Министерство образования Республики Беларусь

Учреждение образования
«Полоцкий государственный университет»

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АНГЛИЙСКИЙ ЯЗЫК

Учебно-методический комплекс
для студентов специальности 1-70 03 01
«Автомобильные дороги»

Новополоцк
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Способствует развитию навыков чтения и перевода литературы по специальности на английском языке, овладению навыками общения и монологического высказывания в ситуациях, обусловленных профессиональной деятельностью.

Составлен в соответствии с рабочей программой по английскому языку для студентов 1 курса специальности 1-70 03 01 «Автомобильные дороги».

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ВВЕДЕНИЕ

Данный учебно-методический комплекс предназначен для студентов 1 курса специальности 1-70 03 01 «Автомобильные дороги», изучающих в качестве иностранного языка английский. Учебно-методический комплекс разработан в соответствии с рабочей программой.

Данный УМК состоит из двух модулей, каждый из которых, делится в свою очередь на учебные элементы. Каждый элемент имеет свою тематическую направленность и обеспечивает формирование у студентов профессионального словаря, навыков чтения и говорения в рамках профессионального общения. Обучающие задания построены с учетом принципа целенаправленного методического воздействия, стимулирующего аналитическую, поисковую, мотивированную работу студента – будущего специалиста – в четкой согласованности предтекстовых, текстовых и послетекстовых заданий с основной темой урока и постепенном подведении к переводу, пересказу и диалогу.

Целью данного пособия является формирование иноязычной коммуникативной компетенции будущего специалиста в области дорожного строительства.

Задачами курса являются:

- развитие у студентов навыков перевода текстов профессиональной тематики;
- обучение монологической и диалогической речи в рамках предметно-тематического содержания курса;
- развитие навыков пересказа текстов профессиональной тематики, навыков понимания содержания текстов при просмотровом, изучающем видах чтения.

НОРМЫ ОЦЕНКИ
1. Оценка перевода

Уровни	Баллы	Чтение
	0	Отсутствие перевода или отказ от него.
I. Низкий (рецептивный)	1	Перевод текста на уровне отдельных словосочетаний и предложений при проявлении усилий и мотивации.
	2	Неполный перевод текста (менее 90%). Допускаются грубые искажения в передаче содержания. Отсутствует правильная передача характерных особенностей стиля переводимого текста.
II. Удовлетворительный (рецептивно- репродуктивный)	3	Неполный перевод (90%). Допускаются грубые смысловые и терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
	4	Полный перевод. Допускаются грубые терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
III. Средний (репродуктивно- продуктивный)	5	Полный перевод. Допускаются незначительные искажения смысла и терминологии. Не нарушается правильность передачи стиля переводимого текста.
	6	Полный перевод. Отсутствуют смысловые искажения. Допускаются незначительные терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
IV. Достаточный (продуктивный)	7	Полный перевод. Соблюдается точность передачи содержания. Отсутствуют терминологические искажения. Допускаются незначительные нарушения характерных особенностей стиля переводимого текста.
	8	Полный перевод. Отсутствуют смысловые и терминологические искажения. В основном соблюдается правильная передача характерных особенностей стиля переводимого текста.
V. Высокий (продуктивный, творческий)	9	Полный перевод. Отсутствие смысловых и терминологических искажений. Правильная передача характерных особенностей стиля переводимого текста.
	10	Полный перевод. Отсутствие смысловых и терминологических искажений. Творческий подход к передаче характерных особенностей стиля переводимого текста.

2. Оценка понимания при чтении. Показатели оценки чтения

Уровни	Баллы	Чтение
	0	Отсутствие ответа или отказ от ответа.
I. Низкий (рецептивный)	1	Понимание менее 30% основных фактов и смысловых связей между ними.
	2	Понимание 30% основных фактов и смысловых связей между ними.
II. Удовлетворительный (рецептивно- репродуктивный)	3	Понимание менее 50% основных фактов и смысловых связей между ними.
	4	Понимание 50% основных фактов текста и смысловых связей между ними.
III. Средний (репродуктивно-продуктивный)	5	Понимание большинства основных фактов текста, смысловых связей между ними и отдельных деталей текста.
	6	Понимание всех основных фактов текста, смысловых связей между ними и 50% деталей текста.
IV. Достаточный (продуктивный)	7	Понимание всех основных фактов текста, смысловых связей между ними и 70% деталей текста.
	8	Понимание всех основных фактов текста, смысловых связей между ними и 80% деталей текста.
V. Высокий (продуктивный, творческий)	9	Понимание всех основных фактов текста, смысловых связей между ними и 90% деталей текста.
	10	100-процентное понимание основных фактов текста, смысловых связей между ними и деталей текста.

3. Оценка письменных тестов

Шкала перевода в десятибалльную систему в соответствии с Приложением к постановлению Министерства образования Республики Беларусь от 01.04.2004г. № 22:

100% - 95% правильных ответов	10 баллов
94,8% - 90% правильных ответов	9 баллов
89,6% – 83% правильных ответов	8 баллов
82,6% - 75% правильных ответов	7 баллов
74,6% - 65% правильных ответов	6 баллов
64,7% - 50% правильных ответов	5 баллов
49,7% - 35% правильных ответов	4 баллов
34,7% - 20% правильных ответов	3 баллов
19,7% - 10% правильных ответов	2 баллов
9,7% - 1,8% правильных ответов	1 баллов
1,4% - 0% правильных ответов	0 баллов

Наименьшая положительная оценка – 4 балла – выставляется при правильном выполнении не менее 2/3 заданий. Отсутствие работы или отказ от выполнения соответствуют оценке 0 баллов.

Формы контроля

Программа предусматривает текущий контроль в форме письменных и устных тестов по всем видам речевой деятельности, семестровый зачет в зимнюю сессию и курсовой экзамен в письменной и устной форме в летнюю сессию.

Содержание зачета

Зачет носит характер накопительного, что предусматривает посещение 75-100% практических занятий и усвоение 95-100% программного материала.

Содержание экзамена

Экзамен включает письменную и устную формы тестирования, по результатам которого выставляется общая оценка.

Письменное тестирование:

1. Перевод текста со словарем.
2. Лексико-грамматический тест.

Устный экзамен:

1. Монологическое высказывание по одной из заданных в программе тем.
2. Чтение без словаря и пересказ текста, тема которого связана с будущей профессиональной сферой студентов.

РАБОЧАЯ ПРОГРАММА
Содержание учебного материала

Разделы, темы, вопросы	Содержание
Модуль социального общения	
Тема 1. Моя визитная карточка (About myself) Повторение временных форм глагола. Времена группы Indefinite, Continuous. Pronouns.	Личностные характеристики (Биографические сведения, семья, хобби и.т.д.) Введение и активизация новых лексических единиц. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Развитие навыков диалогической и монологической речи по теме. Коммуникативно-поведенческие стереотипы в ситуациях бытового общения. Употребление времен группы Indefinite, Continuous. Лексико-грамматические упражнения по теме. Закрепление времен группы Continuous. Написание грамматического теста. Употребление неопределенных местоимений, слов few, a few, little, a little, much, many. Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 2. Novopolotsk. Polotsk State University Modal Verbs Времена группы Perfect	Социокультурный портрет Новополоцка (географическое положение, промышленность, население, достопримечательности и.т.д.) Полоцкий государственный университет, его роль в формировании образовательного потенциала страны, история становления, структура вуза, социокультурный профиль. Введение новых лексических единиц. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Развитие навыков устной монологической и диалогической речи по теме. Лексико-грамматические упражнения по теме. Модальные глаголы “can”, “may”, “must” и их эквиваленты. Употребление времен группы Perfect; Сопоставительные упражнения по теме “Perfect”и “Indefinite”. Обзорные упражнения на времена и активного залога. Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 3. Belarus. Great Britain Article1. Passive Voice	Социокультурный портрет страны изучаемого языка и Республики Беларусь: национальные традиции и ценности, образование, спорт, досуг, экологическая культура. Текущие события культурной и социально-политической жизни в соизучаемых странах.

	Введение и активизация лексических единиц. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Развитие навыков устной диалогической и монологической речи.
	Употребление артикля с географическими названиями. Лексико-грамматические упражнения по теме. Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 4. Carrier and jobs	Получение высшего образования в университете. Моя будущая профессия. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 5. My future profession Highway Engineering	Моя будущая профессия. Я – студент ПГУ. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 6. My future profession The basics of road building	Моя будущая профессия. Я – студент инженерно-строительного факультета. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Progress test	
Модуль профессионального общения	
Тема 7. Road building materials	Материалы для дорожного покрытия. Исторический аспект, современные технологии. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 8. Road pavements	Виды дорожных покрытий. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи.

	Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 9. Highway network planning	Планирование сети автомобильных дорог. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 10. Traffic signs, signals, marking	Дорожные знаки, сигналы, разметка. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 11. Road Maintenance	Технико-профилактическое обслуживание дорог. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 12. Bridge Building	Мостостроение. Типы мостов по конструкции, функциям, материалам. Проблемы безопасности. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Тема 13. Road Ecology.	Дорожная экология. Проблемы, пути решения. Введение и активизация лексических единиц. Развитие навыков устной диалогической и монологической речи. Развитие навыков владения всеми видами чтения (изучающее, ознакомительное, просмотровое, поисковое). Лексико-грамматический тест. Монологическое высказывание на тему.
Progress test	

Примерный тематический план

	Модуль социального общения	
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2	тема: «Новополоцк. ПГУ.»	12
3	тема: «Беларусь. Великобритания.»	12
4	тема: «Карьера и профессии»	10
5	тема: «Моя будущая профессия»	10
6	Тема: «Основы дорожного строительства»	10
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	Модуль профессионального общения	
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	итого:	136

Перечень устных экзаменационных тем

1. Моя семья. Моя биография
2. Новополоцк. ПГУ
3. Беларусь. Великобритания
4. Карьера и профессии
5. Моя будущая профессия
6. Основы дорожного строительства
7. Материалы для дорожных покрытий
8. Виды дорожных покрытий
9. Планирование сети автомобильных дорог
10. Дорожные знаки, сигналы и разметка
11. Технико-профилактическое обслуживание дорог
12. Мостостроение
13. Дорожная экология

МОДУЛЬ I

УЧЕБНЫЙ ЭЛЕМЕНТ 1 (УЭ-1)

MY FUTURE PROFESSION

I. Read and memorize the new words:

adverse ['ædvɜ:s] (adj.) – неблагоприятный, неблаготворный; вредный

appropriate [ə'prəuprɪət] (adj.) – 1) подходящий, соответствующий; должный

appropriate dress — подобающая одежда; book not appropriate for children – книга, не подходящая для детей; appropriate conduct – должное поведение

base course – основание дорожного покрытия

be in demand – пользоваться спросом, быть востребованным

Ex. Small cars are in great demand. – Малогабаритные машины пользуются большим спросом. There is a brisk demand for home computers. – Сейчас большой спрос на домашние компьютеры.

bridge (n.) – мост

construction (n.) – сооружение, строительство, стройка

Ex. The new skyscraper is under construction. – Строится новый небоскреб.

effective [ɪ'fektɪv] (adj.) – действенный, результативный, эффективный

ensure (v.) – гарантировать, обеспечивать

Ex. We will ensure equal opportunities for all. – Мы твердо намерены обеспечить равные возможности для всех. The book ensured his success. – Эта книга принесла ему успех.

flexible pavement – нежесткое дорожное покрытие

gravel pavement – гравийное дорожное покрытие

ground science – дорожное грунтоведение

highway engineer – дорожный инженер

highway engineering – дорожное строительство

impact ['ɪmpækt] (n.) – сильное воздействие; влияние

considerable / strong / dramatic impact – сильное влияние emotional impact – эмоциональное воздействие to have an impact (up)on smb. / smth. – иметь влияние на кого-л. / что-л.

interact (v.) – взаимодействовать; влиять друг на друга

interchange [ˌɪntə'ʧeɪnʤ] (n.) – перекресток с эстакадой; развязка

intersection [ˌɪntə'sekʃ(ə)n] (n.) – перекресток

at an intersection – на перекрестке; busy intersection – перекресток с оживленным движением; dangerous intersection – опасный перекресток

Syn: crossing , crossroad

pavement (n.) – дорожное покрытие

predict [prɪ'dɪkt] (v.) – предсказывать, пророчить; прогнозировать

prominent ['prɔmɪnənt] (adj.) – заметный, видный, выдающийся

rigid pavement – жесткое дорожное покрытие

road alignment [ə'laɪnmənt] – план трассы

road maintenance ['meɪnt(ə)nən(t)s] – технико-профилактическое обслуживание дорог

road network – сеть автомобильных дорог

steel-reinforced – армированный сталью

strive (v.) – а) стараться, пытаться б) стремиться, прилагать усилия
to strive for victory – стремиться к победе; to strive for success – стремиться к успеху to strive after / towards happiness – стремиться к счастью

structural mechanics – строительная механика

subbase course – нижний слой основания дорожного покрытия

traffic flow – транспортный поток

traffic volume – плотность движения (число автомобилей, проходящих на данном участке в единицу времени)

wearing course – верхний слой дорожного покрытия (слой износа)

II. Read the international words and give their Russian equivalents:
engineer, profession, design, transportation, material, analyze, service, asphaltic, cement, ecological, factor, defect, structure, hydraulics, sphere

III. Match these words with the definitions below:
Interact, hydraulics, bridge, maintenance, cement, traffic flow, pavement, interchange

1) A hard smooth surface of a road;
2) The physical science and technology of the static and dynamic behavior of fluids;
3) A highway intersection designed to permit traffic to move freely from one road to another without crossing another line of traffic;
4) The work of keeping something in proper condition;
5) To act on each other;
6) A structure spanning and providing passage over a gap or barrier, such as a river or roadway;
7) A building material made by grinding calcined limestone and clay to a fine powder, which can be mixed with water and poured to set as a solid mass or used as an ingredient in making mortar or concrete;
8) The total number of vehicles passing a given point in a given time.

IV. Arrange the following in pairs of synonyms:

1) construction; 2) to try; 3) adverse; 4) suitable; 5) building; 6) appropriate; 7) to interact; 8) to contact; 9) impact; 10) remarkable; 11) negative; 12) to strive 13) influence; 14) prominent.

V. Complete the following sentences translating the words in brackets:

1. There is a necessity to erect a new (мост) over that river.
2. In general there are three types of (дорожное покрытие).
3. We have to make an (подходящий) maintenance plan.
4. This term we have an exam in (грунтоведение).
5. (плотность движения) was not taken into account at the design stage.
6. Highway engineers are in great (востребованы) at present.
7. New traffic lights were erected at this (перекресток).
8. Nobody was able to (предугадать) all the consequences.
9. (Гравийный) pavement is used for lightly travelled country roads.
10. Human, vehicular and roadway factors (взаимодействуют) to provide a safe highway.

VI. Read the text and translate it into Russian:

MY FUTURE PROFESSION

Hello! My name is Kirill Petrov. I am a first year student of Polotsk State University. I am lucky to study at the Faculty of Civil Engineering. After graduating from the higher school I'll become a highway engineer. This profession is in great demand nowadays.

Highway engineering involves the planning, design, construction, operation, and maintenance of roads, bridges, and tunnels to ensure safe and effective transportation of people and goods. The beginning of road construction could be dated to the time of the Romans. However highway engineering became prominent towards the latter half of the 20th Century after World War 2. Standards of highway engineering are continuously being improved. Highway engineers must take into account future traffic flows, design of highway intersections/interchanges, geometric alignment, highway pavement materials, structural design of pavement thickness, and pavement maintenance.

Highway planning involves the estimation of current and future traffic volumes on a road network. Highway engineers strive to predict and analyze all possible civil impacts of highway systems. Some considerations are the adverse effects on the environment, such as noise pollution, air pollution, water pollution, and other ecological impacts.

The most appropriate location, alignment, and shape of a highway are selected during the design stage. Highway design involves the consideration of three major factors (human, vehicular, and roadway) and how these factors interact to provide a safe highway. Highway and transportation engineers must meet many safety, service, and performance standards.

Moreover pavement design is also of great importance. There are generally three types of pavements. Gravel pavement is the simplest type of pavement and is often designed for lightly traveled roads. Flexible pavement is a multilayered structure that includes a subbase, a base, and an asphaltic wearing course. Rigid pavement consists of a plain or steel-reinforced portland cement concrete slab laid on a prepared crushed-stone base course.

Highway engineers are also responsible for road maintenance. The overall purpose of highway maintenance is to fix defects and preserve the pavement's structure and serviceability.

So the profession of a highway engineer is rather difficult and requires profound knowledge in specific spheres and sciences such as engineering and structural mechanics, ecology, road and construction machinery, ground science, geology, hydraulics, etc. But at the same time this profession is significant and challenging.

I`ll do my best to become a highly-qualified specialist in the chosen field.

VII. Choose the best alternative according to the text:

1. The beginning of road construction could be dated to the time of the ___.
a) Americans b) Romans c) Greeks
2. The most appropriate location, alignment, and shape of a highway are selected during the ___ stage.
a) design b) construction c) maintenance
3. Highway planning involves the estimation of current and future traffic ___ on a road network.
a) wardens b) lights c) volumes
4. The overall purpose of highway ___ is to fix defects and preserve the pavement's structure and serviceability.
a) operation b) maintenance c) planning
5. ___ pavement is the simplest type of pavement and is often designed for lightly traveled roads.
a) gravel b) macadam c) stoneblock
6. Highway engineers strive to predict and analyze all possible civil ___ of highway systems.
a) imports b) impacts c) imparts

VIII. Agree or disagree with the following statements:

1. The profession of a highway engineer is very honorable and important nowadays.
2. Highway engineering became significant after the First World War.
3. Highway engineers are also busy with constructing tunnels and bridges.
4. They don't take into account the environmental aspects of road building.
5. There are generally two types of pavements.
6. The profession of a highway engineer requires deep knowledge in specific spheres and sciences.
7. Road maintenance is one of the major considerations for highway engineers.

IX. Answer the following questions:

1) Is it an easy thing to choose a profession?
2) What do you want to become and why?
3) What faculty do you study at?
4) When did road building begin?
5) What are highway engineers busy with?
6) Highway engineering involves the planning, design, construction, operation, and maintenance of roads, doesn't it?
7) What is taken into account by highway engineers?
8) Which factors interact to provide a safe highway?
9) What kind of pavements are the most common?
10) Why is road maintenance so important?
11) What subjects should a highway engineer be trained in?

X. Fill in suitable prepositions:

1. Flexible pavement consists ___ three courses.
2. My cousin studies ___ the faculty of Machine-Building.
3. A highway engineer is also responsible __ road maintenance.
4. Highway network planning is ___ great importance.
5. First scientific roads can be dated __ the time of the Romans.
6. Highway specialists must meet ___many safety standards.
7. Future traffic flows and geometric alignment must be taken __ account.

Speaking

I. Look through the text again and discuss it in the form of a dialogue using the active words and expressions. The topics for dialogues:

- what are building engineers busy with;
- highway planning;
- pavement and its types;
- road maintenance;

II. Dwell on the following:

1. Where can people look for a job?
2. What kind of job can people have?
3. Jobs can be attractive and not attractive. What qualities make them such?
4. What kind of work are you interested in?

– well-paid work;
– interesting work;
– work in a large and famous company;
– quiet work;
– work in an industry which has future prospects;
– prestigious work;
– a kind of work such as not to sit the whole day in the office;
– to travel a lot.

5. What are the most important things for you in your work? Arrange these aspects in order of importance and add some more things you think are important?

- job satisfaction;
- earning plenty of money;
- having pleasant co-workers/colleagues;
- meeting people;
- earning enough money;
- security

If you could choose any job in the world to do, what would it be?
Please, discuss advantages and disadvantages of your future profession.
a) Do you think your future profession is prestigious?
b) Do you think it will be still prestigious and well-paid by the time you graduate?
c) How difficult is to find a good work in your field?

Giving opinions:
Actually…
To tell the truth…
If you ask me…
I (think, believe, feel)…
I'm pretty sure…
In my opinion…
To my mind…
You know, I'm not really sure...
I'd rather not say...
I don't have anything to say about that.

УЧЕБНЫЙ ЭЛЕМЕНТ 2 (УЭ-2)

FROM THE HISTORY OF ROADS

I. Read and memorize the active vocabulary. Translate the given sentences.

amber (n.) – янтарь

bold (adj.) – смелый.

Ex. His bold concept surprised everyone.

bridge (n.) – мост.

Ex. There was an iron bridge over that river.

course [kɔ:s] **(n.)** – пласт, слой.

Ex. The first course consisted of small stones.

ditch (n.) – канава, ров.

Ex. He found himself in a long narrow ditch.

drainage ['dreɪnɪʤ] **(n.) –** дренаж, сток, отвод вод.

evidence (n.) – доказательство, свидетельство.

Ex. Medical evidence shows that men are more likely to have heart attacks than women.

expressway (n.)– автострада, автомагистраль.

Ex. An expressway is a very wide road, usually in a city, on which cars can travel very quickly without stopping.

facilitate (v.) – содействовать, способствовать, обеспечить.

Ex. Computers can be used to facilitate language learning.

ferry (n.) – паром, переправа.

Ex. A ferry is a boat that carries people or goods across a river or a narrow part of a sea.

flat (adj.) – плоский.

Ex. It was a perfectly flat sandy beach.

freeway (n.) – автострада, скоростная автомобильная дорога.

Ex. A freeway is a very wide road in the US, usually in cities, built for fast travel.

grouting [`grautiŋ] **(n.) –** заливка, бетонирование

highway (n.) – шоссе, автодорога.

Ex. A highway is a broad main road that joins one town to another.

hollow (n.) – впадина, углубление, низина, яма

include (v.) – включать.

Ex. The price includes postage charges.

marsh (n.) – болото.

Ex. There are a lot of marshes in our country.

motorway (n.) – шоссе, автомагистраль.
Ex. A motorway is a very wide road for travelling fast over long distances, esp. between cities.
path (n.) (syn. trail)– тропа, дорожка.
Ex. I walked nervously up the path towards the front door.
paved roadway – мощеная дорога.
prior to – раньше, до, перед.
Ex. All the arrangements should be completed prior to your departure.

remarkable [rɪ'mɑ:kəbl] **(adj.) –** значительный, примечательный, необыкновенный.
Ex. She has made remarkable progress.

substantial [səb'stæn(t)ʃ(ə)l] **(adj.)**– существенный, важный, значительный.

Ex. The document requires substantial changes.
tin (n.) – олово
trade (n.) – торговля.
Ex. There has been an increase in trade between East and West.

transverse [trænz'vɜ:s] **(v.)** – пересекать, располагать поперек **(adj)** – поперечный
construct (v.) – строить, сооружать.
Ex. The new hotel is being constructed near hear.
AD (Anno Domini) – нашей эры
BC (before Christ) – до нашей эры

BUILDING MATERIALS

bituminous mortar – битумный раствор
burnt brick – обожженный кирпич
concrete – бетон
flint-like lava – кремнистая лава
gravel - гравий
gypsum – гипс
lime – известь, известняк
log – бревно
sand - песок
stone – камень
stone slab – каменная плита

II. Study the following list of proper names:

Asia ['eɪʃə]

China ['ʧaɪnə], **Chinese**

Egypt, Egyptian
Etruscan – (n) этруск, **(v)** этрусский
Europe
Greece, Greek
India, Indian
Mesopotamia, Mesopotamian
Rome, Roman
The Black Sea
The Caspian Sea

The Mediterranean Sea [ˌmedɪt(ə)'reɪnɪən]

The Persian Gulf

II. Make pairs of synonyms:

1.	construct	a) proof
2.	flat	b) hole
3.	substantial	c) layer
4.	evidence	d) build, create
5.	bold	e) essential
6.	hollow	f) plain
7.	course	h) bog, swamp
8.	prior to	i) challenging
9.	path	j) trail
10.	facilitate	k) enable
11.	marsh	l)before

IV. Make pairs of antonyms:

1.	motorway	a) prevent, hinder
2.	remarkable	b) hilly
3.	facilitate	c) destroy
4.	prior to	d) disproof
5.	flat	e)exclude
6.	construct	f) path
7.	include	g) insignificant
8.	evidence	h) after

V. Complete the sentences with the appropriate words from the active vocabulary:

1. We got to the other bank of the river by … .
2. There was a car accident on the … over the Dvina River.
3. The police have enough … to arrest them.
4. Lots of people have drowned in this … .
5. I prefer something … for breakfast, not just tea or coffee.
6. Common currency has facilitated the … between European countries.
7. I didn't want to … Tom in the list of the guests.
8. The … in the forest were made by some wild animals.
9. Everybody liked his … ideas. He is a great enthusiast.
10. The window was broken with a … .

VI. Match English and Russian equivalents:

A. 1) wheeled vehicle 2) of minor importance 3) draft animal 4) provide for drainage 5) archaeological sources 6) differ in crookedness 7) bed of boughs 8) fasten with pegs 9) high ground 10) strings of logs

B. 1) археологические источники 2) колесное транспортное средство 3) возвышенность 4) слой веток 5) отличаться кривизной 6) ряд бревен 7) тяговое животное 8) обеспечить дренаж 9) закреплять колышками 10) незначительной важности

VII. Read and translate the following text:

The terms road and highway define those travelled ways on which wheeled vehicles, carriages, animals, and men on foot have moved throughout recorded history. In modern usage highway refers to a rural travelled way as contrasted with the urban "street". The word road is more generally used today to describe lesser travelled ways in rural areas, primarily those carrying small amounts of traffic or being of minor importance. In more recent years the terms freeway, expressway, and motorway and similar terms in other languages (*autobahn, autostrada*) have come into use to describe highways in both urban and rural areas.

The first road builders probably practised their art in southwestern Asia in the area bounded by the Black and Caspian seas, the Mediterranean Sea, and the Persian Gulf. People migrated east, west, north, and south from this area; presumably in their earliest travels they recognized the necessity of improving their paths and trails to facilitate the movement of their draft animals; this made the beginnings of trade possible. The first artificial roadways may have been constructed by levelling the high ground, filling the hollows, and transferring earth from the edges of the pathway to the centre, thus forming side ditches and providing for drainage. During the Bronze Age, the development of agriculture and trade, facilitated by the domestication of the horse, marked the beginning of

civilization. Trade required better roads. The first serious road builders probably were the Mesopotamians, who constructed paved roadways in which burnt brick and stone were laid in bituminous mortar.

The earliest roads in Europe were the "Amber Routes" probably used between 1900 and 300 BC by Etruscan and Greek traders to transport amber and tin. These roads were constructed by laying two or three strings of logs in the direction of the road on a bed of branches and boughs up to 20 feet (6 meters) wide and covering them with transverse logs 9 to 12 feet (2.7 – 3.6 meters) in length laid side by side. In the best log roads, every fifth or sixth log was fastened to the underlying subsoil with pegs.

The ancient road system of China was a substantial and remarkable system. Many of the Chinese roads were wide, well built, and surfaced with stone; rivers were crossed by bridges or well-managed ferries; steep mountains were traversed by stone-paved stairways with broad treads and low steps. Chinese roads differed markedly from the Roman roads in their crookedness, particularly in hilly areas.

Evidence from archaeological and historical sources indicates that by AD 75 several methods of road construction were known in India. These included the brick pavement, the stone slab pavement, a kind of concrete as a foundation course or as an actual road surface, and the principles of grouting with gypsum, lime, or bituminous mortar.

The early Greeks depended primarily on sea travel. There is evidence of the building of special roads for religious purposes and transport about 800 BC, but there is little evidence of substantial road building for travel and transport prior to the Roman system.

The first scientific road builders were the Romans. Roman roads were remarkable for preserving a straight line from point to point regardless of obstacles. They were carried over marshes, lakes, ravines and mountains, and by their bold conception, they have excited the admiration of modern engineers. The foundation of the roads was then covered with a light bedding of sand or mortar on which four main courses were constructed; (1) a layer of large flat stones 10 to 24 inches (250-600 millimeters) in thickness; (2) a layer of smaller stones mixed with lime about 9 inches (225 millimeters) thick; (3) the *nucleus* layer, about one foot (300 millimeters) thick, consisting of small gravel and coarse sand mixed with hot lime; and (4) on this fresh mortar there was a wearing surface, of flint-like lava about (150 millimeters) deep. The total thickness thus varied from 0.9 to 1.5 meters. The width of such road was 10.5 meters. This massive Roman road section adopted about 300 BC set the standard of practice for the next 2,000 years.

VIII. Think of a title to the given text. Explain your choice.

IX. Make a plan of the text.

X. Answer the following questions:

1. What is a road?
2. What other terms are used to denote the word road?
3. How were the 1st roads constructed?
4. What facilitated the construction of better roads?
5. How were the earliest roads in Europe called?
6. What are the main features of the Chinese road?
7. The first scientific road builders were the Greeks, weren't they?
8. How many courses did the Roman road consist of?
9. Who set the standard of road building?

XI. Define whether the following sentences true or false:

1. The first road builders practiced their art in Western Europe.
2. The first artificial roadway had side ditches.
3. During the Stone Age there was a necessity for better roads.
4. Etruscan and Greek traders transported iron and gold by means of "Amber Routes".
5. The ancient Chinese could build bridges.
6. Roman Roads were built over marshes and lakes.
7. The nucleus layer of the Roman road included gravel and coarse sand mixed with hot lime.
8. The length of the Roman road was 10,5 meters.

XII. Match the beginnings of the sentences with their endings:

1. The Mesopotamians constructed paved roadways	a) in their crookedness.
2. Chinese roads differed markedly from the Roman roads	b) small stones mixed with lime.
3. Roman roads were remarkable	c) laying two or three strings of logs in the direction of the road on a bed of branches and boughs
4. The Greeks built roads	d) by laying burnt brick and stone in bituminous mortar.
5. Amber routes were constructed by	e) were the Romans.
6. Freeway, expressway, and motorway	f) marked the beginning of civilization.
7. During the Bronze Age the development of agriculture and trade	g) for religious purposes.
8. The second course of the Roman road included	h) have come into use to describe highways in both urban and rural areas
9. The first scientific road builders	i) for preserving a straight line from point to point.

Speak on the following:

- terms for *roads* in different languages;
- Mesopotamian roads;
- Amber Routes;
- Chinese roads;
- Indian roads;
- Roman roads.

УЧЕБНЫЙ ЭЛЕМЕНТ 3 (УЭ-3)

THE BIRTH OF MODERN ROAD BUILDING

I. Read and memorize the active vocabulary. Translate the given sentences.

automobile ['ɔ:təmə(u)bi:l] (n) **–** автомобиль

bypass ['baɪpɑ:s] (n) – объезд, объездная дорога.

Bypass is a road that goes around a town or other busy area rather than through it.

capacity [kə'pæsətɪ] (n) – предельная нагрузка, вместимость.

Our factories have been working at full capacity all year.

curve [kɜ:v] (n) – поворот; *a sharp curve* – крутой поворот

demand [dɪ'mɑ:nd] (n) – спрос; demand ***for*** smth;

demand determines supply – спрос определяет предложение;
*be **in** demand – пользоваться спросом;*
divide *into* [dI'vaId] (v) – делить на, разделять
freight [freIt](syn. load) (n)– груз, фрахт

inadequate [ɪn'ædɪkwət] (adj) – неподходящий, не соответствующий требованиям;

The parking facilities are inadequate for such a busy shopping centre.

increase [ɪn'kri:s] (v) – увеличиваться, возрастать;

Food prices increased by 10% in less than a year.

(n) ['ɪnkri:s] – рост, увеличение;

There has been an increase in the crime rate this year.
introduce (v) – представлять, вводить

major ['meɪʤə] (adj) – главный, основной

(*syn. main, principle, chief, leading, fundamental)*

reduce [rɪ'dju:s] (v) – уменьшать, сокращать; (syn. to decrease)

The staff has been reduced by half.

require [rɪ'kwaɪə] (v) – требовать

requirement [rɪ'kwaɪəmənt] – требование;

to meet requirements – отвечать требованиям;
speed (n) – скорость;
*to move **at** a high speed* – двигаться с высокой скоростью

terrain [tə'reɪn] (n) – местность, ландшафт, рельеф

tire ['taɪə] (n) – шина, покрышка

flat tire – ненакачанная, спустившая шина

pneumatic [nju:'mætɪk] tire – пневматическая шина

spare tire – запасная шина

traffic (n) – движение; heavy traffic – интенсивное движение.

traffic stream = traffic flow – транспортный поток

traffic jam – «пробка», затор

traffic accident – дорожное происшествие, авария

traffic volume – плотность, интенсивность движения

traffic lights – светофор

traffic warden ['wɔ:d(ə)n]– инспектор дорожного движения

truck [trʌk] (n) – грузовик

heavy truck – тяжелый грузовой автомобиль

vehicle ['vɪəkl] (n) – транспортное средство

Word Combinations

axle load – нагрузка на ось
collector road – магистральная дорога районного значения
feeder road – подъездная дорога, ведущая к автостраде
local road – дорога местного значения
primary highway – магистральная (главная) автомобильная дорога
secondary highway – автомобильная дорога второстепенного значения
sight distance – расстояние видимости
to set a standard – установить стандарт
to take *into* account (consideration) – принимать во внимание, учитывать
to turn (pay, draw) attention *to* smth – обращать внимание на что-л.
vertical gradient – вертикальный градиент
wheel load – нагрузка на колесо

II. Match the words with their definitions:

bypass, speed, requirement, feeder road, truck, traffic jam, tire, axle load, terrain, traffic warden, traffic lights

1) a covering for a wheel, usually made of rubber reinforced with cords of nylon, fiberglass, or other material and filled with compressed air;
2) distance traveled divided by the time of travel;
3) a highway or section of a highway that passes around an obstructed or congested area;
4) any of various heavy motor vehicles designed for carrying or pulling loads;

5) a road signal for directing vehicular traffic by means of colored lights;
6) the surface features of an area of land; topography;
7) a relatively smooth bend in a road or other course;
8) a person who is appointed to supervise road traffic and report traffic offences;
9) the total weight felt by the roadway for all wheels connected to a given axle;
10) something that is required; a necessity;
11) a minor road used to bring traffic to a major road.

III. Make pairs of synonyms:

1. automobile	a) grow
2. speed	b) rate
3. inadequate	c) classify
4. increase	d) load
5. major	e) car
6. divide	f) main
7. freight	g) unsuitable
8. introduce	h) establish

IV. Make pairs of antonyms:

1. curve	a) supply
2. reduce	b) appropriate
3. demand	c) straight road
4. truck	d) nonprincipal, minor
5. inadequate	e) increase
6. major	f) passenger car

V. Complete the following sentences using phrases with the word *traffic:*

1. Mr. Smith is going to be late. He is stuck in a … … .
2. There were a lot of casualties in the result of the … … on this expressway.
3. You must stop at the … … and wait for the green.
4. A … … checks that vehicles have not parked illegally on the streets.
5. The … … on this highway is rather high.

VI. Insert the necessary prepositions:

1. You should take … account that prices are increasing rapidly.
2. Jack was driving … a high speed and got … a car accident.
3. Doctors are … demand now.
4. All roads can be classified … primary and secondary.
5. Tom’s education is inadequate … such a position.
6. They must reduce their expenses … 20%.
7. There`s a great demand … foodstuffs nowadays.

VII. Read the text and translate it:

The Birth of Modern Road Building

The automobile and a little later the heavy truck introduced totally new requirements for road and highway construction. Vehicle speeds increased rapidly; roadway alignment suitable for horse and buggy travel was completely inadequate, as were road surfaces, whose stones were torn loose by the heavily loaded tires. The development of the pneumatic tire substantially reduced the destructive effect of truck loading on thin pavements intended for horse and buggy, but it was obvious that much stronger surfacing was required.

There was substantial amount of long distance travel both for business and pleasure, and the tonnage of intercity freight carried by trucks was increasing steadily, bringing a powerful demand for direct, long-distance express routes, including suitable links and bypasses in the metropolitan areas. In the late 1960s and early '70s increasing attention was being turned to the problem of safety in design of highways and their auxiliary equipment.

Highway planners and designers have had to take into account the speed and operating characteristics of the motor vehicles, wheel or axle loads, and the density and composition of vehicles in the traffic stream, as well as the safety, comfort, and convenience of the travelling public.

Depending upon the volume of traffic, composition of traffic, and major purpose, roads and highways may be divided into four functional classifications:
1) local roads and city streets;
2) collector and feeder roads, and secondary rural highways;
3) primary highways that carry relatively high volumes of traffic between population centres;
4) expressways that serve major traffic flows.

Design standards are usually established for each functional classification, taking into account the type of terrain in which the road or highway will be built (or rebuilt) classified as flat, rolling, or mountainous. Design standards are usually established on the basis of average daily traffic volumes, and it is common practice to set both a minimum standard and a desirable standard. Design standards commonly provide for:

- the speeds for which the roadway is to be designed;
- maximum permissible sharpness of horizontal curves;
- maximum permissible vertical gradient;
- minimum width of roadway and surfacing (pavement);
- minimum sight distance (the distance a driver can see above the roadway);
- the capacity of bridges.

With the growth of traffic density a demand for greater amenities has come. It is necessary to provide the national road system with hotels and restaurants, service stations and repair shops, where drivers and passengers may rest and vehicles be serviced and repaired. Attention should be given to such questions as fitting roads into the landscape in plan, and in profile, planting trees, so as to improve their aesthetic value.

VIII. Answer the following questions:

1. What introduced new requirements for road building?
2. Did the pneumatic tire reduce or increase the destructive effect on road pavements?
3. People began to travel more, didn't they?
4. When was increasing attention being turned to road safety?
5. What major things should highway planners and designers take into account?
6. How can all the roads be classified?
7. Is the type of terrain important for road designers?
8. Which two kinds of standard are there in road building?
9. What amenities are needed in the present day road system?

IX. Say whether it is true or false:

1. Roads intended for horse and buggy were quite adequate for automobiles.
2. Substantial increase in travel brought a powerful demand for different well-build types of roads.
3. Little attention to the problem of road safety was paid in the 1960-1970s.
4. Wheel and axle loads are of no importance for highway planners.
5. There are four functional classifications of roads.
6. Types of terrain are classified as rural and urban.
7. Minimum and desirable standards are usually set by road designers.

Speaking

- Can you give the main idea of the text in a nutshell?
- What key phrase explains the main idea of each paragraph?
- Pick up some key words for each paragraph.
- Retell the text briefly in your own words making use of the key words you've written out.

УЧЕБНЫЙ ЭЛЕМЕНТ 4 (УЭ-4)

ROAD CONSTRUCTION

I. Study the new words and try to memorize them:

aid (v.) – содействовать, помогать, способствовать
amenities – удобства, рекреационно-бытовые условия
base course – основание дорожного покрытия
bearing ratio – показатель плотности грунта
blasting (n.) – подрывные работы
camber (n.) – выпуклость; выступ; изгиб
cat's-eyes – "кошачьи глаза" (утопленные в резиновые подушки зеркальные рефлекторы на дорогах; обеспечивают видимость разметки при свете фар)
commence (v.) – начинать(ся)
compact (v) – уплотнять, сдавливать, спрессовывать
crash barrier – ограждение; барьер на автостраде, разделяющий полосы с противоположным направлением движения
density (n.) – плотность
digging (n.) – копание, рытье; земляные работы; выемка грунта;
drain away (v.) – стекать, утекать
embankment (n.) – насыпь, дамба *earth embankment* – земляная насыпь *road embankment* – дорожная насыпь *railroad embankment, railway embankment* – железнодорожная насыпь
feature (v.) – походить, напоминать
filling station – автозаправочная станция
fluorescence – свечение, флуоресценция
grader (n.) – грейдер
in-situ ground – земля на месте проведения работ
level marking – маркировка уровня
level off (v.) – выравнивать
peg (n.) – колышек
protrude – высовывать(ся), выдаваться
removal (n.) – устранение, удаление
repair shop – станция техобслуживания автомобилей
right-of-way (n.) – полоса отчуждения (пространство по обеим сторонам шоссейной или железной дороги, изъятое из другого землепользования и переданное для эксплуатации транспортникам, которые организуют на нем защиту дорог от неблагоприятных метеорологических факторов, строя всевозможные оградительные, защитные сооружения, создавая лесополосы, объекты транспортного назначения и др.)

seal – защитное покрытие
set out (v.) – определять
stockpile (v.) – складировать, накапливать
strip (v.) – сдирать, обдирать; снимать верхний слой
sub-base (n.) – нижний слой основания дорожного покрытия
subgrade (n.) – подстилающий слой
surface course – верхний слой дорожного покрытия
topsoil (n.) – верхний слой почвы
vegetation (n.) – растительность
vibratory road roller – вибрационный дорожный каток

II. Match the equivalents:

1. continuous right-of-way	a) до некоторой степени
2. bearing ratio	b) непрерывная (сплошная) полоса отвода
3. in-situ	c) как только
4. motorized grader	d) защитное покрытие
5. to some extent	e) показатель плотности грунта
6. once	f) напоминать выпуклость
7. to import	g) начинать
8. commence	h) световозвращательный показатель
9. seal	i) слегка выступать
10. retroreflector	j) ограждение (установленное на разделительной полосе или на обочине)
11. to feature camber	k) на месте
12. to protrude slightly	l) вносить, вводить
13. crash barrier	m) автогрейдер

III. Choose the right equivalent of the word:

1. уклон	a) level b) shoulder c) grade
2. взрывать	a) to blast b) to penetrate c)to compact
3. удаление	a) development b) removal c) reduction
4. колышек	a) mark b) peg c) barrier
5. складировать	a) to keep b) to remove c) to stockpile
6. плотность	a) density b) location c) quality
7. грунтовое основание	a) subsoil b) pavement base c) subgrade
8. слой износа	a) surface course b) wearing course c) base course
9. распространение	a) digging b) blasting c) spreading
10. оседание	a) overcoming b) settling c) alignment

IV. Match the words with their definitions:

1. right-of-way	a) is a mixture of bitumen and stone
2. asphalt	b) movements of people and vehicles along roads and streets
3. pavement	c) is a mixture of cement and stone
4. traffic	d) central part of the road used by wheeled traffic
5. subbase	e) the land needed for road pavement, shoulders, ditches, side slopes
6. carriageway	f) is a rigid or semi-rigid upper layer of the surface of the road
7. concrete	g) is a thoroughly compacted upper layer of the roadbed
8. gravel	h) a self-propelled wheeled machine with a steel blade used to level roads, hills and cuts
9. road	i) to put flat stones, bricks, etc. on a path, a road, etc.
10. motor grader	j) specially prepared way between places for the use of pedestrians, riders, vehicles
11. to pave	k) small stones with coarse sand
12. subgrade	1) is a layer resistant to moisture, which is made of gravel, slag, soil treated with binders

V. Choose the right verb:

a) When constructing a road builders should carry *away / exclude / overcome / overtake* different obstacles.

b) Builders sometimes *compact / add / place / level* Portland cement to the base course to ensure adequate strength of this layer.

c) The surface course spreads out the vehicle loads and at the same time *strengthens / involves / cuts / compacts* the pavement structure.

d) A borrow pit (source for obtaining fill (насыпной грунт), gravel, and rock) and a water source should be *divided / located / used / indicated* near or in reasonable distance to the road construction site.

e) Old road surfaces, fences, and buildings may need to be *blasted / removed / allocated / erased* before construction can begin.

VI. Match the words with their synonyms:

1) to commence, to employ, to strip, to permit, to introduce, to aid, to select, bend, to specify

2) to remove, to import, turn, to choose, to begin, to determine, to apply, to help, to allow

VII. Arrange the words according to the parts of speech:

Noun	Verb	Adjective

Variety, creative, import, selection, remove, select, creation, vary, importation, survey, selective, continue, create, removable, continuous, surveyor, various, strengthen, removal, strength, spread, reflect.

VIII. Read the text and translate it:

ROAD CONSTRUCTION

Road construction requires the creation of a continuous right-of-way. Removal of earth and rock by digging or blasting, construction of embankments, bridges and tunnels, and removal of vegetation (this may involve deforestation) are often needed. A variety of road building equipment is employed in road building.

Once these activities are completed, construction of the pavement can begin.

Firstly the longitudinal and vertical alignment of the road is set out by a surveyor. The alignment of the road will be marked with control pegs. The pegs will have level markings as a control mechanism to ensure the road is constructed according to design levels.

Construction of the road commences with the stripping of the topsoil. The topsoil is usually stockpiled nearby for the construction of embankments along the road. The in-situ ground will be removed, using a heavy motorised grader to a level specified by the civil engineer. This is considered as the roadbed level. It will be compacted using a heavy vibratory road roller. Once the roadbed has been compacted to the required density (as will be specified by the engineer), the pavement layers can now be imported.

The first layer to be imported is the selected subgrade. This is usually a gravel type material. Once placed the material is leveled off by a grader. It will be compacted to a required density, using a road roller.

The next layer to be imported is the sub-base. The subbase material is of a higher quality than the selected sub-grade. It is usually a gravel type material with a high bearing ratio.

While the material is worked by a grader, it is mixed with water to aid compaction. Once the subbase layer has been compacted to its required density, the importation of the final layer can commence.

The final layer of a road is the base course consisting of gravel or crushed stone. The base course will be leveled off and compacted. Sometimes (usually for roads that will experience heavy loads) portland cement will be added to it,

to ensure adequate strength of this layer. On top of the base course is placed a surface course which typically consists of asphalt concrete or a seal consisting of a mixture similar sized small stones, bitumen and portland cement. This surface course strengthens the pavement structure and provides a smooth and high-friction surface for vehicles to drive on.

Modern roads, and indeed many ancient ones, such as those built by the Romans, feature camber. This is designed to allow water to drain away from the road to its edges. On the side of the road there may be retroreflectors on pegs, rocks or crash barriers, white toward the direction of the traffic on that side of the road, and red toward the other direction. In the road surface there may be cat's eyes: retroreflectors that protrude slightly, but which can be driven over without damage.

Road signs are often also made retroreflective. For greater visibility of road signs at daytime, sometimes fluorescence is applied to get very bright colors.

Finally, when the highway is put into service, its maintenance and the provision for uninterrupted traffic become of the utmost importance of the national economy. The engineer in charge of the highway operation must ensure the maintenance of the road quality under all traffic and weather conditions.

With the growth of traffic density a demand for greater amenities has come. It is necessary to provide the national road system with hotels and restaurants, filling stations and repair shops, where drivers and passengers may rest and vehicles be serviced and repaired. Attention should be given to such questions as fitting roads into the landscape in plan and in profile, planting trees, so as to improve their aesthetic value.

IX. Answer the following questions:

1. What does road construction require?
2. Who sets out the longitudinal and vertical alignment of the road?
3. What road building equipment is used during road construction?
4. What is the difference between the materials used in the subgrade and in the subbase?
5. What is the purpose of mixing the materials of the sub-base with water?
6. What does the final layer consist of?
7. Asphalt concrete or a seal is used in a surface course, isn’t it?
8. Can you name the important factors in road construction?
9. What does the low density of each layer lead to?
10. What is camber designed for?
11. Are there any special devices on the side of the road? What is their purpose?
12. What is added to road signs to make them brighter at daytime?

X. Decide whether these statements are true or false:

a.

Removal of earth and rock by digging or blasting, building embankments, bridges and tunnels are often needed when the road is constructed.

b.

The longitudinal and vertical alignment of the road is set out by road planners.

c.

The removed topsoil is usually stockpiled nearby for rehabilitation of newly constructed embankments along the road.

d.

A heavy motorized grader is used to remove the in-situ ground.

e.

The first pavement layer to be imported is the selected sub-base.

f.

The sub-based material is usually a gravel type material which is worked by a grader and mixed with water to aid compaction.

g.

The base course is the final layer of a road.

h.

The density of each layer shouldn't be close the maximum dry density of the specific material to prevent any undulations and holes in the road surface.

i.

Modern roads feature camber.

j.

Road signs are not retroreflective.

XI. Speak about road construction stages, using the following clichés:

First, the author discusses ....
Attention is drawn to the fact that....
Further it should be noted that....
A detailed description of... is given.
The author emphasizes the fact that....
The final part of the article reports on …

УЧЕБНЫЙ ЭЛЕМЕНТ 5 (УЭ-5)

PAVING MATERIALS

I. Study the new words:

aggregate ['ægrɪgət] – заполнитель

airfield – аэродром Syn: aerodrome ['ɛərədrəum]

application – применение, использование, употребление; приложение; применимость

asphalt ['æsfælt] – асфальт

available [ə'veɪləbl] – доступный; имеющийся в распоряжении, наличный

bitumen ['bɪtjumɪn] – битум

cement [sə'ment] – 1. 1) цемент 1) цементировать, бетонировать 2) крепить, скреплять (об отношениях между людьми); сплачивать *to cement a friend-ship* – скреплять дружбу

concrete ['kɔŋkri:t] – бетон *fast hardening concrete* – быстротвердеющий бетон;

cement concrete – цементный бетон *to cast concrete* – укладывать бетон

conduct ['kɔndʌkt] – проводить

course [kɔ:s] – слой *base course* – несущий слой

crack – трещина, щель ***crack resistance*** сопротивление образованию трещин, трещиноустойчивость

deformation – деформация, разрушение

demand (demands) – запросы, требования to place demands on smth – предъявлять требования к чему-л.

deposit [dɪ'pɔzɪt] – залежь

failure ['feɪljə] – недостаток, авария, повреждение, отказ

gravity ['grævɪtɪ] – плотность

impetus ['ɪmpɪtəs] – побуждение, движущая сила; стимул, импульс, толчок

impurity – примесь

oil – нефть ***crude oil*** – сырая нефть

pipeline ['paɪplaɪn] – трубопровод; нефтепровод

refinery – нефтеочистительный завод

residue ['rezɪdju:] – остаток ; осадок; отстой

smooth [smu:ð] – гладкий, ровный;
soil – почва
stiff – жесткий (о конструкции) ; крепкий; негибкий
strength – прочность

surface ['sɜ:fɪs] – поверхность

to crush – давить, дробить, толочь
to mix – мешать, смешивать, перемешивать
to obtain – получать; добывать; приобретать
to refine – очищать (от примесей) , рафинировать; повышать качество; облагораживать *to refine oil* – очищать нефть
to spread – покрывать, устилать, укладывать (асфальт) Syn. to cast

to transport [træn'spɔ:t] – перевозить; везти, транспортировать

tough [tʌf] – прочный, износоустойчивый, крепкий

variable ['vɛərɪəbl] – изменчивый, изменяющийся, непостоянный

versatile ['vɜ:sətaɪl] – многоцелевой, универсальный

waterproofing – гидроизоляция
waterproof – водонепроницаемый, непромокаемый; водоотталкивающий; водостойкий, водоупорный

II. Match the words and their definitions:

Airfield, soil, concrete, asphalt, transport, crush, available, waterproof

1) Impervious to or unaffected by water;
2) The top layer of the earth's surface, consisting of rock and mineral particles mixed with organic matter;
3) Present and ready for use; at hand; accessible;
4) To break, pound, or grind (stone or ore, for example) into small fragments or powder;
5) A hard, strong construction material consisting of sand, conglomerate gravel, pebbles, broken stone, or slag in a mortar or cement matrix;
6) A brownish-black solid or semisolid mixture of bitumens obtained from native deposits or as a petroleum byproduct, used in paving, roofing, and waterproofing;
7) To carry from one place to another; convey;
8) The area of fields and runways where aircraft can take off and land.

III. Find synonyms to the following words:

A. course, airfield, versatile, conduct, variable, obtain, failure, stiff, demand, usage, impetus, purify, sediment.

B. refine, changeable, layer, get, tough, application, residue, stimulus, aerodrome, universal, accident, carry out, requirement.

IV. Make phrases matching the words from two columns and translate them:

1. to spread	a) soil
2. to conduct	b) course
3. to transport	c) demands
4. serious	d) residue
5. wearing	e) concrete
6. to meet	f) asphalt
7. heavy	g) experiments
8. variable	h) conditions
9. sandy	i) failure
10. fast-hardening	j) goods

V. Complete the following sentences with the appropriate words from active vocabulary:

1. There are few ___ of oil in our country.
2. We are awfully sorry but these goods are not ___ at present. Can you drop in next week?
3. Is this watch ___? I'd rather not take it off while bathing.
4. The ___ in the south of Belarus are more fertile (плодородный).
5. ___ content is not very high in this mixture.
6. The marriage was a great ___ to start his own business and earn more money.
7. I prefer ___ leather to suede (замша).
8. First ___ of concrete is referred to the II century BC.
9. ___ is a component of composite materials such as concrete and asphalt concrete; it serves as reinforcement to add strength to the overall composite material.
10. Their vehicle was ___ by an army tank.

VI. Read and translate the text.

PAVING MATERIALS

Roads at the turn of the 20th century were largely inadequate for the demands about to be placed on them by the automobile and bicycle. As vehicle speeds increased rapidly, the available friction between road and tyre became critical for accelerating, braking and cornering. In addition, numerous pavement failures made it obvious that much stronger and tougher materials were required. The result was an ongoing search for a better pavement. Asphalt and concrete both offered promise.

Asphalt is a mixture of bitumen and stone, and concrete is a mixture of cement and stone. The first road use of asphalt occurred in 1824 when asphalt blocks were placed on the Champs-Elysees in Paris. The first successful concrete pavement was built in Inverness, Scotland, in 1865. Both asphalt and concrete required the availability of powerful stone-crushing, mixing and spreading equipment.

The impetus for the development of modern road asphalt came from the United States which had few deposits of natural bitumen to draw upon and where engineers were therefore forced to study the behaviour of this material. The first steps came in the 1860s with the work of Belgian immigrant Edward de Smedt at Columbia University in New York. De Smedt conducted his first tests in New Jersey in 1870 and by 1872 was producing the equivalent of modern road asphalt. The first applications were in Battery Park and on Fifth Avenue in New York Cityin 1872.

In 1887 de Smedt was followed as inspector of asphalts and cements by Clifford Richardson. Richardson basically developed two forms of asphalt: asphaltic concrete, which was strong and stiff and thus provided structural strength; and hot-rolled asphalt, which contained more bitumen and thus produced a far smoother and better surface for the car and bicycle.

Richardson published a standard textbook on asphalt paving in 1905, and the practice did not change greatly thereafter. The biggest change was in the machinery available to produce, place and finish the material rather than in the product itself. Toward the end of the century, there were major movements towards the use of recycled asphalt, chemical modifiers for improving bitumen properties and small fibres for improving crack resistance.

The first modem concrete roads were produced by Joseph Mitchell who conducted three successful trails in England and Scotland in 1865-66. Like asphalt technology, concrete road building was largely developed by the turn of the 20th century and was restricted more by the available machinery then by the material. For the following century the two materials remained in intense competition, both offering a similar product at a similar cost, and there was little evidence that one would far ahead of the other as they continued on their paths of gradual improvement.

- Champs-Elysees – главный бульвар в Париже (Елисейские поля).
- Battery Park – Бэттери-парк (Парк на берегу Нью-Йоркской гавани на южной оконечности Манхэттена. От парка начинается Бродвей).

VII. Answer the given questions:

1. The world entered the 20th century and roads didn't satisfy the demands of the automobile, didn't they? Why?
2. What kinds of materials were required for modern roads?
3. Why did the impetus for the development of modern road asphalt come from the United States?
4. What scientist produced the equivalent of modem road asphalt?
5. What kinds of asphalt did Clifford Richardson develop?
6. Who published standard textbook on asphalt paving?
7. Where were the first concrete roads built?
8. Why was concrete road building restricted?
9. Why did asphalt and concrete remain in intense competition for the following century?

VIII. Match the beginning with the ending:

1. Asphalt	a) was strong and stiff and provided structural strength.
2. Concrete	b) a mixture of bitumen and stone.
3. Asphaltic concrete	c) is a mixture of cement and stone.
4. Hot-rolled asphalt	d) were restricted by available machinery.
5. Asphalt technology and concrete road building	e) contained more bitumen and produces concrete road building a far smoother and better surface for the car and bicycle.

IX. Give the derivatives of the following words and translate them into Russian:
to pave, to conduct, to mix, to require, possible, to improve, to change, stiff, to continue, to produce, to move, to complete, to add, available.

X. Try to recollect the achievements of the following people whose names were mentioned in the text:

- ✓ Edward de Smedt
- ✓ Joseph Mitchell
- ✓ Clifford Richardson

XI. Match the equivalents:

1. oil pool	a) нефтяная залежь
2. crude oil	b) ни коим образом
3. light fractions	c) заполнитель
4. heavy residue	d) тонкий слой
5. gravity	e) сырая нефть
6. refinery	f) нефтяная скважина
7. oil well	g) легкие частицы
8. aggregate	h) сильная жара
9. thin coating	i) испаряться
10. intense heat	j) плотность
11. by no means	k) нефтеочистительный завод
12. evaporate	l) тяжелый осадок

XII. Read the text carefully and do the tasks that follow:

Asphalt is an Ancient Construction Material

Asphalt, the world's most versatile construction material today, is by no means new. It was used in many ways in ancient Mesopotamia, Syria and Egypt. The asphalt used by the ancients was a native material obtained from many of the oil pools where crude oil rose to the surface and the lighter fractions were evaporated by nature. The remaining heavy residue usually contained various amounts of water, soil and other impurities; but by slow and crude methods of distillation, fuel for lamps and bituminous products for mastics, waterproofing and paving were obtained.

The most extensive sources of native asphalt 4,000 to 5,000 years ago were located in Iraq. Several large deposits are known to have existed along the banks of the Euphrates River.

The Egyptians obtained native asphalts for waterproofing and building from the Dead Sea and from a source near the River Jordan in Lebanon.

Asphaltic construction materials are a component of crude oil taken from the hundreds of thousands of oil wells throughout the world today. The amount of asphalt that a crude oil may contain is quite variable, depending upon the gravity of the crude. The lower the gravity of the crude oil the higher is the asphalt content.

The crude oil is transported by pipelines, tank cars or barges to the refineries where it is separated into its various components by a continuous-flow refining process.

In the refining of asphalt, two different processes are used: steam and vacuum distillation method and solvent extraction method. Another refining method used to obtain a higher percentage of motor fuel is the "cracking" process, which by intense heat and high pressures brings about a chemical change producing a bituminous type of material not widely used for paving.

The basic principles of soil-asphalt stabilization, as applied to highway and airfield construction, are methods of designing and mixing local soil or aggregate with asphaltic material to form a stable and waterproof base course. Properly constructed soil-asphalt base courses resist deformation through the cementing action of the asphalt which binds the soil particles together. The thin coating of asphalt around the soil particles also provides a high degree of waterproofing which is further aid to resistance to deformation.

XIII. Answer the following questions:

1. How was native asphalt obtained in ancient times?
2. Where were large sources of native asphalt found?
3. What was asphalt used for?
4. What does the amount of asphalt in a crude oil depend on?
5. How is the crude oil transported to the refineries?
6. What processes are used in the refining of asphalt?
7. What is done to form a stable waterproofed base course?

XIII. Choose the most appropriate translation of the given words:

A. content – a) содержание b) объем c) качество
B. aid – a) препятствие b) содействие c) добавка
C. steam – a) дым b) пар c) облако
D. extensive – a) узкий b) качественный c) большой
E. fuel – a) топливо b) энергия c) свет
F. solvent – a) катализатор b) загуститель c) растворитель
G. stable – a) прочный b) гибкий c) гладкий
H. continuous – a) стремительный b) медленный c) непрерывный

XIII. Translate from Russian into English:

1) Асфальт является природным материалом, получаемым из нефтяных скважин.
2) Сырую нефть транспортируют на нефтеочистительные заводы, где ее разделяют на различные составные элементы.
3) Количество асфальта в сырой нефти зависит от ее плотности.
4) Чем выше плотность сырой нефти, тем выше содержание асфальта.
5) При очистке асфальта используется два метода: Метод паровой и вакуумной дистилляции, а также метод экстракции растворителем.
6) Укрепление грунта или заполнителя асфальтом широко используется при строительстве дорог и аэродромов.
7) Тонкое покрытие асфальтом вокруг частиц грунта обеспечивает высокую степень водонепроницаемости основания дорожного покрытия.

УЧЕБНЫЙ ЭЛЕМЕНТ 6 (УЭ-6)

ROAD PAVEMENTS

I. Study the new words:

coat (v.) – покрывать слоем чего-л.
cobblestone (n.) – булыжный камень, булыжник
compact (v.) ['kɔmpækt] – сжимать, уплотнять;
crack (n.) – трещина, щель
diverse [daɪ'vɜ:s] (adj.) – многообразный, разнообразный, разный
durable (adj.) – прочный, стойкий, крепкий
enhance [ɪn'hɑ:n(t)s] (v.) – увеличивать, усиливать, улучшать (обычно какое-л. положительное свойство)
flexural stiffness – изгибная жесткость
glue (v.) – клеить, приклеивать
granite sett – брусчатка
harden (v.) –застывать, твердеть
in turn – в свою очередь
inch (n.) – дюйм (единица длины; = 1/12 фута; = 2,54 см)
initially (adv.) – в начальной стадии, в начале;
intended (adj.) – предназначенный
joint (n.) – стык, соединение, шов
light reflectance – светоотражающая способность
longitudinal [ˌlɔnʤɪ'tju:dɪn(ə)l] (adj.) – продольный
macadam [mə'kædəm] – 1) щебень 2) щебеночная дорога
paving machine – бетоноукладчик
related (adj.) – связанный; *related phenomena* – связанные между собой явления *alcohol-related diseases* – болезни, связанные с чрезмерным употреблением алкоголя
relative (adj.) – относительный; сравнительный; релятивный *relative error* – относительная ошибка *relative minimum* – относительный минимум *relative accuracy / precision* – относительная точность
replace (v.) – заменять, замещать *to replace the broken window* – заменять разбитое окно; вытеснять; занимать чье-л. место
riding characteristics – ходовые качества
service life period – срок службы
shrink (shrank, shrunk) (v.) – давать усадку; сжиматься
solidify (v.) – твердеть; затвердевать; застывать;
solution (n.) ─ решение, разрешение (проблемы и т. п.);

to find a solution – найти решение *There's no solution to / for this problem.* – Эту проблему решить невозможно.
sustain (v.) – выдерживать, выносить *He sustained a stress.* – Он перенес стресс.
tensile strength – прочность на растяжение

transverse [trænz(s)'vɜ:s] (adj.) – пересекающийся, поперечный

transverse section – поперечный разрез, поперечное сечение
tyre friction – сцепление шины с дорожным покрытием
withstand (v.) – противостоять, не поддаваться (чему-л.) *to withstand competition* – выдержать конкуренцию *to withstand overload* – выдерживать перегрузки to *withstand pressure* – выдерживать давление
workability (n.) – применимость; годность; работоспособность

II. Match these words with the definitions below:
Solution, inch, diverse, macadam, replace, durable, initially, shrink
1) pavement made of layers of compacted broken stone, now usually bound with tar or asphalt;
2) to take or fill the place of;
3) the method or process of solving a problem;
4) at the beginning, at first;
5) capable of withstanding wear or decay;
6) a unit of length equal to $^{1}/_{12}$ of a foot;
7) to become constricted (сжатый, суженный) from heat, moisture, or cold;
8) differing one from another.

II. Match the equivalents:

1. flexible pavement
2. to maintain workability
3. paving machine
4. to roll thouroughly
5. tyre friction
6. light reflectance
7. bituminous film
8. to spray coating
9. wear resistance stones
10. flexural stiffness
11. longitudinal joints
12. steel reinforcement
13. transverse joints
14. rigid pavement

a. тщательно укатывать
b. бетоноукладчик
c. жесткость при изгибе
d. сохранять способность подвергаться обработке
e. битумная пленка
f. износоустойчивые камни
g. трение шины
h. отражение света
i. напылять покрытие
j. нежесткая дорожная одежда
k. жесткая дорожная одежда
l. стальная арматура
m. продольные швы
n. поперечные швы

IV. Choose the right translation of the word:

- to create a) соединять b) создавать c) дополнять
- to spray a) напылять b) отражать c) укатывать
- to enable a) требовать b) давать возможность c) допускать
- embankment a) насыпь b) прочность c) пленка
- treatment a) отражение b) обработка c) распределение
- durability a) упругость b) долговечность c) гибкость
- solidify a) защищать b) обеспечивать c) затвердевать, застывать
- additive a) добавка b) обочина c) плотность
- stabilize a) распределять b) включать c) укреплять (грунт)
- reinforcement a) наклон b) арматура c) износ

V. Fill in the blanks using the words below and translate the sentences:

flexible, pavement, highway, rigid, cracking, resistance, properties, gravel, site

1. The substance ___ to be determined are of great importance for our research.
2. The ___has storage for up to 50,000 tonnes of material.
3. The road___must be of adequate rigidity, uniformity and resistance to wear.
4. The asphalt concrete surfacing is ___ and should, therefore, be laid over a solid stone base.
5. Broken-stone surfacings have a low___to wear under automobile traffic.
6. The pavement is the most expensive part of a ___.
7. The ___road is the cheapest form of road and the simplest from the construction point of view.
8. Two classifications of pavement have been developed: flexible and ___.
9. Rigid pavement, made of Portland cement concrete, generally has greater strength but is susceptible to ___.

VI. Arrange the words according to their part of speech:

typically, removal, solidify, supplement, durability, temporary, place, thoroughly, reflect, suitable, moisten, resist, relatively, coating, shrink, cast, prevent, reinforcement, distribute, joint, harden, workability, flexible, protective, cause, stabilizer, additive.

verb	noun	adjective	adverb

VII. Translate the following words paying attention to the prefixes and suffixes:

impermeable, unsuitable, disadvantage, motionless, unprotected, untested, useless, invisible, irregular, inaccurate, disappear.

VIII. Form nouns from the following words:
to resist, stiff, to add, durable, to shrink, susceptible, to distribute, to stabilize, to supply.

IX. Match the words with their synonyms:
a. to conduct, to range, to glue, commonly, to involve, to ensure, to stabilize, to enhance, to solidify, to identify, to protect.
b. to connect, to vary, to carry out, to contain, to specify, usually, to reinforce, to defend, to guarantee, to enlarge, to harden.

X. Match the words with their antonyms:
a. To heat, to expand, to repair, to appear, to enhance
b. To damage, to cool, to contract, to reduce, to disappear

XI. Read and translate the text:

ROAD PAVEMENTS

Modern highways are complex engineering structures. They are intended for high-speed motor traffic. The road pavement must continuously provide good riding qualities and withstand the dynamic loads influenced by passage of vehicles. Roads are built in the most varied natural conditions – in broad plains and hills, sandy deserts and in mountains. In all these diverse and complex conditions the road engineer has to be able to find correct engineering and economic solutions. Because of this, when solving construction problems related to road he has to make use of many sciences such as geology, climatology, hydraulics, hydrology, etc. He must be able to design highways so as to ensure comfort and safety of transportation which in turn mostly depend on the road pavement.

Road surface or pavement is the durable surface material laid down on an area intended to sustain vehicular or foot traffic. In the past, gravel road surfaces, cobblestone and granite setts were widely used, but these surfaces have mostly been replaced by asphalt or concrete.

Pavements are called either flexible or rigid, according to their relative flexural stiffness.

Flexible pavements have base courses of broken stone pieces either compacted into place (macadam pavement) or glued together with bitumen to form asphalt. In order to maintain workability, the stones are usually less than 1.5 inches in size and often less than 1 inch. Initially the bitumen must be heated to temperatures of 300° – 400° F (150° – 200° C) in order to make it fluid enough to mix with the stone. At the road site a paving machine places the hot mix in layers about twice the thickness of the stone size. The layers are then thoroughly rolled before the mix cools and solidifies.

The surface layer of a flexible pavement protects the underlying base course from traffic and water while also providing tyre friction, generating minimal noise in urban areas, and giving suitable light reflectance for night-time driving. Such surfaces are provided either by a bituminous film coated with stone or by a thin asphalt layer. Bituminous surfacing with stone is relatively cheap, effective and impermeable and lasts for about 10 years. Asphalt surfacing is used with higher traffic volumes or in urban areas.

Rigid pavements are made of portland cement concrete. The concrete slab ranges in thickness from 6 to 14 inches. It is laid by a paving machine, often on a supporting layer that prevents pumping water and natural formation material to the surface through joints and cracks. Concrete shrinks as it hardens, and this shrinkage is resisted by friction from underlying layer, causing cracks to appear in concrete. Cracking is usually controlled by adding steel reinforcement in order to enhance the tensile strength of the pavement. Transverse joints are sometimes also used for this purpose. Longitudinal joints are used when the whole carriageway cannot be cast in one pass of the paving machine.

In deciding whether to use a flexible or rigid pavement, engineers take into account service life period, riding characteristics, ease and cost of repair, and the effect of climatic conditions. Often there is little to choose between rigid and flexible pavements.

XII. Answer the following questions:

1) What does this text discuss?
2) What must the road pavement provide?
3) What is the pavement?
4) What types of road pavement were used in the past?
5) How are pavements classified according to their structural stiffness?
6) There are two kinds of flexible pavements, aren't there?
7) What is cracking?
8) What does the choice of pavement depend on?

XIII. Complete the following sentences:

1. Modern highways are intended for …
2. Pavements can be either … or …
3. A highway engineer has to make use of many sciences such as …
4. In the past … pavements were widely used.
5. Rigid pavements are made of …
6. Cracking is usually controlled by adding … in order to enhance the tensile strength of the pavement.

XIV. Speak about:

a) flexible pavement
b) rigid pavement

МОДУЛЬ II

УЧЕБНЫЙ ЭЛЕМЕНТ 1 (УЭ-1)

HIGHWAY NETWORK PLANNING

I. Study the new words and try to memorize them:

accurate – скрупулезный, тщательный **Syn**. thorough ['θʌrə]

adjacent – [ə'ʤeɪs(ə)nt] 1) (adjacent **to**) расположенный рядом, смежный, соседний (с кем-л./чем-л.) **Syn**: neighbouring

aerial photography – аэросъемка, воздушное фотографирование

affect – ['æfekt] оказывать воздействие, влияние; касаться, затрагивать *to affect smb. deeply* – сильно повлиять на кого-л**. Syn:** influence, impact

boundary – ['baund(ə)rɪ] граница, межа **Syn**: border , confine, frontier , limit , bound

compact – [kəm'pækt]сдавливать, спрессовывать, уплотнять

culvert – ['kʌlvət] 1) водопропускная труба 2) дренажная труба, кульверт

curve – поворот, изгиб **Syn.** bend, turn

discover in advance – узнать заранее

ditch – канава, ров *deep ditch* — глубокая канава **Syn.** trench

draw up – составлять, разрабатывать **Syn**. elaborate, develop

drawing – чертеж; рисунок; изображение **Syn**. picture, plan, scheme

effect – [ɪ'fekt] действие, влияние; воздействие

environmental impact state – заключение о воздействии на окружающую среду

excavation – [ekskə'veɪʃ(ə)n] 1) копание, рытье 2) яма, котлован **Syn**: hole 3) раскопки

feature – особенность, характерная черта; деталь **Syn**. characteristic , quality, peculiarity

fulfil – [ful'fɪl] 1) выполнять; делать, исполнять, осуществлять, совершать *to fulfil a promise* – выполнять обещание **Syn:** perform , implement , **carry out** 2) завершать, заканчивать, оканчивать **Syn**. complete 3) удовлетворять (требованиям, условиям)

goods – товары; товар *consumer goods* – потребительские товары, товары народного потребления

grade – степень, уровень, градус

haulage – ['hɔ:lɪʤ] 1) а) буксировка; перевозка; транспортировка; доставка

heavy traffic – интенсивное движение

humus – ['hju:məs] гумус, перегной; чернозем

identify – [aɪ'dentɪfaɪ] устанавливать, определять *to identify the limits* – устанавливать допустимые границы **Syn** determine

impermeable – [ɪm'pɜ:mɪəbl] 1) а) непроницаемый, герметичный; не пропускающий (жидкость или газ) **Syn**: impenetrable , impervious

lane – полоса, линия уличного движения

locate – [ləu'keɪt] 1) а) определять место, местонахождение 2) располагать в определенном месте; помещать, размещать

map – карта *on a map* – на карте *to draw / trace a map* – чертить карту

parking lot – автостоянка, парковка **Syn.** car park, parking, parking area, parking place

predict – [prɪ'dɪkt] предсказывать, пророчить; прогнозировать **Syn**: forecast, prognosticate

right-of-way – полоса отчуждения (пространство по обеим сторонам шоссейной или железной дороги, изъятое из другого землепользования и переданное для эксплуатации транспортникам, которые организуют на нем защиту дорог от неблагоприятных метеорологических факторов, строя всевозможные оградительные, защитные сооружения, создавая лесополосы, объекты транспортного назначения и др.)

road section – участок дороги

route – [ru:t] 1. 1) дорога, путь; шоссе; магистраль *direct route* – прямой путь sea route – морской путь *overland route* – сухопутный путь *trade route* – торговый путь **Syn**: way , road , highway

sharpness – резкость, крутизна

shoulder – обочина дороги **Syn**. road border, verge, roadside, wayside

sidewalk – тротуар **Syn**: pavement, footpath

slope – наклон, склон, угол уклона

solid – твердый, прочный, крепкий

steepness – крутизна, крутость

suitable – ['s(j)u:təbl] **for** sth годный, подходящий, пригодный, применимый, соответствующий **Syn:** appropriate , apt

II. Match the English words with their Russian equivalents:

1) long-range needs	a) узнать заранее
2) public hearings	b) котлован, выемка грунта
3) to identify	c) прогнозировать
4) environmental impact statement	d) чернозем, перегной
5) excavation	e) долговременные нужды
6) to discover in advance	f) прилегающий, смежный
7) sidewalk	g) заключение о воздействии на окружающую среду
8) humus	h) особенность
9) to predict	i) тротуар
10) adjacent	j) обозначать
11) feature	k) общественные слушания

III. Choose the right equivalent of the word:

1. *formation* a) создание b) земляное полотно c) учреждение
2. *impermeable* a) недоступный b) непроницаемый c) устойчивый
3. *compact* a) поднимать b) уменьшать c) уплотнять
4. *slope* a) наклон b) подъем c) спуск
5. *suitable* a) тщательный b) внимательный c) подходящий
6. *tough* a) слабый b) прямой c) жесткий
7. *solid* a) солидный b) устойчивый c) твердый
8. *crush* a) копать b) дробить c) облегчать
9. *complete* a) проводить b) завершать c) исследовать
10. *thoroughly* a) тщательно b) первоначально c) успешно

IV. Fill in the correct word from the box:

benefits, distance, traffic, drawings, populations, route, highways, volumes, available

1) _____ are designed for the haulage of goods and passengers with a minimum of effort and at low cost.
2) Traffic between two centers is approximately proportional to their _____ and inversely proportional to the _____ between them.
3) Consideration in planning is also given to the effect of new _____ on existing streets, roads, and parking lots.
4) The economic, social, and environmental _____ and costs of the roads are discussed with relevant official and community organizations until an acceptable specific _____ is determined.

5) Computer models are then used to estimate future traffic _____ on each proposed route.
6) Aerial photography is widely used today to draw maps if they are not_____.
7) All construction work is performed in accordance with working _____.

V. Match the terms with their definitions:
Ditch, slope, shoulder, right-of-way, bridge, vehicle, culvert
1. Any means in or by which someone travels or something is carried.
2. A long, narrow excavation made in the ground by digging, as for draining or irrigating land.
3. A structure that spans and provides a passage over a road, railway, river, or some other obstacle.
4. Ground which has a natural inclination, as the side of the hill.
5. A portion of the right-of-way which is wide for safe emergency stopping and sloped for proper drainage.
6. A drain or channel crossing under a road, sidewalk, etc.
7. The zone which is marked for laying the road, excavating the soil for filling the embankments, for building ancillary structures and for green plantings.

VI. Arrange the synonyms in pairs:
needs, fulfill, permit, exact, govern, determine, locate, ditch, allow, demands, direct, carry out, trench, accurate, decide, place.

VII. Form nouns from the following verbs and translate them:
to plan, to travel, to predict, to grow, to participate, to meet, to discover, to exist, to locate, to draw, to pave, to determine.

VII. Read and translate the text:

HIGHWAY NETWORK PLANNING

In planning a highway network or a route, highway planners must learn: where people live, where they want to go, how they get there, where goods are produced, what markets the goods are sent to, how the goods reach their final users.

Traffic counts tell how many and what kinds of vehicles travel on a road, and when traffic is the heaviest. From these and other facts about the past and present, planners try to predict future growth in population and industry, changes in land use, and how such growth and change will affect highway needs.

Public participation in road planning is essential. In the U.S. highway planners hold public hearings on most major highway projects. These meetings enable citizens to present their views before a project begins.

Before highway construction begins, planners must also prepare an environmental impact statement. The purpose of such a statement is to discover in advance all the possible good and bad effects that a new highway may have on the public and on the environment.

Highway engineers draw up standards for various kinds of roads, highways, and bridges. These standards govern the thickness and kind of foundation and surfacing for different kinds of traffic; the number of lanes needed; the sharpness of curves; and the steepness of hills.

In planning a new road or rebuilding an existing one, maps must be drawn if they are not already available. Aerial photography is widely used today for this work. These maps show the location of other roads, railroads, towns, farms, houses, and other buildings. They also show such natural features as rivers, lakes, forests, hills and the slope of the land. The types of soil may also be identified.

Using these maps, engineers locate new highways and make detailed drawings called plans. The plans show the exact boundaries of the right- of-way. This is land needed for road pavement, shoulders, ditches, and side slopes. The plans also show the exact location, grades, and curves of the pavement, and the location of bridges and culverts.

So highway planners study everything from the long-range needs of a country to a particular section of a single route. This planning determines what the highway needs of the region are and how these needs can best be fulfilled and paid for.

VIII. Decide whether these statements are true or false:

1. There is no need for highway planners to know where people live, where they want to go, where goods are produced and sent to.
2. In planning a new highway planners try to predict future growth in population and industry.
3. In the USA before the project begins people meet and discuss their ideas about future highways.
4. Maps showing the location of other roads, towns, houses and other buildings are usually drawn in planning a new road or rebuilding an existing one.
5. There are no special standards for various kinds of roads, highways, and bridges, which govern the thickness, kind of foundation, surfacing, the number of lanes and other peculiarities.
6. A plan is a drawing that shows exact boundaries of the right-of- way and also the exact location, grades, and curves of the pavement, and the location of bridges and culverts.
7. The aim of planning is to find the best way of highway needs fulfillment.

IX. Put 10 questions of all types to the text.

X. Translate the following sentences into English:

1. Инженеры-дорожники составляют стандарты (нормы) для различных видов дорог, магистралей и мостов.
2. При планировании новой дороги следует чертить карты.
3. Карты показывают местоположение рек, озер, лесов, холмов, других дорог, железных дорог и домов.
4. Используя эти карты, инженеры выполняют детальные чертежи, называемые планами.
5. При планировании магистрали следует знать, где люди живут и куда они хотят ездить.
6. Участие общества в планировании дорог в США является весьма важным.

XI. Speak about planning of roads and highways. Use the following expressions as introductions:

It is known that...
It should be noted that...
It is essential to note that...
It is a well-known fact that...

УЧЕБНЫЙ ЭЛЕМЕНТ 2 (УЭ-2)

TRAFFIC SIGNS, SIGNALS AND MARKING

I. Study the new words:

additional [ə'dɪʃ(ə)n(ə)l] (adj.) – добавочный, дополнительный

breakthrough ['breɪkθru:] (n.) – достижение, успех, открытие, новинка

colour-blind ['kʌləblaɪnd] (adj.) – страдающий дальтонизмом, не различающий цветов

common (adj.) **–** общепринятый, распространенный

competing [kəm'pi:tiŋ] (adj.) – противоположный, конкурирующий

continuous [kən'tɪnjuəs] (adj.) – непрерывный, постоянный Syn: persistent

distance ['dɪst(ə)n(t)s] (n.) – расстояние; дистанция *good / great / long distance* – большое расстояние *safe distance* – безопасная дистанция *short distance* – небольшое расстояние

gradual ['grædjuəl], [-ʤu-] (adj.) – постепенный; последовательный Syn: successive , consecutive

intersection [ˌɪntə'sekʃ(ə)n] (n.) – перекресток *at an intersection* – на перекрестке *busy intersection* – перекресток с оживленным движением *dangerous intersection* – опасный перекресток Syn: crossing , crossroad

longevity [lɔn'ʤevətɪ] (n.) – долгожительство, долголетие; долговечность Syn: durability

mandatory ['mændət(ə)rɪ] (adj.) – предписывающий

milestone ['maɪlstəun] (n.) – мильный камень или столб (указатель расстояния в милях)

pictorial [pɪk'tɔ:rɪəl] (adj.) – графический, сделанный в форме рисунков

priority [praɪ'ɔrətɪ] (n.) – преимущество, приоритет

prohibitory [prə'hɪbɪt(ə)rɪ] (adj.) – запрещающий

reflectivity [ˌrɪflek'tɪvətɪ] (n.) – отражательная способность

remote [rɪ'məut] (adj.) – дистанционный; действующий на расстоянии

road marking – дорожная разметка

to adopt (v.) – (официально) принимать (что-л.)

to apply [ə'plaɪ] (v.) – накладывать, наносить

to convey [kən'veɪ] (v.) – сообщать, передавать

to delineate [dɪ'lɪnɪeɪt] (v.) – очерчивать, схематически изображать

to display – показывать; демонстрировать

to enhance [ɪn'hɑ:n(t)s] – увеличивать, усиливать, улучшать

to erect [ɪ'rekt] – сооружать; устанавливать; возводить, строить Syn: construct, raise, put up

to install [ɪn'stɔ:l] (v.) – вставлять, устанавливать

to proceed [prə'si:d] (v.) – продолжить движение

to prohibit [prə'hɪbɪt] (v.) – запрещать *to prohibit smth.* – запрещать что-л. *to prohibit smb. from doing smth.* – запрещать кому-л. делать что-л. *Cameras are prohibited here.* – Проносить видео и фотоаппаратуру запрещено

to standardize ['stændədaɪz] (v.) – стандартизировать; приводить в соответствие со стандартом

traffic (road sign) – дорожный знак

traffic flow – транспортный поток (поток уличного движения)

uniformity [,ju;nɪ'fɔ:mətɪ] (n.) – единообразие, согласованность

varying (adj.) – различный, переменный

warning ['wɔ:nɪŋ] – предупреждающий, оповещающий

II. Match the groups of traffic signs and their definitions:

regulatory sign; direction sign; warning sign; information sign; prohibitory sign; mandatory sign; variable (changeable, dynamic) sign

A. a type of traffic sign used to prohibit certain types of manoeuvres or some types of traffic;

B. a type of traffic sign that indicates a hazard ahead on the road that may not be readily apparent to a driver;

C. a type of traffic sign intended to instruct road users on what they must or should do (or not do) under a given set of circumstances;

D. a very legibly printed and very noticeable placard that informs people of the purpose of an object, or gives them instruction on the use of something;

E. a type of traffic sign used to set the obligations of all traffic which use a specific area of road;

F. any road sign used primarily to give information about the location of either the driver or possible destinations;

G. an electronic traffic sign often used on roadways to give travelers information about special events. Such signs warn of traffic congestion, accidents, incidents, roadwork zones, or speed limits on a specific highway segment.

III. Match pairs of synonyms:

1. common	1. ban
2. enhance	2. show
3. prohibit	3. different
4. flow	4. continue
5. additional	5. facilitate
6. display	6.extra
7. varying	7. progress
8. priority	8. widely spread
9. breakthrough	9. primary right
10. proceed	10. stream

IV. Match pairs of antonyms:

1. gradual	1. verbal
2. erect	2.allow
3. pictorial	3. same
4. uniformity	4. hasty
5. proceed	5. short duration
6. prohibit	6. inconsistence
7. breakthrough	7. reject
8. longevity	8. stop
9. adopt	9. destroy
10. varying	10. stagnation

V. Make phrases:

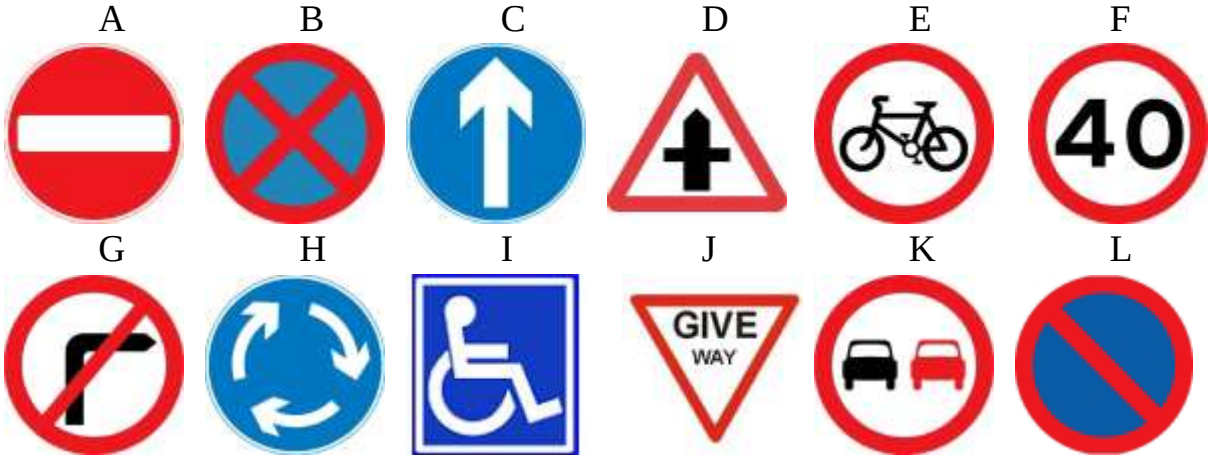
1. busy	a) changes
2. gradual	b) marking
3. remote	c) distance
4. adopt	d) control
5. install	e) intersection
6. apply	f) traffic flows
7. short	g) information
8. mandatory	h) signs
9. convey	i) equipment
10. competing	j) a law

VI. Complete the derivation table:

Adjectives/Participles	*Nouns*	*Verbs*
1. long	___	___
2. ___	___	vary
3. competing	___	___
4. ___	____	prohibit
5. ___	___	apply
6. continuous	___	___
7. ___	warning	___

VII. Match road signs and their meaning: Disabled only

1) Don't stop here
2) Don't walk through
3) Don't cycle here
4) Don’t enter
5) Don't turn right
6) Turn left
7) Cycle here
8) Stop
9) Turn round
10) Don't turn back
11) Crossroads ahead
12) Don’t overtake
13) Go straight on
14) Give way
15) Don't drive over 40
16) Turn left
17) Don't turn left
18) Don't park here



VIII. Read and translate the text:

ROAD SURFACE MARKING, TRAFFIC SIGNS AND SIGNALS

Road surface marking is any kind of device or material that is used on a road surface in order to convey official information. They can also be applied in other facilities used by vehicles to mark parking spaces or designate areas for other uses.

Road surface markings are used on paved roadways to provide guidance and information to drivers and pedestrians. Uniformity of the markings is an important factor in minimizing confusion and uncertainty about their meaning, and efforts exist to standardize such markings across borders. However, countries and areas categorize and specify road surface markings in different ways.

Road surface markings are either mechanical, non-mechanical, or temporary. They can be used to delineate traffic lanes, inform motorists and pedestrians or serve as noise generators when run across a road, or attempt to wake a sleeping driver when installed in the shoulders of a road. Road surface marking can also indicate regulation for parking and stopping.

There is continuous effort to improve the road marking system, and technological breakthroughs include adding reflectivity, increasing longevity, and lowering installation cost.

Traffic signs or road signs are signs erected at the side of roads to provide information to road users. With traffic volumes increasing over the last eight decades, many countries have adopted pictorial signs or otherwise simplified and standardized their signs to facilitate international travel where language differences would create barriers, and in general to help enhance traffic safety. Such pictorial signs use symbols (often silhouettes) in place of words and are usually based on international protocols. Such signs were first developed in Europe, and have been adopted by most countries to varying degrees.

Traffic signs can be grouped into several types. For example:

A. Danger warning signs

B. Priority signs

C. Prohibitory or restrictive signs

D. Mandatory signs

E. Special regulation signs

F. Information, facilities, or service signs

G. Direction, position, or indication signs

H. Additional panels

The earliest road signs were milestones, giving distance or direction; for example, the Romans erected stone columns throughout their empire giving the distance to Rome. In the Middle Ages multidirectional signs at intersections became common, giving directions to cities and towns.

The development of automobiles encouraged more complex signage systems using more than just text based notices. One of the first modern-day road sign systems was devised by the Italian Touring Club in 1895.

Over the years, change was gradual. Pre-industrial signs were stone or wood, but painted cast iron became favoured in the late eighteenth and nineteenth centuries. Cast iron continued to be used until the mid twentieth century, but it was gradually displaced by aluminium or other materials. Before the development of reflective plastics, reflectivity was provided by glass reflectors set into the lettering and symbols.

New generations of traffic signs based on electronic displays can also change their text (or, in some countries, symbols) to provide for "intelligent control" linked to automated traffic sensors or remote manual input.

Traffic lights, also known as traffic signals, traffic lamps, signal lights and semaphores are signalling devices positioned at or near road intersections, pedestrian crossings and other locations to control competing flows of traffic. Traffic lights were first installed in 1868 in London, United Kingdom and now used in almost every city of the world. Traffic lights alternate the right of way accorded to road users by displaying lights of a standard color (red, yellow/amber, and green) following a universal color code (and a precise sequence to enable comprehension by those who are color blind).

In the typical sequence of color phases:

- Illumination of the green light allows traffic to proceed in the direction denoted, if it is safe to do so;
- Illumination of the orange/amber light denoting prepare to stop short of the intersection, if it is safe to do so;
- Illumination of the red signal prohibits any traffic from proceeding.

So the role of traffic marking, signs and signals can hardly be overestimated, if they were absent on our roads and highways there would be a complete chaos and far more traffic accidents.

IX. Agree or disagree with the following:

1. Road surface marking can be only mechanical.
2. Pictorial signs have created additional barriers for international travel.
3. The earliest road signs were Roman milestones.
4. Wood is the most common material for road signs nowadays.
5. New generations of traffic signs are based on electronic displays.
6. Traffic lights have a universal colour-code.
7. First traffic lamps appeared in the 20^{th} century.

X. Answer the following questions:

1. Why is the uniformity of road marking so important?
2. What is the function of road surface marking?

3. What are the most common categories of road signs?
4. Where did the 1st pictorial road signs appear?
5. What showed distance and direction on Roman roads?
6. What provided reflectivity of road signs in the past and what provides it now?
7. What country was the first to install traffic lights?
8. What do different colours of traffic lights denote?

XI. Insert the suitable prepositions:

1. Traffic signs can be grouped ___several types.
2. There are no priority signs ___ this intersection.
3. Up-to-date traffic signs are based ___ electronic displays.
4. Nowadays reflectivity is provided ___ reflective plastics.
5. Road surface marking can indicate regulation ___ parking and stopping.
6. Traffic volumes have increased ___ the last decades.
7. Milestones gave directions ___ cities and towns.
8. The main function of traffic signs is to provide ___information ___ road users.
9. Red signal prohibits any traffic ___proceeding.
10. Traffic lights follow ___ a universal colour code.

Speaking:

- Make a report on UK traffic signs;
- Dwell on US traffic signs;
- Make a comparative analysis of Belarusian and European traffic signs;
- Find information about unusual traffic signs and present it to the group.

УЧЕБНЫЙ ЭЛЕМЕНТ 3 (УЭ-3)

ROAD MAINTENANCE

I. Study the active vocabulary:

allocate ['æləkeɪt] – назначать, распределять, выделять

cinder ['sɪndə] – зола, шлак, угольный мусор

course [kɔ:s] – слой

crack – трещина, щель

deteriorate [dɪ'tɪərɪəreɪt] – ухудшать, портить, повреждать Syn: worsen , impair

footpath ['futpɑ:θ] – пешеходная дорожка, тротуар Syn: sidewalk , pavement

frequent ['fri:kwənt] – частый, часто встречающийся

grading – выравнивание, профилирование (дороги)

initial [ɪ'nɪʃ(ə)l] – начальный; исходный

maintenance ['meɪnt(ə)nən(t)s] – технико-профилактическое обслуживание

passable ['pɑ:səbl] – проходимый

patch – производить ямочный ремонт

picket ['pɪkɪt] – столбик, колышек

pile up – накапливать

pothole ['pɔthəul] – 1) выбоина, рытвина, яма (на дороге)

prolong – продолжать, увеличивать

prompt - срочный, быстрый, немедленный

put up – строить, возводить

rehabilitation [,ri:hə,bɪlɪ'teɪʃ(ə)n] – восстановление, ремонтные работы

renovation [ˌrenə'veɪʃ(ə)n] – восстановление Syn: renewal

resurface [,ri:'sɜ:fɪs] – покрывать заново; асфальтировать заново (дорогу)

rigorous ['rɪg(ə)rəs] – суровый, холодный (обычно о климате, погоде)

road marking – дорожная разметка

scatter – посыпать, усыпать, рассеивать

schedule ['ʃedju:l] – устанавливать очередность обслуживания, составлять график

sealing ['si:liŋ] – заделка, грунтование

slippery ['slɪp(ə)rɪ] – скользкий

smooth [smu:ð] – делать гладким, ровным

snow fence – снегозащита, снегозащитное сооружение, снегозащитное заграждение

snow plow – снеговой плуг

snowdrift – снежный сугроб; снежный занос Syn: snow wreath , snowbank

traction – сила сцепления

trash – мусор, отходы Syn: waste, rubbish, litter

wayside – придорожная полоса, обочина Syn: road shoulder, roadside

wire ['waɪə] – связывать или скреплять проволокой

II. Match the words and their definitions:

Trash, pothole, to deteriorate, prompt, slippery, cinder, to put up, to patch, wayside, to schedule

A. Carried out or performed without delay;
B. a hole or pit, especially one in a road surface;
C. a burned or partly burned substance, such as coal, that is not reduced to ashes but is incapable of further combustion;
D. causing or tending to cause sliding or slipping;
E. worthless or discarded material or objects; refuse or rubbish;
F. edge of a road, way, path, or highway;
G. to mend, repair;
H. to erect; build;
I. to grow worse; degenerate;
J. to plan or appoint for a certain time or date.

III. Match the English words with their Russian equivalents:

1. drain clearing	1. бульдозер с прямым отвалом
2. emergency maintenance	2. ремонт выбоин (ямочный)
3. pothole patching	3. разрушенные участки
4. to scatter salt	4. по крайней мере
5. major failure	5. накапливать
6. routine maintenance	6. очистка дренажных канав
7. worn spots	7. серьезное разрушение
8. straight-blade dozer	8. разбрасывать соль
9. at least	9. текущий ремонт
10. to pile up	10. транспортные сооружения
11. traffic facilities	11. срочный текущий ремонт

IV. Choose the right equivalent of the word:

1. to prevent a) насыщать b) предотвращать c) сохранять
2. binder a) покрытие b) маршрут c) вяжущее вещество
3. to spread a) улучшать b) распределять c) обрабатывать
4. to reduce a) регулировать b) уменьшать c) насыпать
5. to penetrate a) проникать b) размещать c) противостоять
6. alignment a) конструкция b)устойчивость c) трасса
7. to deteriorate a) удалять b) ухудшать c) улучшать

V. Read and translate the following words into Russian paying attention to the prefix "re-":

resurface, reconstruct, restore, replace, remove, remix.

VI. Form nouns from the following verbs and translate them:

to care – …	to improve – …	to deteriorate – …
to treat – …	to wire – ...	to strengthen – …
to attach – …	to align – …	to smooth – …
to protect – …	to remove – …	to repair – …

VII. Match the words with their synonyms:

a) to continue, shoulder, to spread, to plan, to connect, damage, traction.
b) failure, wayside, to prolong, adhesion, to schedule, to scatter, to wire.

VIII. Match the words with their antonyms:

a) to improve, to destroy, to narrow, restoration, final, under.
b) initial, to rehabilitate, failure, above, to widen, to deteriorate.

IX. Read and translate the text:

ROAD MAINTENANCE

The life of a road structure depends on the quality of its maintenance and minor renovation. Maintenance keeps the roadway safe, provides good driving conditions, and prolongs the life of the pavement, thus reducing the road investment. Maintenance consists of activities concerned with the condition of the pavement, shoulders, drainage, traffic facilities, and right-of-way. It includes the prompt sealing of cracks and filling of potholes to prevent water entering through the surface, the removal of trash thrown on the wayside by the traveling public, and the care of pavement markings, signs, and signals. In rigorous winter climates, substantial effort is required to remove snow and ice from the pavement, to scatter salt for snow and ice removal, and to spread sand for better traction.

In many countries an increasing share of road budgets is being allocated to rehabilitation and maintenance of existing roads, rather than new road construction.

Routine maintenance refers to activities such as grading, grass cutting, drain clearing, pothole patching, and shoulder repairs, which are performed at least yearly if not more frequently. *Periodic* maintenance activities are typically scheduled over periods of several years and include resurfacing and bridge repairs. *Rehabilitation* involves more substantial intervention to strengthen a road, repair structural defects, and restore the road to its initial condition, often after it has deteriorated to an "unmaintainable" standard. Rehabilitation sometimes also includes changes or improvements to previous characteristics, for instance, by widening, making small alignment changes, or providing footpaths.

Other maintenance activities include *seasonal* maintenance, such as snow clearing and flood repairs, *emergency* maintenance to restore roads after major failures, and the *regular* maintenance of road signs.

Repairing damage and resurfacing. Gravel and other similar type roads have to be smoothed quite often. Surfaces and edges of bituminous materials are repaired by patching with new material where worn spots develop from travel or because of weak spots in the ground underneath. Every 10 or 15 years many roads with bituminous surfaces are resurfaced completely.

Workers repair concrete pavements by digging out broken sections and putting in new concrete. They often repair cracks by filling them with asphalt. Many older concrete pavements must be resurfaced completely.

Deteriorated pavements can be reconstructed in several ways: the surface can be treated to improve its characteristics; the existing course can be overlaid; the damaged layers can be removed and replaced; the existing wearing course can be remixed with additional materials.

Clearing ice and snow. Most roads and highways must serve the year around. So they must be kept free from snow and ice in winter. In some places, snow fences are; put up. These are thin pickets wired together and placed parallel to the road, on the side from which the storm winds usually blow, and about 50 to 100 feet (15 to 30 meters) from the road. Snowdrifts then do not pile up on the road.

V-shaped or straight-blade dozers clear the roads when it snows. In deep drifts, special snowplows are needed.

Often roads and highways that are slippery from ice and snow must have salt, chemicals, sand, or cinder spread on them to keep them passable.

X. Answer the following questions:

1) What does the life of the road structure depend on?
2) What does maintenance include?

3) It is better to maintain and rehabilitate existing roads than construct new ones, isn't it?
4) What types of maintenance are there?
5) What are the ways of reconstruction of deteriorated pavements?
6) What means of protection from snow do you know?
7) What kinds of machines are used to protect roads from snowdrifts?
8) Do most of roads and highways meet the requirements of modern traffic?

XI. Match the words in A with an appropriate ending in B:

A		B
1 .Routing maintenance		a) resurfacing and bridge repairs scheduled over periods of several years
2.Periodic maintenance	involves	b) restoration of the road to its initial condition and sometimes widening, making small alignment changes or providing footpaths
3. Rehabilitation		c) grading, grass cutting, drain clearing, pothole and shoulder repairs which are carried frequently
4.Seasonal maintenance		d) restoring roads after major failures) and repairing of road signs
5.Emergency maintenance		e) snow clearing and flood repairs

XII. Fill in the blanks using the words below and translate the sentences:

to suit, slippery, to clear, conditions, caused, bends

Driving in bad weather _____creates extra difficulties. An early indication of likely weather conditions allows motorists to change their driving _____ those conditions. Statistics also show that such early warnings (предупреждения) have saved lives, particularly at dangerous _____. For example, in Finland where most travel is by road, and where one in four accidents are _____ by speeding on icy roads warning of coming snow or ice is essential. This allows road workers _____ snow and prevents _____ surfaces, thus preventing many accidents.

Speak on:

- The significance of maintenance for the life of a road;
- The main types of maintenance activities;
- Ways of repairing damage and resurfacing;
- Maintenance activities in winter.

УЧЕБНЫЙ ЭЛЕМЕНТ 4 (УЭ-4)

BRIDGE BUILDING

I. Read and memorize the new words and word-combinations:

aloft [ə'lɔft](adv.) – наверху; на высоте; в воздухе

anticipate [æn'tɪsɪpeɪt] (v.) – ожидать, предвидеть

beam bridge – балочный мост (несущая конструкция пролетных строений выполнена в виде балок или балочных ферм)
box girder – коробчатая пустотелая балка
breakthrough (n.) – достижение, успех, открытие *technological break-through* – технологический прорыв
bridge deck – настил моста
cable (n.) – канат, трос, ванта
cable-stayed bridge – вантовый мост (тип висячего моста, состоящий из одного или более пилонов, соединенных с дорожным полотном посредством прямолинейных стальных тросов-вантов)

cantilever ['kæntɪli:və] – консоль, кронштейн

cantilever bridge – консольный мост (мост, пролетные строения которого свешиваются за пределами опор. Пролетное строение состоит из анкерной части, находящейся между опорами, и части, свешивающейся от опоры до конца фермы (консоли). Расстояние между опорой и концом консоли, а также между двумя консолями перекрывается подвесными пролетными строениями, применяются преимущественно при больших пролетах)
evolve (v.) – эволюционировать, развиваться
fan cable-stayed bridge – вантовый мост с веерным расположением вант (пучок вант крепится к одной точке пилона, а затем подобно вееру расходится, чтобы соединиться в разных точках с балкой жесткости)
framed structure – каркасная (рамная) конструкция
girder bridge – балочный мост

guardrail ['gɑ:dreɪl] (n.) – перила, поручень

harp cable-stayed bridge – вантовый мост с расположением вант в виде арфы (ванты крепятся к разным точкам пилона и идут к балке жесткости практически параллельно)
high-tensile steel – высокопрочная сталь

masonry ['meɪs(ə)nrɪ] (n.) – каменная или кирпичная кладка

mortar (n.) – строительный (цементный) раствор
passageway (n.) – проезд; проход

pier [pɪə] (n.) – бык моста, мостовая опора

pontoon bridge [pɔn'tu:n] – понтонный или наплавной мост

precast concrete [,pri:'kɑ:st] – сборный железобетон

prestressed concrete – предварительно напряженный железобетон

pylon ['paɪlɔn] – опора, пилон

reinforced concrete [,ri:ɪn'fɔ:st'kɔnkri:t] – железобетон

rest (v.) – держаться, основываться, опираться
safety harness – привязные ремни безопасности
safety helmet – защитная каска
site (n.) – стройплощадка; площадь, место (для строительства) *site preparation* – подготовительные работы на стройплощадке; *site work* – работы на стройплощадке
span (n.) – пролет (моста) ; расстояние между опорами (арки, свода)
span (v.) – охватывать, простираться, перекрывать
stainless steel – нержавеющая сталь
stone concrete – 1) бутобетон 2) щебеночный бетон
structural steel – конструкционная сталь
suspension (n.) – подвешивание, подвес
suspension bridge – висячий мост (несущая конструкция пролетного строения – балки жесткости – поддерживается висячими поясами из кабелей или шарнирных цепей, закрепляемых на пилонах)
tower (n.) – башня, пилон, опора
truss (n.) – ферма, связь, стропильная ферма

II. Read the following words and try to guess their meaning. Use English-Russian dictionary if necessary:
structure, natural, construction, type, unprecedented, horizontal, project, suicide, categorize, monitoring, inspection, personnel, pylon, proportional, design, optimal, pontoon, dynamic, distance, material.

III. Match English and Russian equivalents:

1. manufactured materials	a) строительная площадка
2. unprecedented advance	b) беспрецедентный успех
3. additional supports	c) дополнительные опоры
4. makeshift shelter	d) временное сооружение
5. ongoing monitoring	e) наплавной (понтонный) мост
6. construction plant	f) технический прорыв
7. safety net	g) страховочная сеть
8. engineering breakthrough	h) материалы промышленного изготовления
9. floating bridge	i) постоянный контроль
10.temporary structure	j) временное убежище

III. Match the following words with their appropriate definitions:

1. anticipate	a) any of various bonding materials used in masonry, surfacing, and plastering, especially a plastic mixture of cement or lime, sand, and water that hardens in place and is used to bind together bricks or stones;
2. pier	b) a rigid framework, as of wooden beams or metal bars, designed to support a structure, such as a roof;
3. evolve	c) in or into a high place; high or higher up;
4. truss	d) to feel or realize beforehand; foresee;
5. span	e) the section between two intermediate supports of a bridge;
6. mortar	f) a supporting structure at the junction of connecting spans of a bridge;
7. aloft	g) to develop or achieve gradually;
8. guardrail	h) a protective railing, as on a staircase or along a highway.

V. Arrange the following in pairs of synonyms:

evolve, aloft, pylon, rope, cable, guardrail, atop, beam, develop, girder, progress, handhold, anticipate, support, predict, breakthrough.

VI. Form nouns from the given verbs and adjectives (using typical suffixes –sion, -tion, -ure, -ment, -ance, -ing, -ity, etc.)

to suspend, to cross, to reconstruct, to support, to transmit, to fail, to equip, to maintain, considerate, available, high, necessary.

VII. Translate the following sentences from Russian into English:

1. Подвесные мосты имеют самые длинные пролеты.
2. Балочные мосты держатся на мостовых опорах.
3. Римляне строили арочные мосты без цементного раствора.
4. Фермы для консольных мостов строят из конструкционной стали или предварительно напряженного железобетона.
5. Существует два основных типа вантовых мостов: с расположением вант в виде веера и в виде арфы.
6. Понтонные мосты – это обычно временные сооружения.

VIII. Read and translate the text:

advance [əd'va:n(t)s] (n.) – движение вперед, продвижение, успех, прогресс

brittle fracture - хрупкое разрушение; хрупкий излом

combat ['kɔmbæt] – бороться

creeper ['kri:pə](n.) – ползучее растение

declivity [dɪ'klɪvɪtɪ] (n.) – склон; откос; покатость; спуск

demolition [demə'lɪʃ(ə)n] - разрушение; разборка, снос

erection [ɪ'rekʃ(ə)n] - возведение, сооружение, строительство (процесс) Syn: construction

festoon [fes'tu:n] (n.) – гирлянда

fiber reinforced polymers – волокнистонаполненные полимеры

gangway - опорная конструкция (напр. рама, каркас) рабочей платформы 2) служебный мостик; рабочие мостки, рабочая площадка, рабочая платформа, сходни;

inspection (n.) – проверка, осмотр, контроль

makeshift (n.) – временная замена

obstacle ['ɔbstəkl] (n.) – помеха, преграда, препятствие

ongoing (adj.) – непрерывный, постоянный

project (v.) – выдаваться, выступать

push down – давить, жать, оказывать давление

ready to hand – находящийся под рукой

sophisticated [sə'fɪstɪkeɪtɪd] (adj.) – утонченный, сложный, сложно устроенный

surmount [sə'maunt] (v.) – пересекать, преодолевать

trunk –ствол (дерева)

underside – нижняя часть (предмета) ; дно, низ

unprecedented [ʌn'presɪd(ə)ntɪd] (adj.) – беспрецедентный; беспримерный

The Bridge. Its classifications.

A bridge is a structure surmounting an obstacle such as a river, declivity, road, or railway and used as a passageway for pedestrian, motor, or rail traffic.

The first bridges were natural for example rock bridges. The first man-made bridges were flat stones or tree trunks, laid across to make a girder bridge, and festoons of creepers hung in suspension.

Three types of bridge – beam or girder, arch, and suspension – have been known and built from the earliest times. Through the ages, materials of construction have evolved from those ready to hand, such as timber and stone, to manufactured materials, such as brick, dimension stone concrete, reinforced and precast concrete, iron, and steel. The type of bridge to be preferred at any site depends on the nature of the ground, the length of the span required, the kind of traffic anticipated, and the materials of construction available.

In the 17th and 18th centuries, bridge building became a science. Early in this period, scientists, including Galileo, had investigated the theory of beams and framed structures. The period since World War II has been the greatest bridge-building era in the history of the world. This is due partly to postwar reconstruction and urban development but even more to the unprecedented advance of motorways.

The beam (girder) bridge

The beam bridge is basically a rigid horizontal structure that rests on two piers (or supports), one at each end. The weight of the beam pushes straight down on the piers. The further apart the piers, the weaker the beam becomes. Next time you're on a journey, look out for these bridges crossing motorways. They're usually made of concrete or steel. Beam bridges rarely span more than 60m.

The arch bridge

It is the shape of the structure that gives the arch bridge its strength; they're a natural form of bridge. That's why they're so beautiful. An arch bridge doesn't need any additional supports or cables. In fact, an arch bridge made of stone doesn't even need mortar. Imagine that! There are still many arch bridges built by the Romans 2,000 years ago, without mortar, which are still standing today, real proof of the natural effectiveness of an arch as a bridge structure. Modern arch bridges can span up to 300m.

The suspension bridge

But surely the most elegant and sophisticated of all bridges is the suspension bridge. Modern suspension bridges usually have two tall towers (the supports) joined by cables (or ropes or chains). The bridges hang from these cables. This means it is the towers that are supporting the majority of the bridge's weight. These bridges can have the longest spans – up to 2,000m.

The cantilever bridge

A cantilever bridge is a bridge built using cantilevers, structures that project horizontally into space, supported on only one end. For small footbridges, the cantilevers may be simple beams; however, large cantilever bridges designed to handle road or rail traffic use trusses built from structural steel, or box girders built from prestressed concrete. The steel truss cantilever bridge was a major engineering breakthrough when first put into practice, as it can span distances of over 1,500 feet (460 m).

The cable-stayed bridge

A cable-stayed bridge has one or more towers (or pylons), from which cables support the bridge deck. There are two major classes of cable-stayed bridges: harp and fan. In the harp design, the cables are nearly parallel so that

the height of their attachment to the tower is proportional to the distance from the tower to their mounting on the deck. In the fan design, the cables all connect to or pass over the top of the towers. The cable-stayed bridge is optimal for spans longer than cantilever bridges, and shorter than suspension bridges.

The pontoon bridge

A pontoon bridge or floating bridge or bridge of boats is a bridge that floats on water and in which barge- or boat-like pontoons support the bridge deck and its dynamic loads. While pontoon bridges are usually temporary structures, some are used for long periods of time. Pontoon bridges are especially useful in wartime as river crossings.

Which bridge when?

Choosing the design of a bridge primarily depends on how wide the obstacle is – is it a small road or an enormous river? The main difference between the three main types of bridges is the distances they can cross in a single span. This means the distance between one vertical support to another. Some bridges can cross an obstacle in a single span, while others need many. If an enormous river is to be crossed, a bridge is needed that doesn't need too many supports. Another consideration of course is the types of material available to be used as well as the overall look of the bridge.

A bridge can also be categorized by what it is designed to carry, such as trains, pedestrian or road traffic, a pipeline or waterway for water transport or barge traffic. A road-rail bridge carries both road and rail traffic. A bridge can carry overhead power lines.

Some bridges accommodate other purposes, such as the tower of Nový Most Bridge in Bratislava, which features a restaurant, or a bridge-restaurant which is a bridge built to serve as a restaurant. Other suspension bridge towers carry transmission antennas.

Bridges are subject to unplanned uses as well. The areas underneath some bridges have become makeshift shelters and homes to homeless people, and the undersides of bridges all around the world are spots of graffiti. Some bridges attract people attempting suicide, and become known as suicide bridges.

The materials used to build the structure are also used to categorize bridges. Until the end of the 18th Century, bridges were made out of timber, stone and masonry. Modern bridges are currently built in concrete, steel, fiber reinforced polymers (FRP), stainless steel or combinations of those materials.

Bridge maintenance consists of structural health monitoring and testing. It includes an ongoing monitoring every three to six months, a simple test or inspection every two to three years and a major inspection every six to ten years. In Europe, the cost of maintenance is higher than spending on new bridges.

During the last few years, much more attention has been paid to reducing accidents on bridges and, indeed, on all engineering structures. Most failures occur during erection, and safety can be considered under three heads: the safety of the structure during erection or demolition, the safety of construction plant, and the safety of personnel.

In order to combat risk of brittle fracture, high-tensile steel has now been greatly improved in strength at low temperatures. Accidents caused by failure of plant are too varied to detail here. They can be largely avoided by ensuring that all plant and equipment is kept in good repair and used only within its capacity.

The causes of accidents to personnel are also diverse. The first necessity is to provide safe means of access and safe place of work, by means of ladders, gangways, and working platforms with guardrails and cradles, as necessary. Accidents to men working aloft can be prevented by means of safety harness and safety nets; safety helmets should be worn by all men on site.

IX. Answer the questions to the text:

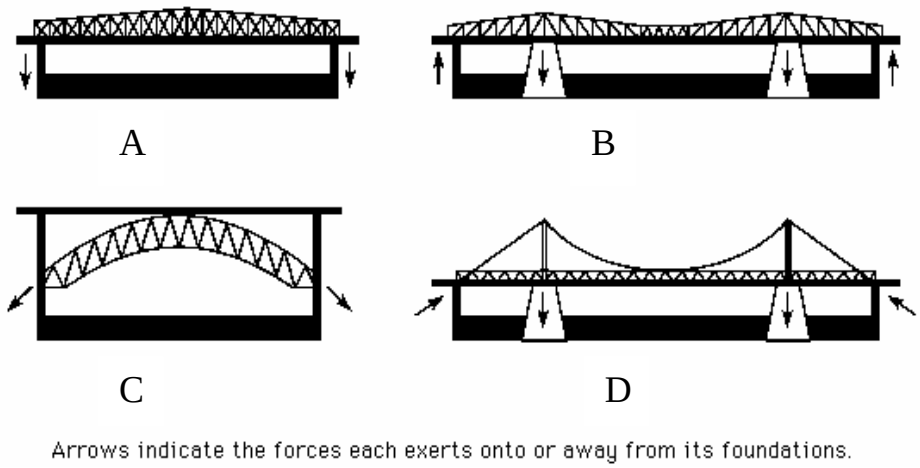
1. What is a bridge?
2. How can bridges be categorized?
3. What did the first man-made bridges look like?
4. When did bridge building become a science?
5. Beam bridges often span more than 60 km, don`t they?
6. Do Roman arch bridges still exist?
7. What type of bridges can have the longest spans?
8. Box girders for cantilever bridges are built from aluminum, aren`t they?
9. What are the two major classes of a cable-stayed bridge?
10. What unplanned uses are bridges subject to?
11. What can provide safe place of work at the construction site?

X. Define whether the following sentences true or false:

1. The first artificial bridges were made from timber and stone
2. The further apart the piers of the beam bridge, the stronger the beam becomes.
3. An arch bridge requires a lot of additional supports and cables.
4. The towers of the suspension bridge are joined by cables.
5. The pontoon bridges are usually permanent structures.
6. Bridges can serve only one function: to carry trains, pedestrian or road traffic.
7. Modern bridges are built from concrete, steel, FRPs, stainless steel and combinations of these materials.
8. Most bridge failures occur during demolition.
9. Safety helmets should be worn only by engineers on site.
10. Nowadays much attention is paid to reducing accidents on bridges.

XI. Match the pictures with the types of bridges:

1. suspension bridge
2. girder bridge
3. arch bridge
4. cantilever bridge



XI. Insert the appropriate prepositions where necessary:

1. Cantilever bridges can span ___ rather long distances.
2. The main difference ___ the types of bridges is the distance they can cross ___ a single span.
3. The period ___ World War II was the greatest bridge-building era.
4. Suspension bridge usually has two towers joined ___ cables.
5. ___ fact an arch bridge made ___ stone doesn't need any mortar.
6. Festoons ___ of creepers hung ___ suspension were the first man-made bridges.
7. The girder bridge rests ___ two piers.
8. The cable-stayed bridge is optimal ___ spans longer than cantilever bridges, and shorter than suspension bridges.
9. The choice ___ the design of a bridge depends ___ many factors.
10. Much consideration is required to combat ___ risk of accidents.

XII. Dwell on the following:

1) The history of bridge-building;
2) Structure type classification of bridges;
3) Materials for bridge construction;
4) Accidents on bridges. Ways of preventing them.

УЧЕБНЫЙ ЭЛЕМЕНТ 5 (УЭ-5)

ROAD ECOLOGY

I. Study the following words:

adverse ['ædvɜ:s] – неблагоприятный, неблаготворный; вредный

be deployed – размещаться

byproduct ['baɪˌprɔdʌkt] – побочный продукт

combustion [kəm'bʌstʃ(ə)n] – горение, возгорание, сжигание

contaminate [kən'tæmɪneɪt] – загрязнять; отравлять

contributor [kən'trɪbjətə] – 1) жертвователь; спонсор 2) источник, участник

divert [daɪ'vɜ:t] – отводить; отклонять, направлять в другую сторону *To prevent flooding, we shall have to divert the river from its course.* – Чтобы устранить опасность затопления, нам придется отвести реку в другое русло. *Traffic is being diverted (on)to a side road because of the accident.* – Из-за аварии движение направляют по боковой дороге.

emission [ɪ'mɪʃ(ə)n] – выделение, распространение (тепла, света, запаха) ; выброс *gas emissions* – выбросы газа *to control emissions* – контролировать выбросы *to cut / reduce emissions* – сокращать выбросы

generate ['ʤen(ə)reɪt] – вызывать, порождать, рождать

groundwater – почвенная, грунтовая вода;

habitat ['hæbɪtæt] – родина, место распространения, ареал (животного, растения) *natural habitat* – естественная среда обитания

hazardous ['hæzədəs] – опасный, рискованный *hazardous to smb.'s health* – опасный для чьего-л. здоровья Syn: dangerous , perilous ['per(ə)ləs]

impervious [ɪm'pɜ:vɪəs] – 1) а) непроницаемый, не пропускающий (влагу, воздух) *impervious surfaces* – водонепроницаемые поверхности - impervious soil Syn: impenetrable , impermeable

impinge [ɪm'pɪnʤ] – 1) (impinge on, impinge upon, impinge against) сталкиваться, ударяться (обо что-л.) *I heard the rain impinging upon the roof.* – Я слышал, как капли дождя стучат по крыше.

mortality [mɔ:'tælətɪ] – смертность

nuisance ['nju:s(ə)ns] – 1) досада; неприятность *to cause / create a nuisance* – доставлять неприятности *confounded / damned / perpetual nuisance* – вечные неприятности *It's a nuisance that there's no hot water.* – Какая неприятность, что нет горячей воды! 2) вредное воздействие; помеха; ущерб

occur [ə'kɜ:] – 1) происходить, случаться, совершаться *to occur again* – повторяться, случаться снова When *exactly did the incident occur?* – Когда в точности случилось это происшествие? Syn: happen , befall 2) встречаться; попадаться *The disease occurs chiefly in tropical climates.* – Это заболевание, в основном, встречается в тропическом климате. 3) (occur to) приходить на ум *New ideas occur to him in the act of writing.* – Новые идеи приходят к нему, когда он пишет. *It did not occur to me to mention it.* – Мне и в голову не приходило упоминать об этом.
pick up – поднимать, подбирать; забирать, собирать
predation – хищническое истребление
relieved (of sth) – облегченный, освобожденный от чего-л.
runoff – сток; поверхностный сток

sensitive ['sen(t)sɪtɪv] – чувствительный, восприимчивый

species ['spi:ʃi:z] – pl. species 1) а) вид (подразделение в систематике, входящее в состав высшего раздела - рода) *endangered species* – вид, находящийся под угрозой вымирания *species becomes extinct / dies out* – вид вымирает *species survives* – вид выживает б) род; порода
surface water – поверхностные воды
toxic – токсический, ядовитый - *toxic substance* Syn: poisonous , venomous
trigger (off) – инициировать, дать начало (чему-л.) *to trigger off war* – развязать войну *to trigger rain* – вызвать дождь *A spark triggered the explosion.* – Искра вызвала взрыв.

vulnerable ['vʌln(ə)rəbl] – уязвимый; ранимый

II. Study the following chemicals and chemical elements:

cadmium ['kædmɪəm] – кадмий

carbon dioxide (CO2) ['kɑ:b(ə)n daɪ'ɔksaɪd] – двуокись углерода, углекислый газ

carbon monoxide ['kɑ:b(ə)n mə'nɔksaɪd] – окись углерода, угарный газ

copper ['kɔpə] – медь

de-icing chemicals – химический состав для удаления льда или для борьбы с обледенением
fossil fuel – ископаемое топливо
gasoline ['gæs(ə)li:n] – бензин, газолин

lead [led] – свинец
motor oil – моторное масло

nickel ['nɪkl] – никель

polycyclic aromatic hydrocarbons (PAHs) – полициклические ароматические углеводороды

volatile organic compounds ['vɔlətaɪl ɔ:'gænɪk 'kɔmpaundz**] –** летучие органические соединения

zinc [zɪŋk] **–** цинк

III. Match the following word combinations with their Russian equivalents:

1. speed bump
2. habitat fragmentation
3. habitat disturbance
4. genetic drift
5. inbreeding depression
6. population decline
7. population extinction
8. greenhouse effect
9. allergic reaction
10. built-up areas
11. stream bed
12. vehicle emissions
13. combustion byproducts

a) вымирание популяции
b) населенный пункт
c) выбросы автотранспортных средств
d) парниковый эффект
e) искусственная неровность для ограничения скорости движения транспорта
f) аллергическая реакция
g) нарушение среды обитания
h) фрагментация среды обитания
i) распространение генетических мутаций в популяции
j) сгорание побочных продуктов
k) инбредная депрессия
l) сокращение численности популяции
m) речное русло

IV. Match these words with the definitions below:

adverse; species; runoff; nuisance; mortality; impervious; emission; groundwater; to divert; vulnerable;

1) the draining away of water (or substances carried in it) from the surface of an area of land, a building or structure, etc.
2) death, esp. on a large scale;
3) water held underground in the soil or in pores and crevices in rock;
4) exposed to the possibility of being attacked or harmed, either physically or emotionally;
5) harmful; unfavorable;
6) a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding;
7) not allowing something to pass through;

8) a person, thing, or circumstance causing inconvenience or annoyance;
9) a substance discharged into the air, especially by an internal combustion engine;
10) cause (someone or something) to change course or turn from one direction to another.

V. Find pairs of synonyms:

1. adverse	a) impenetrable
2. contributor	b) to cause
3. to occur	c) to happen
4. to contaminate	d) harmful
5. hazardous	e) exhausts
6. impervious	f) source
7. emissions	g) to pollute
8. to generate	h) poisonous
9. toxic	i) dangerous
10. to deploy	j) to locate

VI. Find pairs of antonyms:

1. to pick up	a) favourable
2. adverse	b) to purify
3. mortality	c) resistant
4. to contaminate	d) to scatter
5. sensitive	e) reproduction
6. predation	f) protection
7. hazardous	g) safe

VII. Complete the following sentences with the appropriate words from the table (change the word-forms if necessary):

to trigger; to deploy; combustion; species; nuisance; to pick up; habitat; to generate

1. The natural _____ of many specious of wild animals was disturbed.
2. It's not recommended _____ mushrooms in this contaminated area.
3. Our new boss has already _____ some useful ideas for facilitating trade.
4. The catastrophes can _____ birds' mortality.
5. We should protect the endangered _____ otherwise they will become extinct.
6. He didn't come again. What a _____!
7. Internal _____ engine was invented in 1860.
8. Some additional speed bumps will be ____ not far from that busy intersection.

VII. Read and translate the text:

ENVIRONMENTAL IMPACT OF ROADS

The environmental impact of roads (both positive and negative) include the local effects of highways such as on noise, water pollution, habitat destruction/disturbance and local air quality; and the wider effects which may include climate change from vehicle emissions. The design, construction and management of roads, parking and other related facilities can change the impacts to varying degrees.

Roads can have both negative and positive effects on air quality. Air pollution from motor vehicle emissions can occur wherever vehicles are used. Emissions include exhausts from engines, volatile organic compounds, carbon monoxide and various other hazardous air pollutants. Concentrations of air pollutants and adverse respiratory health effects are greater near the road than at some distance away from the road. Road dust kicked up by vehicles may trigger allergic reactions. Carbon dioxide is non-toxic to humans but is a major greenhouse gas and motor vehicle emissions are an important contributor to the growth of CO_2 concentrations in the atmosphere and therefore to global warming.

On the other hand the construction of new roads which divert traffic from built-up areas can deliver improved air quality to the areas relieved of a significant amount of traffic.

Motor vehicle traffic on roads cannot but generate noise. Road noise can be a nuisance if it impinges on population centres, especially for roads at higher operating speeds, near intersections and on uphill sections. Noise health effects can be expected in such locations from road systems used by large numbers of motor vehicles. Speed bumps, which are usually deployed in built-up areas, can increase noise pollution. Especially if large vehicles use the road and particularly at night.

But at the same time new roads can divert traffic away from population centres thus relieving the noise pollution.

Urban runoff from roads and other impervious surfaces is a major source of water pollution. Rainwater and snowmelt running off of roads tends to pick up gasoline, motor oil, heavy metals, trash and other pollutants. Road runoff is a major source of nickel, copper, zinc, cadmium, lead and polycyclic aromatic hydrocarbons (PAHs), which are created as combustion byproducts of gasoline and other fossil fuels.

De-icing chemicals and sand can run off into roadsides, contaminate groundwater and pollute surface waters. Road salts can be toxic to sensitive plants and animals. Sand can alter stream bed environments, causing stress for the plants and animals that live there.

Roads can act as barriers or filters to animal movement and lead to habitat fragmentation. Many species will not cross the open space created by a road due to the threat of predation and roads also cause increased animal mortality from traffic. Habitat fragmentation may also divide large continuous populations into smaller more isolated populations. These smaller populations are more vulnerable to genetic drift, inbreeding depression and an increased risk of population decline and extinction.

VIII. Answer the following questions:

1) What does the environmental impact of roads involve?
2) What are the consequences of air pollution?
3) How can noise pollution be reduced?
4) Do highways affect plants and animals?
5) What substances can be found in road runoff?
6) What is habitat fragmentation?

IX. Match the beginning of the sentence with its ending:

1. Urban runoff from roads is a	a) increase noise pollution.
2. Speed bumps	b) greater near the road.
3. Road dust	c) major source of water pollution.
4. Road salts are	d) trigger global warming.
5. Carbon dioxide	e) to habitat fragmentation.
6. Roads as barriers can lead	f) trigger allergic reactions.
7. Concentrations of air pollutants are	g) toxic to plants and animals.

X. Make a plan of the text, pick out key words for each paragraph and retell the text in a nutshell.

XI. Fill in the appropriate words:

Drawback, positive, distance, health, streets, carry, satisfactory, air, time

People experience improved ___ as the main benefit of walking. The most ___ aspects of cycling are that it is fun and convenient. Other benefits of cycling are getting fresh ___ and that it is simple, inexpensive. The most important ___ of walking and cycling is that it takes too much ___ and there are ___ limits. Other important disadvantages are that it is impossible to ___ large and heavy objects and the infrastructure is not ___, i.e. the network for pedestrian and bicycle paths is insufficiently developed, it is difficult to cross ___, etc.

XII. Imagine you and your colleague are stuck in a traffic jam. Role-play a dialogue which can occur between you while in a car.

ПРИЛОЖЕНИЕ А

GRAMMAR FOCUS

1. State the function of the verb “to be” in the following sentences and translate them:

a. The structural layer is eight inches thick.
b. They are building a new ring road around the city.
c. The ring road around the city is to be as long as 150 km.
d. In the Old World all wheels were solid discs. Finally? The wheel was covered with iron and then with rubber.
e. These machines were to make construction quicker and cheaper.
f. The engineer was working at his design for some months.
g. All these materials are to be transported to the site from afar.
h. Granular base was to be compacted by the rollers.

2. State the function of the verb “to do” in the following sentences and translate them:

a. We’ll do our best to improve the road quality.
b. They didn’t know how to give the road a pavement of flat stones but the Romans did.
c. Motorists don’t have to pay a toll to travel on these roads.
d. Did Richardson publish a standard textbook on asphalt paving in 1905?
e. This type of asphalt did play an important part in road construction.
f. Do these methods help you to improve the road pavement?
g. The Egyptians obtained native asphalt from the Dead Sea, didn’t they?
h. They began to do their best much earlier than we did.

3. State the function of the verb “to have” in the following sentences and translate them:

a. He is a very skilled engineer and we have high opinion of his work.
b. We have to mechanize all building operations to make the road in time.
c. During the construction of the bridge across the river specialists had to solve many technical problems.
d. You will have to take measures to prevent spring waters from penetrating the subgrade.
e. This type of cement has changed the concrete properties.
f. The new ceramic engine has been developed in Japan.
g. They had to stop and rest every quarter of an hour as path was very steep.
h. They will have to consider the conditions of this locality.

4. Read and translate the following sentences paying attention to the function of "it" (study the material given below):

1. Личное местоимение Местоимение it в качестве личного местоимения заменяет ранее упомянутые неодушевленные имена существительные и выполняет в предложении функции подлежащего и дополнения. На русский язык в этом случае оно переводится в зависимости от грамматического рода заменяемого существительного.	I have a new textbook on criminal law, you may take it. У меня есть новый учебник по уголовному праву, вы можете взять его (учебник). This article is very difficult; translate it into Russian. Эта статья очень трудная; переведите ее (статью) на русский язык.
2. Формальное подлежащее В предложениях, выражающих явления природы, время, расстояние, а также действия, которые нельзя отнести к какому-либо конкретному лицу или предмету, безличное местоимение it является формальным подлежащим и на русский язык не переводится. Часто встречается в безличных оборотах типа it is necessary, it is important, it is difficult и т.п.	It is winter now. Сейчас зима. It is getting dark. Темнеет. It often rains in autumn. Осенью часто идет дождь. It is 10 o'clock now. Сейчас 10 часов. It is 3 miles from here to the nearest station. Отсюда до ближайшей станции 3 мили. It is difficult to study law. Трудно изучать право.
3. Безличное местоимение в страдательном залоге Сочетание безличного местоимения it с глаголами в страдательном залоге переводится на русский язык неопределенно-личными оборотами типа: говорят, считают, полагают и т.д.: it is said – говорят it is known – известно it was reported – сообщалось it was believed – полагали	It is known that he may be discharged. Известно, что его могут освободить. It is believed that a new bypass will appear here next year.
4. Формальное дополнение После глаголов, выражающих умственное восприятие, таких как: to believe – полагать; to consider – считать; to think – думать; to find – находить и некоторых других, местоимение it является формальным дополнением и на русский язык не переводится.	We consider it necessary to study law. Мы считаем необходимым изучать право. It was this book on civil law that I gave Ann yesterday (Именно эту книгу по гражданскому праву я дал Анне вчера). It was I who gave Ann this book on civil law (Именно я дал Анне эту книгу по гражданскому праву).
5. Указательное местоимение	What is it? – Что это?

6. Местоимение it может входить в состав *усилительной конструкции* it is (was)... that (who), которая служит для усиления какой-либо мысли путем выделения одного из членов предложения. Переводится простым предложением с добавлением таких слов, как именно, как раз, только и т.п. Слова it is (was) ... that (who) не переводятся.	It was yesterday that I gave Ann this book on civil law (Именно вчера я дал Анне эту книгу по гражданскому праву). It was he who helped me. Именно он помог мне. It was not until 1970 that he published his book. - И только в 1970 г. он опубликовал свою книгу. It is precisely this method that he followed. - Как раз этот метод он и использовал.

a. It is necessary to develop the principles of road design and construction.
b. It is essential that the machinery must be serviced regularly.
c. It is to be noted that the Belarusian enterprises produce modern road-building equipment.
d. It is with the help of our specialists that a lot of roads have been constructed in Asia and Africa.
e. It was May when we received the new equipment.
f. It is said that the experiments are going on successfully.
g. It were Russian engineers who suggested granular surfacing. It was laid on a sand base. In fact it was the cheapest way of road construction.
h. I bought a new dictionary. It is very good. You may take it.

5. Define the function of “one” and translate these sentences:

a. One can say that geographical position of Belarus itself has determined its social and cultural peculiarities for many years.
b. One may work in the laboratory only observing certain rules.
c. One should know how to cross the street.
d. In planning a new road or rebuilding an existing one maps must be drawn.
e. These methods are different from the ones used before.
f. Scientists are developing new processes and improving old ones to produce metals that will meet present day requirements.

6. Pay attention to the words “only”, “the only”, “some”, “the same” and translate the following phrases:

A. the only method of solving the problem; coal is not only a source of hest; the only example known; the work was finished only yesterday; the only means of access to the station.

B. some new methods of work; the same properties; some rules; the same traffic intensity; some local materials; the same equipment; polluted to some extent.

7. Choose the right variant and translate the sentences:

a. The equipment may be used only (owing to, in case of, due to) emergency.

b. They could not get there in time (in order to, owing to, instead of) a severe storm.

c. Interest in transport problems has extended far (among, beyond, between) the specialists.

d. This bus makes regular trips (out of, among, between) the city centre and the suburb.

e. The research centre was situated high in the mountains some three kilometers (below, under, above) the sea-level.

f. All the workers decided to stay and wait for the results (since, till, as long as) the end of test.

g. They had to stop and rest every quarter of an hour (as, because of, but) the mountain path was very steep.

8. Give the appropriate degrees of comparison of the following adjectives and adverbs:

positive	comparative	superlative
1. light	1. ___	1. ___
2. ___	2. less	2. ___
3. ___	3. ___	3. the most difficult
4. ___	4. worse	4. ___
5. ___	5. ___	5. the best
6. expensive	6. ___	6. ___
7. ___	7. denser	7. ___
8. ___	8. ___	8. the most
9. ___	9. farther(further)	9. ___
10. attractive	10.___	10. ___

9. Translate the following sentences, paying attention to the suffix "-er":

a. The denser the ground, the slower is the process of moisture transfer.

b. The higher the average speed of the traffic, the wider will be the lane.

c. The more experiments scientists make, the greater is their knowledge of the properties of the material.

d. The higher the degree of soil compaction, the slower is the penetration of capillary water.

e. The greater the number of vehicles in the stream, the more severe will be requirements to the road.

10. Translate the following sentences paying attention to the modal verbs (study the table given below):

МОДАЛЬНЫЕ ГЛАГОЛЫ
MODAL VERBS

глаголы	значения	перевод	примеры
pr. **CAN** pst. **could** = pr. **to be able to** pst. **was able to** fut. **will be able to**	– возможность, умение, способность, разрешение – сомнение, невероятность	могу, умею, можно**,** нельзя возможно, не может быть, неужели	I can do it. You can't go there. Can they do that? Can she have changed so much?
pr. **MAY** pst.**might** = pr.**to be allowed to** pst.**was allowed to** fut.**will be allowed to**	– разрешение совершить действие – допускаемая возможность, предложение с оттенком сомнения	можно возможно, может быть	You may go home. May I do it? He may not smoke. She may have left.
MUST	– долженствование, обязанность, приказ – предположение (почти уверенность)	должен, нельзя должно быть, очевидно, вероятно	I must do it now. You mustn't do it. Must he work? He must be at home already. They must have forgotten
pr. **HAVE TO** pst. **had to** fut. **will have to**	– вынужденная необходимость	вынужден, нужно (приходится)	I have to go there. Has he to study? She has not to miss classes.
pr. **BE TO** pst. **was/were to**	– необходимость, предусмотренная планом, договоренностью, расписанием	должен	The train is to arrive at 10. Am I to go? They are not to leave.
SHOULD	– личный совет, мнение, рекомендация, упрек – вероятность, предположение	следует, следовало бы, должен был бы, нужно наверное	He shouldn’t smoke so much. You should work hard. He should be 40.
OUGHT TO	– моральный долг – вероятность, предположение	должен, следует должно быть	We ought to help her. You ought to have done it yesterday.
NEED	– нецелесообразность	не нужно, не надо, нет необходимости	You need not hurry. You needn't have done it.

a. A crane can raise a weight of several tons.
b. Crossing the street cars and trucks should slow down the speed.
c. They might use the new equipment for the experiment.
d. The equipment is to be supplied by a Japanese firm.
e. These machines were to make construction quicker and cheaper.
f. During the construction of the bridge across the river specialists have to solve many technical problems.
g. They had to remove a thick layer of sand before they started the construction.
h. You will have to take measures to prevent spring waters from penetrating into the subgrade.
i. A driver must be able to see a pavement ahead in order to stop or turn aside.
j. The drivers are allowed to park their cars in this place.
k. He had to pay a fine for speeding. The properties of this metal will have to be tested with special machines.

11. Choose the correct modal verb:

a. The wheel ___(have to, should, can) be changed if you don`t want to get into an accident.
b. Environmental factors ___ (may, must, have to) always be considered.
c. The road ___ (have to, was to, is to) be reconstructed last year.
d. Our car had broken down and we ___ (were to, must, had to) walk to the station.
e. Somebody ___ (may, must, will have) to help them.

12. Insert the appropriate modal verbs or their equivalents:

1. The piers of the old bridge are rotten. We _____ build new ones. (necessity arising out of circumstances)
2. You ____ have used the bypass. The bridge is already opened after the reconstruction. (unnecessary action, waste of time)
3. However beautiful the design or sophisticated the technology bridges still ___ fall down. (possibility of the fact)
4. A new girder bridge ____ be built in 2005.(obligation arising out of arrangement)
5. ____ tell me how to get to the London Bridge? (polite request)
6. ___ you be ___ to shoot me on the Tower Bridge tomorrow morning?(possibility in the future)
7. You ____ come to San Francisco and see “Golden Gate” with your own eyes.(invitation)
8. The soldiers ____ have broken step to prevent their rhythmic marching from starting resonant vibrations. (criticism, reproach)

9. Heavy trucks ____move on the nearly dilapidated bridge.(prohibition)
10. The cables of the old suspension bridge ____ have failed to bear the traffic volume. (probability, near certainty)
11. ___ the Romans build stone arch bridges without mortar? (surprise in the past)
12. The Romans ____ have build them.(strong doubt, incredulity)
13. - ___ we set his speech down? (obligation or necessity)
- No, you ____ .(absence of necessity)
14. I suppose the passageway is closed. You ___ think of some new route. (advice)

13. Define the part of speech of the underlined words and translate these sentences:

A. 1. A car causes air pollution. 2. Some mistakes in calculations have been the main cause of failure of the bridge. 3. Both of these failures are most entirely caused by traffic. 4. The continuous use of highways causes loud traffic noise creating a problem for people who live near highways. 5. These accidents are caused by speeding on icy road.

B. 1. They have read an interesting article on the subject of their investigation. 2. Aluminium loses its strength when it is subjected to a high temperature. 3. The results of their experiments are subjected to criticism. 4. The pavement is subjected to the direct action of traffic loads and of natural factors.

C. 1. Minor roads run parallel to the highways. 2. Transport running on tracks has been widely used in the cities of the 19-th century. 3. Escalator runs at full speed when carrying passengers but when empty it runs at half speed. 4. The compressor is designed to run at comparatively low speeds. 5. The company has had a run of spectacular successful years. 6. Great difficulties had to be overcome during the construction of the road. It runs through the taiga, huge marshes and rivers. 7. A well-run company should not have problems of this kind.

D. 1. Motor transport is the most efficient form of transportation over comparatively short distances. 2. In countries with a planned economy all means of transport form a single transportation system. 3. Different kinds of earth and soil are mixed together to form a pavement. 4. Fill in the form and send it back with your resume. 5. Engineers are trying to form an idea of what kind of road pavement to choose.

E. 1. Different metals have to be produced in different ways. 2. Cycling is another pleasant way of seeing the British countryside. 3. The roads must be maintained in a proper way. 4. The cleared way was quite wide in the forest to use new machines. 5. He seems to be the only person to have a way with new equipment.

14. Find the verb in the Passive Voice (study the given table):

The Passive Voice Страдательный залог

Present	**Past**	**Future**	
Формула Simple	*is/am/are + V_{ed} (V_3)*	*was/were + V_{ed} (V_3)*	*will/shall + be + V_{ed}(V_3)*
	Letters are sent every day. – Письма посылают каждый день.	Letters were sent yesterday. – Письма отправили вчера.	Letters will be sent tomorrow. – Письма отправят завтра.
Формула Continuous	*is/am/are + being + V_{ed} (V_3)*	*was/were + being + V_{ed} (V_3)*	———————
	Letters are being sent now. – Письма отправляют сейчас.	Letters were being sent at 5 yesterday. – Письма вчера отправляли в 5 часов.	———————
Формула Perfect	*has/have + been + V_{ed} (V_3)*	*had + been + V_{ed} (V_3)*	*will/shall + have/has+ been +V_{ed} (V_3)*
	Letters have been already sent. – Письма уже отправили.	Letters had been sent before he phoned. – Письма отправили до того, как он позвонил.	Letters will have been sent by 5 tomorrow. – Письма отправят завтра до 5 часов.
Perfect Continuous	——————— ———	———	———————

1. a) will need b) is needed c) has needed
2. a) was employed b) has employed c) employs
3. a) mixed b) was mixing c) will be mixed
4. a) is removing b) must be removed c) had removed
5. a) has been used b) used c) uses
6. a) leveled b) is being leveled c) will level

15. Translate the following sentences paying attention to the predicates in the Passive Voice with prepositions:

a. This material was much spoken of.
b. The design of the road was much worked at.
c. The engineers` measurements and their calculations can be relied on.
d. The experimental model will be followed by mass production of these mechanisms.
e. The new model of the device will be worked at in the plant laboratory.
f. The construction of the new tunnel was paid great attention to.
g. This document is much spoken about.
h. The specialists were sent for some days ago.

i. Beautiful bridges are looked at with great pleasure.
j. The original design of the bridge was referred to in some journals.

16. Paraphrase the sentences (like in the example):

They built concrete pavement in 1865. – Concrete pavement was built in 1865.

a. People pay great attention to ecological problems.
b. Lorries transport sand to the site.
c. People used this road very often.
d. The workers maintained the road in a proper way.
e. The scientists produced a new substance after many years of hard work.
f. The workers will smooth? Pave and prepare roads to allow easy travel.
g. People expect considerable noise health effects from road systems.

7. Choose the best variant:

1) This expressway ___ next year.
a) is completed b) was completed c) will have been completed d) will be completed
2) Local road-building materials ___ be employed to reduce the cost of construction.
a) were b) is c) must d) able
3) A lot of new roads ___ this year.
a) will build b) have build c) have been built
4) New traffic signs ___ in our city every year.
a) was installed b) have been installed c) has been installed d) are installed
5) A great number of roads ___ in Belarus since the war.
a) are designed b) has designed c) have been designed d) designed

18. Define the function of the Participle and translate the given sentences (make use of the tables given below):

a. Working in the laboratory he deals with different new materials.
b. While designing a tunnel there are many factors to be taken into consideration.
c. The bridge was constructed while maintaining traffic on the existing road underneath.
d. Having become popular suspension bridges were built in different places of Great Britain.
e. Having investigated the static and dynamic behavior of the system, the scientists approved it.
f. Having been given the site, they examined it thoroughly.
g. Having been built nine centuries ago, the bridge has been reconstructed several times.
h. Being obtained in the laboratory the new substance showed valuable properties.

i. The problem being discussed at the scientific conference is of great importance for industry.
j. The professor told us about the experiments being carried out in the laboratory.
k. When excavating the ground the workers found some very hard rock thus discovered naturally formed concrete.
l. If protected by a special coating this material becomes waterproof.

Причастие
(Participle I, II)

Participle I	Active	Passive
Simple	**reading** The girl **reading** a book is my friend. Девушка, **читающая** книгу, моя подруга. **Reading** a book he made some notes. **Читая** книгу, он делал какие-то записи.	**being read** The book **being read** now is very interesting. Книга, **которую сейчас читают**, очень интересная.
Perfect	**having read** **Having read** the book he put it aside. **Прочитав** книгу, он отложил ее в сторону.	**having been read** **Having been read** the book was returned to the library. После того как книгу **прочитали, ее** вернули в библиотеку.
Participle II	The book **read** by him is on the table. Книга, **прочитанная им**, лежит на столе.	

Причастные обороты
(Participle Constructions)

Определительный причастный оборот	
The translation **done** at home by the students was of great importance for them.	Перевод, **выполненный (который был выполнен)** дома студентами, представлял для них большую важность.
Обстоятельственный причастный оборот	
Translating the text the students used the dictionaries. **Having translated the text** the students began to answer the questions.	**Переводя текст (во время перевода текста)**, студенты пользовались словарями. **Переведя текст (после перевода текста)**, студенты начали отвечать на вопросы.
Независимый причастный оборот	
The students having translated the text, the lesson was not over. The lesson was over, **the students having translated the text before the bell rings**.	**Когда студенты перевели текст**, урок еще не был окончен. Урок был закончен, **причем студенты перевели текст раньше звонка** (до того, как прозвенел звонок).

19. Choose the right translation of the words given in the brackets:

A. The test (выполнен) by a group of students. 2. The group of students (выполняющая) the test is in the laboratory. 3. The test (выполненный) is very complex.

is performing; performing; performed; is performed

B. 1. The engineer (проводит) the investigation. 2. The investigation (проводимое) by the engineer is important. 3. The engineer (проводящий) the investigation works is in the laboratory.

carrying out; is carrying out; carried out; is carried out

C. 1. (Определяя) the properties of the soil the scientist made lots of experiments. 2. The properties of the soil (определены) accurately enough. 3. When (были определены) all the properties of the soil it was recommended for the construction.

are determined; determined; determining; are determining

20. Read and translate the following sentences paying attention to the words with the ending "-ed":

a. The machine used showed good results.
b. The methods introduced received general recognition.
c. The equipment tested required some improvement.
d. The substance investigated showed interesting results.
e. The discovery mentioned remained unknown to most scientists for a long time.
f. The methods applied increased the production of motor cars.
g. The properties described require further investigation.
h. The phenomenon discovered attracted the scientists` attention.
i. The results obtained showed that there was a mistake.

21. Choose the best variant of translation for the underlined Participles:

1. The topsoil is stockpiled for rehabilitation of newly constructed embankment.
a) строящие b) построив c) построенной
2. It will be compacted using heavy vibratory road roller.
a) использующие b) используя c) использовав
3. The in-situ ground will be removed to a level specified by the engineer.
a) определили b) определяя c) определенного
4. The final layer of a road is the base course consisting of gravel or crushed stone.

a) состоявший b) состоящий c) который состоял

5. Having placed a surface course the builders strengthened the pavement structure.

a) разместив b) размещая c) размещенный

6. Being leveled off by a grader a gravel type material will be compacted to required density.

a) выравнивая b) при выравнивании c) будучи выровненным

22. Choose the right form of the participle:

a. (Building, having built) new roads we make our life more comfortable.

b. The road (being repaired, repairing) will be much wider.

c. (Crossing, having crossed) the street, cars and trucks should slow down the speed.

d. (Having built, having been built) nine centuries ago, the bridge has been reconstructed several times.

e. (Being finished, having finished) the experiment, he printed the results.

f. (Broken, having broken) by the wind the tree was lying on the road.

g. Roads (connecting, having connected) large industrial centres are very important.

h. (Having lived, while living) in London many years he knew the city well.

23. Translate the following sentences paying attention to the function of the Gerund (make use of the tables given below):

Герундий
(Gerund)

	Active	Passive
Simple	**asking** The students like **asking** questions. Студенты любят **задавать** вопросы.	**being asked** Some students don't like **being asked**. Некоторые студенты не любят, когда их **спрашивают**.
Perfect	**having asked** I know of his **having asked** you about it. Я знаю, что он **спрашивал** тебя об этом.	**having been asked** I remembered **having been asked** about it. Я вспомнил, что **меня спрашивали** об этом.

Функции герундия в предложении

Функция	Перевод
1. Подлежащее **Driving** at a high speed is dangerous.	Существительное или неопределенная форма глагола. **Ездить (езда)** на большой скорости опасно (опасна).
2. Дополнение My brother likes **riding** at a high speed.	Существительное или неопределенная форма глагола. Мой брат любит **ездить (езду)** на большой скорости.
3. Часть составного сказуемого His favourite sport is **racing**.	Существительное или неопределенная форма глагола. Его любимый вид спорта – **гонки**.
4. Определение The idea of **designing** gas engine was given by specialists long ago.	Существительное Идея **создания** газового двигателя была предложена специалистами давно.
5. Обстоятельство We can reduce pollution by **observing** good ecology rules.	Деепричастный оборот Мы можем понизить загрязнение окружающей среды, **соблюдая** правила экологии.

a. Building a road tunnel through a mountain takes much time.
b. A new system of removing snow and ice from the city streets by using heat has been tested in Moscow.
c. In planning the bridges considerable attention was paid to their appearance.
d. We must avoid placing concrete on frozen subgrade.
e. The British and French government signed an agreement to build a tunnel and digging began.
f. Heating may change the properties of the substance.
g. It is not possible to start a construction job without leveling the site.
h. The scientists considered different ways of solving the problem.
i. Cracking is usually controlled by adding steel reinforcement.
j. Good lightning helps cut accidents for both vehicles and pedestrians.

24. Choose the sentences with the Gerund:

a. Porous asphalt reduces noise by absorbing some of the noise emitted by vehicles.
b. In the late 18^{th} century European engineers began designing roads that included lighter surfaces.
c. The thin coating of asphalt around the soil particles provides a high degree of waterproofing.
d. An engineer testing the pavement resistance found sufficient drawbacks.

e. When constructing a road a lot of earthworks should be done.
f. Being provided with batteries an electric car can develop a speed of 50 miles an hour.
g. Several methods of testing soil stability are used.
h. Improving the properties of the material required much time.

25. State the part of speech of the underlined words (Participle or Gerund) and translate the sentences:

A. Reconstructing this road will require much time and money.
Reconstructing this road they met with many difficulties.
B. Working at a construction site they used different types of machines.
Working at a construction site helps to understand all stages of road building.
C. Scientists devote much attention to the problem of changing the climate.
Changing the climate science makes nature serve the man.
D. Melting is a physical process.
We cleared the road from melting snow.
Melting ice we get water.

26. Translate into Russian and state the function of the Infinitive (make use of the tables given below):

Инфинитив

	Active	Passive
Simple	**to write** I want **to write** him a letter. Я хочу **написать** ему письмо.	**to be written** The letter **to be written** will be posted at once. Письмо, **которое нужно написать**, будет послано сразу.
Continuous	**to be writing** The students seem **to be writing** a dictation now. Кажется, студенты **пишут** диктант сейчас.	
Perfect	**to have written** The students seem **to have written** their dictation. По-видимому, студенты **написали** диктант.	**to have been written** The dictation seems **to have been written**. Диктант, кажется, **написан**.
Perfect Continuous	**to have been writing** The students seem **to have been writing** their dictation for 2 hours. Студенты, по-видимому, **пишут** диктант уже в течение двух часов.	

Функции инфинитива в предложении
Способы перевода инфинитива

Функция	**Перевод**
1. Подлежащее **To read** books is useful. **To smoke** is bad for health.	Существительное или неопределенная форма глагола. **Чтение (читать)** книг(и) полезно. **Курение (курить)** вредно для здоровья.
2. Дополнение I want **to read** this book.	Неопределенная форма глагола. Я хочу **прочитать** эту книгу.
3. Часть составного сказуемого. Our task is **to speak** English.	Неопределенная форма глагола. Наша задача – **говорить** по-английски.
4. Определение. A thermometer is an instrument **to show** the temperature. The text **to be translated** is very interesting.	Глагол в настоящем или будущем времени или с модальным значением определительного придаточного предложения. Термометр – это прибор, **который показывает (должен показывать)** температуру. Текст, **который нужно (будет) перевести**, очень интересный.
5. Обстоятельство We went to the station **to meet** them.	Существительное с предлогом или неопределенная форма глагола с союзами «чтобы», «для того чтобы». Мы поехали на станцию, **(для того) чтобы встретить** их **(для встречи с ними)**.

A. It is essential to collect and study information about the area where the road is to be laid.
B. To use more glass in a modern motor vehicle means improvement of visibility.
C. The chief engineer allowed the new engine to be tested.
D. This method of construction is said to have some advantages.
E. Nothing could make him turn the computer off.
F. Plastics are supposed to be used instead of metals in many cases.
G. The road surface to be repaired was destroyed many years ago by heavy vehicles.
H. Some degree of elevation of the road was made in order to ensure drainage.
I. The authorities wanted speed to be limited within the city centre.
J. This machine enables many operations to be carried out easily.
K. Modern discoveries allow science and engineering to be developed rapidly.
L. The use of this machine permits leveling of the roadbed to speed up.
M. They are likely to be familiar with this phenomenon.
N. This experiment seems to give good results.

27. Read and translate the sentences with the Complex Subject (make use of the table given below):

Сложное подлежащее (Complex Subject)

Глаголы-сказуемые, с которыми употребляется сложное подлежащее	Примеры	Перевод
1. В страдательном залоге: to know – знать to think – думать to consider – считать to believe – полагать to expect – ожидать to report – сообщать to state – утверждать to suppose – предполагать	**The delegation** is said **to arrive** soon. **The delegation** is said **to have arrived**. **The delegation** is said **to be arriving** now. **He** is believed **to have been working** for 2 years there.	Говорят, что **делегация** скоро **приедет**. Говорят, что **делегация прибыла**. Говорят, что **делегация сейчас прибывает**. Полагают, что **он работал** там в течение двух лет.
2. В действительном залоге: to seem – казаться to appear – оказываться to happen – случаться to prove – оказываться	**He** seems **to know** English well. **He** seems **to have known** English well.	**Он**, кажется, **знает** хорошо английский. **Он**, кажется, **знал** хорошо английский.
3. Со словосочетаниями: to be likely – вероятно to be unlikely – маловероятно to be certain – определенно to be sure – обязательно	**She is likely** to come here in time.	**Она**, вероятно, **придет** вовремя.

A. This bridge is said to have been built two hundred years ago.
B. Rubber is known to have been brought from America.
C. They were reported to have completed the construction of the road last month.
D. Speeding is found to be one of the factors increasing accidents on the road.
E. Proper alignment of the road is supposed to contribute to safe driving.
F. The journey was expected to be brief and pleasant.
G. They seem to be studying the materials of great interest.
H. The cooling system proposed by the designers proved to be inefficient.
I. The road to be built in this district is likely to meet all modern requirements.
J. The discovery of a laser is sure to be of great value.
K. This scientist is certain to make a great discovery.

28. Translate into English using the Complex Subject:

A. Известно, что этот тип вяжущего (astringent) является очень чувствительным (sensitive) к погодным условиям.
B. Говорят, что несколько мостов будет построено по всей длине дороги.
C. Полагают, что стоимость строительства будет уменьшена путем использования местных материалов.
D. Применение этого материала, вероятно, даст лучшие результаты.
E. Улица оказалась более привлекательной после ремонта.
F. Этот вопрос вряд ли будет рассматриваться на конференции.

G. Дорога, несомненно, будет расширена после реконструкции.
H. Новый метод, кажется, является эффективным.

29. Read and translate the sentences with the Complex Object (make use of the table given below):

Сложное дополнение (Complex Object)

Глаголы-сказуемые, после которых употребляется сложное дополнение	Примеры	Перевод
1. Выражающие желание: to want – хотеть to wish – желать to like – нравиться to dislike – не нравиться to hate – ненавидеть	I want **him to read** this book. I like **people to tell** the truth.	Я хочу, **чтобы он прочел** эту книгу. Мне нравится, **когда люди говорят** правду.
2. Выражающие умственную деятельность: to expect – ожидать to think – думать to suppose – предлагать to know – знать to suspect – подозревать	We know **him to be a good engineer**. We suppose **him to have done** his work.	Мы знаем, **что он хороший инженер**. Мы предполагаем, **что он выполнил** свою работу.
3. Выражающие чувственные восприятия: to see – видеть to watch – наблюдать to feel – чувствовать to hear – слышать	I saw **him cross** the street. I felt **somebody touch** my arm. (Инфинитив употребляется без астицы “to”).	Я видел, **что он переходил** улицу. Я почувствовал, **что кто-то дотронулся** до моей руки.
4. Выражающие побуждение: to make – заставлять to let – позволять to force – заставлять (силой)	He made **us wait** for him. She let **me do** it. (Инфинитив употребляется без частицы “to”).	Он заставил **нас ждать** его. Она позволила **мне сделать** это.

A. 1. We expected the designers to simplify the design of the structure.2. Nowadays drivers want the road signs to be visible, understandable and uniform. 3. Everybody wanted the construction of the pavement to be completed in time. 4. I know him to have been working at this project for a long time. 5. We supposed them to finish the earthworks.

B. 1. These methods enable full investigation of local materials to be carried out. 2. Modern mechanized methods employed for earthworks permit a stable roadbed to be built. 3. This plan enables the reconstruction of this bridge to be completed in time. 4. This width of lanes and shoulders allows the carriageway width to be determined.

C. 1. Heat causes most materials extend. 2. The rain made us return home. 3. They could make him change his decision. 4. Air pollution causes scientists find different ways from its harmful effect. 5. Nothing could make him alter the direction.

ПРИЛОЖЕНИЕ Б

АНГЛО-РУССКИЙ ТЕРМИНОЛОГИЧЕСКИЙ СЛОВАРЬ-МИНИМУМ

Aa

abrasion (n.)	истирание
access (n.)	подъезд, въезд, доступ
accuracy (n.)	точность
accurate (adj.)	скрупулезный, тщательный
add (v.)	добавлять, присоединять
addition (n.)	добавка, заполнение
additional (adj.)	добавочный дополнительный
adequate (adj.)	соответствующий, достаточный
adhesion (n.)	сцепление, прилипание
adjacent (adj.)	расположенный рядом, смежный, соседний
adopt (v.)	принимать
adverse (adj.)	неблагоприятный, вредный
aerial photography	аэросъемка, воздушное фотографирование
ageing	старение
aggregate (n.)	заполнитель
aid (v.)	помогать, содействовать
airfield (n.)	аэропорт
align (v.)	выравнивать, трассировать
alignment (n.)	1) трасса 2)выравнивание, выпрямление
allocate (v.)	размещать, резервировать
aloft (adv.)	наверху, на высоте
amenities (n.)	сооружения
ancillary (adj.)	вспомогательный
anticipate (v.)	предвидеть, ожидать
application (n.)	применение
apply (v.)	применять
appropriate (adj.)	подходящий, соответствующий
arid (adj.)	засушливый
ash (n.)	зола
asphalt (n.)	асфальт
available (adj.)	доступный, имеющийся в наличии
axle load	нагрузка на ось

Bb

bank (n.)	насыпь, вал
base course	основание дорожного покрытия
beam bridge	балочный мост

bearing capacity	несущая способность
bearing ratio	показатель плотности грунта
bed (roadbed) (n.)	основание, слой, пласт (земляное полотно)
bend (n.)	закругление дороги, поворот
bind (n., v.)	связь, связывать
binder (n.)	вяжущее вещество
bitumen (n.)	битум
bituminous mortar	битумный раствор
blade (n.)	лопасть, дорожный струг
blast (n., v.)	взрыв, взрывать
blasting	подрывные работы
borrow pit (n.)	карьер; резерв (грунта); котлован
boundary (n.)	граница, межа
box girder	коробчатая пустотелая балка
breakthrough (n.)	достижение, успех, открытие, новинка
bridge (n.)	мост
bridge deck	настил моста
bucket (n.)	ковш, черпак
burnt brick	обожженный кирпич
bypass (n.)	объезд, объездная дорога
byproduct (n.)	побочный продукт

Cc

cable (n.)	канат, трос, ванта
cable-stayed bridge	вантовый мост
camber (n.)	изгиб, выпуклость
cantilever (n.)	консоль, кронштейн
cantilever bridge	консольный мост
capacity (n.)	пропускная способность, предельная нагрузка
carriageway (n.)	проезжая часть дороги
carry away (v.)	отводить
carry out (v.)	проводить, выполнять
cast (v.)	лить, отливать, укладывать (асфальт)
cast iron	чугун
cat`s eyes	"кошачьи глаза" (утопленные в резиновые подушки зеркальные рефлекторы на дорогах; обеспечивают видимость разметки при свете фар)
cause (v.)	причинять, вызывать, заставлять
cement (n.)	цемент
cinder (n.)	шлак, зола
class (n.)	категория дороги
clay (n.)	глина

coat (n.)	слой
coarse sand	крупнозернистый песок
cobblestone (n.)	булыжник
collector road	магистральная дорога районного значения
collision (n.)	столкновение
combustion (n.)	сгорание, горение
commence (n.)	начинать
common (adj.)	общепринятый, распространенный
compact (v.)	уплотнять, сдавливать, спрессовывать
competing (adj.)	противоположный, конкурирующий
concrete (n.)	бетон
condition (n.)	условие, состояние
conduct (v.)	проводить
congestion (n.)	перегруженность, затор движения, пробка
construct (v.)	строить
construction (n.)	строительство
contaminate (v.)	загрязнять
content (n.)	содержание
continuous (adj.)	непрерывный, сплошной
convey (n.)	сообщать, передавать
cool (v.)	охлаждать, остывать
course (n.)	слой
crack (n.)	трещина
crack resistance	сопротивление образованию трещин, трещиноустойчивость
crash (n.)	авария, крушение
crash barrier	ограждение; барьер на автостраде, разделяющий полосы с противоположным направлением движения
cross-section (n.)	поперечное сечение; поперечный разрез, профиль
crowd (v.)	собираться толпой, скапливаться
crush (v.)	дробить
culvert (n.)	1) водопропускная труба 2) дренажная труба, кульверт
curb (v.)	ограждать
curve (n.)	поворот, изгиб
cutting	выемка грунта кон

Dd

data (pl. от datum) (n.)	данные, факты
dead end	тупик
deformation (n.)	деформация, разрушение

delineate (v.)	очерчивать, схематически изображать
demand (n., v.)	1)требование, запрос; 2) требовать
dense (adj.)	плотный; сжатый; густой, частый
density (n.)	плотность
deposit (n.)	залежь
destruct (v.)	разрушать
deteriorate (v.)	ухудшать
deterioration (n.)	повреждение, ухудшение
detrimental (adj.)	вредный, наносящий ущерб
digging	копание, рытье; земляные работы; выемка грунта;
display (v.)	показывать, демонстрировать
distance (n.)	дистанция, расстояние
distribute (v.)	распределять
ditch (n.)	канава
drag (v.)	тащить, волочить
drain (v.)	осушать, отводить воду
drainage (n.)	дренаж, сток, отвод вод
draw up (v.)	составлять, разрабатывать
drawing (n.)	чертеж, рисунок
durability (n.)	прочность
durable (adj.)	прочный, долговечный, крепкий

Ee

earthwork (n.)	земляные работы
edge (n.)	бровка, край
effect (n.)	действие, влияние, воздействие
effective (adj.)	действенный, результативный, эффективный
elevate (v.)	поднимать, повышать
embankment (n.)	насыпь, дамба
emission (n.)	выделение, распространение (тепла, света, запаха)
employ (v.)	использовать, употреблять
enhance (v.)	увеличивать, усиливать, улучшать
ensure (v.)	гарантировать, обеспечивать
erect (v.)	сооружать; устанавливать; возводить, строить
estimate (v.)	рассчитывать, определять, оценивать
evolve (v.)	эволюционировать, развиваться
excavate (v.)	рыть, копать
excavation (n.)	земляные работы, выемка грунта
excess (n.)	избыток
excessive (adj.)	чрезмерный, избыточный
exploration (n.)	исследование
explore (v.)	исследовать
expressway (n.)	автострада, автомагистраль

Ff

facilitate (v.)	содействовать, способствовать, обеспечивать
failure (n.)	недостаток, авария, повреждение, отказ
fan cable-stayed bridge	вантовый мост с веерным расположением вант
feeder road	подъездная дорога, ведущая к автостраде
fence (n.)	забор, изгородь, ограждение
ferry (n.)	паром
filling station	автозаправочная станция
fine (adj.)	мелкий
flat (adj.)	плоский
flexible (adj.)	гибкий
flexible pavement	нежесткое дорожное покрытие
fluorescence (n.)	свечение, флуоресценция
footpath (n.)	пешеходная дорожка, тротуар
formation (n.)	земляное полотно
fraction (n.)	доля, часть, фракция
framed structure	каркасная (рамная) конструкция
freeway (n.)	автострада, скоростная автомобильная дорога
freight (n.)	груз, фрахт
frequent (adj.)	частый, часто встречающийся
friction (n.)	трение
fulfill (v.)	выполнять, осуществлять

Gg

generate (v.)	вызывать, порождать
girder bridge	балочный мост
glue (v.)	клеить, склеивать(ся)
grade (n.)	уклон, степень, градус
grader (n.)	грейдер, дорожный струг
gradient (n.)	уклон, подъем
grading	выравнивание, профилирование (дороги)
gradual (adj.)	постепенный
granite sett	брусчатка
granular surfacing	щебеночное покрытие
gravel (n.)	гравий
gravity (n.)	плотность
ground science	дорожное грунтоведение
groundwater (n.)	почвенная, грунтовая вода
grouting (n.)	заливка, бетонирование
guardrail (n.)	перила, поручень
gutter (n.)	водосточный желоб, водоотводная канава
gypsum (n.)	гипс

Hh

harden (v.)	застывать, твердеть
harp cable-stayed bridge	вантовый мост с расположением вант в виде арфы
haul (v.)	подвозить, доставлять, транспортировать
haulage (n.)	высота
hazardous (adj.)	опасный
heavy traffic	интенсивное движение
height (n.)	высота
high-tensile steel	высокопрочная сталь
highway (n.)	автомобильная дорога (магистраль)
hollow (n.)	впадина, углубление, яма
humus (n.)	перегной, чернозем, гумус

Ii

impact (n.)	сильное воздействие; влияние
impetus (n.)	побуждение, движущая сила; стимул, импульс
impermeable (adj.)	непроницаемый, герметичный
implement (v.)	выполнять, осуществлять
in-situ	на месте
interchange (n.)	перекресток с эстакадой, развязка
intersect (v.)	пересекаться, скрещиваться
intersection (n.)	перекресток
investigate (v.)	исследовать
investigation (n.)	исследование
iron (n.)	железо
identify (v.)	устанавливать, определять
impervious (adj.)	непроницаемый, не пропускающий
impurity (n.)	примесь
inadequate (adj.)	неподходящий, не соответствующий требованиям
initial (adj.)	начальный, исходный
intended	предназначенный
interact (v.)	взаимодействовать, влиять друг на друга

Jj

jam (n.)	затор
joint (n.)	шов, стык
junction (n.)	узел, пересечение нескольких дорог, примыкание

Kk

kerb (n.)	бордюр, край тротуара
keep (v.)	хранить, сохранять
knock (v.)	удар, толчок

Ll

lane (n.)	полоса движения
layer (n.)	слой
layout (n.)	трассирование автомобильной дороги
level (n.)	уровень
level off (v.)	выравнивать
lighting (n.)	освещение
lime (n.)	известь, известняк
limit (n., v.)	предел, граница; ограничивать
limitation (n.)	ограничение
line (n.)	линия (разметки проезжей части)
load (n.)	нагрузка, груз
local road	дорога местного значения
locate (v.)	располагать, размещать
log (n.)	бревно
longitudinal (adj.)	продольный
lower (n.)	понижать, опускать
luminance (n.)	яркость

Mm

macadam (n.)	покрытие из уплотненного щебня
machinery (n.)	машины, оборудование
maintenance (n.)	содержание, текущий ремонт
major (adj.)	главный, основной
mandatory road sign	предписывающий дорожный знак
map (n.)	карта
marking (n.)	разметка
marsh (n.)	болото
masonry (n.)	каменная или кирпичная кладка
matrix (n.)	вяжущее вещество
means (n.)	средство, способ
measure (n.)	размер, мера
median (n.)	разделительная полоса
milestone (n.)	мильный камень или столб
mixture (n.)	смесь
mode (n.)	вид транспорта
moisture (n.)	влага, влажность
mortar (n.)	строительный раствор
motorway (n.)	шоссе, автомагистраль
mud (n.)	грязь, ил

Nn

network (n.)	сеть дорог
noise (n.)	шум
nuisance (n.)	вредное воздействие, помеха

Oo

observation (n.)	наблюдение
obstacle (n.)	препятствие
obtain (v.)	получать, добывать
oil (n.)	нефть
operate (v.)	управлять
overhaul (n.)	капитальный ремонт
overtake (v.)	обгонять
overtaking	обгон

Pp

parking lot	автостоянка, парковка
parkway (n.)	парковая дорога
passable (adj.)	проходимый
passageway (n.)	проезд, проход
patch (n., v.)	ямочный ремонт; производить ямочный ремонт
path (n.)	тропинка, путь, дорога
pavement (n.)	дорожное покрытие
paver (n.)	укладчик
paving machine	бетоноукладчик
pedestrian (n.)	пешеход
pedestrian crossing	пешеходный переход
peg (n.)	колышек
penetrate (v.)	проникать
penetration (n.)	проникновение
picket (n.)	столбик, колышек
pictorial (adj.)	графический, сделанный в форме рисунка
pier (n.)	бык моста, мостовая опора
pile (n.)	свая, столб, куча, кипа
pile up (v.)	накапливать(ся)
pipe (n.)	труба
pipeline (n.)	трубопровод, нефтепровод
pit (n.)	яма, карьер, котлован
planner (n.)	планировщик
planting	зеленые насаждения
plough (n.)	плужный снегоочиститель
pneumatic (adj.)	пневматический
pollution (n.)	загрязнение
pontoon bridge	понтонный мост
porous (adj.)	пористый
post (n.)	столб, свая
pothole (n.)	выбоина
precast concrete	сборный железобетон

predict (v.)	предсказывать, прогнозировать
prediction (n.)	прогноз
prestressed concrete	предварительно напряженный железобетон
prevent (v.)	предотвращать
primary highway	магистральная (главная) автомобильная дорога
priority (n.)	приоритет
proceed (v.)	продолжить (движение)
prohibitory road sign	запрещающий дорожный знак
prolong (v.)	продолжать
prominent (adj.)	заметный, видный, выдающийся
prompt (adj.)	срочный, быстрый
provide (v.)	обеспечивать, снабжать
pump (n., v.)	насос; выкачивать, накачивать
put up (v.)	строить, возводить
pylon (n.)	опора, пилон

Qq

quality (n.)	качество
quantity (n.)	количество
quarry (n.)	карьер, каменоломня

Rr

ramp (n.)	съезд (на автомагистрали); пандус
range (n., v.)	ряд, предел, размах; колебаться (а определенных пределах)
rate (n.)	норма, разряд; скорость, темп
reactivity (n.)	химическая реактивность
recycled materials	повторно использованные материалы
recycling	переработка, повторное использование
reduce (n.)	уменьшать, сокращать
reduction (n.)	уменьшение, сокращение
refine (v.)	очищать (от примесей), рафинировать
refinery (n.)	нефтеочистительный завод
reflection (n.)	отражение
reflectivity (n.)	отражательная способность
rehabilitation (n.)	ремонт, восстановление, реконструкция
reinforce (v.)	укреплять, усиливать
reinforced concrete	железобетон
remote (adj.)	дистанционный; действующий на расстоянии
removal (n.)	удаление, устранение
remove (v.)	удалять
renovation (n.)	восстановление
repair (n., v.)	ремонт, починка; ремонтировать

repair shop	станция техобслуживания автомобилей
replace (v.)	заменять, замещать
require (v.)	требовать
requirement (n.)	требование
residue (n.)	осадок, остаток, отстой
resist (v.)	сопротивляться, противостоять
resistance (n.)	сопротивление
rest (v.)	держаться, основываться, опираться
resurface (v.)	заменять покрытие; покрывать заново (дорожное покрытие)
resurfacing	перекладка покрытия
retroreflector (n.)	отражатель световозвращающий
revolve (n.)	вращать
riding qualities	ходовые (ездовые) качества
right-of-way	полоса отвода
rigid (adj.)	жесткий
rigid pavement	жесткое дорожное покрытие
road maintenance	технико-профилактическое обслуживание дорог
road section	участок дороги
roadbed (n.)	основание, земляное полотно
roadside (adj.)	придорожный
roadway (n.)	проезжая часть дороги, дорожное полотно
rock (n.)	горная порода, скала
roller (n.)	каток
rough (adj.)	грубый, неровный, шероховатый
roughness (n.)	шероховатость
roundabout	кольцевое пересечение
route (n.)	трасса дороги, маршрут
rubber (n.)	резина, каучук
running repair	текущий ремонт
runoff (n.)	сток
rural (adj.)	сельский

Ss

safety (n.)	безопасность
safety harness	привязные ремни безопасности
safety helmet	защитная каска
sample (n.)	образец
sand (n)	песок
saturate (v.)	насыщать, пропитывать
scarcity (n.)	нехватка, недостаток
scatter (v.)	посыпать, усыпать, рассеивать
schedule (n., v.)	расписание, график; составлять (расписание или

	график)
seal (n., v.)	изоляция, уплотнение; заполнять, уплотнять
sealing	герметизация, уплотнение
sealing coat	тонкая пленка битума или дегтя (на поверхности дорожного покрытия)
search (v.)	искать
secondary road	второстепенная дорога
section (n.)	участок; сечение, разрез, профиль
sensitive (adj.)	чувствительный, восприимчивый
separate (v.)	разделять, отделять
separation (n.)	разделение
service (n.)	служба
service life	срок службы
set a standard	устанавливать стандард
set out (v.)	определять
setting	твердение, схватывание
settling	оседание
sewer (n.)	коллектор, канализационная труба
shape (n.)	форма, профиль
sharp (adj.)	резкий, крутой
sharpness (n.)	резкость
shortage (n.)	нехватка, недостаток; усушка, сжимание
shoulder (n.)	обочина
shovel (n.)	лопата, совок
shrink (v.)	давать усадку, сжимать, сокращаться
shrinkage (n.)	усадка
sidewalk (n.)	тротуар
sight distance	расстояние видимости дороги
sign (n.)	знак
silt (n.)	ил
site (n.)	строительная площадка
slag (n.)	шлак
slippery (adj.)	скользкий
slope (n.)	откос, склон, уклон
smooth (adj.)	ровный, гладкий
smoothness (n.)	ровность, гладкость
snow fence	снегозащита, снегозащитное заграждение
snowdrift (n.)	снежный занос, сугроб
snowplow (n.)	снеговой плуг, снегоочиститель
soil (n.)	почва
solid (adj.)	твердый, крепкий
solidify (v.)	твердеть, застывать, густеть

solution (n.)	решение
space (n.)	место, пространство
span (n., v.)	пролет (моста); охватывать, простираться
speed bump	искусственная неровность для ограничения скорости движения
spoil bank	кавальер, вал
spot (n.)	точка, место
spread (v.)	распространять, распределять
spread asphalt	укладывать асфальт
stability (n.)	устойчивость
stabilization (n.)	укрепление
stabilize (v.)	укреплять, усиливать
stack (v.)	собирать, складывать, накапливать
stainless steel	нержавеющая сталь
steel (n.)	сталь
steel reinforced	армированный сталью
steepness (n.)	крутизна
stiff (adj.)	жесткий
stockpile (v.)	накапливать, сгружать, делать запасы
stone (n.)	камень
stone concrete	бутобетон, щебеночный бетон
stone slab	каменная плита
storage (n.)	склад, хранилище
store (v.)	хранить
straight (adj.)	прямой
stream (n.)	поток
strength (n.)	прочность, крепость
strengthen (v.)	усиливать, укреплять
stress (n.)	напряжение
strip (n., v.)	полоса; снимать верхний (растительный) слой грунта
structural mechanics	строительная механика
structure (n.)	сооружение, конструкция
subbase (n.)	нижний слой основания дорожного покрытия
subgrade (n.)	подстилающий слой
subject (v.)	подвергать (воздействию, влиянию)
subsoil (n.)	грунт под растительным слоем
substantial (adj.)	существенный, важный, значительный
suitable (adj.)	подходящий
supplement (n.)	добавление, дополнение
supply (v.)	снабжать, поставлять
support (n.,v.)	опора; поддерживать
surface (n.)	поверхность
surface course	верхний слой дорожного покрытия

surface water	поверхностные воды
surfacing	покрытие
survey (n.)	изыскания
suspension (n.)	подвешивание
suspension bridge	подвесной мост
sustain (v.)	выдерживать, выносить
swell (v.)	набухать, разбухать

Tt

tar (n.)	гудрон, деготь
tarmacadam (n.)	дегтебетон
temporary (adj.)	временный
tensile strength	прочность на растяжение
terminate (v.)	кончать(ся), завершать(ся)
terrain (n.)	местность, ландшафт, рельеф
thaw (v.)	таять
thickness(n.)	толщина
thoroughly (adv.)	тщательно
toll road	платная автодорога
topsoil	верхний слой почвы
top speed	предельная (максимальная) скорость
tough (adj.)	вязкий, прочный, жесткий
tower (n.)	башня, пилон, опора
traction (n.)	сила сцепления
trade (n.)	торговля
traffic (n.)	движение
traffic accident	дорожно-транспортное происшествие, авария
traffic flow	транспортный поток
traffic jam	пробка, затор
traffic lights	светофор
traffic sign	дорожный знак
traffic volume	плотность, интенсивность движения
traffic warden	инспектор дорожного движения
transverse (adj.)	поперечный
transparent (adj.)	прозрачный, светопроницаемый
transport (n., v.)	транспорт; перевозить, перемещать
trash (n.)	мусор
treat (v.)	обрабатывать, воздействовать
trench (n.)	канава
truck (n.)	грузовая машина
trunk road	магистральная дорога
turn (n., v.)	поворот; поворачивать
tyre (tire) (n.)	шина
tyre friction	сцепление шины с дорожным покрытием

Uu

underpass (n.)	дорога под путепроводом
undulation (n.)	волнистость
uniformity (n.)	единообразие, согласованность
unit (n.)	элемент, единица
upgrade (n.)	подъем
urban (adj.)	городской
utilize (v.)	использовать, утилизировать
U-turn (n.)	разворот

Vv

valuable (adj.)	ценный
variable (adj.)	изменчивый, непостоянный
vary (v.)	изменять(ся), варьировать(ся)
vegetation (n.)	растительность
vehicle (n.)	транспортное средство
velocity (n.)	скорость
versatile (adj.)	многоцелевой, универсальный
vertical gradient	вертикальный градиент
vibratory road roller	вибрационный дорожный каток
visibility (n.)	видимость
volume (n.)	объем
vulnerable (adj.)	ранимый, уязвимый

Ww

wagon (n.)	повозка, подвода
walking	ходьба
warn (n.)	предупреждать
warning road sign	предупреждающий дорожный знак
wastes (n.)	отбросы, отходы
waterproof (adj.)	водонепроницаемый, водостойкий
waterproofing	гидроизоляция
wayside (n.)	придорожная полоса, обочина
wealth (n.)	богатство
wear (n., v.)	износ, истирание; изнашивать
wearing course	верхний слой дорожного покрытия (слой износа)
weave (v.)	перестраиваться в другой ряд движения
wheel (n.)	колесо
wheel load	нагрузка на колесо
width (n.)	ширина
withstand (v.)	выдерживать
workability (n.)	применимость, годность; работоспособность

ПРИЛОЖЕНИЕ В

Irregular verbs
Неправильные (нестандартные) глаголы

Infinitive (I форма)	Past Indefinite (II форма)	Participle II (III форма)	Перевод
be	was, were	been	быть
become	became	become	становиться
begin	began	begun	начинать(ся)
break	broke	broken	ломать
bring	brought	brought	приносить
build	built	built	строить
burn	burnt	burnt	гореть, жечь
buy	bought	bought	покупать
choose	chose	chosen	выбирать
come	came	come	приходить
cut	cut	cut	резать
do	did	done	делать
draw	drew	drawn	тащить, рисовать
drink	drank	drunk	пить
drive	drove	driven	везти, ехать
eat	ate	eaten	есть
fall	fell	fallen	падать
feel	felt	felt	чувствовать
fight	fought	fought	бороться
find	found	found	находить
fly	flew	flown	летать
forget	forgot	forgotten	забывать
get	got	got	получать, становиться
give	gave	given	давать
go	went	gone	идти, ехать
grow	grew	grown	расти, выращивать
hang	hung	hung	вешать
have	had	had	иметь
hear	heard	heard	слышать
hold	held	held	держать
keep	kept	kept	хранить
know	knew	known	знать

lead	led	led	вести
learn	learnt, learned	learnt, learned	учить(ся)
leave	left	left	оставлять
let	let	let	позволять
light	lit	lit	зажигать
lose	lost	lost	терять
make	made	made	делать
mean	meant	meant	значить
meet	met	met	встречать
put	put	put	класть
read	read [red]	read [red]	читать
ring	rang	rung	звонить
run	ran	run	бежать
say	said	said	сказать, говорить
see	saw	seen	видеть
sell	sold	sold	продавать
send	sent	sent	посылать
set	set	set	помещать, класть
show	showed	shown	показывать
shut	shut	shut	закрывать
sing	sang	sung	петь
sit	sat	sat	сидеть
sleep	slept	slept	спать
speak	spoke	spoken	говорить
spend	spent	spent	тратить, проводить
stand	stood	stood	стоять
swim	swam	swam	плавать
take	took	taken	брать
teach	taught	taught	учить, обучать
tell	told	told	сказать
think	thought	thought	думать
throw	threw	thrown	бросать
understand	understood	understood	понимать
win	won	won	выигрывать
write	wrote	written	писать

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