

FIRESAFETY

CONSIDERATIONS FOR SMOKE CONTROL

1. GENERAL

1.01 This section provides guidelines on the methods and procedures for the removal and control of smoke and heat from telephone company buildings.

1.02 This section is being reissued to reflect the most recent refinements of the Firesafety Practices. Revision arrows are used to identify the revised paragraph(s).

1.03 The recommendations in this section are based, in general, on the Fire Codes (90A-Appendix B) of the National Fire Prevention Association (NFPA) and the Model Building Codes. Since many detail features of these source documents have not been covered herein, they should be reviewed for complete details.

1.04 Where local, state, or Occupational Safety and Health Act (OSHA) regulations require higher degrees of protection, the legislated criteria should be followed.

2. REQUIREMENTS FOR IMPLEMENTATION

A. New Buildings

2.01 Smoke control shall be provided in all new telephone equipment buildings with more than 25,000 square feet and three stories.

B. Existing Buildings

2.02 In general, smoke control systems are not recommended for existing buildings. However, if local codes require a smoke venting or smoke control system on a retrofit basis, then the type of system described herein should be considered.

2.03 The cost for implementation of a smoke control system will vary considerably, depending on existing conditions of the building. Facilities

with the following characteristics represent the most attractive opportunities for such a system:

- 100 percent outside air capability
- Air distribution systems which do not span a number of floors—one per floor is ideal
- Extensive coverage of early warning fire detection
- Plans to tie to energy management/monitoring systems.

In cases where these conditions are not met, implementation of smoke control is not justifiable.

2.04 Local authorities should be consulted prior to the incorporation of any smoke systems.

3. PHILOSOPHY

3.01 The basic concept of smoke control as indicated in Fig. 1 is as follows:

- (a) In the smoke compartment under alarm, all positive means of air supply (ie, supply fans, dampers, etc) are turned off and all means of exhausting to the outside (ie, exhaust fans, relief dampers, etc) are fully opened.
- (b) The adjacent compartments, not involved in the fire, should be provided with outside air supply and have all normal exhaust paths (ie, exhaust fans, relief dampers, etc) closed.

This mode will cause a flow of outside air through the adjacent compartments into the compartment under alarm. The smoke and fire gases will be exhausted from the building via the alarmed compartment. The net result is the pressure in the adjacent compartment is higher than in the alarmed compartment which restricts the movement of smoke and fire gases; the fire area is vented to the outside to remove heat and smoke.

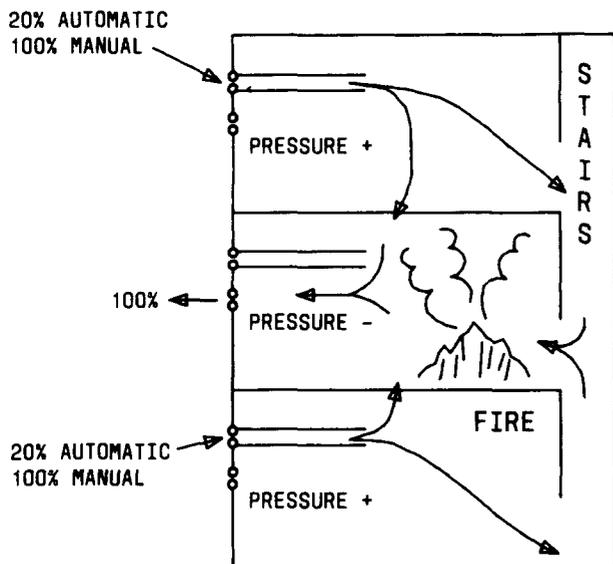


Fig. 1—Smoke Control Concept

4. SMOKE COMPARTMENT

4.01 The concept of a smoke compartment, as opposed to a fire compartment, must be fully understood before a smoke control system can be designed. A basic smoke compartment can be defined as the smallest area enclosed by fire-rated walls, doors, ceilings, etc, whose supply and exhaust system can be selectively isolated from that of other compartments.

4.02 A smoke compartment shall not encompass more than one floor.

5. CONTROL SEQUENCE

5.01 Smoke control requires an early warning fire detection system which is tied into the heating, ventilating, and air conditioning (HVAC) fan and damper control system.

Note: Fire damper fusible links in return or exhaust ducts must be replaced with standard 212°F links (or higher as fire codes permit)

if the present links are rated at lower temperatures.

5.02 The sequence of control of the smoke control system as indicated in Fig. 2 is basically as follows:

(a) Has a fire been detected? If not, continue normal operations of the HVAC system. However, if a fire has been detected by an early warning fire detection system, **the automatic mode of smoke control is immediately activated.**

(b) In the automatic mode, the fire floor is placed on 100 percent exhaust, with all adjacent floors being placed on 20 percent outside air. **This is partial smoke control** and is employed until the following has been determined:

- (1) If there is a false alarm.
- (2) The fire is out.
- (3) The fire is being controlled by the employees.

Should any of these conditions be present, return the HVAC system to normal operation.

Note: This partial smoke control mode is required to avoid bringing in 100 percent outside air and possibly subjecting telephone equipment unnecessarily to a thermal shock due to extremely cold or moisture-laden air.

(c) When it has been determined that the fire is not being controlled, then **manually** activate the full smoke control mode. At this point, 100 percent outside air is introduced into the adjacent compartments. This can be initiated by the professional fire fighter or an employee, depending upon local code requirements.

5.03 The installation of a central control panel, including start/stop fan control, should be considered especially in multifan room buildings. The smoke control system could be incorporated

into such a panel. Consideration should be given to including these functions as part of the fire command station as specified in Section 760-660-100, Engineering Provisions for the Firesafety Plan.

performed to assure proper operation and that pressure differentials are such that egress doors are operable.♦

6. FINAL ACCEPTANCE

6.01 ♦Whenever a smoke control system is installed, an acceptance test should be

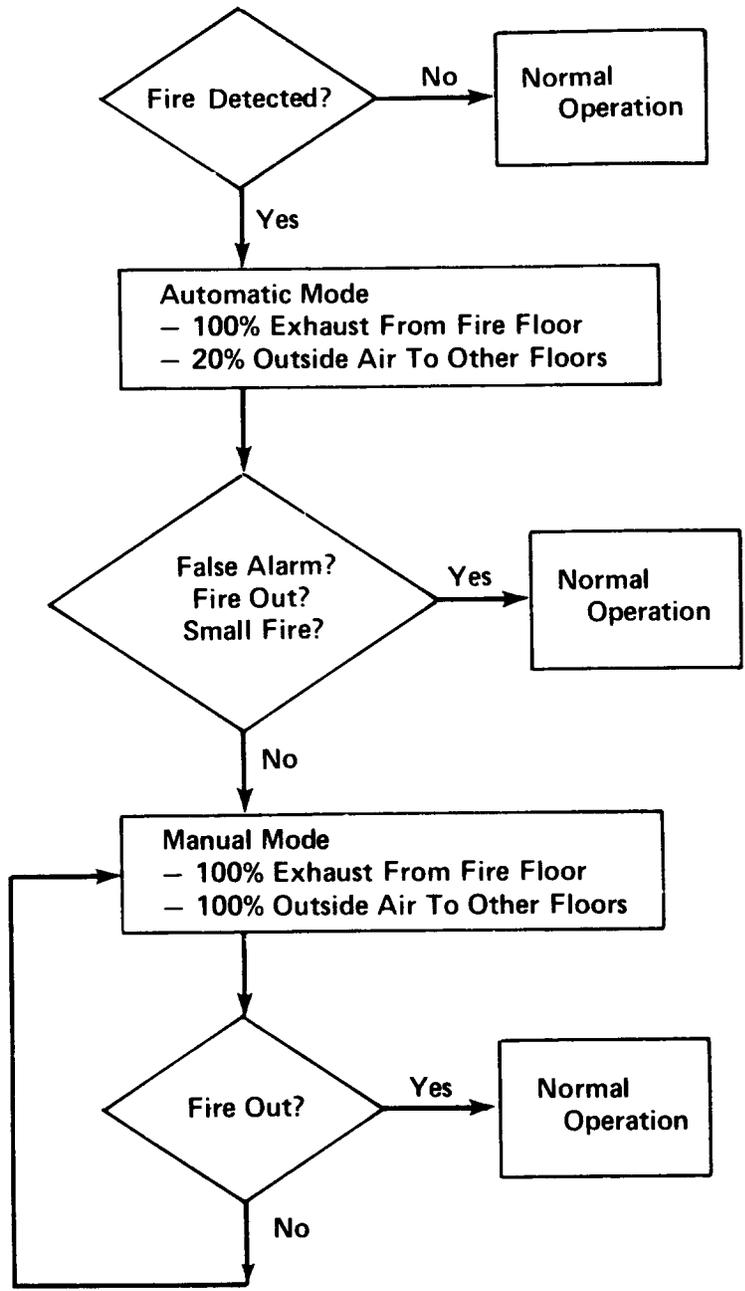


Fig. 2—Sequence of Operation