50 MPH: EPISODE 29

“A VFX HYBRID”

Transcript (01:19:07)

KRIS TAPLEY
This is *50 MPH*!

[INTRO MUSIC]

DENNIS HOPPER (as “Howard Payne”)
Pop quiz, hotshot!

DENNIS HOPPER (as “Howard Payne”)
There’s a bomb on a bus.

JEFF DANIELS (as “Harry Temple”)
You’re deeply nuts, you know that?

DENNIS HOPPER (as “Howard Payne”)
Once the bus goes fifty miles an hour, the bomb is armed.

SANDRA BULLOCK (as “Annie”)
Stay on or get off?

DENNIS HOPPER (as “Howard Payne”)
If it drops below fifty...

SANDRA BULLOCK (as “Annie”)
Stay on or get off?!

DENNIS HOPPER (as “Howard Payne”)
...it blows up.

ALAN RUCK (as “Stephens”)
Oh, darn.

DENNIS HOPPER (as “Howard Payne”)
What do you do?

KEANU REEVES (as “Jack Traven”)
You have a hair trigger aimed at your head. What do you do?

DENNIS HOPPER (as “Howard Payne”)
What do you do?!

KEANU REEVES (as “Jack Traven”)
What do you do?

KRIS TAPLEY
I’m your host, Kris Tapley, and you’re listening to an oral history of director Jan de Bont’s 1994 summer blockbuster, *Speed*, straight from the people who made it happen. Now, don’t forget to fasten your seatbelts. Let’s hit the road!

KRIS TAPLEY
So, I really had no idea this episode would end up as long as it is. But the more I dug in, the more I felt a need to either explore or explain and eventually I just ran with it. You might not expect the visual effects component of *Speed* to pack such a punch, but I think there’s just a lot of context to provide and frankly a lot of good shop talk to engage in, so anyway, stick with us as we dive in this week. Right now in our timeline, *Speed* is shot. It’s basically cut. It’s now moving through a post-production pipeline as it barrels toward a June 10, 1994 release date. Today’s focus with that in mind is indeed visual effects, and it’s an interesting component of this movie. We’ve talked a lot about the special effects side of things, meaning the on-set, practical gags and mechanical stunts that gave the film and its many action sequences such life. And *Speed* was certainly part of the handful of movies that rest at the peak of those techniques. However, it was also something of a hybrid film that incorporated some very early digital enhancements, and not only that, but married them with the old-school applications in ways that hold up beautifully to this day. You see, 30 years ago, you’re talking about a very different status quo for cinematic visual effects, and before we forge ahead here, I feel I ought to set that scene a bit. To begin, we’re pretty niche around here but I also don’t want to leave a broader audience in the dust. So, a quick education on one point. You’re going to hear a lot today about something called compositing. I want to have *Speed*’s visual effects supervisor, Boyd Shermis, break down exactly what that is before we proceed.

BOYD SHERMIS
A lot of people today refer to “CGI” in various forms and various ways, and what they’re really referring to is compositing. And what we mean in compositing, in visual effects, is that you’re layering images. You’re taking, you know, two discrete elements of film, or in some cases you might be generating something in 3D, and layering it into some other film element. And many times, and certainly in the case of *Speed*, we had multiple film elements. I’ll give you an example: the train sequence. Like, the taillights on the train were shot separately and independently from the train car itself, because the exposures had to be done differently. So, it was shot with motion control, and motion control allows you to shoot the same camera movement multiple times and get the exact same camera movement, but you can set different exposures for different things, be it lights or

a background or the train or a reflection or, you know, you want to fill in some shadows, a shadow pass, you want to create a shadow, what have you. But you shoot all these things separately, and then you layer them together in a composite image. And that's what we typically mean as compositing.

KRIS TAPLEY
Alright, hold onto that a moment and let's paint the picture of the visual effects world that *Speed* was coming into. For that, I want to introduce Todd Vaziri. If you're at all active with film voices in social media, you've surely come across Todd once or twice. He's a visual effects artist who has quite literally worked on the biggest films of all time, movies like *Avatar*, *The Avengers* and *Star Wars: The Force Awakens*, just to name a few. He's a wonderful educational voice and you should seek him out because he digs into the minutiae of filmmaking in a way that I'm sure, if you're listening to this podcast, you'll enjoy. Here's Todd talking about where things stood in his field as *Speed* came onto the scene.

TODD VAZIRI
Just a reminder of the context, you may watch this movie and not even fathom that this is only a year after *Jurassic Park*. This is the same year as the incredible digital compositing techniques that were developed for *Forrest Gump*, where all of a sudden, with incredible fidelity and creativity, you can mix and match photography digitally to make something that wasn't there before. The reality of the situation is, of *Speed*, at the time, so much of it had to be in-camera, so much of it had to be practical, and even the idea of split-screening certain things or shooting stuff against a blue screen, with the exception of extremely specialized shots, is not even in the cards. Forget about budget. Even if it was three times the budget, it pretty much couldn't have happened. And using that as a lens, I think it's really interesting in that there are certain parts of this movie that are a little bit of a throwback, because it's kind of a bridge movie of the technology at the time in terms of visual effects. It kind of closes the door on the '80s, Joel Silver era of American Hollywood action movies where you've got a lot of puppets, you know, dummies blowing up, large-scale miniatures, being able to see the tow rig and wires in shots, just trying to disguise it with out-of-focus foregrounds and stuff like that. There's a lot of that in *Speed*, and the movie is so good, nobody even cares. Nobody even bothers to see that stuff.

KRIS TAPLEY
And sticking with non-affiliated voices for a moment, I obviously have to bring visual effects journalist Ian Failes back in here, editor-in-chief of *Befores & Afters* and a hall-of-fame *Speed* fan.

IAN FAILES
Places like ILM and some London shops had sort of solved digital compositing, in some ways, by 1993. And then Imageworks and Digital Domain were kind of, like, left to their own devices as new shops and had to develop new tools. So, that's why Imageworks' compositing team ended up being part of the invention of this software called Shake, and then of course Digital Domain invented Nuke. What I'm getting at is, like, they had

to solve compositing on these live-action films with real film and they just had to get the color science right and all that sort of stuff. So, I'm actually saying, like, *Speed* and similar films like that were actually trailblazers to digital compositing work. Maybe not CG characters or anything like that.

KRIS TAPLEY
Here is Dave Drzewiecki, the visual effects director of photography on *Speed* who we first heard from a couple of weeks back.

DAVE DRZEWIECKI
It was a transitional period of time. It was a hybrid movie and I would say that to people, and they would look at me like they didn't understand what I was talking about, but it's true. It was really a period of time when it was turning and you could feel it, you could smell it in the air. Ever since I was a kid, I was enthralled by movie special effects. I make my living as a cameraman. I did a lot of visual effects over the years. But you could just smell that the way it used to be done, the Linwood Dunn wire, tape and rubber-band style was going away, and this new thing, this digital imaging, was really coming into its own, you know, as opposed to 10 or 15 years earlier when these, you know, computers just didn't have the horsepower to really produce images easily, or to composite images easily.

KRIS TAPLEY
And finally at the top here, another new peripheral voice I want to bring in is Jake Braver. Like Todd, I wanted to reach out to someone in the effects field today who can speak to *Speed*'s time and place. Jake was the visual effects supervisor of films like *Birdman*, *John Wick*, *The Pale Blue Eye* and, most recently, *NYAD*.

JAKE BRAVER
Speed isn't a VFX movie by our standards today, right? It's an invisible VFX movie by our standards today. It's a movie where the special effects, visual effects and miniatures all are working together, leading with the best of what was possible for those crafts at that time. The visual effects work because of the shot design of the visual effects in the movie. The way the film was photographed allowed you to tradeoff between the best of special effects, miniatures and visual effects all together, and I don't think that's an accident. I think that's a lot of skill and craft.

KRIS TAPLEY
Now, there were a few vendors involved in *Speed*'s effects work, in both the practical and the digital realms. We heard all about Sessums Engineering two weeks ago in the subway episode regarding the miniature train stuff. Also on the miniatures side was Grant McCune Design, which I'll come to shortly. In the digital sphere, there were two entities at play: Sony Pictures Imageworks and Video Image or VIFX. I'll start with the former, which brings up a whole other origin story. A few weeks back I talked about Apogee, Oscar winner John Dykstra's visual effects company that arose in the wake of *Star Wars*. Boyd Shermis started his career there as did Dave Drzewiecki and another gentleman I'll get to in a moment. That company was disbanded and sort of sold off for

parts in 1992. A lot of it was sold to Sony where at the same time the studio was also launching a small visual effects shingle built solely on computer-assisted effects work: Sony Pictures Imageworks. And from there I'll let Ron Brinkmann, *Speed*'s Imageworks-based computer graphics supervisor, pick up the string.

RON BRINKMANN
This was pretty early on with Sony Imageworks. Like, I don't think that Imageworks had been in existence. I think we had only been there for two or three years. Imageworks wasn't like an ILM that had a whole depth of technical expertise and stuff. There was definitely stuff that was hard, but I think we were just sort of reinventing the wheel that, you know, someplace like ILM would have looked at it and been like, "Yeah, just toss the junior guy on that for a couple of hours."

KRIS TAPLEY
Next up here is Frank Foster, also Imageworks-based and specifically responsible for pre-visualization on the opening credits in the elevator shaft. Pre-viz was a big part of Imageworks' early business and we'll get into some more detail on that in just a sec.

FRANK FOSTER
We went through a long phase where we weren't in fashion, and I'm pretty sure the only reason that we got the chance to work on *Speed* was because ILM was totally booked and Jan didn't have that much choice, because I remember being called with a bunch of the other vice presidents from Sony to meet with the head of post-production at Fox over on the Fox lot and we went through kind of an inquisition of, "Could Imageworks really do this kind of work?" So, it was definitely a big opportunity for Imageworks because, like, you know, *In the Line of Fire* and *Last Action Hero* and all of these various films that we had done before were all Columbia or TriStar films.

IAN FAILES
I think at the time, interestingly, it was thought that Imageworks would use *Speed* as a little bit of a calling card, but it didn't, because people didn't realize how much work they did on it. So, weirdly, *Speed* became what we would now call an invisible effects film. The big contrast was *True Lies*, where Digital Domain went all out with compositing and CG-related things and the harrier jet. It just is a huge film.

KRIS TAPLEY
Now, before we get back to the pre-viz stuff, I have to lay a little more track here. That work would specifically relate to the elevator material, and even more specifically, a miniature version of the elevator shaft used for the opening credits sequence and a handful of other shots. Back in the elevator episode I mentioned a man named Grant McCune and his shop, Grant McCune Design, was responsible for building this elevator miniature. Grant's entree into the business was his uncredited work building the shark for *Jaws*. That ought to tell you plenty right out of the gate. He was then tapped by George Lucas to be the chief model maker on *Star Wars*, where he was responsible for a lot of the design details on things like R2-D2. He also played a huge role in the models used to bring movies like *Battlestar Galactica* and *Star Trek: The Motion Picture*

to life. I mean, he created the dancing Gopher in *Caddyshack*. You owe a lot of your childhood to this guy, and frankly, I hate to just touch on him and move on, but he sadly passed away in 2010. However, just like that other departed legend of miniatures on this film, Jack Sessums, I felt I had to find someone from Grant's world to speak to all of this. And so, here is Clark Schaffer, the chief model maker on *Speed*, specifically tasked with this elevator miniature project. I want to let him talk for a bit, and you'll see as he starts here that this is yet another Apogee connection.

CLARK SCHAFFER
Initially, I went to Hollywood in '91. I was about 23 years old and within that first year there I was working at Apogee, and that's John Dykstra and Grant McCune. And I think it was about '92 when Apogee sold to Sony, and Grant kept Grant McCune Design in the same building there, the *Star Wars* building, and he invited me at that point to become his production designer for Grant McCune Design. For about a year, year and a half, even though Grant had a reputation, we were still proving ourselves. So, we did a lot of commercials, a lot of, like, music videos and stuff like that. We did an old Pillsbury Doughboy, you know, the last of the stop-motion animation. We did a couple of those. We did some Duracell commercials. But *Speed*, I believe, was our first big feature film at Grant McCune Design. And it was very exciting because I'd been on the team there. Smokey Stover was another model maker and a designer that was on board with us at the time and we were the two full-timers. Our elevator was to give the scope and the falling aspect of the height of the building. So, what we ended up doing, we were required to build – I believe it was between 35 and 40 floors of this skyscraper from inside the elevator shaft, and we built it sixth scale, which, I think each level ended up being about 20 to 22 inches, and therefore, the entire elevator shaft in miniature was 70 feet long. And so, to accomplish the shot, we built it laying on its back instead of standing upright, because that wouldn't make any sense. It wouldn't be accessible. We couldn't film it. So, we laid it on its back, 70 feet long, and therefore, the elevator cart actually ran like a little – almost like a model train, up and down the length of this elevator shaft. The general structure – the back wall and the two side walls – were just built like a basic flat, you know, a one-by-four covered in lauan panel, and that gave us a structure for the elevator shaft. And then, all the beams are actual scaled aluminum beams. We did a little bit of woodwork. And then all the elevator doors, I remember making a form out of masonite and other materials, and then I spent a day on the vacuform machine just pulling parts, and it was the door, the header over the door in the wall right there with it, too, so each door of each level was just a vacuform piece. I painted the different components and then each floor got its own custom floor number, floor 12, you know, 13, 14, 15, like that. And we did paint them each a little differently as far as the weathering, obviously, was different. And every, like, fifth floor had a different element to it. I think that's common in practice in elevator shafts, so that people working there are really aware of where they are within the building, but being a repeated shot, you know, each floor looking like the other, we did our best to give it some excitement. And actually, at different points, we had hundreds and hundreds of little steel beams, or they're probably aluminum, but we had them machined and it went together like a big Erector Set. So, we had, you know, hundreds of these pieces and a hundred of these pieces and A went to B and we bolted it together. We actually powder-coated them all

and I did final aging and weathering and finish work on all the paint, but we put it all together that way.

KRIS TAPLEY
Let's go back to Jake Braver.

JAKE BRAVER
It's a brilliant miniature. It's a hard thing to do, right? When you're cutting from a set on a soundstage that you're lighting in full scale, to cut to a miniature that you're lighting not at full scale, direct cuts, matching, literally one shot to the next. That's a hard thing to do. That's a hard thing to do now, when you're doing that with CG. So, it's even a harder thing to do when you're doing that with a miniature and you don't have the sort of, you know, ability to finesse the way you do now.

KRIS TAPLEY
Ultimately, through Grant McCune's company, Clark would take on projects like *Batman Forever*, *Executive Decision*, *Dante's Peak*, *Batman and Robin*, *Sphere*, *Deep Blue Sea* and more. It was a boom time for this work, and it's the kind of artisanal skillset that digital artistry would eventually squeeze out. But Clark maintains his own shop in Utah, Schaffer Studios, and he's kept his art form alive through commission work and, certainly, when the industry comes to town, whether it be Disney productions or Kevin Costner's upcoming western epic Horizon: An American Saga. Now, I want to circle back to Frank Foster and the pre-viz discussion. Pre-viz, in the most basic of terms, is the visualizing of scenes or sequences in a movie before actually filming them. You might render a set in a computer so you can experiment with lighting design or camera placement, staging, things like that, so that when you get to the set, you've already worked out some things virtually. This was obviously very new in 1993. Let me have Frank detail this part of Imageworks' business for you.

FRANK FOSTER
This was at a point at TriStar where they had just done a Bruce Willis film in Italy that went way over budget, and then ended up being a box office failure.

KRIS TAPLEY
Just to dust off the mystery there, he's talking about *Hudson Hawk*.

FRANK FOSTER
And so, when they were going to shoot this film with Bruce Willis in Pittsburgh, and there were so many action sequences in it, because it's an action film, the studio was interested in testing this technique to see if it would help save money. And Rowdy Herrington, the director on that film, was excited because he felt it could help him understand – and it definitely did – help him understand what the second unit was doing. Because I worked with the second unit, not so much with the first unit, because the second unit, of course, was responsible for all of the boat chase and car chase sequences. Working in second unit, everybody accepted the fact that, you know, you would storyboard. But to do electronic storyboarding or pre-visualization was so new,

and also, they knew that it was getting cut into the dailies, that they felt like the studio in Culver City was going to be able to see what they were doing and maybe interfere. I don't think there was any interference, but that was the fear.

KRIS TAPLEY
On that note, before long, Frank was actually presenting this technology to top filmmakers in the industry. And plenty of people turned their nose up at him.

FRANK FOSTER
Remember, during this time, even digital editing was just starting to get accepted. So, just computers in general were kind of a scary thing to the entire industry. I remember Paul Verhoeven said to me something like, "You know, this wouldn't be helpful to me because I see everything in my head." Some directors felt offended, like it was a crutch that they didn't need or something like that. But like everything new, it takes a while, and fortunately, Sony made a huge investment, which eventually paid off.

KRIS TAPLEY
Which brings us back to *Speed* and Imageworks taking the project on. That included Frank and his pitch.

FRANK FOSTER
We had the elevator shaft miniature in CAD on the laptop, and the laptop was on the set with the large miniature, and Jan took the mouse and started grabbing the camera and moving it and talking about the camera placements on the motion-control camera. And I was just, like, in awe, because never before had I seen a director not only accept the process so excitedly – I mean, Jan took to it as if it was an extension, almost, of the camera. And, of course, his background was in cinematography as a cameraman, so to me, that was like making the full circle of how the planning process would go all the way to the final shot. It was not that often that we had the opportunity to be pre-visualizing at the same time as on a set or location. But yeah, that was the moment, you know, the epiphany, that, OK, all of these years of predicting that this would be an effective tool, now it's actually being utilized in that way.

KRIS TAPLEY
Visual effects supervisor Boyd Shermis.

BOYD SHERMIS
To my knowledge, it was one of the first times that pre-viz had been used in a feature film, and we did it for that opening title sequence. One of the reasons we did it, really, was just to time it all out. How fast did we need for the title sequence to run? You know, there are sort of standard times. When you're doing a title sequence and you have opening titles and certain categories have to be on screen, certain names have to be on screen, for a minimal number of seconds and frames. So, we literally wanted to time out the title sequence so that all these names would be on screen for that exact amount of time. So, to determine how fast the camera was going to move and how sections of elevator hookups did I have to do in order to make this all work, and at what camera

speed, etc., etc., we pre-visualized that entire opening title sequence down to the frame. So, that was fairly new and sort of an unheard-of thing to do at the time. But the technology was available to us, and so, we decided to do it, just to figure out how we were going to do it.

KRIS TAPLEY
Moving away from the pre-viz, now it's time to actually execute the shot. What you see in the film is brief enough. I mean, it's an opening credits sequence. But the work that went into achieving it? We're talking weeks. Here's Boyd again.

BOYD SHERMIS
It was, like, I don't know, two-and-a-half, three minutes long, I forget off-hand – 4,500 frames, something of that nature. And we shot it all in VistaVision, which, by today's standards is 6K resolution, which back in those days was about 12 times the resolution that you were doing for feature film compositing. It just didn't make any kind of sense at all to try and do that opening title sequence digitally, and so we ended up doing it photochemically. And, you know, listen, it's titles. How hard is that? It's not that hard, except that a) it was 4,500 frames long; b) because of the length of the shot, and the fact that we were dealing with a single miniature that was really only a third the length of the elevator shaft that we needed, I had to go through it in multiple passes and hook it up multiple times in order to create the illusion of the continuous shot. So, I used a section of elevator shaft that was one-third the length of the total shot, and we timed it out and programmed it with motion-control and shot it in multiple passes, because you had passes for beauty, passes for the fluorescent lighting within the shaft.

KRIS TAPLEY
CG supervisor Ron Brinkmann.

RON BRINKMANN
Everything was going so slowly and they had so much light pumped into there that pieces of it started to smoke or melt or something and I remember they had to go back and fix some stuff because it got too hot in there.

BOYD SHERMIS
One of the things that you try to do when you're shooting a miniature is to emulate a full-scale t-stop or f-stop on the lens, and when you're doing that with a miniature, the only way to compensate, in a sense, is to flood a miniature with a ton of light or slow your exposures way down. And the issue with this miniature was it was a four-walled set. You know, I couldn't just open up one wall, because you were seeing the whole – all four walls. I couldn't just open up one wall and load it up with light. So, the alternative is to have very long exposures. So, what that means is we had very long passes, multiple passes, of very long exposures. And so, shooting this elevator shaft, each section of it, each pass of each section, took eight-to-10 hours, and very often what would happen in that scenario is that over the course of an eight- or 10-hour film pass, one of the studio lights would burn out, or one of miniatures, you know, the fluorescents within the miniature, would burn out, which would ruin the pass, of course. So, you'd have to go

back and do that pass again. Quite literally, things were melting as we were shooting it. And you'd have film jams, you know, the magazine would jam. Any number of bad things can and did happen. So, it was always coming into the next morning to see what you had. You never knew.

KRIS TAPLEY
Chief model maker Clark Schaffer.

CLARK SCHAFFER
The exposures, some of them might be, you know, 12 or 15 seconds apiece. And so, they would just be creeping along. That camera would just move at the slowest of speeds. And therefore, we get these really buttery, clean shots that are super beautifully exposed, but, you know, it plays back and it might be a 12-second shot. We could control the movement and the speed at which it was moving with a snorkel lens that dropped down into the set. So, at one point, even, to get the right effect, the snorkel went down into the set, and as it moved, we had to remove the next beam to allow the camera to pass, but then replace it as soon as the lens got past it. So, we were playing hopscotch with our set. And so, the motion control was going very, very slow, and we were, you know, lifting one and replacing it as the lens passed in the right linear space. So, I remember babysitting that model and it was quite a project on a few days.

BOYD SHERMIS
That thing took us a week and a half, two weeks, to shoot, the opening sequence. And we had other shots within the elevator sequence, but that opening title sequence took us about a week and a half to shoot, if I'm not mistaken. So, it was a little more complicated than it appears on the surface.

KRIS TAPLEY
Indeed, that sentiment can be carried straight over to the actual credits themselves, which were designed to wipe on and off as the shot moves from floor to floor. These credits were rendered digitally in 4K, but then they were combined with the background of the elevator shaft optically. I guess I should explain that, but I don't want to slow us down, either. Generally speaking, optical effects are effects created in-camera. We're basically still talking about compositing here, but the elements at play are film elements. Think of it as a fancy double-exposure. Here's Frank Foster again to explain further.

FRANK FOSTER
These were some of the earliest digital titles, but at the time, it was so expensive to scan film that we had to composite the titles optically, you know, with photochemical process. Today, of course, everything would be either shot digitally or scanned. But in those days, even though we had scanning and everything at Sony already, it was too expensive to scan that many frames for the background. We had a lot of problems because of the difference of doing an optical composite. We didn't have any optical printing capability at Imageworks. Everything we had was digital, even though everything was still photochemical with the processing of film and all of that. So, we had to shoot the titles and try to create a matte that would separate the titles from the

background, you know, so it could be printed traditionally with three sets of film, you know, the matte, the title and the background – and the matte had to wipe the title off as each floor of the elevator shaft wiped off the title. So, we had a lot of problems with registration between the layers of film, because, you know, there's camera weave and stuff in traditional film. And that was a huge headache and it was a tremendous panic, because I think that the title sequence was one of the things that was the last to get completed, and there was a lot of pressure, because we were redoing the composite over and over and screening it to the check the weave, and we never really got it to satisfaction because of the problems between using analog and digital and combining it and not doing it completely as a digital, you know, generation. We went through hell trying to get just the technical, analog composite to work out. And it was extremely problematic, because everybody was busy at this time in Hollywood, and we had to go to Buena Vista, what was leftover of the old Disney visual effects, or optical effects department, and we had to do it in the middle of the night and stuff like that just to be able to get it through and we were, like, begging them to do another version of it and stuff like that. So, it was one of the real cliffhangers of the production, which was under such a strict schedule, and I felt so bad that we brought so much stress, not only to ourselves, which was horrendous – I had the head of Imageworks coming to me every day and like, you know, almost pounding the table, like, "Why can't we get this? Why can't we get this?" And it was totally out of our hands because we didn't have control over the compositing.

KRIS TAPLEY
For more on all of this, if you're interested, I would like to point you to Ian Failes' 25th-anniversary package of *Speed* articles from a few years back. He even got ahold of Rachel Nicoll, the digital artist at Imageworks who was responsible for rendering the text for the credits. OK, deep breath. I know we're just about as thick into the weeds as we've ever been but we're doing good. Now, already, in the titles sequence alone, we've seen the marriage of digital technology and a practical miniature. I talked a few weeks ago about the only blue-screen work in the film, which was used for the shots of Keanu Reeves riding on top of the elevator. The backgrounds there were plates shot inside the miniature. But there would be another sequence where this thing would be used as practical environment for a digital effect. Here's Boyd Shermis to explain that.

BOYD SHERMIS
The moment where the window-washing winch, you know, the thing that holds the cable, that's holding the elevator in the air, when those bolts break and that window-washing winch goes flying down the shaft, the elevator shaft itself is a miniature, but the winch that's flying down, and the cable that it's sort of whipping around, was done in 3D – CGI 3D. So, they built that as a 3D model and they rendered it as a 3D model and ran it as a – I'll call it a simulation of that thing flying down and bouncing off the walls. It wasn't a true dynamic simulation in the way we think of it today, but the way they animated it, and the way I asked them to do it, was to use physics, and so they kind of came up with some physics-based animation to give it that erratic thing. And so that combination of CG layered in with a miniature, composited digitally in the computer, was

kind of a cutting-edge, hybrid, new-wave thing that we were doing at the time that not too many people had done at that moment.

KRIS TAPLEY
CG supervisor Ron Brinkmann.

RON BRINKMANN
I remember it was the first time I used RenderMan on a show. RenderMan is sort of the standard computer graphics rendering software. At the time, we used it because it did such really nice-looking motion blur. And that whole winch was just totally – that whole shot was just totally motion-blurred anyway, crashing down the elevator shaft. It's a very quick shot, but it worked nicely because the winch was, you know, it waw bright yellow, so it kind of popped out well enough to see it.

KRIS TAPLEY
Visual effects DP Dave Drzewiecki.

DAVE DRZEWIECKI
It was very much a hybrid concept, and that was, you know, something that we had suggested from the beginning. To build a big winch and have it fall convincingly, it had to be big – full-size, or half-size or something like that – then you had to put it way up high and shoot it at high speed. It would have been a really big deal, but doing it as a computer-generated thing inside of a miniature environment made all the sense in the world, and it was used, I think, very effectively, and you never would think twice about it.

KRIS TAPLEY
While we're here I want to bring in another new voice, and we're about to hear more from him regarding the work done on the jump sequence. But this is David Douglas, a computer graphics artist at Sony Imageworks at the time who did some work on the movie. This guy is a character and has a really good sense of the stuff we've been talking about throughout this project as it pertains to *Speed* helping to mark the end of an era and what was so great about that era. Anyway, here's David talking about all this stuff about the digital winch rendered inside the miniature.

DAVID DOUGLAS
We had to do all that shit by hand, or they did, and so we were taking a live – in this case, a model shot – and adding a 3D, you know, match move, because there was no match-moving software. There was nothing. You basically just had to build a facsimile in geometry of details inside the elevator, line it up and then hand-track it for each frame. I mean, it was just – it was crazy. And all of the software was buggy because it was always being updated and they were pushing new things. You would have these massive crashes. We had these Silicon Graphics workstations that by today's standards are, like, flip phones. And we had this thing called the Everest, and it was the size of, like, an institutional refrigerator you'd see at a prison or a big restaurant or something. And it took you hours to render a fucking frame. Oh, man, it was really, really

something. But it was one of those expressions of the style and technology of the time that is a great snapshot of what it was like to be there in the mid-90s.

KRIS TAPLEY
Back to Todd Vaziri.

TODD VAZIRI
Those early-90s, it's an exciting time for what could be accomplished. And with the flexibility and the freedom that computer graphics would give you, especially in those early days where just one shot of this thing, of a hard-surface prop that has no discernible scale cues, can we put that in this miniature environment to sell the shot, to tell the story that the winch has broken down and is falling down the elevator shaft? What can we do about that? I think that stuff is fascinating. And it's also one of those true times where there was a ceiling as to what could be accomplished with computer graphics at the time, and compositing at the time. And just hitting that ceiling with these types of movies is really exciting and bringing it down to the most efficient, what are the fewest amount of ingredients of this shot that we need to tell this story? Which is what any good filmmaker should be doing. Don't add all the superfluous stuff. Don't get indulgent. Don't use blankety blank as your crutch – costumes, music, cinematography. Don't just make beautiful shots for beautiful shots' sake. It all has to flow. It all has to work together. The things like eye-lines and 180-degree line and cutting on action, all those things make a sequence flow and the people that shoot miniatures and every single step of the way, computer graphics people, the model builders, it's like, movies are fake and we all know that, and how do we tell the story using all these wonderful tools that we have? And how do we not go overboard and forget that we're making a forest, not just the leaves on the trees? We need to see the forest from the trees. Yeah, there's always going to be a time where we need to focus on a particular tree and a particular leaf, but we're still making a forest.

KRIS TAPLEY
OK, next up, this is a smaller point but I might as well throw it in here, too. The moment when Howard Payne escapes through the parking garage and triggers that explosion that blows Jack Traven clean across the room into a wall on the other side, there was some touch-up work there because there were wires involved in the stunt. Here's Boyd Shermis on that.

BOYD SHERMIS
There was a new platform. Quantel, as a company, they used to have a "Harry" and then a "Henry." Those were digital compositing platforms that were very prevalent, primarily in the commercial and television world. And just at the time that *Speed* was being worked on in post-production, Quantel came up with their film resolution version of a similar device, similar platform. And it was a film resolution box that you could sit down on and do film composites, and they were anxious to have somebody use it on a feature film. And I was, of course, happy and anxious to be using it, but at the same time, wasn't quite convinced that there was anybody who knew how to operate it and use it to, you know, full effect. But it sort of came to a compromise, and we had a series

of shots that required some wire removals, which, of course, today, you don't think twice about. You know, it's sort of a commodity in modern visual effects to do wire removals. But it was still a relatively new concept back in those days, where you either, if you were going to use wires, you tried to make them so small and thin that they weren't detectable in your film camera, so that you didn't have to remove them – because you couldn't really remove wires film-optically. It wasn't something you did with routine. But I knew that I could do it with digital techniques and there was this device that, you know, they were dying to use and I was happy to try it out. But not on something that had a lot of impact or something that, you know, had a lot of risk to it.

KRIS TAPLEY
Moving right along, we come to probably the crown jewel of effects shots in this film. We've discussed it a couple of times but it's the helicopter shot that starts on the bus as it approaches the gap in the freeway, and then the camera pans and tilts over to the gap and zooms in on it. Seems easy enough, right? Well, the gap isn't real, and there's a lot involved in getting the things into frame that you see there. Here's film editor John Wright followed by Boyd Shermis.

JOHN WRIGHT
What it was about that shot, as I remember, that was a shot that I think Jan wanted, and I'm not sure they wanted to spend the money, but after they saw the movie, they agreed to do it because they saw that the movie was working.

BOYD SHERMIS
I'm pretty sure it was the most expensive shot in the movie, and it primarily because, once again, it was a very long shot, but even more than just the duration, it was – I think we shot it on VistaVision, too, although we down-rezed it – it's a panning, tilting, zooming camera mounted to a moving helicopter. And this is back in the days when, you know, you didn't just have match-moving and tracking and all those things that we, today, take for granted, or LiDAR, you know, that you can check your tracks against. This was something done sort of freehand, once again, panning, tilting, zooming on a moving helicopter.

KRIS TAPLEY
CG supervisor Ron Brinkmann.

RON BRINKMANN
When the schedule got tight, we were like, you know, "We don't have the resources to do this and everything else." And it's just, back then, when, you know, the camera was moving, it was very painstaking to try and match even an image or a 3D geometry to a shaky camera like that.

BOYD SHERMIS
When a zoom is happening in a shot and you're trying to track on a zooming lens, you just pull your hair out. You can't figure out what's going on. And over the course of this very long shot, and again, the helicopter is pushing in as you're zooming in, so it's hard

for – even if you had the computer technology, which we didn't, really – it's hard to know if something in the track is a result of the zoom or of the push-in of the helicopter. And, again, you've got all the parallax of these crisscrossing freeways going on. You know, we didn't know if we could actually do it, and this is to the credit of Richard Hollander and his team at Video Image at the time.

KRIS TAPLEY
Alright, we're about to go on another side quest. This one brings us to Richard Hollander and VIFX. Richard's work on this shot is sort of spoken in hushed tones almost. There's clearly a lot of respect afforded to the skill and effort involved, and it was enough – again, one shot – to get Hollander an inclusion on the nominees list when *Speed* received a BAFTA nod for visual effects. He was also part of the Oscar bake-off that year, though the film fell just short of a nomination there. Let me bring him into the fold here to give you a little background from his perspective.

RICHARD HOLLANDER
I had worked for Robert Abel and Associates and Doug Trumbull. I worked for Doug on quite a few shows and stuff and one of the things I decided was that the world of optical printing, which I grew up in, was – when you finally get to the place where you're trying to put these layers together – was doomed. It's a non-repeatable process. You have a beautiful list that's 14 pages of instructions of what the optical printer is supposed to do, and the human starts operating it, and you change nothing on it, unless you ask the human to do it again, and of course, there's some modification to the actual process that happened. And the things that I think everybody wanted to do at that time was, everybody was pushing optical printing farther and farther, and the interesting thing that was going on at that time was the digital revolution, one day I saw an ad in a magazine that doesn't exist anymore, that the government put out, called NASA Tech Briefs, and there it was, was the Kodak 1K-by-1K sensor that they had used in outer space, and they were advertising it for public use. It was a beautiful chip. I threw it on an optical printer and a few weeks later realized that we were in another world. We were going to digitize, you know, the work that was shot on film, and once we digitized it, then the world would open up. That story – I swear, that story rings through the industry. Once everybody understood that you could put together people programming code really fast to merge imagery to do what the optical printer did, the very basics of the optical printer – and because when you do it digitally, you can repeat it perfectly, so you have the ability to continue to improve over and over again. And that concept just spread like wildfire to everybody. And there was – God, I forgot. Cineon? Kodak's machine, which was way ahead of its time, doing compositing. Great machine. Too expensive for us, but great machine. Flame came out. That was another compositing machine. People like us were writing their own little screwy languages to do compositing, and that's where we were. We were right in the mix as the digital world was picking up. We were continuously, you know, looking to improve the process, the pipeline and the capability, so there was not a full toolset at that time for doing blue screen and green screen, any kind of isolation technique. There was a whole hodgepodge of techniques to do it, and none were really refined like they are today. I think that marriage of the technical and the old-school stuff was really what VIFX was in the middle of, and that train, you know,

for everybody, took off very fast, hot and heavy, and became more powerful. And that was great. Not that it was easy, but it was very exciting to watch all that stuff get improved and go through its phases.

KRIS TAPLEY
Now, here's Richard talking about that shot in *Speed*.

RICHARD HOLLANDER
We had a Flame machine at that time, which I bought. It was sort of the state of the art of compositing machines, and the funny thing is, is that as far as I remember, we used the Flame to do the tracking. And I'll say this is 2D tracking, not 3D tracking. Because the lens was a zoom, it was so flat, we could get away with this, which, there were only a few people who were on the edge of doing that at that time. And one of them was over at Digital Domain at that time. The track I needed to do was 2D and I realized, well, the Flame could do that. We can pick up and get a fairly good tracking of that image and then I could somehow get those numbers out and give it to the 3D group for that camera, you know, to be working, and I wrote code to modify what was going on and export out the data that I got from the Flame.

KRIS TAPLEY
I feel compelled to chime in here and say, if you're lost, just go with it. I certainly won't pretend to be an expert at all of this stuff. Just hold on tight. Here's Boyd.

BOYD SHERMIS
What they had to do was track it in an almost innumerable number of ways and in places, and the matte painter extraordinaire, Bob Scifo, painted sections of the matte painting. So, they would, for example, track one of the supporting poles in the freeway overpass, and the pole right adjacent to it might be a different track because of what was going on with the camera and the lens. And so, we had to break it down – I don't know how many different layers – but many, many layers of what he would do as 2D paintings, and they would track in, in multiple instances, in multiple locations, all these different layers of paintings, and to hook it all in and make it all fit as a match move.

KRIS TAPLEY
And back over to Ron Brinkmann to touch on the expense factor here.

RON BRINKMANN
Back then, the Flame systems were hundreds of thousands of dollars, I think, to get the piece of hardware, and so they charged equivalently for the work being done on it. The operators, you know, they were just extraordinarily expensive.

KRIS TAPLEY
OK, one thing people talk about a lot with this shot is that flock of birds you see fly through the gap. Here's Richard with more on that.

RICHARD HOLLANDER

We were adding things to it. We had already done flight behavior stuff based on Craig Reynolds' work from his school, and Andy Kopra. Craig and Andy were both at VIFX at the time and Andy was the one who actually took Craig's software and just started running sims of the flight to the birds and then rendered our birds that we had, but, you know, we were putting birds into everything at that time. So, to say whose idea it was, we were trying to find atmospherics, birds. If we could do squirrels, we would have done them, too, you know, at the time. Just put it in there to make it look real and make them look different than what's ever been done before, not to draw your eye away from it, but to make you believe it was a real thing.

KRIS TAPLEY
And to wrap us up on this section, Todd Vaziri.

TODD VAZIRI
No, that shot is absolutely stunning and beautiful and I love that it's a crash zoom, which, you know, very much a John McTiernan-type thing, which you'll see in all of his films, including the ones that Jan de Bont photographed. It doesn't just cut to a shot of the gap. It starts on the bus, tilts up. You're showing the audience. That's where they're going. Here's the connection. This is what's going to happen, as opposed to just cutting to that gap, which plenty of movies just do. It's genius all around, not only in shot design and sequence design, but execution. Just absolutely wonderful. Even today, the match move of that shot would not be straightforward. We would be able to hit it, but it would be, like, "Ooh, that's going to probably be one of the hardest shots of the movie."

KRIS TAPLEY
And on we move to the jump. If you haven't already, go back a few weeks to episode 22 where we break down everything that happened the day they actually shot the jump – or the days, if we're to believe Jan de Bont's story about doing it twice. Obviously, they shot that moment on a ramp on a freeway, not over an actual gap in an overpass. So, here we are in post-production to really build out that moment with visual effects. Here's Boyd Shermis.

BOYD SHERMIS
I had worked with Jan on several commercials and I had been doing all kinds of what you might, at the time, have considered extravagant digital types of effects, doing commercials. But there were a number of these things that, you know, people were just starting to do in feature films, really, at the time, as far as the digital work. And when they asked me about doing this, the jump, it was just, "Yeah, I think I can figure this out." And this is one of the – by the way – one of the fun things back in those days, which isn't true of today, which is you had to really think hard about how you were going to do this stuff. I mean, these days, you go, "Yeah, I'll throw it in my computer and we'll make it work," and it's sort of lost the charm of the challenge of laying awake at night and trying to figure out a way, of, "How am I going to do this? What parts do they have to shoot and what parts can I fudge or paint or remove," or any of that business. So, it was one of those things where we spent a great deal of time thinking about how we were going to go about it.

KRIS TAPLEY
Ron Brinkmann.

RON BRINKMANN
They did the jump off of a fairly low ramp and the goal was obviously make everything below that ramp look like it's a sheer drop-off everywhere. So, we had a matte painter, David Douglas, painted a couple of really great-looking matte paintings for the straight-on shot and the reverse shot. I think everything was shot large-format, VistaVision, so we had plenty of room to kind of add our own camera move after the fact. Just basic stuff. Put the matte painting over the existing background and then add a whole bunch of little things to kind of integrate it into the scene, you know, a bunch of smoke elements and dust, and throw some birds in the background to make it look like it's got some life up there. I remember very explicitly that, you know, Jan was like, "The bus has to just barely clear it. It's got to be as tight as you can make it." I remember we had to go back and forth a little bit and kind of tweak a few things to really make it as on-the-edge as it could be.

KRIS TAPLEY
Which brings us back to David Douglas, who Ron just mentioned and who we heard from earlier in this episode.

DAVID DOUGLAS
Essentially, they had to get this painting out – two of them, I believe – for the trailer, and they weren't sure yet what the final shot was going to be like, or anything, but, I mean, we had, like, a couple of days to do it. So, if you take a look at the shot where the bus, from behind, is going over the gap and coming in to land, and you can see where the freeway cross-section is exposed and there are all these pipes and channels coming out of it for the electrical systems and things like that. My version of that is in the trailer. That was a three-day shot, literally. It was just a flat hack. It was in there to basically get it into the trailer, and the final version, which is Jesse Silver's, I believe, is the one that's in the actual film.

KRIS TAPLEY
So, to clarify that, when you look at the trailer and you see the shot of the bus landing, that's a different version of the cross-section of the overpass than what's in the movie. What's in the movie is far more detailed. If you look at them side-by-side, the difference is obvious. As David says, he did the one for the trailer, and he tells me a bout of carpal tunnel syndrome sidelined him from doing the full job in the movie, alas. Alright, finally, the subway. There isn't as much to discuss in the visual effects realm on this sequence beyond the compositing stuff we've mentioned, like the different passes for lights and things on the miniature trains. The rear projection we've already detailed previously, but I did get some further perspective on all of that. Here's Jake Braver again, followed by Todd Vaziri.

JAKE BRAVER

Could you have done that another way at the time? Yeah, but I think that's some really smart choices going, "Rear-screen's the right thing for this." So, you have all of that sort of light that's matching the background available on set to sort of make those two things feel integrated. It's really something.

TODD VAZIRI
It's a good companion piece to *Terminator 2*, which was three years earlier, which, yeah, *Terminator 2* definitely pushed the boundaries of computer graphics at the time, but excluding the computer graphics and excluding even the digital compositing, the techniques used in *Terminator 2* – stop-motion, rear projection, large-scale miniatures, all that type of business – similarly at the peak, zenith, of their fidelity with understanding about what you can get away with, who could do these types of things, who can craft the most amazing shots together. And rear projection in Terminator 2 is amazing and relied upon not only, like, nighttime driving sequences but daytime stuff. I mean, in places that you probably – most folks don't even realize was rear projection. The RP on the top of the subway at the end of *Speed* is more obvious. I would love to see the rear projection plates that were shot for this, just on their own, because they are remarkable. And the lighting of the top of the subway car, and the performances of Keanu and Dennis Hopper, and then the stunt folks, really sell it. It really sells it. Of course, on some of the wider shots where you really get to soak it all in, me, personally, I'm, like, "Oh, man, if it was only a little bit brighter, so that those pin lights could really pop." Especially when it cuts up against some of the real tunnel shots. Yeah, but, hey, that's rear projection of the day. It's – even at its greatest, it still can't hit those marks. But maybe that's just my eye and the things that I look at. But the way that stuff was filmed, for example, notice how the camera, in almost all circumstances, is right down there at the surface of the subway as it's shooting down the subway. Yeah, there's a couple down-angle shots, and you're already immersed in the sequence and you're not thinking about how could they have filmed that. But wherever you saw down the subway car, having that camera so tight to the top of the subway car, as if the camera operators are in extreme danger themselves, I think that's the kind of stuff, that's the kind of shot design, the thought that goes into it. They could have shot it with much longer lenses two cars away, you know? And I think that just would have looked weird. It would have looked photo real, but there's something subconscious that telegraphs to the audience, "Hm, there's something little fakey about this. There's something that it's hard for me, as an audience member, to fathom how they could have got that shot." And without any technical knowledge, again, and with the visual vocabulary of the time. So, those types of choices, being right there, intimate, with the performers, it's one of the things that really helped solve it. And of course, all the light, all the interactive lighting, all the reflections and everything, it's just so great.

JAKE BRAVER
I think that the dynamic choices of shot design make the effects work, every single one of them, because they're telling story. They weren't showy, right? There's nothing in the shot design that's showy in terms of the visual effects. And I think that makes it sort of a hallmark of, certainly, its time, but even something that gets referenced today, because

you sort of go, “Well, yeah, that’s a real explosion.” You go, like, “Yeah, that’s actually dynamically lit,” like, “It’s in an environment,” because it was.

KRIS TAPLEY
As we start to wind down today, there is a question I tend to pose throughout my interviews with the crew of *Speed*, and that is, if you were going to make this movie today, how would it be different. We’ve gotten some of that flavor from folks like first assistant director David Sardi and special effects coordinator John Frazier. Here’s what Boyd Shermis had to say.

BOYD SHERMIS
I think today, you’d maybe shoot an LED video wall of the Dennis Hopper and Keanu fight on top of the train in the LA subways, as opposed to rear projection. You probably would have done the elevator shaft, once again, as a 3D CGI thing. And I probably would go into a real elevator shaft, for example, and I would LiDAR a real elevator shaft and I would go and take textures from within the elevator shaft and we would build a miniature of that exact elevator shaft that was a hundred stories tall or whatever and we’d have it all in one piece in a computer. And I would do photogrammetry of the real elevator shaft, so you capture all that real lighting and you would build it into your 3D rendering. Once again, you would do it all in the computer. You wouldn’t bother to build a miniature and shoot it motion control, with all the painstaking layers that we would do back in those days.

KRIS TAPLEY
Boyd brought up an LED wall there, and indeed, much of the movie would probably be done in an LED volume, which is a totally immersive space, versus just the sort of back-drop instance that Boyd suggested for the subway fight. OK, so, you’ve got your bus on a gimbal in an LED volume surrounded by screens ready to be populated with an environment. But you still have to capture all of the hair-raising footage that would go onto those screens, right? At that point, why not just shoot the damn movie the way they did? You’d be killing yourself otherwise. Here are Jake Braver and Todd Vaziri once again on that point.

JAKE BRAVER
Not only would you be killing yourself, but you would have to be capturing things so many times, right? Think about the event when Jack jumps onto the bus and the door of the car, you know, comes off and rips off from the front of the bus. You’d capture that, probably, twice. You’d capture it with a plate vehicle and then you’d capture, you know, all of the coverage of it. It is interesting because it is kind of a movie that you can only shoot this way. And it’s not beyond the powers of anything anyone can do now. It’s just not something we do anymore. You have that much driving in a script, every physical production executive and visual effects executive that reads that script goes, “Alright, great, green-screen driving. Here’s, you know – it’s going to be plates. Here’s what we’re going to do.” Or they go, “OK, if there’s enough of a page count, we can justify a volume of some sort for this stuff.” Whatever it is. Nobody’s brain goes to, “Yeah, let’s

put the bus on a trailer or let's free drive the bus." Nobody's brain goes there anymore. That would have to be a filmmaker going, "That's what we need to do."

TODD VAZIRI
Nobody in their right mind would argue that you're going to get better performances, better spontaneity, all of the things that are beautiful, happy accidents – nobody would argue that you're not going to get that if you go out and shoot a bus on a tow rig, driving around Los Angeles. Everybody should advocate for that. I think having the actors stuck on that bus, moving for hours on end, not being able to just hop off, go into their trailer, I think that led to a special type of camaraderie. I think that led to a special type of connection that you can see on screen. It is not the best for flexibility, for schedules, for timelines, for control, for lighting, for sound. If you were trying to make this movie today, I would absolutely advocate to use basically the exact same methodology that was done for this film. Now, "We only have the lead actor for this amount of time." "We can't close down this many streets because of security." "Oh, well, what if" – you know, usually from up top – "What if this was shot against a blue screen or on a LED volume or something like that? How much money could we save? How much time could we save?" You could have a director who wants the flexibility to be able to change what neighborhood they're in at any particular time. You may have a studio that may say, "Oh, this section of the movie that we've already shot where they're in city streets, we want them to be in the airport environment right now." I mean, that sounds ridiculous, right? That could never happen on a major motion picture these days, right? Hmmmm... So, you've got a lot of forces at play nowadays. But those of us who care about the movies, who care about the look of these movies and who care about the happy accidents that would happen and the connection that the performers would have, I think the forced ingenuity of how to light these types of scenes, if it's out in the real world with the bus on a tow cable and all this business, I think it's going to lead to a better final product. But, folks like me aren't in charge of all these things these days.

KRIS TAPLEY
And back to Boyd Shermis.

BOYD SHERMIS
People are so used to the tools, now, to just do anything you want. You don't think about the practical nature of, "Oh, yeah, we can't really make the camera do that, because the cameraman will die," or, "you'll destroy the camera," or – which, of course, we did a number of on that film – or, "we can't get that freeway, so, you know, what are we going to do? Let's figure out what we can do." And so, you would find practical solutions that forced you to do organic filmmaking. And to me, it was really sort of the beginning of my real strong collaborations with people like John Frazier, you know, special effects designers and coordinators or supervisors, where you try to get as much for real as you can, you know, things that have a lot of big impact. And we augment it where we need to and we fill in the gaps, no pun intended, where, you know, they just can't pull it off or they've got massive rigs that stand in the way or, you know, you just can't have fire with this situation. So, one of the funnest parts of the business, to me, is working with those guys to watch them design and build rigs that do outrageous things,

and then we put outrageous things on top of it and make it thoroughly outrageous. So, that was one of my first experiences. You know, I did a certain amount of that in some of my commercial work, but I had never done it on the scale of *Speed* or working with somebody, you know, at the top of their game like John Frazier at the time, where you just go, "Wow, this is amazing. This is so much fun," you know, blowing shit up. You were forced to do things. Today, you're not forced to do things like that. In fact, what happens a lot today is that you sit at the computer and you pre-viz things, and you can do virtually anything you want in a computer, to the point where it's just fantastical and unreal and you're not even asking the viewer to suspend disbelief. The viewer goes in and goes, "Yeah, I know this isn't even real. There's no way they shot this. It's all done in CGI." And so, you don't even have that suspense of, "Oh my God, somebody nearly got killed when they photographed that," or, "somebody is an inch from the ground when they shot it." And in fact, Keanu was inches from the ground when he's on that little dolly underneath the bus circling the airport. He literally was doing that. And so, you know, when you see, I don't know, Ant-Man or Spider-Man nearly kill themselves – and by the way, none of those guys can ever die anyway, so, there's no there's no real suspense or peril involved – but here, there is real peril. People could die and you're shooting it in a way that you know it was for real and that they really – somebody had their neck on the line. And yes, we did some sleight of hand to, you know, make it feel more real, but it was all shot with that sensibility of feeling real. And even down to some of the miniature things that, you know, we did. Jan would come in on the set and as much as I and Dave Drzewiecki will take some credit – a great deal of credit – for the work we did on those miniatures, Jan came in, even on that stuff, and gave us kind of what he wanted to see that would be in keeping with the style of film he was shooting and making, so that it all had that sense of real action excitement that you just don't have today, and I think that's why it holds up.

KRIS TAPLEY
Ron Brinkmann.

RON BRINKMANN
It was fun because it was definitely still a lot of, I guess you'd call it old-school filmmaking at the time. It was before you did everything digital, but after you could do some things digital, so it was kind of a fun little mix of it.

KRIS TAPLEY
And by the way, I'd be remiss not to mention that Ron literally wrote the book on digital compositing. It's called *The Art and Science of Digital Compositing* and it was published in 1999. It's widely viewed as one of the essential, seminal sort of tomes about this process, so, seek it out if you're interested in learning more about it. Here's Clark Schaffer, meanwhile, bemoaning the transition from his hand-made heyday to the digital status quo of today. And this isn't just to bash CGI or anything. I'm zeroing in on something.

CLARK SCHAFFER

We had smaller teams, and even the different shops would have a signature look. I mean, you could look at something and say, “Oh, that was a Boss film. That was a Grant McCune. That was, you know, Fantasy II,” or whatever creature shop was creating something. Because it was tangible, you kind of felt the signature of the artist, I think. Which, digital is more assembly line. They’re using the programs, the same tools, the same brushes, the same pixels, and it’s all assembly line. We’ve lost the personal signature of the artists, I think, a little bit.

KRIS TAPLEY
And here’s Richard Hollander with a counterpoint, talking about VIFX.

RICHARD HOLLANDER
If you look back two years or three years, it had changed that fast. I just remember one year trying to do a comp and having these disk drives that weren’t large enough to hold the data, and realized, you know, six years later, we had, I don’t know, 100 times that disk, maybe even more, and then the whole world just became a different place to do the work, which was all good. Because you could concentrate on the artwork, and we weren’t fighting – you’re always fighting technology. I guess I should say that, even today. But as time went on, the things that you fought for were bigger and more interesting things.

KRIS TAPLEY
Nevertheless, you’ll find people in the computer effects world who have a similar gripe to Clark’s regarding the assembly-line nature of the work. Here’s David Douglas again.

DAVID DOUGLAS
Nowadays, everything is regimented. It’s like working at Amazon. They have a person who does nothing but composite sunlight onto the pyramids. They have another person that works on the reflective the surface of the original marble that’s coating the pyramids, right? And it’s a production line where it goes down that assembly line and when it gets to the color-and-lighting people, when it gets to the modelers, whatever, they create it and then they put it into that shot. But that weird quality that something like *Speed* had where you would work on an entire shot or even a sequence is no more. I mean, I know a guy, a very talented guy, who was hired simply to work out the shoulders on Iron Man’s suit. They had to completely rebuild the shoulder, because the shoulders didn’t really work, and they had been hiding that fact for, like, three films, so, they finally redesigned it. But, I mean, that’s a guy spending weeks just to work out the mechanics of the shoulders for one character. And, I mean, you know, when I started out, there were probably a dozen people in the world that did that job, digital matte painting. It was Chris Evans had done the work for *Star Trek II*. It was extremely rare. And now there are 50 people on a single film doing one aspect of Paintbox or compositing. And there are entire university courses taught in how to design battle armor for video games.

KRIS TAPLEY

And so, what I'm zeroing in on, I guess, is in part a lament over the fact that progress continues apace, but only in so much as it, by perceived necessity, leaves old ways behind when the old ways still have something to contribute. *Speed* is, as we've said, a hybrid movie, and 30 years later, it looks fantastic. Now, go back and look at *The Scorpion King*. Go back and look at the late-90s status quo where the industry was going hog-wild with CGI. Now, growing pains, I get it, but I would also submit that plenty of what we see in theaters today won't hold up as well in 30 years as *Speed* has. Anyway, I'll close this with these two beefy quotes from Dave Drzewiecki and David Douglas. These gentlemen are scholars and I think they put a far finer point on it all than I could.

DAVE DRZWIECKI

I was always just, as a kid, enthralled with what is now sort of old-school special-effects movies. So, it was neat, and like I said, I had a feeling it wasn't going to last. It just didn't seem like it was going to be possible. You can clearly see that digital imaging was going to be the way it was all going to be. I didn't necessarily expect that miniatures would be thrown out completely, you know, throw the baby out with the bathwater. But that's the way the film industry – well, not just the film industry. It's just the way it goes, you know? I'll give you an analogy, if I may. I like to collect and restore old TVs, vintage TVs. Like, I have this beautiful 1966 Zenith console. It's just a fucking beautiful thing and it's working again, but nobody makes picture tubes anymore, CRTs, you know? And nobody even rebuilds them anymore. So, what we have in the world left of old TV parts are just either what was used or what was unused that was left around, left over. But when you see an old TV working, an old color Zenith like this, and you feed it an old TV show off of a DVD or something like that, it's just amazing. Comparatively, it's low-res. It's 480 lines at best. But it's a compelling image. Is it better than 4K? Fuck no. This modern imaging? 4K? Yes, it's superior. So, old images, old ways – it isn't necessarily worse, it isn't necessarily better, it's just different, and you had these old legacy companies like Zenith and Admiral and Motorola that made these old TVs, and they were giants. They were huge electronics giants in their day and they – as times changed, as things changed, manufacturing went to Japan and overseas because it was cheaper, and these old legacy, giant companies, they just faded away, maybe like a General Motors manufacturing plant, you know? So, I equate these old movie special-effects techniques – opticals, film opticals – as the same thing. I just remember that it was a very interesting time for me because it was one of those periods when digital was exploding and all of a sudden, we went from being guys nobody would hire because computers were 20 years off, right? To, "Oh my God, that kid fell drunk out of a window at art school, hire him." And I'll go back and watch that film again, man. I can't promise I'll go back and watch most of the stuff I worked on, but I will watch that. As I'll tell people, I'll leave it at this for the nostalgia, but, you know, when I was a kid, I went to see *Star Trek III*, and in *Star Trek III* they have a sequence where the Enterprise, wounded, is brought in to Spacedock. That was 23 shots of somebody parking a spaceship, and you can't imagine what it was like to go see a movie where for the first time it wasn't 23 shots of trying to blow something up or a planet collapsing into itself. It was 23 shots of parking the ship, and that was breathtaking, because no one had ever done it. No one had even conceived of doing it. And now you can have battles with 10,000 giant Star Destroyers

pounding each other and people are checking their phone to see if there's a new text. And I think that's the thing that people miss about, like, *The Road Warrior*, even, or *Speed*, or anything, like, is there is a kinetic reality to putting a car or a bus through a billboard that you don't get from the calculated, premeditated sort of reality. I mean, you've seen *The Prestige*. If you really go back and watch that film, what *The Prestige* is, is kind of Christopher Nolan's analysis of classical filmmaking versus the new digital age. And Borden is the classical filmmaker. He's not showy, but he has great tricks, he's a very smart guy and he's dedicated to his illusions. Whereas Angier is the showman who takes the shortcut of using technology, but ultimately pays a price in sincerity.

[OUTRO MUSIC]

KRIS TAPLEY
Next week on *50 MPH*...

KRIS TAPLEY
We have a picture lock. Now we need music. But *Speed* calls for something unique.

JAN DE BONT
This movie needed a composer who actually wasn't very experienced in film composing.

KRIS TAPLEY
With the vigorous support of director Jan de Bont, newcomer Mark Mancina gets the job.

MARK MANCINA
Technology was changing everything and where I had a huge advantage was that I could mock up my music with synthesizers and make it sound pretty realistic, and that became an unfortunate art form.

KRIS TAPLEY
Mark will detail the journey to craft an original score that would ultimately influence a decade of action filmmaking.

MARK MANCINA
The first thing I came up with was the little bit, the bum-bum bum bum-bum bum. That was like a little tag that just sounded like the bus racing through town.

MARK MANCINA
I had all of these sounds. So, instead of a high hat going tacka-tacka tacka-tacka tack, I had a hubcap, tacka-tacka tacka-tacka tack.

KRIS TAPLEY
All of that and more next week right here on *50 MPH*!

KRIS TAPLEY
Thanks so much for listening. *50 MPH* is written, produced and edited by yours truly, Kris Tapley. You can find us on Twitter @50MPHPod. I'm @kristapley. That's Kris with a K. You can also catch every episode and more at our website 50MPHpodcast.com. If you dug the show, please like and subscribe and do all the things. We'll see you next time.