ЭКЗАМЕНАЦИОННЫЕ МАТЕРИАЛЫ ДЛЯ ДИФФЕРЕРЕНЦИРОВАННОГО ЗАЧЕТА ДЛЯ БАКАЛАВРИАТА ИНЖЕНЕРНО - СТРОИТЕЛЬНОГО ФАКУЛЬТЕТА и ЭКЗАМЕНАЦИОННЫЕ БИЛЕТЫ ДЛЯ СПЕЦИАЛИТЕТА ИНЖЕНЕРНО-СТРОИТЕЛЬНОГО ФАКУЛЬТЕТА

Экзаменационный билет №1

Письменный перевод текста по специальности

1. Комментарий текста
2. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

COMPRESSIVE STRENGTH OF CONCRETE

The transfer strength requirement for the nine batches was either 3500 or 4000 psi (24 or 28 MPa). The 28 day requirement was 5000 psi (35 MPa). Table 1 summarizes the results from the nine batches. Indiana Specifications[1] require a slump between 3 and 5 in. (76 and 127 mm). When plasticizing admixtures are used, the slump must be between 4 and 6 in. (102 and 152 mm). The air content must be between 5 and 8 percent. All batches evaluated met these requirements, as shown in Table 1. The average compressive strength at the time of transfer and at 28 days are listed in Table 2. The results of the last set of cylinders and corresponding age are also included.

Batches Al, A2, B4, B5 and B6 consisted of the same mix proportions: 6.9 bags of Type III cement per cubic yard, limestone coarse aggregate, and retarding and superplasticizing admixtures. All of these mixes exceeded 7500 psi (52 MPa) at 28 days.

Batches A3 and B3 were steam cured and produced the lowest compressive strength at 28 days, 5970 and 5900 psi (41.2 and 40.2 MPa), respectively. This would indicate a possible detrimental effect due to the accelerated curing. It should be noted, however, that these batches were cast in November and March, respectively, and hence were exposed to lower field curing temperatures. Other factors, such as a higher slump, less cement, and gravel aggregate in Batch A3, or no superplasticizing admixture in Batch B3, could also contribute to the reduction in compressive strength.

Batches B1 and B2 were similar except that Batch B1 had gravel coarse aggregate and Batch B2 had limestone. Each batch was cast on the same date.

EGYPTIAN PYRAMIDS

Architecture is the art which makes' buildings beautiful to look at as well as useful. A man who designs (проектировать) buildings and makes the plans for them is called an architect. He has to think not only of what he wants the building to look like when it is finished, but also what it is to be used for. He must not forget the sort of material to be used in the building. This may be stone, brick, wood or steel and concrete.

There have been many different styles or kinds of architecture in the past and there are many different styles today in different parts of the world.

The oldest monuments which are met within architecture are the colossal pyramids of Egypt most of which were constructed about 6,000 years ago.

The pyramids are large triangular (треугольный) buildings which were placed over the tombs (могила) of Egyptian kings. The best known of the pyramids are a group of three built at Giza south of Cairo. The largest of these is 482 feet high. They tell us of the advanced civilization of ancient Egypt which is much spoken about even in our days.

It was a country which had expert mathematicians and engineers, where astronomy and philosophy were known and studied.

The country was rich in hard and durable (прочный) stone, but poor in timber and metal, so that the main material used for construction was granite, and this was the reason for the durability of the pyramids.

Large blocks of stone were transported over long distances by land and water, and placed into position with the help of the most primitive equipment. That was done by slaves (раб) working for thirty or forty years. All this great amount of work was done, masses of material and a large territory sometimes of about 52,000 square meters were used, only for protecting the body of a dead king and constructing a dwelling placeт for his happy life in the "other world".

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №2

3. Письменный перевод текста по специальности
4. Комментарий текста
5. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

Failure Criteria for Concrete

The strength of the concrete in compression fields or within nodes depends to a large extent on its multiaxial state of stress and on disturbances from cracks and reinforcement.

(a)Transverse compression is favorable especially if it acts in both transverse directions, as for example in confined regions. Confinement may be provided by transverse reinforcement or by bulk concrete surrounding a relatively small compression field (see Fig. 21).

(b)Transverse tensile stresses and the cracks caused by them are detrimental.[23] The concrete may fail considerably below its cylinder strength if the transverse tension causes closely spaced cracks approximately parallel to the principal compression stresses such that the prisms between those cracks are ragged and narrow. The reduction of compressive strength is small or nominal if the tensile forces are carried by the reinforcement and the cracks are wide enough apart.

(c) In particular, cracks which are not parallel to the compressive stresses are detrimental.

In 1982, an empirical formula for calculating the strength of parallel concrete compression fields with transverse tension was published by Collins et al.,[23] and 2 years later a similar formula was introduced into the new Canadian CSA-Standard A 23.3-M 84.[24] These formulas summarize the influence of such significant parameters as crack width, crack distance and crack direction by the transverse tensile strain e_t.

TRANSPORTATION FOR THE YEAR 2000

1. Experts estimate that by the year 2000, we will go by rocket from New York to Tokyo in 30 minutes. We will be able to reach any point on the globe from any other point through, tunnels deep in the earth.

The prospect is adventurous and exciting. But most people are more interested in better ways to travel during their own lifetime.

It's possible, that within the next two or three decades we will be riding in re mote-controlled electronic cars.[1]

We will travel over plastic-footed climate-controlled highways.

Trips through metropolitan areas will be made on quiet, swift buses travelling on separate express lines of city streets. Helicopters may carry whole buses loaded with passengers from point to point above city traffic.

But don't look for such developments in the next 30 years. Moving sidewalks still aren't moving, and won't for some time.

2. What about monorails? Half a dozen are already operating.

Tokyo has one that runs from the suburbs of the city to the airport, but few people use it. But for some Reason, no monorail system has ever been able to find a practical place.

3. "Flying crane" helicopters soon may help solve the complicated problem of getting passengers from the centre to airport and back again.

A new mass transit system2 particularly well suited to medium-sized towns is being tested now. Lightweight automated vehicles operate singly or in trains on a lightweight aerial roadway. The cars look like buses and run on four pairs of rubber tyres. Service is round-the-clock with trains running every two minutes. The system is controlled by a central computer.

4. Electric cars are under development in a number of countries. Experts say they expect electric cars td be available within the next ten years, although they believe that their use will be limited almost totally to city centre delivery vans and suburban shopping cars.

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №3

1. Письменный перевод текста по специальности
2. Комментарий текста
3. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

Strains Due to Circumferential Prestressing

Fig. 20 shows the circumferential and meridional strain profiles due to the circumferential prestressing force for the fourth stage of construction. The circumferential prestressing force was idealized by Rizkalla1 as a uniformly distributed load, and each segmental ring was treated as a separate structure (free from previously completed substructure). On the other hand, the solution by Roy3 was based on the assumption that, at each stage of construction, the segmental ring under consideration would act monolithically with the previously completed substructure.

It can be seen that the results obtained from Rizkalla's solution were about the average of those obtained by using Roy's approach. In the meridional direction, the measured results indicated a very significant local effect for the circumferential prestressing force, which is clearly verified by the theoretical results based on Roy's work. The measured strains in the lower portion of the shell were found to be insignificant. This confirms the assumption that each segmental ring could be analyzed as a separate structure.

THE WHEEL, STEAM CARRIAGES AND RAILWAYS

One of mankind's earliest and greatest inventions was the wheel. Without it there could be no industry, little transportation or communication, only crude farming no electric power.

Nobody knows when the wheel was invented. There is no trace of the wheel during, the Stone Age, and it was not known to the American Indian until the White Man came. In the Old World it came into used| during the Bronze Age, when horses and oxen were used as work animals. At first all wheels were solid discs.

The problem to be solved was to make wheels lighter and at the same time keep them strong. At first holes were made in the wheels, and they became somewhat lighter. Then wheels with spokes were made. Finally, the wheel was covered with iron and then with rubber.

Light two-wheeled carriages were used widely in the ancient world. As time passed they were made lighter, stronger, and better. Later people joined together a pair of two-wheeled carts into a four-wheeled vehicle. At first only kings and queens had the privilege of driving in them.

In the West the first steam carriage was invented in France. The three-wheeled machine had the front wheel driven by a two-cylinder steam engine, and carried two people along the road at a walking pace. It was not a great success, as the boiler did not produce enough steam for keeping the carriage going for more than about 15 minutes.

The steam engine appeared in 1763. It was followed by several improved steam road carriages. Their further development was prevented by railway companies. The rapid spread of railways in the United Kingdom was due largely to George Stephenson, who was an enthusiast as well as a brilliant engineer.

He demonstrated a locomotive that could run eighteen kilometres an hour and carry passengers cheaper than horses carry them. Eleven years later Stephenson was operating; a railway between Stockton and Darlington. The steam locomotive was a success.

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №4

1. Письменный перевод текста по специальности
2. Комментарий текста
3. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

EVALUATION OF MATERIAL PROPERTIES

The results of the survey on concrete mixes used in prestressed structural members for the IDOH were evaluated in a year-round study conducted at a local precast plant The study began in June of 1985, and samples were taken throughout the year. At first, the evaluation included only compressive strength. Later, the evaluation was extended to include static modulus of elasticity, modulus of rupture and split cylinder strength.

Nine individual batches were studied. In Batches Al, A2 and A3, the concrete compressive strength and the tensile strength were determined. In Batches B1 through B6, the concrete compressive strength, tensile strength and modulus of elasticity were evaluated. The tensile strength was evaluated using both flexure beams and split cylinder tests.

A typical batch consisted of six flexure beams and 24 cylinders. The flexure beams were 6 x 6 x 18 in. (152 x 152 x 457 mm), and the cylinders were 6 x 12 in. (152 x 304 mm). The flexure beams and the cylinders were cast in accordance with ASTM C31-84.3 Steel flexure beams and plastic cylinders with lids were used as specimen molds.

The test specimens were made after the slump and air content readings were taken. All the specimens were cast from the same batch with the exception of Batch Al. Batch Al had a variety

of samples of the same mix proportioning, but from different batches. The test specimens of all the batches were placed next to the casting bed to simulate the curing environment of the precast beams. Batches A3 and B3 were steam cured up to the time of transfer. Curing conditions in the remaining batches consisted of wet burlap and tarpaulin up to the time of transfer of the prestress force.

Just prior to the prestress force transfer, the test specimens were removed from the casting bed and transported to the Purdue University Structural Laboratory located a few miles from the precast plant The test specimens were then stripped and field cured outside the laboratory until the time of testing.

THE OXFORD AND CAMBRIDGE BOAT RACE

Sporting activities at Oxford and Cambridge are varied and numerous. There are different competitions (соревнования) between the colleges. One of the most popular sports is rowing (гребля). At the end of the term long, narrow, light boats, rowed by eight men, compete in the races. Boats start at short intervals one after another and try to knock the boat in front. Those who are able to do it move one place in a table (таблица) and the college at the top of the table is known as the "Head of the River".

Rowing has a long history in England. Rowing a boat with eight oars (весло) or with four oars was first started in England in the 18th century. At that time the boats took part in festivals and processions on the River Thames.

In the 19fh century people started to use the boats for racing, not only in London on the Thames but also in the universities of Oxford and Cambridge. The first Boat Race between Oxford and Cambridge was held in 1829.

Nearly every year since then there has been a Boat Race between these two Universities. It is held in London on the Thames, during the Easter vacation, at the end of March or the beginning of April.

The course, from Putney to Mortlake, is 4 1/4 miles long. It has many turns, and the crews usually row the 4 1/4 miles in 20 minutes.

The crews, of the boats, chosen from the members of the college Boat Clubs, train together for twelve weeks before the race, first in Oxford or Cambridge and finally in London. In each boat there are eight oarsmen and a coxswain (рулевой), usually called a "cox". The cox, who is much lighter than the others, sets the speed and the rhythm, and steers.

On Boat Race Saturday the banks and bridges of the Thames are thick with people who have come to watch. Some wear dark blue ribbons (лента) for Oxford, and some wear pale blue ones for Cambridge.

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №5

1. Письменный перевод текста по специальности
2. Комментарий текста
3. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

Strains Due to Meridional Prestressing

Strains induced by the meridional prestressing force are shown in Fig. 21. In Rizkalla's solution, the meridional prestressing force was idealized as a uniformly distributed load. The results indicate a reasonable agreement between the theory and the test.

Strains Due to Lateral Loads

The uniform loading patterns shown in Fig. 17, (a) through (h), were used to test the validity of superposition and the repeatability of the measured results. Figs. 22 and 23 illustrate the measured versus the theoretical values. Again, the local effect of the applied lateral load was-

investigated by using Roy's approach. It can be observed that the principle of superposition is valid and the measured results are repeatable.

On the loaded side of the test structures, $\theta = 60$ deg, a significant local effect can be noticed for the applied loads. The measured strains showed a better correlation with Roy's solution. The significant discrepancies between the measured and theoretical strains at $\theta = 120$ deg, up to a height of 4 ft (1.2 m), could probably be attributed to the high stress concentration created by the meridional prestressing cable. The cable was terminated at that height and happened to be near the strain gages at the reference angle.

SURVEY

l. A topographic survey is a survey made to secure data from which may be made a topographic map indicating the relief or elevation and irregularities of the land surface.

Maps are based on measurements of distances, directions and heights. Surveying is the name given to the methods of making these measurements.

2. The simplest and most commonly used method of measuring the distance between two points on the ground is called chain surveying.1 It is very similar to the way in which the distance between two points on a piece of paper is measured using a foot-rule. In chain surveying the place of the foot-rule is taken by a chain which is laid down in a straight, line between the two points.

Small areas are often surveyed entirely by chain survey1 provided that the ground is not too rough.

3. Angles in surveying are measured with special instruments called theodolites. In its simplest form the theodolite is a telescope mounted above a horizontal circular scale, which is rather like a protractor. It is marked in degrees, minutes and fractions of minutes. (There are 60 minutes in one degree)

Theodolite also allows the measurement of angles in a vertical plane, such as the angle between the horizontal and the top of a tall building or hill.

4. Route survey2 is a survey necessary for the location and construction of transportation or communication lines such as highways railroads, canals, transmission lines and pipe-lines. The preliminary work consists of a topographic survey.

5. Mine surveying3 makes use of the principles of land, topographic and route surveying with modifications in practice made necessary by altered conditions. Both surface and underground surveys are required. City surveying4 is the term frequently applied to the operation of laying out lots5 and to the municipal surveys6 made in connection with the construction of streets, water supply systems and sewers.

ЭКЗАМЕНАЦИОННЫЙ БИЛЕТ №6

6. Письменный перевод текста по специальности
7. Комментарий текста
8. Беседа по теме: 1. Traffic management
   2. Pacific National University
   3. Khabarovsk

Concrete Stresses

Fig. 8 shows the states of strain and stress in the two sections at prestress transfer. As can be seen from Fig. 8, a significant reduction in the concrete stress at the time of prestress transfer was realized by replacing 17 percent of the prestressed reinforcement with mild steel reinforcement. This allows a reduction of the required concrete strength at transfer.

Both the fully and partially prestressed noncomposite sections are cracked under service load (see Fig. 9). However, the crack depth in the partially prestressed section is about 50 percent higher than that in the fully prestressed section. Concrete stresses at service load in the extreme compression fibers were less than $0.45\ f_c'$ in both cases.

Tensile stresses developed in the composite topping due to shrinkage effects. The magnitude of these stresses increased with time up to 120 days, when the superimposed dead load was applied to the composite section, resulting in cancelling most or all of the tensile stresses. After that, compressive stresses in the topping increased with time as can be seen from Fig. 10.

The partially prestressed composite section cracked upon the application of the superimposed dead load. The crack depth increased with time as a result of additional prestress losses. Again, the crack depth in the partially prestressed section was about 50 percent higher than that in the fully prestressed section.

ROADS AND TUNNELS

1. British roads are classified in three groups. The arterial roads, so called because they might be compared to the arteries in the human body, are known as A or Class I roads. The arterial roads include the principal roads radiating, from London to far parts of the country, and many roads joining big cities. The second group of classified roads consists of B or Class II roads which, are a little less important than A roads. Last comes a third group, which has no official name. Each road of the first two classed, A and B, has a different number, which appears on all signposts, so that a motor driver can find his way across Britain if he has previously looked up the number on a map.

2. The crowded state of the British roads caused many accidents and delays even before World War II and became much worse afterwards. For some years little was done to tackle the problem apart from widening the roads in places and making by-pass roads around towns to avoid traffic jams in busy streets. In the late 1950s a programme was begun for building some 400 mites of motorways in the form of a network over the country, the chief tones radiating from London to the industrial areas in South Wales, the Midlands, and Lancashire. These modern double-track highways are being built with fly-over junctions and crossings and will in time form part of a system of motorways running rights across Europe.

3. A motorway is usually designed with two carriage-ways, one for traffic in each direction. These should be at least 30 feet apart to avoid the vision of drivers being dazzled by the lights of vehicles coming the other way. The two carriage-ways needn't run side by side. A width of 24 feet between kerbs usually gives ample room for passing, but some roads are wider, for example the London-Birmingham motorway is 36 feet wide. At all cross-roads there are fly-over or clover-leaf crossings.

4. In thinly populated tropical countries, where the earth is dry and sandy, roads to carry occasional traffic can be made quite cheaply. The soil is turned over and mixed with a small quantity of cement, watered, and finally rolled, after which it has quite a good hard surface.

In many countries there are high-speed motorways, like the German "autobahnen" or Italian "autostrade". They are usually fenced in, and motorists are admitted to them only at special gates where they pay a toll. Once inside, they can travel at 80 or 90 miles an hour, for there are hardly any junctions, and no slow moving traffic is allowed.