BIG & HEAVY ANIMATION

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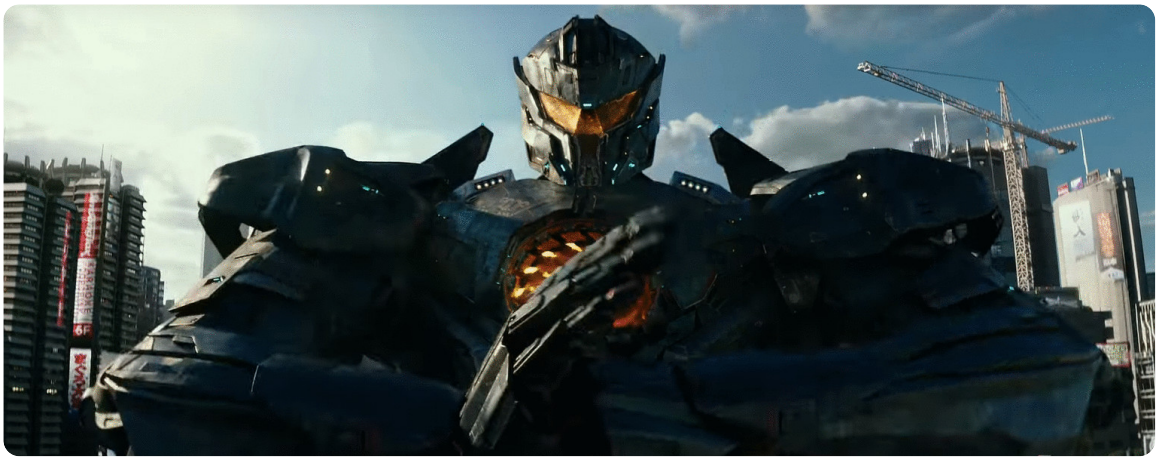

Jeremy Stewart
Working with storytellers to help achieve their artistic vision
2 articles

Under the ever enthusiastic direction of Aaron Gilman, I supervised one of the three amazing animation teams involved in the VFX behemoth Pacific Rim: Uprising. One of the biggest challenges the team had was getting the *Jagers* and *Kaijus* to look big and heavy while keeping the action exciting and fast. The Pacific Rim franchise is fun action-packed science *fiction*. If someone were to build a real three-hundred-foot-tall robot with known technology and materials it would move too slow to be functional. Our job as VFX animators is to give audiences a fun visual experience. Yes we should try our best to match reality, but we go to the movies to see something exciting and

free to leave a comment and mention other details you add to show weight and scale in your animation.

3 MAIN PRINCIPALS OF BIG, HEAVY, ANIMATION

Often your scene will have some point of reference (a tree, a building, a mountain) that will give the audience a sense of scale of your creature. Its movements have to match its size though. Here are the first three things you should focus on when animating giant creatures:

1. ***Posing;*** *do the poses support the body weight of your character?*
2. ***Speed (inertia);*** *the heavier something is the more power it takes to get it moving, so start slow.*
3. ***Momentum;*** *once something heavy is moving it's hard to stop. Try stopping a speeding freight train.*

1) POSES:

Poses should give *structural support* to your animated character. They should never be off balance for very long. When standing, feet should be firmly planted on the ground and the center of gravity balanced between them. I'm referring to the true center of gravity, not necessarily C.O.G. control. *What do weightlifters and the Eiffel Tower have in common?* They're both great examples of strong

with the weight above his head because most of the weight is balancing on his skeleton. If his back and arms were bent, his muscles would fail to hold the weight for very long. When animating, you need to create poses that show strength and balance. Think of yourself as both artist and structural engineer when posing out your character.

- *Notice the weight lifter is "locking" his elbow joints, turning the bones in his arms into rigid structural supports. He also has a wide stance to give him stability and balance.*

2) SPEED:

Compare these two extreme examples; the takeoff speed of the space-shuttle which weighs 4.4 million pounds and reaches a top speed of 28,163 kph to a bullet which reaches a top speed of 4,392 kph instantaneously. The space shuttle is very slow to get moving because, like a weightlifter it has to overcome gravity. The bullet weighing only a few grams can reach the speed of sound in a fraction of a second because it is so light. The proper physics term for this is inertia. *Inertia is the resistance of any physical object to any change in its state of motion. This includes changes to the object's speed, direction, or state of rest.*

- *The space shuttle has a very slow take off, but once it's up to speed it is faster than a bullet.*

We blocked in our animation using motion capture slowed down by at least 50%. How much we slowed it down wasn't a set rule though. Our perception of speed depends on our perspective. Seeing a jet flying high above doesn't look that fast. If you were up at the same altitude and the jet flew right past you it would seem much faster. Distance and camera angles play a huge part in our perception of speed. In the film you'll notice the the faster action is often shown close up from "Jaeger eye-level" and the slower action is shown with a wide lens from a "human's-eye level". So it was the camera that dictated how much to slow down the motion capture, not one set rule. Aaron did not direct the motion capture actors to act big and heavy, or strap weights to them

exaggerating the "ease in" to show inertia. Big, heavy things move slower than small, light things. This is true for all the small parts attached to the Jaegers and Kaijus. We'd also add faster secondary motion to the little panels and plates. Seeing contrasting speeds helps show scale.

- *Jason and the Argonauts* was a ground breaking film, but in 1963 VFX artists were very limited. Here they created Poseidon by filming in slow-motion and from a low camera angle. It almost works but its missing details that would make it really believable; the water especially gives away the scale. Focusing on Poseidon's movements you'll notice they just don't have the power and impact

In simple terms momentum is the result of weight and movement. Once a heavy object is in motion it takes a huge amount of force to stop or change direction. An elephant, dinosaur, Jaeger, anything heavy is hard to stop once it is in motion. Any change of direction will also be slower and more labored than it would for something small and light. If part of a moving body hits a solid object the rest of it will continue to travel in the direction of the momentum. Look closely at this clip from the first film, you see the knee is stopped by the ground but everything continues to slowly move down until it hits its own structural limits or the solid ground. There's lots of "ease out" and "follow through" in this clip.

bricks, concrete, and iron.

What makes the Pacific Rim movies so freak'n awesome is seeing the massive amount of power and force in every movement of the Kaijus and Jaegers. To give your animation a good feeling of size and weight start by focusing on *poses, speed, and momentum*. Poses that support the characters weight. Timing that shows the effect of inertia on speed. And momentum that is hard to stop.

Here's some fun additional links

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3D Animator
2y (edited)

so informative and helpful. thanks Jeremy Stewart

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3y

Will be seeing the movie today. Always a fan of pacrim

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