



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

---

**Date:** May 10, 2004

**In reply refer to:** A-04-42 and -43

Honorable Marion C. Blakey  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

---

On September 25, 2003, about 0658 central daylight time, a McDonnell Douglas<sup>1</sup> MD-80, N462AA, operated by American Airlines as flight 1128, experienced fumes and smoke in the cabin after powering back from the gate at Dallas/Fort Worth International Airport (DFW), Dallas, Texas.<sup>2</sup> The airplane was about 200 feet from the jetway when the captain initiated an emergency evacuation. The flight was to be operated as a scheduled domestic passenger flight from DFW to Tampa International Airport, Tampa, Florida, under the provisions of 14 *Code of Federal Regulations* Part 121. The airplane was not damaged, and 8 of the 89 passengers sustained minor injuries during the evacuation. None of the five crewmembers was injured.

During the emergency evacuation, the tailcone slide deployed but did not automatically inflate. An off-duty flight attendant reported that she attempted to manually inflate the slide but that she could not locate the red manual inflation handle on the slide's girt. She observed a small metal ring near where the red manual inflation handle should have been located and tried unsuccessfully to inflate the slide numerous times by pulling on that ring. The off-duty flight attendant then blocked the tailcone exit and directed passengers to other exits.

### Slide Design And Operation

Air Cruisers Company part number (P/N) D29984-series evacuation slides are standard equipment installed at tailcone exits on MD-80, MD-90, and Boeing 717 airplanes. The slide is

---

<sup>1</sup> The MD-80 airplane was manufactured by the McDonnell Douglas Company. The Boeing Commercial Airplane Group and McDonnell Douglas subsequently merged in August 1997.

<sup>2</sup> According to American Airlines, the fumes and smoke occurred when hydraulic fluid spilled onto the air conditioning system as a result of a thrust reverser hydraulic pipe failure.

mounted in a hard pack cover at the end of the tailcone catwalk and is attached to the catwalk by a girt bar (see figure 1), which is inserted into two girt bar floor fittings. The girt bar is connected to the slide by a fabric girt. By design, deployment and inflation of the slide are automatically initiated when the aft bulkhead door leading to the tailcone is opened in the armed mode. The tailcone is rigged with cables that release the tailcone from the airplane when the door is opened, subsequently allowing the tailcone to fall to the ground. Cables simultaneously pull the hard pack cover and evacuation slide off the catwalk. An inflation cable that is attached to a grommet tab on the girt becomes taut and is pulled from the inflation reservoir's regulator valve (shown in figure 2) as the slide falls from the catwalk, releasing a compressed gas mixture into an inflation hose. An aspirator attached to the hose draws ambient air into the slide where it mixes with the compressed gas mixture and inflates the slide.

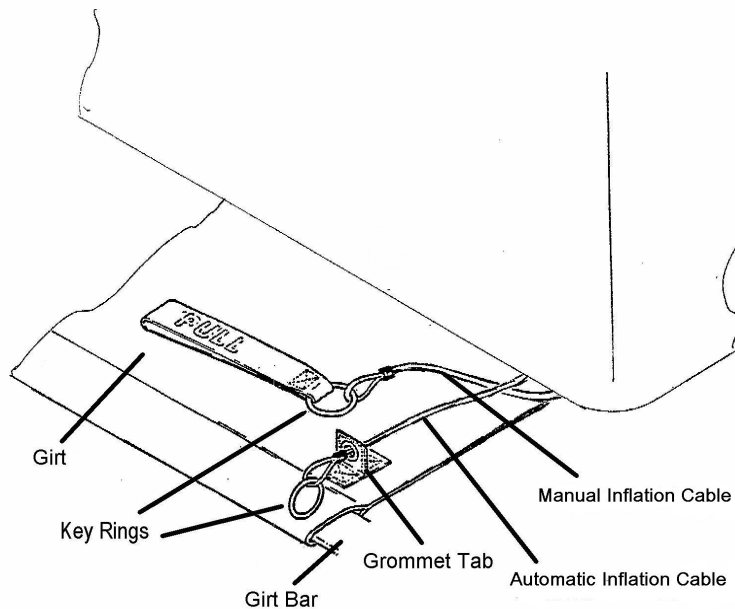


Figure 1. Air Cruisers P/N 29984-series tailcone slide

The slide inflation cable originates in the regulator as a single cable, then divides into two portions: a 5-inch-long cable that ends in a key ring (the automatic cable discussed above) and a 42-inch-long cable that ends in a key ring attached to a red manual inflation handle (the manual cable). The manual cable provides a means of inflating the slide if automatic inflation does not occur. The automatic cable is attached to the fixed grommet tab when the slide is installed on an airplane, whereas the manual cable is coiled into a stitched pocket in the girt, with the red "PULL" handle attached to the girt by Velcro (see figure 2).

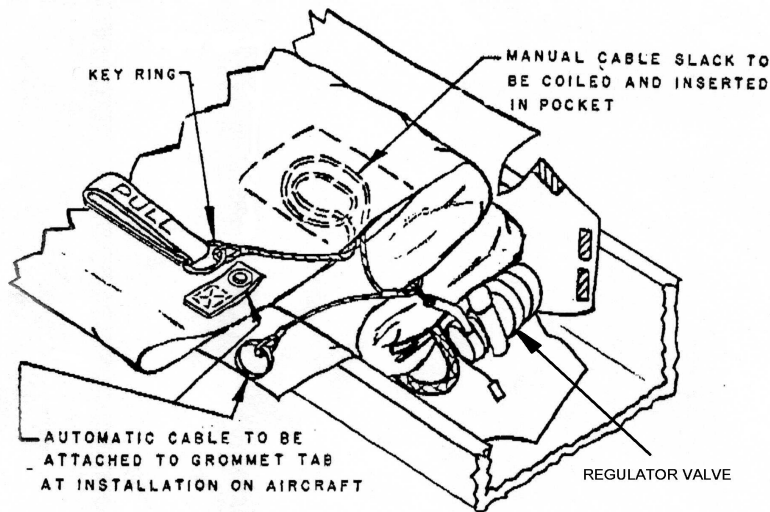


Figure 2. Air Cruisers P/N 29984-series tailcone slide (partially unpacked)

### Findings of the Investigation

There were two findings related to the operational capability of the slide. First, the American Airlines maintenance technician who examined the slide immediately after it was removed from the airplane noted that the inflation cable was looped around the inflation reservoir's pressure gauge. When he pulled on the cable, the loop tightened around the gauge and prevented the cable from releasing from the regulator. The maintenance technician reported that he had to put his foot on the reservoir and pull with "a pretty good force" before the cable released from the regulator and the slide inflated normally on the floor of the maintenance hangar.

Second, photographs of the inflation cable from the incident slide showed that the red "PULL" handle on the incident slide was incorrectly attached to the automatic (shorter) cable and that only a key ring was attached to the manual (longer) cable. If an incorrectly rigged slide is installed on an airplane in this manner (as the incident slide was), it would most likely deploy but not inflate because of the difference in the lengths of the automatic and manual inflation cables. When the slide is properly rigged, the shorter, automatic inflation cable becomes taut almost immediately, and the slide begins to inflate. However, if the slide is rigged as it was on the incident airplane, it is unlikely that the longer, manual inflation cable would become sufficiently taut and, thus, it is unlikely that the regulator valve would activate. Additionally, in this incorrectly rigged configuration, the manual inflation handle on the shorter, automatic cable would most likely be torn away from the Velcro as the slide pack fell from the tailcone and, therefore, would not be available for subsequent manual slide inflation.

### Past Actions

In July 1991, Air Cruisers submitted Engineering Multiple Change Notice (ECN) 11,489 to McDonnell Douglas, which stated, "reconfigure pull cable assembly by removing 'key ring' at

web handle (this change results in incorporating the web handle as an integral/attached part of the cable [assembly]).” The ECN stated the reason for the change was “to insure [sic] cable will be properly rigged when installed on aircraft. Elimination of ring on web handle removes potential of incorrectly rigging ‘manual’ cable to grommet tab on girt instead of correctly rigging automatic cable (no handle) to tab.”

On April 27, 1992, Air Cruisers issued Service Bulletin (SB) 304-25-24 for P/N D29984-series evacuation slides manufactured before serial number 0940. The SB instructed operators to remove and discard cable assembly P/N 37028-105, which contained key rings attached to both the automatic and manual portions of the inflation cable (as shown in figure 1), and install new cable assembly P/N 61866-101, which contained a key ring attached to the automatic cable but not to the manual cable (as shown in figure 3). On the new cable assembly, the red “PULL” handle is attached directly to the manual portion of the cable. The SB also stated that Air Cruisers “folding procedure P-11843 will require a revision as a result of this service bulletin.”

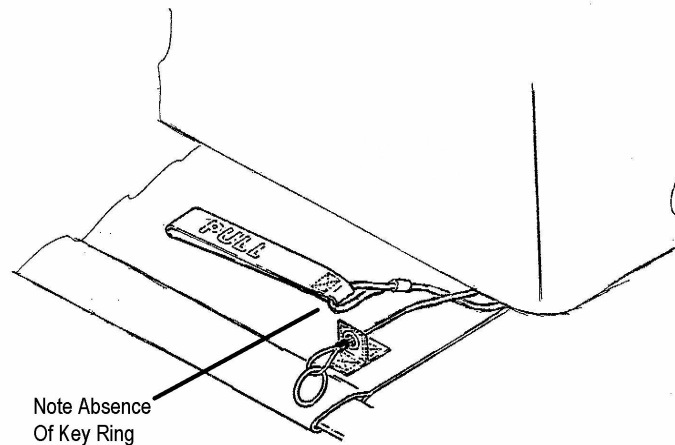


Figure 3. Air Cruisers P/N 29984-series tailcone slide, revised per SB 304-25-24

American Airlines reported that the actions called for in SB 304-25-24 had not been implemented in its MD-80 fleet. Additionally, discussions with two American Airlines slide shop employees revealed that when they occasionally received P/N 61866-101 cable assemblies from the airline’s inflation reservoir overhaul facility, employees removed the newer style manual inflation handles (with no key ring) and replaced them with an older style red manual inflation handle (with a key ring). According to the American Airlines slide shop employees, they accomplished this task in accordance with guidance contained in Air Cruisers slide folding procedure P-11843, which instructed, “attach loop of manual cable to key ring on pull handle.” The Safety Board’s review of Air Cruisers folding procedure revealed that it had not been updated as deemed necessary in SB 304-25-24.

## Recent Actions

Since this incident, American Airlines has performed an inspection of its MD-80 fleet and found that about 47 of its P/N D29984-series slides (16 percent) had rigging problems with the automatic and manual portions of the slide inflation cable that most likely would have resulted in an uninflated slide with no available manual inflation handle during an emergency evacuation. Another 43 of American's P/N D29984-series slides were found with the manual inflation cable not coiled into the stitched pouch in the girt. All of these improper configurations were corrected by American Airlines maintenance personnel before the airplanes were returned to service.

Air Cruisers issued a revised folding procedure P-11843 on December 19, 2003. The revised procedure clarifies the stowage location of the manual inflation cable and includes the updated drawing shown in figure 3. Also on December 19, 2003, Boeing released an "All-Base" message notifying MD-80 and MD-90<sup>3</sup> operators of the findings of the investigation and suggesting that operators consider a one-time inspection for proper cable routing as well as implementation of the actions called for in SB 304-25-24 at the earliest maintenance opportunity.

## Summary

This investigation identified numerous instances in which Air Cruisers P/N D29984-series slides were installed on American Airlines airplanes with improperly rigged cable assemblies and in which newer style cable assemblies had been improperly modified. The Safety Board is concerned that these latent failure modes very likely exist on other MD-80 and MD-90 airplanes in the U.S. fleet and would likely render an important escape route unusable during an emergency evacuation because of an uninflated slide. As a result of this concern, the Board considers it critical that the FAA specifically target and rectify the improperly rigged/modified slide problem expeditiously, rather than waiting for a normal cycle of slide maintenance to transpire. Therefore, the Safety Board believes that the FAA should expeditiously issue an airworthiness directive to require operators to implement Air Cruisers SB 304-25-24 on an accelerated schedule and not wait for the slides' next regularly scheduled maintenance interval. Further, because maintenance personnel at other airlines may have improperly modified new P/N 61866-101 inflation cables (as American Airlines personnel did) due to the misleading packing instructions, the Safety Board believes that the FAA should require operators that are operating airplanes with slides with P/N 61866-101 inflation cables that have been improperly modified to include a manual inflation cable handle with a key ring, to reinstall new, unmodified P/N 61866-101 inflation cables (in which the manual inflation handle does not include a key ring) at the next scheduled maintenance opportunity.

---

<sup>3</sup> Although P/N D29984-series slides are also used on Boeing 717 airplanes, 717 operators were not included in this notification because the new tailcone slides (post S/N 0940) that were delivered with 717s were equipped with P/N 61866-101 cable assemblies.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Expediently issue an airworthiness directive to require operators to implement Air Cruisers Service Bulletin 304-25-24 on an accelerated schedule and not wait for the slides' next regularly scheduled maintenance interval. (A-04-42)

Require operators that are operating airplanes with slides with part number 61866-101 inflation cables that have been modified to include a manual inflation cable handle with a key ring, to reinstall new, unmodified part number 61866-101 inflation cables (in which the manual inflation handle does not include a key ring) at the next scheduled maintenance opportunity. (A-04-43)

Chairman ENGLEMAN CONNERS, Vice Chairman ROSENKER and Members GOGLIA, CARMODY, and HEALING concurred in these recommendations.

By: Ellen Engleman Connors  
Chairman