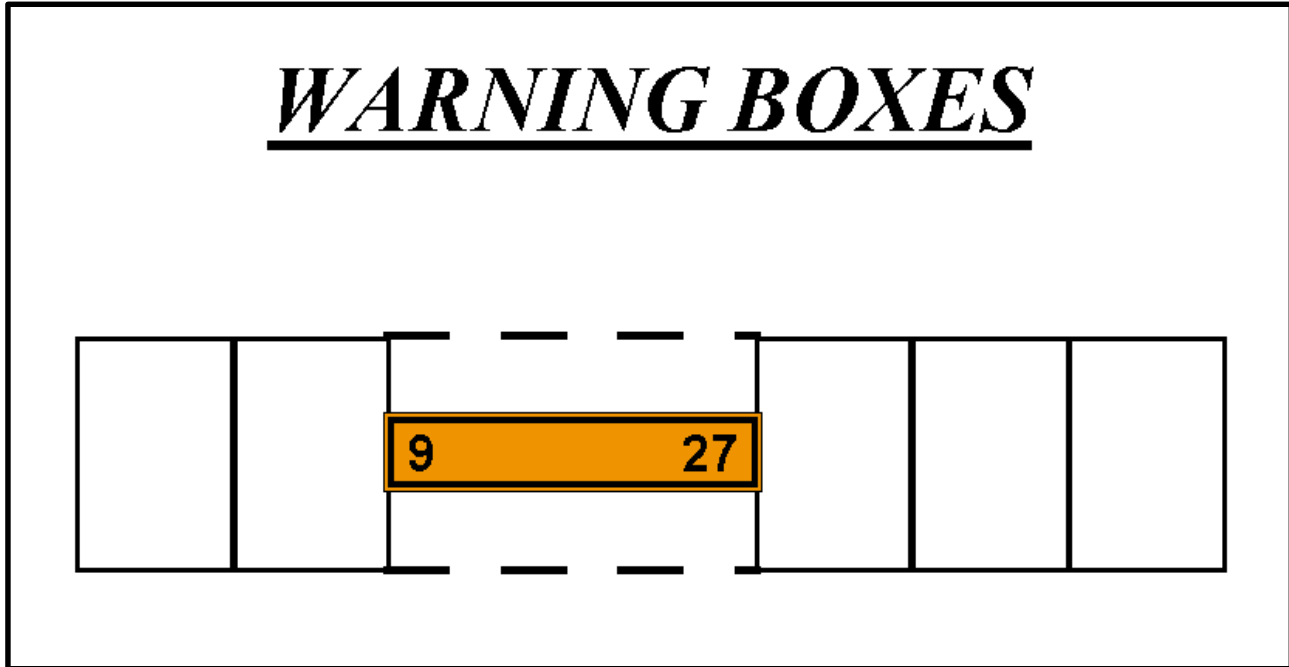


FIG 7-1-16  
Warning Boxes



(b) LLWAS was fielded in 1988 at 110 airports across the nation. Many of these systems have been replaced by new TDWR and WSP technology. While all legacy LLWAS systems will eventually be phased out, 39 airports will be upgraded to LLWAS-NE (Network Expansion) system. The new LLWAS-NE systems not only provide the controller with wind shear warnings and alerts, including wind shear/microburst detection at the airport wind sensor location, but also provide the location of the hazards relative to the airport runway(s). It also has the flexibility and capability to grow with the airport as new runways are built. As many as 32 sensors, strategically located around the airport and in relationship to its runway configuration, can be accommodated by the LLWAS-NE network.

### 3. Terminal Doppler Weather Radar (TDWR).

(a) TDWRs have been deployed at 45 locations across the U.S. Optimum locations for TDWRs are 8 to 12 miles off of the airport proper, and designed to look at the airspace around and over the airport to detect microbursts, gust fronts, wind shifts, and precipitation intensities. TDWR products advise the controller of wind shear and microburst events

impacting all runways and the areas  $\frac{1}{2}$  mile on either side of the extended centerline of the runways out to 3 miles on final approach and 2 miles out on departure. (FIG 7-1-16 is a theoretical view of the warning boxes, including the runway, that the software uses in determining the location(s) of wind shear or microbursts). These warnings are displayed (as depicted in the examples in subparagraph 5) on the RBDT.

(b) It is very important to understand what TDWR does NOT DO:

- (1) It **DOES NOT** warn of wind shear outside of the alert boxes (on the arrival and departure ends of the runways);
- (2) It **DOES NOT** detect wind shear that is NOT a microburst or a gust front;
- (3) It **DOES NOT** detect gusty or cross wind conditions; and
- (4) It **DOES NOT** detect turbulence.

However, research and development is continuing on these systems. Future improvements may include such areas as storm motion (movement), improved gust front detection, storm growth and decay, microburst prediction, and turbulence detection.