By 1963, many of the New York Central's switchers had a rotary beacon on the front edge of the cab roof to make them more visible at night. This Norfolk Southern Dash 9-40CW displays the current three-light system with a headlight and two alternately flashing lower lights to capture motorists' attention. Jim Hediger photos

Gumball machines and ditch lights

When did railroads switch from rotary beacons to today's triangular headlight and flashing light display? Were they mainly used in yards or in road service? Were they mandated by federal rules? *Jason Adler, Richland, Wash.*

Rotary beacons were initially used in the early 1960s to make switchers more visible in large yards at night. The flashing lights helped the yardmasters in the towers keep track of the switchers.

In the 1970s, the Federal Railroad Administration began studying ways to reduce grade crossing accidents by making trains more visible to motorists. Tests with oscillating headlights, rotating beacons, alternating flashing lights, ditch lights, and roof-mounted strobe lights led to the use of a triangular combination of two strobe lights with a standard headlight or a pair of roof-mounted strobe lights.

More FRA testing followed in the early 1990s to identify the most effective combination of a normal headlight with various secondary lights. In 1993, a triangular configuration with alternately flashing lower lights was field tested on CalTrans, Conrail, and Norfolk Southern. At the end of the tests, the FRA report lists an accident reduction of 76.4 percent on CalTrans, 74.3 percent on Conrail, and 54.6 percent on Norfolk Southern.

Further experiments compared motorists' recognition of the triangular light system in different spacing combinations. This program also evaluated the costs of installation and maintenance.

These tests were the basis for interim regulatory requirements for locomotive auxiliary lights issued in 1993 and amended in 1994. These rules included specifications for the auxiliary lights and their positioning on the front of the locomotive.

A final interim rule in 1996 established the current uniform triangular light pattern. The lower lights produce steady beams of bright light during normal train movement, but flash alternately when the horn is sounded, and for 30 seconds afterward. These bright flashing lights mounted close to the motorists' eye level do a good job of attracting attention anytime, day or night.

Using the current version of these auxiliary alerting lights is a matter of the engineer switching them on or off, just like the headlights. From then on, the flashing safety feature is automatic anytime the horn is sounded. – *Jim Hediger, senior editor*