ROAD TRAFFIC CONTROL SYSTEM VIA INDUCTIVE LOOPS IN ORDER TO PRIORITIZE TRAMS IN A ROUNDABOUT

Sanda BOGDAN [1]
University of Oradea
[1]sandaromocea@yahoo.com

Abstract— Case Study on adaptive solution facilitates deployment of traffic light tram traffic prioritization in relation to the phase of conflict designed cars in the points which are intersections of tram lines and the lanes car Independence Square of Oradea, Bihor County. Description of the chosen solution for optimizing traffic by prioritizing traffic in relation to the phase trams designed cars will require abolition of the intersections with traffic lights and intersections to configure other decongestant and road flow in this area too.

Keywords: Traffic optimization, adaptive traffic lights, prioritize trams, inductive loop detectors, traffic, traffic lights operating diagram

I. INTRODUCTION

CASE Study on Implementation of adaptive Traffic Light solution facilitates prioritization of trams in relation to a motor vehicle intended primary destinations phase in the conflict points are the intersections of tram lines and the lanes car Independence Square of Oradea, Bihor County.

The description of the chosen solution for optimizing traffic by prioritizing traffic trams in relation to a play designed cars.

Due to friction between the rail and tram wheels found a degree of usage of tram rails, thus becoming a threat to safety of passengers in such conditions can always derail trams if not traveling at a speed much lower than the movement Under normal conditions. This inconvenience imposed regulatory measures to reaching solution amending the path of the tram route and also reconfiguring intersections geometric Independence Square.

The solution presented at the meeting submitted to the movement, (author part of this committee) has led to the possibility of including this intersection traffic circuit executing a so-called "Turbo to turning" to decongestants and take the road flow in the area. This goal led to the cancelation of street intersections with traffic lights Cantemir - Marshall Way and the Averescu street- The 3 Cris - H. Heine street - the Civic Center street– "1 December" Square following that regulating the

movement to achieve both mixed signs, and through traffic lights.

Geometric configuration of the zone subject to change by the so-called "Turbo to turning" led to the creation of two areas ,, the conflict "between the tram and car traffic lanes, preventing the traffic in the roundabout of vehicles covered by the indicator, but especially not ensure safe passage through them ,, trams conflict "concerning the safety of trams crossing in good condition, and primarily streamline the flow of vehicles in the area ,, the conflict".

Drivers, to ensure the two directions which may approach from trams, are practically obliged to reduce speed until the vehicle stops and trams as leaders are forced to slow to a stop and crossing ,, the conflict zone "only when the goodwill of a car driver stopped giving priority flow trams and all of them require traffic lights, and this led to the development of a project that has been assigned to solving the author [1], [2].

Analyzing the above presented, to start drafting a project to prioritize trams in relation to motor vehicles designed phase, phase in which the author of this thesis has contributed.

II. CASE STUDY ON IMPLEMENTATION OF ADAPTIVE TRAFFIC LIGHT SOLUTION BY PRIORITIZING TRAFFIC IN RELATION TO THE PHASE TRAM VEHICLES IN CIRCULATION INDEPENDENCE SQUARE IN ORADEA.

The so-called "Turbo to turning" Independence Square ,, has two areas of conflict "with tram lines, intersection and the intersection B, shown in plan in Fig. 1. intersections. Conflict resolution will be the indicator for the tram, it is a means of transport high-capacity rolling their own way and limited opportunities for maneuver.

This regulation does not ensure increased safety but traffic in the area. Safety tram crossing in good condition first and streamlining the flow of vehicles in the area ,, the conflict "will be achieved through the traffic light [3], [4]- [11] The classical solution would impose a two-phase traffic light traffic: the default one and other associated vehicles trams, launched only after a call

requested by a tram approaching from one direction or the other. So if there are trams, vehicles Phase permanent benefit their movement. If a tram approaching vehicles intended phase ends and is intended trams are passing phase.

The design theme required but prioritizing the phase designed trams in relation to motor vehicles, which can not be achieved through conventional traffic lights [5].

For security reasons, fluency and rhythm, prioritization will be done but with certain constraints. For example, if a number of trams approaching the intersection, only the first phase will immediately benefit from being able to cross the traffic intersection [6], [7].

Basically few adjustable parameters of the program will adjust the traffic light rhythmic movement phase appearance and its maximum designed trams [8].

Initially, to enable serving trams without them stop at traffic lights, for early detection requires a period of time greater than or equal to the duration of the transitional phase intended for vehicles in the tram.

Thus, if the transition is performed within 3 seconds of flashing green ,, "plus three seconds ,, yellow" and still one second red ,, general "in total seven seconds, tram detection should be about 60 m before the point ,, the conflict ". It is assumed that the tram will travel the 60 m with an average speed of 30 km / h, [9], [10].
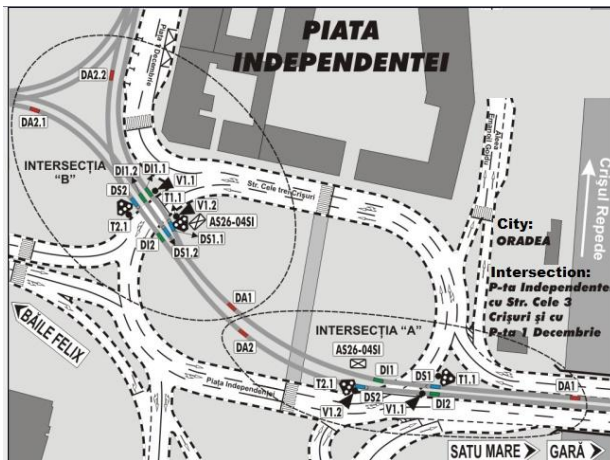

Fig.1. - Operation plan semaforizării intersections between lines tram and car traffic lanes version Independence Square traffic detectors and inductive loops [1]

In fact this interval, even if the tram is approaching at high speed (we consider the legal limit of 50 km / h in vehicles) must decelerate because approaching a conflict point "and that the traffic light is associated with indicator 'give way'.

Detection tram will be achieved through inductive loop located between the rails of the chassis, shown in SR 1848/5- .inductive loop located .

Each direction of travel of the trams will be equipped with three detection loops detailed in Fig. 3.
In Fig. 4. is shown loop anticipation, located about 60 m before the point of conflict, this loop is located in the

green space, an area which is provided with irrigation carpet of grass [11].

In order to remove any suspicion of wear and deformation due to inductive loops and wet environment due to irregularities presented by the substrate on which they were to be positioned, launched the idea of finding a solution that takes all these inconveniences due to location area configuration.

Fig. 3. - Detail Location inductive loop detection anticipation tram grassy area [1]

Fig. 4. - Covering natural grass inductive loop detection tram grassy area [1]

In other words, to find a solution by author by installing inductive loop in a material called,, TEGO" type rectangular hollow figure embedded necessary to preserve moisture carpet of grass material that consists of a laminated plywood used automotive and allows cutting a sense,, "the inductive loop to be installed without it being modified. Coverage loop and the ductus cut material will be made with a material called silicone

exterior,, "black. Fig. 5. shows in detail the realization inductive loop location in the protective conduit.
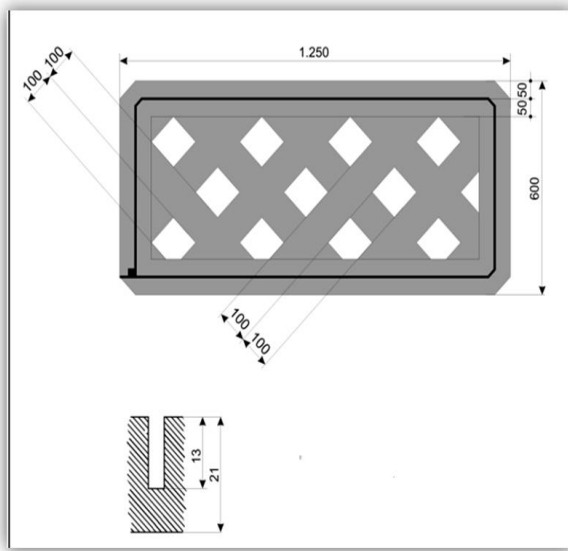

Fig.5.-Detail the location of the loop channel protection [3]

In some situations where the tram was detected in advance though, it fails to reach a reasonable time for any reason intersection may not receive the required phase. Yet he will come later and will be served in the intersection. This is achieved through the loop,, security ", located in the vicinity of the conflict. As long as it will signal the presence of the tram, the machine will serve traffic light phase trams allocated.

Loop,, safety "mounted about 3m before the point of conflict in the asphalt is shown in Fig. 6. It is noted that the geometric shape of the loop does not have full middle, removing it is to reduce labor costs for placement.

Fig. 6. - Detail Location inductive loop,, safety "for the detection tram in the asphalt [1]

,, Loop closure "or cancelation is to trigger the transition from phase allocated to the allocated tram vehicles. It cancels the effect of anticipated demand and opens a new cycle of detection. ,, Loop closure "or,, cancelation" located about 5m after point,, the conflict "is shown in Fig. 7.

Fig. 7. - Detail location,, inductive loop closure "for the detection tram in the asphalt [1]

It was followed by the realization of this goal and that a tram, which comes at a time lower than the one served with priority, and he will not be served by extending the time allotted extra trams phase. It will have to wait at traffic lights will be served in the next cycle. This feature of the operating algorithm will feature semaforizării adjusting the minimum interval between two trams finishes.

Issues related to the implementation of this goal are shown in Figs 8, 9 .

Fig.8.- Fireplace input protection tubes stranded copper conductor, which is connected with the automatic traffic light [1]

Fig.9. - Method of twisted pair multiwire cable 1,5-2,5 (mm^2) copper (at least 10 twists per meter) [1]

In Fig. 10. is shown a diagram of the intersection operation of P Independence Square.
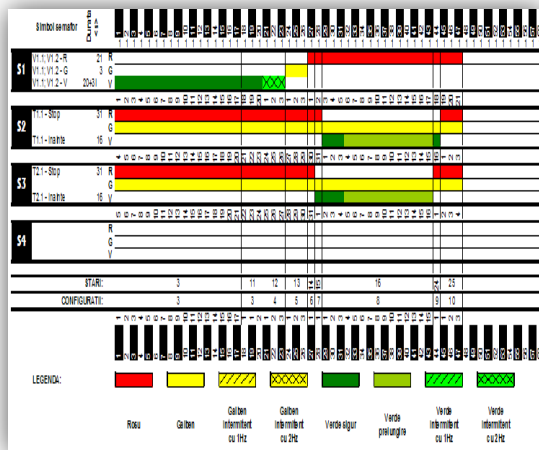

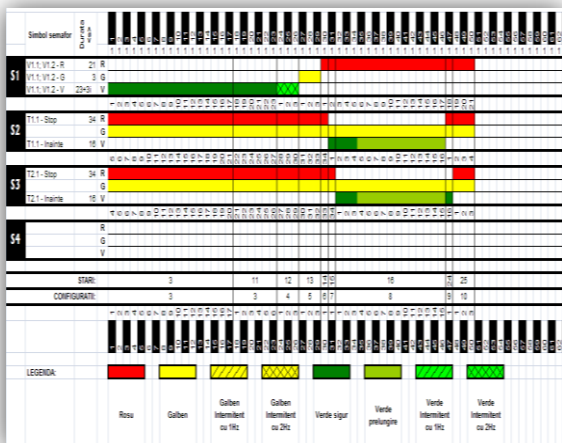Fig.10. - Operating Diagram intersection Independence Square in P [9]

Fig.11. - Operating Diagram B intersection of Independence Square P [9]

III. 3. CONCLUSION ON ADAPTIVE TRAFFIC LIGHTS

Traffic theory seeks to describe a mathematically precise as the interaction between vehicles and their operators (mobile components) and infrastructure (buildings components). Last lies in the system of roads and runways all operational components: control devices and traffic lights, signaling and monitoring.

In this way, these theories are indispensable for the design and construction of all types and facilities used in the design and operation of streets and highways.

Measuring the effectiveness of programs implemented requires a system for collecting traffic data, recording them in a reasonable period of transfer through a communication network in a final point of calculation and processing, plotting and analysis, compiling -the statistical reports.

A simple method at hand is local direct observation. The formation of queues at traffic lights, without that they are discharged from service following phase associated semaforizării shows a low efficiency.

Otherwise said, if a vehicle waiting for more than one cycle to the traffic lights, traffic lights program is not effective. At the same time and waiting at traffic lights, while traffic unloaded phases are conducted with consistent flows of vehicles, it is considered a weak adaptive traffic light program.

To eliminate these deficiencies author proposed solution for implementing adaptive semaforizării presented in this chapter and that solves the problem.

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