MAKING TRACKS

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LF-LRVs for the Village: The Lower the Better?

By William K. Guild

In its first four years of advocating the return of light rail to the 8th Street transit corridor, *MAKING TRACKS* has frequently extolled the virtues of low floor light rail vehicles—LF-LRVs to transportation specialists—noting their proliferation in Europe over the past decade and, more recently, their introduction to the United States. We have not previously discussed the various categories of LF-LRVs nor even described just how they differ from "conventional" LRVs. Now that low floor LRVs are being delivered for service in Newark and on the Hudson-Bergen Light Rail line, the time has come for a closer look.

This article will survey the major categories of LF-LRVs currently available and other developments, exploring disadvantages as well as advantages of each and considering which elements are best suited to a pure urban route such as the Village Crosstown corridor. The author is again indebted to the Transportation Research Board for its excellent report on LF-LRVs cited below.

***"Incentro" is the name for Adtranz' latest 100% low floor light rail vehicle** designed specifically for operation in urban streets. Incentro will go into service on the Nantes, France urban light rail sy em, one of dozens of new systems built or under construction in Europe. Car floor is 11.2 inches above the rail.*

Streetcars, Trams and "Conventional" LRVs

There is nothing new about the idea of providing low floor entrances for transit vehicles to ease boarding, reduce "dwell time" and improve efficiency. The cover picture on the Summer 1998 *MAKING TRACKS* shows a 1916-vintage battery-powered low floor streetcar on Delancy Street, and a number of other such vehicles ran, at least on an experimental basis, in New York and elsewhere. In 1984 a "modern" low floor tram intro- duced in Geneva, Switzerland. Prior to the 1990s, however, the vast majority of streetcars and articulated LRVs were "conventional" high-floor vehicles.

Most light rail vehicles, like railroad cars, are mounted on trucks comprising wheels, axles, brakes, springs, frames and, in the case of LRVs, motors. Other electrical and mechanical quipment is also mounted beneath the floor. Unless costly and intrusive high platforms are provided along the route, passengers must board from low curbs or even from street level, climbing a series of steps like those on a bus. This increases "dwell time" at stops, slows service and creates serious obstacles in accommodating passengers

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NYU Bus Debate Highlights Need for Crosstown Trolley

By George Haikalis

Finding a suitable terminal for New York University's growing fleet of shuttle buses sparked the latest in a never e g stream of conflicts between the Greenwich Village community and the world's largest private university. Beginning with a single minibus donated by a trustee some four years ago, the fleet has grown to 32 medium to full-sized vehicles used on four different routes.

The first bus, painted a garish purple and built to resemble a trolley car, was used to ferry students around town on occasional class excursions and field trips. Later as NYU began to draw students from outside the metropolitan area the university acquired or constructed a constellation of dormitories and residence halls, many located some distance from the Washington Square campus. Ostensibly under pressure from fearful parents whose teenage youngsters were just getting used to living in a big city, the university established a network of dedicated shuttle buses to "safely" ferry students between the campus and the more distant dorms. Initially the shuttle buses loaded on the south side of Washington Square Park, in front of the Bobst Library. The first group of new shuttle buses were mid-sized, each painted with the university's symbolic purple stripe. As more routes and buses were added to meet the growing demand, NYU's bus contractor—Gray Line, the tour and charter operator—began adding full-sized over-the-road coaches. The narrow street alongside the park was quickly overwhelmed by a sea of buses.

To meet community protests, the university reacted swiftly and without further consultation. On January 16, 1999 abruptly relocated the buses to West Third St., one block south of the park. This location provoked a new firestorm of protest from residents of Washington Square Village, a large high-rise apartment complex facing the new bus congregation point. Community Board Two, often at odds with the university in its district, convened an emergency forum where residents of the complex, many NYU faculty or staff, showed up to complain about their employer's

Finally the university administration did its homework and found a way to dispatch the buses so that they would not congregate, en-

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On the Back: Letter from the Editor

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with disabilities. In the 1980s European designers began to look seriously at ways of reducing floor height, from 30 inches or more to 13.8 inches (350mm) or less.

Categories of LF-LRVs

The simplest solution to the low floor problem, at least for loading and unloading, is to drop the floor between the trucks, moving some under-floor equipment to the roof above low-floor sections. One early approach with articulated trams was to suspend a low-floor segment between two conventional segments, sometimes referred to as "two rooms and a bath." The main with Category 1 vehicles, which use conventional trucks, wheels and axles throughout, is that only about 9% to 15% of floor area can be at the lower level. The rest of the vehicle must be reached by interior ramps or steps.

Category 2 LF-LRVs retain conventional power trucks located at the ends of the vehicle, beneath the operators' cabs, but use various types of "innovative" running gear in between, allowing a continuous low floor through the rest of the vehicle, even through articulated sections. This can be achieved with either small-wheeled "trailer" trucks or standard-sized wheels mounted in an unconventional way—on a cranked axle or with no axle at all. As we shall see, to date all LF-LRVs delivered to North American operators have been variations of the latter type.

100% low floor LRVs comprise Category 3 and are achieved through the use of "innovative" running gear throughout. Wheels are somewhat smaller and traction power is provided by individual motors, some built into the wheel hub itself, rather than through an axle. To date, cars of this type have been relatively slow, with most European models rated for a maximum speed of 44 miles per hour. While this should be adequate for urban street operations, it is far below the performance required on most North American LRT systems, with their extensive off-street and "interurban" segments. It is also more difficult for such vehicles meet the more stringent North American "buff load" standards for car strength and safety in the event of collision.

A modular 100% low floor system, a subset of Category 3, permits a single articulated LF-LRV to be lengthened or shortened, eliminating unnecessary cab units and allowing passengers to move freely through the entire "train." An early model developed in Europe, Variotram, is now being used on the new LRT system in Sydney, Australia. The latest version, Incentro, is shown on page 1.

LF-LRVS in North America

The first American city to order low floor LRVs was Portland, Oregon, which had opened a 15-mile "starter" system in 1986 with a fleet of standard six-axle articulated LRVs Each two-segment car was mounted on three four-wheel trucks, one at each end and one in the center, under the articulation. The 89-foot LRVs usually run in 2-car trains, with a single operator and a capacity of 328 passengers, 148 seated. From a large street-running loop in downtown Portland, the line crosses the Willamette River on a landmark bridge, continues on another city street past a major and civic center, parallels an interstate highway and then completes its run into suburban Gresham on former interurban right of way..

By the early 1990s, when Portland began planning a Westside extension which would double system mileage, LF-LRVs were coming into use abroad. By specifying that new low flo cars be operable in 2-car trains with the original LRVs, it would be possible to eliminate the cumbersome wheelchair lifts which had been installed at every station. 70% low floor Category 2 vehicles were selected and have been running successfully, both in tandem with high floor cars and in low floor trains, since 1997 on a system now extending some 27 miles.

Just across the Hudson, a dozen Category 2 vehicles ha already been delivered to NJ Transit for testing and will form the nucleus of two fleets operating on the new Hudson-Bergen light rail line and the Newark City Subway. While produced by a different car builder and differing in a number of technical points from the cars now running in Portland, these are also 70% low floor vehicles with similar operating characteristics. The existing fleet of 50-year-old PCC cars will be retired from service in Newark and replaced by the new low floor LRVs as the subway is expanded to become the Newark-Elizabeth Light Rail line. These modern cars should be in revenue service early next year and will soon reach the Hudson River waterfront in Jersey City and Hoboken..

Other existing and planned systems in this country are expected to adopt LF-LRV technology, among them San Jose with its major extensions of a system first opened in 1987. In New York, plans for 42nd Street include 100% low floor vehicles, similar to those used in Strasbourg (see photo, *MAKING TRACKS*, July 1995). In its MESA Study, however, NYC Transit proposes 70% low floor LRVs for the Lower East Side and other light rail options. Nearly all new car orders from French, German and other European systems now call for some version of low floor technology. There is no compelling reason not to follow this lead.

Why Not Low Floor?

A number of objections have been raised to the use of LF-LRVs, but most technical problems have been resolved over the past decade, as car builders have focussed on improved accessibility and performance. Yet questions are still raised in four major areas: cost, performance, safety and compatibility.

The last question is most easily disposed of, since there is no existing light rail system in the city for the Village Crosstown Trolley to be compatible with. Moreover, Portland (and San Jose) have resolved any compatibility problems by adopting Category 2 vehicles with couplers, drawbars and the like at conventional height. Of course, compatibility with other local routes is highl desirable, but both 70% and 100% low floor vehicles are currently being considered in New York.

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gines idling, at the pickup point.

Long-time village residents recall a pattern of callousness by the university when dealing with its neighbors. Like the shuttle bus reroute, many other problems could have been avoided with planning and consultation. For VCTC the university's clumsy way of dealing with an experimental closing of one block of Washington Place to motor vehicles is a painful recent memory. In a well-meaning effort to improve the university's surroundings, in 1993 a joint committee of faculty and students suggested the . Without substantial analysis or any plan to enhance th street, NYU sought and gained Community Board approval for the closing. Residents in the adjoining block feared that the newly created public space would become an extension of Washington Square Park, and a haven for drug dealers and the homeless. Thanks to the university's poor management of truck access to adjacent classroom buildings, occasional truck backups into the residential block occurred. No attempt was made to transform the newly created public space into an attractive area or community asset. Reinforced by a longstanding animosity toward NYU, opponents persuaded the Community Board to terminate the experiment after its initial test, catching university officials by surprise. The abrupt and contentious end to this experiment has caused community leaders to look askance at proposals to create additional auto-free streets, including the Crosstown Trolley and pedestrian-only corridor for 8th St., Christopher St. and St. Marks Place.

But adding more pedestrian space is not a dead issue in the Village. The proposed sidewalk widening advanced by the Village Alliance BID and its energetic Executive Director, Ms Honi Klein, show that community support can be gained by doing one's homework first. Approvals were sought only after careful urban design and traffic planning studies were completed. The lesson is clear for VCTC—to gain community support, a long period of consultation and analysis is needed. While we have spread the word about our trolley proposal through the printing of some 50,000 copies of Making Tracks, we still have a long way to go. The lesson should also be clear for NYU. It is time that they revisited the Washington Place closing, but this time by seeking broad community support first.

The Crosstown Trolley - Better than buses

While NYU may have quieted down community unrest for the moment on the shuttle bus issue, the broader question remains—why can't students and faculty rely on basic public transit system for their access needs in Manhattan? The M-8 crosstown bus, for example, serves most of the dorms lying to the east and to the west of the campus. Why duplicate this regular transit route with a separate costly-to-run university shuttle service? The answer may lie in better marketing and increased service levels. crosstown route is little known to the university community. Public timetables are not available in university information centers. The crosstown buses look like all the others used on city routes. Bus stops are not given special emphasis. Posted schedules are inaccurate or non-existent. The route loses some of its identity because it is divided between two one-way streets. While midday headways of ten minutes are pretty good compared to many routes in the city, service levels drop off quickly in the evening, when students y want to get home quickly after long hours in the library.

The answer of course is the Village Crosstown Trolley. The tracks make it obvious where the trolley goes. Trolley stops can easily be identified. The service would be two-way on an auto-free street. The attractiveness of the trolley would generate much higher levels of ridership justifying much more frequent service. The reduction of pollution and congestion would benefit all us living in the village. In short we invite NYU and the community large to join us in exploring in much greater detail the feasibility of the Village Crosstown Trolley. r

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A few years ago cost was a major factor, with early LF-LRVs twice as expensive as conventional vehicles. With all car builders competing in the low floor market, the picture has changed dramatically. When Portland ordered LF-LRVs in 1993, these cars cost only about 10% more than conventional LRVs, a premium more than offset by infrastructure savings and operational improvements. Even this differential has now largely disappeared and is no longer significant.

Performance relates mainly to speed and deficiencies in this area also have been largely overcome. It was thought that low floor vehicles, with smaller wheels or other "unconventional" running gear, could not operate efficiently on most American s stems, where speeds of 55 miles per hour (70 mph in Dallas!) e required for some off-street running. Again, this has proven not to be a prob-

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lem in Portland, where Category 2 vehicles have met the challenge successfully. For an all-urban street-running line, even 44 miles per hour (70 kph), the rated speed of virtually all European Category 3 vehicles, should be more than sufficient.

The main safety factor is "buff load," a measure of resistance to structural damage in the event of collision or other impact. Since North American standards are about twice as stringent those in Europe, early low floor LRVs could not be operated on sys- tems here. As in the other problem areas discussed, however, great structural advances have been made by the car builders and LF-LRVs meeting North American standards are now available from several manufacturers. Thus there is no longer a safet issue which would preclude use of low floor vehicles on the Village Crosstown corridor.

Whither the Village?

The purpose of this article is not to define exact specifications for the Village Crosstown Trolley, but rather to demonstrate that low floor vehicles are both practical and available, and to familiarize our members and other readers with the general characteristics of "state-of-the-art" LF-LRVs. If we were making a final selection now, we would look seriously at a 100% low floor modular vehicle, since such vehicles are ideal for urban, street-running routes. For compatibility reasons, we would also look at 70% low floor vehicles, since the decision ought to be influenced, at least, by equipment used on adjacent routes. With LF-LRV technology evolving so rapidly, however, 100% low floor light rail vehicles are likely to become increasingly attractive and popular. r

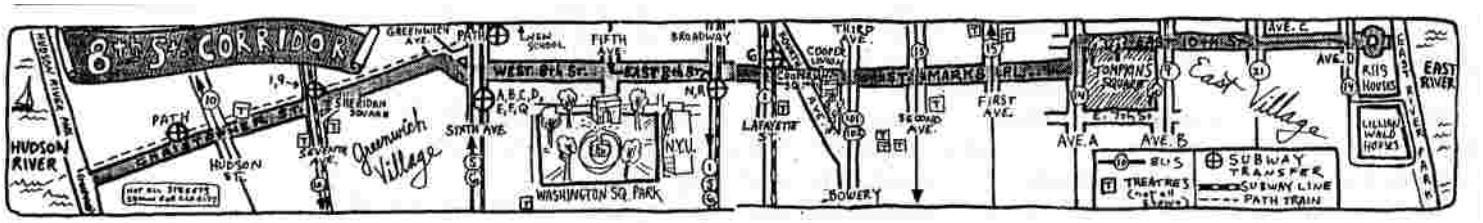
*The author wishes to acknowledge Booz*Allen & Hamilton, Inc. and the Transit Research Board, whose Report 2, Applic lity of Low-Floor Light Rail Vehicles in North America (1995), was indispensable in the preparation of this article.*

Dear Reader,

When considering upgrading or creating light rail transit, a key issue is rolling stock—the type, appearance and characteristics of the vehicles to be used. One of this issue's cover stories focuses on "low floor" light rail vehicles (LF-LRVs). While the subject has been mentioned in *MAKING TRACKS* before, this article goes into detail on the history of LF-LRVs and the various types used around the world today. Our other cover story discusses the issues surrounding New York University's fleet of buses used to transport students between its far-flung dormitories and the main Washington Square campus. Thank you for your continued support as we celebrate the beginning of our 5th year!

Michael Goodman, *Editor*

The Village Crosstown Trolley Coalition (VCTC) has been organized by a group of neighborhood residents to develop plans and community support for a river-to-river light-rail trolley line linking the East Village, West Village and Greenwich Village.



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Village Crosstown Trolley Coalition

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