

Building the Volvo Bertone 780 by Hand

Part 3

BY DAVIES OWENS

Mario Panizza, the Volvo 780 project manager for Bertone, jumped back on a factory bicycle—the fastest way to get across the nearly million sq ft factory to the main office. Located in the heart of the historic automobile manufacturing district of Grugliasco on the western outskirts of Turin, the factory had undergone significant renovation in 1982 to accommodate Volvo's production requirements.

Nuccio Bertone, the famed designer and namesake of the company, was a daily presence at the factory. He once said in a promotion for the 780, "Style...this is a car with real class, real style. Good style never goes out of style." Style was a part of every car his team designed, and that spirit permeated the company, including the dress code. For Mario, his everyday work uniform was an off-the-rack Italian suit. All management wore suits and the 1,500+ workers sported Bertone uniforms with matching hats, gloves, and shirts. Expectations were high everywhere, especially in the creation of the 780.

Mario arrived at the main office and heard a voice with a familiar Swedish accent. It was Sven-Gunnar Johansson, his colleague from Volvo, who had just arrived from Gothenburg for a meeting. One of the perks for the Swedish team were the business trips to the warm and beautiful northern Italy. A welcome break from the frozen North during the winter months. The many seaside towns of the Italian Riviera and their beaches lay just a two-hour drive from Turin. But no time for such an adventure this time.

Mario noticed a large, odd-shaped box on

the floor next to Sven-Gunnar. It no doubt contained parts and panels he'd brought from Sweden. For quality control purposes, it was often necessary to test parts with Volvo equipment. Transporting such packages made air travel somewhat unpredictable, since the parts often caught the attention of airport security.

Mario and Sven-Gunnar walked into the second-floor conference room with the large table, capable of seating 20 people, with a fold-up screen and overhead projector at one end. Later that afternoon they would have one of their long meetings, where the Volvo and Bertone teams painstakingly worked through change requests line by line. But first things first—time for a late morning espresso.

The canteen, open during lunch hours, had a full-service espresso bar—a vast improvement over the coffee machines that were the only option when the canteen was closed. Mario looked at his watch and indicated to Sven-Gunnar they needed to get going for the weekly audit review meeting in the final inspection area at the end of C Shop. Claudio Cisoni, quality control manager for Bertone, normally ran the meetings along with Roine Lundin, his Volvo counterpart, who was now a full-time resident of Turin.

Additionally, Bertone top management and the respective managers from A, B, and C Shops would gather weekly to review the audit results from the manufacturing process. Anything that wasn't absolutely perfect was added to the report, regardless of whether the issue was reported by an individual line inspector or by the white-coated final inspec-

tion team. They would spend hours with calipers inspecting and measuring the completed car. All 780s were inspected thoroughly, but some were randomly pulled for this intensive multi-hour inspection. Any issue that had come up during the week had to be communicated back to the respective team who oversaw



that production process to make sure the problem was resolved.

Cats in the Factory

When Sven-Gunnar and Mario arrived, a circle of ten or so people were gathered. After the initial reports by the shop managers, an issue of scratches that periodically appeared on the painted 780s came up. It was obvious from the group's expressions that this was not the first time the problem had been discussed. Although the meeting was held in English, Paolo Caccamo, CEO, turned to several of the Bertone managers and began speaking quickly in Italian. They responded back with equal passion, waving their hands, pointing to one of the nearby 780s that was sitting under the bright inspection lights. Paolo switched back to English and explained, "There is an odd-shaped scratch in the paint of this car. It's the third time in a week this has happened, and it is not acceptable." He looked at everyone in the circle and continued, "We must determine immediately what's the cause of the damage. Our rework percentage has been low, but the number is going up."

This percentage was the number of cars, which had some quality issue that had to be

Mario Panizza and Gunnar Magnusson, Volvo's customer service representative for the 780 project, in the B Shop after the pickling bath.





corrected before they would clear the final audit. He continued, "I need everyone's full attention in finding the source of this paint damage. As you can see the scratches are consistent, several small lines together. We are confident it is not a line worker or tool brushing against the car during transportation from the B Shop." He paused and looked around as if hesitant to continue, "It looks like the scratches by an animal, perhaps a cat." Snickers and laughter broke out among the typically serious auditors and managers.

Paolo continued, "I know in the past cats have entered the factory when the doors are left open." Roine Lundin jumped in, "Yes, but I know Bertone has put practices in place to ensure this is no longer a problem." Several of the others said at the same time,

"Niente gatti!" (No cats!). Another manager declared, with a look of disdain, "This is a first-class operation and there are absolutely no cats wandering around, much less scratching our cars."

Just then, as if to spite them all, a scrappy looking cat scurried past the group and ran into a nearby corner, leering at them. They all shouted, "Un gatto!" And with that several managers, in their suits and Italian shoes, took off trying to catch the cat, but it was too fast and quickly disappeared in the factory. The mystery of the paint scratches had been solved. Now it was just a matter of catching all the cats.

The meeting continued with other reports and less exciting discussions. Sven-Gunnar and Mario headed to B Shop to look at the ▶

Pehr G. Gyllenhammar, president of AB Volvo 1971-83 and chairman of the board 1983-93, had a special affinity for bright red cars. In 1985, in celebration of his 50th birthday, Bertone custom-built a 780 in vibrant red with matching red interior. It now belongs to the Volvo Cars collection and has been exhibited at the Museum in Gothenburg.

The VIN shows it's an early 1986 model year. It came with a prototype trip computer that never made it into production and which would not be seen again until it was offered on the 850 as an option.

painting process. As they walked through the factory, Sven-Gunnar, who didn't speak Italian, greeted the Bertone workers with Ciao, the one word that was universally exchanged with smiles and waves. A versatile word, pronounced /CHou/, that means both hello and goodbye. He fondly recalls the genuine warm welcomes he always received and the workers' obvious pride in their work—craftsmanship at its finest.

The B Shop

Sven-Gunnar and Mario arrived at the beginning of the B Shop line, near the small desk of Domenico Gentile, the manager of the B Shop. He had also just returned from the audit meeting and wanted to show them the latest changes made to the paint process. Painting was by far the most complicated process in the manufacturing of the 780.

At face value, the painting process seems rather straightforward. It requires a controlled, ventilated space, where no dust can mix with the paints. Basecoat sprayed over primer, clearcoat on top of it to seal the paint, let it dry, and onwards to C Shop for the trim work. But as Sven-Gunnar later recalled, "Painting the 780 was a magic science—almost mysterious. The more you know about the paint process, the more you realize how little you know. A few people really know the entire process—I am absolutely not one of them—but I have been exposed enough to have a deep respect for those who really understand the paint business."

If there was magic in painting, then Domenico Gentile was the chief magician as the

Sound-deadening panels, called dead sheets, were applied to all flat interior surfaces. They were thin, dense pieces of foam-like material with an adhesive backing and filled with small holes.



Pickling a 780 by cataphoresis in the immersion bath. This process was critical for preventing rust.

manager of the B Shop. It was also the only section of the entire factory common to all the cars Bertone produced at the time, including the small and sporty Fiat X1-9, the Opel Kadett Cabriolet, and the Bertone Freeclimber. It was simply more cost-effective to use the same dipping tanks, paint booths, and ovens for all the cars. The reality was that Volvo had insisted on such a high quality level that the entire paint process had been overhauled at the start of the 780 program. As a result, all the models produced at the factory benefited.

Sven-Gunnar and Mario walked with Domenico to the start of the line. 780s were sitting on four-wheeled trolleys resting on their jack points. All the body panels had been assembled and welded. Doors, hood, and trunk lid had been attached, albeit loosely as there were no gaskets or door strikers, just bare metal. The workers pushed the trolleys with the 780s by hand, with a single peg under each trolley following a track on the floor, ensuring they followed a consistent path. Yellow ramps were positioned along the track to allow the workers to easily reach the top of the roof for any buffing or correcting as they passed under the bright overhead lights.

Pickling a 780

Pickling may sound like something you do to a cucumber, but it is the first major step in the paint process. As a 780 enters the B Shop, other than a zinc coating, the raw steel is totally unprotected from future rust and corrosion. But given Volvo's insistence on absolute quality, and the harsh northern winters, durability and rust prevention was non-negotiable. Swedes didn't think too highly of many European cars, since the extensive use of salt during the Swedish winters quickly turned them into rust buckets.

Another name for pickling is cataphoresis. The short explanation is that the car body is lowered into a negatively charged bath, filled with a mixture of pigments, resins, and solvents. A positive charge is placed on the car, which causes the mixed solution to be deposited on all the surfaces (opposites attract), including all cracks and crevices. This film over all the bare metal forms a base layer for the paint primer, providing an excellent resistance to corrosion.

	Year	1986 (G)	1987 (H)	1988 (J)	1989 (K)	1990 (L)	1991 (M)
	VIN	0001-	1200-	4000-	6500-	9000-	11300-
019 Black		X	X	X	X	X	X
130 Silver Metallic		X					
173 Red			X				
189 White		X	X	X	X	X	X
200 Blue Metallic		X	X				
400 Champagne Metallic		X	X	X	X	X	
401 Light Brown Metallic		X	X	X			
405 Silver Beige Metallic		X	X	X	X	X	
407 Blue Pearl Metallic				X	X	X	X
408 Red Pearl Metallic				X	X	X	X

Volvo 780 paint options. (Information collected by Hedwig Lambrechts from various Volvo sources.) For more paint details, please see 780coupe.com.

The workers connected the 780 bodies to an overhead hoist system using chains. The bodies then moved along a track allowing the entire shells to be dipped into the pickling bath. As the bodies are lifted back out of the solution, the excess liquid drips back into the bath, leaving a grey coat on the entire body, which dries fairly quickly. The heat and drying process used later in the B Shop ovens will further cure the coating. Sven-Gunnar and Mario watch as the workers return the 780 bodies to the trolleys, which are then moved forward along the track into the next area where the sound deadening panels will be installed.

Keeping the 780 Quiet

A \$43,000 automobile in the late 80s better have a quiet ride. This was achieved by adding sound-deadening panels. These thin, dense pieces of foam-like material with an adhesive backing were known as “dead sheets.” These distinctive panels, with small holes, were applied by hand to any flat interior surface—behind the dashboard, inside the doors, on the metal roof and floorboards. Anywhere it was possible to put a barrier between the passenger compartment and the outside road noise. These panels would later, during the oven-drying process, form an impenetrable bond with the metal. Later, additional foam and heavy layer sheets would be added to the floorboards. The 780 was the quietest of any Volvo in its day due to this extensive effort to ensure road noise was kept outside the passenger compartment.

Additionally, the workers applied a “wax” filler during this step. Initially the consistency of a paste, this wax quickly hardens and forms air and moisture tight seals through the interior and exterior body. Any place where two metal panels were joined, the wax was applied. It guaranteed no moisture between the panels and no doubt minimized road noise.

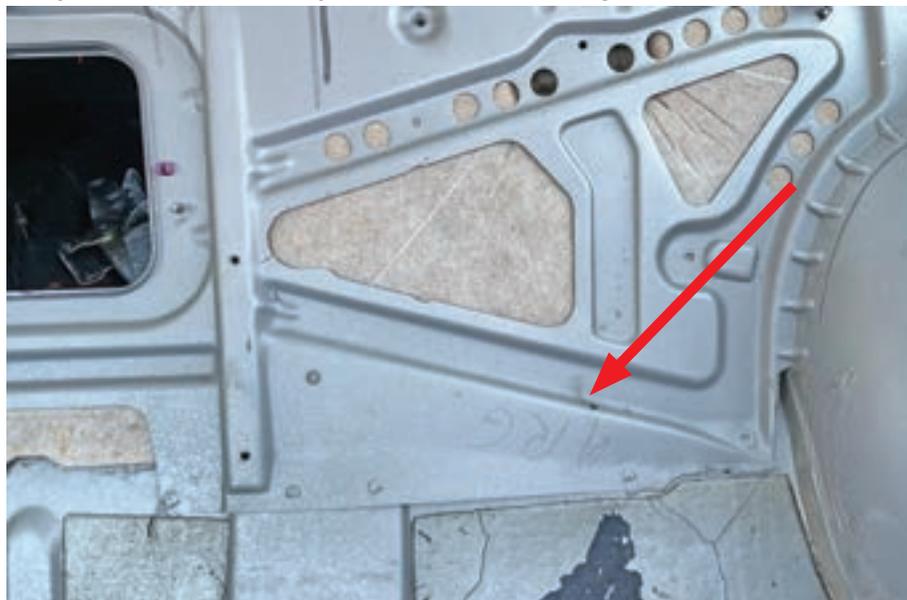
Next, it was time to move the sound-

proofed 780s forward for the application of the greyish primer. Watching from some distance, Mario, Sven-Gunnar, and Domenico observed two workers roll a 780 into the climate-controlled paint booth.

Prime Time

Looking like space travelers, the Bertone workers in full protective gear from head to toe, began to apply the primer with handheld paint guns attached to yellow air hoses working under bright lights. Primer provides a solid foundation for the basecoat. Primer is also important in rust prevention. If the car ever gets scratched, it means bare metal will not be easily exposed. The painters opened the hood and trunk, as well as the doors, allowing the primer to cover all edges and the interior. Once completed, and shining white, the primed bodies were then rolled into the first of three ovens they would travel through

Instructions for the painters were handwritten on the metal in the backseat area. This particular car was to be painted silver (ARG for Argento).



on their journey through the B Shop, in order to dry quickly and cure the paint.

Sven-Gunnar and Domenico discussed the paint process and some of the challenges Bertone has had to work out. Sven-Gunnar reiterated the high paint expectations Volvo has. He explained, “In the end, the paint system should be able to deliver a great looking color with consistent gloss and depth. If one looks at the car from one direction, it should have the same gloss and depth as from another angle. This is especially true where different materials come together. A plastic bumper valance, for example, should look the same as the metal body even though it’s made of a different material.” He continued, “There are also expectations regarding the durability of the paint, of course. No owner wants UV light to fade the paint after only a few years. Paint has to endure all kinds of abuse. Everything from mechanical wear by the brushes at a car wash to chemical attacks from gas spills below the fuel door to bird droppings left on the paint for days by busy owners. These potential hazards all have to be tested and the quality approved.”

Domenico agreed and brought up another challenge with which he continuously has to contend. “The various sealants, waxes, and adhesives, such as those used in the glass application, can react negatively with the paint below it. It seems like every time we change a supplier, I am delayed with new testing. That’s why I hope we will be able to keep the same suppliers and that they do not change any of their formulas. Something as simple as a change in the windshield adhesives used in C Shop had better not cause a problem with the paint. Nothing can be changed without first testing it, which is why we are always in these meetings.”

Basecoat

Sven-Gunnar, Mario, and Domenico walked to the next area of B Shop where the paint booth was open and a 780, sporting its new white primer, was being rolled in for the basecoat to be applied. Finally, the body would receive its color. The ventilation systems kicked on, respirators went on the workers faces, and the spraying of the air guns could be heard.

But what color would each car receive? That was a decision made by the Volvo planning department in Gothenburg based on projected customer demand received from the various sales regions. Typically, a customer would simply pick from the local dealer's inventory. Custom ordering a specific color and interior was more difficult, so generally the most popular color selections were the best guess of the sales teams. Mario recalls that the most common colors for the 780 were 405 Beige Metallic and 019 Black.

One reminder of the handmade nature of these cars is the handwritten note that can be found on the primed metal behind the backseat that tells what color that the car is to be painted. One of my cars has *Rosso* written there and it is painted Ruby Red Pearlescent, Volvo paint code 408. Another 780 has the word *Cham* and it is painted Champagne Metallic (400). Mario explained that the purpose of handwriting the color on the car body was simply due to the fact that the printed card, which travelled with the car through the factory, specifying everything from color, to engine type and distribution market, etc. could not go through the painting process. So, the Bertone workers would place the card in a plastic envelope and then handwrite the color on the body to tell the paint team which color to use. After the cars exited the paint booths, the cards were reattached to the hood before heading to C Shop.

For the sake of efficiency, cars were painted in batches with the same color before switching to another color. The easiest colors to apply were the solid colors, Black (019) and White (189). The metallic pearlescent colors, such as Blue Pearl Metallic (407) and Red Pearl Metallic (408), were far more complicated and added an additional cost to the car.

For the most part, the 780s were painted in colors that could be found on other models of the day, which was both a blessing and a curse. For Volvo, any color had to be uniformly consistent. Bertone Volvos had to look exactly like other Volvos manufactured in Gothenburg or elsewhere. This meant a batch of Blue Metallic (200) 780s had to look exactly the same as the Blue Metallic 760s painted in Sweden. This was no small feat as this color required mixing mica chips into the paint to provide the ability to sparkle and give off different hues ranging from royal



Another custom 780 was the car Bertone built for Hans Gustavsson. He was Volvo's vice president for product planning and development and had been the project leader for the entire 700-series. It was painted a one-of-a-kind pearlescent white. These paints were difficult to produce requiring several extra steps and care to get a consistent blend. (This car is also part of the Volvo Museum collection and was featured in the Nov-Dec 2016 issue of *Rolling*.)

blue to purple to almost black depending on the lighting.

For most colors, matching the paint isn't more complicated than taking the paint code to your local auto paint store, where they will mix the color based on the formula in their system. But to correctly match some colors it gets more complicated. There are numerous variables to take into consideration. I have tried to match the Blue Pearl Metallic on my 1991 780 and have had a heck of a time. I keep getting a much darker blue.

The Volvo 780 was painted in ten different colors between 1986 and 1991. Please see the chart on the previous page for the available colors each year.

Chip Protection

After the final basecoat application, an additional pass was made over any flat, vertical surface that would be more prone to stone chips. The front edge of the hood as well as the forward-facing fender flair points received an extra layer of paint. The now shiny 780 was carefully rolled into the oven to be baked and prepared for the clearcoat layer.

Domenico continued to explain some of the challenges of producing a high quality paint job. "You have to keep in mind there are multiple requirements that have to be met when painting. First, the paint has to have the right viscosity. It can't be too thick or too thin. Second, it has to cure properly, so we have to ensure that both the paint booths and ovens are always at the correct temperature and humidity, which isn't always easy here

in the Piedmont region. Third, the paint has to have the right coverage and not run or 'orange peel.'"

He went on, "Finally, we have to pace our work around the workhours. Our shifts run from 7:30 am to 4:30 pm. We can't stop halfway through and leave a 780 sitting in an oven for too long during a lunch break, the weekend or when the line is stopped for some reason." Domenico paused and then thought of several more variables he was constantly having to contend with, "Oh, there is also a concern that the entire paint process is timed the same. We can not take too long between the different paint layers. I am always having to insist with project planning and internal logistics that nothing unexpected occurs to change the timing. And one of my biggest challenges is dust. We have to run this place like a medical surgery area, and without air-conditioning in the entire shop, it means windows stay closed, which isn't a lot of fun during the summer months."

Having a new appreciation for the work Domenico and his team were doing, they walked on to the next step in B Shop where the workers were applying the clearcoat.

Clearcoat

Clearcoat was a fairly new technology, even cutting edge, in the late 80s. Ford didn't introduce clearcoats until 1991. By using urethane and polyurethane paints, it was possible to put this top protective coat over the basecoat. The clearcoat also provided a glossy finish, protected from UV rays, acid rain, etc. and

allowed for small scratches to be buffed out. But like the other steps, the Bertone craftsman had to work very carefully to spray each panel consistently, any variation would result in too much or too little clearcoat being applied, which would require even more buffing work or possibly even respraying if not done correctly. The workers moved the 780 forward again, this time into another oven for rapid drying.

Green Paints

Sven Gunnar commented that Volvo had helped the Bertone factory “go green,” the first automobile plant in Italy do so. Before environmental concerns were not as important to most companies, Bertone switched to a water-based paint made by the well-respected paint supplier PPG.

Up to 85 percent of lacquer paints can evaporate into the air and pollute the atmosphere. Still, they were the standard until replaced by water-based acrylic polyurethane, which is now almost universally accepted when paired with a final clearcoat layer. This combination is far less toxic and now the standard in modern automotive factories. With the paint shining, it was now time to deal with the bottom of the 780.

Undercoating

When the clearcoat was dry, the Bertone workers carefully transferred the car from the trolley to a large clamp-looking structure known as a rotisserie. Attached to the front and back frame rails, which would later hold the bumpers, the 780 was held on each end allowing it to be tipped 90 degrees on its side. A two-part undercoating was gently sprayed from front to back, with the outer layer a rough, rubbery substance that would be the outward protection to road salt and debris. It was undoubtedly a bit nerve-racking to spray

The letter A stenciled behind the passenger-side headlamp to indicate the car had passed the paint quality control.



Painted bodies on trolleys awaiting inspection in the B Shop.

this rough undercoating so close to the freshly painted upper body. No doubt a job for a paint artist rather than a simple line worker. Once the undercoating had been applied and dried, the rotation process was reversed and the 780 put back on the trolley and rolled off for the final B Shop inspection.

Final B Shop Inspection

The B Shop inspection room looked like a large garage with long rows of painted 780s on their trolleys. One might think it was some art project with more than ten 780s backed up to the wall with their front ends almost in perfect alignment, showing a mix of black, white and

blue colors. Mario looked over a White 780, it looked perfect. A rich, dark, shiny white that reflected back into his eyes. But several inspection workers walked up and commented that they were not satisfied and pointed to some small black dots on the paint. Possibly overspray from the undercoating they speculated. Mario was impressed as he said to Sven-Gunnar, “I don’t see anything.” The inspectors proceeded to carefully buff the car to gently remove the contaminants, as the paint would not fully harden for another 30 days.

The cars that had passed the final inspection received the letter “A” stenciled in white paint on the right front crossmember, just below where the passenger-side headlight would soon be installed. This was to confirm that the paint job met Volvo standards. If you know where to look, you can still find it there on your car.

The B Shop team then applied large sheets of bubble wrap across the entire hood, as well as the fenders and trunk, which was held in place with masking tape. The painted 780s were then put back on the track to be pushed around the corner to the C Shop, where the engine and all interior and exterior components would be added. Along the way, every effort was made to ensure the paint wasn’t scratched. ■

To be continued in the next issue of Rolling. Part 1 and 2 can be found in the previous two issues of Rolling, respectively.

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