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Successful Rehabilitation of Movable Bridge Through Design Build Process

Eric Kelly, P.E. - HNTB New York Engineering and Architecture, PC & Warren Howard – Kiewit Infrastructure Company

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Introduction

Bridge Description

General elevation of Harlem River Lift Span looking southwest

The Harlem River Lift Span (HRLS) is a 310-foot Warren truss tower drive vertical lift bridge. It carries vehicular traffic between Manhattan and Randall's Island to access the Bronx and Queens. The HRLS is a portion of the Robert F. Kennedy RFK Bridge and was opened in 1936. The lift span raises to allow marine traffic to pass through on the Harlem River which is a navigable waterway. At each corner of the lift span are counterweight ropes that pass over large sheaves located at the top of each of the 210-foot-tall towers. At the top of these towers within the machinery houses is the operating machinery consisting of motors, brakes, gears and shafts that turn these large sheaves to raise and lower the lift span. The bridge operating system is electrically controlled, including stopping vehicular traffic with lights and gates, from a control room located just above roadway level in one of the tower legs. The HRLS carries six lanes of vehicular traffic and two sidewalks between Manhattan and Randall's Island.

General elevation looking south showing lift span in raised position to allow passage of a marine vessel

Randall's Island, with its facilities and network of parks, hosts a number of visitors, festivals, local users and agencies, including the New York City Parks Department, throughout the year. Any closures or restrictions to access would have a negative impact on the community and were kept to a minimum. Strict requirements for maintenance and protection of traffic (MPT) included restrictions to lane closures during the day. These restrictions included permissible periods of the day as well as which direction on the bridge they could be put in place. There were also embargos on the ability to utilize lane closures during certain holiday periods. The DB team notified MTAB&T ahead of time when any of these lane closures were going to occur to further minimize any impacts.

Project Description and Intent

The Contract No. RK-07, Design-Build of Electrical and Mechanical Rehabilitations at the Robert F. Kennedy (RFK) Bridge Harlem River Lift Span (HRLS) project was implemented to provide a minimum of 20 years of additional reliable service and improve the safety and access to maintain the bridge operating systems. The technical scope of work for the project included improving bridge operational reliability by upgrading the lift span operating system both electrically and mechanically by refurbishing

and/or replacing worn components, such as brakes, reducers, motors, open gears, droop cables and key electrical distribution equipment. Work included the installation of a new large 1000kW standby generator and related equipment to provide an auxiliary source of power, as well as rehabilitation of the rack and pinion driven tower elevators to provide reliable function. Scope also included improving maintenance access by providing additional maintenance lighting; additional pedestrian lighting, upgrading walkways and ladders; and installing new designated tie-off points for maintenance personnel.

Design-Build Best Practices

The Design-Build Institute of America* (DBIA) lists their Universal 10 Best Practices and have further advanced these Best Practices more specifically for Transportation, Wastewater and Federal Sectors work. DBIA lists their 10 best practices into three sectors. The 3 sectors are (I) Procuring Design-Build Services; (II) Contracting for Design-Build Services; and (III) Executing the Delivery of Design-Build Projects.

In Sector I the following three best practices listed are:

1. An owner should conduct a proactive and objective assessment of the unique characteristics of its program/project and its organization before deciding to use design-build.
2. An owner should implement a procurement plan that enhances collaboration and other benefits of design-build and is in harmony with the reasons that the owner chose the design-build delivery system.
3. An owner using a competitive design-build procurement that seeks price and technical proposals should: (a) establish clear evaluation and selection processes; (b) ensure that the process is fair, open and transparent; and (c) value both technical concepts and price in the selection process.

Sector II lists the 3 best practices as:

1. Contracts used on design-build projects should be fair, balanced and clear, and should promote the collaborative aspects inherent in the design-build process.
2. The contract between the owner and design-builder should address the unique aspects of the design-build process, including expected standards of care for design services.
3. The contracts between the design-builder and its team members should address the unique aspects of the design-build process.

And Sector III has the 4 best practices as:

1. All design-build team members should be educated and trained in the design-build process and be knowledgeable of the differences between design-build and other delivery systems.
2. The project team should establish logistics and infrastructure to support integrated project delivery.
3. The project team, at the outset of the project, should establish processes to facilitate timely and effective communication, collaboration, and issue resolution.
4. The project team should focus on the design management and commissioning/turnover processes and ensure that there is alignment among the team as to how to execute these processes.

*Design-Build Institute of America, 1001 Pennsylvania Avenue, NW, Suite 410, Washington, D.C. 20004, Telephone: (202) 682-0110, Fax: (202) 682-5877, https://dbia.org/

All parties involved with this project made sure that the Design-Build process was implemented using available tools to ensure success. This paper highlights how the Design-Build (DB) team with support from the owner was able to utilize these best practices with a strategy that encouraged open collaboration and focused on a schedule driven, success oriented workplan and construction.

Owner Commitment to the DB Process

With the introduction of the Infrastructure Investment Act in 2011, Design-Build has become prevalent in New York State as a means of getting work performed timely and cost effectively. MTA Bridges and Tunnels (MTAB&T) determined that this project would be delivered through the DB process. MTAB&T encourages DB and has successfully developed and issued multiple DB projects and the contract requirements are well established.

This project was unique in that it involved rehabilitation on a movable bridge. The scope was defined but the successful implementation was critical due to the importance of this bridge to the traveling public, it is crossing a navigable waterway and is a revenue generating toll facility. As a result, the project did get extra scrutiny from MTAB&T to ensure that the right team members from the owner as well as the DB team were in place, procedures were followed, and the contract requirements were maintained.

Following NYSDOT standard Design Build requirements, MTAB&T used a two-step procurement process with the intent to award the contract to the proposer that provided the best value, considering the price and technical factors. Step 1 evaluated responses to a Request for Expressions of Interest and established a shortlist of DB firms. In Step 2, only shortlisted firms were invited to submit proposals in response to the Request for Proposals (RFP). MTAB&T evaluated the ability of the design-builder to manage, design, construct and control the project to provide a safe and quality outcome on or ahead of schedule for a reasonable lump sum price within MTAB&T's project budget. MTAB&T considered both price and technical factors to select the best value proposal.

Strategies Used for Successful Project by DB team

Following the basic DB guidelines, the DB team of Kiewit and HNTB looked to concentrate their efforts on specific areas which would provide the most impact and best results to ensure success of the project.

Effective Teaming and Staff Selection

To ensure the success of the project a strong strategy was formulated by the DB team well before the RFP. Both HNTB and Kiewit investigated to see the ability of each firm to make sure they were suitable to perform the work. Both firms have successfully teamed on other DB projects as well as each firm was familiar with the other's experience working on movable bridges both locally and nationally as well as working for the MTAB&T. This allowed the teaming agreements to be put in place well before the Request for Expressions of Interest came out and allowed both firms to prepare ahead of time on necessary contractual documentation. This pre-proposal preparation allowed documentation and contracting to be completed ahead of time and minimize distraction from project specific work when actual scope, fee and bids were needed to be developed.

Effective teaming and selection of the right personnel to lead the assignments was essential to the success of the project and the ability to deliver the work on an accelerated schedule. Assembly of the DB team, including design and construction subconsultants, began well before the RFP phase of the project. For the

design phase, developing and issuing permits was critical for construction to commence on time. The effort of the expeditor to facilitate approval of these permits was included in the project schedule. Similarly, for the environmental compliance, identification of hazardous materials in the areas of work needed to be done as early as possible. This was done to determine impacts that may have affected the work and the schedule as well as to develop and gain approval for remediation procedures as early as possible in the project.

From the construction side, key fabricators were identified and brought on early to procure long lead time items. These included any steel forging or castings, as well as fabricated components, such as the droop cables and the large generator. Early component design and advance submission of design packages assisted in the timely procurement of long-lead items. The designer worked with both the Contractor and the Fabricator early in the project to coordinate the information needed to procure materials as early as possible to minimize possible delay.

The DB team's experience with movable bridges was essential to the success of the project. The design manager and all discipline leads on the design side had extensive experience with movable bridge projects. This fostered an understanding of the intricate relationships between the mechanical, electrical and structural work. The design manager leveraged his experience leading multidisciplinary movable bridge projects to confirm the proper conversations were occurring between disciplines and serve as a final check of the work as a complete, cohesive package. Similarly, the project manager, construction manager and the construction task leads involved all had worked on previous movable bridge assignments. The DB team understood the impact of their work on the other disciplines and were able to make design decisions accordingly.

The entire team benefited from the focused leadership of the project manager. Throughout the design and construction process, the project manager's ability to lead the team to discover and consider innovative solutions to issues, evaluate those solutions, and ultimately select the best course of action was key to maintaining the aggressive project schedule and budget. The project manager's ability to keep the team focused on what was important while still giving all ideas due consideration confirmed that timely and informed decisions were made.

Open and Constant Discussions

Throughout every step of the project there were open, sincere, and straightforward conversations and discussions on all levels regarding every aspect of the work regardless of whether the task discussed was great or small. These open discussions allowed "cause and effect" to be brought up and discussed for both the design and construction of the work to assess impacts early or see what benefit may be achieved. Comments and feedback from the construction side were examined to see how they may be implemented into the design to facilitate the construction in the field whenever possible. The design team realized and understood that a small refinement in the design could save time, crew size or equipment usage in the field.

Constant collaboration between all members for the contractor and designer on the team was an integral part of the strategy for the success of the project. Before the proposal phase, meetings were held with all levels of project personnel, including representatives of all disciplines. Concepts and potential design solutions were formulated at this time. Even at this early stage, collaboration was not limited to the DB

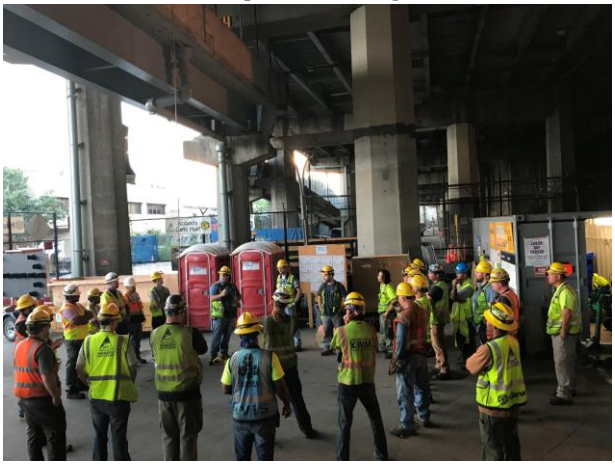
team alone. One-on-one sessions with MTAB&T were held to discover their particular project concerns and the items they felt were at risk. This enabled the DB team to craft focused and innovative solutions to address the owner's concerns before the project was even awarded.

With the award of the project one of the first tasks performed was to set up an executive partnering meeting. This meeting allowed stakeholders to express their expectations and concerns and establish open channels of communication to initiate and maintain a collaborative effort. The commitment of open discussion and collaboration that started with this partnering meeting was followed continually throughout the project duration.

During the design phase, the DB team participated in weekly **task force meetings**. These task force meetings were detail oriented, generally full-day workshop sessions with all parties in person to foster a collaborative environment. Face to face meetings fostered the development of personal relationships, which served as the catalyst for the open, collaborative dialogue that made this project such a success. At these meetings, all aspects of the design were examined with the intention of facilitating fabrication and installation. This was done to ease field work and make installation as safe and quick as possible for the crews performing the work. In keeping with open collaboration, the owner was invited to attend these task force meetings whenever they wanted. The task force meetings were also used to discuss MTAB&T concerns that arose.

The owner and their representatives remained an important part of the design process. A series of **over-the-shoulder** review sessions were held to gather valuable feedback from MTAB&T as the design was developed. This allowed the design and construction team to become informed of the owner's maintenance and operations personnel concerns and preferences, all of whom participated in these meetings. An added benefit of these sessions was an expedited review period for each of the design submissions since the design was already familiar to the owner and proactively addressed their concerns. When a milestone was pending, a specific over-the-shoulder review meeting was set up to show the progress of the design and keep the owner informed. This allowed the owner to be aware of what was being provided in the submission ahead of time.

Once construction commenced, task force meetings continued on a weekly basis. Since it was the construction phase, the direction changed slightly, as the designers were now supporting construction personnel to resolve issues discovered in the field and to address owner-requested changes. The same project design personnel remained involved during this stage, leveraging their familiarity with the design to generate prompt responses to contractor inquiries and modification requests.


Meetings were held daily and for each critical activity

Constant communication among all design and construction staff on the project was emphasized. At the start of every day and when a critical construction task was to be performed, a meeting of trades was held. This was to confirm everyone was aware of the work, knew the work being performed by others, where the work was being performed, understood the expectations, and remained safe during the work. Safety and communication were continually stressed throughout the project to make certain quality work was performed and everyone remained safe.

Scope Refinement/ Negotiation

As part of the technical and price proposal submission, the DB team maximized the DB model by striving for **innovation, creativity and outside-the-box thinking** throughout the design development. The proposal offered the most cost-effective solutions to the project goals and objectives, while providing significant savings to the owner and traveling public, by reducing project duration. The solutions offered by the DB team added value by making the proposed repairs easier to maintain or maintenance free thus reducing future costs to the owner. To make a successful, cost effective, quick and safe project, the DB team refined the project scope before the submission of the bid. As part of the proposal, the DB team offered transparent cost/benefit analysis of a number of suggested changes to the scope that either saved money or provided a superior product, while meeting the goals of the project. These refinements were accepted by MTAB&T and included:

- Use of lubrication free guides for the main and auxiliary counterweights
- Elimination of concrete roadway barrier removal to access warning gate operating mechanism and electrical controls
- Bold and innovative re-phasing of the construction approach to facilitate droop cable replacement without relocating the droop cable location.

Innovative solutions were developed prior to bid such as proposing lubrication free guides for the counterweights.

Through initial brainstorming at the receipt of the RFP, the DB team looked at ways to make the repairs less complex, simpler to fabricate and easier to install on the bridge and improve maintainability for the owner. One such example from the above bulleted items is the elimination of the specified automatic lubricating system for the main and auxiliary counterweight guides. The proposed systems were to use rollers that would distribute grease to the guide rails during a bridge lift. The rollers supplied grease by electrically operated pumps that would feed grease to the rollers at a determined rate. This system has many parts, requires power to operate and would require continual maintenance by facility personnel. As part of the option pricing, the DB team proposed the first known implementation of lubrication-free technology; the guides were fabricated with a low friction, solid engineered nylon polymer that, once installed, would require no grease or maintenance.

All solutions proposed by the DB team were accepted by the owner and included in the project. These cost-effective solutions achieved the project goals of extending the reliable service of the bridge operation systems and improving safety to access and maintain the systems while also making the construction safer, quicker, less complex and less costly.

Change Orders

When design change orders did evolve, either by request from the owner or due to scope change initiated by the contractor, the DB team quickly notified affected parties, presented the scope and fee, then promptly negotiated the change. As change orders advanced, the contractor provided the designer with advanced notice to proceed (NTP) to allow the design work to continue or be adapted in accordance with

the proposed change until the formal change order was approved. Keeping the design and construction schedule on track throughout the administrative process.

After submission of the proposal, there was a long period of negotiation prior to project award, which was used to discuss all aspects of the project including scope, schedule and fee. Collaboration with the owner for a successful project outcome was one of the primary goals from the onset. The DB team's collaborative approach during this phase was to obtain a clear understanding of the owner's issues and provide custom tailored solutions. This process resulted in additional **changes in scope** that were initiated and accepted by the DB team and owner in the Best and Final Offer (BAFO). These included:

- Elimination of dehumidification system for machinery houses
- Reuse of droop cable terminal cabinets
- Reuse of fiber optic cable across lift span
- Updates to the DB team's schedule and cost to account for more complex work and traffic control schemes

During the design phase **additional improvements were implemented to further increase project success** for all parties, including:

- Eliminating the replacement of rack pinions through projected life expectancy analysis and reconditioning the existing rack pinion gears, to eliminate costly replacement
- Reconfiguring the generator and associated equipment to optimize footprint size, saving space to retain existing parking area for facility personnel
- Increasing the torque of the operating machinery to provide more consistent and reliable operation
- Adding exhaust fans to ventilate machinery houses located at top of towers

Except for the last item which was incorporated after the RFC package the other innovations had to be developed, refined and presented by the DB team to the owner to first notify them of the recommendation, to answer any questions that the refinements may produce and then to incorporate these into the RFC package. The formal **Over-the-Shoulder Review** sessions were performed and added value, reduced cost and allowed for open dialogue for the refinements. Sensitive "hot button" scope elements were further developed while other elements were reduced or eliminated, resulting in a series of credits and one successful **Value Engineering** Proposal. Each of the refinements involved multiple disciplines and would not have successfully been implemented without these Over the Shoulder Reviews or the weekly task force meetings that were being performed.

1000 KW generator being installed. Due to size of generator and equipment, the foundation and position were redesigned multiple times during the design phase

To expand on one of the examples from above is the work involving the new 1000 KW generator and its foundation. The generator with its enclosure was about the size of a tractor trailer. Both the generator and the associated equipment for the generator required foundations to be installed in an already developed area of the facility. The location where the generator was to be installed was being used for parking by facility staff, which would be eliminated with the

installation of the new generator. At the request of the owner, the DB team offered alternate foundation arrangements and configurations to minimize the footprint. These were presented to and accepted by the owner, and the design changed without altering the project schedule. This was possible through prompt owner feedback (before the design was complete) developing ideas/alternates quickly, presenting these alternates schematically and having the owner available to accept quickly, when necessary. The review and acceptance by the owner were critical in keeping the project schedule on track. The owner's ability to receive, assess and decide quickly provided benefit to all. The DB team made sure that whatever material, calculations, and documents needed by the owner to facilitate their review were in place and the DB team was available to discuss when the owner needed.

A second example is the first bullet from above regarding the owner's RFP scope to replace in kind four of the eight rack pinion gear shaft and differential bevel gear assemblies that drive the main sheaves to operate the lift span. This example is the direct result of open and transparent communication; only through a deep understanding of the owner's root cause for replacement was the DB team able to propose the true best-value solution. The replacement proposed was due to heavy scoring of the pinion teeth, apparently caused by contamination from previous work on the bridge. The replacement would have placed the lift span operation out of service for an extended period to disassemble, remove and replace these mechanical components. The DB team, with their extensive experience on movable bridges, carefully inspected and analyzed the condition of the pinions and tooth data history from previous inspection reports. They performed a detailed life-expectancy analysis and demonstrated to the owner that the pinion gear teeth could be carefully reconditioned with fine hand tools to last more than the required 20-year service life. All eight rack pinions and the mating rack gears were reconditioned in place for a complete reconditioned gearset. This led to significant reduction in construction phases, bridge closures, schedule and temporary support structures, minimizing impacts to the local community and travelling public

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Project Schedule

The most important and critical piece of the DB team's approach to this work was the project schedule. From the very start Kiewit understood that to win of this project the schedule had to be shortened to provide a cost-effective price. Each task was closely examined and integrated into a construction schedule that was very aggressive and significantly less than that proposed by the owner. The contractor developed an aggressive 21-month project schedule, versus the RFP schedule of 36 months. This also included an aggressive 6 month design schedule for development of the Release for Construction (RFC) documents. Having the right DB team with the right personnel and an open collaborative approach with the owner were critical to meet this aggressive schedule.

Work covered repairs in and on all areas of the movable bridge structure

A successful construction project starts with a thorough and knowledgeable understanding of scope of work, understanding the risks involved with the scope and incorporating them into a detailed project schedule. The contractor knew that an exceptional project performance required an unwavering commitment to an aggressive schedule.

Using Primavera (P6) scheduling software from the onset of the project, the contractor developed an aggressive 21-month project schedule, versus the RFP schedule, which was 36 months. This aggressive

schedule was refined during negotiations to 24 months and ultimately completed in 19 months. Instrumental successful schedule alignment was the truly **integrated schedule**, in which design, fabrication, administrative and construction activities all shared the same file and were driven by the actual interdisciplinary logic relationships. Being able to develop the interdependencies of each task, the task duration and risks involved required a team of knowledgeable people familiar with this type of work to develop the schedule. This schedule was continually tracked and updated, not only through the design phase, but also during the construction phase, to make sure all interdependent tasks were performed when needed and confirm the materials, staff and documents required for the next task were in place. The interdependency of multiple disciplines interacting in major tasks and each segment of the task had to be tracked and monitored to make sure each portion of the task was started at the right time and completed when required to minimize delay or disruption of any trade. Since this project was a rehabilitation of a large complex structure it entailed area specific work throughout the structure that had to be coordinated with the necessary equipment, staging and staff needed for the assignment on a daily basis. The DB team maintained its integrated design and construction schedule throughout the project by constantly updating the Primavera schedule. During the weekly task force meetings, the DB team went through each deliverable, updated status, prioritized which reviews needed immediate attention, and projected finish dates to confirm that the schedule was still on track. Any adjustment was input into the schedule to assess its impact, either positive or negative. Any negative outcome was more closely examined to find corrective resolution. The owner was updated at each monthly progress meeting to keep them informed. This occurred throughout the project during both design and construction phases.

Lastly the HRLS is a critical part of the RFK Bridge that connects three of the five boroughs of New York, New York, and provides direct access to Randall's Island from Manhattan. This schedule showed anticipated lane closures and their duration. These closures were aligned with the time restrictions due to rush hour traffic and the embargo periods when lane closures were not permitted. The schedule for lane closures was coordinated with the owner throughout the project duration.

Since the HRLS is a movable bridge that spans the Harlem River, a navigable waterway under the jurisdiction of the US Coast Guard, its ability to be raised when required is essential to allow movement of marine traffic. The project required a period of lift span inoperability. The schedule showed and detailed when the lift span outage would occur as well as the duration of the outage. Each detailed task required to be performed during this critical period was carefully monitored and the progress of work in the field reviewed continually with the schedule to make sure the work remained on schedule.

Throughout the project, the designer provided the contractor a monthly **resource-loaded schedule** for easy monitoring of scope, schedule and staffing requirements. During the design phase, this schedule was reviewed during the weekly task force meetings to make sure staffing resources were being properly utilized and for the tasks most critical to the schedule. The weekly task force meetings allowed the contractor to show the designer the areas that were most important and openly discuss areas of concern and where design staff should concentrate their efforts. These meetings also allowed the designer to discuss the implications of any adjustments in the design effort created to the contractor. This allowed the contractor to weigh the benefit before the action started. This also allowed construction personnel to review and critique the design in advance during development, offering resolution to potential issues before they could arise in construction. It also confirmed procedures, permits, and required deliverables were completed before construction commenced.

Determining and Managing Risks

As part of the RFP response to address risk management, the DB team strategized and collaborated to develop a detailed risk matrix. Rehabilitation of an existing structure brings forth its own construction challenges and risks, as compared to construction of a new structure. Keeping the existing structure

operational and usable by the traveling public during the construction also poses added challenges. Key risks for this project, as presented to the owner in the proposal, included the impact to vehicular traffic that would occur with a bridge lift operational failure, uncovering unknown existing conditions, interface between new and existing conditions, damage to existing infrastructure or components, and excessive duration of planned outages. During the partnering meeting, these and other risks were presented, risk was allocated by agreement between the owner and the DB team to the appropriate party, and strategies were put in place to mitigate. The risks listed above as well as others developed during the project were included in the risk matrix and continually monitored. The risk matrix was updated at least monthly, when a risk was resolved, or when a new risk encountered. Careful consideration of each risk, and the development of a detailed work plan, were used to mitigate potential risk. Work plans are a standard procedure for the contractor and were developed before the construction activity occurred. They also bring to light any safety concerns the operation may have had and confirmed the work plan included safety measures for the owner, traveling public and workers performing the assignment. The work plan is discussed with all people involved prior to commencing work to make sure everyone is aware of the risks and what to look for before a problem arises.

One such risk was the six-month period of lift span inoperability to allow repairs to equipment critical to the operation of the lift span. The inoperability did not close the navigable waterway to marine traffic, but only restricted size of vessels that could pass since the HRLS provides 55 feet vertical clearance over the waterway when not operated. Failure to restore the operation of the lift span before the end of this period would have resulted in the possibility of fines as well as other penalties and for this reason was a critical stage in the work. The DB team improved on construction work plans to make sure the repairs were completed before this lift span outage period ended. Repairs to the critical components were completed well ahead of the six-month period. The DB team worked closely with the owner’s facility personnel to confirm that the construction was planned to minimize impacts to both the traveling public and users of the waterway. This was done through proactive discussions regarding the construction schedule and monthly coordination meetings showing anticipated work for the upcoming month. With this information, the owner was able keep all required agencies, community and the public informed of any impediment construction may have caused. To minimize any impact to the community, traveling public and pedestrians, construction was coordinated around scheduled events on Randall's Island, such as concerts and ball games, and temporary workarounds were constructed to accommodate the traveling public during the repairs.

Conclusion/Outcome

Timely completion was the precedent set for the successful cost-effective approach to this multi-faceted rehabilitation project. Throughout the whole project duration, the initial proposed schedule was reviewed, assessed, refined, adjusted and shortened whenever possible. This incredible conquering of schedule was made possible through continued and constant collaboration by all stakeholders involved from the start with the DB team in Pre-award, through the design and construction. Proactive support from MTAB&T’s experienced personnel and Hardesty & Hanover, LLP, MTAB&T’s Design-Build Quality Oversight Representative, provided timely resolution of major project scope decisions critical to achieving the aggressive schedule under budget. MTAB&T’s prompt decision making and the close partnership among DB team firms also contributed to the success of the project. The timely completion could not have occurred without the cooperation of all parties.

The success to this project can be credited to three specific items:

1. Having the right team in place and keeping them on the assignment throughout the project duration.

2. Establishing and maintaining open, collaborative discussion from the onset of the project and maintaining that throughout the project.
3. Developing a detailed project schedule and updating and modifying it throughout the project.

By having these three critical items established and maintained throughout the project duration allowed the DB process and each step of the project to proceed in a controlled manner. If and when any issue arose it could quickly be identified, the impact to project assessed, determination of solution developed and outcome resolved quickly.

Awards

The project was successful for the owner since the goals of the project were achieved in less time and lower cost than had been anticipated. The success of the project also benefited the traveling public by minimizing the inconvenience of the construction to a shorter period of time than expected. For both the designer as well as the contractor the expected goals of project completion in shorter time with the innovations proposed resulted in a profitable project and demonstrated the capabilities of the DB team to the owner for future projects. The pro-active behavior of making sure safety came first throughout the project benefited everyone who worked on the project since there were 0 recordable injuries for 85,285 hours worked on the job. To be able to show and express this success, this project won two awards. The first was from the Design Build Institute of America and the RK-07 project won National Award of Merit in the Rehabilitation, Renovation and/or Restoration category.

Project received DBIA Award of Merit in the Rehabilitation, Renovation and/or Restoration category

The second award was from Engineering News Record (ENR) and received the Safety Award of Merit for the outstanding safety achieved during this fast-paced multidiscipline project.