VISION4ERONETWORK

Taming Speed for Safety

A Defining Approach and Leadership from Portland, Oregon

Managing speed to save lives and eliminate life-altering injuries is a cornerstone of Vision Zero.

This focus on safe speeds extends beyond the traditional approach of influencing individual behavior with education and/or enforcement campaigns. While these activities can play a constructive role, the Vision Zero Network encourages communities to focus "upstream" in their work, to impact the underlying systems and environment influencing individual behavior.

This means ensuring the systems and policies in our communities prioritize safety over speed – including how we design streets and neighborhoods, how we set speeds, and how we communicate and socialize expectations for behavior.

This Case Study highlights promising efforts in Portland, Oregon to focus on upstream policy and design strategies to encourage safe speeds that result in safer conditions for all roadway users. The Vision Zero Network believes that Portland's approach to speed management aligns with a Safe Systems approach and offers a strong model for other communities.

MANAGING SPEED FOR SAFETY: CRITICAL TO VISION ZERO SUCCESS

One of the most important tenets of Vision Zero is its focus on managing speed for the sake of safety. This is a core part of Vision Zero's Safe Systems approach, which recognizes that individuals are going to make mistakes, so the transportation system should be designed to protect people, even when mistakes are made.

A simple fact: a person's chances of surviving a crash decrease dramatically if they are involved in a high-speed versus a low-speed crash, especially if that person is hit while walking or biking, or if they are more physically vulnerable, including the elderly and the young. For too long, this simple fact has been undervalued or ignored, often due to political or practical challenges.

Credit: Portland Bureau of Transportation

Fortunately, this is changing with Vision Zero, which recognizes that, more often than not, it's speed that kills.

We can manage speeds to preserve life — *if we choose to*. And an increasing number of local communities are choosing to do so, filling longtime leadership gaps at the federal and state levels.

LAY THE FOUNDATION: DETERMINE THE ROLE SPEED PLAYS

Portland, Oregon is among the nation's leaders in elevating both the principles and actions of managing speed for safety. Specifically, Portland's Bureau of Transportation (PBOT) is tapping into the trifecta of speed management strategies to encourage safe behavior: setting appropriate speed limits, designing streets to support safe speeds, and operating camera programs to enforce the posted speed limits.

Upon adoption of Vision Zero in 2015, the City of Portland identified a High Crash Network (HCN) that consists of 30 high crash intersections and 30 high crash streets. The HCN is a compilation of the city's most dangerous streets and intersections for people driving, walking, and bicycling. The HCN represents eight percent of Portland streets, yet accounts for 57 percent of deadly crashes. (This is a common reality in many communities, where a relatively small percentage of streets account for a far greater portion of serious injury and fatal crashes. Learn more about Vision Zero's development of High Injury Networks here.)

As part of its early analysis within its Vision Zero initiative, Portland staff reviewed the rate of traffic deaths per mile of posted speed limit, among other data. One key piece of information stood out: Most traffic deaths were occurring on streets with higher posted speed limits, between 35-45 mph, representing 235 miles or almost 9 percent of Portland's street network (by centerline) and 45 percent of streets in the HCN.

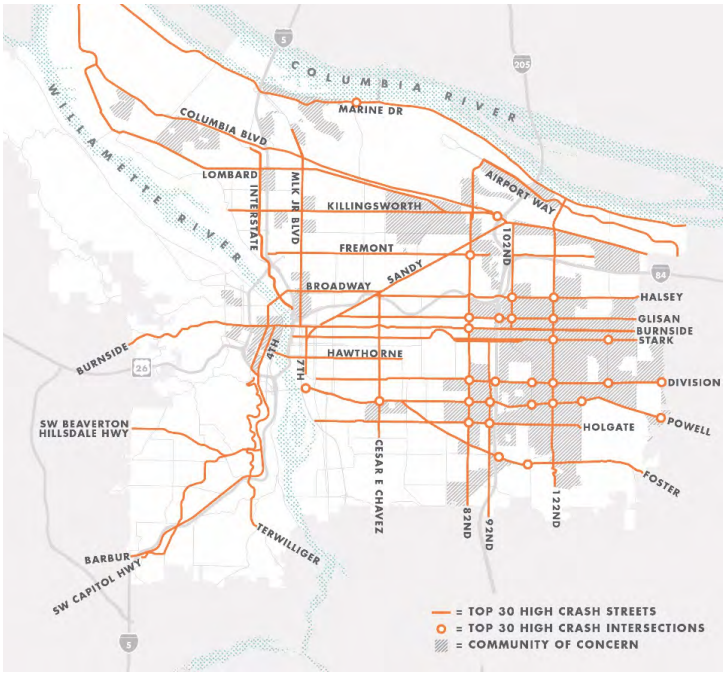
The finding that more safety problems were happening on higher speed streets seem obvious, but it is a fact that too many communities ignore at great peril.

Portland's early analysis of how speed relates to severe injury/fatal crashes was important as PBOT prioritized actions to reduce speeds, including elevating the following three strategies in its Vision Zero Action Plan:

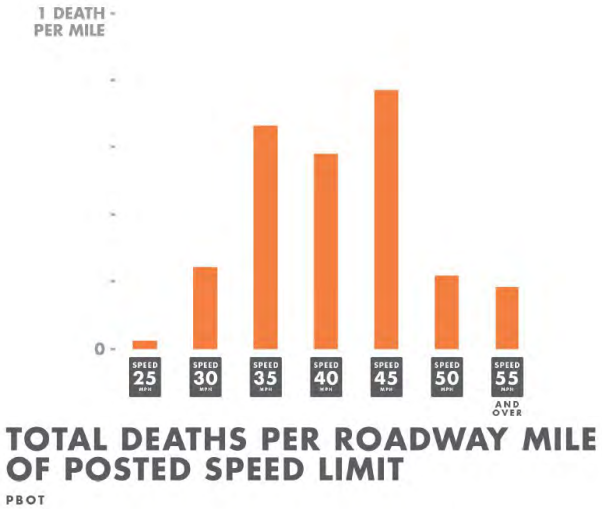
» Lower posted speeds. Gain local authority for speed reduction on City of Portland streets

» Improve street design to support safe speeds

» Install safety cameras on high injury streets



Portland's High Crash Network identifies the most dangerous streets for people walking, biking, and driving. The HCN is shown on a map above, overlapping with the city's low-income communities and communities of color (Communities of Concern) based on a composite index of 10 equity indicators.



Most traffic deaths in Portland occur with speeds between 35 and 45 mph

Each of these strategies is detailed below, with emphasis on setting appropriate speed limits, as this is a core strategy to Vision Zero where Portland is taking a particularly strong and promising approach. Portland's work can be a model to other communities questioning outdated practices that undermine safety priorities.

RECOMMENDATION: Analyze data early in the Vision Zero process to understand how speeds impact safety and use these findings to prioritize strategies and actions.

Strategy #1: Set Appropriate Speed Limits

While we know that lowering posted speed limits, alone, is unlikely to have the full desired safety effect, it can be an important piece of the speed management puzzle. At the most basic level, posted speed limits are a key communication tool influencing drivers' behavior; they send important messages about what authorities deem to be not only the legal speed, but also the appropriate speed.

In addition – and with greater consequences than most people probably realize – those same posted speed limits influence how the roadways are designed. In most states in the U.S., local communities do not have full control over how they set speeds on their roadways. Speed limits in many cities are statutory, which means they are established through state law, and as a result, controlled by the state.

Generally, in areas where statutory limits do not fit specific road, traffic, or land use conditions, local authorities can establish speed zones and set speed limits. But even within this framework, the state often dictates (or at least strongly influences) the methodology that determines how speeds are set. Historically, "appropriate" and "safe" speeds in many states have been determined by using the 85th

UNINTENDED CONSEQUENCES OF THE 85TH PERCENTILE SPEED

A 2017 study on reducing speeding-related crashes from the National Transportation Safety Board (NTSB), the nation's leading authority on crashes and prevention, cited speeding as a national deadly problem -- on par with drunk driving. In the study, NTSB made numerous recommendations to national and state authorities to change outdated policies that contribute to the dangerous behavior.

Among other policies, NTSB reviewed the history of speed setting in the U.S., and specifically, the Federal Highway Administration (FHWA) requirement (outlined in the Manual on Uniform Traffic Control Devices) for states and local cities to use engineering studies that emphasize the use of 85th percentile speed to change speed limits. The 85th percentile is based on the free-flowing travel speed or lower of 85 percent of drivers, which according to NTSB, leads to unintended consequences of higher operating speeds, and an undesirable cycle of speed escalation and reduced safety. As a result, NTSB recommends that FHWA revise the MUTCD to incorporate the Safe Systems approach for urban roads to strengthen protection for road users.

Specific recommendations include:

» Revise the MUTCD so that additional relevant factors – including crash experience, surrounding land uses, and pedestrian activity – currently listed as *optional* for all engineering studies, are *required*

» Remove the guidance that speed limits in speed zones should be within 5 mph of the 85th percentile speed

Simplified Decision Matrix

Street and Limits:	Street								
	Advisory	Statutory							
	10 MPH	≤15 MPH	≤20 MPH	≤25 MPH	≤30 MPH	≤35 MPH	≤40 MPH	≤45 MPH	≤50 MPH
PED	Shared Roadway			5' Sidewalk 100% One Side	Sidewalk Both Sides Curb or Swale; 8' Separation	>8' Separation Both Sides NCHRP 562 Crossings: 20/Hr.	>12' Separation Both Sides	Impermeable Separation Barrier	
BIKE	Shared Roadway			≤ 5' Bike Lane	6' – 7' Bike Lane	Minimum 2' Separation from Autos	Permeable Barrier	Impermeable Separation Barrier	
AUTO	Gravel Roadway	≤ 9' Travel Lanes	10' Travel Lanes, Greenway	10' Travel Lanes		≤ 11' Travel Lanes Angle Crash Mitigations	Permeable Center Barrier; Roadside Object Setback or Shielding		Impermeable Center Barrier
Notes:	None								

percentile methodology, or the speed at which 85 percent of free-flowing traffic is travelling at or below. This long-standing practice was based on studies from the 1960s of largely rural roads, which determined 85 percent of drivers would drive at a prudent speed. Yet, determining the speed limit on unconstrained free-flowing travel speed is not appropriate for urban roads where we have a mix of road users. And, as noted in a recent study from the National Transportation Safety Board (NTSB), the 85th percentile practice has "unintended consequences" and can lead to higher speeds (see sidebar on page 3).

Alternatives to 85th Percentile Speed Setting Standards

In Oregon, decisions regarding non-statutory posted speeds on streets are made by the Oregon Department of Transportation (ODOT). An independent body, the Oregon Speed Zone Control Board, hears appeals of ODOT decisions from local jurisdictions. Given this structure, PBOT has worked closely over the past two years with the Oregon State Legislature and ODOT to gain flexibility for speed reduction. Portland's goals in this work have been to (a) develop an alternative to the traditional methodology (which relies heavily on the vehicle 85th percentile speed for speed setting), to include greater consideration of non-motorized road users, and (b) lower speed limits, even as street design may stay the same.

PBOT's approach to setting speed limits is focused on shifting the focus away from an approach that only considers people driving to a more balanced incorporation of all road users, with more attention

PBOT created a Decision Matrix to emphasize risk reduction to vulnerable road users and to guide staff to make decisions regarding setting speed limits

directed toward the safety of the most vulnerable roadway users, those walking and bicycling.

Portland pursued an administrative rule in 2015 with ODOT to allow the city to use alternatives to the 85th percentile methodology, and it won permission in 2016. Since adopting Vision Zero, PBOT has proactively worked with ODOT to put this new authority into practice and pursue lower speed limits, especially on roads identified in the city's High Crash Network.

Portland's authority to use alternative methods comes with caveats, most notably that, at least for now, the alternative methods can only be used on non-arterial roads, which make up 94 percent of the city's street network. While arterials constitute a small percentage (six percent) of the total street network, it is the arterials that dominate the city's High Crash Network and streets where slowing speeds to save lives is most urgent.

According to Clay Veka, PBOT's Vision Zero Program Manager, the agency plans to continue working with ODOT to make federally classified arterials eligible for using the alternative methodology.

PBOT's alternative speed-setting methodology focuses on minimizing the risk of fatality for different roadway users. City staff created a Simplified Decision Matrix, see above, to help translate this approach to practice. The Decision Matrix looks at design features needed to protect different roadway users when cars are traveling at varying speeds.

Process for ODOT Review

With these priorities in mind, PBOT worked with ODOT to create a process where PBOT submits a formal request – an Alternate Speed Zone Investigation – to lower the speed limit for a street in question, which ODOT reviews. The investigation method includes information on the street context – including land use, facilities for people walking and bicycling, crash history, and recommended speeds to protect people walking and bicycling based on the Decision Matrix. Using this process, Portland has successfully lowered speed limits on eight streets since August 2017, and requests are pending for another four streets. These streets include various types such as collectors, neighborhood greenways, and streets within business districts.

PBOT and ODOT have successfully streamlined the review process to reduce processing time from a lengthy six-to-18 months (and a thick report for most projects) to just a few months (and a three-to-four-page analysis).

Speed Limit Change vs. Street Design Change

PBOT sees value in lowering a speed limit, even if a street redesign is not imminent. Matthew Ferris-Smith, a Vision Zero specialist in PBOT's Active Transportation and Safety Division says, "Portland can't redesign all of its roads now, but by lowering speed limits, we can lower the public's expectations for high speed and begin to change the broader culture of speeding." As a result, PBOT has sought speed reductions on a variety of streets including business corridors, arterials, and neighborhood streets.

"Portland can't redesign all of its roads now, but by lowering speed limits, we can lower the public's expectations for high speed and begin to change the broader culture of speeding."

– Matthew Ferris-Smith, PBOT Active Transportation and Safety Division

Credit: Portland Bureau of Transportation

PORTLAND'S ALTERNATE SPEED ZONE INVESTIGATION

This investigation allows the city to formally and more quickly request a change in speed limits on local streets via ODOT. The investigation reviews a substantial number of factors intended to reduce the risk of fatality for vulnerable road users to 10 percent, balanced with the city's mobility goals.

Specific factors for consideration in setting speed limits include:

» Adjacent land uses
» Street width(s)
» Average daily traffic volume
» Total number of fatal and injury crashes in specified time period
» Number of crashes per mile in specified time period
» Number of fatal and injury crashes per mile in specified time period
» Details of pedestrian, bike, and vehicle facilities
» Recommended speeds for pedestrians and bicyclists based on Portland's Simplified Decision Matrix (speed intended to reduce the risk of fatality to 10 percent, balanced with mobility goals)

RECOMMENDATION: Work with the state Department of Transportation to develop alternatives to the 85th percentile practice, as well as gain local flexibility to use these alternatives as needed

Strategy #2: Design Streets to Encourage Safe Speeds

In addition to lowering speed limits, Portland's approach to managing speeds also includes safe street design.

The Decision Matrix (page 4) helps identify recommended design features to minimize risk for each mode. PBOT implements design features on the roadways to create separation and barriers between different types of road users, who are often moving at different speeds, such as those walking, biking, and driving.

Equity and Prioritizing Street Design Improvements

PBOT prioritizes street design changes on the city's High Crash Network streets, and especially on segments identified as low-income communities and communities of color, identified using a composite of 10 equity indicators.

Using Vision Zero's data-driven approach, PBOT starts with three metrics to rank intersections within the High Crash Network for safety improvements. These intersections are then cross-referenced with low-income communities and communities of color to ultimately prioritize project funding.

The three metrics include:

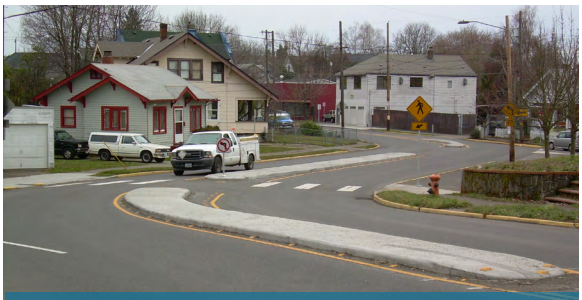
a) The number of fatal and injury crashes in a specified four to five-year time frame

b) The collision rate (based on the number of crashes compared with the number of cars traveling through the intersection), and

c) The total value of crashes, which assigns a monetary value to the severity of injuries.

TRADITIONAL BIKE LANES

PROTECTED BIKE LANES



RAISED CURBS

PBOT uses a variety of design tools to improve safety for all road users.

EQUITY INDICATORS

- Low-income households
- People with disabilities
- Low English proficiency persons
- Youth
- Older adults
- Affordable housing
- Lower paying jobs
- Poor vehicle access
- Access to services

RECOMMENDATION: Prioritize street design changes on streets in the High Crash/ Injury Network and in low-income communities and communities of color.

Strategy #3: Maximize Proven Technology, Safety Cameras

The usage of speed safety cameras is also part of PBOT's strategy to encourage safe behavior. One of the actions outlined in the city's Vision Zero Action Plan is to pilot the implementation of fixed speed safety cameras on Portland's high crash streets. With approval from the Portland City Council, PBOT worked extensively in 2015 with its Office of Government Relations to seek state legislation that would authorize the city to use fixed speed safety cameras on high crash corridors, where it previously was not allowed. A bill was signed into law that same year granting the city the desired authorization.

In May 2016, the Council approved an initial pilot program with 10 high crash corridors – all located within the High Crash Network – to be eligible for future camera installation. Eight cameras were installed along four high crash streets (a camera faces each direction of travel). Portland's Vision Zero Action Plan tasks PBOT to expand the program to additional high crash corridors following the pilot. According to staff, effectiveness of the new safety cameras will be evaluated throughout 2018 and assessed before expanding the program.

A 2017 initial evaluation of Portland's safety camera program shows them to be successful in reducing speeding. Data comparisons of speeds near the cameras before and after installation show a decrease in speeding of as much as 61 percent, and a reduction of top end speeding – or drivers exceeding 10 mph above posted or legal speed limit – of up to 92 percent. Some results are highlighted in the table below.

Outreach and Education

Portland city staff recognized the importance of integrating substantive community outreach and education to ensure community awareness of speed problems and buy-in for safety strategies. They also prioritized equity considerations and acknowledged concerns about the risks of over-enforcement and inequitable results of some safety strategies.

PBOT contacted community members and businesses located near the camera locations to notify and educate them about the pending installations. Outreach included mailing postcards to residents living within 10 blocks of each camera system. Staff also disseminated postcards in 10 other languages, a Frequently Asked Questions information sheet, and a map of upcoming citywide safety projects schedule for construction. In addition, PBOT staff visited businesses located near the cameras prior to installation to talk directly with community members, answer questions, and address concerns.

So as not to over-concentrate cameras in any communities, PBOT piloted cameras in geographic areas throughout the city. Currently, staff is exploring opportunities to lessen the fine burden on low-income community members, for example, to allow first time offenders to take driver safety education classes in lieu of paying the fine.

Speed: Before and after installation of speed safety cameras on select corridors, 2016-2017

CHANGE IN SPEEDS		
BOTH DIRECTIONS	**SPEEDING**	**TOP END SPEEDING**
SE DIVISION STREET	47% DECREASE	71% DECREASE
SE 122ND AVENUE	68% DECREASE	91% DECREASE
SW BEAVERTON HILLSDALE HWY	61% DECREASE	92% DECREASE

Percentage speeding decrease before and after speed count, one-year (2016) timeframe

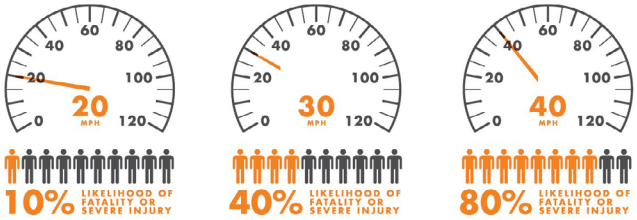
Safety Cameras on High Crash Corridors

Coming in August to Beaverton-Hillsdale Highway

What Are Safety Cameras? Safety Cameras are a proven safety tool that can reduce dangerous speeding in your neighborhood and save lives. They are mounted along High Crash Corridors and when people driving past them exceed the posted speed limit, they capture photos and video for review by Portland Police.

Why Beaverton-Hillsdale Highway? SW Beaverton-Hillsdale Highway is a High Crash Corridor. People walking along or crossing it on foot are twice as likely to be struck by a car than on the average city street.

Will these cameras issue speeding tickets? Our goal is to reduce speeding and save lives. The cameras will issue warnings for the first 30 days. Thereafter, people can avoid citations by travelling the posted speed limit on Beaverton-Hillsdale Highway. Any money received from the tickets pays for the program and safety improvements on the corridor.



DEATH DUE TO SPEED

U.S. DEPARTMENT OF TRANSPORTATION, LITERATURE REVIEWED ON VEHICLE TRAVEL SPEEDS AND PEDESTRIAN INJURIES. MARCH 2000.

What is Vision Zero? The City of Portland has joined cities around the country in embracing Vision Zero – the notion that the death of even one person on our roads is one too many. Vision Zero prevents traffic deaths through smart policy and system design. Learn more by visiting ***www.VisionZeroPortland.com***

VISION ZERO

The Portland Bureau of Transportation fully complies with Title VI of the Civil Rights Act of 1964 the ADA Title II and related statutes and regulations in all programs and activities. For accommodations, complaints and information, call (503) 823-5291, City TTY (503) 823-6868, or use Oregon Relay Services: 711

Education has been an important part of PBOT's speed safety camera program. PBOT created informational postcards – in English and 10 other languages – to distribute to nearby residents and businesses prior to camera installation to provide background information on the program.

RECOMMENDATIONS:

» **Include automated enforcement as part of a speed management program. Specifically, work with state legislature to pilot the use of fixed safety cameras on select streets within the High Crash/ Injury Network.**

» **Consider equity in camera placement so that cameras are not concentrated in any one community.**

» **Create options to tier camera fines based on family income and/ or ability to pay.**

CONCLUSION

Managing speed to save lives and eliminate life-altering injuries is a cornerstone of Vision Zero. This is a critical part of Vision Zero's Safe Systems approach, which recognizes that humans are going to make mistakes, so the transportation system must be designed to protect people, even when mistakes are made. Communities across the U.S. are working to untangle the complicated web of outdated policies to prioritize speed over safety over speed as part of their Vision Zero efforts.

Portland's three-part strategy to work with the state DOT to gain authority in setting speeds and use a Safe Systems alternative to the 85th percentile practice, design roads that support safe speeds, and use safety cameras is a promising model for other Vision Zero cities.

Listen to the Vision Zero Network's recorded webinar, featuring more background from PBOT staff about their approach to speed management, here.