NORTH Dakota | Highway Patrol
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68th Legislative Assembly

Testimony in **Neutral** of

Senate Bill 2169

House Transportation Committee

March 8, 2023

TESTIMONY OF

Trooper Jacob Jones

Good morning, Chairman Clemens, and members of the Senate Transportation Committee. I am here today to provide neutral testimony regarding increasing the speed limit to 80 mph on interstate roadways. I have been a trooper with the North Dakota Highway Patrol for almost 12 years and I am a member of our crash reconstruction team. As a full-time reconstruction analyst, I have been to numerous training courses pertaining to human causation in crash investigations.

One of the biggest dangers to drivers while behind the wheel is encountering speed variance. Variance in vehicle travel speeds leads to drivers to change lanes, pass other vehicles, and slowing down. In an ideal world, all the vehicles on the roadway would travel at a uniform speed, keeping adequate distance between them. However, the highway is shared by many different users who travel at various speeds due to vehicle types, capabilities, and simply driver preference. Today, I want to talk to you about a specific type of hazard that drivers encounter on highways: closing on a lead vehicle.

Closing on a lead vehicle involves a faster vehicle approaching a slower vehicle with both traveling in the same direction. It is not the same as following too closely in a grouping of vehicles, but rather the faster vehicle encountering the slower vehicle unexpectedly.

While this can happen on lower posted speed limit roads such as 55 mph, 60 mph, or 75 mph; at 80 mph there would be more opportunity for speed variance. Approaching a slower vehicle is so dangerous because humans have difficulty discerning the speed of an object ahead of them unless they have more information.

An example of more information would be if there are people standing next to a vehicle roadside or a vehicle is over on the shoulder with its hazard lights on. These cues tell the approaching driver that the vehicle ahead is not moving or is moving slowly. Without roadside cues such as flashing lights or brake lights, the human eye relies on the rate at which objects grow in the field of vision to determine how fast something is moving toward or away from them.

While this mathematical equation can be very complex, it simply can be explained that the speed difference of 45 mph to 50 mph becomes a major problem for drivers. Human factors expert Jeffrey Muttart puts this threshold at closing speeds of 35 mph or greater. At the closing speed of 45 mph and greater, a crash is almost guaranteed: or at least it is a very near miss. This is because at the closing speed of 45 mph or greater, the hard emergency stopping distance (or distance to match speed) plus the driver's reaction distance needed will exceed the available distance to eventual impact. Simply stated, by the time your brain tells you that you are in a dangerous situation, it becomes impossible for you to avoid the slower hazard ahead.

An argument that you may be thinking about is - what about law enforcement officers who exceed the speed limit, why aren't they in more crashes? In this case, when a driver, in this case law enforcement, knows they are traveling faster than the other vehicles on the road, these slower vehicles become a non-immediate hazard that can be dealt with far in advance. The issue for the average driver is that they do not recognize the presence of the speed variance.

I will admit that these cases of stopped or slowly moving vehicles in the travel lane are very rare. The probability of a driver encountering a stopped or almost stopped vehicle on a controlled access highway is below one percent. However, crash statistics of these highway rear-end crashes show that 34% involved closing speeds of 30 mph or greater.

While it might seem odd that I am impartial about motorists traveling at higher speeds, it is the controlled access environment and speed variance that is concerning to me: regardless of the change of the speed limit. On these types of roadways which are controlled access, drivers usually activate cruise control and do not expect the types of hazards they would be more alert for on an uncontrolled access road.

As stated, I am providing neutral testimony on this bill, but would like for you to keep this in mind from someone who studies crashes nearly every workday. When a 5,000-pound SUV travels at 80 mph versus 75 mph, the kinetic energy increases approximately 130,000-foot-pounds of energy and an 80,000-pound semitruck will have an increase of just over 2-million-foot pounds of energy. If you remember from your science studies, kinetic energy has to go somewhere and, in a crash, it will go to the object the vehicle hits.

I know I gave some very specific numbers and information in a short amount of time, but I would be happy to answer any questions.

Trooper Jacob Jones
North Dakota Highway Patrol
Crash Reconstruction Team

KINETIC ENERGY W/ SPEED AND WEIGHT

Find a Kinetic Energy with Speed and Weight or Speed and Mass.

CASE NUMBER: None 3/8/2023

$$KE = \frac{W \times S^2}{30}$$

$$KE = \frac{5000.00 \times 75.00^2}{30}$$

$$KE = \frac{5000.00 \times 5625.00}{30}$$

$$KE = \frac{28125000.00}{30}$$

$$KE = 937500.00$$

KE = The Kinetic Energy in ft-lbs or Joules.
W = The Weight in pounds.
S = The Speed in mph/kph.
30 = A Constant.

Formula Inputs:

The Weight in pounds is:	5000.00
The Speed in mph is:	75.00

Formula Results:

The Kinetic Energy (ft-lb or Joules) is: 937500.00

Incrementation Results

Speed	K Energy	Speed	K Energy	Speed	K Energy
75.00	937500.00	80.00	1066666.66		

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Trooper Jacob Jones
North Dakota Highway Patrol
Crash Reconstruction Team

KINETIC ENERGY W/ SPEED AND WEIGHT

Find a Kinetic Energy with Speed and Weight or Speed and Mass.

CASE NUMBER: None 3/8/2023

$$KE = \frac{W \times S^2}{30}$$

$$KE = \frac{80000.00 \times 75.00^2}{30}$$

$$KE = \frac{80000.00 \times 5625.00}{30}$$

$$KE = \frac{450000000.00}{30}$$

$$KE = 15000000.00$$

KE = The Kinetic Energy in ft-lbs or Joules.
W = The Weight in pounds.
S = The Speed in mph/kph.
30 = A Constant.

Formula Inputs:

The Weight in pounds is:	80000.00
The Speed in mph is:	75.00

Formula Results:

The Kinetic Energy (ft-lb or Joules) is: 15000000.00

Incrementation Results

Speed	K Energy	Speed	K Energy	Speed	K Energy
75.00	15000000.00	80.00	17066666.66		

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