Evaluation of the Dynamic Performance of Rocky Mountain Doubles

Draft

Prepared for

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1. INTRODUCTION

The western provinces are in the process of formalizing a regional agreement on permit conditions for long combination vehicles. This includes the Rocky Mountain double, which consists of a long lead semitrailer and a short rear trailer. Some carriers may also run a reverse Rocky Mountain Double, with a short lead semitrailer and a long rear trailer. The dynamic performance of the reverse Rocky Mountain Double was evaluated briefly during the CCMTA/RTAC Vehicle Weights and Dimensions Study. However, that evaluation was very limited in scope, and did not address the range of trailer combinations that re now possible.

This work has therefore evaluated the dynamic performance of reverse Rocky Mountain Double, in comparison with the dynamic performance of a conventional Rocky Mountain Double.

2. VEHICLE CONFIGURATION

2.1 Configuration

This work addressed the reverse Rocky Mountain Double, as shown in Figure 1, which has a short lead semitrailer and a long rear trailer. The Rocky Mountain Double, as shown in Figure 2, has a long lead semitrailer and a short rear trailer.

Figure 1: Reverse Rocky Mountain Double

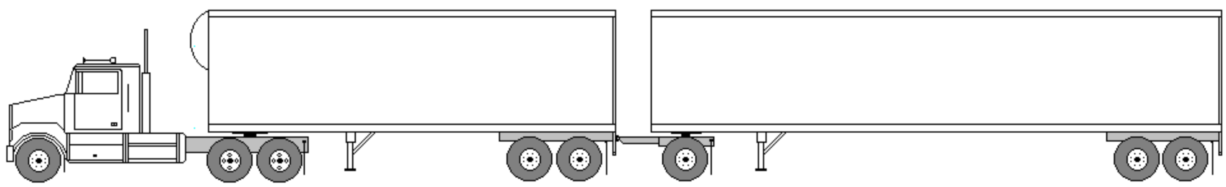
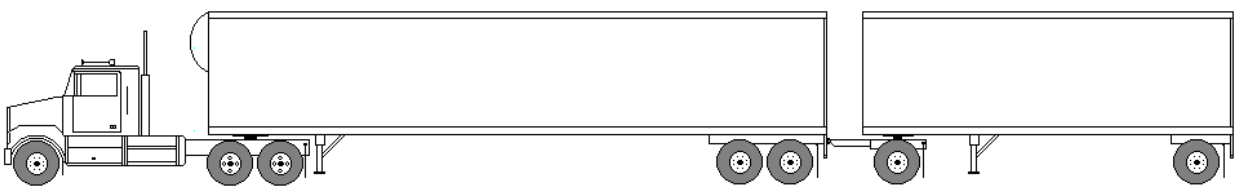


Figure 2: Rocky Mountain Double



2.2 Tractor

This work used a generic tractor with a tandem drive axle. The tractor had a front axle setback of 1.32 m (52 in), a 4.47 m (176 in) wheelbase, a tandem drive axle with a spread of 1.32 m (52 in), and a fifth wheel placed 0.15 m (6 in) forward of the centre of the drive tandem. The tractor was assumed to weigh 8,165 kg (18,000 lb), with a tare front axle load of 4,763 kg (10,500 lb).

2.3 Long Semitrailer

This work used a generic dry van semitrailer with a length of 12.19, 14.65 or 16.20 m (40, 48 or 53 ft), with a kingpin setback of 0.91 m (36 in).

The long semitrailer was considered with a sliding bogie with either a single axle, a tandem axle group at 1.22 m (48 in) spread, or a tridem axle group at 3.05 m (120 in) spread. The semitrailer wheelbase was that which arose when its rearmost axle was 0.76 m (30 in) from the rear of the semitrailer, or 12.50 m (492 in), whichever was least. The long semitrailer tare weights are shown in Table 1.

Table 1: Long Semitrailer Tare Weights

Axles	Semitrailer Length		
	12.19 m (40 ft)	**14.65 m (48 ft)**	**16.2 m (53 ft)**
1	4,536 kg (10,000 lb)	4,990 kg (11,000 lb)	5,216 kg (11,500 lb)
2	5,670 kg (12,500 lb)	6,124 kg (13,500 lb)	6,350 kg (14,000 lb)
3	6,804 kg (15,000 lb)	7,257 kg (16,000 lb)	7,484 kg (16,500 lb)

2.4 Short Semitrailer

This work used a generic dry van semitrailer with a length of 8.53 or 9.45 m (28 or 31 ft), with a kingpin setback of 0.61 m (24 in).

The short semitrailer was considered with a fixed bogie with either a single axle, or a tandem axle group at 1.22 m (48 in) spread. The semitrailer wheelbase was that which arose when its rearmost axle was 0.76 m (30 in) from the rear of the semitrailer. The tare weight of a single axle short semitrailer was assumed at 3,629 kg (8,000 lb), and a tandem axle short semitrailer was assumed at 5,216 kg (11,500 lb), regardless of the semitrailer length.

2.5 Converter Dolly

This work used a generic converter dolly with either a single axle, or a tandem axle group with a spread of 1.22 m (48 in). Each converter dolly had sufficient drawbar length to ensure 3.05 m (120 in) inter-axle spacing from a lead semitrailer with its rearmost axle 0.76 m (30 in) from the rear of the trailer. While a shorter drawbar would have slightly diminished dynamic performance, the reduced payload from the lead trailer-dolly knockdown formula would significantly reduce the payload in some cases, which would significantly improve dynamic performance. The fifth wheel of the converter dolly was placed directly over the turn centre of the axle group. The dolly frame and drawbar was assumed to weigh 454 kg (1,000 lb) for a single axle dolly, or 680 kg (1,500 lb) for a tandem axle dolly.

2.6 Allowable Gross Weight

The allowable gross weight was the lesser of the sum of allowable axle group weights, or 53,500 kg (117,946 lb).

The allowable gross weight was limited to 49,800 kg (119,789 lb) when the lead semitrailer, converter dolly and rear trailer each had a single axle. It was 53,500 kg (117,946 lb) when one or more of the lead semitrailer, converter dolly and rear trailer had a tandem or tridem axle.

2.7 Payload Weight and Distribution

The payload weight was the difference between the allowable gross weight of the vehicle, and the tare weight of the vehicle.

The payload was split between the two trailers so that the weight of the lead trailer and its payload was not less than the weight of the rear trailer and its payload.

Payload in each trailer was loaded as a solid block of uniform density over the usable length of the trailer, over a width of 2.44 m (96 in), and to the specified height. The usable length of a trailer normally left 0.08 m (3 in) at the front, and 0.23 m (9 in) at the rear, but these were adjusted as necessary to ensure no axle group was overloaded.

The payload was loaded to two heights:

- 2.44 m (96 in) above the deck, representing a full trailer; and
- 1.83 m (72 in) above the deck, representing a load on pallets.

2.8 Operating Conditions

The proposed operating speed was 100 km/h (62.1 mi/h). The analysis also considered speeds of 90 and 110 km/h (55.9 and 68.3 mi/h).

2.9 Scope

The issue was concern about the dynamic performance of the reverse Rocky Mountain Double. To assess this, it was compared to the conventional Rocky Mountain Double.

In summary, there were:

- 2 Rocky Mountain Double configurations, reverse and conventional;
- 1 tractor configuration;
- 2 short trailer lengths with 2 axle groups, so 4 short trailer configurations;
- 3 long trailer lengths with 3 axle groups, so 9 long trailer configurations;
- 2 converter dolly configurations;
- 1 payload weight; and
- 2 payload heights.

These result in a total of 2 x 1 x 4 x 9 x 2 x 1 x 2 = 288 total combinations of configuration, axle group and payload.

2.10 Computer Simulation

This work evaluated the following customary high-speed performance measures:

- Static roll threshold;
- High-speed offtracking;
- Load transfer ratio;
- Transient offtracking;

The performance measures were evaluated for a vehicle traveling at 90, 100 and 110 km/h (55.9, 62.1 and 68.3 mi/h). There were two simulation runs for each speed for each of three speeds and 288 vehicle combinations, so (2 x 3 x 288) = 1,728 total simulation runs.

Low-speed offtracking, front outswing, rear outswing, friction demand and lateral friction utilisation are collectively considered the low-speed performance measures. The vehicle configurations considered here were within or close to the dimensional limits allowed by current permits in the provinces involved in this process, so the low-speed performance measures did not need to be evaluated.

3. RESULTS AND DISCUSSION

3.1 Static Roll Threshold

Table 12 through Table 15 in the Appendix present the static roll threshold for all combinations of long and short semitrailers, for single and tandem axle converter dollies, and medium and high payloads. Table 2, extracted from Table 12, illustrates the effect of vehicle configuration and speed on the static roll threshold. The top three rows are for single axle long semitrailers, the next three are for tandem axle long semitrailers, and the bottom three for tridem axle long semitrailers, and each is combined with a single axle 8.53 m (28 ft) short semitrailer. Combinations not meeting the performance standard of 0.40 g are highlighted in bold.

Table 2: Static Roll Threshold, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**0.395**	**0.394**	**0.395**	**0.391**	**0.390**	**0.391**
DSLM	**0.397**	**0.397**	**0.398**	**0.390**	**0.389**	**0.390**
GSLM	**0.399**	**0.398**	**0.399**	**0.390**	**0.389**	**0.392**
BSLM	0.408	0.410	0.416	**0.393**	**0.397**	**0.397**
ESLM	0.410	0.411	0.416	**0.393**	**0.398**	**0.398**
HSLM	0.412	0.414	0.418	**0.393**	**0.397**	**0.396**
CSLM	0.439	0.430	0.431	**0.395**	**0.397**	**0.398**
FSLM	0.436	0.444	0.431	**0.395**	**0.397**	**0.396**
JSLM	0.440	0.433	0.432	**0.393**	**0.397**	**0.397**

In all cases, the tractor and lead semitrailer rolled over while the rear trailer remained standing.

The static roll threshold was not significantly affected by speed or semitrailer length, but decreased as payload height increased. It would also decrease with payload weight, but all runs made for this work were made with similar payload weights. The static roll threshold increased as the number of axles on the lead semitrailer increased, because the additional axle increased the roll resistance and the additional tare weight of the semitrailer decreased the payload weight. All combinations with a tandem or tridem lead semitrailer met the performance standard for a medium payload height, while none met it with a high payload.

The static roll threshold of a reverse Rocky Mountain Double was generally slightly lower than that of the conventional Rocky Mountain Double when the lead trailer had the same number of axles, because the shorter lead semitrailer had a lower tare weight so carried more payload. The values shown in Table 2 hardly vary, because all these combinations have the same short semitrailer in the lead position.

3.2 High-speed Offtracking

Table 16 through Table 19 in the Appendix present the high-speed offtracking for all combinations of long and short semitrailers, for single and tandem axle converter dollies, and medium and high payloads. Table 3, extracted from Table 16, illustrates the effect of vehicle configuration and speed on high-speed offtracking, in the same format as Table 2. Combinations not meeting the performance standard of 0.46 m (18 in) are highlighted in bold.

Table 3: High-speed Offtracking, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**0.625**	**0.680**	**0.721**	**0.602**	**0.657**	**0.698**
DSLM	**0.642**	**0.711**	**0.761**	**0.588**	**0.657**	**0.708**
GSLM	**0.708**	**0.774**	**0.823**	**0.587**	**0.656**	**0.707**
BSLM	**0.550**	**0.601**	**0.639**	**0.568**	**0.620**	**0.658**
ESLM	**0.536**	**0.603**	**0.653**	**0.547**	**0.614**	**0.664**
HSLM	**0.584**	**0.650**	**0.700**	**0.545**	**0.613**	**0.664**
CSLM	**0.520**	**0.566**	**0.599**	**0.567**	**0.614**	**0.648**
FSLM	**0.504**	**0.564**	**0.609**	**0.547**	**0.609**	**0.653**
JSLM	**0.507**	**0.574**	**0.624**	**0.532**	**0.601**	**0.652**

High-speed offtracking increased with speed, semitrailer length and payload height. It would also increase with payload weight, but all runs made for this work were made with similar payload weights. High-speed offtracking decreased as the number of axles increased for a semitrailer of the same length, or if a tandem axle dolly was used rather than a single axle dolly. All except a few combinations with a tridem long semitrailer at 90 km/h (55.9 mi/h) exceeded the performance standard of 0.46 m (18 in), for both payload heights and for both converter dollies, at all speeds. Each of the single axle long semitrailers (A, D and G) was clearly worse than any tandem or tridem semitrailer, and each of the 12.19 m (40 ft) long semitrailers (A, B and C) was worse than the two longer semitrailers, in either position.

The high-speed offtracking of each reverse Rocky Mountain Double was slightly lower than that of the corresponding conventional Rocky Mountain Double with a single axle long semitrailer, and slightly higher with a tandem or tridem long semitrailer.

High-speed offtracking would appear to be a concern for the vehicles considered here. The actual amount of high-speed offtracking is not an issue on roads or freeway ramps with a speed limit up to 70 km/h (43.5 mi/h), or on a modern divided highway, which has a design speed not less than the highest truck operating speed, because the side friction factor at the design speed would be much less than the 0.20 g at which the performance standard is evaluated [3].

3.3 Load Transfer Ratio

Table 20 through Table 23 in the Appendix present the load transfer ratio for all combinations of long and short semitrailers, for single and tandem axle converter dollies, and medium and high payloads. Table 4, extracted from Table 20, illustrates the effect of vehicle configuration and speed on load transfer ratio, in the same format as Table 2. Combinations not meeting the performance standard of 0.60 are highlighted in bold. “Roll” indicates that the rear semitrailer rolled over in the manoeuvre.

Table 4: Load Transfer Ratio, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**0.918**	**0.964**	**Roll**	**0.850**	**0.918**	**0.955**
DSLM	**0.902**	**0.960**	**1.000**	**0.791**	**0.862**	**0.921**
GSLM	**0.944**	**0.978**	**Roll**	**0.786**	**0.857**	**0.916**
BSLM	**0.803**	**0.904**	**0.950**	**0.792**	**0.887**	**0.935**
ESLM	**0.727**	**0.836**	**0.919**	**0.710**	**0.802**	**0.882**
HSLM	**0.784**	**0.899**	**0.950**	**0.701**	**0.790**	**0.867**
CSLM	**0.816**	**0.919**	**0.957**	**0.766**	**0.849**	**0.926**
FSLM	**0.725**	**0.833**	**0.922**	**0.684**	**0.764**	**0.847**
JSLM	**0.713**	**0.825**	**0.919**	**0.658**	**0.730**	**0.808**

Load transfer ratio increased with speed and payload height, and decreased with semitrailer wheelbase. It would also increase with payload weight, but all runs made for this work were made with similar payload weights. Load transfer ratio decreased as the number of axles increased for a semitrailer of the same length, or if a tandem axle dolly was used rather than a single axle dolly. There appears to be an anomaly for the 16.20 m (53 ft) tandem axle semitrailer H, but this is because this semitrailer has almost the same wheelbase as the 14.65 m (48 ft) semitrailer, but a different load distribution. Each of the single axle long semitrailers (A, D and G) was clearly worse than any tandem or tridem semitrailer, and each of the 12.19 m (40 ft) long semitrailers (A, B and C) was worse than the two longer semitrailers, in either position.

All combinations exceeded the performance standard of 0.60, for both payload heights and for both converter dollies, at all speeds. There were many instances where the rear trailer rolled over, especially with a high payload, or over 100 km/h (62.1 mi/h).

The load transfer ratio of each reverse Rocky Mountain Double was consistently slightly lower than that of the corresponding conventional Rocky Mountain Double.

3.4 Transient Offtracking

Table 24 through Table 27 in the Appendix present the transient offtracking for all combinations of long and short semitrailers, for single and tandem axle converter dollies, and medium and high payloads. Table 5, extracted from Table 24, illustrates the effect of vehicle configuration and speed on transient offtracking, in the same format as Table 2. Combinations not meeting the performance standard of 0.80 m (31.5 in) are highlighted in bold. “Roll” indicates that the rear semitrailer rolled over in the manoeuvre.

Table 5: Transient Offtracking, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**1.174**	**1.419**	**Roll**	**1.173**	**1.423**	**1.640**
DSLM	**1.113**	**1.383**	**1.613**	**1.074**	**1.326**	**1.561**
GSLM	**1.248**	**1.529**	**Roll**	**1.069**	**1.319**	**1.552**
BSLM	**0.920**	**1.158**	**1.365**	**1.056**	**1.276**	**1.485**
ESLM	**0.778**	**1.009**	**1.236**	**0.942**	**1.167**	**1.382**
HSLM	**0.855**	**1.121**	**1.356**	**0.932**	**1.155**	**1.367**
CSLM	**0.903**	**1.140**	**1.342**	**1.037**	**1.231**	**1.414**
FSLM	0.743	**0.966**	**1.189**	**0.927**	**1.130**	**1.320**
JSLM	0.711	**0.941**	**1.173**	**0.875**	**1.082**	**1.274**

Transient offtracking increased with speed and payload height, and decreased with semitrailer wheelbase. It would also increase with payload weight, but all runs made for this work were made with similar payload weights. Transient offtracking decreased as the number of axles increased for a semitrailer of the same length, or if a tandem axle dolly was used rather than a single axle dolly. Again, there appears to be an anomaly for the 16.20 m (53 ft) tandem axle semitrailer H, but this is because this semitrailer has almost the same wheelbase as the 14.65 m (48 ft) semitrailer, but a different load distribution. Each of the single axle long semitrailers (A, D and G) was clearly worse than any tandem or tridem semitrailer, , in either position, and each of the 12.19 m (40 ft) long semitrailers (A, B and C) was worse than the two longer semitrailers in the lead position.

Most combinations exceeded the performance standard of 0.80 m (31.5 in), for both payload heights and for both converter dollies, except for some tandem or tridem long semitrailers at 90 km/h (55.9 mi/h).

Transient offtracking of each reverse Rocky Mountain Double was slightly lower than that of the corresponding conventional Rocky Mountain Double for a single axle long semitrailer, but slightly higher for a tandem or tridem long semitrailer.

3.5 Comparison of Conventional and Reverse Rocky Mountain Doubles

A comparison of the dynamic performance of conventional and reverse Rocky Mountain Doubles is presented in Table 6. The table is arranged with pairs of rows highlighted and not, where the upper row of a pair contains the performance measures for the conventional Rocky Mountain Double, and the lower row gives the corresponding results for the reverse Rocky Mountain Double made up with the same trailers. The first column identifies the trailers, using the codes given in the Appendix. The next four columns respectively contain the static roll threshold, high-speed offtracking, load transfer ratio and transient offtracking. The last four columns give the percentage difference between the performance measures for the conventional and reverse Rocky Mountain Double, where a negative sign indicates the reverse Rocky Mountain Double has the poorer performance. The results are for a single axle converter dolly with a medium payload height at 100 km/h (62.1 mi/h), and only consider a single axle 8.53 m (28 ft) short semitrailer, trailer L. The first six rows are for the three single axle long semitrailers, the next six are for the three tandem axle long semitrailers, and the last six are for the three tridem axle long semitrailers. Combinations not meeting the appropriate performance standard are highlighted in bold.

Table 6: Comparison of Dynamic performance of Rocky Mountain Doubles

Code	SRT	HSOT	LTR	TOT	%SRT	%HSOT	%LTR	%TOT
AL	**0.394**	**0.680**	**0.964**	**1.419**				
LA	**0.390**	**0.657**	**0.918**	**1.423**	-1.0%	3.4%	4.8%	-0.3%
DL	**0.397**	**0.711**	**0.960**	**1.383**				
LD	**0.389**	**0.657**	**0.862**	**1.326**	-2.0%	7.6%	10.2%	4.1%
GL	**0.398**	**0.774**	**0.978**	**1.529**				
LG	**0.389**	**0.656**	**0.857**	**1.319**	-2.3%	15.2%	12.4%	13.7%
BL	0.410	**0.601**	**0.904**	**1.158**				
LB	**0.397**	**0.620**	**0.887**	**1.276**	-3.2%	-3.2%	1.9%	-10.2%
EL	0.411	**0.603**	**0.836**	**1.009**				
LE	**0.398**	**0.614**	**0.802**	**1.167**	-3.2%	-1.8%	4.1%	-15.7%
HL	0.414	**0.650**	**0.899**	**1.121**				
LH	**0.397**	**0.613**	**0.790**	**1.155**	-4.1%	5.7%	12.1%	-3.0%
CL	0.430	**0.566**	**0.919**	**1.140**				
LC	**0.397**	**0.614**	**0.849**	**1.231**	-7.7%	-8.5%	7.6%	-8.0%
FL	0.444	**0.564**	**0.833**	**0.966**				
LF	**0.397**	**0.609**	**0.764**	**1.130**	-10.6%	-8.0%	8.3%	-17.0%
JL	0.433	**0.574**	**0.825**	**0.941**				
LJ	**0.397**	**0.601**	**0.730**	**1.082**	-8.3%	-4.7%	11.5%	-15.0%

The percentage differences for static roll threshold reflect the explanation given in section 3.1. The other three performance measures are better for a reverse Rocky Mountain Double than for a conventional Rocky Mountain Double for a single axle long trailer, while high-speed offtracking and transient offtracking are generally worse for tandem and tridem long semitrailers.

3.6 Effect of Tandem Axle Dolly on Reverse Rocky Mountain Doubles

A comparison of the dynamic performance of conventional and reverse Rocky Mountain Doubles is presented in Table 7. The table is arranged in the same way as Table 6, but compares reverse Rocky Mountain Doubles, where the upper row of a pair contains the performance measures for a vehicle with a single axle dolly, and the lower row gives the corresponding results for same vehicle with a tandem axle dolly. The first column identifies the configuration, using the codes given in the Appendix. The results are for a 1.83 m (72 in) payload height at 100 km/h (62.1 mi/h), and only consider a single axle 8.53 m (28 ft) short semitrailer, trailer L. The first four rows are for 14.65 and 16.20 m (48 and 53 ft) tandem axle long semitrailers, and the last four are for the two corresponding tridem axle long semitrailers.

It is clear from this table that a tandem dolly results in a small improvement in dynamic performance for a reverse Rocky Mountain Double, except for transient offtracking for tridem semitrailers.

Table 7: Effect of Tandem Dolly on Reverse Rocky Mountain Doubles

Code	SRT	HSOT	LTR	TOT	%SRT	%HSOT	%LTR	%TOT
LSEM	**0.398**	**0.614**	**0.802**	**1.167**				
LTEM	0.404	**0.598**	**0.779**	**1.130**	1.5%	2.6%	2.9%	3.2%
LSHM	**0.397**	**0.613**	**0.790**	**1.155**				
LTHM	0.405	**0.597**	**0.772**	**1.120**	2.0%	2.6%	2.3%	3.0%
LSFM	**0.397**	**0.609**	**0.764**	**1.130**				
LTFM	0.405	**0.602**	**0.740**	**1.141**	2.0%	1.1%	3.1%	-1.0%
LSJM	**0.397**	**0.601**	**0.730**	**1.082**				
LTJM	0.405	**0.595**	**0.713**	**1.095**	2.0%	1.0%	2.3%	-1.2%

3.7 Comparison with Previous Work

The conventional and reverse Rocky Mountain Doubles were considered during the CCMTA/RTAC Vehicle Weights and Dimensions Study [1], [2], and the results are summarized in Table 8. The conventional Rocky Mountain Double was considered with a single axle dolly, while the reverse Rocky Mountain Double was considered with a tandem axle dolly, which was noted as standard practice at the time [2].

This work does not have any case that matches exactly the dimensions, weights, payload weight or distribution of that work, but Table 9 presents results for the configurations and conditions that appear to be the closest to those in Table 8.

Table 8: Results from Vehicle Weights and Dimensions Study

Configuration	Static Roll Threshold (g)	High-speed Offtracking (m)	Load Transfer Ratio	Transient Offtracking (m)
Reference RMD	0.48	0.50	0.65	0.68
Reverse RMD	0.40	0.49	0.57	0.69
High Payload CG	0.33	0.59	0.98	0.97

Table 9: Results from Closest Configuration in Current Work

Configuration	Static Roll Threshold (g)	High-speed Offtracking (m)	Load Transfer Ratio	Transient Offtracking (m)
Reference RMD	0.46	0.56	0.67	0.86
Reverse RMD	0.46	0.56	0.69	1.01
High Payload CG	0.36	0.66	0.94	1.14

4. CONCLUSIONS

This work has evaluated the dynamic performance of conventional and reverse Rocky Mountain Doubles, an A-train configuration composed of a long semitrailer and a short semitrailer. It considered all combinations of a 12.19, 14.65 and 16.20 m (40, 48 and 53 ft) long semitrailer with a single, tandem or tridem axle group with an 8.53 or 9.45 m (28 or 31 ft) short semitrailer with a single or tandem axle group, using either a single axle or a tandem axle dolly.

The dynamic performance of a Rocky Mountain Double with a 12.19 m (40 ft) long semitrailer was clearly and significantly worse than if a 14.65 or 16.20 m (48 or 53 ft) semitrailer was used.

The dynamic performance of a Rocky Mountain Double with a single axle long semitrailer was clearly and significantly worse than if a tandem or tridem semitrailer was used.

The load distribution for the rear trailer of a reverse Rocky Mountain Double was greatly improved when a tandem dolly was used with a tandem or tridem long semitrailer, and this also improved the dynamic performance compared to use of a single axle dolly.

The transient offtracking of the reverse Rocky Mountain Double was generally slightly better than that of the conventional Rocky Mountain Double composed of the same trailers, while the other three high-speed dynamic performance measures were generally somewhat worse.

REFERENCES

[1] Ervin R.D. and Guy Y, "The Influence of Weights and Dimensions on the Stability and Control of Heavy Trucks in Canada - Part 1", CCMTA/RTAC Vehicle Weights and Dimensions Study Technical Report Volume 1, Roads and Transportation Association of Canada, Ottawa, July 1986, http://www.comt.ca/english/programs/Reports2013/RTAC%20Study%20-%20The%20Influence%20of%20Weights%20and%20Dimensions%20on%20the%20Stability%20and%20Control%20of%20Heavy%20Trucks%20in%20Canada%20Part%201.pdf

[2] Ervin R.D. and Guy Y, “The Influence of Weights and Dimensions on the Stability and Control of Heavy Trucks in Canada - Part 2", CCMTA/RTAC Vehicle Weights and Dimensions Study Technical Report Volume 2, Roads and Transportation Association of Canada, Ottawa, July 1986, http://www.comt.ca/english/programs/Reports2013/RTAC%20Study%20-%20The%20Influence%20of%20Weights%20and%20Dimensions%20on%20the%20Stability%20and%20Control%20of%20Heavy%20Trucks%20in%20Canada%20Part%202.pdf

[3] Billing J.R. and Patten J.D., “A Discussion of the High-speed Offtracking Performance Standard”, 10’th International Symposium on Heavy Vehicle Transportation Technology, France, May 2008, http://road-transport-technology.org//Proceedings/HVTT%2010/Papers/Papers_HVTT//A%20DISCUSSION%20OF%20THE%20HIGH-SPEED%20OFFTRACKING%20PERFORMANCE%20STANDARD%20-%20Billing.pdf

APPENDIX – BULK RESULTS

The bulk results for all runs are presented in tables below. There four tables for each performance measure. Each table includes all combinations of long and short semitrailers, and there is one table for each of the four combinations of dolly configuration (single or tandem) and payload height (2.44 or 1.83 m (96 or 72 in)). Any performance measure not meeting its performance standard is highlighted in bold. "Roll" indicates rear trailer rollover in the evasive manoeuvre.

The first column of each table identifies the configuration by a four character code LDRP, where:

- L is a code for the lead semitrailer, from Table 10 for a long semitrailer, or Table 11 for a short semitrailer;
- D is a code for the dolly, S for single axle, T for tandem axle;
- R is a code for the rear trailer, from Table 10 for a long semitrailer, or Table 11 for a short semitrailer; and
- P is a code for the payload height, H for 2.44 m (96 in), M for 1.83 m (72 in).

Table 10: Codes for Long Semitrailers

Code	Length	Axle Group
A	12.19 m (40 ft)	Single
B	12.19 m (40 ft)	Tandem
C	12.19 m (40 ft)	Tridem
D	14.65 m (48 ft)	Single
E	14.65 m (48 ft)	Tandem
F	14.65 m (48 ft)	Tridem
G	16.20 m (53 ft)	Single
H	16.20 m (53 ft)	Tandem
J	16.20 m (53 ft)	Tridem

Table 11: Codes for Short Semitrailers

Code	Length	Axle Group
L	8.53 m (28 ft)	Single
M	8.53 m (28 ft)	Tandem
N	9.45 m (31 ft)	Single
P	9.45 m (31 ft)	Tandem

Table 12: Static Roll Threshold, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**0.395**	**0.394**	**0.395**	**0.391**	**0.390**	**0.391**
ASMM	0.400	0.403	0.402	0.409	0.409	0.417
ASNM	**0.394**	**0.396**	**0.395**	**0.389**	**0.389**	**0.390**
ASPM	**0.399**	0.402	0.402	0.408	0.410	0.415
BSLM	0.408	0.410	0.416	**0.393**	**0.397**	**0.397**
BSMM	0.427	0.434	0.429	0.429	0.432	0.429
BSNM	0.408	0.410	0.416	**0.393**	**0.398**	**0.398**
BSPM	0.428	0.433	0.430	0.427	0.432	0.428
CSLM	0.439	0.430	0.431	**0.395**	**0.397**	**0.398**
CSMM	0.450	0.452	0.454	0.431	0.433	0.428
CSNM	0.439	0.430	0.431	**0.394**	**0.396**	**0.399**
CSPM	0.449	0.450	0.453	0.428	0.432	0.429
DSLM	**0.397**	**0.397**	**0.398**	**0.390**	**0.389**	**0.390**
DSMM	0.402	0.404	0.406	0.408	0.410	0.417
DSNM	**0.398**	**0.397**	**0.397**	**0.388**	**0.389**	**0.390**
DSPM	0.402	0.406	0.407	0.407	0.408	0.414
ESLM	0.410	0.411	0.416	**0.393**	**0.398**	**0.398**
ESMM	0.429	0.436	0.432	0.429	0.433	0.429
ESNM	0.409	0.412	0.417	**0.394**	**0.397**	**0.399**
ESPM	0.429	0.436	0.432	0.426	0.431	0.429
FSLM	0.436	0.444	0.431	**0.395**	**0.397**	**0.396**
FSMM	0.450	0.452	0.453	0.430	0.434	0.430
FSNM	0.436	0.444	0.432	**0.394**	**0.396**	**0.397**
FSPM	0.449	0.451	0.453	0.427	0.431	0.428
GSLM	**0.399**	**0.398**	**0.399**	**0.390**	**0.389**	**0.392**
GSMM	0.404	0.406	0.406	0.409	0.411	0.416
GSNM	**0.399**	**0.399**	**0.401**	**0.389**	**0.390**	**0.390**
GSPM	0.404	0.406	0.407	0.407	0.409	0.414
HSLM	0.412	0.414	0.418	**0.393**	**0.397**	**0.396**
HSMM	0.437	0.438	0.436	0.430	0.434	0.428
HSNM	0.412	0.414	0.419	**0.395**	**0.398**	**0.398**
HSPM	0.436	0.437	0.436	0.427	0.431	0.428
JSLM	0.440	0.433	0.432	**0.393**	**0.397**	**0.397**
JSMM	0.451	0.454	0.454	0.430	0.432	0.427
JSNM	0.440	0.433	0.433	**0.394**	**0.397**	**0.399**
JSPM	0.451	0.453	0.456	0.427	0.431	0.426

Table 13: Static Roll Threshold, Single Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLH	0.342	0.343	0.343	0.334	0.336	0.338
ASMH	0.349	0.349	0.353	0.354	0.358	0.363
ASNH	0.342	0.345	0.344	0.335	0.336	0.338
ASPH	0.350	0.350	0.353	0.354	0.357	0.363
BSLH	0.357	0.359	0.363	0.342	0.343	0.343
BSMH	0.380	0.380	0.384	0.375	0.381	0.380
BSNH	0.356	0.360	0.363	0.340	0.342	0.342
BSPH	0.379	0.379	0.384	0.375	0.378	0.379
CSLH	0.385	0.386	0.381	0.341	0.343	0.344
CSMH	0.399	0.400	0.402	0.375	0.382	0.379
CSNH	0.384	0.384	0.383	0.342	0.342	0.343
CSPH	0.400	0.401	0.402	0.376	0.380	0.379
DSLH	0.345	0.348	0.348	0.334	0.337	0.337
DSMH	0.352	0.354	0.356	0.354	0.358	0.364
DSNH	0.344	0.347	0.348	0.334	0.335	0.337
DSPH	0.353	0.354	0.356	0.353	0.357	0.362
ESLH	0.360	0.361	0.365	0.342	0.342	0.344
ESMH	0.380	0.381	0.388	0.376	0.381	0.379
ESNH	0.360	0.362	0.366	0.341	0.342	0.342
ESPH	0.380	0.382	0.388	0.377	0.379	0.380
FSLH	0.385	0.390	0.384	0.341	0.343	0.344
FSMH	0.402	0.403	0.404	0.376	0.381	0.379
FSNH	0.384	0.390	0.384	0.341	0.342	0.343
FSPH	0.402	0.403	0.404	0.377	0.379	0.378
GSLH	0.347	0.350	0.349	0.335	0.337	0.338
GSMH	0.356	0.356	0.359	0.355	0.357	0.363
GSNH	0.347	0.350	0.350	0.334	0.336	0.338
GSPH	0.356	0.356	0.359	0.353	0.357	0.362
HSLH	0.361	0.364	0.368	0.341	0.342	0.343
HSMH	0.385	0.386	0.392	0.375	0.380	0.380
HSNH	0.361	0.365	0.368	0.341	0.342	0.343
HSPH	0.386	0.386	0.392	0.376	0.378	0.378
JSLH	0.386	0.392	0.385	0.342	0.342	0.344
JSMH	0.403	0.405	0.406	0.375	0.381	0.379
JSNH	0.386	0.392	0.386	0.341	0.342	0.344
JSPH	0.403	0.405	0.406	0.377	0.379	0.379

Table 14: Static Roll Threshold, Tandem Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLM	0.409	0.410	0.412	0.404	0.404	0.407
ATMM	0.409	0.410	0.412	0.437	0.438	0.439
ATNM	0.407	0.410	0.413	0.403	0.404	0.407
ATPM	0.408	0.411	0.411	0.436	0.437	0.438
BTLM	0.438	0.437	0.439	0.403	0.406	0.407
BTMM	0.438	0.437	0.440	0.437	0.439	0.440
BTNM	0.438	0.438	0.437	0.402	0.405	0.406
BTPM	0.438	0.437	0.439	0.438	0.438	0.437
CTLM	0.460	0.462	0.465	0.403	0.405	0.407
CTMM	0.460	0.461	0.464	0.438	0.440	0.443
CTNM	0.461	0.463	0.465	0.402	0.406	0.407
CTPM	0.460	0.461	0.463	0.437	0.439	0.440
DTLM	0.412	0.413	0.415	0.403	0.404	0.406
DTMM	0.411	0.413	0.415	0.437	0.439	0.440
DTNM	0.411	0.413	0.415	0.403	0.405	0.405
DTPM	0.411	0.413	0.415	0.437	0.435	0.436
ETLM	0.440	0.440	0.440	0.403	0.404	0.406
ETMM	0.441	0.439	0.443	0.437	0.440	0.441
ETNM	0.440	0.439	0.441	0.403	0.406	0.405
ETPM	0.440	0.439	0.441	0.436	0.436	0.439
FTLM	0.460	0.462	0.463	0.404	0.405	0.408
FTMM	0.459	0.460	0.461	0.439	0.439	0.443
FTNM	0.459	0.462	0.464	0.402	0.404	0.406
FTPM	0.459	0.460	0.462	0.436	0.439	0.440
GTLM	0.415	0.416	0.418	0.404	0.405	0.407
GTMM	0.414	0.417	0.418	0.435	0.439	0.439
GTNM	0.414	0.416	0.418	0.402	0.405	0.406
GTPM	0.413	0.416	0.419	0.436	0.437	0.438
HTLM	0.441	0.444	0.446	0.404	0.405	0.407
HTMM	0.443	0.447	0.449	0.438	0.439	0.440
HTNM	0.442	0.445	0.447	0.402	0.405	0.407
HTPM	0.443	0.447	0.447	0.437	0.438	0.438
JTLM	0.462	0.463	0.466	0.403	0.405	0.406
JTMM	0.460	0.461	0.465	0.439	0.440	0.443
JTNM	0.461	0.463	0.467	0.403	0.405	0.406
JTPM	0.461	0.461	0.464	0.437	0.438	0.439

Table 15: Static Roll Threshold, Tandem Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLH	**0.355**	**0.357**	**0.359**	**0.348**	**0.349**	**0.352**
ATMH	**0.356**	**0.358**	**0.360**	**0.385**	**0.388**	**0.386**
ATNH	**0.356**	**0.357**	**0.359**	**0.348**	**0.348**	**0.351**
ATPH	**0.357**	**0.358**	**0.360**	**0.385**	**0.386**	**0.387**
BTLH	**0.388**	**0.388**	**0.390**	**0.349**	**0.351**	**0.352**
BTMH	**0.387**	**0.387**	**0.392**	**0.384**	**0.387**	**0.388**
BTNH	**0.389**	**0.388**	**0.391**	**0.348**	**0.349**	**0.352**
BTPH	**0.387**	**0.386**	**0.391**	**0.385**	**0.385**	**0.387**
CTLH	0.409	0.412	0.415	**0.350**	**0.351**	**0.352**
CTMH	0.409	0.411	0.413	**0.385**	**0.387**	**0.386**
CTNH	0.408	0.413	0.415	**0.349**	**0.350**	**0.353**
CTPH	0.410	0.412	0.412	**0.386**	**0.386**	**0.387**
DTLH	**0.360**	**0.362**	**0.364**	**0.349**	**0.349**	**0.352**
DTMH	**0.361**	**0.362**	**0.364**	**0.383**	**0.387**	**0.387**
DTNH	**0.360**	**0.362**	**0.364**	**0.347**	**0.350**	**0.352**
DTPH	**0.361**	**0.362**	**0.364**	**0.385**	**0.386**	**0.387**
ETLH	**0.390**	**0.389**	**0.396**	**0.350**	**0.350**	**0.352**
ETMH	**0.390**	**0.389**	**0.395**	**0.384**	**0.386**	**0.386**
ETNH	**0.389**	**0.389**	**0.395**	**0.349**	**0.350**	**0.352**
ETPH	**0.390**	**0.389**	**0.395**	**0.385**	**0.385**	**0.386**
FTLH	0.409	0.414	0.415	**0.350**	**0.351**	**0.354**
FTMH	0.411	0.413	0.414	**0.386**	**0.387**	**0.388**
FTNH	0.410	0.414	0.415	**0.349**	**0.351**	**0.353**
FTPH	0.411	0.413	0.415	**0.385**	**0.385**	**0.388**
GTLH	**0.363**	**0.366**	**0.367**	**0.348**	**0.350**	**0.353**
GTMH	**0.363**	**0.365**	**0.368**	**0.384**	**0.387**	**0.386**
GTNH	**0.363**	**0.365**	**0.366**	**0.348**	**0.350**	**0.351**
GTPH	**0.363**	**0.365**	**0.367**	**0.384**	**0.386**	**0.385**
HTLH	**0.394**	**0.393**	**0.395**	**0.349**	**0.350**	**0.353**
HTMH	**0.394**	**0.393**	**0.396**	**0.385**	**0.386**	**0.386**
HTNH	**0.394**	**0.393**	**0.395**	**0.349**	**0.349**	**0.351**
HTPH	**0.395**	**0.394**	**0.396**	**0.384**	**0.385**	**0.386**
JTLH	0.412	0.416	0.417	**0.349**	**0.351**	**0.354**
JTMH	0.413	0.415	0.416	**0.385**	**0.387**	**0.387**
JTNH	0.412	0.417	0.418	**0.349**	**0.350**	**0.352**
JTPH	0.413	0.415	0.417	**0.387**	**0.385**	**0.387**

Table 16: High-speed Offtracking, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**0.625**	**0.680**	**0.721**	**0.602**	**0.657**	**0.698**
ASMM	**0.592**	**0.645**	**0.684**	**0.542**	**0.595**	**0.633**
ASNM	**0.630**	**0.690**	**0.733**	**0.615**	**0.674**	**0.718**
ASPM	**0.596**	**0.653**	**0.694**	**0.549**	**0.605**	**0.647**
BSLM	**0.550**	**0.601**	**0.639**	**0.568**	**0.620**	**0.658**
BSMM	**0.481**	**0.530**	**0.566**	**0.480**	**0.529**	**0.565**
BSNM	**0.555**	**0.611**	**0.652**	**0.581**	**0.636**	**0.677**
BSPM	**0.485**	**0.538**	**0.577**	**0.485**	**0.537**	**0.576**
CSLM	**0.520**	**0.566**	**0.599**	**0.567**	**0.614**	**0.648**
CSMM	**0.471**	**0.514**	**0.544**	**0.480**	**0.523**	**0.556**
CSNM	**0.525**	**0.575**	**0.612**	**0.579**	**0.629**	**0.666**
CSPM	**0.475**	**0.522**	**0.555**	**0.484**	**0.531**	**0.567**
DSLM	**0.642**	**0.711**	**0.761**	**0.588**	**0.657**	**0.708**
DSMM	**0.607**	**0.674**	**0.722**	**0.528**	**0.594**	**0.643**
DSNM	**0.648**	**0.721**	**0.774**	**0.601**	**0.674**	**0.728**
DSPM	**0.611**	**0.681**	**0.733**	**0.535**	**0.605**	**0.657**
ESLM	**0.536**	**0.603**	**0.653**	**0.547**	**0.614**	**0.664**
ESMM	**0.461**	**0.526**	**0.574**	0.458	**0.523**	**0.572**
ESNM	**0.542**	**0.613**	**0.666**	**0.558**	**0.630**	**0.683**
ESPM	**0.465**	**0.534**	**0.585**	**0.463**	**0.532**	**0.583**
FSLM	**0.504**	**0.564**	**0.609**	**0.547**	**0.609**	**0.653**
FSMM	**0.451**	**0.510**	**0.551**	0.459	**0.518**	**0.562**
FSNM	**0.510**	**0.574**	**0.622**	**0.559**	**0.624**	**0.672**
FSPM	0.456	**0.517**	**0.561**	**0.464**	**0.526**	**0.573**
GSLM	**0.708**	**0.774**	**0.823**	**0.587**	**0.656**	**0.707**
GSMM	**0.671**	**0.735**	**0.784**	**0.527**	**0.593**	**0.642**
GSNM	**0.713**	**0.784**	**0.836**	**0.600**	**0.673**	**0.727**
GSPM	**0.675**	**0.744**	**0.794**	**0.534**	**0.604**	**0.656**
HSLM	**0.584**	**0.650**	**0.700**	**0.545**	**0.613**	**0.664**
HSMM	**0.504**	**0.568**	**0.616**	0.456	**0.522**	**0.571**
HSNM	**0.589**	**0.660**	**0.713**	**0.556**	**0.629**	**0.683**
HSPM	**0.508**	**0.576**	**0.627**	**0.460**	**0.531**	**0.582**
JSLM	**0.507**	**0.574**	**0.624**	**0.532**	**0.601**	**0.652**
JSMM	0.451	**0.517**	**0.563**	0.445	**0.511**	**0.561**
JSNM	**0.512**	**0.584**	**0.636**	**0.544**	**0.617**	**0.671**
JSPM	0.455	**0.525**	**0.573**	0.449	**0.519**	**0.572**

Table 17: High-speed Offtracking, Single Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLH	0.701	0.756	0.796	0.671	0.727	0.767
ASMH	0.657	0.709	0.748	0.586	0.638	0.676
ASNH	0.708	0.767	0.811	0.689	0.748	0.792
ASPH	0.661	0.718	0.760	0.595	0.651	0.693
BSLH	0.599	0.649	0.687	0.627	0.678	0.715
BSMH	0.508	0.557	0.593	0.507	0.555	0.592
BSNH	0.606	0.661	0.701	0.643	0.698	0.739
BSPH	0.513	0.566	0.605	0.512	0.565	0.604
CSLH	0.547	0.592	0.626	0.619	0.665	0.698
CSMH	0.488	0.531	0.562	0.500	0.544	0.576
CSNH	0.554	0.604	0.640	0.635	0.685	0.722
CSPH	0.493	0.539	0.574	0.506	0.553	0.588
DSLH	0.725	0.794	0.844	0.659	0.728	0.778
DSMH	0.679	0.744	0.793	0.573	0.639	0.687
DSNH	0.732	0.804	0.858	0.676	0.750	0.803
DSPH	0.683	0.753	0.804	0.583	0.652	0.704
ESLH	0.590	0.657	0.707	0.607	0.674	0.724
ESMH	0.490	0.554	0.602	0.486	0.551	0.600
ESNH	0.597	0.668	0.721	0.623	0.695	0.747
ESPH	0.495	0.563	0.614	0.492	0.561	0.612
FSLH	0.533	0.593	0.637	0.600	0.661	0.706
FSMH	0.471	0.528	0.570	0.481	0.540	0.583
FSNH	0.540	0.604	0.651	0.616	0.681	0.729
FSPH	0.476	0.536	0.582	0.486	0.549	0.595
GSLH	0.795	0.861	0.911	0.658	0.727	0.777
GSMH	0.747	0.811	0.858	0.571	0.637	0.686
GSNH	0.802	0.873	0.925	0.675	0.748	0.802
GSPH	0.752	0.819	0.869	0.581	0.651	0.703
HSLH	0.640	0.707	0.757	0.604	0.673	0.723
HSMH	0.535	0.599	0.646	0.484	0.550	0.599
HSNH	0.647	0.718	0.771	0.621	0.693	0.747
HSPH	0.539	0.607	0.657	0.489	0.559	0.611
JSLH	0.536	0.603	0.653	0.586	0.654	0.705
JSMH	0.472	0.535	0.583	0.467	0.533	0.582
JSNH	0.543	0.614	0.667	0.602	0.675	0.728
JSPH	0.477	0.544	0.594	0.472	0.542	0.594

Table 18: High-speed Offtracking, Tandem Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLM	**0.614**	**0.668**	**0.708**	**0.586**	**0.641**	**0.682**
ATMM	**0.586**	**0.639**	**0.677**	**0.495**	**0.548**	**0.587**
ATNM	**0.618**	**0.676**	**0.719**	**0.599**	**0.657**	**0.701**
ATPM	**0.589**	**0.645**	**0.686**	**0.500**	**0.557**	**0.599**
BTLM	**0.500**	**0.551**	**0.589**	**0.556**	**0.607**	**0.646**
BTMM	**0.475**	**0.524**	**0.561**	**0.467**	**0.516**	**0.553**
BTNM	**0.504**	**0.559**	**0.600**	**0.568**	**0.624**	**0.665**
BTPM	**0.477**	**0.530**	**0.570**	**0.471**	**0.525**	**0.564**
CTLM	**0.486**	**0.532**	**0.566**	**0.563**	**0.610**	**0.644**
CTMM	**0.462**	**0.506**	**0.538**	**0.475**	**0.520**	**0.553**
CTNM	**0.490**	**0.540**	**0.577**	**0.575**	**0.625**	**0.663**
CTPM	**0.465**	**0.512**	**0.547**	**0.480**	**0.528**	**0.564**
DTLM	**0.633**	**0.700**	**0.749**	**0.570**	**0.638**	**0.688**
DTMM	**0.603**	**0.668**	**0.717**	**0.478**	**0.545**	**0.594**
DTNM	**0.636**	**0.708**	**0.760**	**0.582**	**0.654**	**0.708**
DTPM	**0.606**	**0.675**	**0.726**	**0.483**	**0.554**	**0.606**
ETLM	**0.481**	**0.548**	**0.597**	**0.530**	**0.598**	**0.648**
ETMM	0.455	**0.520**	**0.568**	0.441	**0.507**	**0.556**
ETNM	**0.485**	**0.556**	**0.609**	**0.542**	**0.614**	**0.668**
ETPM	0.457	**0.526**	**0.577**	0.446	**0.515**	**0.567**
FTLM	**0.468**	**0.529**	**0.574**	**0.541**	**0.602**	**0.648**
FTMM	0.443	**0.502**	**0.545**	0.453	**0.512**	**0.556**
FTNM	**0.472**	**0.537**	**0.585**	**0.553**	**0.618**	**0.667**
FTPM	0.446	**0.508**	**0.554**	0.458	**0.521**	**0.568**
GTLM	**0.700**	**0.765**	**0.813**	**0.570**	**0.638**	**0.689**
GTMM	**0.669**	**0.732**	**0.778**	**0.478**	**0.545**	**0.594**
GTNM	**0.704**	**0.773**	**0.824**	**0.582**	**0.655**	**0.708**
GTPM	**0.672**	**0.738**	**0.788**	**0.483**	**0.554**	**0.606**
HTLM	**0.525**	**0.592**	**0.641**	**0.528**	**0.597**	**0.648**
HTMM	**0.499**	**0.563**	**0.611**	0.439	**0.506**	**0.555**
HTNM	**0.530**	**0.600**	**0.652**	**0.540**	**0.613**	**0.667**
HTPM	**0.501**	**0.570**	**0.620**	0.443	**0.514**	**0.567**
JTLM	**0.470**	**0.537**	**0.585**	**0.525**	**0.595**	**0.646**
JTMM	0.444	**0.510**	**0.556**	0.438	**0.505**	**0.554**
JTNM	**0.474**	**0.545**	**0.596**	**0.537**	**0.611**	**0.664**
JTPM	0.447	**0.516**	**0.565**	0.442	**0.513**	**0.565**

Table 19: High-speed Offtracking, Tandem Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLH	**0.684**	**0.737**	**0.777**	**0.650**	**0.704**	**0.743**
ATMH	**0.646**	**0.698**	**0.736**	**0.525**	**0.578**	**0.617**
ATNH	**0.689**	**0.747**	**0.789**	**0.667**	**0.725**	**0.767**
ATPH	**0.649**	**0.705**	**0.746**	**0.531**	**0.587**	**0.630**
BTLH	**0.529**	**0.580**	**0.618**	**0.608**	**0.659**	**0.696**
BTMH	**0.495**	**0.544**	**0.580**	**0.486**	**0.535**	**0.572**
BTNH	**0.534**	**0.590**	**0.631**	**0.625**	**0.680**	**0.720**
BTPH	**0.498**	**0.551**	**0.590**	**0.491**	**0.545**	**0.584**
CTLH	**0.510**	**0.554**	**0.588**	**0.614**	**0.659**	**0.693**
CTMH	**0.477**	**0.520**	**0.551**	**0.493**	**0.537**	**0.570**
CTNH	**0.515**	**0.564**	**0.600**	**0.630**	**0.680**	**0.716**
CTPH	**0.480**	**0.527**	**0.561**	**0.498**	**0.547**	**0.582**
DTLH	**0.708**	**0.775**	**0.824**	**0.635**	**0.703**	**0.752**
DTMH	**0.669**	**0.734**	**0.781**	**0.510**	**0.577**	**0.626**
DTNH	**0.714**	**0.785**	**0.836**	**0.652**	**0.724**	**0.776**
DTPH	**0.672**	**0.741**	**0.791**	**0.516**	**0.586**	**0.638**
ETLH	**0.511**	**0.578**	**0.628**	**0.584**	**0.650**	**0.699**
ETMH	**0.476**	**0.541**	**0.589**	**0.461**	**0.527**	**0.575**
ETNH	**0.517**	**0.588**	**0.640**	**0.600**	**0.671**	**0.723**
ETPH	**0.479**	**0.548**	**0.599**	**0.466**	**0.536**	**0.587**
FTLH	**0.493**	**0.554**	**0.596**	**0.593**	**0.653**	**0.698**
FTMH	**0.459**	**0.516**	**0.559**	**0.472**	**0.531**	**0.575**
FTNH	**0.498**	**0.563**	**0.609**	**0.609**	**0.674**	**0.721**
FTPH	**0.462**	**0.524**	**0.568**	**0.477**	**0.540**	**0.587**
GTLH	**0.782**	**0.845**	**0.892**	**0.635**	**0.702**	**0.751**
GTMH	**0.740**	**0.802**	**0.848**	**0.510**	**0.576**	**0.625**
GTNH	**0.787**	**0.855**	**0.904**	**0.652**	**0.724**	**0.776**
GTPH	**0.743**	**0.809**	**0.857**	**0.516**	**0.586**	**0.638**
HTLH	**0.557**	**0.623**	**0.672**	**0.581**	**0.649**	**0.699**
HTMH	**0.522**	**0.586**	**0.633**	**0.458**	**0.525**	**0.575**
HTNH	**0.563**	**0.633**	**0.685**	**0.597**	**0.670**	**0.723**
HTPH	**0.525**	**0.592**	**0.642**	**0.464**	**0.535**	**0.587**
JTLH	**0.494**	**0.562**	**0.610**	**0.578**	**0.646**	**0.696**
JTMH	**0.460**	**0.526**	**0.572**	**0.457**	**0.524**	**0.573**
JTNH	**0.500**	**0.570**	**0.623**	**0.593**	**0.666**	**0.719**
JTPH	**0.463**	**0.532**	**0.581**	**0.462**	**0.533**	**0.585**

Table 20: Load Transfer Ratio, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	0.918	0.964	Roll	0.850	0.918	0.955
ASMM	0.868	0.947	1.000	0.790	0.886	0.942
ASNM	0.895	0.956	1.000	0.850	0.916	0.953
ASPM	0.833	0.937	0.963	0.762	0.863	0.933
BSLM	0.803	0.904	0.950	0.792	0.887	0.935
BSMM	0.728	0.841	0.928	0.699	0.806	0.895
BSNM	0.776	0.884	0.940	0.791	0.881	0.939
BSPM	0.696	0.811	0.909	0.674	0.782	0.876
CSLM	0.816	0.919	0.957	0.766	0.849	0.926
CSMM	0.746	0.861	0.938	0.675	0.774	0.870
CSNM	0.785	0.891	0.945	0.766	0.844	0.930
CSPM	0.712	0.826	0.920	0.652	0.751	0.846
DSLM	0.902	0.960	1.000	0.791	0.862	0.921
DSMM	0.841	0.941	0.992	0.728	0.828	0.897
DSNM	0.875	0.948	0.979	0.794	0.859	0.915
DSPM	0.808	0.925	0.961	0.699	0.802	0.881
ESLM	0.727	0.836	0.919	0.710	0.802	0.882
ESMM	0.655	0.770	0.871	0.627	0.717	0.808
ESNM	0.701	0.811	0.904	0.708	0.798	0.882
ESPM	0.632	0.739	0.840	0.608	0.695	0.788
FSLM	0.725	0.833	0.922	0.684	0.764	0.847
FSMM	0.658	0.773	0.874	0.596	0.688	0.776
FSNM	0.697	0.806	0.898	0.681	0.761	0.842
FSPM	0.634	0.739	0.840	0.575	0.668	0.756
GSLM	0.944	0.978	Roll	0.786	0.857	0.916
GSMM	0.915	0.964	Roll	0.722	0.822	0.892
GSNM	0.930	0.975	Roll	0.789	0.854	0.912
GSPM	0.878	0.954	1.000	0.694	0.797	0.876
HSLM	0.784	0.899	0.950	0.701	0.790	0.867
HSMM	0.703	0.826	0.924	0.619	0.705	0.797
HSNM	0.755	0.873	0.940	0.704	0.785	0.866
HSPM	0.671	0.795	0.899	0.600	0.683	0.776
JSLM	0.713	0.825	0.919	0.658	0.730	0.808
JSMM	0.647	0.760	0.866	0.565	0.656	0.741
JSNM	0.684	0.797	0.893	0.649	0.726	0.803
JSPM	0.624	0.727	0.832	0.545	0.635	0.721

Table 21: Load Transfer Ratio, Single Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLH	1.000	Roll	Roll	0.936	1.000	Roll
ASMH	0.949	Roll	Roll	0.924	0.941	1.000
ASNH	0.944	Roll	Roll	0.934	0.968	Roll
ASPH	0.939	1.000	Roll	0.916	0.940	1.000
BSLH	0.934	1.000	Roll	0.903	0.952	Roll
BSMH	0.889	0.949	Roll	0.844	0.933	0.962
BSNH	0.927	0.967	Roll	0.898	0.946	Roll
BSPH	0.851	0.937	1.000	0.815	0.925	0.956
CSLH	0.937	Roll	Roll	0.863	0.928	0.964
CSMH	0.905	0.957	Roll	0.791	0.905	0.945
CSNH	0.930	0.981	Roll	0.834	0.926	0.957
CSPH	0.862	0.944	1.000	0.765	0.876	0.942
DSLH	0.987	Roll	Roll	0.884	0.945	0.963
DSMH	0.947	Roll	Roll	0.859	0.919	0.940
DSNH	0.947	Roll	Roll	0.874	0.947	0.952
DSPH	0.936	0.991	Roll	0.845	0.919	0.939
ESLH	0.902	0.941	Roll	0.862	0.908	0.949
ESMH	0.803	0.922	0.958	0.746	0.855	0.931
ESNH	0.872	0.935	1.000	0.820	0.898	0.941
ESPH	0.769	0.896	0.948	0.721	0.830	0.922
FSLH	0.900	0.937	Roll	0.863	0.909	0.949
FSMH	0.800	0.922	0.960	0.700	0.803	0.891
FSNH	0.863	0.934	0.985	0.820	0.875	0.919
FSPH	0.764	0.892	0.949	0.675	0.781	0.880
GSLH	Roll	Roll	Roll	0.875	0.947	0.954
GSMH	0.996	Roll	Roll	0.851	0.913	0.939
GSNH	Roll	Roll	Roll	0.867	0.945	0.955
GSPH	0.960	Roll	Roll	0.837	0.915	0.938
HSLH	0.932	1.000	Roll	0.862	0.908	0.953
HSMH	0.866	0.949	1.000	0.735	0.838	0.926
HSNH	0.922	0.947	Roll	0.820	0.876	0.944
HSPH	0.823	0.934	0.985	0.711	0.814	0.914
JSLH	0.888	0.936	1.000	0.863	0.909	0.949
JSMH	0.787	0.916	0.958	0.664	0.768	0.842
JSNH	0.850	0.933	0.962	0.821	0.875	0.916
JSPH	0.750	0.880	0.947	0.641	0.744	0.832

Table 22: Load Transfer Ratio, Tandem Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLM	**0.902**	**0.947**	**1.000**	**0.865**	**0.928**	**0.951**
ATMM	**0.808**	**0.919**	**0.966**	**0.773**	**0.868**	**0.931**
ATNM	**0.883**	**0.945**	**0.996**	**0.866**	**0.926**	**0.951**
ATPM	**0.790**	**0.899**	**0.957**	**0.743**	**0.843**	**0.921**
BTLM	**0.762**	**0.869**	**0.932**	**0.771**	**0.844**	**0.919**
BTMM	**0.671**	**0.768**	**0.881**	**0.675**	**0.766**	**0.862**
BTNM	**0.740**	**0.849**	**0.925**	**0.776**	**0.842**	**0.919**
BTPM	**0.652**	**0.747**	**0.853**	**0.652**	**0.743**	**0.837**
CTLM	**0.787**	**0.896**	**0.939**	**0.731**	**0.807**	**0.893**
CTMM	**0.688**	**0.787**	**0.902**	**0.636**	**0.731**	**0.820**
CTNM	**0.763**	**0.873**	**0.934**	**0.732**	**0.808**	**0.890**
CTPM	**0.667**	**0.762**	**0.874**	**0.614**	**0.708**	**0.798**
DTLM	**0.878**	**0.945**	**1.000**	**0.820**	**0.895**	**0.942**
DTMM	**0.784**	**0.901**	**0.964**	**0.723**	**0.821**	**0.901**
DTNM	**0.858**	**0.942**	**0.980**	**0.823**	**0.892**	**0.938**
DTPM	**0.763**	**0.875**	**0.954**	**0.696**	**0.798**	**0.879**
ETLM	**0.685**	**0.797**	**0.893**	**0.716**	**0.779**	**0.861**
ETMM	**0.608**	**0.702**	**0.795**	**0.616**	**0.706**	**0.787**
ETNM	**0.667**	**0.777**	**0.872**	**0.721**	**0.782**	**0.858**
ETPM	0.590	**0.684**	**0.773**	0.596	**0.684**	**0.767**
FTLM	**0.691**	**0.803**	**0.897**	**0.666**	**0.740**	**0.810**
FTMM	**0.611**	**0.706**	**0.797**	0.574	**0.661**	**0.744**
FTNM	**0.672**	**0.783**	**0.878**	**0.667**	**0.741**	**0.810**
FTPM	0.591	**0.685**	**0.773**	0.553	**0.641**	**0.724**
GTLM	**0.938**	**0.989**	**Roll**	**0.815**	**0.891**	**0.941**
GTMM	**0.849**	**0.952**	**0.989**	**0.716**	**0.815**	**0.894**
GTNM	**0.927**	**0.962**	**Roll**	**0.819**	**0.888**	**0.937**
GTPM	**0.825**	**0.939**	**0.984**	**0.690**	**0.791**	**0.873**
HTLM	**0.739**	**0.857**	**0.933**	**0.709**	**0.772**	**0.850**
HTMM	**0.652**	**0.754**	**0.871**	**0.609**	**0.698**	**0.779**
HTNM	**0.717**	**0.836**	**0.922**	**0.713**	**0.775**	**0.848**
HTPM	**0.631**	**0.733**	**0.840**	0.589	**0.676**	**0.759**
JTLM	**0.678**	**0.792**	**0.892**	**0.653**	**0.713**	**0.781**
JTMM	0.599	**0.695**	**0.788**	0.548	**0.633**	**0.713**
JTNM	**0.658**	**0.770**	**0.869**	**0.641**	**0.714**	**0.781**
JTPM	0.578	**0.675**	**0.764**	0.528	**0.613**	**0.695**

Table 23: Load Transfer Ratio, Tandem Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLH	**1.000**	**Roll**	**Roll**	**0.923**	**Roll**	**Roll**
ATMH	**0.910**	**0.951**	**1.000**	**0.914**	**0.936**	**Roll**
ATNH	**0.932**	**Roll**	**Roll**	**0.922**	**1.000**	**Roll**
ATPH	**0.892**	**0.943**	**0.988**	**0.905**	**0.932**	**1.000**
BTLH	**0.907**	**1.000**	**Roll**	**0.858**	**0.924**	**0.963**
BTMH	**0.797**	**0.909**	**0.948**	**0.796**	**0.903**	**0.944**
BTNH	**0.902**	**0.936**	**Roll**	**0.839**	**0.923**	**0.956**
BTPH	**0.776**	**0.891**	**0.942**	**0.772**	**0.874**	**0.939**
CTLH	**0.912**	**1.000**	**Roll**	**0.859**	**0.910**	**0.952**
CTMH	**0.809**	**0.913**	**0.958**	**0.744**	**0.848**	**0.924**
CTNH	**0.905**	**0.981**	**Roll**	**0.820**	**0.886**	**0.941**
CTPH	**0.785**	**0.899**	**0.944**	**0.718**	**0.821**	**0.917**
DTLH	**0.963**	**Roll**	**Roll**	**0.917**	**0.943**	**Roll**
DTMH	**0.911**	**0.954**	**1.000**	**0.885**	**0.925**	**0.967**
DTNH	**0.928**	**Roll**	**Roll**	**0.913**	**0.935**	**Roll**
DTPH	**0.891**	**0.948**	**0.979**	**0.854**	**0.922**	**0.937**
ETLH	**0.864**	**0.913**	**1.000**	**0.858**	**0.909**	**0.952**
ETMH	**0.726**	**0.832**	**0.921**	**0.731**	**0.822**	**0.910**
ETNH	**0.837**	**0.909**	**0.985**	**0.819**	**0.873**	**0.925**
ETPH	**0.704**	**0.806**	**0.909**	**0.706**	**0.801**	**0.898**
FTLH	**0.870**	**0.915**	**1.000**	**0.860**	**0.910**	**0.953**
FTMH	**0.726**	**0.829**	**0.919**	**0.670**	**0.768**	**0.849**
FTNH	**0.840**	**0.910**	**0.988**	**0.820**	**0.874**	**0.918**
FTPH	**0.702**	**0.803**	**0.904**	**0.646**	**0.744**	**0.837**
GTLH	**Roll**	**Roll**	**Roll**	**0.917**	**0.942**	**Roll**
GTMH	**0.952**	**1.000**	**Roll**	**0.873**	**0.927**	**0.939**
GTNH	**Roll**	**Roll**	**Roll**	**0.910**	**0.937**	**1.000**
GTPH	**0.942**	**0.971**	**Roll**	**0.845**	**0.920**	**0.937**
HTLH	**0.903**	**0.974**	**Roll**	**0.858**	**0.909**	**0.952**
HTMH	**0.778**	**0.901**	**0.947**	**0.722**	**0.813**	**0.902**
HTNH	**0.896**	**0.923**	**Roll**	**0.819**	**0.873**	**0.923**
HTPH	**0.754**	**0.873**	**0.939**	**0.697**	**0.792**	**0.887**
JTLH	**0.853**	**0.912**	**1.000**	**0.860**	**0.910**	**0.953**
JTMH	**0.713**	**0.817**	**0.913**	**0.640**	**0.736**	**0.813**
JTNH	**0.824**	**0.906**	**0.974**	**0.821**	**0.874**	**0.918**
JTPH	**0.688**	**0.793**	**0.900**	**0.617**	**0.711**	**0.803**

Table 24: Transient Offtracking, Single Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLM	**1.174**	**1.419**	**Roll**	**1.173**	**1.423**	**1.640**
ASMM	**1.059**	**1.301**	**1.512**	**0.981**	**1.228**	**1.454**
ASNM	**1.155**	**1.417**	**1.633**	**1.158**	**1.414**	**1.640**
ASPM	**1.036**	**1.290**	**1.509**	**0.939**	**1.188**	**1.423**
BSLM	**0.920**	**1.158**	**1.365**	**1.056**	**1.276**	**1.485**
BSMM	0.767	**0.967**	**1.167**	0.798	**1.003**	**1.204**
BSNM	**0.902**	**1.146**	**1.368**	**1.042**	**1.268**	**1.483**
BSPM	0.746	**0.951**	**1.155**	0.764	**0.973**	**1.175**
CSLM	**0.903**	**1.140**	**1.342**	**1.037**	**1.231**	**1.414**
CSMM	0.758	**0.955**	**1.152**	0.782	**0.967**	**1.142**
CSNM	**0.880**	**1.122**	**1.340**	**1.024**	**1.223**	**1.412**
CSPM	0.735	**0.934**	**1.138**	0.750	**0.938**	**1.116**
DSLM	**1.113**	**1.383**	**1.613**	**1.074**	**1.326**	**1.561**
DSMM	**0.993**	**1.259**	**1.495**	**0.891**	**1.138**	**1.374**
DSNM	**1.090**	**1.380**	**1.619**	**1.060**	**1.319**	**1.562**
DSPM	**0.969**	**1.244**	**1.490**	**0.852**	**1.099**	**1.341**
ESLM	0.778	**1.009**	**1.236**	**0.942**	**1.167**	**1.382**
ESMM	0.640	**0.840**	**1.036**	0.687	**0.898**	**1.099**
ESNM	0.762	**0.997**	**1.233**	**0.928**	**1.160**	**1.380**
ESPM	0.622	**0.827**	**1.025**	0.656	**0.870**	**1.074**
FSLM	0.743	**0.966**	**1.189**	**0.927**	**1.130**	**1.320**
FSMM	0.616	**0.809**	**0.999**	0.677	**0.869**	**1.050**
FSNM	0.725	**0.950**	**1.180**	**0.912**	**1.123**	**1.319**
FSPM	0.597	0.794	**0.986**	0.648	**0.843**	**1.027**
GSLM	**1.248**	**1.529**	**Roll**	**1.069**	**1.319**	**1.552**
GSMM	**1.120**	**1.411**	**Roll**	**0.887**	**1.131**	**1.366**
GSNM	**1.231**	**1.525**	**Roll**	**1.055**	**1.312**	**1.553**
GSPM	**1.088**	**1.395**	**1.664**	**0.848**	**1.093**	**1.333**
HSLM	**0.855**	**1.121**	**1.356**	**0.932**	**1.155**	**1.367**
HSMM	0.701	**0.922**	**1.148**	0.678	**0.887**	**1.086**
HSNM	**0.836**	**1.106**	**1.358**	**0.919**	**1.148**	**1.366**
HSPM	0.680	**0.905**	**1.133**	0.649	**0.860**	**1.061**
JSLM	0.711	**0.941**	**1.173**	**0.875**	**1.082**	**1.274**
JSMM	0.583	0.783	**0.980**	0.629	**0.823**	**1.006**
JSNM	0.693	**0.925**	**1.163**	**0.860**	**1.075**	**1.273**
JSPM	0.565	0.768	**0.966**	0.603	0.797	**0.984**

Table 25: Transient Offtracking, Single Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ASLH	**1.291**	**Roll**	**Roll**	**1.291**	**1.486**	**Roll**
ASMH	**1.193**	**Roll**	**Roll**	**1.137**	**1.339**	**1.511**
ASNH	**1.282**	**Roll**	**Roll**	**1.282**	**1.489**	**Roll**
ASPH	**1.174**	**1.388**	**Roll**	**1.104**	**1.316**	**1.497**
BSLH	**1.064**	**1.261**	**Roll**	**1.158**	**1.364**	**Roll**
BSMH	**0.878**	**1.079**	**Roll**	**0.907**	**1.121**	**1.298**
BSNH	**1.057**	**1.260**	**Roll**	**1.146**	**1.361**	**Roll**
BSPH	**0.855**	**1.066**	**1.249**	**0.872**	**1.092**	**1.281**
CSLH	**1.010**	**Roll**	**Roll**	**1.107**	**1.295**	**1.458**
CSMH	**0.851**	**1.044**	**Roll**	**0.859**	**1.054**	**1.223**
CSNH	**1.003**	**1.192**	**Roll**	**1.095**	**1.292**	**1.464**
CSPH	**0.824**	**1.029**	**1.204**	**0.825**	**1.023**	**1.203**
DSLH	**1.260**	**Roll**	**Roll**	**1.192**	**1.431**	**1.608**
DSMH	**1.159**	**Roll**	**Roll**	**1.038**	**1.272**	**1.470**
DSNH	**1.250**	**Roll**	**Roll**	**1.182**	**1.432**	**1.621**
DSPH	**1.140**	**1.375**	**Roll**	**1.006**	**1.252**	**1.454**
ESLH	**0.931**	**1.139**	**Roll**	**1.039**	**1.259**	**1.458**
ESMH	0.742	**0.956**	**1.142**	**0.790**	**1.014**	**1.217**
ESNH	**0.912**	**1.141**	**1.330**	**1.028**	**1.257**	**1.462**
ESPH	0.721	**0.941**	**1.138**	0.756	**0.983**	**1.199**
FSLH	**0.867**	**1.065**	**Roll**	**0.993**	**1.190**	**1.370**
FSMH	0.701	**0.906**	**1.085**	0.750	**0.952**	**1.135**
FSNH	**0.844**	**1.067**	**1.242**	**0.983**	**1.188**	**1.376**
FSPH	0.678	**0.888**	**1.079**	0.719	**0.923**	**1.118**
GSLH	**Roll**	**Roll**	**Roll**	**1.184**	**1.426**	**1.605**
GSMH	**1.288**	**Roll**	**Roll**	**1.031**	**1.263**	**1.466**
GSNH	**Roll**	**Roll**	**Roll**	**1.174**	**1.426**	**1.618**
GSPH	**1.266**	**Roll**	**Roll**	**1.000**	**1.243**	**1.450**
HSLH	**1.012**	**1.230**	**Roll**	**1.027**	**1.245**	**1.444**
HSMH	**0.814**	**1.043**	**1.239**	0.779	**1.001**	**1.202**
HSNH	**1.005**	**1.228**	**Roll**	**1.016**	**1.244**	**1.450**
HSPH	0.790	**1.029**	**1.233**	0.746	**0.971**	**1.185**
JSLH	**0.835**	**1.046**	**1.222**	**0.942**	**1.141**	**1.323**
JSMH	**0.668**	**0.881**	**1.068**	0.700	**0.904**	**1.089**
JSNH	**0.812**	**1.048**	**1.229**	**0.933**	**1.139**	**1.329**
JSPH	0.645	**0.862**	**1.062**	0.671	**0.876**	**1.073**

Table 26: Transient Offtracking, Tandem Axle Dolly, Medium Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLM	**1.152**	**1.398**	**1.613**	**1.195**	**1.453**	**1.668**
ATMM	**0.993**	**1.213**	**1.405**	**0.913**	**1.167**	**1.408**
ATNM	**1.141**	**1.406**	**1.627**	**1.180**	**1.443**	**1.664**
ATPM	**0.979**	**1.208**	**1.410**	**0.871**	**1.123**	**1.377**
BTLM	**0.832**	**1.069**	**1.290**	**1.014**	**1.215**	**1.405**
BTMM	0.710	**0.896**	**1.075**	0.757	**0.953**	**1.138**
BTNM	**0.819**	**1.060**	**1.300**	**1.001**	**1.208**	**1.403**
BTPM	0.696	**0.887**	**1.073**	0.725	**0.924**	**1.113**
CTLM	**0.831**	**1.074**	**1.282**	**1.036**	**1.227**	**1.404**
CTMM	0.698	**0.881**	**1.059**	0.780	**0.966**	**1.139**
CTNM	**0.815**	**1.063**	**1.291**	**1.023**	**1.220**	**1.402**
CTPM	0.682	**0.870**	**1.052**	0.748	**0.937**	**1.115**
DTLM	**1.082**	**1.358**	**1.593**	**1.116**	**1.390**	**1.641**
DTMM	**0.928**	**1.168**	**1.386**	**0.835**	**1.089**	**1.352**
DTNM	**1.067**	**1.365**	**1.608**	**1.101**	**1.380**	**1.637**
DTPM	**0.913**	**1.161**	**1.391**	0.794	**1.049**	**1.313**
ETLM	0.692	**0.915**	**1.151**	**0.916**	**1.130**	**1.330**
ETMM	0.592	0.776	**0.955**	0.662	**0.864**	**1.059**
ETNM	0.679	**0.910**	**1.151**	**0.903**	**1.123**	**1.328**
ETPM	0.579	0.769	**0.954**	0.633	**0.837**	**1.035**
FTLM	0.670	**0.889**	**1.122**	**0.936**	**1.141**	**1.329**
FTMM	0.565	0.744	**0.917**	0.681	**0.876**	**1.060**
FTNM	0.656	**0.882**	**1.119**	**0.921**	**1.135**	**1.328**
FTPM	0.552	0.735	**0.914**	0.653	**0.849**	**1.038**
GTLM	**1.228**	**1.514**	**Roll**	**1.107**	**1.376**	**1.628**
GTMM	**1.038**	**1.311**	**1.552**	**0.828**	**1.079**	**1.337**
GTNM	**1.222**	**1.519**	**Roll**	**1.092**	**1.366**	**1.624**
GTPM	**1.019**	**1.304**	**1.555**	0.789	**1.040**	**1.299**
HTLM	0.765	**1.025**	**1.275**	**0.906**	**1.120**	**1.319**
HTMM	0.646	**0.852**	**1.052**	0.653	**0.855**	**1.049**
HTNM	0.751	**1.014**	**1.284**	**0.893**	**1.114**	**1.318**
HTPM	0.632	**0.842**	**1.048**	0.625	**0.828**	**1.026**
JTLM	0.635	**0.860**	**1.100**	**0.886**	**1.095**	**1.286**
JTMM	0.533	0.718	**0.898**	0.635	**0.831**	**1.017**
JTNM	0.621	**0.853**	**1.097**	**0.872**	**1.089**	**1.286**
JTPM	0.521	0.709	**0.895**	0.608	**0.806**	**0.996**

Table 27: Transient Offtracking, Tandem Axle Dolly, High Payload Height

Run Code	Conventional Rocky			Reverse Rocky		
	90 km/h	100 km/h	110 km/h	90 km/h	100 km/h	110 km/h
ATLH	**1.262**	**Roll**	**Roll**	**1.296**	**Roll**	**Roll**
ATMH	**1.106**	**1.301**	**1.472**	**1.061**	**1.267**	**Roll**
ATNH	**1.258**	**Roll**	**Roll**	**1.285**	**1.501**	**Roll**
ATPH	**1.093**	**1.297**	**1.474**	**1.025**	**1.237**	**1.435**
BTLH	**0.965**	**1.156**	**Roll**	**1.092**	**1.289**	**1.456**
BTMH	**0.793**	**0.989**	**1.158**	**0.845**	**1.050**	**1.225**
BTNH	**0.962**	**1.160**	**Roll**	**1.080**	**1.286**	**1.463**
BTPH	**0.778**	**0.981**	**1.159**	**0.810**	**1.020**	**1.205**
CTLH	**0.939**	**1.126**	**Roll**	**1.098**	**1.280**	**1.442**
CTMH	0.764	**0.955**	**1.121**	**0.851**	**1.041**	**1.210**
CTNH	**0.937**	**1.129**	**Roll**	**1.087**	**1.278**	**1.447**
CTPH	0.746	**0.945**	**1.120**	**0.817**	**1.012**	**1.190**
DTLH	**1.226**	**Roll**	**Roll**	**1.250**	**1.465**	**Roll**
DTMH	**1.072**	**1.284**	**1.474**	**0.989**	**1.232**	**1.432**
DTNH	**1.223**	**Roll**	**Roll**	**1.237**	**1.463**	**Roll**
DTPH	**1.059**	**1.280**	**1.477**	**0.944**	**1.205**	**1.409**
ETLH	**0.826**	**1.040**	**1.222**	**0.991**	**1.202**	**1.393**
ETMH	0.664	**0.863**	**1.048**	0.744	**0.961**	**1.157**
ETNH	**0.814**	**1.046**	**1.234**	**0.981**	**1.200**	**1.397**
ETPH	0.650	**0.855**	**1.048**	0.711	**0.930**	**1.137**
FTLH	**0.790**	**0.993**	**1.168**	**0.997**	**1.193**	**1.369**
FTMH	0.621	**0.813**	**0.992**	0.750	**0.953**	**1.136**
FTNH	0.776	**0.999**	**1.179**	**0.987**	**1.191**	**1.376**
FTPH	0.606	**0.803**	**0.990**	0.718	**0.924**	**1.116**
GTLH	**Roll**	**Roll**	**Roll**	**1.243**	**1.461**	**Roll**
GTMH	**1.194**	**1.429**	**Roll**	**0.979**	**1.228**	**1.426**
GTNH	**Roll**	**Roll**	**Roll**	**1.229**	**1.458**	**1.666**
GTPH	**1.182**	**1.423**	**Roll**	**0.935**	**1.201**	**1.403**
HTLH	**0.909**	**1.121**	**Roll**	**0.981**	**1.191**	**1.384**
HTMH	0.728	**0.948**	**1.141**	0.734	**0.950**	**1.147**
HTNH	**0.902**	**1.124**	**Roll**	**0.971**	**1.189**	**1.388**
HTPH	0.712	**0.939**	**1.142**	0.702	**0.920**	**1.127**
JTLH	0.755	**0.970**	**1.152**	**0.948**	**1.147**	**1.326**
JTMH	0.589	0.787	**0.974**	0.703	**0.907**	**1.094**
JTNH	0.740	**0.977**	**1.162**	**0.938**	**1.146**	**1.334**
JTPH	0.573	0.777	**0.972**	0.673	**0.880**	**1.074**