JOHN McLEOD, Special Effects Coordinator: Quentin definitely wrote a very intricate car crash sequence that had everyone scratching their heads. We had so many questions that it was hard to figure out a starting point to find out how to do it and what we needed to fabricate. We realized that this would have to be done by presenting pictures to the man and having him give the OK. Once we had the pictures, Quentin took off with info and then we had one hell of a sequence on our hands. Along with a huge build list.

[Stunt Coordinator] Jeff Dashnaw and Quentin were trying to figure out how to achieve a very difficult part of the scene when Stuntman Mike first makes contact with the Honda. The Nova was supposed to go up and over the Honda and take off the roof of the vehicle. It needed to tie into the inserts that Quentin had devised for the girls’ deaths. They decided to have us build a Honda that we could tow unmanned. It would have a ramp off the front end that we could pull into a head-on collision with a Nova test car that Jeff would be driving. In the Nova, we put in a full cage for the head-on collision test, along with the full safety systems we always install to make the car as safe as possible for the stunt drivers. We tried to make this car strong enough to maintain its integrity but also absorb some of the shock. The day before the test, we had needed to check that the steering mechanism was running true so I pulled the car from an offset line with my pick up truck at 45 mph. I was a good 25 feet from the line of the Honda. The car pulled down the line like it was on rails but it was strange to see that car in front of me without a driver. It was not a good feeling to imagine pulling that car into head-on crash with my truck. The next day Jeff decided he would pull the cart at 40 mph into a head-on collision. The cars were 1200 feet apart and pulled into an impact point at 600 feet at 40 mph. Since both cars were traveling at 40 mph, it gave the car an upward lift of 80 mph off the ramp. The ramp we had built into the Honda had created a strength that kept any real damage from occurring to the Honda. It was a tough little opponent for the Nova. The Nova, however, flew like 23 feet into the air and traveled 75 feet forward. And during the flight, it rolled driver-side down and contorted on its...
landing. It was hard to watch Jeff come back down to
earth on the driver's side. After that, we abandoned
the idea of a manned vehicle for the crash. We went
back to the drawing board, and Jeff headed to the
doctor. He was a lucky guy.

JEFF DASHNAW, Stunt Coordinator: John McLeod and I put
our heads together and talked about the best way
to bring the two cars into each other for a head-on
collision. We designed a ramp that attached to the
front of the Honda that Stuntman Mike's Nova would
launch off of. So we built cages, attached the ramps
and determined the speed we would go.

I drove the Nova in the original test, pulling the Honda
into myself. Both cars were going 40 miles per hour,
which made for an extremely violent 80 miles per
hour collision. Quentin really liked what he saw, but
you could tell that something was missing. Ultimately,
we decided that we could be more efficient and more
violent and get more speed by towing both cars into
each other, unmanned.

So John came up with the two-to-one pull system to
create the effect. I’ve seen a lot of systems where the
car wanders when you’re towing them into one another,
but these cars tracked so straight, it was unbelievable.
This new system allowed Stuntman Mike's Nova to go
80 and the Honda to go 40. We also lowered the
ramp on the Honda, so we could take more of the car
top off and make it look more violent. For the final shot,
the car flew unbelievably well, stayed on its wheels
when it hit, bounced a couple times, turned sideways
and went into a sideways barrel roll, which we were
later able to reenact with Buddy Joe Hooker for the
overlap. He came in at 70-75 miles per hour and did
a cannon roll for us and it just cut together great.
JOHN McLEOD: For the interior car crash sequence—where you actually saw the girls get crushed—we had numerous meetings between the departments to develop a list of questions before we presented it to Quentin. It really became quite comical at times. Each girl had a very detailed and choreographed ending to her life that only a guy like Quentin can put into words. We would listen to his descriptions and reasons for each gruesome scene and somehow the majority of us would end up laughing. Maybe because we were so nervous about how to pull all of this off.

The script actually seemed fairly simple—except for the detailed car crashes and chase sequences. Those really caught my eye. And since I had heard through the grapevine that Quentin was intense about the details of some of his action scenes in previous films, I realized we would not be taking the easy way out on any of these scenes.

Quentin was full of endless energy and seems to truly enjoy the process of making films. At certain points, he seemed to slow down and mull over ideas a bit as far as story points related to our mechanical gags. So we tried to provide visual aids like models and videos of our tests. And then he would spring back with a keen sense of direction and then we were off to the races. If we started to stray from his direction—which, of course, we tried to avoid—he’d give us a quick and decisive verbal redirection.

GREG NICOTERO, KNB Effects: One of the first things Quentin said to me was, “If these dummies don’t look real, then I won’t be able to shoot them. And if I can’t shoot them, I don’t have a crash.” He didn’t want to rely on computer-generated effects. Quentin’s a practical guy. It was the same on Kill Bill. With the exception of maybe one or two shots, the only CG stuff we had on Kill Bill was for wire removal. Quentin’s a purist; he wants to be able to see it, to touch it, to be able to figure out where he wants to put his camera.

What made this crash sequence even more difficult was Quentin’s desire to shoot it as if it were crash test dummy stock footage. Everything was going to be at super slow motion. We’re talking 150 frames per second. Generally, when you’re watching a movie, you see a dummy on screen for just a few frames. The gag happens and you cut away. With this, we
Now we had done two films earlier in the year where we had been experimenting with new ways to create bodies. One was a Tony Scott film called D_{j} Vu. We had to create a burned autopsy cadaver of a woman that would move realistically and be heavy. So we actually built an armature where all the joints were machined. The elbow would move in the right place, the wrist would move, the shoulder would move. So we spent a lot of time building these custom armatures that were totally articulated, put those into the mold and then we ran the bodies out of solid silicone. Silicone is a material we utilize for fake heads. You can tint it flesh-colored, put a little paint on it, punch hair into it and it looks completely realistic—more so than foam latex or latex would. Silicone is sort of the standard that we use for making fake bodies.

For us, the first task at hand was determining the position each girl would be in at the moment of impact. I had to get Quentin to commit to who was sitting in which seat and what position they were in well before we started shooting. So Lanna Frank’s hands were on the steering wheel, Julia’s leg was on the window sill, Arlene was behind the driver and Shanna was reaching between the two front seats, fucking with the radio. So we stood outside of Troublemaker Studios with a camera, put four girls in a car and I got Quentin to sign off on the position of each body.

Literally had to build dummies that had to act. You had to be able to stay on them for a long enough period of time to sell the shot, but they also had to look completely realistic and move realistically. So we had to do perfect replicas of each actress in the exact position, completely articulated, so once the impact of the car hit, they would move realistically. And we had to do all this in eight weeks.

The rigs that John McLeod came up with were just absolutely amazing. It was probably one of the best experiences in terms of interface with a physical effects department that I’ve ever had. But we test the hell out of everything too. We made dummies that I flew down to Austin with, we stuck them in the car and we actually tested all of them. And then showed everything to Quentin.

As soon as I read the script, I knew how I wanted to build the bodies. And it was interesting because when we got down to it and we were on set, he came up to me and he said, “Hey, I looked at all the videotaped test footage you did. And a lot of the angles that you shot tests of, I really like. I want to duplicate those angles.” I think it really helped him visualize the scene by being able to look at the tests that we had done so that he could see which angles were successful and which angles were less successful.
Then the actresses came to KNB and we individually cast each of their heads, hands and feet. Then we sent them to a facility in Burbank called CyberFX, where each actress was scanned in the exact position that her body would be at the moment of impact. CyberFX then provided us with a one-to-one scale foam replica of the actress’ body, and we re-sculpted areas to add muscle detail and to basically clean it up a bit.

At the same time, we were cleaning up sculptures of their heads and hands. So we then grafted the heads, hands and feet onto the foam bodies, to create complete foam bodies of each actress. Then we molded those out of fiberglass. Concurrently we were building the articulated armatures, so we would open the mold, take the foam out, put the armature in, seal it back up and fill it with silicone. That took three days. Then you’d open that, trim all the excess off, paint it and then you’re into the hair work. For Sydney, we literally had to make all of the wigs custom because she has that long, black curly hair. So we had to hand tie each of those wigs as well as the ones for Jordan, Vanessa and Monica. Once the bodies were created, we had to start thinking about how many bodies we needed to make, based on camera position. If you’re inside a car, you’re not going to be able to just see something happen to Julia without seeing everybody else in the car at the same time. We weren’t just making one dummy of each girl; we had to make three dummies of each girl. So we ended up making 12 fully articulated dummies—three dummies of each girl so we could get three individual takes.

Lanna Frank [played by Monica Staggs] was the driver. Her body was created hollow because originally Quentin wanted the steering wheel to crush her chest and we were going to fill the whole thing up with blood. There were tubes. There was basically a reservoir in her chest that we were going to fill through the mouth. So that when the steering wheel crushed the chest, it would force all the blood up through the throat and out the nose and mouth. We built it anatomically correct so that we could get the blood shooting out the mouth. That’s really what would happen if your chest was crushed by a steering wheel. Quentin also wanted to do something really specific with her legs. He wanted the entire engine block to come in and crush her legs. So John McLeod and I came up with a rig. We built anatomically correct legs that started with resin bone, then we laid layers of silicone muscle, then we put a skin over that.

So the idea was that when the engine block comes in, we put pointed shards of metal that would catch the flesh and tear the flesh backwards, revealing all the muscle and all the blood and all the bone underneath. We really wanted it to look like someone was scraping the top layer of skin off. So we had three sets of legs since we had three versions of Lanna Frank. We did three different takes, Quentin picked three different angles, and right before each take, I would make incisions in the silicone and inject blood into the leg with a syringe, so that when the flesh came off, you would see instant blood. And one of the most effective aspects of that was that her neck was so well jointed, that there was a camera that was straight overhead looking down and all the rigs that John McLeod built all had “jerk” cables on them and pistons on them. The entire car could move forward and backwards really quick to simulate the action of the car impact. So when you’re watching the footage, all of the dummies are reacting to the physical rigs that John McLeod built, so Lanna Frank’s body fell forward when the car was jerked backward and then when the car stopped, she fell backwards and her head and her chin tilted back, looking right into the camera. So it looked like the thing was literally acting. It was pretty amazing.

Arlene [played by Vanessa Ferlito] is sitting in the backseat and is the only one with her seatbelt on. So for a split second you think that she’s going to survive. But the idea is that Stuntman Mike’s car drives
over the top of their car and his wheel tears through the roof and rips her face off. This was one of the first gags that we started building because I wanted to test the whole thing out even before we started working with the actress. So when we were shooting Planet Terror, I had one of the guys at KNB sculpt a generic torn-away face, so that we could test it to see exactly how we wanted to do it. So the idea was we got a cast of the actress, got a clay version of her head and then we sculpted away the face, which revealed the skull and the muscle. Once we molded that, we made a little plug that filled in the areas that still had her face detail on it. We stuck that on there. Then the whole neck was jointed and then the jaw was jointed. So, one of the first tests that we did, when the wheel is coming through and hits the chin, it pushes the head back against the chair. As the face gets crushed and torn off by the wheel, it actually opens up the mouth of the dummy. When Quentin watched that in slow-motion, he couldn’t believe how realistic it looked. Again, these dummies all had lives of their own.

With Julia, because Sydney is a really tall woman, Quentin was specific about wanting her leg to get torn off. The way she’s sitting in the car, her right leg is dangling out the window. She’s sort of lounging in the front seat of the car. So the idea was that we had to build a leg that we could pull off and on top of that, we had to put a scoop underneath the dummy to push the dummy’s body upward so that we could clear the window sill when we wanted to pull the leg off. So again, this whole sequence couldn’t have been done without John McLeod.

The idea was that we had to mount the cameras onto the platform that moved the car back and forth. And on action, the car would jerk, there was a piston that John McLeod put underneath Julia’s body that would push the body upward and there was another cable rig that would tear the leg off. So we filled the joint where the leg attached to the hip with fake blood and condoms and all kinds of viscera, so when the leg flew out, there was this trail of blood and viscera that would follow the leg. And I think we hit the camera on every take with the leg and then of course with the trailing guts and viscera. And it worked out amazingly well.

So at the point of impact, Lanna Frank gets pinned behind the steering wheel, Julia gets crushed in the passenger seat and her leg is torn off and Shanna, who is in between those two front seats reaching for the radio, goes face first through the windshield. John
McLeod rigged a cable that we attached directly behind the head of the dummy. There was a scaffold that was built around the car rig with pistons that, once activated, would pull the dummies in whatever direction we needed them to go. So for the Julia leg gag and for Shanna going through the windshield, they squibbed the windshield and pulled the dummy out. We’re talking about 60 or 70 pound dummies that we were pulling. The amount of force to actually pull those bodies was astounding. But when we did it, they launched like they weighed five pounds.

Myself, Andy Shoenberg and Eric Feedler flew down to Austin, got the dummies all dressed and it pretty much went like clockwork. We did three takes of each version. And then at the end of the first night Quentin said, “You know this stuff looks so great, I want to do another couple of takes. Do we have any more dummies?” And I said, “Well, they’re a little screwed up because we’ve been tearing them apart, but we can certainly put something together for tomorrow.” So we ended up shooting extra coverage at different angles once we got into it and he realized what he had.

Quentin took a lot of pleasure and glee in bringing each girl over to her dummy to look at it. They were all really mesmerized. I know Sydney and Vanessa were probably the most creeped out looking at their dummies. Especially after we did the first exterior crash, because when we did the first exterior crash, we put all the dummies in the car and I actually put several well-placed blood bags in the car. Once the impact happens and we all walked over, we were basically looking at four slumped over dummies covered in blood and glass. It really felt like we were walking up to a real accident scene. All the bodies were slumped, their hair was all messed up, there was glass everywhere, there was blood everywhere. It was really disturbing because you could almost imagine if a crash really happened and you were the first person to walk up to it, that’s what it would look like.

This is going to be one of those sequences in modern American cinema that people are going to be talking about for years to come. Because there is virtually no CGI, it’s all practical, it’s all in camera. And it’s certainly a tribute to Quentin’s initial vision and John McLeod’s work and the people here at KNB that did an astounding job building these dummies. When we were finished, Quentin came up to me, put his hand on my shoulder and said, “You’ve outdone yourself.” He said, “I think that this is some of the best work that you’ve ever done.”

I love the challenge, I love the fact that Quentin and Robert challenge us. I feel like our company that’s now been in existence for 19 years, we welcome those
challenges because they test us. And I love that. I want to keep getting better and better and when you have directors like these two guys, they push you. And I like being pushed because it inspires us to do better.

Quentin told me last week that he was talking to the editors and he asked for an angle of Lanna Frank's dummy in the front seat of the car and the editors, who study this footage over and over again, said, "We don't have a shot of Lanna Frank's dummy, we only have the actress in the car." They had no idea it was a dummy. Quentin said to me, "If that's not knocking it out of the park, I don't know what is.”

Andy Shoenberg was basically our key shop supervisor. He really supervised a lot of cosmetic work. Eric Feedler and Wayne Toast, in conjunction with the rest of our mechanical department, built all the armatures. It takes 45 people to make these, you have different departments, you have sculptors like Jaremy Aiello and Kevin Wasner and Andy Shoenberg. Then you have moldmakers like Jim Leonard and Rob Freitus. Then you have the guys that run the silicone. Steve Hartman was basically the key guy that ran all of the silicone bodies. He and Caleb Schneider really worked out how to make the bodies. And then fabrication and final cosmetics and then hair work. We had eight or nine people just making wigs.

JOHN McLEOD: Quentin had a very specific idea for the interior of Stuntman Mike's car during the crash scene. The movement of the car was hard for me to grasp at first, so Quentin simulated the movement with his cell phone.

The idea was that the car would move like a plane flying in a loop. Cameras would shoot Kurt Russell in the car's interior, giving the impression that the background was spinning. I was still a bit unsure of the concept, so the next day, I put together a prototype model to help both of us understand it. Quentin liked what I showed him and we were off to the races.

We had four days to build the unit. After we designed the device, I was still a bit nervous about the main shaft, so I enlisted the help of Mechanical Engineer Larry Slate to double check our calculations. Most guys will not touch devices like this due to the liability
involved. Lucky for me, Larry is always willing to give me advice when I'm in a jam. I always want to triple check myself when it comes to safety. We based our design around the materials we could gather quickly. Our boys worked hard at it for four days, swinging a lot of big steel.

We installed the rig on the backlot area of Troublemaker Studios on the day before we shot it. Kurt Russell was very brave and trusting. He hopped right in and seemed like he was having a ball.

Over the course of this fifteen month production, there were many crew members that helped make these two films possible. Too many to name, but I'd like to at least mention our core group. Shop Foreman Richard Woods headed the shop that dealt with the gadgets and mechanisms. He's very good with hydraulic systems and fabrication. I leaned on Richard to guide the crew of effects fabricators through the various projects. Set Foreman Frank Tarantino dealt with the day to day operation of the shooting company. It was a handful between the two films. Car Shop Foreman Andy Miller was in charge of cages and general fabrication of the *Death Proof* cars. He played an important role for us. We were prepping cars for *Death Proof* while shooting *Planet Terror*. Setting up a second shop was a huge project and Andy was able to bring in some great help. Gang Boss Mike Reedy was my go-to-guy when I had difficult rigs or gags that were hard to describe in one sitting. He can take intricate projects from design to on-set operation with ease. Mike also pre-rigged a lot of the large sets for us on *Planet Terror*. This is something that you cannot teach or tell people—it comes only with experience. Gang Boss Rob Clot also was a clutch guy for me. I put him in charge of the pyrotechnic inventory and recording for all the pyro on *Planet Terror*. I also had Rob with me during all of our testing with the unmanned cars for *Death Proof*. Special Effects Buyer Brian Montgomery took a huge load off my shoulders by dealing with purchasing and buying for the set and the shop. Brian also dealt with the crew and the drivers for all the various rigs and jobs. Driver Billy Chambers was critical to our operation. He does so much for us during a shoot and has a great mechanical sense. I trusted Billy with the position of driving the vehicles that pulled all of our mechanical rigs for the car crash in *Death Proof* and the motorcycle rig in *Planet Terror*. Our resident Machinist, Keith Haynes, who is a key player in our group with his knack for gadgetry and machine tool operations. Car Shop Foreman Elia Popov took over when Andy had to leave for a prior commitment. He brought in some great help during a tough time in the schedule. Special Effects Technicians Wes Mattoo, James McCormick, Dan Yates, Marc McCord and Bill McGinnley were key guys for me both in the shop and on set. Lead Prop Fabricator Jeff Poss was also a huge help when it came to the interior car crash sequence. He, along with his great crew of techs, made duplicate parts for the interior Honda that interfaced with our mechanical rigs. A great crew, across the board.