P-804

INDUSTRIAL HYGIENE OFFICER
2D FORCE SERVICE SUPPORT GROUP (REIN)
FLEET MARINE FORCE, ATLANTIC
CAMP LEJEUNE, NORTH CAROLINA 28542

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27 Jun 86

From: Industrial Hygiene Officer
To: Commanding General, 2d Force Service Support Group (AC/S G-3/MSU)

Subj: FACILITY REQUIREMENTS FOR INCREMENT III FIELD MAINTENANCE FACILITY: INDUSTRIAL HYGIENE REVIEW

Ref: (a) 2d FSSG Plan Review of 5 Jun 86
(b) CO, 2d Maint BN ltr 110/3 of 17 Jun 86

Encl: (1) Industrial Hygiene Design Recommendations

1. In response to reference (a), the Industrial Hygiene Officer has done research into the industrial hygiene aspects of the proposed field maintenance facility. The goal of this review is to ensure that potential health hazards are recognized and that feasible engineering approaches are taken to control such hazards. Design recommendations, for shop areas outlined in reference (b), are presented in enclosure (1).

2. For further assistance, contact LT Byrnes at extension 1930/2767.

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P-804
FY-90
Field Maint Complex
2d Maint Bn
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INDUSTRIAL HYGIENE DESIGN RECOMMENDATIONS

References:
(a) OPNAVINST 5100.23B
(b) ANSI Z358.1-1981
(c) IES Lighting Handbook
(d) NIOSH Technical Information Manual: Recommended Industrial Ventilation Guidelines
(e) TM 4750-15/1 (Draft)
(f) Industrial Ventilation: A Manual of Recommended Practice
(g) 29 CFR 1910
(h) NFPA Fire Codes
(i) NAVMED P-5010
(j) NAVFACINST 11300.24B
(k) BO 11090.1B
(l) BO 6240.5
(m) DODINST 6055.5M

SPECIFIC SHOP/AREAS

1. Brake Repair, GSM Co.

a. Discussion. Reference (a) uses an airborne asbestos fiber concentrati of 0.1 fibers per cubic centimeter of air (f/cc) as the Medical Surveillance Action Level (MSAL) for the inclusion of personnel on the Asbestos Medical Sur veillance Program (AMSP). Historically, asbestos brake riveting and changing operations do not produce airborne asbestos levels at or near 0.1 f/cc.

b. Recommendations

(1) Ventilation using the air velocity guidelines for continuous exposure presented in attachment (1) should be considered. Fans should be located using the guidelines set forth in attachment (2). A HEPA vacuum, lik the NILFISK currently being used is sufficient local exhaust ventilation. If possible, the shielded hand drill application of the unit as shown in attachment (3) is recommended.

(2) While compressed air may be utilized in the shop for various tasks it should not be used for blowing down asbestos brakes or workbenches.

(3) Depending on the versatility of the work area, the installation of a plumbed eyewash meeting all the requirements of reference (b) should be considered.

(4) Space should be allocated in the hazardous waste disposal pickup area for "contaminated" coveralls.

(5) Installation of an "asbestos" washer and dryer for laundering of cloth coveralls should be considered. This will eliminate the possibility of personnel inadvertently carrying home small quantities of dust on their clothin

(6) Illumination levels should meet or exceed the recommended guidelin for service bays set forth in reference (c).

(7) AABAs or an equivalent supplied air system is not recommended for this area. Use of air purifying respirators with HEPA filters is adequate worker protection for asbestos brake operations.

2. Machine Shop, Ord Maint Co.

a. Unless the workload is to change significantly, ventilation guidelines described in attachment (1) are sufficient.

b. Installation of a plumbed eyewash which meets the requirements of reference (b) should be considered.

c. Illumination levels should meet or exceed the recommended guidelines for machine shops set forth in reference (c).

3. Welding Shop, Ord Maint Co.

a. Attachment (4) to this enclosure provides recommended ventilation guidelines for weld shop general and local exhaust ventilation. This attachment is excerpted from reference (d). All other applicable weld shop requirements of 29 CFR 1910.252 must be met (including proper storage of welding gases).

b. AABAs are not adaptable for welding applications. Use of air purifying respirators in conjunction with good local exhaust and dilution ventilation is adequate.

c. Illumination levels should meet or exceed the recommended guidelines for welding areas set forth in reference (c).

d. Installation of a plumbed eyewash which meets the requirements of reference (b) should be considered if any solvents, oils or paints are to be used or stored in this shop.

4. Tool Rooms, GSM Co. & MTM Co. The illumination levels should meet or exceed the recommended guidelines for storage rooms set forth in reference (c).

5. Offices, GSM Co. & MTM Co.

a. The illumination levels should meet or exceed the recommended guidelines for offices set forth in reference (c).

b. Ventilation should be for comfort. Attachment (1) provides air velocity guidelines.

6. Body Shops, GSM Co. & MTM Co.

a. Discussion. While the exact nature of work may vary in the body shops, common tasks consist of: welding, grinding and sanding. The comments outlined below are general in nature since requirements will vary with equipment used and tasks performed.

b. Recommendations

(1) Attachment (4) to this enclosure provides recommended ventilation guidelines for weld shop general and local exhaust ventilation. All other applicable weld shop requirements of 29 CFR 1910.252 must be met (including proper storage of welding gases).

(2) Illumination levels should meet or exceed recommended quidelines for welding areas (where applicable) set forth in reference (c).

(3) Attachment (5) to this enclosure provides recommended local exhaust ventilation guidelines for grinding, polishing and buffing operations. This attachment is excerpted from reference (d). Installation of any of these systems will be dependent on operations planned for the respective body shops.

7. Glass Radiator Repair, MTM Co.

a. If acid dip tanks are to be utlized in this shop then adequate local exhaust ventilation is needed. Attachment (6) to this enclosure provides ventilation guidelines for open-surface tank operations. This attachment is excerpted from reference (d). Installation of lateral hoods designed and sized for radiator acid dipping are recommended. The hazard potential of the acid as well as contaminant evolution should be considered during hood design. Dilution ventilation should also be considered if the radiators are to be air dried.

NOTE: All applicable NFPA construction and safety requirements must be met.

b. A plumbed eyewash that meets the requirements of reference (b) should be installed in close proximity to the dip tanks.

c. The illumination levels should meet or exceed the recommended guidelines for dipping (i.e. paint) operations set forth in reference (c).

8. Bead Blasting, MTM Co., and GSM Co.

a. Abrasive blasting rooms and dust collectors should meet the recommended guidelines set forth in attachment (7), which was excerpted from reference (d).

b. Breathing air must be supplied to the blaster(s) via some type of supply system (i.e. AABA). Breathing air must be grade D certified and must be operated off a compressor remote to the blasting apparatus. Breathing air connectors must not be interchangeable with equipment compressed air lines.

c. While personal protective equipment (i.e. blasting suits) may not be essential to this design process, it should be included in the facility budget.

d. The chamber illumination levels should meet or exceed the recommended guidelines for similiar operations (i.e. welding and machining) set forth in reference (c).

e. A plumbed eyewash meeting the requirements of reference (b) should be installed in close proximity to the blasting room/chamber.

9. Spot Painting Booth, MTM Co.

a. Discussion. The role of spot painting (application of paint via roller or brush) and the quantity performed needs to be identified. Reference (e) limits painter application to one quart per day per vehicle/item of equipment. The questions that need to be addressed are: how large will the room or booth be? How many vehicles could be spot painted at a given time? How many painters would be in the room at any time?

b. Recommendations

(1) Ventilation should be designed for the maximum amount of painting anticipated. Dilution ventilation using the principles outlined in Chapter 2

of reference (f) is recommended over local exhaust ventilation. Make-up air must be temperature controlled to meet the requirements of reference (e).

(2) All other applicable requirements of references (e), (g), and (h) should also be considered and implemented.

(3) Installation of an AABA or equivalent breathing system would not be required if good dilution ventilation can keep the solvent concentration less than ten times the standard. Appropriate respirator protection would be a fullface or half-face (w/eye protection) chemical cartridge respirator.

10. Maintenance OPS; Other Administration Spaces, MTM Co.

a. These are strictly administrative areas. Ventilation should be designed for comfort, using attachment (1) as a guide.

b. Illumination levels should meet or exceed the recommended guidelines for office spaces set forth in reference (c).

11. Lavatory Facilities/Drinking Fountains

a. Reference (i) should be used as a guide to determine the ratio of plumbing fixtures to the number of persons to be accomodated.

b. Illumination levels should meet or exceed the recommended guidelines for toilets and washrooms set forth in reference (c).

c. Lavatories should be equipped with showers for personnel upon removal of tyvecks and other protective equipment.

12. Mechanical Room w/Compressed Air

a. General room ventilation is needed to prevent heat buildup.

b. Illumination levels should meet or exceed recommended guidelines for control rooms set forth in reference (c).

13. Ambient Air Breathing Apparatus Compressor

a. General room ventilation is needed to prevent heat buildup.

b. Illumination levels should meet or exceed recommended guidelines for control rooms set forth in reference (c).

c. A back-up system should be considered in the event the primary system fails. Breathing air or sources of breathing air for supplied air respirators must meet the minimum grade D breathing air requirements of:

oxygen 19.5 - 23.5%
Carbon dioxide (by volume) 1000 parts per million - maximum
Carbon monoxide (by volume) 20 parts per million - maximum
hydrocarbons (condensed) 0.005 milligrams/liter - maximum
water (variable)

d. Oil lubricated compressors should not be used for breathing air systems. Irregardless, the safety precautions for industrial compressed air systems should be included in specifications, using reference (j) which is provided as attachment (8).

14. Mixing Room

a. Discussion. At this point it is unknown if paint will be "hand" mixed or meter mixed as described in reference (e). Probably the safest assumption is the "worst" case where all paint is hand mixed.

b. Recommendations

(1) Ventilation should be designed for the maximum amount of mixing anticipated. Dilution ventilation using the principles outlined in Chapter 2 of reference (f) is recommended. Room temperature should be controlled for a range of 70-75° as recommended in reference (e).

(2) Other applicable ventilation, safety, and work practice requirements of references (e), (g), (h) and attachment (9) should be considered and implemented.

(3) Installation of an AABA or equivalent breathing system would not be required if good dilution ventilation can keep the solvent concentration less than ten times the standard. Appropriate respiratory protection would be either a fullface or half face (with eye protection) chemical cartridge respirator. Other personal protective equipment (PPE) should meet the requirements set forth in reference (e).

(4) Illumination levels should meet the recommended guidelines for paint manufacturing set forth in reference (c).

(5) A plumbed eyewash meeting the requirements of reference (b) should be installed in close proximity to the immediate mixing area.

15. Flammable Material Storage

a. This inside flammable storage room must meet or exceed design and construction requirements of 29 CFR 1910.106 and applicable standards included therein. Room storage temperature should be controlled in the range of 70-75°F as recommended in reference (e).

b. A plumbed eyewash meeting the requirements of reference (b) should be installed in this storage room.

c. Illumination levels should meet or exceed the recommended guidelines for storage rooms set forth in reference (c).

d. Installation of an AABA or equivalent breathing system is not required as all materials would be unopened, thus presenting no vapor hazard. In the event of a spill, personnel could rapidly don appropriate chemical cartridge respirators and protective clothing, as described in reference (e), and clean up the spill in a matter of minutes.

16. Hazardous Waste Awaiting Disposal

a. This inside flammable storage room must meet or exceed design and construction requirements of 29 CFR 1910.106 and applicable standards included therein. Room storage temperature should be controlled in the range of 70-75°F as recommended in reference (e).

b. A plumbed eyewash meeting the requirements of reference (b) should be installed in this storage room.

c. Illumination levels should meet or exceed the recommended guidelines for storage rooms set forth in reference (c).

d. Installation of an AABA or equivalent breathing system is not required as all materials would be unopened, thus presenting no vapor hazard. In the event of a spill, personnel could rapidly don appropriate chemical cartridge respirators and protective clothing, as described in reference (e), and clean up the spill in a matter of minutes.

17. Prep Rooms

a. Discussion. As described in reference (e), preparation of surfaces to be painted includes the following operations: solvent cleaning, high pressure washing, stripping (chemical or blasting), welding and sanding. The way the prep rooms are drawn presently the actual work would include: solvent cleaning, high pressure washing, chemical stripping, and minor sanding. Blasting and welding would be conducted in other specifically designed shops.

b. Recommendations

(1) Ventilation should be designed for the maximum amount of solvent cleaning anticipated. Dilution ventilation using the principles outlined in Chapter 2 of reference (f) is recommended. Room temperatures should be controlled in the range of 70-75°F as recommended in reference (e).

(2) Other applicable ventilation, safety and work practice requirements of references (e), (g), and (h) should be considered and implemented.

(3) Installation of an AABA or equivalent breathing system would not be required if good dilution ventilation can keep the solvent concentration less than ten times the standard. Appropriate respiratory protection would be either a fullface of half face (with eye protection) with filters or cartridges specific for job tasks. Other personal protective equipment should meet the requirements set forth in reference (e).

(4) Illumination levels should meet or exceed the recommended guidelines for paint shops set forth in reference (c).

(5) At least one plumbed eyewash meeting the requirements of reference (b) should be installed in each prep room.

(6) High pressure vehicular washing should be located (ideally) outdoors. Consideration should be given to detergents used and the environmental impact of this operation.

18. Primer Booth

a. Discussion. These booths would be utilized for the application of epoxy primer only. Some design questions that should be addressed are: How are vehicles to be moved from primer booths to paint booths to drying booths? By conveyor? By personnel?

b. Recommendations

(1) Epoxy spray lines must not be used for PUP.

(2) Attachment (9) which is excerpted from reference (d) provides ventilation and design guidelines for spray finishing operations. The tunnel style water wash booth is the spray booth of choice because of the inherent advantages of fire protection and mist removal. All other applicable ventilation, safety, temperature control, work practice requirements of references (e), (g), (h) must be met.

(3) If possible, the atomization procedure of choice is the air assisted airless spray, since it is the most efficient.

(4) A plumbed eyewash meeting the requirements of reference (b) should be installed in each booth.

(5) A supplied breathing air system should be installed. Requirements of reference (e), (g), and (j) must be met.

(6) Illumination levels must meet or exceed the guidelines for paint shops set forth in reference (c).

19. Paint Booths

a. Discussion. These booths would be utilized for the application of epoxy enamel and PUP.

b. Recommendations

(1) Separate spray lines are needed for PUP and epoxy enamel as stated in reference (e).

(2) Attachment (9) provides ventilation and design guidelines for spray finishing operations. The tunnel style water wash booth is the spray booth of choice because of the inherent advantages of fire protection and mist removal.

(3) All other applicable ventilation, safety, temperature control, and work practice requirements of references (e), (g), and (h) must be met.

(4) If possible, the atomization procedure of choice is the air assisted airless spray since it is the most efficient.

(5) A supplied air system should be installed. Requirements of (e), (g), and (j) must be met.

(6) Plumbed eyewashes meeting the requirements of reference (b) should be installed in each booth.

(7) Illumination levels must meet or exceed the guidelines for paint shops set forth in reference (c).

20. Drying Oven

a. Ventilation and other design considerations for drying ovens are presented in attachment (9). All other applicable ventilation, safety and procedureal requirements of references (g) and (h) must be met.

b. Installation of an AABA or equivalent breathing system is not required if good ventilation design and personnel work practices are implemented. Appropriate respiratory protection would be either a fullface of half face (with eye protection) chemical cartridge respirator.

c. Illumination levels should be consistent with the recommended guidelines for paint shops set forth in reference (c).

21. Outside Flammable Storage Building

a. Discussion. This building will be used for storage of paint utilized in the main paint facility.

b. Recommendations

(1) The building must meet the general safety requirements of 29 CFR 1910.106 for flammable and combustible storage buildings.

(2) Building ventilation should be maintained sufficiently well so paint temperatures remain within the ranges recommended in reference (e).

22. IMA Supply; Organic Supply; Storage, MTM Co.

a. These areas are receipt issue points and storage sites for company supplies/tools (excluding solvents, paints, etc.). Ventilation should be designed for comfort, using attachment (1) as a guide.

b. Illumination levels should meet or exceed the recommended guidelines for storage and office spaces set forth in reference (c).

GENERAL COMMENTS

1. Safety Consideration

a. The entire paint facility building should be sprinklered in accordance with all the requirements set forth in references (g) and (h).

b. Explosion proof wiring (including ventilation system fans) must be installed whenever air contaminants (i.e. dusts, vapors) may be generated in sufficient quantity to present an ignition or explosion hazard.

c. Tools must be non-sparking and equipment must be intrinsically safe in accordance with reference (e) to prevent the ignition of solvents and paints.

d. Reference (k) should be used as a guide in developing a fire and chemical spill/leak contingency plan.

e. Personnel must wear personal protective equipment (PPE) that meets the requirements of reference (e). The 2d FSSG Industrial Hygiene Officer and the 2d FSSG Safety Officer should have review authority for all PPE.

2. Environmental Consideration. The potential environmental impact of the chemicals utilized at the facility should be reviewed by Natural Resources, MCB to ensure compliance with current EPA and local regulations. Disposal of waste material should be anticipated and planned for in accordance with reference (l).

3. Medical Surveillance/Occupational Health Training

a. Personnel working at the PUP facility should receive medical examinations in accordance with references (e) and (m).

b. Personnel are required to receive documented training on hazardous chemicals utilized in their workspaces, in accordance with the new Hazard Communication Standard set forth in 29 CFR 1910.1200.

c. Consideration should be given to placement of a breakroom in the facility. This room would be used as a lunchroom area so shop personnel would have no reason to eat, drink, or smoke in workspaces, thus further reducing safety and occupational health exposures.