Positive train control in the Northeast Corridor came before the rest of the industry

by Al DiCenso

While the nation’s freight railroads scramble to put positive train control in place by the end of 2015, Amtrak has used a crash avoidance system on parts of the busy and fast Northeast Corridor since 1999. Amtrak put the first segment of its Advanced Civil Speed Enforcement System, or Aces (pronounced “AX-es”), into operation along the Boston to New Haven, Conn., segment as part of its electrification and modernization program. Aces prepared the route for America’s new fast trains, the sleek Acela Express. On this and two other stretches of the Northeast Corridor, the system guards all trains moving at speeds of up to 150 mph. Predecessors of the system have been used for more than 90 years, beginning in the 1920s when the Pennsylvania Railroad developed its four-aspect cab signal system. The system kept the engineer informed of conditions...
Transponders mounted between the rails communicate train locations and speeds between on-board computer signals.

Amtrak full-motion computer simulator at the training center near Wilmington, Del., provides a deeper look into the Acela system. System General Road Foreman Don Savidge and Operating Practices Senior Analyst Jay Gillian set up a simulated route for me to try out the system. The simulator is a replica of an Acela cab. Ahead of the windshield is a full-width projection screen. With Savidge settled into the engineer’s seat, Gillian starts the movie-like scene of the right of way, complete with lineside buildings, catenary supports, signals, and even weeds. We “move” as Savidge advances the power handle (Acelas have no “throttle”), and the instruments come to life. Our speed advances quickly to that shown in the “signal speed” window of the aspect display unit to Savidge’s right. The speed allowed by the cab signal indication is just above it, in this case green, or “clear 150”. Below that is the “track speed” window, which shows the actual function is to let the train’s on-board computer know its exact location. On-board measuring equipment plots distance traveled, and the transponders correct minor errors caused by wheel diameter variation. The train then also feeds the train’s position and route location in tandem with directions distances to the next two transponder pairs, the next signal, or the next interlocking command.

What’s next
On the Boston-New Haven segment, Acelas operate at the maximum speeds permitted. AEMT and HHPA locomotives are restricted to a 125-mph maximum. North of New Haven, the route stretches for 150-mph running, with the balance mostly 135 mph. Between New York and Washington, Amtrak is operational on two short stretches New York to New Haven, New Haven to Wilmington, Del., to Perryville, Md., each about 30 miles. These legs will be extended to the entire Northeast Corridor, with completion by the end of 2012. The New York-Washington segment will hold maximum speeds to 135 mph, partly because of curves and congested areas, but mainly owing to the age and design of the catenary. The next segment over the Boston-New Haven line, with Acelas now in the Northeast Regional train project, along Chesapeake Bay. Because no work will be done here, a second engineering model is being used. Unobstructed, the Acela reaches 150 mph on the Acela Express, just reminiscent of the old-style signals in operation. Amtrak will begin offering a 125-mph service to and from New York City in 2010.

The next time you’re cruising along at 130 mph on the Acela Express, just remember, it’s thanks to the magic of a control train system created nearly 20 years ago. AL DINCENZO is semi-retired, living in Annapolis, Md., and is vice president of the Railroaders Memorial Museum in Altoona, Pa.