

can safely comply. Finally, after landing and upon exiting the runway, ensure your aircraft has completely crossed over the runway hold markings. Once all parts of the aircraft have crossed the runway holding position markings, you must hold unless further instructions have been issued by ATC. Do not initiate non-essential communications or actions until the aircraft has stopped and the brakes set.

Engineered Materials Arresting Systems (EMAS)

Aircraft can and do overrun the ends of runways and sometimes with devastating results. An overrun occurs when an aircraft passes beyond the end of a runway during an aborted takeoff or on landing rollout. To minimize the hazards of overruns, the FAA incorporated the concept of a runway safety area (RSA) beyond the runway end into airport design standards. At most commercial airports, the RSA is 500 feet wide and extends 1,000 feet beyond each end of the runway. The FAA implemented this requirement in the event that an aircraft overruns, undershoots, or veers off the side of the runway.

The most dangerous of these incidents are overruns, but since many airports were built before the 1,000-foot RSA length was adopted some 20 years ago, the area beyond the end of the runway is where many airports cannot achieve the full standard RSA. This is due to obstacles, such as bodies of water, highways, railroads, populated areas, or severe drop-off of terrain. Under these specific circumstances, the installation of an Engineered Materials Arresting System (EMAS) is an acceptable alternative to a RSA beyond the runway end. It provides a level of safety that is generally equivalent to a full RSA. [Figure 14-55]

An EMAS uses materials of closely controlled strength and density placed at the end of a runway to stop or greatly slow an aircraft that overruns the runway. The best material found to date is a lightweight, crushable concrete. When an aircraft rolls into an EMAS arrestor bed, the tires of the aircraft sink into the lightweight concrete and the aircraft is decelerated by having to roll through the material. [Figure 14-56]

Incidents

To date, there have been several incidents listed below where the EMAS technology has worked successfully to arrest aircraft that overrun the runway. All cases have resulted in minimal to no damage to the aircraft. The only known injury was an ankle injury to a passenger during egress following the arrestment. [Figure 14-57]

- May 1999—A Saab 340 commuter aircraft overran the runway at John F. Kennedy International Airport (JFK).



Figure 14-55. Engineered material arresting system (EMAS) located at Yeager Airport, Charleston, West Virginia.

- May 2003—A Cargo McDonnell Douglas (MD)-11 overran the runway at JFK.
- January 2005—A Boeing 747 overran the runway at JFK.
- July 2006—A Mystere Falcon 900 overran the runway at Greenville Downtown Airport (KGMU) in Greenville, South Carolina.
- July 2008—An Airbus A320 overran the runway at O'Hare International Airport (ORD).
- January 2010—A Bombardier CRJ-200 regional jet overran the runway at Yeager Airport (KCRW) in Charleston, West Virginia (WV). [Figure 14-58]
- October 2010—A G-4 Gulfstream overran the runway at Teterboro Airport (KTEB) in Teterboro, New Jersey (NJ).
- November 2011—A Cessna Citation 550 overran the runway at Key West International Airport (KEYW) in Key West, Florida.

EMAS Installations and Information

Currently, EMAS is installed at 63 runway ends at 42 airports in the United States with plans to install more throughout the next few years.

EMAS information is available in the Chart Supplement U.S. (formerly Airport/Facility Directory) under the specific airport information. Figure 14-59 shows airport information for Boston Logan International Airport. At the bottom of the page, it shows which runways are equipped with arresting systems and the type that they have. It is important for pilots to study airport information, become familiar with the details and limitations of the arresting system, and the runways that are equipped with them. [Figure 14-60]