagout device is not available to remove it, that device may be removed under the direction of INDOT, provided the specific procedures and training for such removal have been developed, documented, and incorporated into INDOT energy control program. INDOT shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

Verification that the authorized employee who applied the device is not at the facility.

Making all reasonable efforts to contact the authorized employee to inform him/her that their lockout/tagout device has been removed.

Ensuring that the authorized employee has this knowledge before he/she resumes work at the plant.

<u>Section 10: ADDITIONAL REQUIREMENTS: TESTING OR POSITIONING OF MACHINES, EQUIPMENT OR COMPONENTS</u>

In situations in which lockout/tagout devices must be temporarily removed from the energy isolating device, and the machine or equipment energized to test or position the machine or equipment or component thereof, the following procedures shall be followed:

- **Clear the machine or equipment of tools and materials.**
- **Remove employees from the machine or equipment area.**
- **Remove the lockout/tagout devices following INDOT policies and procedure.**
- **Energize and proceed with the testing or positioning.**
- **De-energize all systems and re-apply energy control measures.**

<u>Section 11: OUTSIDE PERSONNEL (CONTRACTORS)</u>

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this policy, INDOT and the outside employer shall inform each other of their respective lockout/tagout procedures.

INDOT shall ensure that all employees understand and comply with restriction and prohibition of the energy control procedures.

INDOT shall ensure that employees of outside contractors understand and comply with the INDOT energy control procedures.

Section 12: GROUP LOCKOUT/TAGOUT PROCEDURES

When servicing and/or maintenance is performed by a crew, team, department or other group they shall utilize a procedure that affords the employee a level of protection equivalent to those provided by the implementation of a personal lockout/tagout device.

Group lockout/tagout device(s) shall be used in accordance with the procedures required by INDOT policies including, but not necessarily limited to the following specific requirements:

> **Primary responsibility is vested in the authorized employee, for the set number of employees, working under the protection of a group lockout/tagout device.**
>
> **The authorized employee shall ascertain the exposure status of individual group members with regard to the lockout/tagout of the machine or equipment.**
>
> **When more than one crew, team, or department is involved assignment of overall job-associated lockout/tagout control responsibility will be made to an authorized employee designated to coordinate affected work force and ensure continuity of protection.**

Section 13: SHIFT OR PERSONNEL CHANGES

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout/tagout protection including provisions for the orderly transfer of lockout/tagout devices between off-going and on-coming employees to minimize exposure to hazards from the unexpected energization, start-up of the machine or equipment or release of stored energy.

ENERGY CONTROL INVENTORY

LOCATION:_____

Equipment	Energy Source	Device(s)

DEFINITIONS

<u>Affected Employee</u> - An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout/tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

<u>Authorized Employee</u> - An employee who locks or implements a lockout/tagout system procedure, on machines or equipment, to perform the servicing or maintenance on that machine or equipment.

<u>Capable of being locked out</u> - An energy isolating device will be considered to be capable of being locked out, either if it is designed with a hasp, or other attachment, or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

<u>Energized</u> - Connected to an energy source or containing residual or stored energy.

<u>Energy Isolating Devices</u> - A mechanical device that physically prevents the transmission or release of energy, including, but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch, a manually operated switch, by which the conductor of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch and other control circuit type devices.

<u>Energy Sources</u> - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy.

<u>Hot Tap</u> - A procedure used in the repair, maintenance, and service activities which includes welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline, without the interruption of service, for air, gas, water, steam and petrochemical distribution systems.

<u>Lockout</u> - The placement of lockout/tagout devices on an energy isolating device in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout/tagout device is removed.

<u>Lockout Device</u> - A device that utilizes a positive means such as a lock, either key or combination types, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

<u>Normal Production Operations</u> - The utilization of a machine or equipment to perform its intended production function.

<u>Servicing and/or maintenance</u> - Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to unexpected energization or start-up of the equipment or release of hazardous energy.

<u>Setting up</u> - Any work performed to prepare a machine or equipment to perform its normal production operations.

<u>Tagout</u> - The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device, and the equipment being controlled may not be operated until the tagout device is removed.

<u>Tagout Device</u> - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device, in accordance with an established procedure to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Chapter 32- RESPIRATORY PROTECTION PROGRAM

Section 1: GENERAL

The department shall protect employees from respiratory hazards through respiratory hazard recognition, monitoring and the use of engineering controls and respiratory protective equipment.

Employees shall be knowledgeable of respiratory hazards and use proper and effective work practices to avoid overexposure.

If respirators are necessary employees shall wear them as required, maintain them properly and advise supervisors of any problems related to their use.

Section 2: TYPES OF RESPIRATORS

There are four (4) types of respirators commonly used in INDOT:

Filtering Face Piece (Dust) - Particulate masks are air-filtering devices that cover the nose and mouth to trap particles in the air before you can inhale them. These masks are the simplest and most common form of respiratory protection and work only if they fit snugly and are not clogged from overuse. Examples of use would be for employees mowing grass, dusty operations, and even some welding operations. Employees required to wear a particulate (dust) mask must meet all requirements of the Respiratory Protection Program.

Half Masks - Half mask respirators generally have cartridges and are air- purifying devices that cover the nose, mouth, and chin. Half masks have cartridges that capture harmful gases and vapors from the air while allowing oxygen to flow through. Each cartridge is made for a specific gas or vapor hazard. A pre-filter may be attached to the cartridge to trap dusts, fumes and mists. Examples of use would be spray painting or working with pesticides.

Full Face - Full face respirators are similar to half mask respirators, with the addition of a full face piece to protect the eyes and face. These masks fit snugly around your face, with a canister or cartridge to filter out harmful gas and vapor hazards from the air.

Supplied-Air - Supplied-Air respirators provide the greatest protection against respiratory hazards. Air-Line Respirators use a hose to connect your mask to a stationary clean air source. Self-Contained Respirators allow you to carry your own supply of clean air. Example of a use would be for rescue in a confined space.

Section 3: SELECTION OF RESPIRATORS

Any respirator to be used must be approved by the employee's supervisor. Any questions concerning selection should be referred to INDOT Employee Safety Personnel.

Different respirators provide different levels of protection. The necessity for and selection of a respirator will be based on the following criteria:

<u>The Nature of the Hazard</u>

There are three (3) kinds of Respiratory Hazards:

Particulates
Gases and Vapors
Oxygen Deficiency

The Concentration of the Hazard

If the contaminant is present in a high enough concentration, the harmful effects can be immediate and deadly.

Length of exposure

Long-term exposure to even very low concentrations of some particulates, gases and vapors can cause permanent damage to lungs and other organs.

<u>Section 4: REQUIRED USE OF RESPIRATORS</u>

Atmospheric testing and monitoring is required to determine if the use of respirators when engaged in an operation is needed, the operations listed below have some respiratory concerns.

- **Abrasive blasting.**
- **Welding.**
- **Using epoxies in enclosed areas.**
- **Sanding or grinding on metals.**
- **Spray painting.**
- **Loading or mixing paint, thinner or cleaning agents into tanks on traffic striping equipment.**
- **Spraying herbicides or pesticides.**
- **Loading or mixing herbicides or pesticides into tanks for application.**

If atmospheric testing and monitoring reveal the operation is below the Permissible Exposure Limit (PEL) for the identified respiratory hazard(s), then no respirator is required. Operations found to exceed the PEL shall require the use of an appropriate respirator. Operations that have no documented atmospheric testing and monitoring shall be treated as exceeding the PEL, and an appropriate respirator shall be worn at all times until atmospheric testing and monitoring are documented below the PEL. Departmental operations will be periodically monitored to determine the need to add or delete from this list. Supervisors should be alert for other operations, which may require

respiratory protection. If such operations are found the supervisor should contact the appropriate Employee Safety person for your area to have employee exposure evaluated.

Section 5: VOLUNTARY USE OF RESPIRATOR

Employees who choose to wear a respirator on a voluntary basis shall follow all OSHA standards applicable.

Section 6: MEDICAL FITNESS

Employees shall not be assigned to operations or areas where respirators are required, unless it has been determined that they are physically able to wear a respirator and perform the work. A physician must make this determination.

The Medical Fitness Evaluation Questionnaire is required to be completed by the employee. The questionnaire is designed to aid the physician in determining the employee's ability to use a respirator. This questionnaire can be found at the end of this chapter.

Once a physician has made determination that the employee is medically fit to wear a respirator, one (1) copy of the written recommendation will be given to the employee and the employee's supervisor will retain one (1) copy. The Physicians Recommendation Form is provided for this purpose at the end of the chapter.

The respirator user's medical status should be reviewed periodically by the immediate supervisor. If the supervisor suspects there has been a change in the medical status of the employee, since the last medical review, or if the type of respirator has been significantly changed, an additional physical examination by a physician may be necessary.

Additionally, if an employee is exposed to an excessive amount of lead a more extensive physical may be required.

Section 7: TRAINING

To ensure the safe use of respirators it is required that all respirator users are properly instructed in the selection, use, and maintenance of respirators. Training shall provide an opportunity for employees to handle the respirator, have it fitted properly, test its seal, wear it in normal air to become familiar with it, wear it in a test atmosphere and finally inspect, clean and maintain the respirator.

Every respirator wearer shall receive fitting instructions including demonstration and practice on how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Following this instruction, each respirator wearer will be fit tested to ensure that a proper seal is achieved. A Respirator Fit Test Record form will be completed and retained on file.

Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be a growth of beard, sideburns, a skullcap that projects under the face piece, or temple pieces on eyeglasses.

To assure proper protection the face piece fit should be checked, by the wearer each time the respirator is worn. This should be determined by a negative or positive fit test.

Training will be conducted by INDOT Employee Safety Personnel or personnel designated by the Safety Department.

Training will include the following:

- **INDOT Respiratory Protection Program.**
- **The OSHA Respiratory Protection Standard.**
- **Why the respirator is necessary.**
- **How to use the respirator in emergency situations.**
- **How to recognize medical symptoms limiting the effectiveness of respirators.**

Training Documentation:

Training Roster - upon completion of the training program employees will sign a form acknowledging their attendance.

No employee is allowed to wear a respirator unless he has completed the Respirator Training Program and has signed a Training Roster acknowledging this training.

Section 8: RECORD KEEPING

Records of medical evaluations must be kept in accordance with OSHA standards.

A record of the individual qualitative or quantitative fit test shall be kept until the next fit test is administered.

Section 9: INSPECTION AND MAINTENANCE

All respirators shall be regularly inspected, cleaned and stored in a convenient location after each use.

Inspection Procedure:

Before each use, the respirator will be inspected by the wearer for the following:

- **Check for worn or frayed straps.**
- **Look for wear or damage on the seal of the face piece.**
- **Be sure any screws are tight.**

- **Check rubber and plastic parts for flexibility.**

- **Valves should be clean and seated perfectly.**

Be sure filters and cartridges are the right kind for the atmosphere in which work is to be done;

The face shield, if provided, should be clean and in good condition;

If using an air-line or self-contained breathing apparatus respirator, check the air supply and warning alarm.

Cleaning Procedure:

Dry each part of the respirator and inspect it carefully to be sure it is in good condition before re-assembling.

Follow the manufacturer's instructions for cleaning and disinfecting the respirator. Generally, a mild detergent and soft brush are used for cleaning. Rinse the respirator thoroughly in clean, warm water. Rinsing is extremely important because a residue of the cleaning agent can damage the respirator and cause skin irritation the next time the respirator is worn. Be sure all parts are thoroughly dried before re-assembling the respirator. Use a soft, lint-free cloth to absorb most of the water. A fan may be used to speed up the drying process.

Storage Procedure:

When storing a respirator, even overnight, first flex the rubber parts to make sure they are not twisted or bent. Seal the respirator in a plastic bag and store it where it will be protected from the following elements:

Dust
Sunlight
Extreme Heat
Extreme Cold
Moisture
Damaging Chemicals
Physical Damage

The respirator should be placed in the storage area in such a way that no part of it will be stretched, bent, or compressed. Do not put anything on top of it that will affect its shape. Respirators stored incorrectly can easily become distorted and develop leaks.

Physicians Recommendation

Concerning Employee's Ability to Use a Respirator

Patient Name_____

Date _____

Given the information available, and after reviewing the medical evaluation questionnaire, the above employee has been determined:
(Check one)
___ Medically able to use the respirator
___ Not medically able to use the respirator
___ Unable to determine, follow-up examination needed*

*** If unable to determine, list recommendation for follow-up examination:**
_____
_____

List any recommended limitations on respirator use:
_____
_____
_____
_____
_____

By signing this document you agree to send a copy of this recommendation to the employee and INDOT.

Signature of Physician

Name (please print)_____

Signature_____ Date_____

Medical Evaluation Questionnaire

Name: _____ Today's Date: _____

Age (to nearest year): _____ Sex (circle one): Male / Female

Height: _____ft. _____in. Weight: _____

Job Title: _____

Can you read (circle one) Yes / No

Phone number where you can be reached by the health care professional who reviews this questionnaire (include the area code): (____)_____: Best time to reach you at this number: _____

Has INDOT told you how to contact the health care professional who will review this questionnaire?
(Circle one): Yes / No

Check the type of respirator you will use (you can check more than one):
_____a.) N, R, or P disposable respirator (filter mask, non-cartridge type only)
_____b.)Other type (for example, half- or full-facepiece type, powered-air purifying, supplied air, SCBA)

Have you worn a respirator before? (Circle one): Yes / No
If "yes", what type(s):
_____
_____

Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: (circle one) Yes / No

Have you ever had any of the following conditions?
a.) Seizures (fits): Yes / No b.) Diabetes (sugar disease): Yes / No
c.) Allergic reaction(s) that interfere with your breathing: Yes / No
d.) Claustrophobia (fear of closed-in places): Yes/No e.) Trouble smelling odors: Yes / No

Have you *ever* had any of the following pulmonary or lung problems?
a.) Asbestosis: Yes / No b.) Asthma: Yes / No
c.) Chronic bronchitis: Yes / No d.) Emphysema: Yes / No
e.) Pneumonia: Yes / No f.) Tuberculosis: Yes / No
g.) Silicosis: Yes / No h.) Pneumothorax (collapsed lung): Yes / No
i.) Lung cancer: Yes / No j.) Broken ribs: Yes / No
k.) Any chest injuries or surgeries: Yes / No
l.) Any other lung problem that you've been told about: Yes / No

Do you currently have any of the following symptoms of pulmonary or lung illness?
a.) Shortness of breath: Yes / No

b.) Shortness of breath when walking fast on level ground or up a slight or incline: Yes / No
c.) Shortness of breath when walking with other people at an ordinary pace on level ground: Yes / No
d.) Have to stop for breath when walking at your own pace on level ground: Yes / No
e.) Shortness of breath when washing or dressing yourself: Yes / No
f.) Shortness of breath that interferes with your job: Yes / No
g.) Coughing that produces phlegm (thick sputum): Yes / No
h.) Coughing that wakes you early in the morning: Yes / No
i.) Coughing that occurs mostly while you are laying down: Yes / No
j.) Coughing up blood in the last month: Yes / No
k.) Wheezing: Yes/ No
l.) Wheezing that interferes with your job: Yes / No
m.) Chest pain when you breathe deeply: Yes / No
n.) Any other symptoms that you think may be related to lung problems: Yes / No

Have you *ever* had any of the following cardiovascular or heart problems?
a.) Heart attack: Yes / No
b.) Stroke: Yes / No
c.) Angina: Yes / No
e.) Swelling in you legs or feet (not caused by walking): Yes / No
f.) Heart arrhythmia (heart beating irregularly): Yes / No
g.) High blood pressure: Yes / No
h.) Any other heart problem that you've been told about: Yes / No

Have you *ever* had any of the following cardiovascular or heart symptoms?
a.) Frequent pain or tightness in your chest: Yes / No
b.) Pain or tightness in your chest during physical activity: Yes / No
c.) Pain or tightness in your chest that interferes with your job: Yes / No
d.) In the past two years, have you noticed your heart skipping or missing a beat: Yes / No
e.) Heartburn or indigestion that is not related to eating: Yes / No
f.) Any other symptoms that you think may be related to heart or circulation problems: Yes / No

Do you *currently* take medication for any of the following problems?
a.) Breathing or lung problems: Yes / No
b.) Heart trouble: Yes / No
c.) Blood pressure: Yes / No
d.) Seizures: Yes / No

If you have used a respirator, have you *ever* had any of the following problems? (If you've never used a respirator, check the following space and continue to the next question)_____
a.) Eye irritation: Yes / No
b.) Skin allergies or rashes: Yes / No
c.) Anxiety: Yes / No
d.) General weakness or fatigue: Yes / No
e.) Any other problem that interferes with you use of respirator: Yes / No

Would you like to talk with the health care professional who will review this questionnaire about your answers to this questionnaire: Yes / No

INDOT must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, INDOT or your supervisor must not look at or review your answers, and INDOT must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Chapter 33- SAFETY TRAINING

Section 1: GENERAL

Training is one of the most important functions in developing and maintaining an effective safety program. It is an absolute necessity for training to be planned, scheduled and conducted effectively if we expect the safety program to be successful. Training must be thought of as a job requirement and given priority in the overall work schedule. It is not just a "spur of the moment" or "rainy day" activity.

Section 2: GUIDELINES

All newly hired personnel shall be given an initial safety orientation prior to assuming their duties. As a minimum, this orientation shall consist of a verbal explanation by a supervisor who shall explain individual safety work rules, requirements for protective clothing and equipment, and advice about specific hazardous conditions.

Safety training topics to be covered in safety training sessions are identified in the Master Safety Training Program. All managers and supervisors should obtain a copy of this program to ensure that employees are receiving training relevant to their duties.

Meetings may take the form of formal platform type instruction or they may be broken down into small discussion groups to solve particular problems.

It shall be the responsibility of INDOT safety directors to coordinate safety training. Every effort shall be made to ensure that regulatory requirements are met.

Section 3: SAFETY MEETINGS

Safety meetings are the forums where most safety training is conducted. It is important that supervisors meet on a regular basis with their employees to discuss the various aspects of job safety. All safety training that affects employees in general should be planned for safety meetings.

Each safety meeting shall be planned around specific subject matters, which include but are not limited to:

- **Occurrences since last meeting.**
- **Safety problems.**
- **Occurrence reporting**
- **New laws/regulations.**

- **Detailed safety training.**
- **Performance expectations.**
- **Safety goals.**
- **Department safety policies and procedures.**
- **Location of required documentation.**
- **OSHA inspections.**
- **And much more.**

The length of the meeting will depend on the material to be presented. Meetings should not be allowed to digress into long and nonproductive sessions.

Safety Directors should attend and participate in safety meetings whenever possible. Meetings should deal with real life safety problems that should be discussed and resolved. Maximum participation should be encouraged.

Documentation that shall be maintained for all safety meetings shall be:

- **Prepared report of the subject areas discussed.**
- **Names of persons in attendance.**
- **The name of individuals responsible for conducting the meeting.**
- **Copies of any handouts.**

Safety meetings shall be coordinated and included in the District Safety Plan for all elements of the district.

Safety meetings shall be conducted at least monthly.

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