

Case 23

Preventing Crashes on America's Highways

Dorr Foundation, 1952

Steven Schindler

Background. Dr. John V. N. Dorr was internationally known for his inventions and innovations in the field of metallurgical engineering. While still a teen, Dorr worked for Thomas Edison in his laboratory.³⁴³ He later began an engineering firm that gradually brought him the wealth with which to establish a foundation in his name in 1940.³⁴⁴ The indenture for the foundation specified scientific research, after-retirement utilization of the skills of professionals, special educational projects for youth, and support of charitable work of other organizations as focus areas for the foundation. Early grants from the foundation largely supported scholarships, research, and aid to service organizations.³⁴⁵

The Dorr Foundation was established with the initial purpose of supporting the fields of chemistry and metallurgy exclusively. Inspired by the complaints of his wife, however, Dr. Dorr steered the foundation's resources and his own efforts toward the traffic hazards of night-time and bad-weather driving. Mrs. Dorr complained that, in poor driving conditions, headlight glare from oncoming traffic led drivers to hug the center line or to swerve away from the center line and into the soft shoulder of the highway, resulting in a high frequency of accidents in both cases.³⁴⁶ Dorr became convinced that a shoulder line marking the division between the road lane and the shoulder would significantly reduce such hazards. Such a line, he thought, could also increase the safety of pedestrians walking along the shoulders of roads by providing a clear demarcation.³⁴⁷

Strategy. Dorr's first response was to mail a letter to the Connecticut State Highway Commissioner suggesting his idea of a shoulder line in 1952, but the state took no action in response to his suggestion.³⁴⁸ The next year, Dorr wrote a letter to his local newspaper, the *Westport Town Crier*, with an outline of his suggestion, a plan for a test site, and an offer to fund the test.³⁴⁹ "If the white line were painted on the outer or right-hand side," Dorr wrote, "the driver's eyes would avoid meeting the headlight's glare."³⁵⁰

Dorr's advocacy this time led the Connecticut highway officials to conduct a field test on a portion of the Merritt Parkway. The position and driving behavior of 11,289 vehicles along this test strip demonstrated that the shoulder lines improved automobile position in the center of the lane, corrected speed differentials resulting from adverse driving conditions, and nullified the effects of distracting roadside features, particularly during the dawn and dusk hours.³⁵¹ These results supported the conclusions that shoulder striping would reduce same direction sideswipe accidents, would prevent the early destruction of paved shoulders, and would prevent accidents resulting from automobiles losing traction upon drifting onto the soft shoulders.³⁵² The results of this test prompted the state to stripe the entire length of the Parkway.³⁵³ New York followed suit with a test of its own on the Hutchinson River Parkway, which is the continuation of the Merritt Parkway into New York State. In seven months prior to the application of white stripes along the parkway shoulders, 102 accidents resulting in forty-nine injuries occurred. In the seven months after the application of the white stripes in 1954, only forty-six accidents occurred with twenty-seven injuries, a 55 percent reduction from the pre-stripe period.³⁵⁴ Credit for the reduction in accidents was blurred, however, because two additional motorcycle police began to patrol the test strip after the application of the white stripes. This gave critics of the stripes an opportunity to challenge the validity attributed to the benefits of the shoulder stripes.³⁵⁵

Highway officials were reluctant to pursue Dorr's suggested course of action. The cost of shoulder striping, estimated as high as \$150 per mile, as well as some skepticism both regarding the

effectiveness of the stripes in decreasing accidents and arising from potential harmful effects of the stripes, were all obstacles to Dorr's campaign.³⁵⁶ California officials even charged that motorists would mistake the right shoulder line for the center line and would drive to the right of the line, placing the driver and passengers at grave risk.³⁵⁷

In 1957, the shoulder line was still considered to be "highly controversial," but the controversy stemmed from ignorance of its effects rather than reasoned judgment and weighing of factors.³⁵⁸ In New York, the State Traffic Commission deemed the shoulder lines unnecessary, speculating that the lines were effective only on roads with paved shoulders. Other states, particularly in the West, felt that lines were appropriate only on roads without paved shoulders. These conclusions justified not striping, as few New York roads had shoulders, and many roads in the Western states did.³⁵⁹

After the tests along the Hutchinson River Parkway, the Dorr Foundation encouraged further safety testing.³⁶⁰ In response to the reservations among highway department officials about potential harmful consequences of the shoulder lines, the Dorr Foundation organized extensive studies in Rhode Island, New Jersey, Ohio, and Connecticut, overseen by the Highway Research Board of the National Academy of Sciences.³⁶¹

In addition, public sentiment in Dorr's favor began to mount. Numerous newspaper editorials and letters to the editor, many citing Dorr's pioneering efforts, called for shoulder lines on highways for increased safety.³⁶² In a report to the Highway Research Board in 1958, the chief of research of the Bureau of Public Roads strongly urged the Board promptly to begin the testing urged by Dorr. "The Public is demanding it," the Chief of Research wrote, "and is now leading us in the matter of road-shoulder edge-lining of highways.... As highway engineers we've got to stop dragging our feet."³⁶³

The Ohio study was documented in 1960 in a research bulletin issued by the Highway Research Board.³⁶⁴ In Ohio, researchers selected twelve lengths of two-lane state highways spread throughout the state to test the effects of the white shoulder lines (three of the sections turned out to be unusable for the study). Each strip was divided into two sections—a control section and a test section—and the researchers literally flipped coins to determine which section in each of the nine study-strips would be the test section along which shoulder lines would be drawn. All accidents in each section of highway were recorded during the year 1956 and again during the first full year after the application of the white lines in the test sections. A total of 132 accidents occurred in all of the control sections during the first period and 167 accidents occurred after shoulder lines were applied on the test sections (indicating an overall increase in all accidents, possibly resulting from increased traffic). In the test sections, 123 accidents occurred prior to the shoulder line application and 126 accidents occurred after the application. Using the control section to provide a forecast multiplier, the test sections could have expected 156 accidents. In other words, the number of accidents in the test sections would likely have been much higher without the white shoulder lines, and the slower growth of accidents in the test sections is attributable to the white shoulder lines.³⁶⁵ There was an even more significant difference in the number of fatalities and injuries resulting from accidents between the test sections and the control sections. Generally, the study showed that a 19 percent decrease in accidents, a 35 percent decrease in night accidents, and a 37 percent decrease in fatalities and injuries were attributable to the white shoulder lines.³⁶⁶

Impact. The Dorr Foundation served as a clearing house for information on the white shoulder line. It issued bulletins in which it reported new tests, as well as new states and regions applying the white lines to road shoulders. The Foundation also reprinted and distributed copies of the early studies in Connecticut.³⁶⁷ The Foundation, primarily through Dr. Dorr, also worked with a number of safety groups and state highway departments, including the President's Action Committee for Traffic Safety, the Highway Research Board of the National Academy of Sciences, and the Federal Bureau of Public Roads, to promote white shoulder lines.³⁶⁸ A few years after Dorr began supporting his idea with his foundation's resources, the highway shoulder line, proven to be effective at reducing traffic accidents and fatalities, would gain universal acceptance and application.

Notes

343. "John Van Nostrand Dorr Dies; Metallurgist, 90, Was Inventor," *New York Times*, 7/1/1962, 57.
344. *The Dorr Foundation Report: December 28, 1940 to December 31, 1957* (New York: Dorr Foundation), 5.
345. Ibid.
346. Joseph C. Ingraham, "Line on Road's Edge is Cutting Accidents," *New York Times*, 1/5/1955, 1.
347. Cliff Ridley, "The Case for the Right Shoulder Line," *Fairfield County Fair*, 8/18/1955, 10.
348. Dorothy Fagerstrom, "Another Line for Safety: The Story of a Man and His Idea," *Law and Order*, June 1958, 5.
349. Fagerstrom, "Another Line," 5; Ridley, "Case for the Right Shoulder Line," 7.
350. Ridley, "Case for the Right Shoulder Line," 7.
351. "Right Shoulder Guides Gain as Road Safeguards," *Fleet Owner*, July 1955, 128.
352. Fagerstrom, "Another Line," 5; Ridley, "Case for the Right Shoulder Line," 7.
353. Ingraham, "Line on Road's Edge," 1, 18; Ridley, "Case for the Right Shoulder Line," 7.
354. "Right Shoulder Guides," 128.
355. Ingraham, "Line on Road's Edge," 18.
356. Ibid.
357. Ridley, "Case for the Right Shoulder Line," 10.
358. Joseph C. Ingraham, "Automobiles: Edges," *New York Times*, 9/22/1957, 165.
359. Ingraham, "Automobiles," 165.
360. Fagerstrom, "Another Line," 5.
361. Ingraham, "Automobiles," 165.
362. "Now That White Paint Is Saving Lives," *Mt. Vernon Argus* (New York), 10/7/1954; Arthur D. Camp, letter to the editor, *Daily Times* (Mamaroneck, NY), 12/20/1954; "White Line on the Right," *Daily Times* (Mamaroneck, NY), 12/20/1954; H.P. Hawes, letter to the editor, *Farmingdale Post* (NY), 2/16/1955; W.N. Seymour, Jr., letter to the editor, *Adirondack Daily Enterprise*, 4/11/1955; Helen S. Nason, "They Are So Right!" *Adirondack Daily Enterprise*, 4/13/1955; "Why Neglect Safety on Bronx Parkway?" *Mt. Vernon Argus* (NY), 5/11/1955.
363. *Dorr Foundation Report*, 14.
364. *Bulletin 266: Pavement Edge Markings, Shoulders and Medians*, (Washington: Highway Research Board, 1960), 1.
365. *Bulletin 266*, 2.
366. *Bulletin 266*, 6.
367. *Dorr Foundation Report*, 13.
368. *Dorr Foundation Report*, 14.