

## CHAPTER 9

# LIGHTING EQUIPMENT VAULT

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### 9-1. Purpose or vault

The primary purpose of the airfield and heliport lighting equipment vault, referred to below as the vault, is to house the regulator equipment, the alternate source of control (secondary control panel), the transfer and low burden relays of the lighting system controls, the emergency generator and power transfer switch, the service entrance feeder and service entrance switch, and other electrical equipment needed for operation of the airfield and/or heliport lighting system. The vault may be a separate building or structure, or an enclosure within a larger structure, as appropriate. At installations where both airfield and heliport are to be constructed, a combination airfield heliport vault may be constructed if considered practicable.

*a. New vault.* Where a new vault is required and constructed as a separate structure, it will be of concrete masonry construction. The vault will be located a minimum horizontal distance of 350 feet from the control tower to prevent radio interference with control equipment. The maximum horizontal distance between the vault and the control tower is 7,350 feet. Control leads from the control tower to the vault will terminate in the vault at the actuating coils of the relays in the Pilot Relay Cabinet Assembly via the Transfer Relay Cabinets, also located in the vault. Power switches, regulators, and contactors located in the vault will be actuated by the control panel switches through the Pilot Relay Assembly. Above equipment will be as described in chapter 10.

*b. Existing vault.* An existing vault not meeting the above described location may be used provided the existing structure is otherwise adequate to serve the overall purpose, or can be modified economically to provide the desired facility.

### 9-2. Design of vault

The vault will be sized in accordance with the space allowances indicated in TM 5-803-4. Design, construction and clearance criteria for the vault and the installation of equipment therein will be in accordance with the applicable requirements of NFPA 70, for this type of structure. All equipment cases, frames, and cabinets will be solidly grounded. The design of the vault may vary with local conditions and the amount and type of equipment installed, both initially and in the future, and may be modified as necessary to conform to the needs of a particular installation. Where high ambient operating temperatures are anticipated, exhaust fans with electrical connections therefore will be provided in the vault. The vault will have a concrete slab that will slope to drain through floor drains connected to an exterior pit or other similar means. No floor drains will be connected to the storm sewer system. The pad for the

emergency generator will be isolated from the remainder of the floor slab. Interior walls will be of concrete masonry blocks. The roof will be built up roofing design, with slope of 3/8 inch per foot. The operator's control area may have a window. The remainder of the vault will not have windows, but will be ventilated through louvers where required. The vault will be heated, where required, by unit heaters in the equipment area and baseboard heaters in the operator's area. Doors to the equipment area will be louvered if required. Generators will require louvers for proper cooling of the units. A motor operated louver, interlocked with the starting of the generator, will be installed to permit air movement over the generator. An exhaust louver from the generator radiator will be installed with a duct system from the generator radiator to the exhaust louver. The exhaust louver will be closed when the generator is idle and open automatically from the force of the exhaust air currents when the generator is operating. The fill under the slab and the building footings will be determined by site conditions and size of building.

*a. Operator's control area.* A section at one end of the building will be isolated from the remainder of the building by a concrete masonry wall. This section will house the alternate source of airfield lighting control (control panel), the key switch for transfer of the control from the control tower to the vault and vice versa, and two telephone outlets. One telephone outlet will be for normal telephone, and the other for a tieline between the operator's area in the control tower and the operator's area in the vault. The tieline will be used when the alternate source of control in the vault is used, thereby allowing the operator in the tower to have direct and uninterrupted contact with the operator in the vault. Above criteria also will apply if the vault is for a heliport lighting system. Where a combination airfield heliport vault is utilized, the control area will be installed so that both control systems can be installed. However, where such occurs, a barrier will be installed between the two control panels so that the operator cannot operate the wrong panel inadvertently.

*b. Power supply area.* This area will house the service entrance feeder, the main service switch or breaker, emergency generator and transfer switch, regulators, fused cut-outs for regulators if needed, and the relay and terminal cabinets. High voltage conductors, where used, will be run in rigid steel galvanized conduits or intermediate metal conduit. These conduits will be noted as high voltage when voltage exceeds 600 volts. Two red bands, spaced 8 inches apart, will be painted near each conduit coupling. Space between the red bands will be painted white; on the white space, the voltage will be stenciled in black, in locations clearly visible from all angles. Low voltage feeders and

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control wires will be installed in coated rigid steel galvanized conduits or coated intermediate metal conduit when run under the floor slab; in rigid steel galvanized conduits, intermediate metal conduit, or electric metallic tubing (EMT) when run on the walls or ceilings; and in cable trays supported from the ceiling or walls when there is a multiplicity of cables and possible need for expansion in the future. Conduits will not be installed in concrete slabs on grade. Cabinets, panels, and fused cut-outs when used, will be mounted on the walls. Regulators will be floor mounted close to the walls so as to keep exposed conductor lengths to a minimum. Series feeders from regulators and various other feeders from the control panel will be brought out of the vault in coated rigid steel galvanized conduits or coated intermediate metal conduit 2 feet below grade. Where feasible, a floor trench may be used for conductors leaving the vault. Feeders to this trench and from this trench to the exterior will be run in rigid steel galvanized conduits or intermediate metal conduit.

*c. Emergency power.* Where emergency power is required for the operation of the airfield or heliport, the generator and its control panel, the starting equipment, and the automatic transfer switch will be located in the vault, not the control tower. The unit will be sized in accordance with the lighting system load and the essential power requirements other than the airfield or heliport lights, such as the vault lighting, ventilation, heating, future expansion of the lighting systems and, when the control tower is connected to the same transformer bank and fed through the vault, the essential control tower loads. However, where the loads in

the control tower are large enough or the distance between the vault and the control tower great enough to cause feeders between vault and control tower to be uneconomical, a separate service with transformer bank should be installed at the control tower and where authorized, a separate emergency generator with its related equipment will be installed at the control tower. If the latter emergency generator is used, it will normally carry all of the control tower loads and control circuits except for the airfield and heliport lighting control circuits. The latter will be in all cases part of the vault emergency system. The generator and the fuel system will be in accordance with the applicable portions of TM 5-811-1.

### **9-3. Helipad lighting control vault or house**

Where helipads are constructed at existing Army airfield and/or heliports, the vaults described above, if practicable, will be used for power supply and control of the helipad lighting system. Where distances are too great to service the helipads feasibly from the vault, a separate vault or structure to house the electrical service and the intensity controllers will be erected near the helipad, but outside flight clearance zones. Electrical circuits to the helipads will normally be low voltage, 120-volts, single phase, 60 hertz. Each feeder will be from a circuit breaker on a panelboard mounted in the vault or structure, and fed through a dimmer as described in chapter 10. Where a separate structure is erected near the helipad, it should be lighted and heated as described for the vaults for the airfield and heliport lighting equipment.