Smoke Detector Requirements for Exhaust Fans

Posted by Ron Stewart-Saanich Fire (207.194.135.1) on November 03, 2000 at 17:55:25:

The question of smoke detector requirements for a 3-story motel unit. The three bathrooms exhaust fans directly above each other are hooked together to one duct to the roof. The system has a separate make up air system. We have approximately 9 ducts installed this way. The question is does each duct require a smoke detector and be zoned separately (9 zones)

Re: Smoke Detector Requirements for Exhaust Fans

Posted by Bob Furlong (209.53.94.149) on November 09, 2000 at 17:05:33:

In Reply to: smoke detector requirements for exhaust fans posted by Ron Stewart-Saanich Fire on November 03, 2000 at 17:55:25:

From BC Building Code:

3.2.4.12. — Prevention of Smoke Circulation
1) If a fire alarm system is installed, an air handling system shall be designed to prevent the circulation of smoke upon a signal from a duct-type smoke detector if the air handling system
a) Serves more than one story,
b) Serves more than one suite in a story, or
c) Serves more than one fire compartment required by Sentence 3.3.3.5.(2).

The Building Code does not differentiate between a “return air system”, a “supply system” or a “recirculating air system” as in the 1992 BCBC. The BCBC (1998) states, “air handling system”.

As stated in your scenario, “The three bathroom exhaust fans directly above each other are hooked together to one duct to the roof. The system has a separate make up air system.” It appears that the exhaust system, which serves more than 1 story, would require a duct-type Smoke detector and depending on how the make up air system is ducted, a detector may be required in this system also.
Looking at the zoning requirements in the BCBC:

Except as permitted by Sentence (6), the annunciator required by Sentence (1) shall have separate zone indication of the actuation of the alarm initiating devices in each

d) air handling system required to be equipped with smoke detectors,

If your system duct risers are separate systems, it looks as though a separate zone is required for each. If your duct risers are somewhat connected into a common or common clusters of riser systems, perhaps you could cluster the zones as well.

I would also be concerned as to how the “air handling system shall be designed to prevent the circulation of smoke upon a signal from a duct-type smoke detector…. “
Does this not imply perhaps automatic smoke dampers, interconnected to the fire alarm system? I visualize the duct detector initiating an alarm signal, indicating the zone, shutting down the ventilation fans, closing dampers to prevent the circulation of smoke in the duct risers. Shutting down the fan does not prevent smoke migration up the shaft, if the duct is fitted with fire dampers only. Probably need both some and fire dampers, or ????

I may be way off base on this though! But that’s the way I read it.