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## Tramways of Helsinki

By Walter Rice Ph.D. (14.10.2002)

The tramways of Helsinki began to evolve into a modern efficient transport system in the 1950s with the introduction of a new generation double-bogie trams. Until this time, from the inception of electric tram service on 4 September 1900 (horse drawn tram service started 21 June, 1891), most Helsinki trams were small and two-axle. Before the 1950s Helsinki had but eight double-bogie cars - two cars from 1919 and six cars from 1941.

Ultimately, 105 of these new double-bogie cars with thirty trailers, all Finnish built, were placed into service. Today, approximately twenty-two of these cars are on the roster. Only eight to ten double-bogie cars are operated, the rest being in standby storage. They date from 1959 and are by two builders, Karia (Nos.1-15) and Valmet (Nos.16-30). These older trams are limited to weekday service on lines 1, 1A and 2. Compared with Helsinki's newer trams, these cars offer smaller passenger capacity and therefore lower productivity, with 29 seats and standing room for an additional 70. They will be gone, probably next winter, after more of the new Variotrams are in use. These new five-section articulated trams (Nos. 201-240) feature low-floor design.

Helsinki City Transport (HKL) - the system has been municipally operated since January 1, 1945 - began to provide its passengers with modern era cars with introduction in December 1973 of chopper control six-axle articulated trams. Ultimately, HKL purchased eighty-two of these cars. They have a seating capacity of forty-four and can hold a total of 162 passenger. These trams provide and will provide for the foreseeable future the majority of Helsinki's tram service. They arrived in two groups. The initial forty (Nos. 31-70) arrived during 1973-1975. A decade later, the first of the second group consisting of forty-two trams (Nos. 71-112) began arriving. This group of cars was built during 1983-1987. Breaking Helsinki's tradition of a green paint scheme, the new articulated trams were in an orange ("carrot") and grey scheme reflecting that of Finnish State Railway's DMU expresses. By 1995 these had repainted into the handsome traditional tram colours - green and yellow.

The oldest of these trams is approaching the thirty-year service mark. When placed into service they were possibly the most modern trams in the world. Today, they still offer the atmosphere of a contemporary vehicle. This is due to a variety of factors. First is excellent maintenance coupled with rebuilding. A rebuilding and modernization program that began in 1993 continues today. For example, all trams have been equipped with interior digital signage announcing each stop in both Finnish and Swedish, the two official languages of Finland. Speed and passenger comfort characterize this equipment. Too often modern systems tend to operate at relatively slow average speeds (notably North American systems). The opposite is true of Helsinki.

Speed is obtained because of the system's design. In the 1970s trams were given separate reserve lanes. Traffic signals are tram activated. Tram operators are guided at such points by special lunar white tram signals. Therefore, Helsinki's trams can and do provide a fast smooth ride even when auto and bus traffic is congested.

On Mannerheimintie, a major downtown tram street that sees more than 1,000 daily tram movements, there are special pocket turning tracks for trams making right and left-hand turns. Turning trams do not slow through-routed trams.

Aleksanterinkatu is another central corridor for downtown tram traffic. On weekdays, nearly 1,000 trams carrying tens of thousands of passengers operate along the street. Its tram tracks were last rebuilt at the beginning of the 1980s. During the last twenty years, tram traffic has increased and trams have grown in size. The present tram stops are unsuitable for the new low-floor trams. Currently the street is undergoing a three-year renovation. When completed in the autumn of 2003 new rails will have been laid, tram stops lengthened and raised to ease entering the new low-floor trams. In 2003, pavement heating will be installed and new paving will be laid. Aleksanterinkatu will have no more snow and ice!

This project, largely funded by the City of Helsinki (properties along Aleksanterinkatu will pay for the pavement heating system), is but another illustration of Helsinki's commitment to trams and its recognition that trams are both

a unique and invaluable urban transit asset. Finland is concerned with clean air - Helsinki's trams do not leave exhaust in their wake.

At the start of the twentieth century when electrically tram service began with a four-line 13 kilometres, system, Helsinki was a small city. As late as, the late 1880s Helsinki's population was only 43,000. Today Helsinki has approximate population of 500, 000 with a total one million in the metropolitan area. As a result many sections of Helsinki the tram system serves are relatively new neighbourhoods (lines 4, 6, 7A, 7B, 8 and 10). Track design has taken advantage of this opportunity. Often centre- private-reservations have been provided. On the 7A and 7B tracks run next to the curb to facilitate passenger boarding. In older areas of the city, Eira for example, the sidewalks have been extended to the tracks.

The fare system helps rapid boarding. A flat-fare POP (Proof-of-Purchase) system is in effect. Most passengers use prepaid tickets that range from a single ticket to an annual pass. Also, available are 1-day, 3-day and 5-day tourist tickets. On trams and buses passengers can buy single and group ticket, but as much as 50% higher than a prepaid ticket. This pricing policy purposely discourages on board purchases that tend to slow service. Typically, a tram pulls up at a stop and all doors are opened for boarding riders. On buses, however, passengers must show their tickets and passes to the driver when they board. Roving fare inspectors working in pairs verify tram tickets. A penalty fee of 42 Euros plus a single 2 Euro fare is assessed fare evaders. Conductresses (all conductors were women) were last used in May 1987.

Tram operators work on a drop-back system. That is, they are in "the seat" for an approximately two/three hour straight period before being relieved. At terminal points, a short "catch-up" period is built into the schedule. Therefore, trams are effectively constantly on the move. This policy maximizes the productivity of the trams, since fewer trams are required to meet a given headway pattern. A stationary tram is not a productive asset.

Helsinki Transport operates 75 kilometres (at the system's peak in 1956. 93 kilometres were in service) of 1000 mm (3ft 3.375 in) gauge track with 105 scheduled in service weekday trams on eleven routes (see table for route listing). Trams run on 600 volts direct current with fourteen substations that convert power from 10,000 volts.

Tram ridership has been on a consistent upward trend in recent years. During 2000, Helsinki's trams carried 56.7 million passengers and ran a grand collective total of 5.1 million kilometres. These ridership increases imply the need for increased future capacity combined with the desire to remove from operation the remaining obsolete 1959 four-axle trams (also, schedules have been missed because of a lack of daily availability of these cars), and the anticipated 2005 opening of a new tram line No. 9, caused HKL to order a total of forty new 24.4 meter three-truck five-sectioned low-floor articulated trams. HKL ordered the first twenty (Nos. 201- 220) in March 1996. On 31 May 2000 an additional order of twenty cars (Nos. 221-240) was placed. The orders were placed with ADtranz (ABB Daimler-Benz Transportation). As of 1 May 2001 Bombardier became the builder. Assembly of these Germany technology trams is in Finland at the Talgo-Transtech facility at Otanmäki. The first cars of this type - Nos. 202 and 203 - entered revenue service on Route 10 on 30 August 1999.

To achieve a total low-floor design, each of the twelve wheels has a hub motor. Conventionally designed trams have their motors separate from the wheels. This design resulted in the cars being modified to reduce the noise as the trams pass through special work - switches and crossings. These modifications have resulted in a delay in tram acceptance. The noise is because of the closeness of the ride to the wheels and the increase in unsprung weight, resulting from combining the wheels and motors. Each of the low-floor tram operators has their own smart card that adjusts the drivers seat, mirrors, instrument panel and controls to their individual requirements. The cabs also have their own air-conditioning system.

The proposed new tram route No. 9 will run from Tarkk'ampujankatu to Ilmalantori. Route No. 10 currently serves the section of the No. 9 south of the City Center. HKL will reroute the 10 to provide additional service to the commercial and residential neighbourhoods of Helsinki's shipbuilding area. The new No. 9 will require two sections of new track. Otherwise, it will offer a new routing over existing track. Three bus lines will be either totally or partially replaced by this new tram service.

Uniquely, HKL has rebuilt 1959 four-axle tram No. 15 to a restaurant tram and renumbered it No. 175. A beer company sponsors the handsome red tram. It operates on a city centre loop routing on an hourly schedule during the summer from a point just east of Helsinki's impressive Central Railway Station. Fares include one beer with the trip.

It is the only Helsinki tram that has a toilet. When it is not in this service, No. 175 is available for charter. Seeing this restaurant tram in charter service is not unusual.

At rear of Töölö Hall (car barn) is the Helsinki Tram Museum. Töölö Hall was built in 1900. This brick structure with its shallow saddled roofs and simple ornamentation is typical of late-19th century industrial architecture. The Museum offers a complete representation of Helsinki trams ranging from an 1890 horse tram to until recently a full-size model of the new low-floor trams. The full-size model of the low-floor tram was replaced with a two-axle car from the Museum's collection, because the Variotrams are now a common sight on Helsinki's streets. An open tram last used during the Olympic games in 1952 is part of the Museum's display. Open trams were very popular with the people of Helsinki in the summer heat. Besides the Museum trams and revenue fleet, nearly twenty work cars that include shunters, rail grinders and snow sweepers support the tram system.

Helsinki is a beautiful city. It is particularly so on a bright sunny day after a snowfall. The efficient trams of Helsinki are integral and lasting part of its urban environment.

**Helsinki Tram Lines (Normal Routing, With One-Way Running Times and Maximum Trams assigned PM Rush Hour 2002)**

- 1 - Kauppatori - Käpylä (24 min., Rush Hour 1A)
- 1A - Eira - Kauppatori - Käpylä (32 min., 10 Trams)
- 2 - Katajanokka Terminaali - Keskusta - Linjat (18 min., 5 Trams)
- 3B - Eira - Kallio - Töölö - Kauppatori - Eira (loop 50 min., 9 Trams)
- 3T - Eira - Kauppatori - Töölö - Kallio - Eira (loop 50 min., 9 Trams)
- 4 - Katajanokka - Munkkiniemi (26 min., 16 Trams)
- 6 - Hietalahti - Arabia (26 min., 9 Trams )
- 7A - Senaatintori - Töölö - Pasila - Senaatintori (loop 39 min., 7 Trams)
- 7B - Senaatintori - Pasila - Töölö - Senaatintori (loop 35 min., 7 Trams)
- 8 - Salmisaari - Sörnäinen - Vallila (24 min., 9 Trams)
- 10 - Kirurgi - Pikku Huopalahti (23 min. 13 Trams)

### **Helsinki Tram Museum**

Location: Rear of Töölö Hall (car barn)

Hours: Wed-Sun 11am-5pm

Tram Lines: 3B, 3T, 4, 7A, 7B & 10

Helsinki City Museum: [Tram museum](#)

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