

Wolf Trailer Company, Inc

"The Safer-Trailer Company"

www.wolftrailer.com



Improving the Safety and Productivity of Truck-Trailer Combinations by means of Roll Coupling

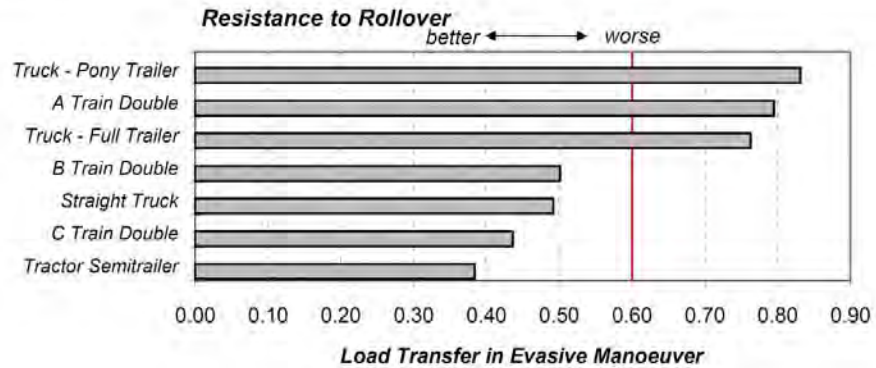
Presentation to Task Force on Vehicle Weights and Dimensions Policy
November 2010

Presentation Objectives

- Relate safety concerns associated with non-roll coupled configurations
- Update the committee on project progress

Safety Concerns: non-roll coupled trailers

Rollover



John Pearson, 1996, "Performance Based Truck Size and Weight Regulations: A Layman's Guide"

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Safety Concerns: Ontario (MTO) Study

- Eight years of Ontario tractor-trailer collisions were closely examined.
- This involved 29,340 tractor-trailer collisions which occurred between 1995 – 2002 on provincial highways.



* Graph indicates collisions on all highways.

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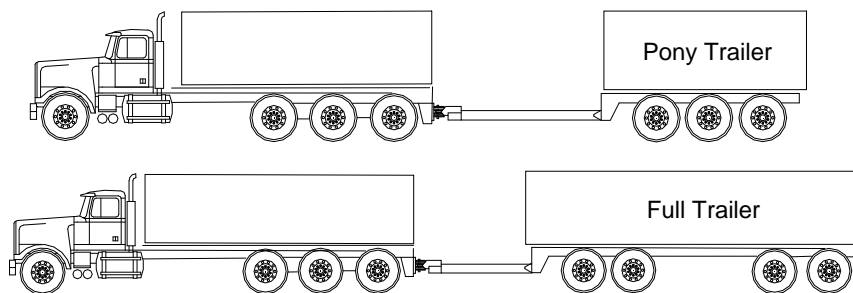
Safety Concerns: Ontario (MTO) Study

Rates of Collisions

Class	Collisions/MVKT	One Collision per:
2 axle semi	0.45	2,200,000 km
3 axle semi	0.60	1,700,000 km
4 axle semi	0.66	1,500,000 km
5+ axle semi	1.03	1,000,000 km
A-train	1.33	750,000 km
B-train	0.36	2,800,000 km
<u>Total</u>	<u>0.51</u>	<u>2,000,000 km</u>

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Safety Concerns: reduced productivity



MOU: trailer weights are reduced by regulation to discourage use and /or to bring these configurations into range of acceptable dynamic performance

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Safety Concerns: UMTRI training video



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Safety Concerns: non-roll coupled trailer



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Importance of LTR performance measure

Load Transfer Ratio

"Load transfer ratio is the most comprehensive and informative vehicle dynamic measure for vehicle configuration safety analysis."

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Preliminary vehicle dynamic assessment*

* FP Innovations using computer simulation

The Effect of Roll-Coupling on Roll Stability of Various Vehicle Combinations

	TAC Prescribed Performance Standard	Tandem Truck Tridem Pony		Tandem Truck Quadaxle Wagon		Tri-drive Truck Quadaxle Wagon		A-Train (8 Axle)	
		Roll-Coupled No	Roll-Coupled Yes	Roll-Coupled No	Roll-Coupled Yes	Roll-Coupled No	Roll-Coupled Yes	Roll-Coupled No	Roll-Coupled Yes
Load Transfer Ratio (LTR):	<0.60	0.725	0.524	0.834	0.539	0.94	0.526	0.666	0.451
Gross Combination Weight (kg):		47,100	50,100	60,100	60,100	63,500	63,500	53,500	62,500

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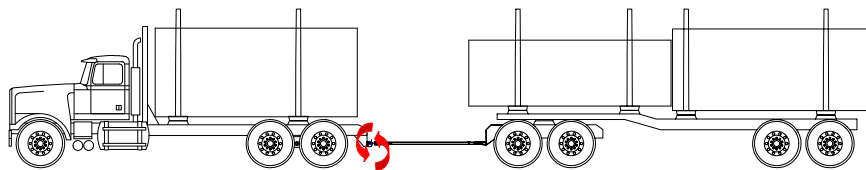
R&D Program: goals

- SAFETY - improved overall vehicle stability
- PRODUCTIVITY – 2+ tonnes more payload on trailer
- ENVIRONMENT – reduced GHGs & fuel consumption

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R&D Program: basic premise

➤ LTR can be reduced to acceptable levels by roll-coupling the truck and trailer together; however, the traditional pintle hitch arrangement does not provide roll-coupling.



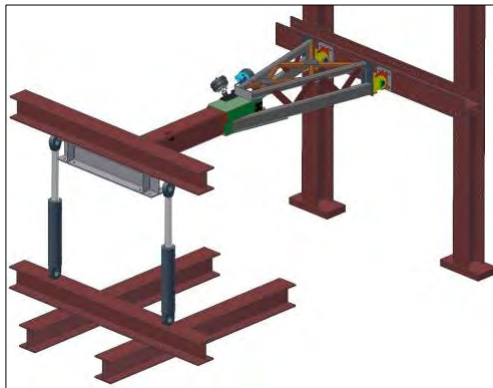
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R&D Program: steps to completion

- FP Innovations & Wolf Trailer present concept to National Task Force on Heavy Vehicle Weights and Dimensions Policy (2007).
- BC government (CVSE) takes lead on behalf of Task Force and agrees to host project.
- Multi-phase research plan developed in collaboration with CVSE.
- Research, development, and field trials (2008 – 2010).

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Product development: design testing



Pre-installation testing of drawbar and hitch assembly

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Product development: rollover evaluations



Tilt table testing to validate computer modelling predictions.

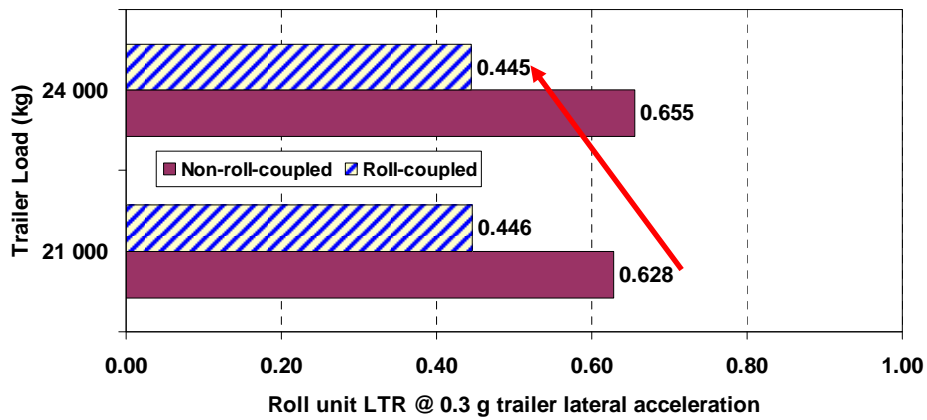


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R&D Program: test results

FP Innovations Vehicle Stability Testing – Pony Trailer

Roll coupling reduces roll unit LTR

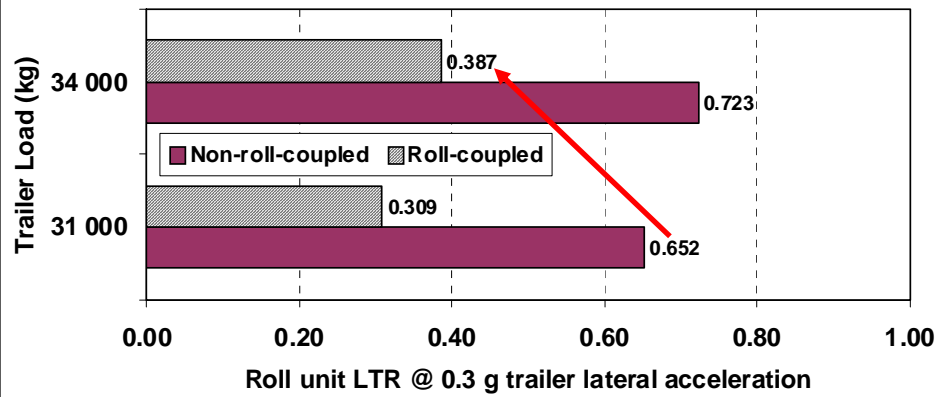


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R&D Program: test results

FP Innovations Vehicle Stability Testing – Full Trailer

Roll coupling reduces roll unit LTR



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R&D Program: full-trailer field trials



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R&D Program: pony trailer field trials



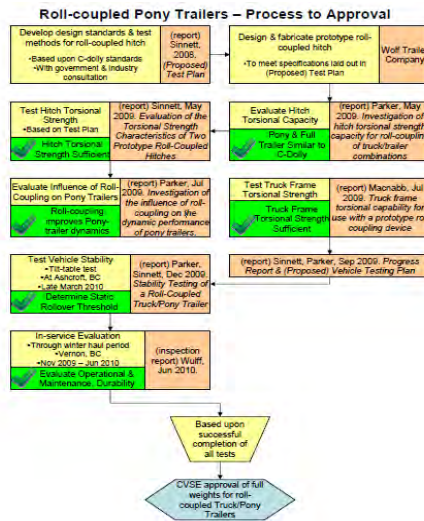
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R&D Program: field trial results

- Driver feedback (both configurations):
 - Were easy to connect / disconnect
 - Felt to be much more stable on the road
 - Provided driver with feedback from trailer
 - Had a tighter hitch connection with less "jarring" impacts
 - Handled more like a 5th wheel hitch than a pintle hitch
- No operational or maintenance issues were found

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R&D Program: accomplishments



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Current Status

BC-hosted research essentially completed for full-trailers and pony-trailers.

BC approves weight increases for roll coupled pony-trailers (July 2010).

Final report for full-trailers submitted to BC government.

Saskatchewan government offers pilot program for tridem drives to tow trailers.

Four Western provinces met in September to consider a harmonized approach for regulating this technology.

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Conclusions

Roll coupling technology now makes it possible for these truck/trailer combinations to meet the LTR performance standard while, at the same time, being more productive.

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Ongoing Work and Next Steps

Support initiatives to implement roll coupling in other provincial jurisdictions.

Continue to support carriers wishing to participate in Saskatchewan tridem drive truck/roll coupled trailer pilot study.

Ongoing collaboration with Western Provinces to develop a definition of roll coupling such that it can be added to the reference section of the MOU; this can then be used as the default reference for provinces to issue permits.

Explore the possibility of applying the technology to A-train configurations.

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