Log I-99

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 9, 1991

In reply refer to: I-91-02

Mr. Anthony R. O'Neill
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About 0915 mountain standard time, on Sunday, November 25, 1990, a fire erupted at a fuel storage and dispensing facility about 1.8 miles from the main terminal of Stapleton International Airport at Denver, Colorado. The facility, referred to as a fuel farm, was owned by United Airlines and Continental Airlines. United Airlines' portion of the fuel farm was operated and maintained by an independent contractor, AMR Combs. From the time firefighting efforts were initiated immediately after the fire erupted until the fire was extinguished, a total of 634 firefighters, 47 fire units, and 4 contract personnel expended 56 million gallons of water and 28,000 gallons of foam concentrate. The fire burned for about 48 hours. Of the 5,185,000 gallons of fuel stored in tanks at the farm before the fire, about 3 million gallons were either consumed by the fire or lost as a result of leakage from the tanks. Total damage was estimated by United Airlines to have been between $15 and $20 million. No injuries or fatalities occurred as a result of the fire.[1]

United Airlines' flight operations were disrupted because of the lack of fuel to prepare aircraft for flight. Airport facilities, other than the fuel farm, were not affected by the fire. The duration and intensity of the fire, however, raised concerns about the ability of airport and local firefighters to respond to a fuel fire of this magnitude. The origin of the fire also raised concerns about the safety oversight and inspection of fuel farm pumping operations.

An analysis of the design and cost benefits of various safety features of the Denver fuel farm or the new fuel storage facility at the new Denver airport was beyond the scope of the Safety Board's investigative role. However, obvious safety deficiencies were noted during the investigation that are not addressed in existing industry codes or standards.

[1] National Transportation Safety Board. 1991. Fuel farm fire at Denver's Stapleton International Airport, Denver, Colorado, November 25, 1990. Aviation Accident Report NTSB/AAR-91/07. Washington, D.C.

There were eight fuel storage tanks in the area of the fuel farm where the fire occurred. Tank capacities ranged from 420,000 gallons to 2,100,000 gallons. Tanks 3 and 4 were completely destroyed by the fire; tanks 2, 5, 8, and 10 received extensive damage; and tank 1 received smoke damage.

The investigation revealed that only tank 10 had an internal fire valve with external fusible links that would automatically close when exposed to heat from a fire. Further, only the control valves on the piping to tanks 2 and 5 were fail-safe--that is, they were designed to automatically close if either electrical power or air pressure was lost. The control valves installed on tanks 1, 3, and 4, were not fail-safe; air pressure had to remain on the valves' control system for the valves to close automatically in the event of an electrical power failure. If the air pressure was lost, the valves had to be closed manually. However, because of the intensity of the fire at tanks 3 and 4, firefighters were unable to manually close the valves to these tanks. The Safety Board concludes that had tanks 3 and 4 been equipped with fail-safe control valves and internal fire valves with fusible links, the amount of fuel that fed the fire would have been significantly reduced, and consequently, the duration and intensity of the fire lessened. The lack of such valves, therefore, contributed to the severity of this fire. The Safety Board believes that all above-ground fuel storage tanks should be equipped with internal fire valves and that all control valves on above-ground fuel storage tanks should be fail-safe. Consequently, the Safety Board has urged the Federal Aviation Administration to require that all tanks at fuel storage facilities on airport property be equipped with an internal fire valve and fail-safe control valves. Further, the Safety Board believes that the National Fire Protection Association Standard 30 should require that internal fire valves and fail-safe control valves be installed on all above-ground fuel storage tanks.

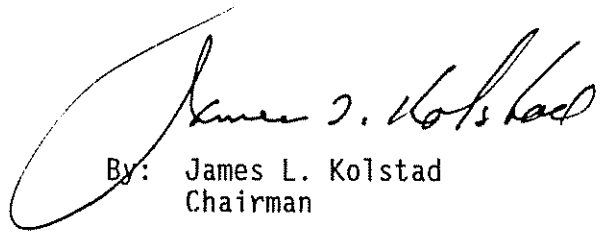
Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the National Fire Protection Association:

> Revise National Fire Protection Asssociation Standard 30 to require internal fire valves and fail-safe control valves on all above-ground fuel storage tanks. (Class II, Priority Action) (I-91-02)

Also, as a result of the investigation, the Safety Board issued recommendations to the Federal Aviation Administration, AMR Combs, the Airport Operators Council International, Inc., and the American Association of Airport Executives.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation I-91-02 in your reply.

Chairman KOLSTAD, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in this recommendation.



By: James L. Kolstad
Chairman