



Accommodating Bicycles

Presentation to 2010 WVDOT/MPO/FHWA
Transportation Planning Conference

October 27, 2010

Frank Gmeindl

LCI #1703

Chairman, Morgantown Bicycle Board

LCI = League Cycling Instructor

The League of American Bicyclists formed in 1896 as the League of American Wheelmen. The “Good Roads Movement” to pave the roads was its first initiative. The FHWA recognizes LAW and the Good Roads Movement as a foundation of transportation in the US today.

Objectives of This Presentation

- Recognize bicyclists' needs
- Understand impact on cyclists of planning & engineering solutions
- Some effective solutions

What do cyclists need?

• Respect

- Treat bicyclists as equals to other road users as provided by the law WV 17C-11-2
- Make bicycling less scary.

WV Code 17C-11-2

“Every person riding a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle by this chapter, except as to special regulations in this article and except as to those provisions of this chapter which by their nature can have no application.”

4

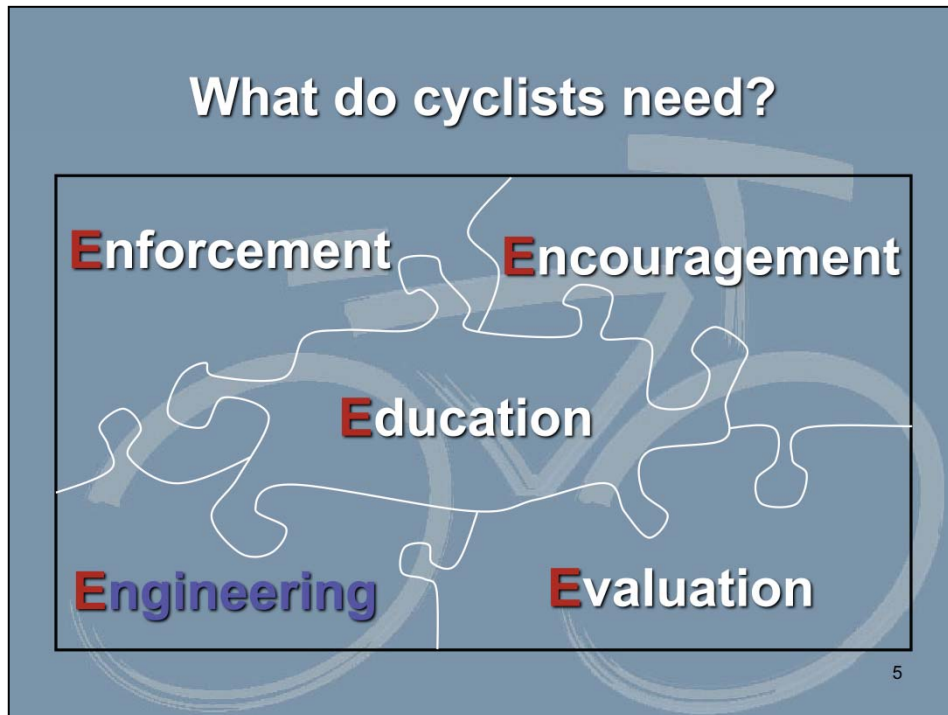
All 50 states laws have similar language.

Special regulations: far to the right as practicable; no more than two abreast; mandatory side path; number of passengers; clinging to vehicles; carrying articles; lamps, bells, brakes; helmet use under 15.

When a person is riding a bicycle off the roadway what rights and duties does he or she have?

Cyclists fare best when they act and are treated as drivers of vehicles.

What do cyclists need?



Cyclists need more than places to ride our bikes. We need:

Education: Teach cyclists how to act as drivers of vehicles. Teach motorists how to treat cyclists.

Enforcement: Police must enforce traffic laws whose violation most endangers cyclists. Most MV/bicyclist crashes occur at intersections. The number one cause of MV/bicyclist crashes is motorists and cyclists running red lights and stop signs. Most crashes result from motorist failure to yield right of way to bicyclist. To accommodate bicycling, police must ticket both motorists and bicyclists who violate laws at intersections, especially running lights and stop signs and failure to yield.

Engineering: Engineering is highlighted in this slide because while we recognize that increasing bicycling will require Enforcement, Education, Encouragement and Evaluation, since the MPO limits its scope to physical infrastructure, this presentation emphasizes Engineering and does not address the other pieces of the puzzle very much.

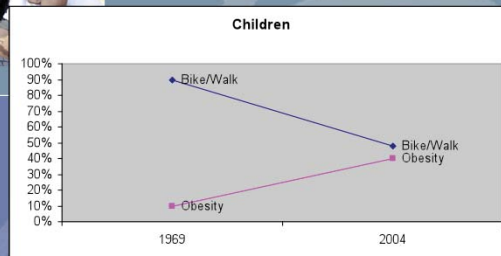
Encouragement: The Community must recognize bicyclists as citizens with the same rights as drivers of vehicles.

Evaluation: We must collect and analyze data on bicycle use, bicycle crashes, and law violations that diminish bicycling and use that data to make objective decisions that increasing bicycling use and safety.

Motivation



- \$2.6 Million/year: Mon Co. spends busing children to school
 - 8,500 children transported
 - 1 mile: average distance to school/child
 - 250,000 gallons fuel consumed
 - 89 buses on the road each day
- Source: Dominion Post Sep. 7, 2009 p.1-A



WV: most obese state in US.
34% of West Virginians are obese

In 1969, about 90 percent of kids who lived within a mile of school walked or rode bikes to get there. In 2004, just 48 percent did that at least one day a week. In the same time obesity rates have gone from 10% to 40%.

Ref: <http://www.cdc.gov/Features/WalkToSchool/>

West Virginia has the highest obesity rate in the US according to August 4, 2010 gallup report: <http://www.gallup.com/poll/141734/One-Three-Adults-Obese-America-Three-Obese-States.aspx>

The \$2.6M/year that Mon County spends on busing could build 52 miles of bike lanes or 5 miles of sidewalks.

We Must Make Bicycling Safer

- **Cyclists fare best when they act and are treated as drivers of vehicles**
- **Visible + Predictable => Safe**

WVDOT, MPO and FHWA decisions must enable bicyclists to operate their bicycles as vehicles and to maximize their visibility and predictability.

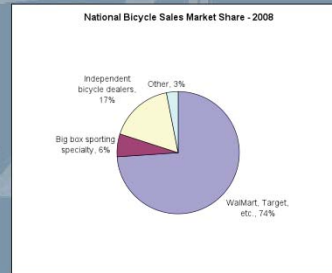
7

When cyclists act as drivers of vehicles they are most visible and predictable. The law supports cyclists acting as drivers of vehicles. Cyclists must act as drivers of vehicles to be treated as drivers of vehicles. Motorists must also be educated that cyclists have the same rights and duties.

In October 2008, the City of Morgantown received a \$58K WV Transportation Enhancement Program grant to support an Effective Cycling Education Program. Education accomplishments as of August 2010:

1. Increased the number of League of American Bicyclists' League Certified Instructors in Morgantown from 2 to 5
2. Created website BikeMorgantown.com to provide educational information, course schedule and on-line registration
3. Taught 67 students the League of American Bicyclists Traffic Skills 101 course in 14 deliveries
4. Developed a 1-hour course for high school driver education instructors to conduct with their driver education students
5. Developed seven 15-second TV spots aired on networks Discovery, tbs, CNN, Comedy Central, CMT and Travel Channel
6. Published 7 monthly articles in the *Dominion Post* newspaper and on BikeMorgantown.com website. Topics include: National Bike Month; Pre-ride safety check; The law: bicyclist rights and duties; Driving around bicycles; Bicycling in Traffic
7. Developing billboards that contain nominally 7 bicycle awareness and education messages
8. Achieved agreement with WVU to display billboard images on WVU information kiosks
9. Developed a plan for Shared Lane Markings and Bicycles May Use Full Lane signs for application when the WVDOT adopts the 2009 MUTCD
10. Developed a bike route map
11. Developed a signage plan for location of Bike Route and Share the Road signs
12. Developed bumper sticker

Pent up demand for accommodating bicyclists



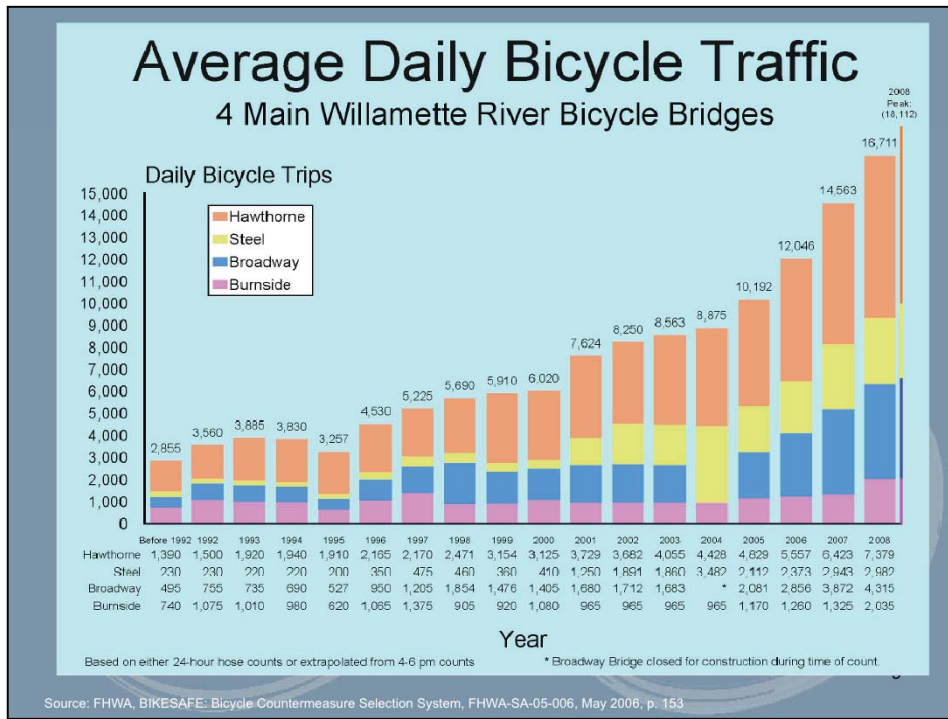
"We have sold more bikes for transportation in the last four years than in any period since 1970" – Chip Wamsley

8

There is a growing pent-up demand for bicycle accommodations that include infrastructure, education, enforcement and encouragement.

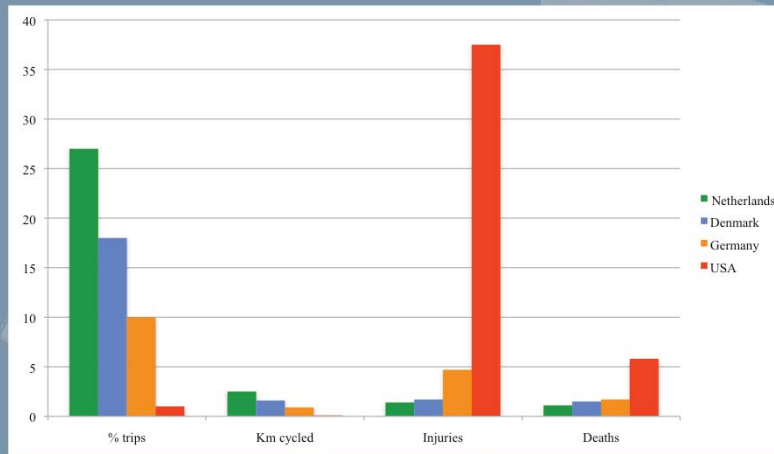
National Data Source: National Bicycle Dealers Association

Local Data: Morgantown Bicycle Dealer



Increase in bicycle use in Portland OR that may be attributed to improvements in infrastructure, education, enforcement and encouragement.

Lessons from Netherlands, Denmark and Germany



* *Making Cycling Irresistible: Lessons from Netherlands, Denmark, Germany*; John Pucher and Ralph Buehler, *Transport Reviews*, Vol. 28, 2008

10

Netherlands, Denmark and Germany have 10-25 times more bicycling than the US but 1/4 to 1/5 the cyclist fatalities and 1/8 to 1/25 the cyclist injuries. What are they doing differently to get so many more people bicycling while reducing injuries and fatalities?

% trips = % trips by bicycle

Km cycled = Km cycled per inhabitant per day

Injuries = Cyclists injured per 100,000 km cycled

Deaths = Cyclists killed per 100,000 km cycled



The “problem”

- Bicycles are often slower than motor vehicles so they can delay motorists and increase congestion

A solution

- Enable cars to pass bicycles safely

11

In WV, the problem is most acute on the climbing side of narrow curvy roads.

Classes of Cyclists

- **Novice**
 - Afraid of traffic
 - Primarily recreational
 - Favors separation and segregation facilities
 - Limited bicycle operating knowledge and skill
 - Majority of WV cyclists... today
- **Experienced**
 - Minority... today
 - Drives bicycle as a vehicle; obeys common traffic principles
 - Uses bicycle for transportation as well as recreation
 - Needs fair access to the roads
 - Needs enforcement of the law
 - Needs to be treated as the driver of a vehicle: not a pedestrian or a child



12

MPO/DOT/FHWA actions must recognize and accommodate different needs of these two groups while facilitating movement from the novice group to the experienced group.

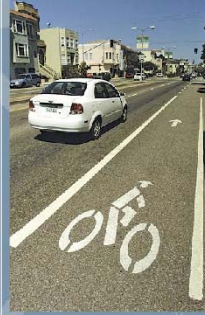
Alternative Bicycle Facilities

Roadways



Integrated

Bike Lanes



Separated

Shoulders, Bike Paths/ Rail Trails, Sidewalks



Segregated

13

Roadway: **Integrates** bicyclist with traffic and treats bicycle as a vehicle.

Bike Lane: **Separates** cyclist from traffic but keeps cyclist on the roadway.

Bike Path: **Segregates** cyclists from other vehicles

Roadways



- **Benefits**
 - Connect most trip origins and destinations
 - Smooth, clean surface: minimal effort, time
 - Same rights and rules for all users: predictable
 - Enable bicyclists to position for maximum visibility

Roadways

- **Problem: Cars can't get around**
 - Blind curves and blind hill crests are dangerous on narrow high-speed uphill lanes

Solution: Widen

- New DOH policy to stripe ~2 feet in from the edge mitigates, e.g. Rt. 7 from Kingwood to Scott Ford
- 14 feet = minimum width for cyclists and motorists to travel safely side-by-side in the lane

15

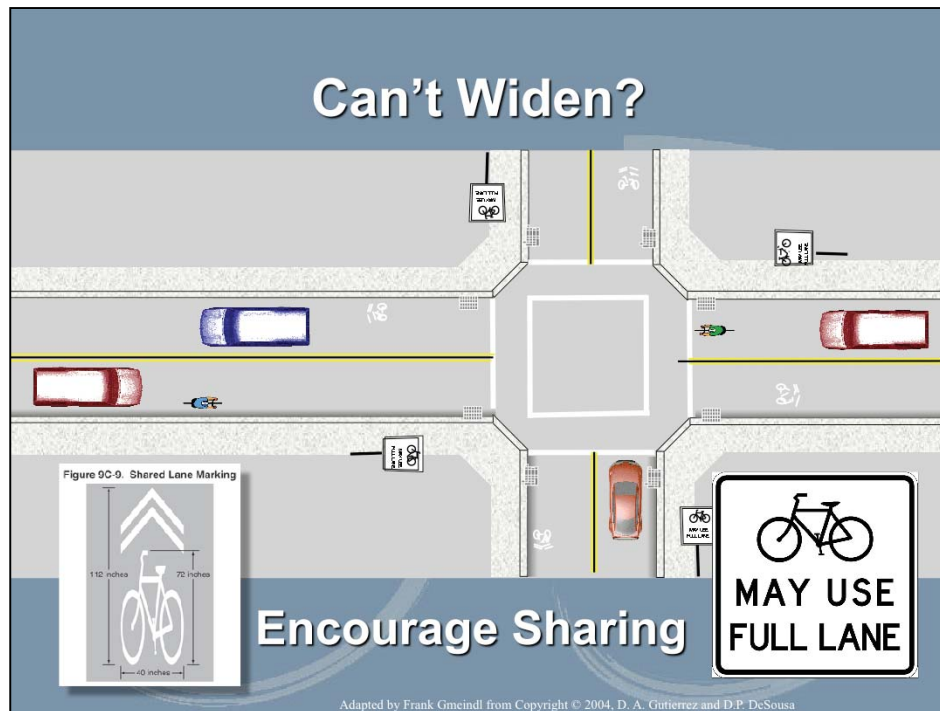
Novice cyclists will move as far to the right as **possible** when they perceive a motor vehicle behind them: whether or not it is safe to be passed. This movement invites the motorist to attempt to pass. The result is often on-coming vehicle leaving the roadway or overtaking vehicle forcing cyclist off the roadway.

If it is unsafe to pass, for example narrow road with on-coming traffic, blind curve ahead or blind crest of hill ahead, **competent** cyclists will maintain position to the right of the center of the lane to discourage motorist from attempting pass until it is safe to do so.

Widening the climbing lane to 14 feet enable motorist to pass bicyclist without crossing double yellow line.

Crossing the double yellow line is only permitted when directed to do so by a law officer or traffic official.

If MPO/WVDOH/FHWA would focus on enabling motor vehicles to safely pass bicycles on the roadway, all WV's roadways would be bikeways.

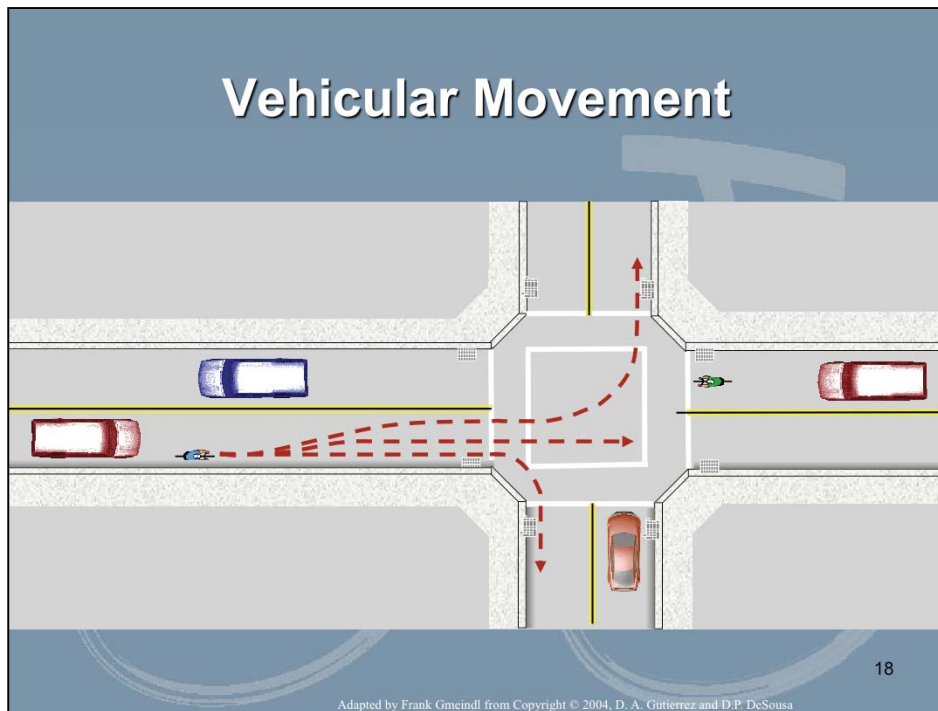


Shared lane markings and shared lane signs, 1) signify that bicycles belong on the roadway; 2) encourage bicyclists to use the roadway; 3) encourage bicyclists to adopt proper lane positioning; 4) discourage motorists from attempting unsafe passing. This new marking and sign are in the 2009 FHWA approved MUTCD that remains to be adopted by WVDOT but are in wide use in many other states.

Bike Lanes



- **Attraction**
 - Novice cyclists feel safe
- **Problems:**
 - Increase crashes at crossings
 - Reduced visibility
 - Right hook, drive out, left cross
 - Prevent vehicular movements
 - Straight through, left turn



Being narrower, bicyclists must choose the safest line that serves their destination. When proceeding straight through an intersection, driving in the center of the lane 1) discourages motorists from overtaking and turning right into the cyclist; 2) signals crossing and oncoming motorists that the cyclist does not intend to turn right; 3) increased cyclist visibility to crossing and oncoming vehicles. When turning left, driving on the left side of the lane 1) signals following, on-coming and crossing traffic that the cyclist intends to turn left; 2) discourages motorists from trying to pass the cyclist and cutting off the cyclist's path into the intersection. Bike lanes can discourage cyclists from taking proper lane position and can mislead motorists to believe that the bicyclist will stay in the bike lane.



On 7-Sep-2007 a [cyclist named Bryce Lewis was killed](#) in Seattle at the intersection of Eastlake and Fuhman (heading north on Eastlake just before the University Bridge). The cyclist was going straight and a dump truck turned right across his path, dragging the cyclist for 25 feet.

Motorists look left when turning right to look for on-coming traffic. Same as problem with pedestrians getting hit in the cross walk at Spruce and Walnut and at High and Walnut in Morgantown.

Solutions

- **Correct Bike Lane Design, Construction and Maintenance**
 - ≥ 5 feet wide
 - Outside the “door zone”
 - Travel in direction of traffic flow
 - Terminate far enough before intersection to enable straight-thru and left-turning cyclists to merge
 - Maintained clear of debris and parked cars

20

Bicycles are approximately 2 feet wide and 3 feet is a minimum safe passing distance.

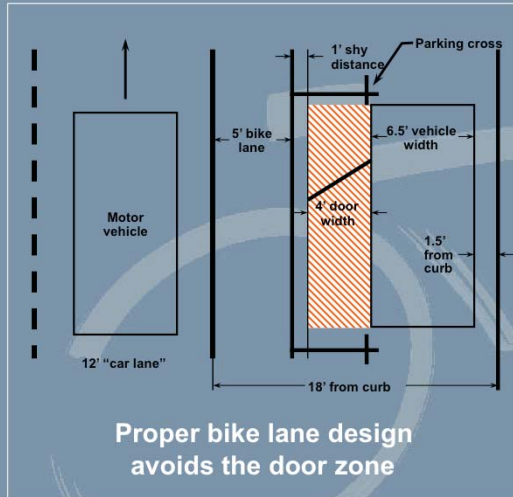
Car doors can protrude 4 feet from the side of a parked car. Cyclists driving less than 4 feet from parked cars risk collision with an unexpected opening door.

Bike lanes that allow cyclists to travel opposite the flow of traffic set them up for head on collisions at speeds = car speed plus bike speed: severe injury and death.

Bike lane must end early enough for cyclist to be able to scan, signal and negotiate change of lane position. The higher the speed, the more distance is required.

On the roadway, motor vehicles remove glass in the tire path. If motor vehicles don't drive on bike lanes, glass collects increasing punctures.

Avoiding the “Door Zone”



Proper bike lane design avoids the door zone

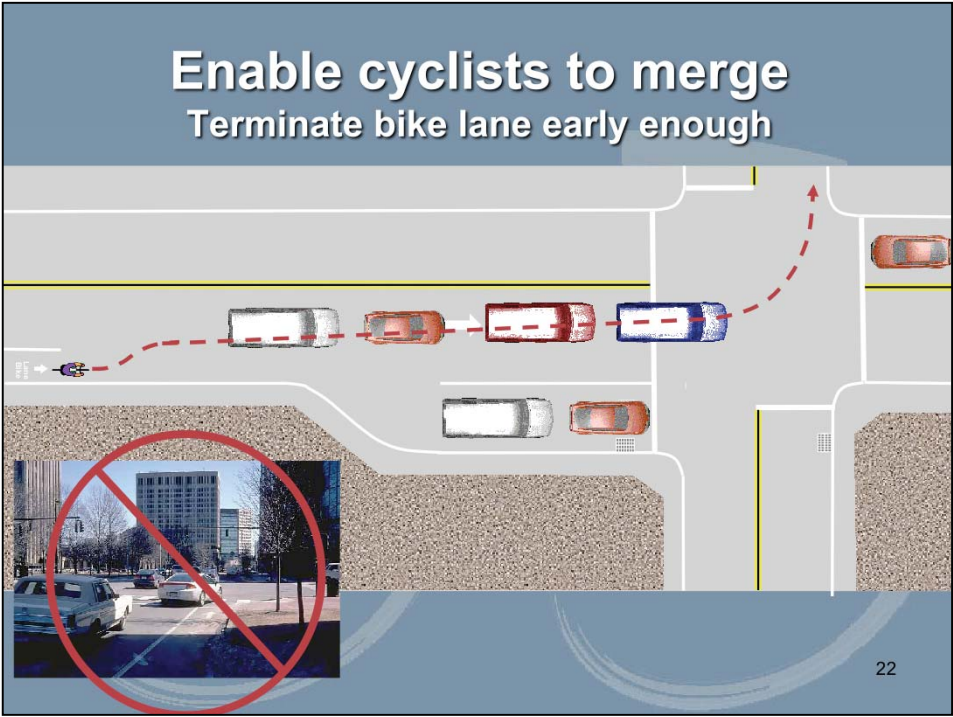


Fatality, Jul 2, 2002
www.rwinters.com/
Bike lane in the door zone

21

Adapted by Frank Gmeindl from Fred Oswald *Roadway and Bikeway Safety Issues* April 2007

A 30-foot curb lane width is required to place a bike lane on a roadway with motor vehicle parking.



In the lower left picture, the bike lane continues to the intersection. Although the arrow in the bike lane points straight, the only safe cyclist move from where the arrow is positioned is a right turn. To go straight, the cyclist should be driving between or behind the pictured cars. To turn left, the cyclist should be in the left side of the lane. The bike lane instructs the cyclist to proceed straight when the only movement he or she can execute safely would be a right turn.

Where Bike Lanes Make Sense

(Increased sprawl may negate these)

- Arterials with few collectors and collectors have little traffic
- Flats and climbing side of hills
- Morgantown examples:
 - Monongahela Blvd. between Eighth and Evansdale
 - Rt. 19 north of Star City bridge
 - Rt. 7 west of Pursglove
 - Rt. 19 south of Morgantown Mall
 - Rt. 73 south of diverge from Rt. 119
 - Rt. 119 south of Wal-Mart
 - Rt. 119 north of Easton

23

Bike lanes have been shown to increase collisions between motor vehicles and bicycles at intersections. Bike lanes only make sense where there are no intersections or where measures to prevent crossing of paths are implemented.

Bike Paths/Rail Trails₁



- **Benefits**

- Novice cyclists feel safe
- Can provide some transportation links
- Serve pedestrians, roller bladers, dog walkers, baby strollers, etc.
- Linear parks, primarily recreational

Bike Paths/Rail Trails₂

- **Potential problems**
 - Serve limited destinations
 - Trails crossing roadways are more dangerous than roadways crossing roadways
 - No established enforced rules
 - No authoritative enforcement body
 - Conflicts / crashes between user types
 - Force cyclists to behave as pedestrians instead of drivers of vehicles

25

Trail-roadway intersections 1) are usually not built with sight lines typical of roadway intersections; 2) sometimes aren't controlled, e.g. red lights, stop signs; 3) merge onto roadways at angles and locations that surprise motorists.

Cyclists have the capability of travelling well over 20 mph on paved level surfaces. Having to travel at low speeds to avoid collisions with other trail users diminishes the feasibility of trails for bicycling as transportation.

Bike Paths/Rail Trails₃

- **Some solutions**
 - Design and build trails to minimize crashes at crossings with roadways, e.g. square up alignment, elevate crossings (speed table), provide cyclist activated signals
 - Morgantown examples
 - Green Bag Rd.
 - Decker Creek Blvd.
 - Carnegie St.
 - Stripe trail to encourage keeping to the right
 - Establish and enforce standard trail-use laws

26

Sidewalks

- Sidewalks are for pedestrians
- Bicycling on sidewalks is dangerous for pedestrians and bicyclists
- Transition from sidewalk to roadway presents highest risk and severe consequences to bicyclist and motorist

27

Cyclists traveling faster than walking speeds on sidewalks present danger to pedestrians.

Motorists do not attend to activity on the sidewalk. Motorists crossing sidewalks, e.g. driveways, watch for traffic on the roadway, not the sidewalk. Curbs present maneuverability challenge: high crash potential. Speed and travel direction differences increase crash severity.

Summary₁

Do...

- **Treat bicyclists as drivers of vehicles**
- **Widen curb lanes to enable cars to pass bikes safely**
- **Design bike lanes to preclude crashes at crossings and to enable vehicular movement**

28

Widen curb lanes especially on up hills. 5-feet is ideal but even 3-feet helps.

Summary₂

Don't...

- Force bicyclists to drive in an unexpected, unpredictable, unsafe or unlawful manner
- Expect bike lanes and bike paths to suffice for bicycle transportation

Summary₃

- **Traffic law gives bicyclists driving on the roadway the same rights as motorists and subjects them to the same duties**
- **Cyclists fare best when they act and are treated as drivers of vehicles**
- **Visible + Predictable => Safe**

30

The majority of cyclists are incompetent: riding on sidewalks; riding against traffic; disobeying signs and signals; swerving, making turns and sideways movements without signaling and obtaining right of way. The laws need to be enforced. High quality education must be available. The infrastructure must encourage cyclists to obey the rules and drive their bicycles as vehicles: signage, wide climbing lanes.

Motorists may not be aware that bicyclists have the same rights to the road and are subject to the same rules. Enforce the laws, particularly with regard to safe passing and yielding right of way especially at crossings. Educate motorists of their duties to cyclists beginning with the WV Driver Licensing Handbook and license test.

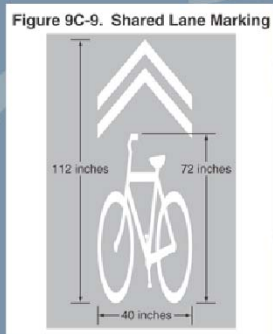


Morgantown's Bicycle Board

- Formed by Traffic Commission 2006
- 17 members representing the City and Greater Morgantown
- Vision: All Morgantown residents can enjoy bicycling safely and fearlessly anywhere, anytime, for any reason. Morgantown residents choose to ride bicycles for transportation as well as recreation. Our state and our nation recognize Morgantown for the benefits of bicycling to our health, our environment, our economy and our quality of life.
- Purpose: Work to make Morgantown a Bicycle Friendly Community as defined by the League of American Bicyclists so as to reduce traffic demands, afford better air quality, and improve public health. Also to make recommendations for improving signage, safety, capacity and facilities for bicycles on streets, trails or other land design or use which supports cycling; advocate for the provision of bicycle travel opportunities to and from locations such as residential, employment, commercial, education, recreation and transit centers; promote the development of safe bicycle routes to schools; and encourage use and enjoyment of bicycling and bicycle safety education in Morgantown.

Accomplishments

- Developed a plan for Shared Lane Markings and Bicycles May Use Full Lane and processed through WVDOH approval



Accomplishments

- Applied for League of American Bicyclists Bicycle Friendly Community award
- Developed a bike route map
- Developed a signage plan for location of Bike Route and Share the Road signs
- Provided WVU bicycle parking guidance and design
- Provided Mountain Line bicycle parking design
- Inventoried Morgantown bicycle parking
- Recommended rail-trail striping and provided design
- Served on Steering Committee for first annual WV Cycling Symposium

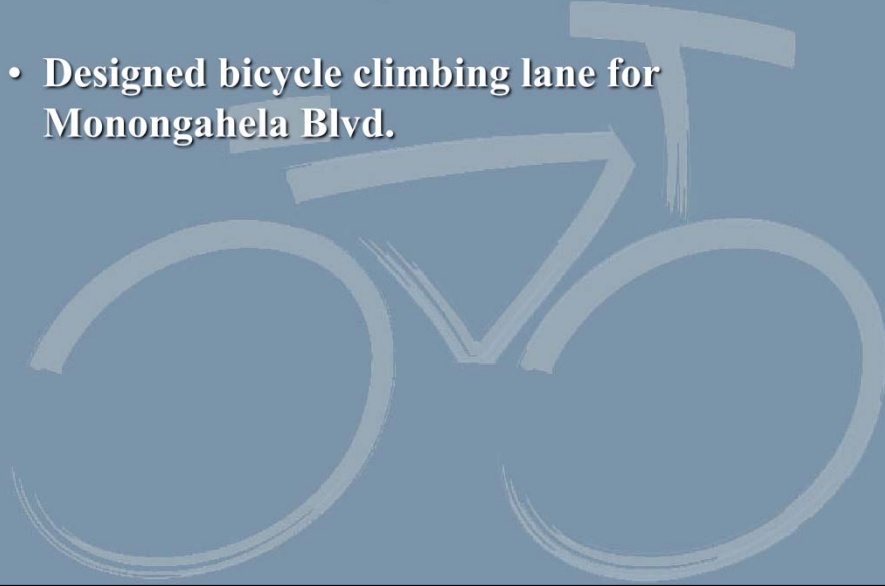
Accomplishments

- Established downtown Morgantown bicycle parking



Accomplishments

- Designed bicycle climbing lane for Monongahela Blvd.



Accomplishments

- Initiated action with City, Utility Board and WVDOH to replace in-line grates



Accomplishments

- **Received Transportation Enhancement Program grant 2009: Morgantown Effective Bicycling Education**
 - Increased the number of League of American Bicyclists' League Certified Instructors in Morgantown from 2 to 5
 - Created website BikeMorgantown.com to provide educational information, course schedule and on-line registration
 - Taught 67 students the League of American Bicyclists Traffic Skills 101 course in 14 deliveries
 - Developed a 1-hour course for high school driver education instructors to conduct with their driver education students

Accomplishments

- **TEP Grant**
 - Developed seven 15-second TV spots aired on networks Discovery, tbs, CNN, Comedy Central, CMT and Travel Channel and displayed on WVU info kiosks
 - Always Ride with the Flow of Traffic
 - Obey Intersection Rules
 - Always Scan, Signal, and Negotiate
 - Treat Bicycles the Same as Other Vehicles
 - Passing Cyclists Safely
 - Yield to Traffic that has the Right of Way
 - Watch for Cyclists

Accomplishments

- **TEP Grant**
 - Published 7 monthly articles in *The Dominion Post* newspaper and on BikeMorgantown.com website.
 - ABC Quick Check
 - May is National Bike Month
 - Same Road, Same Rights, Same Rules
 - Bicycling in Traffic
 - Driving Around Bicyclists
 - Out and About on the Rail Trail
 - Bicycling with Children

Accomplishments

- **TEP Grant**
 - Developed billboards that contain bicycle awareness and education messages



Accomplishments

- TEP Grant
 - Developed bumper sticker

