

Cloverfield Carnage

How Double Negative Smashed Up Manhattan

By Bryant Frazer

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When it comes to monster movies, it's generally the monsters that get all the attention. But in the case of *Cloverfield*, the creature team at Tippett Studio got a big assist from the crew at Double Negative, which handled more or less every VFX shot in the film that didn't involve the monster itself. That meant collapsing the Brooklyn Bridge, sending the head of the Statue of Liberty rolling down a city street, and creating the rooftop environs of a ruined apartment building, complete with a purloined view of Manhattan from exactly the right camera angle. (Scroll down to the very end of the story to read about the VFX team's stealth operation in a posh midtown hotel.) In each of those memorable scenes, it was Double Negative that created the credible environment for the *Cloverfield* creature to run rampant through. We got VFX supervisor Mike Ellis and CG supervisor David Vickery on the phone to walk us through their work on the picture.



F&V: How did you get involved with *Cloverfield*?

Mike Ellis: We got a call from [VFX producer] Chantal Feghali. We had worked with her on *World Trade Center*, and she knew that we were good at city environments — and also busting up cities. [Cloverfield VFX supervisor] Kevin Blank was also kind of a fan of ours who had seen *World Trade Center* and *Children of Men* which we had done very recently, and also *United 93*. He thought this project was, in a weird way, an amalgamation of all of those.

How long ago did that first contact happen?

ME: Sometime in June, I think.

Did you get a sense of the incredible marketing build-up, and the secrecy around it?

ME: We did, right from the word go. When Alex Hope [managing director and co-founder of Double Negative] and I went over for the very first meeting, we were hoping to be able to take away a script and see some storyboard frames, but they really wouldn't let anything out of the building. Basically we had two hours in a room together to read the script. We didn't see a script again until — you know, I still haven't really seen another script! Our only way of judging what was needed was talking to Kevin, to understand what was required. It was pretty vague to begin with.

Given that, how did you know where to begin?

David Vickery: Kevin had done a lot of previs work with a company called The Third Floor [Los Angeles, CA]. They needed so much choreography for these extremely long sequences that they had to have some sort of gameplan as to how they were going to go out and shoot it, and how to set the cameras up to get continuous four- or five-minute takes of action. We did get a look at that, so we knew from the outset we were going to have a heavy 3D commitment for the Brooklyn Bridge, for example. Also, in our bid package, they asked us to quote for specific things — like building four or five entire blocks of CG Manhattan, including four or five extremely high-res digital buildings. They weren't specific about it, but it gave us the idea of what sort of team we needed to put on it.

ME: They gave us a very broad, rough shot count and we had to break down the sequences as best we could and try to hit a ballpark figure for them.

DV: To give you an idea of how fast the turnaround was, the only lead time I had on this project was two weeks. I had enough time to start thinking about how we were going to track the cameras and start some 3D builds going, and then we were out shooting. It was so rapid-fire — that was part of the scariness of it.

Did you advise them at all on how they could best shoot it, in terms of the types of cameras they used or anything like that?

DV: Not so much the types of cameras. They pretty much dictated to us what cameras they were using and how they were going to point them and what lenses they were going to use. Essentially, they used a zoom lens that covered every focal length they could think of. They shot however they wanted, but what they were open to was anything on set that would enable us to track that. They bent over backwards to help us do that. They wouldn't compromise the way they shot it, but they would give us access to the sets for days in advance, and the crew would put up green screens for us and cover them with tracking markers. A lot of productions you work on, you get 20 minutes before they start shooting. But we had access for days beforehand to shoot reference photography. They were aware of how difficult it could be for us if they didn't give us a hand.

ME: We stipulated from a very early stage the kind of camera they were shooting for visual effects. Given half a chance, they probably would have shot the entire movie on a consumer camcorder, which is the look they wanted. But we knew if they did that it was going to be impossible for us to track anything or grade anything. We did say that any VFX shots had to be shot on a higher-res camera. [See our sister publication HD Studio for more information on the shoot, which used handheld Thomson Grass Valley Vipers and Sony F23s, as well as Panasonic HVX200s and FD1 AVC-HD camcorders for non-VFX shots.]

You said you went to L.A. to be on location, but there was some location shooting in New York, right?

ME: They had about three weeks in New York. They shot as many streets scenes as they could, and we got lots and lots of photography while we were there. We needed textures for the Brooklyn Bridge and other parts of New York we knew we would have to build.

DV: We essentially ran a mini-VFX unit while we were there to get all the reference material we needed.

ME: The intersection of 40th Street and Park Avenue was going to be their landing zone for the evacuation of Manhattan, so we knew we would have to build that in a lot of detail, and we spent a lot of time photographing that.

And then in L.A. you got to take a good look at the sets before they were shot.

ME: We were on set every day, helping out and advising them on what was going to work and what wasn't going to work so well. We knew the tracking was always going to be a problem, so we made sure we had enough information on each set to track things. We ended up working closely with Tippett and sharing a lot of data with them, but we ended getting a detailed set survey for exact measurements and taking a lot of photographs. The Brooklyn Bridge set — which was entirely green-screen, shot at Downey Studios in L.A. — was very difficult to track. There were lots of people in the foreground, the camera was very frenetic, shaking around all over the place and zooming, which made tracking very critical. We did little tricks and cheats, like putting a lipstick camera on the main camera that showed us what the zoom ring was doing.

So you could figure out what was happening with the focal length in the shot?

ME: As long as we could line the shots up with our zoom-ring tape, we knew where the zoom was at any given moment and we could track it to that.

DV: It was born out of the necessity to set this up really quickly. It was something we could do within a day, just tape a mini-camera to the side of the main unit camera. There are ways to extract that data out of the camera as it records, but it involves liaising with all sorts of different departments — and the camera department has to be happy that we're attaching extra wires to their cameras. So the lipstick camera was the easiest way.

You had to not just create the Brooklyn Bridge environment, but also collapse the bridge.

ME: We looked at a lot of reference footage of suspension bridges under stress in hurricanes and things like that. We looked at the Tacoma Narrows footage, with is a famous piece of filming from 1940.

With the bridge just whipping around in the wind before the collapse?

ME: Yeah, we used that as a reference. And we built simulations of how a bridge would react under the stress of an enormous monster's tail hitting it. We wanted to create something that would look spectacular on camera and have a sense of realism as well. We did lots of dynamic animation for how the cables break and that kind of thing.

How did you create the 3D model?

ME: We bought off-the-shelf LIDAR information of the Brooklyn Bridge, and we picked the specific area we knew the characters were supposed to be standing on. We modeled that ourselves. We took measurements on the actual bridge and made very high-detail models of nuts and bolts and things like that.

DV: The bridge itself is an amazingly repetitive structure when you get into it. So we were able to divide it up into much simpler 10 or 15 feet sections. When we were using them in the shots, the highest-resolution section would always be closest to the camera. We were building, literally, all of the nuts and bolts, with bevels on the edges of the nuts and bolts, and intricately painted rust. Three or four sections away from us, at a 100-foot distance, we could throw all the nuts and bolts away and use a much lower-resolution piece of 3D geometry. We had five or six different resolutions in the end, the lowest of which being just a painting of the extreme distance of the bridge that we could map onto cubes and distort as the bridge tore itself apart.

ME: The bridge was such a complex creation that we knew we couldn't build the whole thing in detail. We had to be specific about the areas we needed, or we'd never be able to render the whole thing.

Were you using Maya?

DV: Yes, and we have built a number of our own proprietary simulation engines for it. One of them is a rigid-body simulator called Dynamite. We also have a fluid renderer called DNB, which was developed for Batman Begins. And a fluid simulation engine called Squirt, which we used for the smoke and particulate debris you see in the air, and also the water once the bridge collapses.

What did you render with?

DV: It's all rendered using PRMan.

How did it complicate the whole shot when the Tippet creature's tail had to slice through the bridge?

ME: It actually worked really well in the end. Tippet gave us the model they were using — just gave us something to pin our fluid sims onto. It could only work with our two companies sharing things very openly. We built up a very good relationship with Eric Leven, the VFX supervisor for them. We just talked every day, kept sharing stuff back and forth. If we had a problem with their model they would re-render it and send it back to us, and vice versa.

What were some other complicated scenes you did for the film?

ME: The bodega scene was another really big one. It's the start of the movie, where they see the explosion from the roof and then they run down and the Liberty head is thrown down the street.

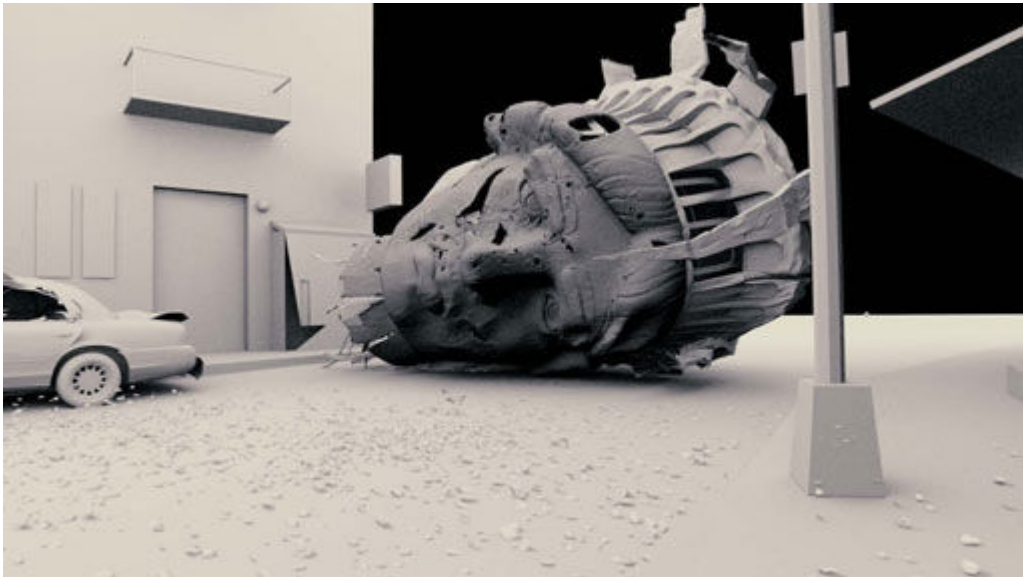


That was in the teaser, right?

ME: Yes, and Hammerhead [Studio City, CA] did the original shot. But they only had a couple of weeks to do it, and I don't think anyone was very happy with it. We reworked the shot, rebuilt the head, changed a lot of things about it, made it much more dynamic, and we also knew that [director] Matt [Reeves] wanted to focus on the head for quite a long time. In order for it to stand up to that scrutiny, we had to put a lot of work into it. We spent a long time creating the model itself, and then painting all the dust and the debris and the erosion and burnished copper showing through. We also spent a long time creating smoke sims and dust and debris thrown up from it as it goes by. We didn't use any practical elements for that. It was all simulations for the dust and dirt to make it work properly in the scene.

DV: It was one of the first shots we started work on, and pretty much the last one we finished. It's obviously such a massive American icon that everyone who saw the shot in any sort of working state had an opinion of how it should look. "Make the head a little bit bigger!" We got to version 70 or 80 of the shot by the time we got to the end of it. We painted and repainted the textures over and over again. It didn't matter how finished we thought it was. It always needed one more tweak to make it the perfect shot that it needed to be.







ME: It was such an iconic thing for J.J. Abrams and Matt Reeves. In a weird way, it was the inspiration for the whole movie. J.J. had seen the poster for *Escape From New York* with a great big Liberty head in the middle of the street. He wanted to replicate that, with the same kind of shock factor. So they really wanted to make sure that looked right.

DV: We started with Hammerhead's geometry. We got that, and then we found some amazing reference on the Internet, these huge 4K and 5K wide black-and-white stills of the Liberty head when it was being cleaned a few years ago, with scaffolding up all around it. We were able to see how all the panelwork was welded in places and riveted in others, and also the rivulets of grime — even after it had been cleaned it was obvious that it had weathering for a hundred years. As with all these things, there's a certain amount of creativity. When we started out, we built it perfectly to scale. But I think it's only about 11 ½ feet from ear to ear. And we put this in our scene and rendered it and everyone thought it was tiny. People were saying, "Ah, you can have 15 people standing in the crown!" I don't think that's true. People imagine it being bigger than it is. So it ended up being about 50 percent bigger than reality. By the time we chucked it down the street and bounced it off the walls and bent the crown and the spikes, it occupied a much smaller space anyway. But it was a really challenging shot for us, and really rewarding.

So you went for something that wasn't completely accurate, but felt right.

DV: Compositionally, it made it much more imposing if it was bigger on the screen. That was very hard to judge on set, where all you had was a green two-foot-by-two-foot pyramid with some orange tennis balls on the corners to show us where it was supposed to be.

ME: It's a constant thing in VFX: doing what's technically right versus what looks right. And the technical size of our Liberty head just didn't look right to people. It looked way too small, so we had to cheat it to make it feel right.

There were some events in New York not so many years ago that seem to have been specifically referenced in some of the scenes of destruction early in the film — especially the clouds of dust billowing down the streets behind buildings. But is this a case where you said, "We've got to make this moment on screen look dead on?"

ME: It's not so much "dead on," but people have seen that footage so much — the collapsing towers and the pyroclastic clouds — that they know exactly what it looks like. If you waver from that, people think it's false. They know what this thing looks like. If a building collapses and it throws up dust, it has to look a certain way for people to accept it. So we did reference the 9/11 collapse, and we used a lot of the stuff we worked on for *World Trade Center* in order to create that cloud and the falling paper. Matt [Reeves] had realized there is a parallel in a weird way. Nobody wanted to create something that was in bad taste, but because everybody knows what a collapsing building looks like, we had to reference that to make it work.

Did you do the shot from the street showing the one building leaning against the other? Was that just a matte painting or was there a 3D element to it?

ME: There was a small 3D element to it. Because of the nature of the camera move, we had to build a lot of the ground dust and debris 3D elements and track those in correctly. The Hummer that was parked on the road had to be a 3D model, because the camera move was creating so much parallax that we couldn't get away with a simple matte painting.

DV: The usual way we start out with our shots is, if a matte painting suffices, that's fine. But before you step into full 3D, the next stage for us would be to try building basic geometry and projecting or hanging a matte painting on it, so you could get enough simple parallax going on to sell the shot. We added to that some swirling, falling dust and debris and paper in the atmosphere, which is another tool that we developed for *World Trade Center*. It has an amazing effect in the shots it plays in — it makes them very ghostly and spooky.

It's about trying to address what's there as best as possible, rather than painting it out and recreating it. That's something we learned on *Children of Men*. Anything you photograph is real, and if you can keep it it's going to stay looking real. But as start as you start replacing huge sections of the frame with painting and CG, you're fighting to get

back where you were at the beginning. We try to keep as much of the plate as we can, and reuse it, re-project it, and sort of augment it.

What other scenes were especially challenging?

ME: The other big thing we did was the walk out onto the roofs when they go to save Beth. That was a situation where we knew we were going to shoot on quite a small set, a very small area of the roof. We had to recreate the entire environment around it. We extended the roof, built the building they walked out of and back into at the end, and built the entire 360-degree cyc of New York around them. That was quite difficult, because we couldn't really get close to the actual position we needed to take the photographs of New York we needed.



We hired a helicopter, and went up various buildings to try and get the right angle, but ultimately we found out that the only place to get exactly the camera position that we needed was at a restaurant at the top of quite a famous hotel — and they wouldn't let us take photographs in there, so it was a real problem. In the end, we all very covertly booked a table at the restaurant and asked to be as near the window as we could be. We took our cameras in there, and kind of snapped away whenever the waiter wasn't looking. And had a very, very nice dinner.

DV: Our tripod was a napkin and a coaster.

ME: We were hiding the camera with a menu. But it was really good fun.

I suppose you don't want to give the name of that restaurant.

ME: I'd better not! They'll never let us in again.

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