



Adaptive control system (ACS)

# Tasks:

- Make ACS affordable;
- Ensure ACS effective work in oversaturated conditions;
- Decrease labor cost of signal timing; optimization and performance analysis.

# Input

- T7F model
- All kinds of traffic data, including:
  - Traffic detection information:
    - On line,
    - Off line,
  - Manual counts,
  - Data from simulation models.

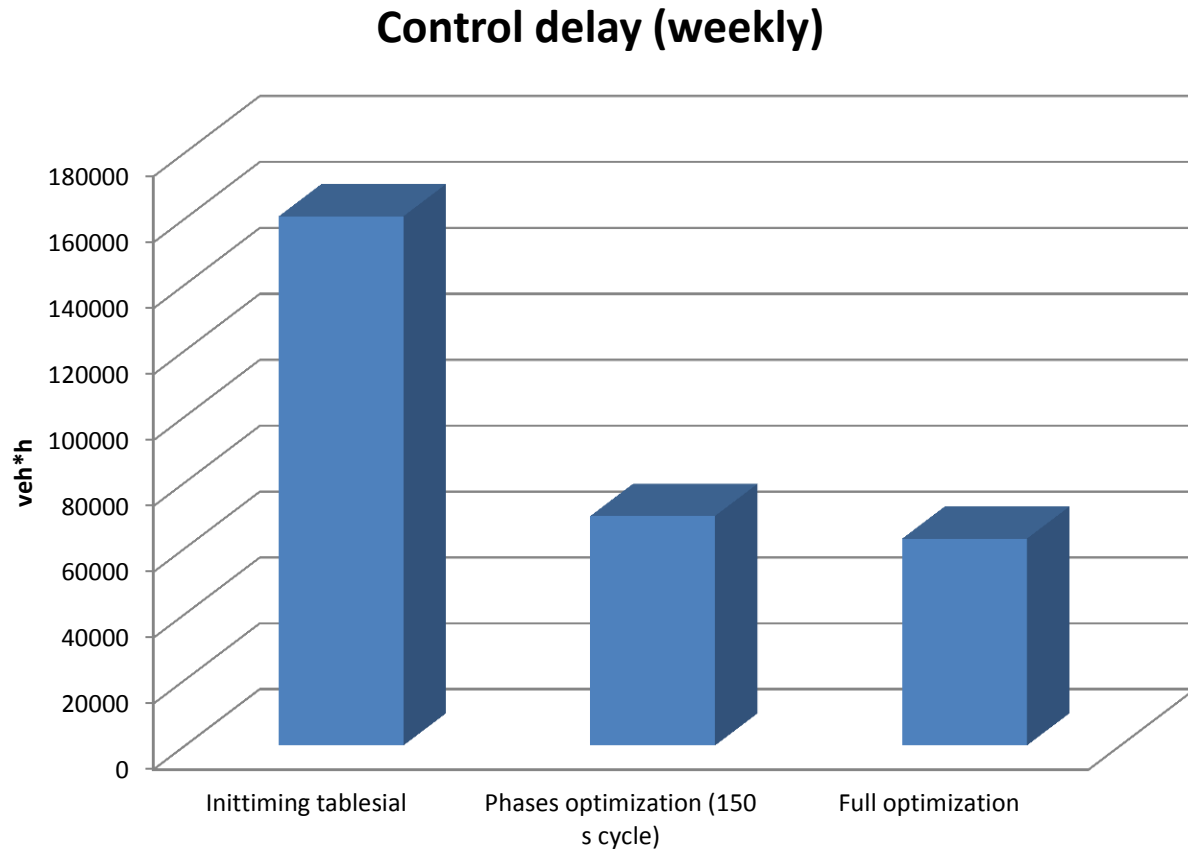
# Processing

- Traffic data quality assurance,
- Traffic data processing and assignments for each link,
- Calculation of required set of timing intervals,
- Optimization of timing tables with the use of T7F, AGA (saturation based), or Expert (field-proven) algorithms,
- Calculation of performance indexes,
- Calculation of phase lengths limits,
- Forming of Schedule considering controllers constrains.

# Output

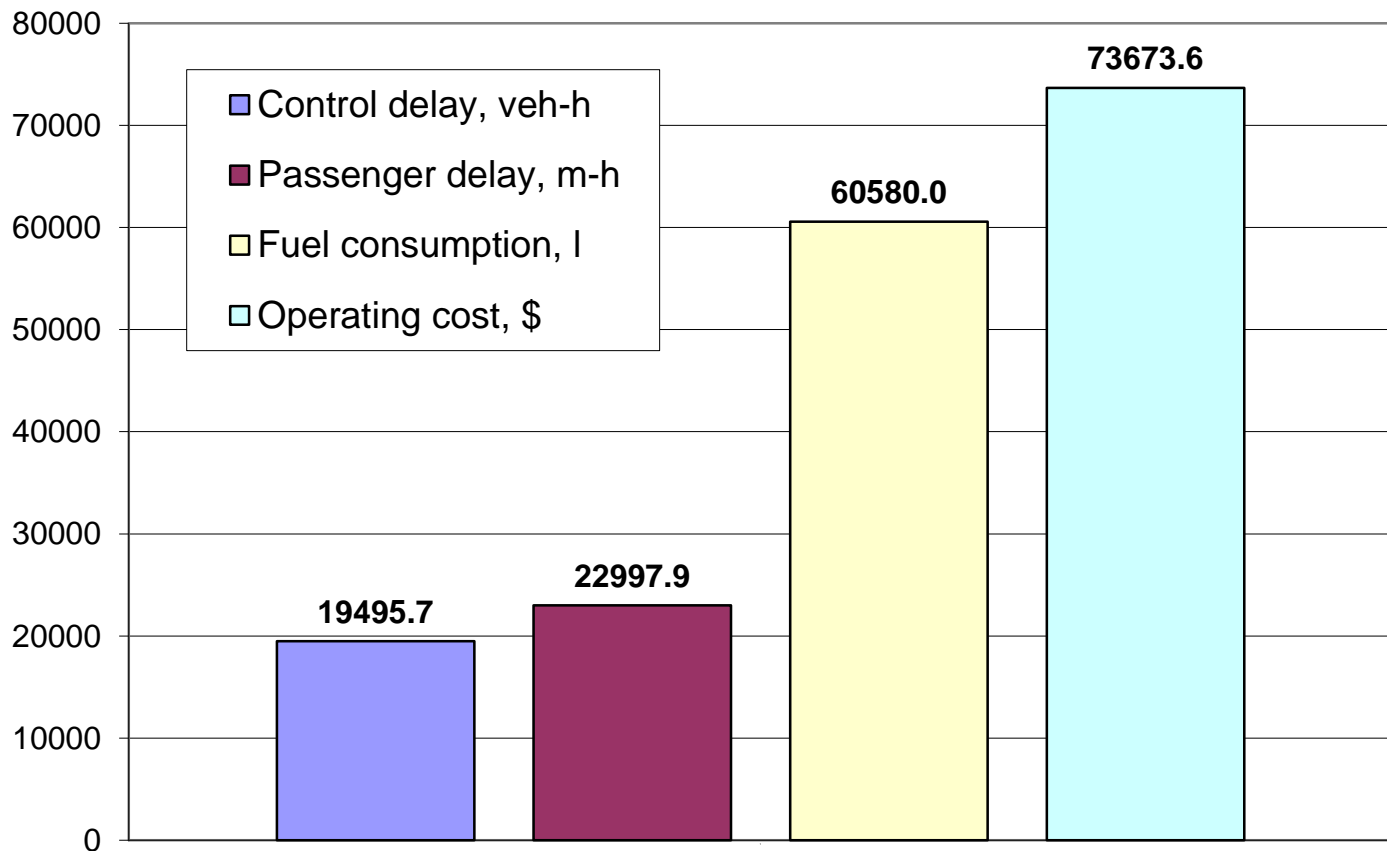
- Optimal timing intervals,
- Week sets of optimized timing tables with Performance indexes,
- Phase lengths limits for local adaptive control,
- Week set of optimal timing tables with the consideration of controllers technical constrains.

# City of Tumen, Russia: optimization based on manually collected traffic data



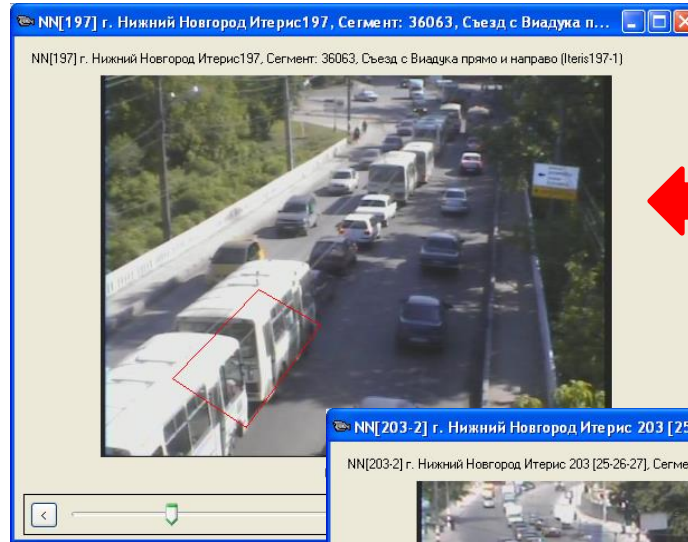
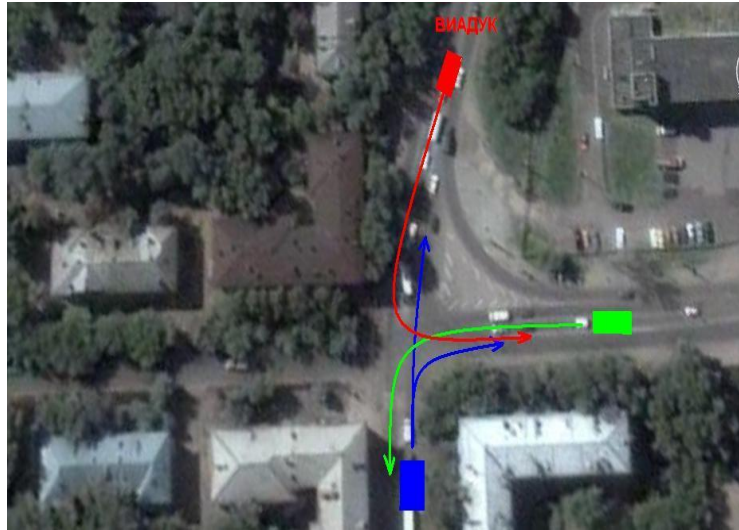
# City of Nizhniy Novgorod, Russia: Optimization based on video detection

**Customers benefits from ArteryLite based ACS  
for the intersection Dolzhanskaya-Murashkinskaya,**



# ArteryLite ACS Algorithm

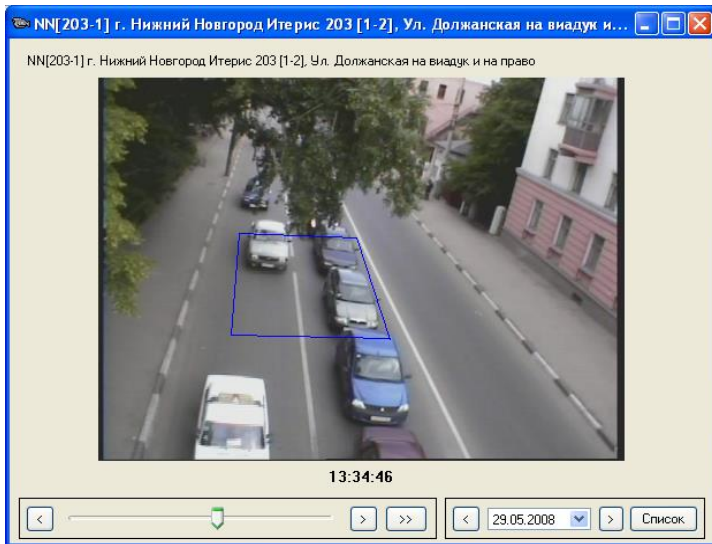
Calendar Set of Optimal Timing tables recalculated weekly based on collected statistical traffic data + Semi-Actuated turning of each timing table in allowed limits



Red and Green detectors form demands for 2<sup>nd</sup> and 3<sup>rd</sup> phases



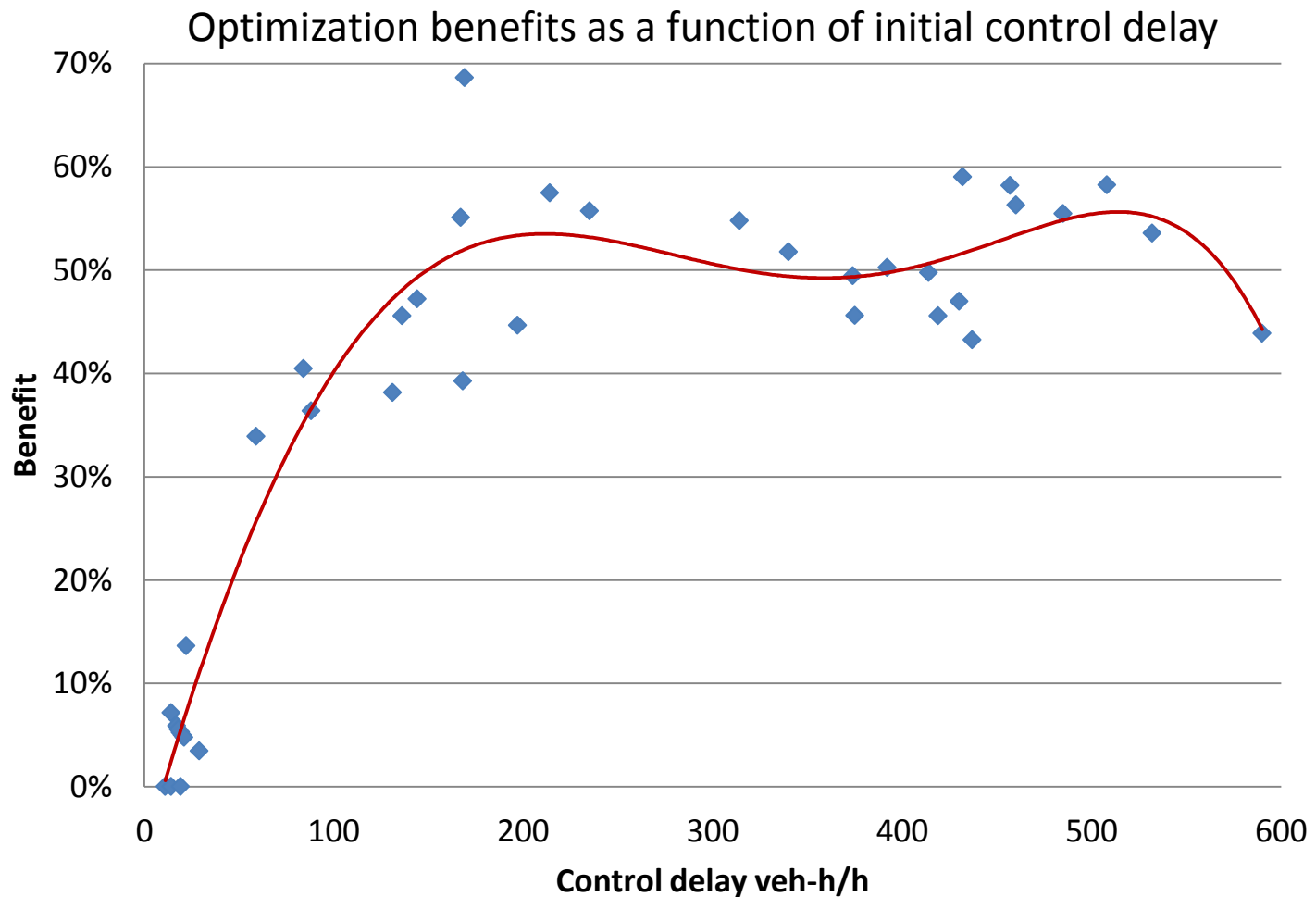
Dolzhanskaya –  
Murashkinskaya  
intersection,  
Nizhniy  
Novgorod,  
Russia



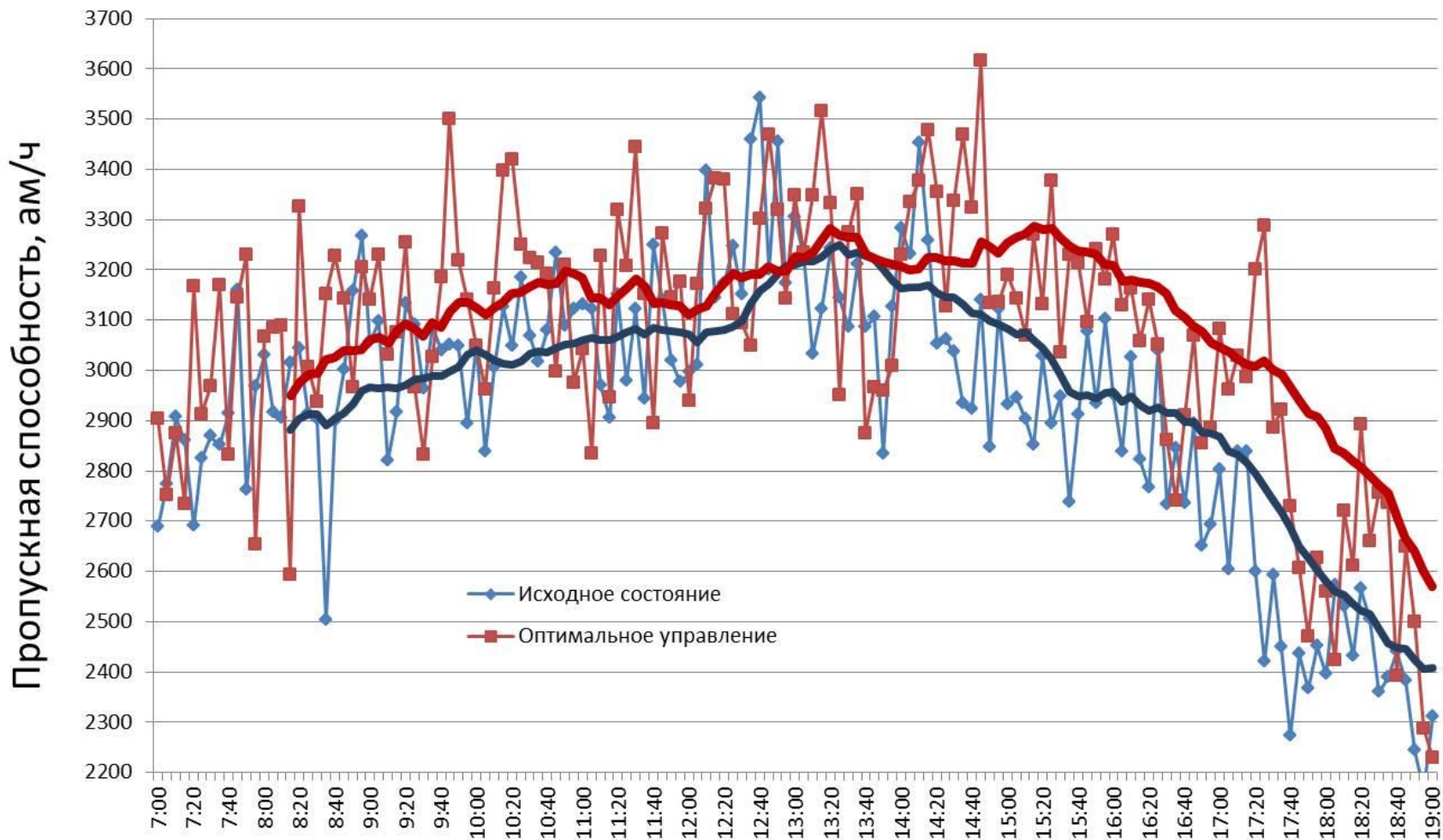
Blue detector controls main approach. By its demand BLUE phase will be at possible maximum



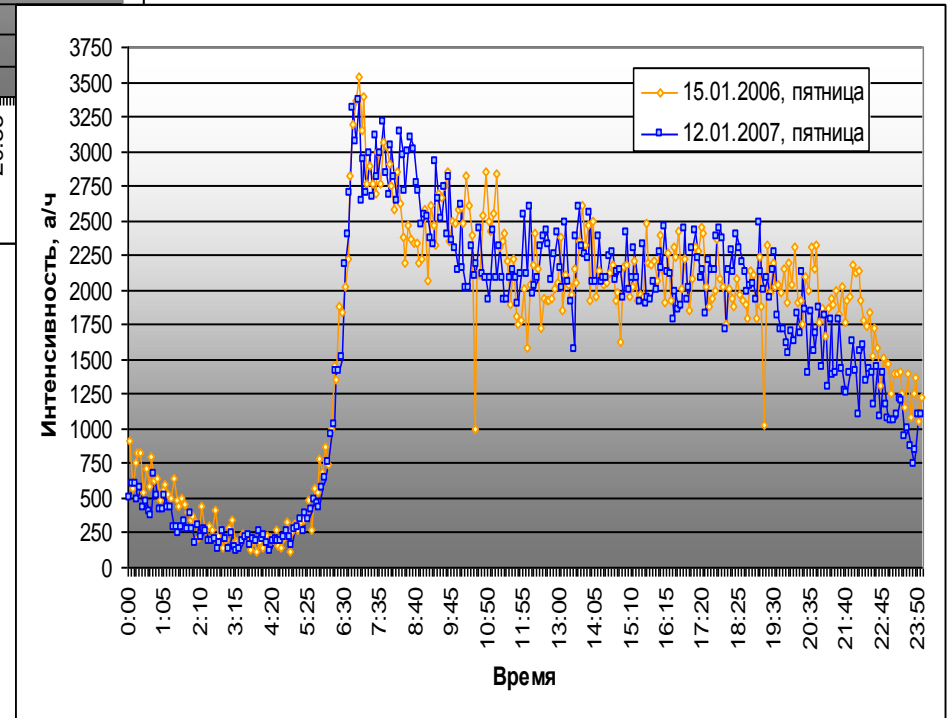
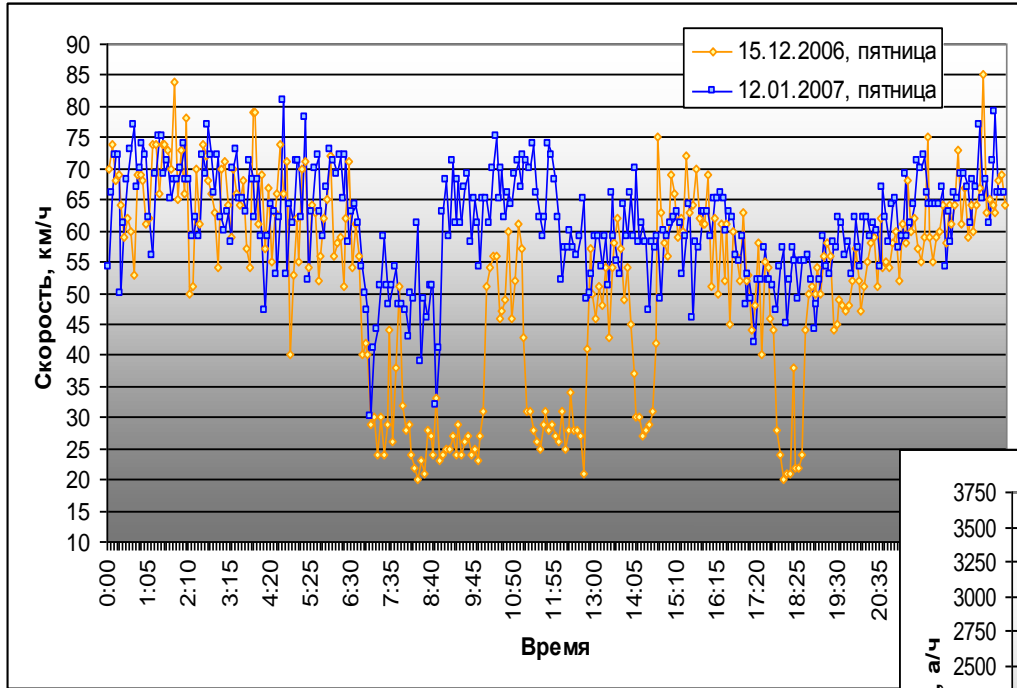
# ArteryLite optimization performance



# Road capacity increase with ArteryLite ACS (video detection based)

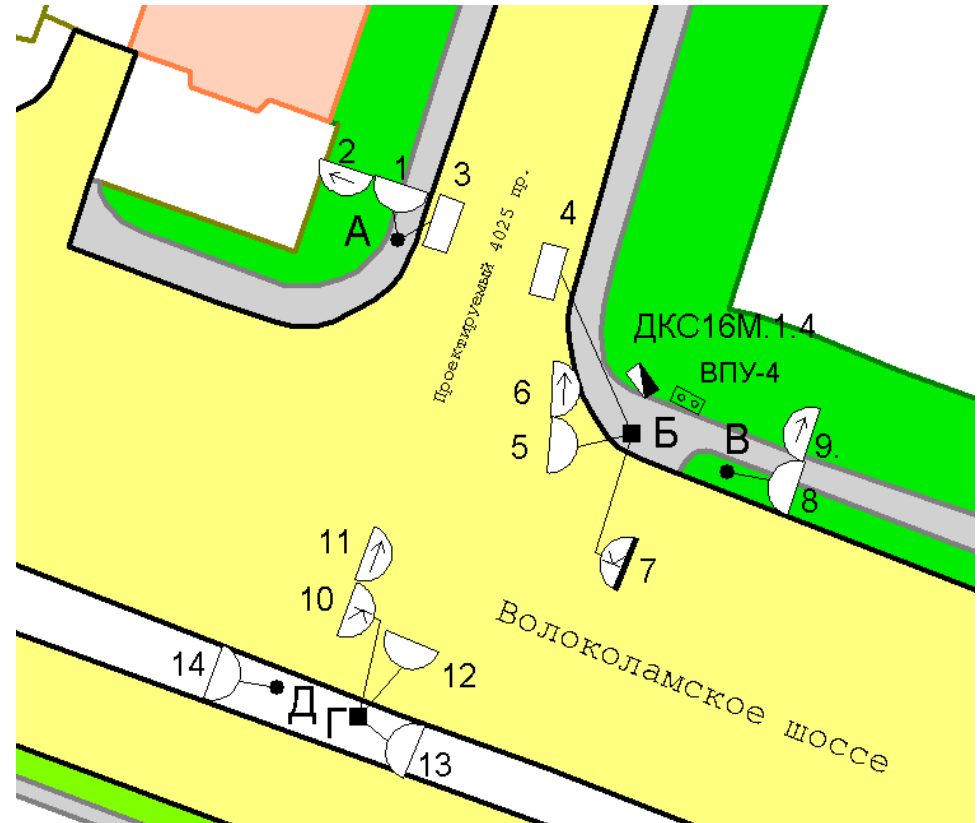


# Congestion control with the help of ArteryLite ACS



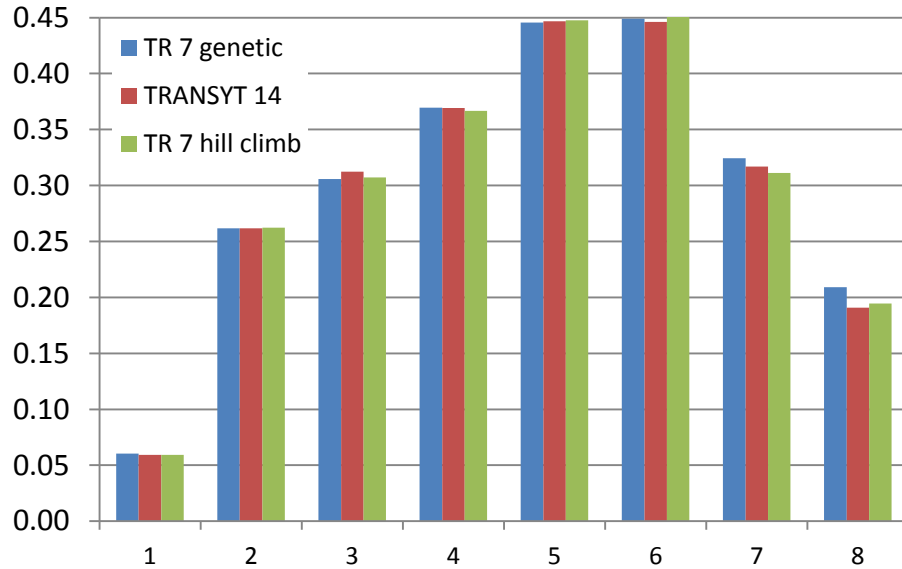
# ArteryLite+T7F versus Transyt 14 (1/6)

## Test Intersection



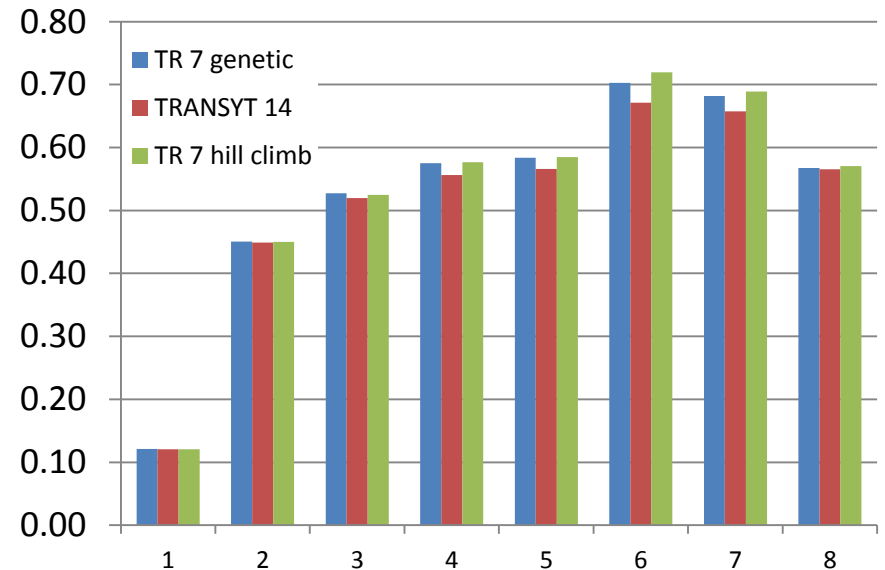
# ArteryLite+T7F versus Transyt 14 (2/6)

## Saturation indexes



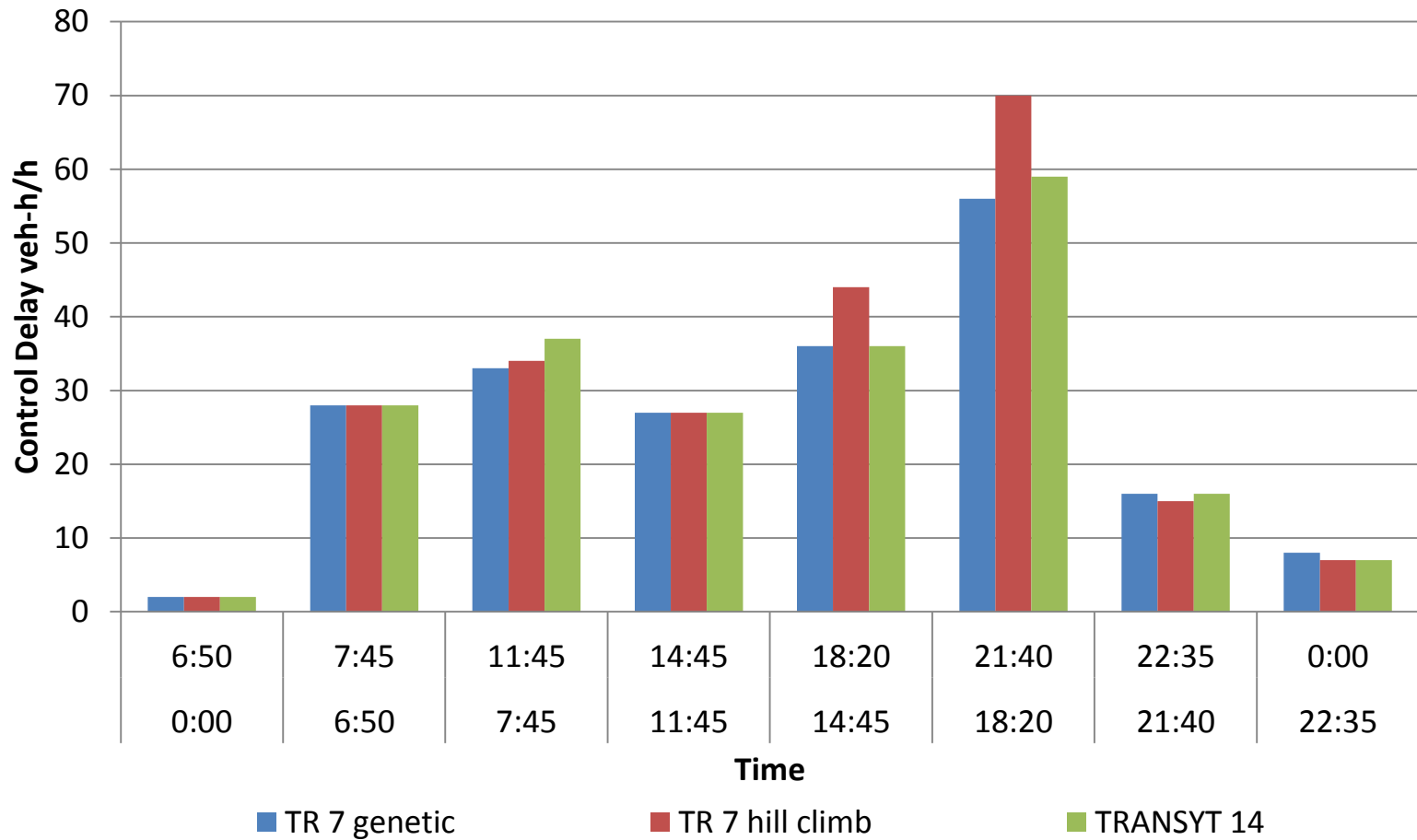
Case #1

Case #2



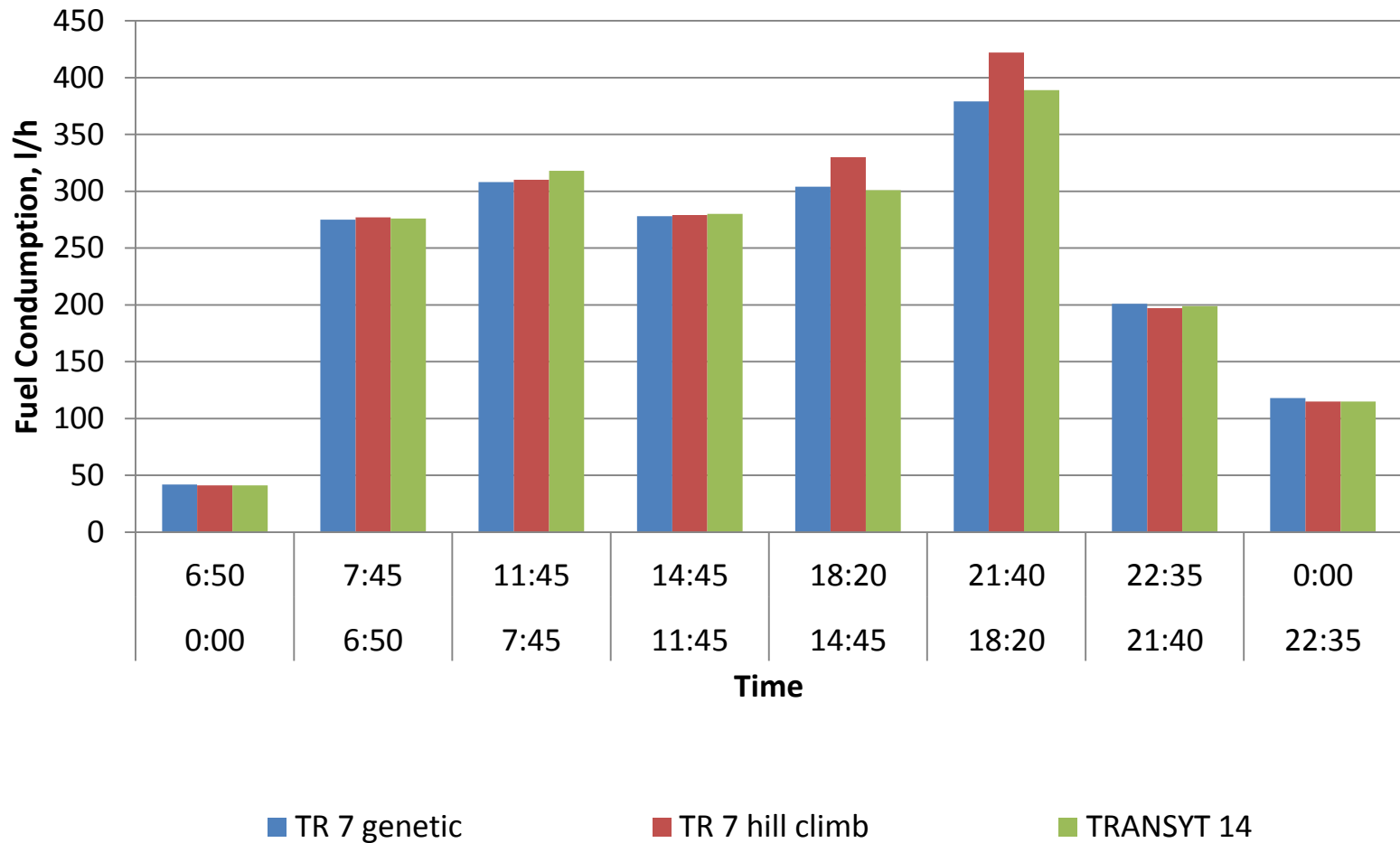
# ArteryLite+T7F versus Transyt 14 (3/6)

## Case #1 – Control Delay



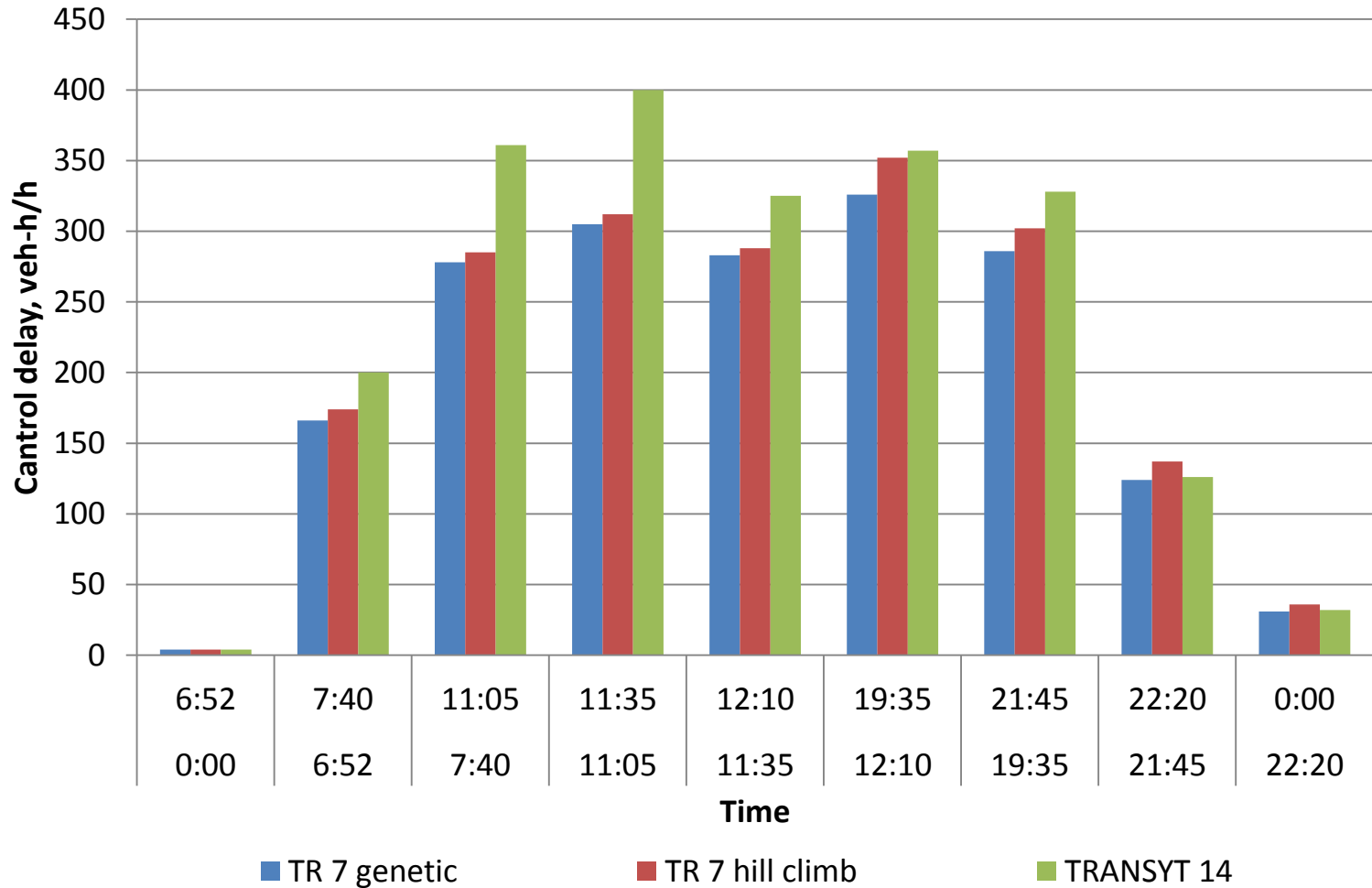
# ArteryLite+T7F versus Transyt 14 (4/6)

## Case #1 - Fuel consumption



# ArteryLite+T7F versus Transyt 14 (5/6)

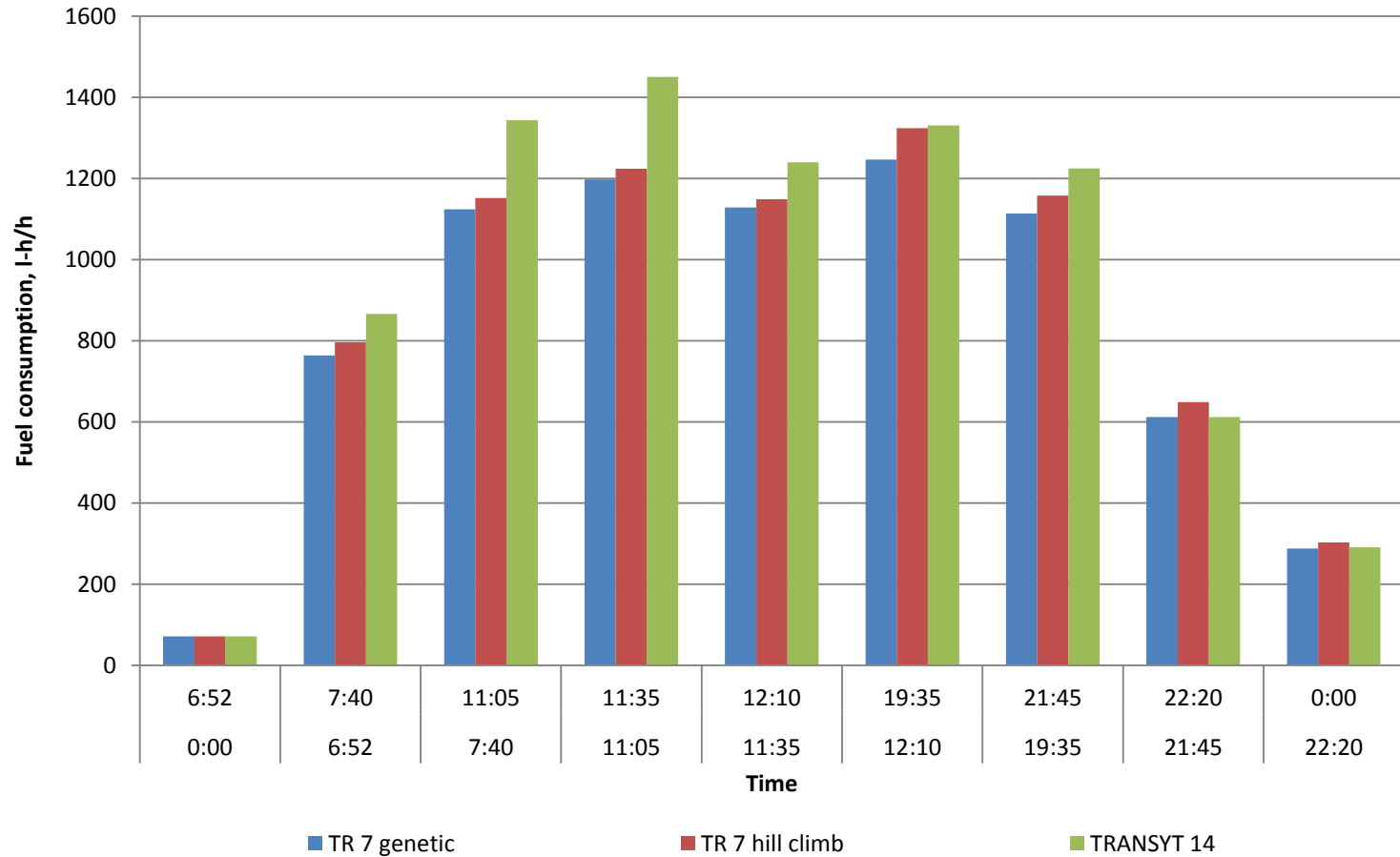
## Case #2 – Control Delay





# ArteryLite+T7F versus Transyt 14 (6/6)

## Case #2 - Fuel consumption



# T7F : Initial Timing Tables and their influence on optimization results

