

LOW ALTITUDE WINDSHEAR THREAT  
TO COMMERCIAL AIRCRAFT

1.0 INTRODUCTION AND BACKGROUND

When the influence of environmental factors on airplane performance is discussed in the United States, discussion is often initially focused toward low altitude windshear. Windshear has been identified as a contributing factor in at least 32 transport category aircraft accidents or incidents during the past 22 years. These accidents have resulted in over 600 fatalities and almost 250 injuries. During the last 10 years in the continental United States, windshear has been identified as a contributing factor in nearly half of all fatalities resulting from commercial aircraft accidents during takeoff and landing. A partial list of these incidents/accidents is shown below.

LOCATION	DATE	EQUIPMENT	FATALITIES	FLIGHT PHASE
Detroit Metropolitan	6/13/84	DC-9-31	None	Landing
Denver Stapleton	5/31/84	Boeing 727	None	Takeoff
Tau Manua Am. Samoa	5/12/84	DHC-6	None	Landing
New York LaGuardia	12/28/83	Boeing 727	None	Landing
New York LaGuardia	7/28/82	Boeing 727	None	Landing
New Orleans Intl.	7/09/82	Boeing 727	153	Takeoff
Dayton, Ohio Cox	5/21/82	BAC 111	None	Landing
Tucson, Ariz. Intl.	6/03/77	Boeing 727	None	Climb
Wildwood, N. J.	12/12/76	CHC-6	3	Final
Philadelphia Intl.	6/23/76	DC-9	None	Go-around
Denver Stapleton	8/07/75	Boeing 727	None	Climb
New York JFK	6/24/75	Boeing 727	113	Final
Dallas/Ft. Worth	8/02/85	Lockheed L-1011	134	Landing

An undetermined number of "close-calls" that did not result in damage or loss of life have also been attributed to windshear. Although the result of an encounter may be catastrophic, the probability of a given flight encountering a lethal windshear is low. Even with the current departure rate approaching 10 million takeoffs per year in the free world, past experience indicates only one or two serious encounters per year can be expected. Nearly all pilots can correctly say "It won't happen to me."

Although sensational low altitude windshear encounters are less frequent in Europe and Asia, the threat of windshear to civil aviation safety is also well recognized in those areas. European and Asian countries have taken a close interest in the problem and have given encouragement to the National Transportation Safety Board, NASA, and the Federal Aviation Agency (FAA) in establishing budget lines for windshear research.

Since 1983, a coherent response to the windshear threat has developed. In response to a congressional requirement which was established following the July 9, 1982 accident at New Orleans, a six month National Research Council (NRC) study was performed to investigate all aspects of the windshear