

adequate technical support, and continuously monitoring the system's operation to prevent possible negative consequences.

In conclusion, while countdown timer displays for traffic lights have the potential to improve safety and efficiency of road traffic, their implementation requires careful consideration of the aforementioned issues and the development of appropriate measures to address them. It is important to balance the potential benefits of this technology with its potential disadvantages to ensure the safety of all road users.

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COMPARATIVE ANALYSIS OF THE TRANSPORT FLOWS INTENSITY IN KHARKIV BEFORE AND AFTER 2022.

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The organization of traffic means a set of scientific, engineering and organizational measures that ensure the necessary level of efficiency and safety of traffic and pedestrian traffic [1]. Road traffic is characterized by the following parameters:

- traffic flow intensity;
- traffic flow density;
- traffic speed;
- traffic composition;
- delays of traffic flow;
- distribution of traffic flow by direction [2].

Traffic intensity is the quantity of vehicles that passed the cross section of a street or road per unit of time [2]. Traffic intensity can be expressed in the actual unit (car/h), when it is necessary to define the physical number of vehicles, as well as in consolidated units (units/h), when the traffic flow based on the comparison of the dynamic dimensions of the vehicles is reduced to a common car [2].

A year, a month, an hour and shorter time intervals (a second) can also be used as a calculation period of time for determining the intensity of traffic, depending on the task of observation. On the street and road network, it is possible to single out individual areas and zones where the traffic reaches its maximum size, while in other areas it is several times smaller.

Very important in the problem of traffic organization is the unevenness of traffic during the year, month, day and even hour. A sharp increase in motorization led to a change in the pattern of intensity fluctuations. Fluctuations in traffic intensity throughout the year are characterized by the coefficient of annual unevenness.

Sometimes there are unplanned factors that affect fluctuations in intensity during a month or a whole year. Such an example was the year 2022, when the displacement of the population as a result of hostilities in the city of Kharkiv caused significant fluctuations in the intensity of traffic flows on the city's roads.

Below is a comparative analysis of the intensity of traffic flows in Kharkiv before and after 2022 (Fig. 1-3). For the analysis, control points on the city's road network were selected, where traffic detectors are located, which record the intensity of traffic flow.

Traffic detectors are devices designed to detect types of vehicles and determine their movement characteristics in the controlled area of the street network [3].

IP traffic cameras are used as traffic detectors, which are located at the busiest nodes of the Kharkiv road and transport network. Information from traffic detectors is sent to the Data Processing Center, where it is processed and analyzed.

Control points	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Geroyiv Kharkova ave./P.Grigorenko ave.	304217	414642	509827	625920	678147	688059	705609	712587	606521	568093	532502	470418
Gagarina ave./Molochna st.	78921	50501	40774	386117	580059	587522	547476	525211	396536	484643	407246	157801
Gagarina ave./Odeska st.	49530	42137	20252	196270	507391	515683	483098	459349	471344	450324	315079	64800
Gagarina ave./Molchanovskiy In.	74856	100404	111403	257983	189370	196975	362445	391940	324097	276157	160289	52819
Vernadskogo st./Malomyasnitska st.	60764	44509	108747	188797	233522	246401	233492	197300	178650	161907	144272	71135

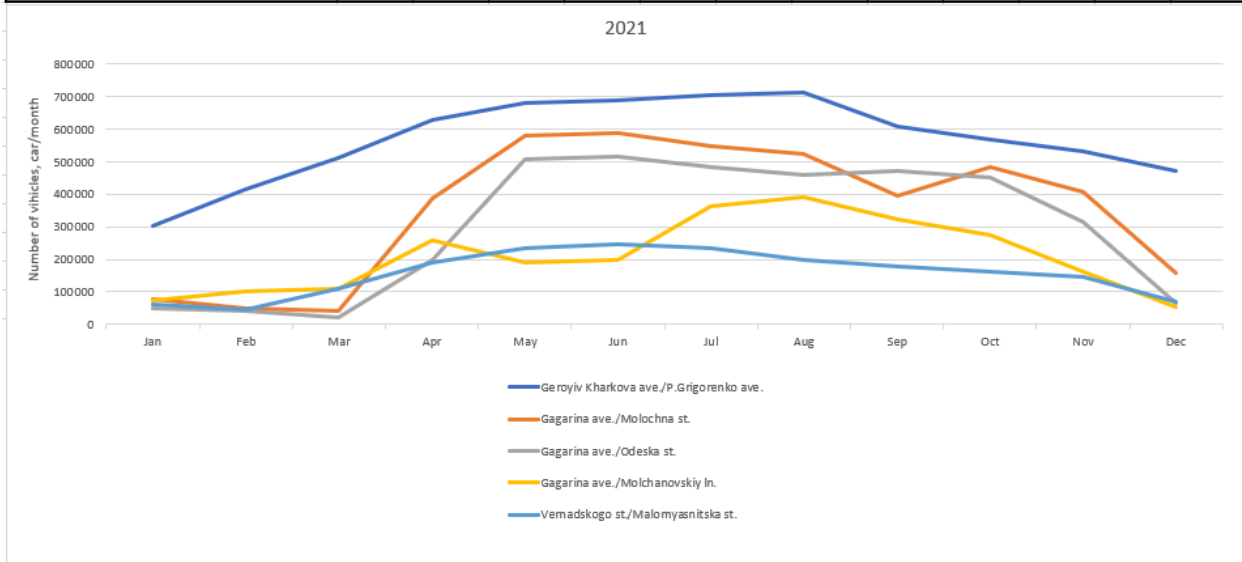


Figure 1 - Intensity of traffic flow in a more congested direction for 2021 by month at some intersections in the city of Kharkiv, auto/month.

Control points	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Geroyiv Kharkova ave./P.Grigorenko ave.	464684	478291	127878	188492	262240	182218	323097	331307	337104	306934	304765	303734
Gagarina ave./Molochna st.	120669	190382	66285	129283	165979	210862	229030	262543	245960	230292	168876	122492
Gagarina ave./Odeska st.	103166	135272	51370	154118	204404	241697	255977	236121	258996	206646	194435	96963
Gagarina ave./Molchanovskiy In.	33098	80449	42148	103091	143845	178006	187335	197405	161324	98891	138273	83795
Vernadskogo st./Malomyasnitska st.	85534	103591	14439	23875	49087	73554	39136	35678	32756	92355	90984	99722

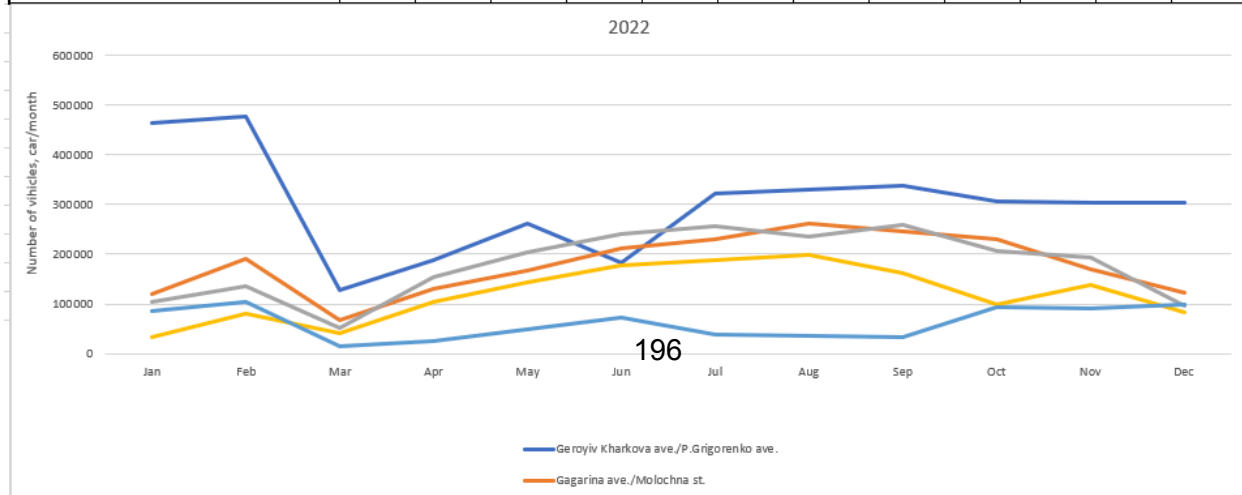


Figure 1 - Intensity of traffic flow in a more congested direction for 2022 by month at some intersections in the city of Kharkiv, auto/month.

Control points	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Geroyiv Kharkova ave./P.Grigorenko ave.	318645	310363	425718	513108	555722	565300	435848	590773	554601	537922	486230	396418
Gagarina ave./Molochna st.	132244	66190	134735	148486	104705	281712	256967	190338	203966	246284	140961	177697
Gagarina ave./Odeska st.	103483	69494	278173	338492	354480	346228	302590	359249	359482	328885	234574	204912
Gagarina ave./Molchanovskiy ln.	64309	80309	160403	221480	274290	277439	247413	258657	245874	220794	203635	192975
Vernadskogo st./Malomyasnitska st.	88458	88012	118361	143487	164036	162825	130677	101743	109067	138334	118486	108046

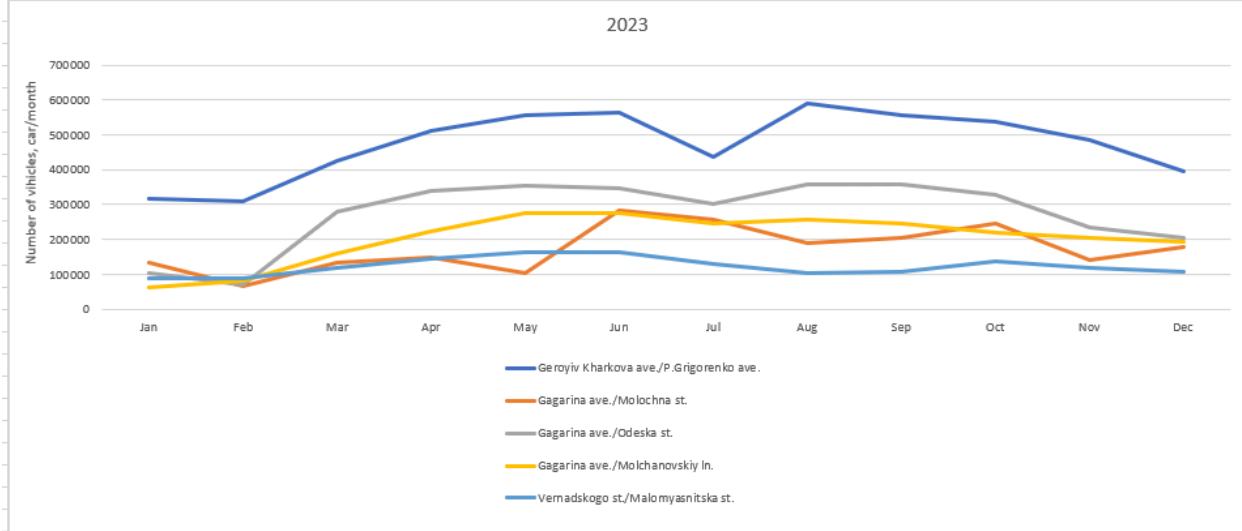


Figure 1 - Intensity of traffic flow in a more congested direction for 2021 by month at some intersections in the city of Kharkiv, auto/month.

The main advantages of IP camera detectors include: the possibility to provide video surveillance at any level of illumination, the ability to simultaneously observe traffic on 4 lanes of the road, operation in harsh conditions (-30 - 70° C with humidity less than 95%), low energy consumption (6 W maximum).

On the graphs, it is possible to observe that at the beginning of spring 2022, there is a significant sharp decline in the intensity of traffic flows on the city's road network, but already in 2023, the intensity approached 80 percent of the level of 2021, taking into account the decrease in the total number of the city's population.

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HOW EFFECTIVELY REDUCE TRANSPORTATION COSTS

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Transportation costs represent a significant portion of business expenses, especially for companies reliant on logistics and supply chain operations. Reducing these costs can lead to substantial savings and increased profitability. This essay explores effective strategies to minimize transportation costs, focusing on various methods, technologies, and practices that businesses can adopt.

Introduction. Transportation costs are a critical factor in the profitability of many businesses. These costs can be influenced by fuel prices, labor expenses, maintenance, and logistical inefficiencies. By effectively managing transportation expenses, companies can improve their bottom line, enhance operational efficiency, and offer more competitive pricing to their customers. This essay discusses strategies to reduce transportation costs, including optimizing routes, leveraging technology, negotiating with carriers, and implementing sustainable practices.

Optimizing Transportation Routes. One of the most effective ways to reduce transportation costs is through route optimization. This involves planning the most efficient routes for delivery vehicles to minimize fuel consumption, travel time, and overall expenses.

Route Planning Software. Investing in route planning software can significantly