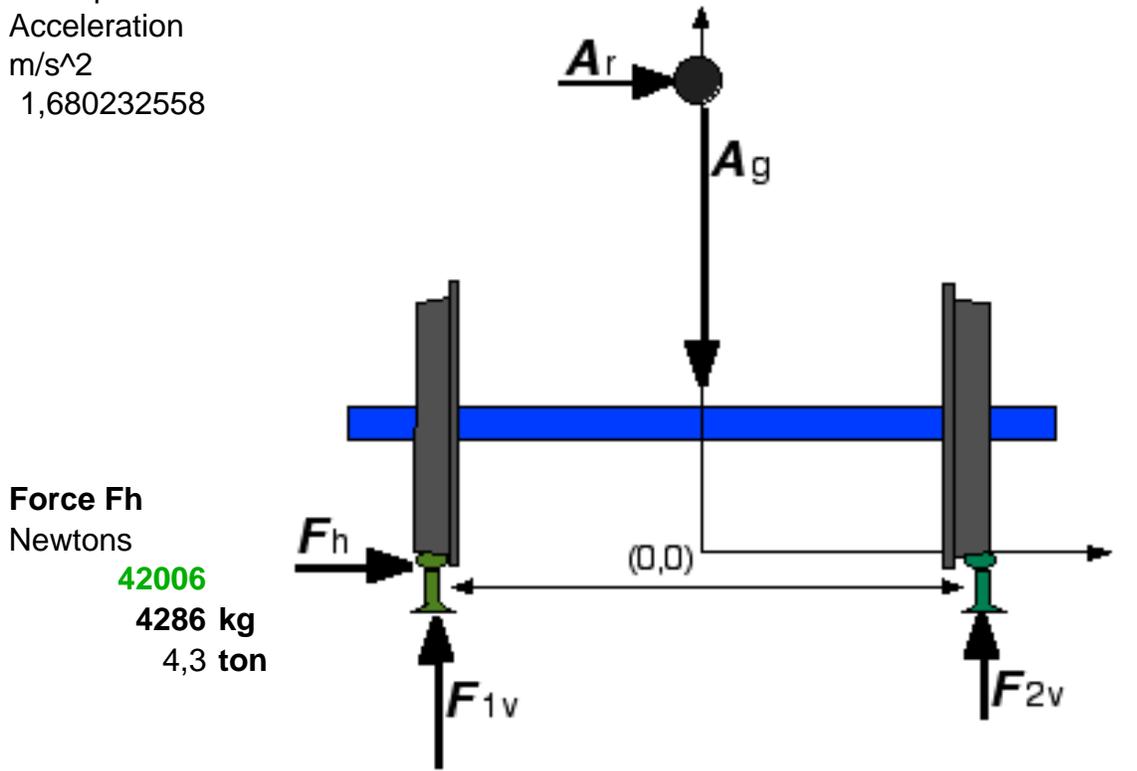


Rail forces and accelerations for bottom supported railcars on curves

Centripetal
Acceleration
m/s²
1,680232558



Force Fh
Newtons
42006
4286 kg
4,3 ton

Limiting Condition Trial A

Force F1v
239183 Newtons
24406 Kg
24,4 metric tons

Force F2v
5817 Newtons
594 Kg
0,6 metric tons

Input data for bottom supported railcar

Number	Units	Name
	9,8 meters/second ²	Acceleration of gravity
	1,44 meters	Gauge (distance between rails)
17,0	meters/secon	Speed = 61,2 K/hr=MPH 38,3
172	meters	Curve radius
4	meters	Center of mass height
25000	kilograms	Mass

CHANGEABLE VARIABLES!

Sheet1

Maximum Overspeed = 17m/sec at a radius of 172 m = **83.5% higher speed for Trial B**

For suspended system 31.2m/sec = Design maximum of 30 degree

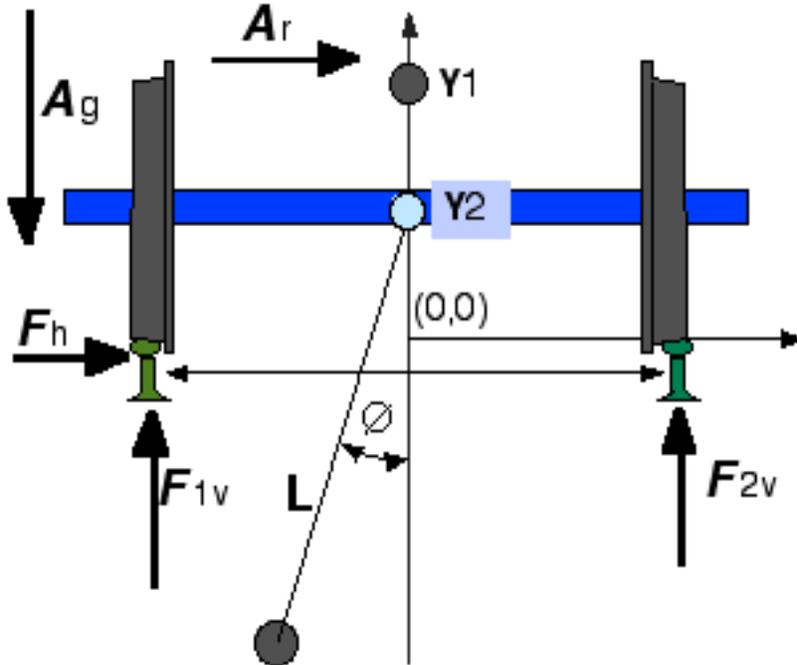
Note that Superelevation not included is a very effective solution to higher speeds!

Rail forces, accelerations, and lean angles for railcars with suspended cargo pods and passenger cabins

Centripetal
Acceleration
m/s²
1,680232558

Force Fh

42006 Newtons
4286 kg
4,3 ton



Force F1v

131251 Newtons
13393 Kg
13,4 metric tons

Angle Ø

9,7 Degrees

Force F2v

113749 Newtons
11607 Kg
11,6 metric tons

Input data for railcars with suspended cargo pods and passenger cabins

Number	Units	Name	Units to match-->	Trial A	Trial B
	9,8 meters/second ²	Acceleration of gravity		Near turnove	30 Degree
	1,44 meters	Gauge (distance between rails)			
17,0	meters/secon	Speed =	61,2 K/hr	17	31,2
172	meters	Curve radius		172	172
	0,3 meters	Center of supported mass height (Y1)			
	10000 kilograms	Supported mass			Trial C
	0,3 meters	Suspended mass pivot vert. position (Y2)			Safe speed
	15000 kilograms	Suspended mass			

Sheet1

FRA standard: 10 degree Curve of 172 m use =

At 10 degree swingout 17 m/sec/ 7.5 = 2.26 times faster

At 30 degree swingout 31.2 m/sec/ 7.5 = 4.16 times faster

7,5
172