k = 58860 b = 5370

Suspension Tools Verification — Max Extension

	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k
	v = 15 m/s					**v = 30 m/s**					**v = 45 m/s**				
0.5 b	1.08%	0.11%	-0.30%	-0.57%	-0.59%	3.47%	2.97%	2.34%	1.45%	0.53%	1.06%	3.99%	4.62%	3.98%	3.57%
0.75 b	0.80%	0.26%	-0.06%	-0.32%	-0.32%	0.84%	1.50%	1.19%	0.46%	-0.22%	-0.28%	0.97%	1.40%	1.88%	2.07%
b	0.48%	0.26%	0.00%	-0.16%	-0.25%	-0.62%	0.04%	0.00%	-0.36%	-0.62%	-1.04%	-0.65%	0.00%	0.50%	0.00%
1.25 b	0.35%	0.08%	0.00%	-0.13%	-0.24%	-0.91%	-0.77%	-0.67%	-0.67%	-1.03%	-1.73%	-1.11%	-1.12%	-0.58%	-0.56%
1.5 b	0.10%	0.08%	0.00%	-0.12%	-0.21%	-1.73%	-1.12%	-1.04%	-1.14%	-1.20%	-2.27%	-1.76%	-1.91%	-1.77%	-1.51%

k = 58860 b = 5370

Suspension Tools Verification — Max Compression

	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k
	v = 15 m/s					**v = 30 m/s**					**v = 45 m/s**				
0.5 b	0.96%	0.74%	0.55%	0.07%	-0.41%	5.85%	1.86%	-0.67%	-1.73%	-2.27%	9.64%	6.83%	5.37%	1.84%	-2.38%
0.75 b	1.15%	0.48%	0.19%	-0.16%	-0.37%	4.08%	1.67%	-0.01%	-0.90%	-1.58%	4.69%	3.06%	1.10%	-0.84%	-2.52%
b	0.99%	0.40%	0.00%	-0.19%	-0.44%	3.38%	1.82%	0.00%	-0.76%	-1.48%	1.81%	-0.15%	0.00%	-1.82%	-3.19%
1.25 b	0.92%	0.36%	-0.04%	-0.25%	-0.46%	1.77%	0.85%	-0.01%	-0.91%	-1.11%	-0.65%	0.02%	-1.70%	-2.98%	-3.14%
1.5 b	0.87%	0.29%	-0.03%	-0.21%	-0.39%	1.63%	0.50%	-0.68%	-0.75%	-1.06%	-2.32%	-2.37%	-2.04%	-2.64%	-4.25%

k = 58860 b = 5370

Suspension Tools Verification — Positive Acceleration

	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k
	v = 15 m/s					**v = 30 m/s**					**v = 45 m/s**				
0.5 b	-34.93%	-32.33%	-28.94%	-24.23%	-17.08%	-20.75%	-19.41%	-18.85%	-17.03%	-14.02%	-28.27%	-20.62%	-13.26%	-13.73%	-13.10%
0.75 b	-24.95%	-22.58%	-14.98%	-13.09%	-3.03%	-12.00%	-10.67%	-8.94%	-8.26%	-6.32%	-16.14%	-10.76%	-8.78%	-5.63%	-4.53%
b	-5.08%	-1.85%	0.00%	3.60%	6.22%	-1.80%	-0.36%	0.00%	0.71%	1.09%	-5.88%	-2.76%	0.00%	0.81%	1.25%
1.25 b	13.66%	15.91%	19.23%	19.25%	22.80%	7.60%	10.58%	10.28%	10.29%	10.59%	3.53%	4.44%	7.76%	9.48%	9.66%
1.5 b	30.03%	31.72%	33.30%	34.87%	35.97%	20.68%	22.17%	22.34%	23.21%	24.01%	11.59%	14.03%	15.39%	16.28%	17.98%

k = 58860 b = 5370

Suspension Tools Verification — Negative Acceleration

	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k	0.5 k	0.75 k	k	1.25 k	1.5 k
	v = 15 m/s					**v = 30 m/s**					**v = 45 m/s**				
0.5 b	-28.36%	-22.07%	-18.15%	-16.32%	-12.15%	-38.86%	-37.16%	-29.27%	-23.95%	-13.53%	-24.02%	-17.22%	-15.92%	-18.11%	-17.23%
0.75 b	-19.08%	-14.54%	-10.76%	-8.96%	-2.12%	-22.56%	-18.14%	-12.84%	-7.40%	-2.96%	-16.84%	-13.05%	-11.45%	-11.49%	-12.08%
b	-2.60%	-3.58%	0.00%	3.20%	6.94%	-7.98%	-3.96%	0.00%	5.28%	7.74%	-1.60%	-0.23%	0.00%	3.24%	6.82%
1.25 b	10.15%	11.96%	14.75%	15.52%	19.11%	7.14%	7.78%	10.57%	15.32%	15.68%	15.29%	16.15%	17.49%	19.84%	23.44%
1.5 b	25.27%	25.89%	27.98%	29.81%	32.15%	17.82%	21.53%	24.73%	27.04%	26.47%	31.39%	30.40%	34.16%	34.87%	34.98%

Analysis and Conclusions

Extension and compression:

- larger extensions and compressions mean more rapid spring wear (bad for spring)
- as a car company, this is bad for us

If color coding / qualitative analysis were instead considered from the perspective of user comfort:

- large extension and compression correspond to a smooth ride (the suspension is doing most of the “work” to ride the road’s bumps while the cabin stays relatively steady)
- large extension and compressions would be considered *good* instead of *bad*; color key would be swapped.

Positive and negative acceleration:

- qualitative analysis considered from the perspective of passenger wellbeing
- good (green) values are those which minimize them magnitude of acceleration; bad (red) values are categorized as such because they lead to a bumpy and uncomfortable ride.

Overall conclusion: The car ride is most comfortable at smaller b values and smaller k values, however, suspension wear varies significantly depending on speed but is generally worst at these small k values and small b values. For the best balance, 0.75b and 1.25k should be used.