

# **THE UNIVERSITY OF CONNECTICUT**

## **CIVIL & ENVIRONMENTAL ENGINEERING**

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CAST 306**

*Advisory Committee:*

Dr. Norman Garrick (Major Advisor)  
Dr. Atkinson-Palombo (Major Advisor)  
Dr. John Ivan (Associate Advisor)

### **SUSTAINABLE SAFETY AND THE DECREASING VULNERABILITY OF CYCLISTS AND PEDESTRIANS IN THE NETHERLANDS: LESSONS FOR THE UNITED STATES**

Fatal road injuries are the eighth leading cause of death globally in 2016 claiming 1.4 million lives. This makes road safety a crucial focus for all countries. One aspect of road safety receiving attention recently is the growing fatalities and risk to vulnerable road users, namely cyclists and pedestrians. In recent years, pedestrian fatalities in the U.S. have increased from 4,109 in 2009 to 5,984 in 2016. That is an astounding 45% increase over a 7-year period. The Netherlands on the other hand has seen a relatively steady decline in vulnerable user fatalities as well as overall fatalities. We take a look at the historic approach to road safety in the U.S. and use the Netherlands as a case study for comparison. Both the Netherlands and U.S. hit their peak fatality tolls in 1972 with similar fatality rates of around 25 fatalities per 100,000 people. After almost four decades, the United States has drastically deviated with a road fatality rate that is nearly three times that of the Netherlands, 10.9 and 3.1 (per 100,000 population) respectively. Part of the reason for selecting the Netherlands is because of their Sustainable Safety vision, which we believe might be one of the factors driving the sustained decrease in their fatalities.

Using an established comprehensive conceptual framework, we analyze road safety indicators such as policy, infrastructure, and safety culture, which are influential in decreasing road fatalities. We looked at the change in risk to pedestrians and cyclists against cars over time using a user based risk metric that accounts for the number of users at risk on the roads. Our findings show that risk in the Netherlands has decreased and converged to the point that cars, pedestrians, and cyclists experience equal risk, 2.5, 2.7, and 3.0 fatalities per 100,000 users respectively. That is 1.2 and 1.08 times higher risk to cyclists and pedestrians than car users. In the U.S., vulnerable user risk has diverged compared to car fatality risk. Fatalities per 100,000 users are 8.2 for cars, 59.8 for pedestrians, and 42.5 for cyclists in the U.S. That is 7.3 and 5.2 times higher risk to pedestrians and cyclists than cars. The nature of the Netherlands system has decreased the vulnerability of cyclists and pedestrians and made it so that they do not need armored protection to survive on the street.