Designing the Artic .

It is a “back to the future” tram concept

A new type of tram building thinking, a hard road from conception to delivery

The demanding conditions of Helsinki have been taken into account with the construction of this new tram. Its construction includes a freely pivoting bogie that is able to communicate the steep curves of the tram network of Helsinki, and its surface materials have been selected with easy maintenance and the climatic conditions of Helsinki in mind.

The car has a fully low-floor design with 74 fixed and 14 folding seats. The car offers easy wheelchair or pram access.

The car has been designed with consideration of the environment. Its weight per passenger seat has been reduced as much as possible, and it exploits energy from braking to heat the passenger compartment. Lighting and destination displays employ LED technology, which is not only energy efficient but improves visibility of the car in traffic.

Jouni Riikonen of Oy Windell & Riikonen Design was selected as designer of HKL out of about twenty leading design offices from around the country on 28 January 2011 on the basis of the finished design submitted. IDIS Design Oy was chosen by Transtech as its partner in the design on the basis of its concept. However, four companies appealed with a procurement correction claim against HKL. They considered that the design involved the entity, not a separate item. They regarded the approach to be wrong and the competition a failure. Because their correction claim was rejected by the board of HKL on 5 May 2011, the four companies took a joint complaint to the Market Court to make the HKL selection

null and void, but the appeal was rejected by the court on 20 May 2011. A joint appeal to the Supreme Administrative Court followed, but on 31 December 2013 the claim was dismissed as being without foundation.

The tram design, accomplished by HKL under the direction of Jouni Riikonen, was in accordance with the purchase contract that stipulated that HKL was to be responsible for the design. The proposals put forward by the IDIS Design Company were evaluated by HKL and Jouni Riikonen. The external appearance of the tram was to be similar to the earlier fleet (livery, grey roof, windscreen visor, vertical front and red seating) as well as displaying an ultra-modern and reliable image. The tram was to be ageless, functional and totally practical, as well as to be in harmony with the historical and modern capital environment. The journey should be such a positive, comfortable and enjoyable experience that it creates a craving for more.

Wear-resistant high pressure laminate, stove-enamelled aluminium sheeting, stainless steel, rubber, leather and plush fabric are used in the interior. The raised seats provide a good view, and the bright and spacious interior is aided by LED-lighting and light coloured surfaces. The materials are long lasting and easy to maintain for the removal of wilful stains. Contrasting colours set in the right places assist the visually impaired. Vertical grab rails and seat back handles are in abundance for support. Ample space is available in the vicinity of the second entrance from the front for prams and wheelchairs. A mechanically operated folding

ramp is provided at one of the entrance doors. Serviceability, durability and practicality have influenced the design throughout.

The tram front is designed with an eye to safety. The lower part is shaped to absorb collision force, so that should a pedestrian be struck, he/she will not fall underneath, but be rolled on top of the bumper. The bogies are fitted with protective flaps as a safety precaution so that no loose garment becomes entangles with rotating machinery or the wheels. For improved safety surveillance cameras are installed in the passenger accommodation.

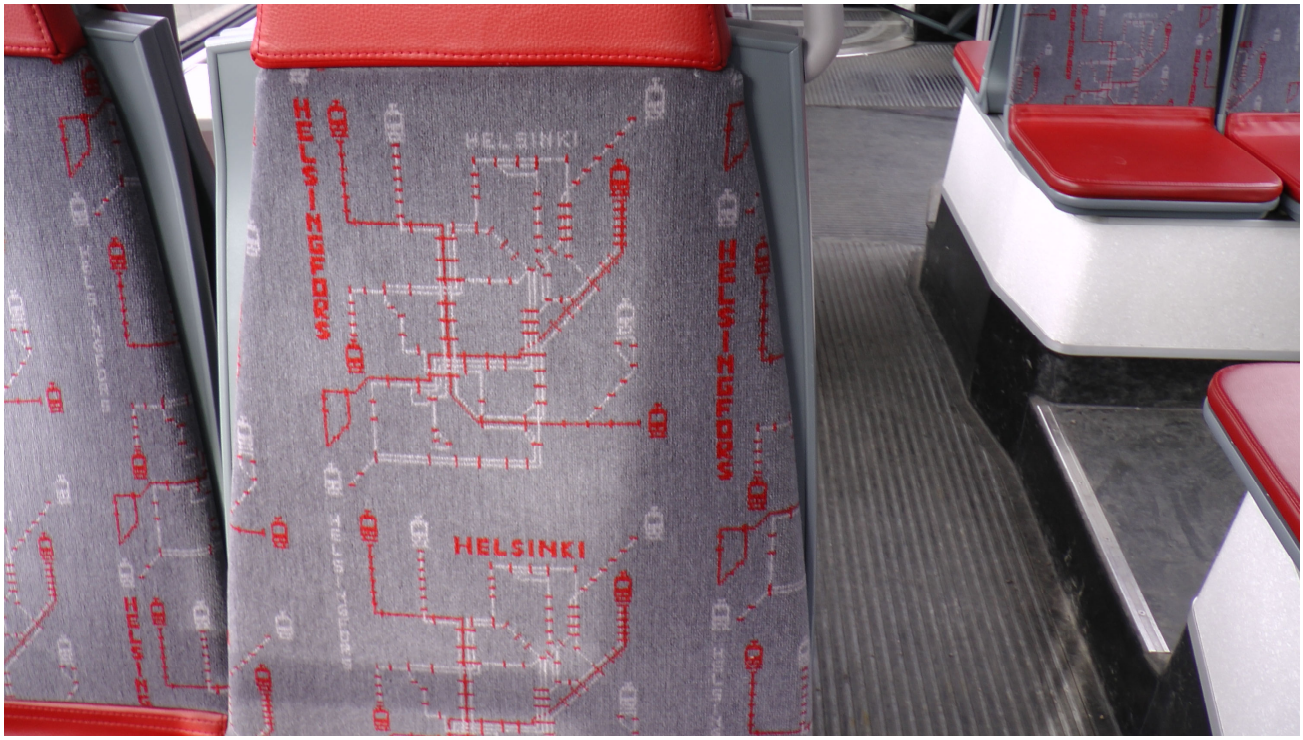
The tram is technically adept for winter conditions. It is equipped with a traction control system and automatic sanding for slippery conditions that might be caused by autumn leaves, drizzle, etc. The heated composite floor prevents snow and ice from accumulating inside. The heating system involves heat energy dissipated by the water-cooled brake resistors. All exterior lights, apart from the headlamps, are effective durable LED fittings. The destination displays, the first in the country to use white LED technology, are highly visible even in bright sunshine,

The cab layout was influenced by a drivers' committee. The driving console is ergonomic and clearly laid out. It has two 10.4 inch LCD displays on which graphic symbols indicate the various systems. The driving control is permanently installed and includes a system known as dead man's switch that constantly monitors the driver's vigilance. The leather driving seat can be adjusted six ways, the position being digitally memorised for a specific driver. Three displays on the right of the cab provide the driver with eleven camera views from inside and outside the tram. The displays can be divided in two, for six different camera views at a time. A monitor is used instead of a rear view mirror. A personal air-conditioning or heating device is for driver comfort.

“To get a ride on one of the two new Helsinki trams is still a game of chance, but the chase is worthwhile as they are not route specific and are rostered to routes as required.

The ride is particularly smooth despite the geometry of the roadway and performs well with super crush loading experienced at the several ferry terminals. I was particularly impressed at the crush loading on 402 at Route 9 Lansiterminal where I calculated that the load was 400 pax plus, 402 pulling away and up the gradient effortless, the passengers , a happy bunch having enjoyed a "booze cruise" to Tallin Estonia and back laden with must booze for the house, a truly magnificent passenger movement

Divaani is still particularly delighted with the plush fabric upholstery of the tram seats, designed by the team of Jouni Riikonen, KUI Design and IDIS Design” is a quote from 11 December 2013. Divaani magazine awarded HKL the “”2013 Everyday Joy of the Year” for its new Arctic Tram, and if you get lost, there is a route map in the fabric of your seat



Transtech Artic – a workable concept

Transtech actively keeps abreast with schemes for future tram orders, especially in the Nordic countries where the climate is similar to our own, but also in the Baltic States, German-speaking Europe and Russia. It is usual for a list of references to be included in a call for tenders, and it will be easier to respond when at least five of the production series Artics are in operation and further practical experience is gained. With its production capabilities in mind, Transtech is monitoring the findings of HKL regarding operation and maintenance. The estimated time and material consumption to manufacture and the construction costs are to be taken into account for the production development of the Artic.

It is often suggested that a standard type of tram is suited to new tramways. The idea, however, is misleading, because both the PCC and B-tram were standard types. On the other hand, the multi-module articulated types have been called "standard", yet they significantly differ depending on the manufacturer. It is a well-known fact that if a European tramway is constructed according to the requirements of the tram type it uses, the end result is usually successful. However, if the tramway is built according to the demands of the town structure, the tramcar itself has to be flexible.

If a transport operator purchases a tram from a sales catalogue of today, it will either purchase an item from the past or else a contemporary tram that will restrict the flexible planning of the tramway in the locality for which it is required to operate. Helsinki took the opposite stance in its design concept; the tram needs to operate within the confines of the city street structure – hence the Transtech Artic tram design. Since the time Helsinki chose Transtech after a call for tenders, other manufacturers have offered trams according to the principals of the Helsinki Artic Tram, and for this reason the Artic is the "standard" tram of the future, having taken historic lessons into consideration.

It is the “back to the future” tram concept that should have been adopted a quarter of a century ago when low- floor technology began to take over from the B-type tram.

This family of Trams are now available in Standard Gauge, High Floor and TramTrain variants and with the very high standard of construction expected and enjoyed with Finnish manufacturing and engineering, at a price circa 3 million Euros, these cars would do well on UK rails and certainly raise the quality of the Light Rail offer.

Jim Harkins FCILT

Light Rail (UK)

Research material from Tom Heino's Book "Artic Back to the Future" available from LRTA

Many thanks to Mr Ollipekka Heikkila MD Transtech and Helsinki Tramways