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Studying the Experience of Full Breakage on the Streets of Karshi in Kashkadarya Region

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ABSTRACT: The article shows that local but powerful and one-sided acting refractive fields can be formed in built-up areas. To study the influence of various factors on the formation of refractive fields in the streets of modern cities on the basis of experimental research shows the optimal ways to account for horizontal refraction in the districts of Karshi, Kashkadarya region of the Republic of Uzbekistan.

KEYWORDS: Built-up area, warm radiation, local, heated surfaces, experimental studies, optimal paths, meteorological measurements, solar radiation.

I.INTRODUCTION

In modern technology of high-precision angular measurements, the most important reasons limiting the accuracy of horizontal angle measurements are not instrumental errors, but errors caused by the external environment and, mainly, lateral refraction.

The study of this phenomenon and the elimination of its harmful effects should be the first task of science and production, if desired, to improve the accuracy of triangulation and polygonometric networks.

Large-scale mapping, making more and more high requirements for geodetic justification and, in particular, to the accuracy of angular measurements, forced to revise the previously established scheme of construction of the main geodetic justification and replace it with a new, more perfect.

The new scheme of the main geodetic justification shortens the length of the sides of polygonometry due to the need for a greater density of points. This circumstance, in turn, leads to a decrease in the sighting beam over the underlying surface as the visibility between the points opens directly from the Ground. As a result, we have a certain deterioration of the conditions of the sighting beam with the simultaneous requirement to improve the accuracy of angular measurements in this regard, it is necessary to raise the question of the influence of lateral refraction on the accuracy of horizontal angles in urban polygonometry. there Is a need to begin studying the effect of lateral refraction in urban polygonometry of classes III and IV.

In built-up areas, local but powerful and one-sided acting fields of refraction can be formed. They arise as a result of thermal radiation of the walls of buildings heated by the sun, or under the influence of technological processes taking place inside the premises. The horizontal gradients of the refractive index of such fields near the heated surfaces can be 2-3 orders of magnitude greater than the corresponding gradients of the refractive field existing above the city. It can be assumed that the effect of horizontal refraction on the results of angular measurements performed at the walls of buildings will be very significant.

For a detailed study of the influence of various factors on the formation of refractive fields in the streets of modern cities and the search for optimal ways to account for horizontal refraction, we carried out experimental studies in two districts of Karshi, Kashkadarya region of the Republic of Uzbekistan by setting volumetric meteorological measurements in the summer on the streets

Meteorological measurements included multi-day, hourly and synchronous measurements of air temperature by Asman psychrometers at an altitude of 1.5 m above the surface across (across the street) normal to the building line.

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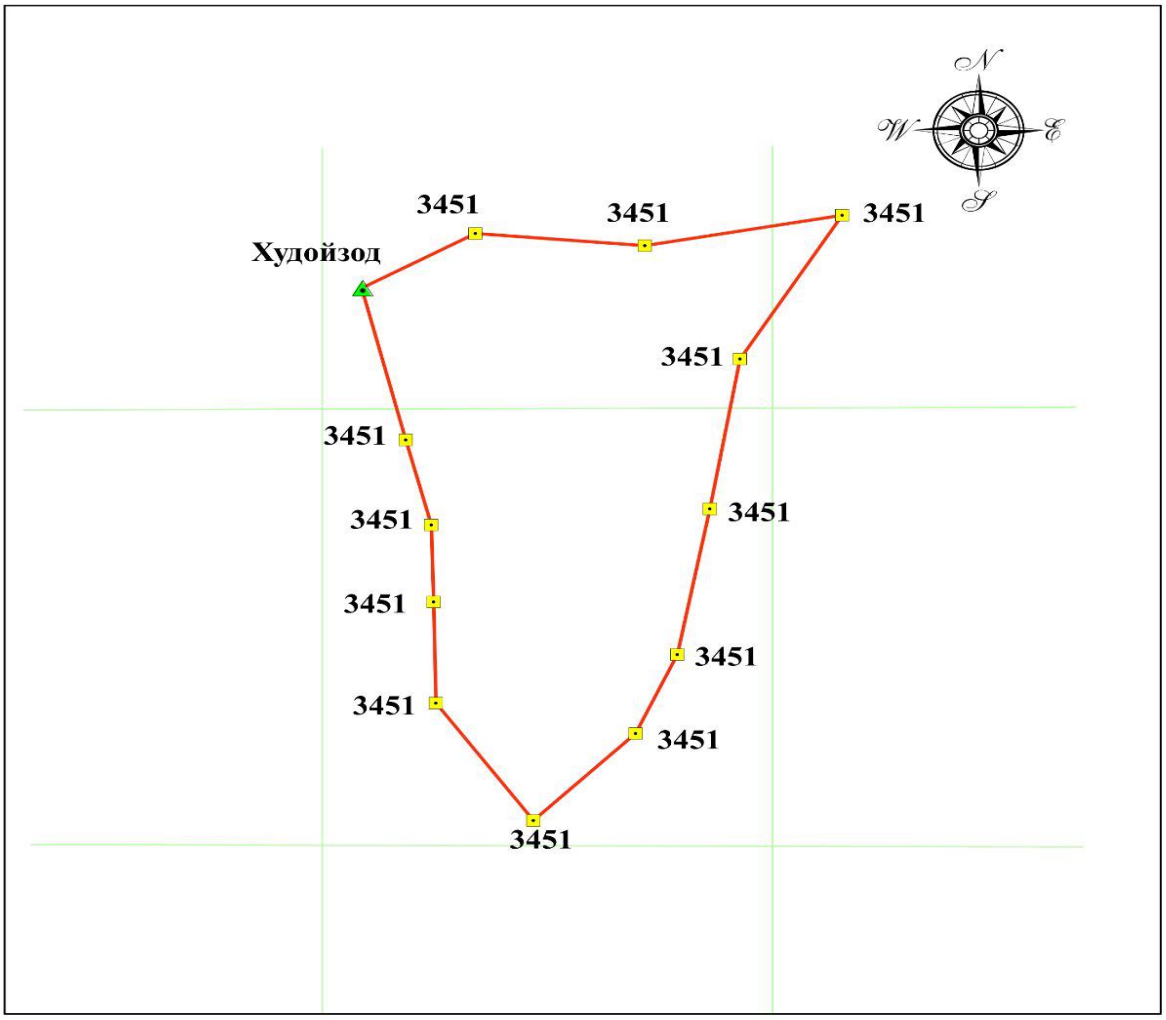

Scheme of the experimental network.

The temperature determination points were located at a distance of 0.5 m, 1.0 m, 2.0 m, and 3.0 m from the heated wall, then over both sides and the edges of the axis of the roadway, and then at several points over the sidewalk of the opposite side of the street. At one point of the studied field, measurements were made of wind speed with manual anemometers, pressure with aneroid barometers, and humidity with psychrometers. Much of the experimental work was accompanied by the determination of direct, scattered reflected and total solar radiation-actinometer and pyranometer.

According to meteorological data, numerous hourly maps of isotherms of temperature fields of Karshi city streets have been compiled and temperature profiles of streets have been constructed. From the analysis of maps of isotherms of streets with dense bilateral building it follows that isotherms are located along the street reaching the greatest density near the walls heated by the sun. For one-way streets buildings and the slope of the isotherms may cross the eating part. Horizontal temperature gradients near the heated walls reached 0.6-0, 0.8 ^{0}C, and sometimes 1,2 ^{0}C or more per meter and were maximum in the direction perpendicular to the building line. This is consistent with the danpo meteorological data numerous hourly maps of the isotherms of the temperature fields of the streets of Karshi city have been compiled and temperature profiles of the streets have been constructed. From the analysis of maps of isotherms of streets with dense bilateral building it follows that isotherms are located along the street reaching the greatest density near the walls heated by the sun. This is consistent with data [3,5] obtained in other CIS cities. In clear hot weather, small temperature gradients up to 0.2-0,5 ^{0}C per meter, the sun-besieged walls, were observed up to 8 -10 hours and from 17-19 hours.

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The magnitude of the horizontal gradient varied from the intensity of solar radiation, orientation, weather conditions, time of day, building density, distance to the heat-emitting walls of buildings, their material, color, surface roughness, etc.

Temperature gradients are especially high in clear hot weather in the absence of wind and trees, shading the walls, in continuous construction or in buildings of great length. An important role in this is played by the height and azimuth of the sun, which determines the amount of radiant energy entering the vertical walls. In the midday hours, the maximum arrival of solar radiation is observed and, under other different conditions, the most powerful fields of refraction were formed at the southern walls.

Analysis of hourly and daily amounts of direct solar radiation arrival showed that 20-25 days in the summer month can be expected the appearance of strong fields of refraction on city streets.

In cloudy and semi-Sunny windy weather and on the shady side of the street, temperature gradients weaken several times and become insignificant. However, the direction of the gradient near the walls does not change. According to studies [1,2,4]it is observed at night.

As the distance from the walls of the Sunny side of the street in clear weather, horizontal temperature gradients rapidly decreased and at a distance of 2-2. 5 m, were generally no more than 0.2-0,3 ^{0}C per meter.

Calculations of corrections for horizontal refraction, performed according to the known formulas of N. B. Rabinovich and H. Moritz, taking into account the obtained meteorological data, showed that for directions passing near the heat-emitting walls, at a distance of 0.5-1.0 m, they can reach 10-20 and more.

On the basis of the conducted researches it is possible to draw the following conclusions and recommendations:

1.On city streets, powerful and one-sided acting fields of refraction are formed, causing horizontal refraction of light rays. These are fields of the second kind, in which the gradient vector of the refractive index of air remains constant throughout the day. The power of these fields depends on the intensity of solar radiation orientation of streets, time of day, weather conditions, the nature of construction, heat-absorbing properties of the walls of buildings, the presence of green spaces, etc.

2. The isotherms of the temperature field determining the field of refraction mainly follow the building line, and horizontal temperature gradients in close proximity to the sunlit walls of buildings in clear weather can reach 0.9 ^{0}C and even 1.5 ^{0}C per meter and are maximum during periods of the day when the sun's rays are directed perpendicular to the building line.

3. To attenuate and account for the influence of refractive fields when measuring horizontal angles on a city street, it is advisable to work in cloudy or variable weather or at night. In clear weather, the sighting rays should be removed at least 3 m from the heat-emitting walls and exclude from observation periods of the day when the sun's rays are perpendicular to the building line.

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