

# The Arad Tram Modernisation- the most environmentally-friendly means of public transport.

by Eng. Gheorghe Falca, Mayor of Arad

**The town of Arad, situated in Northwest Romania, has the most extended tram network in Romania in relation to the population, namely 100 kilometres of track for 165,000 inhabitants. Tram is the traditional means of transport in Arad. The tram track coverage in Arad municipality is also very good: 17 urban routes and 5 suburban ones. During the year of 2007, 200 tram vehicles carried 7,362,000 passengers and the 22 routes amounted to 5 million kilometers covered.**

This year, the town celebrated 140 years of public transport, when the first horse-drawn trams were put into service on three routes.

They operated until 1916. A suburban tram line was inaugurated in 1910, connecting the town to the Arad Vineyard Region, the agricultural products supply source for the town's markets. The line Arad – Podgoria was electrified in 1913, becoming the first such tramline in Romania and among the first in the world. In 1946, the electric tram was put into operation in Arad and since then, the network has gradually extended, along with the urban development.

For the last four years, Arad has invested extensively in tram transport modernization, as this is the most environmentally-friendly means of transportation and at the same time, the one

the people of Arad use the most. At present, Arad Municipality is carrying out the most important urban transport project of Arad, co-financed by the European Bank for Reconstruction and Development that imply the rehabilitation of urban infrastructure on the main axis of Arad, from its Western entrance to its exit towards Timișoara.

The first stage of the project, amounting to over 30 million Euros will be completed by the end of this year and modernizes 11.765km of track and the adjoining roads. The works for the second phase of the project, starting next year, will cover 6.39km of track

The project consists of rehabilitating the



The Arad road/rail bridge



Original tracks fastened with screwspikes

1000mm gauge tram track by replacing the old, worn-out S40 rails which were fixed by screwspikes directly onto the wooden sleepers.

The rehabilitated tracks utilise a far more modern system, whereby the S49 and Ri60N rail is fixed to new concrete sleepers by the FASTCLIP FD rail fastenings. These fastenings are designed for mainly tram track and traffic conditions with lower levels of axle load, speed and curve – therefore typically suited to trams operating low or medium density operations, such as those in Arad.

This fastening system has no threaded components – anchorage is by cast-in shoulders that hold the rail at the correct gauge and FASTCLIP FD automatically sets the deflection.

The shoulders are set into the sleepers during the sleeper manufacturing process.

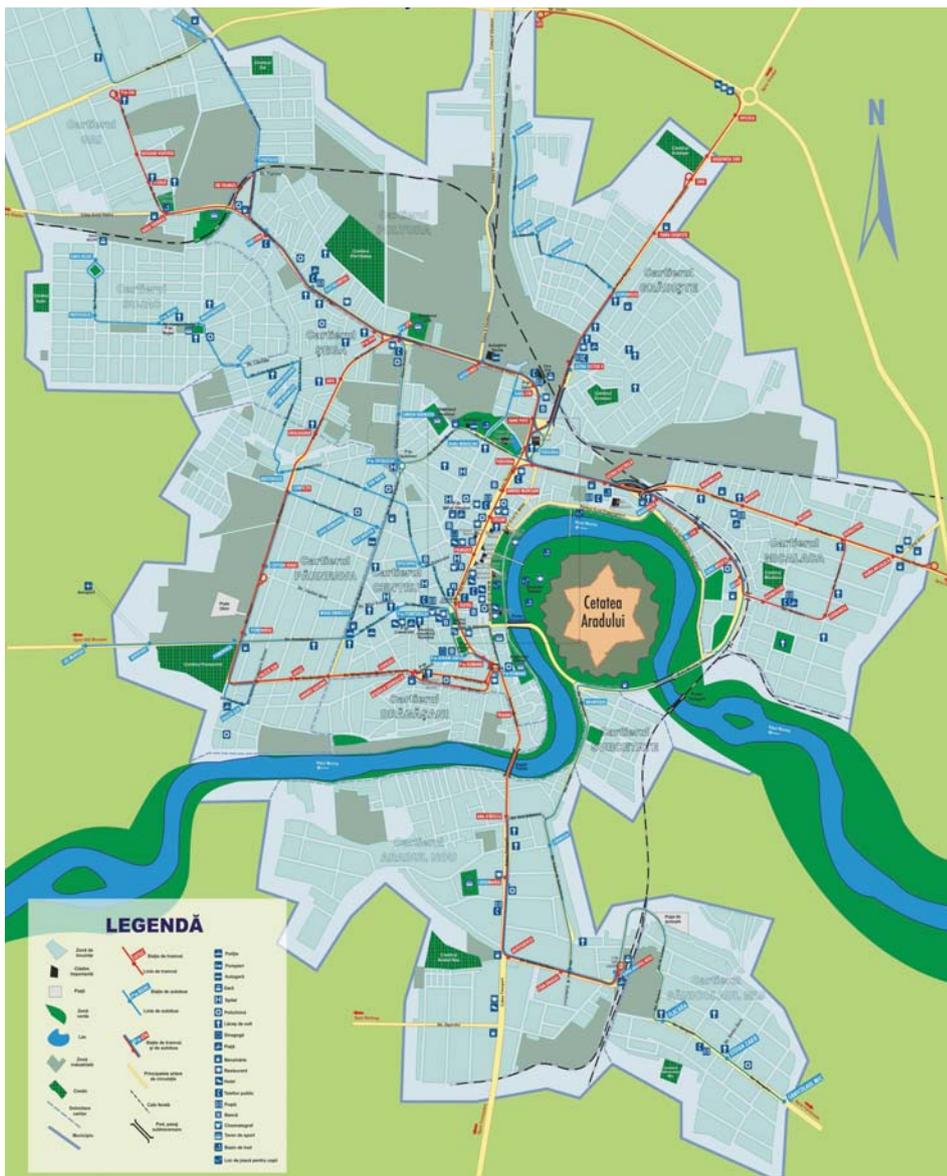
Out of the entire route length, about 75% is on concrete sleepers and the remainder on concrete slab track.

**The main features of the track are:**

- track gauge 1000mm
- minimum radius 50m
- uncompensated cross acceleration 0,65 m/s<sup>2</sup>
- shock co-efficient 0,40m/s<sup>3</sup>
- maximum allowed declivity 45 0/00
- sleeper spacing 0,75m
- rail inclination: 40:1 for Ri60N rail, 20:1 for S40 rail

**The main features of the rolling stock are:**

- static load on axle 12 tonnes



Caption here please



Modernised track with Pandrol Fastclip FD fastenings



- wheel diameter 900mm
- cart axle base 1800mm to 2000mm
- wagon axle base 6000mm to 10000mm
- utility wagon axle base 3000mm to 6000mm

The works contract for the Arad Urban Transport Project was awarded based on open public tender, with pre-selection, in accordance with the EBRD Procurement Policies and Rules.

The project required an elastic rail fastening system and based on this requirement, the Pandrol FASTCLIP FD assembly was selected by the Contractor. Tender procedures don't allow the Municipality to choose the suppliers, but we are pleased to say that the Contractor's decision meets all our technical requirements and international quality standards.

The track was mounted in accordance with the project design and the tender specifications, Pandrol FASTCLIP FD met UIC 864 norm and complies with the international standards. On the sections where the track is mounted on sleepers, the track has been de-stressed by dismantling and reinstalling it, followed by welding. This technological requirement was easily accomplished, as the dismantling and installing of the FASTCLIP FD is performed in a single operation.

This method ensures a high productivity, namely fast and easy installation and this is one of the reasons the Contractor appreciates the



simplicity and the efficiency of the FASTCLIP FD rail fastening.

In 2010, Arad municipality also plan to start the works for the Old Historic Centre Rehabilitation, another important project for the municipality, financed by European Union structural funds. It includes the modernization of 1.80km of tram tracks and the catenaries in the old historic centre and also 0.4km on the "Traian" Bridge. At the same time, we intend to make an investment in rehabilitating 0.75km of tracks inlaid in the carriageway on Renaşterii Street. ■

*\*Eng Gheorge Falca is also President of the Romanian Municipalities Association. Mr Falca is a great supporter of the continued development and expansion of the tram network, believing that continued investment in public transport is the only way to Arad achieved its goal to have modern and less polluted public transport. Arad has received an award for the development of the local tram transport system at the Romanian Railway Gazette, and at European level it was nominated for the European Mobility Week awards in 2008 alongside Frankfurt ( Germany) and Koprivnica (Croatia) on traffic issues.*