

**Federal Express DC-10 Landing Gear Collapse**  
**Memphis, Tennessee**  
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**Presented By:**  
**Captain Brian Boucher**  
**Air Canada**

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Last December 18, 2003 a Federal Express McDonald Douglas MC-10 was on a routine freighter operation from Oakland, California to Memphis International Airport. The aircraft was carrying a crew of three along with 4 passengers. The weather at the airport on the day of the accident was clear skies but with gusty winds blowing at 25-30 knots. The approach was normal except for light to moderate turbulence on the approach. Upon touchdown, the right main landing gear collapsed and then sheered away from the aircraft while still in motion. Approximately 1,000 meters later they Aircraft came to a rest beside a drainage ditch that was located adjacent to the runway. The Captain immediately contacted the tower who then reported that a large fire was burning on the starboard side of the fuselage. The Captain immediately ordered for the evacuation checklist. The Captain had reported to the ATC unit that all engines were shutdown with the fire handles pulled. Only the # One of the pilots on board the aircraft immediately proceeded to open the L1 door. (The L1 door would be the primary escape route for the crew) Unfortunately after opening the door, the slide fell to the ground without inflating. The pilot immediately used the manual inflation handle to inflate the slide, but after inflation, the slide blew underneath the aircraft and was not useable. The crew of 7 immediately noticed that the fire was burning intensely from the right side R1 door and proceeded to use the cockpit windows as their escape route.

The number of passengers and pilots on the aircraft surprised the Memphis Fire Department that day. Normally, a MD-10 requires 2 pilots for a flight from Oakland, but it is not unusual for any Cargo airplane to carry up to 30 passengers given the size and type of aircraft. Many Cargo carriers allow pilots commuting to work and employees of the airline to travel in those empty seats. All Airports should thoroughly familiarize those Cargo aircraft that carry passengers. The FAA has subsequently released CERT ALERT 04-01 on March 1, 2004 to make responders aware of this issue.



The Memphis International airport is unique to most other airports because it has two separate ARFF departments that would normally respond to an incident or accident. Because Memphis is a Hub for Federal Express, the cargo operator made the decision to contract with Rural Metro and provide its own ARFF protection. Under the current FAR 139 Index C, all that is legally required is 2 1500 ARFF vehicles with no consideration for Cargo Aircraft operations.

Below is a summary of the FedEx and Memphis Fire Department ARFF equipment.

Federal Express Fire Department (FedEx FD)

A-35 Oshkosh 1,500 gallon with a SNOZZLE™ elevated waterway and a bumper turret.

A-37 Twin agent RIV, 100gallons AFFF, 500 pounds PKP

The Memphis Fire Department (MCFD)

A1 RIV dual agent 100/500. Command Vehicle.

A-3 Oshkosh 3,000 gallon with a SNOZZLE™ elevated waterway and a bumper turret.

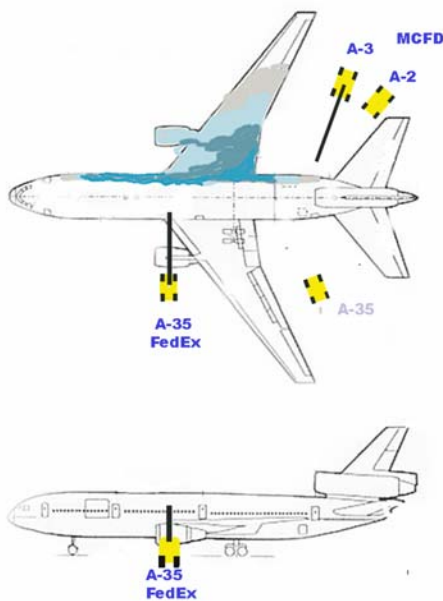
A-2 Oshkosh 3,000 gallon with a Rhino™ high capacity extendible bumper turret.

E-33 Backup MCFD structural responding from airport's Station 33.

The two ARFF fire departments have trained and worked together in the past. In fact, Chief Boyd (MCFD) insisted that the same platoons would be on duty at the same time so all firefighters would be familiar with all responders involved in the initial dispatch. It became apparent early in the ARFF operations that this training was credited with a successful end result. The reason for this statement is because in the past 10 years there have been other Cargo aircraft that have landed with the same collapse gear condition or on fire prior to landing and the aircraft was totally consumed by the fire in the end. All aircraft in previous accidents were totally consumed along with copious amounts of agent (60-80 thousand liters) used in the fire attack.

## STRATEGIES AND TACTICS

At approximately 1226 hours the Air Traffic Control Facility on the field activated the crash alarm system. They reported that a MD-10 had landed on runway 36R and was off the runway burning out of control. The Tower also relayed information to the Incident Commander (Chief Boyd) that all Fire Handles were pulled and that there were seven souls onboard. Chief Boyd immediately responded with three ARFF vehicles and arrived on location in less than two minutes. On his way to the scene he activated the Emergency plan to an ALERT 3 which would automatically alert the off airport station 33. Station 33 would respond with structural engines and a ladder truck along with EMS crews. Also responding on the initial alarm was Chief McCann from the FEDX ARFF. Normal staging for Chief McCann would be to man the MCFD ARFF station, but because of the nature and heavily involved fire status, the IC had FEDX ARFF vehicles position strategically on the left side of the aircraft (Non burning side).



When engine 33 arrived on location, the IC ordered the crew to plug the hydrate that was located approximately 200 meters from the aircraft, lay a 1000mm supply line to the FEDX snozzle. This was no easy task for them because they had to carry the large diameter hose across two drainage ditches and an airfield perimeter road.

A3 (MCFD) was positioned at a 45-degree angle behind the wing on fire and to start discharging agent with his snozzle. He immediately discharged agent unto the right wing and the wing root area where there was intense fire. A2 move into position near the right rear horizontal stabilizer. This ARFF vehicle has the RHINO installed, which was designed for a low elevation fire attack. A2 began

fire suppression sweeping back and forth along the surface and the lower portion of the right fuselage. In the high flow mode, the RHINO can discharge up to 3000 LPM.

Meanwhile, the IC then ordered A35 with the snozzle to the rear of the left side of the aircraft and their task was to knock down the fire underneath the fuselage. This task was completed relatively quickly and then the IC ordered the Snozzle to penetrate the cabin. A3 immediately moved to the front of the left wing moving delequately along the leading edge flaps. There wasn't much room for error because the engineer was worried that the ARFF vehicle would slide sideways or maybe even tip into the ditch. With the help of the FEDX ARFF Captain, they maneuvered the vehicle into position as close as possible to the left engine nacelle. The snozzle was then raised and fully extended and began to penetrate the cabin.



The penetrator made entry approximately 3 meters aft of the cargo and about 14 inches above the window line. The fire was burning intense almost directly across the cabin and starting to penetrate the interior. Water and foam was now being discharged into the cabin at approximately 1000-1200 LPM. They were now 6-8 minutes into the event and the fire started to shows signs of subsiding.

Examination of the aircraft interior after extinguishment revealed that the area in front of the wing attachment root was penetrated by the fire in three places. The skin forward of the right wing was severely damaged and melted away for about a 8 meter area along the fuselage. Only the support stringers were left. The fire penetrated at the floor line at the air-conditioning grill distribution area. It further penetrated the sidewall fiberglass panels approximately two meters from the floor at an overlap seam in the interior. The final flame penetration source was about a 1x3 meter area along the ceiling of the aircraft approximately 2 meters from the floor and forward of the wing root. This area only had the installation batten material hanging from the upper attachment point. The fiberglass interior panels were destroyed showing that a severe fire had gotten inside the fuselage. The piercing nozzle mounted on A-35 (Oshkosh 6,000liter/elevated waterway) was

fitted with an additional ½ meter extension for deep-seated cargo fires. With the left side of the fuselage rotated upwards at an angle, this additional length positioned the piercing nozzle initially inside one of the cargo bins. The unique design of the piercing nozzle slip clutch mechanism allowed the stress to be relieved due to the acute angle of the penetration and the piercing nozzle came to rest with the nozzle outside of the cargo bin. With the piercing nozzle freed from the cargo bin, the majority of the water was distributed throughout the entire aircraft interior. Soot was visibly washed from most of the bins in this area.

A three dimensional fire continued to burn and with the help of firefighters on the ground with their twin agent line, they were able to extinguish the remaining fire in about 10-12 minutes from when they arrived at the scene. The reason for this, was because most of the fuel from the left wing was being transferred into the center of the fire area and continued to feed the fire.

MCFD and FedEx FD had control of the fire. The combined total of approximately 20,000 liters of water from the three responding trucks was utilized to gain control of the fire. An additional ten minutes and approximately 4,000 liters of extinguishing agent were used to subdue the stubborn-three-dimensional running fuel fire on the right wing root area using hand lines from A-35 (Oshkosh 6,000 liter/elevated waterway) and the 1000 mm supply line from E-33 (Backup structural truck from the airports Station 33, supported by the MCFD engine company). E-33 was attempting to put out some residual fire on the right side of the aircraft. They did not have any more water at that time so the 200 millimeter preconnect from A-35 was taken under the aircraft and given to the E-33 crew.

In the end, total extinguishment time was 20-25 Minutes.



## Conclusion

When it was all over, 99 percent of the 9000 kilograms of cargo (US Mail) was saved and major components of the aircraft were salvaged. The Aircraft had just

been major overhauled with a new glass cockpit work millions of dollars. All of the CRT's were saved and reused on other FEDX aircraft. The left wing and all of its components were reusable along with the number one and two engines. This incident was the first actual test for the new technology equipment in action. Major amendments to NFPA 414 over the past ten years, has allowed operators around the world to implement these new fire suppression devices and now we have seen what a properly trained and equipped ARFF department can accomplish.