



**Duke University - Facilities Management Department
Environmental Safety and Health Program**

PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

Area: All FMD Organizations	Date Effective: 8 April 2011
Issue No.: 1 Revision: 2	Page 1 of 7

A. Purpose

- To identify and define the proper Personal Protective Equipment (PPE) to be worn in order to protect employees from hazards on the job.

B. Scope

- In some work environments Personal Protective Equipment (PPE) must be provided and used to protect personnel against hazards capable of causing injury, illness, or impairment. It is the policy of Duke University and Facilities Management Department (FMD) to provide appropriate PPE to employees who may be subjected to a hazardous environmental condition.
- PPE shall be selected, constructed, used and maintained in accordance with the requirements contained in or incorporated in the reference. Whenever feasible, hazards must be eliminated through engineering or supervisory controls, prior to resorting to the use of PPE.

C. Policy:

- FMD will take all reasonable measures to provide a safe workplace. All FMD operations must be performed in a manner, which will prevent any undesirable effects to FMD and/or Duke employees, assets, the local community, and the environment.
- The provisions of this program and all applicable standards will be followed to ensure the safety of personnel performing service or maintenance activities to equipment, machines, or systems. Failure to follow the requirements of the Personal Protective Program will be cause for disciplinary action.

D. Definitions

- Administrative controls:** A process for limiting personnel exposure to workplace hazards by minimizing an employee's time of contact, instead of using engineering controls or PPE.
- Affected personnel:** Personnel who could be expected to use PPE to protect him or herself from injury and illness from chemical or physical agents.
- Engineering controls:** Devices such as exhaust ventilation, interlocks or material handling devices used to control employee exposure by minimizing or eliminating employee contact with chemical or physical agents.
- Hazard assessment:** A document that defines the chemical and physical hazards for a specific task and indicates recommended PPE by job task.
- Job task:** A process or activity performed by an employee in order to accomplish required work. Job task hazard: A risk of harm or loss to the body which exists as the result of a process or activity performed by an employee.
- Personal Protective Equipment (PPE):** Clothing and other work accessories designed to create a barrier by shielding or isolating the body from the hazard of process or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing impairment or injury of the body through absorption, inhalation or physical contact. This includes equipment for eye and face protection, head protection, hand and body protection, foot protection and fall protection.
- Protective clothing:** Personal protective equipment designed to protect specific parts of the body. Examples include chemical resistant suits and gloves, steel-toe shoes, hardhat, etc.
- Respiratory protection:** Personal protective equipment, such as air purifying and air supplied respirators, which filter or supply air and prevent inhalation of potentially hazardous concentrations of chemicals and dusts.
- Work area hazard:** The risk of harm to or loss of a portion of the body which exists throughout a work area, such that persons are subject to the risk due to their presence in the area.

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Revision	Description	Effective Date
1	Text changes; removed one PPE category and moved to another Program; added AHA and JHA language/rqmt; provided clarification	2/22/10
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E. Responsibilities

1. Supervisors/Managers

- a. Ensure hazard assessments are performed, posted or are readily accessible in the work area, updated as necessary
- b. Ensure employees are aware of their responsibilities,
- c. Ensure applicable signs identifying work area PPE requirements are posted;
- d. Furnish all PPE required and provide extra area required PPE for visitor use;
- e. Ensure employees are appropriately trained and the PPE is worn as the manufacturer suggests.

2. ESH Representative

- a. Provide the training curriculum for instruction that meets regulatory and Duke requirements.
- b. Assist with any questions regarding the selection of appropriate personal protective equipment.
- c. Review hazard assessments and work with supervisor/manager if changes are necessary.
- d. Work with Facilities and the supervisor/manager to institute engineering controls where feasible.

3. Employees

- a. Refrain from performing work without proper PPE or PPE training.
- b. Understand proper PPE selection and use before performing work requiring its use.
- c. Maintain and clean PPE properly.
- d. Ensure that PPE is in good condition and fits properly.
- e. Ensure that damaged PPE is properly reported and replaced.
- f. Report workplace hazards to their supervisors/facilitators promptly.
- g. Change PPE according to the established change schedule when working with chemicals. (Consult ESH Representative for guidance).
- h. Dispose of PPE that has been chemically contaminated, in the appropriate chemical waste container.

F. Procedures

1. Hazard Assessments.

- a. The procedures in this section define requirements for determining workplace and job hazards, and in other sections the use of eye and face protection, head protection, hand and body protection, foot protection and fall protection is discussed.
- b. **Area Hazard Analysis** (see Attachment A)
 - 1) An Area Hazard Analysis (AHA) is a formalized process by which personnel identify hazards associated with the physical environment where potential hazards exist. AHAs are completed once then reviewed annually or when conditions in the area change significantly or a new hazard(s) is introduced.
 - 2) An analysis should be completed to determine if hazards are present, or are likely to be present, which necessitate the use of Engineering Controls, Administrative Controls or PPE. If PPE is deemed necessary, the assessment must be documented and readily available.
 - 3) The AHA will include the following elements:
 - a) Description of Work Area;
 - b) Review of Potential Hazards, such as, but not limited to:
 - i. Chemicals or harmful dust;
 - ii. Noise levels;
 - iii. Biological or other potentially infectious agents (e.g. Bloodborne pathogens);
 - iv. Impact or penetration;
 - v. Compression (e.g. rolling, pinching);
 - vi. Potential for fall from elevated heights;
 - vii. Electrical energy;
 - viii. Light radiation (e.g., lasers, soldering, arc welding), and

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- ix. Temperature extremes (e.g., furnaces or cryogenic fluids), Including heat stress resulting from PPE use
 - c) Engineering Controls;
 - d) PPE required for each part of the body;
 - e) The date(s) and name(s) of the person performing the assessment.
 - 4) Areas that require a Area Hazard Analysis include, but are not limited to:
 - a) Mechanical Rooms
 - b) Utility Plants
 - c) Utility Tunnels or basements
 - d) Maintenance Shops
 - e) Electrical Rooms
 - f) Substations Yards
 - 5) Signs will be posted at the entrance to each work area identifying any area where PPE is required. Signs and labels will clearly identify the PPE required and will provide a means of forewarning people that hazards are present. Entry is not permitted without first donning the required PPE.
 - c. **Job Hazard Analysis** (see Attachment B)
 - 1) A Job Hazards Analysis (JHA) is a formalized process by which personnel identify hazards associated with job tasks where potential hazards exist.
 - 2) Jobs that require a Job Hazard Analysis (JHA) include, but are not limited to:
 - a) Jobs with the highest injury or illness rates;
 - b) Jobs with the potential to cause severe or disabling injuries or illness, even if there is no history of previous accidents;
 - c) Jobs in which one simple human error could lead to an accident or injury;
 - d) Jobs that are new to your operation or have undergone changes in processes and procedures; and
 - e) Jobs complex enough to require written instructions.
 - 3) The JHA will include the following elements:
 - a) Description of Work Area;
 - b) Description of Job Tasks;
 - c) Review of Potential Hazards for each task
 - d) Identify any Engineering Controls, Administrative Controls or PPE required for each part of the body to mitigate potential hazards;
 - e) The date(s) and name(s) of the person performing the analysis.
- 2. PPE Selection**
- a. Personal protective equipment will be selected by the supervisor and employee on the basis of the following minimum requirements:
 - 1) Provide adequate protection against the particular hazards (identified in the Hazard Assessment) for which they are designed;
 - 2) Be reasonably comfortable when worn under the designated conditions;
 - 3) Fit appropriately per the manufacturer's instructions without interfering with the movements or vision of the wearer;
 - 4) Be durable;
 - 5) Be capable of being cleaned and disinfected.
 - 6) All required PPE will be provided at FMD's expense. Contractors will be responsible for providing required PPE for their employees.

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3. Appropriate Use of PPE

- a. Supervisors/Managers of work areas where area hazards have been identified, will keep a supply of spare PPE available for loan to visitors and will ensure the visitors have proper understanding of PPE requirements before entering areas requiring PPE.
- b. Visitors must wear the PPE required in the area unless they are walking through the area on a path approved for visitors without PPE. Paths approved for visitors without PPE or proper PPE training, must be clearly marked. Visitors may include support functions such as cleaning services, engineering, and management.
- c. Defective or damaged PPE of any type will not be used and will be turned into the employee's supervisor for repair or replacement.
- d. PPE will only be re-used only when it is still in good working condition, can effectively be decontaminated between uses, and can effectively be sanitized between different users.
- e. PPE and FMD supplied work clothing contaminated by hazardous materials while at work is NOT to be removed from FMD property by the employee.

4. Overview of PPE

a. Head Protection

- 1) Employees will wear protective helmets when working in areas where there is a potential for injury to the head caused by impact/penetration from falling or flying objects, or bumping the head against a fixed object. Hard hats shall meet the requirements of ANSI Z89.1-1997. Bump caps will not be used to protect against falling objects, but can be used for areas with low obstructions.
- 2) Employees working near exposed electrical conductors which could contact the head will wear protective helmets designed to reduce electrical shock hazard (Type B or E).
- 3) Maintenance: Hard hats must be maintained in a sanitary and reliable condition. If the hats or caps are worn by more than one person the head band assembly must be cleaned thoroughly prior to each use. Follow manufacturer recommendations for cleaning PPE. After cleaning, the shell will be carefully inspected for any signs of damage.
- 4) Head protection is required to be worn by all FMD employees in utility tunnels, construction zones, any posted areas, and when recommended in an Owner's Manual of a tool or equipment.
- 5) To avoid deterioration, when not in use, hard hats will not be stored in direct sunlight or where they might be exposed to chemicals.

b. Eye and Face Protection

- 1) Nearly all maintenance or construction tasks have a reasonable probability of exposure to eye or face hazards, these include but are not limited to flying particles, molten metal, dripping paint, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. As such, every employee will wear safety glasses with hard side shields or wrap around type when performing these tasks. Safety eyewear must be ANSI Z87.1-2003 certified and stamped.
 - a) This requirement also applies to visitors and others in an area where the likelihood of possible eye injury could occur.
- 2) Employees who are required to wear protective eyewear and who need vision correction must obtain an authorization form from FMD Human Resources. FMD will pay up to a certain dollar amount of the cost of prescription safety eyewear. The prescription safety glasses must be obtained from an authorized safety glasses vendor. The vendor will provide side shields that are attached to the eye wear frame (not slide on type).
 - a) Goggles may be worn over corrective eye glasses provided they do not disturb the proper position of the prescription lenses or protective eyewear.

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- 3) Metal frame eye protection devices shall not be worn when there is an electrical contact hazard to the head unless a protective face shield or appropriate safety glasses over the metal frame optical glasses are worn.
- 4) When an employee is exposed to hazards from impact, heat, or chemical splash a face shield will be worn. The welding helmets or face shield will only be worn over primary eye protection (goggles or safety glasses with side shields). Faceshields must also meet ANSI Z87.1 for impact requirements.
- 5) Maintenance: Eye and face protection will be kept in good repair and maintained in a sanitary and reliable condition. When dirty, goggles will be washed down with water. Goggles and face shields which are shared, must be wiped down and disinfected with a disinfecting solution/wipe prior to use.
- 6) **Inspection:** Safety glasses and goggles will be inspected before wearing for cracks or any other type defects. The lens will be kept clean and free of scratches or other defects that obstruct vision or compromise the impact resistance of the lens. Glasses with defects must not be used and a new pair obtained.

c. Hand Protection

- 1) Employees working in a job which exposes their hands to hazards will wear appropriate hand protection.
- 2) Gloves used for protection from chemicals must be checked for leaks prior to each use. This can be done by blowing into the glove closing it off at the wrist and seeing if air is leaking. For electricians and high voltage employees, gloves used by them will be sent off once every six months to a lab for testing.
- 3) Prior to using a glove for any application, the glove must be checked to verify that it is compatible for the intended use. Selection process will be based on:
 - a) Hazards identified;
 - b) Characteristics of glove relative to task;
 - c) Duration of use;
 - d) Measured for proper size;
 - e) Ensure safe grip.
- 4) As with other personal protective equipment, employees shall take care to store gloves so that it is protected from damage or loss when not in use.
- 5) Gloves are manufactured for designated uses as outlined by the manufacturer. Employees will ensure gloves are worn that are made for and recommended for specific tasks.
 - a) For general tasks requiring protection against cuts and abrasions, gloves will be worn that are manufactured with leather that covers the fingers and palms.
 - b) For welding, torch cutting, soldering, or brazing, leather gloves that extend beyond the wrist, at a minimum, must be worn. Upper leathers will be worn when welding or torch cutting.
 - c) For chemical hazards, nitrile gloves may generally be worn.
 - d) For biological hazards (body fluids and waste), latex gloves must be worn. Always refer to glove manufacturer recommendations when handling ANY kind of chemicals.
 - e) For electrical tasks, refer to the FMD Electrical Safety Program.

d. Body Protection. Aprons will be worn when chemicals present a hazard to the torso. The word "front" will be marked with a permanent marker on the outside face of all aprons. The aprons will be washed down with water after each use or disposed of in the appropriate waste container.

e. Foot Protection

- 1) Employees performing tasks in areas where there is a danger of foot injuries due to falling and rolling objects, or objects piercing the sole or where their feet are exposed to electrical hazards will wear safety footwear. All FMD mechanics, electricians, grounds, sanitation & recycling employees are required to wear steel toed (or equivalent) safety shoes. Safety footwear shall comply with ANSI standard Z41.1-1991 for foot protection.
- 2) General Use

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- a) All protective footwear will incorporate a steel or composite toe to protect the wearer's toes against impact or compression, per the 75-pound classification of ASTM-F2413. The use of toe caps or in-step protectors will be prohibited, except for temporary use by visitors or employees who are in designated safety areas for short periods of time. Employees who are wearing casts or other medical devices which preclude them from wearing safety shoes must be evaluated on a case-by-case basis.
- b) Other types of safety footwear, such as waders or rubber knee-length boots, will be exempt from having a safety toe, provided that such footwear will properly fit over safety-toed footwear.
- c) Metatarsal guards that cover the in-step and do not enclose the outsole of the shoe or boot or have straps fitting around the outsole, shall be used as necessary to protect the top of the foot from impact or compression, and shall meet ASTM-F2413 strength requirements.
- d) Safety shoe wear is mandatory by all maintenance and grounds personnel and by all other employees who perform work in areas where safety shoes are generally required.
- e) Welders/Steamfitters/Plumbers. Are required to wear ankle high slip-in safety shoes that provide additional protection from slag that can result from welding, torch cutting, brazing, or soldering.
- f) Electrical/High Voltage. Refer to Electrical Safety Program.
- f. **High Visibility Clothing**
 - 1) In order to reduce the risk to FMD employees of being struck by a motor vehicle or construction equipment, high visibility clothing is required to be worn by any FMD employee performing work on or within 20 feet of a road, in a parking lot or on construction sites.
 - 2) High visibility clothing shall be properly worn over the outermost layer of clothing so that it is completely visible.
 - 3) Additional procedures such as the placement of signs, barriers, temporary lighting, and the use of road closures may be warranted.
 - 4) New Purchase/ Replacement:
 - a) All high visibility clothing shall be compliant with ANSI / ISEA 107-2004, "American National Standard for High-Visibility Safety Apparel and Headwear" and may be "Class 2" or "Class 3" as determined by the work conditions which are addressed in the AHA. Examples may include, but not be limited to vests, coats, pants, shirts.
 - b) The color of all newly purchased high visibility clothing shall be "LIME." Previously purchased high-visibility clothing that meets the ANSI / ISEA 107-2004 standard shall be allowed whether LIME or ORANGE.
 - 5) Storage/ Handling:
 - a) As with other personal protective equipment, employees shall take care to store the high-visibility clothing so that it is protected from damage or loss when not in use.
 - b) High visibility clothing that has become dirty must be cleaned per the manufacturer's instructions so as to maintain the proper visibility during use.
 - 6) Lost/ Damaged:
 - a) Employees shall immediately notify their supervisor of any lost high-visibility clothing so that a replacement can be purchased.
 - b) Because the amount of visible fabric is an important part of the risk-reduction offered through the use of high visibility clothing, high visibility clothing with large holes/ tears must be replaced. Employees shall immediately notify their supervisor of any damaged high visibility clothing so that a replacement can be purchased.
- g. **Electrical PPE Requirements.** See the FMD Electrical Safety Program.
- h. **Hearing Protection Requirements.** See the Duke Hearing Conservation Program.
- i. **Respiratory Protection Requirements.** See the Duke Respiratory Protection Program.
- j. **Fall Protection Requirements.** See the Duke Fall Protection Program.

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G. Training.

1. Employees shall receive a copy of this Program and be trained on its contents and specific requirements. The training will be documented and a signature obtained from the employee that they acknowledge receipt of the Program and understand its contents.

H. References

1. Job Hazard Analysis, OSHA 3071, 2002 (Revised) (<http://www.osha.gov/Publications/osha3071.pdf>)
2. ANSI Z87.1-2003 American National Standards Institute
3. 29 CFR Part 1910.135 "Head Protection" (OSHA General Industry Standard)
4. 29 CFR Part 1910.132 "Personal Protective Equipment" (OSHA General Industry Standard)
5. Duke University Safety Manual, Section I, Chapter 2 "Personal Protective Equipment"
6. ASTM-F2413 American Society for Testing and Materials.
7. ANSI/ISEA 107-2004 American National Standard for High Visibility Safety Apparel
8. 29 CFR Part 1910.132 "Personal Protective Equipment" (OSHA General Industry Standard)
9. 29 CFR Part 1926.201 "Signaling, Flaggers" (OSHA Construction Industry Standard)
10. 23 CFR Part 634, "Worker Visibility" (Federal Highway Administration)

I. Attachments

1. Attachment A: Area Hazard Analysis Form
2. Attachment B: Job Hazard Analysis Form

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