



University Transportation Research Center - Region 2

Final Report



Major Workforce Challenges Confronting New York City Transit

Performing Organization: City University of New York (CUNY)



May 2017



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The Region 2 University Transportation Research Center (UTRC) is one of ten original University Transportation Centers established in 1987 by the U.S. Congress. These Centers were established with the recognition that transportation plays a key role in the nation's economy and the quality of life of its citizens. University faculty members provide a critical link in resolving our national and regional transportation problems while training the professionals who address our transportation systems and their customers on a daily basis.

The UTRC was established in order to support research, education and the transfer of technology in the field of transportation. The theme of the Center is "Planning and Managing Regional Transportation Systems in a Changing World." Presently, under the direction of Dr. Camille Kamga, the UTRC represents USDOT Region II, including New York, New Jersey, Puerto Rico and the U.S. Virgin Islands. Functioning as a consortium of twelve major Universities throughout the region, UTRC is located at the CUNY Institute for Transportation Systems at The City College of New York, the lead institution of the consortium. The Center, through its consortium, an Agency-Industry Council and its Director and Staff, supports research, education, and technology transfer under its theme. UTRC's three main goals are:

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The research program objectives are (1) to develop a theme based transportation research program that is responsive to the needs of regional transportation organizations and stakeholders, and (2) to conduct that program in cooperation with the partners. The program includes both studies that are identified with research partners of projects targeted to the theme, and targeted, short-term projects. The program develops competitive proposals, which are evaluated to insure the most responsive UTRC team conducts the work. The research program is responsive to the UTRC theme: "Planning and Managing Regional Transportation Systems in a Changing World." The complex transportation system of transit and infrastructure, and the rapidly changing environment impacts the nation's largest city and metropolitan area. The New York/New Jersey Metropolitan has over 19 million people, 600,000 businesses and 9 million workers. The Region's intermodal and multimodal systems must serve all customers and stakeholders within the region and globally. Under the current grant, the new research projects and the ongoing research projects concentrate the program efforts on the categories of Transportation Systems Performance and Information Infrastructure to provide needed services to the New Jersey Department of Transportation, New York City Department of Transportation, New York Metropolitan Transportation Council, New York State Department of Transportation, and the New York State Energy and Research Development Authority and others, all while enhancing the center's theme.

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The modern professional must combine the technical skills of engineering and planning with knowledge of economics, environmental science, management, finance, and law as well as negotiation skills, psychology and sociology. And, she/he must be computer literate, wired to the web, and knowledgeable about advances in information technology. UTRC's education and training efforts provide a multidisciplinary program of course work and experiential learning to train students and provide advanced training or retraining of practitioners to plan and manage regional transportation systems. UTRC must meet the need to educate the undergraduate and graduate student with a foundation of transportation fundamentals that allows for solving complex problems in a world much more dynamic than even a decade ago. Simultaneously, the demand for continuing education is growing – either because of professional license requirements or because the workplace demands it – and provides the opportunity to combine State of Practice education with tailored ways of delivering content.

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UTRC's Technology Transfer Program goes beyond what might be considered "traditional" technology transfer activities. Its main objectives are (1) to increase the awareness and level of information concerning transportation issues facing Region 2; (2) to improve the knowledge base and approach to problem solving of the region's transportation workforce, from those operating the systems to those at the most senior level of managing the system; and by doing so, to improve the overall professional capability of the transportation workforce; (3) to stimulate discussion and debate concerning the integration of new technologies into our culture, our work and our transportation systems; (4) to provide the more traditional but extremely important job of disseminating research and project reports, studies, analysis and use of tools to the education, research and practicing community both nationally and internationally; and (5) to provide unbiased information and testimony to decision-makers concerning regional transportation issues consistent with the UTRC theme.

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List of Abbreviations and Symbols

NYCT	New York City Transit
MTA	Metropolitan Transportation Authority
TWU	Transport Workers Union
MaBSTOA	Manhattan and Bronx Surface Transportation Operating Authority
ATU	Amalgamated Transit Union
SSSA	Subway Surface Supervisors Association

Executive Summary

Objectives

The purpose of this research was to identify the pressing workforce issues confronted by transit authorities nationwide and promising ways in which they are being addressed. The study also included a closer examination of New York City Transit (NYCT), the nation's largest transit authority, to consider its challenges and which solutions could be brought to bear to address them. The research questions guiding the study were:

- *How do the labor and management of the nation's transit authorities define their workforce challenges?*
- *How have they addressed these challenges?*
- *What if any workforce issues uniquely apply to NYCT's workforce?*
- *How is NYCT addressing the identified issues?*
- *What other strategies can be adopted by NYCT to address its challenges?*

The results are expected to be instructive not only to NYCT, but also to transit systems and their labor partners throughout the nation. The findings are especially important in light of the transit industry's unique economic and public safety importance, and the career opportunities the industry can provide to current and future workers who have been negatively affected by the confluence of globalization and technology.

Research Approach

- A review of scholarly and trade literature for urban transit economic and policy drivers and current trends, workforce challenges, and promising approaches to address these challenges (see [Appendix A. Bibliography](#));
- Secondary analysis of employment and wage data, nationally and in New York City, including:
 - Census Bureau's American Community Survey public use microdata combined samples
 - Bureau of Labor Statistics and New York State Department of Labor's, Employment Matrices, Quarterly Census of Employment and Wages, Employment Projections, and Occupation Employment Statistics
 - Transit ridership, budget, and staffing;
- Fourteen semi-structured interviews with labor union and industry officials, especially those responsible for human resources, training, and labor relations functions.¹

Key Findings

The major national workforce issues identified in the literature include:

- [An aging transit workforce](#), with about one in three within 10 to 15 years of retirement and an inadequate pipeline of young adults to replace them.

¹ There are 37 collective bargaining units at NYCT. For this research, interviews were conducted with members Transport Workers Union Local 100, who comprise 80 percent of the workforce.

- [Technological transformation of the industry](#), from electric and mechanical to electronic and digital, including the impact on outdated staffing functions, and the need to train the existing workforce on new equipment and recruit a capable workforce
- [Increased competition with other industries](#) for a skilled workforce, working within the regulatory and fiscal constraints of a public authority
- Mismatch between the organizational culture and workplace environment of transit authorities and the expectations and preferences of the [21st Century workforce](#)
- [Underinvestment in professional development](#), including technical and managerial skills.

The interviews with labor and management revealed that NYCT shares all of these issues in common with transit authorities across the nation. In the context of the authority's governance, a vital and competitive local labor market, labor-management relations, and the sheer vastness of NYCT as an enterprise, the challenges and potential solutions appear more complex. Nonetheless, there are solutions to these interrelated workforce issues that will require effort and political will. Although other authorities have discovered ways to reduce the tension caused by fiscal constraints in the face of a growing demand and an aging infrastructure, their consideration was beyond the scope of this research.

Fortunately, the literature review and local interviews revealed many promising practices to address the workforce challenges. Some have been used sporadically or in isolation from one another at NYCT. Our recommendations are to test, and implement multiple strategies simultaneously for maximum effect. All of these strategies apply equally to the operational and professional sides of the NYCT workforce, except where otherwise noted. Some of the major recommendations include:

- Provide older workers with incentives to delay or stagger their retirement.
- Implement a formal, agency-wide mentorship program to retain institutional memory and better prepare the younger workforce.
- Provide learning-on-demand opportunities to the operational workforce.
- Re-introduce a rotational model of professional development embodied in the Future Managers program so that workers understand their role within a broader context and are exposed to management in a variety of departments.
- Create a NYCT Civil Service Commission.
- Invest in communications and marketing that conveys the vital role played by the transit workforce to the City's functioning in order to improve its public image and attract qualified talent.
- At least double the size of the apprenticeship program and place a limit on the number of seats that can be filled by incumbent workers.
- At least double the size of the school year and summer college internship program.
- Form stronger partnerships with institutions of higher education so that professional and technical students learn about transportation as a career of choice, especially in the business management, engineering, and information technology disciplines.
- Relax restrictions wherever possible without compromising service and rider safety. Revise regulations and improve work facilities to communicate that NYCT values its workforce.
- Create opportunities for vertical interaction to create empathy and trust throughout the organization.

The list is long because NYCT is large and complex, and in many ways, has turned away from making serious investments in its workforce. Across the board, however, labor and management believe in their colleagues and want to see NYCT function at its best. The authority's workforce has responded above and beyond, time and time again to major crises in order to protect the public and maintain the

functioning of the transit system. They are more than capable of undertaking large-scale projects like this and transforming the authority to meet the needs of the 21st Century. The stakes almost could not be higher.

Part 1. The National Transit Industry and its Workforce Challenges

Industry Drivers

The most distinctive characteristic of the transit industry is its sole focus on safely and effectively meeting a huge daily public demand. Every day, the public transit system must determine how many and which cars, buses, and railcars will be needed, how many and which ones will be inspected, repaired, or maintained. The transit system not only must ensure that it has sufficient equipment capacity, it must also schedule the equipment to meet rider demand. In addition, support services are needed to manage and operate the system such as station attendants, station cleaners, train announcers, and pension fund managers. There are all kinds of functions and all kinds of jobs needed to meet the enormous demand. Public transit is about as diverse as any complex enterprise can be.

Funding

Transit agencies receive about 40 percent of their funding through passenger fares and other agency sources (tariffs, purchased agreements, and subsidies from other agencies); the remaining funds come from financial assistance or targeted taxation from local, state, and federal governments. Nationally, urban transit agencies struggle with operating deficits and capital improvement needs.

Business Cycles

Any slowdown in the general economy translates to lower tax receipts, which means less money available for transit services. When the economy is weak, City and State governments tend to reduce support to urban transit. In order to remain viable, however, urban transit systems must not only maintain their systems and operate efficiently, they must invest in infrastructure investments to modernize and increase the capacity of their systems, regardless of the business cycle.

Ridership

Since 1995, transit ridership has grown by nearly 3 billion trips. As shown in [Figure 1](#), between 24 and 2012, transit passenger miles of travel have increased by 15 percent; the population has grown by seven percent, while highway travel stopped growing. (American Public Transportation Association, 2013, p. 11)

Fuel Prices

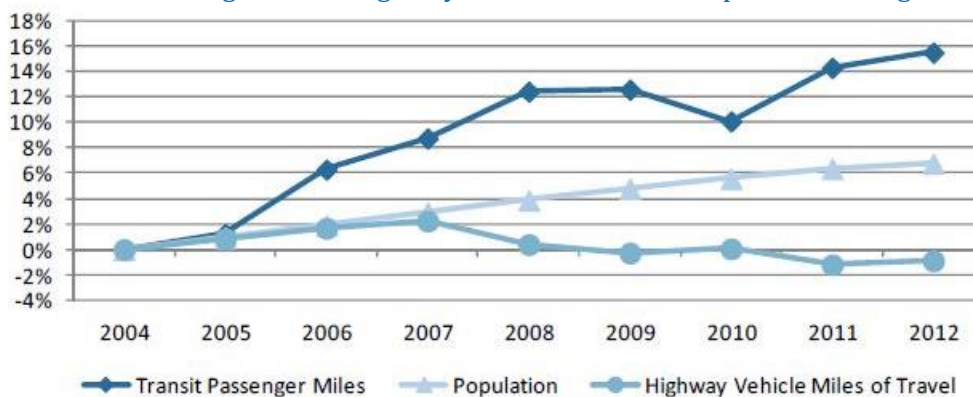
Finally, fuel prices affect the demand for public transit. When they are higher, drivers are more likely to turn to rapid transit systems in an effort to save costs associated with refilling family- or employer-owned cars. Ridership benefits are mitigated for transit agencies, however, as they incur their own fuel-related costs. They pay for materials to be transported to them from manufacturers and from site to site within the system. Also, some city buses and paratransit vans still operate on diesel fuel.

Infrastructure Resiliency

Transit agencies face over \$77 billion in deferred maintenance needs; acts of nature further stress infrastructure, which is already in need of additional investment. Though agencies have provided the highest quality service and safety possible in a constrained funding environment, the inability of the federal government to address the nation's infrastructure challenges leaves transit agencies vulnerable to extreme acts of nature. The impact on transit emanating from recent events, such as rising temperatures and extreme weather events, underscore the need for additional federal support to

protect the state of good repair, cost containment, regional mobility, and service that local communities expect from public transportation. (American Public Transportation Association, 2012)

Figure 1. Transit Passenger Miles, Highway Vehicle Miles and Population Change, 2004-2012

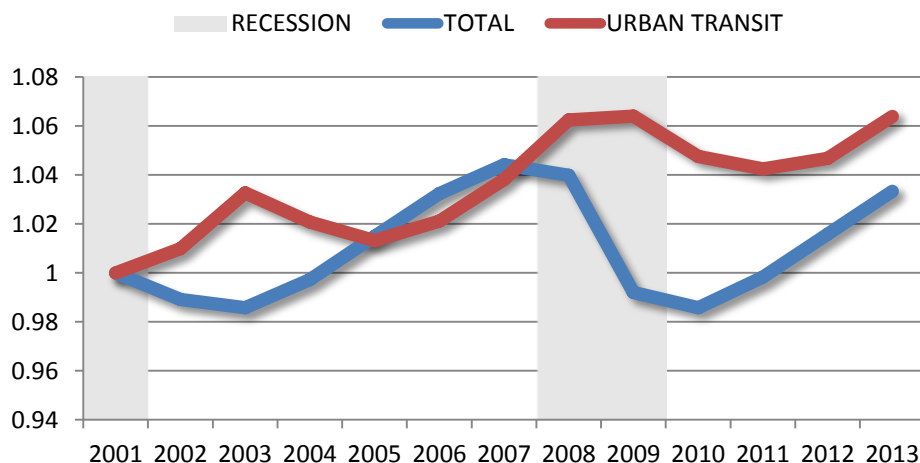


SOURCE | APTA, 2013, page 11.

Employment and Wage Trends

Figure 2 shows normalized employment trends for the urban transit industry and for the US economy as a whole. Nationwide, transit employment increased by six percent between 2001 and 2013, while total US employment grew by three percent during the same time period. Moreover, urban transit employment rose by more than three percent after the first recession of the 21st Century, while overall employment dropped by almost two percent. From 2004 to 2007, the economy outperformed the transit industry, but transit employment growth has outperformed the overall labor market ever since then. Transit employment dropped during 2009 at the height of the national recession, but lost fewer jobs on a proportional basis than the labor market as a whole

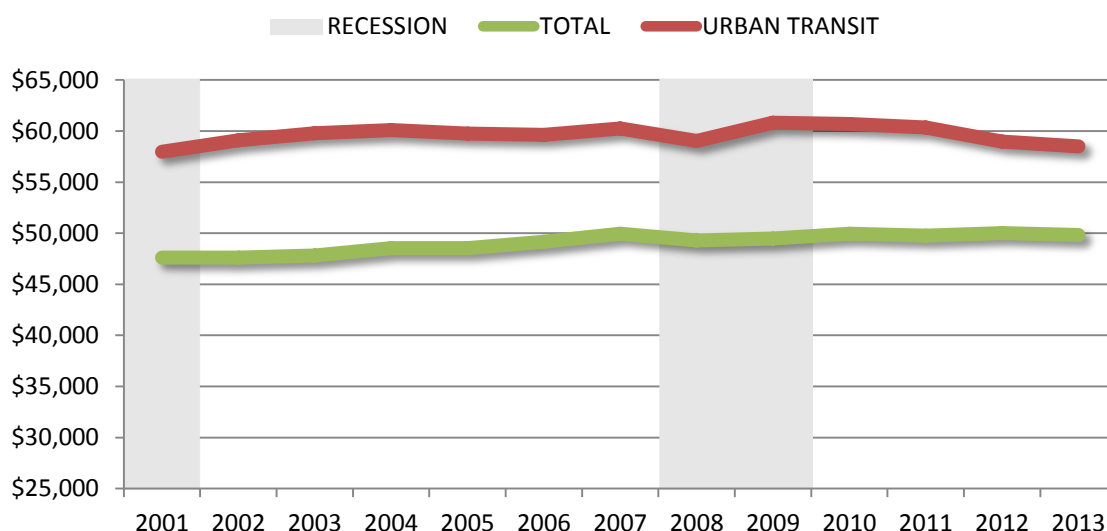
Figure 2. Employment Growth in Urban Transit and the US Economy, 2001 to 2012



SOURCE | Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Figure 3 compares real (inflation-adjusted) annual average wages of workers in the transit industry with workers in all industries combined nationwide from 2001 to 2013. At every point, transit workers earned at least \$8,500 per year more than the average worker in the US labor market. Transit workforce real wages rose by five percent between 2001 and 2013 compared to one percent for the national labor market during the same period. Despite these figures, transit workers lost ground from 2006 to 2008 and their wage premium decreased by more than 15 percent over this 12-year period.

Figure 3. Real* Annual Average Wages in Urban Transit and the US Economy, 2001 to 2013



*Adjusted for inflation using CPI-U, all items, all urban consumers, US total.
SOURCE | Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Occupational Employment

There is limited agreement across employers and government agencies on how to classify and discuss occupations in public transportation (Herzog, Cleary, & Shen, 2012, p. 1) One important division is between operational titles – such as those involved in vehicle operations and maintenance, maintenance of way, rapid transit, etc. – which are typically unionized and paid hourly wages, and the office-related and professional titles which are, in the main, not unionized and who draw annual salaries. Operational titles may require a great deal of knowledge, judgment, and skill, but they typically do not require a high level of educational attainment. Indeed, transit is among the few industries remaining in the United States that offers well-paying opportunities and advancement for people without a postsecondary degree. On the other hand, administrative and professional roles like planning, engineering, procurement, human resources, and budget, typically require more education. Although each has its own workforce challenges, many challenges are shared across the two types.

Table 1 lists the titles that make up at least one-tenth of one percent of the transit workforce nationally, organized by the typical minimum education required for entry, along with their projected growth over the 2012-2022 period. Occupations that require a high school diploma or its equivalent make up almost 90 percent of the transit workforce – bus drivers alone make up 60 percent of the workforce – and occupations requiring no formal education make up an additional six percent. The industry as a whole is projected to grow by two percent. In total, eight of the occupations are expected to lose jobs, and these

were all administrative positions being phased out, in and out of public transit, due to outsourcing, automation, and other technological advances.

The table also clearly shows the predominance of operational workers over administrative and professional workers in terms of sheer numbers: 91 percent of the national transit workforce is operational.

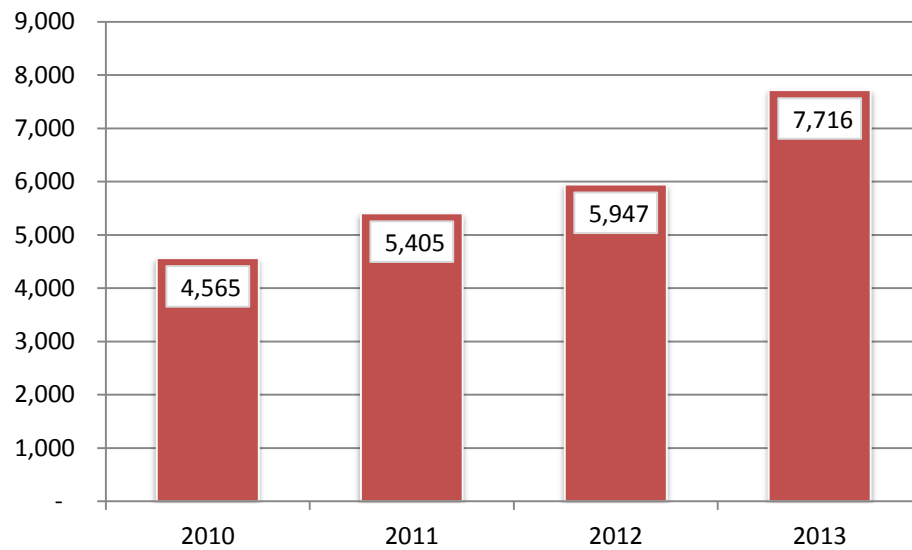
Table 1. Occupational Composition of the Urban Transit Industry*

	INDUSTRY EMPLOYMENT 2012	% OF INDUSTRY EMPLOYMENT	% GROWTH 2012-2022
ALL TRANSIT OCCUPATIONS	225,699	100.0%	2.4%
NO FORMAL EDUCATION			
Taxi drivers and chauffeurs	4,817	2.1%	2.8%
Cleaners of vehicles and equipment	3,670	1.6%	2.8%
Automotive and watercraft service attendants	1,606	0.7%	2.8%
Stock clerks and order fillers	1,376	0.6%	2.8%
Janitors and cleaners, except maids and housekeeping cleaners	1,147	0.5%	2.8%
Cashiers	459	0.2%	-2.4%
Material moving workers, all other	459	0.2%	2.8%
Laborers and freight, stock, and material movers, hand	229	0.1%	2.8%
HIGH SCHOOL DIPLOMA OR EQUIVALENT			
Bus drivers, transit and intercity	137,871	61.1%	2.8%
Bus and truck mechanics and diesel engine specialists	15,599	6.9%	2.8%
Bus drivers, school or special client	10,323	4.6%	2.8%
Dispatchers, except police, fire, and ambulance	6,194	2.7%	2.8%
Supervisors of transportation, material-moving machine/vehicle operators	5,735	2.5%	2.8%
Subway and streetcar operators	3,212	1.4%	2.8%
Customer service representatives	2,982	1.3%	2.8%
First-line supervisors of mechanics, installers, and repairers	2,294	1.0%	2.8%
Transportation attendants, except flight attendants	2,294	1.0%	2.8%
Office clerks, general	1,835	0.8%	-2.4%
Reservation and transportation ticket agents and travel clerks	1,606	0.7%	2.8%
Maintenance and repair workers, general	1,606	0.7%	2.8%
Transportation, storage, and distribution managers	1,376	0.6%	2.8%
First-line supervisors of office and administrative support workers	1,376	0.6%	2.8%
Receptionists and information clerks	1,147	0.5%	-7.5%
Secretaries and administrative assistants	918	0.4%	-2.4%
Transit and railroad police	688	0.3%	2.8%
Helpers--installation, maintenance, and repair workers	688	0.3%	2.8%
Protective service workers, all other	459	0.2%	2.8%
Switchboard operators, including answering service	459	0.2%	-38.6%
Payroll and timekeeping clerks	459	0.2%	-7.8%
Production, planning, and expediting clerks	459	0.2%	2.8%
Executive secretaries and executive administrative assistants	459	0.2%	-10.6%
Office and administrative support workers, all other	459	0.2%	2.8%
Automotive body and related repairers	459	0.2%	2.8%
Security guards	229	0.1%	2.8%
SOME POSTSECONDARY EDUCATION			
Bookkeeping, accounting, and auditing clerks	1,147	0.5%	-12.6%
Human resources assistants, except payroll and timekeeping	229	0.1%	-7.5%
BACHELOR'S DEGREE			
General and operations managers	2,753	1.2%	2.8%
Training and development specialists	918	0.4%	2.8%
Purchasing agents, except wholesale, retail, and farm products	459	0.2%	2.8%
Compliance officers	459	0.2%	2.8%
Business operations specialists, all other	459	0.2%	2.8%
Accountants and auditors	459	0.2%	2.8%
Administrative services managers	229	0.1%	2.8%

SOURCE | Bureau of Labor Statistics, National Employment Matrix for Urban Transit, and Long-Term Occupational Projections.

Figure 4 shows the increase of online ad volume for transit bus drivers, selected because of the predominance and importance of the position within the transit industry. The figure suggests that demand for this occupation grew at a faster rate than transit industry employment overall during the same period. The relatively low ad volume suggests that many openings for transit bus operators may not be advertised online.

Figure 4. Online Ad Volume for Bus Drivers, Transit and Intercity, 2010-2013



SOURCE | Burning Glass Labor Insights ©

National Workforce Challenges

Within this difficult framework of increasing ridership, short- and long-term budgeting challenges, and an aging infrastructure in the face of climate change, transit agencies must recruit, train, and retain a quality workforce. There are several major workforce-related challenges that urban transit agencies across the country will have to address over the next several years. The major challenges identified by the U.S. Department of Transportation and the Council of University Transportation Centers include:

- **The aging of the urban transit workforce.** Up to 50 percent of the current transit workforce across the country is or will become eligible for retirement over the next 10 years. This offers both a challenge and an opportunity. The exodus of experienced employees could be a challenge for urban transit systems, which will lose many people with institutional memory and skills. At the same time, the skills and abilities of the next generation of the transportation workforce may need to be substantially different from today's, and may require greater skills in areas such as financing, project management, sustainability, livable communities and greater public engagement, not to mention responding to rapidly changing technology.
- **Increased competition from other fields for a smaller pool of skilled workers.** There are well-documented shortages of information technology professionals and competition for others with engineering and technical expertise.
- **Substantially different skill sets and abilities to respond to rapidly changing demands and a transforming industry.** There is a national movement underway to replace mechanical parts and systems with computers and electronic parts and systems. New vehicles use new and more computerized technology with standard modules that can be popped in and out; it is more cost effective to convert to the new systems because of parts standardization than to attempt to repair the older mechanical parts. The skills of the existing workforce may need to be enhanced. A comprehensive strategy is needed to develop the qualified and high performing transportation workforce required to meet the demands of the rapidly changing 21st century transportation system.

The literature review conducted for this research revealed two additional, interrelated challenges: the **mismatch with the expectations and preferences of the rising generation of young adults** and an **under-investment in professional development**. In this section, each type of workforce challenge is presented in turn, followed by strategies that have been used to address it wherever they have been identified in the literature.

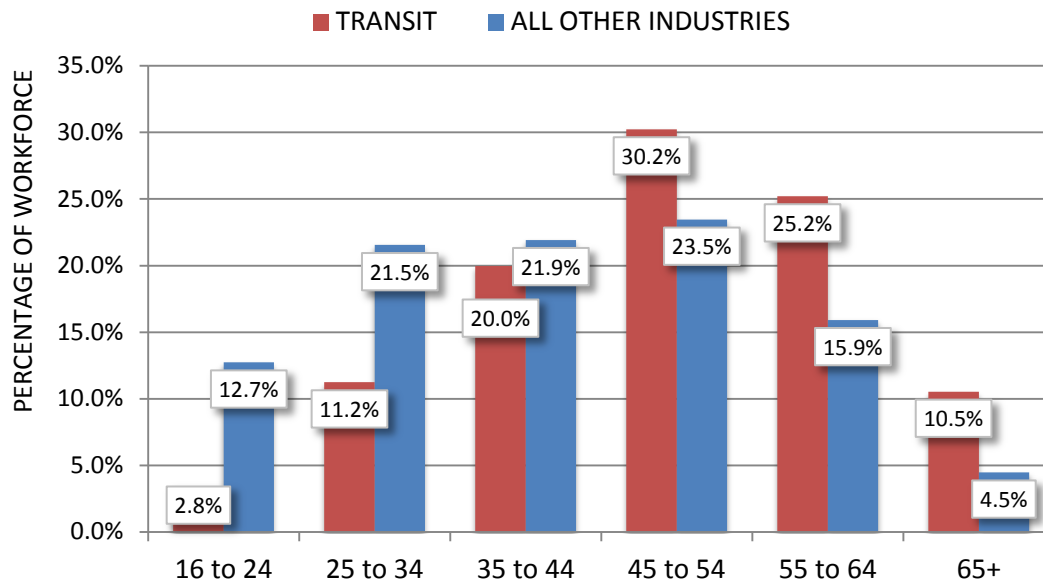
Aging of the Transit Workforce

"Many transportation agencies are experiencing difficulty in attracting and retaining capable employees. Competition with other industries and fields, as well as current economic and demographic trends, is making it difficult to sustain an adequate and competent workforce. A growing number of employees are becoming eligible for retirement, and constraints on public sector financing limit the ability of transportation agencies to match salary and benefit levels of the private sector.... Without a skilled workforce, all aspects of an agency's transportation program are at risk." (Cronin, Anderson, et al., 2011, forward)

Figure 5 shows the stark contrast between the age distribution of the transit workforce and the workforce of the rest of the national economy. More than one in three workers in urban transit (35.7%) is age 55 or older – within 10 to 15 years of retirement age – compared to about one in four (20.4%) in the rest of the labor market. In addition, transit employs a larger percentage of workers ages 45 to 54

(30.2%) than does the rest of the economy (23.5%). The contrast at the other end of the age distribution is just as stark: three percent of the transit workforce is less than 25 years of age compared to 13 percent of all other industries combined. These facts suggest a combination of scenarios, all of which are directly or indirectly reflected in the literature about the transit workforce. Likely explanations include:

Figure 5. Age Composition of the US Urban Transit Workforce, 2010-2012



SOURCE | US Census Bureau, American Community Survey, public use microdata, combined 2010-2012 sample.

- The transit workforce confronts a retirement “cliff” as it stands to lose more workers in the next five to 10 years than they will need to replace with younger workers. Indeed, according to Agrawal and Dill (2009), there are probably very few industries where this workforce concern is more acute than in the transportation industry. Moreover, the demographics of the transit workforce suggest that many top executives will retire in the next 10 years. (Douglas, Espinosa, Grose, Peterson, Reyno, & Schniedel, 2007, p. 6)
- Some of the positions held by retiring workers are not being replaced either because they are being made obsolete by automation or because they are being eliminated to achieve cost savings.
- The transit industry is recruiting its entry-level workforce from among older age groups in general.
- The transit industry is hiring more people in positions that require additional education, and who therefore tend to be over the age of 25.
- Because of the high level of unionization and the stability and benefits it offers, retention is higher in transit than it is in less unionized industries. (Delery, 2000)

Increased Competition for a Shrinking Talent Pool

Because of limitations in public sector financing, the transit industry is unable to offer salaries that are competitive with the private sector. (Cronin, Anderson, Heinen, Cronin, Fien-Helfman, & Venner, 2011). This is a particularly acute problem for occupations in high demand in the private sector, such as marketing, information technology, and engineering. (Transportation Research Board, 2003, p. 44) (Jenks, 2001) (Warne T. R., 2003, p. 1)

In addition, there is a growing shortage of professional engineers and planners who choose to focus on the transportation industry. (Agrawal & Dill, 2009) Other challenges include the lack of flexibility in offering incentive pay and innovative compensation packages (Jenks, 2001) and comparatively low salaries at the highest levels of leadership, which discourage high-achieving individuals from entering or remaining in the industry.

Technological Transformation of the Industry

There is underway in the subsector a national movement to replace mechanical parts and systems with computers and electronic parts and systems. (Transportation Research Board, 2003) A recent national survey of a representative sample of U.S. private sector manufacturing and service firms with more than 20 employees suggests that transit agencies are experiencing a more rapid increase in skill demands than the average private firm. New vehicles use new and more computerized technology with standard modules that can be popped in and out; it is more cost effective to convert to the new systems because of parts standardization than to attempt to repair the older mechanical parts. Is not just new electronics that require advanced skills: virtually all vehicle subsystems are becoming more complex. Fixing an older fleet requires new technology as much as maintaining a newer one does. Increasingly, transit agencies are running out of options: at some point, suppliers simply will not make the old buses and rail cars anymore. This includes new electronic equipment, new forms of diagnostic testing, and advances in vehicle technology. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996) The most game-changing technologies cited in the literature include:

- Alternative fuels, such as liquid natural gas or compressed natural gas, that require additional skill. It is next to impossible to hire mechanics already experienced in those technologies.
- On conventional engines, the addition of new systems, such as pollution controls that can only be repaired through the use of auto-diagnostic equipment. Not only must repairers have a mastery of basic electronics, but they must also be able to work with computers and be able to interpret diagnostic output.
- Providing information (schedules/routes/fares) to customers via website trip planners, text message and/or mobile apps. (American Public Transportation Association, 2013, p. 14)
- Automated vehicle location systems.
- Camera and wireless transmission systems for increased security. (Ardieli, 1994)
- More sophisticated fare collection systems.
- Military-developed fire-suppression systems. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996).
- Vehicle management systems for communicating information between the vehicle and the maintainer.

In addition to basic skills (e.g., literacy, numeracy, and mechanical aptitude), the abilities rated most highly were those associated with high-performance workplaces (e.g., problem-solving and openness to new ideas) and those required for new technologies (e.g., electrical and electronics skills). For supervisors, there is an even greater perceived need for a set of skills associated with managing in a new environment. Interestingly, the only skill area rated as relatively minor in importance was advanced mathematics, such as statistics.

Entry-level skill requirements for mechanics have been increasing. Nationally, most maintenance departments hire experienced, skill-certified mechanics if they are available, while just under one-third of agencies hire persons only for entry-level, semi-skilled positions and then promote individuals from within the organization. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)

Mismatch with the Expectations and Preferences of 21st Century Young Adults

In the 21st Century, young adults have different work-life balance preferences and expectations than previous generations did and are less motivated by the prospect of lifelong, stable employment. They hold different views and attitudes toward jobs and careers than Baby Boomers. They value civic engagement, expect their jobs to be fun and flexible, and expect promotional opportunities to come more quickly than their predecessors did. They also tend to move on to other jobs when their expectations aren't met. Boomers, who now are in positions of authority are optimistic, hardworking, proud and loyal and expect loyalty in return. (Douglas, Espinosa, Grose, Peterson, Reyno, & Schniedel, 2007, p. 4) The mismatches between transit authorities and the expectations of young adults are outlined in this section.

There are a number of characteristics of the work of public transit that are nonstarters for young people considering their career options. To gain entry into most operational titles, candidates must be willing to work nontraditional hours (weekends, evenings, early mornings and midnight shifts). For at least the first year or two in the job, new workers often are required to work the least desirable shifts with other workers moving to shifts of their choosing as they gain seniority. (Herzog, Cleary, & Shen, 2012, p. 5) Vehicle operators must hold a Class B commercial driver's license with a passenger endorsement with a clean record and are subject to random drug and alcohol testing. (Transportation Research Board, 2003, p. 41) Finally, at the time of recruitment, candidates are also often asked to undergo criminal background checks and credit checks (Herzog, Cleary, & Shen, 2012, p. 5)

Given the nature of the work, transit authorities are extremely rule-bound and seniority based. (Transportation Research Board, 2003, p. 41) Because of the economic and public safety stakes involved in operating a transit system, it is a heavily regulated industry. Those who work within it must be aware of rules and regulations set by their employers as well as those set by federal, state and local laws that also govern their operations. (Herzog, Cleary, & Shen, 2012, p. 5) As a result, many young people who view transit authorities as old-fashioned or rigid work organizations do not even entertain the possibility of working in them. (Jenks, 2001)

Workplace culture is also a significant factor in an employee's decision whether to remain with a given firm or agency. Employees want fair compensation, meaningful work, career advancement opportunities, increasing responsibility and recognition and reward for accomplishments. (Transportation Research Board, 2003, p. 112) The transit industry has become cut off from innovative practices used by more sophisticated businesses to recruit and retain their workforce. Private sector experts have long known that they need to go beyond paying competitive salaries and offer perquisites like schedule flexibility, professional development training programs to prepare workers for leadership positions, and educational assistance, all items which are difficult to arrange within a civil service environment. (Cronin, Anderson, Heinen, Cronin, Fien-Helfman, & Venner, 2011, p. 2)

Underinvestment in Professional Development

A serious investment in employees is needed if transit agencies are going to use and benefit from new technologies, methods and materials, environmental and planning regulations and yet, they are significantly underinvesting in employee training. (Transportation Research Board, 2003, p. 82) According to Finegold et al, the job security offered by this employment sector, and the corresponding lack of turnover, translates to a workforce of technicians whose training is now 10 to 15 years out of date. Add to this a lack of funds for training programs and you have a serious situation. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996) On average, transit agencies set aside two percent of

employee salary, the equivalent of about 40 hours of training per year for training expenditures, while a majority devote 1 percent or less of budget devoted to training. (Transportation Research Board, 2003, p. 138) Most managers viewed current training as inadequate to meet the needs. Continuing education partnerships with community colleges (even some with customized training) can cut costs because of state subsidies. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996) Training is often viewed as the “first item to be cut” at times of budget stringency. (Jenks, 2001)

In addition to funding restrictions, other factors account for this inadequate investment in professional development. It is difficult to arrange for time off the job. Strict seniority practices also reduce the incentive for training. Many supervisors lack technical skills, management or communication skills to be adequate mentors. There is concern among more skilled workers that sharing their skills would undermine their job security. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996) Less than half of the agencies have a way to assess the effectiveness of the training they do invest in, which makes it more difficult to justify further investment.

Best Practices to Address Workforce Challenges

- Develop and implement registered apprenticeships that are geared toward attracting young adults (Transportation Research Board, 2003, p.106)
- Partner with school systems to identifying transit career ladders (Transportation Research Board, 2003, p. 125-126)
- Develop work-life programs such as offering a greater range of choices over how, when and where employees work, addressing the health and well-being of employees and those they care for, improving the physical workspace, and putting greater emphasis on diversity and affirmative action, labor-management relations, effective communication, supervisory training and leadership development. (Warne, 2003, p. 3; Douglas, Espinosa, Grose, Peterson, Reyno, & Schniedel, 2007, p. 5)
- Encourage more civil engineering and urban planning students to specialize in transportation while completing their degrees. In order to do so, the industry must recognize what factors into students’ decisions to concentrate on transportation and attempt to intervene strategically. (Agrawal & Dill, 2009)
 - Civil engineering students who specialize in transportation are more socially oriented, less swayed by money, and more attracted to involvement in policy decisions than are students in other specializations. They were also about as likely as construction and environmental engineers, but less likely than other concentrations to be concerned with prestige.
 - Urban planners who specialize are more motivated by contributing to the quality of life, and are more interested in long-term job security and upward mobility. They are more likely to have studied math or science as undergraduates and have been more influenced by foreign travel experiences. Internships factored in more for transportation than for other urban planning students.
- Have computer-assisted training systems installed that enable workers to learn at their own pace and update skills whenever necessary (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)
- Provide self-study materials for legally mandated training (e.g., the handling of hazardous wastes) and then certify those who pass a short test (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)
- Use simulators and cutaways to provide training (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)
- Send trainers to evaluate the quality of vendor training and if not up to snuff, do it themselves. (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)

Part 2. New York City Transit

Overview

In New York City, the huge daily demand for public transit makes urban transit indispensable to the smooth functioning of the economy, residents' personal lives, and of the City as a tourism destination. Transit activities are overseen by the Metropolitan Transportation Authority (MTA), which itself is overseen by the Governor of the State of New York. MTA is the largest transit agency in the U.S., with more than five times the number of passenger trips than Chicago, the next largest. The MTA is organized by operating unit. These include, in descending order by employment size, New York City Transit, Long Island Railroad, Long Island Bus, Metro North, Metro North Bus, MTA Bridges and Tunnels, and MTA Headquarters.

New York City Transit (NYCT) operates the City's subways and many of its buses. The subways serve four of the five boroughs. In 2012, they had an average weekday ridership of more than 5.4 million people and an estimated 1.7 billion riders per year. NYCT operates 24 hours a day and seven days a week, maintaining a fleet of more than 6,003 subway cars that travel nearly 660 miles of track, and stop at 468 stations. Its fleet also comprises 4,431 buses – larger than any other in the United States – and has an average weekday ridership of over 2.2 million people.

New York City's bus system made more than 4,000 trips and traveled about 300,000 miles in 2011. To meet this huge demand, NYCT directly employs nearly 50,000 people; in addition, the tremendous construction and service needs of the industry create many thousands of jobs in other sectors.

NYCT by the Numbers

- Provides 24/7 subway service in Manhattan, Brooklyn, Queens, and the Bronx.
- Staten Island Railway links 22 communities
- Buses serve all 5 boroughs on more than 200 local and 30 express routes and account for 80 percent the city's surface mass transportation
- Administers paratransit options for people with disabilities across the five boroughs
- 2014 operating budget: \$10.1B billion
- Annual ridership: 2,331,836,169;
 - Subway: 1,707,555,714
 - Bus: 677,569,432
 - Paratransit: 9,343,000
- Average weekday passengers: 7,631,410
- Subway lines: 24
- Bus Routes: 224
- Subway Cars: 6,311
- Buses: 4,431
- Track Miles: 660
- Bus route miles: 1,968
- Subway stations: 468
- Employees: 45,537

SOURCE | Metropolitan Transit Authority, 2013

Organizational Complexity

Because of its sheer size, organizational complexity is an important factor in gauging any of its multiple systems, including its human capital. As one executive explained:

"It's difficult to change the business process. People may recognize that current practices are inefficient, but they can't change them that easily. We have long lead times for training – so when technology changes, we don't...catch up that quickly. It could be months before NYCT gets to complete its procurement procedures. There are so many users and systems, we had to develop a delicate balance over the generations."

Industry Drivers

In general, the factors that drive transit nationally also drive NYCT: ridership, business cycles, funding sources, infrastructure resiliency, and to a lesser extent, fuel prices. Where the New York City context is important to understanding is in how these drivers affect the

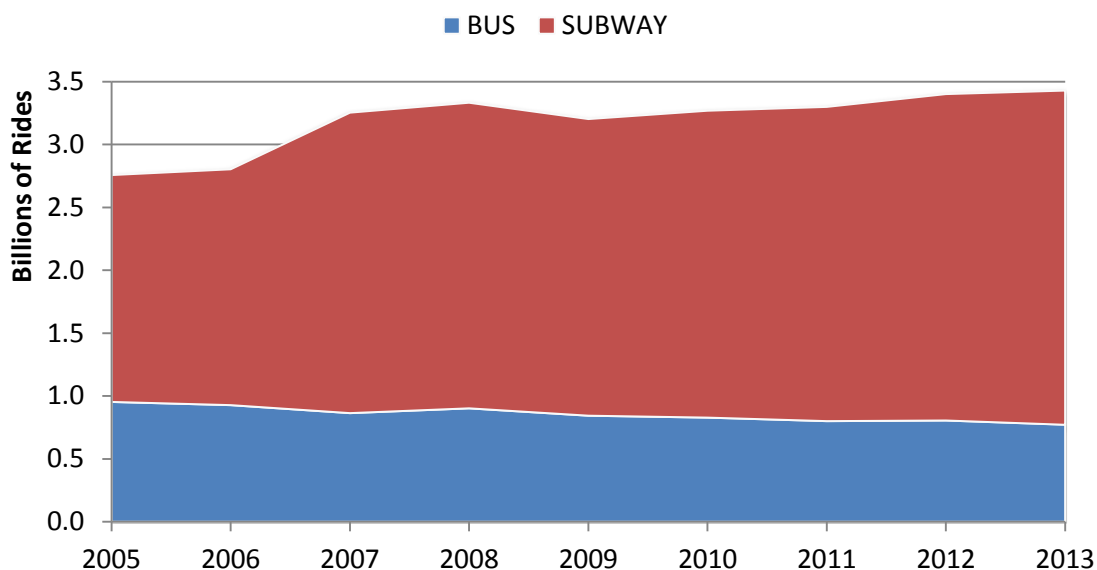
authority. Climate resilience is also discussed as an important additional driver influencing NYCT.

Ridership

In New York City, transit ridership is dependent on numerous factors. When the economy is doing well, more people are going to work and traveling throughout the city for business and leisure. The condition of the facilities is also a major factor. After the major investment made in the 1980s on cars and stations, subway ridership began to rise. It is now at the highest level it has been since the 1950s. When the subways were less safe, desirable, and reliable, many people turned to the buses as their method of transportation. Bus ridership peaked in the 1980s, and then declined and stabilized at the level it is now. Like many transit authorities, NYCT has instituted changes that speed up bus rides, such as dedicated bus lanes and limited stop buses. Ridership on the lines with these efficiency features has risen in the past several years. (Figure 6)

Given the increase in population, real estate development, and growth in tourism in New York City, it is not surprising that number of annual subway rides increased 47 percent from 1.8 billion rides in 2005 to about 2.7 billion in 2013. According to the interviews conducted with NYCT officials, the 20 percent decrease in bus rides (from 952 million to 771 million) was also anticipated.

Figure 6. NYCT Annual Rides by Mode, 2006 to 2013 (in billions)



Funding Sources

The major sources of funding for the NYCT, which are mortgage recording tax and other taxes collectively referred to as “urban tax subsidy,” are partly derived from large real estate transfers in New York City. Other sources include state and federal support for capital projects.

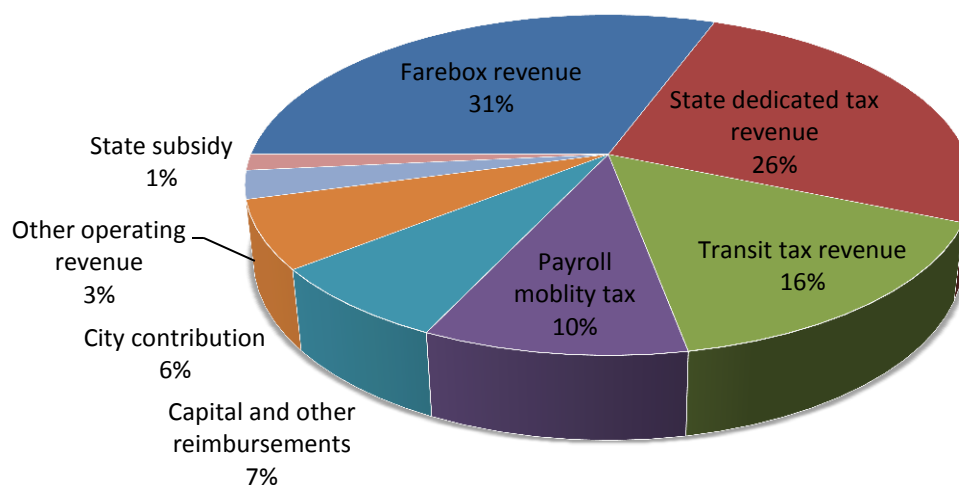
One of the MTA's biggest problems in recent years is that much of its funding comes from real estate taxes that are highly unstable. In a strong real estate market, mortgage recording and real estate transfer taxes are a reliable source. In 2007, before the housing market collapsed, the mortgage recording taxes provided \$702 million, and real estate transfer taxes provided \$861 million. Just one

year later, revenue from the two taxes fell by 41 percent. In 2009, they decreased 75 percent from just two years earlier. (Mooney, 2010)

Another fundamental weakness lies in the way the five-year capital budget is funded. While federal government support for capital projects remained strong through 2013, city and state contributions over the years have dwindled. To make up the difference, the authority has increasingly borrowed money by issuing bonds, and that borrowing has taken a toll. The MTA's outstanding debt, which was \$13 billion in 2000, had reached \$31 billion by 2009. (Mooney, 2010)

In other words, in bad times, the onus of the MTA's debt and budget shortfalls fell to the riders through fare increases. Indeed, the MTA raised subway fares three times between 2005 and 2009. (Obichere, E-mail, 2014) In 2009, the State legislature passed a payroll mobility tax on large non-educational employers as well as providing additional MTA aid. Subsidies from these new sources were expected to provide an additional \$1.2 billion out of a total operating budget of \$7.6 billion in calendar year 2012. (Obichere & Toth, Hearing on the Mayor's Fiscal 2013 Preliminary Budget & the Fiscal 2012 Preliminary Mayor's Management Report: Metropolitan Transportation Authority, 2012) Although helpful, the additional funding has not prevented two additional fare increases in 2011 and 2013. Finally, there have been other proposals for financing public transit, such as congestion pricing, but none of these have passed in the State Legislature.

Figure 7. Sources of Funding for New York City Transit's Operating Budget, Calendar Year 2012 (\$7.6 Billion)



SOURCE | Obichere and Toth, 2012

Climate Resilience

New York City experienced the deleterious effects of two major weather incidents in the years leading up to this research: Tropical Storm Irene in 2011 and Superstorm Sandy in 2012. Because of this, there is now a much stronger emphasis on resilient and sustainable systems at NYCT, with the subway system its foremost concern.

While losses from Irene were about \$12 million, the losses from Superstorm Sandy are estimated in the hundreds of millions, if not billions of dollars, including repair costs and lost fare box revenue.

Prescient Recommendations

"A risk-based, systematic approach to adaptation is important now because of the long lifetimes of urban infrastructure, long planning horizons, and the significant social, economic, and environmental risks faced by urban coastal areas already. New Orleans and hurricane Katrina are an extreme case in a special location far from the MTA service area, but they can serve as a wake-up call: lack of preventive action in the face of known threats can lead to unacceptable losses and outcomes. But not just such extreme events need attention. More frequent, seemingly lesser events cause considerable disruptions and losses, as demonstrated by the modest storm of 2007. It severely disrupted much of the region's mass transit. In addition, MTA facilities face a long-term threat from rising sea levels and higher storm surges."

Excerpted from Metropolitan Transportation Authority, "MTA Adaptations to Climate Change - A Categorical Imperative," October 2008.

The MTA and NYCT now recognize that they must contend with rising sea-levels that can lead to the flooding of track, bus ways, tunnels, lots, facilities, and higher groundwater levels flood tunnels. Some of the MTA's systems are more vulnerable than others: low-lying, fixed structures such as below-sea-level road- or subway-tunnels, or near-sea-level railroad tracks, rail yards and shops are more prone to coastal and urban street flooding than bus routes that can be readily rerouted on short notice according to flood conditions. (Metropolitan Transportation Authority, 2008)

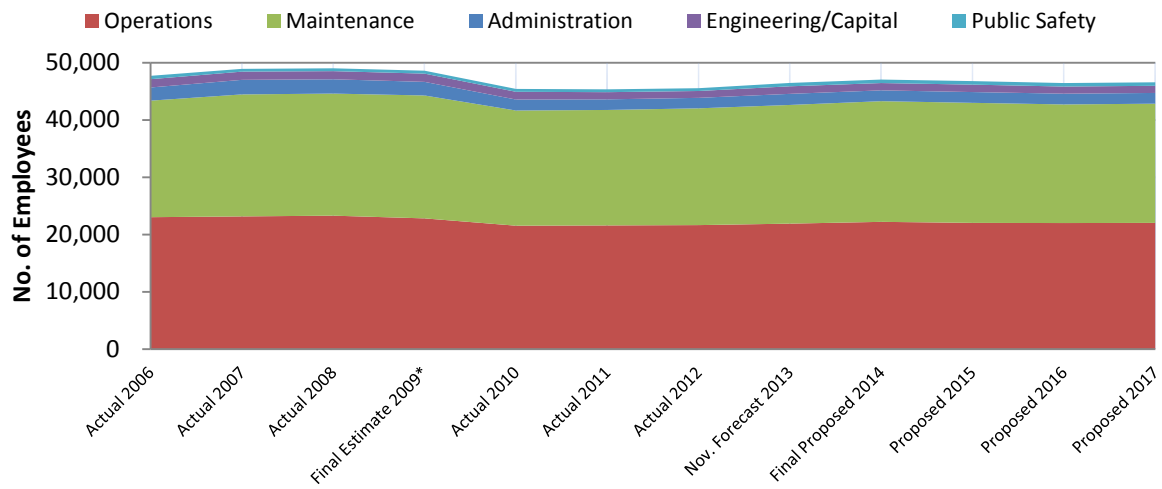
NYCT's most costly assets are at or below sea level. The subways are the most vulnerable not only from occasional flooding in the short run, but are quite fundamentally threatened in the long-run by the combination of sea level rise and storm surges. Many rail yards and maintenance shops are also located in high-risk flood zones. (Metropolitan Transportation Authority, 2008)

The NYCT Workforce

The workforce is transit authority's largest expenditure, accounting for 76 percent of NYCT's total operating costs. [Figures 8](#) through [10](#) on the following pages detail the distribution of NYCT's workforce by occupation type and functional area. Ninety-two percent of NYCT's workers are "operational hourly workers," the majority of whom work within operations and maintenance functional areas. All told, operational hourly workers make up 77 percent of the total workforce.

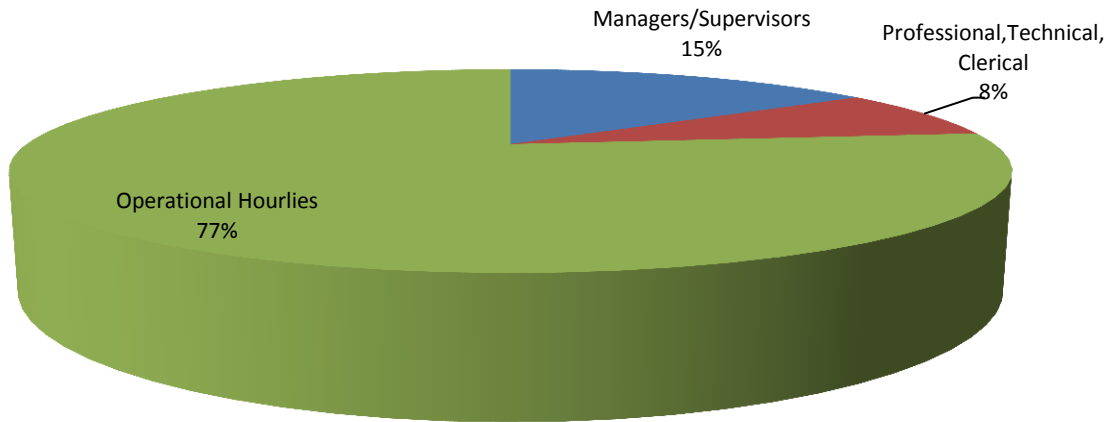
Employment in the urban transit industry grew from 31,670 in 2000 to more than 60,000 in 2012, about 75 percent of which is accounted for by New York City Transit. Although the size of the NYCT workforce has fluctuated and grown, the functional distribution has remained about the same since 2006. Analysis of staffing levels by quarter revealed no discernable seasonal pattern to the overall size of the workforce. One pattern emerged, however: operational hourly workers were substantially more likely to be brought on in the first quarter of the year than in any other quarter.

Figure 8. NYCT Staffing Composition by Function, 2006-2017



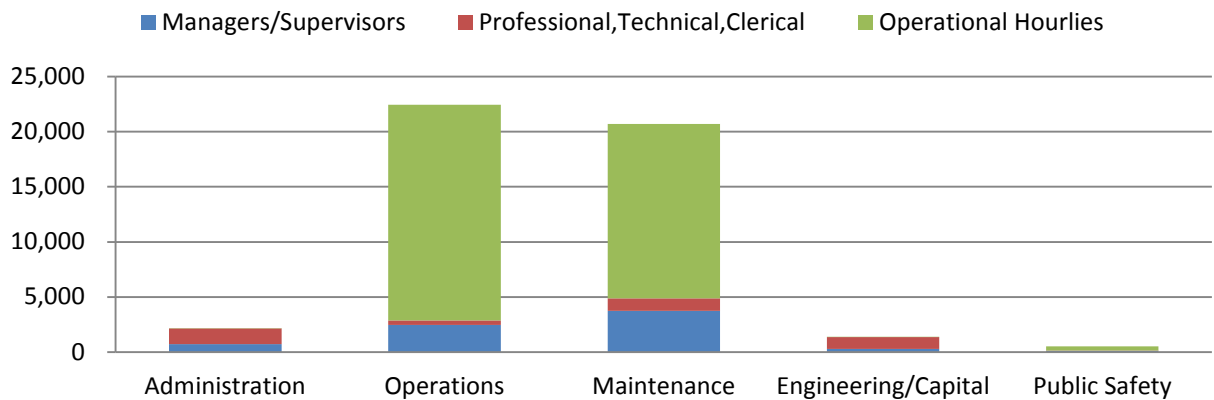
SOURCE | Total Full-time Positions and Full-time Equivalents by Function & Occ. Group, MTA New York City Transit, November Financial Plans for FYs 2008 thru 2010, 2012 & 2013 and February Financial Plans for FYs 2010 and 2014. *2009 actual position data

Figure 9. NYCT Staffing Composition by Occupational Group, 2012



SOURCE | Total Full-time Positions and Full-time Equivalents by Function & Occupation Group, MTA New York City Transit Adopted February Financial Plan FY 2012.

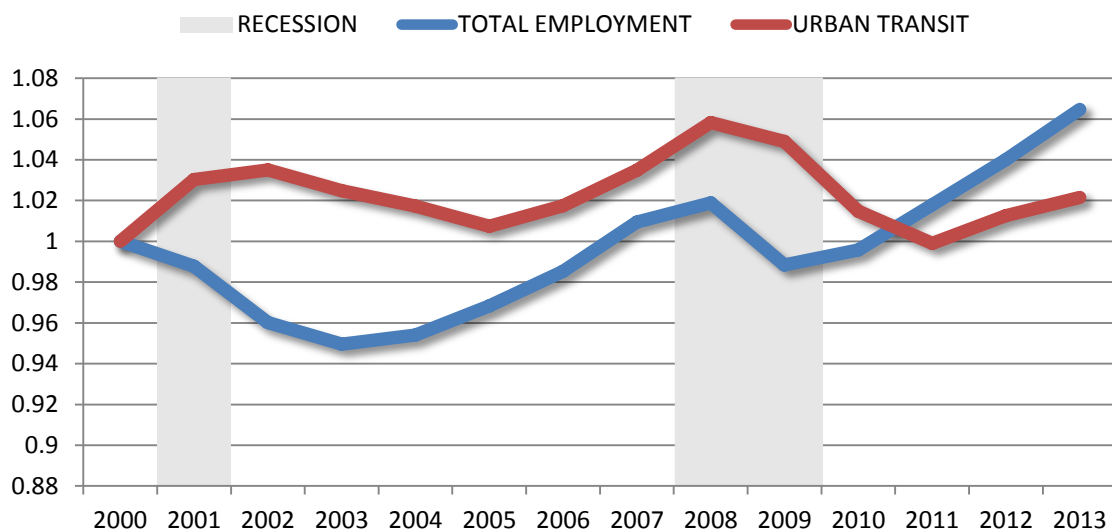
Figure 10. NYCT Staffing Composition by Function and Occupational Group, 2012



SOURCE | Total Full-time Positions and Full-time Equivalents by Function & Occ. Group, MTA New York City Transit, November Financial Plans for FY 2013.

Figure 11 shows that, from 2000 to 2008, growth in the transit workforce (6%) exceeded growth in the New York City economy as a whole (2%). As a result of budget shortfalls from the national recession, employment levels sharply decreased beginning in 2009. For the economy as a whole, the decrease ended in 2009 and the employment growth exceeded its original level by six percent. The transit workforce had further to fall, and shed 15 percent of its jobs, until 2011 when it was back at its 2000 employment level. Many of the layoffs were in roles that were to be phased out due to the adoption of new technologies, such as station attendants. These layoffs and staff reductions had a profound effect on everyone interviewed in the course of this research even though transit employment began to grow again from 2011 to 2013, especially as new workers were needed to recover from the damage caused by Superstorm Sandy.

Figure 11. Employment in New York City's Transit Industry and All Industries, 2000-2013



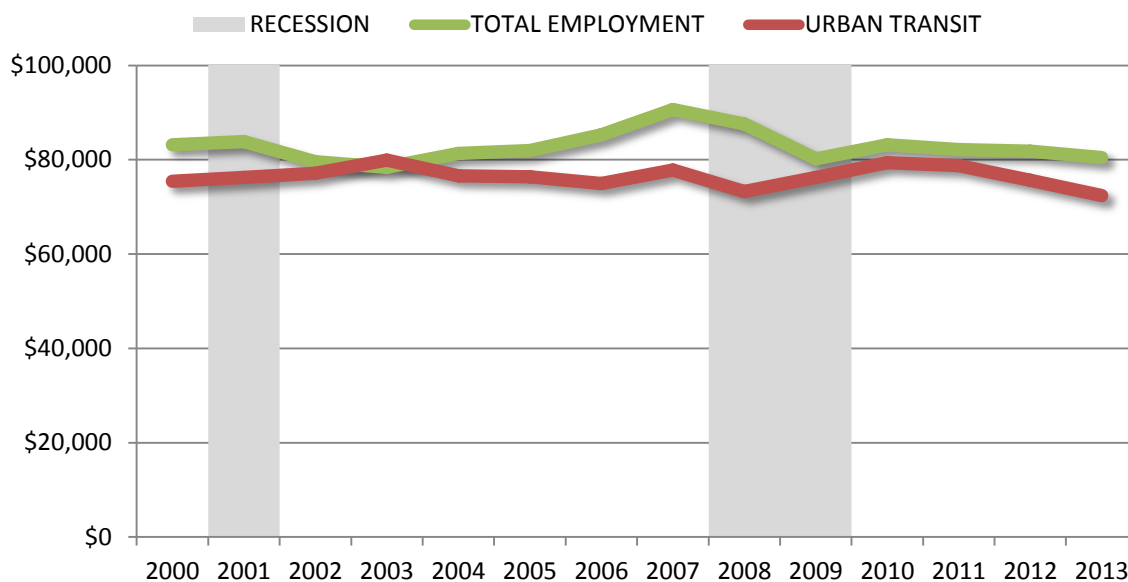
SOURCE | New York State Department of Labor, Quarterly Census of Employment and Wages, Public and Private Establishments.

There are 37 collective bargaining units in NYCT, the largest of which is the TWU Local 100, which represents about 80 percent of the workforce, followed by the Amalgamated Transit Union, the Subway Surface Supervisors Association (formerly known as the Transit Supervisor's Organization), and TWU Local 106, which represents some of the technical/professional workforce.

Wages

Real (inflation-adjusted) annual average wages in urban transit have remained within \$10,000 of the citywide average since 2000, with the exception of the boom years (2006-2008), when wages in finance soared (Figure 12). Transit wages followed a counter-cyclical pattern since 2000, rising during and after the first recession, falling during the boom years of 2003 to 2008, and rising again in 2009 to 2011. Collective bargaining at least partially explains this pattern. During this period TWU Local 100 and the MTA either signed agreements or settled arbitration for 1999 to 2005, 2005 to 2009, 2009 to 2012 (note, however, that all of these agreements or settlements were made after the fact and required retroactive pay). Although members are partially protected from business cycles by these agreements, there is no guarantee that annual increases will keep pace with inflation in any given year.

Figure 12. Real* Annual Average Wages in Transit and All Industries, New York City, 2000-2013



SOURCE | New York State Department of Labor, Quarterly Census of Employment and Wages, Public and Private Establishments.

The main reason that annual average wages compare favorably to the overall citywide average is the labor-management agreement between TWU Local 100 and the MTA. Local 100 hourly wage rates as of January 2011 appear in Table 2. A comparison of wages with the median hourly wage of comparable occupations in 2011 reveals premiums of between 12 and 50 percent (*not shown*). For example, the median wage for a bus driver in New York City was \$26.63 in 2011 compared to \$29.96 for a Local 100 bus operator; the median wage for an Electrician-Helper in New York City was \$18.02, compared to \$26.96 for a Helper-Light and Power in Local 100.

Table 2. TWU Local 100 Hourly Wage Contract, 2011

TITLE	HOURLY WAGE	TITLE	HOURLY WAGE
Electronic Specialist @ Woodside	\$35.51	Railroad Stockworker II	\$31.43
Roadcar Inspector	\$34.14	Train Operator Yard	\$30.62
Car Inspector A&B	\$33.28	Tower Operator	\$30.10
Mechanic Maintainer C	\$33.28	Bus Operator	\$29.96
Plant & Equipment Maintainer	\$33.11	Money Truck Operator OA	\$29.96
Power Elect. Maintainer	\$33.02	Power Elect. Tech	\$29.26
Electronic Equipment Maintainer	\$32.92	Money Truck Operator TA	\$29.24
Revenue Equipment Maintainer I & II	\$32.92	Track Worker	\$29.11
Power Cable Maintainer	\$32.74	Car Maintainer Trainee	\$28.50
Power Distribution Maintainer	\$32.11	Maintainer Trainee A, B, C, D	\$28.50
Power Maintainer B	\$32.11	Collecting Agent	\$28.49
Signal Maintainer	\$32.11	Railroad Stockworker I	\$28.11
Bus Maintainer A, B, CM, BM	\$31.87	Conductor	\$27.82
Light Maintainer	\$31.87	Station Agent	\$27.51
Mechanic Maintainer C (not in car equip)	\$31.87	Cleaner/Helper OA	\$26.96
Train Operator Road	\$31.87	Helper (Light, Power, Tel, Mech)	\$26.96
Structure Maintainer A-H	\$31.87	Maintainer Helper B	\$26.96
Telephone Cable Maintainer	\$31.87	Railroad Track Cleaner	\$26.43
Telephone Maintainer	\$31.87	Station Agent Non-AFC	\$26.19
Track Equipment Maintainer	\$31.87	Cleaner	\$25.39
Turnstile Maintainer	\$31.87	Transit Property Protection Agent	\$24.85
Track Specialist	\$31.87	Traffic Checker	\$16.11
Ventilation & Drain Maintainer	\$31.87		

SOURCE | Contract, Transport Workers Union Local 100

Workforce Challenges in New York City Transit

New York City's transit workforce confronts the same challenges as other transit agencies around the nation. But because the system is exceptional in so many regards, there are also issues that are unique to the NYCT. MTA – indeed, NYCT on its own – is by far the largest transit agency in the United States. The NYCT operating budget was \$7.6 billion in 2012 (MTA, 2011). The industry in New York City is also highly unionized, with an estimated 76 percent of the New York City bus service and urban transit workforce reporting that they belong to a union (Milkman & Luce, 2013). Essentially, all line-level transit employees are union members. There are many labor unions representing transit labor, the largest of which is the Transport Workers Union (TWU) Local 100 representing 38,000 active MTA workers, including NYC Transit workers (Transport Workers Union Local 100).

The data in this section are from interviews with multiple NYCT employees at headquarters and the offices housing TWU Local 100. The challenges shared in common with transit authorities around the nation— an aging workforce, technological transformation, competition for a narrowing pool of skilled talent, mismatch with the expectations and preferences of the rising generation of young adults, and underinvestment in professional development – are presented first.

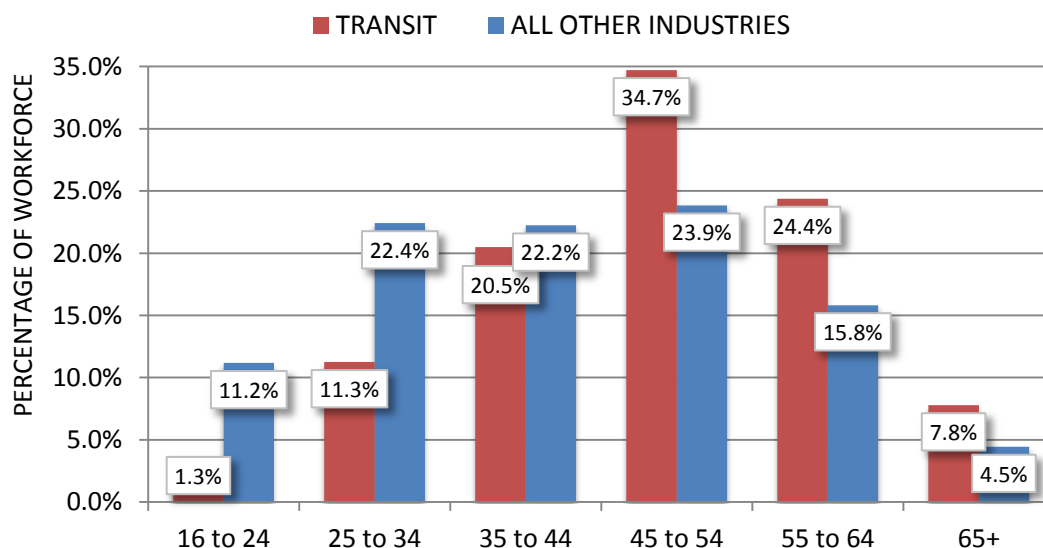
Additional workforce issues arose in the course of this research, and these are discussed below. This chapter closes with examples of strategies used in NYCT to address its challenges.

Aging of the Transit Workforce

Figure 13 shows that NYCT has an aging workforce and, by all appearances, has not recruited a sufficient number of young adults to create a long-term talent pipeline. Thirty-two percent of the NYCT workforce is over the age of 55, compared to 20 percent of the rest of the New York City labor market. Interviews with a variety of NYCT staff shed light on the dynamics underlying the aging phenomenon at NYCT.

- It was several years after the fiscal crisis of the 1970s when NYCT was finally able to bring on a large number of staff after the MTA built up its first capital program in a very long time. In particular, a large cohort of young engineers and project managers was hired. That group that is now retiring, leaving the TA with substantially less capacity for project management.
- Forty-five percent of all managers are over the age of 55, and 20 percent are 65 or older. There is a great deal of pressure to capture what they know before they leave and to delay their departure.
- Aging is not just because of long tenures at NYCT. Incoming employees are older as well. Line staff report meeting newcomers who are retired postal workers, accountants, and construction workers.
- According to senior staff of the human resources department, NYCT recruits an adequate number of young adults but is unable to retain them.
- One union official observed that many young people leave NYCT even before completing orientation training, hypothesizing that the work environment and organizational culture play important roles in their decisions.

Figure 13. Age Distribution of New York City's Transit Industry, 2012



SOURCE | US Census Bureau, American Community Survey, public use microdata, combined 2010-2012 sample

Succession Planning

One human resources official reported that there was no agency-wide retention strategy or workforce planning strategy. NYCT migrated to a PeopleSoft system in 2011, which should allow it to analyze its workforce needs and develop a longer-term strategy. Other executive staff expressed serious concern at this lack of succession planning, given the huge number of people set to retire in the next 10 years. They were concerned that there was a lack of experienced management in operations, capital programs, and professional functions, and about the possible implications of this shortfall for service and safety.

Technological Transformation of the Industry

Across the board, staff were emphatic that NYCT still provides excellent opportunities for individuals who cannot or do not want to attend postsecondary school. At the same time several people interviewed for this research said that many technologies being adopted create a need for a workforce with a higher degree of technological sophistication. Among the technologies that have had an impact on workforce skill needs were:

- Air conditioning
- Communications-based train control
- Electronic subway and bus systems
- Hand-held monitoring and reporting devices
- On-board audiovisual systems, or wireless announcement systems intended to provide prerecorded announcements and planned and real-time service alerts on subways and buses
- Onboard geographic positioning systems
- Electronic sensors

As one seasoned bus mechanic related, “The old test asked: ‘What is the difference between a flat screwdriver and a Phillips head? What do you use a chisel hammer for?’ Then, you needed to understand internal combustion engines. Now, you need to know how to read a digital meter and understand hybrid and electric engines. It used to be electrical and mechanical. Now it’s electronic and digital. You’ve gone from wires to boards.” By his own account, this mechanic made the transition through self-education. According to him, “if you don’t adapt, you can hurt the equipment, yourself, and others.”

When new equipment arrives, vendors train managers who then do turnkey training with line staff. Interviewed employees believe that they need more real training on new equipment before it makes it to the shop floor. According to one, “Management is concerned about time away from the job, but it’s really a matter of public safety.”

Increasingly, automated technologies are replacing people. For example, many token booths were removed from stations, and a majority of station attendants were removed from duty in 2010 and ‘replaced’ by the electronic Metro Card machines. Soon, NYCT anticipates moving to a single-operator subway on all but a very few lines.

The process of getting a huge transit system to adapt to technological change has been difficult. As one senior staff person stated, “It’s a challenge to move everyone to the same mindset. “ At the time of this research, NYCT was using change management techniques to move to an asset management system for monitoring and maintaining its increasingly high tech equipment. Six pilot projects were under way including both the operational and capital investment side of the authority.

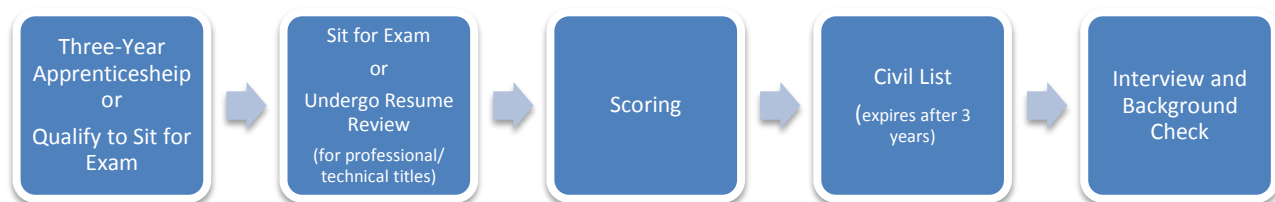
Essentially, NYCT is re-engineering asset inspections, management, and maintenance and making these processes more data-driven. Formerly, regardless of need, regular bus maintenance was done at regular intervals. The new system will be based on need as documented in parts specifications and all maintenance will be done at the depots. For example, the new articulated crosstown buses are more reliable than the old ones and tend to go as much as 8,000 miles before they require maintenance.

Increased Competition for a Skilled Talent Pool

NYCT's demand for several positions is broad and long-standing. Interviewed staff cited different reasons for the difficulty recruiting for different roles including an inadequate labor supply, faulty civil service system, lax hiring standards, inability to offer an adequate salary, and seniority rules.

- Positions believed to be in short supply include electro-mechanical repairers and technicians, and elevator repairers.
- Human resources is making a concerted effort to recruit more immigrants, but have a hard time ensuring that they have the English language skills to pass the examination.
- On the professional and technical side, this includes engineers and IT staff. Many believe that the NYC civil service system has failed to serve its purpose for these roles.

Figure 14. The Civil Service Process in New York City



- On the operational side, NYCT staff cited difficulty finding bus maintainers – who require a high school diploma or its equivalent - who are good diagnosticians, and “more than parts changers.” One senior leader described the hiring process as “not robust,” because it consists of a single interview and background check.
- NYCT does not offer some skilled trades competitive salaries. As a result, as one human resources employee stated, “Verizon, Keyspan, and National Grid grab them before we have a chance.”
- NYCT’s pay scales for the highest management positions were described as “incomparably low” compared to other transit authorities. Current compensation levels raised the question of how much respect the MTA had for the NYCT management.
- Human resources cited professional and technical positions that were hard-to-fill, mentioning their inability to offer salaries that are competitive with the private sector. These included business managers, attorneys, corporate communications professionals, and investigators, especially those with experience.
- Because they are no longer operational hourly covered by the union, first-line bus maintenance supervisors are not able to earn overtime pay. Many find themselves earning less than the people they supervise. To make matters worse, first-line supervisors are subject to transfers “as needed” to any depot anywhere in New York City and often receive the most difficult schedules with weekend and late night shifts. Not surprisingly, NYCT has difficulty filling this position and is now attempting to recruit supervisors from firms in the private sector. When asked why NYCT did not change this position, the researchers were told that the union blocked their efforts at instituting a signing bonus.

- In general, NYCT managers find it difficult to market their jobs to the best and the brightest. They believe that the job descriptions used to describe open positions contain too much “canned jargon,” and do not show working at NYCT in the best light possible. Some managers who take an interest are able to make job descriptions more specific and exciting.
- Finally, the work itself makes it difficult to recruit, particularly on the operations side. As one NYCT employee put it, “It’s a 24/7 365-day-a-year grind. It’s not for everybody.”

Table 3 is a list of the hardest to fill positions provided to the research team by NYCT’s human resources department.

Table 3. Hardest-to-Fill Positions at NYCT

SKILLED TRADES	PROFESSIONAL/TECHNICAL
Bus Maintainer – B/Bus Maintainer - Chassis	Architect
Car Inspector/Road Car Inspector	Civil/Structural Engineer
Electronic Equipment Maintainer	Computer Support Specialist
High Pressure Plant Tender	Electrical Engineer
Bus Maintenance Supervisor	Environmental Engineer
Power Cable Maintainer	Mechanical Engineer
Power Distribution Maintainer	Nurse
Power Maintainer – Group B	Physician
Signal Maintainer	Superintendent, Maintenance
Stationary Engineer	
Transit Electro-Mechanical Maintainer (E&E)	
Transit Electro-Mechanical Maintainer (HVAC)	
Transit Electro-Mechanical Maintainer (V&D)	
Track Equipment Maintainer	

SOURCE | New York City Transit, Human Resources Department, 2013

The Pay Freeze

At the time of this research, non-represented employees had not received a cost-of-living increase in five years. This “pay freeze” was described as a “major pain point” and a “huge challenge” for NYCT, hampering its ability to recruit and retain talent. NYCT employees were not sanguine about receiving an increase any time soon.

Communications

Nearly all of the people interviewed for this research felt that NYCT did not advertise itself well to the pool of qualified applicants.

- Many jobs are posted internally or on the NYCT website and are too difficult to find.
- Managers complained that job descriptions were “canned jargon,” and needed to be re-worked to better reflect the actual work and attract young people.
- NYCT had one person devoted to attending job fairs nationwide.
- The managers with whom we spoke outside of the human resources department could point to two or three colleges with which they had some relationship.

Mismatch with the Expectations and Preferences of the 21st Century Young Adults

Interviewed employees observed that young people are less likely to be attracted to a career in transit than the generations that preceded them. As one human resources professional stated, “What used to appeal to our applicants was the high degree of stability and security, the pensions in particular. This isn’t true any more.”

Underinvestment in Professional Development

Executive staff made sure to emphasize how well NYCT leadership managed the problems caused by Superstorm Sandy and their competence in handling difficult situations in general. To a one, they were proud of their “home-grown talent.” Nonetheless, all levels of labor and management still believed that there was too little investment in professional development.

Current training opportunities are outlined below, followed by a list of respondents’ observations about the need for more.

- All new employees attend a two-day orientation offered every week on Mondays and Tuesdays. In this session, new workers are introduced to their careers, their benefits, security requirements, and other major issues.
- TWU Local 100’s Training & Upgrading Fund offers defensive driving, computer courses, languages (foreign, ESL and American Sign Language), high school equivalency, electronics and civil service test prep for promotional titles.
- Technical training is provided by each division (e.g. buses, subways). There are multiple training facilities for operational hourly employees, including one for bus operators at Zerega Park, the MTA Transit Learning Center in Gravesend, fiber optics and solar instruction at Stillwell Yard, and signal training at Corona Yard.
- Human resources has a team of examiners who spend several weeks in the field to understand precisely what is needed to do the job, so that they can be sure to prepare people when they are hired.
- The human resources department offers four types of training programs:
 - **General programs**, such as collaborative conflict resolution, defensive driving, presentation skills, sexual harassment policy, resume preparation, stress management, time management, and valuing differences.
 - **Supervisory and management programs**, including change management, cultivating your management style, business writing, foundations of leadership, leading for optimum performance, mediating disputes
 - **Other targeted programs**, including administrative professionals and analyst core programs.
 - **Computer training**, including basics, Office applications (beginner, intermediate and advanced), PeopleSoft, and instruction on applications used internally.
- NYCT offers tuition reimbursement (maximum \$4,000 per year) to managers, non-represented operating employees and some represented supervisors. To apply for the reimbursement, managers must have approval from their supervisors, department heads, division heads, as well as the

“They Really Invested in Me” A Success Story

One NYCT executive recounted his advancement from operations to executive management, citing opportunities that NYCT made available to him. The first, MTA’s Corps of Transit Engineers for high-potential engineering graduates is on hold until further notice. The second, the Future Managers program, has been discontinued. NYCT’s Future Managers program consisted of rotational job assignments and leadership development. It provided an overview of the organization, and visibility and access to current managers and executive leadership. He later received a scholarship through the Advanced Institute for Transportation Education and attended and received a Master’s degree in urban planning while working full-time. He credited his advancement to these opportunities: “they [NYCT] really invested in me.”

educational reimbursement program administrator. (By the time of this writing, Local 100's training and upgrade fund had instituted a \$4,000 tuition reimbursement policy for operational hourlylies.)

- In addition, transit has "external" partners with other types of arrangements. These include the Advanced Institute for Transportation Education (AITE) Scholarship at Polytechnic, CCNY, Rutgers and NJIT, Certificate in Transportation Management at CUNY, Dowling College MBA, Empire State College, and the Mayor's Graduate Scholarship.

The major observations made by employees on the need for additional investment are listed below:

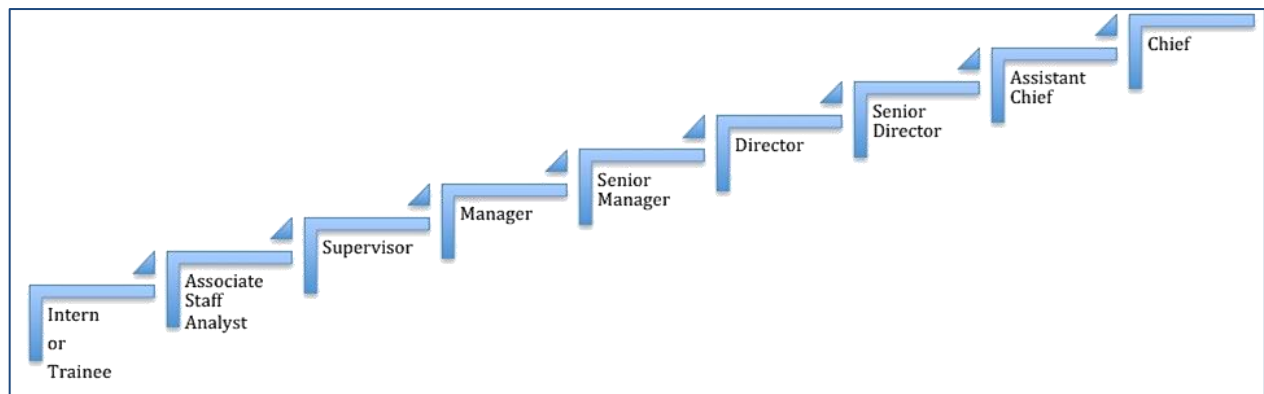
- Management positions do not require candidates to have four-year degrees, nor is there any incentive for incumbents to earn them.
- Operating hourlylies thought that the lack of tuition reimbursement sent the wrong message to the workforce that NYCT is not invested in their personal growth or advancement.
- Other than anti-sexual harassment training, one bus operator told us that the only training she received is the minimum safety training as required by the State.
- While several managers lauded NYCT's promotion from within practice, they also felt that operations staff could not be expected to have the management skills they needed. There is a real need for more and better supervisory and managerial skills training.
- Within labor and management, some people observed that, while some individual managers go out of their way to identify and develop potential leaders, there is no formal agency-wide program.
- Operational hourlylies who were on staff during 9/11 and Superstorm Sandy wished they had received some first-responder training.

Employee Retention

Several people also remarked on retention challenges, mainly citing the pay freeze described earlier in this report:

- Without cost-of-living incentives, workers are motivated to earn more money in other agencies within MTA (like Metro North), at airlines, and at private sector transportation companies. Older workers are motivated to retire early.
- Highly skilled project managers and are often "poached" by the other companies they do business with. They also have a hard time recruiting, and lose desirable candidates to the Department of Education, Office of General Services, and the Port Authority of New York and New Jersey.
- One high-level executive expressed great frustration at his inability to retain talent, laying the responsibility on inadequate compensation and the pay freeze. Because he is unable to provide merit or cost of living increases, he estimated his departmental attrition is 10-15 percent each year. NYCT does not have the flexibility to make counter-offers when candidates or incumbents receive offers from others. When they lose people because of salary, there is little they can do.
- The SSSA (supervisors union) works under a 2007 contract that has a two-step pay increase. Supervisors earn \$63,000 then receive a single \$15,000 bump in salary after 38 months. Appendix D contains numerous examples of career pathways ("promotion trees") with multiple steps for operational hourlylies. [Figure 15](#) below is a sample of what a professional career advancement pathway might entail.

Figure 15. Sample Professional Career Advancement Pathway at NYCT



SOURCE | NYCT management interview

Workplace Culture

The research uncovered another important factor – other than salary – that may help to explain NYCT’s retention challenges. From the bottom to the top of the organization, employees felt disrespected by the people above them. While some was due to what the employees felt to be inadequate compensation (including executive leadership), a large part was attributed to an arbitrarily punitive and rule-bound culture.

- According to one union delegate: “People are scared. Even management has no protection. Supervisors have been demoted.”
- Several line staff talked about ways in which sick days and absence records are used to hold people back, punish them, or push them out.
- One operational hourly employee described news bulletins that are issued on a regular basis and include ad hoc regulations that can be written by anyone. According to her, “sometimes you don’t know what isn’t allowed until you break the rule.”
- After Hurricane Sandy, bus operators worked multiple shifts and slept at their depots, even before buses were back in operation. One bus operator was troubled because “NYCT didn’t do anything for our own.” NYCT employees were expected to find their way to work without transit or gasoline. Employees in other companies – like Federal Express – received gasoline to help them get to work.
- There are no regular days off or hours for an entry-level bus operator in the first year, also called “on probation.” No accruals for sick leave and no emergency days. Operators can get sick as a result of shifting hours, but probation is extended if they take two sick days, and they are fired if they take three. Operators must bring sick notes on physician letterhead.
- NYCT provides no bathrooms and no place to eat for the bus operators. Bus operators have a 28-minute lunch. If they are late due to weather or traffic, they take 20 minutes. If they report late for their shift, they get 15 minutes.
- There are no bathrooms for women in the Maintenance of Way division
- The first “probation” year for bus operators does not have regular hours making it difficult to arrange for childcare.

Actions Taken to Address NYCT’s Workforce Challenges

The following are the strategies uncovered in the course of this research and are not intended to be an exhaustive list of efforts underway to address the workforce challenges listed above.

Delayed Retirement

As a result of discussions with the research team, the NYCT started to develop, but has not yet implemented, a retention agreement for workers approaching retirement. Those who are eligible to retire would receive bonuses of up to \$20,000 for three years. NYCT is also considering post-retirement contingent employment and staggered retirement.

Apprenticeship Program

In 1998, NYCT, the Board of Education (later renamed “Department of Education”), and TWU Local 100 formed the Cooperative Apprenticeship Program Pilot training program to enlist NYC career and technical high school graduates as apprentices in a structured training environment aimed at providing replacement for its electrical, structural, and mechanical technicians. (Transportation Research Board, 2003, p. 70) The NYCT’s original goal was to eventually recruit as much as one-third of its blue-collar staff in some specialties from the city’s technical schools. (Jenks, 2001)

In reality the program graduates about 96 people per year but most of these are incumbent workers hoping to change career tracks. Even within Local 100, there is a dilemma about how to serve incoming youth while serving the interests of existing members.

Table 4. Career and Technical Education High Schools in Partnership with NYCT and TWU Local 100

	BOROUGH
ALFRED E. SMITH	BRONX
AUTOMOTIVE	BROOKLYN
AVIATION	QUEENS
GEORGE WESTINGHOUSE	BROOKLYN
QUEENS VOCATIONAL AND TECHNICAL	QUEENS
SCHOOL OF COOPERATIVE TECHNICAL EDUCATION (CO-OP TECH)	MANHATTAN
THOMAS EDISON	QUEENS
TRANSIT TECH	BROOKLYN
WILLIAM E. GRADY	BROOKLYN

SOURCE | NYCT Human Resources Department

Internship/Mentorship Program

NYCT established an internship program in 1981 and currently has a partnership with 232 colleges and universities throughout the United States (including Puerto Rico) and in Quebec. Internships include paid and unpaid projects. The program has been a success for New York City Transit, colleges, universities and students. At least 170 students participate during the school year and more during the summer. Since the program’s inception, a considerable number of participants have been hired for full-time positions after graduation. NYCT recruits interns from most majors, including business, economics, engineering, history, humanities, law, math, and the sciences.

Employee Recognition

In 2002, NYCT implemented a plethora of awards for everything from years of services, to exemplary service of different types, such as medals of excellence, unit citations, and safe driver awards (for bus operators), to name a few. The feedback suggested that the workforce felt more valued and there were productivity gains. The program was terminated and there have been minimal efforts to acknowledge employee service in the past several years.

3. Best Practices and Recommendations

In 2007, the MTA established a Blue Ribbon Panel on Workforce Development that issued a report to the MTA Executive Director and CEO entitled, [Engaging, Recognizing and Developing the MTA Workforce](#). (Ravitch, et al., 2007) The thorough and informed recommendations addressed a variety of issues, some that were and some that were not germane to this research. In this section, all recommendations, including the relevant Blue Ribbon recommendations, are organized according to the workforce challenge they address. All of these strategies apply equally to the operational and professional sides of the NYCT workforce except where otherwise noted.

The list is long because NYCT is large and complex, and in recent years, has turned away from making far-reaching investments in its workforce. Across the board, however, labor and management believe in their colleagues and want to see the authority function at its best. NYCT's workforce has responded above and beyond, time and time again, to major crises in order to protect the public and maintain a functioning transit system. It is more than capable of undertaking large-scale projects like implementing these recommendations and transforming the authority to meet the needs of the 21st Century. The stakes almost could not be higher.

Aging of the Transit Workforce

Blue Ribbon Commission Recommendations

- 33. Identify critical positions where departure of talent poses the highest risk for the organization in achieving its strategic business goals.
- 34. Team up seasoned veterans with less experienced employees for training and hands-on knowledge transfer.
- 35. Establish and empower a cross-organizational team to develop MTA-wide succession planning methodology.
- 36. Select and procure a competency-based assessment tool to identify technical skills and behavioral qualities needed to fill positions.

Track Skill Needs

Institute a detailed process to track future needs for all essential roles. It will help human resources to identify future knowledge gaps as a result of retirement eligibility and historical retirement practices, and will support workforce/succession planning moving forward.

Develop a Workforce Planning Unit

The Department of Citywide Administrative Services instituted a workforce planning unit inside of its human resources department. NYCT should review this and other models for possible adoption. (Jenks, 2001; DeLong, 2001)

Institute Delayed or Staggered Retirement

Offer phased retirement, a formal transition program that enables an employee to retire in stages over an extended period of time through such options as reduced hours or part-time work, or movement into different roles or types of work. (Jenks, 2001; DeLong, 2001, Rappaport, 2003)

Rethink Job Duties

Redesign jobs to be less physically demanding or less stressful to encourage older workers to stay on, including allowing for part-time work. (Calo, 2008; Rappaport, 2003)

Offer Post Retirement Employment

Offer postretirement employment, by which a company hires its own retirees or those of a competitor on a project basis or on a full- or part-time basis, in an existing job or in a capacity specially tailored to the individual's skills/capabilities and the organization's needs. (Rappaport, 2003)

Establish a Formal Mentoring Program

NYCT should identify titles along the career advancement pathways of the positions expected to be lost to retirement and pair them with their senior counterparts. Mentoring, coaching, and job shadowing are among the most effective ways to transfer knowledge from one person to another because mentoring builds close personal relationships and creates a positive organizational culture. Time must be set aside at regular intervals over a period of months to ensure an effective transfer of tacit and explicit professional knowledge. (Calo, 2008)

Blue Ribbon Commission Recommendations

39. Work collaboratively with unions to explore the development of apprenticeship programs.

Competition for a Skilled Talent Pool

Improve Marketing and Advertisement

- Invest in communications and marketing that conveys the vital role played by the transit workforce to the City's functioning in order to improve its public image and attract qualified talent.
- Advertise online and not just on the NYCT website.

Solve the Apprenticeship Dilemma

Work with TWU Local 100 to place a limit on the number of seats that can be filled by incumbent workers and at least double the size of the apprenticeship program.

Expand the Internship Program

Reinstate and at least double the size of the school year and summer college internship program.

Develop Career Exploration and Planning Tools

NYCT's career pathways are opaque to the general public and to some existing workers. Build off of existing "promotion trees" (see [Appendix C](#)) to develop easy to use career exploration and planning guides for both operational and professional/technical staff. These should be placed on the web where they can be found, and provided in print form to the City's Career and Technical Education high schools.

Strengthen Relationships with Postsecondary Institutions

Conduct more outreach and form stronger partnerships with institutions of higher education and Local Technical Assistance Programs (LTAP) so that professional and technical students learn about transportation as a career of choice, especially in the business management, engineering, information technology, and urban planning disciplines. (Transportation Research Board, 2003, p. 145)

Expose College Students to Transit as a Career

- Work with the relevant departments to develop transportation-related modules that can be included in introductory, survey classes. (Smith, 2008)

- “Sell” transit careers to young people by emphasizing the role technology plays in transportation systems and the positive contributions the industry makes to the environment. (Smith, 2008; Agrawal and Dill, 2009)
- Encourage employees in hard-to-fill positions to teach at local universities. (Agrawal & Dill, 2009)
- Hire additional recruiters to attend college job fairs and send talented alumni/ae to recruit at their own schools.

Create a NYCT Civil Service Commission

By all accounts, the Civil Service process is not working for NYCT, especially when it comes to the hardest-to-fill positions. Like the City University of New York did in the 1980s, NYCT should have its own civil service commission. It will need to take stronger steps to pass a bill in the State Legislature. With its own civil service commission, NYCT would have greater control over job requirements and recruitment.

Advertise Online

One department that requires highly capable project managers advertises its jobs online. They started doing this because they found it extremely difficult to navigate the authority’s own job site. Advertise and create public awareness materials online for all hard-to-fill positions, operational hourly and professional/ technical.

Create Flexible Scheduling Arrangements Wherever Possible

When asked what type of compensation attracts them to an employer, 29 percent of a sample of public transportation workers said flexible time/flexible hours, 17 percent said benefits, 13 said tuition reimbursement, and 10 percent atmosphere/work environment. Competitive salary and advancement within the company tied at eight percent. (Douglas, Espinosa, Grose, Peterson, Reyno, & Schniedel, 2007, p. 7)

Workplace Culture

Blue Ribbon Recommendations

3. Publicize internally and externally the hard work MTA employees perform in a concerted effort to recognize their commitment.
5. Increase employee recognition opportunities and events and share best practices of existing employee recognition programs.
6. Research ways to provide incentives and reward the workforce.
9. Identify and prioritize employee facilities in need of upgrade or repair.
44. Review feasibility of increased counseling/advisory sessions to address minor time and attendance violations.
45. Provide mandatory conflict resolution training for all managerial employees and labor relations personnel.
48. Research best practices in the industry and other state agencies regarding use and monitoring of FMLA leave.
49. Strengthen focus on health and wellness and develop programs to alleviate job-related stress.
52. Examine applicability of flextime options and greater use of alternative assignments.

Help Workers Access Benefits

Operational staff need more guidance – from their unions, superintendents, and human resources – on how to access benefits like family medical leave and tuition reimbursement (instituted across the board after this research was completed in 2014) and family medical leave.

Encourage Interaction along the Chain of Command

Create formal and informal opportunities for vertical interaction within departments to create empathy and trust throughout the organization (Douglas, Espinosa, Grose, Peterson, Reyno, & Schniedel, 2007)

Underinvestment in Professional Development

Blue Ribbon Panel Recommendations

18. Restructure and reinstate the award-winning Future Managers Program.
19. Create a formal, multi-level mentoring program within each agency.
20. Expand the existing Executive Leadership Institute Program.
21. Consider creation of an MTA-wide Leadership and Development Academy.
24. Work with local colleges and universities to develop programs for hard-to-fill positions.
25. Reach out to labor unions to help identify additional training needs for represented employees and create a committee to develop joint programs.
26. Develop and/or strengthen the network of internship programs throughout the agencies.
28. Maximize opportunities to use e-learning online courses and Webinars to augment other development strategies.
29. Develop rotational assignments between headquarters and the operating agencies.
31. Create a management leadership training program for headquarters.

Create a Formal Leadership Program for Operational Hourlies and Professional Staff

Modify the existing offerings of supervisory, management, and leadership development instruction to create a series of articulated, stackable opportunities.

Be Proactive About New Technologies

Ensure that all operational workers who need to work with new technologies are trained before they are completely adopted.

Facilitate Learning on Demand

Given the difficulty releasing workers for full days of class, there appears to be a significant opportunity to install web-based training and explore other mechanisms to facilitate learning on demand (e.g., information exchange between shifts about maintenance problems, and job rotation). (Finegold, Robbins, Galway, Kaganoff, & Trinkle, 1996)

Rotational Model of Professional Development

Re-introduce a rotational model of professional development embodied in the Future Managers program so that workers understand their role within a broader context and are exposed to management in a variety of departments.

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Appendix B. Selected Collective Bargaining Units at the New York City Transit

At the time of this research, there were 37 collective bargaining units at the NYCT. The following are the major units mentioned in this report.

[TWU Local 100](#): is the largest local chapter of the Transport Workers Union of American and primarily represents workers in the NYC public transportation systems and at some private bus lines serving the NYC metro area

- 38,000 active members and 26,000 retirees
- President: John Samuelson

[TWU Local 106 also known as the Transit Supervisors Organization](#): represents some supervisors in NYCT's Manhattan and Bronx Surface Transportation Operating Authority (MABSTOA) division

- President: Vincent Modafferri

[Subway-Surface Supervisors Association](#) - is a labor union that represents certain Transit Authority employees, including the Supervisors promoted from hourly employees to supervisory positions

- President: Michael Carrube

[Amalgamated Transit Union \(ATU\) Local 1179](#): Represent bus operators and maintainers working in parts of Queens

- President: Jeff Lyons

[Amalgamated Transit Union \(ATU\) Local 1056](#): Represent bus operators and maintainers working in parts of Queens

[Amalgamated Transit Union \(ATU\) Local 726](#): Represent bus operators and maintainers working in Staten Island

[Amalgamated Transit Union \(ATU\) Local 1181](#): Represents drivers, escorts and Mechanics in New York City, Westchester and Long Island:

- President: Michael Cordiello

[DC 37 Local 375](#): Represents the architects, project managers, and design professionals at the NYCT

- President: Behrouz Fathi (taken under administratorship by the AFSCME International in 2016)

Appendix C. NYCT Promotion Trees

Figure D1. Electrical Helper Promotion Tree

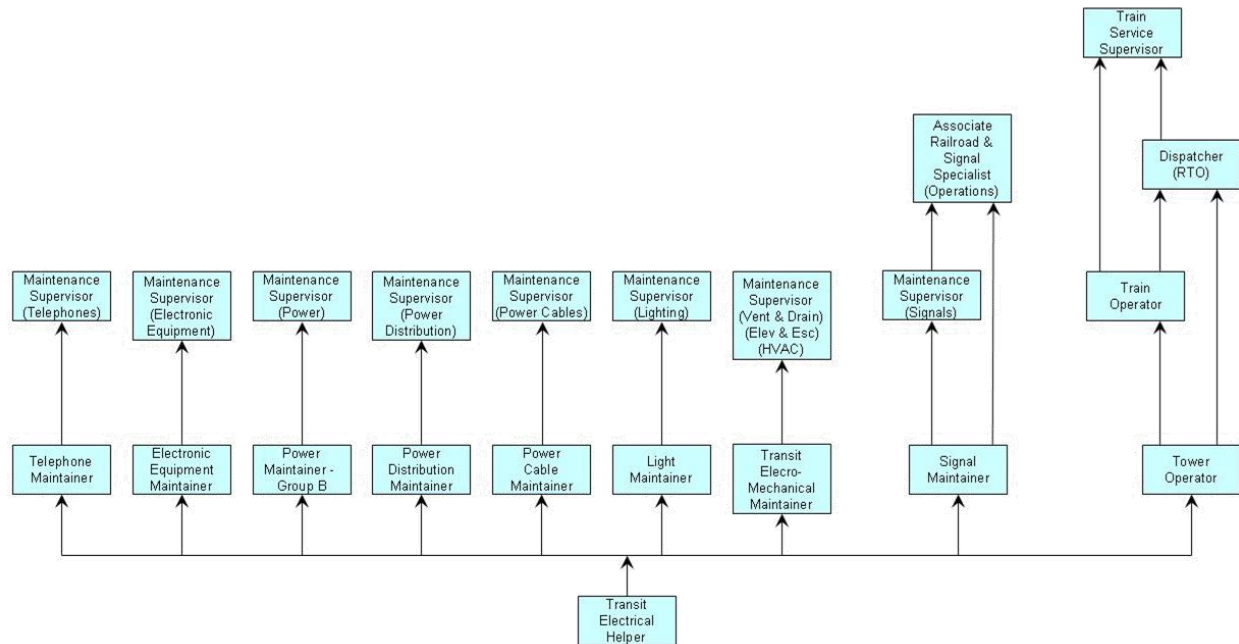


Figure D2. Transit Cleaner Promotional Tree

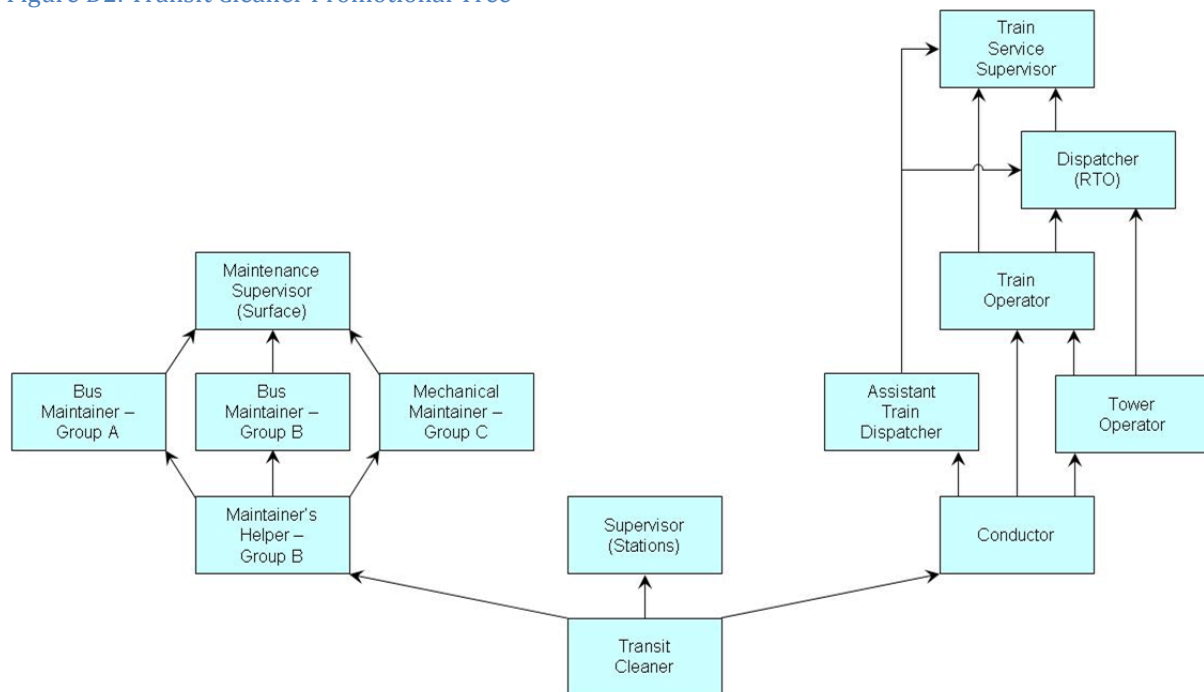


Figure D3. Track Worker Promotion Tree

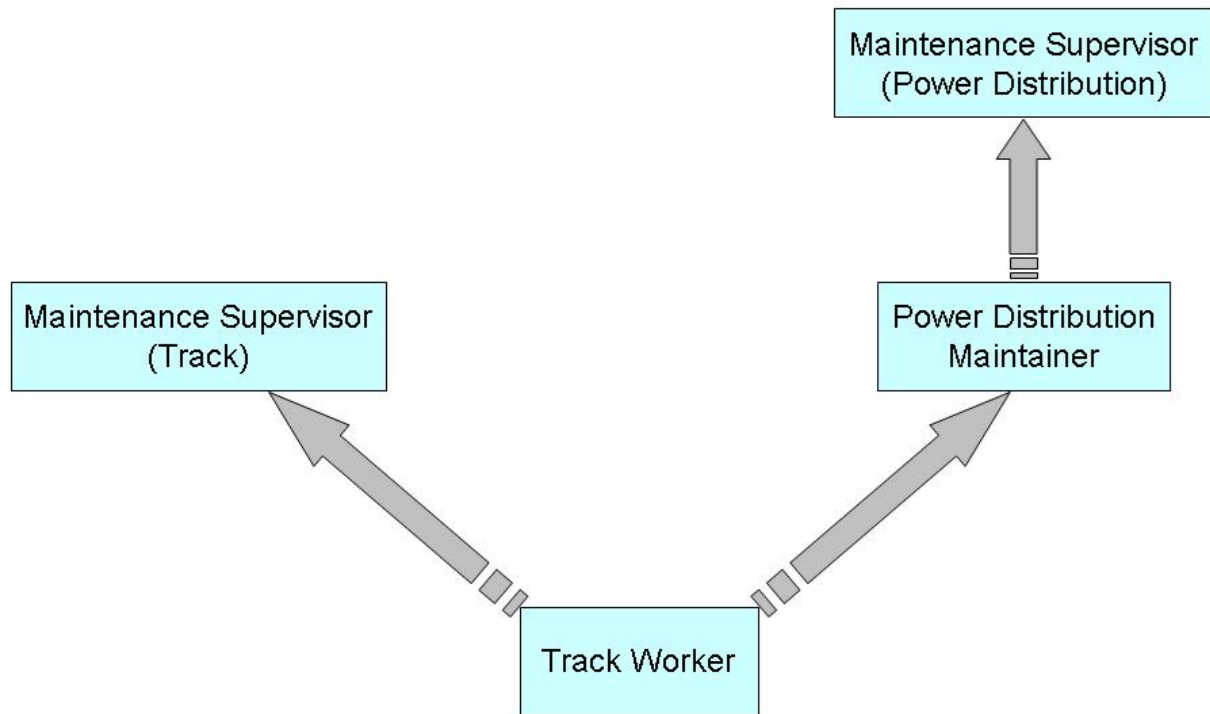
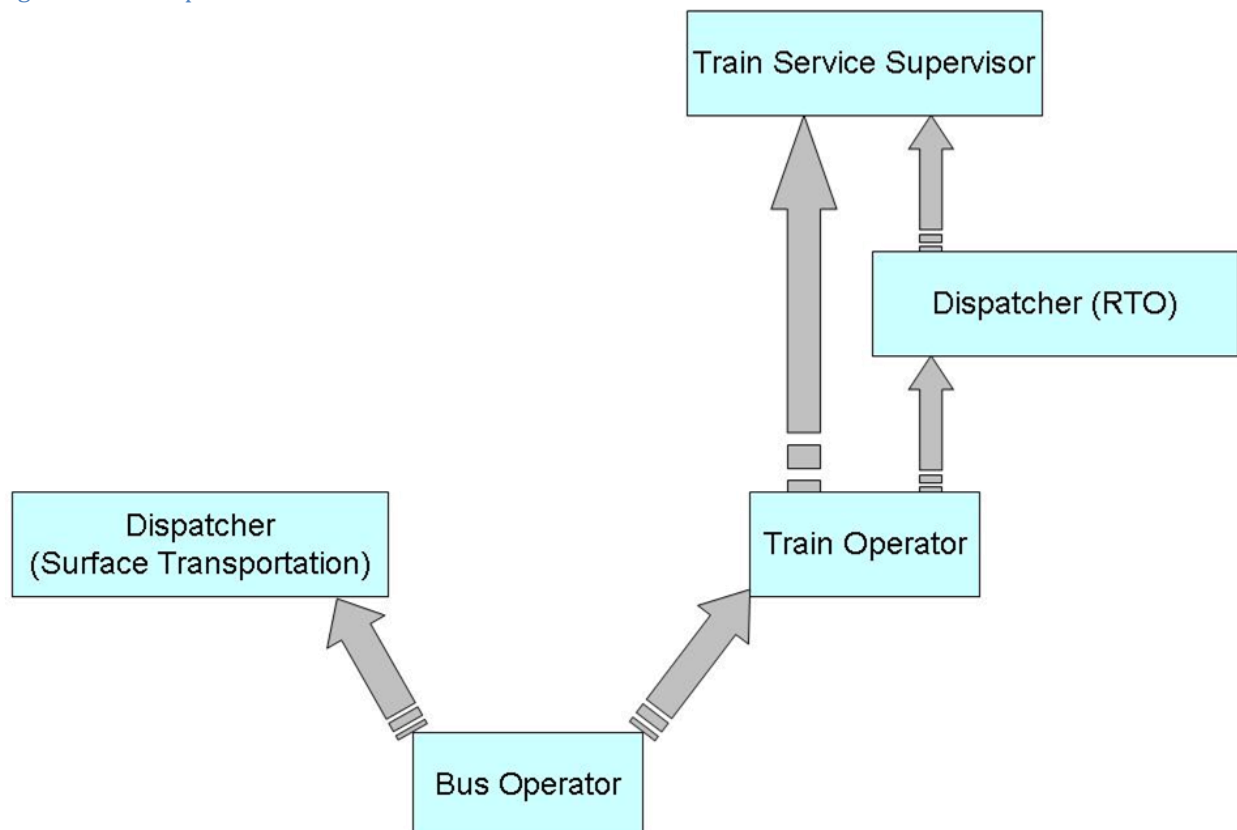
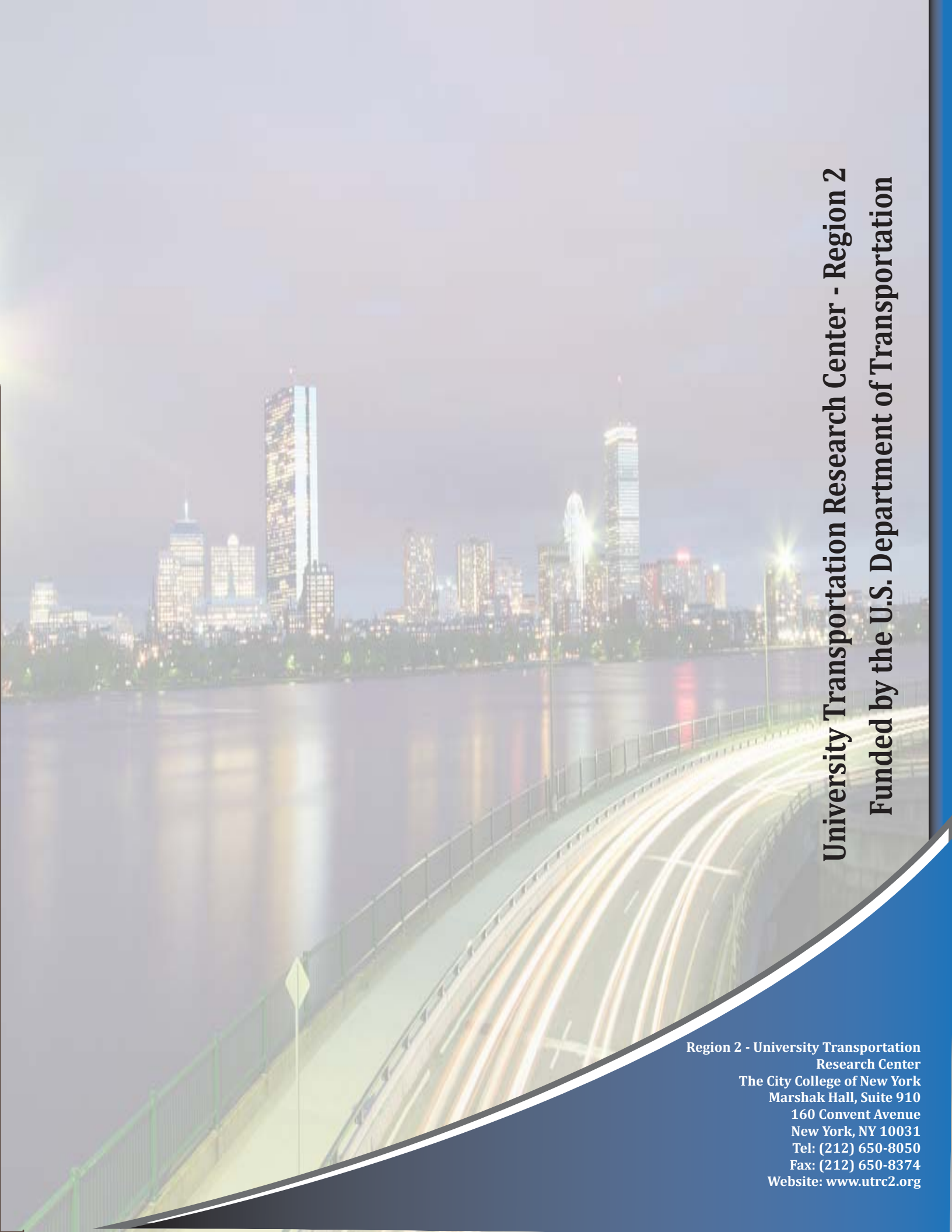


Figure D4. Bus Operator Promotion Tree





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