Sorry, you can't go on this one A ride of the future as imagined by illustrator Peter Crowther

BUILDING

FANTASYLAND

The sky is quite literally the limit when it comes to building a blockbuster theme park ride. The top attractions cost tens of millions of pounds to construct and employ state-of-the-art technology. This is no Mickey Mouse industry, says **Christian Sylt**

7 mins

ILLUSTRATION PETER CROWTHER

It isn't enough any more for a major movie franchise to be accompanied by the usual merchandise and video game. What any self-respecting blockbuster needs these days is an eponymous theme park ride. And it's big business.

This summer, for example, Universal Studios in Florida will be launching Transformers: The Ride, to add to similar installations in their Singapore and Hollywood theme parks. Guests don 3D glasses and travel in small open-topped cars through sets populated by giant cinema screens and large-scale replicas of the shape-shifting robots that give the series its name. The screens come alive with 3D movement and explosions, with visuals in pin-sharp definition. At the end of the ride, the slightly befuddled guests are then funnelled through a gift shop. DVDs of the movie are on sale as well as the toys on which the ride is based. And so much is crammed into the four-minute attraction that you can't see it all the first time round. *Ker-ching* go the cash tills as the guests go round again…

Legendary animator Walt Disney invented modern-day theme parks with the opening of his first Disneyland park in California in 1955. He claimed his motivation was the lack of entertainment options available to him and his two young daughters. The amusement parks of Disney's era had few rides that parents could enjoy with their children and they were often dirty and unsafe. Disney changed that by integrating his rides with the stories that had become famous in his movies.

So not for Disney any old log flume that just winches people up one side and slides them down the other into a pool of water. At Disneyland the log flume was built inside a giant tree stump and based on the 1946 movie *Song of the South*, which put the Uncle Remus stories to music. The tale of Brer Rabbit and Brer Fox is told during the ride using audio-animatronics – moving models of the characters co-ordinated to music and speech – with the drop at the finale representing Brer Rabbit being flung into the briar patch by his enemy.

"Disneyland is where you live the magic and we fight very hard to keep people totally immersed," says Peter McGrath, vice president of creative development at Walt Disney Imagineering. "I guess it was the first form of virtual reality in the 50s."

"We were looking for a gut-wrenching, hair-raising thrill"

Disneyland was an overnight success when it opened and the Anaheim theme park, subsequently rebranded as Disneyland Park, has seen more than 650 million visitors in the succeeding years. It was followed in 1971 by Disney World, a resort in Orlando comprising four theme parks. Since then further Disney parks have opened in Tokyo, Paris and, most recently, Hong Kong in 2005.

The attractions in all of Disney's theme parks are designed by its 'imagineering' arm. (The term was coined by Disney from the words imagination and engineering.) There are around 1,000 'imagineers'

worldwide and they have a diverse range of job descriptions including writers, artists, interior designers, financial analysts and computer programmers.

"There are about 140 different disciplines in imagineering," says McGrath. "To build one of Norman Foster's buildings there are probably about 20 to 30 different disciplines but when you enter show business and entertainment you start to introduce a lot more."

According to the Themed Entertainment Association, a total of 121.4 million guests visited Disney's parks in 2011 and they generated $11.8bn of the company's $40.9bn revenue. Attendance is driven by new rides and there is a precise formula for pulling them off.

"If we are designing an attraction for an existing park there is usually a business reason behind it," says David Minichiello, Imagineering's creative development director. "For example, does the park need more shows and attractions geared toward a younger or teenage audience?"

Once the commercial considerations have been taken into account, the process of design begins in earnest (see next page). "We go into blue sky thinking, where the sky really is the limit and it's really fun. You brainstorm," says Minichiello.

Post-it notes and sketches are core to the early stages of the design process and Minichiello stresses that no idea is too radical to be considered. That doesn't mean to say that the process is unstructured. Far from it, in fact.

"There are several types of blue sky," says McGrath. "There is free blue sky, where ideas are generated purely on the basis of storytelling – a new story or new idea, stretching a new technical innovation or finding a new way purely in a kind of experimental mode. Then we have targeted blue sky, which is targeted at Disneyland Paris or targeted at Hong Kong or Tokyo. Sometimes we'll develop attractions and target them afterwards once they've gone through a pure blue sky process."

He adds that one of imagineering's mantras is "there's no such thing as a bad idea." This means that it keeps detailed records of all concepts, even tho e that may seem too outlandish to make it into reality. Imagineering takes the long view that there may come a time in future when technology is available to pull off something that was previously considered impossible. Hence it has an archive with more than 80,000 pieces of concept art and three million research photos taken by its members.

Perhaps surprisingly, imagineering produces physical models of every project. "Three-dimensional models are a very strong design tool that we use," says McGrath. "All our art direction takes place at scale level before we get into documenting and constructing anything. We model everything. We now use technology to do it three dimensionally in the digital world but we still always physically model it."

He explains that this enables imagineering to visualise how the technical and engineering aspects of an attraction will function. Ensuring it is within the budget is not so straightforward.

"We do estimates all along the way to ensure that we fall into the business plan and the budget we propose. Initially we think outside the box but then take it to where we think it's realistic," says Minichiello. Lateral thinking is often the only solution.

In 2008 the Tower of Terror opened in Disneyland Paris and its development pushed imagineering's creativity to new heights. The $230m 183ft structure resembles a faded Art Deco hotel from Hollywood's golden era. The queue winds past a reception that has been artificially aged with fake cobwebs covering dusty luggage trunks. Guests are eventually led to an elevator car fitted out with seats. Once everyone is strapped in, the car rockets upwards in complete darkness before huge windows swing open at the top revealing a vista that stretches across the outskirts of Paris. The lift then plummets down faster than the speed of gravity, giving guests moments of weightlessness before coming to a smooth stop.

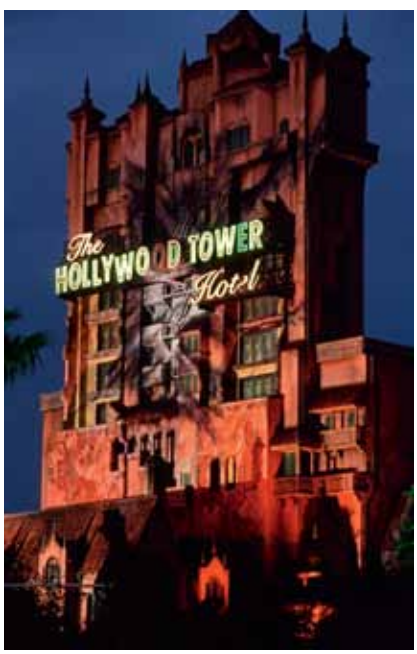
The effect is generated thanks to the world's largest ride-system motors, which are hidden at the top of the tower. They are 12ft tall, 7ft wide, 35ft long and weigh 60 tonnes. The motors are capable of accelerating ten tons at a rate of 15 times the speed of a normal elevator whilst generating torque equivalent to 275 Corvette engines. In order to achieve the weightlessness effect, the elevator car is pulled down by cables attached to the bottom of it whilst the motors force it down at the same time. Imagineering built the system from the ground up, but this isn't what it originally wanted to do.

The designers began by drawing on the expertise of renowned elevator manufacturer Otis, who invited them to visit a new skyscraper in Los Angeles containing its newest and fastest elevator system. Otis took the imagineers to the top floor and cranked the lift up to full speed. They soon found themselves at the ground floor without feeling a thing.

"What did you think?" asked an Otis executive expectantly. "It's fast," responded one of the imagineers. "But what we were really looking for was a gut-wrenching, hair-raising, free-falling thrill."

"What? And undo everything we've been trying to perfect for more than a century?" responded the surprised Otis executive. That was when Disney realised they needed to build the ride system from scratch. The theme park industry is anything but slow moving.

ALMOST $12BN IN REVENUE WAS GENERATED BY DISNEY'S THEME PARKS IN 2011



Building the dream for over 50 years
Walt Disney opened his first park in 1955 in California (above). The Tower of Terror at Disneyland Paris cost $230m to build (below)

WAYNE MILLER/MAGNUM PHOTOS

MAKING THE MAGIC: THE TEN STEPS TO CREATING A THEME PARK ATTRACTION

1. BLUE SKY

"Each of the design phases is like a 3D building block in a 3D storybook," says Peter McGrath. The first stage involves the designers brainstorming ideas about what the attraction could involve. They try to be as free-thinking as possible and the direction of their discussion is mainly driven by the type of technology they want to use, the story they want to tell or the geographical location of the attraction. The ideas are often written on Post-it notes, which are grouped into themes on a wall to narrow down the strongest directions. The discussion is still highly conceptual at this point.

2. STORYBOARDING

The designers choose the strongest ideas and then take them to the concept design phase. This centres on the creation of storyboards, which are a series of hand-drawn illustrations showing what will be the key moments in the attraction. "Like the movie industry, you start doing big broad idea vignettes but then also refine it into smaller story ideas," says David Minichiello.

3. MODEL MAKING

The strongest concepts are turned into models to show what the finished attraction would look like. The construction of the initial models is relatively basic as they are usually made of foam and cardboard cut-outs. They are supplemented with Computer Generated Imagery (CGI) of the attraction from the guests' perspective.

4. SET DRAWING

Once the attraction has been visualised through models or CGI, the process moves into a cost estimation phase. The designers then require the park operator's agreement on the proposed format for the attraction and the estimated budget. Next they produce detailed set drawings, which are essentially blueprints for the attraction.

5. FEASIBILITY ANALYSIS

This phase answers perhaps the most important question: how will the attraction be built? It focuses on the technical detail and engineering which will underpin it. The special effects and audio designers use the models and set designs for reference and the acoustics team studies the proposed space so that it can provide input.

The birth of a ride Disney imagineers consistently push creativity to new heights, from storyboarding, to scale models, to installation (the Finding Nemo pool at the Art of Animation Resort), to measuring guest response (Tower of Terror at Disneyland Paris)

6. CONTRACT DOCUMENT DESIGN

The designers pool their feedback from the different areas involved with the planning of the attraction. This is condensed into a contract document that outlines the work required to build the attraction. Contractors bid for it and the key areas covered are show control, lighting, audio, ride manufacture and installation.

7. CONSTRUCTION

Some of the work is carried out directly by the designers and a team of them supervise the construction in the field. Ride systems are typically manufactured by specialist companies and it is the design surrounding them which makes the overall experience unique.

8. THE FINALE

Once installation is complete the attraction goes through a test and adjust period that focuses on areas such as audio levels, programme animation and effects. Then comes the grand opening. It usually takes between two to five years from the first blue sky meetings to the doors of the attraction swinging open. However, the designers' work doesn't end there.

9. MAINTAINING STANDARDS

Once the attraction has opened it is overseen by a group of designers from the Show Quality Standards (SQS) division. It makes minor tweaks and improvements to the attraction when necessary.

10. MEASURING GUEST RESPONSE

The success of the designers' work is judged by guest surveys. The park operator monitors guests' intent to revisit, intent to recommend and general levels of satisfaction. The attraction is also measured using objective business-driven criteria, the main one being Theoretical Hourly Ride Capacity (THRC). This shows the number of guests per hour that can experience an attraction under optimal conditions. The more the better. ■

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