

# TURNING AROUND AMERICA'S TRAFFIC CRISIS ONE ROUNDABOUT AT A TIME: WHY MORE ROUNDABOUTS MEANS SAFER ROADS AND FEWER AUTOMOBILE DEATHS

## INTRODUCTION

Henry Ford's early twentieth-century breakthroughs in automotive mass production merged the United States into the fast lane toward motor vehicles becoming a dominant mode of personal travel.<sup>1</sup> Today, for an hour a day, ninety percent of Americans over the age of sixteen will buckle into motorized, multi-ton projectiles and propel themselves along a vast infrastructure of roads designed and regulated primarily for expediency of travel, not safety.<sup>2</sup> And while America's obsession with personal locomotion may be a realization of Henry Ford and other industrialists' highest hopes for a modern society, the magnitude of the harm occasioned to America by automobile crashes is certainly far beyond the scope of their imaginations. Traffic crashes are one of the top three causes of unintentional injury death for Americans of all ages.<sup>3</sup> Nearly 40,000 Americans will die in car accidents this year, and an estimated 2.74 million Americans were injured in car accidents in 2019.<sup>4</sup> Equally as horrible, more than 50,000 pedestrians were struck and killed between 2010 and 2019 simply by

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1. *The Age of the Automobile*, U.S. HIST. ONLINE TEXTBOOK, <https://www.ushistory.org/us/46a.asp> [<https://perma.cc/T54R-YGMH>] (last visited Jan. 19, 2023).

2. AAA FOUND. FOR TRAFFIC SAFETY, NEW AMERICAN DRIVING SURVEY: UPDATED METHODOLOGY AND RESULTS FROM JULY 2019 TO JUNE 2020, at 2 (2021), <https://aaaafoundation.org/wp-content/uploads/2021/04/New-American-Driving-Survey-Report-April-2021-1.pdf> [<https://perma.cc/EUP2-U437>]. The eighty-five percent rule for determining speed limits and traffic flows, which directs regulators to set speed limits at the eighty-fifth percentile speed of flowing traffic at a given location, is a prime example of favoring speed and economy over obvious increases in danger. *See, e.g.*, Sara C. Bronin & Gregory H. Shill, *Rewriting Our Nation's Deadly Traffic Manual*, 135 HARV. L. REV. FORUM 1, 10 (2021); FED. HIGHWAY ADMIN., MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS § 2B.13.12 (rev. July 2022), <https://mutcd.fhwa.dot.gov/pdfs/2009r1r2r3/mutcd2009r1r2r3edition.pdf> [<https://perma.cc/6VWF-CNCY>].

3. *10 Leading Causes of Injury Deaths by Age Group Highlighting Unintentional Injury Deaths, United States – 2018*, CTRS. FOR DISEASE CONTROL AND PREVENTION, [https://www.cdc.gov/injury/images/lc-charts/leading\\_causes\\_of\\_death\\_by\\_age\\_group\\_unintentional\\_2018\\_1100w850h.jpg](https://www.cdc.gov/injury/images/lc-charts/leading_causes_of_death_by_age_group_unintentional_2018_1100w850h.jpg) [<https://perma.cc/4FZ7-22GR>] (last visited Jan. 19, 2023).

4. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., TRAFFIC SAFETY FACTS 2019: A COMPILATION OF MOTOR VEHICLE CRASH DATA 20 (2021), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813141> [<https://perma.cc/ET4U-VVZV>]. Additionally, almost 350,000 people have died in car crashes since 2010 in America. *Motor Vehicle Traffic Fatalities and Fatality Rates, 1899-2020*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. (June 2022), <https://cdan.nhtsa.gov/tsftables/Fatalities%20and%20Fatality%20Rates.pdf> [<https://perma.cc/5NBH-7PD4>].

walking near or crossing roadways.<sup>5</sup> Additionally, traffic fatalities cost Americans around \$384 billion per year.<sup>6</sup> Furthermore, “[w]hen quality of life valuations are considered, the total value of societal harm from traffic crashes in the United States in 2010 was an estimated \$836 billion.”<sup>7</sup> Adjusted for the environmental effects of driving, such as pollution from emissions, the annual death toll caused by driving in the United States rises from roughly 40,000 to nearly 100,000 lives.<sup>8</sup> And less obvious but more insidious is the disproportionate effect of the current traffic crisis, both in terms of crashes and adverse environmental impact, on people of color and other underrepresented communities throughout America.<sup>9</sup>

The American traffic crisis must be met with drastic changes to address the harms caused by vehicle collisions and emissions. However, any radical revision to the vehicular transportation system would have to overcome the entrenched legal, political, and economic incentives that reinforce the promotion of expediency over safety.<sup>10</sup> Even in the face of skyrocketing risks created by confounding behavioral factors like intoxicated driving and speeding, or structural and legal risks such as widening highways,<sup>11</sup> road design favoring speed,<sup>12</sup> and weak traffic law enforcement, American society refers to car crashes as “accidents” and often views their occurrence

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5. NAT’L COMPLETE STS. COAL. & SMART GROWTH AM., DANGEROUS BY DESIGN 2021 4 (2021) [hereinafter DANGEROUS BY DESIGN], <https://smartgrowthamerica.org/wp-content/uploads/2021/03/Dangerous-By-Design-2021-update.pdf> [<https://perma.cc/AE6X-QZB2>].

6. Gregory H. Shill, *Should Law Subsidize Driving?*, 95 N.Y.U. L. REV. 498, 501–02 (2020).

7. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., TRAFFIC SAFETY FACTS – 2019 DATA: SUMMARY OF MOTOR VEHICLE CRASHES 10 (Nov. 2021), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813209> [<https://perma.cc/43MY-GHCS>].

8. Bronin & Shill, *supra* note 2, at 1 n.1; *see also* Fabio Caiazzo, Akshay Ashok, Ian A. Waitz, Steve H.L. Yim & Steven R.H. Barrett, *Air Pollution and Early Deaths in the United States. Part I: Quantifying the Impact of Major Sectors in 2005*, 79 ATMOSPHERIC ENV’T 198, 198 (2013) (“The largest contributors for both pollutant-related mortalities are road transportation, causing ~53,000 [related deaths].”).

9. Bronin & Shill, *supra* note 2, at 8 (“As has been documented extensively, the lives taken by car crashes are far likelier to be African American, Latino, Indigenous, low income, or belong to people with disabilities than the general population. Even after adjusting for differences in walking rates, African American pedestrians face two-thirds more danger than their white counterparts and Native American pedestrians twice as much. Transportation-related emissions disproportionately affect the health of those same groups.” (footnotes omitted)). U.S. Transportation Secretary Pete Buttigieg was quoted stating: “There is racism physically built into some of our highways.” Corinne Grinapol, *Biden Administration Seeks to Address the Interstate Highway System’s Racist Past*, ENG’G NEWS-RECORD (Apr. 15, 2021), <https://www.enr.com/articles/51593-biden-administration-seeks-to-address-the-interstate-highway-systems-racist-past> [<https://perma.cc/JLJ5-MMTR>]; *see also* DANGEROUS BY DESIGN, *supra* note 5, at 26–28.

10. *See generally* Shill, *supra* note 6, at 498 (highlighting the legal and policy drivers that shape multiple arenas of law toward favoring and relying on unsafe vehicular travel).

11. *See, e.g.*, Subha Ranjan Banerjee & Ben Welle, *Bigger Isn’t Always Better: Narrow Traffic Lanes Make Cities Safer*, WORLD RES. INST. (Dec. 7, 2016), <https://www.wri.org/insights/bigger-isnt-always-better-narrow-traffic-lanes-make-cities-safer> [<https://perma.cc/U7GW-R3V9>].

12. *See supra* note 2 and accompanying text.

as an unavoidable cost of living in an advanced society.<sup>13</sup> The structural risks faced by drivers are further compounded by the increasing average size and performance of consumer vehicles.<sup>14</sup> But the severity of the public health crisis presented by increasingly dangerous driving behavior, high-risk driving regulations, bigger and faster cars, and inherently dangerous infrastructure is becoming more of an urgent issue at the highest levels of government.<sup>15</sup> Adjusting infrastructure design and reshaping traffic policy to incentivize and promote safety is America's best chance at ameliorating the traffic death crisis.<sup>16</sup> The recent passage of the Infrastructure and Investment Jobs Act, designed, among other purposes, "[t]o authorize funds for Federal-aid highways, highway safety programs, and transit programs," has provided substantial funding to tackle the toughest of America's traffic issues.<sup>17</sup>

Although traffic law is the "body of law with which ordinary Americans interact most frequently,"<sup>18</sup> "the substance of vehicle and traffic regulation

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13. See, e.g., Shill, *supra* note 6, at 526–27; Gregory H. Shill, *Americans Shouldn't Have to Drive, but the Law Insists on It*, ATLANTIC (July 9, 2019), <https://www.theatlantic.com/ideas/archive/2019/07/car-crashes-arent-always-unavoidable/592447/> [<https://perma.cc/HXW8-Z4PK>]; see also *What is Vision Zero?*, VISION ZERO NETWORK, <https://visionzeronetWORK.org/about/what-is-vision-zero/> [<https://perma.cc/4L2Y-CNHU>] (last visited Jan. 25, 2023) ("Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe — and now it's gaining momentum in major American cities."); Tom Krisher & Hope Yen, *US Cites 'Crisis' as Road Deaths Rise 18% in First-Half 2021*, AP NEWS (Oct. 28, 2021), <https://apnews.com/article/coronavirus-pandemic-business-health-transportation-pete-buttigieg-dbf430dbcc16e5a0800dbc375efa75aw> [<https://perma.cc/JVA3-KPP8>].

14. See Michael Wayland, *More People are Dying on U.S. Roads, Even as Cars Get Safer. Here's Why It's a Tough Problem to Solve*, CNBC (May 22, 2022, 7:00 AM), <https://www.cnbc.com/2022/05/22/us-roadway-deaths-rise-even-as-cars-get-safer.html> [<https://perma.cc/YWF2-R2E5>].

15. Krisher & Yen, *supra* note 13; see also Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 11111, 135 Stat. 429, 475–79 (2021) (amending 23 U.S.C. § 148 to include roundabouts as improvements eligible for federal funding under the federal highway safety program); U.S. DEP'T OF TRANSP., NATIONAL ROADWAY SAFETY STRATEGY (Jan. 2022), [https://www.transportation.gov/sites/dot.gov/files/2022-01/USDOT\\_National\\_Roadway\\_Safety\\_Strategy\\_0.pdf](https://www.transportation.gov/sites/dot.gov/files/2022-01/USDOT_National_Roadway_Safety_Strategy_0.pdf) [<https://perma.cc/3JYQ-2LB7>].

16. See, e.g., Bronin & Shill, *supra* note 2, at 16–19 (proposing a drastic change to the rules set forth in the Department of Transportation's traffic manual, the Manual on Uniform Traffic Control Devices (MUTCD)).

17. Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021). A recent analysis by the Brookings Institution found that the legislation earmarked "\$361 billion . . . [for] various highway, roadway, and bridge programs." Adie Tomer, Caroline George, Andrew Bourne & Joseph W. Kane, *Introducing the Brookings Federal Infrastructure Hub: A Comprehensive Guide to the Infrastructure Law*, BROOKINGS: AVE. (Feb. 10, 2022), <https://www.brookings.edu/blog/the-avenue/2022/02/10/introducing-the-brookings-federal-infrastructure-hub-a-comprehensive-guide-to-the-infrastructure-law/> [<https://perma.cc/8XAX-B8JH>].

18. See Lior Jacob Strahilevitz, "How's My Driving?" *For Everyone (And Everything?)*, 81 N.Y.U. L. REV. 1699, 1703 n.11 (2006).

has largely escaped critical analysis.”<sup>19</sup> This Note will add to the legal scholarship concerning traffic safety regulation and reform by advocating for the broad implementation of roundabouts at intersections throughout America as a means of combatting traffic and pedestrian injuries and fatalities. Such regulatory and policy changes will also help to address the disproportionate adverse effects poor traffic policy and regulation have on underrepresented populations and the environment. Installing roundabouts in place of signalized and unregulated intersections<sup>20</sup> throughout the country would be a substantial step toward solving the United States’ current traffic safety crisis.<sup>21</sup> In addition to eliminating unprotected left turns,<sup>22</sup> roundabouts protect against a critical mass of the risks facing American drivers by dramatically reducing crashes, injuries, and adverse environmental impacts while also promoting efficiency and slower speeds.<sup>23</sup>

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19. See Shill, *supra* note 6, at 505 (“Cloaked in mundanity and a surface neutrality, the substance of vehicle and traffic regulation has largely escaped critical analysis.”).

20. For a thorough definition and a discussion of signalized intersections, see FED. HIGHWAY ADMIN., SIGNALIZED INTERSECTIONS INFORMATIONAL GUIDE SECOND EDITION § 1.1 (July 2013), <https://safety.fhwa.dot.gov/intersection/signal/fhwasa13027.pdf> [<https://perma.cc/3PWE-UB3C>] (“Traffic signals are electrically operated traffic control devices that provide indication for roadway users to advance their travels by assigning right-of-way to each approach and movement.”). Unregulated intersections are intersections where there are no traffic control devices or signals in place to direct drivers, thus leaving often complicated and confusing determinations of right of way and traffic flow to drivers. See, e.g., *Uncontrolled Intersections*, ZUTOBI DRIVERS ED (June 14, 2021), <https://zutobi.com/us/driver-guides/uncontrolled-intersections> [<https://perma.cc/VF9Y-E93Z>].

21. See, e.g., Hope Yen, *US Road Deaths Rise at Record Pace as Risky Driving Persists*, AP NEWS (Feb. 1, 2022, 12:08 PM) <https://apnews.com/article/coronavirus-pandemic-business-health-transportation-pete-buttigieg-a16719e38d72f68e338030103e924cf0> [<https://perma.cc/ENW4-53S4>] (highlighting that roughly 31,720 people died in car crashes during the first nine months of 2021, which was 12% higher than the same period in 2020 and represents the highest percentage increase over a nine-month period since the National Highway Traffic Safety Administration (NHTSA) began recording traffic fatality statistics).

22. See, e.g., Caroline Delbert, *We Should Abolish the Left Turn, Science Suggests*, POPULAR MECHS. (June 14, 2021), <https://www.popularmechanics.com/science/a36620755/eliminate-left-turns/> [<https://perma.cc/JJX7-CMN6>].

23. *Roundabouts*, INS. INST. FOR HIGHWAY SAFETY (July 2022) (citing Casey Bergh, Richard A. Retting & Edward Myers, *Continued Reliance on Traffic Signals: The Cost of Missed Opportunities to Improve Traffic Flow and Safety at Urban Intersections*, INS. INST. FOR HIGHWAY SAFETY (Sept. 2005), <https://www.iihs.org/topics/bibliography/ref/1848> [<https://perma.cc/R629-WKQ6>]), <https://www.iihs.org/topics/roundabouts#roundabouts> [<https://perma.cc/QM9B-GB79>] (estimating the use of roundabouts instead of traffic signals can reduce intersection delays by up to seventy-four percent). Installing roundabouts in place of other traffic signals resulted in a “62% to 67% reduction in total crashes and an 85% to 87% reduction in injury crashes” in one study. Hillary Isebrands & Shauna Hallmark, *Statistical Analysis and Development of Crash Prediction Model for Roundabouts on High-Speed Rural Roadways*, 2312 TRANSP. RSCH. REC.: J. TRANSP. RSCH. BOARD 3, 12 (2012). Constructing roundabouts in place of traffic signals or stop signs reduced fuel consumption by an estimated twenty-three to thirty-four percent. INS. INST. FOR HIGHWAY SAFETY, *supra* (citing Wen Hu, Anne T. McCartt, Jessica S. Jermakian & Srinivas Mandavilli, *Public Opinion, Traffic Performance, the Environment, and Safety After the Construction of Double-Lane Roundabouts*, 2402 TRANSP. RSCH. REC.: J. TRANSP. RSCH. BOARD 47 (2014); András Várhelyi, *The Effects of Small Roundabouts on Emissions and Fuel Consumption: A Case Study*, 7 TRANSP. RSCH. PART D: TRANSP. & ENV’T 65 (2002); Paul G Höglund,

## I. BACKGROUND

Among the toughest of America's traffic issues are the risks faced by drivers traveling through intersections. Fairly described as ubiquitous and inherently dangerous, intersections are "where two or more roads cross each other and activities such as turning left, crossing over, and turning right have the potential for conflicts resulting in crashes."<sup>24</sup> Americans experience this danger in serious ways: twenty-four percent of all fatalities and roughly forty-eight percent of injuries caused by automobile crashes between 2010 and 2019 occurred at intersections.<sup>25</sup> Moreover, nearly all crashes at intersections have causes attributable to drivers.<sup>26</sup> One of the most prevalent pre-crash events reviewed by the National Highway Traffic Safety Administration (NHTSA) was turning left.<sup>27</sup> To combat these risks, this Note proposes roundabouts as the dominant form of intersection traffic control in America.

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*Alternative Intersection Design—A Possible Way of Reducing Air Pollutant Emissions from Road and Street Traffic?*, 146–47 SCI. TOTAL ENV'T 35 (1994)). Roundabouts reduce driver speed by imposing a steeper angle of entry and a tighter turn—caused by the smaller radius of the footprint of the roundabout—to travel around the center. NAT'L COOP. HIGHWAY RSCH. PROGRAM, MODERN ROUNDABOUT PRACTICE IN THE UNITED STATES: A SYNTHESIS OF HIGHWAY PRACTICE 4 (1998), [https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_264.pdf](https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_264.pdf) [<https://perma.cc/FE9C-NCVQ>] ("Entering traffic points toward the central island, which deflects vehicles to the right, thus causing low entry speeds.").

24. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., CRASH FACTORS IN INTERSECTION-RELATED CRASHES: AN ON-SCENE PERSPECTIVE, at i (2010), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811366> [<https://perma.cc/GZZ7-SJL5>]. If the safety risks of just ten percent of the most dangerous roads in America were addressed, nearly fifty percent of traffic accidents could be avoided. Alex Kopestinsky, *How Much Do Americans Drive?* (Infographic), POLICYADVICE (Sept. 29, 2022), <https://policyadvice.net/insurance/insights/how-much-do-americans-drive/> [<https://perma.cc/U6ZW-DL9F>].

25. NHTSA Fatality and Injury Reporting Tool, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <https://cdan.dot.gov/query> (select crashes; select all motor crashes within "fatality and/or injury;" select 2010 through 2019 for timeframe; select build your own report; place crash date (years) in the row section and intersection in the column section; click submit).

26. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 24, at 5 fig.6. Crashes with causes attributable to drivers are important for this Note because I am arguing that, by eliminating many of the variables that lead to drivers causing crashes, roundabouts can ultimately promote safer driving.

27. *Id.* at 3 fig.1.

### A. *What Is a Roundabout?*

The modern roundabout is a circular intersection that directs the flow of traffic around a raised circular median in a counterclockwise direction.<sup>28</sup> While often confused with earlier iterations of traffic control devices such as traffic circles and rotaries, roundabouts are functionally distinct from their predecessors and consequently provide material advantages in safety and efficiency. Chief among the differences between roundabouts and traffic circles is roundabouts' ability to operate without traffic signals and their requirement that incoming traffic yield to those vehicles already traveling in the roundabout.<sup>29</sup> In contrast, traffic circles often contain traffic signals and operate by giving entering vehicles the right of way; these key operational differences create large disparities in safety and efficiency.<sup>30</sup>

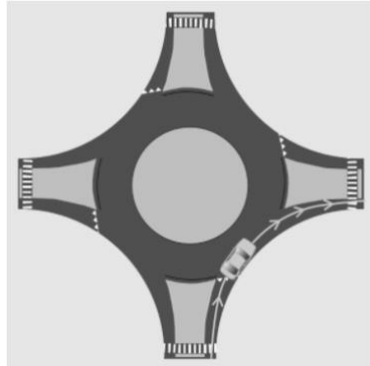
Vehicles approach roundabouts just as they would a normal signalized intersection; however, to make a right turn, cars enter the roundabout and exit at the first exit.

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28. INS. INST. FOR HIGHWAY SAFETY, *supra* note 23. As defined by statute in New York, a roundabout is “[a] circular intersection which is characterized by a circulatory roadway with counterclockwise movement, channelized approaches, low speeds, and yield control of entering traffic. A roundabout encompasses the area bounded by the outermost curb line or, if there is no curb, the edge of the pavement, and includes crosswalks on any entering or exiting roadway.” N.Y. VEH. & TRAF. LAW § 140-d (LexisNexis 2012). Roundabouts operate in the opposite direction in countries whose driving laws require driving on the left side of the road. *See* Robert L. Reid, *Modern Roundabouts Boost Traffic Efficiency and Safety*, AM. SOC. OF CIV. ENG’G: CIV. ENG’G SOURCE (Mar. 3, 2021), <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/issues/magazine-issue/article/2021/03/modern-roundabouts-boost-traffic-safety-and-efficiency> [https://perma.cc/7QQU-V78F].

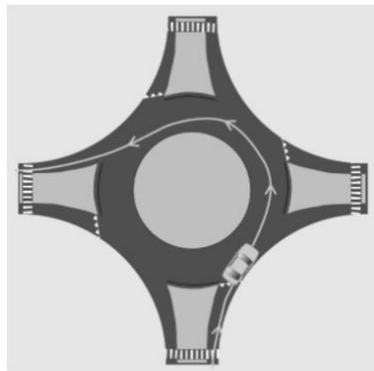
29. BHAGWANT N. PERSAUD, RICHARD A. RETTING, PER E. GARDER & DOMINIQUE LORD, INS. INST. FOR HIGHWAY SAFETY, CRASH REDUCTIONS FOLLOWING INSTALLATION OF ROUNDABOUTS IN THE UNITED STATES 2 (2000), [https://www.dot.ny.gov/main/roundabouts/files/insurance\\_report.pdf](https://www.dot.ny.gov/main/roundabouts/files/insurance_report.pdf) [https://perma.cc/5Z4Z-H7TW].

30. *See Roundabouts in St. Louis*, MO. DEP’T OF TRANSP., <https://www.modot.org/roundabouts-st-louis> [https://perma.cc/N2J5-4MW5] (last visited Jan. 25, 2023); *see also* NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 4. Classic examples of traffic circles can be found at Washington, D.C.’s Dupont Circle; Paris, France’s Place Charles de Gaulle; and New York, New York’s Columbus Circle. *See Roundabouts*, WASH. STATE DEP’T OF TRANSP., <https://wsdot.wa.gov/travel/traffic-safety-methods/roundabouts> [https://perma.cc/9ZK8-BKZZ] (last visited Jan. 25, 2023); NAT’L COOP. HIGHWAY RSCH. PROGRAM *supra* note 23, at 4.

FIGURE 1: EXECUTING A RIGHT TURN AT A STANDARD ROUNDABOUT<sup>31</sup>

Right turn

A car turns left by entering the roundabout, continuing around the island, and exiting into what is most often the third exit—roundabouts with unique traffic patterns may have more or fewer than the standard four exits.

FIGURE 2: EXECUTING A LEFT TURN AT A STANDARD ROUNDABOUT<sup>32</sup>

Left turn

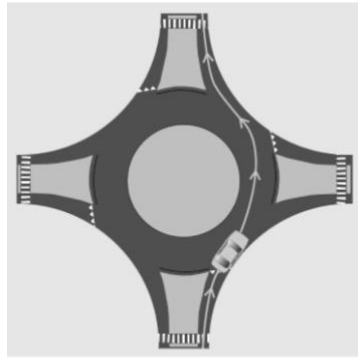
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31. See INS. INST. FOR HIGHWAY SAFETY, *supra* note 23.

32. *Id.*

To continue straight, a car will enter the roundabout, pass the right turn exit, and continue forward on what is most often the second exit from the roundabout.<sup>33</sup>

FIGURE 3: CONTINUING STRAIGHT AT A STANDARD ROUNDABOUT<sup>34</sup>



### Straight through

Although both traffic circles and roundabouts can be designed to accommodate multiple lanes of traffic, traffic circles are often designed to accommodate lane changing or weaving within the circle while roundabouts are designed to allow cars to travel through the intersection in one lane.<sup>35</sup>

Structurally, roundabouts are typically smaller than traffic circles and require drivers to enter the circle facing the island instead of at a shallower angle.<sup>36</sup> The tighter turn radius created by the direct entry angle and smaller island requires drivers to enter and travel through roundabouts at much lower speeds than they would in traffic circles.<sup>37</sup> Additionally, roundabouts handle

33. For helpful visual and video representations of multiple formats and sizes of roundabouts, see Scott Hotchkin, *Exploring the Circular Logic of Roundabouts*, SEH, <https://www.sehinc.com/news/exploring-the-circular-logic-of-roundabouts> [https://perma.cc/4ZDZ-ZAJ5] (last visited Jan. 25, 2023).

34. INS. INST. FOR HIGHWAY SAFETY, *supra* note 23.

35. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9. For visual representations of multiple lane roundabouts, additional diagrams, and accompanying explanations of the functionalities of varying styles and designs of roundabouts, see Hotchkin, *supra* note 33.

36. PERSAUD ET AL., *supra* note 29, at 2; NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 4–5.

37. PERSAUD ET AL., *supra* note 29, at 2; *see also* Leif Ourston & Joe G. Bared, *Roundabouts: A Direct Way to Safer Highways*, PUB. RDS., Autumn 1995, <https://highways.dot.gov/public-roads/autumn-1995/roundabouts-direct-way-safer-highways> [https://perma.cc/X8BE-3MUA] (explaining that the entry angle of roundabouts “is contrary to an intersection where many drivers are encouraged by a green or yellow light to accelerate to get across the intersection quickly and to ‘beat the red light’ and contrary to old traffic circles where tangent approaches also encourage, or at least allow, high-speed entries”).



crossing pedestrian traffic differently than most traffic circles by disallowing pedestrians from crossing through the center island and instead placing crosswalks at least one car length before the entry point of the roundabout.<sup>38</sup>

### B. History

Today's roundabouts were not the first device to direct the flow of traffic at an intersection in a circular motion around a central object. Rather, the first device of its kind, known as a gyratory or rotary, came when William Phelps Eno—who is often referred to as “the father of traffic control”—suggested in 1903 that traffic in New York City's Columbus Circle should circulate in one direction around an object,<sup>39</sup> most often an illuminated “trestle, metal post or stone column.”<sup>40</sup> Eno deployed such posts at the centers of intersections—they were commonly referred to as “silent cop[s]” or “dummy policem[en]”—to serve as the center points around which traffic circulated.<sup>41</sup> But, because drivers often ran into these, iron discs five feet in diameter were installed, and the first rotary traffic control devices were born.<sup>42</sup> Interestingly—and purportedly without taking influence from Eno's invention three years prior—in 1906, the architect for the city of Paris, Eugene Henard, proposed the installation of “gyratory” traffic control devices at intersections around the city.<sup>43</sup> His proposals required the width of each circle roadway to be “equal to one-quarter of the combined widths of the converging roads, regardless of the size of the central island.”<sup>44</sup> In contrast to Eno's preference for a smaller roundabout, Henard ardently supported a larger island diameter of roughly twenty-six feet.<sup>45</sup>

In the decades that followed, the popularity of gyratory traffic control devices increased dramatically.<sup>46</sup> With the explosion came a desire to increase the capacity of circulating traffic devices, a goal accomplished in part through the installation of larger circles. In one instance in the early twentieth century, the state of New Jersey constructed dozens of large traffic circles following a recommendation of the Highway Commission that

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38. PERSAUD ET AL., *supra* note 29, at 2.

39. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9.

40. Kenneth Todd, *A History of Roundabouts in The United States and France*, 42 *TRANSP. Q.* 599, 600 (1988). These center pieces were sometimes called “safeties” and were shaped similarly to concrete flower vases. *Id.*

41. *Id.*

42. *Id.* See also NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9 (discussing the iron discs used as center pieces in gyratory traffic control devices at the time).

43. *Id.* Interestingly, because of the closeness of the installation and the similarity of their ideas, a debate came to be regarding who was the actual inventor of the gyratory; however, it appears that “each arrived at the concept of the gyratory traffic movement independently.” *Id.*

44. Todd, *supra* note 40, at 614.

45. *Id.*

46. *Id.* at 601–02.

“automatically controlled traffic signals be ordered off the New Jersey state highways for causing obstruction.”<sup>47</sup> The enthusiasm for gyratory intersection traffic control was not shared by everyone, particularly due to increased congestion stemming from the lack of consistent or effective priority rules directing traffic flow at the entry points to traffic circles.<sup>48</sup> This confusion eventually informed a distaste for traffic circles that all but stopped any momentum for their broad adoption in the United States.<sup>49</sup>

In the early stages of their existence, roundabout right-of-way rules were inconsequential due to low traffic volumes,<sup>50</sup> but as traffic volumes increased with the rise in popularity of automobiles, so too did the importance of right-of-way rules governing the use of roundabouts. An overview of the evolution of these rules is helpful to understand the history of roundabouts and what led to their rise in popularity because, until the roundabout rules were codified statutorily, there was little recognition of any superior system of traffic flow regulation by courts or legislative bodies.<sup>51</sup>

A handful of jurisdictions enacted right-of-way rules in the early twentieth century that gave vehicles traveling north or southbound through intersections, not just roundabouts, priority over vehicles traveling east or westbound.<sup>52</sup> In 1913, Wisconsin adopted a rule granting incoming vehicles to a traffic circle the right-of-way.<sup>53</sup> This type of rule, also referred to as “nearside priority,” originated in France.<sup>54</sup> To accommodate increasing traffic volumes while also maintaining use of the nearside priority rule,

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47. *Id.* at 602. It is also worth noting that around the same time, the Supreme Court of Minnesota considered the “gyratory movement of traffic’ . . . as the most intelligent solution . . . .” *State v. Larrabee*, 115 N.W. 948, 949 (Minn. 1908).

48. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9; Todd, *supra* note 40, at 603. One noteworthy objection, but perhaps less pertinent to this discussion, was the fear from police officers in large metropolitan areas utilizing rotary traffic control devices at the time that they would lose their jobs directing traffic if implementation became more widespread. Perhaps comically, police in New York City struggled to direct congested traffic around a traffic circle on its opening day only to see the congestion resolve itself after they “went away in disgust.” Todd, *supra* note 40, at 603. Other noteworthy objections and impediments to earlier widespread adoption of traffic circles were a popular municipal obsession at the time with installing traffic control signals, the free advice traffic signal salespeople gave to towns who did not possess budgets sufficient to employ the consultants required to design a suitable traffic circle, and streetcars, mostly because of the congestion that running their tracks through circles would cause. *Id.*

49. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9. A similar decline in popularity of traffic circles occurred in France due to “the large sizes of the circles, the desire to maintain relatively high speeds, and the priority to the right bec[oming] [a] major impediment[] to safety and high capacity.” *Id.*

50. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9.

51. *See* Todd, *supra* note 40, at 606.

52. *Id.* Inconveniently, some midwestern jurisdictions enacted functionally opposite rules that granted priority to east and westbound traffic. *Id.* at 606–07.

53. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9.

54. Todd, *supra* note 40, at 617.

traffic circles grew larger to allow for more “storage distance” for flowing traffic.<sup>55</sup> This accommodation inevitably failed, and the nearside priority rule was an impediment to broad traffic circle adoption in the early twentieth century because yielding to entry causes slowdowns and congestion, even in low traffic areas.<sup>56</sup> The nearside priority rule was also uncondusive to optimal traffic flow because it “cause[d] vehicles to interlock and paralyze[d] all movement.”<sup>57</sup> The nearside priority was at times compared to a law requiring passengers to board a bus before letting departing passengers exit.<sup>58</sup>

Conversely, the offside priority rule, also referred to as the “priority-to-the-circle” rule,<sup>59</sup> is analogous to a rule letting “people get off the bus before others get on, a feat routinely performed without the help of police officers, traffic lights or computers.”<sup>60</sup> And while it may seem obvious today that the offside rule would be most effective, it must be understood that the yield sign was completely foreign to American traffic control until the 1950s and that there were fears that requiring entering vehicles to yield might result in rear-end collisions due to deceleration of entering traffic.<sup>61</sup>

While inefficient traffic control rules hampered the popularity of the traffic circle in the United States and France, drivers in the U.K. were far more receptive to a different gyratory traffic device: the roundabout. The term “roundabout” was coined in the U.K. in the early twentieth century.<sup>62</sup> As previously mentioned, roundabouts require incoming traffic to yield to traffic already within the circle.<sup>63</sup> U.K. law requires motorists to exercise due care at all times when driving.<sup>64</sup> This due care requirement informed the use and eventual adoption in 1966 of the offside priority rule for roundabouts.<sup>65</sup> The success of these newly minted roundabouts in the U.K.

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55. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9.

56. Todd, *supra* note 40, at 615. For example, a traffic circle in France operating under the nearside priority rule was said to become so congested during peak traffic hours that “sometimes no vehicles could enter or leave for several hours.” *Id.* at 616.

57. *Id.* at 607.

58. *Id.* at 620.

59. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 11.

60. Todd, *supra* note 40, at 620.

61. *See id.* at 609. Some commentators even ventured so far as to say that “the American driver lacks the skill to yield the right-of-way to vehicles on the left.” *Id.* at 612.

62. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 9.

63. Many states today have codified the offside priority rule in their traffic regulations. *See, e.g.*, ALASKA ADMIN. CODE tit. 13, § 02.120(d) (2022) (“A driver entering a roundabout must yield to a vehicle on the circulating roadway in the roundabout.”).

64. *See, e.g.*, Road Traffic Act 1991, c. 40, § 2 (UK), <https://www.legislation.gov.uk/ukpga/1991/40/section/2> [<https://perma.cc/X3K4-UFNS>] (defining the current legal standard of care for driving in the U.K.).

65. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 10–11. These requirements have to some extent been codified as a driving regulation in the form of what is now referred to as “due care

created excitement elsewhere and led to the “export” of roundabouts to Australia, France, and other European countries.<sup>66</sup> In some places the importation of roundabouts was tremendously successful; for instance, as of 2016 there were roughly 30,000 roundabouts in France.<sup>67</sup>

As mentioned previously, the use of inefficient traffic rules in the mid-twentieth century led to a stewing American skepticism of roundabouts and traffic circles.<sup>68</sup> But in the 1970s, a small group of traffic engineers successfully set in motion a movement promoting the increased implementation of roundabouts in the United States.<sup>69</sup>

### C. Roundabouts in America Today

The deficiencies of the first types of traffic circles used in the early twentieth century likely caused the slow adoption and reluctant implementation of roundabouts in the United States.<sup>70</sup> Multiple studies indicate that most people initially oppose substituting more traditional forms of intersection control with a roundabout.<sup>71</sup> Among other grievances, residents typically display an “irrational opposition” to roundabouts and a general misunderstanding of the safety and efficiency benefits they provide.<sup>72</sup> This opposition is almost certainly a result of a lack of exposure

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and attention.” Failure to drive with “due care and attention” in the U.K. results in a serious violation, similar to that of reckless driving in the United States. *See Penalty Points (Endorsements)*, U.K. GOV’T, <https://www.gov.uk/penalty-points-endorsements/endorsement-codes-and-penalty-points> [<https://perma.cc/CFY2-UZD4>] (last visited Jan. 25, 2023).

66. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 11. The French appreciated the upside of the offside priority rule so much that, in 1984, they adopted the offside rule for roundabouts on highways. This was a major departure from what had otherwise been the norm of French driving laws given the fact that the nearside priority rule was effectively the “basic rule” governing intersections. *Id.*

67. *French Revolution*, ECONOMIST (Apr. 23, 2016), <https://www.economist.com/europe/2016/04/23/french-revolution> [<https://perma.cc/UQN7-2NSS>].

68. Todd, *supra* note 40, at 611–12.

69. NAT’L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 12.

70. *Id.* at 4.

71. *See, e.g.*, Richard A. Retting, Greg Luttrell & Eugene R. Russell, *Public Opinion and Traffic Flow Impacts of Newly Installed Modern Roundabouts in the United States*, INST. TRANSP. ENG’RS J., Sept. 2002, at 30, 32 [hereinafter Retting et al., *Public Opinion*] (thirty-one percent pre-construction support); Richard A. Retting, Srinivas Mandavilli, Anne T. McCart & Eugene R. Russell, *Roundabouts, Traffic Flow and Public Opinion*, 2006 TRAFFIC ENG’G & CONTROL 268, 268 (thirty-six percent pre-construction support); Hu et al., *supra* note 23, at 47 (thirty-four percent pre-construction support). Elderly drivers are of notable concern because a dominant factor in crashes involving such drivers is their failure to yield appropriately. *See* Daniel R. Mayhew, Herbert M. Simpson & Susan A. Ferguson, *Collisions Involving Senior Drivers: High-Risk Conditions and Locations*, 7 TRAFFIC INJ. PREVENTION 117, 117–18 (2006); Keli A. Braitman, Bevan B. Kirley, Susan Ferguson & Neil K. Chaudhary, *Factors Leading to Older Drivers’ Intersection Crashes*, 8 TRAFFIC INJ. PREVENTION 267, 272 (2007). Perhaps this comes as a byproduct of declining reflexes and a lack of experience traversing modern roundabouts.

72. Andrew Keh, *European Import Has Cars Spinning Heads, Too.*, N.Y. TIMES (Nov. 18, 2010), <https://www.nytimes.com/2010/11/19/us/19roundabouts.html> [<https://perma.cc/C2Q3-JLM2>]. As of 2016, “U.S. roundabouts are not spread evenly throughout the land, but amass in certain places

or experience with roundabouts.<sup>73</sup> Some believe the dearth of roundabouts in America is a function of the United States possessing a “more aggressive, confrontational culture” as compared to countries with higher levels of roundabout adoption, like the U.K. or France, known for cultures that emphasize “virtues of compromise and cooperation.”<sup>74</sup>

It would be unfair to label the United States' opposition as a full-fledged phobia of roundabouts, though. In fact, the opposite may be true: according to a database compiled by traffic engineering firm Kittelson & Associates, there are currently around 8,800 operational roundabouts in the United States, and this number is increasing.<sup>75</sup> Some states are hosts to an incredibly high number of roundabouts: Florida has approximately 1,400 roundabouts; California has over 750 roundabouts; Texas has almost 700 roundabouts; Indiana, North Carolina, and Washington each have between 600 and 650 roundabouts; and Colorado and Wisconsin each have approximately 500 roundabouts.<sup>76</sup> Carmel, Indiana, has the most roundabouts of any city in America<sup>77</sup> and even celebrates National Roundabouts Week with a week-long series of festivities recognizing “the many positive results of [the] network of roundabouts, most importantly

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like Florida (1,283 roundabouts) and virtually disappear in others like the Roundabout Bermuda Triangle of Wyoming/South Dakota/North Dakota (not even 50 among the three).” See John Metcalfe, *Why Does America Hate Roundabouts?*, BLOOMBERG (Mar. 10, 2016, 8:58 AM), <https://www.bloomberg.com/news/articles/2016-03-10/mapping-america-s-resistance-to-traffic-roundabouts> [https://perma.cc/9F6W-8VKN].

73. *Id.*

74. *Id.* The idea that “compromise and cooperation” contribute to less public opposition to roundabouts aligns well with the theory underlying the offside priority rule discussed earlier in this Note.

75. *Roundabouts Database*, KITTELSON & ASSOCS., INC., <https://roundabouts.kittelson.com/> [https://perma.cc/YY5G-PKKE] (last visited Jan. 26, 2023). The creator of the database, Kittelson's Lee Rodegerdts, has worked on identifying roundabout installations throughout the world for his database since 1997. As quoted on the Kittelson & Associates website, “[t]he database has become the definitive inventory of roundabouts for the U.S., but it also has broad coverage of Canada and is now poised to become a worldwide resource.” Katie Taylor & Lee Rodegerdts, *How Many Roundabouts Are in the United States?*, KITTELSON & ASSOCS., INC., <https://www.kittelson.com/ideas/how-many-roundabouts-are-in-the-united-states/#:~:text=Thanks%20to%20the%20database's%20growth,through%202020%20is%20about%207%2C900> [https://perma.cc/6SW8-WRBQ]. Notably, Rodegerdts was a key member of the Kittelson & Associates-directed team responsible for the creation of *Roundabouts: An Informational Guide*, which was a valuable resource in the research and analysis for this paper. See generally LEE RODEGERDTS ET AL., *ROUNDABOUTS: AN INFORMATIONAL GUIDE* (2d ed. 2010).

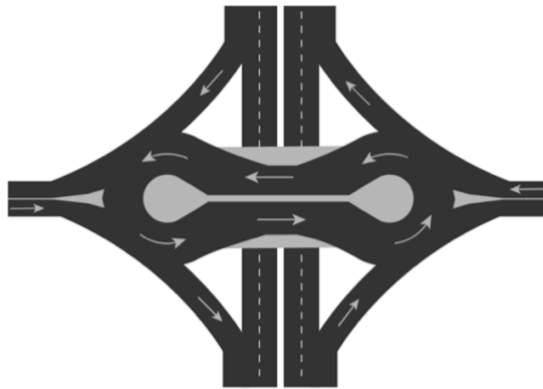
Additionally, some experts posit that the number of roundabouts in the United States is higher, but these estimates utilize a relaxed interpretation of the definition of a roundabout such as one defining a roundabout as “contiguous loop with consistent one-way traffic . . . that controls the traffic flow from converging roads.” Metcalfe, *supra* note 72 (describing geospatial designer Damien Saunder's analysis of the current state of roundabouts).

76. See *Reports*, KITTELSON & ASSOCS., INC., <https://roundabouts.kittelson.com/Home/Reports> [https://perma.cc/5EFB-66SG] (last visited Jan. 26, 2023) (showing roundabouts/traffic circles by state/province).

77. Cara Buckley, *These Americans are Just Going Around in Circles. It Helps the Climate*, N.Y. TIMES (Nov. 20, 2021), <https://www.nytimes.com/2021/11/20/climate/roundabouts-climate-emissions-driving.html#:~:text=Carmel%2C%20a%20city%20of%20102%2C000,significantly%20reduce%20injuries%20and%20deaths> [https://perma.cc/P2PN-V6P7].

their safety.”<sup>78</sup> Thanks to initiatives undertaken by the city’s climate-conscious mayor, residents of the Indianapolis suburb have benefitted from dramatic reductions in crashes resulting in injuries.<sup>79</sup> The safety benefits of the roundabout craze in Carmel were most significant following the installation of double-teardrop roundabouts at historically high-risk intersections, typically those servicing roads running over a branch taking on traffic exiting from a highway.<sup>80</sup>

FIGURE 4: DOUBLE-TEARDROP ROUNDABOUT<sup>81</sup>



The benefits attendant to roundabout installation and community adoption are gaining increasing popularity at both federal and state levels. For example, Congress recently amended the Federal Highway Safety Program’s (FHSP’s) list of fundable road improvements to include roundabouts.<sup>82</sup> Additionally, “[s]ome jurisdictions, such as the New York State Department of Transportation and the City of Bend, Oregon, have

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78. See *Carmel Celebrating National Roundabouts Week*, WTHR, (Sept. 22, 2021, 6:55 AM), <https://www.wthr.com/article/news/local/carmel-national-roundabouts-week/531-b36f30cb-1d7d-4f13-82f3-c6093da28c20> [https://perma.cc/ME8T-VE78].

79. *Id.*

80. See *Unusual Design Slashes Injury Crashes for Roundabout City*, INS. INST. FOR HIGHWAY SAFETY (Aug. 19, 2021), <https://www.iihs.org/news/detail/unusual-design-slashes-injury-crashes-for-roundabout-city> [https://perma.cc/7WUA-CPNF].

81. *Id.* The double-teardrop roundabouts “were installed at crossing points with higher-speed roads at intersections that had more injury crashes in the period before the conversion than other converted intersections. These intersections also may have benefited more from the speed reductions associated with roundabouts.” *Id.*

82. See Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 11111, 135 Stat. 429, 475–79 (2021) (amending 23 U.S.C. § 148 to include roundabouts as improvements eligible for federal funding under the federal highway safety program).

implemented a 'roundabouts first' policy. These policies require that a roundabout be analyzed and, if feasible, should be the preferred option."<sup>83</sup>

Cities like Carmel, Indiana, and Bend, Oregon, have taken it upon themselves to improve road safety through extensive local roundabout installation and education efforts. States like Wisconsin and Maryland, cognizant of the tremendous safety benefits of roundabouts, have adopted statewide roundabout-first policies.<sup>84</sup> Federal-level recognition of these safety benefits brought with it the inclusion of roundabouts as projects now fundable under the FHSP.<sup>85</sup> Combined with the aforementioned local-, state-, and federal-level undertakings, initiatives such as Vision Zero<sup>86</sup> and current Secretary of Transportation Pete Buttigieg's National Roadway Safety Strategy<sup>87</sup> have primed the United States to move toward a safer driving future.

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83. Andrew Plowman, *The Roundabout Craze*, WSB, <https://www.wsbeng.com/the-roundabout-craze/> [<https://perma.cc/PL6Q-59QH>] (last visited Jan. 26, 2023). Bend, Oregon's policy states that "roundabouts are the preferred option for intersection improvements." KITTELSON & ASSOCS., INC., ROUNDABOUT EVALUATION AND DESIGN GUIDELINES 1 (2010), <https://www.bendoregon.gov/home/showdocument?id=2512> [<https://perma.cc/DT5S-YQ38>]; see also CHRIS TIESLER, ED MYERS, ALEK POCHOWSKI & PETE JUNIOR, KITTLESON & ASSOCS., INC., ROUNDABOUT POLICY AND PROCESS SCANNING REVIEW 3–9 (2013),

[https://www.virginiadot.org/business/resources/Roundabout\\_Scan\\_Review.pdf](https://www.virginiadot.org/business/resources/Roundabout_Scan_Review.pdf) [<https://perma.cc/J6RT-5TRX>] (engineering firm's report evaluating and discussing various state- and city-level roundabout preference policies).

84. See Alek L. Pochowski, *An Analytical Review of Statewide Roundabout Programs and Policies* 22 (Dec. 2010) (Master's dissertation, Georgia Institute of Technology), [https://www.researchgate.net/publication/50253065\\_An\\_analytical\\_review\\_of\\_statewide\\_roundabout\\_programs\\_and\\_policies](https://www.researchgate.net/publication/50253065_An_analytical_review_of_statewide_roundabout_programs_and_policies) [<https://perma.cc/UQ7K-FDPL>].

85. See *infra* note 110 and accompanying text.

86. Vision Zero is a nationwide initiative focused on eliminating traffic deaths. See *What is Vision Zero?*, VISION ZERO NETWORK, <https://visionzeronetwork.org/about/what-is-vision-zero/> [<https://perma.cc/BS7J-7C3X>] (last visited Jan. 23, 2023). Vision Zero's strategies for eliminating traffic fatalities include:

- "Building and sustaining leadership, collaboration, and accountability – especially among a diverse group of stakeholders to include transportation professionals, policymakers, public health officials, police, and community members;
- Collecting, analyzing, and using data to understand trends and potential disproportionate impacts of traffic deaths on certain populations;
- Prioritizing equity and community engagement;
- Managing speed to safe levels; and
- Setting a timeline to achieve zero traffic deaths and serious injuries, which brings urgency and accountability, and ensuring transparency on progress and challenges."

*Id.* Vision Zero was "[f]irst implemented in Sweden in the 1990s." *Id.*

87. See generally Alissa Walker, *Grading Secretary Pete's New Road-Safety Plan*, CURBED (Jan. 28, 2022), <https://www.curbed.com/2022/01/secretary-pete-buttigieg-road-safety-vision-zero.html> [<https://perma.cc/ABD3-F2GJ>] (discussing and evaluating Secretary Buttigieg's plans to address the traffic death crisis).

## II. ANALYSIS

### A. *Why Roundabouts Are Better*

In terms of true ease of maneuvering, roundabouts eliminate nearly all conflict imposed on drivers at intersections regulated by stoplights because the:

*One-way operation, yield-at-entry, and the reduced number of conflict points* make the decision process for drivers easier. The entering driver, after looking out for pedestrians only has to look to the left for an acceptable gap to enter into the flow. Weaving only occurs in multiple-lane roundabouts, where it is simplified by the low speeds.<sup>88</sup>

Drivers travelling through intersections face myriad risks, such as each lane of oncoming traffic having multiple choices of direction, speed, or exit angle, and reducing the opportunity for travel-path conflicts to arise from such risks correspondingly reduces the risks faced by drivers in an intersection.

Therefore, taking away the opportunity for drivers to attempt unsafe and unprotected turns—as well as eliminating any ability to speed through intersections—creates roadways that are conducive to safe driving.<sup>89</sup>

### B. *Cost*

In addition to drastically reducing both the occurrence and severity of injury crashes, roundabouts also reduce the financial repercussions of car collisions: “[a] calculation of costs at the five Maryland roundabouts showed that the average cost per crash decreased from \$120,000 before the roundabout to \$84,000 after the roundabout, a reduction of 30 percent in crash severity.”<sup>90</sup> The costs of traffic crashes alone total nearly \$400 billion per year.<sup>91</sup> Broad implementation of roundabouts throughout the country could introduce a substantial reduction in these outlays, resulting in a return of capital to the pockets of drivers, federal and state highway systems, and municipalities. In particular, a reduction in the costs of traffic crashes would

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88. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 29.

89. See NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 24, at 5–7 (discussing the risks presented by intersections and unprotected turns).

90. NAT'L COOP. HIGHWAY RSCH. PROGRAM, *supra* note 23, at 25.

91. See Shill, *supra* note 6, at 501–02.



stand to significantly benefit minority communities whose populations are disproportionately affected by the costs of traffic crashes.<sup>92</sup>

### C. Efficiency

The introduction of roundabouts substantially improves the efficiency of the operation of intersections, thereby improving traffic flow and reducing the adverse impact of vehicular travel on the environment. When replacing stop signs, roundabouts can reduce vehicle delays by thirteen to twenty-three percent and vehicle stoppage by fourteen to thirty-seven percent.<sup>93</sup> A 2005 study found that the use of roundabouts at intersections in place of traffic signals could reduce vehicular delays by sixty-two to seventy-four percent.<sup>94</sup> As previously discussed, less idling and less frequent stopping and starting substantially lessens emissions by reducing fuel consumption.<sup>95</sup> Furthermore, emissions at roundabouts are lessened even further because they encourage less acceleration and force drivers to maintain low, steady speeds while traveling through the roundabout.<sup>96</sup> Because “200,000 early deaths occur in the U.S. each year due to U.S. combustion emissions,”<sup>97</sup> a reduction in the adverse climate impact created by combustion emissions would stand to save lives. Notably, a reduction in vehicle carbon emissions, whose impact is disproportionately felt by communities of color, would stand to reduce and improve the “racism physically built into some of our highways.”<sup>98</sup> In terms of improving our traffic safety and the environmental impact of driving in America, “[m]odern roundabouts are the most sustainable and resilient intersections around.”<sup>99</sup>

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92. See Bronin & Shill, *supra* note 2, at 8. For example: “Designing roads for slower speeds that are self-enforcing also reduces the need to rely on law enforcement, which can pose disproportionate financial and legal burdens on lower-income people.” DANGEROUS BY DESIGN, *supra* note 5, at 12. Transportation Secretary Pete Buttigieg has begun an initiative focused on increasing racial equity in roads with \$1 billion in funding. Hope Yen, *Buttigieg Launches \$1B Pilot to Build Racial Equity in Roads*, U.S. NEWS WORLD REP. (June 30, 2022), <https://apnews.com/article/race-and-ethnicity-racial-injustice-transportation-pete-buttigieg-48e09f253781c89359d875f19fc70f9d> [<https://perma.cc/C9FQ-MGVT>].

93. Retting et al., *Public Opinion*, *supra* note 71, at 32.

94. Bergh et al., *supra* note 23, at 7.

95. See *id.* at 8. Installing roundabouts in place of other traffic signals resulted in a “62% to 67% reduction in total crashes and an 85% to 87% reduction in injury crashes” in one study. See Isebrands & Hallmark, *supra* note 23, at 3.

96. See *supra* note 23 and accompanying text.

97. Caiazzo et al., *supra* note 8, at 198.

98. Grinapol, *supra* note 9.

99. Buckley, *supra* note 77 (quoting Ken Sides, chairman of the roundabout committee at the Institute of Transportation Engineers).

#### D. Pedestrians & Cyclists

The traffic crisis impacts pedestrians in an alarming way, with pedestrian fatalities increasing at a staggering rate over the last decade.<sup>100</sup> These impacts, as have been described throughout this paper, also fall disproportionately on racial minorities and “aggravate racial injustice” in America.<sup>101</sup> Beyond the protection of drivers at large created by the improvement to intersection designs resulting from roundabout installation, roundabouts offer substantial improvements in protection to both pedestrians and bicyclists,<sup>102</sup> thereby also serving to ameliorate where possible the pressures of the traffic crisis on racial and underrepresented minorities.

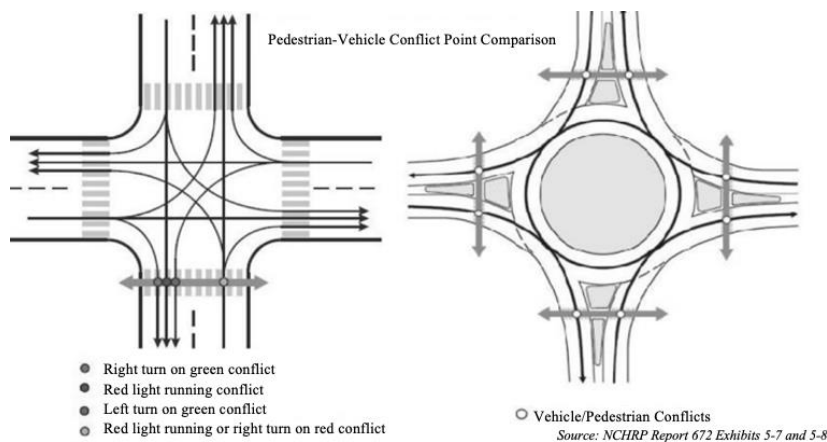
Put simply, there is less opportunity for conflict between traveling vehicles and pedestrians and bicyclists in a properly designed roundabout than in nearly any other format of a signalized intersection at the same location. As is demonstrated in Figure 5, roundabouts typically set pedestrian crossings off from the roundabout by at least a car length. Roundabouts also commonly have a storage space in the medians that separate traffic exiting and entering the roundabout. After crossing one side of the road, pedestrians can wait in this storage area until it is safe to proceed across the other side. This feature simplifies crossing and improves safety for pedestrians because they only need to look one way, at one direction of oncoming traffic at a time when crossing the road.

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100. Gregory H. Shill, *Regulating the Pedestrian Traffic Crisis*, 97 N.Y.U. L. REV. ONLINE 194, 198–201 (2022) (discussing statistics and trends of pedestrian fatalities over the last decade).

101. *Id.* at 201–02.

102. See PERSAUD ET AL., *supra* note 29, at 2–3 (concluding pedestrian crashes were reduced by approximately thirty to forty percent and bicycle crashes were reduced by approximately ten to twenty percent). The adverse impacts of the current state of the traffic system against communities of color are prominent and outsized with respect to pedestrians. See also Bronin & Shill, *supra* note 2, at 8 (“Even after adjusting for differences in walking rates, African American pedestrians face two-thirds more danger than their white counterparts and Native American pedestrians twice as much.”).

FIGURE 5: PEDESTRIAN-VEHICLE CONFLICT POINT COMPARISON<sup>103</sup>

As a practical matter, any reduction in potential pedestrian-vehicle conflict is a net-positive outcome. However, the safety benefits of roundabouts for pedestrians are also particularly prescient today due to the dramatic increase in both the popularity<sup>104</sup> and size of large personal vehicles such as trucks and SUVs.<sup>105</sup> The growing fleet of trucks and SUVs means that pedestrians are more than three times as likely to be killed in a crash with an SUV or truck than they are by any other kind of personal vehicle.<sup>106</sup> Thankfully, roundabouts can reduce injury crashes with pedestrians substantially,<sup>107</sup> thereby combatting the outsize risk of death the growing population of large consumer vehicles presents to pedestrians.<sup>108</sup>

103. RODEGERDTS ET AL., *supra* note 75, at 5-11, 5-12.

104. See, e.g., David Muller, *Jeepers: SUVs make '18 4th-Best Year Ever; Light Trucks Take a Record 69% of U.S. Market*, AUTO. NEWS (Jan. 7, 2019, 12:00 AM), <https://www.autonews.com/sales/light-trucks-take-record-69-us-market> [<https://perma.cc/8WLJ-2F4C>]; Erik Shilling, *Trucks and SUVs Are Now Over 80 Percent of New Car Sales in the U.S.*, JALOPNIK, (Jan. 27, 2022, 2:40 PM), <https://jalopnik.com/trucks-and-suvs-are-now-over-80-percent-of-new-car-sale-1848427797> [<https://perma.cc/RXQ3-249A>] (“[I]n October 2021, over 80 percent of estimated new vehicle sales in the U.S. were SUV and trucks for the first time ever.”).

105. DANGEROUS BY DESIGN, *supra* note 5, at 10 (“The size of larger vehicles has also increased dramatically over the past several decades: pickup trucks in particular are nearly 1,256 pounds (32 percent) heavier than they were in 1990.”).

106. See B.S. Roudsari, C.N. Mack, R. Kaufman, D. Grossman, B.Y. Henary & J. Crandall, *Pedestrian Crashes: Higher Injury Severity and Mortality Rate for Light Truck Vehicles Compared with Passenger Vehicles*, 10 INJ. PREVENTION 154, 158 (2004).

107. See PERSAUD ET AL., *supra* note 29, at 2-3.

108. See Shill, *supra* note 6, at 556-68.

### III. PROPOSAL

Roundabouts are a valuable and proven tool for improving traffic safety and flow. This Note proposes that, at the federal, state, and local levels, elected representatives, government officials, and relevant rulemaking bodies should promote the installation of roundabouts at new and existing intersections. Such promotion could and should come through regulations, codified policies, design recommendations, and increased funding.

#### A. Federal-Level Initiatives

Although the 2021 Infrastructure Investment and Jobs Act (IIJA) added language to include roundabouts as a safety mechanism fundable with federal dollars<sup>109</sup> under the Federal Highway Safety Act, which requires states to possess and operate a “[s]tate highway safety program” in order to receive federal funding for highway maintenance and operation,<sup>110</sup> little else exists federally to promote the consideration of roundabouts. The absence of any mention of utilizing roundabouts to promote safety at intersections from the National Roadway Safety Strategy (NRSS) written by the Department of Transportation (DOT) is disappointing but does not rule out a policy-driven increase in the installation of roundabouts in America.<sup>111</sup>

The NRSS highlights a handful of key departmental foci seeking to create safer roads, including amending the Manual on Uniform Traffic Control Devices (MUTCD) and aiming to support the “planning, design and implementation of safer roads and streets in all communities using all available and applicable Federal funding resources.”<sup>112</sup> Each of these foci presents an opportunity to drive the much-needed proliferation of roundabouts at intersections throughout the country.

In the recently passed IIJA, a “total of \$660 billion—or 76% of the entire law—either gets delivered directly to states and localities via formula funding or to specific federal agencies for predetermined activities such as research or product monitoring.”<sup>113</sup> “The law commits most of this formula spending to the transportation sector, where funds primarily flow to state highway programs and transit agencies.”<sup>114</sup> Funds devoted specifically to

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109. See Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 11111, 135 Stat. 429, 475–79 (2021) (amending 23 U.S.C. § 148 to include roundabouts as improvements eligible for federal funding under the federal highway safety program).

110. See 23 U.S.C. § 148.

111. See generally U.S. DEP’T OF TRANSP., NATIONAL ROADWAY SAFETY STRATEGY (2022), <https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf> [<https://perma.cc/4MY9-9MG9>].

112. *Id.* at 20.

113. Tomer et al., *supra* note 17.

114. *Id.*

safety total between roughly \$11 and \$18.1 billion.<sup>115</sup> Typically, federal money for state-funded highway safety improvements under the FHSP is not allowed to fund more than ninety percent of a project's total construction cost.<sup>116</sup> However, the recently enacted IJA increased this amount to 100% for specific safety improvement projects,<sup>117</sup> including specific allocations for installation of at least 155 roundabouts throughout the country.<sup>118</sup> The increased funding potential for safety improvements, operating in tandem with a DOT strategy that more aggressively encourages a roundabout-first policy at the federal level, would certainly promote and achieve material increases in safety for American drivers.

At the federal level, it may be difficult to directly impose meaningful burdens on states that would motivate an increase in the installation of roundabouts, mostly because the Tenth Amendment to the Constitution reserves "to the States respectively" those powers which are not granted to the federal government.<sup>119</sup> Even so, as has been previously discussed, the federal government can play a valuable role in the broad adoption of roundabouts in place of other intersection control devices through its funding power. The IJA's inclusion of roundabouts as an approved safety device within the FHSP is a prime example.<sup>120</sup> Additionally, through the DOT, which was created in 1966 to help provide "safe, efficient, and convenient transportation" through the "coordinated, effective administration of the transportation programs of the Federal Government,"<sup>121</sup> the federal government can condition federal funding for

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115. See NAT'L CONF. OF STATE LEGISLATURES, *BIPARTISAN INFRASTRUCTURE INVESTMENT AND JOBS ACT SUMMARY: A ROAD TO STRONGER ECONOMIC GROWTH* 3 (2021), <https://docs.acec.org/pub/B64DDA9E-1866-DAAC-99FB-DB1C9D0CBBEC> [<https://perma.cc/U8T7-QN3B>]; *Brookings Federal Infrastructure Hub*, BROOKINGS, <https://www.brookings.edu/interactives/brookings-federal-infrastructure-hub/> [<https://perma.cc/G7UY-WNUP>] (last visited Jan. 26, 2023) (click "Transportation" to see the \$18.1 billion amount for safety).

116. See 23 U.S.C. § 120(a)(1).

117. *Id.* § 120(c)(1). It is worth noting that the drafters of the legislation incorrectly included "traffic circles" in the list of safety projects while concurrently noting that traffic circles are also known as roundabouts. For the many reasons previously discussed, roundabouts are the desired gyratory traffic control mechanism, not traffic circles.

118. Press Release, U.S. Dep't of Transp., Fed. Highway Admin. Biden-Harris Administration Sending States Nearly \$60 Billion from the Bipartisan Infrastructure Law for America's Roads and Bridges (Oct. 11, 2022), <https://highways.dot.gov/newsroom/biden-harris-administration-sending-states-nearly-60-billion-bipartisan-infrastructure-law> [<https://perma.cc/XKG6-SWS9>].

119. U.S. CONST. amend. X.

120. See Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 11111, 135 Stat. 429, 475-79 (2021) (amending 23 U.S.C. § 148 to include roundabouts as improvements eligible for federal funding under the federal highway safety program).

121. Department of Transportation Act, Pub. L. No. 89-670, § 2(a)-(b)(1), 80 Stat. 931, 931 (1966).

state roadway and intersection improvements through its various safety initiatives, such as the current administration's NHSP.<sup>122</sup>

### *B. State and Local-Level Initiatives and Implementation*

The goal of achieving widespread roundabout adoption in the United States is not solely conditioned on a federal directive to do so by the DOT or some combination of federal legislation and regulation. States themselves possess dominion over the construction and maintenance of their public, intrastate roadways and can consequently serve as the sole impetus for roundabout installation.<sup>123</sup> As such, with or without a federal imperative to do so, states should aim to enact policies directing—and, at a minimum, encouraging—the installation of roundabouts at existing and newly constructed intersections. This can be accomplished through enabling legislation,<sup>124</sup> state-level highway safety programs requiring consideration of roundabouts for any newly constructed intersections, or state transportation department guidelines favoring roundabouts when renovating existing intersections. Even in the absence of federal- or state-level policies, municipalities can still proactively achieve enhanced roadway safety through roundabout installation on their own. One needs to look no further than locales like Carmel, Indiana, or Bend, Oregon to see that this can be done.

State-level initiatives provide the strongest and most promising opportunity for widespread roundabout installation. State-level policies favoring roundabout installation are “directly correlated to the number of roundabouts in a state, on a per capita, per [vehicle mile traveled], and per roadway mile basis.”<sup>125</sup> Those states without roundabout-first policies should endeavor to follow the lead of states like Maryland, Wisconsin, and New York who “each have state policies that require the analysis of roundabouts at all intersection projects where state or federal funding will be used.”<sup>126</sup> Such policies can be promulgated via a state-level statutory regime or through guidance and policies provided by state transportation

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122. See Infrastructure Investment and Jobs Act § 11111; see also NATIONAL ROADWAY SAFETY STRATEGY, *supra* note 15 (discussing various ways in which federal funds will be used at the state level to address traffic issues).

123. See 39 AM. JUR. 2D *Highways, Streets, and Bridges* § 51 (2022).

124. See *id.* § 89 (discussing ways in which states are empowered to “alter or change highways [and] streets”).

125. See Pochowski, *supra* note 84, at 71. Appendix A of this article provides a comprehensive overview of each state's roundabout policy and source. *Id.* at 76–78.

126. *Id.* at 22. States could also implement a liability regime similar to New York's that imposes fault upon the state for damages caused by accidents at intersections where a roundabout, if installed, would have prevented the crash, which incentivizes the state to avoid liability by favoring roundabouts where feasible. See *id.*

departments. Additionally, states should ensure that roundabouts are fairly evaluated at all intersection construction sites by conditioning permits and licenses upon a showing by the constructing locality that a roundabout was fairly considered as a primary option to control the flow of traffic. Furthermore, state-level support can come through the issuance of guidance on best practices for roundabout installation.<sup>127</sup>

### CONCLUSION

In addressing the unnecessary risks to life and limb that Americans face on roadways and at intersections throughout the country, we can make meaningful progress toward eliminating traffic fatalities and leave in the rearview the notion that traffic injuries and fatalities are an unavoidable externality of mobile, modern life. To be sure, widespread roundabout adoption cannot singlehandedly solve America's traffic fatality crisis. Additional interventions addressing speeding, vehicle design, distracted driving, and the deeply entrenched legal and political regimes that have led to this moment in America's traffic history are also of dire importance. But a first step toward the goal of eliminating traffic fatalities can and should be the promotion of roundabouts at intersections nationwide. The safety, environmental, and societal benefits of these simple but powerful traffic control devices are undeniable. Roundabouts can unquestionably help America turn around its traffic crisis, one intersection at a time.

*Neven Sussman* \*

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127. Delaware and Kansas, among other states, have issued such guidance. See DEL. DEP'T OF TRANSP., ROUNDABOUT SUBMISSION AND REVIEW REFERENCE GUIDE (2020), [https://deldot.gov/Business/subdivisions/pdfs/Roundabout\\_Guidelines.pdf?cache=1649200433221?cache=1649207377650](https://deldot.gov/Business/subdivisions/pdfs/Roundabout_Guidelines.pdf?cache=1649200433221?cache=1649207377650) [<https://perma.cc/DP6A-RGQX>]; KAN. DEP'T OF TRANSP., KANSAS ROUNDABOUT GUIDE (2d ed. 2014), [https://www.ksdot.org/Assets/wwwksdotorg/bureaus/burtrafficeng/Roundabouts/Roundabout\\_Guide/KansasRoundaboutGuideSecondEdition.pdf](https://www.ksdot.org/Assets/wwwksdotorg/bureaus/burtrafficeng/Roundabouts/Roundabout_Guide/KansasRoundaboutGuideSecondEdition.pdf) [<https://perma.cc/S54B-7AEM>].

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