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ASSESSMENT OF THE LEVEL OF STREET SAFETY UNDER THE IRAP PROGRAM

Abstract: *In this article, Uzbekistan Streets-Ernazar Alakoz estimated 2,200 km with a 5-star mortality risk rating for road users such as vehicles (driver), motorcyclists, pedestrians and cyclists, based on the IRAP star rating methodology. The results of the iRAP program research showed that the risk level was assessed as high at intersections with high traffic intensity and at pedestrian crossings where people irregularly cross the road. Recommendations were provided to reduce this risk indicator.*

Key words: *street safety, the iRAP program, risk indicator.*
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Introduction

An increase in the average speed of traffic directly affects both the risk of road traffic accidents and the severity of their consequences. For example, a 1% increase in average traffic speed leads to a 4% increase in the risk of fatal accidents and a 3% increase in the risk of serious accidents. When a vehicle's speed increases from 50 km/h to 65 km/h, the risk of death for pedestrians increases 4.5 times. In collisions at 65 km/h, the risk of death for drivers and passengers of vehicles is 85%. Road safety audit studies, using road traffic accident records, include examining the safety of roadsides and dividing barriers, as well as assessing safety measures on selected road sections. As the automotive industry developed worldwide, urban populations initially saw only positive aspects, such as increased mobility, time savings, improved transport accessibility, and facilitation of cargo and passenger movement. While cars were considered a luxury in the early stages, they have now become a common means of transportation. However, with the growth of the automotive industry, negative impacts on cities began to emerge, including: traffic accidents; environmental pollution; traffic congestion; reduction of recreational spaces for residents due to the expansion of parking areas; increased traffic noise in urban areas; and infringement on citizens' rights to free movement caused by the aggressive development of the street and road network [1].

iRAP is a UK registered charity established to help tackle the devastating social and economic cost of road crashes. Without intervention, the annual number of road deaths worldwide is projected to increase to some 2.4 million by 2030. The majority of these will occur in low and middle-income countries,

which already suffer nine out of ten of the world's road deaths. Almost half of those killed will be vulnerable road users – motorcyclists, bicyclists and pedestrians.

Large as the problem is, making roads safe is by no means an insurmountable challenge. The requisite research, technology and expertise to save lives already exists. Road safety engineering makes a direct contribution to the reduction of road death and injury. Well-designed intersections, safe roadsides and appropriate road cross-sections can significantly decrease the risk of motorized vehicle crashes occurring and the severity of crashes that do occur. Footpaths, pedestrian crossings and bicycle paths can substantially cut the risk that pedestrians and bicyclists will be killed or injured by avoiding the need for them to mix with motorized vehicles. Motorcycle lanes can minimize the risk of death and injury for motorcyclists. Speed management treatments can improve safety for all road users. iRAP has developed five globally-consistent protocols to assess and improve the safety of roads by building on the work of Road Assessment Programmes (RAP) in high-income countries (EuroRAP, AusRAP, usRAP and KiwiRAP) and with the expertise of leading road safety research organizations worldwide, including ARRB (Australia), TRL (United Kingdom), MRI Global (United States), MIROS (Malaysia), IMT (Mexico), RIOH (China), SWOV (The Netherlands), Labtrans (Brazil), KOTI (Korea), Chula Engineering (Thailand) and FPZ (Croatia). The IRAP Star Rating Methodology is a standardized method for evaluating and ranking roads around the world [3-5-6].

IRAP is a scientific road evaluator that focuses its results on governments, passenger protection agencies and other participants in road processes aimed at reducing deaths.

How the Star Rating methodology works:

• Checking the path
• Data set
• Risk assessment
• Star Rating
* Recommendations
* Monitoring and review

EXPERIMENTAL RESEARCH

Road attribute coding is the heart of an iRAP project. The purpose of road attribute coding is to use georeferenced images collected during a survey or road designs to record road attributes for each 100m segment of road. This coding data is then combined with other supporting data and uploaded in ViDA to produce Star Ratings, Safer Roads Investment Plans and, ultimately promote the implementation of road safety countermeasures that can save lives. This manual describes the coding process and defines the road attributes that must be recorded. Throughout the manual, the following symbols are used to highlight key issues or provide additional information.

Data has been collected on the features of the 2200 m street from the intersection of Uzbekistan - Amir Temur streets to the intersection of Ernazar Alakoz-Jumanazarov streets. During the study, photo and video shooting was carried out using a video camera with a car on the street (Fig.1) [6].

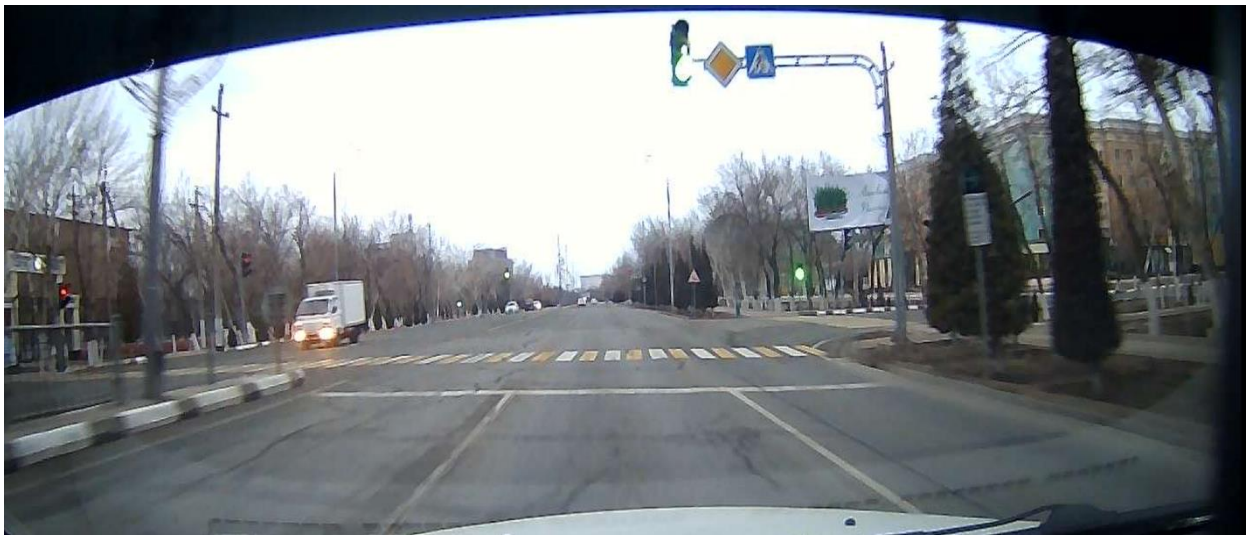

FIGURE 1. Footage captured on a video camera with a car at a distance of 2200 m from the streets of Uzbekistan-Ernazar Alakoz.

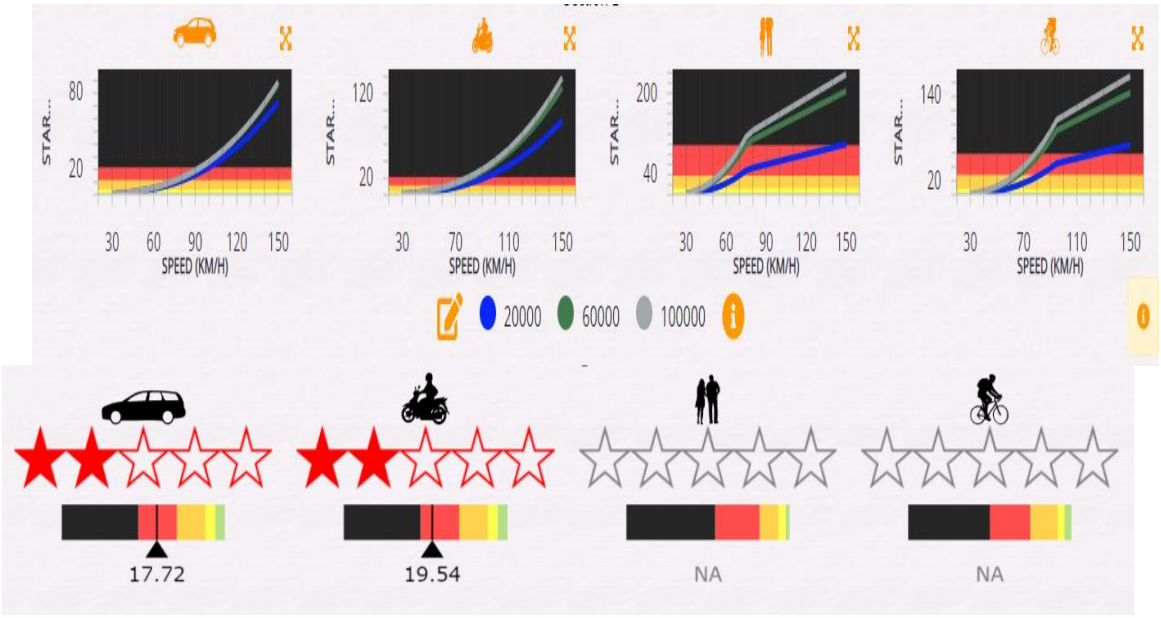

FIGURE 2. The results of the 5-star rating of traffic participants on the streets of Uzbekistan and Ernazar alakoz on the level of mortality risk.

The iRAP method was used to assess the safety indicators of road users (drivers, pedestrians, cyclists and motorcyclists). Along with data on roads and intersections, the IRAP model makes it possible to assess the safety of vulnerable road users, such as pedestrians, cyclists and motorcyclists, using road conditions. Based on the overall results for Uzbekistan-Ernazar Alakoz streets, as shown in Figure 2, the level of mortality risk for road users, such as vehicles (driver), motorcyclists, pedestrians and cyclists, was rated with a 5-star rating.

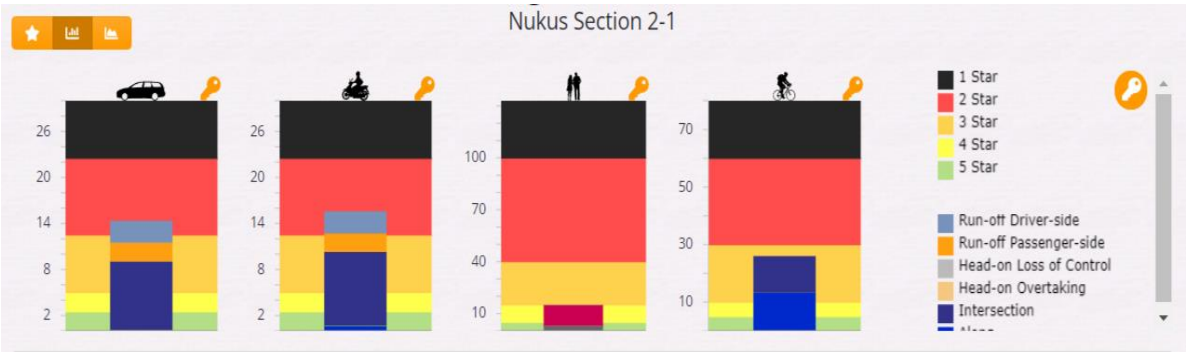

FIGURE 3. The level of risk for road users according to the safety index on the streets of Uzbekistan and Ernazar alakoz.

From Figure 3, it can be concluded that the higher the risk index, the lower the star rating. In addition, it can be determined that dangerous sections of the road for car and motorcycle drivers are intersections, while it is more dangerous for pedestrians and cyclists to cross the road. The results obtained can be divided using the QGIS program according to the level of safety of various sections of the roadway (Fig.4) [2-4].

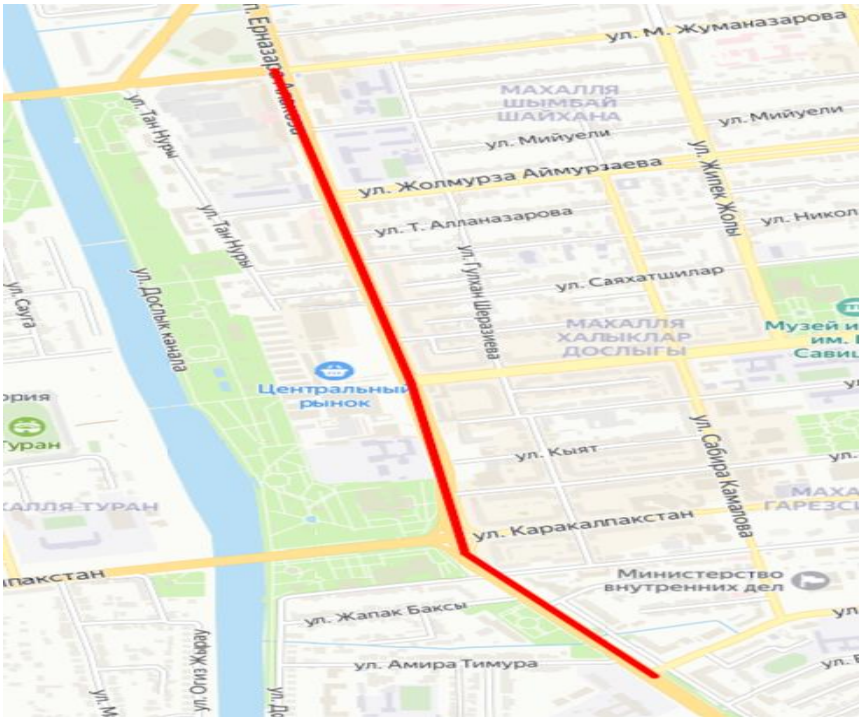

FIGURE 4. Map of road sections highlighted in color according to the IRAP Road User Safety rating.

RESEARCH RESULTS

The object of the study was divided into pickets, a total of 44 points were evaluated, of which 5 of our points on cars and motorcycles turned out to be dangerous, 3 of our points on cars, motorcycles and cyclists were dangerous, 2 of our points on cars, motorcycles and trains were dangerous and 1 of our points on pedestrians were dangerous (Fig.5).

				initial							
				Left	Right	Left	Right	Left	Right	Left	Right
Section		Left	Right	Vehicle	Vehicle	Motorcyclist	Motorcyclist	Pedestrian	Pedestrian	bicycles	bicycles
0	100	L-1	R-1	3	4	3	3	5	5	3	3
100	200	L-2	R-2	2	2	2	2	4	4	3	3
200	300	L-3	R-3	2	3	2	3	3	5	3	3
300	400	L-4	R-4	3	3	3	3	5	5	3	3
400	500	L-5	R-5	3	3	3	3	5	5	3	3
500	600	L-6	R-6	3	3	3	3	3	3	3	3
600	700	L-7	R-7	3	3	3	3	4	5	3	3
700	800	L-8	R-8	3	2	3	2	3	1	3	3
800	900	L-9	R-9	2	3	2	3	1	1	3	3
900	1000	L-10	R-10	3	3	3	3	1	5	4	3
1000	1100	L-11	R-11	3	3	3	3	5	5	3	3
1100	1200	L-12	R-12	3	2	3	2	3	3	3	3
1200	1300	L-13	R-13	3	4	3	3	5	5	3	3
1300	1400	L-14	R-14	2	2	2	2	4	3	3	2
1400	1500	L-15	R-15	2	3	2	3	3	3	2	3
1500	1600	L-16	R-16	3	3	3	3	3	3	3	3
1600	1700	L-17	R-17	3	3	3	3	3	3	3	3
1700	1800	L-18	R-18	3	2	3	2	5	4	3	3
1800	1900	L-19	R-19	2	3	2	3	3	4	3	3
1900	2000	L-20	R-20	3	3	3	3	3	3	3	3
2000	2100	L-21	R-21	3	3	3	3	5	5	3	3
2100	2200	L-22	R-22	1	1	1	1	3	3	2	2

FIGURE 5. Star rating on the index of safety on the streets of Uzbekistan and Ernazar Alakoz.

Looking at the results of the above-mentioned study, we can say that at intersections with high traffic and pedestrian crossings that cross the road irregularly, the risk level is assessed as high in accordance with the program.

CONCLUSIONS

WHO recommended that all types of road traffic stations have a 3 I vishe sign. In this study, optimization of points with the other three stars was

considered, and the following general recommendations were given.

1. The use of special lanes at intersections in places of left turn and the guiding green indicator of the additional network of left turn at the traffic light.

2. Where possible, arrange special guide strips for turning to the right [7].

3. Abandonment of uncontrolled (unregulated) pedestrian crossings located in areas with low traffic of pedestrians and cars. That is, the organization of controlled or multi-level crossings through traffic lights.

4. At intersections with low traffic intensity, reducing the consequences of an accident is possible only by reducing the speed of movement [8-9-10].

Based on the above recommendations, the location of the research object was changed from less than 3 stars to 3 and 5 stars based on the above recommendations (Fig.6).

							changed				
				Left	Right	Left	Right	Left	Right	Left	Right
Section		Left	Right	Vehicle	Vehicle	Motorcyclist	Motorcyclist	Pedestrian	Pedestrian	bicycles	bicycles
0	100	L-1	R-1	3	4	3	3	5	5	3	3
100	200	L-2	R-2	3	3	3	3	4	4	3	3
200	300	L-3	R-3	3	3	3	3	3	5	3	3
300	400	L-4	R-4	3	3	3	3	5	5	3	3
400	500	L-5	R-5	3	3	3	3	5	5	3	3
500	600	L-6	R-6	3	3	3	3	3	3	3	3
600	700	L-7	R-7	3	3	3	3	4	5	3	3
700	800	L-8	R-8	3	3	3	3	3	3	3	3
800	900	L-9	R-9	3	3	3	3	3	3	3	3
900	1000	L-10	R-10	3	3	3	3	3	5	4	3
1000	1100	L-11	R-11	3	3	3	3	5	5	3	3
1100	1200	L-12	R-12	3	3	3	3	3	3	3	3
1200	1300	L-13	R-13	3	4	3	3	5	5	3	3
1300	1400	L-14	R-14	3	3	3	3	4	3	3	3
1400	1500	L-15	R-15	3	3	3	3	4	3	3	3
1500	1600	L-16	R-16	3	3	3	3	3	3	3	3
1600	1700	L-17	R-17	3	3	3	3	3	3	3	3
1700	1800	L-18	R-18	3	3	3	3	5	4	3	3
1800	1900	L-19	R-19	3	3	2	3	3	4	3	3
1900	2000	L-20	R-20	3	3	3	3	3	3	3	3
2000	2100	L-21	R-21	3	3	3	3	5	5	3	3
2100	2200	L-22	R-22	3	3	2	2	4	4	3	3

FIGURE 6. Star shift based on recommendations.

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