

time Reichardt cut off all engine power. Using the jet's flight recorder, Madole showed that in 19 seconds, the 707 accelerated from 80 knots to 132 knots.

Therefore, he argued, Reichardt's decision to abort must have been reached prior to V1—the refusal speed. Since the TWA crew performed a perfect aborted takeoff procedure, the jet should not have skidded off the runway, endangering 29 passengers and a crew of seven. But it did, raising the question of why?

No one in FAA accused the TWA pilots of miscalculating their refusal speed, yet their calculation left no margin for safety. Similar calculations, Madole said, "are used every day to compute the proper performance of every airline jet that takes off on every passenger-carrying flight in scheduled air transportation. It is impossible, therefore, to overemphasize the seriousness of this accident."

It was during the certification process that Boeing and the FAA had decided that a 212,231-pound 707 could accelerate to 132 knots, sustain the loss of an engine and still stop safely within a 7800-foot runway. Behind that decision was a series of test flights that bore little resemblance to the last abortive flight of TWA 707 N742TW the night of Nov. 6 at Cincinnati.

NO SURPRISE ELEMENT

To determine the 707's runway length requirements, Boeing used a team of crack test pilots. It gave them a brand new 707 with brand new brakes. The 707's tires, fresh from the factory, were perfectly round and had deep, finely grooved treads. Installed on the 707's instrument panel was an oversized airspeed indicator that registered velocity in fractions of knots.

Instead of staging the tests on a runway slickened by engine oil and jet exhaust particles, the pilots used a long stretch on dry, clean concrete. But, more important, the men knew what lay in store as they sped down the runway.

Actual emergencies shock and surprise. It takes the average pilot four seconds to recognize the hazard, select proper countermeasures and employ them. During those four seconds, his plane can roll 1000 feet and accelerate 20 knots or more, easily exceeding the speed V1.

Yet the element of surprise is ignored in determining runway length requirements—a fact that the Air Line Pilots Association has long found infuriating.

Four and a half years before the Cincinnati accident, the FAA recognized that the average airline pilot might have difficulty duplicating the sudden stops achieved by the manufacturer's best test pilots. In a Notice of Proposed Rule Making published July 15, 1963, the agency declared that allowable accelerate-stop distance (an acceleration to V1, then a stop on the remaining runway) afford the "absolute minimum level of safety."

In unusually tough tones, FAA then proposed lengthening such distances by a constant 800 feet at all U.S. airports. It simultaneously proposed that an extra 1200 feet be tacked onto predicted landing distances whenever rain or snow made a runway slippery.

"FEELINGS" NO CRITERION

Industry's reaction was swift and angry and illustrative of the intimate relationship between safety and profit in air transportation. Representing the larger manufacturers, the Aerospace Industries Association commented:

"The statement that some airline pilots doubt that they could reproduce the certificated accelerate-stop distances during air carrier operations is not a legitimate reason for rule changing. Feelings should not be substituted for test data when making an important decision, such as that under consideration."

Representing scheduled U.S. trunklines, the Air Transport Association warned that the regulation would inflict huge economic penalties on its membership. For example, Eastern Air Lines would have to cut back jet payloads by up to 15,000 pounds at 27 cities, Pan American at 13 and so on.

Behind the AIA and ATA protests is a harsh fact of the marketplace: Compact jetliners require fewer feet of concrete to land and take off. The "little" jets, therefore, are alighting at smaller cities where runways generally are shorter—in the 5000- to 7000-foot category. When FAA adds 1000 feet to takeoff roll requirements on such runways, airlines must subtract up to 8 percent from their planes' maximum takeoff weight.

That 8 percent must come out of the fuel tank or the passengers' cabin, and either way it would cost the industry millions. Consider that the 15,000-pound weight reduction cited by Eastern could equal 75 paying passengers or 2500 gallons of kerosene which airlines burn to keep passengers paying.