



STRENGTH OF CEMENT CONCRETE COATING

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Annotation

The article highlights the issues of ensuring the surface strength of the cement concrete pavement of roads. Increasing requirements for reliability, performance and strength of pavements are caused by an increase in the carrying capacity of vehicles and the intensity of traffic on the roads

Keywords: cement concrete pavements, roads, strength, quality destruction, reconstruction.

Increasing requirements for reliability, performance and strength of road pavements are caused by an increase in the carrying capacity of vehicles and the intensity of traffic on the roads. Over the past decade, the car park of Uzbekistan has grown several times and, according to road specialists, as well as designers, the intensity of traffic on some roads is 1.5 - 3 times higher than the permissible for this category of road.

The growing requirements of traffic, as domestic and world experience shows, are best met by cement concrete pavements.

Modern roads are subject to high requirements for quality, durability, safety, environmental friendliness and comfort [1,2].

The purpose of the research is to ensure the surface strength of the cement concrete pavement. When analyzing the results of control tests on the object "Reconstruction of the A-380 highway" Guzar-Bukhara-Nukus-Beyneu "on the section 315-355 km, the compressive strength of concrete by taking cores directly from the cement concrete pavement, there is a tendency to reduce strength in the upper part of the pavement:

Location of core cutting	Single, Values		Reducing the strength of concrete relative to the bottom, in %	Average core strength (kgN/cm ²)
ПК 5719+00	Top part	356,5	28	427
	Bottom part	498,6		
	Top part	329,5	24	382
	Bottom part	435,0		
ПК 5718+25	Top part	311,1	21	353
	Bottom part	394,4		
	Top part	302,4	26	356
	Bottom part	409,5		
Average			25	379



To complete the study of the decrease in strength in thickness, additional tests were carried out with a concrete strength meter using the ONIKS-OS tear-off method with shearing.

In this case, the strength of concrete on the surface zone of the cement concrete coating with a depth of 35-50 mm turned out to be lower by 31-32%.

The results of studies of cores taken from the cement concrete pavement are shown in Table-1.

Table 1. The results of studies of cores taken from the cement concrete pavement

Compressive strength of cores (kg,N/cm ²)			Concrete strength under compression with ONYX device (with coefficient 1.49)	decline strength relative to the average strength of cores in %	
Single values of core concrete strength. (kgf/cm ²)	Strength reduction Relative to the lower part %	Average (kgN/cm ²)			
Upper	356,5	28	427	295	31
Lower	498,6				
Upper	329,5	24	382	258	32
Lower	435,0				

Tests with a concrete strength meter using the ONYX-OS shearing method (at a depth of 35 mm) additionally confirmed the decrease in concrete strength as it approaches the surface of the coating.

In our opinion, the main reasons for the decrease in the strength of the upper part of the cement concrete pavement slabs are:

- non-optimal grain composition of concrete;
- overdose of plasticizing additives;
- heterogeneous concrete mix and relatively high mobility;
- segregation of fresh concrete mix due to excessive vibration;
- Insufficient care of concrete.

In addition to the above, it should be noted that there is a desire of designers to increase the thickness of the cement concrete pavement.

Of course, one can understand good intentions to increase the margin of safety due to thickness. But in this case, an increase in thickness is not justified, since with a single-layer laying of a cement concrete pavement, the risk of undercompaction or segregation of the laid layer increases.

Of all the negative factors, the most influencing the decrease in the strength of concrete in the zone approaching the surface, in our opinion, is the settling of coarse aggregate (segregation) due to excessive vibration and insufficient concrete care.

The low strength of concrete in the zone approaching the surface of the coating significantly reduces the durability and quality of the surface of the cement concrete coating. In this case, premature peeling and coloring, the formation of potholes and pits are possible [3].

To prevent possible defects, it is recommended:

- to limit the thickness of the cement-concrete coating during single-layer concrete laying within 24-25 cm;



- in order to simplify the surface finish of the coating does not tend to increase the proportion of sand;
- refrain from increasing the dose of plasticizers in order to increase strength, as this increases the risk of separation of the mixture;
- minimize the consistency of the laid concrete mixture, ensure the draft of the cone at the time of laying within 1-2 cm.
- ensure strict control over the speed of the concrete paver, preventing excessive vibration of the freshly laid concrete mix, thereby preventing mixture separation and settling of large aggregates;
- when the concrete mixture arrives with $OK = 3-4$ sm, increase the speed of the concrete paver (2.5 - 3 m/min);
- do not carry out concreting work when:
 - wind speed over 5 m/s;
 - increase in ambient temperature over $400C$, concrete mixture over $300C$;
- in the hottest summer period, when caring for a freshly laid concrete mixture, one should not limit it only to treatment with a film-forming material, since it is not effective even with a two-layer treatment and is destroyed.

Conclusion. In the construction of roads, to ensure the surface strength of the cement concrete pavement, it is necessary to take into account the causes of defects in order to prevent them.

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