Jordan Zink

Carnegie Mellon University

jzink@andrew.cmu.edu

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### Review - Early Manufacturers

<table>
<thead>
<tr>
<th>Name</th>
<th>Wood or Steel</th>
<th>Country of Origin</th>
<th>Years of Primary Operation</th>
<th>Operating or Defunct</th>
</tr>
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<tr>
<td>Arrow Dynamics</td>
<td>Steel</td>
<td>🇺🇸</td>
<td>1950s-2002</td>
<td>Defunct</td>
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<tr>
<td>CCI</td>
<td>Wooden</td>
<td>🇺🇸</td>
<td>1992-2002</td>
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<td>Dinn Corp</td>
<td>Wooden</td>
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<td>1989-1991</td>
<td>Defunct</td>
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<tr>
<td>PTC</td>
<td>Wooden</td>
<td>🇺🇸</td>
<td>1920s-1979</td>
<td>Defunct*</td>
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<td>Schwarzkopf</td>
<td>Steel</td>
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<td>1960s-1990s</td>
<td>Defunct</td>
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<td>Togo</td>
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<tr>
<td>Vekoma</td>
<td>Steel</td>
<td>🇳🇱</td>
<td>1979-Current</td>
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</table>
Review - Early Manufacturers

• 1972-1979
  • Steel - Rise to prominence; modern inversions perfected; becomes the staple amusement attraction
  • Wood - Helps usher in the Second Golden Age; overtaken by steel

• 1979-1992
  • Steel - Time of innovation and pushing the limit; dominated by Arrow Dynamics
  • Wood - Almost dies out, brief resurgence by Dinn Corp

• 1992-2002
  • Steel - Arrow replaced by B&M and Intamin; innovations continue
  • Wood - Revived by CCI; sets the stage for modern wooden coasters
Today - Modern Manufacturers

- The two dominant steel manufacturers
  - Intamin AG
  - Bolliger and Mabillard (B&M)
  - I guess Vekoma too...

- The two dominant wooden manufacturers
  - Great Coasters International (GCI)
  - The Gravity Group (TGG)

- Some other important manufacturers operating today
Intamin AG

Steel, Swiss, 1979-Current
Intamin AG - Origins

Started as a ride manufacturer making tower rides, ferris wheels, water rides, etc.
Intamin AG - Origins

During the 70s and 80s, acted as broker for Schwarzkopf to sell rides outside of Germany
Intamin AG - Early Coasters

First coaster was a whopping 19ft high and went 6mph!
Intamin AG - Early Coasters

During 80s, perfected the stand-up coaster (but not popular)
Intamin AG - Early Coasters

Concept called Space Diver; only one ever built (it moved around)
Intamin AG - Werner Stengel

Intamin is often considered Werner Stengel’s company, even though he designs coasters for others (including B&M).
Intamin AG - Mega Coasters

First major successful line, started with Ride of Steel at Darien Lake
Intamin AG - Mega Coasters

Large camelbacks, low to the ground turns, smooth transitions, lots of airtime
Intamin AG - Millennium Force

First giga coaster (310ft), built in 2000, secured Intamin’s position in industry as a dominant manufacturer
Intamin AG - Accelerator Coaster

Another major line, utilize hydraulic launches, first coaster was Xcelerator at Knott’s Berry Farm in 2002
Intamin AG - Accelerator Coaster

Some are the tallest coasters in the world (Kingda Ka at SFGAd, 456ft tall)
Intamin AG - Accelerator Coaster

Others are the fastest (Formula Rossa, 149mph)
Intamin AG - Accelerator Coaster

Large variety of sizes
Intamin AG - LSM Coasters

LSMs sometimes used over hydraulics, e.g. Volcano: The Blast Coaster at Kings Dominion in 1998
Intamin AG - Mega Lites

Recent line of coasters, focuses on airtime and forces over height and speed, very successful
Intamin AG - ZacSpins

Intamin’s take on 4th dimensional coasters, free spinning, no turns
Intamin AG - Other Rides

Still makes many flat rides, especially drop towers
Bolliger and Mabillard (B&M)

Steel, Swiss, 1990-Current
B&M - Founders

Founded by two Intamin engineers: Walter Bolliger and Claude Mabillard
B&M - First Rides
First coaster was Iron Wolf at SFGA m, 1990, similar to stand-up coasters made at Intamin
B&M - Inverted Coasters

Huge success in 1992 with Batman: The Ride at SFGAmp, first inverted coaster
B&M - Inverted Coasters

B:TR cloned across the world, inverts became B&M’s main line
B&M - Kumba

1993 at BGT, another huge success, eclipsed Arrow’s Drachen Fire, beginning of the end of Arrow
B&M - Kumba

Example of B&M formula: lift, string of big inversions (vertical loops, dive loops, immelmanns, zero-G rolls, cobra rolls), MCBR, then smaller elements ([interlocking] corkscrews, helixes)
B&M - Mega Coasters

1999 began making 200ft+ coaster (same time as Intamin), focus on camelbacks
B&M - Mega Coasters

While Intamin quickly reached 300ft+, B&M waited until 2012 with Leviathan at CW
B&M - Floorless Coasters

Invented the floorless coaster in 1999 with Medusa at SFGAd (now Bizarro)
B&M - Flying Coasters

Improved on Vekoma’s flying coaster concept in 2002, better station loading
B&M - Flying Coasters

Much larger than Vekoma’s Flying Dutchman coasters, e.g. Tatsu at SFMM (170ft tall)
B&M - Dive Machines

Not exactly a type, but distinctive style, vertical drop with hold-over-edge features
B&M - Wing Coasters

Current hot line, riders sit on side of track (no rotation), first one Raptor at Gardaland in 2011
B&M - Wing Coasters
Unique features like keyhole element
B&M - Launches

No true launch coasters by B&M until 2015 with Thunderbird at 2015 (LSM)
Vekoma

What about Vekoma? Recall they went bankrupt in 2002, but survived by making their staple Boomerang and SLC model lines.
Vekoma

First innovation after bankruptcy was the motorbike coaster with Booster Bike at Toverland in 2004
Vekoma

Have recovered and are still prominent today, shifting towards Intamin/B&M design styles
Vekoma

Also make some of Disney’s coaster systems
Great Coasters International (GCI)
Wood, American, 1996-Current

![GCI Logo]
GCI - Origins

Formed by former CCI employees, first coaster Wildcat at Hersheypark in 1996
GCI - Design Philosophy

Coasters meant to emulate 1920s coasters (esp. Fred Church coasters), lots of twisting drops and crossovers, avoid camelbacks
GCI - Unique Features

Many GCI woodies feature station fly-throughs
GCI - Unique Features

Use their own Millennium Flyer rolling stock instead of PTC trains
The Gravity Group (TGG)

Wood, American, 2005-Current
TGG - Origins
After CCI went bankrupt, 4 of the best designers form TGG (everyone else went to S&S)
TGG - Design Philosophy

Huge stress on uniqueness, made huge mark with their first coaster Hades at Mt. Olympus in 2005
TGG - Design Philosophy

Going under parking lot only on Hades, but 90 degree banked turns common
TGG - Voyage

Their second coaster, Voyage at Holiday World in 2006, was ranked the #1 woodie in the world for several years.
TGG - China

Built China’s first wooden coaster (Fireball, 2009), and now many of their coasters are in China
TGG - Dauling Dragon

Impressive dueling coaster, features “high-five” element

Photo: Justin Garvanovic - www.coasterclub.org
TGG - Smaller Coasters

Not all major installations, Wooden Warrior is only 35ft tall
# Dominant Modern Manufacturers

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Other Important Manufacturers
Mack

Steel, German, 1960s-Current

 RIDES GmbH & Co KG
Mack

Make a lot of wild mouse coasters
Mack

Invented the modern bobsled (better than Intamin)
Mack
Perfected the water coaster
Mack

Becoming a competitor to Intamin, Blue Fire at Europa Park featured Blitz Coaster feature
Maurer Soehne

Steel, German, 1996-Current
Maurer Soehne
Lots of wild mouse coasters and spinning coasters
Maurer Soehne
X-Car line, feature odd lift hills
Gerstlauer

Steel, German, 1998-Current
Gerstlauer

Famous line is their Eurofighters
Chance Morgan

Steel, American, 1996-Current
Chance Morgan
Made a handful of hyper coasters in late 1990s
Chance Morgan
Resurfaced in 2014 with Lightning Run at Kentucky Kingdom
S&S Worldwide
Steel, American, 2001-Current
Mack

Invented the compressed air launch in 2001, bought out Arrow after the latter’s bankruptcy.
Premier Rides
Steel, American, 1996-Current
Mack

First to use LIMs in 1996, “spaghetti bowl” launched coasters
Zamperla

Steel, Italian, 1980s-Current
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