Restoring the Volvo 780 Concept Car

BY DAVIES OWENS

It all began back in 1989 when Volvo Cars of North America shipped a Volvo 780 to American Sunroof Corporation (ASC) to produce an eye-catching "concept car" for the 1990 New York Auto Show.

Volvo was eager to promote their new Turbo + kit and the notion that, while safe, a Volvo could still be a lot of fun to drive. The ads showed a 740 flying through the air—presumably cresting a racetrack jump. Not sure the added 26 hp were enough to fly, but they boosted the power from 162 to 188 hp, making it the "fastest production Volvo to date." It was a creative effort to enhance the brand's image and give the sluggish 780 sales a boost.

David Scheinberg was Volvo's project manager for this initiative. A brand new 780, white with beige interior, was shipped to ASC in Detroit. While the name implies sunroofs, the company was often engaged by car manufacturers for custom projects. For Scheinberg, the pressure was high. The 780 had to be a showstopper. ASC spent countless hours and $35,000 alone on the blue pearlescent paint that was supposed to pop as the car rotated on the turntable at the show.

Working with young ASC designer Oluf Bendixon, the concept car went from design on paper to clay sculpting the body kit, consisting of front spoiler, side skirts, and rear spoiler. ACS then fabricated the body panels out of fiberglass, made the special wheels, and lowered the car. After almost a year of work, the car was displayed on a brightly lit pedestal at the Javits Center in New York.

After the show, the car was put away in Volvo's warehouse in Rockleigh, N.J. Eight years later, Scheinberg was given the task of selling it, with just 632 miles on the odometer. He put the factory wheels back on, had it professionally appraised, and put it up for sale.

Tricia, the first owner, was an American Airlines flight attendant. She lived in the San Francisco area and used the car as her daily driver. After five years she decided to sell it, for a lofty $34,000! The odometer now showed 32,000 miles. I actually had the opportunity to drive it back then but wasn't in a position to buy it. How I wish I had taken some photos, but without cell phones we typically didn't carry a camera with us.

Chris, a musician, was the second owner. He had hand controls installed and drove it for 12 years. Despite having to navigate a wheelchair, he was grateful for this unique car. He parked it under tree—good for the interior but not so great for the raw steel brackets ASC had used to attach the body kit.

ASC made the modifications simply to get through the show, not to make it last for 30+ years of daily driving. Rust was showing around the front and rear glass, likely caused by failing to treat the bare metal they exposed when cutting out the windows. The odometer now showed 120K+ miles.

Sayre became the third owner. He had been Chris' mechanic and kept the car in good operating condition. After a few years, he sold it to Anthony, owner number four. By now, the car's history was fading. Anthony thought the car had some kind of aftermarket body kit, which was literally beginning to fall off. In many places, it was held on with drywall screws. Other parts, such as the driver's interior door panel, had simply disappeared. The window switch was held on with zip ties. Other crude repairs were made all over the car, adding to the damage.

Owner five would have the car for just one year. She had no idea what she was driving ▷

The 780 Concept Car was in sad shape when I managed to track it down at an impound yard, days before being crushed.

and called it a "beater to get down the road." The car's unique history was completely gone at this point. By the time I tracked it down, she had managed to get a DUI, have the car impounded, and smash the front clip against a curb, losing it in the process.

Less than two weeks before the impound yard in Sacramento was scheduled to crush the car, my good friend Todd flew down from Boise with just his tool bag. Three days later, he had negotiated to buy it, paid the impound fees, and limped the car back to Boise.

Equally amazing was the fact that I had found the one-off show wheels on a website. They had been removed from the car in 1990 and sold separately. The search was finally over, and the restoration could begin.

The original thought was to refresh the engine, patch up the body kit, and make it a casual around-town restoration with a crazy story to tell. But that all changed in 2018.

Enter Rebuilding Generations (RG), a Boise nonprofit charitable organization where "car guys" spend time mentoring the next generation. Together, we decided to go all in. Kevin Keep, RG's founder, had a long-standing relationship with the Specialty Equipment Market Association (SEMA). Every year one of RG's restorations had been showcased at the annual SEMA show in Las Vegas, considered the world's largest automotive trade show.

Kevin agreed to make the Volvo RG's build for the 2021 show as long as I commited to meeting the deadline. My two high school-aged sons, along with a dozen of their peers in RG, all agreed to put in whatever it took. My wife also agreed to let me spend most of my non-working hours in the shop.

We began the restoration in May 2020 with 535 days to go. The car had to be ready by October 2021—there is no grace period with a SEMA build. That sounded like plenty of time, but not when you consider the work would be done by volunteers with school and job commitments.

After power washing the underside, removing three decades of dirt and oil residue, we brought the car into the shop and began the disassembly. We took more than 6,000 photos and videos to help put it back together and used hundreds of plastic bags to organize the parts, however, found that bagging and tagging wasn't really enough. Best practice is to put each component on a piece of cardboard to show where all the bolts go.

As the parts came off, the rust damage became evident. The fiberglass body panels were warped, bulging, and distorted from the expanding rusty raw steel brackets.

When we pulled the taillights off, we found the blue pearlescent paint perfectly preserved, having never been exposed to light. Neil Ramey, our painter and gifted body shop pro, now had something to go by when mixing the paint.

Rebuilding Generations youth disassemble and clean the 780 on the rotisserie.

The entire interior was removed, minus the dash. My neighbor Jim, who runs a professional glass company, pulled the front and rear glass. When we saw how bad the rust was, we decided to replace the entire roof with the one from our parts car, a champagne 1989 780. It also donated a number of interior panels.

We opted to make only small period-correct enhancements during the restoration, no heavy "mods," and only using Volvo parts, unless something was not available. For example, since we were rebuilding the B230FT motor, we decided to upgrade to the more robust L block, which came with oil squirters for improved piston cooling, found on 1993 940 Turbos. We found a suitable motor at a local pull-a-part and Paul, our machinist, began the engine restoration using oversized Mahle pistons and an IPD (one of our sponsors) performance camshaft.

There was no way to fully address the underside without turning the car on its side. Greg, who is a professional welder, spent several days making brackets so we could mount the car on a rotisserie.

We assembled a large Harbor Freight car tent inside my shop to cover the car allowing my son, dressed in a hazmat suit, to paint parts and spray on fresh undercoating.

The 1989 780s came with the Bosch 2.2LH engine management system. By 1990, Volvo had upgraded to the more sophisticated

My son Liam sprayed the underside, including the disassembled multi-link suspension, with undercoating in our makeshift spray booth.

Bosch 2.4LH system. Since one of our three parts cars had this newer system, we decided to replace the car's old one.

We rotated the car back to horizontal to remove the remaining interior components—everything from sunroof drain lines to sound deadening panels. No wonder Volvo claimed the 780 was the quietest Volvo ever built!

My son Bennett located a fourth parts car—a 1990 740 Turbo with a M46 manual transmission. We had decided if we could find a manual transmission, this would be a fantastic upgrade. After all, the vast majority of 780s sold in Europe came with a stick shift. We sent the M46 to Ultimate Transmission (one of our sponsors) for a total rebuild.

After Paul finished machining the block, team RG prepared it for painting. Other engine room components, such as intake manifold, fuel rail, and brake lines, also had to be restored. More than 80 percent of the parts were actually restored rather than replaced, given the lack of availability.

An effective tool for metal restoration is our tabletop vapor blasting machine by Vapor Honing Technologies, which I first saw on Jay Leno's Garage. Water under high pressure is mixed with aluminum oxide and glass beads. It makes any metal part look basically factory new. It was a big hit with the RG students who loved the transformation.

Cleaning, scrubbing, and renewing endless parts was a weekly ritual for many of the volunteers. Other parts that wouldn't work in the vapor blaster simply required lots of elbow grease. One father, with his young sons, spent hours restoring all the copper brake lines from tarnished grey-black to beautiful shiny copper.

One of our biggest challenges was figuring out how to replace the missing fiberglass body panels. Chad, who runs the Idaho high school robotics team, thought he could get one of his students to use SolidWorks, a computer design and engineering program, to map out the missing panels. We could then 3D print them using lightweight ABS plastic.

Because so few parts are still available, most of them had to be refurbished. Liam and Bob prep engine parts for repainting.

A few days later, Mason, a high school senior, was measuring the panels inch by inch with calipers and entering the data into his computer. For the next three months, he would measure and then print on his 3D printer various small curved test pieces.

Chad then connected us with Stratasys, a 3D printer manufacturer, that agreed to use their industrial 3D printers to produce Mason's files in two large pieces rather than the six to eight required on a home system.

Neil had accomplished nothing short of a miracle in his body shop. The new roof had been installed and the first coat of primer had been applied. The folks at Bertone would have been proud—the roof looked factory original.

A local upholstery shop, another sponsor, had replaced a leather panel in the driver's seat using material from a donor seat. My son Liam learned how to restore the original beige color by applying dye in multiple layers, which a company in Virginia had mixed from a small piece of leather we sent them.

One group focused on the wooden trim pieces made of seven-layered burled elm. Since the driver's door panel was missing, we had to piece together an entire set of six matching trim pieces. The wood in each 780 was unique, no two cars alike. Bill, a furniture restoration expert, led the stripping of the cracked epoxy off the wood. We then applied numerous layers of satin finish, which brought out the intricate swirls and colors.

Less than three months away from SEMA, we began reassembling the car. With the fuel tank and rear axle multi-link components installed, we bolted on the new IPD stainless steel brake lines.

Only two of the eight seat adjustments worked. It was the typical 700/900 problem, where the cables had stretched—the motors turned but the seats didn't move.

Fifty days out, we finally picked up the ▷

Cutting off the roof from the donor car, using a carbide-tipped blade, wasn't too difficult.

The interior panels were all cleaned and stained to match the original color.

freshly painted car at Neil's body shop. He explained there were no less than 22 layers of primer, paint, and clear coat from bare metal. His efforts were evident in the deep glossy shine. Still, the car would need another five days at Paul's shop for cutting and buffing to bring out the supershine.

Volvo used a combination of spring clips and sandbags in the trunk to achieve the lowered stance, but we needed something more lasting. I had ordered custom coil-overs for the front and rear, but they wouldn't fit despite hours of adjustments. We then ordered IPD lowering springs that worked in the front, but not for the more complex multi-link suspension in the rear. We tried no less than five different spring and shock combinations, yet nothing looked just right.

We had found a brand new OEM headliner at a dealer, but it began to drop immediately after installation. The 30-year-old foam was failing. We couldn't find anybody with a fabric that came even close, so we pulled it back out, peeled the fabric, and scraped off the old foam. We then reattached it with 3M adhesive. It worked!

The factory wheels were back from restoration and painting but upon closer inspection we noticed that something missing. They were supposed to have a machine-polished shiny silver lip. So, we stripped the paint off again and found Brad, the only person left in the state who still hand-polishes metal. He spent literally a day on each wheel. With the edges shining, we brought the wheels back to Neil for painting. A graphic designer had recreated the center cap Volvo badges months before, which Neil clear-coated into the paint.

The dash came back from McDowell's Upholstery (another sponsor), where Bert, the owner, spent 20 hours restoring the cracks in the 30-year-old vinyl. It looked amazing! Meanwhile, I had disassembled and reconditioned the instrument cluster, including replacing the 19 light bulbs.

Jonah, our seat guy, carefully peeled back the upholstery, restored the cables, and cleaned the switches. After many hours of work, we had two fully functioning seats.

The odometer showed 143,261 miles when we began the restoration. Upon advice from Mark McCourt and Hemmings, we did not change the mileage, despite the car being fully reborn. They convinced us to keep the continuity with the car's past. Mark also wrote an article about the restoration for the May 2021 issue of *Hemmings Motor News*.

With 18 days to go, we paired the engine to the rebuilt transmission while others installed the final wiring harnesses and electronics. Thanks to friend and former Volvo employee, Chuck Wilberger, we installed a factory-new Turbo + unit.

The shop was buzzing with half a dozen people on most evenings. Body plugs and drain lines were reinstalled in the trunk, fog lights polished, new a/c lines and components installed. The hood liner was hand-cleaned, since a new one could not be found. The black felt looked factory new when it was reinstalled on the underside of the hood.

The big moment of starting the engine for the first time had come. Cameras were rolling, we held our breaths, turned the key, and nothing happened. It didn't even turn over. Instead, the hazard lights started flashing, half the taillights came on, and the wipers were flapping and wouldn't stop. Most of the demons came from several improperly connected harnesses. We also found the starter motor solenoid had failed. After putting in another starter, the engine now cranked but still wouldn't start.

It turned out there was no spark, even though everything was connected. After hours of searching, we found the wire to the coil was severed inside the engine harness, despite no outside visual damage.

After splicing the wire, we had spark, but the engine still wouldn't fire. Todd and the RG team went over every single system trying to figure it out. We thought we had fuel but to verify Todd decided to test the injectors. To save time, he simply pulled out the fuel rail, and cranked the engine after having disconnected the coil to make sure there was no spark.

Todd watched fuel spray into a tray then heard a whoosh and saw flames. He rushed

Mason test fits a 3D printed sample piece. Some 40 test pieces were printed to get the exact fit.

Brandon installs the freshly cleaned and tinted glass in the driver's door.

Professional detailer Paul spent five days cutting and buffing the paint for the show.

My son Bennett installs the interior door panel and components after months of refurbishing.

All interior leather was restitched where needed and color-matched to the exact factory color.

A burled elmwood trim piece after the cracked and cloudy epoxy had been removed and a new satin finish applied.

My son Bennet, friend Ashton, and I about to install the restored B230FT engine and refurbished M46 manual transmission.

for the fire extinguisher but when he pulled the trigger nothing happened. By now the fuel had reached the floor and flames were coming up between the engine and the firewall. He finally managed to extinguish the flames by spraying water with a garden hose.

After pulling an all-nighter, Todd had replaced the fire-damaged parts and was back to starting the engine. We had checked the timing multiple times, but a timing light revealed the distributor was firing out of sequence. A mistake in rebuilding it had caused the alignment to be off by 180 degrees. Once corrected, the engine finally started, but it ran like an old farm tractor.

We were three days out. Fortunately, the hood was off when the fire started, so only the cowling under the windshield was damaged. Neil took it back to be repainted. Everything between the engine and the firewall was pulled, and either replaced or restored. ▷

The Rebuilding Generations team proudly displays the 780 Concept Car at the main entrance of the SEMA show in Las Vegas among 1,000s of the world's finest cars. Thirty-one years later the 780 Concept Car was back in the limelight.

After several hours of steam cleaning, things were presentable again.

It was 9 pm the evening before 16 of us were leaving for SEMA. We found a poorly attached connector to the knock sensor, which made it run better, but it still didn't cold start without some effort. We now had brakes and forward motion. It was test drive time.

The rear end had been lowered with the wheels too cambered and a mere quarter inch from touching the inner fender. At less than 5 mph, I carefully drove a short loop out the driveway and back. As I pulled back into the shop, I couldn't get it into gear without grinding the transmission. When we looked under the car, we saw transmission fluid leaking out.

We figured we could get through the show by putting it in first before starting it, but what about the parade through Las Vegas? We loaded the car into the trailer, collapsed, and got ready to wake up a few hours later.

We were six hours away from Las Vegas when my phone rang. It was the head of Optima Battery's marketing team. They were one of our primary sponsors and had invited us to display the car in their large outdoor booth. He told me they had run out of room, but offered us the premium spot they had purchased in front of the main entrance.

We arrived early evening in Las Vegas. One of Kevin's friends had graciously offered us to continue working on the transmission in his shop. When we traced the lines from the fluid reservoir, we noticed the line to the clutch slave cylinder was slightly loose, letting air into the system. A quick half-turn and we started getting more resistance in the clutch pedal. We topped off the fluid, bled the system, and were able to shift once again.

At the convention center, the Optima team escorted us to the front of the main building. A uniformed SEMA person directed us onto the sidewalk and pointed to a marked box showing the exact spot where to park the car.

Over the next four days, we were overwhelmed by all the people stopping by to see the car, telling us their Volvo story, and asking for interviews. On Friday, the last day of the show, my son Bennett proudly drove the 780 in the parade with the engine purring and without any issues.

Lots of tweaking remains, but under far less pressure. We are looking forward to showing the car at meets for years to come.

Many people to thank, including the 15+ sponsors and the endless number of volunteers. Thank you! ■

Davies Owens lives in Boise, Idaho and can be reached at davies@owenspod.com.

Photos, videos, and articles about the 780 Concept Car can be found at 780coupe.com/concept.

Learn more about Rebuilding Generations at rebuildinggenerations.com.