



NZ TRANSPORT AGENCY
WAKA KOTAHI

'Cheescutters', 'Eggslicers' and Motorcyclists

Wire Rope Safety Barriers and the risks posed to
Motorcyclists

Nicholas Rodger Dip.Eng (Civil), GIPENZ

Background

Recent years have seen growing concern amongst motorcyclists about the safety of Wire Rope Safety Barriers (WRSB) in crashes involving motorcyclists. A recent high profile crash fuelled these concerns.

It will be demonstrated that the actual risk from WRSB is appropriate, given the 'no barrier' alternative, and that the barriers are a safe, appropriate treatment, notwithstanding emotive appeals.

<http://www.cheesecutter.co.nz>

CheeseCutter Campaign Group safer barriers for all road users

[Protest Rides](#) [Petition](#) [Get Involved](#) [Barrier Information](#) [Press](#) [Contact Us](#)

On Saturday 20th October at 3AM, 21 year-old Daniel Evans was killed when he hit the wire-rope median barrier on State Highway 1 near Papakura. The impact with the barrier caused horrific injuries with his body literally ending up sliced in half. The wire-rope median barrier, colloquially referred to as 'cheesecutters', is of a type banned in several European countries and subject to stringent usage conditions in several others precisely as a result of the danger they pose to motorcyclists. When hit by a body, the steel legs of the barrier trap limbs and fling the body around causing terrible injury. The high tension steel cables act as a guillotine, severing and lacerating anything that comes into contact with them.

Transit NZ, with the backing of the government and Land Transport New Zealand, continue to state that these barriers are a safe and cost-effective method of preventing head-on collisions on New Zealand's roads.

CheeseCutter - the Campaign for Safer Barriers - urges the government and Land Transport New Zealand to place an immediate moratorium on the use of such barriers until a comprehensive review is undertaken into the effectiveness and safety of these barriers to all road users, particularly motorcyclists. We believe that the low cost and ease of building, rather than safety considerations, are the main reasons why wire rope median barriers are becoming so widespread and the preferred form of barrier on a range of roads and highways.

Sign the Petition

To support our call for the government and Land Transport New Zealand to place an immediate moratorium on the use of such barriers until a comprehensive review is undertaken, please sign the petition below. Your email address will be kept private; only your full name will be published.

We, the undersigned, are concerned about the safety of wire traffic barriers and their increasing presence on New Zealand roads and highways. We urge Transit New Zealand, Land Transport New Zealand and the Ministry of Transport to place a moratorium on the use of such barriers until a comprehensive review is undertaken into the effectiveness and safety of wire traffic barriers to all road users, particularly motorcyclists.

Your first name:
Your last name:
Your email address:

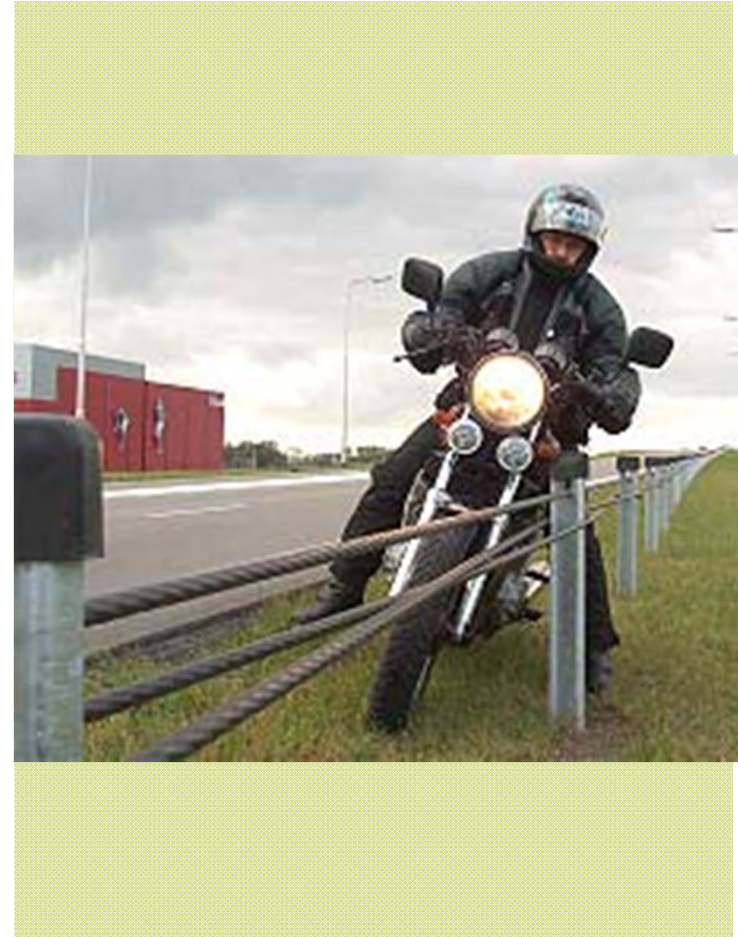
Supported by: BRONZ — Kiwi Biker — SportsBike.co.nz

This is not just a NZ issue.

“Motorcyclists will continue to be killed by wire median strips if road authorities fail to review their “prehistoric” designs...with a reputation for leaving riders with severed limbs” - Head of the NSW Motorcycle Council, Guy Stanford,

Motorcyclists Advocacy Groups around the world are vocal in their opposition to WRSB.

“It seems perverse that a safety system has been designed which actually increases the likelihood of a fatality. Not only is the wire rope itself dangerous to motorcyclists, but its numerous upright support posts can also be lethal to riders.” - British Motorcyclists Federation



They (The Motorcycling Community) say...

“With reference to wire-rope barriers, they are fatal for motorcyclists. A recent study in Scotland showed that out of 7 impacts last year there were 7 motorcyclist fatalities. That’s 100%. ...”– British Motorcycle Federation

“...all motorcyclists' organisations in Europe are strongly opposed to the use of cable barriers” - Federation of European Motorcyclists (FEMA)

“They're deadly for motorcyclists, we've seen eight killed that we know of on wire rope barrier sites,”
- Motorcycle Riders Association (Australia)

They (The Motorcycling Community) say...

ON2wheels CARSguide.com.au

Protest on wire barriers

By TREVOR HEDGE

DOZENS of motorcyclists this week rode to the steps of Parliament House to present a petition against the installation of wire rope barriers.

Receiving the petition from Motorcycle Riders Association of WA president Dave Wright were Police and Emergency Services Minister John Kobelke, South Metropolitan Region MLC Simon O'Brien and Serpentine-Jarrahdale MLA Tony Simpson.

The Sunday Times first raised concerns about the dangers wire rope barriers posed to motorcyclists in 2004.

Despite those reports, the WA Office of Road Safety continued to promote their use.

European studies have found wire rope barriers pose an unacceptable risk to motorcyclists and there are moves to force their removal throughout the European Union.

Denmark and Norway have taken steps to remove wire rope barriers from roads and the Dutch Parliament banned their use in 2005.

There are many reported cases of riders being decapitated by wire rope barriers.

In WA, riders have lost limbs after coming into contact with the barriers.

In Dwellingup, a rider's leg was amputated after he came into contact with a wire rope barrier. He died weeks later as a result of his injuries.

In Victoria, at least five motorcyclists have died after tangling with the barriers.

This has prompted the Victorian Labor Party to propose banning them.

Studies have shown that up to 30 per cent of all motorcycle fatalities involve some sort of barrier, pole or tree, indicating that roadside "furniture" poses a significant danger to motorcyclists.

In some countries where wire rope barriers have been present in greater numbers and for a much longer time, they have been blamed for up to 16 per cent of motorcyclist fatalities.

The barriers are used on free-ways to help prevent an out-of-control vehicle crossing into oncoming traffic.

But the most common result when a motorcycle hits the barrier is for the rider to be catapulted over it and into oncoming traffic.

Mr Wright also showed the MPs an example of protective barriers used in some countries to prevent injury to motorcyclists.

The simple and cost-effective device is fitted over existing barriers to reduce danger to motorcyclists.

The advancement and implementation of a new motorcycle graduated rider training and licensing project was also raised at the protest. Mr Kobelke supported better rider training.



Motorcycle Riders Association of WA president Dave Wright shows the type of device used to protect motorcyclists from impacts against wire rope barriers. In the background is the Minister for Police and Emergency Services, John Kobelke, and Serpentine-Jarrahdale MLA Tony Simpson.



We (the Engineering Community) Say...

“There is no conclusive evidence to suggest that wire rope median barriers will make roads more unsafe for motorcyclists.” – Transit NZ

“...Sweden, with over 600 km of flexible barriers on its roads does not have any records of motorcycles being “sliced” by the barriers.” – Monash University Accident Research Centre

“We have not seen any proof that wire-rope barriers are more dangerous than other types of barriers with posts.

...the barriers are installed in order to protect something that is worse to hit than the barrier” – Swedish National Road and Transport Institute.

Q: How big a problem are we looking at here?

A: Lets put things in perspective...

- o 174 Motorcyclist fatalities 2003-07 inclusive (previous 5 years)
- o 34 were coded 'struck objects'
- o 3 of these were coded 'Guard Rail' (1 WRSB, 1 W-Section, 1 Bridge Rail)

During the study period (2003-07 inclusive), there were a total of 77 reported injury / fatal crashes between motorcycles and guard rails, with:

- o 3 Fatal,
- o 28 Serious,
- o 46 Minor crashes.

Q: Are WRSB as lethal as opponents claim?

A1: The short answer is No.

A2: The slightly longer answer is we can't accurately tell one way or the other.

In the preceding 5 years, two serious and one fatal crashes have involved WRSB.

Rather than decapitation and lethal injuries, the two (coded as Serious) crashes resulted in a fractured ankle in one case, and grazes and the loss of the tip of the large toe in the other.

Although it is difficult to derive accurate conclusions from the small number of NZ crashes, research has been conducted overseas.

Are WRSB as lethal as opponents claim? (continued)

nzherald.co.nz

Motorcyclist's horrific death brings call to ban 'cheese-cutter' barriers

5:00AM Monday October 22, 2007

By [Mathew Dearnaley](#)

Motorcyclists are calling for wire median barriers to be removed immediately from motorways and state highways after the gruesome death of a young Auckland rider at the weekend.

Daniel Luke Evans, 21, was killed after hitting a wire barrier – nicknamed a "cheese-cutter" by motorcyclists – on the Southern Motorway near Papakura about 3.30am on Saturday.

His death has sparked messages of outrage and sorrow on an internet motorcyclists' forum and spurred calls for Transit NZ to abandon plans to extend the barriers and for it to dismantle those already in place.

A motorcycling friend of the dead man, Felix Tsang, said on 3 News last night that Mr Evans was following him when thrown from his machine and into the barrier.

"I stopped and raced back to the scene where it first happened and find that he has been severed, waist down, and was lying on the road – it was extremely disturbing," Mr Tsang said.

"With the cheese-cutter ... he had no chance."

Contributors to the Kiwibiker internet forum accused Transit of considering only cars and trucks when installing the barriers and ignoring "an unacceptable risk to motorcyclists", a claim denied by the highways agency. Some suggested a protest blockade of the motorway to force the removal of the barriers.

Motorcycling safety consultant Allan Kirk told the *Herald* that although there might be some stretches of road where wire could be justified because of limited space, notably the narrow coastal highway north of Wellington, it was "utterly unforgivable" of Transit to install these where there was enough room for steel barriers.

Veteran Auckland motorcyclist Lou Girardin, a former Ministry of Transport patrolman, said he did not believe the wire barriers were acceptable anywhere and suspected Transit was driven by cost considerations. "If you set out to design something to mutilate the human body, you couldn't do any better.

"It's not a matter of speed – if you're tipped off [a motorcycle] by a driver changing lanes you are dead or at the very least your limbs will be severed. These things are just horrendously dangerous."

But Transit's national operations manager, Dave Bates, denied there was much difference in cost between wire and steel barriers and said the main reason for using wire was its greater effectiveness in protecting most road users.

He could recall no previous deaths of motorcyclists hitting wire barriers and did not believe they would have much more of a chance against traditional W-section steel guard-rails.

Asked whether Transit might now review plans to extend the barriers, Mr Bates said it investigated every fatal crash on its network "to see whether there is in fact anything we can do".

This story was found at: http://www.nzherald.co.nz/section/1/story.cfm?c_id=1&objectid=10471320

Copyright ©2007, APN Holdings NZ Limited



Daniel Evans

Your Views

Should 'cheese-cutter' barriers be banned?

- [Send us Your Views](#)
- [Read Your Views](#)
- [Register for Your Views](#)

Studies on Motorcycle Collisions with Barriers have been conducted...

Barrier Type (Impact angle)	Dominant Injury Mechanism's	Observed Outcome	Primary Injury Risk	Secondary Injury Risk
W-Section (horiz.)	Impact with posts	High impact to head, chest and shoulder	High	Moderate
W-Section (upright)	Impact with posts, impact onto road	High impact to head	Minor	Moderate
Concrete (horiz.)	Collision with barrier	High impact to head	High	Minor
Concrete (upright)	Secondary collision with road / oncoming vehicle	Little deceleration, overtopped barrier	Minor	Moderate
WRSB (upright @ 12°)	Impact with posts, impact with road	High impact to chest, extremities. Moderate impact to head	High	Moderate
WRSB (Upright @ 25°)	Impact with posts, impact with road	High impact to head, chest and extremities	High	High

(High is defined as exceeding biomechanical limits; moderate as high values but under limits, with minor being low values)
 (Primary Injury = injuries sustained upon impact with barrier < Secondary injury = all injuries after primary)
 Table 1. Crash test summary (all crashes at ~60km/hr) (Rodger, 2008, Berg et al, 2005)

Studies on Motorcycle Collisions with Barriers have been conducted (continued)

“...all sliding collisions with barriers occurring at open road speeds are likely to result in severe to fatal injuries to riders...

Upright collisions with barriers are likely to result in minor to fatal injuries...

W-Section and Concrete can be considered to have broadly similar motorcycle compatibility, with WRSB being less compatible

Unlike W-Section, all collisions with WRSB result in posts being struck, increasing the injury risk” (Rodger, 2008)

Q: So why do we install WRSB, if Concrete Barriers are more forgiving to motorcyclists?

A: Because they are typically safer for vehicle occupants than other barrier systems.

Concrete barriers, while very effective in preventing cross-over crashes, impart high deaccelerative forces on vehicle occupants, and inflict sever damage on vehicles in collisions.

Studies have shown that concrete barriers are out-performed by WRSB in areas such as energy dissipation, deflection levels and forces experienced by vehicle occupants. (Monash University Accident Research Centre MUARC)

Steel W-section guard rails, although more forgiving to vehicle occupants still impart high deaccelerative forces, and have potential to cause serious injury through inappropriate end terminals.

Q: They're not 'Cheesecutters' then?

A: No – unless you collide with one at 150 km/hr

Rather than being sliced by the cables, motorcyclists are injured in collisions with posts, and when they and their motorcycle become tangled in the cables.

Due to this post profiles have been modified from the original 'H' posts to the current 'S' posts, which present a blunter, curved face to riders.



Q: So why have barriers at all? They kill people..

"A road safety barrier is considered to be a hazard, and should only be used when the consequences of hitting it are less than the hazard/object it is shielding. The use of a road safety barrier should only be considered as a last resort following an assessment of whether or not the mitigation of the hazard or object can be achieved through the application of the principles of clear zoning" - TNZ M/23 Notes on the specification for road safety barrier systems



Q: So why have barriers at all? They kill people... (continued)

A: Because overall they are safer to hit, than the objects they are shielding.

Crash barriers, whilst affecting the outcome of a crash will not increase the risk that a motorcyclist will crash. Overall the risk of a motorcyclist is considered greater without a crash barrier than it is with it.

So crash barriers are a necessary evil. What can we do to increase their compatibility with motorcyclists?



Proprietary retrofittable products have been developed by European manufacturers. These devices attach to the posts of WRSB (and W-Section) and prevent impact with the supporting posts.

Covers for the cables, have been proposed, but these ignore the posts, and therefore cannot be recommended.

Q: So where do we start?

A: We don't need to retrofit the entire barrier asset (and certainly can't afford to)

The Crash Analysis System (CAS) was interrogated for on all serious and fatal injury crashes involving motorcycles and guardrails over the past 5 years (2003-07 inclusive).

Detailed crash by crash analysis was performed on the 31 individual (serious and fatal) Traffic Crash Reports (TCR's) to establish trends for parametric analysis and comparison.

Q: Where / how are the crashes happening?

A: The accompanying tables summarise the findings.

Trends identified:

- o Rural environment
- o 100 km/hr speed limit
- o Right hand turn
- o Single vehicle
- o Weekend (58%)
- o Dry Road (94%)
- o W-Section struck

Crash Location	Percentage Composition
Right-hand corners	64%
Left-hand corners	18%
Straight sections	18%

Table 2. Road Geometry at Crash sites. (Rodger, 2008)

	Percentage Composition
Motorcycle upright upon impact	46%
Motorcycle horizontal upon impact	54%

Table 3. Motorcycle attitude upon impact. (Rodger, 2008)

Barrier Type	Serious Crashes	Fatal Crashes
Concrete	0	0
Steel W Section	27	2
WRSB	2	1
Other (sight rail etc)	2	0

Table 4. Frequency of serious / fatal crashes. (Rodger, 2008)

Q: Where / how are the crashes happening?

Analysis of crash data suggests that median barrier crashes are uncommon, and generally have better outcomes than entering the opposing traffic lane.



The dominant crash type, is single vehicle loss of control on right hand bend, colliding with W-Section steel guardrail.

Q: So WRSB isn't the problem?

A: In statistical terms, no.

The 3 crashes into WRSB were all median treatments, with the two serious crashes likely to have had the same outcome regardless of the barrier type.

As previously mentioned, the fatal involving WRSB, would have been fatal no matter what barrier type was involved, due to the speeds involved.

Had no barrier been installed, encroachment into oncoming traffic would almost certainly have occurred.

So where to from here?

In situations where WRSB is installed as a 'side of road' treatment, simple guidelines could reduce the risk to motorcyclists, without detracting from its performance with larger vehicles. Assuming clear-zoning is not possible:

- No installs of unmodified WRSB on broken-back or low radii corners (<250m), as analysis shows these are most frequently struck by motorcyclists.
- On intermediate radii corners (250 – 500m) on known motorcycle routes, installation of barriers with additional lower rail to prevent post impact. (It may be worth considering W-Section with lower rail treatment in these areas)

Conclusion

WRSB is a proven barrier treatment, which safely arrests vehicles with low deaccelerative forces, is easily repaired, and highly cost efficient.

In un-modified form it has the potential to inflict serious injuries on motorcyclists, but these need to be balanced against the likely injuries had the barrier not been there, and the benefits to the general motoring public.

Further research is needed to establish the true risks of WRSB as installed in the NZ environment, so that definitive conclusions as 'in-service' performance can be made.