



Speed Zoning & the 85th Percentile

Rock Miller, P.E.

Rockmiller49@yahoo.com

@Rockmiller

What is the 85th percentile

- Speed at which 15% are going faster and 85% are not
- Presumes 85% are Driving “Responsibly”
- Concentrates Enforcement on “Irresponsible” Driving
- Helps to insure that the fastest motorists are subject to enforcement
- California Speed Limits must be near the 85th %-ile
- Addresses Speed Trap Revenue vs Safety Issue

Jurisdiction _____ Date _____
Location _____ Weather _____
Recorder _____ Begin Time _____ End Time _____

mph	NUMBER OF VEHICLES						PERCENT OF TOTAL	CUMULATIVE PERCENTAGE
	5	10	15	20	25	30		
65								
60								
55								
50								
45								
40								
35								
30	X	X	X				1	100
	X	X	X				3	99
	X	X	X				4	94
	X	X	X				8	90
	X	X	X				5	82
	X	X	X				9	77
	X	X	X				9	68
	X	X	X				15	59
	X	X	X				11	44
	X	X	X				7	33
	X	X	X				7	26
	X	X	X				6	19
	X	X	X				1	10
	X	X	X				5	9
	X	X	X				2	4
	X	X	X				1	2
	X	X	X				1	1
15								

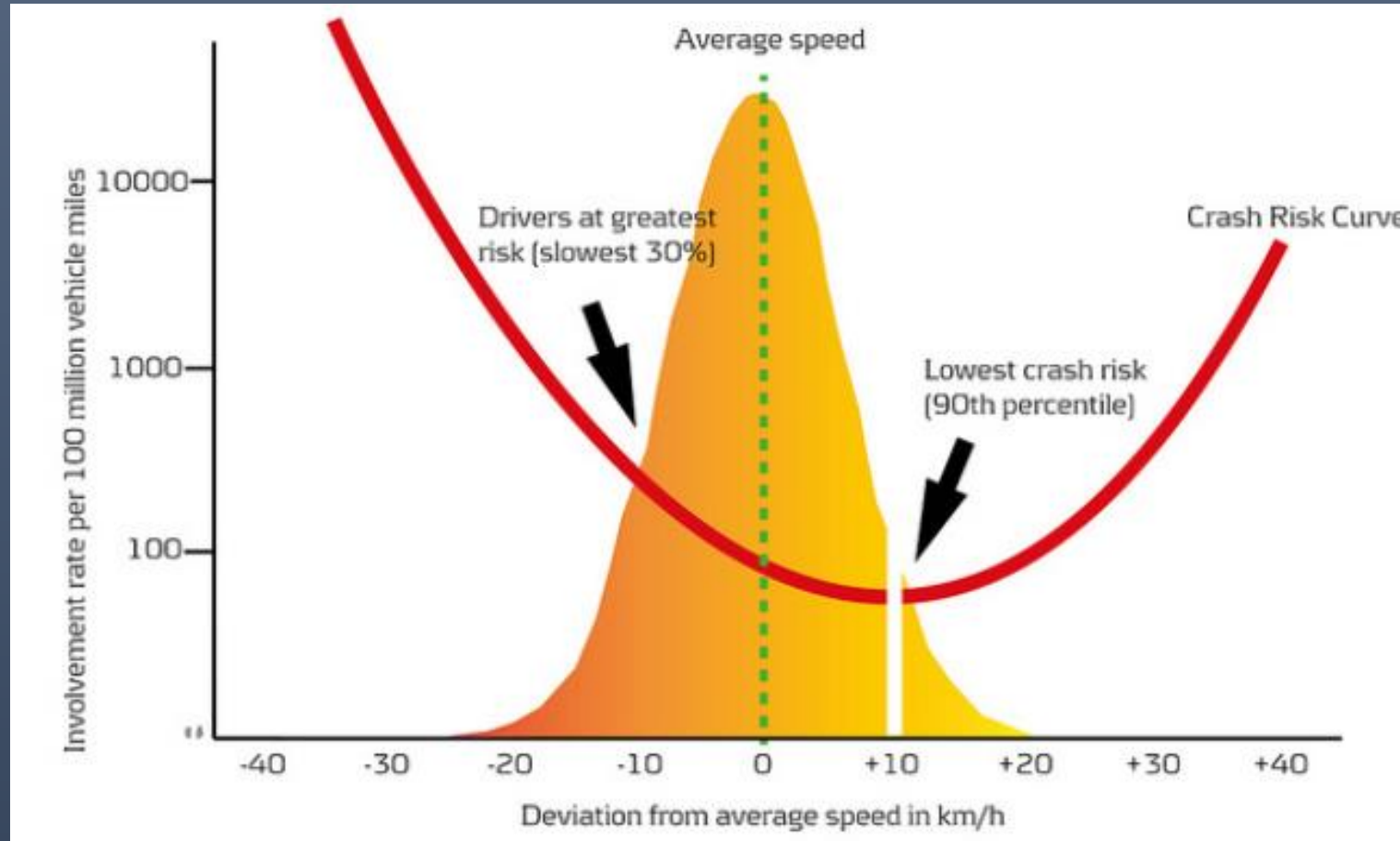
TOTAL NUMBER OF VEHICLES 100

Signed _____ Date _____ Title _____

Other Considerations _____
Accident History : _____
Unusual Conditions : _____

85th Percentile and Safety

The Solomon Curve

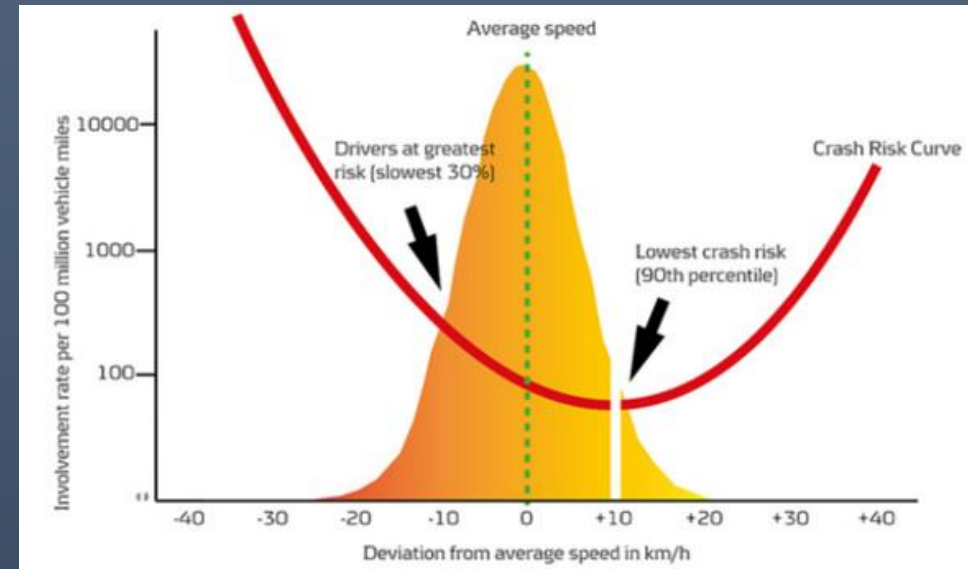


The Solomon Curve

- 1960's Original Research on Rural Roads
- Based upon Reported Collision Speeds vs Average Speed
- Suggests that Speed Differential is Stronger Predictor than Actual Speed
- Has not been Verified by Subsequent Research
- Speed of Turning or Stopped Vehicles Clouds Findings

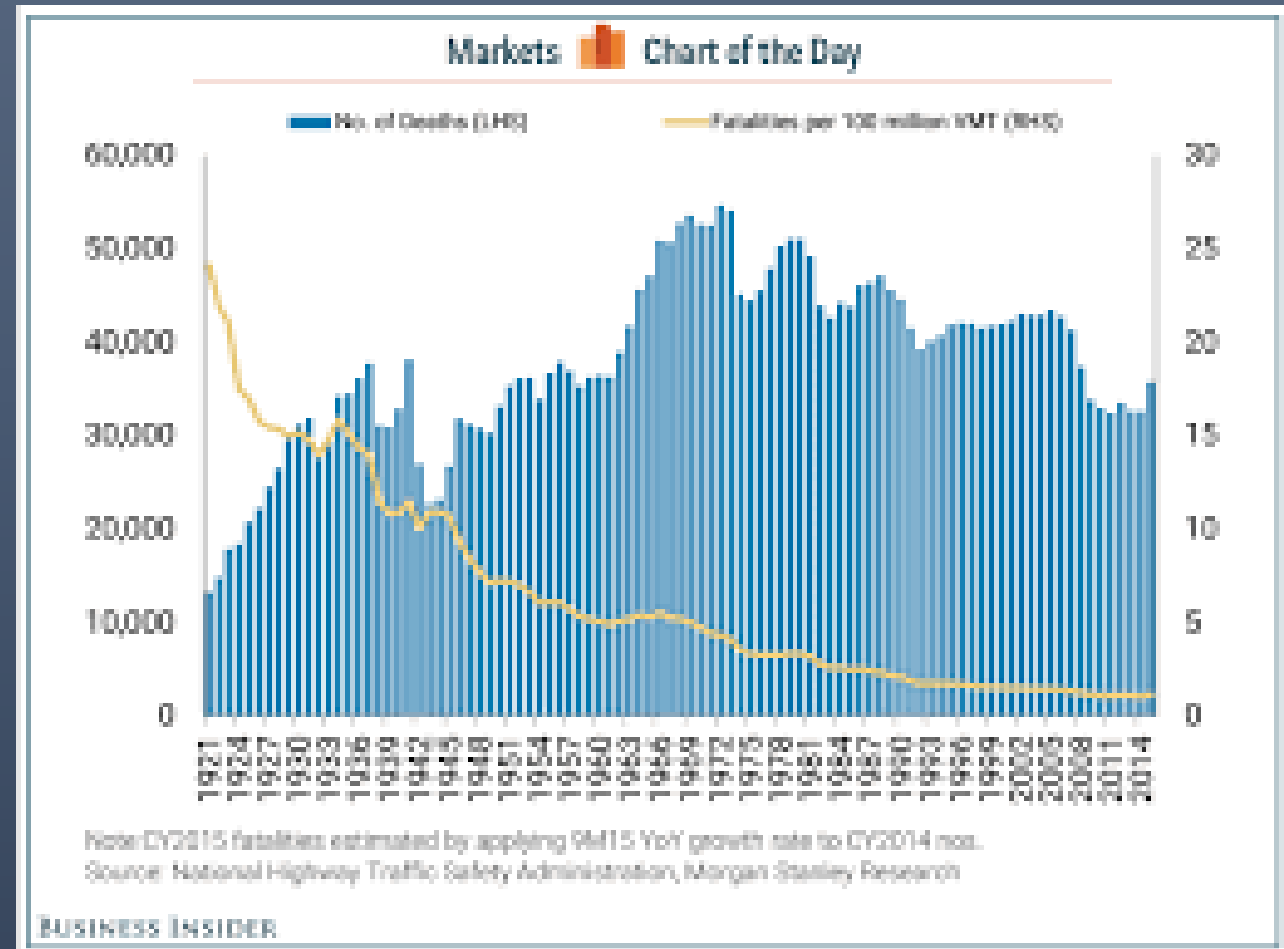
The Solomon Curve

- The Solomon Curve would predict that roads with highly varied driver speeds (such as urban commercial arterials) **WOULD** have more crashes



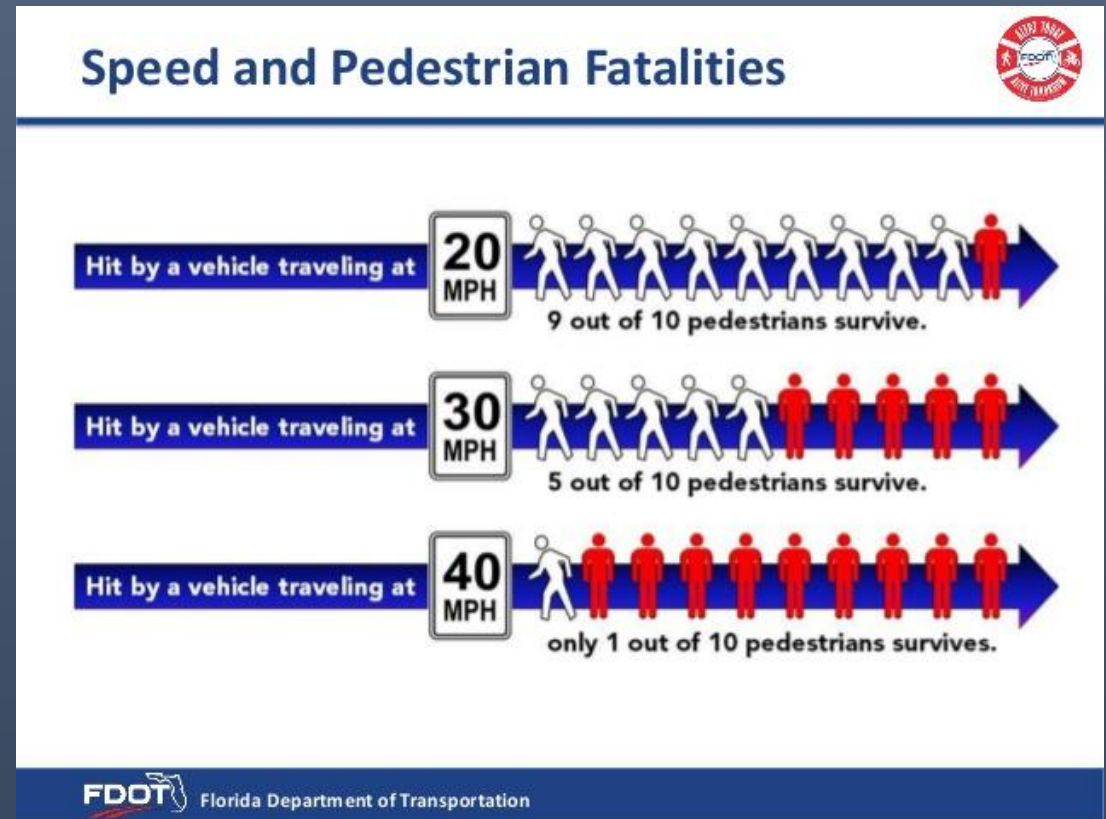
Alternative Considerations

- National 55 MPH Speed Limit (1974) Evidence
 - VMT Drop?
 - Safety Imps?



Alternative Considerations

- Growing Concerns for Pedestrian Safety
 - Approaching 50% of Urban Fatalities
 - Clear Obstacle to Vision Zero for Cities



NTSB Study Key Findings (2017)

- Excess Speed Cited in 30% of All Fatalities
- Raising Speed Limits to match 85th Percentile can have Unintended Consequences
- Weak evidence that 85th Percentile equates to low crash risk
- Reporting of speed related crashes is inconsistent, which leads to underreporting
- Speed Limits appear to be creeping upward over the years

NTSB Recommendations

- Revise ... MUTCD so that factors listed as optional are required...and remove guidance that speed limits should be within 5 mph of the 85th Percentile

National Actions Underway

- National Committee on Uniform Traffic Control Devices (NCUTD) has formed a task force
- Nationwide survey of Users is underway
 - Strong and Wide Range of Opinions
- National MUTCD is not very detailed
 - Leaves much flexibility to State and Local Governments

California Vehicle Code

- Speed Zoning and Enforcement Scattered through the Code
 - 627 Engineering and Traffic Survey Requirements
 - 21400 (b) 85th Percentile Usage
 - 22348 et seq Speed Limits and Adjustments
 - 40802 et seq Enforcement of Speed Limits
- CVC 21400 is very restrictive

CVC 21400 (b)

- (b) The Department of Transportation shall revise the California Manual on Uniform Traffic Control Devices, as it read on January 1, 2012, to require the Department of Transportation or a local authority to round speed limits to the nearest five miles per hour of the **85th percentile** of the free-flowing traffic. However, in cases in which the speed limit needs to be rounded up to the nearest five miles per hour increment of the 85th-percentile speed, the Department of Transportation or a local authority may decide to instead round down the speed limit to the lower five miles per hour increment, but then the Department of Transportation or a local authority **shall not reduce the speed limit any further for any reason.**

State Protocol Issues

- Survey Protocol in California
 - Measure Speed of Unimpeded Traffic
 - Minimize the Effects of Traffic Signals or Stop Signs
 - Should be taken during off-peak hours on weekdays
 - Short-length speed zones are discouraged
 - Curvature, etc, should not require special downward zoning
- Procedure tends to limit survey to faster vehicles
- Survey Speeds are **NOT** Representative of Conditions that Drivers Must Deal with that Result in Crashes
- Protocol Result is much higher than speed of 85% of vehicles on Urban Arterials

Personal Experiences

- Narrow Mountain Roads with Multiple Curves

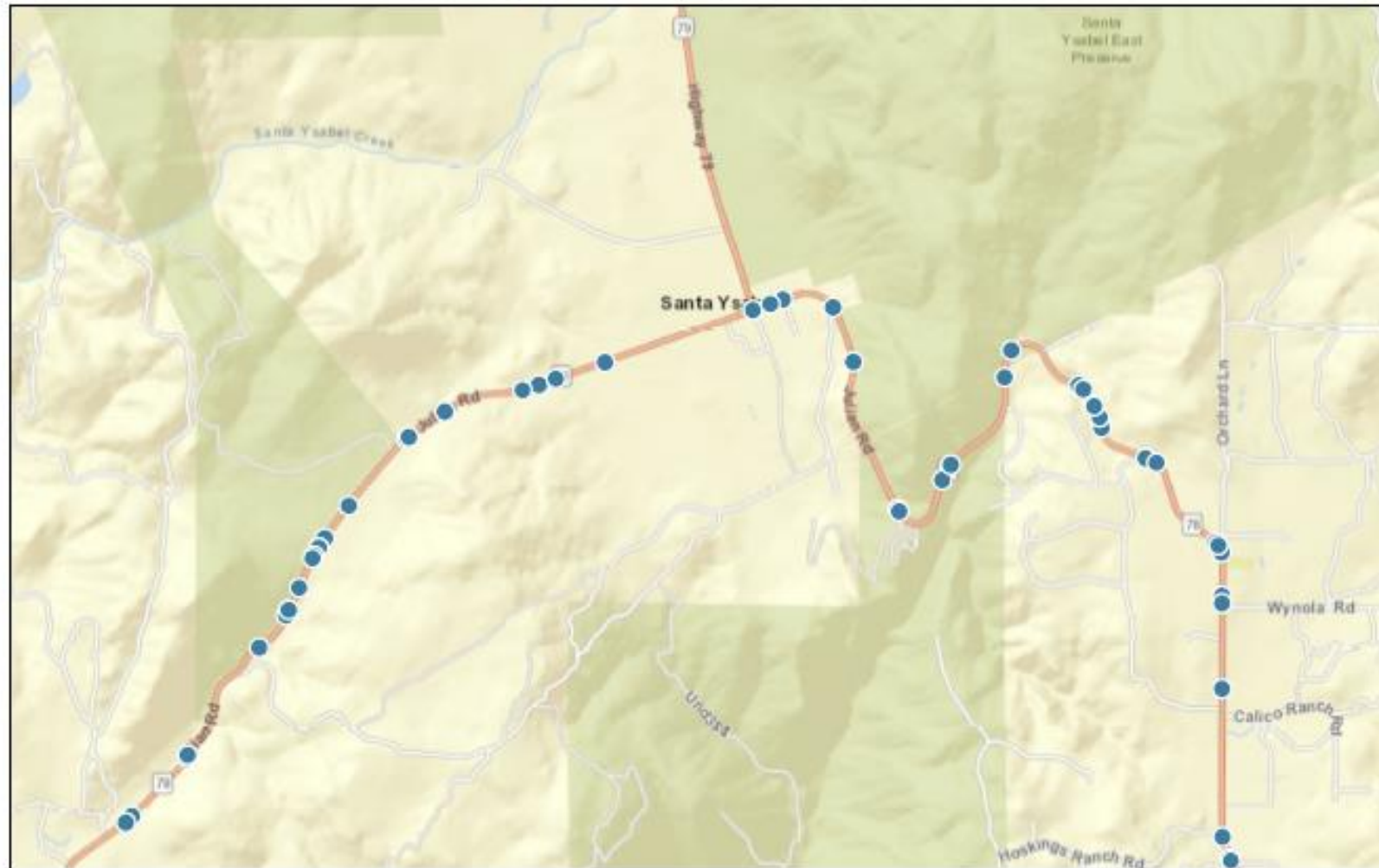


Personal Experiences

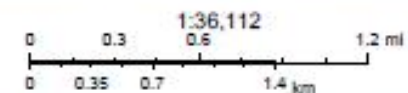
- Built-up Isolated Communities



SWITRS GIS Map: San Diego, 78 01/01/2012 - 12/31/2014



March 25, 2018
SWITRS Collisions
● Collisions



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

Pacific Coast Highway



45 MPH



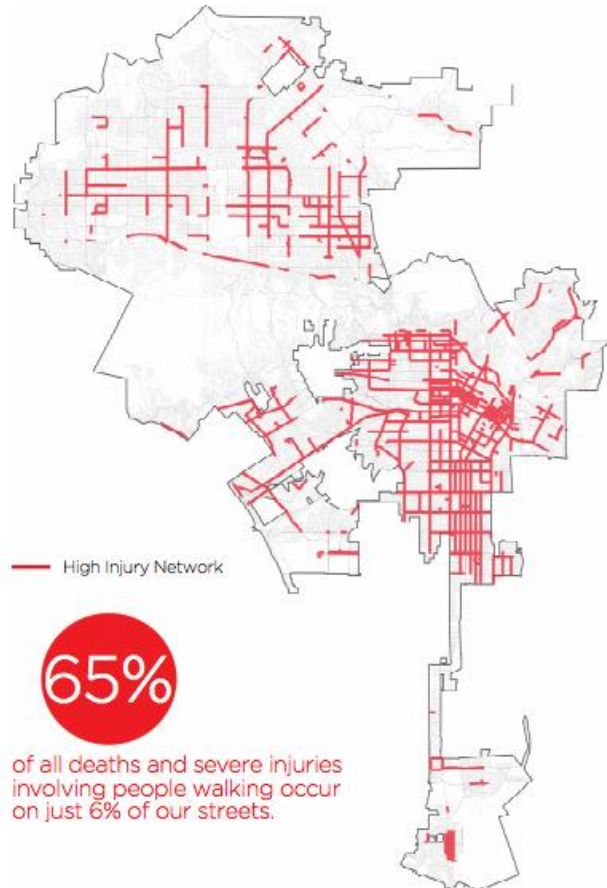
55 MPH

City of Los Angeles

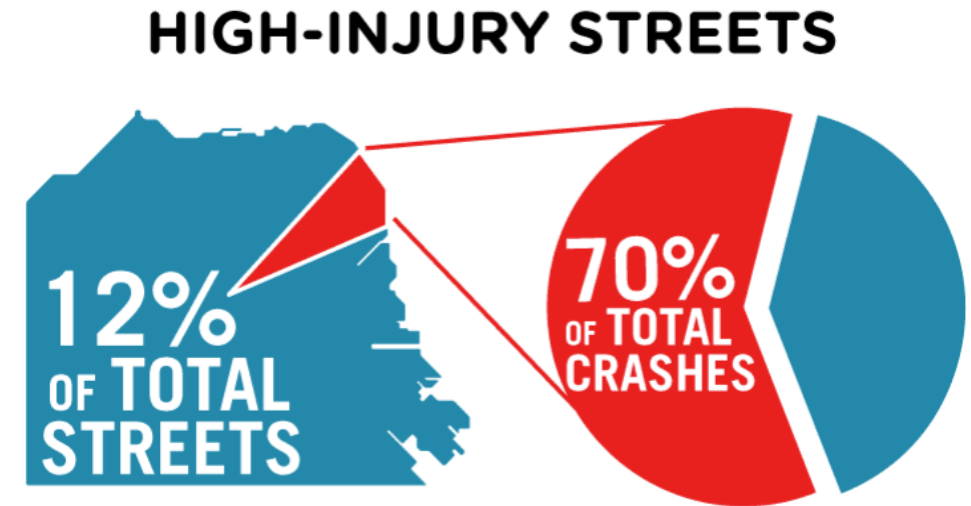
- Completing resurvey of 143.9 miles of Street
- All on High Injury Network
 - 94.6 miles to have speed limit increased
 - 49.3 miles to have speed limit decreased
- Another 300 miles, no Change
- City Attorney Office is very concerned over notice of network and need for speed limit increase
- Plaintiff lawyer has indicated that City has placed itself on notice of danger

Death and serious injury concentrated on arterials

Los Angeles



San Francisco



Denver



VISION 4410 NETWORK

My Questions

- How Can We Improve Safety through Speed Management?
- How can we Avoid accusations of Speed Trap?
- How can we Refine the State Dictated Procedure?
- How can we get Drivers to Slow Down, Voluntarily?

SHSP Bicycle Challenge Area

- 85th Percentile is explicitly in State Law (CVC 21400(b)).
 - It's application is guided by in California Manual on Uniform Traffic Control Devices (CA MUTCD).
 - Changes in CA MUTCD procedure will require legislative direction
 - Caltrans Statewide Safety Initiative has identified 85th Percentile as appropriate for review
 - Team established

Deeper Issues

- Speed Photo Enforcement not allowed by State Law
- Variable Speed Limits not allowed by State Law
- 25 mph Minimum set in State Law
- Changing Sign Legends alone not good at Reducing Speeds
 - But fines will increase for speeding



Needed Steps for Change

- Legislative Direction Needed, especially for CVC 21400 (b)
- Clarify the need to relate closely speed zone with road safety
 - Consider stronger connection between speed zoning and high injury collision areas.
- Consider whether Protocol for Measuring 85th Percentile is Appropriate
- Address concern of Enforcement Community and Drivers' Rights groups

AB 2363 (Freedman)

- Text is being modified based upon input.
- Adds or strengthens Safety emphasis and connection
- Changes round off rule to pre-2012 in CVC 21400 (b)
- Addresses Los Angeles Vision Zero situation