MTA Press Releases

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NYC Transit IMMEDIATE

MTA Announces L Train Shutdown Averted

MTA Accepts Recommendations of Expert Panel That L Train Tunnel Can Be Repaired While Service Continues To Operate

Report by Engineering Experts from Columbia and Cornell Engineering Schools Includes a Series of Recommendations to the MTA that Would Employ Innovative Techniques to Streamline the Scope and Timeline of the Tunnel Repair Project

MTA Confirms Recommendations Can Be Achieved; Weekday Service Would Remain in Full Operation; Only Weekend and Nighttime Closures of One Tube at a Time, with Trains Running in Both Directions; Project Could Be Completed in Approximately 15 to 20 Months

The Metropolitan Transportation Authority (MTA) today accepted the recommendations of a panel of engineering experts that determined a complete closure of the L Train Tunnel is unnecessary. The report – which followed weeks of extensive review and analysis by the deans and faculty of the Columbia University and Cornell University engineering schools – presents a series of innovative engineering methods to streamline the required repair work and limit the impact on L Train service, which provides 400,000 daily rides. Work could be completed on nights and weekends only, with a single tube providing continued service in both directions during work periods.

The plan has been presented to and reviewed by the MTA, and it has been confirmed that the report's goals are achievable within a 15 to 20-month timeframe. The MTA still plans to implement additional subway service where needed, including on the G, M and 7 Trains.

"We appreciate the dedication and the analysis provided by this group of experts," said Acting MTA Chair Fernando Ferrer. "We have a shared goal in this effort: to make sure New Yorkers are subjected to the least possible disruptions as a result of this necessary repair work. With the L Project, and all our major projects, we're consistently looking for new and innovative methods, and the guidance and recommendations we have received today will ease the strain on customers and help us ensure we are providing a consistently reliable service."

"The L Train Tunnel project gives us the opportunity to integrate technologies and methods that have never been used before in a tunnel rehabilitation project, putting New York in a leadership position when it comes to building 21st century infrastructure," the panel of engineering experts said in a joint statement. "We have proposed a forward-thinking, innovative approach that relies on state-of-the-art technologies to rehabilitate this century-old tunnel. We were grateful to have this extraordinary opportunity to work with the MTA to lead the way in infrastructure design and development, and we hope this solution can set an example for other projects in New York and around the world."

While the new plan eliminates the need for a complete shutdown of the tunnel, L Train Project rebuilding and improvements will continue as planned to address long–term capacity on the line. These include constructing new power substations; storm and flooding resiliency measures; and station improvements, such as providing ADA accessibility and other capacity upgrades at the Bedford Avenue Station in Brooklyn and the 1st and 6th Avenue Stations in Manhattan.

In 2012, the L Train Tunnel (AKA Canarsie Tunnel) – which is 1.5 miles long and runs under the East River – was filled with corrosive salt water due to Superstorm Sandy. As a result, the 100-year-old tunnel sustained critical damage, including the Circuit Breaker House, system and power cables, and the cement benchwall that holds and protects the cables. Crucial repair work was planned to begin in the spring of 2019, including the laborious and time-consuming process of removing – by hand – and replacing all 32,000 feet of benchwall, as well as installing 126,000 feet of power cable and 176,000 feet of communications cable inside the benchwall. This work would require a complete shutdown of L service through the tunnel for 15 months.

In December 2018, Governor Andrew M. Cuomo empaneled an expert review team, including leadership from Cornell University's College of Engineering and Columbia University's Fu Foundation School of Engineering and Applied Science, to do a final review of the plan ahead of the L Project and its tunnel shutdown. The review team was charged with examining the current plan and recommending new designs, new systems, or technology that would improve the project and/or expedite the timetable, or confirm the current plan as the best way forward. Members of the panel toured the L Train Tunnel, as well as the Hudson River tunnel along with Amtrak leadership to further inform their analysis. They also consulted with MTA and New York City Transit, the project contractors, and conducted their own intensive analysis and performed hundreds of hours of pro bono work.

The expert review team also considered rail tunnels in cities around the world – such as Hong Kong, London, and Riyadh – in order to implement the most efficient design in New York City. Among the findings, the team found that other modern tunnel designs under construction do not use benchwalls to protect cables.

The extensive review and analysis led to the following recommendations that have been made to the MTA:

L Train Tunnel Project Recommendations:

· Implement a new power and control system design.

· Implement racking system design to suspend cables on side of tunnel.

· Decouple cable system housing from benchwall.

· Jacket cables with low smoke, zero halogen fireproof material.

· Abandon all old cables in benchwall.

· Leave benchwall unless structurally compromised and fortify using fiber reinforced polymer.

· Install “smart” sensor systems to monitor benchwall integrity.

· Install walkway where benchwall is removed.

· Increase flood resilience measures.

· Enhance public safety.

The benefits to these recommendations include:

· New system design achieves all functional outcomes, while reducing work and allowing simultaneous, not sequential execution of critical tasks

· Racking system will allow greater access to cables for inspection or future upgrades

· Installation of smart sensor system will allow for monitoring on a continuous basis rather than a periodic basis.

· Upgrades to the pump system and rail will occur in tandem with the cable and benchwall work.

· Dramatic reduction in non-value added project scope (i.e. avoiding complete removal and reconstruction of the benchwall)

· Enhanced safety and functionality of the project.

· Enhanced flood resilience.

· This new system design approach can be potentially applied to other projects, such as the Second Avenue Subway Phase 2 and Hudson River Train Tunnels.

These recommendations would mean the following:

· No closure of service is necessary with this new design.

· Work can be completed with weekend and nighttime closures of only one tube at a time leaving the other to run trains in both directions.

Review Team Bios:

Columbia University:

Dean Mary C. Boyce leads the education and research mission of Columbia Engineering with more than 200 faculty, 1600 undergraduate students, and 2600 graduate students. A strong advocate of interdisciplinary research and the translation of innovation to impact, she has increased faculty in cross-cutting fields, and recently launched an inspiring new vision for the school, Columbia Engineering for Humanity.

Her own research focuses on materials and mechanics, particularly in the areas of multi-scale mechanics of polymers and composites. She has also served as a consultant to industry and the government. Dean Boyce has been widely recognized for her scholarly achievements, including election as a fellow of the American Society of Mechanical Engineers, the American Academy of Arts and Sciences, and the National Academy of Engineering. Dean Boyce earned her BS degree in engineering science and mechanics from Virginia Tech, and her MS and PhD degrees in mechanical engineering from MIT, and served as a professor of mechanical engineering and head of the department of mechanical engineering at MIT prior to joining Columbia in 2013.

George Deodatis has research interests in the area of probabilistic methods in civil engineering and engineering mechanics, with emphasis on risk analysis and risk management of the civil infrastructure subjected to natural and man-made hazards (including climate change and extreme weather), with the goal of establishing adaptation and mitigation strategies. Deodatis received a five-year diploma in civil engineering from the National Technical University of Athens, Greece, in 1982, and MS and PhD degrees in civil engineering from Columbia University in 1984 and 1987, respectively. He served on the faculty at Princeton University until 2002, when he joined Columbia Engineering where he is currently the chair of the department of civil engineering and engineering mechanics. In 2009, he was elected president of the International Association for Structural Safety and Reliability. In 2017, he was elected president of the Engineering Mechanics Institute of the American Society of Civil Engineers. His many honors and awards include the American Society of Civil Engineers Walter Huber Civil Engineering Research Prize, the International Association for Structural Safety and Reliability Junior Research Prize, and the National Science Foundation Young Investigator Award. Deodatis is a Fellow of the Engineering Mechanics Institute of the American Society of Civil Engineers.

Andrew W. Smyth specializes in structural health monitoring, using sensor information to determine the condition of critical infrastructure. Recently his interest in sensor network monitoring has expanded to large fleets of vehicles in urban environments. Smyth is the chair of the Smart Cities Center at Columbia University's Data Science Institute. Smyth has been involved with the sensor instrumentation and vibration analysis and remote monitoring of a large number of iconic long-span bridges and landmark buildings and museums. His research interests include the development of data fusion and structural health monitoring algorithms to derive maximum information from large heterogeneous sensor networks, dynamic systems modeling and simulation, and natural hazards risk assessment. Smyth received his ScB and AB degrees at Brown University in 1992 in Civil Engineering and Architectural Studies respectively. He received his MS in Civil Engineering at Rice in 1994, an MS in Electrical Engineering (1997) and his PhD in Civil Engineering (1998) at the University of Southern California.

Peter Kinget is the chair of the electrical engineering department at Columbia Engineering and the Bernard J. Lechner Professor of Electrical Engineering. Kinget's research group focuses on the design of analog and RF integrated circuits and the novel systems or applications they enable in communications, sensing, and power management. He is a Fellow of the IEEE and has won several awards, including the 2011 "Outstanding Paper on New Communication Topics" from the IEEE Communications Society. Kinget received an engineering degree in mechanical and electrical engineering and a PhD degree in electrical engineering from the Katholieke Universiteit Leuven, Belgium. After several years in industrial research and development, he joined Columbia University in 2002.

Cornell University:

Lance R. Collins is serving his second term as the Joseph Silbert Dean of Engineering at Cornell University. Under Dean Collins' leadership, Cornell Engineering has maintained its rank as one of the top engineering colleges in the world. He was part of the leadership team that successfully bid to partner with New York City to build Cornell Tech, which opened its Roosevelt Island campus in 2017. In addition, he is leading the ambitious Earth Source Heat project that aims to heat Cornell's 745-acre campus with deep geothermal energy. Dean Collins has accelerated the college's efforts to diversify its faculty and student body. For these efforts he received the inaugural Mosaic Medal of Distinction from Cornell Mosaic and the Edward Bouchet Legacy award from the Edward Bouchet Society. Dean Collins' research combines simulation and theory to investigate a broad range of turbulent flow processes. He is a fellow of the American Physical Society (2007), the American Association for the Advancement of Science (2015) and the American Institute of Chemical Engineers (2015). He served as vice chair, chair and past chair of the US National Committee on Theoretical & Applied Mechanics 2008-2014. Dean Collins earned his B.S.E. in 1981 at Princeton University and his M.S. in 1983 and his Ph.D. in 1987 at the University of Pennsylvania, all in Chemical Engineering.

Professor Thomas Denis O'Rourke is the Thomas R. Briggs Professor of Engineering in the School of Civil and Environmental Engineering at Cornell University. He holds a Ph.D. and M.S. degree in Geotechnical Engineering from the University of Illinois at Urbana-Champaign and a B.S.C.E. from Cornell. He is a member of the US National Academy of Engineering, International Fellow of the Royal Academy of Engineering, Distinguished Member of American Society of Civil Engineers (ASCE), and Fellow of the American Association for the Advancement of Science. He has won numerous awards for his contributions to engineering and resilient infrastructure. He has advised on over 100 projects worldwide associated with highway, rapid transit, water supply, and energy distribution systems. Representative projects include the Third NYC Water Tunnel, Boston Central Artery and Tunnel (CA/T), risk assessment for the First NYC Water Tunnel and NYC aqueducts, Tren Urbano Rapid Transit System, NYC Second Avenue Subway and Fulton St. Transit Center, Trans-Bay Tube Seismic Retrofit, and seismic design for the San Francisco water supply (including the San Francisco Public Utilities Commission Crystal Springs By-Pass Tunnel, Bay Tunnel, Irvington Tunnel, and Bay Division Pipelines).He authored or co-authored nearly 400 publications on geotechnical, underground construction, earthquake engineering, and impact of extreme events on civil infrastructure. He was principal or co-principal investigator on more than 75 research projects. He holds US Patent No. 5713393 for "frictionless pipe", and jointly holds US Patent No. 8701469 for flexible substrate sensor system for environmental & infrastructure monitoring.