**Казанский (Приволжский) федеральный университет**
**Филиал Казанского федерального университета в г. Чистополе**

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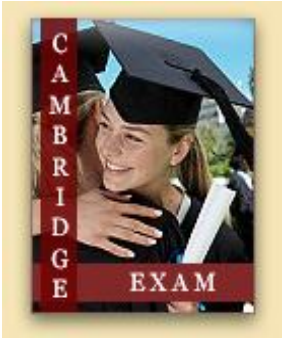
# Иностранный язык в профессиональной сфере

Конспект практических занятий




Казань-2013

**Сафиуллина Р.Р**.
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Аннотация

Дисциплина « Иностранный язык в профессиональной сфере» основывается на образовательный учебно-методический комплекс «*Cambridge English for Engineering.Professional* » - Издательство: Кэмбридж -2009 - / автор: Mark Ibbotson - Cambridge University Press, 2009 Технология имеет следующую комплектацию: Class CD ( 2 parts) - аудиторный аудио-диск ( 2 части), Student`s Book - Пособие для студента: Workbook- Рабочая Тетрадь, Student`s CD- Персональный CD-ROM, Tests-Тестовые задания для самопроверки. В основу образовательной технологии положен коммуникативный и межкультурно- компетентностный подход и самые новые идеи, поэтому этот курс подготовит студентов- инженеров-механиков, авиаторов, строителей, автомобилестроителей к общению в профессиональных ситуациях. Освоению глоссарием и речевых структур отводится одинаковое место, а также значительное внимание уделяется слушанию и разговорным заданиям, просмотру видеосюжета, в которых смоделированы реальные профессиональные задачи. Цель применения образовательных технологий – оптимизация репродуктивных видов речевой деятельности; преобразование традиционного учебного процесса на поисковую учебно-познавательную деятельность. Данный курс полностью отвечает Общей европейской системе стандарта обучения языкам(English for Specific Purposes)

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## Тема 1.Используемые технологии Unit 1. Technology in use

1.1. Опорный текст

1.2.Глоссарий технических терминов

1.3Построение диалогической, монологической речи

1.4. Аудио и видео практика. Самоконтроль знаний .

**1.5. Контроль знаний**

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***Методические рекомендации***

-1.

Paula: Obviously navigation is the primary application of most GPS devices.

Jo: Sure.

Paula: Then you've got associated applications, uses that are related to navigating, such as tracking systems you can use for monitoring delivery vehicles and findings stolen cars, that kind of thing.

Jo: Mm.

Paula: And then there are more creative features. A good example would be on a boat GPS, you get drift alarms. So if the anchor starts to drag and the boat starts moving, there's a setting on the GPS that allows it to detect the movement and an alarm sounds to warn you, and prevents the boat from drifting unnoticed.

Jo: I see.

Paula: Or another example on boat systems is man overboard buttons. So if you're sailing along and someone falls into the sea,you hit a button, which logs the position and ensures that you don't lose track of where you were, which then enables you to turn round and come back to the same point and find the peBon.

Jo: Right.

Paula: So, these are the kinds of applications we want to develop, more specialised, and more creative.

Jo: So, effective|y you're not ta|king about technicailn novations. What you'rer eally looking for is innovative ways of actually using the technology.

Paula: Precisely. Because these days, from the end-users point of view, accuracy is no longer the main selling point. Most devices are accurate enough.The key is to make them more useful. So in terms of development that's the kind of ...

- 2.

James: The engineering challenge of connecting a satellite to earth us inga cable is,obviously, significant. In order to support its own weight, and be securely attached at each end, the cable would require a phenomenasl trength-to-weight ratio.Carbonnan tube materials might, one day, be up to the job. And l'll talk about those in detail later on. How could vehicles b e raised into space, up the cable? Well, using a self-contained energy source would be problematic due to the weight of fuel or batteries required to power the vehicle. There are two possible ways round this problem: transmittinge lectricity wirelessly, or using solar power.The first techniqueis only in the early stages of research. The second would allow the vehicle to ascend only very slowly,thought his wouldn'tn ecessarilyb e a problem,as the car could be controlled remotely, allowing it to transport pay loads as an unmanned vehicle.

-3

James: The ofthore base station would be supported by a floating structure, which could

be attached to the seabed by anchors. Payloads could be carried from the shore to the station by ship before being lifted into orbit. The main advantage of a floating mobile station, rather than a fixed base on land, would be to help reduce the risk of a collision between the cable and one of the many lumps of space debris such as redundant satellites that litter orbital space. Based o n careful monitoring of debris movements, i n the case of an alert the station's anchors could be raised and the station could be moved, driven by propellers, to a new location out of harm's way.
-4
Richard: As you can see, we've started work on the substructure in, other words, the part of the structure thats belowg round level.The foundation as reconcrete piles. Basicallya, pile is a column going down into the ground. And we're using what we call bored in situ concrete,in other words, we bore, or drill a hole in the ground,and concrete's poured in insitu, which means i t's actually poured on the construction site, in its final position. An alternative is to use what we refer to as ore-cast driven oiles. Precast refers to the fact that the oiles are made at a factory away from the site, before being delivered. They're then driven into the ground. They're hammered in with a piled river which, put simply,is iust like a gianth ammer . And they don't iust drive in piles, they drive everyone mad with the constant boom-boom-boom all day long. So, thankfully for our ears, w e're not using that technique. Instead we're boring the piles. The pile a ugero vert here i s effectivelj yu st like a giant drill. As it drills into the ground, we pump a special liquid called bentonitein to the hole. Essentially it's a kind of clays uspensiona, sort of mud. And that prevents the walls of the holef rom collapsing in wards. So when the hole's finished,it 's full of bentonite. lt looks just like a big muddy puddle on the ground. Obviously , it 's not a good idea to step in one, like a colleague of mine once did, and then had to drive home in his underpants for a change of clothes. So, once the hole's been bored and filled with bentonite, they lower in some steel reinforcement. And then concrete's pumped in. And because the concrete is denser than the bentonite, it displaces . So, in simple terms, if you picture a glass full of water and imagine pouring concrete in to the glass, the water would overflow and you'd end up with a glass full of concrete. So, that's piling. lf anyone has any uestions, by the way, j ust ...

## 1.2. Глоссарий технических терминов

| | |
|---|---|
| bearing | mechanism containing balls or rollers placed around a component which spins, e.g. a shaft, to reduce friction |
| belt (drive belt) | closed band placed around two or more wheels (pulleys)a, llowingo ne wheel to drive the other(s)<br>rope made of many wires, usually metal |
| cable | rope made of many wires, usually metal |
| component | individual part of an assembly/mechanism |
| electromagnetic | наnuses an e\|ectrically generated magnetic fie\|d |
| foundation | base supporting a building or structure, usually made of concrete |
| gears | wheels with cogs (teeth) which mesh together to transfer drive from |

| | |
|---|---|
| | one wheel to the other where the<br>wheels are side by side |
| inertia | the resistance of an obtect to acceleration or deceleration due to its mass |
| lubricant | \|iquid or viscous so\|id (e.g. oil) used to reducef riction betweenm ovingp arts whose surHacesa re touching |
| (electric)motor | device which transforms electrical energy into rotary motion |
| pile | foundation comprising a vertical column of concrete in the ground |
| propeller | device with spinning blades used to push boats or aircraft through water or air |
| reinforcement | networkso ffibres or bars placed inside a materialt o strengtheni t, e.g.s teel reinforcementin concrete |
| remote control | system used to control a device or vehicle from a distance, usually via a wireless connection |
| sheave | alternative term for pulley (see bert above) |
| solar power | energy from sunlight converted into electrical energy |
| strength-to-weight ratio | toughness of a materia\|( abi\|ity to resist breaking)re\|ative to its density (density = masнvo\|ume) |
| structural engineer | engineer specialising in the design of structures, e.g. bridges |
| wind load | force exerted on a structure by the wind |
| wireless | signal transmission without a physical connection by wire, e.g. by radio waves or infrared waves |
| | |
| | |

**1.3** Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

**Complete the following extracts from the discussion with words that come from *use***

1 Then Aou've got associated applications, - thot are reloted to navigating...

2 ... traclsing sAstems Aou can for monitoring deliverg vehicles ...

3 . .. from the end-- point of view, accuracg is no longer the main selling point. Most devices are accurate enough. The keg is to make them more associated applications more creative features (4)

**2.Match the GPS applications (1-6) to the descriptions (a-fl**.

| | |
|---|---|
| 1 topographicasl urveying- | a naьgation and safet1ar t sea |
| 2 geotogicael. exploration | b settingo ut positionsa nd levetso f news tructures |
| 3 city engineering | \ c mapping surhce features |
| 4 avionicse quipment | d apptications in mininga nd the oil industry |
| 5 maritime applications | e highway navigation and vehicte tracking |
| 6 GPs in cars and trucks | f air traffic control, naьgation and autopilot systems |

**1.** In pairs, explain the main functions and applications of a product made by your company or a product you know about. Student A, you are an engineering manager; Student B, you are a new employee. Use the language from this section and the phrases in the box. Swap roles and practise again.

**I see. 5o ... 0K. In other words ... So vou mean ...**

**4.ln pairs, look at the picture and discuss the following questions.**

- How do you think a space elevator would work?
. What could it be used for?
. What technical challenges would it face?
- How seriously do you think the concept of space elevators is being taken at present?

**5.Read the following article and compare it to your answers**

lN his 1979 novel, The Fountains of Paradise, Arthur C Clarke wrote about an elevator connecting the earth's surface to space. Three decades later,this science-fiction concept is preparing to take off in the real world. NASA has launched the Space Elevator Challenge, a competition with a generous prize fund, and several teams and companies are working on serious research projects aimed at winning it . As its name suggests, a space elevator is designed to Haiset hings into space' Satellites components H or spaceships, supp|ies H or astronauts t n spacestations , and even astronauts themselves are examples of payloads that could be transported into or be without the need

How e xpIosive and environmentaIuly rockets. However, th e altitude of orbital space -a colossal 3 5,790 km above the earth - is a measure of the challenge facing engineers. H ow could such a heightb e reached? The answer i s by using an incredibly strong and lightweightable,strong enough to support its own weight and a heavy load' The design such a cable is still largely theoretical. This would be attached to a base station o n earth a t one end and a satellite in geostationary orbit (lixed above a point on the equator) at the other. Lift vehicles would then ascend and descend the cable, powered by electromagnetic force and controlled remotely.

C Match the verbs (l -9) from the text to the definitions (a-i).

1 connecting
2 raise

3 transported
4 support
5 attached
6 ascend
7 descend
8 powered
9 controlled

a carried (objects, over a distance)
b hold something firmty/ beari ts weight
c climb down
d provided with energy / moved by a force
e joining
f driven / have movement directed
g fixed
h climb up
i lift / make something go up

**1.4** Аудио и видео практика. Самоконтроль знаний .

Выполнить задания стр 12-13 **ссылка Student`s Book** *Cambridge English for Engineering(Mark Ibbotson)*

**Контроль знаний –**
**Расскажи**

-Describing technical functions and applications
-Explaining how technology works
-Emphasising technical advantages
-Simplifying and illustrating technical explanations

## Unit 2. Технологические материалы Materials technology

2.1 Опорные тексты

2.2.Глоссарий технических терминов

2.3Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

2.4.Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

**2.5 Контроль знаний**

**Расскажи**

-Describing specific materials
-Categorising materials
-Specifying a nd describing properties
- Discussingq utality issues

**2/1-**

**Irina**: The only way to assess the environmental impact of a given material properly is to carry out an environmental audit and analyse the total impact of that material on the environment.
I emphasise total impact because it's all too easy to judge materials and products on single aspects of their ecological impact. As an example, if we compare traditional and energysaving light bulbs it's tempting to say energysaving ones are better because they consume less energy. In fact, that's only part of the picture. That's just the in-use phase. You also need to consider the pre-use phase - in other words, the Environment aim impact of mining the materials used to make the bulbs, of transporting those materials to the factory, of manufacturing them et cetera. Then there's the post-use phase. How easy is it to recycle spent bulbs? And when you start to consider all of these factors, suddenly the comparison between classic bulbs and their energy-saving equivalents becomes much less clear-cut. Some of the materials used in energy-saving lights are problematic from an Environment.
S o the point is, it's essential to look at the whole picture. And doing that can be quite a complex task, as we'll see later on.

**2-**

Sophia:O K, so steel bodywork versus aluminium bodywork.
Fete:What about p re-use th en?
Sophia: Well, I think it takes a lot of energy to produce aluminium, compared with steel,
Because aluminium's made by electrolysis.
Pete: Yeah. So steel's better, presumably.
Sophia: I think so, yeah. But, hang on a minute, with aluminium, it depends how much i s derived from ore, and how much is recovered from recycled material. As far as I know recycling aluminium takes less energy. So I'm not really sure.
Pete: Presumably, it'll be mixed, won't it? For a given batch, there'll be so much new material,
and so much recycled material.
Sophia:P robably , yeah. O K, so that needs t o be researched then.
Pete: ls car bodywork galvanised when it's made from steel?
Sophia:U m ... good question.I 'm not sure.
Pete: lf it is, if it has to be coated with zinc, then that would take extra material and extra energy. So that's an importantc onsideration.

Sophia: Mm, true. OK, so that's another question to note.
Pete:Then there's the energy consumed when they're transporting bulk metal to the car plant.
Sophia:Presumably aluminium takes less energy to transport, being lighter.
Pete: I'd say so, yeah.
Sophia: OK. What about manufacturing?
Pete: W ell, aluminium would be lighter to handle, wouldn't i t? lt probably t akes less energy to cut, as well.
Sophia:Y eah. Not sure whether it takes less energy to weld, compared with steel.
Pete: Good question. Another thing to check out.
Sophia: M m, what about i n-use then? I assume aluminium's better because i t's lighters, o you consume less fuel.
Pete: Yeah. And it should last longer, a s well.
Sophia: Mm, is that an environmental consideration, though?
Pete: Well, yeah, because if things last longer, they need to be manufactured less often. So you use less energy.
Sophia: True. B ut then,is the lifespan of a car determined by the life of its bodywork?
Pete: Ah. Cood point.
Sophia:l t's usually determined by the chassis, or the engine,is n'ti t?
Pete: ls it?
Sophia: Mm, another one to be researched.
Pete: OK, what about post-use,then?
**- 2.3**
Tom: Speaking as an engineer, Louisa, my view is that all the materials we use should be genuinely suitablef or making watches, and not just chosen as marketing gimmicks. We're often guilty, in my view of using exotic-sounding materials that are not particularly suitable from a technical standpoint.
Louisa: Yeah, I know what you mean.
Tom: A good example was that debate we had on whether to use submarine-grade steel in Some models, to give the impression that they're exceptionally resistant to water. O K, submarine steel's good at withstanding the pressure of
Being a mile beneath the sea. B ut it's heavy. Lf it's not coated, its corrosion resistance is not that good, at least compared with other metals like titanium.lt 's also fairly poor in terms of looks, in my view. Water resistance isn't a question of metal quality, it 's about the quality of the joints and seals you use. So, as a watch material, for me,i t's not at all suitable. Tremendously marketable. I' m sure, but ...
Louisa: Hm. No, I take your point. But I think it's fair to say that we've never chosen a material for marketing reasons that's insufticiently durable or not adequately built in anyway.
Tom: O h, no. No, if anything, it 's been the reverse. We've used materials that are over the top, so they can be described with superlatives in advertising.
Louisa: H m. ldeally,we should b e usings tuff that's good for watches and good for marketing as well.
Tom: Sure. But that's easier said than done. I mean, a lot of the materials that are ideal for the job, in terms of scratch-resistance, shock-resistance and all the rest of it, are either pretty ordinary, or their compositions are relatively complex, and they've got complicated names which means they're not all that good for
marketing.That's the problem.
Louisa: Sure. But the other problem is, consumers are not technical experts, and they make

choices based on their impressions, rather than based on facts. Thats a hard commercial fact, as hard as submarine steel.
Tom: No, I accept that.
Louisa: So what should our approach be? lt's
Obviously not an easy question. ..

Jan: When you look at the various types of plugs and sockets in different countries, most
Designs have a basic layout that's existed for decades,in terms of the way the pins are laid out, and the profile of the pins. And as a manufacturer, the position of our company has always been,basically, to accept that we're stuck with several standard configurations,and to effectively say to customers, we produce all the main formats- take whichever one you want. However (as I'm sure you know many countries use plugs and sockets of more than one format. And this leads to a comparative situation, with some configurations becoming more
popular, and others progressively being abandoned.This is particularly true in countries
undergoing rapid economic expansion. And because of this process of selection, we're finding that big customers are increasingly asking us which of the standard plug and socket formats in current use we recommend as a manufacturer. Which are the best from a
technical standpoint? Up until now we haven't had a standardized company policy t o allow us to respond to that question properly. But this project aims t o formulate a company
policy that allows us to say these are the configurations we recommend, and these are the technical reasons why w e recommend them.
-3.2
I
Erin: On this one, there are circular pins for live and neutral.There's n o earth pin.This is quite a common format in Europe and Russia. lt's also quite widely used in India.
Erin: Here, you've got circular slots for live and neutral. And the earth slot's got a flat base with one side rounded over t o forma semi-circle. This type's only used in a few places.
3
Erin: This one has rectangular blades for live, neutral and earth, i n triangular configuration.
This is the standard in the UK and lreland, and a few other places, Malaysia and Singapore, for instance

**2.2. Глоссарий технических терминов**

**Aggregate**- solid particles or lumps of material used in a mixture, e.g. sand and gravel in concrete

**Automotive-** related to vehicle design and manulacturing

**Blade**- cutting device, often metal with a sharp or toothed edge

**Cemen**t- lime-based powder mixed with water to make concrete

**Chassis**- base of a vehicle to which all main components are fixed

**composite** (material)- combined materials; consists of a bulk material (called a matrix) reinforced with fibres or bars, e.g. glassreinforced

**conductor**- material that conduct (carries le lectricityo r heat - in engineering, usually refiers to an electrical conductor

**electrolysis**- passing an electrical current through a liquid or solid in order to separate chemical compounds

**exhaust-** system for evacuating smoke or gases, e.g. from an engine

**galvanized**- coated with zinc - used to protect steel from corrosion (rusting)

**insulation**- protective layer to prevent or reduce conduction of heat or electricity

**ironmongery**- collective term for small metal items commonly used in buildings, e.g. door handles, hinges, screws, nails

**kinetic energy**- energy in the form of movement, e.g. a spinning wheel

**melt down**- change a solid substance into a liquid by heating it

**membrane**- thin layer of material, often acting as a barrier, e.g. to prevent water passing

**puncture**- hole causing a leak of air or liquid, e.g. in a tyre

**rust**- common name br iron oxide - produced when iron corrodes as a result of exposure to air and water
**scrap**- used/recovered material intended for recycling; often refers to metal

2.3. Построение диалогической, монологической речи

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите письменно

HERMAN HELMHOLTZ (1821-1894)

1.Herman Helmholtz is celebrated for his contributions to Physiology and theoretical physics .A delicate child ,Helmholtz early displayed a passion for understanding things, but otherwise developed slowly , and had no marked early talent for mathematics . Although he wised to study physics, he was persuaded by his father to take up the study of medicine, entering the Medical Institute at Berlin in 1838.

2.His researches into physiological optics began about 1850 with the discovery of the ophtalmoscope (1851) followed by investigations into colour , including the problem of colour –blindness. He also made fundamental contribution to the understanding of the structure and mechanism of the human eye.

3.Helmholtz`s first and most celebrated paper in theoretical physics was his article on the conservation of force. In this paper he proved the conservation of total energy of a system of particles which were interacting through central forces depending only on the masses and separations of the particles.

Other important work in theoretical physics included the famous paper on vortex motion (1858), and the application of the principle of least action to electrodynamical problems.

4.Helmholtz was undoubtedly the most versatile of nineteenth- century scientists. From 1871 onwards he was perhaps more famous as a theoretical physicist than as a physiologist. But it seems probably that apart from his work on the conservation of energy he will ultimately be remembered more for his epoch- making researches in physiological optics and acoustics in which his talent as a physiologist, physicist , mathematician and experimentalist of genius were most vividly displayed.

Прочтите 4-й абзац и вопрос к нему. Из приведенных вариантов ответа укажите номер предложения, содержащего правильный ответ на поставленный вопрос:

For what researches will Helmholtz be remembered ?

1. …….for his celebrated paper in theoretical physics .

2 .. for his epoch- making researches in physiological optics and acoustics

3…. for his famous paper on vortex motion.

2.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

2.5 **Контроль знаний**

**Расскажи**

-Describing specific materials
-Categorising materials
-Specifying a nd describing properties
- Discussingq utality issues

## Unit 3. Компоненты и конвейеры Components and assemblies

3.1. Опорные тексты
3.2 Глоссарий технических терминов
3.3 Построение диалогической, монологической речи
Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

2.2 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)
**3.5. Контроль знаний Расскажи**

-Describing component shapes and features
- Explaining

3.1.
Erin: Int his configuration,there's a circulars lot at the top. lt'so bviouslya blind hole,i t doesn't go right through. And that's designed to receive the earth pin, which is mounted on the face of the socket.Then there are two plastic ridges, one on either side of the plug casing, and they slot into corresponding grooves at each side of the socket. In addition, the centre of the socket is recessed. So rather than being flush with the front of the socket, on the same face, the circular area that receives the plug is set back from the surrounding casing, i n a recess about I 5mm deep. The live and neutral sockets are also equipped with covers, just inside the opening. These covers only open when pressure is applied to both by the two pins of the plug simultaneously. So we need to look at the advantages of this configuration.. .
**3 . 5**
Andy: In this format the plug slots into the recess in the socket.That allows it to fit in really tightly,compared with other designs.Plus,these ridges and grooves on the sidesi ncrease the amount of friction. That helps it to resist pullout forces even more, so it won't fall out of the socket.
Karin: Yeah, but at the end of the day, how securely do you want it to be retained?l f it's held in too hard,t hat makesi t difficultt o pull out.
Andy: That's true.
Karin: Plus, it could be dangerous. If you're vacuuming enthusiastically to loud music, let's say, and you pull the cord, you actually want the plug to pull out, don't you? Otherwise you might rip the cable half way out of the plug, or the appliance.
Andy: So, really,w e needt o comparet he pull out resistance of all the formats.
Karin:And determine what the ideal resistance is.
Andy: Yeah. OK. Erm, what else can we say about this one? Karin: Well I guess another advantage is, given that the plug's in a recess, if it gets pulled out just a fraction, and the pins are still live,nothing can physically touch them.
Andy: So you think that's more effective than having insulators round the tops of the pins?
Karin: I'd say so, yeah.
Andy: This one's also got covers inside the live and neutral slots.
Karin: Thats a standard feature on more or less every format, though, isn't i t?
Andy: Yeah. But I think it's something w e should look at. I mean, i t's obviously a good thing. Anything that stops children from sticking things in is obviously a good idea.The only problem with this system is, if the mechanism's too sensitive, it makes it difficult to insert the plug,sometimes. And that makes it easy to damage.
Karin: When people try to force it.

Andy: Exactly...
Evan: Most of what we do is sheet metal working. We don't do foundry work - you know, casting and that type of thing. That's obviously a different discipline. But apart from that, we're equipped to do most things to do with metal bashing.
Mr Barrett: That's the technical term for it, is it?
Evan:I 'm not sure what the technical definition of metal bashing would be. A collective Term for hammering, grinding and generally making a lot of noise, probably.
Mr Barrett: lt's actually not that noisy in here,is it?
Evan: No, it's not too bad. We had a specialist firm come in a while ago to measure noise levels at each machine - you know for health and safety regulations.A lot of what we do isn't all that noisy.Things like drilling and milling machines are not too bad, relatively speaking. Anything involving abrasives tends to be noisy, things like grinders, even if they're only hand tools. And that big press over there makes a loud bang when they're shearing steel. lt certainly saves a lot of time,though,compared with flame cutting,or sawing with a grinder blade.
Mr Barrett: So, it's a guillotine?
Evan: That's what we use it for mostly, yes.

**3.8**

Pedro: So, basically, our obiective is to get key suppliers more actively involved in the design Process. So rather than us going to a supplier and saying,we want a specific type of bolt or screw or rivet for connecting these components,can you give us a price? We want to be able to say, we need a way ofjoining this part to this part, what's the best way of fixing them to each other?
Alicia: OK.
Pedro: So it might be that you say, well, actually, instead of bolting this onto the machine, What about using a weld? Or instead of riveting these, how about bonding them with adhesive, or fixing them on with some kind of clip, or whatever, whatever's the most cost-effective solution.
Alicia: Right. But,obviously, we're a supplier of mechanical fixings, so we can only provide a mechanical solution. So if you ask us to design some points, which is obviously quite an involved job,and then,after all that, a rival firm comes along and says, w ell we suggest welding it all together, or gluing it together for half the price,
um, it would mean a lot of work for no return. l'm not saying it's a bad idea. lt's just that we would have to be careful we covered our costs.
Pedro:I appreciate that. But the flip side is, we want to work with fewer suppliers than w e have in the past. So, overall, that problem would be offset by the greater volume of work you'd get.

3.2 Глоссарий технических терминов

gas commonly mixed wth oxygen in welding( oxy-acetylene)
densem aterialu sedt o add weight,e .g.a s a counter-balancoer to resistl ift
plastic strap used to fix several cables together side by side, or to fix cables to a supporting structure
pouringm oltenm ateriali ntoa mould
electricacl onnectionb etweena circuita nd the ground

in a mainse lectricacl ircuit,t he wiret hroughw hichc urrentf lowsi ntoa n appliance- also meansa circuit
is energised( currenits flowing)
collectivete rmf or processesin volvingc utting,d rilling,e tc.
machineW ithc uttingw hee|su sedt o cut awayt he surfaceo f metб|i n thin |ayers
in a mainse lectricacl ircuit,t he wiret houghw hichc urrentf lowso ut of an appliance

3.3. Построение диалогической, монологической речи

Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. 1.Energy can exist in many forms and each form can be transformed into the other.
2. The computers should become an integral part of the organization of industrial processes of all types.
3. These metal parts had to be subjected to x-ray examination.
4. The chemists may use reactor to analyse various substances for their exact composition.

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 2-й и 3-й абзацы.

D.I. Mendeleev (1834-1907)

1. A Russian name appeared in 1964 on the honorary board of science at Bridgeport University. USA Mendeleev was added to the list of the greatest geniuses- Euclid, Archimedes, Copernicus, Galilei, Newton and Lavoisier. Mendeleev, the explorer of nature , is the greatest chemist of the world. The Mendeleev system has served for almost 100 years as a key to discovering new elements and it has retained it`s key capacity until now.
2. Mendeleev was the fourteenth, and last child of the Director of the Gymnasium at Tobolsk. Ay 16 he was taken by his mother to St. Petersburg to seek higher education. He entered the Pedagogical Institute Where his father had also studied. In 1856 he took a degree in chemistry and in 1859 he was sent abroad for two years further training.He returned to St.Petersburg in 1861 as a Professor of Chemistry.3
3. In 1868 Mendeleev began to write a great textbook of chemistry, known in its English translation as the “Principles of Chemistry”. In compiling this, he tried to find some system of classifying the elements- some sixty in all then known- whose properties he was describing. This led him to formulate the Periodic Law , which earned him lasting international fame. He presented it verbally to the Russian Chemical Society in October 1868 and published it in February 1869.
4. In this paper he set out clearly his discovery that if the elements are arranged in order of their atomic weights, chemically related elements appear at regular intervals. The greatness of Mendeleev`s achievement lies in the fact that he had discovered a generalization that not only unified an enormous amount of existing information but pointed the way to further progress.

Прочтите 4-й абзац и вопрос к нему. Из приведенных вариантов ответа укажите номер предложения, содержащего правильный ответ на поставленный вопрос:

What can you say about the greatness of Mendeleev`s discovery?

1. The greatness of Mendeleev`s achievement lies in the fact that his Periodic Table pointed the the way to further progress in Chemistry.
2. Mendeleev had discovered several new elements.
3. Mendeleev created the system of classifying chemical elements .

**3.4.** Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

**3.5. Контроль знаний**

**Расскажи**

-Describing component shapes and features
- Explaining and assessing manufacturing techniques
- Explaining jointing and fixing techniques
-Describing positions of assembled components

## Unit 4. Инженерный дизайн Engineering design

### 4.1. Опорные тексты

Joe: I have a question about the panels on Staircase3 . You know those glass panels around the opening, through D eck C ?
Linda: Um, yes. I know where you mean, yeah.
Joe: Well, I've been looking for a cross-section through the deck, at the stair opening. But I can't find one anywhere.
Linda: lsn't there a note on the general arrangement drawing, with a reference to a section on another drawing?
Joe: I couldn't find one.
Linda: I've got the deck plans out, somewhere on here.What's this?A ir conditionings chematic, that's no good. Ah here we are. Deck plan. Um, no, you're right. There's no section mentioned.
Joe: I mean. in actual fact. what I need is an Elevation, showing all the panelsf rom the front.
I thought that might be referenced on the main section through the stairs.
Linda:There is a full set of drawings for all the internal panelling with details showing exploded views of all the fixing details,and sections through the panel joints. Do you have those?
Joe: Not as far as I know.
Linda:And there's a written specification for the panels, as part of the main spec. That might specify the sizes.
Joe: Those are obviously what I need,t hen.I want to see how many there are, and what size they are. Have those drawings been issued?

**- 4.2**

Pavel: So how wide is this panel at the top?
Joe: Good question. There's no dimension.
Pavel: ls this drawing to scale? lt's one to five. Have y ou got a scale rule? L et's measure it. Lt looks to be about three hundred mil.
Joe: The golden rule is, you shouldn't scale off drawings, though, should you?
Joe: lt's not so bad if it's actual size. on a fullscaled Rawing, but I'd rather not with this. Let's query it. l'll give them another call in the office

**-4.3**

Mei: Basically, the client has said they want a superflat f inish over the entire floor area. That makes it a free movement floor, where vehicles can run anywhere on it. But on the manufacturing process drawings, it shows precisely specified routes for these automated vehicles.So, technically it, should be a defined movement floor, where you can just have a few narrow lanes for the vehicles, which are superflat, and then the rest of the slab is just laid to normal tolerances.
Lewis: Right. S o you're questioning the extra cost of doing everything superflat?
Mei: That's the main thing, yeah. The other thing i s quality. To get the best finish on these superflat floors, it's better to lay narrow widths of slab in fairly long lengths. So, ideally, y ou want lanes, rather than big, wide areas.
Lewis: OK. But maybe they want everywhere to be superflats they can change the layout of the production line in the future.
Mei: Possibly.B ut even if they w ant t o do that,the surface can always be modified at a later date. lt's a thick slab, so there's nothing to stop them grinding a layer off the top. In

fact, we could increase the depth of the steel reinforcemenst lightly when we pour the slab, so there's some extra thickness of concrete over it. so, if they did want to grind a thin layer off a section in future, t hey wouldn't have problems with shallow cover.
Lewis: Right. Well let's look into an alternative design for a defined movement floor
**-4.4**
Leo: So, to sum up. As regards design information flow, a ll preliminary d rawings a re Going to be shown to the senior engineer in charge of each design team. The senior engineers then say whether or not their teams need to receive copies of later revisions.lf they d on't, they w on't receive any further revisions. lf they do, they'll be issued with every subsequent revision and, later,revlsions of working drawings. To coordinate the interface between mechanical and electrical design, I 'm going t o appoint a mechanical and electrical coordinator responsible for liaising between the senior engineers in the teams, r eporting to me. W e're locating all three design teams in a single,open-plan office so when anyone's got a question or a problem, they can talk to the appropriate person face-to-face. We still have scheduled to discuss formal issues, b ut the emphasis will be on ongoing, informal dialogue between the teams.

4.2 Глоссарий технических терминов

**Black bolt**- in constructional, ordinary bolt
**Cable tray**- long metal plate on which cables are laid – designed to support large number of cables
**Column**-vertical support in a structure
**construction joint** - ioint between two sections of concrete that were poured at different times (where concrete structures are poured in several stages)
**duct**-large section pipe, with a circular or square profile, for carrying air; or a protective cover for cables or hoses
**fabrication**-making/assembling, often used to describe metalwork
fixing-collective term ficr bolts, screws, rivets and clips
**[HSFG) bolt** -high strength friction bolt which holds plates together by friction (gripping them tightly together) rather than by shear force

**M&E** - abbreviationf or mechanical and electrical - in construction,r efers t o electrical installations, w ater pipes,air-conditioning et,c .
**pour concrete**- Dlace/castc oncrete
**Slab**-large flat area of concrete, for a floor or roof

4.3 Построение диалогической, монологической речи
Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

4.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 2-й и 3-й абзацы.

LISE MEITNER ( 1878-1968 )

1. 1. In 1938, an Austrian physicist named Lise Meitner announced the splitting of the atom in the laboratory. That announcement confirmed once again the beginning of the Atomic Age. At that time Lise Meitner was one of the few persons in the world who had a thorough understanding of atomic energy and the uses which could be made of this great power.
2. Lise Meitner , The daughter of a lawyer , was born on the 17th of November 1878. She grew interested in science when she read of the Curies` discovery of radium. The example of Marie Curie showed that a woman was able to achieve something in science. Lise Meitner became the first woman in the history of the University of Vienna who earned her doctorate in physics.
3. In 1906 she went to the University of Berlin to continue her studies by attending the theoretical lectures of Max Planck and by doing experimental work. There she began her research in the new field of radioactivity. She focused her attention on the behavior of beta radiation from radioactive elements , experimenting with the primitive methods then available for measuring and analyzing radioactivity. Meitner`s work in the 1920s and early 1930s emphasized the physical aspects of radioactivity.
4. In 1938 she left Germany for Sweden Lise Meitner declined to work on the development of the atom bomb remaining in Sweden throughout the war. She was concerned with the properties of new radioactive isotopes, produced by the cyclotron. Her career was illustrious and productive ( she published more than 135 scientific papers), but throughout it she remained ashy person , with a deep interest in music. Her devotion to science had been total. She never married. In 1960 she moved to Cambridge, England, where she died in 1968.

Прочтите 4-й абзац и вопрос к нему. Из приведенных вариантов ответа укажите номер предложения, содержащего правильный ответ на поставленный вопрос

Why can we say that Lise Meitner `s career was illustrious and productive ?

1. …because she was concerned with the study of thermal conductivity in non-homogeneous bodies.
2. …because she published more than 135 scientific papers.
3. …because she was measuring and analyzing radioactivity

**Контроль знаний**
**Расскажи**

Working with drawings
Discussing dimension and precision
Describing design phases and procedures
Resolving design problems

## Unit 5. Исправление ошибок. Breaking point

5.1 Опорные тексты

Al: So what does the warning message say?
Mr Rooney: When you start the engine, it says check injection.
Al: Right.
Mr Rooney: Obviously, it must be some sort of defect in the fuel injection system. The thing is,though, i t only happens intermittently.
Sometimes, you start it and there's no message at all. So it might be a software problem,I don't know. Or maybe it could be a defective sensor.
Al: ls the engine working properly?
Mr Rooney: lt seems to be fine, yeah.
Al: lt doesn't appear t o be misfiring or down on power?
Mr Rooney: No, we haven't noticed anything. Presumably, it can't be anything too serious. W e thought it was possibly water in the fuel system because it's an outdoor unit. But in that case,I assume there'd be major problems with it.
Al: Has it been refuelled recently?
Mr Rooney: Not that recently.
Al: And was it refueled w th diesels tored in your own tank, o r directly from a delivery tanker?
Mr Rooney: From a tanker truck.
Al: I doubt it's water then. if the fuel went in directly from a delivery. You said the warning doesn't display systematically?
Mr Rooney: No.
Al: ln what sort of circumstances does it come up?
Mr Rooney: Well, when you start it up for the first time each day, it comes up. But then if you stop it, and start it again a short time after, there's no message. lt's when it's been off for a long time that you get the warning.
Al: oK. So it's certainly a question of temperature. lt only comes up when it's started from cold?
Mr Rooney: Um, yeah. Exactly.
Al: Hm, it sounds like it's a faulty fuel pre-heater. It'sp robably just one of the pre-heater plugs that's gone. lt's only a minor fault.
Mr Rooney: Oh, right. So it doesn't need urgent attention?
Al: No. lt can be replaced at the next service. Keep an eye on it, though. lf any other problems start to show up, give us a call and we'll send someone over.
-5.2
Alan: Hello.
Julia: Hello, Alan, it'sJ ulia. I 've just started a landing gear check and found a bit of a problem with some tyres. All the pressures on one of the wing blocks are well down.
Alan: On the same block?
Julia: Yeah. On all the other blocks they're correct. S o it seems odd that this one group of tyres, on one corner of the aircraft, are all low. And the strange thing is, they're down by exactly the same amount on every tyre on the block.
Alan: I see. You're right, that is unusual.
Julia: The wear rate's consistent across the whole aircraft, though.There's n othing unusual about the wear pattern.
Alan: Are you sure the pressure gauge is working properly?
Julia: Um, well, to be honest you can tell just by looking at the tyrest hat they're down.

Alan: Right. Let me come out and have a look.
**-5.5**
Paul: O K, let's have a look at the coolant,f irst. The level'sO K.
Eric:l t's full of residue, though ,by the look of it.
Paul: lt looks a bit black, doesn't it? Time to change it, I think.
Eric: OK. What's the filter like?
Paul: U m ... it looks reasonable to me.
Eric: ls it due to be changed?
Paul: lt is if we follow the service programme to the letter.The trouble is, if you do that,y ou end up wasting parts half of the time.
Eric: We can take it out and give it a bit of a clean. lt'll be alright.
Paul: OK. Blades, next. Hm, they look more or less OK to me. There are no signs of damage.
Eric: Yeah. No need to change those. They'll have moved a bit since they were last checked, though. The alignment will need to be looked at.
Paul: Sure.
Eric: Apart from that, it's not looking too bad.

## 5.2 Глоссарий технических терминов

**Clearance**- distance between components designed to fit together closely
**Clutch**- friction mechanism allowing engine motion to be transferred to wheels progressively
**Coolant**- liquid in a cooling system
**Drag**- resistance to movement through a gas or liquid,e .g.when a plane moves through the air
**electrical contact** -point where two electrical conductors are connected
**engine** -often refers to an internal combustion engine - i.e. one which burns petrol or diesel
**fan**- spinningd evicew ithb ladesu sedt o generatea flowo f air
**filter** -material with small holes located i n a flow of gas or liquid;used t o block solid particles e, .g.t o prevent them from damaging a sensitive mechanism such as a pump
**flaps** – moveable panels on aircraft wings which increase lift t o assist low speed f light' eg. during take.off landing
**fly-by-wire** - aircraftc ontrolsw hicho perate moveabled evices( e.9.f laps)e lectronicallyr, ather than mechanically
**fuel iniection** - system for injecting fuel vapour into the piston cylinder of an engine
temperature gauge device which shows a temperature reading
**gearbox**- case containing shafts w ith gears 'usually w ith a gearshift mechanism, lowing gears t o be moved t o change between different gear ratios
**hyudraulics**- high-pressured circuits used t o push pistons called hydraulic rams
**isolate-** separate an electrical component or part of a circuit from t he rest of the circuit- e.g.b y opening a switch - to prevent electricity from flowing through it
**landing gear** - wheels of an aircraft
**loose connection-** electrical connection that is not fully tight, often causing the circuit to be broken,preventing current from flowing

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 2-й и 3-й абзацы.

CH.V. RAMAN (1888-1970)

1. Raman was an Indian physicist, pre- eminent in molecular spectroscopy and acoustics. He created the Indian Academy of Science in1934 and was its president until his death in 1970. He was justly considered a father of Indian science and the Indian Government honoured him with the first of its National Professorships. In 1957 he became an International Lenin Peace Prize Winner.
2. The son of a teacher and lecturer ,Raman entered the College in Madras in 1903 and achieved the highest distinctions for scientific degrees. As scientific research was at this time almost completely neglected in India, then he entered the Civil Service and was appointed to a position in the Finance Department in 1907. He retained his employment for 10 years, mostly in Calcutta. When he was eighteen years old , he continued scientific work , his name became familiar to scientists in Europe and America.
3. In 1997 Raman was offered the professorship of Physics at the Calcutta University. He occupied the chair from 1917 to 1933. Raman brought to Calcutta many talented young Indians to undertake research into optical phenomena, acoustics and other branches of physics.
4. During the years in Calcutta Raman emerged as a truly international figure. In 1930 he was awarded the Nobel Prize in Physics (for his work on the scattering of light and the discovery of the effect named after him). Raman was honoured by universities and scientists in the Soviet Union and America as well as in his own country.
5.

Прочтите 4-й абзац и вопрос к нему. Из приведенных вариантов ответа укажите номер предложения, содержащего правильный ответ на поставленный вопрос

Why was Raman honored by many universities and scientific institutions of different countries?

1. …because he was awarded the Nobel Prize in Physics.
2. …because he brought to Calcutta many talented young Indians.
3. …because of for his work on the scattering of light and the discovery of the effect named after him.

**5.3** Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

5.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

**5.5 Контроль знаний**

Describing types of technical problem
Assessing and interpreting faults
Describing the causes of faults Discussing repairs and maintenance

## Unit 6. Технический прогресс Technical development

### 6.1 Опорные тексты

. 1
Claudia: So with regard to the capacity, in terms of the number of people it actually needs t o carry, what sort of figure are you looking at?
Kevin: Um, 36 is what we're aiming for.
Dave: lf you think we can add a few seats without making compromises, th en by all means, let's look at it.
Kevin: I think 36 is going to be at the top end as far as size is concerned.
Claudia: And as regards the graphics, is the
video sequence finalised? Will it be exactly as it is on this DVD?
Kevin:Unless you have any problems g enerating the physical effects that go with it, then,yeah, as far as we're concerned, that's it.
Claudia: Right,excellent. We can startl ooking a t that straight away then, and get things moving. Um, so regarding the schedule, then, what sort of timescale do you have i n mind,
for the whole project?

2-
Rick:lt obviously has to be lifted with a crane.
Gabriella: Yes, but do the slings necessarily have to pass under the base? Why not come up with a way of hooking onto the side of the statue?
Rick: How?
Gabriella: Well, couldn't we drill into it, horizontally an d insert bars into the holes? Then hook onto the bars.
Rick: People would see the holes afterwards, though.
Cabriella:W e could fill all the holes,couldn't w e? Surely they could use some sort of filler that's the same colour as the stone.
Rick They'd never hide the holes completely, though l t would still leave marks,wouldn't it ? I don't think that would be acceotable.
Gabriella: Or, alternatively, we could m ake sure the holes were out of sight. What about drilling into the top, vertically? lf the holes were right on the top,t hey'd be less visible.
Then the bars could be set in, with lifting eyes on the end.
Rick: Hmm. The trouble is, if the bars were set in with resin, they'd never come out. They'd have to be cut off, wouldn't they? And this mammoth's lying down, so the top will probably be seen, to an extent.
Gabriella: True.
Rick: To be honest, I don't think we can envisage drilling into it. I suppose another option would be to use some sort of grab, on the end of the crane jib. You know, like the ones they use for off loading lorries. So, the statue would be held by friction. But I can'ti maginet here
b eing anything capable of lifting 3 6 tonnes. Especially not something that wide.
Gabriella: Hm, no. Have you spoken to the masons about this?
Rick: Not yet, no.
Gabriella: Why don't we ask them?
-3-

Viktor: In terms of cost, performing is obviously a lot cheaper, because all you need are plastic tubes, which are cheap to buy, and quick to put in. lf we do it that way, it'll be dead easy, and it'll cost peanuts.Whereas core drilling will be slow it'll be quite a painstaking
job.B ut ...
Rajesh: B ut core drilling's more accurate, clearly.
Viktor: A lot more accurate. I mean sometimes. you can get away with performing. lf you need t oget within twenty m il,then it's perfectly feasible. Tenm il is - it's achievable, but it's
Stretching it . Anything less than ten mil,and there's no way you can do it.
Raiesh: And what sort of tolerance are you looking for?
Viktor: About ten mil.
Rajesh: S o it's border line th en.
Viktor: lt's a tall order. The safe bet would be going for core drilling.
Rajesh: The problem is going to be the schedule, though.
Viktor: Exactly.I mean,t o diamond drill the number of holes we're talking about will take,um .
Rajesh: lt'll take forever and a day, won't it? Whereas if they're preformed th ey'd be ready a s soon as the walls are cast.
Viktor: But if half of them are in the wrong place, it'll cost an arm and a leg to put them right.
Because if they're wrong, i t's not j ust a question of drilling new ones in the right place. lf they're slightly out of position, t hey have t o be filled in, first, with cement, to avoid having two holes overlapping, so putting them right is easier said than done.
Rajesh: Sure. So as I see it, the key issue here, in terms of feasibility, is the tolerance.lf the holes can be bigger, and there's more play for the bolts. we won't have this problem.
-4-
Marta: So, to be clear about how far we can go with this redesign we're not aiming t o reinvent the wheel, in terms of the main components and how they fit together. The reasons for that are firstly, from a hardware point of view, the existing design has proved to be effective.And secondly, we don't have the resources at this point in time to make
f undamental changes to the production process.
Engineer l: So the overall internal layout needs to remain the same?
Marta: Yes. We're looking for an evolution, rather than designing th e whole thing from
the ground up. Presumably, there is room for improvement?
Engineer 2: Well, this model has been revamped once before. Of course. B ut, no doubt we can refine it a bit more.
Marta: However, given that software redesign isn't an assembly issue and has been the Achilles heel of the exlsting model, it would make sense to rethink that whole system.
Engineerl : So for software, back to the drawing board, then?
Marta: Well, er, whatever we do, we need to make a quantum leap. Whether that means
Designing th e system froms cratch, I don'tk now. We need to make the whole thing much simpler to use.

## 6.2 Глоссарий

**Beam**-long,n arrowh orlzontacl omponentin a structure
**Core drill**- hole-sawfo r drillingt hrought hickm aterials
**Crane**-machine for lifting heavy objects, able to reach significant heights and distances, includes mobile cranes (whichw heel) tower cranes( which are supported by a fixed
tower) a nd gantry cranes( whichr un along beams)

**dynamic**-relatedt o movemente, .g.a dynamicl oad [: a loadg eneratedb y a movingo bject)
**G-force**- force of acceleration or deceleration 1 G is equivalent to the force of acceleration exerted by gravity
**Jib**-moveable arm of a crane
Lifting eye- ring fixed t o a heavy object allowing a hook (eg. o f a crane) to be attached t o enable lifting
**Low-loader**- truck w ith a low flat trailer, used for transporting large heavy v ehicles, e, specially construction plant
**Slings**-flat straps which can be attached to crane hooks and placed under objects i n order to lift them
**Thrust**- pushing force,e .g.generated b y expanding gases exiting a rocket

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 2-й и 3-й абзацы.

C.F. POWELL (1903-1969)

1. Powell was a prominent English scientist noted his techniques and discoveries in particle physics. He was also deeply concerned with problems relating to the social responsibility of scientists. Powell was a leader in the World federation Workers in the mid- 1950s and was a founder of the Pugwush Conferences on Science and World Affairs in 1957/ As a public man and his published articles the perils of destructive weapons and the need for international cooperation.
2. Powell was born in December 1903 in England . His parents were poor and they were determined to give their children a good education to increase their opportunities for a better life . In 1921 Powell won a scholarship of one of the colleges at Cambridge which he graduated in 1925 with first-class honors in science. He started his scientific career at the Cavendish laboratory headed by Ernest Rutherford. After gaining his scientific degree at Cambridge in 1928 Powell accepted a position at the new Physics laboratory in the university of Bristol.Powell spent the rest of his career there advancing to professor in 1948 and the director of the laboratory in 1964.
3. In 1947 Powell`s Bristol group identified a new particle in the cosmic radiation. Powell and other two scientists discovered the $^{n}$ - meson and demonstrated that this sub-nuclear particle was produced directly in reactions and rapidly decayed in flight , producing the $^{n}$ - meson. The discovery solved a complicated scientific problem and helped to open a new era of particle physics.
4. Powell continued to develop and apply the photographic method in Bristol. His laboratory became the source of new experimental discoveries in meson physics and an international training center for physicists of many countries. In 1950 he was awarded the Nobel Prize for his development of the photographic methods and his meson discoveries.

Прочтите 4-й абзац и вопрос к нему. Из приведенных вариантов ответа укажите номер предложения, содержащего правильный ответ на поставленный вопрос

For what discovery was Powell awarded the Nobel Prize ?

1. …for the role he played in the establishment of the European Center for Nuclear Research.
2. .. for his development of the photographic methods and his meson discoveries.

3. ..for a new techniques for detecting high- energy particles .

6.3 Построение диалогической, монологической речи
Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

6.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)
6.5 **Контроль знаний**
**Расскажи о**

**Suggesting ideas and solutions**
**Describing improvements and redesigns**
**Describing technical requirements**

## Unit 7. Процессы и прежупреждения Procedures and precautions

7.1 Опорные тексты

a)Rosana: N ext week they're due to start maintenance work o n the grain silos in Zone 4 .
We need to make sure that everyone's aware that all those silos are classed as confined spaces. In other words, no one should go inside them without first doing an air test. And we need to keep a check on dust levels, as well.
Marc: We've got a CO, detector here, haven't we?
b)
Rosana: lf you walk past that machine while it's running, and you're trying to talk to someone, you have to shout to be heard. And as a rule of
thumb, that means it should be an ear protection area.
Marc: Yeah, b ut the regs differentiate between brief exposure , when you're walking past
Something, and continuous exposured, on't they?
c)
Marc: So is it harmfully if it splashes on your skin?
Rosana: According to the notice it's an irritant, and it's toxic.
Marc: But it's not corrosive?
Rosana: Not as far as I'm aware.
Marc: So you don't need gloves and eye protectional masks and all the rest of it? lf you
get any on your skin, you just wash it off.
Rosana: Hm, I'm not sure about that.
d)
Rosana: We need to enquire whether or not this maintenance involves welding. There are
Forklif trucks going through that area carrying flammable liquids.lf there are going to be any naked flames or sparks, we'll need to put a proper procedure in place.
Marc: Right. l'll get in touch with their people,
then.
e)
Stephanie: S o in terms of access,theoretically, there's a risk of someone falling, a s they
Climb up a silo, or down into one. B ut there's always an external staircase with a guardrail, leading to the top, and there are permanent ladders,with protective hoops around them, fixed to the insides, leading down to the bottom. S o workers should be able to access these silos fairly safely. The big problem w ill be getting the welding equipment, th e gas bottles,
down into the bottom.
Ben: They can be lowered down by rope.
Stephanie: Won't they be too heavy?
Ben: Not if they use the smaller-sized bottles.
Stephanie: We'll need to specify the bottle size in the procedure th en.
Ben: Yeah. They'll have to take care that the bottles don't fall onto someone, as well. That no one's standing in the bottom of the silo,while they lower them down.
Stephanie: True. That's a nother point t o mention.O K, so access isn't really a problem,then. The main danger is the fact that it's a confined space.Especially g iven that they're welding,
With an oxy-acetylente orchburning, which will produce a fair amount of COr.
Ben: So they'll need a CO, detector.
Stephanie: I mean, to be safe, they'll need to test the air before they go down,anyway.But we

should probably specify that they need to keep the detector with them while they're working, and keep it switched o n.
Ben: Yeah. Another hazard is there'll be metal fumes given off as they're actually
Welding, which is a different problem t o the CO, issue.
Stephanie: S ure. So really,t hey'll need a ventilation system down there, s ome kind of air extractor.
Ben: Probablyy, eah.A nd there's the problem of dust, as well. They'll have to be very careful
About that. lf they're welding and there's grain dust in the air,there's going to be an explosion hazard.
Stephanie: Y eah. Would a ventilator clear the dust, or make it worse? I suppose if there's a lot lying around, i t'd keep blowing it up into the air, wouldn'tit ?
Ben: Mm. I'm not sure.
f)
Stephanie: Restricted areas are places where a seriousd anger is present. S o it's essential that these should be kept locked at all times. Under no circumstances should anyone be able to access them, unless they have a permit to work,in other words, a written form giving permission to work in the restricted area.
Lin: And permits to work, and the keys to
Restricted areas,can only be issued b y the electricasl supervisor?
Stephanie: That's right. So that one individual
is responsible for electrical safety for the whole plant. O nly that person is authorized to issue permits to work.
Lin: Presumably, it 's important that permits are issued every single time someone enters a
Restricted area- each time they d o a new job,they need a new permit.
Stephanie : Exactly,they shouldn't b e issued for any longer than a full shift.
Lin: OK.
Stephanie: And it's crucial that there's j ust a single key t o each restricted area.T he whole idea of havinga lock-out system is to ensure that only one person has access to switch geaart any given time. So whatever happens, someone cannot switch o n a circuit at aswitchboard while somebody else is working on it somewhere else in the plant.
Lin: Mm, if we imagine a technician needs t o, let's say they're going to change a motor on one of the lines, they get a permit to work, and obtain the key to the switchboard from the electrical supervisor. Then they take the key, unlock the door to the switchboard, switch off the circuit-breaker for the motor to isolate it. then lock the door again.

## 7.2/ Глоссарий

**Air inlet**- Point where air enters a device or process- the opposite is air outlet
**Arc-** electrical current travelllng a short distance through the air to flow between two conductors
**Blower**-pump-like mechanism which generates airflow
**Circuit breaker**- electrical device which instantly breaks a circuit( switches of f the power supply) a s a safety measure if a variation in current is detected
**Extinguisher**-device used for putting out fires; usually a metal container with a hose or nozzle containing water,C O,powder or foam

**Gas bottle**- metal container which contains compressed gas, often in liquefied form
**Guardrail**- safety rail designed to prevent people falling from high places
**Handrai**l- (asg uardrail above)
**Load bearing**- Describes a part of a structure or assembly that is designed to resis transmit force
**Moisture sensitive**- can be damaged by water
**Off-cuts**- waste pieces left over after cutting
**Shot blasting**- firing small metal balls propelled b y compressed air as an abrasive cleaning process
**silo**- large container for storing buIkgranular materials sucha s grain
**strain**-change in size/shape o f a component( e'g's tretching) du e to force
**switchboard**- control panel containing several switches for all the individual circuits of an electrical installation
**switchgear**- collective term for switching equipment
**transformer**- electrical device for modifying current and voltage- a step-up transformer in creases voltage and reduces current,a step-down transformed recreases voltage and increases current

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 1-й и 2-й абзацы.

| | |
|---|---|
| 1. leap | прыжок |
| 2. cushion | подушка |
| 3. collaboration | сотрудничество |
| 4. recoup | компенсировать |
| 5. magnetic suspension train | поезд на магнитной подвеске |

## THE TWENTY - FIRST CENTURY TRANSPORT

1. It has been a long time since train velocities first surpassed the 100 km per hour and they are approaching 200 km per and even higher velocities in some countries. Is it possible to increase the speed with the help of a traditional wheel at the present stage in the development of transport ? Scientists and engineers have come to the conclusion that a new leap in speed is possible only if the wheel is replaced with an air or magnetic cushion.
2. The advantages of high-speed ground transport to be used in future are obvious. At present air and road transport burn three-fourths of all fuels, and the combination process, naturally, affects the earth`s ecology.
3. The future trains must be ecologically clean and noiseless.It has been estimated that the cost of high- speed ground transport will be recouped three times faster than with the railways.
4. The high- speed ground transport will connect cities and industrial centers to air-ports. The first magnetic suspension train is not yet in operation, but its principle has found a way into technology.

VII. Письменно ответьте на следующий вопрос

What kind of transport will connect industrial cities to air port?

7.3 Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

7.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

**7.5 Контроль знаний – Расскажи о**

Describing health and safety precautions
Emphasising the importance of precautions
Discussing regulations and standards
Working with written instructions, notices

## Unit 8. Мониторинг и контроль производства Monitoring and control

### 8.1. Опорные тексты

8.1
Roland: We know the client is a very green orientated company.very big on all things environmental.
Saskia: Absolutely.
Roland: s o energy saving obviously needs to be an important consideratioin the design.Clearly,it'sa big subject,and something w e need to look into in depth.B ut one specific aspect of it where I think we can make a real difference is with the Building Management System- specifically, with the way we use presence detectors. And I've had a couple of ideas that I'd appreciate your views on.
Saskia: Sure.
Roland: I think we should put two totally different design options to the client. Option one is to have a building with maximum automation. So witht he maximum automation option. ..
- 8.2
Roland: ... with the maximum automation option,we put presence detectors a ll over the place,and link them to as many systems a s possible. Not just the usual systems t hat activate the lights when people walk into rooms and turn them off when they leave.We could use presence detectors to control other systems, as well, like the blinds on the windows. So, if it'st he middle of summer,and a presence detector senses that everyone's left a meeting room, a temperature sensor picks u p a positiver eading from s unlight coming through the glass,the electronics activate the blinds,which automatically co me d own and black out the room. That would limit heat absorbition and reduce the load on the airconditioing, s aving energy.
Saskia: OK.
Roland:O r in winter,i f the blinds h ad been pulled down in the meeting room the evening Before, th e next morning, the sensor detects sunlight, and triggers the blinds t o raise and let in as much sunlight a s possible, contributing to the heating. And there could be temperature measurement to determine which rooms are the warmest, a,nd those sensors s et circulation system t o distribute the warm air throught he building, in to the corridor, or into rooms at the other side of the building, or wherever.
Saskia: S o, we'du se presence detectors and heat sensors to regulate as many systems a s possible?
Roland: Yes. Well, that's what we'd have with the maximum automation option.
8.3
Roland: The second option is this. lt's a very environmentalclyo nsciousc ompanys, o I assume that green attitude is shared by all the staff. Lf that's the case, why is there a need to automate everything in the building when most things can be operated manually? W hy doesn't the boss j ust circulate a n email reminding people to switch the lights off when they go out and tell them to lower the blinds when they leave a room in summer, so it helpst he air-conditioning? I mean, you'd save all the systems automatically, an d the money you saved by buying old-fashioned manual controls instead of hi-tech electronics could be spent on planting trees o r something. I mean,i t sounds simple, but . . .

Saskia: M m ... it'sa veryi nteresting idea. W e Have to bear in mind, of course , that the client's a manufacturer of hi-tech electronic gizmos. I 'm n ot sure how they'd feel about ...
- 8.4
Jochem: The obvious danger here is that you could get a build-up inside the vessel i f there's a blockage further a long the pipe.
Katerina: So the vessel needs a safety valve?
Jochem: Yes, and maybe some sort of warning system,a s well.lt could be something that's trulggered by a differential measurement. So if there's a high reading in the tank, and a lower one further along, you'd know there was a blockage somewhere.
Katerina: We'll need a system for monitoring gas consumption.
Jochem; What, a meter on the supply pipe?
Katerina: Well, yes, that would measure cumulative consumption. But we also need to monitor t he actual rate of consumption a t different points in time during the reaction cycle. And if we have those two parameters, we can then determine the frequency of peaks in consumption,w hich is the third parameter w e need.
Jochem: S o that's a software issue,then .A s long as the cumulative value's being recorded against the timescale, we can plot the rate of consumption...
Katerina: The reaction that takes place is going to be exothermic. But the amount of heat w ill partly depend on how hot the gas is when it enters the vessel.
Jochem: Yes. because that input heat can be adjusted.
Katerina:Exactly. So we'll need a sensor next to the valve to measure the input value, as gas comes in, and then another to give us an output value.T hen,w e can worko ut the optimum input temperature for the gas.
-8.5
Helen: One of the biggest headaches in Power generationis the fact that electricity consumption fluctuates considerably. So in order to maintain a continuous supply w e have t o make continual checks,and adjust the power load w e generate.To help us plant hoseaadjustments we forecast f luctuationisn demand,s o that we can anticipate peaks and troughs. We base these forecasts o n a number of different factors. One of them,one of the most important ones, i s temperature . During periods of very cold or very hot weather, demand increases. The increase in demand is obviously due to millions of electric radiators coming on when it's cold, and airconditioning units working hard when it's hot. Another factor, a key factor which increases or decreases demand, is whether or not it's light or dark in the morninga nd evening- obviously that dictate sl ighting consumption. So those are the two main seasonal factors.They generally go hand-in-hands on cold, dark,winter evenings

## 8.2. Глоссарий

| | |
|---|---|
| Cargo Compartment Fire Control Panel | Панель противопожарной защиты багажно-грузовых отсеков |
| Cargo Compartment Fire Extinguishing | Средства пожаротушения багажно-грузовых отсеков |
| Cargo Compartment Heater | Обогреватель багажно-грузового отсека |
| Cargo Compartment Lights | Освещение багажно-грузовых отсеков |
| Cargo Compartment Smoke Detection | Сигнализация об обнаружении дыма в багажно-грузовых отсеках |

| | |
|---|---|
| Cargo Compartment Smoke Detector | Датчик дыма багажно-грузового отсека |
| Cargo Compartments Ventilation | Вентиляция грузовых отсеков |
| Cargo Compartments Ventilation System | Система вентиляции багажно-грузовых отсеков |
| Cargo Doors Monitoring and Operation | Сигнализация грузовых дверей |
| Cargo Holding | Фиксация грузов |
| Cargo Loading System | Система погрузки |
| Cargo Smoke Generator | Генератор дыма |
| CAS Control Panel | Панель управления системой предупреждения экипажа (новое название ECP) |
| Caution | Внимание |
| Ceiling Panels | Потолочные панели |
| Center Post | Центральная стойка |
| Center Wing | Центроплан |
| Center-of-Gravity | Центр тяжести |
| Central Computer | Центральный вычислитель |
| Central Maintenance System (CMS) | Бортовая система технического обслуживания |
| Central overhead panel | Средняя панель верхнего пульта пилотов |
| Central Pedestal | Центральный пульт пилотов |
| Central Pedestal Lighting Control Panel | Панель освещения среднего пульта. |
| Central Processing Unit | Вычислитель центральный |
| Central Tank Access Panels | Люки доступа в центральный топливный бак |
| Central Tank Probe | Датчик топливомера центрального бака |
| Central Warning System | Центральная система предупреждений |
| Channel-Spacing | Разнос каналов |
| Charging Valve | Клапан зарядки |
| Check | Проверка, осмотр, форма технического обслуживания |
| Check Valve | Обратный клапан |
| Chemical Oxygen Generator | Химический генератор кислорода |
| Child Escape Cradle | Детская спасательная люлька |
| Chock | Упорная колодка |
| Chronometer | Хронометр |
| Circuit Braker | Автомат защиты сети (АЗС) |
| Clamp Loop | Крепёжный хомут |
| Class Divider | Перегородка разделительная |
| Clearing | Очистка |
| Climb | Набор высоты |
| Climb-Out Speed | Скорость начального набора высоты |
| Clock | Часы |
| Clogging | Засорение |
| Closing Panel | Панель-заглушка |
| Cockpit Controls | Органы управления в кабине |
| Cockpit Display System | Система электронной индикации в кабине пилотов |
| Cockpit Item | Элемент кабины экипажа |

| | |
|---|---|
| Cockpit Panels Control Unit | Контролер пультов |
| Cockpit Refuel Control Panel | Пульт контроля и управления заправкой топлива (КПКУЗ) в кабине экипажа |
| Cockpit Speaker | Громкоговоритель кабины экипажа |
| Cockpit Voice Recorder System | Система регистрации переговоров экипажа |
| Cold Weather Maintenance - Air Conditioning | Обслуживание системы кондиционирования при низких температурах |
| Cold Weather Maintenance - Airborne Auxiliary Power | Обслуживание ВСУ при низких температурах |
| Cold Weather Maintenance - Doors | Обслуживание дверей, люков и створок при низких температурах |
| Cold Weather Maintenance - Electrical Power | Обслуживание электрической системы при низких температурах |
| Cold Weather Maintenance – Equipment/Furnishings | Обслуживание бытового и аварийно-спасательного оборудования при низких температурах |
| Cold Weather Maintenance - Flight Controls | Обслуживание системы управления самолетом при низких температурах |
| Cold Weather Maintenance - Fuel | Обслуживание топливной системы при низких температурах |
| Cold Weather Maintenance – Indicating/Recording Systems and Navigation | Обслуживание приборного и пилотажно-навигационного оборудования при низких температурах |
| Cold Weather Maintenance - Landing Gear | Обслуживание шасси при низких температурах |
| Cold Weather Maintenance - Oxygen | Обслуживание кислородной системы при низких температурах |
| Cold Weather Maintenance - Power Plant | Обслуживание силовой установки при низких температурах |
| Cold Weather Maintenance - Structure | Обслуживание конструкции планера при низких температурах |
| Cold Weather Maintenance - Water/Waste | Обслуживание системы водоснабжения и удаления отходов при низких температурах |
| Collector Tank Probe | Датчик топливомер расходного бака |
| Combined Slat and Flap Lever | Комбинированный рычаг управления закрылками и предкрылками |
| Combustion Chamber | Камера сгорания |
| Commercial Off The Shelf | Серийно-выпускаемое изделие |
| Communication Management Unit (CMU) | Блок управления связью |
| Communication System | Система связи |
| Communications | Связное оборудование |
| Compass | Компас |
| Component Maintenance Manual | Руководство по технической эксплуатации компонента |
| Component Manual Index | Перечень руководств по компонентам |

| | |
|---|---|
| Compressor Discharge Temperature Sensor | Датчик температуры на выходе из компрессора |
| Computer | Вычислитель |
| Condenser | Теплообменник конденсатор |
| Condition Monitoring | Отслеживание состояния |
| Conditional Probability of Failure | Условная вероятность отказа |
| Configuration Specification | Стандартная спецификация |
| Constant Speed Drive Unit | Привод постоянной скорости |
| Consumable Products Manual | Перечень расходных материалов |
| Continuous Built In Test | Непрерывный встроенный контроль |
| Control and Monitoring System | Система управления и контроля |
| Control Panel | Пульт управления |
| Control Tower | Диспетчерская |
| Control Valve | Регулирующий клапан |
| Control-By-Wire | Управление по проводам и дистанционное управление |
| Controller Pilot Data Link Communications | Передача данных по радиоканалу «Пилот-диспетчер» |
| Control-Surface Balancing | Балансировка рулевых поверхностей |
| Cooler | Радиатор |
| Cooling | Охлаждение |
| Cooling Pack | Установка охлаждения воздуха (УОВ) |
| Core Avionics Cabinet | Кабинет ядра авионики |
| Core Processing and Input/Output Module (CPIOM) | Блок обработки и ввода/вывода данных ядра |
| Core Processing Module (CPM) | Вычислительный модуль ядра |
| Corrosion | Коррозия |
| Counterbalance/Locking Spring | Уравновешивающая/стопорящая пружина |
| Cover | Чехол |
| Cowl Anti-Ice Valve | Клапан ПОС воздухозаборника двигателя |
| Cowling | Капоты |
| Crack | Трещина |
| Cranking | Прокрутка двигателя |
| Crash Safety | Безопасность разрушения |
| Crease | Гофр |
| Crew Alerting System | Система предупреждения экипажа |
| Crew door | Дверь для экипажа |
| Crew Oxygen Stirage Assembly | Кислородное оборудование для экипажа |
| Crew Oxygen System | Кислородное оборудование экипажа |
| Critical-Engine-Fail Decision speed | Скорость принятия решения при отказе двигателя на взлете |
| Cross Bleed Valve | Клапан линии перепуска |
| Cross Feed System | Система перекрестного питания двигателя |
| Crossfeed Start | Перекрестный запуск двигателя |
| Crossfeed Valve | Клапан перекрестной подачи |

| | |
|---|---|
| Crossover | Крестовина |
| Current Transformer Assembly (CTA) | Блок трансформатора тока |
| Current Transformer Unit | Блок трансформаторов тока |
| Curtain | Штора/занавеска |
| CVR/FDR Control Panel | Пульт управления регистраторами |

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 1-й и 2-й абзацы.

SUN- DRIVEN ENGINE

1. It is common knowledge that certain metals and their alloys are attracted by a magnet. After heating, this property vanishes , it is restored after cooling down. A new magneto-heat engine works on this principle. This invention relates to devices which transform thermal power, for instance , the power of the sun rays into a mechanical power of rotation.
2. We know solar power is inexhaustible and its use does not harm the environment. That`s why such importance attached to the devices which make it possible to apply the idea of direct use of solar power , transforming it into mechanical forms of power. The development of an engine directly driven by a heat source such as solar power, makes it possible to simplify and make power generation considerably cheaper, in comparison to the existing thermal engines we use today.
3. The rotor of the new engine is made of an alloy that loses its magnetic properties already at 100 C. If the rotor is heated on one side ,the cold side of the rotor will turn toward the magnet. Since heating continues, the rotor goes on rotating too .Thus solar power can be used as a source of heat in this case. The magneto-heat engine can drive pumps in waterless districts, can also be widely used for watering greenery in cities and settlements.
4. By using thermomagnetic alloys it is possible to develop a lot of automatic devices, for example , solar clocks thermometers, etc. Mention should be made that these devices can withstand extreme temperatures. To organize the production of the necessary alloys is simple as there is no need for rare materials or complex technology.

Письменно ответьте на следующий вопрос

Why are thermomagnetic alloys used in the production of automatic devices?

8.3 Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

8.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

8.5 **Контроль знаний**

- Describing automated systems
- Referring to measurable parameters
- Discussing readings and trends
- Giving approximate figures

## Unit 9 Теория и практика Theory and practice

9/1 Опорные тексты

Tony: With the aerodynamics there are three Development to also vailable t o us.T he first is CFD software- Computational F luid Dynamics. With that, the tests would obviously b e virtual, based on a computer model. The second option is to go into a wind tunnel, with a scale model, or a full-size mock-up.I n either case, we'd probably need to use a tunnel with a rolling road.

Lisa: Would that be necessary?

Tony:Well,t he thingi s,t he wheelsg eneratea lot of turbulence when they're spinning. So to simulate that,you need a rolling road.

Lisa: Yes, I know, but if we go for a bodywork design where the wheels are mostly enclosed, Which is likely, would that be an issue?

Tony: Possibly not. lt depends how fully enclosed they are.

Lisa: OK. l'm just raising the question.

Tony: Sure.l t's something w e can look at. The third option,then, i s field testing, actually Running the prototype outside o n a runway, or somewhere.So we can use these tools in isolation o r as a combination. The question is, how can we gather as much data as possible with the limited budget we have?

Guy: Well, we need to bear in mind that the problem with aero is that it's not just about data Gathering. You also have to validate the data. CFD and wind tunnels are not a hundred oercent reliable. The acid test only comes when you try out a full-scalep rototypein real Conditions.We need to make sure that everything is tried-and tested outside,w ith a full-scale trial run.

Lisa:Yeah,but let's not forget we're designing a car that does a hundred kilometers an hour, i t's not a supersonic aircraft! The aero'sn ot going to be that critical.

Tony: Plus,w ithc hangeable weather, it 's not easy to do back-to-back testing out in the field.

Guy: No, of course not. I'm just saying we need to be careful ...

- 9.2

Arnaud: So, theoretically, the horizontasl peed will keep decreasing until the container hits the ground.The higher the drop altitude, the lower horizontal speed a t touch down.

Jenna: Sure.

Arnaud: But, obviously, th e higher the altitude, the higher the vertical speed, up to a certain pornt.

Jenna:Absolutely.So, assuming the drop altitude's very low the vertical speed won't b e all that high on impact.

Arnaud: True.

Jenna:And in terms of protecting th e cargo, surely a low vertical speed i s the critical f actor.

Arnaud: I'm not so sure it's the critical factor. I'd say the horizontal speed's more problematic. Because, presumably, if the ground speed' s quite high,there's a danger the container will roll over and bounce along when it touches down. In fact, if you're dropping from low altitude, that's probably inevitable.So if the container rolled and bounced for 50 metres, o r whatever, then y ou'd have to have some kind of destructible external envelope t o protect it from the multiple

impacts. Which would be very expensive. So, arguably, rolling is the worst problem, worse than a high vertical impact speed.
Jenna: Hm, you think so?
Arnaud: So you don't think rolling's a bad thing?
Jenna: I'm not convinced the container would actually roll.
Arnaud: No?
Jenna: Not necessarily.The military drop tanks out of flying aircraft at low level, tied to special Platforms, and they just slide along the ground.And the systems that eject things out of the Backs of planes are incredibly powerful. So because,obviously,they f ire the container in the opposite direction t o the plane,that reduces the groundspeed. Plus, they use a parachute that deploys horizontally, which also helps t o slow it down.
Arnaud: Of course.
Jenna: So, based on what they do with tanks, I think we can safely assume that we can stop a Container from rolling.
Arnaud: But a tank's got massive weight, and a low centre of gravity. With a smaller, Lighter container, there's n o way of knowing how it would behave, not without actually testing i t. And even if you tested it ten times, it would probably behave differently each time, i t would be very unpredictable. Whereas if you drop from a higher altitude OK, the vertical speed is higher, but with a lower groundspeed, it would behave more predictably. And that would make it easier to design a cushioning system because you'd be dealing with a single, predictable impact.
Jenna:Yes, but surely, a heavy vertical landing is a huge problem.The force of it would be far greater...

- 9.3

Manfred: The first time we launched one of these things, o r w e basically just go plastic washing-up liquid bottle,filled it about half full of water, then pumped it up with an ordinary foot pump.
Interviewer So it was just ordinary household stuff?
Manfred: Oh, yeah, nothing too technical. And, actually,there was a bit of a coincidence, because the opening in the bottle was just slightly bigger than the fitting at the end of the pump, so there was quite a good seal. So we pumped it up - one of us held the bottle while someone else worked the pump. And we released it, and it wentu p, literally, like a rocket. I mean, we expected it would shoot up reasonably fast,but we didn't anticipate just how powerful it would be. lt just went Moosl, and totally exceeded our expectations. So you can imagine us, a group of 'l2 -year-olds, we were absolutely ecstatic. And having said that there was one problem. Once all the water had come out, which
happened virtually i n a split-second, the bottle- because it was very light- started tumbling over in the air.
Interviewer: So it wouldn't fly straight?
Manfred: That's right. But we quickly came up with a solution to that problem

## 8.6 Глоссарий

| Термин_En | Термин |
|---|---|
| 3-phase static inverter | Преобразователь трехфазный статический |

| Термин_En | Термин |
|---|---|
| Aborted Takeoff | Прерванный взлет |
| Abrasion | Истирание |
| Absolute pressure | Абсолютное давление (относительно полного вакуума) |
| AC Canister | Канистра для насоса переменного тока |
| AC Distribution System | Система распределения переменного тока |
| AC Distributor | Распределительное устройство переменного тока |
| AC Electrical Consumer Connection System | Система подключения потребителей переменного тока |
| AC Electrical Load Distribution | Система распределения электрической нагрузки переменного тока |
| AC External Power | Система аэродромного питания переменного тока |
| AC External Power Connector | Штепсельный разъем аэродромного питания (ШРАП) |
| AC Generation System | Система электроснабжения переменным током |
| AC Generator Air/Oil Cooler | Воздушно-масляный радиатор генератора переменного тока |
| AC Generator Drive System | Система привода-генератора переменного тока |
| AC Motor-Pump (ACMP) | Насосная станция переменного тока |
| AC Motor-Pump Shock Mount | Амортизатор насосной станции |
| AC Pump | Насос переменного тока |
| AC Standby Power System | Аварийная система электроснабжения переменным током |
| Accelerate-Stop Distance Available | Располагаемая дистанция прерванного взлета |
| Access Doors and Panels | Эксплуатационные люки и панели |
| Accessory Compartment Lights | Освещение вспомогательных отсеков |
| Accessory Compartments | Вспомогательные отсеки |
| Accessory Drive | Привод агрегатов |
| Accessory Drive Gearbox | Коробка приводов агрегатов |
| Accumulator | Гидроаккумулятор |
| Accumulator Battery | Аккумуляторная батарея |
| Accumulator Fill and Pressure Gauge | Манометр гидроаккумулятора |
| ACMP Case Drain Filter Assembly | Фильтр линии слива ACMP |
| ACMP Pressure Filter Assembly | Фильтр линии нагнетания ACMP |
| Acoustic Panel | Звукопоглащающая панель |
| Acoustic Underwater Locator Beacon | Маяк локационный подводный акустический |
| Actuating Bell Crank | Приводная качалка |
| Actuator | Привод (исполнительный механизм) |
| Actuator Control Electronic Module (ACE Module) | Блок управления и контроля приводами |
| Actuator Hold Down Screw Washer | Винты с шайбами, удерживающие привод |
| Adapter | Переходник |

| Термин_En | Термин |
|---|---|
| ADF Antenna | Антенна автоматического радиокомпаса |
| ADF Receiver | Приемник автоматического радиокомпаса |
| ADIRS Computer | Вычислитель ADIRS инерциальной системы |
| ADIRS Control Panel | Пульт управления ADIRS инерциальной системы |
| Advanced Engine Vibration Monitoring | Система контроля вибрации двигателя |
| Aerodynamic Smoothness | Гладкость аэродинамических поверхностей |
| Aft Cargo Compartment Door | Дверь заднего багажно-грузового отсека |
| Aft Engine Mount | Задний узел навески двигателя |
| Aft Handset | Задний терминал связи |
| Aft Passenger Door | Задняя пассажирская дверь |
| Aft Service Door | Задняя сервисная дверь |
| Aileron | Элерон |
| Aileron Actuator | Привод элерона |
| Aileron Control System | Система управления элеронами |
| Air Bleed | Отбор воздуха |
| Air Bleed Filter | Фильтр отбираемого воздуха |
| Air Bleed Temperature Sensor | Датчик температуры воздуха в линии отбора |
| Air Conditioning | Система кондиционирования воздуха |
| Air Conditioning Unit | Блок кондиционирования воздуха |
| Air Cycle Machine | Турбохолодильник |
| Air Data and Inertial Reference Unit | Модуль системы инерциальных и воздушных данных |
| Air Data Computer | Вычислитель воздышных данных |
| Air Data Computing System | Система вычисления воздушных данных |
| Air Data Inertial Reference System (ADIRS) | Инерциальная система и система воздушных сигналов |
| Air Data Module | Модуль воздушных сигналов |
| Air Data Sensor | Датчик аэродинамических данных |
| Air Duct | Воздухопровод |
| Air Filter | Воздушный фильтр |
| Air Flow | Расход воздуха |
| Air Intake | Воздухозаборник |
| Air Intake Flap | Створка воздухозаборника |
| Air Preparation System | Система подготовки воздуха (системы нейтрального газа) |
| Air Recirculation System | Система рециркуляции |
| Air Starter | Воздушный стартер |
| Air Supply | Подача воздуха |
| Air Supply Service Valve | Клапан подачи воздуха сервисный |
| Air Traffic Control | Управление воздушным движением |
| Air Traffic Control Message | Сообщение УВД |
| Air Traffic Control System (ATC) | Система управления воздушным движением |
| Air Turbine Starter Valve | Клапан запуска воздушной турбины |
| Air/Oil Cooler | Воздушно-масляный радиатор |

| Термин_En | Термин |
|---|---|
| Airborne Auxiliary Power | Бортовая вспомогательная силовая установка |
| Airbrake | Тормозной щиток |
| Airbrake Control System | Система управления тормозными щитками |
| Airbrake Lever | Рычаг управления тормозными щитками |
| Airbrake Spoiler Actuator | Привод воздушного тормоза |
| Airbrake Spoiler Valve Block | Блок клапанов привода воздушного тормоза |
| Aircraft | Самолет |
| Aircraft Center Line | Плоскость симметрии самолета |
| Aircraft Condition Monitoring System | Система контроля состояния самолета |
| Aircraft Controllability | Управляемость самолета |
| Aircraft Grounding | Заземление самолета |
| Aircraft Illustrated Parts Catalog | Иллюстрированный каталог деталей самолета и сборочных единиц |
| Aircraft Personality Module | Модуль конфигурации персональный |
| Aircraft Protection | Защита самолета |
| Aircraft Recovery Manual | Руководство по восстановлению самолета |
| Aircraft Stability | Устойчивость самолета |
| Aircraft Video Monitoring System | Система видеонаблюдения за обстановкой в самолете |
| Airflow Control | Управление воздушным потоком |
| Airfoil | Аэродинамическая поверхность |
| Airframe Drainage | Дренаж конструкции планера |
| Airplane Flight Manual | Летное руководство |
| Airplane Rescue and Fire Fighting | Инструкция по аварийной эвакуации и пожаротушению |
| Airport Planning Manual | Руководство по планированию стоянки и перронного обслуживания самолета в аэропорту |
| Airspeed | Приборная скорость |
| Airspeed indicator | Указатель приборной скорости |
| Air-to-Air Heat Exchanger | Воздуховоздушный теплообменник |
| Airworthiness requirements | Нормы летной годности |
| Alternate Aerodrome | Запасной аэродром |
| Alternating Current Motor-Driven Pump | Насосная станция с приводом от электродвигателя переменного тока |
| Alternator | Преобразователь постоянного тока в переменный |
| Altimeter | Высотомер |
| Altitude | Высота |
| Altitude Selector | Задатчик высоты |
| Altitude Switch | Высотный сигнализатор |
| Ambient Overheat Detection System | Система обнаружения перегрева окружающего воздуха |
| Ambient Temperature | Температура забортного воздуха |
| Analyzer | Анализатор |
| Ancillary Equipment | Дополнительное оборудование |
| Angle Gearbox | Угловой редуктор |

| Термин_En | Термин |
|---|---|
| Angle of Attack | Угол атаки |
| Angle of Attack Sensor | Датчик угла атаки |
| Annunciator | Сигнализатор |
| Antenna | Антенна |
| Anti-Collision Lights | Огни предупреждения столкновения |
| Anti-Icing Protection | Защита самолета от обледенения |
| Anti-Skid Control | Антиюзовая автоматика |
| Anti-Skid Transducer | Датчик юза |
| Approach | Заход на посадку |
| Approach pattern | Схема захода на посадку |
| APU | ВСУ |
| APU Air Intake | Воздухозаборник ВСУ |
| APU Bleed Air System | Система отбора воздуха от ВСУ |
| APU Build-up Manual | Руководство по установке агрегатов на ВСУ |
| APU Check Valve | Обратный клапан линии ВСУ |
| APU Combustion Chamber | Камера сгорания ВСУ |
| APU Control Panel | Пульт управления ВСУ |
| APU Core (Power Section and Gearbox) | Основная часть ВСУ (газотурбинный двигатель и редуктор) |
| APU Drain System | Дренажная система ВСУ |
| APU Engine | Силовая часть/двигатель ВСУ |
| APU Engine Compartment | Отсек ВСУ |
| APU Exhaust Compartment | Отсек выхлопа ВСУ |
| APU Exhaust System | Выхлопное устройство ВСУ |
| APU Fire Detection | Средства пожарной сигнализации ВСУ |
| APU Fire Detector | Датчик пожара в отсеке ВСУ |
| APU Fire Extinguisher bottle | Баллоны с огнегасящеим составом |
| APU Fire Extinguishing | Средства пожаротушения ВСУ |
| APU Firewall | Противопожарная перегородка ВСУ |
| APU Fuel Feed System | Система подачи топлива в ВСУ |
| APU Fuel System | Топливная система ВСУ |
| APU Generator | Генератор ВСУ |
| APU Lubrication System | Система смазки ВСУ |
| APU Mounts | Крепление ВСУ |
| APU Oil Indicating System | Система индикации масла ВСУ |
| APU Oil System | Маслосистема ВСУ |
| APU Reducer | Редуктор ВСУ |
| APU/Cargo Fire Control Panel | Панель пожарной защиты ВСУ и багажно-грузовых отсеков |
| Area Navigation ATC | Зональная навигация |
| Arming Switch | Переключатель системы управления колесом передней опоры |
| Articulating Joint | Шарнирное соединение |
| Articulating Spline Joint | Шарнирное шлицевое соединение (муфта) |

| Термин_En | Термин |
|---|---|
| ATC Antenna | Антенна ответчика УВД |
| ATC Antenna Switch | Антенный переключатель УВД |
| ATC Control Panel | Панель УВД |
| ATC Transceiver | Приемопередатчик ответчика УВД |
| Atlas Standard Oven | Духовой шкаф |
| Attachment Fittings | Присоединительные фитинги |
| Attitude & Direction | Пространственное положение и направление полёта |
| Attitudes | Пространственное положение |
| Audio & Radio Management System | Система управления звуком |
| Audio & Video Monitoring | Радиоаппаратура звука и видеозаписи |
| Audio Control and Cabin Interphone System | Система управления аудиосигналами и внутренними переговорами |
| Audio Control Panel | Пульт управления аудиосигналами |
| Audio Frequency Conducted Susceptibility | Восприимчивость к помехам звуковых частот |
| Audio Integrating System (AIS) | Интегрированная аудиосистема |
| Aural Warning | Речевое (голосовое) предупреждение |

**Упражнения:**

Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 1-й и 2-й абзацы.

CORROSION

1. During a year almost 200 million tons of metal objects are considered to be destroyed by corrosion. Considering that about 600 million tones of metal a year are produced in the world, it is easy to understand the losses of objects. Without which our life could not be imagined.
2. The situation is very serious , because not only metal is destroyed but also a great amount of articles , instruments and tools whose cost exceeds many times the cost of the metal used for their manufacture.
3. Combating the corrosion of metals has now becomes a key problem in all industrialized countries. The scientific and technical achievements in the field of raising the corrosion resistance of construction materials are the basis of technical progress in different branches of industry, an indicator of the country`s economic potential.
4. A large number of “anti-corrosion” work is being carried out in the Russia. The result is evident:Russian-made inhibitors, varnishes, paint- covers are being well-known throughout the world. Gas pipelines, metal structures , the bodies of atomic reactor and ships,etc. have been reliably protected against corrosion.
5. Russia also exports special equipment and some kinds of technology designed to weaken corrosion. Anti- corrosion varnishes , insulating materials and equipment are purchased abroad.

V. Прочтите 5-й абзац текста и ответьте письменно на следующий вопрос:

What materials weakening corrosion does Russia sell?

9.3 Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

9.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

9.5 **Контроль знаний**

- Explaining te sts and experiments
- Exchanging views on predictions and theories
- Comparing results with expectations
- Discussing causes and effects

## Unit 10 Отодвигаем границы Pushing the boundaries

10/1. Опорные тексты

Mike: Obviously, a tubular steel tower o nly gives you sufficient structural strength if you give it adequate protection from corrosion - fl,e big problem w ith offthore installations. So , technically, you could say steel is in appropriate in that environment.
Loreta: They make ships out of it.
Mike: I know, Loreta, but only because there's no cost-effective alternative. B ut we're not talking about ships, we're talking about fixed structures. The point is, I think we should look more seriously at alternatives to all-steel supports. And the obvious alternative is reinforced concrete.
Loreta: We've already looked into it, though, and it wasn't cost-effective.
Mike: Not in the short term. But we didn't really look into it properly over the long term.
Loreta: But you made the point yourself. Mike, that steel's c ompletely in effective if it's corroded. And one of the mainc onstituentosf reinforced concreteis steel.
Mike: lt's protected, though ,i sn'ti t? lt's embedded inside concrete. That's a much more effective protection than paint.
Loreta: N ot necessarily, lf we're talking about the long term, as you say, what happens to concrete when it's exposed to the sea for a few years? Lt erodes.Which means the stee
Eventually g ets exposed. You look at concrete coastal defences. How often do you see the concrete all crumbling away, and all the steel exposed Mike: That's d ue to inconsistent quality,t hough. You only get that problem ,if there's insufficient cover. As long as there's appropriate cover at design level,and the construction quality's consistent, th en there
s houldn't b e a problem.
Loreta:lsn't i n adequate cover m ore of a problem in a slender structure ,though? Y ou'd
Probably have less cover,compared w ith t he big lumps of concrete they use for coastal defences.
Mike: Not if ...
Hanif: Just a second.
Mike: Yes, HaniP
Hanif: Let's just think about what we're trying to resolve, here.The key issue is what's t he mosts uitablel ong-terms olution?A nd in both cases,w e're saying steel is necessary,either in an all-steel tubular structure o r in the form of reinforcement inside concrete. But obviously exposed steel i s unsuitable because of the problem o f corrosion. So the question is,w hat's the most reliable way o f protecting steel,over the long term? And we have to bear in mind that' j ust because something requires reguIar maintenance, such as painting, that doesn't necessarily mean i t's unreliable. As long as the maintenance is consistent.The key question is,w hat's the most economical approach? So painting a steel structure every couple of years is uneconomical only if the cost of painting is more expensive than the additional cost of using concrete at the time of construction.
Mike: So, to determine the most efficient solution we need to assess the lifespan of a Reinforced concrete structure. lf we know that, w e can determine how many times the equivalent steel structure would need to be repainted over that same period, and what the cost of that would be.

Hanif: Yeah.
Mike: But this is really the point I'm making,
Hanif. We can't categorically say that reinforced concrete is inefficient unless we look into it in detail.
Hanif: Of course not. Look, let me make a suggestion. .
-10.2
Su: With very tall structures, one of the main loads you need to take into consideration, Clearly, is the mass o f the structure, it s weight. Due to gravity, that mass exerts a downward load,which has to be transmitted to the ground. So that downward force means the structure is in compression, especially near the bottom. Obviously, the closer you are to the bottom, the more compressive force the structure is subjected to . But with tall structures, downward load compressing the structural elements is only part of the problem.A nother major force acting on the structure is windload,which i s a horizontal load,e xerted by air pressure against one side of the structure. Because the structure is fixed at ground level, and free at the top, that generates bending forces. And when elements bend,you have opposing f orces:c ompression at one side, tension at the other. And at ground level,the wind effectivety lies to slide the structure along the ground, and the foundations below the ground resist that. The result of that is shear force between the substructure and the superstructure. Th e wind generates tensile loads on the foundation of tall structures a s well, as the bending action tries to pull them out of the ground on one side, a bit like a tree being uprooted b y the wind. S o the foundations need to rely on friction with the ground t o resist the pull-out f orce, just as tree roots d o. The action of the wind can also generate torsion.You g et a twisting force sometimes, when the air pressure is comparatively higher against one corner of a building ,although that's l ess of a problem with chimneys because of their circular profile. With very large masses of concrete, you also have to think about the forces generated by thermal movement. When concrete absorbs heat from the sun, you get expansion, as soon as the sun goes in, there's contraction. That movement c an be significant over a large area,especially as the sun generally heats one side of a structure much more than the other. So there are all kinds of different forces acting on a tall structure.
- 10.3
Andrej: The record speed exceeded the standard operating speed by a huge margin. lt was 80o/o faster at its peak. So you would imagine that the TCV used for the record run was heavily modified. In fact, that wasn't really the case. The train was modified to a certain e xtent but, with a few exceptions, it was essentially just an ordinary TCV. As you can see from this slide, one of the biggest differences was that the modified train w as significantly ,in order t o make it lighter.There was a 500/0 reduction in length, down to 100 metres.c omoared w tha 200- metre standard length.The coaches being pulled were perfectly standard - the only differences were that some of the seats had been removed to make way for all of the monitorin equipment that was carried on board. And some changes were made to the bodywork, to make it slightly more aerodynamic, which meant t he drag coefficient was reduced by I 5olo.The wheels on the modified train were marginally b igger than the standard size. The diameter was increased by 9olo,in order to reducet he speed of revolution, to limit friction and centrifugalo force. And the power of the electric motors was substantially higher than the standard units - boosted by 680y' But none of the changes was fundamental. So my point is, standard h igh-speed trains can be made to go faster b y a considerable amount.
-10.4

Narrator: In the late I 940s and early '50s, the United States Air Force carried out a series of experiments to explore how much physical stress the human body could withstand.A key a im was to test how much C-force pilots were able to cope with and see what would happen if they exceeded their limits. Led by Air Force doctor John Paul Stapp, a number of spectacular tests were carried out at Edwards Air Force Base in Californiaa, location suitable for the experiments thanks to its 600-metre rail track, specially designed for high-speed rocket tests. A rocket sled,capable of reaching speeds approaching the sound barrier,was mounted on the track. On top of thesled, named SonicWind, researchers fixed a seat,intended f or an abnormally brave volunteer. Refusing to give the dangerous job to a member of his team, the man in the hot seat was John Stapp himself. Over several runs, Stapp was subjected t o progressively greater extremes of force. Each time, he resisted.Eventually, the time came to take the ultimate risk, to surpass what many doctors believed to be a deadly level of G-force. And so on Decemberl oth I 954, Stapp Was strapped onto sonic Wind Hor the mother of all ride Narrator: That day, Stapp was subjiected to extremes of force beyond the imagination. When the sled's rockets fired, he shot from zero to over 1,000 kilometres per hour in just there seconds, subjecting him to 20 Gs. when the sled hit the pool of water in the braking zone, it was like hitting a brick wall. Stapp slowed from the speed of a bullet to a complete stop in little more than a single second.I ncredibly, John Stapp survived the ride, although s o much blood had rushed into his eyes that he was unable to see for some time afterwards. Before the test, doctors had believed that human beings were incapable of surviving forces greater than I 7 Cs. When the sled hit the water,Stapp had pulled a crushing 46 Cs

## 10.2.Глоссарий

| | |
|---|---|
| Automatic Direction Finder | Радиокомпас автоматический |
| Automatic Direction Finder (ADF) | Система автоматического поиска направления (АРК) |
| Automatic Flight Control System | Система автоматического управления полетом |
| Automatic Landing | Автоматическая посадка |
| Automatic Lavatory Extinguisher | Автоматический огнетушитель в туалетах |
| Automatic Mode | Автоматический режим |
| Autopilot | Автопилот |
| Auxiliary Fuel Quantity Ganges | Вспомогательные средства контроля количества топлива |
| Auxiliary Power Unit | Вспомогательная силовая установка |
| Auxiliary Power Unit Light | Огонь освещения ВСУ |
| Available Landing Distance | Располагаемая длина посадки |
| Avionics and Display Ventilation and Ram Air Ventilation | Система вентиляции блоков авионики и система вентиляции продувочным воздухом |
| Avionics Compartment | Отсек авионики |
| Avionics Compartment Door | Люк отсека авионики |
| Avionics Core | Ядро авионики |
| Avionics Core Equipment | Оборудование ядра авионики |
| Avionics Exhaust Valve | Выпускной клапан отсека авионики |
| Avionics Fan | Вентилятор охлаждения блоков авионики |

| | |
|---|---|
| Avionics System | Комплекс авионики |
| Backing Plate | Плита опорная |
| Backing Plate Gasket | Прокладка опорной плиты |
| Backrest Meal Tray | Столик на спинке сиденья |
| Bad Weather Conditions | Сложные метеорологические условия |
| Bag | Сумка |
| Baggage | Багаж |
| Baggage Bin | Багажная полка |
| Baggage/Cargo Loading Manual | Руководство по загрузке грузов и багажа |
| Balancing | Балансировка |
| Ballscrew Actuator | Шарико-винтовой привод |
| Basic Aspect Ratio | Относительное удлинение |
| Basic Taper Ratio | Сужение |
| Beam Deviation | Отклонение потока |
| Bearing | Подшипник, вкладыш |
| Bevel gearbox | Коническая коробка приводов |
| Blade | Лопатка (компрессора или турбины) |
| Blank cover | Заглушка |
| Bleed | Отбор |
| Bleed Air System | Система отбора воздуха |
| Bleed Trip-off Light | Сигнализатор отключения отбора |
| Bleeding Air Control Flapper | Заслонка регулирования отбора воздуха |
| Block Fuel | Рейсовое топливо |
| Block Time | Рейсовое время |
| Bogie Beam | Балка тележки |
| Bolt | Болт |
| Bonding Jumpers | Металлизация |
| Bootstrap Reservoir | Гидробак поршневого типа |
| Bracket | Кронштейн |
| Brake Control Module | Модуль контроля тормозной системы |
| Brake Pedals Transducer | Датчик положения тормозных педалей |
| Brake System | Тормозная система |
| Brake Temperature Monitoring System | Система контроля температуры тормозов |
| Brake Temperature Sensor | Датчик температуры тормоза |
| Brake Unit | Тормоз |
| Braked Wheel | Тормозное колесо |
| Brakes Control Unit | Блок управления тормозами |
| Breather | Сапун |
| Brightness Control Panel | Пульт управления яркостью индикации |
| Built-in Guage | Встроенный манометр |
| Built-in Test | Встроенный контроль |
| Built-in Test Equipment | Встроенные средства контроля |
| Bulkhead | Гермошпангоут, задняя стенка кабины экипажа |
| Bulkhead Check Valve | Обратный клапан гермошпангоута |
| Burst Disc | Разрушающийся диск |

| | |
|---|---|
| By Centigrade | По шкале Цельсия |
| By Fahrenheit | По шкале Фаренгейта |
| Cabin Altitude | Высота в кабине |
| Cabin Attendant | Бортпроводник |
| Cabin Attendant Call Button | Кнопка вызова бортпроводника |
| Cabin Attendant Call Light | Лампа сигнализации вызова бортпроводника |
| Cabin Attendant Call System | Система вызова бортпроводника |
| Cabin Attendant Handset | Терминал связи бортпроводника |
| Cabin Attendant Seat | Кресло бортпроводника |
| Cabin Attendant Service Panel | Пульт управления бортпроводника |
| Cabin Attendant Station | Рабочее место бортпроводника |
| Cabin Attendant Work Lights | Освещение рабочих мест бортпроводников |
| Cabin Bleed Valve | Клапан отбора воздуха в пассажирский салон |
| Cabin Depressurization | Разгерметизация кабины |
| Cabin Emergency Lights | Аварийное освещение пассажирской кабины |
| Cabin Excessive Altitude | Избыточное давление в кабине |
| Cabin Interphone System | Система внутренней связи |
| Cabin Loudspeaker Network | Сеть салонных громкоговорителей |
| Cabin Pressure Control System | Система автоматического регулирования давления |
| Cabin Rate-of-Climb | Скорость набора высоты в кабине |
| Cabin Systems | Системы кабины |
| Cabin Window | Иллюминатор кабины |
| Cabinet | Кабинет (контейнер электроники) |
| Cable Assembly | Жгут |
| Cable-Brake | Тормоз с тросовым приводом |
| Call Up | Вызов |
| Calls Control Panel | Панель вызовов |
| Cap | Крышка |
| Captain | Первый пилот |
| Captain Seat | Кресло первого пилота |
| Cargo | Груз |
| Cargo Compartment | Багажно-грузовой отсек |

**Упражнения** Переведите устно с 1-го по 3-й абзац на русский язык. Перепишите и переведите письменно 1-й и 2-й абзацы.

1. power engineering энергетика
2. hazardous work опасная работа
3. sohpicticated machines сложные машины
4. remote-controlled equipment оборудование с дистанционным управл.
5. call for требовать

ROBOT TECHNOLOGY

1. Robots are machines of a special type. They are considered to replace man wherever he is to do hard, monotones or hazardous work .Robots are sohpicticated machines Many of them fitted with artificial intellect systems, special programming devices and electronic

controllers. Then development required the work of specialists in several technical fields, together with specialists in biophysics and physiology.

2. The idea of robot technology was born in 1940s , when the foundation of atomic power engineering- the basis of technological progress were laid. The materials, scientists must deal with , are radioactive .Besides, the equipment used in obtaining and studing them is dangerous for man. At the same time work with radio-active substances ,assembly and disassembly of atomic reactors the serving of machines and devices in radioactive zones require human effort. Remote-controlled equipment help to solve this problem.
3. Research into radioactive materials is becoming ever more complicated, new problems are arising in atomic engineering and space technology. This calls for newer manipulators and devices to be handled by an operator. An analysis of these ideas and their solutions has two entirely different approaches. The first one is to bring the operator as close to the object as possible, the other requires remote control. Both approaches have already found practical application not only in atomic engineering but in underwater exploration as well.
4. Our research and design organizations create robots for assembling various electronic circuits. Mention should be made that robots are in wide use for performing welding and painting.
5. Robot technology emerged at the junction of two sciences - machine mechanics and control theory.Its further progress requires a wide application of modern control machines and systems, handled by scientists specializing in the theory of working processes, biology and physics.

Письменно ответьте на следующий вопрос.

What does the further progress of robots technology require?

10.3 Построение диалогической, монологической речи

Ex. 1-14 pp14-21 **ссылка Student`s Book** *Cambridge English for Engineering (by Mark Ibbotson)*

10.4 Аудио и видео практика. Самоконтроль знаний (аудиозапись прилагается CD-1)

10.5 **Контроль знаний**

-Discussing performance and suitability
-Describing physical forces
-Discussingre lative performance
-Describing capabilities and limitations

## 11.Использованные информационные ресурсы


1. Словарь технических терминов.ЗАО Гражданские самолеты «Сухого» -43 с
2. Васильева Л. Деловая переписка на английском языке. Москва 2001 г.
3. 12. Современный англо-русский. Русско-английский словарь +грамматический справочник. 2005 г.
4. *Professional, B1-B2 Level, Cambridge English for Engineering, Student`s CD-ROM*
5. Полякова Т.Ю., Панова С.С. Учебно-справочное пособие по грамматике английского языка. – М.: Высшая школа
6. Уманец И.Ф.»Sociology in Earnest», Хабаровск, 2010
7. Доржиева Э.А. «Методические указания к практическим занятиям по английскому языку для студентов 2 курса инженерно-строительных специальностей», Хабаровск, 2006
8. M. Duckworth «Turner Business Result» . Oxford Univ. Press, 2008
9. *Professional, B1-B2 Level, Cambridge English for Engineering, Student`s CD-ROM* - Cambridge University Press, 2009( Mark Ibbitson) -122p
10. Газеты и журналы: « *Engineering professions*"

Sound Smart Training - www.Sound-Smart.com

Supremelearning - www.fastenglish.ru

UchiOnline.ru - www.uchionline.ru

Секреты изучения английского языка - www.language-secrets.ru

BBC Learning English - www.bbc.co.uk/woldservice/learningenglish/

**ссылка http:/ Cambridge for Engineering_prof.zip.html**


and assessing manufacturing techniques
- Explaining jointing and fixing techniques
-Describing positions of assembled components