



January 14, 2014

The Honorable Todd Stone
Minister of Transportation and Infrastructure
Safety and Speed Review
PO Box 3522
Vancouver Main
Vancouver, BC
V6B 3Y4

Dear Minister Stone and Review Team

Re: Rural Highway Safety and Speed Review

We were pleased to hear that you are conducting a review of safety and speeds on British Columbia highways. We are faculty members at British Columbia universities in the fields of public health, emergency medicine, mobility, and injury. We collaborate on a program of research related to transportation safety. We have conducted studies of injury and fatality rates in British Columbia for driving, cycling and walking,¹ and detailed studies of route types associated with higher and lower risks of cycling injuries specifically.² We hope the following points will contribute useful insights for your review.

British Columbia is not as safe as other jurisdictions

Our own analyses¹ and international reports³ show that BC and Canada continue to have higher traffic injury rates (all modes of transport) per capita, per trip and per distance travelled than the safest jurisdictions in the world. Sweden, Norway, Denmark, Iceland, the Netherlands, and the United Kingdom are examples of countries that have targeted traffic safety in a multi-faceted way and have achieved much lower injury and mortality rates.

The latest report from Transport Canada⁴ indicates that British Columbia has higher fatality and injury rates per billion vehicle kilometers than the Canadian average and than most individual provinces. This underscores the importance of a renewed focus on safety in BC.

¹ Teschke K et al. Exposure-based traffic crash injury rates by mode of travel in British Columbia. *Canadian Journal of Public Health* 2013;104:e75-79

² Teschke K et al. Route infrastructure and the risk of injuries to bicyclists: A case-crossover study. *American Journal of Public Health* 2012;102:2336-2343

³ International Transportation Forum (IRTAD - OECD). *Road Safety Annual Report 2013* Paris: OECD Publishing, <http://internationaltransportforum.org/Pub/pdf/13IrtadReport.pdf>

⁴ Transport Canada. *Canadian Motor Vehicle Traffic Collision Statistics 2011*. http://www.tc.gc.ca/media/documents/roadsafety/TrafficCollisionStatistics_2011.pdf

Injuries and deaths increase with motor vehicle speed, especially among vulnerable road users

Both the likelihood of a crash occurring and the severity of injuries in the event of a crash increase with motor vehicle speed.⁵ This is true for all travel modes, but the increase in risk with increasing speed is especially steep for vulnerable road users including pedestrians or bicyclists, two travel modes not mentioned in the Review Discussion Guide.

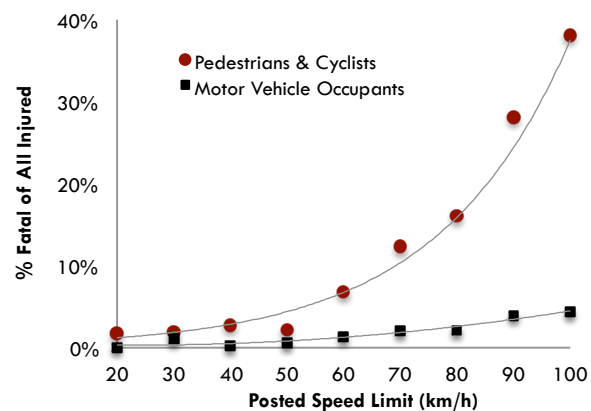
Cycling and walking may not come to mind when thinking about highway travel, however, highways in British Columbia are frequently used by cyclists and certain sections may also be used by people on foot. Examples include Vancouver Island highways, Sea to Sky highway, and Okanagan Valley highway. Bicycling on these routes is important to tourism and sporting events, and serves as an inexpensive and efficient mode of travel between towns.

Thus the consequences of speed to vulnerable road users need to be taken into account in your deliberations.

The figure to the right reports the most recent ICBC data⁶ on the likelihood of an injury event being fatal by posted speed limit. It clearly shows that likelihood of death increases with speed limit for all modes of travel, dramatically so for pedestrians and cyclists. Severe injuries would follow the same pattern, though in higher proportions at every speed.

Figure 1 also makes clear that pedestrians and cyclists in BC do use routes with speed limits of 80 km and above, and are injured and killed in these locations.

Figure 1. % of traffic injuries that were fatal, by posted speed limit, in British Columbia, 2009 – 2012



Complex routes need lower speed limits

The increased likelihood of injury and injury severity associated with higher speeds have led the safest European countries to take an approach to speed limits that is guided by the complexity of the route (e.g., number of intersections and junctions, varying speeds of vehicles, presence of vulnerable road users).⁷ In the Netherlands, this has resulted in a very different pattern of speed limits than in British Columbia.³

Table 1. Speed limits in the Netherlands by route type

Route type	Speed limits
Urban streets	70% of streets ≤ 30 km/h 30% = 50 km/h
Rural roads (highways)	60% of highways = 60 km/h 40% = 80 km/h
Motorways (freeways, i.e., controlled access, divided)	≥ 80 km/h

⁵ Martin J & Lenguerrand E. A population based estimation of the driver protection provided by passenger cars: France 1996-2005. *Accident Analysis & Prevention* 2008;40:1811-1821

⁶ Data provided by Tracy Lee, Research Project Advisor, Road Safety, ICBC, Sept. 25, 2013; analysis by K. Teschke

⁷ Tingvall C & Haworth N. Vision zero - An ethical approach to safety and mobility. *6th ITE International Conference*, Melbourne, 6-7 September 1999 <http://www.monash.edu.au/miri/research/reports/papers/visionzero.html>

Of particular note for this review is the high proportion of Dutch highways with a speed limit of 60 km/h. This is because highways often have great complexity: crossroads, junctions, oncoming traffic, passing, reduced sightlines with hills and curves, and a broad array of road users, including cyclists and pedestrians.

Cyclists need wide paved shoulders or separated routes along highways

Our research and that of others show that route design is crucial to reduce crashes. In motor vehicle research, it is well established that divided highways have much lower likelihood of crashes, injuries and fatalities.⁵ Thus fatalities on the Sea to Sky highway have declined since a greater proportion of the route has been divided. Dividing a highway reduces driving complexity and prevents crashes with the highest speed differentials (head-on collisions).

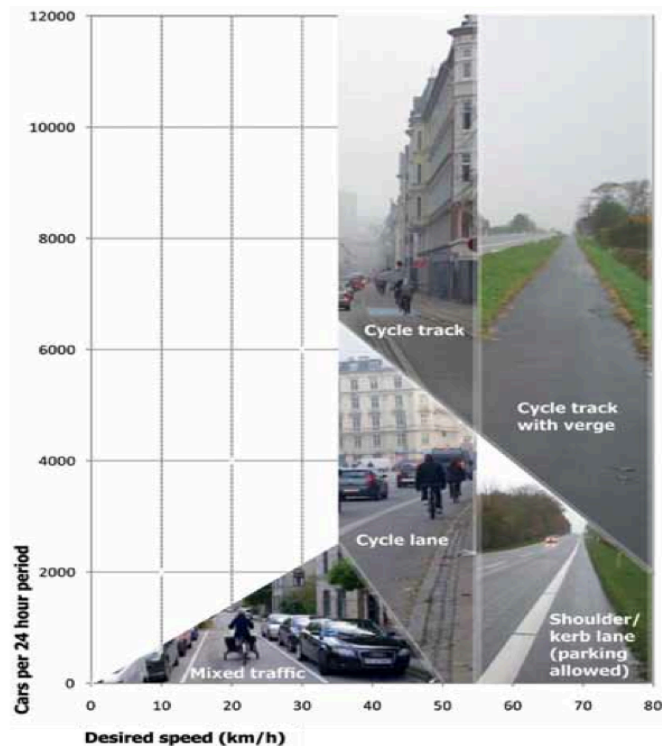
For cycling, separation (from motor vehicles) also greatly reduces injuries.² The current approach to highway cycling in BC is often nothing at all or paved shoulders. Motor vehicles passing cyclists provide narrower passing distances with higher speeds, larger vehicle sizes, and traffic in the opposing direction.⁸ Narrow passing distances increase the likelihood of cyclists being hit.⁸ To provide sufficient passing distances on highways, either wide paved shoulders or physical separation is needed.

In the much safer European jurisdictions, cycling facility design is determined by motor vehicle speeds and volumes, as shown in the nomogram to the right.

On rural highways with speed limits of 80 km/h and traffic volumes less than 2000 motor vehicles per day, paved shoulders are considered adequate. If the speed limit is lower (60 km/h), wide shoulders are allowed with up to 4000 vehicles per day. With higher traffic speed or volume combinations, a path (“cycle track”) for cyclists, separated from the highway by a width of vegetation (“verge”), is indicated.

Of the 54 highway segments outlined in the Discussion Guide, all have speed limits of 80 km/h or higher, 38 have motor vehicle traffic volumes greater than 2000/day, and 24 have volumes greater than 4000/day.

Figure 2. Example of nomogram used to determine cycling facility design in safer European countries. This one is from Denmark.⁹



⁸ Weddell A, Winters M, Teschke K. *Evidence from Safety Research to Update Cycling Training Materials in Canada*. SFU/UBC Report 2012 cyclingincities-spph.sites.olt.ubc.ca/files/2012/09/EvidenceTrainingReport.pdf

⁹ Andersen T et al. *Collection of Cycle Concepts 2012* Cycling Embassy of Denmark <http://www.cycling-embassy.dk/wp-content/uploads/2013/12/Collection-of-Cycle-Concepts-2012.pdf>

Many of the routes commonly used by bicyclists (Vancouver Island, Sea to Sky, the Okanagan) have much higher traffic volumes. But even routes recently improved often do not have the minimum treatment: consistent wide paved shoulders.¹⁰

This photo provides an example of the difficulties cyclists face. It was taken on one of BC's popular highway cycling routes, the Sea to Sky. The route is promoted to tourists,¹¹ heavily used by recreational/sports cyclists, and is home to the GranFondo Whistler. Consider the risks of cycling on this narrow shoulder segment with a steady stream of cars, SUVs, trucks and buses passing at over 80 km/h.



Photo credit:

Simon Fraser University, Sea to Sky Highway Cycling Safety Project¹⁰

We hope these ideas, data and illustrations are helpful for your review. Thank you very much for the opportunity to comment.

Yours sincerely

A handwritten signature in blue ink that reads "Kay Teschke". The signature is fluid and cursive.

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¹⁰ Shuurman N, Yew A, Geography 455 class. *Sea to Sky Highway: Cycling Safety Project* Simon Fraser University, 2012
<http://www.sfu.ca/geog/stsbikesafe/shoulder.html>

¹¹ http://www.whistler.com/resources/pdf/Road_Cycling_the_Sea_to_Sky_Highway.pdf