George Washington Bridge
A Timeless Marvel
DARL RASTORFER
WHEN THE PORT AUTHORITY OF NY & NJ OPENED the George Washington Bridge to the public on October 25, 1931, a monumental, inspiring gateway, and a timeless marvel, was born. Realizing the dream of a long line of imaginative planners, innovative engineers, and proud and skilful builders, this vision of a bridge became a reality.

*George Washington Bridge: A Timeless Marvel* presents a behind-the-scenes history of the bridge and its construction, from the very first ideas for a Hudson River crossing to the bridge that we know today.

We travel back in time to see Othmar H. Ammann, the Port Authority’s first chief engineer, successfully applying new engineering concepts to create a clear span of 3,500 feet — more than twice that of any other bridge existing at that time.

We learn about the builders who, by necessity, developed new construction practices and equipment even as they continued to use established ones on a larger, totally unfamiliar scale.

We glimpse the amazing accomplishment of this bridge, through masterful photographs — mostly from the Port Authority’s own archives — showing how Ammann’s engineering vision became a functioning facility that handled 2.7 million vehicles during the bridge’s first full year of operation, to more than 107 million vehicles in 2005.

Moving forward through time, *George Washington Bridge* shows how the bridge continues to expand and change to keep pace with increasing traffic demands, and environmental, safety, and security needs — and how recent investments have made the bridge one of the world’s most advanced in traffic management.

Above all, *George Washington Bridge: A Timeless Marvel*, is a fitting tribute to this elegant structure in all its beauty and romance, as it reaches its 75th birthday.

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DARL RASTORFER
Today we dedicate the George Washington Bridge to the public service of the millions of people who will use it. Tomorrow will start a traffic that will flow ceaselessly for generations to come. Erected in such a magnificent setting, this massive structure is as beautiful as it is graceful. It is a dream of 75 years come true. It is the first over-water connection spanning this great river between Manhattan and the rest of the North American Continent. It is truly one of the world’s wonders and a marvel of engineering skill.

JOHN F. GALVIN, Chairman
The Port of New York Authority
October 25, 1931
At the bridge’s opening ceremony
This book is dedicated to the long line of visionary planners, and proud and skillful builders who helped bring this beautiful vision of a bridge to reality; to the Port Authority employees who operated and maintained the bridge for the first 75 years; and to their colleagues who lost their lives at The World Trade Center on February 26, 1993, and on September 11, 2001.
The Port Authority of New York and New Jersey was established in 1921 to promote and protect the commerce of New York and New Jersey's common port. In just 10 years, the Port Authority built and opened four bridges: the Goethals and Outerbridge Crossing (both 1928), and the George Washington and Bayonne (both 1931); issued the first version of the consolidated revenue bond to establish a funding source for building new regional transportation infrastructure; and assumed responsibility for the Holland Tunnel.

When the Port Authority opened the George Washington Bridge to the traveling public on October 25, 1931, it created a monumental and inspiring gateway, and a timeless marvel. Since then the bridge has grown and changed to keep pace with increasing traffic demands and environmental, safety, and security needs. This book celebrates the George Washington Bridge on its 75th anniversary, and pays tribute to the people who have proudly maintained and operated the world's most traveled river crossing.

ANTHONY R. COSCIA, Chairman
CHARLES A. GARGANO, Vice Chairman
KENNETH J. RINGLER JR., Executive Director

The Port Authority of New York and New Jersey
October 25, 2006
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Aerial view of the New York metropolitan region in the early 1920s. The East River is to the right, the island of Manhattan is at center, and the Hudson River and the New Jersey shoreline is at left. The site of the future bridge is in the upper left corner.
Planning the Bridge
IN 1924, OTHMAR H. AMMANN began promoting his winning plan to span the Hudson River. He was one in a long line of visionaries who, over the course of more than 75 years, developed proposals to cross the Hudson River at New York City. Colonel John Stevens produced the first credible plan in 1805. Stevens’ scheme envisioned a floating bridge — built on a wooden pontoon — that was 42 feet wide and nearly a mile long. It was intended to connect the designer’s estate in Hoboken, New Jersey to West 11th Street in Lower Manhattan. Stevens’ plan, and the plans of several others who soon followed, embodied pioneering theoretical ideas that were ahead of their time in practical terms and, as a result, attracted little financial backing.

Things changed. By the mid-1850s, New York Harbor was bustling with greatly expanded trade. An emerging national railroad system, with hubs around the harbor, contributed to the region’s robust commercial life. There was, however, a formidable barrier to continued growth. The harbors and rivers that accounted for the region’s ongoing trade paradoxically created a barrier to the free flow of land travel for the coastal highways and railways of the Atlantic. Powerful commercial interests with capital to invest began backing engineering schemes that promised a way to either tunnel under the Hudson River or build a bridge over it.

The engineer who designed New York’s Hell Gate Railroad Bridge, Gustav Lindenthal, came close at the turn of the 20th century, and again in the early 1920s, to seeing a bridge he designed cross the Hudson River. Lindenthal was a masterful promoter of ambitious civic projects; and for the Hudson River project, had the backing of a powerful railroad industry that desperately wanted more direct links to Manhattan. The Pennsylvania Railroad Company built a tunnel under the Hudson at West 34th Street that opened in 1911. In 1921, with the Pennsylvania Railroad Company’s backing, Lindenthal championed a double-deck bridge that connected 50th Street in Weehawken, New Jersey to West 57th Street in Manhattan. Lindenthal’s scheme was unabashedly ambitious with its 12 pairs of railroad tracks and 16 paved lanes for vehicles. As time passed, cost estimates exploded. The expense, scale, and environmental impact of the scheme fell into ever more serious question. Lindenthal refused to modify his plan, and quietly, support for his scheme began to erode.

An engineer who served as Lindenthal’s chief assistant for the Hell Gate Railroad Bridge, Othmar H. Ammann, helped Lindenthal’s office during the development and promotion of the Hudson River project. Ammann eventually came to recognize fundamental problems with Lindenthal’s scheme. He tried to sway his employer’s opinion, arguing that redesigning the bridge with fewer lanes and rail lines, and a location far north of the proposed site, would
keep the project within existing economic and political constraints. Lindenthal's response was terse. He rebuked Ammann for not thinking on a grand enough scale.

Soon thereafter, Ammann left Lindenthal's practice to pursue a very different vision for a Hudson River crossing. In a makeshift office provided by a friend, Ammann designed a vehicular suspension bridge to connect Fort Lee, New Jersey with West 178th Street in Manhattan.

The scheme had financial merit because it avoided a contentious and expensive site in midtown Manhattan. Ammann's structural design for the span was also attractive from a price standpoint. The bridge was engineered to use a relatively small amount of material even though it provided a maximum level of safety and rigidity (the cost of a bridge is directly related to the amount of material used in its construction). Of course, proposing an all-vehicular bridge over one that supported both vehicular and railroad traffic meant that Ammann's structure could be lighter than Lindenthal's. But Ammann pushed the economy of the suspension bridge one step further
by introducing deflection theory. The theory held that spans reaching or exceeding a critical length are sufficiently heavy in and of themselves to eliminate much of the added structure traditionally applied to fortify the span against movement. The science surrounding deflection theory was sound and had been tested on a small scale, but not on the scale of Ammann’s proposed George Washington Bridge with its clear span of 3,500 feet — more than twice that of any other existing bridge.

As its sole promoter, Ammann began meeting with professional and civic groups to present the bridge he designed. That same year — 1924 — the Ford Motor Company announced it had manufactured its 10 millionth automobile. Lindenthal and the railroad investors who backed him could not — or would not — acknowledge that the age of railroad empires was giving way to the rise of motor vehicles. Ammann’s sense of the motor vehicle’s future proved prophetic.

The first prominent person to back Ammann’s scheme, New Jersey’s Governor George S. Silzer, quickly rallied public support. With the backing of the press, Ammann’s plan gained the support of the legislatures of both states. The legislators voted to entrust the financing, construction, and operation of the facility to the recently established Port of New York Authority (later renamed The Port Authority of New York and New Jersey). The Port Authority hired Ammann to see his Hudson River project through. Ammann eventually was named the Authority’s chief engineer. In that position, he designed the Lincoln Tunnel and the Bayonne Bridge. Later in his career, he designed four other long-span bridges in the New York metropolitan region: The Triborough, Bronx-Whitestone, Throgs Neck and Verrazano-Narrows bridges.

Drawing of the proposed bridge with stone-clad towers by the office of Cass Gilbert, Architect. A park and marina in the drawing were designed for the base of the Manhattan tower. The cables shown in the drawing are chains made with steel bars. As constructed, the George Washington Bridge’s cables are made with galvanized steel wire.
The first cross-river survey for the George Washington Bridge. The bridge’s designer, Othmar H. Ammann, stands third from the left.
Construction
TURNING OTHMAR H. AMMANN’S ENGINEERING VISION into a functioning facility began with a groundbreaking ceremony in Fort Lee, New Jersey on September 21, 1927. The project’s budget was set at $60 million for land acquisition, demolition, and construction (the equivalent to over a half billion dollars in 2006). The George Washington Bridge would open to the public on October 25, 1931 — eight months ahead of schedule and $1 million under budget.

Over the course of four years and one month, man and machine poured hundreds of thousands of yards of concrete for the anchorages and roadways, strung tons of galvanized steel wire for the suspension and suspender cables, and fastened together tons of structural steel for the bridge’s two towers and road deck. Work pressed forward through winter, spring, summer, and fall. Foundations for the towers and the anchorages were excavated and constructed first; towers and anchorages were then built at the same time. Once the towers and anchorages were complete, the bridge’s four main cables were spun, suspender cables were attached to the main cables, and the roadway beams were attached to the suspenders.

Building a structure of such unprecedented scale required faith, courage, and invention: faith, on the part of the financial backers that a structural design that reached far beyond the tested boundaries of science and technology would indeed stand; invention and courage, on the part of the builders because, by necessity, they had to develop new construction practices and equipment even as they practiced established ones on a larger, totally unfamiliar scale. Despite the enormous challenges, the George Washington Bridge’s construction unfolded as a case study in efficiency, speed, and safety.
River barges carried prefabricated sections of the tower to the site (left). Once at the site, cranes lifted the sections into position for attachment. In this photograph, a preassembled tower strut is being lifted off the barge.
Tower construction in background, construction of the Manhattan anchorage in the foreground (above).

Ironworkers at the top of a tower swinging a steel section into place (right).
Looking down from the top of a tower leg to ironworkers erecting the struts and braces that tie the legs of the tower together.
Anchorage construction.
Site conditions on opposite sides of the river are different, which is reflected in the designs of the anchorages. On the New Jersey side, the bridge’s cables are anchored to the solid rock of the Palisades. The top of the Palisades ridge was chiseled out, and caverns were blasted and cut into the side of the cliff for the anchorages. This photograph (right) was taken inside one of the caverns. The anchorage on the Manhattan side is a man-made behemoth constructed with reinforced concrete.
The bridge’s four main cables are made from thousands of individual strands of wire laid one on top of the other—enough wire to stretch halfway to the moon. In this photograph (left) taken on September 17, 1929, a cross bridge is being hoisted into position that will connect the temporary footbridges and guide-cables used in the spinning of the main suspension cables.

**Cable spinning.** To begin cable spinning, a barge carries spools of cable that are unwound along the river bottom and between anchorages (left). When the cables reach the full span, they will be lifted to the tops of the towers and secured at the anchorage. These cables will be used to make the temporary footbridges used in the spinning of the main suspension cables.
Cable spinning process viewed from the New Jersey tower looking toward Manhattan.
Aerial view of the bridge during cable spinning.
August 18, 1930. Main cables have been spun and are now being compacted and banded (above).

Threading individual wires around the eyebars of the anchorage. Wire is being unwound from a spool partially visible at the right side of the photograph (left).
Roadway assembly at the bridge's side span as it nears the anchorage.
January 7, 1931. Roadway assembly of the side span viewed from within the Manhattan anchorage.
Road deck construction.
The bridge’s roadway connects to Fort Lee, New Jersey where a section was cut through the ridge of the Palisades. In this photograph (above), a plate girder for the suspended roadway is being lifted from the bed of a truck. The crane will swing the girder around and position it for attachment.

As with the towers, preassembled sections of the suspended road deck were fabricated off-site, transported to the bridge, and lifted into position. To keep the structure in balance, the roadway had to be assembled symmetrically. As illustrated in the photograph (left), assembly began simultaneously at both towers and moved outward in both directions.
Sunday, October 24, 1931. The bridge’s opening ceremony was a festive event replete with police bands, Boy Scouts on parade, military escorts, motorcar processions, and gunfire salutes. A program of speakers at the center of the span began at 3:00 in the afternoon and included Governor Morgan F. Larson of New Jersey and Governor Franklin D. Roosevelt of New York, who dedicated the bridge to friendly cooperation between the states. In this photograph taken at the opening ceremony, Franklin D. Roosevelt, soon to be the 32nd President of the United States, speaks from a temporary podium built on the bridge. His wife, Eleanor, is seated behind him.
The Bridge Opens to the Public
THE GEORGE WASHINGTON BRIDGE OPENED TO THE PUBLIC on a sunny Sunday in October 1931. Hundreds of people participated in the official dedication and opening. And thousands were on hand to simply observe the festivities and be among the first motorists and pedestrians to be on the new bridge and above the Hudson River at points between Fort Lee, New Jersey and Washington Heights in upper Manhattan.

The bridge’s official name was determined only months before the opening. The bridge had been referred to as the Hudson River Bridge during promotion, planning, and the first years of construction. Several newspapers following the structure’s progress challenged readers to offer alternatives. The suggestion that drew the strongest support was the George Washington Bridge. (During the Revolutionary War, General Washington traveled between Fort Lee and Fort Washington in Washington Heights by boat, crossing beneath the future site of the bridge.) Indeed, the bridge officially opened as the George Washington Bridge.

In its first year, 5,510,000 vehicles crossed the span. That number steadily increased to 107 million in 2005, with the 2006 estimate at 108 million.

The bridge spurred widespread economic development, which resulted in explosive community growth. Regional and interstate highways were built and expanded to keep pace with the growing number of commercial and private vehicles on the roads. The George Washington Bridge, which connects interstate highways, expanded as the highway systems it serves expanded. Two lanes were added to the upper deck in 1946. In 1962, the lower road deck with its six traffic lanes was added.

Through all the change and growth, the public adored the bridge. It’s a favorite destination for educational tours, and a venue for community events. Every day, pedestrians and bicyclists share the sidewalk as they enjoy sweeping views of the Manhattan skyline and the Palisades. For millions of people who live in the region, or visit it, the George Washington Bridge is a beloved and thrilling gateway to one of the world’s most vibrant cities.


In 1943, the George Washington Bridge made its film debut in *Ball of Fire*, starring Barbara Stanwyck and Gary Cooper. Other films followed, including *How to Marry a Millionaire*, *The In-Laws*, and *Desperately Seeking Susan*. Shows produced for television use the George Washington Bridge Bus Station.
and the bridge’s span as a scene location. Advertisers use the bridge as a backdrop to sell everything from cars, to coats, to sleeping pills.

In 1952, a three-cent stamp of the George Washington Bridge was issued to portray the advancements made in bridge building and to commemorate the 100th anniversary of the American Society of Civil Engineers.

The American composer William Schuman wrote a composition in 1950 entitled, George Washington Bridge. Schuman drew his inspiration from his observations of the structure during different times of the day, and from the sensation he felt crossing the bridge. He wrote, “The bridge had for me an almost human personality.”
Toll collection booths in the 1930s (left).

A Port Authority toll collector and the first paying motorist, Michael Katen (below). During the early years of the bridge’s operation, toll collection was performed by Port Authority police officers.
Port Authority police officers and travelers at a bus stop in Washington Heights in upper Manhattan (top).

Once the bridge was built (above), Manhattan-bound motorists from New Jersey had two options: they could drive under the Hudson River by entering the Holland Tunnel at Jersey City; or drive over the river by crossing the George Washington Bridge at Fort Lee. During its first full year of operation in 1932, 5,510,000 vehicles traveled across the bridge.

February 22, 1940. Marking the 208th anniversary of George Washington’s birth, traffic was stopped on the famous bridge that bears his name (right), and a motorcar procession led by a carriage pulled by two white horses paraded across the bridge.
The George Washington Bridge on an April night, 1935. The bridge sparkles with its original “diamond necklace,” a series of electric lights strung along the structure’s main cables.
The George Washington Bridge’s suspended roadway accommodated six lanes of motor vehicle traffic at the time of its opening (top). Traffic volume steadily increased. The central two lanes, which are unpaved in this early photograph, were paved in 1946 to ease traffic congestion. A six-lane lower deck opened to the traveling public in 1962.

In 1946, a newly sewn American flag was hung for the first time in the New Jersey tower of the bridge. The largest free-flying flag in the world, its dimensions are 60 feet x 90 feet. The flag has been replaced three times since 1946. The current flag weighs 450 pounds and is flown on specified holidays and occasions throughout the year, weather permitting. When not on display, the flag is housed within the tower’s arch. Before the first flag was installed, engineers built a wooden scale model of the tower, which they used to design the mechanism that hoists and lowers the flag at the bridge (middle).
Repainting the bridge in 1954. This photograph (opposite) looks down and across to the future site of the bus station built in the early 1960s. On average, the bridge was repainted once every 10 years between 1931 to 1996.

Applying a new coat of paint to a suspension cable near the top of the tower in 1954 (top).

Repainting the suspender cables near mid-span in 1954 (bottom).
Construction of the lower roadway. The bridge was built to support an additional deck. Traffic volumes rose steadily from the time the bridge opened, and by the mid-1950s a second deck was needed. Construction of a lower level began in September 1958.
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An ironworker (above) will connect the truss section once it is in place.

River barges (left) bring preassembled sections of the lower deck to the bridge where they are lifted into position by cranes.
While a small maintenance crew makes routine repairs to the sidewalk and roadway lanes of the upper deck, construction workers on the lower level prepare that deck’s roadway for its first layer of reinforced concrete. Traffic on the upper level flowed smoothly during the construction of the lower level, a fact that made headlines in local newspapers.
Six lanes wide, the lower level is ready for a concrete deck.
The underside of the George Washington Bridge on the opening day of the lower level, August 29, 1962. The Little Red Lighthouse occupied the site before the bridge (above). A protected historic landmark, the lighthouse was not disturbed during the bridge’s initial construction or during the construction of the lower level. The George Washington Bridge was designated a National Historic Civil Engineering Landmark in 1981.

Opening ceremony for the lower deck (right). New York Governor Nelson A. Rockefeller shakes hands with New Jersey Governor Richard J. Hughes during the official morning program (the New Jersey governor stands to the right of Rockefeller). The six lanes of the lower deck were cleared after the 11:00 am dedication ceremony. At 3:00 pm, the lower level opened to the public, increasing the bridge’s overall capacity by 75 percent. The bridge handled 46.5 million vehicles the year the lower deck opened.
Construction of a regional bus station on the Manhattan side of the bridge began while construction of the lower deck of the bridge was under way. The bus station opened on January 17, 1963 — five months after the lower level. Designed by the Italian architect and engineer, Pier Luigi Nervi, the facility occupies a two-block site at 4211 Broadway between 178th and 179th streets, and Fort Washington and Wadsworth avenues.
Tollbooths, circa 1966.
In the mid-1960s, civilian toll collectors replaced Port Authority police officers who had been responsible for collecting tolls since the bridge opened. The new civilian all-female toll collectors, like the all-male police force before them, wore specially designed and tailored uniforms. In this photograph (below), two toll collectors model the 1966 uniforms.
View toward the Manhattan tower from a sidewalk in 1978.
Detail of the newly illuminated tower with spotlights aimed at the American flag flying within the opening of the upper arch of the New Jersey tower. In this photograph, the lower legs of the tower are surrounded by scaffolding erected as part of a nine-year sandblasting and repainting project that began in 1997 and was completed in 2006.
Improvements for the 21st Century
RECENT INVESTMENTS HAVE MADE the George Washington Bridge one of the world’s most advanced with respect to its operations. A computer-based network collects detailed traffic and road-condition data and feeds that information to a communications center, where operations staff monitors traffic conditions and dispatches roadside assistance around the clock. Electronic message boards positioned throughout the approaches to the span keep motorists updated about potential delays and informed about changes in lane access. Travelers are pleased with these innovations in monitoring, communication, and central control. Instant detection and rapid response, along with the expansion of electronic toll collection, enables the bridge to maintain a steady flow for an ever greater number of vehicles.

Other recent improvements are preserving the structure. For example, anchorage interiors are now equipped with humidity control. A telecommunications network of fiber-optic cable was installed from one end of the bridge to the other replacing an all-hardwire network that was incrementally installed, expanded, and spliced together over a 50-year period. The switch to fiber optics, like many other system upgrades at the bridge, came at a time when mounting repair costs matched the replacement cost for new systems or materials.

Most recent bridge improvements directly contribute to traffic flow or the preservation of the structure. One enhancement, however, speaks solely to the beauty and romance of the bridge. On New Year’s Eve 2000, 400 electric lights at 1,000 watts each illuminated the interiors of the towers for the first time. Now a permanent part of the bridge’s “night life,” the glowing towers combine with the cable’s “diamond necklace” to form a monumental gateway of light that shines on holidays and special occasions.
Paint removal and repainting. From 1997 to 2006, the underside of the upper deck and the bridge’s towers were stripped of up to seven layers of accumulated lead-based paint, and repainted. All work was done within fully sealed enclosures as illustrated in this photograph (left). The scaffolding around the structure had only one purpose: to form a framework for the airtight enclosures. The enclosures, made with fabric and wood bulkheads, trapped all lead paint flakes and particles for collection, containment, and removal while air-handling equipment filtered the air.
A workman prepares to enter a 24 inch x 18 inch oval opening in one of the tower’s hollow columns to inspect the 3 feet x 3 feet interior. He then suits up to begin a sandblasting process that will remove all paint down to the steel base.
Carpenters build wood bulkheads (above). The bulkheads are joined to the fabric wrapping to create the work enclosure. A bulkhead was also erected to divide the enclosure into two chambers so that sandblasting could take place in one chamber while painting took place in the other.

Inspecting for correct thickness, the magnetic device shown in this photograph (top) ensures that each of the three new, lead-free coatings is between 3mm - 5mm, approximately the thickness of three one dollar bills.

Covered with a full body suit, mask, and a breathing apparatus, a worker begins sandblasting inside a tower column (below). Both sandblasting and painting is done with a hose that sprays at a pressure similar to that of a fire hose.
Intelligent Transportation System. Inside the communications center of the George Washington Bridge (below). The Intelligent Transportation System (ITS) is a computer-based network that uses cameras and microwave sensors to detect traffic and road surface conditions on the bridge and approaches. As data pours into the communications center, tunnel and bridge agents analyze traffic patterns, spot disabled vehicles, and monitor road conditions. Sending messages on electronic signboards located throughout the system, Port Authority staff advise motorists of best routes to facilitate the flow of traffic, while alerting them to delays and detours.
Motorists who stop to pay a toll are greeted by a Port Authority toll collector (opposite, top). Toll collectors, police officers, tunnel and bridge agents, and maintenance workers are among the more than 200 employees at the bridge 24 hours a day, each day of the year, keeping the facility safe, well-maintained, and fully operational.

View of upper and lower level toll plaza approaches to the bridge (above). Since 1970, tolls have been collected in the eastbound direction only, which facilitates traffic flow.

Upper level toll plaza with E-ZPass™ lanes (left). All lanes are equipped with E-ZPass with several dedicated to E-ZPass only. E-ZPass, a pre-paid electronic toll collection system, uses microwave technology to allow participating motorists to approach and enter the tollbooth without stopping. Today, the majority of tolls are paid using E-ZPass.
Ice removal. Winter weather occasionally coats the cables with a thick sheath of ice. If clouds part and the sun shines, sections of ice can break free and fall onto the roadway. Under such conditions, traffic traveling toward the upper level is diverted to the lanes of the lower level. In an effort to shorten the upper deck closure period due to cable ice, Port Authority staff investigated several modern de-icing methods, but none proved as reliable and cost effective as the method devised in the 1980s, and still practiced today. “Height-certified” crew members carrying wood pick-ax handles climb on top of the cables at midspan, hook on their safety ropes, and begin a journey to the top of a tower. Swinging the ax handle as they climb, they break and pry free sections of ice. The crew member in the illustration is making his way down the cable after ice was cleared.
Nonstop Inspection and Maintenance
THE GEORGE WASHINGTON BRIDGE IS IN SUPERB CONDITION, both at the surface and deep within. Structural engineers work full time at the bridge, inspecting, classifying, and documenting every element of the structure over the course of a two-year cycle. Resident engineers also make certain that the facility is environmentally clean and safe, and play a central role in projects such as the recent removal of lead-based paint from the upper deck and towers.

The bridge is maintained to scrupulous standards, which helps account for its fine state of preservation and operation. Keeping the bridge well-maintained is a tall order, especially since it spans tidal water, and salt in the air is exceptionally corrosive to paint and steel. And, there is a lot of bridge to maintain. In addition to the span, the bridge's property encompasses approach roads, ramps, and toll plazas, as well as community parks, a bus station, and support buildings. In all, the bridge has 76 lane-miles to sweep, paint, patch, and from which to remove debris and snow. The job of keeping the bridge open and safe requires a small fleet of vehicles, testing and maintenance equipment, and committed people. Plumbers, painters, general maintenance workers, and electricians — in addition to administrative and management staff, police, tunnel and bridge agents, and toll collectors — are at the bridge around the clock, keeping it well-groomed, structurally sound, and running smoothly.
300,000 vehicles cross the bridge each day in both directions. The photograph was taken from the top of the New Jersey tower looking toward Manhattan in August 2006. The Little Red Lighthouse is seen standing at the base of the distant tower.
Help is at hand. A Port Authority tunnel and bridge agent assists a motorist whose vehicle became disabled on the bridge (opposite). Port Authority vehicles and personnel are stationed throughout the bridge and its approaches. With the help of ITS, road crews are quickly dispatched to respond to emergencies.

A Port Authority police officer performs a random inspection (left). Police officers are assigned to the bridge around the clock. They patrol the span, ramps, approaches, public spaces, and buildings associated with the bridge, and have authority to enforce the law in both states.
Routine cable inspection (above). The bridge is routinely monitored for corrosion and distress. In this photograph, engineers are standing on a temporary wooden platform built at midspan. Inspectors are driving long, wooden wedges into the bundle to look for rust deep inside. The fabric enclosure keeps rain off the cable while it is exposed.

Replacing the light bulbs of the bridge’s “diamond necklace.” The cables (opposite) were originally illuminated with incandescent lamps that required weekly bulb replacement. The current 156 necklace lights are vapor lamps that rarely need replacement.
The Future and the George Washington Bridge
AS THE ECONOMY OF THE NEW YORK METROPOLITAN REGION and the Atlantic coast booms, pressure mounts to keep traffic flowing at the George Washington Bridge. Structural engineers point out that the bridge is strong enough to support a third deck with up to six more lanes. But structural engineers and transportation planners hasten to note that the highways connecting to the George Washington Bridge cannot be expanded so easily. The bridge and the roadways it connects depend on parallel growth. Consequently, the bridge's future expansion is directly tied to the expansion of local expressways and interstate highways.

The challenge of maintaining the flow of traffic has always kept The Port Authority of New York and New Jersey forward-looking. In the near future, the Port Authority intends to link the George Washington Bridge's monitoring and communications network with that of the nearby Holland and Lincoln tunnels so that the systems of each can be more effectively coordinated. Also, the agency is planning more E-ZPass™ lanes with higher speed allowances. And, a new approach ramp for the New Jersey side is planned that will give motorists using the Palisades Interstate Parkway the option to use either of the bridge's levels.

As the George Washington Bridge keeps the region moving, revenues from its tolls are continually invested in its preservation, operation, and safety. A bustling highway in the sky, the bridge is also a cherished icon. Several years before Othmar H. Ammann conceived the bridge, he wrote, “It is only with a broad sense of beauty and harmony, coupled with wide experience in the scientific and technical field, that a monumental bridge can be created.” The George Washington Bridge was so created, and it carries us, with inspiration, into the future.
Dedicated people at The Port Authority of New York and New Jersey made this book possible. All involved feel deeply about the bridge, and share a common interest in its legacy and history.

I gained invaluable insight into the planning, operation, maintenance, and economic role of the bridge through a series of interviews with Port Authority personnel. Interviewees included: Anthony R. Coscia, Chairman; Charles A. Gargano, Vice Chairman; Kenneth J. Ringler Jr., Executive Director; Ernesto L. Butcher, Chief Operating Officer; Francis J. Lombardi, Chief Engineer; Robert M. Durando, General Manager, George Washington Bridge and Bus Station; and Andrea Giorgi Bocker, Resident Engineer, George Washington Bridge and Bus Station.

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