They See Us Roller Coastin’

Summary Sheet

Problem

Our group was given the problem of designing a roller coaster ranking system/algorithm that numerically ranked roller coasters using purely objective data. We also had to determine the world’s 10 best roller coasters using the algorithm and compare our list with at least two other lists found on the internet. In addition, we were to conceptualize an app that used user preferences and the ranking system to find potential roller coasters, and write a press release describing the algorithm, app, and results.

Summary

Our goal was to design our coaster ranking algorithm to be as flexible and comprehensive as possible. Based on research we conducted on other online ranking systems, we implemented 5 different parameters for our algorithm: coaster length, duration, maximum speed, maximum drop height, and number of inversions. Of these parameters, internet research failed to adequately complete the drop height data set. As such, we used kinematic equations to define an equation to extrapolate drop height from speed.

For our scoring method, we created a subscore between 0 and 1 for each of the five parameters using a normal distrib ution curve. Then, we weighted each subscore depending on how much that parameter's importance was valued. Subscore calculation utilized user-defined ideal values and tolerance for each parameter, with the ideal being the optimal value, and the tolerance being used to define the slope of the parameter’s distribution curve, i.e., how willing one is to stray from their preferences.

For our app, the user would input a value from 1-10 for each parameter that denotes how much they care about that parameter, which determine how much the parameter is weighted. There would also be an advanced option that would allowed the user to set their ideal values and tolerances for each parameter. The tolerance would be a value 1-10, 10 meaning high tolerance and 1 meaning low tolerance. If the user does not input their ideal values and tolerances, the app will use default values.

For our top ten list, we determined proper weights, set the ideal values to be maximum values, and used default tolerances for each parameter. Our top ten were, in order of best to worst: Kingda Ka at Six Flags Great Adventure New Jersey, Top Thrill Dragster at Cedar Point, Formula Rossa at Ferrari World Abu Dhabi, Ultimate at Lightwater Valley, Red Force at Ferrari Land, Smiler at Alton Towers, Steel Dragon at Nagashima Spa Land, Fury 325 at Carowinds, Superman: Escape from Krypton at Six Flags Magic Mountain, and Tower of Terror II at Dreamworld

News Release

Our application helps users find the roller coasters that they would be most interested in. Our special algorithm uses five parameters: Length of the ride, Duration of the ride, Maximum Drop Height, Maximum Speed, and Number of Inversions.

Users would input values 1-10 for each of these parameters to determine how much they care about the parameter. These values would determine how much each parameter is weighted in the final score. For example, someone who doesn't care at all about inversions, really enjoys a high drop height, would prefer a fast ride, and does not care how long the ride is might enter the following values: ten for drop height, five for the duration of the ride and for length, eight for max speed, and one for inversions.

There would be more advanced options for users who want to further personalize their rankings. The advanced options would show two more values for each parameter: the user's ideal value and their tolerance. The ideal value is the user's preferred value for that parameter. For example, if they want coaster to have a max speed of 60 mph, then they would list that as their ideal value for maximum speed. The tolerance is how willing the user is to stray from their ideal value for that parameter. This would be a number from 1-10, from low tolerance to high tolerance. If the user selects a low tolerance for speed, then a roller coaster's speed score would decrease quickly as it got further from their ideal value. If the user selects a high tolerance, then a roller coaster's speed score would decrease slowly as it got further from their ideal value. By default, the ideal value for each parameter is set to ¾ of the way towards the maximum for that parameter, while the tolerance levels would be set to 5.

For our list of the top 10 roller coasters in the world, we set the ideal to maximum possible and used default tolerance values for each parameter. We set weights for categories as such: 8 for speed, 6 for inversion, 7 for duration, 2 for length, and 8 for drop height.

Note : A link to the application would appear here

Top Ten List

- 1. Kingda Ka at Six Flags Great Adventure New Jersey
- 2. Top Thrill Dragster at Cedar Point
- 3. Formula Rossa at Ferrari World Abu Dhabi
- 4. Ultimate at Lightwater Valley
- 5. Red Force at Ferrari Land
- 6. Smiler at Alton Towers
- 7. Steel Dragon at Nagashima Spa Land
- 8. Fury 325 at Carowinds
- 9. Superman: Escape from Krypton at Six Flags Magic Mountain
- 10. Tower of Terror II at Dreamworld

Solution

Assumptions

- All roller coasters are safe and never break down (for our purposes)
    - According to online science websites “the chance of being injured on a fixed-site ride at one of those parks is 1 in 17 million” [2]
- Aesthetics of roller coasters due not affect roller coaster ratings
    - Aesthetics are nigh impossible to quantify, and most roller coaster riders care about riding on a roller coaster, as they can watch a video of riding on a roller coaster for free
    - Originality is not important for determining a roller coaster’s rate in and of itself
    - Roller coaster riders are effectively “blind” because they don’t care about what they see
- Price does not matter for determining the top ten roller coasters
    - Generally, the cost of riding roller coasters is fairly standard, and most roller coasters are at amusement parks which have one rate of admission which allows riders to ride many roller coasters
- The geographical location and name of a roller coaster does not affect the rating of the roller coaster
    - The statistics we are using are independent of location and name, and though location and name could affect aesthetics, we are not considering aesthetics for our ratings (see above point)
- Height/health requirements and wait times are irrelevant, as our rating targets the roller coaster itself and how the people that actually ride the roller coaster enjoy the roller coaster
- Construction materials do not matter
    - Certain techniques can be used to give wood very similar properties to steel, or wood can be coated with steel to give a smoother ride [6]
    - In addition, preferred construction type is highly subjective, and so we chose for it not to have bearing in our model
- Type of roller coaster does not have a bearing by the same logic as construction not having a bearing
- Correlations in data and classical mechanics (physics) can be used to fill holes in data
    - There is no friction
- Highest speed will occur after the highest drop
    - This comes from physics and classical mechanics [2]
    - We are assuming that roller coaster drop using gravity, because that is what our knowledge of physics can handle
- At the top of the roller coaster the speed is ~0
- All roller coasters have approximately the same preferences (in the context of rating the top ten roller coasters)
    - Though this is not actually true, we are trying to come up with a general method for rating , so we consider the “average” rider to be representative of every rider

    - For the app design, riders will be able to choose their favorite roller coaster(s) based off of the criteria speed, duration, length, drop height, and number of inversions.

- Roller coasters go both up and down

Datums/Data

Rationale for Excluding Data

- Name: Has no bearing on quality of roller coaster (see Assumptions)
- Location: Has no bearing on quality of roller coaster (see Assumptions)
- Construction: While there exist differences between steel and wooden roller coasters, the preferred construction type is heavily subjective, and so will not have bearing in our model (see Assumptions)
- Type: We excluded this by the same logic that we excluded construction (see Assumptions)
- Status: All the roller coasters in the Excel sheet are operating, so there is no need to take status into account in the model
- Year/Date Opened: While the year opened may affect aspects of the roller coaster such as safety and aesthetics, based on our assumptions, none of these elements apply to our rating.
- Height: Height and drop height are heavily related, so we are not including height. The effect of being high up in the air will not affect the quality of the roller coaster according to our model. (see Assumptions)

Rationale for Including Data

- Speed: The speed of the roller coaster definitely affects the enjoyment of the passengers
- Length: This is a factor in how long the passengers get to enjoy the roller coaster
- Number of Inversions: This affects how much force the passengers feel on themselves
- Drop Height: This affects the time that the passengers feel weightless
    - One of the features that roller coaster riders enjoy is air time. Though we could not find air time directly for many roller coasters, air time is related to drop height
- Duration: This is a factor in how long the passengers get to enjoy the roller coaster
- G-Force: This affects how much force the passengers feel on themselves
- Vertical Angle: This affects how weightless the passengers will feel on the initial drop

Note: See Appendix for the big data table with statistics for all the roller coasters.

Since the data had many holes, we filled it in using various methods:

Internet Research

The first way we attempted to fill the holes in the data was through internet research. There were several online databases that had stats on roller coasters consistent with those given. We went through these databases to find any data cells that were missing. We were able to fill in a considerable amount of values through this method, especially drop height. (See Appendix for databases)

To fill in the missing duration values for each coaster, we watch POV videos of that coaster. With these videos, we were able to find the duration for every roller coaster. (see appendix for youtube channels)

Extrapolation

At this point, each column of values was either light or dense. Dense meant that almost all (>90%) of the values for the parameter were filled, and light meant that a considerable amount of the values for the parameter were missing. The light parameters were drop height, vertical angle, and g-force. The dense parameters were height, speed, length, inversions, amount of inversions, and duration. We did not consider the other data to be important in determining our rating (see assumptions). The goal of our extrapolation was to find a relationship between a dense parameter and a light parameter.

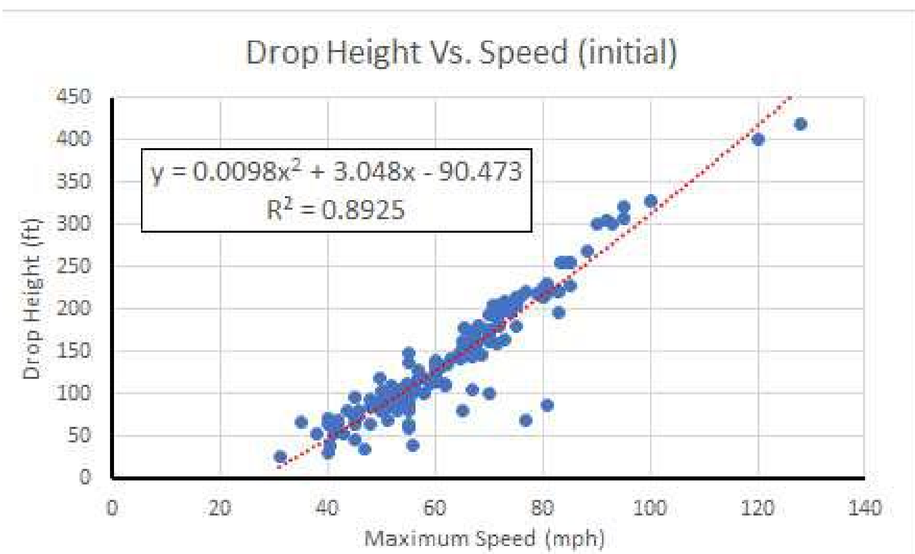
Drop Height and Speed

Since the highest speed occurs after the largest drop (see assumptions), there is a relationship between drop height and speed. During large drops on roller coasters, gravity is the primary force accelerating the cart. Using kinetic and potential energy equations (from physics), we can show that $v^2 \sim h$ where v is the speed and h is the drop height, so there is a quadratic relationship between v and h.

Using Microsoft Excel we created a scatter plot of drop height vs speed. We then used Excel to create a quadratic curve of best fit for the scatter plot.

The curve had equation $0.0098\,x^2 + 3.048\,x - 90.473$ and an R^2 value of 0.8925. We made the model stronger by removing 2 outlier points, which gave us the equation $0.0079\,x^2 + 3.4161\,x - 104.3$ and an R^2 value of 0.9317. The graph of both relationships are shown below.

Out[ ]=



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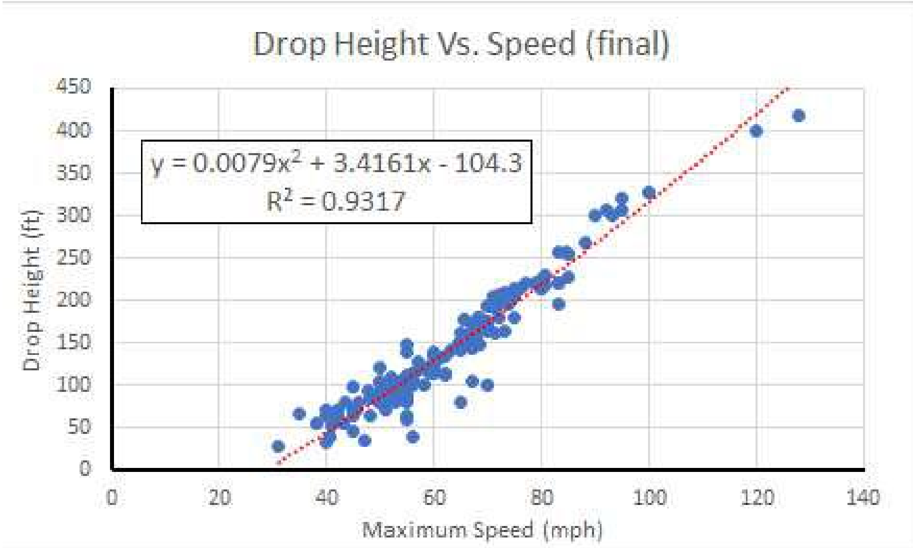


This model was much stronger, so we decided it could be used to model the drop height given speed. However, we noticed that there still was a noticeable difference between our projected and actual drop height values. This % error was likely a result of friction, which our initial kinematic equation assumed did not exist. Thus, to compensate for friction, we reduced our theoretical values by taking the average % error between the two data sets, and multiplied our theoretical values by 1 minus this number.

We used this equation to calculate the unknown drop heights for roller coasters, generating a complete list of roller coaster drop heights. There were some roller coasters were the calculated drop height was greater than the total height, so we set the drop height to the total height for some roller coasters

Relationships Involving G-Force

As we could not find reliable online databases for g-force, we decided to try extrapolating g-force. Since g-force is tied to the apparent weight a rider experiences relative to the coaster, we tried thinking of locations in a roller coaster where the trajectory of the rider and coaster might contradict and thus create g-force. Thus, our two most likely candidates for sources of g-force were tall drops and sharp turns. However, since we were not provided with any information on turns, and it would be unreasonable to research every single turn in each roller coaster, we decided to focus on the theorized relationship between drop height and g-force. According to the online resources we researched, g-acceleration (which is g-force divided by mass) can be measured using the change in velocity and time that the rider experiences. Based on our previous equation for drop height and speed, we knew that the largest change in velocity usually occurred at the bottom of the largest drop. Assuming that the time taken at the bottom of a curve is constant, we could relate velocity and g-force. We then tried graphing this function linearly (graph below), because one of the two parameters used was assumed constant.

Out[ ]=

However, graphical analysis indicated that there was no significant correlation between the two. This is most likely because the actual layout of a roller coaster itself lends to different kinds of g-force, that may be enhanced or inhibited based on coaster elements. As we could not reasonably obtain this information for the roller coasters in the time given, we could not create a formula to reliably derive g-force, so we did not use g-Force in our rating calculations.

Relationship Involving Vertical Angle

We tried to find a relationship between a dense variable and vertical angle, but quickly reached a dead end, so we decided not to use vertical angle in our rating calculations.

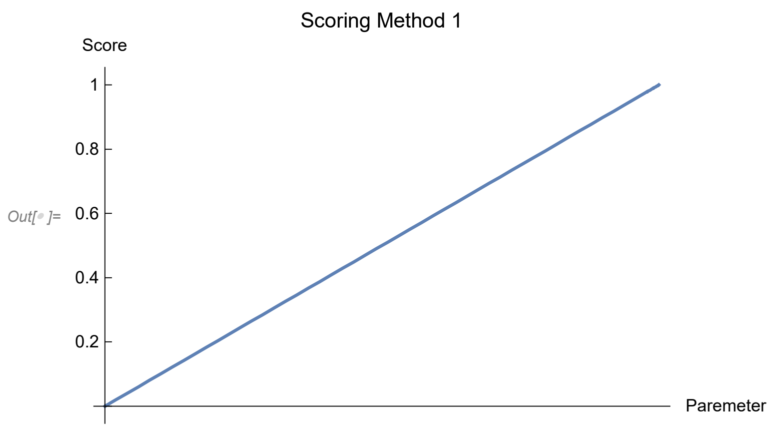
Rating Function

General Method

Our goal was to generate a subscore for each parameter (drop height, speed, duration, inversions, length) that we considered. This subscore was a number between 0 and 1. Then we weighted each category in terms of importance and found the weighted average of the subscores. The quintessential problem for determining subscore was to develop a function with range from 0 to 1 that assigns a subscore for each parameter.

Method 1

Our first function for determining subscore was to take the value for a parameter and divide it by the maximum value for that parameter (maximum value being the highest value of that parameter in the given Excel sheet). The rationale for this was that in general, when the parameters that we are considering get bigger, the rides get better. Therefore, the score of each parameter is determined by how close it is to the maximum value. This ratio will always be between 0 and 1, so it could be used for the subscore.



As the graph above shows, a score between 0 and 1 is assigned to each parameter in a linear fashion,

Pros:

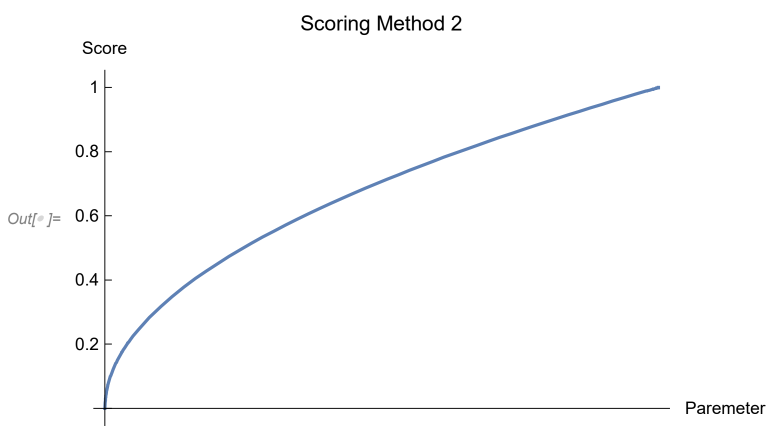
- Restricts subscore value between 0 and 1
- Subscore value based directly on parameter

Cons:

- Assumes the best value for each parameter is the maximum value, which is not the case for every user
- Subscore increases linearly, but in reality there would be diminishing returns on quality with increased values because the difference between 1 and 2 inversions should be more than the difference between 9 and 10 inversions

Method 2

Our second function for determining subscore was to take the subscore value from the first function and square root it. The rationale behind taking the square root of the first function was to have diminishing returns for increased parameter values, so the difference between 1 and 2 inversions is more than the difference between 9 and 10 inversions. This subscore value will always be between 0 and 1 since it is the square root of a ratio between 0 and 1.



As the graph above shows, a score between 0 and 1 is assigned to each parameter in a linnear fashion, Pros

- Restricts subscore value between 0 and 1
- Increasing parameter values yields diminishing returns
- Subscore value is related directly to the parameter

Cons

- Assumes that the best value for each parameter is the maximum value, which is not the case for every user

We could slightly modify this method by determining each subscore via the cube root, or fourth root of the ratio. This would cause a higher increase close to 0, but larger diminishing returns for higher values.

Method 3

Our third function was determining subscore using a Normal Curve. This method could also take into account a person's ideal score for each category. The method is to center the normal curve around the person's ideal value (for speed, drop, length, duration, or inversions), so their ideal value would receive a rating of 1. The scores would get lower around that value at a rate based on the tolerance of the person. The tolerance of a person is how much they are willing to stray from their ideal parameter value. A higher tolerance would mean that the curve slopes more gradually towards the tails, while a lower tolerance would mean that the curve slopes more sharply towards the tails.

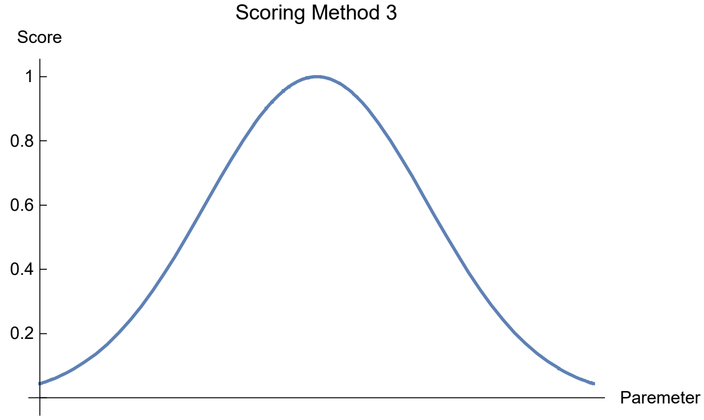
The equation for the subscore of a roller coaster with parameter value x, ideal value μ, and tolerance σ is

$$\textbf{score} = e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

Notice that this is very similar to the formula for the normal curve, except there is no $\frac{1}{\sqrt{2\pi\sigma^2}}$ term in the front (which corresponds to "amplitude"). We decided to delete this term because we desired an amplitude of 1, as the score of the ideal value should be 1.

Scoring Method 3

Out[ ]=



As the graph above shows, a score between 0 and 1 is assigned to each parameter in a fashion similar to the normal curve

Pros:

- Restricts subscore between 0 and 1
- Score decreases as value gets farther from ideal on both sides
- Highly flexible formula, as ideal and tolerance can be set

Cons:

- The formula has many constants that must be inputted (like ideal, tolerance)

Combining subscores

To combine the subscore we took the weighted average of the individual subscores. We assigned each subscore a weight from 1-10 ourselves, but the weighted average formula is modular, so we could change the weights depending on user preference for our app's calculations.

Results

Our Rating

For our rating we used the function from method 3 to get a score for each roller coaster, then found the top ten roller coasters with the best scores. We set the ideal values to the maximum values for each parameter and set the tolerance as the standard deviation of the parameter.

We set the speed weight to 8, the inversion weight to 6, the duration weight to 7, the length weight to 2, and the drop height weight to 8.

Justification for Weights

Speed

Speed is the is one of the quintessential elements that is always thought of when it comes to roller coasters. Not only do other enjoyment factors like g-force and airtime depend on it, but it is also often the first factor a potential rider looks at when researching a roller coaster. With this in mind, we gave speed a weight of 8.

Drop Height

Like speed, drop height is also responsible for generating factors like g-force and airtime, and even generating the speed itself. It also serves as the primary marketing factor of a roller coaster -- even with all other factors being mediocre, people often flock to the most precipitous roller coasters because of the imposing, powerful image that a tall roller coaster strikes. Therefore, we gave drop height an 8.

Duration

This category should be self explanatory: Even a roller coaster with brilliant track design and ludicrous speed is useless without the ability for riders to experience it for long. Few things are as disappointing as getting off a roller coaster that was just getting good, so we rated duration at 7.

Inversions

Inversions can play a great role in inducing the sought-after feeling of weightlessness and disorientation that a roller coaster brings. However, inversions rely on great speed and ride design to work, and are often a relatively minor part of the roller coaster. As a result, we gave inversions a 6.

Length

The actual length of track a roller coaster matters little -- it might synergize with the speed to create duration, but duration is already a category that receives its own ranking. In the interest of including as many enjoyment factors as possible, length is factored into the equation, but it serves no purpose in our model besides aesthetics, which do not count as per our assumptions. Thus, we gave length a weight of 2.

Top Ten List

- 1. Kingda Ka at Six Flags Great Adventure New Jersey
  - Score: 0.369
- 2. Top Thrill Dragster at Cedar Point
  - Score: 0.301
- 3. Formula Rossa at Ferrari World Abu Dhabi
  - Score: 0.294
- 4. Ultimate at Lightwater Valley
  - Score: 0.283
- 5. Red Force at Ferrari Land
  - Score: 0.212
- 6. Smiler at Alton Towers
  - Score: 0.194
- 7. Steel Dragon at Nagashima Spa Land
  - Score: 0.131
- 8. Fury 325 at Carowinds
  - Score: 0.127
- 9. Superman: Escape from Krypton at Six Flags Magic Mountain
  - Score: 0.108
- 10. Tower of Terror II at Dreamworld

- Score: 0.108

Note: there was a tie between Superman and Tower of Terror II. The table of the top ten is below:

Out[1]=

Name	Subscore-Speed	Subscore-Inversions	Subscore-Duration	Subscore-Length	Subscore-Drop Height	Final Score
Kingda Ka	0.429387166	5.23505E-07	0	0.002624706	1	0.369043545
Top Thrill Dragster	0.200291233	5.23505E-07	0	0.001206164	0.964841197	0.300757255
Formula Rossa	1	5.23505E-07	0	0.557941016	0.001060357	0.294334453
Ultimate	7.96308E-09	5.23505E-07	1	0.893256903	4.27357E-06	0.283437135
Red Force	0.071227237	5.23505E-07	0	0.001499914	0.750265413	0.212094973
Smiler	2.25048E-08	1	4.26236E-07	0.012807592	1.25763E-05	0.194378031
Steel Dragon 2000	0.003857893	5.23505E-07	0.000427129	1	0.255127949	0.131447735
Fury 325	0.003857893	5.23505E-07	4.26236E-07	0.574670315	0.346130883	0.127395386
Superman: Escape from Krypton	0.010277309	5.23505E-07	0	1.30977E-05	0.409504849	0.108331826
Tower of Terror II	0.010277309	5.23505E-07	0	1.30977E-05	0.409504849	0.108331826

Application Design

Our application was designed to suit the needs of a wide variety of users while still being easy to use for most users. On opening the app the user would see a screen listing our five criteria: drop height, duration of ride, max speed, length, and inversions. The user would then enter a number between one and ten determining how much he or she cares for certain elements (one means you don't care it at all and ten means you would definitely want it on your ride). For example, someone who doesn't care at all about inversions, really enjoys a high drop height, would prefer a fast ride, and does not care how long the ride is would enter the following values: ten for drop height, five for the duration of the ride and for length, eight for max speed, and one for inversions.

Our application would also contain an advanced options tab that would allow users to further personalize their rankings. This would contain two options for each criteria: ideal and tolerance. By default the ideal values would be set to one standard deviation in the positive away from the mean. (SEE FIGURE FOR VALUES) This allows average users who do not want the most extreme roller coaster to find a ride that is just below that extreme. By default the tolerance values will be set to five on a one to ten scale. If you have a lower tolerance (i.e. you want a value close to your ideal value for that criteria) you chose a lower number. If you have a higher tolerance, you chose a higher number.

Our program would then take the tolerance value, divide it by five and multiply it by the data's standard deviation to get our adjusted standard deviation value (for the spread of the score vs parameter graph). We would then calculate each roller coaster's subscores using the formula from method 3. The program would then list out the top ten roller coasters for the user.

Additionally there would be an option to eliminate roller coasters that are outside of a certain driving range from a certain location. This could be done by having the user input their location and maximum driving time and have google maps check each roller coasters' location and eliminate ones that take longer to get to than the maximum driving time, and then display the updated list.

Conclusion

Comparison to Other Ratings

Our first top ten list we found is from a site called the Top Tens. This site simply compiled a list of all the roller coasters in the world and had users vote for the ones they liked the most displaying the ones rated the highest. There are a few issues with this method. First it heavily subjective and relies on impressions of individuals. These impressions could have had a number of factors affecting them including but not limited to user's location, ride preferences, and experience riding roller coasters. Its top rated roller coaster, Millennium Force was rated as the 11th best roller coaster in the world according to our list. Its second rated roller coaster El Toro, was number 97 in our ranking system. Its third best roller coaster, Intimidator 305 was ranked number 13 on our list. The similarities between this list and our list include Fury 325, which was number 4 on their list and 8 on our list, and Kingda Ka, which was number 7 on their list and number 1 on our list. One observation about this list is that a majority of users seem to be localized in the United States, therefore skewing rollercoaster local to the United States much higher due to familiarity bias.

Our second top ten list came from a individual writing for the blog Useless Info Junkie. The list is a bit more objective than the previous one, examining roller coasters from around the world in a fairly unbiased manner (i.e. the author does not seem prefer a certain region over another), and examining ride elements to determine rankings. However, this list is still biased towards the author's opinion of what makes a ride interesting. Its top roller coaster was Takashiba in Japan. This roller coaster was rated number 71 according to our list. This disparity is due largely to Takishiba's interesting way it drops its riders by first holding them at the apex of the drop for a few seconds, followed by a p-shape drop that leads into an inversion. Our model cannot account for this "thrill" factor therefore only placing the roller coaster at position 71 on our list. It second rated roller coaster, Gravity Max, was not on our original list, so therefore our algorithm did not consider it. Its third best roller coaster was Kingda Ka, which is rated number 1 on our list. One other similarities between our top ten list and their top ten list include The Smiler, which is number 5 on their list and number 6 on our list.

Strengths

- Our model was extremely flexible and adaptable and included many elements
  - Tolerance parameter allows user to determine ranges,
  - Weights and ideal values can also be set
  - If we had g-Force ratings we could easily add it to our rating function (it would just be another subscore)
- Covers a wide range of data
- Our app has a simple interface, but advanced options tabs allows users to feel technical

Weaknesses

- Our model did not consider vertical angle or g-Force because we could not g-Force and vertical angle for many roller coasters
- Fails to account for special types of roller coasters or special features
  - For example, our solution does not consider the possibility of launcher roller coasters
  - Special features like launchers could mess up the drop height extrapolation
- Fails to account for roller coaster structure
  - This could have been improved with a g-Force rating, but we didn't have one

Future Extensions

- Look at angle, g-Force
- Take into account path of coaster
- Take into account different ride elements
- Include a safety rating/a "nausea" rating
- For the app, the user could choose to prefer steel or wood, type, etc.

Appendix

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Data Table

Imported from Sheets:

Name	Park	City/Region	City/State/Region	Country/Region	Geographic Region	Construction	Type	Status	Year/Date Opened	Height (feet)	Speed (mph)	Length (feet)	Inversions (YES or NO)	Number of Inversions	Drop (feet)	Duration (min:sec)	G Force	Vertical Angle (degrees)	Duration (seconds)	First Iteration Score	Second Iteration Score	Maximum / Average / STDEV	Weights	Subscore-Speed	Subscore-Inversions	Subscore-Duration	Subscore-Length	Subscore-Drop Height	Weighted Average	Score (Average*10)
10 Inversion Roller Coaster	Chimelong Paradise	Panyu	Guangzhou, Guangdong	China	Asia	Steel	Sit Down	Operating	2006	98.4	45	2788.8	YES	10	63.30443	1:32			92	1.167542584	1.783688053	Speed	Speed	0.000000001156691118	0.3070851639	0	0.001172559671	0.000000920903726	0.05951172515	0.5951172515
Abismo	Parque de Atracciones de Madrid	Madrid	Madrid	Spain	Europe	Steel	Sit Down	Operating	2006	151.6	65.2	1476.4	YES	2	147.0926	1:00	4		60	0.9320437242	1.632452218	59.65420875	8	0.000001566682031	0.00002428451953	0	0.00002837647103	0.0003013118549	0.00008469317289	0.0008469317289
Adrenaline Peak	Oaks Amusement Park	Portland	Oregon	United States	North America	Steel	Sit Down	Operating	2018	72	45	1050	YES	3	63.30443	1:07		97	67	0.6675425843	1.401443848	149.1	Inversions	0.000000001156691118	0.0001325546417	0	0.000007108567642	0.000000920903726	0.00002635230587	0.0002635230587
Afterburn	Carowinds	Charlotte	North Carolina	United States	North America	Steel	Inverted	Operating	1999	113	62	2956	YES	6	113	2:47			167	1.11473466	1.819438602	16.22696468	6	0.0000005542706961	0.008892734784	0.000000527196806	0.001776851221	0.00003443900219	0.001844959603	0.01844959603
Alpengeist	Busch Gardens Williamsburg	Williamsburg	Virginia	United States	North America	Steel	Inverted	Operating	1997	195	67	3828	YES	6	170	3:10	3.7	79	190	1.284632837	1.962728213		Duration	0.000002763070693	0.008892734784	0.000005435606377	0.0125346899	0.001120201037	0.00282088873	0.0282088873
Alpina Blitz	Nigloland	Dolancourt	Champagne-Ardenne	France	Europe	Steel	Sit Down	Operating	2014	108.3	51.6	2358.9	NO	0	89.99462	1:21	4.3	64	81	0.5613745927	1.052284935	Inversions	7	0.0000001447068698	0.0000005235048738	0	0.0003790156456	0.000006892891866	0.0002633649414	0.002633649414
Altair	Cinecittà World	Rome	Rome	Italy	Europe	Steel	Sit Down	Operating	2014	108.3	52.8	2879.8	YES	10	94.91893	1:12			72	1.295489243	1.916765909	2.223333333	Length	0.0000002250475039	0.3070851639	0	0.001472630836	0.000009822435183	0.05953338725	0.5953338725
American Eagle	Six Flags Great America	Gurnee	Illinois	United States	North America	Wood	Sit Down	Operating	1981	127	66	4650	NO	0	147	2:23		55	143	0.7943305768	1.258345552	14	2	0.000002019094554	0.0000005235048738	0.00000003712135775	0.05689078185	0.0002996461921	0.003748331834	0.03748331834
Anaconda	Walygator Parc	Maizieres-les-Metz	Lorraine	France	Europe	Wood	Sit Down	Operating	1989	118.1	55.9	3937	NO	0	40	2:10	5.1		130	0.4706099436	0.9216480922	2.603083242	Drop height	0.000000006866352209	0.0000005235048738	0.000000008033731706	0.01560268059	0.000001396448109	0.001006781449	0.01006781449
Apocalypse	Six Flags America	Upper Marlboro	Maryland	United States	North America	Steel	Stand Up	Operating	2012	100	55	2900	YES	2	90	2:00			120	0.727048094	1.449335518		8	0.00000004985533085	0.00002428451953	0.000000002367174764	0.001548210856	0.000006895579771	0.0001063777058	0.001063777058
Apocalypse the Ride	Six Flags Magic Mountain	Valencia	California	United States	North America	Wood	Sit Down	Operating	2009	95	50.1	2877	NO	0	87.3	3:00			180	0.5448677712	1.036671881	Duration (s)		0.000000008268332353	0.0000005235048738	0.000002021362648	0.001462427486	0.000005665605018	0.000096372146	0.00096372146
Apollo's Chariot	Busch Gardens Williamsburg	Williamsburg	Virginia	United States	North America	Steel	Sit Down	Operating	1999	170	73	4882	NO	0	210	2:15	4.1	65	135	0.9919966369	1.4085137	125.01		0.00001675590649	0.0000005235048738	0.0000001458623218	0.08229260907	0.008401845456	0.00748184749	0.0748184749
Atlantica SuperSplash	Europa Park	Rust	Baden Wuerttemberg	Germany	Europe	Steel	Sit Down	Operating	2005	98.4	49.7	1279.5	NO	0	82.24282	3:20			200	0.5300864912	1.020918931	440		0.000000007111679621	0.0000005235048738	0.00001406062275	0.00001513520485	0.00000390435165	0.000005262177576	0.00005262177576
Backlot Stunt Coaster	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Sit Down	Operating	2005	45.2	40	1960	NO	0	31.2	1:04			64	0.3429174729	0.7911593019	50.77246014		0.000000001527988606	0.0000005235048738	0	0.0001229201876	0.00000006639511192	0.000008048832138	0.00008048832138
Balder	Liseberg	Gothenburg	Vastra Gotaland	Sweden	Europe	Wood	Sit Down	Operating	2003	118.1	55.9	3510.5	NO	0	100	2:08		70	128	0.6141506134	1.101419968			0.000000006866352209	0.0000005235048738	0.000000006311428987	0.006415772184	0.000014076494	0.000417673898	0.00417673898
Bandit	Movie Park Germany	Bottrop	North Rhine-Westphalia	Germany	Europe	Wood	Sit Down	Operating	1999	91.2	49.7	3605.7	NO	0	81.7	1:30			90	0.5287878788	1.019452684	Length		0.000000007111679621	0.0000005235048738	0	0.007881957691	0.000003750136364	0.0005095843462	0.005095843462
Banshee	Kings Island	Mason	Ohio	United States	North America	Steel	Inverted	Operating	2014	167	68	4124	YES	7	150	2:40			160	1.314921426	1.981478445	3140.101347		0.000003766847145	0.02689863131	0.000000002488256175	0.02242063915	0.0003582495412	0.006746159325	0.06746159325
Bat	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Suspended	Operating	1993	78	51	2352	NO	0	70	1:52	2.9	45	112	0.5095164287	0.9940761819	8133.2		0.000000001157993125	0.0000005235048738	0.0000000008660654874	0.0003719423107	0.000001548595087	0.00002450042301	0.0002450042301
Batman - The Dark Knight	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Sit Down	Operating	2002	117.8	55	2600	YES	5	104.004	2:20			140	0.9748362006	1.703781167	1454.715956		0.00000004985533085	0.002536575845	0.000000262275135	0.0007217744844	0.00001861649226	0.0005423393267	0.005423393267
Batman The Ride	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Inverted	Operating	1992	100	50	2700	YES	5	84.5	2:00	4		120	0.894641373	1.62631886			0.000000007963082768	0.002536575845	0.000000002367174764	0.0009352551377	0.000004613418017	0.0005524823536	0.005524823536
Batman The Ride	Six Flags Great Adventure	Jackson	New Jersey	United States	North America	Steel	Inverted	Operating	1993	105	50	2693	YES	5	84.5	1:30	4		90	0.894641373	1.62631886	Drop height		0.000000007963082768	0.002536575845	0	0.0009185862022	0.000004613418017	0.0005514064147	0.005514064147
Batman The Ride	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Inverted	Operating	1994	105	50	2700	YES	5	84.5	2:00	4		120	0.894641373	1.62631886	126.3982466		0.000000007963082768	0.002536575845	0.000000002367174764	0.0009352551377	0.000004613418017	0.0005524823536	0.005524823536
Batman The Ride	Six Flags St. Louis	Eureka	Missouri	United States	North America	Steel	Inverted	Operating	1995	105	50	2693	YES	5	84.5	2:00	4		120	0.894641373	1.62631886	418		0.000000007963082768	0.002536575845	0.000000002367174764	0.0009185862022	0.000004613418017	0.0005514069384	0.005514069384
Batman The Ride	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Inverted	Operating	1999	105	50	2700	YES	5	84.5	2:00	4		120	0.894641373	1.62631886	67.27690651		0.000000007963082768	0.002536575845	0.000000002367174764	0.0009352551377	0.000004613418017	0.0005524823536	0.005524823536
Batman the Ride	Six Flags Mexico	Mexico City	Mexico City	Mexico	Central America	Steel	Inverted	Operating	2000	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0.0000000001076080883	0.0002891060645	0.00000390435165	0.0005106116018	0.005106116018
Batman: Arkham Asylum	Parque Warner Madrid	San Martin de la Vega	Madrid	Spain	Europe	Steel	Inverted	Operating	2002	105	49.7	2700.2	YES	5	82.24282	1:15	4.9		75	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0	0.0009357354934	0.00000390435165	0.0005523296065	0.005523296065
Batwing	Six Flags America	Upper Marlboro	Maryland	United States	North America	Steel	Flying	Operating	2001	115	50	3340	YES	5	103	2:02	4.3	33	122	0.9388997462	1.673102971			0.000000007963082768	0.002536575845	0.000000003031904371	0.004390506228	0.00001736203219	0.0007786918938	0.007786918938
Beast	Kings Island	Mason	Ohio	United States	North America	Wood	Sit Down	Operating	1979	110	64.8	7359	NO	0	141	4:10	3.1	45	250	0.77192822	1.240040844			0.000001378786822	0.0000005235048738	0.0009100793171	0.8679523331	0.000208383971	0.05625666015	0.5625666015
Behemoth	Canada's Wonderland	Vaughan	Onterio	Canada	North America	Steel	Sit Down	Operating	2008	230	77	5318	NO	0	70	2:18	4.5	75	138	0.6838960397	1.127855777			0.00005164541649	0.0000005235048738	0.00000002076523913	0.1537320191	0.000001548595087	0.009932028282	0.09932028282
Big Apple Coaster	New York, New York Hotel & Casino	Las Vegas	Nevada	United States	North America	Steel	Sit Down	Operating	1997	203	67	4777	YES	2	144	2:40		55	160	0.9367175942	1.635248975			0.000002763070693	0.00002428451953	0.0000002488256175	0.06985074232	0.0002501314604	0.004576519026	0.04576519026
Big Loop	Heide-Park Resort	Soltau	Lower Saxony	Germany	Europe	Steel	Sit Down	Operating	1983	98.4	39.2	2316.3	YES	4	40.3992	1:45			105	0.6452738877	1.358154671			0.0000000001095564838	0.0006242631781	0.000000003520556413	0.0003372786782	0.00000144376339	0.0001426224121	0.001426224121
Big One	Blackpool Pleasure Beach	Blackpool	Lancashire, England	United Kingdom	Europe	Steel	Sit Down	Operating	1994	213	74	5497	NO	0	205	3:00	3.5	65	180	0.9867418225	1.404801097			0.0000223284152	0.0000005235048738	0.000002021362648	0.1935945499	0.006658641225	0.01421464992	0.1421464992
Big Thunder Mountain	Disneyland Resort Paris	Marne la Vallee	Ile-de-France	France	Europe	Steel	Sit Down	Operating	1992	72.2	40.4	4921.3	NO	0	39.3	3:56			236	0.3649782266	0.8271627115			0.000000001802873643	0.0000005235048738	0.0003122002827	0.08738245618	0.000001317081037	0.005708210015	0.05708210015
Big Thunder Mountain Railroad	Disneyland	Anaheim	California	United States	North America	Steel	Sit Down	Operating	1979	104	28	2671	NO	0	39	3:00			180	0.2810948626	0.7388042266			0	0.0000005235048738	0.000002021362648	0.0008679768774	0.000001284420168	0.00005658941501	0.0005658941501
Bizarro	Six Flags Great Adventure	Jackson	New Jersey	United States	North America	Steel	Sit Down	Operating	1999	142	61	3985	YES	7	132	2:20	4		140	1.224910869	1.908684249			0.000003974110038	0.02689863131	0.000000262275135	0.01715135763	0.0001190613756	0.006343559904	0.06343559904
Black Mamba	Phantasialand	Bruhl	North Rhine-Westphalia	Germany	Europe	Steel	Inverted	Operating	2006	85.3	49.7	2519.7	YES	4	88.6	1:45	4		105	0.8310093415	1.572265762			0.000000007111679621	0.0006242631781	0.000000003520556413	0.0005841923191	0.000006228963316	0.0001601243475	0.001601243475
blue fire Megacoaster	Europa Park	Rust	Baden Wuerttemberg	Germany	Europe	Steel	Sit Down	Operating	2009	124.7	62.1	3464.5	YES	4	133.8288	2:30	3.8		150	1.022377873	1.745720704			0.000005729007724	0.0006242631781	0.000000008236632858	0.005799521174	0.0001335969876	0.0005296308738	0.005296308738
Blue Hawk	Six Flags Over Georgia	Austell	Georgia	United States	North America	Steel	Sit Down	Operating	1992	122	52	2742	YES	5	109	1:20	4	48	80	0.9666676294	1.698824786			0.000000001677572869	0.002536575845	0	0.001041309994	0.00002625560187	0.0005649114245	0.005649114245
Blue Streak	Cedar Point	Sandusky	Ohio	United States	North America	Wood	Sit Down	Operating	1964	78	40	2558	NO	0	72	1:45		45	105	0.4405251284	0.9329826576			0.000000001527988606	0.0000005235048738	0.000000003520556413	0.0006464394502	0.000001805212355	0.00004227307469	0.0004227307469
Boardwalk Bullet	Kemah Boardwalk	Kemah	Texas	United States	North America	Wood	Sit Down	Operating	2007	96	51	3236	NO	0	92	1:45	3.5	56	105	0.5621480077	1.053995961			0.000000001157993125	0.0000005235048738	0.000000003520556413	0.003460207294	0.000007967519634	0.0002253997057	0.002253997057
Bocaraca	Parque de Diversiones	La Uruca	San Jose	Costa Rica	Central America	Steel	Sit Down	Operating	2005	64	37.3	1148.3	YES	2	33.0076	1:44			104	0.4719903658	1.159140214			0	0.00002428451953	0.0000000003090928296	0.00009855611239	0.0000007745808737	0.000005356147158	0.00005356147158
Boomerang	Six Flags Mexico	Mexico City	Mexico City	Mexico	Central America	Steel	Sit Down	Operating	1988	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Walibi Rhone-Alpes	Les Avenieres	Auvergne-Rhone-Alpes	France	Europe	Steel	Sit Down	Operating	1988	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Fantasilandia	Santiago	Metropolitan Region	Chile	South America	Steel	Sit Down	Operating	1996	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Parque de la Costa	Tigre	Buenos Aires	Argentina	South America	Steel	Sit Down	Operating	1998	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Elitch Gardens	Denver	Colorado	United States	North America	Steel	Sit Down	Operating	1999	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	1999	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Freizeit-Land Geiselwind	Geiselwind	Bavaria	Germany	Europe	Steel	Sit Down	Operating	2000	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Worlds of Fun	Kansas City	Missouri	United States	North America	Steel	Sit Down	Operating	2000	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang	Six Flags St. Louis	Eureka	Missouri	United States	North America	Steel	Sit Down	Operating	2013	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boomerang Coast to Coaster	Six Flags Discovery Kingdom	Vallejo	California	United States	North America	Steel	Sit Down	Operating	1998	116.5	47	935	YES	3	116	1:48	5.2		108	0.8070223574	1.551152825			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000421128375	0.00003683545409	0.0003683545409
Boss	Six Flags St. Louis	Eureka	Missouri	United States	North America	Wood	Sit Down	Operating	2000	122	66.3	4631	NO	0	150	3:05	3	52	185	0.8035196827	1.265876616			0.000002219220418	0.0000005235048738	0.000003330826557	0.05513444135	0.0003582495412	0.003650938374	0.03650938374
Boulder Dash	Lake Compounce	Bristol	Connecticut	United States	North America	Wood	Sit Down	Operating	2000	110	60	4725	NO	0	115	2:30		59	150	0.6775341041	1.158879942			0.000002838628242	0.0000005235048738	0.000000008236632858	0.06428022645	0.00003939028665	0.004157469796	0.04157469796
Bullet Coaster	Happy Valley	Nanshan	Shenzhen, Guanagdong	China	Asia	Steel	Sit Down	Operating	2012	196.8	83		NO	0	221.2	2:38	5.2		158	1.085859976	1.473557602			0.0002493718464	0.0000005235048738	0.0000002000846586	0.0000001630528947	0.01386390211	0.003642292238	0.03642292238
Cannibal	Lagoon	Farmington	Utah	United States	North America	Steel	Sit Down	Operating	2015	208	70	2735	YES	4	167.92	2:30	4.2	116	150	1.156920342	1.853527009			0.000006921528067	0.0006242631781	0.000000008236632858	0.001022892955	0.0009990626597	0.0004464456466	0.004464456466
Cedar Creek Mine Ride	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Steel	Operating	1969	48	42	2540	NO	0	51.39269	2:42			162	0.40463916	0.8813857616			0.000000003473018082	0.0000005235048738	0.000003089601749	0.0006164525454	0.000003564572257	0.00004003429928	0.0004003429928
Coaster Express	Parque Warner Madrid	San Martin de la Vega	Madrid	Spain	Europe	Wood	Sit Down	Operating	2002	120	49.7	4574	NO	0	120	2:00			120	0.620414673	1.113149989			0.000000007111679621	0.0000005235048738	0.000000002367174764	0.0501327689	0.00005489798967	0.003248643103	0.03248643103
Coaster Thrill Ride	Puyallup Fair	Puyallup	Washington	United States	North America	Wood	Sit Down	Operating	1935	55	50	2650	NO	0	83.46311	1:45		63	105	0.5350179177	1.025937456			0.000000007963082768	0.0000005235048738	0.000000003520556413	0.0008220958426	0.000004273570654	0.00005424475641	0.0005424475641
Coaster Through the Clouds	Nanchang Wanda Theme Park	Xinjian	Nanchang, Jiangxi	China	Asia	Steel	Sit Down	Operating	2016	242.8	84.5	5105	NO	0	255.9	4:12		78	252	1.178934693	1.535249917			0.000361846022	0.0000005235048738	0.001053808469	0.1145642118	0.05487417791	0.02188375534	0.2188375534
Colorado Adventure	Phantasialand	Bruhl	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	1996	85.3	31.1	4199.5	NO	0	9.271531	2:55			175	0.2307655386	0.6056427466			0	0.0000005235048738	0.000001214855578	0.02583349926	0.0000000009966521508	0.001667055512	0.01667055512
Colossus	Thorpe Park	Chertsey	Surrey, England	United Kingdom	Europe	Steel	Sit Down	Operating	2002	98.4	45	2788.8	YES	10	97	1:32	4.2		92	1.248153996	1.876250793			0.000000001156691118	0.3070851639	0	0.001172559671	0.00001139003026	0.05951442686	0.5951442686
Comet	Walygator Parc	Maizieres-les-Metz	Lorraine	France	Europe	Steel	Sit Down	Operating	1989	78.7	40.4	1935.7	YES	3	45.09602	1:15			75	0.5931300175	1.311906206			0.0000000001802873643	0.0001325546417	0	0.0001144925537	0.000002131130605	0.00003309739826	0.0003309739826
Corkscrew	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Steel	Operating	1976	85	48	2050	YES	3	65	2:00		45	120	0.6917196962	1.424638123			0.000000003722920077	0.0001325546417	0.000000002367174764	0.0001595188411	0.000001051435591	0.00003622010873	0.0003622010873
Corkscrew	Valleyfair!	Shakopee	Minnesota	United States	North America	Steel	Sit Down	Operating	2005	85	50	1950	YES	3	83.46311	1:30	3.5		90	0.749303632	1.488847506			0.000000007963082768	0.0001325546417	0	0.0001193834354	0.000004273570654	0.00003446281699	0.0003446281699
Crazy Bird	Happy Valley	Dongli	Tianjin	China	Asia	Steel	Sit Down	Operating	2013	98.4		1279.5	YES	2	98	1:29		120	89	0.3773069036	0.8621645977			0	0.00002428451953	0	0.00001513520485	0.00001222580234	0.000008831749638	0.00008831749638
Crazy Coaster	Loca Joy Holiday Theme Park	Yongchuan	Chongqing	China	Asia	Steel	Sit Down	Operating	2013	108.3	52.8	2870.8	YES	10	94.91893	1:35			95	1.295489243	1.916765909			0.0000002250475039	0.3070851639	0	0.001440066243	0.000009822435183	0.05953128633	0.5953128633
Cyclone	Lakeside Amusement Park	Denver	Colorado	United States	North America	Wood	Sit Down	Operating	1940	80	55	2800	NO	0	80	2:00		50	120	0.5602675062	1.044833516			0.00000004985533085	0.0000005235048738	0.000000002367174764	0.001206163619	0.000003304090336	0.00007878440009	0.0007878440009
Demon	California's Great America	Santa Clara	California	United States	North America	Steel	Sit Down	Operating	1976	102	50	2130	YES	4	90	1:45		54	105	0.8363706963	1.577628806			0.000000007963082768	0.0006242631781	0.000000003520556413	0.0002004604518	0.000006895579771	0.0001355397026	0.001355397026
Demon	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Sit Down	Operating	1976	103.7	50	2130	YES	4	90	1:45		54	105	0.8363706963	1.577628806			0.000000007963082768	0.0006242631781	0.000000003520556413	0.0002004604518	0.000006895579771	0.0001355397026	0.001355397026
Desafio	Parque de la Costa	Tigre	Buenos Aires	Argentina	South America	Steel	Inverted	Operating	1999	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0.0000000001076080883	0.0002891060645	0.00000390435165	0.0005106116018	0.005106116018
Desert Race	Heide-Park Soltau	Soltau	Lower Saxony	Germany	Europe	Steel	Sit Down	Operating	2007	62.3	62.1	2132.6	NO	0	133.8288	0:49			49	0.7366635873	1.21119822			0.000005729007724	0.0000005235048738	0	0.0002019441195	0.0001335969876	0.00004775446375	0.0004775446375
Desperado	Buffalo Bill's Resort & Casino	Primm	Nevada	United States	North America	Steel	Sit Down	Operating	2005	209	80	5843	NO	0	225	2:43	4	60	163	1.074830161	1.466171524			0.0001154414105	0.0000005235048738	0.000003440753022	0.2896001039	0.01632860817	0.02292768239	0.2292768239
Diamondback	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Sit Down	Operating	2009	230	80	5282	NO	0	215	3:00	4.2	74	180	1.050906716	1.449682363			0.0001154414105	0.0000005235048738	0.000002021362648	0.1464982646	0.01054301859	0.01220262902	0.1220262902
Dinoconda	China Dinosaurs Park	Xinbei	Changzhou, Jiangsu	China	Asia	Steel	Wing	Operating	2012	226.4	78.3	3444.9	YES	3	204.7652	2:07			127	1.229305519	1.887489365			0.00007349039254	0.0001325546417	0.000000005590880119	0.005553584643	0.006585430941	0.002102384095	0.02102384095
Do-Dodonpa	Fuji-Q Highland	Fujiyoshida	Yamanashi	Japan	Asia	Steel	Sit Down	Operating	2001	160.8	111.8	4081.3	YES	1	160.8	2:32	4.25		152	1.205949894	1.753422851			0.07122723667	0.000003838587504	0.0000001030686437	0.02066940798	0.0006703661798	0.01988849651	0.1988849651
Doble Loop	Salitre Magico	Bogota	Cundinamarca	Colombia	South America	Steel	Sit Down	Operating	2004	59.1	56	2822	YES	2	108.1581	1:47			107	0.7771954327	1.499492046			0.00000007113603628	0.00002428451953	0.000000004561951319	0.00127478094	0.00002478714111	0.00009335930345	0.0009335930345
Dragon Khan	PortAventura Park	Salou	Tarragona	Spain	Europe	Steel	Sit Down	Operating	1995	148	65	4165	YES	8	161	1:45	4		105	1.392545063	2.036811922			0.00001469846491	0.07019923491	0.000000003520556413	0.02422197915	0.0006780253442	0.0153250107	0.153250107
Dragon Mountain	Marineland Theme Park	Niagra Falls	Ontario	Canada	North America	Steel	Sit Down	Operating	1993	186	50	5500	YES	4	80	3:30			210	0.8124472513	1.551091276			0.000000007963082768	0.0006242631781	0.00003498758018	0.1943189866	0.000003304090336	0.01266628909	0.1266628909
Dragon's Run	Dragon Park	Ha Long	Quang Ninh	Vietnam	Asia	Steel	Sit Down	Operating	2017	150	65	3738	YES	6	150	2:20			140	1.223372131	1.91396033			0.00001469846491	0.008892734784	0.000000262275135	0.01041752974	0.0003582495412	0.002486109899	0.02486109899
Eejanaika	Fuji-Q Highland	Fujiyoshida	Yamanashi	Japan	Asia	Steel	Wing	Operating	2006	249.3	78.3	3782.8	YES	3	204.7652	2:10		90	130	1.229305519	1.887489365			0.00007349039254	0.0001325546417	0.000000008033731706	0.0114279519	0.006585430941	0.002481376082	0.02481376082
El Toro	Six Flags Great Adventure	Jackson	New Jersey	United States	North America	Wood	Sit Down	Operating	2006	181	70	4400	NO	0	176	1:42	4.4	76	102	0.8905361997	1.334074394			0.000006921528067	0.0000005235048738	0.000000002379790679	0.03714665361	0.001550046914	0.002798457982	0.02798457982
El Toro	Freizeitpark Plohn	Lengenfeld	Saxony	Germany	Europe	Wood	Sit Down	Operating	2009	80.5	45.6	2379	NO	0	71	1:20			80	0.4756914694	0.9651599739			0.000000001465339264	0.0000005235048738	0	0.0004003452404	0.000001672172446	0.00002636195797	0.0002636195797
Eurosat Can Can Coaster	Europa Park	Rust	Baden Wuerttemberg	Germany	Europe	Steel	Sit Down	Operating	1989	83.7	37.3	3024.8	NO	0	33.0076	3:18	4	70	198	0.3291332229	0.781175741			0	0.0000005235048738	0.00001166275148	0.002100217789	0.0000007745808737	0.0001382527718	0.001382527718
Expedition GeForce	Holiday Park	Hassloch	Rhineland-Palatinate	Germany	Europe	Steel	Sit Down	Operating	2001	173.9	74.6	4002.6	NO	0	188.2101	1:15	4.5	82	75	0.9505987425	1.378360556			0.0002647769651	0.0000005235048738	0	0.01775210135	0.002928966236	0.001908093395	0.01908093395
Extreme Rusher	Happy Valley	Chaoyang	Beijing	China	Asia	Steel	Sit Down	Operating	2011	170.6	83	2788.8	NO	0	196.8	0:59			59	1.027486771	1.432263905			0.0002493718464	0.0000005235048738	0	0.001172559671	0.004493353982	0.001299679581	0.01299679581
Fahrenheit	Hersheypark	Hershey	Pennsylvania	United States	North America	Steel	Sit Down	Operating	2008	121	58	2700	YES	6	116.512	1:25	5	97	85	1.096308941	1.806308195			0.0000001431850803	0.008892734784	0	0.0009352551377	0.00004357509577	0.001792795658	0.01792795658
Firehawk	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Flying	Operating	2007	115	50	3340	YES	5	83.46311	2:10	4.3	33	130	0.8921607749	1.623551761			0.000000007963082768	0.002536575845	0.000000008033731706	0.004390506228	0.000004273570654	0.0007753153558	0.007753153558
Firewhip	Beto Carrero World	Penha	Santa Catarina	Brazil	South America	Steel	Inverted	Operating	2008	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0.0000000001076080883	0.0002891060645	0.00000390435165	0.0005106116018	0.005106116018
Flash	Lewa Adventure	Jingyang	Xianyang,Shaanxi	China	Asia	Steel	Sit Down	Operating	2016	200.2	71.5	4176.5	YES	2	190.3	2:08	4.2		128	1.077664231	1.745187493			0.00001081534709	0.00002428451953	0.000000006311428987	0.0247492079	0.00325525058	0.002444280468	0.02444280468
Flashback	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Sit Down	Operating	2000	116.5	47	935	YES	3	34	1:48	5.2	89	108	0.6108501086	1.309559964			0.000000002531109577	0.0001325546417	0.0000000005190002988	0.00004822322455	0.0000008427124554	0.00002598937247	0.0002598937247
Flight Deck	California's Great America	Santa Clara	California	United States	North America	Steel	Inverted	Operating	1993	102	50	2260	YES	3	91	2:26	4.5		146	0.7673344693	1.508587118			0.000000007963082768	0.0001325546417	0.000000005235694976	0.000288705174	0.000007413016051	0.00004620879128	0.0004620879128
Flight Deck	Canada's Wonderland	Vaughan	Onterio	Canada	North America	Steel	Inverted	Operating	1995	109.3	49.7	2260.5	YES	5	82.24282	1:28			88	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0	0.0002891060645	0.00000390435165	0.0005106115858	0.005106115858
Flight of Fear	Kings Dominion	Doswell	Virginia	United States	North America	Steel	Sit Down	Operating	1996	74.2	54	2705	YES	4	99.86525	2:24	4.5		144	0.8867994053	1.62511696			0.000000003480841151	0.0006242631781	0.00000004164624211	0.0009473329637	0.00001394382919	0.0001855601813	0.001855601813
Flight of Fear	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Sit Down	Operating	1996	74.2	54	2705	YES	4	99.86525	1:00	4.5		60	0.8867994053	1.62511696			0.000000003480841151	0.0006242631781	0	0.0009473329637	0.00001394382919	0.0001855507775	0.001855507775
Flight of the Phoenix	Harborland	Beilun	Ningbo, Shejiang	China	Asia	Steel	Sit Down	Operating	2006	101.7	49.7	2723.1	YES	8	82.24282	1:33			93	1.101515063	1.776847877			0.000000007111679621	0.07019923491	0	0.0009922757222	0.00000390435165	0.01365197591	0.1365197591
Fluch von Novgorod	Hansa Park	Sierksdorf	Schleswig-Holstein	Germany	Europe	Steel	Sit Down	Operating	2009	131.3	62.1	2296.6	YES	1	133.8288	2:48	4.3	97	168	0.8080921587	1.478459462			0.000005729007724	0.000003838587504	0.000000005859781305	0.0003194713067	0.0001335969876	0.00005611080943	0.0005611080943
Fly the Great Nor'Easter	Morey's Piers	Wildwood	New Jersey	United States	North America	Steel	Inverted	Operating	1995	115	55	2170	YES	5	95	2:05			125	0.9532955308	1.681700476			0.00000004985533085	0.002536575845	0.000000004382074169	0.000224462878	0.000009879433414	0.000507995026	0.00507995026
Flying Aces	Ferrari World Abu Dhabi	Abu Dhabi	Abu Dhabi	United Arab Emirates	Middle East	Steel	Sit Down	Operating	2016	206.7	74.6	4921.3	YES	1	188.2101	2:22	5		142	1.022027314	1.645621798			0.0002647769651	0.000003838587504	0.00000003307527117	0.08738245618	0.002928966236	0.006401023447	0.06401023447
Force One	Schwaben Park	Kaisersbach	Baden Wuerttemberg	Germany	Europe	Steel	Sit Down	Operating	2010	72.2	40.4	1738.8	NO	0	45.09602	0:38	3.7		38	0.3788443032	0.8489961556			0.0000000001802873643	0.0000005235048738	0	0.00006373336123	0.000002131130605	0.000004268196731	0.00004268196731
Formula Rossa	Ferrari World Abu Dhabi	Abu Dhabi	Abu Dhabi	United Arab Emirates	Middle East	Steel	Sit Down	Operating	2010	170.6	149.1	6561.7	NO	0	169	1:32	4.8		92	1.40430622	1.635850784			1	0.0000005235048738	0	0.5579410157	0.001060356723	0.2943344525	2.943344525
Fujiyama	Fuji-Q Highland	Fujiyoshida	Yamanashi	Japan	Asia	Steel	Sit Down	Operating	1996	259.2	80.8	6708.7	NO	0	229.7	3:36	3.5	65	216	1.091439707	1.477448114			0.0001422359097	0.0000005235048738	0.00005934345915	0.6191271081	0.01990339174	0.04513025105	0.4513025105
Full Throttle	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	2013	160	70	2200	YES	2	167.92	1:30	4		90	1.014063199	1.696968998			0.000006921528067	0.00002428451953	0	0.000244211386	0.0009990626597	0.0002800646364	0.002800646364
Furius Baco	PortAventura Park	Salou	Tarragona	Spain	Europe	Steel	Wing	Operating	2007	46	83.9	2788.8	YES	1	46	0:55	4.7		55	0.7441860092	1.349135559			0.0003121034513	0.000003838587504	0	0.001172559671	0.000002295704224	0.0001569940336	0.001569940336
Fury 325	Carowinds	Charlotte	North Carolina	United States	North America	Steel	Sit Down	Operating	2015	325	95	6602	NO	0	320	2:45		81	165	1.40270651	1.673177969			0.003857892874	0.0000005235048738	0.000004262359527	0.574670315	0.3461308829	0.1273953858	1.273953858
Gao	Greenland	Arao	Kumamoto	Japan	Asia	Steel	Sit Down	Operating	1998	131.3	60.9	5457.7	NO	0	128.7339	3:56			236	0.7164265415	1.194057189			0.000003843270668	0.0000005235048738	0.0003122002827	0.184277751	0.00009674538888	0.01198455105	0.1198455105
GateKeeper	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Wing	Operating	2013	170	67	4164	YES	6	164	2:40	4		160	1.27027877	1.951373075			0.000002763070693	0.008892734784	0.0000002488256175	0.02417659603	0.0008031429286	0.003488986792	0.03488986792
Gemini	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	1978	125.3	60	3935	NO	0	118	2:20		55	140	0.6847111376	1.165677441			0.000002838628242	0.0000005235048738	0.000000262275135	0.01554091148	0.00004810357746	0.001015233777	0.01015233777
GhostRider	Knott's Berry Farm	Buena Park	California	United States	North America	Wood	Sit Down	Operating	1998	118	56	4533	NO	0	108	2:40	3.1	51	160	0.6339600602	1.121155658			0.00000007113603628	0.0000005235048738	0.0000002488256175	0.04677367075	0.00002452025338	0.003024159852	0.03024159852
Giant Dipper	Santa Cruz Beach Boardwalk	Santa Cruz	California	United States	North America	Wood	Sit Down	Operating	1924	70	55	2640	NO	0	65	1:52			112	0.5243823387	1.001692793			0.00000004985533085	0.0000005235048738	0.0000000008660654874	0.0008010495017	0.000001051435591	0.00005206633621	0.0005206633621
Giant Dipper	Belmont Park	San Diego	California	United States	North America	Wood	Sit Down	Operating	1925	73	55	2600	NO	0	60	1:45		40	105	0.5124206162	0.986222492			0.00000004985533085	0.0000005235048738	0.000000003520556413	0.000721774844	0.0000007099514986	0.00004686360117	0.0004686360117
Goliath	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	2000	235	85	4500	NO	0	255	3:00	4.5	61	180	1.180135037	1.536096782			0.0004088756623	0.0000005235048738	0.000002021362648	0.04420870137	0.05312889528	0.01666893099	0.1666893099
Goliath	Six Flags Over Georgia	Austell	Georgia	United States	North America	Steel	Sit Down	Operating	2006	200	70	4480	NO	0	175	3:30		59	210	0.8881438552	1.332228343			0.000006921528067	0.0000005235048738	0.00003498758018	0.04271243437	0.001469185307	0.003144573468	0.03144573468
Goliath	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Inverted	Operating	2008	105	50	2693	YES	5	80	2:00	4		120	0.8838758227	1.614183097			0.000000007963082768	0.002536575845	0.000000002367174764	0.0009185862022	0.000003304090336	0.0005510690474	0.005510690474
Goliath	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Inverted	Operating	2012	191.6	65.6	1204	YES	3	177	1:32	4.5	90	92	1.077703863	1.776941284			0.00001779101423	0.0001325546417	0	0.00001183612102	0.001634997743	0.0004488133964	0.004488133964
Goliath	Six Flags Great America	Gurnee	Illinois	United States	North America	Wood	Sit Down	Operating	2014	165	72	3100	YES	2	180	1:45		85	105	1.056376537	1.729090616			0.00001252646757	0.00002428451953	0.000000003520556413	0.002514902534	0.001916277464	0.0006647079386	0.006647079386
Goudurix	Parc Asterix	Plailly	Picardie	France	Europe	Steel	Sit Down	Operating	1989	118	56	3116.8	YES	7	108	1:20	3.9	64	80	1.13396006	1.828262439			0.00000007113603628	0.02689863131	0	0.002617251572	0.00002452025338	0.005381387814	0.05381387814
Great White	SeaWorld San Antonio	San Antonio	Texas	United States	North America	Steel	Inverted	Operating	1997	108	50	2562	YES	5	81.2	2:00	4.6		120	0.8867466361	1.617451974			0.000000007963082768	0.002536575845	0.000000002367174764	0.0006532852719	0.000003613273219	0.0005340326475	0.005340326475
Green Lantern Coaster	Warner Bros. Movie World	Gold Coast	Queensland	Australia	Oceana	Steel	Sit Down	Operating	2011	108.3	41	1601.1	YES	2	47.45268	1:07	3.5		67	0.5313635335	1.239284888			0.0000000002308012992	0.00002428451953	0	0.00004185233709	0.000002586222706	0.000007467181703	0.00007467181703
Griffon	Busch Gardens Williamsburg	Williamsburg	Virginia	United States	North America	Steel	Sit Down	Operating	2007	205	71	3108	YES	2	205	3:00	4	90	180	1.109478241	1.768337552			0.000009329104771	0.00002428451953	0.000002021362648	0.002563173794	0.006658641225	0.001891289254	0.01891289254
Grizzly	California's Great America	Santa Clara	California	United States	North America	Wood	Sit Down	Operating	1986	91	55	3250	NO	0	88	2:40			160	0.5794062621	1.066186345			0.00000004985533085	0.0000005235048738	0.0000002488256175	0.003573981656	0.000005962585574	0.0002322885693	0.002322885693
Hades 360	Mt. Olympus Water & Theme Park	Wisconsin Dells	Wisconsin	United States	North America	Wood	Sit Down	Operating	2005	136	60	4746	YES	1	140	2:35	3.5	65	155	0.808771288	1.480352563			0.000002838628242	0.000003838587504	0.0000001438561059	0.06648450983	0.0001959917257	0.004340750416	0.04340750416
Half Pipe	Elitch Gardens	Denver	Colorado	United States	North America	Steel	Sit Down	Operating	2004	98.4	43.5	229.7	NO	0	80	2:00	4.5	90	120	0.4831380628	0.9776179759			0.0000000006365283162	0.0000005235048738	0.000000002367174764	0.00000389325584	0.000003304090336	0.0000009798085661	0.000009798085661
Happy Angel	Wanda Theme Park	Harbin	Heilongjiang	China	Asia	Steel	Inverted	Operating	2017		54.1		YES	6	100.2784	2:39			159	1.031315636	1.746815148			0.000000003608786294	0.008892734784	0.0000002231714713	0.0000001630528947	0.00001435441483	0.001724949066	0.01724949066
HeiBe Fahrt	Wild- und Freizeitpark Klotten/Cochem	Klotten	Rhineland-Palatinate	Germany	Europe	Steel	Sit Down	Operating	2004	57.4	34.2	1745.4	NO	0	21.0661	1:20		46	80	0.279773626	0.7034259965			0	0.0000005235048738	0	0.00006501647587	0.00000002761205749	0.000004303066641	0.00004303066641
Helix	Liseberg	Gothenburg	Vastra Gotaland	Sweden	Europe	Steel	Sit Down	Operating	2014	134.5	62.1	4530.8	YES	7	133.8288	2:10	4.3		130	1.236663587	1.918305001			0.000005729007724	0.02689863131	0.000000008033731706	0.04659888166	0.0001335969876	0.00824719247	0.0824719247
Hydra the Revenge	Dorney Park & Wildwater Kingdom	Allentown	Pennsylvania	United States	North America	Steel	Sit Down	Operating	2005	95	53	3198	YES	7	105	2:35		68	155	1.106662302	1.80451133			0.0000000242107068	0.02689863131	0.0000001438561059	0.003167838947	0.0000199461082	0.005415749527	0.05415749527
Hyper Coaster	Land of Legends Theme Park	Antalya	Antalya	Turkey	Europe	Steel	Sit Down	Operating	2018	200.2	71.5	4176.5	YES	2	190.3	2:15	4.2		135	1.077664231	1.745187493			0.00001081534709	0.00002428451953	0.0000001458623218	0.0247492079	0.00325525058	0.002444282337	0.02444282337
Hyperion	Energylandia	Zator	Malopolskie	Poland	Europe	Steel	Sit Down	Operating	2018	252.6	88.2	4757.2	YES	1	269	3:28	4.8	85	208	1.306518537	1.838593528			0.0008738943063	0.000003838587504	0.00002924689818	0.06768510457	0.08607739401	0.02681317018	0.2681317018
Incredible Hulk	Universal Studios Islands of Adventure	Orlando	Florida	United States	North America	Steel	Sit Down	Operating	1999	110	67	3700	YES	7	104.9	2:15	4		135	1.200319782	1.878408122			0.000002763070693	0.02689863131	0.0000001458623218	0.009623666765	0.00001980862842	0.005832896681	0.05832896681
Incredicoaster	Disney California Adventure Park	Anaheim	California	United States	North America	Steel	Sit Down	Operating	2001	120	55	6072	YES	1	108	2:36			156	0.6986817235	1.382920364			0.00000004985533085	0.000003838587504	0.000000160641815	0.3664784971	0.00002452025338	0.0236508939	0.236508939
Intimidator	Carowinds	Charlotte	North Carolina	United States	North America	Steel	Sit Down	Operating	2010	232	75	5316	NO	0	211	3:33	4.3	74	213	1.007802798	1.419719707			0.00002964138775	0.0000005235048738	0.00004564587185	0.1533233954	0.008795988416	0.0121798223	0.121798223
Intimidator 305	Kings Dominion	Doswell	Virginia	United States	North America	Steel	Sit Down	Operating	2010	305	90	5100	NO	0	300	3:00	4.5	85	180	1.32132508	1.624104711			0.00131700505	0.0000005235048738	0.000002021362648	0.1137467801	0.2147755621	0.06310488347	0.6310488347
Invertigo	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Sit Down	Operating	1999	131.3	50	1013.8	YES	3	83.46311	1:30	5		90	0.749303632	1.488847506			0.000000007963082768	0.0001325546417	0	0.000006295435799	0.000004273570654	0.00002716681701	0.0002716681701
Iron Dragon	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Suspended	Operating	1987	76	40	2800	NO	0	43.52797	2:00			120	0.3724102241	0.8406518248			0.000000001527988606	0.0000005235048738	0.000000002367174764	0.001206163619	0.000001872346041	0.00007796722376	0.0007796722376
Iron Rattler	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	2013	179	70	3266	YES	1	171	1:52		81	112	0.9500030486	1.592052101			0.000006921528067	0.000003838587504	0.0000000008660654874	0.003708176855	0.001183161406	0.00547098541	0.0547098541
iSpeed	Mirabilandia	Savio	Emilia-Romagna	Italy	Europe	Steel	Sit Down	Operating	2009	180.4	68.4	3215.2	YES	2	180.5	1:05		90	65	1.03342784	1.71240593			0.000004259421149	0.00002428451953	0	0.003297260478	0.001967273039	0.0007262092828	0.007262092828
Joker	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Wing	Operating	2012	120	38	1019	YES	5	54	1:15		78	75	0.7411919684	1.461878775			0	0.002536575845	0	0.000006406496505	0.0000004399440866	0.0004914770382	0.004914770382
Joker	Six Flags Discovery Kingdom	Vallejo	California	United States	North America	Steel	Sit Down	Operating	2016	100	53	3200	YES	3	95.74179	1:33		78	93	0.7987991889	1.537708763			0.0000000242107068	0.0001325546417	0	0.003182645925	0.00001041586808	0.0002336819624	0.002336819624
Journey to Atlantis	SeaWorld San Diego	San Diego	California	United States	North America	Steel	Sit Down	Operating	2004	95	42	2000	NO	0	70	5:25	3		325	0.4491542557	0.939968688			0.000000003473018082	0.0000005235048738	0.07690923237	0.000138081202	0.000001548595087	0.01737601037	0.1737601037
Journey to Atlantis	SeaWorld San Antonio	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	2007	100		780	NO	0	100	3:30			210	0.2392344498	0.489115988			0	0.0000005235048738	0.00003498758018	0.000002830208272	0.000014076494	0.00001181698255	0.0001181698255
Judge Roy Scream	Six Flags Over Texas	Arlington	Texas	United States	North America	Wood	Sit Down	Operating	1980	71	45	2670	NO	0	65	1:30	4	42	90	0.4573132575	0.943711073			0.000000001156691118	0.0000005235048738	0	0.0008657391938	0.000001051435591	0.00005622711261	0.0005622711261
Jungle Trailblazer	Fantawild Dreamland	Shifeng	Zhuzhou, Hunan	China	Asia	Wood	Sit Down	Operating	2016	111.6	54.1	3989.5	NO	0	91.8	1:30		60	90	0.5824609539	1.070998471			0.000000003608786294	0.0000005235048738	0	0.0173032355	0.000007853534902	0.00111847514	0.0111847514
Jupiter	Kijima Kogen	Beppu	Oita	Japan	Asia	Wood	Sit Down	Operating	1992	138	57	5249.3	NO	0	112.3274	2:34		45	154	0.6510195999	1.136686817			0.0000001011156514	0.0000005235048738	0.0000001287743973	0.1401486327	0.00003291130129	0.009050497005	0.09050497005
Katapul	Hopi Hari	Vinhedo	Sao Palo	Brazil	South America	Steel	Sit Down	Operating	1999	137.8	53	722	YES	1	95.74179	0:35		70	35	0.655942046	1.342059955			0.0000000242107068	0.000003838587504	0	0.000002311788917	0.00001041586808	0.000003586313976	0.00003586313976
Katun	Mirabilandia	Savio	Emilia-Romagna	Italy	Europe	Steel	Inverted	Operating	2000	164.1	64.6	3937	YES	6	147.7	2:22	4		142	1.215186975	1.907315214			0.000001293172005	0.008892734784	0.00000003307527117	0.01560268059	0.0003124548541	0.00280877373	0.0280877373
Kawazemi	Tobu Zoo Park	Minami	Saitama	Japan	Asia	Steel	Sit Down	Operating	2008	101.7	52.8	2477	NO	0	98.4	1:00		67.4	60	0.5895314471	1.080271098			0.0000002250475039	0.0000005235048738	0	0.0005214075487	0.0000125762598	0.00003699181445	0.0003699181445
Kingda Ka	Six Flags Great Adventure	Jackson	New Jersey	United States	North America	Steel	Sit Down	Operating	2005	456	128	3118	NO	0	418	0:28	5	90	28	1.858484239	1.926544245			0.4293871661	0.0000005235048738	0	0.00262470624	1	0.3690435446	3.690435446
Kong	Six Flags Discovery Kingdom	Vallejo	California	United States	North America	Steel	Sit Down	Operating	1998	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.000000007111679621	0.002536575845	0.0000000001076080883	0.0002891060645	0.00000390435165	0.0005106116018	0.005106116018
Kraken	SeaWorld Orlando	Orlando	Florida	United States	North America	Steel	Sit Down	Operating	2000	149	65	4177	YES	7	144	2:02			122	1.280446635	1.954310329			0.00001469846491	0.02689863131	0.000000003031904371	0.02477235431	0.0002501314604	0.006869333167	0.06869333167
Kumba	Busch Gardens Tampa	Tampa	Florida	United States	North America	Steel	Sit Down	Operating	1993	143	60	3978	YES	7	135	2:54	3.8		174	1.225380994	1.909769684			0.000002838628242	0.02689863131	0.000001095961553	0.01691742682	0.0001437691147	0.006335056035	0.06335056035
Legend	Holiday World	Santa Claus	Indiana	United States	North America	Wood	Sit Down	Operating	2000	99	59	4042	NO	0	113	2:00			120	0.666042507	1.148990349			0.000002019890434	0.0000005235048738	0.000000002367174764	0.01916415923	0.00003443900219	0.001245438839	0.01245438839
Leviathan	Canada's Wonderland	Vaughan	Onterio	Canada	North America	Steel	Sit Down	Operating	2012	306	92	5486	NO	0	306	3:28	4.5	80	208	1.349092963	1.641119641			0.002047578424	0.0000005235048738	0.00002924689818	0.1909543638	0.2501447992	0.07740824574	0.7740824574
Lightning Rod	Dollywood	Pigeon Forge	Tennessee	United States	North America	Wood	Sit Down	Operating	2016	207	73	3800	NO	0	165	3:12	3.5	73	192	0.8843411345	1.327998157			0.00001675590649	0.0000005235048738	0.000006593971828	0.01183843544	0.000849408444	0.0009888865973	0.009888865973
Limit	Heide-Park Soltau	Soltau	Lower Saxony	Germany	Europe	Steel	Inverted	Operating	1999	109.3	49.7	2260.5	YES	5	91	1:36			96	0.9081795398	1.641551489			0.000000007111679621	0.002536575845	0.0000000001076080883	0.0002891060645	0.000007413016051	0.0005115170636	0.005115170636
Magnum XL-200	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	1989	205	72	5106	NO	0	194.7	2:00		60	120	0.948686858	1.377395894			0.00001252646757	0.0000005235048738	0.000000002367174764	0.1147282391	0.004053102774	0.008451118381	0.08451118381
Mako	SeaWorld Orlando	Orlando	Florida	United States	North America	Steel	Sit Down	Operating	2016	200	73	4760	NO	0	200	2:18			138	0.9680731919	1.391431759			0.00001675590649	0.0000005235048738	0.00000002076523913	0.06798799599	0.00524804 7429	0.005745087259	0.05745087259
Mamba	Worlds of Fun	Kansas City	Missouri	United States	North America	Steel	Sit Down	Operating	1998	205	75	5600	NO	0	205	3:00	3.5	66	180	0.9934487307	1.409545215			0.00002964138775	0.0000005235048738	0.000002021362648	0.2195475885	0.006658641225	0.01589092672	0.1589092672
Mammut	Erlebnispark Tripsdrill	Cleebronn	Baden Wuerttemberg	Germany	Europe	Wood	Sit Down	Operating	2008	98.4	55.9	2821.5	NO	0	107.742	2:45			165	0.6326721445	1.120000721			0.000000006866352209	0.0000005235048738	0.000004262359527	0.001273182156	0.00002409059631	0.00008857300228	0.0008857300228
Manta	SeaWorld Orlando	Orlando	Florida	United States	North America	Steel	Flying	Operating	2009	140	56	3359	YES	4	113	2:35	3.7		155	0.9316360684	1.667311324			0.00000007113603628	0.0006242631781	0.0000001438561059	0.004583185741	0.00003443900219	0.0004254528596	0.004254528596
Manta	SeaWorld San Diego	San Diego	California	United States	North America	Steel	Sit Down	Operating	2012	30	43	2800	NO	0	54	2:00	4		120	0.4175836518	0.8964514944			0.0000000005206267775	0.0000005235048738	0.000000002367174764	0.001206163619	0.0000004399440866	0.00007803253403	0.0007803253403
Maverick	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2007	105	70	4450	YES	2	100	2:30		95	150	0.8515751607	1.552269171			0.000006921528067	0.00002428451953	0.000000008236632858	0.04054807646	0.000014076494	0.002626142605	0.02626142605

Name	Park	City/Region	City/State/Region	Country/Region	Geographic Region	Construction	Type	Status	Year/Date Opened	Height (feet)	Speed (mph)	Length (feet)	Inversions (YES or NO)	Number of Inversions	Drop (feet)	Duration (min:sec)	G Force	Vertical Angle (degrees)	Duration (seconds)	First Iteration Score	Second Iteration Score	Maximum / Average / STDEV	Weights	Subscore-Speed	Subscore-Inversions	Subscore-Duration	Subscore-Length	Subscore-Drop Height	Weighted Average	Score (Average*10)
Medusa	Six Flags Discovery Kingdom	Vallejo	California	United States	North America	Steel	Sit Down	Operating	2000	150	65	3937	YES	7	150	3:15	4.5		195	1.294800702	1.966413441			0.000001469846491	0.02689863131	0.000008784806071	0.01560268059	0.0003582495412	0.006307625736	0.06307625736
Medusa Steel Coaster	Six Flags Mexico	Mexico City	Mexico City	Mexico	Central America	Steel	Sit Down	Operating	2009	98	58	3000	YES	3	100	1:45		54	105	0.8425208347	1.575725221			0.000001431850803	0.0001325546417	0.0000000003520556413	0.001977888261	0.000014076494	0.0001569311054	0.001569311054
Millennium Force	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2000	310	93	6595	NO	0	300	2:20	4.5	80	140	1.341445804	1.636947415			0.002538593065	0.0000005235048738	0.0000000262275135	0.5717603886	0.2147755621	0.09296894655	0.9296894655
Mind Eraser	Six Flags America	Upper Marlboro	Maryland	United States	North America	Steel	Inverted	Operating	1995	109.3	49.7	2260.5	YES	5	91	1:36	3.1	59	96	0.9081795398	1.641551489			0.0000000007111679621	0.002536575845	0.000000001076080883	0.0002891060645	0.000007413016051	0.0005115170636	0.005115170636
Mind Eraser	Elitch Gardens	Denver	Colorado	United States	North America	Steel	Inverted	Operating	1997	109.3	49.7	2260.5	YES	5	91	1:36	3.1	59	96	0.9081795398	1.641551489			0.0000000007111679621	0.002536575845	0.000000001076080883	0.0002891060645	0.000007413016051	0.0005115170636	0.005115170636
Mine Blower	Fun Spot America	Kissimmee	Florida	United States	North America	Wood	Sit Down	Operating	2017	83	45.8	2290	YES	1	80.5	1:08		65	68	0.5711886952	1.260339833			0.000000001585062903	0.000003838587504	0	0.0003137052914	0.00003429696905	0.0002186749609	0.002186749609
Monster	Walygator Parc	Maizieres-les-Metz	Lorraine	France	Europe	Steel	Inverted	Operating	2010	131.3	55.9	3937	YES	6	107.742	2:28			148	1.061243573	1.774654392			0.0000006866352209	0.008892734784	0.00000006572021368	0.01560268059	0.0002409059631	0.002734048517	0.02734048517
Montana Rusa	La Feria Chapultepec	Mexico City	Mexico	Mexico	Central America	Wood	Sit Down	Operating	1964	110	52.8	4000	NO	0	80	4:21			261	0.5455123083	1.032562456			0.0000002250475039	0.0000005235048738	0.00199983101	0.01766221068	0.000003304090336	0.001592032007	0.01592032007
Montana Rusa	Salitre Magico	Bogota	Cundinamarca	Colombia	South America	Steel	Sit Down	Operating	2000	70	52.8	1250	YES	2	94.91893	1:10			70	0.7240606713	1.449576127			0.0000002250475039	0.00002428451953	0	0.00001375327061	0.000009822435183	0.000008128167692	0.00008128167692
Montana Rusa	VulQano Park	Quito	Pichincha	Ecuador	South America	Steel	Sit Down	Operating	2005	36.1		1197.5	YES	1		3:25			205	0.07142857143	0.2672612419			0	0.000003838587504	0.00002228769379	0.00001158675487	0.0000000041445283	0.000006524259596	0.00006524259596
Montezooma's Revenge	Knott's Berry Farm	Buena Park	California	United States	North America	Steel	Sit Down	Operating	1978	148	55	800	YES	1	148	0:36		70	36	0.7943755034	1.4696514			0.0000000004985533085	0.000003838587504	0	0.000003033600567	0.000318100004	0.0000830418581	0.000830418581
Montezum	Hopi Hari	Vinhedo	Sao Paulo	Brazil	South America	Wood	Sit Down	Operating	1999	139.1	64	3380	NO	0	144	0:58			58	0.773739727	1.242104905			0.000001065952774	0.0000005235048738	0	0.004805046376	0.0002501314604	0.0003749294545	0.003749294545
Montu	Busch Gardens Tampa	Tampa	Florida	United States	North America	Steel	Inverted	Operating	1996	150	60	3983	YES	7	128	3:00	3.8	50	180	1.208634583	1.894839832			0.000002838628242	0.02689863131	0.000002021362648	0.01708423249	0.00009230700009	0.006332746107	0.06332746107
MP-Xpress	Movie Park Germany	Bottrop	North Rhine-Westphalia	Germany	Europe	Steel	Inverted	Operating	2001	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.0000000007111679621	0.002536575845	0.000000001076080883	0.0002891060645	0.0000390435165	0.0005106116018	0.005106116018
Mr. Freeze Reverse Blast	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Sit Down	Operating	1998	218	70	1300	YES	1	194	1:30		90	90	1.005026972	1.633709691			0.00006921528067	0.000003838587504	0	0.00001617258011	0.003915307816	0.001013974573	0.01013974573
Mr. Freeze Reverse Blast	Six Flags St. Louis	Eureka	Missouri	United States	North America	Steel	Sit Down	Operating	1998	218	70	1300	YES	1	194	1:30		90	90	1.005026972	1.633709691			0.00006921528067	0.000003838587504	0	0.00001617258011	0.003915307816	0.001013974573	0.01013974573
Mystic Timbers	Kings Island	Mason	Ohio	United States	North America	Wood	Sit Down	Operating	2017	109.2	53	3265	NO	0	98	2:00			120	0.5899158909	1.080409928			0.000000242107068	0.0000005235048738	0.000000002367174764	0.003699657074	0.00001222580234	0.0002419507049	0.002419507049
Nemesis	Alton Towers	Alton	Staffordshire, England	United Kingdom	Europe	Steel	Inverted	Operating	1994	42.6	50	2349	YES	4	104	1:20	3.5		80	0.8698635192	1.612415031			0.0000000007963082768	0.0006242631781	0	0.0003689056786	0.000018611327	0.0001494304784	0.001494304784
Nemesis Inferno	Thorpe Park	Chertsey	Surrey, England	United Kingdom	Europe	Steel	Inverted	Operating	2003	95.2	47.8	2460.7	YES	4	94	1:43	4.5		103	0.8311848764	1.574944888			0.0000000003447474852	0.0006242631781	0.000000002712676973	0.004991478648	0.000009197963702	0.0001554028383	0.001554028383
Nessie Superrollercoaster	Hansa Park	Sierksdorf	Schleswig-Holstein	Germany	Europe	Steel	Sit Down	Operating	1980	85.3	49.1	2431.1	YES	1	79.80634	2:10			130	0.5916620183	1.278064723			0.0000000005666420104	0.000003838587504	0.000000008033731706	0.004609788408	0.000003256637362	0.00003132722171	0.0003132722171
New Revolution	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	1976	113	55	3457	YES	1	85	2:12	4.9	45	132	0.6436578001	1.325558778			0.0000000004985533085	0.000003838587504	0.0000000001021017203	0.005704274296	0.000004786419344	0.0003700110253	0.003700110253
New Texas Giant	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Sit Down	Operating	2011	153	68.6	4200	NO	0	147	2:00	4.2	79	120	0.8117685379	1.271323836			0.00004528328406	0.0000005235048738	0.000000002367174764	0.02585751922	0.0002996461921	0.001746825555	0.01746825555
Ninja	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Suspended	Operating	1988	60	55	2800	NO	0	104.004	1:30	2.9	36	90	0.6176933435	1.106166863			0.0000000004985533085	0.0000005235048738	0	0.001206163619	0.00001861649226	0.00008273546399	0.0008273546399
Nitro	Six Flags Great Adventure	Jackson	New Jersey	United States	North America	Steel	Sit Down	Operating	2001	230	80	5394	NO	0	215	2:20	4.3	68	140	1.050906716	1.449682363			0.0001154414105	0.0000005235048738	0.0000000262275135	0.1698557926	0.01054301859	0.0137091158	0.137091158
Oblivion	Alton Towers	Alton	Staffordshire, England	United Kingdom	Europe	Steel	Sit Down	Operating	1998	65	68	1222	NO	0	180	1:15	4.5	87	75	0.8866917614	1.331547324			0.000003766847145	0.0000005235048738	0	0.00001255373114	0.001916277464	0.000496406549	0.00496406549
OCT Thrust SSC1000	Happy Valley	Hongshan	Wuhan, Hubei	China	Asia	Steel	Sit Down	Operating	2014	196.8	83		NO	0	221.2	3:20	4.5		200	1.085859976	1.473557602			0.0002493718464	0.0000005235048738	0.00001406062275	0.000000001630528947	0.01386390211	0.003645422037	0.03645422037
Outlaw Run	Silver Dollar City	Branson	Missouri	United States	North America	Wood	Sit Down	Operating	2013	107	68	2937	YES	3	162	1:27		81	87	1.057915275	1.760782433			0.000003766847145	0.0001325546417	0	0.001696003738	0.0007175588362	0.0003212239038	0.003212239038
Pandemonium	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	2007	48	31	1351	NO	0	27	2:35			155	0.272507453	0.7101281654			0	0.0000005235048738	0.000001438561059	0.00001905599131	0.0000000004628184465	0.000001375170469	0.00001375170469
Pandemonium	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Sit Down	Operating	2008	53	31	1351	NO	0	27	1:51			111	0.272507453	0.7101281654			0	0.0000005235048738	0.0000000007624434877	0.00001905599131	0.0000000004628184465	0.000001342858997	0.00001342858997
Patriot	Worlds of Fun	Kansas City	Missouri	United States	North America	Steel	Inverted	Operating	2006	149	60	3081	YES	4	123	2:18			138	0.9823871458	1.711339836			0.000002838628242	0.0006242631781	0.00000002076523913	0.002403578946	0.00006681983542	0.000293216513	0.00293216513
Phaethon	Gyeongju World	Gyeongju	Gyeongsangbuk-do	South Korea	Asia	Steel	Inverted	Operating	2007	147.7	55.9	3280.8	YES	6	107.742	2:20			140	1.061243573	1.774654392			0.0000006866352209	0.008892734784	0.0000000262275135	0.003836376086	0.0002409059631	0.001974923179	0.01974923179
Phantom's Revenge	Kennywood	West Mifflin	Pennsylvania	United States	North America	Steel	Sit Down	Operating	1991	160	85	3200	NO	0	228	1:57	3.5	52	117	1.115541735	1.49359013			0.0004088756623	0.0000005235048738	0.000000001628317223	0.003182645925	0.01853844786	0.005095065562	0.05095065562
Phoenix	Knoebels Amusement Park	Elysburg	Pennsylvania	United States	North America	Wood	Sit Down	Operating	1985	78	45	3200	NO	0	72	2:00			120	0.474059669	0.9644018349			0.000000001156691118	0.0000005235048738	0.000000002367174764	0.003182645925	0.000001805212355	0.000205900013	0.00205900013
Piraten	Djurs Sommerland	Nimtofte	Midtjylland	Denmark	Europe	Steel	Sit Down	Operating	2008	101.7	52.8	2477	NO	0	98.4	1:01		70	61	0.5895314471	1.080271098			0.0000002250475039	0.0000005235048738	0	0.0005214075487	0.0000125762598	0.00003699181447	0.0003699181447
Poltergeist	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	1999	78.8	60	2705	YES	4	124.9271	1:15	4.5	60	75	0.9869974329	1.715572778			0.000002838628242	0.0006242631781	0	0.0009473329637	0.00007573126268	0.0002015601949	0.002015601949
Prowler	Worlds of Fun	Kansas City	Missouri	United States	North America	Wood	Sit Down	Operating	2009	102.3	51.2	3074	NO	0	85	2:30			150	0.5465037434	1.036675355			0.0000001247478331	0.0000005235048738	0.00000008236632858	0.002363717325	0.000004751328703	0.0001538471829	0.001538471829
Pyrenees	Parque Espana-Shima Spain Village	Shima	Mie	Japan	Asia	Steel	Inverted	Operating	1997	147.7	62.1	4048.6	YES	6	133.8288	1:53			113	1.165235016	1.865851891			0.0000005729007724	0.008892734784	0.0000000009833889712	0.01941005383	0.0001335969876	0.003008060721	0.03008060721
Python in Bamboo Forest	Nanchang Wanda Theme Park	Xinjian	Nanchang, Jiangxi	China	Asia	Wood	Sit Down	Operating	2016	164.1	62.1	5111	NO	0	134.5	1:40			100	0.7382693289	1.212615369			0.0000005729007724	0.0000005235048738	0.00000000182942538	0.115551086	0.000139340207	0.007491116747	0.07491116747
Quimera	La Feria Chapultepec	Mexico City	Mexico	Mexico	Central America	Steel	Sit Down	Operating	2007	111	53	3444	YES	3	95.74179	1:54	4.7		114	0.7987991889	1.537708763			0.000000242107068	0.0001325546417	0.00000000111617287	0.00554252137	0.00001041586808	0.0003859322269	0.003859322269
Racer	Kings Island	Kings Mills	Ohio	United States	North America	Wood	Sit Down	Operating	1972	88	53	3415	NO	0	82.17	2:00		45	120	0.5520450775	1.039582048			0.000000242107068	0.0000005235048738	0.000000002367174764	0.005196528818	0.000003883315446	0.0003363701756	0.003363701756
Raging Bull	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Sit Down	Operating	1999	202	73	5057	NO	0	208	2:30		65	150	0.9872119479	1.405130404			0.00001675590649	0.0000005235048738	0.00000008236632858	0.1069011859	0.007660672817	0.008878242556	0.08878242556
RailBlazer	California's Great America	Santa Clara	California	United States	North America	Steel	Sit Down	Operating	2018	106	52	1800	YES	3	91.63361	1:24		90	84	0.782264099	1.521676909			0.00000001677572869	0.0001325546417	0	0.00007661155083	0.0000077598967	0.00003260530577	0.0003260530577
Ranier Rush	Puyallup Fair	Puyallup	Washington	United States	North America	Steel	Sit Down	Operating	2013	63	45	1775	YES	1	63.30443	1:45			105	0.5246854414	1.20579504			0.000000001156691118	0.000003838587504	0.0000000003520556413	0.00007107829858	0.000000920903726	0.000005566679675	0.00005566679675
Raptor	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Inverted	Operating	1994	137	57	3790	YES	6	119	2:16		45	136	1.095554186	1.806515309			0.000001011156514	0.008892734784	0.00000001641507479	0.01159821853	0.00005139429161	0.002482739482	0.02482739482
Raptor	Fantasilandia	Santiago	Metropolitan Region	Chile	South America	Steel	Inverted	Operating	2008	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.0000000007111679621	0.002536575845	0.000000001076080883	0.0002891060645	0.0000390435165	0.0005106116018	0.005106116018
Raven	Holiday World	Santa Claus	Indiana	United States	North America	Wood	Sit Down	Operating	1995	80	48	2800	NO	0	85	1:30			90	0.5252808718	1.018332816			0.0000000003722920077	0.0000005235048738	0	0.001206163619	0.000004786419344	0.00007915450778	0.0007915450778
Ravine Flyer II	Waldameer	Erie	Pennsylvania	United States	North America	Wood	Sit Down	Operating	2008	80	57	2900	NO	0	118	1:30	3.5	60	90	0.6645904133	1.14961505			0.000001011156514	0.0000005235048738	0	0.001548210856	0.00004810357746	0.0001124258265	0.001124258265
Red Force	Ferrari Land	Salou	Tarragona	Spain	Europe	Steel	Sit Down	Operating	2017	367.5	111.8	2887.2	NO	0	367	0:39		90	39	1.627822758	1.802940028			0.07122723667	0.0000005235048738	0	0.001499914082	0.7502654132	0.2120949732	2.120949732
Renegade	Valleyfair!	Shakopee	Minnesota	United States	North America	Wood	Sit Down	Operating	2007	97.5	51.3	3113	NO	0	91.4	2:00	3.9	66	120	0.5627246734	1.054181275			0.00000001294707862	0.0000005235048738	0.000000002367174764	0.002593772875	0.000007630231866	0.0001694144768	0.001694144768
Revenge of the Mummy the Ride	Universal Studios Hollywood	Universal City	California	United States	North America	Steel	Sit Down	Operating	2004	44.4	40	1906	NO	0	43.52797	2:00		50	120	0.3724102241	0.8406518248			0.000000001527988606	0.0000005235048738	0.000000002367174764	0.0001049329883	0.0000001872346041	0.000006920086298	0.00006920086298
Riddler Revenge	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Inverted	Operating	1997	109.3	49.7	2260.5	YES	5	82.24282	1:36			96	0.8872293484	1.618533236			0.0000000007111679621	0.002536575845	0.000000001076080883	0.0002891060645	0.0000390435165	0.0005106116018	0.005106116018
Riddler's Revenge	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Stand Up	Operating	1998	156	65	4370	YES	6	146	3:00	4.2		180	1.213802753	1.90591913			0.000001469846491	0.008892734784	0.000002021362648	0.03522435837	0.0002822005786	0.004067375432	0.04067375432
Ride of Steel	Darien Lake	Darien Center	New York	United States	North America	Steel	Sit Down	Operating	1999	208	73	5400	NO	0	205	2:02		68	122	0.9800349144	1.400024814			0.00001675590649	0.0000005235048738	0.00000003031904371	0.1711786369	0.006658641225	0.01276656817	0.1276656817
Road Runner Express	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	1997	73	35	2400	NO	0	67	2:24	3	27	144	0.3950288654	0.884860274			0	0.0000005235048738	0.00000004164624211	0.0004238266903	0.000001228379641	0.00002777139089	0.0002777139089
Rock 'n' Roller Coaster	Disneyland Paris - Walt Disney Studios Park	Marne la Vallee	Ile-de-France	France	Europe	Steel	Sit Down	Operating	2002	80	57	3403	YES	3	112.3274	1:10	5		70	0.8653053142	1.599596867			0.000001011156514	0.0001325546417	0	0.00505916817	0.00003291130129	0.0003605730176	0.003605730176
Rougarou	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	1996	145	60	3900	YES	4	137	2:40		52	160	1.015879969	1.74137955			0.000002838628242	0.0006242631781	0.0000002488256175	0.0144942519	0.0001628479548	0.001098092877	0.01098092877
Saw - The Ride	Thorpe Park	Chertsey	Surrey, England	United Kingdom	Europe	Steel	Sit Down	Operating	2009	100	55	2362	YES	3	100	1:40		100	100	0.8319790578	1.569076912			0.0000000004985533085	0.0001325546417	0.00000000182942538	0.003822343623	0.00001861649226	0.00005513318181	0.0005513318181
Schwur des Kärnan	Hansa Park	Sierksdorf	Schleswig-Holstein	Germany	Europe	Steel	Sit Down	Operating	2015	239.5	78.9	4051.8	YES	1	219.8	3:08		90	188	1.126440942	1.719851846			0.0000862973729	0.000003838587504	0.000004473784117	0.01953026396	0.01304232031	0.004649800562	0.04649800562
Scream!	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	2003	150	63	3985	YES	7	141	3:00	4		180	1.259855785	1.937926922			0.0000007701132763	0.02689863131	0.000002021362648	0.01715135763	0.000208383971	0.006367157592	0.06367157592
Screamer	Scandia Amusement Park	Ontario	California	United States	North America	Steel	Sit Down	Operating	1995	90	50	2600	NO	0	80	1:56			116	0.5267329656	1.016568793			0.0000000007963082768	0.0000005235048738	0.000000001436277324	0.000721774844	0.000003304090336	0.00004752249027	0.0004752249027
Shambhala	PortAventura Park	Salou	Tarragona	Spain	Europe	Steel	Sit Down	Operating	2012	249.3	83.3	5131.3	NO	0	255.9	3:00	3.8	77.4	180	1.170886403	1.529885355			0.0002688311427	0.0000005235048738	0.000002021362648	0.1189384753	0.05487417791	0.02190446173	0.2190446173
Shock Wave	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Sit Down	Operating	1978	116	60	3600	YES	2	124.9271	2:00			120	0.8441402901	1.559014768			0.000002838628242	0.00002428451953	0.000000002367174764	0.007786362234	0.00007573126268	0.0005266635213	0.005266635213
Sidewinder	Elitch Gardens	Denver	Colorado	United States	North America	Steel	Sit Down	Operating	1995	56	45	635	YES	1	47	1:06	4	47	66	0.485679628	1.151955426			0.000000001156691118	0.000003838587504	0	0.000001701564435	0.0000002492079874	0.000009173413828	0.00009173413828
Silver Bullet	Knott's Berry Farm	Buena Park	California	United States	North America	Steel	Inverted	Operating	2004	146	55	3125	YES	6	109	2:30	3	40	150	1.058216925	1.772660631			0.0000000004985533085	0.008892734784	0.00000008236632858	0.002668580742	0.00002625560187	0.001900148078	0.01900148078
Silver Star	Europa Park	Rust	Baden Wuerttemberg	Germany	Europe	Steel	Sit Down	Operating	2002	239.5	78.9	5315	NO	0	219.8	4:00	4	68.5	240	1.055012371	1.452590604			0.0000862973729	0.0000005235048738	0.0004271286663	0.1531193825	0.01304232031	0.01336324994	0.1336324994
Sky Scream	Holiday Park	Hassloch	Rhineland-Palatinate	Germany	Europe	Steel	Sit Down	Operating	2014	150	62	863	YES	1	133.4034	1:00		90	60	0.8064037645	1.477039618			0.000005542706961	0.000003838587504	0	0.000003770186564	0.0001300734729	0.00003469657586	0.0003469657586
Sky Wheel	Skyline Park	Bad Worishofen	Bavaria	Germany	Europe	Steel	Sit Down	Operating	2004	151.6	65.3	492.2	YES	2	147.5229	0:50	5		50	0.9337438409	1.633826182			0.000001617374396	0.00002428451953	0	0.000001020972213	0.0003091665894	0.00008496841204	0.0008496841204
Skyrush	Hersheypark	Hershey	Pennsylvania	United States	North America	Steel	Sit Down	Operating	2012	200	75	3600	NO	0	212	1:00	5	85	60	1.010195142	1.421401324			0.00002964138775	0.0000005235048738	0	0.007786362234	0.009206586905	0.002885990059	0.02885990059
Smiler	Alton Towers	Alton	Staffordshire, England	United Kingdom	Europe	Steel	Sit Down	Operating	2013	72.2	52.8	3838.6	YES	14	98.4	2:45	4.5	50	165	1.589531447	2.080271098			0.0000002250475039	1	0.0000004262359527	0.01280759192	0.0000125762598	0.1943780309	1.943780309
Snow Mountain Flying Dragon	Happy Valley	Nanshan	Shenzhen, Guangdong	China	Asia	Steel	Inverted	Operating	2012	117.8	54.9	2202.8	YES	4	111.8	1:32	4.7		92	0.9213876561	1.658494298			0.0000000004810420959	0.0006242631781	0	0.0002461356269	0.00003175873418	0.0001449130797	0.001449130797
Soaring Dragon & Dancing Phoenix	Nanchang Wanda Theme Park	Xinjian	Nanchang, Jiangxi	China	Asia	Steel	Sit Down	Operating	2016	196.8	84	4192	YES	6	230.6785	2:50			170	1.54381415	2.14811474			0.0003199219291	0.008892734784	0.0000007230915169	0.02547550468	0.02072814268	0.00879667731	0.0879667731
Soaring with Dragon	Hefei Wanda Theme Park	Baohe	Hefei, Anqui	China	Asia	Steel	Sit Down	Operating	2016	196.8	77.7	3438.3	YES	1	202.0663	2:45			165	1.075967533	1.684430848			0.00006249852927	0.000003838587504	0.0000004262359527	0.005472915314	0.005794482355	0.001865409448	0.01865409448
Spatiale Experience	Nigloland	Dolancourt	Champagne-Ardenne	France	Europe	Steel	Sit Down	Operating	2000	65.6	37.3	2624.7	NO	0	33.0076	2:15	4.5		135	0.3291332229	0.781175741			0	0.0000005235048738	0.00000001458623218	0.0007698162878	0.0000000007745808737	0.00004979018604	0.0004979018604
SpeedSnake FREE	Fort Fun Abenteuerland	Wasserfall	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	1982	64	37.3	1148.3	YES	2	33.0076	1:00			60	0.4719903658	1.159140214			0	0.00002428451953	0	0.000009855611239	0.0000000007745808737	0.000005356077517	0.00005356077517
Stampida	PortAventura Park	Salou	Tarragona	Spain	Europe	Wood	Sit Down	Operating	1997	84	46	3127	NO	0	67.30559	1:40			100	0.4695359312	0.9567144416			0.00000001714307966	0.0000005235048738	0.00000000182942538	0.002681239085	0.000001257824647	0.0001734095739	0.001734095739
Star Mountain	Beto Carrero World	Penha	Santa Catarina	Brazil	South America	Steel	Sit Down	Operating	1997	75	40	2400	YES	2	43.52797	2:37			157	0.515267367	1.218616298			0.000000001527988606	0.00002428451953	0.000001793165739	0.0004238266903	0.0000001872346041	0.0000321327359	0.000321327359
Star Wars Hyperspace Mountain	Disneyland Resort Paris - Disneyland Park	Marne la Vallee	Ile-de-France	France	Europe	Steel	Sit Down	Operating	1995	105	44	3281	YES	3	59.31856	2:05			125	0.651300102	1.382854775			0.0000000007774932375	0.0001325546417	0.00000004382074169	0.003838135799	0.0000006726644504	0.0002734521825	0.002734521825
Stealth	Thorpe Park	Chertsey	Surrey, England	United Kingdom	Europe	Steel	Sit Down	Operating	2006	205.1	80	1312.3	NO	0	219.8	0:26		90	26	1.015021549	1.424212006			0.0001154414105	0.0000005235048738	0	0.00001682722562	0.005248047429	0.001385313103	0.01385313103
Steel Dragon 2000	Nagashima Spa Land	Nagashima	Kuwana,, Mie	Japan	Asia	Steel	Sit Down	Operating	2000	318.3	95	8133.2	NO	0	306.8	4:00		68	240	1.371127563	1.654941936			0.003857892874	0.0000005235048738	0.0004271286663	1	0.2551279491	0.1314477348	1.314477348
Steel Eel	SeaWorld San Antonio	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	1999	150	65	3700	NO	0	150	1:40	3.5	65	100	0.7948007021	1.25930666			0.000001469846491	0.0000005235048738	0.00000000182942538	0.009623666765	0.0003582495412	0.0007138139013	0.007138139013
Steel Force	Dorney Park & Wildwater Kingdom	Allentown	Pennsylvania	United States	North America	Steel	Sit Down	Operating	1997	200	75	5600	NO	0	205	3:00	3.4	61	180	0.9934487307	1.409545215			0.00002964138775	0.0000005235048738	0.000002021362648	0.2195475885	0.006658641225	0.01589092672	0.1589092672
Steel Vengeance	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2018	205	74	5740	YES	4	200	2:30		90	150	1.260494386	1.930730525			0.0000223284152	0.0006242631781	0.00000008236632858	0.2584042889	0.005248047429	0.01815218517	0.1815218517
Steel Venom	Valleyfair!	Shakopee	Minnesota	United States	North America	Steel	Inverted	Operating	2003	185	68	630	NO	0	175	1:00		90	60	0.8747300389	1.322368999			0.000003766847145	0.0000005235048738	0	0.00001671674761	0.001469185307	0.0003803258586	0.003803258586
Storm Chaser	Kentucky Kingdom	Louisville	Kentucky	United States	North America	Steel	Sit Down	Operating	2016	100	52	2744	YES	3	91.63361	1:40	3.8	78	100	0.782264099	1.521676909			0.00000001677572869	0.0001325546417	0.00000000182942538	0.0010466282	0.0000077598967	0.00009518706164	0.0009518706164
Storm Runner	Hersheypark	Hershey	Pennsylvania	United States	North America	Steel	Sit Down	Operating	2004	150	75	2600	YES	3	180	0:50	5	90	50	1.147925833	1.828365704			0.00002964138775	0.0001325546417	0	0.000721774844	0.001916277464	0.0005743944629	0.005743944629
Stunt Fall	Parque Warner Madrid	San Martin de la Vega	Madrid	Spain	Europe	Steel	Inverted	Operating	2002	191	65.6	1204	YES	3	177	1:32	4.5	90	92	1.077703863	1.776941284			0.000001779101423	0.0001325546417	0	0.00001183612102	0.001634997743	0.0004488133964	0.004488133964
Super Tornado	Zoo Safari- und Hollywoodpark Stukenbrock	Stukenbrock	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	1981	64	37.3	1148.3	YES	2	33.0076	1:21			81	0.4719903658	1.159140214			0	0.00002428451953	0	0.000009855611239	0.0000000007745808737	0.000005356080505	0.00005356080505
Superman - Ride Of Steel	Six Flags America	Upper Marlboro	Maryland	United States	North America	Steel	Sit Down	Operating	2000	197	73	5350	NO	0	205	2:10		68	130	0.9800349144	1.400024814			0.00001675590649	0.0000005235048738	0.000000008033731706	0.1603788658	0.006658641225	0.01206980987	0.1206980987
Superman - Ultimate Flight	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Flying	Operating	2003	106	51	2798	YES	2	100	3:00	3		180	0.7241439065	1.451932847			0.00000001157993125	0.00002428451953	0.000002021362648	0.001200098283	0.000014076494	0.00008621799397	0.0008621799397
Superman / la Atraccion de Acero	Parque Warner Madrid	San Martin de la Vega	Madrid	Spain	Europe	Steel	Sit Down	Operating	2002	164.1	62.1	3608.9	YES	7	133.8288	2:26			146	1.236663587	1.918305001			0.0000005729007724	0.02689863131	0.0000000005235694976	0.007936085393	0.0001335969876	0.005752828525	0.05752828525
Superman el Ultimo Escape	Six Flags Mexico	Mexico City	Mexico City	Mexico	Central America	Steel	Sit Down	Operating	2004	219.8	74.6	5577.4	NO	0	205.4	3:04		60	184	0.9907659674	1.407651386			0.00002647769651	0.0000005235048738	0.000003016528315	0.2136619206	0.006658641225	0.01551061449	0.1551061449
Superman Krypton Coaster	Six Flags Fiesta Texas	San Antonio	Texas	United States	North America	Steel	Sit Down	Operating	2000	168	70	4015	YES	6	163	2:35	3.8	58	155	1.28800715	1.964303871			0.000006921528067	0.008892734784	0.0000001438561059	0.01818634576	0.0007592296396	0.003092236018	0.03092236018
Superman the Ride	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Sit Down	Operating	2000	208	77	5400	NO	0	221	2:35	3.6	72	155	1.045140059	1.445755172			0.00005164541649	0.0000005235048738	0.0000001438561059	0.1711786369	0.0137438026	0.01460403245	0.1460403245
Superman: Escape from Krypton	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	1997	415	100	1235	NO	0	328.1	0:28	4.5	90	28	1.455619041	1.704918903			0.01027730941	0.0000005235048738	0	0.00001309766701	0.4095048489	0.1083318259	1.083318259
Swarm	Thorpe Park	Chertsey	Surrey, England	United Kingdom	Europe	Steel	Wing	Operating	2012	127	57	2543	YES	5	112.3274	1:25	4.5		85	1.008162457	1.734301122			0.000001011156514	0.002536575845	0	0.0006213585825	0.00003291130129	0.0005395571528	0.005395571528
T Express	Everland	Yongin-si	Gyeonggi-do	South Korea	Asia	Wood	Sit Down	Operating	2008	183.8	64.6	5383.8	NO	0	150.9	2:27		77	147	0.7942710489	1.259066381			0.00001293172005	0.0000005235048738	0.0000005867064843	0.1676238317	0.00037782467	0.01091239219	0.1091239219
Takabisha	Fuji-Q Highland	Fujiyoshida	Yamanashi	Japan	Asia	Steel	Sit Down	Operating	2011	141	62.1	3280.8	YES	7	133.8288	1:52		121	112	1.236663587	1.918305001			0.0000005729007724	0.02689863131	0.000000008660654874	0.003836376086	0.0001335969876	0.005488319523	0.05488319523
Talon	Dorney Park & Wildwater Kingdom	Allentown	Pennsylvania	United States	North America	Steel	Inverted	Operating	2001	135	58	3110	YES	4	120	1:46	4.5	50	106	0.9617962961	1.694021386			0.000001431850803	0.0006242631781	0.0000000004008346097	0.00257537352	0.00005489798967	0.0003011825262	0.003011825262
Taron	Phantasialand	Bruhl	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	2016	98.4	72.7	4330.8	NO	0	179.7902	1:44			104	0.9177123157	1.354113457			0.00001536170128	0.0000005235048738	0.0000000003090928296	0.03284061724	0.001895244243	0.002611910491	0.02611910491
Tatsu	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Flying	Operating	2006	170	62	3602	YES	4	111	1:57			117	0.9670928281	1.694685657			0.0000005542706961	0.0006242631781	0.000000001628317223	0.00781978541	0.00003008348687	0.0006332343015	0.006332343015
Taunsblitz	Taunus Wunderland	Schlangenbad	Hesse	Germany	Europe	Steel	Sit Down	Operating	1999	45.9	28	1213.9	NO	0	-2.37612	1:50			110	0.1821089296	#NUM!			0	0.0000005235048738	0.0000000006709592032	0.00001222580627	0.0000000003325855339	0.0000008910952191	0.000008910952191
Temple of the Night Hawk	Phantasialand	Bruhl	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	1988	38.4	28.9	3851.7	NO	0	0.990322	4:00			240	0.1961988359	0.4889352225			0	0.0000005235048738	0.0004271286663	0.01315211556	0.0000000004540959926	0.000945074489	0.00945074489
Terminator Salvation: The Coaster	Six Flags Magic Mountain	Valencia	California	United States	North America	Wood	Sit Down	Operating	2009	95	50	2500	NO	0	87.3	3:00			180	0.752111232	1.19406436			0.0001497980736	0.0000005235048738	0.000002021362648	0.000003954413459	0.000005665605018	0.00004093254269	0.0004093254269
Texas Tornado	Wonderland Amusement Park	Amarillo	Texas	United States	North America	Steel	Sit Down	Operating	1985	80	65	2050	YES	2	80	1:43			103	0.7701937302	1.475707474			0.000001469846491	0.00002428451953	0.000000002712676973	0.0001595188411	0.000003304090336	0.00001622381267	0.0001622381267
Thunder Dolphin	Tokyo Dome City	Bunkyo	Tokyo	Japan	Asia	Steel	Sit Down	Operating	2003	262.5	80.8	3500	NO	0	218.2	1:30	4.4	80	90	1.063927745	1.458653216			0.0001422359097	0.0000005235048738	0	0.006270127795	0.01215636883	0.003578459189	0.03578459189
Timber Drop	Fraispertuis City	Jeanmenil	Lorraine	France	Europe	Steel	Sit Down	Operating	2011	96	41	1378	YES	2	47.45268	1:20		113	80	0.5313635335	1.239284888			0.0000000002308012992	0.00002428451953	0	0.00002077481747	0.000000258622706	0.00000610734403	0.0000610734403
Timber Wolf	Worlds of Fun	Kansas City	Missouri	United States	North America	Wood	Sit Down	Operating	1989	100	53	4230	NO	0	95	2:13	2.8		133	0.5827388574	1.072941098			0.000000242107068	0.0000005235048738	0.000000001150371779	0.0273344351	0.000009879433414	0.001766171642	0.01766171642
Timberhawk: Ride of Prey	Wild Waves Theme Park	Federal Way	Washington	United States	North America	Wood	Sit Down	Operating	2003	75	50	2600	NO	0	83.46111	2:08			128	0.5350179177	1.025937456			0.0000000007963082768	0.0000005235048738	0.000000006311428987	0.000721774844	0.000004273570654	0.00004777377958	0.0004777377958
Time Traveler	Silver Dollar City	Branson	Missouri	United States	North America	Steel	Sit Down	Operating	2018	100	50.3	3020	YES	3	90	1:57		90	117	0.7669541973	1.507751044			0.0000000008913367966	0.0001325546417	0.000000001628317223	0.002076011778	0.000006895579771	0.0001613741532	0.001613741532
Titan	Six Flags Over Texas	Arlington	Texas	United States	North America	Steel	Sit Down	Operating	2001	245	85	5312	NO	0	255	3:30	4.5	65	210	1.180135037	1.536096782			0.0004088756623	0.0000005235048738	0.00003498758018	0.1525085386	0.05312889528	0.02366346125	0.2366346125
Titan Cascabel	Selva Magica	Guadalajara	Jalisco	Mexico	Central America	Steel	Sit Down	Operating	1994	75	55	2500	NO	0	104.004	1:49			109	0.6176933435	1.106166863			0.0000000004985533085	0.0000005235048738	0.000000005902229563	0.0005543973447	0.00001861649226	0.00004068614939	0.0004068614939
Tonnerre de Zeus	Parc Asterix	Plailly	Picardie	France	Europe	Wood	Sit Down	Operating	1997	98	52	4044	NO	0	91.63361	2:05			125	0.5679783847	1.058766859			0.00000001677572869	0.0000005235048738	0.00000004382074169	0.01923838378	0.0000077598967	0.001243295247	0.01243295247
Top Thrill Dragster	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2003	420	120	2800	NO	0	400	0:30		90	30	1.761766773	1.875354584			0.2002912329	0.0000005235048738	0	0.001206163619	0.9648411965	0.3007572549	3.007572549
Tornado	Bosque Magico	Guadalupe	Nuevo Leon	Mexico	Central America	Steel	Sit Down	Operating	2008	64	37.3	1148.3	YES	2	33.0076	1:56			116	0.4719903658	1.159140214			0	0.00002428451953	0.000000001436277324	0.000009855611239	0.0000000007745808737	0.000005356401683	0.00005356401683
Tower of Terror II	Dreamworld	Coomera	Queensland	Australia	Oceania	Steel	Sit Down	Operating	1997	377.3	100	1235	NO	0	328.1	0:28	4.5	90	28	1.455619041	1.704918903			0.01027730941	0.0000005235048738	0	0.00001309766701	0.4095048489	0.1083318259	1.083318259
Twisted Colossus	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	2015	121	57	4990	YES	2	128	3:40		80	220	0.8313710011	1.549635132			0.000001011156514	0.00002428451953	0.00008374830977	0.09687777305	0.00009230700009	0.0062976373	0.062976373
Twister II	Elitch Gardens	Denver	Colorado	United States	North America	Wood	Sit Down	Operating	1995	100	55	4640	NO	0	91	2:37	3.1	56	157	0.5865832956	1.073941792			0.0000000004985533085	0.0000005235048738	0.000001793165739	0.0559607186	0.000007413016051	0.003612436659	0.03612436659
Ultimate	Lightwater Valley	Ripon	North Yorkshire, England	United Kingdom	Europe	Steel	Sit Down	Operating	1991	107	50	7442	NO	0	83.46111	7:20			440	0.5350179177	1.025937456			0.0000000007963082768	0.0000005235048738	1	0.8932569025	0.000004273570654	0.2834371354	2.834371354
V2: Vertical Velocity	Six Flags Discovery Kingdom	Vallejo	California	United States	North America	Steel	Sit Down	Operating	2001	150	65	630	NO	0	150	1:10		90	70	0.7948007021	1.25930666			0.000001469846491	0.0000005235048738	0	0.000001671674761	0.0003582495412	0.00009303998389	0.0009303998389
Valravn	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2016	223	75	3415	YES	3	214	2:23		90	143	1.229265545	1.88766275			0.00002964138775	0.0001325546417	0.00000003712135775	0.005196528818	0.01007949604	0.002969733703	0.02969733703
Velikolukskiy Myasokombinat	Wonder Island	Saint Petersburg	Saint Petersburg	Russia	Europe	Steel	Sit Down	Operating	2015	124	62.1	3464	YES	4	133.8288	2:30	3.8		150	1.022377873	1.745720704			0.0000005729007724	0.0006242631781	0.00000008236632858	0.005793126986	0.0001335969876	0.0005292183455	0.005292183455
Velikolukskiy Myasokombinat-2	Wonder Island	Saint Petersburg	Saint Petersburg	Russia	Europe	Steel	Sit Down	Operating	2017	108	52.8	2870	YES	10	94.91893	1:18			78	1.295489243	1.916765909			0.0000002250475039	0.3070851639	0	0.001437204037	0.000009822435183	0.05953110165	0.5953110165
Vertical Velocity	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Sit Down	Operating	2001	185	70	630	NO	0	167.92	0:45			45	0.8712060561	1.319004525			0.000006921528067	0.0000005235048738	0	0.000001671674761	0.0009990626597	0.0002598179962	0.002598179962
Viper	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Sit Down	Operating	1990	188	70	3830	YES	7	171	2:30	4.1	55	150	1.378574477	2.03189764			0.000006921528067	0.02689863131	0.00000008236632858	0.01258578312	0.001183161406	0.006325309489	0.06325309489
Viper	Six Flags Great America	Gurnee	Illinois	United States	North America	Wood	Sit Down	Operating	1995	100	50	3458	NO	0	80	1:45	3.6	53	105	0.5267329656	1.016568793			0.0000000007963082768	0.0000005235048738	0.0000000003520556413	0.005716891714	0.000003304090336	0.00036978785	0.0036978785
Vortex	Kings Island	Kings Mills	Ohio	United States	North America	Steel	Sit Down	Operating	1987	148	55	3800	YES	6	138	2:30	3.9	55	150	1.127594916	1.836589735			0.0000000004985533085	0.008892734784	0.00000008236632858	0.01183843544	0.0001732593722	0.002529688064	0.02529688064
Voyage	Holiday World	Santa Claus	Indiana	United States	North America	Wood	Sit Down	Operating	2006	159	67	6442	NO	0	154	2:45			165	0.8177838964	1.277322295			0.000002763070693	0.0000005235048738	0.0000004262359527	0.5087608544	0.0004531877479	0.03294114322	0.3294114322
Whirl Wind Looping Coaster	Wonder Island	Saint Petersburg	Saint Petersburg	Russia	Europe	Steel	Sit Down	Operating	2003	64	37.3	1148	YES	2	33.0076	1:57			117	0.4719903658	1.159140214			0	0.00002428451953	0.000000001628317223	0.000009845856786	0.0000000007745808737	0.000005355815727	0.00005355815727
Whizzer	Six Flags Great America	Gurnee	Illinois	United States	North America	Steel	Sit Down	Operating	1976	70	42	3100	NO	0	64	2:00	3	35	120	0.4348001887	0.9220376829			0.0000000003473018082	0.0000005235048738	0.000000002367174764	0.002514902534	0.0000009724421579	0.0001626046769	0.001626046769
Wicked Cyclone	Six Flags New England	Agawam	Massachusetts	United States	North America	Steel	Sit Down	Operating	2015	109	55	3320	YES	3	104.004	1:35		78	95	0.8319790578	1.569076912			0.0000000004985533085	0.0001325546417	0	0.004195656935	0.00001861649226	0.0003011604245	0.003011604245
Wicked Twister	Cedar Point	Sandusky	Ohio	United States	North America	Steel	Sit Down	Operating	2002	215	72	215	NO	0	206	0:40	2.1	90	40	0.9757203508	1.396921693			0.00001252646757	0.0000005235048738	0	0.000000368508544	0.006978712918	0.001804315907	0.01804315907
Wild One	Six Flags America	Upper Marlboro	Maryland	United States	North America	Wood	Sit Down	Operating	1986	98	53	4000	NO	0	88	1:52			112	0.5659924459	1.055041272			0.000000242107068	0.0000005235048738	0.000000008660654874	0.01766221068	0.000005962585574	0.001141143962	0.01141143962
Wild Thing	Valleyfair!	Shakopee	Minnesota	United States	North America	Steel	Sit Down	Operating	1996	207	74	5460	NO	0	196	3:00	4.1	60	180	0.9652107221	1.389255961			0.0000223284152	0.0000005235048738	0.000002021362648	0.1848141573	0.004320761864	0.01304484927	0.1304484927
Wild Thing	Wild Waves Theme Park	Federal Way	Washington	United States	North America	Steel	Sit Down	Operating	2008	75	40	1565	YES	3	53.74	1:00			60	0.6356720867	1.37215682			0.000000001527988606	0.0001325546417	0	0.00003742763533	0.0000009724421579	0.00002832141565	0.0002832141565
Wildfire	Kolmarden	Norrkoping	Ostergotland	Sweden	Europe	Wood	Sit Down	Operating	2016	183.8	71.5	4150.3	YES	3	180.8	2:00	4	83	120	1.07851864	1.775634172			0.00001081534709	0.0001325546417	0.000000002367174764	0.02356222083	0.0006703661798	0.001721588332	0.01721588332
Winjas	Phantasialand	Bruhl	North Rhine-Westphalia	Germany	Europe	Steel	Sit Down	Operating	2002	57.1	41	1526.6	NO	0	52.5	1:44	4	90	104	0.4005813189	0.8787866396			0.0000000002308012992	0.0000005235048738	0.0000000003090928296	0.00003321083105	0.0000003898521717	0.000002344694154	0.00002344694154
Wodan Timbur Coaster	Europa Park	Rust	Baden Wuerttemberg	Germany	Europe	Wood	Sit Down	Operating	2012	131.3	62.1	3444.9	NO	0	133.8288	3:25	3.5	52	205	0.7366635873	1.21119822			0.0000005729007724	0.0000005235048738	0.00002228769379	0.005553584643	0.0001335969876	0.0003980542993	0.003980542993
X2	Six Flags Magic Mountain	Valencia	California	United States	North America	Steel	Wing	Operating	2002	175	76	3610	YES	2	215	1:42	4	88.5	102	1.166936227	1.809099584			0.00003920033942	0.00002428451953	0.0000000002379790679	0.007954768621	0.01054301859	0.003248806368	0.03248806368
Xcelerator	Knott's Berry Farm	Buena Park	California	United States	North America	Steel	Sit Down	Operating	2002	145.3	63.2	3278.6	NO	0	138.5185	1:02	4	90	62	0.7552605642	1.226717653			0.0000008220973121	0.0000005235048738	0	0.003817067641	0.0001789015461	0.0002927440473	0.002927440473