

**МИНИСТЕРСТВО ТРАНСПОРТА РОССИЙСКОЙ ФЕДЕРАЦИИ
ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
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**АВИАЦИОННЫЙ АНГЛИЙСКИЙ ЯЗЫК
В НЕШТАТНЫХ СИТУАЦИЯХ**

**AVIATION ENGLISH
IN NON-ROUTINE SITUATIONS**

Учебное пособие



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Содержит аутентичные материалы по темам, рассматривающим нештатные ситуации в полете: разгерметизацию, обледенение воздушного судна, проблемы с шасси и другие, – для формирования и закрепления фонетических, лексических, грамматических навыков, навыков восприятия англоязычной речи на слух и навыков говорения на профессиональные темы.

Упражнения снабжены ключами для проверки правильности их выполнения.

К пособию прилагается компакт-диск с аудиозаписями.

Представленная в пособии тематика соответствует домейнам ICAO (Doc. 9835), требованиям Федеральных авиационных правил «Требования к членам летных экипажей воздушных судов гражданской авиации Российской Федерации при подготовке к выполнению международных полетов», утвержденному учебному плану и содержанию рабочей программы по дисциплине «Общий и авиационный английский язык».

Предназначено для авиаспециалистов, выполняющих и обеспечивающих международные полеты (членов летных экипажей и диспетчеров ОВД), уже имеющих третий уровень владения английским языком по шкале ICAO; студентов высших учебных заведений ГА; может использоваться для самостоятельного обучения.

Печатается по решению Редсовета училища.

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INTRODUCTION

In 2003, ICAO introduced strengthened language proficiency requirements for all pilots, ATC controllers and aeronautical station operators, who are now required to demonstrate a minimum English language proficiency at ICAO Level 4 (Operational).

From March 2011 all international airlines and Air Traffic Control organizations in the Russian Federation will need to provide that their personnel have been assessed according to the ICAO requirements.

English language proficiency is a vital safety issue. While Standard Phraseology is the most important factor of effective verbal communication, it is recognized that there may be circumstances where plain-language communications in English become necessary. Difficulties in plain language communications between ATC and flight crews have often contributed to serious incidents and accidents. In recognition of this ICAO has introduced the new focus on Plain English, which is necessary in flight operations when Standard Phraseology is not enough. This is particularly relevant in non-routine or emergency situations.

This textbook is aimed at those pilots and ATC controllers who have already achieved level 3 and want to raise their level of English language skills. It covers Plain English in an aviation context essential to communicate within the aviation community and focuses on the skills necessary to comply with the ICAO language proficiency requirements: pronunciation, structure, vocabulary, fluency, comprehension and interaction.

Each unit consists of discussions of non-routine situations and includes vocabulary, grammar, listening and communicative exercises, as well as pronunciation drills.

Emphasis is placed on content-based, safety-focused English around important safety and operational topics with authentic materials and situations of real interest to pilots and controllers – motivating them to improve their English language abilities. The aviation-specific topics include:

- Depressurization;
- Icing;
- Landing Gear Problems;
- Fires;
- Bird Strike;
- Hijacking;
- Airspace Infringement.

This text book may help learners to increase their ability to communicate with confidence and equip them with very specific skills needed to function effectively and safely in aviation.

DEPRESSURIZATION


PREVIEW

Describe the picture using the questions below.



1. Where is the aircraft?
2. Can you identify what type it is?
3. What has happened?
4. Do you think it happened in flight or on the ground?
5. What could have caused the damage?
6. If it occurred during the flight, do you believe the passengers are O.K.?
7. Who do you think is the man looking at the hole?
8. Will it be possible to repair the aircraft or is it supposed to be written off?

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description study the following word list. Listen to and repeat the words and sample sentences.**

afterwards (<i>adv</i>)	впоследствии, позднее, потом <i>e.g. The evacuation was carried out successfully and shortly afterwards the injured passengers were taken to hospital.</i>
don (<i>v</i>)	надевать <i>e.g. In case of decompression the crew must don oxygen equipment as soon as possible.</i>
breathable (<i>adj</i>)	пригодный для дыхания <i>e.g. In the event of an emergency depressurization, the crew shall descend immediately to a breathable altitude.</i>
uneventful (<i>adj</i>)	не имеющий важных последствий, без последствий <i>e.g. In spite of some problems with the right main gear, the landing was uneventful.</i>
vomit (<i>v</i>)	страдать рвотой, тошнить <i>e.g. As the plane hit some air pockets a female passenger felt sick and then vomited.</i>
reveal (<i>v</i>)	обнаруживать, показывать, выявлять <i>e.g. The investigators' findings revealed serious failings in the airline logistics division.</i>
rupture (<i>n, v</i>)	1) разрыв, пробоина, разрушение; 2) рвать, разрывать <i>e.g. There was a large rupture in the bottom part of the fuselage.</i> <i>The impact ruptured both fuel tanks.</i>
wing leading edge-to-fuselage transition fairing (<i>n</i>)	обтекатель стыка передней кромки крыла с фюзеляжем, зализ <i>e.g. There was a rupture beneath the wing leading edge-to-fuselage transition fairing.</i>

Ex. 2. Read the description of the occurrence.

Qantas Flight 30

On 25 July 2008, a Boeing Company 747-438 aircraft with 365 persons on board, departed Hong Kong International airport on a scheduled passenger transport flight to Melbourne, Australia. Approximately 55 minutes into the flight, while the aircraft was cruising at FL290, a loud bang was heard by the passengers and crew, followed by the rapid depressurization of the cabin. Oxygen masks dropped from the overhead compartments shortly afterwards, and most passengers and crew commenced using the masks. The passengers were terrified but the hostesses did their best calming them down and securing everything so there was no debris to fly around the cabin. There was no panic.

After donning their own oxygen masks, the flight crew carried out the "cabin altitude non-normal" checklist items and started a descent to a lower breathable altitude. A MAYDAY distress radio call was made on the regional air traffic control frequency. After levelling the aircraft at 10,000 feet the flight crew diverted to Manila, where an uneventful visual approach and landing was made. The aircraft was stopped on the runway for an external inspection. Then the plane taxied to the terminal unassisted, where the passengers and crew disembarked. Many passengers were extremely distressed as they got off the plane, with some vomiting. There were no reported injuries.

The inspection of the aircraft by the operator's personnel and Australian Transport Safety Bureau investigators revealed a rupture in the lower right side of the fuselage, which extended for approximately 2 metres along the length of the aircraft and 1.5 metres vertically immediately beneath the wing leading edge-to-fuselage transition fairing (which had been lost during the event).

After clearing the baggage and cargo from the forward aircraft hold, it was found out that one passenger oxygen cylinder had sustained a sudden failure and forceful discharge of its pressurized contents into the aircraft hold, rupturing the fuselage in the vicinity of the wing-fuselage leading edge fairing. The cylinder had been propelled upwards by the force of the discharge, puncturing the cabin floor and impacting the door frame, door handle and overhead panelling, before falling to the cabin floor and exiting the aircraft through the ruptured fuselage.

Ex. 3. The following words are taken from the text. Match a word in column A with its definition in column B.

A	B
1. bang	a) hit something with great force
2. impact (v)	b) not helped by anyone or anything
3. afterwards	c) in which nothing unusual or dangerous happens
4. unassisted	d) the action of releasing a substance such as a liquid or gas
5. rupture (v)	e) put on
6. uneventful	f) a sudden loud noise
7. don	g) show something that previously could not be seen
8. reveal	h) get burst or broken apart
9. discharge (v)	i) go out, leave
10. exit	j) at a later time

Ex. 4. The words in the chart below have all appeared in the description of the emergency depressurization. Use your dictionary to find the other parts of speech.

Noun	Adjective	Verb
	breathable	
	uneventful	—
discharge		
	unassisted	
		reveal
	pressurized	
		divert
	forceful	

Ex. 5. Use the words in the previous exercise in the correct form to fill in the gaps.

1. Some passengers were in need of medical
2. The doctor told the injured passenger to take a deep and then to out.

3. The wind was increasing to gale
4. The investigators reconstructed the chain of leading to the accident.
5. A band of high is moving across the area.
6. The cabins of modern passenger aircraft are in order to create an environment which is physiologically suitable for humans.
7. One of the hand fire extinguishers was

Ex. 6. Think of all possible word combinations with the following words in columns A and B.

A	B
1. external	a) compartment
2. depart	b) depressurization
3. shortly	c) the fuselage
4. don	d) afterwards
5. rupture (v)	e) into the flight
6. level (v)	f) inspection
7. overhead	g) the aerodrome
8. rapid	h) the aircraft
9. 55 minutes	i) an oxygen mask

Ex. 7. Complete the second sentence so that it is as similar in meaning as possible to the first. Use the word given (it must not be changed) and some other words.

e.g. Oxygen masks dropped from the overhead compartments shortly after the loud bang.

deployed

Oxygen masks automatically deployed shortly after the loud bang.

1. The flight crew should put on oxygen masks as a first and immediate step in case of rapid depressurization.

donned

In case of rapid depressurization the oxygen masks immediately by the flight crew.

2. The flight crew started a descent to an altitude at which they and the passengers could breathe without supplementary oxygen.

breathable

The flight crew began altitude.

3. A Mayday distress radio call was made by the captain on the regional air traffic control frequency.

declared

The captain to the regional ATC.

4. The landing was uneventful.

safely

The crew managed

5. The aircraft taxied to the terminal unassisted.

power

The aircraft taxied

6. There were no reported injuries among the passengers.

none

It was reported injured.

7. During the external inspection of the aircraft a sizeable rupture was found in the fuselage.

revealed

The a sizeable rupture in the fuselage.

8. One of the oxygen cylinders in the forward hold burst and made a hole in the cabin floor.

ruptured

The depressurization was caused the cabin floor.

SPEAKING

Ex. 1. Read the description text "Qantas Flight 30" on p. 6 again and answer the questions.

1. What aircraft type was involved in the incident?
2. Was it operating a domestic flight? Do you remember the destination?
3. Did they arrive there uneventfully?

4. At what stage of the flight did the incident occur?
5. What actually happened?
6. How did the passengers react?
7. What actions were taken by the flight crew?
8. Why was it vitally important to descend the aircraft to 10,000 feet as soon as possible?
9. What happened on landing?
10. Why was the aircraft stopped on the runway?
11. What did the external inspection reveal?
12. What had caused the rupture in the fuselage?
13. Where exactly was it?
14. How many passengers and crew members were hurt?

Ex. 2. Role Play.

- 1. Imagine you are the captain of Qantas 30 flight. Declare an emergency and inform ATC of what has happened and say your intentions.**
- 2. You are a cabin attendant of that flight. Inform the passengers of the emergency situation and try to calm them down.**

LISTENING, READING AND SPEAKING

Ex. 1. You are going to listen to another incident description. Before you listen, study the following definitions of the words from the story.

suck (<i>v</i>)	pull something or somebody with great force in a particular direction
window frame (<i>n</i>)	supporting structure of a window
restrain (<i>v</i>)	stop somebody or something from doing something, especially by using physical force
frostbite (<i>n</i>)	a medical condition in which parts of the body, especially the fingers and toes, become damaged as a result of extremely cold temperatures
fracture (<i>n</i>)	a break in a bone
dislocation (<i>n</i>)	a medical condition in which a bone is put out of its normal position in a joint

Ex. 2. Try to predict what the story is going to be about.

 **Ex. 3. Listen to the story twice. Try to remember the details.**

Ex. 4. Read the following information on the same incident. But there are six factual mistakes in it. Find and correct them.

British Airways Flight 5390 was a British Airways flight between Birmingham International Airport in England and Madrid, Spain. On 10 June 1990 when the plane had climbed to 17,300 feet, a large bird struck and smashed the right windscreen. The aircraft's captain was blown out of the windscreen opening and vanished in the skies. The control of the aircraft was taken over by the first officer, who managed to perform an emergency landing in Southampton. After landing the first officer was taken to hospital where he was found to be suffering from frostbite, bruising and shock. Nine passengers and one of the cabin attendants were badly injured during the incident.

Ex. 5. You are going to listen to Nigel Ogden, the cabin attendant who saved the captain by hanging on to his legs. Before listening think of some questions you would like him to answer.

 **Ex. 6. Listen to the recording. What other details are given in the story?**

Ex. 7. Role Play. Work in pairs. One of you is a passenger of that flight. You have just disembarked the plane and are really distressed. Reply to the questions of the other student, who is a flight safety inspector and needs to know the details of what happened.

Ex. 8. Try to identify the real cause of the incident. Why do you think the left windscreen, on the captain's side of the cockpit, suffered a catastrophic failure?

Ex. 9. Compare your ideas with the accident investigators findings.

Accident investigators found that a replacement windscreen had been installed 27 hours before the flight, and that the procedure had been approved by the Shift Maintenance Manager. However, 84 of the 90 windscreen retention bolts were too small in diameter, while the remaining six were too short. The investigation revealed that the previous windscreen had been fitted with incorrect bolts, which had been replaced on a "like for like" basis by the Shift Maintenance Manager without reference to the maintenance documentation.

GRAMMAR

Ex. 1. Study the following grammar.

Expressing Ability: can, could, be able to

Can, could and be able to all express ability.

Can expresses ability in the present and future.

*e.g. "I **can't** hold on any more", Nigel thought.*

Can and **be able to** have the same meaning, but **can** is more commonly used to talk about present or general ability. **Be able to** is more formal.

*e.g. "I **can** lessen the risk of mid-air collision by increasing the speed", the co-pilot thought.*

Can has only two forms: **can** (present) and **could** (past) and borrows the rest of its forms from **be able to**.

*e.g. "I **haven't been able to** establish contact with ATC yet", the co-pilot said. (**Can** has no present perfect).*

*Nigel thought, "We **might not be able to** land safely". (**Can** has no infinitive).*

*"Will I **be able to** fly again?" the captain asked the doctor. (**Can** is not used with **will**).*

Talking about the past **could** is often used with the following verbs:

see hear smell taste remember understand

*e.g. All I **could see** were his legs while his head and torso were outside.*

*The cabin crew **could hear** a strange noise coming from the left side.*

With other verbs **could** expresses general ability in the past for repeated actions (**Was / were able to** is also possible).

*e.g. My grandfather **could** speak four languages.*

But if you mean that someone *managed to* do something *in one particular situation*, you have to use **was / were able to**, **managed to** or **succeeded (in V + ing)** instead of **could**.

*e.g. He **was able to** land the plane safely. (Not "could get").*

*Compare: He **succeeded in** landing the plane safely.*

*e.g. The passengers **were able to** disembark from the front and rear stairs. (Not "could disembark").*

*Compare: The passengers **managed to** disembark from the front and rear stairs.*

The negative **couldn't** is possible in all situations (talking about both particular situations and general ability).

*e.g. Only five years ago I **couldn't** speak English at all. (General ability).*

*They **couldn't** calm down the screaming female passenger. (One particular situation).*

Note: **can** and **could** are often used to ask for and give permission.

*e.g. **Could** I speak to the captain, please?*

*You **can't** smoke in here.*

Ex. 2. Read another incident report and some comments on it taken from the Southwest Airlines official blog. Fill in the gaps with *can, be able to, succeed in, and manage to* in the correct forms.

Southwest Airlines Flight 2294 was a scheduled US passenger aircraft flight which made an emergency landing at Yeager Airport in Charleston, West Virginia, on 13 July 2009, after a "football sized" opening in the airplane's fuselage caused depressurization of the passenger cabin and activating the passengers' onboard oxygen masks throughout the cabin while the plane was cruising at 34,000 feet. All 126 passengers and crew of five onboard landed safely.

Comments:

1. I am curious as to see what Southwest do to reassure my safety on the flights I have to and from San Diego next week.

Anonymous.

2. Dear Anonymous: I am curious to see what assurances you provide that your car trip to and from the airport will be safe. Southwest has a phenomenal safety record, far better than any other airline and certainly better than the average driver. That is why they land the aircraft safely.

Mark Osborne.

3. Dear Anonymous – we are working with the investigators to determine the cause of the problem. I hope we release their findings soon.

Paula Berg, Southwest Airlines.

4. Dear Anonymous, there are no guarantees in this world. Southwest emergency training paid off in this incident. They knew what to do and got everyone off the plane safely. You rely on them.

KT Moore.

5. Is there a book called Nuts that was written by the Southwest President?

I google it.

Ike.

6. I admire the way they handle the situation. The cabin crew with no worry on their faces keeping the passengers calm.

Tim.

7. Out of the many things that go wrong while flying a small hole in the fuselage isn't that big of a deal. You deny it!

Prospective Employee.

8. Southwest has always had a fantastic safety record. My hat is OFF to all involved!! All I say is WOW!!! This company really does care as if all are family! I LUV them!!! I was among the passengers and I see how efficiently the crew members performed!

Gordon.

9. you tell me the tail number?

Anonymous.

10. I always fly SW when possible. I just wish they fly overseas!!

Patti.

Ex. 3. Translate the sentences using *can, be able to, succeed in, manage to* in the correct forms.

1. Высота в кабине быстро поднималась. Экипаж не мог контролировать наддув.

2. Они не смогли продолжить полет из-за внезапной разгерметизации.

3. Членам кабинного экипажа удалось успокоить пассажиров и подготовить их к аварийной посадке.

4. Пассажирка во втором ряду не сумела надеть кислородную маску, и стюардесса помогла ей.

5. Несмотря на сложные метеоусловия, экипаж сумел произвести успешную посадку воздушного судна.

6. В самолете происходила постепенная разгерметизация салона. Члены экипажа и пассажиры могли дышать, но не получали достаточно кислорода.

7. Просим носилки, так как больной пассажир не в состоянии передвигаться сам.

8. Бортпроводники нашей авиакомпании прекрасно подготовлены и в случае необходимости сумеют оказать помощь даже в экстремальной ситуации.

9. Мы не смогли связаться с УВД «Домодедово». Передайте им, что мы запрашиваем посадку на их аэродроме.

REVIEW

Ex. 1. Answer the questions below.

1. Can you define the term "depressurization"?
2. Why is depressurization regarded as a very dangerous situation?
3. What may cause it?
4. Which factors affect the speed and violence of decompression?
5. What types of depressurization do you know?
6. Do you know how long explosive depressurization takes?
7. What happens in the cabin in case of explosive depressurization?
8. What risks does gradual depressurization pose to humans?
9. What can the lack of oxygen result in?
10. What else may people suffer from if they have gone through in-flight depressurization?
11. What are the crew's actions in case of depressurization?
12. What is the highest breathable altitude?
13. Can you explain the difference between a pressurization problem and depressurization?
14. Have you or any of your colleagues encountered a depressurization situation or a pressurization problem? What happened and how did it all end?

Ex. 2. Read the information below and compare your answers with it.

Uncontrolled Depressurization

Uncontrolled depressurization is an unexpected drop in the pressure of an aircraft cabin.

Generally uncontrolled decompression results from:

- human error;
- material fatigue;
- engineering fault;

- impact;
- or failure of the aircraft pressurization system.

The speed and violence of the depressurization is affected by the size of the aircraft, the differential pressure between the inside and outside of the aircraft and the size of the leak hole.

Below 10,000 ft, the reduced levels of oxygen have little effect on most crew and passengers but the higher the aircraft is, the greater the impact of lack of oxygen. Above 20,000 ft, lack of oxygen leads to loss of intellectual ability followed by unconsciousness and eventually respiratory and heart failure. Importantly, the time of useful consciousness reduces with altitude – at 35,000 feet it is less than one minute.

There are three distinct types of decompression events in aircraft:

- explosive decompression;
- rapid decompression;
- slow or gradual decompression.

Explosive depressurization takes less than 0.5 seconds. The cabin air may fill with dust and debris, and fog caused by drop in temperature and change in relative humidity. Crew may be momentarily dazed or shocked, especially if the event was unexpected, and may therefore be slow to fit oxygen masks. The risk of lung trauma is very high, as is the danger from any unsecured objects which can fly around the aircraft.

Rapid depressurization typically takes more than 0.5 seconds, allowing the lungs to decompress faster than the cabin. The risk of lung damage is still present, but significantly reduced compared to explosive decompression.

Slow, or gradual, depressurization can only be detected by instruments. It occurs so slowly that it may go unnoticed before hypoxia sets in. The great danger of such depressurization is crew incapacitation.

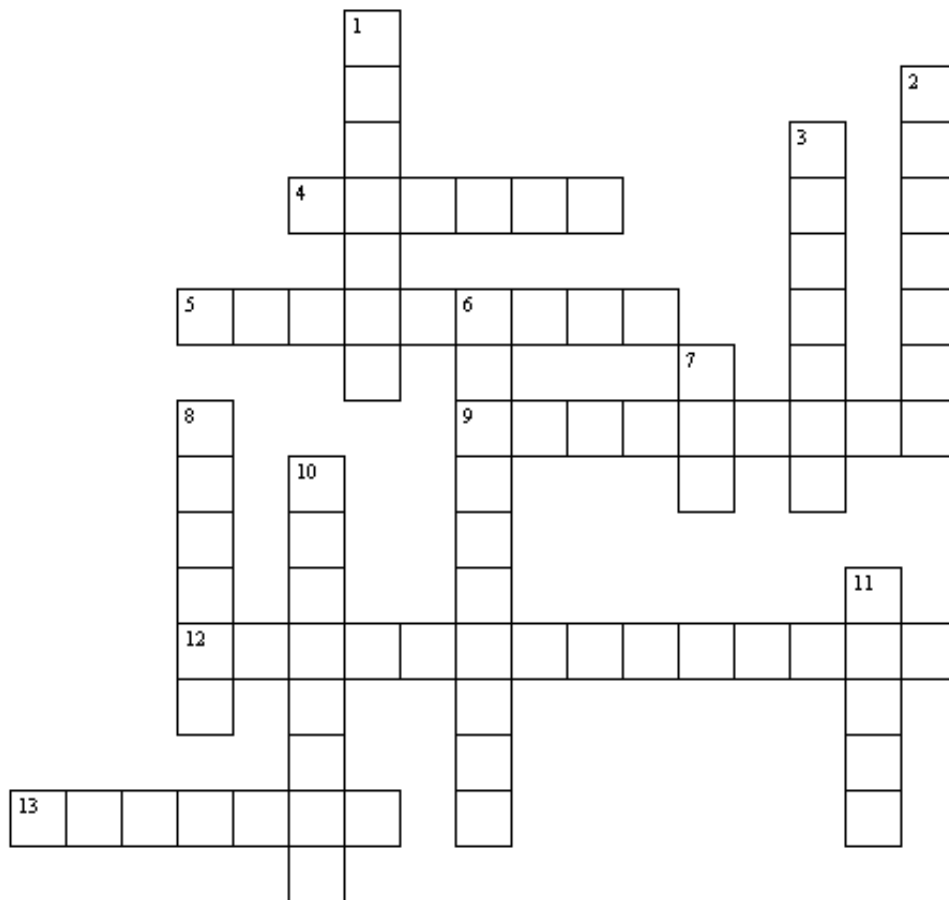
In the event of loss of pressurization, it is essential that the crew don oxygen equipment as soon as possible and descend immediately to an altitude at which they and the passengers can breathe without supplementary oxygen – conventionally 10,000 ft.

Decompression injuries:

- hypoxia (headaches, fatigue, shortness of breath, a feeling of euphoria and nausea);

- barotraumas (pains in the ears, eyes, dental pains);
- decompression sickness (confusion or memory loss (amnesia), headache, unexplained extreme fatigue, dizziness, vomiting and unconsciousness);
- physical trauma caused by debris and loose objects flying around the cabin;
- frostbite or hypothermia from exposure to freezing cold air at high altitude.

Ex. 3. Do the crossword puzzle. All the words are related to the depressurization issues discussed in this unit.



Across: **4.** (*n*) Another word for "trauma". **5.** (*n*) A medical condition in which parts of the body, especially the fingers and toes, become damaged as a result of extremely cold temperatures. **9.** (*adj*) What do we call depressurization that happens very quickly? **12.** (*n*) Inability to perform your duties. **13.** (*n*) Another word for a "hole in the fuselage or somewhere else".

Down: **1.** (*n*) Safety seat belts and shoulder straps to keep pilots from moving off. **2.** (*v*) To take air into your lungs and send it out again. **3.** (*n*) The disease

caused by the lack of oxygen supply to the human body. **6.** (*adj*) What do we call an altitude at which humans can breathe without supplementary oxygen? **7.** (*v*) To put something on. **8.** (*n*) pieces of wood, metal, brick, etc. that are left after something has been destroyed. **10.** (*v*) to make a small hole in something. **11.** (*v*) to bring food from the stomach back out through the mouth.

Ex. 4. Translate the following accident report into English.

14 августа 2005 года произошла одна из крупнейших авиакатастроф в истории Греции и Кипра. Самолет, выполнявший рейс 522 авиакомпании Helios Airways из Ларнаки в Афины и далее в Прагу, разбился в горах неподалеку от селения Грамматика, в 40 км к северу от Афин.

Вскоре после вылета из аэропорта «Ларнаки» экипаж доложил о неисправности системы кондиционирования, но после входа в зону ответственности афинских диспетчеров не отвечал на вызовы с земли. ВВС Греции были извещены о самолете-нарушителе, и в воздух поднялись два перехватчика.

При визуальном контакте перехватчиков с рейсом 522 было обнаружено, что оба пилота без кислородных масок и находятся в бессознательном состоянии в то время как в пассажирском салоне видны свисающие с верхних полок кислородные маски.

Самолет врезался в гору после того, как закончилось топливо. На борту Boeing 737 находился 121 человек. Причиной катастрофы стала разгерметизация кабины самолета и потеря дееспособности обоими пилотами.

ICING


PREVIEW

Describe the picture using the questions below.



1. Where is the plane?
2. Do you know what aircraft type it is?
3. What season is it? Try to assume the weather conditions.
4. What do you think has happened to the plane?
5. Why did the crew have to make the emergency landing?
6. Do you believe there are any survivors?
7. What damage has the aircraft sustained?

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description study the following word list. Listen to and repeat the words and sample sentences.**

respond (v) (to sth / sb)

реагировать, отвечать

e.g. How did they respond to the news?

throttle down / back (v)	уменьшить газ <i>e.g. Due to engine vibration the crew had to throttle down.</i>
simultaneously (adv)	одновременно <i>e.g. Both engines failed simultaneously.</i>
pitch an a/c down (v)	пикировать <i>e.g. The pilots pitched the aircraft down to avoid the danger of collision.</i>
stall (n, v)	сваливание ВС, сваливаться (на крыло) <i>e.g. The right wing stalled the aircraft rolled to a bank of 90 degrees and pitched down.</i>
apparently (adv)	1) вероятно, предположительно; 2) очевидно, несомненно <i>e.g. In the final stage of the flight, the crew apparently lost their spatial orientation.</i>
fail to do sth (v)	не суметь что-либо сделать <i>e.g. They failed to restart the engine.</i>
imminent (adj)	надвигающийся, неизбежный, неминуемый <i>e.g. In spite of the imminent crash landing the crew remained calm and self-controlled.</i>
brace position	специальное положение (поза), которую принимают по инструкции бортпроводников пассажиры во время аварийной посадки <i>e.g. Before the emergency landing the cabin attendants told the passengers to adopt the "brace for impact" position, which later saved their lives.</i>
contributory cause of the accident	причина, способствующая аварии <i>e.g. Snowy and icy conditions are frequent contributory causes of airline accidents.</i>
(in)sufficient (for sb / sth) (adj)	(не)достаточный <i>e.g. The pilot's level of English was insufficient for effective communication with the ATC controllers.</i>
restore an engine operation	восстановить работу двигателя <i>e.g. The crew attempted to restore the engine operation but with no success.</i>

surge (<i>n, v</i>)	1) помпаж; 2.) помпажировать, глохнуть, работать в критическом режиме <i>e.g. The ingestion of foreign objects into an engine can lead to its surge.</i> <i>The engine surged because of the airflow disruption caused by a foreign object and damage to the blades.</i>
re-evaluate (<i>v</i>)	оценивать по-новому, давать новую оценку <i>e.g. They needed to re-evaluate the effectiveness of de-icing procedures.</i>
ATR (Automatic Thrust Restoration)	автоматическое восстановление тяги <i>e.g. ATR is a system that in case of engine failure automatically increases the thrust on the other engine.</i>

Ex. 2. Read the occurrence description.

Gottröra Crash

Scandinavian Airlines Flight 751, a McDonnell Douglas MD-81 with 122 passengers on board, took off from Stockholm-Arlanda Airport, Sweden, in the early morning of December 27, 1991 and was headed to Warsaw, Poland through Copenhagen, Denmark.

After 25 seconds of flight, noise and vibrations from the engines were first noticed. The flight crew responded by throttling down, but an automatic system simultaneously increased throttle as a response to increasing altitude. 39 seconds later problems with the other engine began, and finally both engines failed at 76 and 78 seconds into the flight, at 980 meters of altitude. A No. 1 engine fire warning made the crew activate the fire extinguishing system. The pilot responded to the engine loss by pitching the aircraft down before levelling it, to try and make the aircraft glide the longest possible distance without stalling. The pilots requested a return to Arlanda and attempted the restart procedure, but with the plane breaking through the cloud cover at 270 meters, the pilot chose an opening in the forest near Gottröra for the immediate emergency landing. The wheels were selected down and Stockholm control was informed of the imminent crash-landing.

The plane hit the trees before touching down, losing a large part of the right wing, then struck ground tail-first and slid along the ground for 110 m. The fuselage was broken into three pieces, but there was no fire. 25 people were injured, two of them seriously. Nobody died in the accident, which is known in Sweden as the "Gottröra crash". One of the reasons for the lack of fatalities was the passengers' "brace position".

It was found out later that the crash had been caused by ice from the wings which had entered both rear-mounted engines, known as "foreign object damage". Apparently the maintenance crew had failed to notice the ice, which had formed during the night before when temperature decreased below freezing point. Another contributory cause of the accident was insufficient training of the crew for this particular aircraft: they were not informed about an automatic thrust system (ATR for "Automatic Thrust Restoration"), and they were not trained in restoring engine operation after they repeatedly surged. The reason they were not informed was that McDonnell Douglas had not informed SAS that the ATR system was installed. After the Gottröra accident, airports and airlines operating in cold regions had to re-evaluate and modify their de-icing procedures.

Ex. 3. Match the definitions in column A with the words in B.

A	B
1. A fairly sudden loss of effectiveness of an aerodynamic surface.	a) throttle down
2. An instruction that can be given to prepare for an aircraft crash when it must make an emergency landing over land or water.	b) glide
3. Reduce the engine power	c) lack
4. Happening or done at the same time as something else	d) stall
5. Fly without the use of engine thrust	e) surge
6. A loss of compressor performance leading to a reduction in the fuel flow to the engine	f) brace for impact
7. The state of not having something or not having enough of something	g) simultaneously

Ex. 4. Match the words in column A with their opposites in B.

A	B
1. skilled	a) retract
2. select down	b) actually
3. make sb do sth	c) manage to do sth
4. noise	d) untrained
5. fail to do sth	e) silence
6. apparently	f) prevent sb from doing sth

Ex. 5. Think of all possible word clusters with the following words in columns A and B.

A	B
1. contributory	a) foreign objects
2. increase	b) the aircraft
3. level	c) the aircraft glide
4. adopt	d) cause of the accident
5. ingest	e) the crash
6. cause	f) in an accident
7. make	g) insufficient training
8. two minutes	h) throttle
9. attempt	i) to a stop
10. die	j) "brace for impact position"
11. come	k) into the flight
12. get	l) the restart procedure

Ex. 6. Complete the second sentence so that it is as similar in meaning as possible to the first. Use the word given (it must not be changed) and some other words.

*e.g. The aircraft was headed to Warsaw, Poland through Copenhagen, Denmark.
stopover*

*The aircraft was headed to Warsaw, Poland **with a stopover** in Copenhagen, Denmark.*

1. Noise and vibration from the engines were first noticed after 25 seconds of flight.

into

25 seconds noise and vibrations from the engines.

2. The flight crew responded to the unstable engines operation by throttling down.

thrust

The pilots due to noise and vibration from the engines.

3. A No. 1 engine fire warning made the crew activate the fire extinguishing system.

had

The crew due to fire warning in No. 1 engine.

4. The pilot responded to both engines failure by pitching the aircraft down before levelling it.

pitching

The pilot's response before levelling it.

5. The pilots requested a return to Arlanda.

intention

The pilots reported to the ATC controller.

6. They informed Stockholm Control about the imminent crash-landing.

emergency

Stockholm Control landing.

7. Ice from the wings entered both rear-mounted engines.

ingested

Ice into both rear-mounted engines.

8. The fuselage was broken into three pieces.

split

The fuselage pieces.

9. The major cause of the crash was ingestion of ice from the wings into both rear-mounted engines.

caused

The crash into both rear-mounted engines.

10. The crew did not undergo sufficient training in restoring the engine operation after its surge.

skilled

The crew prescribed actions in case of engine surge.

SPEAKING

Ex. 1. Read the text "Gottröra Crash" on p. 21 again and answer the following questions.

1. What is the story about?
2. Which airline was operating the flight?
3. Did they perform a domestic or international flight?
4. At what stage of the flight did the problems begin?
5. What actually happened?
6. What actions did the crew take?
7. Where did the aircraft land?
8. How many occupants were injured?
9. How did the crew manage to avoid fatalities?
10. What did the investigation reveal? What was the major cause of both engines surge?
11. Were there any contributory factors? What were they?

Ex. 2. The text is divided into 4 paragraphs. Think of an appropriate heading for each of them and write down the headings.

Ex. 3. Retell the story using your headings.

Ex. 4. Imagine you are the pilot-in-command of flight 751. "Transmit" an emergency message to the ATC controller. Inform him of what has happened, report your intention, the situation on board and give any relevant information, which you think is necessary.

Ex. 5. Work in pairs. One of you is a passenger who survived in the Gottröra crash, the other is your friend, who came to visit you in hospital. Make up a dialogue and act it.

GRAMMAR

Ex. 1. Read the description of the de-icing procedure applied to the SAS MD-81 at Arlanda airport and complete the gaps with the following prepositions.

by for during to of from with on in to at for in

The MD-81 arrived (1) Zurich at 22.09 and was parked at gate 2 overnight with temperatures of around +1 degree Celcius. Approximately 2550 kg of fuel remained (2) each wing tank. The aircraft was scheduled to leave Stockholm (3) Copenhagen (4) 08.30 and the temperature had dropped (5) -0 degrees (6) the early morning. (7) the night and in the early morning clear ice had formed (8) the upper side (9) the wings, but this was not detected (10) the ground crew member who checked the forward part of the wing. The aircraft was fuelled (11) 1400 kg of fuel and was ready (12) de-icing at 08.30, which was done using 850l of Type I fluid. After the de-icing the mechanic didn't check whether there was any clear ice on the upper side of the wings, since he had previously found none. The flight was then cleared to taxi (13) runway 08. The holdover time* was not exceeded and the aircraft took off at 08.47.

Ex. 2. Study the forms of the Passive Voice.

	Simple	Continuous	Perfect
Present	am } is } + V ₃ are }	am } are } being + V ₃ is }	have } has } been + V ₃
Future	will be + V ₃	–	will have been + V ₃
Past	was } were } + V ₃	was } were } being + V ₃	had been + V ₃

* Holdover Time – the time for which a given aircraft anti-icing treatment will remain valid – время защитного действия противообледенительной жидкости.

Note:

We can use Passive Forms of the Infinitive (**be + V₃**) after modal verbs and a number of other verbs (for example: have to, be going to, want to, seem to, appear to). Read the following examples:

*The ability of a wing to develop lift **can be** greatly **decreased** even by a small amount of ice or coarse frost on it.*

*Aircraft **must be** properly **de-iced** before take-off.*

*Pilots **should be equipped** with a special ice detector in order to leave icy areas they have flown into.*

*The use of personal electronic devices and calculators **may be prohibited** when an aircraft is below 10,000 feet, taking off, or landing.*

*The elevator **appears to be** seriously **damaged**.*

Ex. 3. In the two texts about "Gottröra Crash" on pp. 21 and 26 there are some passive verb forms (twelve in the first one and six in the other). Find them.

Ex. 4. Change from the active into the passive.

1. Clear ice can alter dramatically the aerodynamic shape of airfoils.
2. Sharp components of the aircraft, such as their leading edges, fins, aerials, gather ice more readily than blunt components.
3. Pilots should conduct a careful preflight inspection of the aircraft to ensure that there is no ice or frost on its surfaces before take-off.
4. Ground staff use special equipment to spray de-icing fluids on the wing.
5. Thanks to aviation you can pass over great distances in a matter of minutes.
6. The aviation community cannot ignore the environmental problems caused by aircraft operation.
7. Most airlines train their crews to deal with emergency situations.
8. Airport authorities must keep the maneuvering areas clear of debris.
9. The crash-landing disrupted the aerodrome operation for 24 hours.
10. Ground vehicles may sometimes damage aircraft.
11. Airlines should fire the pilots for being intoxicated while performing their duties.

Ex. 5. Here is the Board of Accident Investigation report on the same Gottröra Crash. Fill in the gaps with the correct forms of the verbs, either active or passive. Pay attention to the appropriate use of past tenses as well.

The aircraft which (*operate*) by Scandinavian Airlines System (SAS) (*take off*) on December 1991 at 08.47 from Stockholm / Arlanda airport. It (*land*) at Arlanda at approximately 22.10 hours the previous day and (*park*) outdoors overnight. Prior to take-off the aircraft (*de-ice*).

The captain (*make*) a rolling take-off, which was normal up to the rotation. But while lifting off the crew (*hear*) an abnormal noise, which they could not identify.

After approximately 25 second flight the right engine (*start*) to surge. The captain (*throttle back*) on that engine, but without the surging ceasing.* The surges (*continue*) until the engine stopped delivering thrust 41 seconds after the surges (*start*).

When the flight (*last*) about 65 seconds the left engine also (*start*) to surge, which the pilots (*not / notice*) before this engine also (*lose*) thrust. This happened two seconds after the right engine (*fail*).

The crew (*decide*) to make an emergency landing. Approaching the field, which (*choose*) for landing, the plane (*collide*) with trees and the major part of the right wing (*tear off*). The tail of the aircraft (*strike*) the ground first. After impact the aircraft (*slide*) along the ground for approximately 110 meters before coming to rest. The fuselage (*break*) into three pieces. No fire broke out. One passenger suffered a disabling back injury. Apart from four persons, all on board (*make*) their own way out of the aircraft.

The Board of Accident Investigation found that the accident (*cause*) by SAS instructions and routines being inadequate to ensure that clear ice (*remove*) from the wings of the aircraft prior to take-off. During lift-off clear ice came loose and was ingested by the engines causing damage to the fan stages** of the engines, which led to engine surging. The engines (*destroy*) by the surges.

* cease (v) – переставать, прекращать.

** fan stages – ступени вентилятора.


Contributory causes were:

- the pilots (*not / train*) to identify and correct engine surges;
- ATR (Automatic Thrust Restoration) – which was unknown within SAS – (*activate*) and increased engine throttles without the pilots' knowledge.

Ex. 6. Translate the following sentences into English, using either active or passive verb forms in appropriate tenses.

1. Противообледенительная обработка самолета была завершена за 12 минут до взлета.
2. Образовавшийся на крыле лед может оторваться и попасть в двигатель.
3. В двигатели попали частицы льда с крыла, что послужило причиной помпажа.
4. Верхняя плоскость крыла была покрыта льдом.
5. Самолет был оборудован системой автоматического восстановления тяги (ATR), но производитель не проинформировал SAS об этом.
6. В полете обледенения можно избежать с помощью нагрева критических поверхностей электрическим током или горячим воздухом от двигателей.
7. Противообледенительная обработка проводится для удаления с поверхностей ВС замерзших осадков или для предотвращения их появления.

LISTENING AND SPEAKING

 **Ex. 1. You are going to listen to another aviation occurrence description. Study the following wordlist. Listen to and repeat the words and sample sentences.**

burst into flames / erupt into flames	загореться, воспламениться <i>e.g. Immediately after the impact with the ground the plane erupted into flames.</i>
rotation (<i>n</i>)	отрыв переднего колеса при взлете <i>e.g. The term rotation is used in aviation to refer to the upward pitch (nose moves up) of an aircraft, particularly when starting the climb after take-off.</i>
invert (<i>v</i>)	перевернуться <i>e.g. The pilots managed to prevent the aircraft from inverting.</i>

trigger (v)	инициировать, приводить в действие <i>e.g. The fire in the hold triggered the fire warning light.</i>
concussion (n)	контузия, сотрясение <i>e.g. The injuries among the passengers included bone fractures and concussions.</i>
aerodynamics properties (n)	аэродинамические характеристики <i>e.g. The fuselage can be fitted with several improvements, which increases the aerodynamic properties of the aircraft.</i>
contaminate (v)	загрязнять <i>e.g. Ice and frost contaminating the aircraft critical surfaces can be extremely dangerous.</i>

 **Ex. 2. Listen to the story and answer the questions.**

1. What happened?
2. At what stage of the flight did it occur?
3. Did the fire break out immediately after the impact with the runway?
4. What was the cause of the crash?
5. How many people died in the accident?

Ex. 3. Listen to the story again and find out what the following numbers refer to.

3 1834 3–5 4–10 18

VOCABULARY, READING AND SPEAKING

Ex. 1. Before reading another report on the same accident study the following word list. Listen and repeat the words and sample sentences.

palm (n)	ладонь <i>e.g. To carry out a closer inspection of the wing surface the first officer touched it with his palm.</i>
assess (v)	оценивать, давать оценку <i>e.g. In order to reduce the dangers of icing it is necessary to assess the condition of the critical aerodynamic surfaces before the flight.</i>

ambient (*adj*)

внешний, окружающий

e.g. There was substantial temperature difference between the ambient air and the remaining fuel in the tanks after landing.

Ex. 2. In the text below there is some more information on Belavia flight 1834. Complete the gaps with the following prepositions.

on at with after to with between in at for

The airplane had arrived (1) Yerevan 2 hours before scheduled departure and was preparing (2) departure as flight B2-1834 from Yerevan to Minsk (3) with 18 passengers and 3 crew. Refuelling was done (4) automatic mode 25 minutes after landing, and 2200 liters (1802 kg) of Jet-A-1 fuel were added (5) the tanks. Due to reported reducing visibility (6) the main alternate airport, the crew decided to add another 400 liters of fuel about 30 minutes later during flight preparations.

The first officer performed the preflight check of the aircraft about 15 minutes (7) landing (and before refueling) and found all aerodynamics surfaces clean and dry by visual inspection as well as by touching the surfaces (8) the palm of his hand.

After the engine start the crew activated the anti-ice systems of the engines, but the wing anti-ice systems were not activated.

The Interstate Aviation Committee (МАК) performed a test to assess the accumulation and freeze of atmospheric moisture with large temperature differences (9) the ambient air and the remaining fuel in the tanks after landing. It was found that ice accumulated (10) the underside of the wing immediately after landing and grew 25 minutes after landing upon refueling. The upper side of the wing showed dew accumulation after refueling. The fuel temperature at the time of arrival was measured at -21°C , and before departure at -12°C with an ambient temperature of $+8^{\circ}\text{C}$.

Ex. 3. Say whether the following statements are true or false.

1. The report focuses on what actually happened to the Belavia flight immediately after rotation.
2. The aircraft was refuelled with a total of 2,200 liters of fuel.


3. They decided to add some extra fuel due to known icing conditions on route.

4. Although the crew were busy with take-off preparations, they carried out a thorough inspection of the aircraft critical surfaces.


5. The wing anti-ice system was activated, but they forgot to activate the anti-ice systems of the engines.

6. Ice accumulated on the underside of the wing due to worsening weather conditions.


LISTENING AND SPEAKING

 **Ex. 1. You are going to listen to one more accident description. Study the following word list. Listen and repeat the words and the sample sentences.**

droplet (<i>n</i>)	капля <i>e.g. Icing conditions exist when the air contains droplets of supercooled liquid water.</i>
disengage the autopilot	выключить автопилот <i>e.g. The pilot pulled the control column, which disengaged the autopilot.</i>
regain control	восстановить управление <i>e.g. After disengaging the autopilot the captain managed to regain control of the plane.</i>
de-icing boots	противообледенительные профили <i>e.g. De-icing boots are pneumatically inflated rubber boots on the leading edges of airfoil surfaces.</i>
icing certification envelope	эксплуатационные ограничения противообледенительной системы ВС <i>e.g. Pilots are not recommended to perform flights outside the aircraft icing certification envelope.</i>
runback ice	барьерный лед <i>e.g. Runback ice is the result of water freezing on unprotected surfaces and often forms behind deicing boots or heated leading edges.</i>

 **Ex. 2. Listen to the accident description and answer the following questions.**

1. What aircraft type was involved in the accident?
2. What happened?
3. At what stage of the flight did the accident occur?
4. What was the cause of the crash?
5. How many survivors were there?

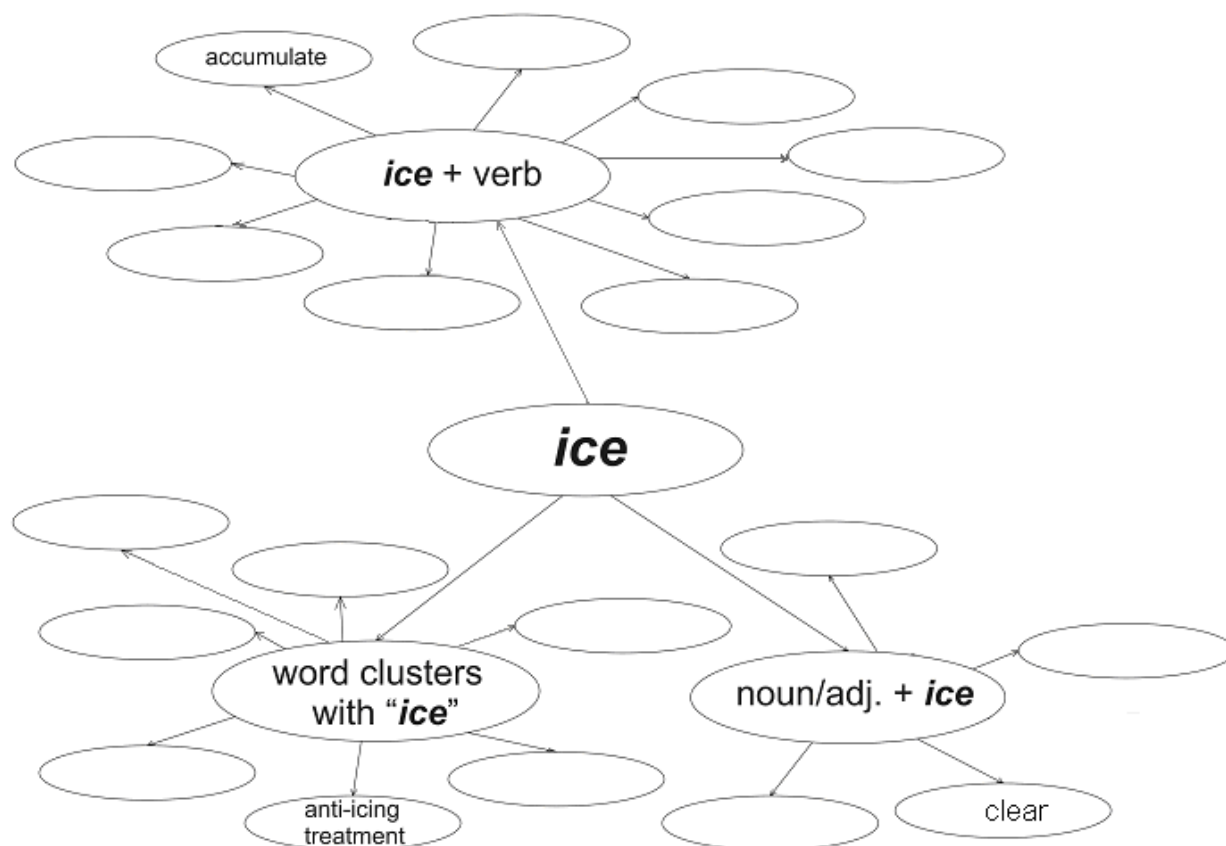
 **Ex. 3. Listen again and then retell the story. The following word clusters will help you.**

operate a domestic flight
 cause delays
 be instructed to hold
 encounter freezing rain
 accumulate on the wing surfaces
 experience an uncontrollable roll
 disengage the autopilot
 regain control
 crash into a field
 cause of the crash

REVIEW

Ex. 1. The words below are all associated with icing. Complete the spaces in the diagram using a dictionary if necessary. Some of the words are already filled to help you.

icing certification envelope	form	runback
accrete	anti-icing fluid	de-icing vehicle
build up	thin	cover
de-icing boots	be ingested	break off
thick	melt	anti-icing system
separate	de-icing procedure	



Ex. 2. Answer the questions.

1. What weather phenomena can cause ice accretion on the aircraft?
2. What happens to the aircraft while flying in icing conditions?
3. What parts of the plane are vulnerable to icing?
4. Why is icing considered to be one of the most serious hazards in aviation?
5. What can ice build-up lead to?
6. How can aircraft be prevented from ice accretion?
7. What is the difference between deicing and anti-icing procedures?
8. Can you explain what 'clean aircraft' concept is?
9. How can frozen moisture be removed from the airframe critical surfaces?
10. What is 'holdover time'?
11. Is holdover time influenced by the ambient temperature?
12. What else is it influenced by?
13. Are all aircraft equipped with ice protection system?

Ex. 3. Using a dictionary read the information below and compare your answers with it.

Icing

In aviation *icing conditions* are those atmospheric conditions that can lead to the formation of water ice on the surfaces of an aircraft, or within the engine.

Many aircraft are not certified for flight into known icing conditions which are certain to exist based on pilot reports, observations, and forecasts.

Effect of Icing

When flying in icing conditions, ice forms on the airframe critical surfaces and if left unchecked, results in dangerous conditions.

Airframe or structural ice adds to an aircraft's weight and disrupts airflow on affected surfaces. The effects include:

- increased stall speed (due to the weight increase and airflow disruption on the wing);
- loss of control (due to disruption of airflow on critical control surfaces);
- in engines, carburetor ice and inlet ice can lead to reduced power, surge or complete engine failure.

Icing Prevention and Removal

Several methods exist to reduce the dangers of icing. The first, and simplest, is to avoid icing conditions altogether, but for many flights this is not practical.

A thorough inspection of all the airframe critical surfaces must be carried out to establish if any existing contaminant is present as the wings and empennage must be completely free of accreted ice at rotation on take off.

If ice is present on an aircraft prior to take-off, this must be removed from its critical surfaces. Removal can take different forms:

- mechanical means, which may be as simple as using a broom or brush to remove snow;
- application of de-icing fluid;
- use of infrared heating to melt and remove contaminants;
- putting the aircraft into a heated hangar until snow and ice have melted.

De/anti-icing procedures

De-icing is the process of removing frozen contaminant, snow, ice, slush, from a surface.

Anti-icing is the process of protecting against the formation of frozen contaminant, snow, ice, slush on a surface between treatment and becoming airborne.

It is essential for the flight crew to determine and monitor the applicable *Holdover Time*, which is the time for which an aircraft can wait after being treated with anti-icing fluid prior to takeoff. Holdover time is influenced by the ambient temperature, wind, precipitation, humidity, aircraft skin temperature, and other factors.

Aircraft De-icing Vehicles

De-icers spray heated de-icing fluid onto aircraft icy surfaces, which prevents ice from forming on the body of the aircraft while on the ground. Aircraft de-icing vehicles usually consist of a large tanker truck, containing the concentrated de-icing fluid, with a water feed and a cherry picker crane, allowing the operator to spray the entire aircraft in as little time as possible: an entire Boeing 737 can be treated in under 10 minutes by a single de-icing vehicle.



A de-icing vehicle treating an American Airlines MD-80 at Syracuse Hancock International Airport, New York

In-flight Icing

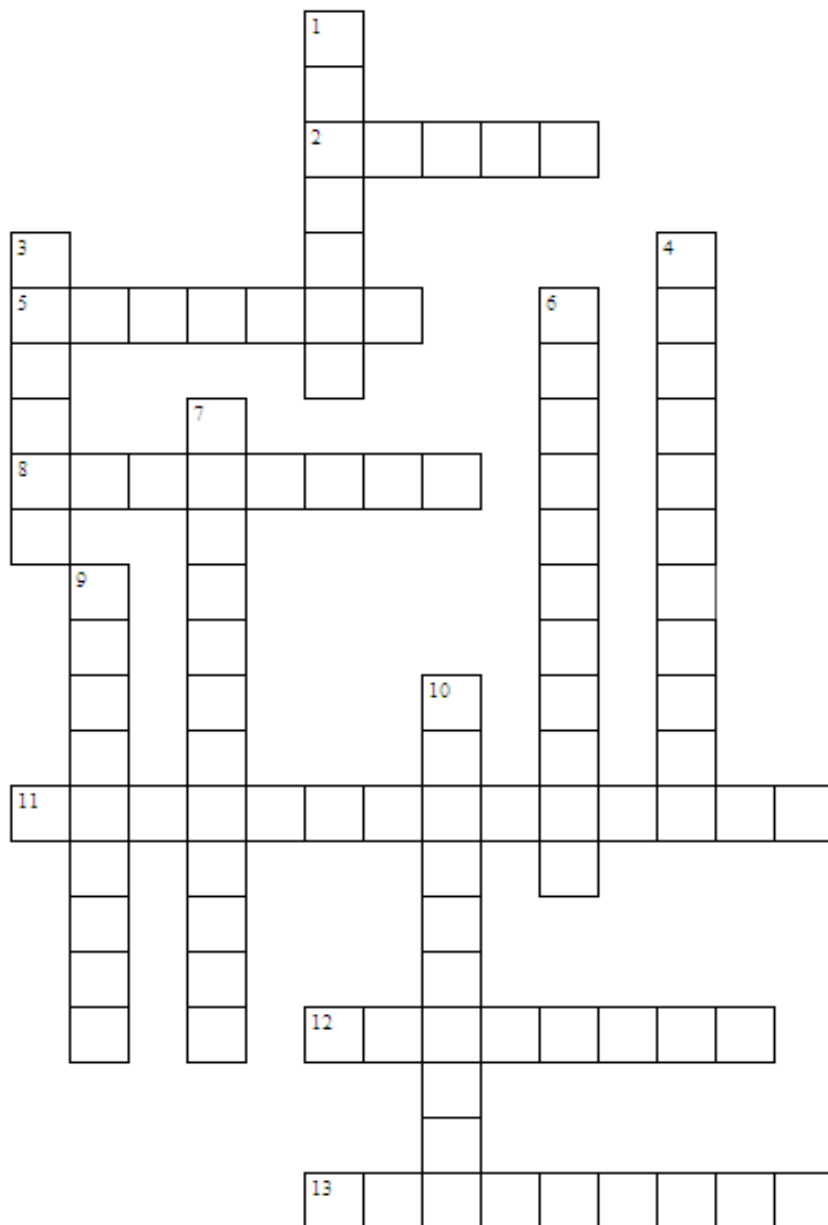
In-flight icing is a serious hazard. It destroys the smooth flow of air, increasing drag, degrading control authority and decreasing the ability of an airfoil to lift. Ice accumulates on every exposed frontal surface of the aircraft – not just on the wings, propeller, and windshield, but also on the antennas, vents, intakes, and cowlings. It builds up in flight where no heat or boots can reach it. It can cause antennas to vibrate so severely that they break. The aircraft may stall at

much higher speeds and lower angles of attack than normal. It can roll or pitch uncontrollably, and recovery may be impossible.

Modern airliners are designed to prevent ice buildup on wings, engines, and tails by either routing heated air from jet engines through the leading edges of the wing, tail, and inlets, or on slower aircraft, by use of inflatable rubber 'boots' that expand and break off any accumulated ice.

Finally, airline dispatch offices keep watch on weather along the routes of their flights, helping the pilots avoid the worst of in-flight icing conditions. Pilots can also be equipped with an ice detector in order to leave icy areas they have flown into.

Ex. 4. Do the crossword puzzle. All the words are related to the icing issues discussed in this unit.



Across: **2.** (*n*) A loss of compressor performance leading to a reduction in the fuel flow to the engine. **5.** (*adj*) Relating to the surrounding area; outside. **8.** (*adj*) Different from what is usual or expected, especially in a way that is worrying, harmful or not wanted. **11.** (*adv*) The opposite of "sufficiently". **12.** (*n*) What do we call the time for which aircraft anti-icing treatment remains valid? **13.** (*n*) A procedure applied to the aircraft to protect it against icing.

Down: **1.** (*v*) To react to something. **3.** (*n*) A large building in which aircraft are kept to prevent ice accretion on their surfaces. **4.** (*n*) A substance that makes something unclean. **6.** (*n*) The people or an organization who have the power to make decisions. **7.** (*adj*) Helping to cause something, often used with the word "factor". **9.** (*v*) Talking of autopilot, the word similar in meaning with "switch off". **10.** (*v*) To gradually increase in number or quality over a period of time; the same as "build up" or "accrete".

Ex. 5. Translate into English.

1. Мы попали в зону переохлажденного дождя. Имеется опасность обледенения. Прошу набор более высокого эшелона.

2. Время защитного действия противообледенительной жидкости истекает через 7 минут.

3. Мы уже превысили время защитного действия противообледенительной жидкости. Просим повторную обработку и новое время согласованного вылета.

4. Из-за обледенения правый крен достиг 20 градусов и не поддается выравниванию.

5. Мы произвели осмотр ВС на предмет образования льда на его поверхностях. Все чисто. Противообледенительная обработка не нужна.

6. У нас помпаж второго двигателя. Видимо, в него попал лед.

Ex. 6. Translate the following accident report into English.

22 марта 1992 года недалеко от аэропорта «Ла Гуардиа» (Нью-Йорк) потерпел катастрофу самолет Fokker F-28. Перед рейсом самолет два раза проходил антиобледенительную процедуру. Тем не менее время действия противообледенительной жидкости после вторичной обработки было превышено, и на крыльях накопился лед. После отрыва самолет потерял скорость и, перевернувшись, упал в залив Флашинг Бей. Погибло 27 человек из 51.

PROBLEMS WITH LANDING GEAR


PREVIEW

Describe the picture using the questions below.



1. What aircraft type is it?
2. Where is the plane?
3. What is wrong with it?
4. Do you think it is about to take off?
5. What do you think has happened?
6. Do problems with landing gear frequently occur?
7. What kind of problems may they be?
8. Have you or any of your colleagues ever had landing gear trouble? Describe what happened, please.

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description study the following word list. Listen to and repeat the words and sample sentences.**

troubleshoot (v)	найти и устранить неисправность, разрешить проблему <i>e.g. The pilots circled the aerodrome several times in an attempt to troubleshoot the undercarriage problem.</i>
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hub (<i>n</i>)	центр, узел <i>e.g. An airline hub is an airport that an airline uses as a transfer point to get passengers to their intended destination.</i>
assess (<i>v</i>)	оценивать, определять <i>e.g. The status of the landing gear was assessed from the ground by both ATC and engineering personnel as safe.</i>
rotate (<i>v</i>)	вращать(ся) <i>e.g. Stay well away from the helicopter when its blades start to rotate.</i>
take advantage of	воспользоваться преимуществом <i>e.g. He took advantage of his job position.</i>
mitigate (<i>v</i>)	ослаблять, смягчать <i>e.g. Since September 11, 2001 tough measures have been taken to mitigate the risks of unlawful interference in airlines operation.</i>
substantially (<i>adv</i>)	существенно, в значительной степени <i>e.g. The tires are substantially damaged.</i>
since (<i>conj</i>)	поскольку, так как <i>e.g. Since the aircraft was low on fuel they declared "fuel emergency".</i>
spark (<i>n</i>)	искра <i>e.g. A spark ignited the fuel in the portside engine.</i>
scrape (<i>v</i>)	скрести, задевать, соприкоснуться <i>e.g. A tug towing a train of baggage carts scraped the fuselage skin.</i>
therefore (<i>adv</i>)	поэтому <i>e.g. They decided to return to the departure aerodrome for emergency landing, therefore they made a 180 degree turn.</i>

Ex. 2. Read the incident description.

JetBlue Airways Flight 292

JetBlue Airways Flight 292 was a scheduled flight from Bob Hope Airport in Burbank, California to John F. Kennedy International Airport in New York City. There were 140 passengers and six crew on board the Airbus A320.

After take-off the pilots realized that they could not retract the nose landing gear. Trying to troubleshoot the problem, they then made a low pass over Long

Beach Municipal Airport in Long Beach (the location of a JetBlue hub) to allow officials in the airport's control tower to assess the damage to the landing gear before attempting to land and it was found that the nose wheel was jammed and rotated ninety degrees to the left, perpendicular to the direction of the fuselage.

Rather than land at Long Beach Airport, the pilot-in-command took the decision that the aircraft would land at Los Angeles International Airport, in order to take advantage of its long, wide runways and modern safety equipment.

The pilots flew the aircraft, which can carry up to 21,255 kg of aviation fuel, over the ocean between their departure aerodrome in Burbank and L.A. International airport for more than two hours in order to burn out fuel and mitigate the risk of fire upon landing. This also served to lighten the plane, reducing potential stress on the landing gear and substantially lowering landing speed as well.

Since JetBlue planes are equipped with Direct TV satellite television, passengers on Flight 292 were able to watch their own life-and-death drama unfolding on live television while the plane circled over the Pacific for hours. The in-flight video system was turned off only before landing when the cabin crew ordered people to assume a crash position, putting their heads between their knees.

Emergency services and fire engines were standing by on the L.A. International airport tarmac in advance of the landing. Although foam trucks were available, they were not used as it was difficult to determine exactly where the runway needed to be foamed, and pre-foaming could also reduce the effectiveness of the aircraft's brakes, potentially causing it to slide off the runway.

The Airbus A320 pilot did an outstanding job. He kept the plane on its rear tires as long as he could before he brought the nose gear down. When the nose gear did touch down, there were sparks and flames from it, the tires tore off, leaving the metal gear scraping the runway for the final few yards, but no serious damage to the rest of the plane. The aircraft came to a stop very close to the end of the 3,382-meter runway 25L. In an attempt to keep the nose gear off the ground as long as possible, reverse thrust was not used to slow the aircraft. The pilots therefore used a much larger portion of the available runway than in a typical landing, stopping 305 m before the end of the runway.

The landing was smooth and no physical injuries were reported. The passengers escaped the aircraft via airstairs (emergency slides were not deployed).

Following the incident, the aircraft was repaired and returned to service.

Ex. 3. Find in the text the substitutes for the following sentences paying attention to the words in italics.

1. Flight 292 *was scheduled to fly* from Bob Hope Airport in Burbank, California to John F. Kennedy International Airport in New York City.

2. After take-off the pilots *became aware* that they could not retract the nose gear.

3. Trying *to sort out* the problem, they then *performed a fly-by* of the tower *to evaluate* the damage to the landing gear.

4. It *was detected* that the front wheels were stuck in a sideway position.

5. *Instead of landing* at Long Beach Airport, the pilot-in-command decided to land at Los Angeles International Airport, in order *to make use* of its long, wide runways and modern safety equipment.

6. They had to burn out fuel for more than two hours in order *to reduce the risk* of fire upon landing and *to considerably decrease* landing speed as well.

7. The cabin crew instructed the passengers *to adopt a "brace for impact" position*, putting their heads between their knees.

8. Emergency services and fire engines *were alerted ahead of the landing*.

9. There was no *severe damage to the plane*.

10. The aircraft *came to a halt* near the end of the 3.382-meter runway 25L.

11. Reverse thrust *was not applied* to slow the aircraft.

12. *It was reported* that none of the occupants was injured.

13. *After the incident* the aircraft was repaired and returned to service.

Ex. 4. Using the text and previous exercise find the synonyms to the following words and word clusters.

1. realize

2. perform a flyby of the tower

3. evaluate the damage to the aircraft

4. try to land

5. It was found that...

6. rather than land

13. serious damage to the aircraft

14. come to a halt

7. decide to land

8. make use of modern safety equipment

9. reduce the risk of fire

10. decrease landing speed considerably

11. assume a crash position

12. ahead of the landing

15. use the reverse thrust

16. after the incident

Ex. 5. The following words are taken from the text. Match them with their definitions given below.


lighten mitigate outstanding hub
foam scrape rotate assess injury
troubleshoot smooth

1. The central and most important part of a particular place or activity.
2. To reduce the weight of something.
3. Extremely good; excellent.
4. A chemical substance that is used to cover the runway in case of belly landing for extinguishing fires.
5. Happening or continuing without any problems.
6. To come into contact with a hard surface making an unpleasant noise by rubbing against it.
7. To move or turn around a central fixed point.
8. To calculate the amount or value of something.
9. To make something less harmful, serious, etc.
10. Harm done to a person's body, for example, in an accident.
11. To solve (a problem).

Ex. 6. Match a word in column A with its antonym in column B.

A	B
1. smooth	a) bad, poor
2. realize	b) front
3. retract	c) increase, intensify
4. increase	d) recorded
5. modern	e) unfold
6. mitigate	f) lower, extend
7. live (<i>adj</i>)	g) be unaware (of)
8. outstanding	h) reduce
9. rear	i) out-of-date, outdated
10. fold	j) rough

PRONUNCIATION

 **Ex. 1. Listen to the pronunciation of the following words and repeat them.**

assess	assessment	rotate
rotation	substantially	perpendicular
equip	equipment	knee
satellite	tarmac	foam

 **Ex. 2. Listen to the sentences with the words above and repeat them.**

READING AND SPEAKING

Ex. 1. Read the text "JetBlue Airways Flight 292" on p. 40 again and answer the questions.

1. Does the story describe an incident or an accident? Why do you think so?
2. What aircraft was involved in it?
3. Why did the pilots fail to retract the nose landing gear?
4. How did they become aware of its sideways position?
5. Why did the captain choose to land at LA International Airport rather than Long Beach Airport?
6. Why did they have to burn out fuel instead of dumping it?
7. What were the reasons for getting rid of excess fuel?
8. How did it happen that the passengers were able to watch their own flight while the plane circled over the ocean?
9. Do you think the runway should have been foamed prior to their landing? Why?
10. What were the crew's actions to mitigate risks on landing?
11. What damage did the aircraft sustain? Why was it written off?

Ex. 2. Here is a brief summary of how the emergency on board JetBlue Airways Flight 292 developed. Reproduce the full story adding some more details.

1. Pilots see a landing gear warning light shortly after take-off.

2. The plane flies by Long Beach Airport, where visual inspection confirms that the forward landing gear is stuck with its wheels turned at about a 90-degree angle. The plane is diverted to LAX.

3. The Airbus A320, mechanically unable to dump fuel over the ocean, burns it off by flying for hours in a circuit above the Pacific.

4. At 6.18 p.m., the rear landing gear touches down. About 15 seconds later, as the aircraft slows, the forward wheels touch down. The nose wheels skid, catch fire and the tires tear off. The plane lands safely.

GRAMMAR

Ex. 1. Study the following grammar material.

Adjectives and Adverbs

While adjectives describe nouns, adverbs normally describe verbs, adjectives or other adverbs. Compare these sentences:

*The crew initiated an **immediate** (adj) descent.*

*Descend to FL 210 **immediately** (adv).*

Adverbs say **how** (slowly, immediately, etc.), **where** (here, far, away), **when** (tomorrow, yesterday, etc.), **how often** (rarely, sometimes, etc.), **to what extent** (very, too, quite, etc.) something happens.

Most adverbs are formed by adding **-ly** to an adjective:

quick – quickly

safe – safely

successful – successfully

accurate – accurately

But: good – well

fast – fast

hard – hard

far – far

late – late

low – low, etc.

Note: some adjectives also end in **-ly** and are not normally adverbs:

friendly – дружелюбный;

likely – вероятный, возможный;

lovely – прекрасный;
timely – своевременный;
ugly – неприятный, безобразный, etc.

e.g. *She gave me a **friendly** smile.*

*She smiled in a **friendly** way.*

*The **timely** arrival of the emergency services contributed to the safe evacuation.*

*The emergency serviced arrived **in time**.*

Daily, weekly, monthly, yearly, early are both adjectives and adverbs.

e.g. *It's an **early** (adj) flight.*

*I arrived at the airport **early** (adv.).*

Note: we use adjectives (not adverbs) after certain verbs:

be, get, become, seem, appear, look, feel, sound, taste, smell.

e.g. ***Be careful!***

*After the landing both pilots **felt** very **tired**.*

*Your landing gear **looks** **safe**.*

Ex. 2. Form adverbs from the following adjectives.

easy	rare	considerable
far	rapid	quick
fast	manual	thorough
proper	good	safe
full	complete	partial

Ex. 3. Fill in the correct adjective or adverb using the words in brackets.

1. On selecting the landing gear down, an alert appeared in the cockpit. (*unsafe*)

2. A company engineer concluded that the gear "was hanging in the bay" and only deployed. (*partial*)

3. Because of the low fuel condition we are unable to make a second low pass. (*relative*)

4. The passenger seemed rather at the flight safety inspector's questions. (*confused*)

5. They have informed the cabin crew of what is going on. (*full*)
6. They decided to position the aircraft for landing and declared an emergency. (*formal*)
7. During the troubleshooting phase the crew was provided with support from ATC and the airline engineering personnel. (*full*)
8. The rescue and fire fighting services were prepared to deal with the aircraft in distress. (*good*)
9. The pilots demonstrated coordination and didn't show any sign of fatigue or stress. (*excellent*)
10. The three pilots worked together as a team and landed the aircraft (*good, successful*)
11. The well-coordinated actions of both flight and cabin crews contributed to the landing. (*uneventful*)
12. The food served by the cabin attendants smelled (*awful*)
13. They flew the final approach phase (*manual*)
14. In response to the landing gear deployment alert during the first approach, the crew decided to conduct a go-around and take time for a assessment of the situation. (*unsafe, correct, thorough*)
15. The passengers deplaned using an air stair. (*normal*)
16. The plane flew very over the tower. (*low*)
17. When the airplane's fuel system generated a low-fuel-quantity alert, the captain judged that a second overflight was not and decided to plan for a landing. (*appropriate*)
18. The aircraft carried out an emergency landing on Runway 27L with the left main landing gear only extended, with the Airport Emergency Services in and attendance. (*partial, full, effective*)
19. Upon touchdown, the nose landing gear tires deflated and tore apart. (*rapid*)
20. The fire brigade chief said that they had reacted as as they could. (*fast*)

21. Some passengers behave very after they have drunk too much.
(aggressive)

Ex. 4. Fill in the gaps using the following adjectives and adverbs.

SAS Flight 1209

<p>SAS Flight 1209 from Copenhagen to Aalborg was (1) On approach to Aalborg, when the landing gear extension sequence was completed, the cockpit landing gear indicator showed two green and one red light. The red light indicated that the right main gear was not (2) locked. The landing was aborted and a go-around was initiated.</p>	<p>fully unsuccessful unsafe</p>
<p>The crew circled for an hour but attempts at lowering the gear (3) were also (4)</p>	<p>manually</p>
<p>A (5) inspection of the landing gear was performed. It still remained (6)</p>	<p>uneventful</p>
<p>The cabin was prepared for an emergency landing and the passengers were (7) briefed.</p>	<p>timely</p>
<p>The aircraft touched down on the left main landing gear, followed by the right main landing gear, and (8) thereafter the right main landing gear collapsed, the right wing touched the ground, and a fire broke out. The aircraft departed the runway to the right and came to rest on the lower fuselage and right wing tip.</p>	<p>shortly well visual</p>
<p>The fire was (9) extinguished due to (10) arrival of the airport emergency teams and all the passengers and crew were (11) evacuated. Five people suffered (12) injuries: some from propeller parts entering the cabin and others from the evacuation. The aircraft was damaged beyond repair and written off.</p>	<p>minor safely quickly</p>

LISTENING AND SPEAKING

Ex. 1. Look at the photograph and answer the questions.



1. What is strange about the aircraft?
2. What do you think has happened?
3. What aircraft type is in the picture?
4. Which airline does it belong to?
5. What do you know about the airline?
6. Have you heard of this occurrence before?
7. What can you remember?

Ex. 2. You are going to listen to the report on this incident. Study the following word list.

QRH (Quick Reference Handbook)	карта обязательных проверок <i>e.g. A Quick Reference Handbook (QRH) is a handbook containing extracts from the Aircraft Flight Manual (AFM) or Operations Manual (AOM) which pilots usually refer to when dealing with emergency and abnormal procedures.</i>
be aware of (sth)	осознавать, отдавать себе отчет <i>e.g. The flight crew were unaware of what was going on in the passenger cabin.</i>
announcement (n)	объявление <i>e.g. The purser made an announcement over the Public Address System asking if there was a doctor or nurse on board.</i>

concrete (<i>n</i>)	бетон <i>e.g. Taxiways 1, 2, 3 and 4 have a concrete surface, a width of 12 m and a bearing strength of 400 kg/cm².</i>
underside (<i>n</i>)	НИЗ, НИЖНЯЯ ПОВЕРХНОСТЬ <i>e.g. A belly landing is a landing on the aircraft underside without its landing gear fully extended.</i>
deplane (<i>v</i>)	ВЫСАЖИВАТЬ(СЯ) ИЗ САМОЛЕТА <i>e.g. After the emergency landing the passengers had to deplane via inflatable slides.</i>
engine casing (<i>n</i>)	КОЖУХ ДВИГАТЕЛЯ <i>e.g. An engine casing is the outside cover of an engine, usually made of metal, which protects it from any external damage.</i>
considerably (<i>adv</i>)	ЗНАЧИТЕЛЬНО, СУЩЕСТВЕННО <i>e.g. In case of a belly landing the underside of the fuselage is considerably damaged.</i>
distract (<i>v</i>)	ОТВЛЕКАТЬ <i>e.g. A pilot may be distracted by irrelevant talk on the flight deck.</i>

 **Ex. 3. Listen to the report and say whether the following statements are true or false.**

1. The approach was aborted due to the crew's inability to lower the undercarriage.
2. After a go-around the crew made several circuits to burn out the fuel.
3. The pilots manually switched off the landing gear warning alarm.
4. The pilot-in-command made an announcement and briefed the passengers on the impending emergency landing.
5. The aircraft managed to leave the runway under its own power.
6. The passengers disembarked via the stairs.
7. None of the occupants was injured.
8. The aircraft's both engine casings and the lower fuselage were considerably damaged.
9. The aviation authorities' investigation concluded that the crew had failed to lower the gear due to technical problems and performed a belly landing on its second approach to Kaliningrad.

Ex. 4. There is a saying within the aviation community, "There are two types of pilots: those that have landed gear up and those that will". What do you think of it?

Ex. 5. Before you listen to another occurrence study the following word list.

reject (sth) (v) отказываться (от чего-либо)
e.g. The pilot rejected take-off because of an indicator malfunction.

affect sth (v) 1) влиять (на что-либо);
2) нарушать, повреждать
e.g. The affected part of the aircraft was beyond repair.

be subject to (sth) быть подверженным, подвергнуться (чему-либо)
e.g. All airlines are subject to regular inspections by Civil Aviation authorities.

 **Ex. 6. Listen to the story and answer the question.**

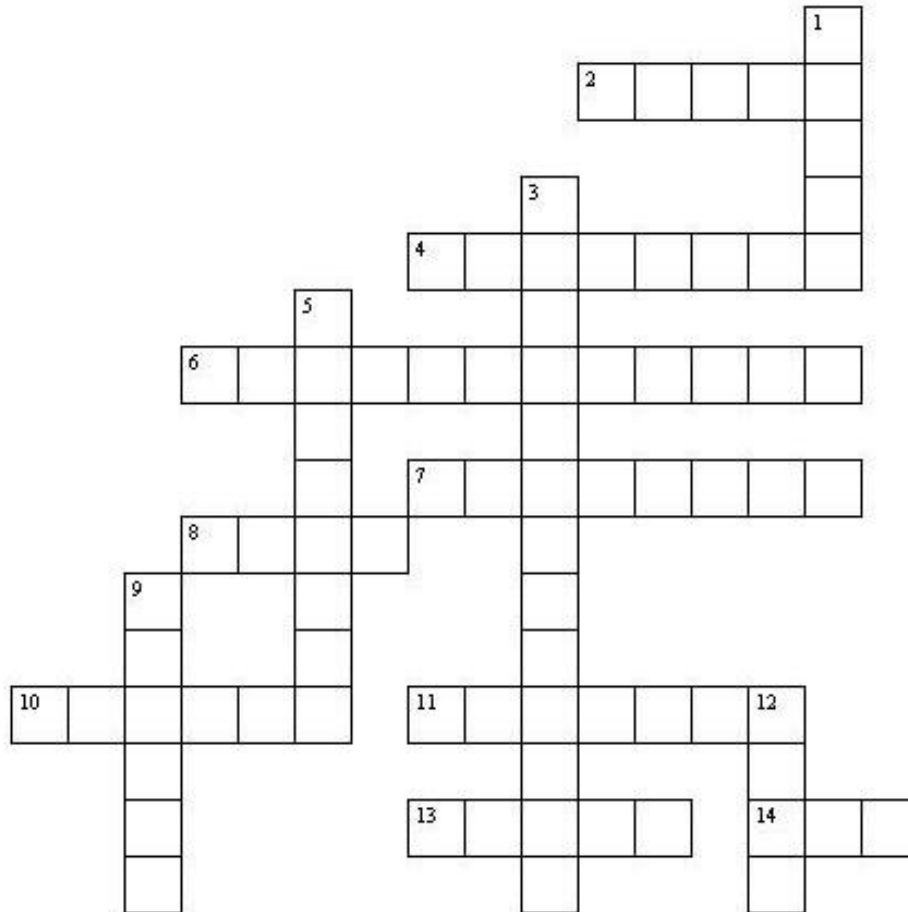
1. What problem did the crew encounter?
2. At what stage of the flight did it happen?
3. How did the crew become aware of what had happened?
4. What was their decision?
5. Why did they decide to do so?
6. What procedure did they have to carry out before landing?
7. How many occupants were injured?
8. What was the damage to the aircraft?

REVIEW

Ex. 1. Do the crossword puzzle. All the words are related to the landing gear issues discussed in this unit.

Across: 2. (n) A device on the main wheels for slowing or stopping the motion of an aircraft before or after landing. **4.** (adv) Operated or controlled by hand rather than automatically. **6.** (v) To solve, to sort out (a problem). **7.** (v) To make something less harmful or serious. **8.** (n) A chemical substance that is used to cover the runway in

case of belly landing for extinguishing fires. **10.** (*adj*) What do we call the landing gear condition when it is down but not locked? **11.** (*v*) Talking of landing gear, the word with the same meaning as "raise". **13.** (*v*) To interrupt. **14.** (*adj*) The colour of the light in the cockpit that shows that landing gear is not extended.



Down: **1.** (*n*) The underside of the aircraft fuselage. **3.** (*n*) An official examination of the facts of an aviation occurrence. **5.** (*v*) To fracture, break down. **9.** (*v*) To evaluate something, to make a judgment about the quality of something. **12.** (*n*) A thick rubber ring that fits around the edge of a landing gear wheel.

Ex. 2. Answer the questions.

1. What problems with landing gear may arise in flight?
2. Why is there a saying within the aviation community: "There are two types of pilots: those that have landed gear up and those that will"?
3. Why do you think gear-up incidents occur fairly often? What are the main reasons?
4. Is there any difference between the terms "gear-up landing" and "belly landing"?

5. What may their consequences be?
6. What damage may the a/c sustain?
7. What aerodrome emergency services are provided in case of belly landing?
8. How does a pilot get to know about his landing gear status?
9. What procedure can a pilot request in case he is unsure whether his landing gear is completely extended before landing? How is he supposed to inform ATC of the problem and what can he request?
10. What risks are involved in case of overheated brakes?
11. What may happen if a tire bursts explosively?
12. Have you had any problems with landing gear in your practice?
13. What would your decision be if you were unable to retract the landing gear after take-off?

Ex. 3. Compare your answers with the information below.

Landing Gear Problems

Malfunctions or human errors related to retractable landing gear have been the cause of numerous accidents and incidents throughout aviation history. The following problems may occur in flight and on the ground:

- Pilots may fail to lower the undercarriage on final approach, in which case a go-around is likely and a visual inspection may be required (a low pass over the runway or sighting from another aircraft can be used).
- Pilots may be unable to retract the landing gear after take-off.
- The aircraft may have reduced braking capability.
- There could be a tire deflation or tire burst.
- The undercarriage may collapse during rough landing, which usually results in the loss of directional control of the aircraft.
- The nose wheel steering may be jammed and inoperative.
- Overheated brakes may cause a wheel well fire.
- Unauthorized passengers may stowaway within the landing gear compartment.

Belly Landing

A belly landing or gear-up landing is when an aircraft lands without its landing gear fully extended and uses its underside, or belly, as its primary landing device. Normally the term gear-up landing refers to incidents in which the pilot simply

forgets to extend the landing gear, while belly landing refers to incidents where a mechanical malfunction prevents the pilot from extending the landing gear.

The status of the landing gear is indicated in a set of lights that change colours from red to amber to green depending on whether the gear are up, in transit, or down. In larger aircraft most airliners incorporate a voice message system which gives the pilot a clear verbal indication: "GEAR NOT DOWN".

During a belly landing, there is typically extensive damage to the airplane. Belly landings carry the risk that the aircraft may flip over, disintegrate, or catch fire if it lands too fast or too hard. Still, belly landings are one of the most common types of aircraft accidents, and are normally not fatal if executed carefully.

Stowaways in Landing Gear Bay

Unauthorized passengers have been known to stowaway on larger aircraft by climbing a landing gear shock strut and riding within the undercarriage compartment. There are extreme dangers to this practice, including:

- death from frostbite or hypoxia, as the landing gear bays are not climate controlled or pressurized;
- death from heat produced by the aircraft's wings and engines;
- being crushed by the gear or bay doors if the bay is not large enough for the stowaway;
- being caught by the tires and run over while climbing on or off a plane in motion;
- falling off the strut, especially when it is extended after takeoff or before touchdown.

Ex. 4. Using the following word list translate the occurrence description into English.

high lift devices	механизация крыла
landing gear warning light and horn systems	звуковая и световая сигнализация выпуска шасси
go off	срабатывать
flap landing position	выпуск закрылков в посадочное положение

Авария Ил-86 в аэропорту «Дубай»

Самолет Ил-86 совершил посадку в аэропорту назначения «Дубай» с убранными шасси и выпущенной механизацией крыла. Схема захода на посадку на данном аэродроме с целью уменьшения шума предусматривает выпуск шасси незадолго перед касанием. Самолет Ил-86 оборудован звуковой и световой сигнализацией выпуска шасси, которая срабатывает при выпуске закрылков в посадочное положение. Командир ВС распорядился отключить сигнализацию, чтобы ее работа не мешала экипажу во время между выпуском закрылков и шасси. Впоследствии сигнализация включена не была. Контрольная карта была зачитана бортинженером, который ошибочно посчитал, что шасси выпущены.

В процессе движения по полосе произошло возгорание двигателей № 2 и 3, а также возгорание в хвостовой части. После остановки пассажиры и экипаж были благополучно эвакуированы, а пожар быстро ликвидирован пожарными расчетами аэропорта. Самолет получил значительные повреждения планера и силовых установок и впоследствии был признан не подлежащим восстановлению.

FIRES


PREVIEW

Describe the picture using the questions below.



1. Where is the plane?
2. Can you identify the aircraft type? What is it?
3. What do you think has happened to it?
4. What could have caused the fire?
5. When do you think it started?
6. Can you see any fire trucks or fire brigades on the site?
7. Where are the passengers?
8. Do you believe there are any survivors?
9. What damage has the aircraft sustained?

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description study the following word list. Listen to and repeat the words and sample sentences.**

precede (v)

предшествовать

e.g. The preceding aircraft reported strong wind shear on final.

downpour (<i>n</i>)	ливень <i>e.g. A downpour is a heavy fall of rain that often starts suddenly.</i>
flare-out (<i>n, v</i>)	1) выравнивание ВС перед посадкой; 2) выравнивать ВС перед посадкой <i>e.g. As the plane approached the ground, the pilot executed a flare-out to make a gentle landing. The pilot flared the plane out over the centerline and executed a smooth landing.</i>
ravine (<i>n</i>)	ущелье, овраг, лощина <i>e.g. A ravine is a very small valley – almost like a canyon but narrower.</i>
deflate (<i>v</i>)	выпускать воздух, сдуваться <i>e.g. One of the starboard rear tires deflated upon landing.</i>
deploy (<i>v</i>)	использовать, употреблять <i>e.g. Emergency chutes were deployed and all the passengers and crew exited the plane safely.</i>
ensure (<i>v</i>)	обеспечивать, удостовериться <i>e.g. The cabin crew ensured that all the passengers were fastened.</i>
contribute (to sth) (<i>v</i>)	содействовать, способствовать <i>e.g. Human error often contributes to aviation incidents and accidents.</i>
evidence (<i>n</i>)	подтверждение, свидетельство, данные <i>e.g. Was there any evidence of the engine malfunction?</i>
adverse (<i>adj</i>)	неблагоприятный <i>e.g. The adverse weather conditions were a contributory factor to the incident.</i>

Ex. 2. Read the description of the occurrence.

Air France Flight 358

The Air France Airbus A340 aircraft departed Paris, France, at 1153 UTC as Air France Flight 358 on a scheduled flight to Toronto, Ontario, with 297 passengers and 12 crew members on board.

Before departure, the flight crew obtained their arrival weather forecast, which included the possibility of thunderstorms. While approaching Toronto, they were advised of weather-related delays. On final approach, they received information that the crew of a preceding aircraft had reported poor braking action, and their weather radar was displaying heavy precipitation coming from the northwest.

During the flare-out the aircraft entered an intense downpour. The heavy rain and lightning made visual contact with the runway very difficult. At 300 feet above ground level, the wind changed from a headwind to a tailwind, increasing the aircraft's groundspeed and effectively changing the flight path.

At about 200 feet above the runway threshold, while on the ILS approach to Runway 24L with autopilot and autothrust disconnected, the aircraft deviated above the glideslope and crossed the runway threshold about 40 feet above it. The aircraft touched down about 3,800 feet down the runway, reverse thrust was selected about 12.8 seconds after landing, and full reverse was selected 16.4 seconds after touchdown. The aircraft was not able to stop on the 9,000-foot runway and overran the far end at a groundspeed of about 80 knots. The aircraft stopped in a ravine and caught fire, following which an evacuation order was given. The two rear left exits remained closed due to the fire. On opening the emergency exits, one of the right middle exit slides deflated after being punctured by debris from the aircraft, while one of the left slides failed to deploy at all for unknown reasons. A number of passengers were forced to jump from the aircraft to exit. The actions of the flight attendants, who ensured that all of the passengers quickly escaped from the plane, contributed to the successful evacuation. The first officer was the last to leave the plane, which was evacuated within the required 90 second time frame.

A total of 2 crew members and 10 passengers were seriously injured during the crash and the evacuation. The rest of the occupants suffered minor or no injuries. A post-crash fire destroyed the aircraft.

The Investigation Board conclusions state that due to adverse weather conditions the plane landed too far down the runway to have been able to stop properly on such wet pavement. No evidence of engine trouble, brake failure, or problems with the spoilers or thrust reversers was found.

Ex. 3. The following words are taken from the text. Match a word in column A with its definition in column B.

A	B
1. destroy	a) straightening the aircraft before landing
2. evidence (<i>n</i>)	b) get a small hole
3. flare-out	c) pieces of wood, metal, brick, etc. that are left after something has been destroyed
4. downpour	d) damage something so badly that it no longer exists or operate
5. puncture (<i>v</i>)	e) let air or gas out of a tire, balloon, etc.
6. precipitation	f) the facts, signs or objects that make you believe that something is true
7. deflate	g) be one of the causes of something
8. debris	h) rain, snow, drizzle, hail
9. contribute	i) heavy rain
10. adverse	j) negative and unpleasant

Ex. 4. Match a word in column A with its synonym in column B.

A	B
1. deploy	a) ruin
2. preceding	b) make certain
3. include	c) extreme
4. destroy	d) hurt
5. ensure	e) previous
6. injured	f) aft
7. display	g) comprise
8. intense	h) use something effectively
9. rear	i) show

Ex. 5. Think of all possible word combinations with the following words in columns A and B.

A	B
1. suffer	a) to the successful evacuation
2. engine	b) of thunderstorms
3. investigation	c) weather conditions
4. thrust	d) aircraft
5. overrun	e) fire
6. contribute	f) minor injuries
7. post-crash	g) trouble
8. possibility	h) precipitation
9. heavy	i) board
10. preceding	j) the end of the runway
11. adverse	k) reverse

Ex. 6. What is the difference in meaning (if there is any) between these pairs of words? Compare your ideas with a partner and then check in a dictionary.

1. weather information / weather forecast
2. downpour / heavy rain
3. headwind / tailwind
4. disconnect autopilot / disengage autopilot
5. ravine / valley
6. debris / waste
7. occupant / passenger
8. deploy emergency slides / activate emergency slides
9. inflatable slide / escape chute

Ex. 7. The words in the chart below are all taken from the text "Air France Flight 358". Use your dictionary to find the other parts of speech.

Verb	Noun	Adjective	Adverb
		intense	
select			
		successful	
		required	—
	injury		—
destroy			

Ex. 8. Use the words in the previous exercise in the correct form to fill in the gaps.

1. A fire during the flight is among the worst situations that cabin crew can be faced with and which urgent actions.
2. The fire resumed with even greater
3. The aircraft was enveloped in flames, which finally led to its complete
4. Despite the adverse weather conditions the crew managed to accomplish landing
5. The investigators were very about which information to include in the report.
6. At the first indication of smoke and fumes within the aircraft, the flight crew are to don smoke goggles and oxygen masks.
7. The passengers escaped with only minor
8. The crew in carrying out a timely emergency evacuation of the passengers.
9. The power of a fire can lead to the catastrophic loss of the aircraft within a very short space of time.

READING AND SPEAKING

Ex. 1. Read the text "Air France Flight 358" on p. 57 again and answer the questions.

1. What were Flight 358 departure and destination airports?
2. Did the crew know about the adverse weather conditions at their destination before the flight?
3. What information did they receive from the preceding aircraft while approaching Toronto?
4. When did the aircraft encounter an intense shower?
5. How did it affect the approach?
6. What was the change in the wind just before their landing?
7. Why did the aircraft fail to stop on the runway?
8. Where did it come to rest?

9. When did the aircraft start to burn?
10. Why couldn't the cabin crew activate one of the right middle inflatable slides?
11. How long did the evacuation take?
12. Were there any casualties?
13. What was the damage to the aircraft?

Ex. 2. Give a summary of what happened to flight 358 using the following key words.

adverse weather conditions
report poor braking actions
during the flare-out
select reverse thrust
overrun the far end of the runway
come to a rest
catch fire
be deflated
be punctured by debris
be seriously injured
suffer minor injuries
contribute to the successful evacuation

GRAMMAR

Ex. 1. Study the following grammar.

Relative Clauses

Relative clauses give more information about something we have just mentioned in a sentence. There are two types of relative clauses.

Type A (Defining Relative Clauses)

Type A identifies which person or thing we mean exactly. We cannot leave information in such clauses out of a sentence:

e.g. It's the plane that has arrived from Paris.

Do not say: *It's the plane.* (This sentence is incomplete).

The table below shows how we form defining relative clauses:

	Subject	Object	Possession
people	who / that <i>He is the pilot who (that) ditched the plane into the Hudson River</i>	who / whom / that <i>He is the pilot (who / whom / that) I saw on TV last night</i>	whose <i>A cabin attendant is a person whose job is to serve and take care of passengers on an aircraft</i>
animals / things	that / which <i>A fire is one of the worst situations that / which could happen in flight</i>	that / which <i>It's a type of aircraft (that / which) each pilot would like to fly</i>	whose / of which <i>That is the aircraft whose wing / the wing of which sustained damage</i>

Note: We can leave out the relative pronoun (**who**, **that**, **which**, **whose**) if it refers to the object of the sentence:

e.g. It's the job (which / that) I'd like to have.

Type B (Non-defining Relative Clauses)

Type B gives additional information about a person or thing. The sentence still makes sense without the non-defining relative clause:

e.g. Saudia Flight 133, which was a scheduled passenger flight, caught fire at Riyadh's international airport. Compare: Saudia Flight 133 caught fire at Riyadh's international airport.

The table below shows how we form defining relative clauses:

	Subject	Object	Possession
people	who <i>The captain of the aircraft, who is French, speaks three languages</i>	who / whom <i>The air hostess, who / whom I spoke to, told me about the incident</i>	whose <i>The airlines authorities, whose Boeing 747 caught fire and crashed, were also questioned</i>

	which	which	whose
animals / things	<i>Heat and toxic smoke, which are caused by a fire, can quickly incapacitate the crew and passengers</i>	<i>The aircraft, which I saw on the apron, is Boeing 747-Combi</i>	<i>The SAS aircraft, whose type was ATR-72, suffered a catastrophic fire and crashed</i>

Note: We cannot usually leave out the relative pronoun (**who, that, which, whose**) in non-defining clauses.

Ex. 2. Find five examples of relative clauses in the text "Air France Flight 358" on p. 57.

Ex. 3. Join the sentences using *who, that, which or whose*. Make sentence in italics the relative clause.

e.g. The co-pilot ensured that all the passengers had evacuated. He was the last to leave the plane.

The co-pilot, who was the last to leave the plane, ensured that all the passengers had evacuated.

1. An air hostess reported a fire to the captain. *She detected it near the aft passenger cabin door.*

2. The in-flight fire resulted in panic among the passengers. *It broke out in the cabin area.*

3. Hidden fires are very dangerous. *They are difficult to locate.*

4. *The crew received fire warnings in the aft cargo compartment.* The crew commenced descent immediately and began planning for an emergency landing.

5. The aircraft developed an in-flight fire behind the toilet. *It spread between the outer skin and the inner decor panels.*

6. The aircraft is still on the runway. *It caught fire after landing.*

7. Smoke goggles are a pair of glasses. *They fit closely to the face to protect the eyes from smoke and fumes.*

8. A strong noxious odour was first reported to the cabin crew around 19:00. *It was coming from the rear of the plane.*

9. The flight attendant traced the odour to the lavatory. *Her name was Judi Davidson.*


10. She attempted to look into the lavatory but was forced back by a thick grey smoke. *It was rapidly filling the small room.*

11. The spreading fire burned through the crucial electrical cables. *That knocked out most of the instrumentation in the cockpit.*

Ex. 4. Fill in the appropriate relative pronoun (*who, which, that or whose*). Pay attention to the word clusters in italics and try to remember them.


Flight 7145, (1) originated in Buenos Aires, was operating a cargo flight to Sao Paulo. En route on the first leg, at FL170, a crew member, (2) was heading to the cargo compartment, *noticed the presence of smoke*. He tried to *extinguish the fire with a portable fire extinguisher*, (3) he had at hand, but did not succeed. Some 16 nm from Melo Airport, (4) is in Uruguay, the crew *declared an in-flight emergency* to Montevideo ACC. The nearest airport Melo, (5) operating hours are from 07.00 to 19.00, was closed. As it was the only aerodrome (6) could accept them, Montevideo ACC contacted the airport guard (7) switched on the runway lights and *reported the emergency to fire fighters* and police. The pilots recognized the runway lights, (8) were on, and landed on runway 07. The F-27 stopped 640 m after touchdown. The crew evacuated through the cockpit windows *due to the intense heat* and smoke in the cargo area, (9) was *caused by the fire*. Ten minutes after landing, the fire fighters, (10) had arrived in time, succeeded in extinguishing the fire. The airplane *suffered considerable damage* in the cargo compartments.

LISTENING, VOCABULARY AND SPEAKING


 **Ex. 1. You are going to listen to an accident report. Before you listen, study the following word list. Repeat the words and sample sentences.**

uneventfully (*adv*) без особенных происшествий
e.g. *The aircraft landed uneventfully.*

burst into flames	вспыхнуть, загореться <i>e.g. The aircraft crashed and burst into flames.</i>
violently (<i>adv</i>)	очень сильно <i>e.g. The plane burst violently into flames.</i>
ignite (<i>v</i>)	воспламенять <i>e.g. Gas ignites very easily.</i>
blaze (<i>n</i>)	сильный огонь, пожар <i>e.g. More than 30 firefighters fought to bring the blaze under control.</i>
loose (<i>adj</i>)	неплотно закрепленный <i>e.g. Check that the plug has not come loose.</i>
slat track (<i>n</i>)	направляющая предкрылка <i>e.g. The slat track is the movable support structure that connects the wing with the leading-edge slats.</i>

 **Ex. 2. Listen to the story, then say whether the following statements are true or false. If they are false, give the correct information.**

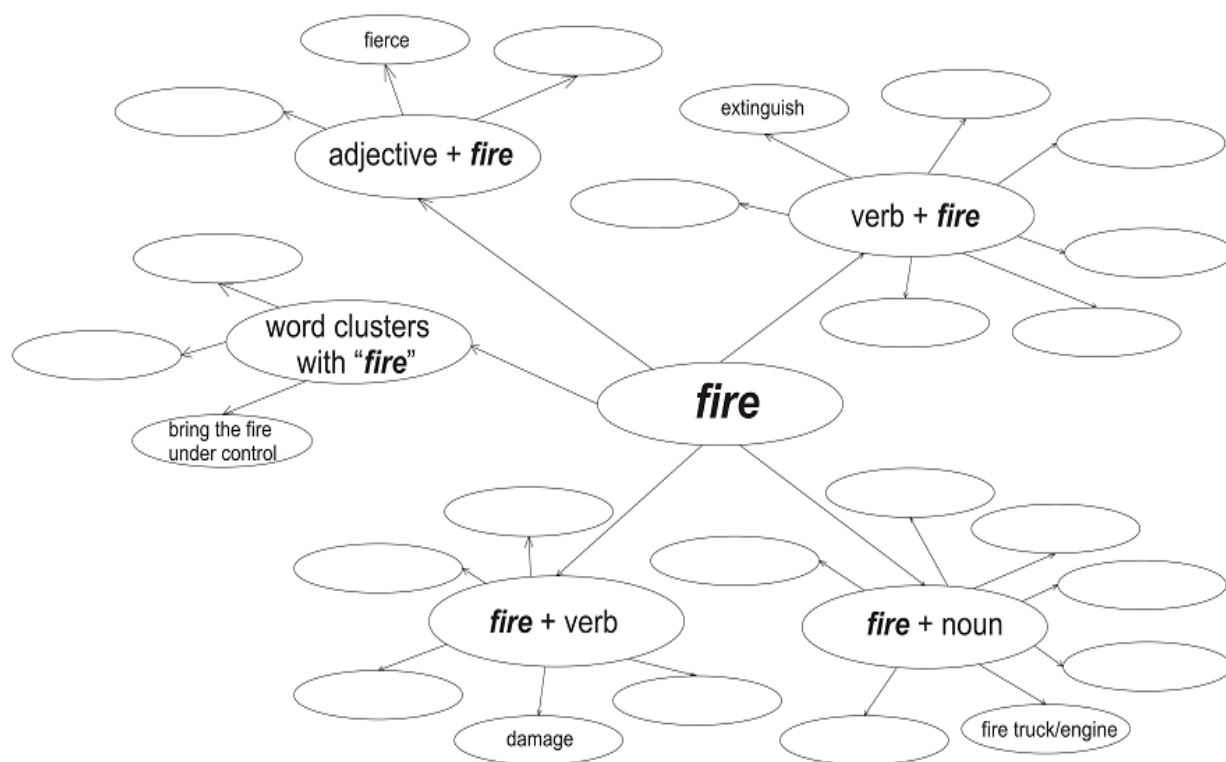
1. Flight 120 was performing a domestic flight. It was a Boeing 737.
2. The problems began shortly before landing.
3. It was the ground crew who noticed flames coming from one of the engines while the Boeing was taxiing.
4. The fire warning light flashed on in the cockpit and the captain ordered an emergency evacuation.
5. One of the inflatable slides was punctured, so some passengers had to jump off the plane.
6. The first officer and the captain fled the aircraft through the cockpit windows.
7. Forty people were injured in the accident but there were no fatalities.
8. The investigating team found that the fire was caused by a loose bolt from the flap track, which had punctured the right wing fuel tank.

 **Ex. 3. Listen to the report again and make a short summary of what happened.**

VOCABULARY

Ex. 1. The words below are all associated with fires. Complete the spaces in the diagram using a dictionary if necessary. Some of the words are already filled in to help you.

big break out huge start extinguisher control spread
 brigade cause catch contain destroy fuel alarm
 fight be on hazard / risk set sth on warning fighter



Ex. 2. Fill in the gaps with the appropriate words in the correct form from the previous exercise.

1. struggled to control the fire.
2. The aircraft was completely by the fire.
3. A fire in the cargo cabin.
4. The fire brigade managed to
5. No 1 engine is
6. The aft fuselage was badly by fire.

7. The number of in the passenger cabin does not comply with the required.
8. The wires short-circuited and the inner panels
9. During the evacuation, the overwing aircraft doors were opened and the air the fire.
10. The investigating team confirmed that the aircraft fire in the gate area.
11. The investigation focuses on the possibility that the fire was by a fuel leak.

REVIEW

Ex. 1. Discuss the questions below.

1. Why is a fire regarded to be one of the most hazardous situations in flight?
2. What may cause a fire on board?
3. What types of fires may occur in flight?
4. Why are hidden fires the most dangerous ones?
5. How can a fire be detected?
6. Why is time critical if a fire breaks out on board the aircraft?
7. What are the effects of the fire? What can they lead to?
8. What fire fighting equipment is there on board the aircraft?
9. What smoke protection devices are available?
10. What preventive actions are to be taken while carrying flammable cargo on board?
11. What is the flight crew supposed to do in case of a fire within the aircraft?
12. If there was a wheel well fire on board your aircraft, what would you do and how would you declare an emergency?

Ex. 2. Read the information below and compare your answers with it.

In-flight Fire

Fire in the air is one of the most hazardous situations that a flight crew can be faced with. Without aggressive intervention by the flight crew, a fire on board an aircraft can lead to the catastrophic loss of that aircraft within a very short space of

time. Once a fire has become established, it is unlikely that the crew will be able to extinguish it. Time is critical and the crew must land the aircraft as soon as possible.

Types of Fire

Engine Fire. An engine fire can normally be detected and contained by the aircraft fire detection and suppression systems. However, in certain circumstances (e.g. an explosive break up of the turbine), the nature of the fire is such that onboard systems may not be able to contain the fire and it may spread to the wing or fuselage. Where an engine fire has been successfully contained, there is still a risk that the fire may reignite and therefore it is still advisable for the crew to land the aircraft as soon as possible and allow fire crews to carry out a visual examination of the engine.

Wing Fire. Most modern aircraft carry the majority of their fuel in wing tanks. If those fuel tanks or the associated pipes leak, or they are damaged, and fuel comes into contact with an ignition source, then fire can break out within, on, or under the wing.

Cabin Fire. A fire within the cabin will usually be detected early and be contained by the crew using onboard fire fighting equipment. As with an engine fire, it is still advisable to land the aircraft as soon as possible and carry out a detailed examination of the cause of the fire and any damage.

Hidden Fires. A hidden fire may be detected by onboard fire detection systems or by the crew or passengers noticing smoke or fumes, a hot spot on a wall or floor, or by unusual electrical malfunctions. This is the most dangerous type of fire because they are difficult to locate and access in order to fight them. The time delay may allow the fire to spread and do considerable damage to the aircraft.

Effects

Smoke and Fumes. Smoke can reduce visibility within the aircraft. An electrical fire in an aircraft typically generates a lot of thick white smoke which can render the flight crew blind; unable to see the instruments or see out of the windows. In such circumstances, unless the smoke can be cleared, the crew are unable to control the aircraft. Smoke and fumes from an in-flight fire are likely to be highly toxic and irritating to the eyes and respiratory system. Smoke and fumes may quickly incapacitate the crew unless they take protective action.

Heat. Heat from fires will affect aircraft systems and the structural integrity of the aircraft, both of which will lead to loss of control.

Aircraft Fire Fighting Equipment

Smoke Detectors. Smoke detectors are installed in airplane lavatories and sometimes in cargo compartments as well.

Portable Fire Extinguishers. Portable fire extinguishers are to be found in the cockpit and in the cabin. They are designed to fight small fires as their capacity is limited.

Automatic Fire Extinguishing Systems. Some aircraft have automatic fire suppression systems in the lavatory waste bins. The cargo holds of most airliners are equipped with "fire bottles" (essentially remote-controlled fire extinguishers) to combat a fire that might occur below the passenger cabin.

Fire / Crash Axe. Fire axes are provided to obtain emergency access to areas and parts of the airplane which are not easily accessible (e.g. behind sidewall, electrical or ceiling panels). In the past, fire axes could be found in the cockpit and in the passenger / cargo compartment but on most carriers, to comply with anti-terrorist regulations and policy, the axe in the passenger/cargo compartment has been removed.

Fire Protection Gloves. These gloves are kept in the cockpit and / or in the cabin to protect the user against heat and fire.

Smoke Protection Devices. There are several different smoke protection devices for cabin crews. The PBE (Protective Breathing Equipment), most commonly referred to as a *Smoke Hood*, incorporating a small oxygen generator, which provides the wearer with oxygen for a certain amount of time. *Portable oxygen bottles* with full face *masks* may also be found on board some aircraft.

Smoke Goggles. Smoke goggles may be found in the cockpit for use with oxygen masks. Many aircraft are equipped with oxygen masks with integral smoke goggles.

Fire Blankets. Some operators have fireproof blankets onboard which can be used to suffocate a fire by cutting off the supply of oxygen.

Guidance for Flight Crews

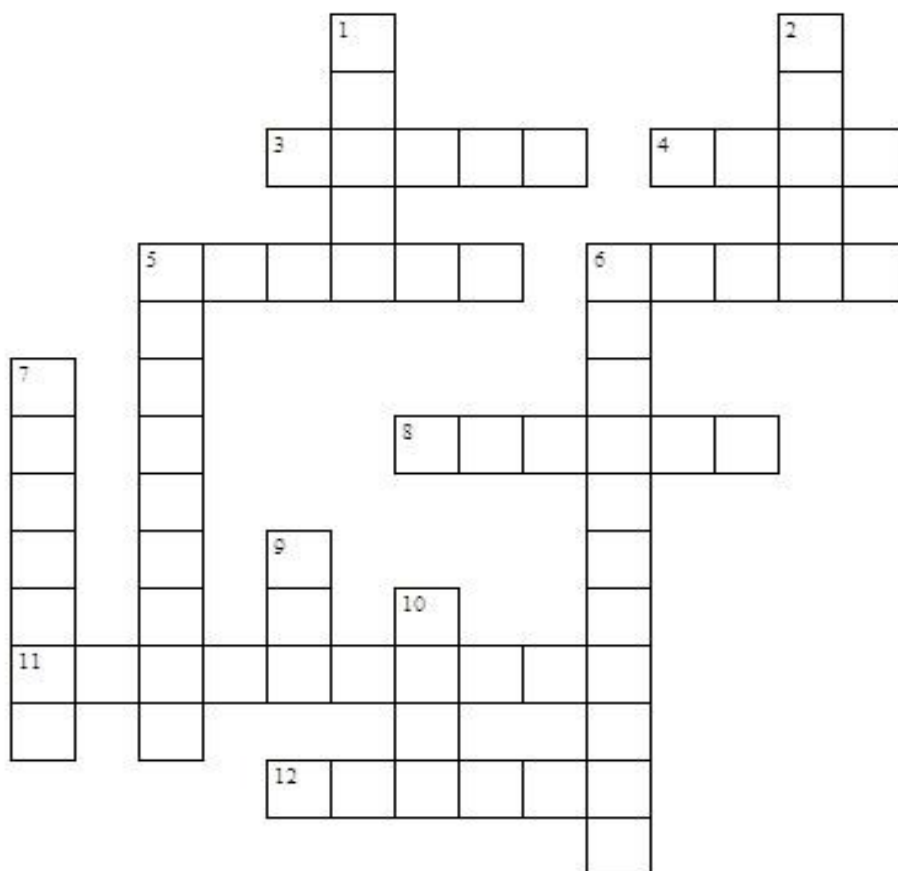
Crews should follow company approved emergency procedures and manufacturers guidance regarding the conduct of the flight, management of aircraft systems, identification of the source of a suspected fire, and fire fighting.

At the first indication, or suspicion of smoke and fumes, or a fire within the aircraft, the flight crew should don smoke goggles and oxygen masks. Goggles and masks need to fit tightly.

Unless smoke and fumes are clearly present on the flight deck, the captain may elect in order to maintain communication with the cabin crew, to delay fitting his own mask until the co-pilot has donned his protective equipment and is in a position to take control of the aircraft.

A flight crew does not have very long to deal with the situation – time is critical. It is necessary to isolate and control the fire using all available resources, to commence descent immediately and begin planning for an emergency landing. An emergency should be declared and ATC told that the aircraft is in descent. Putting an aircraft on the ground within 15 minutes of a fire being detected is a challenge if you are at cruising altitude in a modern passenger jet, so any delay in commencing descent may lead to fatal consequences.

Ex. 3. Do the crossword puzzle. All the words are related to the fire issues discussed in this unit.



Across: **3.** (*adj*) Containing poison; poisonous. **4.** (*n*) A very high level of temperature. **5.** (*v*) To cover a large area. **6.** (*n*) Toxic smoke. **8.** (*v*) To discover or notice something, especially if it is not easy to see. **11.** (*v*) To make a fire stop burning. **12.** (*v*) To start to burn.

Down: **1.** (*n*) The first sign that something is burning. **2.** (*n*) A hot bright stream of burning gas that comes from something that is on fire. **5.** (*v*) To experience difficulty in breathing. **6.** (*n*) A person, usually a man, whose job is to put out fires. **7.** (*n*) A pair of glasses that fit closely to the face to protect the eyes from smoke in case of fire. **9.** (*v*) To put on an oxygen mask. **10.** (*n*) An injury or a mark caused by fire or heat.

Ex. 4. Translate the following two reports into English.

1. 27 июня 2009 года рейс 746, самолет McDonnell Douglas MD-80, на борту которого находились 149 пассажиров и 5 членов экипажа, вынужден был вернуться в аэропорт вылета. В процессе разбега для взлета лопнула одна из шин шасси, кусок которой влетел в левый двигатель и мгновенно вызвал его отказ и возгорание. Экипаж заглушил двигатель согласно предписанной процедуре, сделал круг над аэропортом и совершил аварийную посадку. О пострадавших в результате данного инцидента не сообщалось.

2. 20 декабря 2008 года Boeing 737-800 авиакомпании Continental Airlines, совершавший рейс Денвер–Хьюстон, при взлете задел левым двигателем покрытие ВПП, выкатился с полосы и загорелся. Когда пожарные прибыли на место происшествия, правая часть фюзеляжа была в огне, а пассажиры с помощью бортпроводников выбирались из самолета по аварийным трапам с левой стороны. Из 115 человек на борту никто не погиб, 38 человек получили ранения, в том числе два человека были ранены тяжело. Самолет получил серьезные повреждения и был впоследствии списан. Комиссия по расследованию инцидента не смогла установить истинных причин аварии.

BIRD STRIKE


PREVIEW

Describe the picture using the questions below.



1. Where is the plane?
2. What aircraft type is it?
3. What do you think has happened to it?
4. What could make the pilot ditch the plane?
5. Who are the people standing on the wing?
6. How long do you think the plane can remain on the surface of the water?
7. What will happen to the people if the rescue does not come in time?
8. Have you heard anything about the ditching of the US Airways Flight 1549 into the Hudson River?
9. Do you remember when it happened?
10. Why did the captain take a decision to ditch?
11. Were there any casualties?

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description study the following word list. Listen to and repeat the words and sample sentences.**

bound for (<i>adj</i>)	направляющийся <i>e.g. The plane was bound for Dublin.</i>
attempt (<i>n, v</i>)	1) попытка; 2) пытаться <i>e.g. His repeated attempts to get in touch with the controller were unsuccessful. The engine went dead and the pilot attempted to restart it.</i>
ram air turbine (<i>n</i>)	турбина с приводом от набегающего потока воздуха, ветродвигатель <i>e.g. A ram air turbine (RAT) is a small turbine that is connected to a hydraulic pump, or electrical generator used as a power source for aircraft.</i>
backup (<i>adj</i>)	резервный, запасной <i>e.g. An emergency power supply unit provides backup resources in case of failure of the primary systems.</i>
subsequently (<i>adv</i>)	впоследствии, позднее <i>e.g. Subsequently, the authorities agreed it had been the only possible decision.</i>
bang (<i>n</i>)	громкий удар, внезапный шум <i>e.g. Suddenly there was a loud bang and a puff of smoke.</i>
lack (<i>n</i>)	недостаток, нехватка, отсутствие (чего-либо) <i>e.g. A lot of pilots' errors occur due to lack of situational awareness.</i>
vessel (<i>n</i>)	корабль, судно <i>e.g. It was a huge ocean-going vessel.</i>
skill (<i>n</i>)	умение, мастерство <i>e.g. The job requires skill and an eye for detail.</i>

Ex. 2. Read the report and check whether your answers in Pre-reading Task were correct.

Ditching in the Hudson River

US Airways Flight 1549 operated as a code share* with United Airlines was a passenger flight that ditched into the Hudson River about five minutes after takeoff on January 15, 2009.

The Airbus A320 aircraft had just departed from New York City's LaGuardia Airport bound for Charlotte, North Carolina, with the first officer at the control. About 2 minutes after take-off, while climbing through an altitude of 3,200 feet on the initial climb out to 15,000 feet, the aircraft hit birds. The windscreen quickly turned dark brown. Both engines ingested birds and immediately lost almost all thrust.

The crew radioed the ATC, "Hit birds. We lost thrust in both engines. Returning back towards LaGuardia". The captain took the controls, while the first officer began going through the three-page emergency procedures checklist in an attempt to restart the engines. The emergency ram air turbine, which provides backup electrical and hydraulic power, was subsequently deployed.

The passengers and cabin crew later reported hearing a very loud bang, seeing flames, followed by an immediate loss of power and engine noise, and smell of fuel in the cabin. Responding to the captain's report of a bird strike, the controller gave the flight a heading to return to LaGuardia and told them that they could land to the southeast on Runway 13. But the captain replied that he was unable and asked if they could attempt an emergency landing at the nearest airport. However, after gaining permission to do so the captain realized that it would be impossible due to lack of altitude, so he took a decision to ditch into the Hudson River.

As the plane was about to hit the water, the captain announced, "Brace for impact", and the flight attendants instructed the passengers to keep their heads down.

The ditching was carried out successfully. Immediately after coming to a stop in the water, the cabin crew began evacuating the passengers through the four emergency window exits located over the wings and into the inflatable slides

* A code share flight – рейс, выполняемый двумя авиакомпаниями по взаимному соглашению. Такие код-шеринговые соглашения характерны для большинства крупных современных авиакомпаний.

deployed from the two passenger doors at the front of the Airbus. The rear doors, which were below the water line, were not opened as doing so would have immediately flooded the cabin. After all the people had been evacuated to the wings and slides to await their rescue, the captain walked the length of the cabin twice to be sure that everyone had exited the plane thus making the captain the last occupant to evacuate the aircraft.

Within minutes vessels from the New York City Fire Department, including a fireboat, four marine units, rescue divers and 35 ambulances were on the scene ready to help the people coming off the flight. All of the passengers and flight crew were evacuated safely.

All on board survived, only a few occupants suffered minor injuries.

The lives of 155 people were saved due to the skills and training of the crew. The pilot made a "textbook landing".

Ex. 3. Find in the text the substitutes for the following sentences paying attention to the words in italics.

1. The *destination* of US Airways Flight 1549 was Charlotte, North Carolina.
2. Approximately *2 minutes into the flight* the aircraft *encountered an intensive bird activity and had multiple bird strikes*.
3. Both engines *sucked* birds and immediately lost almost all their *power*.
4. The crew *contacted* the ATC and informed them of what had happened.
5. The co-pilot was trying to *relight* the engines.
6. The passengers and cabin crew suddenly heard *a very loud noise* and saw *a fire*.
7. After the captain *had obtained the permission* to land at the nearest aerodrome, he *became aware* that it would be *impracticable* as their altitude was *insufficient*, so he *made up his mind* to ditch into the Hudson River.
8. The ditching *ended well*.
9. After the completion of ditching, the cabin crew began to *help the passengers leave the plane*.
10. The inflatable slides *were activated* from the two passenger doors at the front of the Airbus.
11. The rear doors, which were below the water line, were not opened as *water could have gushed into the cabin*.

12. Within minutes the New York City Fire Department sent *boats* to the *site*.
 13. Only a few passengers *were slightly injured*.
 14. The lives of 155 people were saved due to *a high level of the Captain's proficiency*.

Ex. 4. The words below are taken from the text. Match a word in column A with its definition in column B.

A	B
1. respond to something / somebody	a) a second piece of equipment that can be used if the main one fails or needs extra support
2. look through something	b) afterwards, later
3. realize	c) continue to live
4. bang	d) a large ship or a boat
5. bound for	e) react quickly to something / somebody
6. backup (<i>adj</i>)	f) a try to do something difficult
7. subsequently	g) travelling in a particular direction
8. lack (of sth)	h) use something effectively
9. survive	i) examine something carefully in order to follow a certain procedure
10. deploy	j) become aware
11. attempt (<i>n</i>)	k) a sudden loud noise
12. vessel	l) the state of not having something or not enough of something

READING AND SPEAKING

Ex. 1. Read the story "Ditching in the Hudson River" on p. 75 again and answer the questions.

1. Is this story about a bird strike or ditching?
2. Can you distinguish between cause and effect?
3. What damage did birds inflict on the aircraft?
4. What was the crew's first intention after encountering birds?

5. Why did the pilots change their mind later?
6. How did the cabin crew prepare the passengers for ditching?
7. Why weren't the rear doors opened during the evacuation?
8. Which services took part in the rescue operation?
9. Were there any casualties?

Ex. 2. Divide the story into 6 parts under the following headings. Put the headings in the logical order.

Encounter with birds	Rescue	History of the flight
Ditching	Evacuation	The crew's actions

Ex. 3. Make a list of three key words for each part, which will help you to remember the main points. Then retell the story.

PRONUNCIATION

 **Ex. 1. Listen to the following words and repeat them.**

ingest	thrust	towards
hydraulic	occupant	through
inflatable	flood	survive
minor injuries	rescue diver	

 **Ex. 2. Listen to the sentences with the words above and repeat them.**

1. The plane ingested pigeons into both engines during take-off and then crashed in an attempt to return to the departure aerodrome.
2. Reverse thrust is typically applied immediately after touchdown to improve deceleration early in the landing roll.
3. They were heading towards the German border.
4. The aircraft suffered number 2 engine failure which destroyed all its three hydraulic systems.
5. The plane was damaged but the occupants were unhurt.
6. The passengers were evacuated through the emergency exits.
7. Inflatable slides are used in an emergency to evacuate the plane quickly and safely.

8. Floods can cause serious problems if the aerodrome is located near water.
9. Of the six people injured in the crash, only two survived.
10. Several passengers suffered minor injuries.
11. A team of rescue divers were on the scene immediately after the ditching.

VOCABULARY

Ex. 1. Read another accident report and fill in the missing words choosing from the following list.

United Airlines Flight 297, a Vickers Viscount 745D, was a (1) flight from Newark International Airport in Newark, New Jersey, to Washington, D.C. with 17 (2) on board.

occupants

separated

a flock of whistling swans

On November 23, 1962 at (3) 12.24 p.m., it crashed just northwest of what is now Columbia, Maryland. None of the people (4)

scheduled

loss

survived

The cause of the accident was an encounter with (5) while the aircraft was (6) at 6,000 feet. After the bird strike the horizontal stabilizer (7), which (8) in (9) of control and the crash.

cruising

approximately

resulted

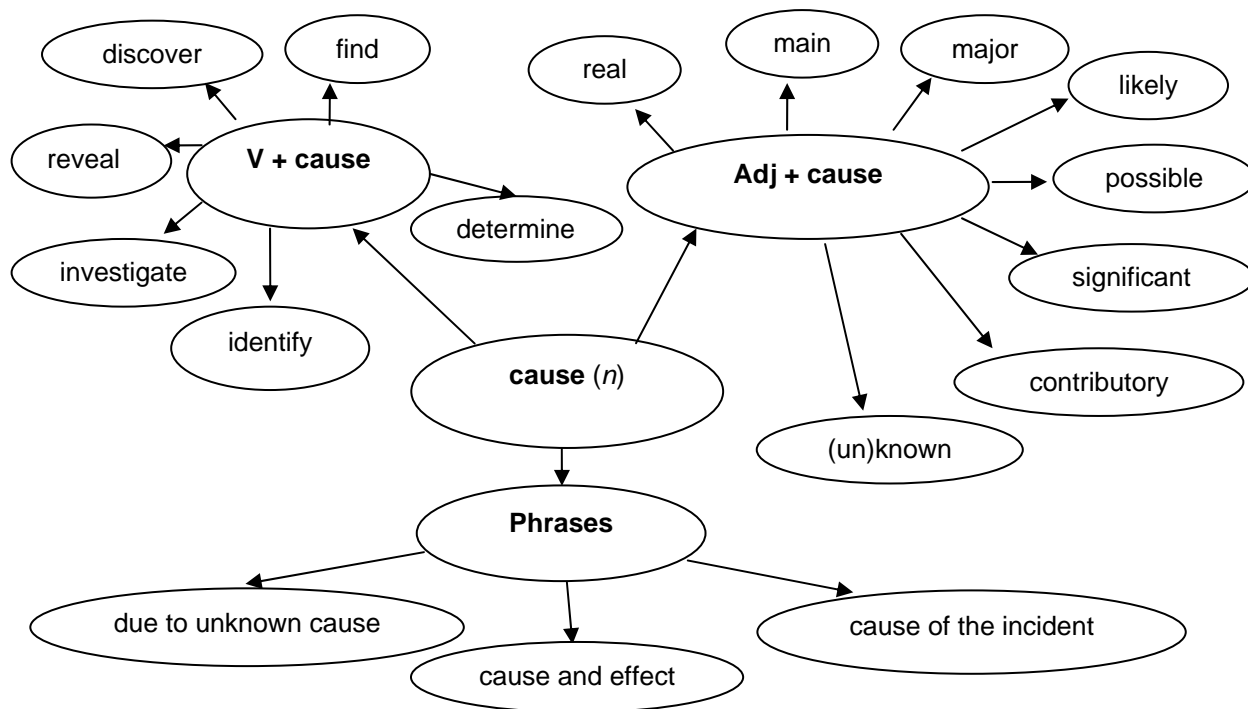
Ex. 2. Pay attention to the word *cause*. You need to know the collocations with it.

cause (v) – быть причиной чего-либо, вызывать что-либо.

We can use this verb either with a **noun** after it (e.g. *Do you know what caused the incident?*) or with a **noun** + **to** + **V₁** (e.g. *The bird strike caused the stabilizer to separate.*)

cause (n) – причина

To find out the most common word clusters with "**cause**" as a noun study the following spider web.



Notice the difference between **cause** and **reason**.

The **cause** of something is what produces the result.

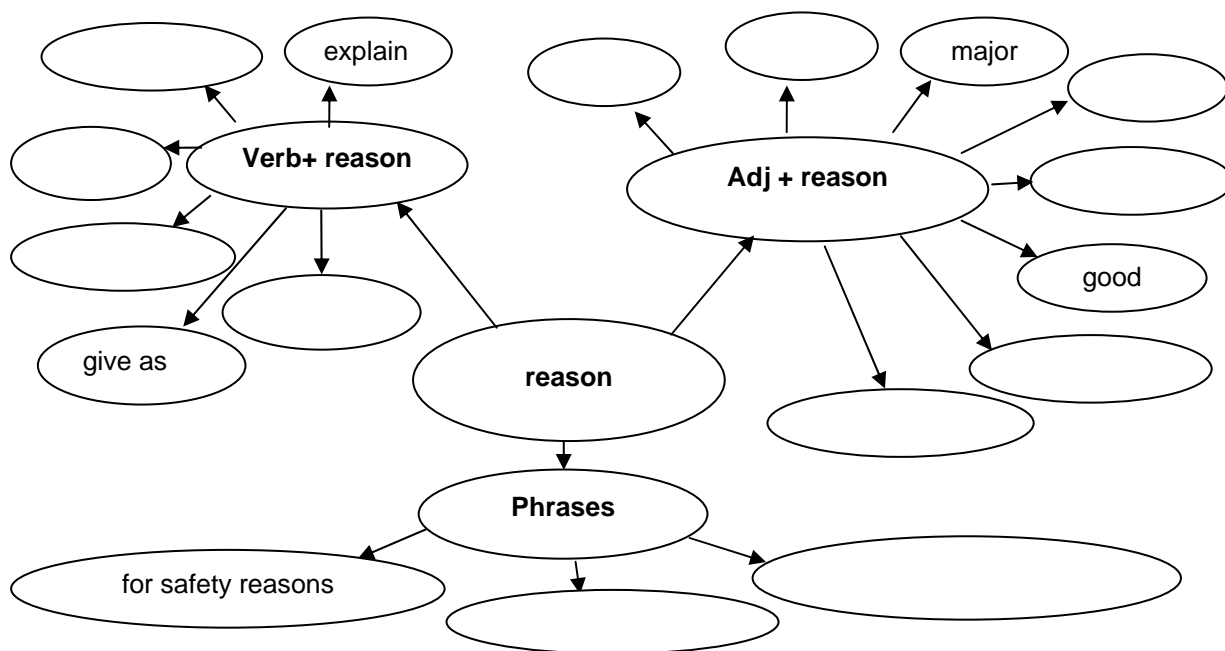
*e.g. There was discussion about the fire and its likely **cause**.*

A **reason** (причина, основание, повод) explains or justifies the result.

*e.g. There are a number of **reasons** why a flight can be delayed.*

Note! We talk about the **reason for** something, but **the cause of** something.

Ex. 3. Use your dictionary and fill in a similar spider web for the noun "reason".



Ex. 4. Translate the following sentences into English using either "cause" or "reason".

1. У них не было повода сомневаться в том, что у пассажира был сердечный приступ.
2. Чем была вызвана необходимость посадки на воду?
3. Какова причина ухода на второй круг?
4. Неблагоприятные погодные условия могут вызвать большие проблемы во время полета.
5. У командира были две веские причины для изменения маршрута следования.
6. Единственной причиной, почему они отказались от взлета, была сложная орнитологическая обстановка в районе аэродрома.
7. Командир решил не сообщать пассажирам об истинной причине возвращения на аэродром вылета.
8. Причина его решения скоро стала понятной.
9. Что послужило причиной повреждения стабилизатора?
10. В целях безопасности мы должны были резко уклониться вправо на 15 градусов.
11. Человеческий фактор является основной причиной большинства происшествий.

GRAMMAR AND LISTENING

Ex. 1. You are going to listen to an incident report with some missing information. You will have to ask questions about it. First read the following grammar material which must be useful for you.

Grammar Revision

A pilot or air traffic controller who does not understand an unexpected message must be able to communicate that fact. It is much safer to ask a question, to clarify, or even to simply acknowledge what you do not understand rather than allow silence to mistakenly represent comprehension. That is why you need to be skilled at checking, seeking confirmation, or clarifying a situation or communication. In other words, you must be able to ask questions when necessary. The following grammar material can help you.

Types of Questions

1. Yes / No Questions.

e.g. Did the plane land safely?

2. Wh-questions.

e.g. When did the incident occur?

3. Subject Questions.

e.g. What caused the damage to the fuselage skin?

Note! The word order in subject questions is the same as in statements.

4. Negative Questions.

e.g. Haven't you received the necessary information yet?

5. Question Tags.

e.g. You are a flight safety inspector, aren't you?

The passengers weren't injured, were they?

Pay attention to the following question tags:

*e.g. I am a captain, **aren't I**?*

*e.g. Please keep me informed of the situation on board, **will you / won't you / can you/ could you?***

*e.g. Let's discuss it later, **shall we?***

*e.g. Everyone went through the security check, **didn't they?***

*e.g. Nobody is injured, **are they?***

6. **Indirect Questions** (introduced by **Do you know...?**, **Could you tell me...?**, **Have you any idea...?**, **I wonder**, etc.+ **question word or if / whether**.)

*e.g. Could you tell me **where the ramp manager is?***


*Do you know **if / whether the landing was carried out successfully?***

Note! The word order in indirect questions is the same as in statements.

Ex. 2. Translate the following questions into English.

1. Почему экипаж был вынужден сливать топливо?
2. Давайте обсудим это с нашим представителем, ладно?
3. Имеется ли опасность столкновения с птицами на более высоких эшелонах?
4. Что можно сделать, чтобы уменьшить риск попадания птицы в самолет при взлете и посадке?


5. Есть ли среди пассажиров врач или медсестра, чтобы оказать больному пассажиру профессиональную помощь?
6. Когда была утеряна связь с аварийным бортом?
7. Какие повреждения получил планер самолета в результате столкновения со стаей птиц?
8. Вы разве не слышали о посадке Ту-124 на Неву в 1963 году?
9. Вы не помните, были ли тогда жертвы среди пассажиров и членов экипажа?
10. Что произошло с самолетом?
11. Кто проводил расследование?

 **Ex. 3. Listen to the incident report and ask your teacher questions about the missing information. Take notes as later you will have to tell the story back.**

Ex. 4. Answer the following questions.

1. What was the total number on board?
2. When did the incident occur?
3. What part of the plane was struck by a bird?
4. Did they return to the departure a/d?
5. What happened on landing?
6. Were there any fatalities?
7. How many people were injured?
8. What kind of damage did the a/c sustain?
9. What caused the RW excursion?

Ex. 5. Using your notes and the questions above tell the story back.

 **Ex. 6. Listen to some more short reports. They all refer to bird strikes. You may ask your teacher questions about what you have not understood or missed. Answer the questions below after each report.**

1. 1. The incident occurred on landing, didn't it?
2. What actually happened?
3. Do you remember the bird species encountered by the plane?
4. How many passengers were injured?

5. What damage did the aircraft sustain?
 6. What actions were taken by the airport authorities after the landing of Boeing 737?
2.
 1. At what stage of flight did it happen?
 2. What kinds of birds were involved in the incident?
 3. How many birds were sucked?
 4. What were the consequences?
 5. What exactly happened to the radome?
 6. What made the communication between the crew members difficult?
 7. Were there any casualties?
 3.
 1. What kinds of birds were involved in the incident?
 2. Who witnessed the incident?
 3. What did they see?
 4. Was the damage to the engine substantial? How do you know?
 5. Were there any injuries among the witnesses?
 6. What procedure did the crew have to carry out before landing?

READING AND SPEAKING

Ex. 1. Look at the photo and answer the questions.



1. What kind of animal can you see?
2. How do you think it has appeared on the runway?
3. Can it pose any risk to aircraft?
4. Have you ever encountered an animal on the aerodrome maneuvering surface? What animals were they? Describe the occurrence.

Ex. 2. Using a dictionary read the following newspaper article about non-avian hazards. Then answer the questions beneath it.

Turtles crawl on runway, delay flights at JFK

By David B. Caruso, Philly.com

July 8, 2009

A runway at John F. Kennedy International Airport was shut down briefly on July 8, 2009 after at least 78 turtles emerged from a nearby bay and crawled onto the tarmac.

The invasion began unfolding, slowly, at around 8.30 a.m., when an American Eagle flight crew reported seeing three turtles while taxiing out for departure. Before long, a chorus of pilots was radioing the tower to report turtles either on the end of a runway that juts out into the water, or approaching on the grass.

The FAA* halted flights for about 12 minutes shortly before 9 a.m. while some of the turtles were cleared away, then quit using the runway entirely after getting new reports of "massive numbers" of turtles on the tarmac.

Ground crews eventually cleared the reptiles away and deposited them back in the water farther from airport property, but not before the incident disrupted JFK's flight schedule and caused delays that reached nearly one and a half hours.

Jets hit turtles a few times each year at JFK, usually in the final days of June or earliest days in July, according to the FAA's wildlife strike database. There have been no recent reports of the strikes causing any damage to an airplane.

1. What caused delays at John F. Kennedy International Airport?
2. Why did the airport authorities stop using the runway?
3. How was the problem solved?
4. What do you know about turtles?
5. Do they pose a serious threat to aviation safety?
6. What other animals may cause trouble on the aerodrome maneuvering areas?
7. Is the encounter with them as frequent as with birds? What can it lead to?
8. What do you think are possible solutions to exclude strikes with large animals on the maneuvering areas on the ground?

* FAA – The Federal Aviation Administration, an agency of the United States Department of Transportation with authority to regulate and oversee all aspects of civil aviation in the U.S.

REVIEW

Ex. 1. Read the following information that might be of interest.

Did you know that...?

- Over 219 people have been killed world-wide as a result of bird strikes since 1988.
- Over 7,600 bird and other wildlife strikes were reported for USA civil aircraft in 2007.
- Waterfowl (31 %), gulls (26 %), and raptors (18 %) represented 75 % of the reported bird strikes causing damage to USA civil aircraft, 1990–2007.
- Over 1,300 strikes involving civil aircraft at heights above 5,000 feet AGL were reported from 1990–2003. The world height record for a strike is 37,000 feet.

Ex. 2. Answer the questions.

1. How can a bird activity endanger flight safety?
2. Is it true that large aircraft are built to withstand all bird strikes and birds are not a serious hazard to them?
3. Do bird strikes occur at high altitudes?
4. What species of birds are most often involved in such incidents?
5. Why is a bird ingestion dangerous? What can it lead to?
6. What can be done to prevent such incidents during take-off and landing?
7. Have you ever encountered flock of birds in your practice? What happened?

Ex. 3. Read the following information using a dictionary. Compare your answers to the questions in the previous exercise with it.

Bird Strike

Bird strikes happen most often during take-off or landing, or during low altitude flight. However, bird strikes have also been reported at high altitudes, some as high as 6,000 to 9,000 meters above the ground. The majority of bird collisions occur near or on airports (90 %, according to the ICAO) during take-off, landing and associated phases.

The point of impact is usually any forward-facing edge of the aircraft such as a wing leading edge, nose cone, jet engine cowling or engine inlet.


Jet engine ingestion is extremely serious due to the rotation speed of the engine fan and engine design. Jet engines are particularly vulnerable during the take-off phase when the engine is turning at a very high speed and the plane is at a low altitude where birds are more commonly found.

Bird strikes can damage aircraft components, or injure passengers. Flocks of birds are especially dangerous, and can lead to multiple strikes, and damage. Depending on the damage, aircraft at low altitudes or during take-off and landing often cannot recover in time, and thus crash.

There are a number of effective techniques that can reduce the number of birds in the airport area. In general, the techniques fall into three categories: making the environment unattractive for birds, scaring the birds, or as a last resort, reducing the bird population.

Airports take a range of measures against bird strikes:

- using frightening devices such as sounds, lights, pyrotechnics, radio-controlled airplanes, lasers, dogs etc.;
- hiring falcons;
- keeping the grass long near RWYs because birds avoid habitats that could hide predators.

 **Ex. 4. Study the word list of species most often involved in bird strikes. Listen to and repeat the words.**

raptor, bird of prey	хищная птица
goose (geese)	гусь
gull	чайка
vulture	гриф
kite	коршун, ястреб
eagle	орел
pelican	пеликан
dove / pigeon	голубь
starling	скворец
lark	жаворонок
blackbird	черный дрозд
swan	лебедь
crane	журавль
waterfowl	водоплавающие птицы



Canada goose.
This species is 80–110 centimetres long with a 130–180 centimetres wingspan and up to 6.5 kilogrammes weight

Ex. 5. Read the following information.**Species**

The species most frequently involved in bird strikes are large birds with big populations, particularly geese and gulls. Large birds of prey (also called "raptors") such as vultures and kites can also be hazardous.

In the US reported strikes are divided between waterfowl (32 %), gulls (28 %), and raptors (17 %). In terms of frequency, mourning doves, starlings and horned larks are commonly involved in the strike.

The largest numbers of strikes happen during the spring and fall migrations. Bird strikes above 500 feet altitude are about 7 times more common at night than in daytime during the bird migration season.

Non-avian hazards during take-off and landing

Along with birds some animal can also cause trouble for departing and landing aircraft.

As with birds, they quickly adapt to the normal noise and activity conditions of a chosen habitat and have no fear of aircraft or vehicles on airports. Most non-avian hazards are of course only found on the ground, which limits the potential consequences of impact, but bats – the only flying mammals – are a notable and occasionally significant exception.

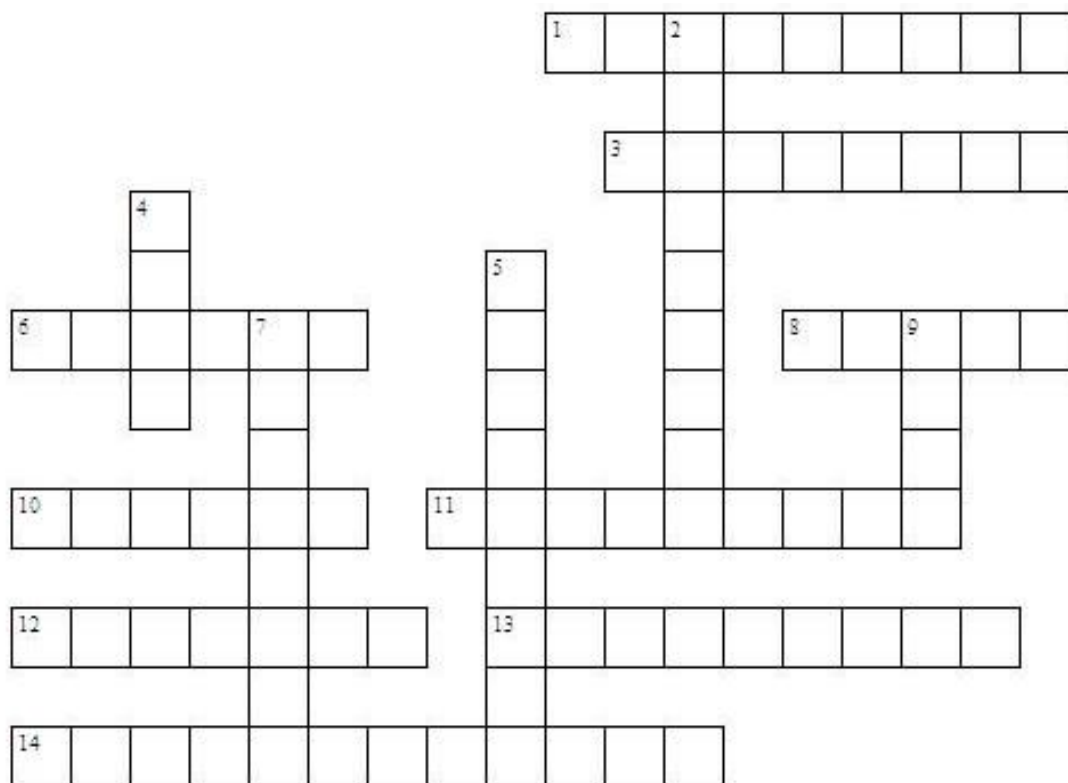
Animal species recorded regularly in such incidents are deer, moose, coyotes often encountered in North America, whereas in Europe, red foxes are often the most common sighting at airports of all sizes although they are only quite infrequently hit by aircraft.

In order to exclude strikes with large animals on the maneuvering areas on the ground, airports are normally secured with airport perimeters with fencing of a sufficient scale.

Ex. 6. Do the crossword puzzle. All the words are related to the bird strike issues discussed in this unit.

Across: **1.** (*n*) A sudden dangerous event or situation which needs immediate actions or assistance. **3.** (*n*) Each person who is on board the plane. **6.** (*n*) The word with the same meaning as "hazard". **8.** (*n*) A large bird of prey with a sharp curved beak. **10.** (*v*) To hit something with great force. **11.** (*n*) Birds that can

swim and live near water. **12.** (*v*) To inform ATC officially about an emergency situation on board. **13.** (*n*) It happens when a bird is sucked into an engine. **14.** (*adv*) Afterwards; later; after something else has happened.



Down: **2.** (*v*) To experience something unpleasant or difficult, to meet something. **4.** (*n*) A sudden loud noise. **5.** (*n*) The movement of large number of birds from one place to another in autumn and spring. **7.** (*v*) To move people from a place of danger to a safer place. **9.** (*n*) A seabird with long wings and usually white feathers.

Ex. 7. Translate the following accident report into English.

Катастрофа Ан-12 в аэропорту «Домодедово»

Грузовой самолет Ан-12 потерпел крушение сразу после взлета из аэропорта «Домодедово». Его обломки были найдены в 4 км от ВПП в лесном массиве. На борту самолета находились семь членов экипажа, все они погибли.

Причиной катастрофы явилось попадание достаточно больших птиц сразу в два двигателя, расположенных на правом крыле, на высоте, равной 70–75 м, при скорости в 160 узлов, что привело к их практически одновременному отказу. Самолет потерял управляемость, вошел в правый крен, превышающий 100 градусов, задел верхушки деревьев и упал через несколько секунд после взлета.

HIJACKING

PREVIEW

Look at the photo and describe what is happening. The following questions will help you.

1. Who are the people?
2. Where are they?
3. What is happening?
4. Who is holding the gun?
5. Why is he threatening the crew?
What does he want?
6. What do you think the captain is thinking about?
7. What do you think he will do?



VOCABULARY

Ex. 1. Brainstorm as many words associated with hijacking as possible.

Ex. 2. Compare your word list with the one below and check the meaning of unfamiliar words in a dictionary or with your teacher.

air marshal (<i>n</i>)	mediate (<i>v</i>)
anti-terrorist squad (<i>n</i>)	negotiate (<i>v</i>)
bullet (<i>n</i>)	negotiation (<i>n</i>)
casualty (<i>n</i>)	obey (<i>v</i>)
demand (<i>n, v</i>)	overpower / subdue (<i>v</i>)
explode / blow up (<i>v</i>)	persuade (<i>v</i>) (sbd to do sth)
explosive (<i>adj, n</i>)	ransom (<i>n</i>)
fatality (<i>n</i>)	release (<i>v</i>)
fire / shoot (<i>v</i>) (at sbd / sth)	seize / capture (<i>v</i>)

grenade (<i>n</i>)	surrender (to sbd) (<i>v</i>)
gun (<i>n</i>)	threat (<i>n</i>)
hostage (<i>n</i>)	threaten (<i>v</i>)
intermediary / mediator (<i>n</i>)	weapon (<i>n</i>)
knife (<i>n</i>)	

be armed with (a gun)

be injured / wounded / bruised / stabbed / hurt / shot to death

engage a hijacker in negotiations

prevent panic

seek / grant political asylum

take / hold passengers hostage

Ex. 3. Match a word in column A with its definition in column B.

A	B
1. hostage	a) the possibility of trouble, danger or disaster
2. seize	b) to push a knife into somebody, killing or injuring them
3. threat	c) to ask for protection that a government gives to people who have left their own country
4. obey	d) an object that is used for fighting or attacking somebody
5. stab	e) a person who is captured and held prisoner and who may be injured or killed
6. seek political asylum	f) formal discussion between people who are trying to reach an agreement
7. ransom	g) to do what you are told or expected to do
8. negotiation	h) to capture and arrest somebody, to take control of a place or situation, often suddenly and violently
9. weapon	i) a security service officer travelling on board the aircraft among the passengers in order to prevent hijacking
10. air marshal	j) money that is paid to somebody so that they release a hostage who is being kept by them

Ex. 4. The words in the chart below are all related to hijacking. Use a dictionary to find the other parts of speech.

Verb	Noun	Adjective	Adverb
seize		—	—
		explosive	
obey			
	threat		
arm			—
injure			—
prevent			
	intermediary		—
demand			—

Ex. 5. Use the words in the previous exercise in the correct form to fill in the gaps.

- The terrorist said that he was ready to carry out his to blow up the plane.
- There were two loud and then the plane burst into flames.
- Four people were in the anti-terrorist operation.
- The captain decided to meet the hijackers' in order to save the passengers' lives.
- One of the hijackers pulled out a gun and looked at the cabin attendant
- The bomb contained 200 pounds of high
- The passengers escaped with only minor
- The man was with a hand grenade.
- The baggage handler's work is physically
- All negotiations between the hijackers and the government were conducted through an
- Airlines must take all possible measures in order to minimize the risk of aircraft hijacking.

VOCABULARY, READING AND SPEAKING

🔊) **Ex. 1. Before reading the occurrence description study the word list below. Listen to and repeat the words and sample sentences.**

smuggle (v)	тайно проносить, заниматься контрабандой <i>e.g. He managed to smuggle a gun on board the plane.</i>
bespectacled (adj)	носящий очки, в очках <i>e.g. An elderly bespectacled lady told one of the cabin attendants that the passenger sitting next to her was behaving strangely.</i>
sufficient (adj)	достаточный <i>e.g. They did not have sufficient fuel.</i>
suspicious (adj)	подозрительный <i>e.g. She became suspicious of his behaviour and informed the cabin attendant about it.</i>
deny / reject (v) (a request)	отказать (в просьбе) <i>e.g. They were denied access to the flight deck. The captain firmly rejected their demand to be flown to a new destination.</i>
ascend (v)	набирать высоту, подниматься вверх <i>e.g. Mist ascended from the valley.</i>
ill-fated (adj)	злополучный <i>e.g. The ill-fated flight eventually departed five hours later.</i>

Ex. 2. Read the occurrence description.

Ill-fated Flight 814

Indian Airlines Flight 814 with 178 passengers on board was operating an international flight from Kathmandu, Nepal to Delhi, India. Shortly after the aircraft entered Indian airspace on 24 December 1999, it was hijacked by five Pakistani gunmen, who had managed to smuggle on board guns, knives and grenades .

The senior flight attendant on that flight later recalled that a masked, bespectacled man had threatened to blow up the plane with a bomb and ordered the captain to "fly west". The hijackers wanted the crew to divert the aircraft over

Lucknow and head towards Lahore, but Pakistani authorities quickly refused permission as they did not want to be linked with the terrorists. Also, the fuel was not sufficient. The captain told the hijackers that they had to land in Amritsar, India.

At Amritsar the captain requested refueling the aircraft. But the hijackers became suspicious of the delay and forced the crew to take off without waiting for ATC clearance.

Due to extremely low fuel level, the aircraft requested emergency landing in Lahore, Pakistan. Pakistan denied the request. Pakistan also shut down their air traffic services, thus effectively blackening the whole of Pakistan airspace for the Indian Airways flight, and switched off all the night landing facilities at Lahore Airport. With no help from ATC, the captain relied on his visual instincts and began descending on what he thought was a runway, only to find out that it was a well lit road. Fortunately he managed to ascend the aircraft in time. On understanding that the only other option for the aircraft was to crash-land, Lahore Airport switched on its lights and allowed the aircraft to land. The hijackers demanded food, water, and fuel, all of which were provided. But Pakistani officials rejected the pilot's request to offload some female passengers and children.

The aircraft took off for Dubai where 27 passengers aboard the ill-fated flight were released. The hijackers also released critically injured 25-year-old Indian man, who was stabbed by the hijackers multiple times and who later died, becoming the first and only casualty of the hijacking. Soon after the release of these passengers, the hijacked plane left for Kandahar International Airport.

After the aircraft landed in Kandahar, Taliban authorities, in an attempt to gain international recognition, agreed to cooperate with Indian authorities and took the role of intermediaries between the hijackers, who were holding the remaining 148 passengers hostage, and the Indian government. The negotiations were very long and difficult. The hijackers initially demanded the release of 35 terrorists imprisoned in Indian jails as well as US \$ 200 million ransom money, but Indian negotiators and the United Nations official, who had arrived to mediate between the hijackers and Indian authorities, persuaded the hijackers to reduce their demand to the release of just three prisoners.

After the three released terrorists landed in Kandahar, the hostages aboard the flight were freed and flown back to India on a special plane.

Ex. 3. Find in the text "Ill-fated Flight 814" the synonyms to the following words.

- | | | |
|--------------|-------------------|----------------------|
| 1. armed men | 5. enough | 9. seriously wounded |
| 2. recollect | 6. make sb do sth | 10. free |
| 3. explode | 7. climb | 11. many times |
| 4. refuse | 8. disembark | 12. convince |

Ex. 4. Complete the second sentence so that it is as similar in meaning as possible to the first. Use the word given (it must not be changed) and some other words.

- The plane departed Kathmandu, Nepal, and was heading for Delhi, India.
operating
The aircraft to Delhi, India.
- The hijackers had guns, knives and grenades.
armed
The hijackers and grenades.
- The offensive weapons had been carried on board secretly and illegally.
smuggled
The terrorists on board the aircraft.
- A hijacker, who was wearing a mask, frightened the senior cabin attendant.
masked
The senior cabin attendant hijacker.
- The crew was ordered to fly to Pakistan.
made
The hijackers to Pakistan.
- Pakistani authorities did not allow them to land at Lahore.
refused
Pakistani authorities at Lahore.
- The aircraft endurance was low.
sufficient
The crew on board.
- The delay in refueling alerted the hijackers.
suspicious
The hijackers the delay.

9. The airport authorities stopped all the ATC services.

shut down

The ATC services the airport authorities.

10. They did not allow the crew to offload some women and children.

rejected

Their request to

11. One of the hijackers fatally wounded a young man with a knife.

stabbed

A young man a knife.

12. The rest of the passengers were not injured.

casualties

There were the passengers.

13. The United Nations official mediated in the negotiations between the Indian government and the hijackers.

intermediary

The United Nations official took in the negotiations.

14. The hijackers claimed that they would release the hostages in case they were paid \$ 200 million.

ransom

The hijackers demanded a huge of the hostages.

15. The negotiators managed to talk the terrorists into reducing their demands.

persuaded

The terrorists their demands.

PRONUNCIATION

 **Ex. 1. Listen to and repeat the following words.**

weapon

threat

threaten

seize

capture

persuade

surrender

asylum

negotiate

negotiation

suspicious

sufficient

 **Ex. 2. Listen to and repeat the sentences with the words above.**

READING AND SPEAKING

Ex. 1. Read the text "Ill-fated Flight 814" on p. 93 again and answer the questions.

1. At what point during the flight did the hijack occur?
2. What were the hijackers armed with?
3. What did they look like?
4. What were their demands?
5. Why do you think they wanted to be flown to Pakistan?
6. What was the reason for the aircraft landing in Amritsar, India?
7. Why did the crew take off from Amritsar without obtaining ATC clearance?
8. Why did Pakistani authorities refuse the crew's request to land at Lahore?
9. What else did they do to prevent their landing there?
10. Where did the hijackers release some of the hostages?
11. What was the final destination of the hijacked aircraft?
12. Who took part in the negotiations as intermediaries?
13. What did the negotiations result in?
14. What happened to the passengers?
15. Were there any casualties?

Ex. 2. Make up a summary of the hijack you read about using the following plan.

- | | |
|--------------------------|----------------------------|
| 1. Hijack and hijackers. | 4. After landing at Dubai. |
| 2. Stopover in Amritsar. | 5. Arrival in Kandahar. |
| 3. Landing at Lahore. | |

GRAMMAR

Ex. 1. Study the following grammar

Verb + somebody + to+V₁

Many verbs in English can be followed by **object+ to + infinitive**, rather than by **that + clause**.

e.g. They didn't want the captain to inform the ATC about what had happened.

(Do not say: They didn't want that the captain informed the ATC...)

*e.g. They **did not allow the captain to disembark** women and children.*

(Do not say: They did not allow that the captain disembarked ...)

Some common verbs that can be followed by **object + to + V₁**:

allow	ask	cause	command
encourage	expect	forbid	force
instruct	invite	offer	permit
persuade	recommend	request	teach
tell	want	warn	

Note: Some verbs (e.g. **let, make, see, hear, feel, watch, notice** and sometimes **help**) are followed by **object + infinitive without to**:

*e.g. I will **let you know** about their decision in a few minutes.*

They made the passengers obey them.

*The cabin attendant saw **the hijacker pull out** a gun.*

Ex. 2. Find in the text on p. 93 5 examples of Verb + somebody + to + V₁.


Ex. 3. Translate the following sentences into English.

1. Захватчики заставляют нас изменить маршрут следования.
2. Я предупредил пассажиров, чтобы они не оказывали сопротивления захватчикам.
3. Посредники сумели убедить террористов отпустить женщин и детей.
4. Бортпроводники сказали пассажирам оставаться на своих местах.
5. Я советую вам сохранять спокойствие и подчиниться требованиям захватчиков.
6. Удар был таким сильным, что это явилось причиной отрыва правого двигателя.
7. Власти Пакистана предложили захватчикам обратиться с просьбой о политическом убежище в Афганистане, но все же позволили самолету приземлиться в Лахоре.
8. Посредник предложил им уменьшить сумму требуемого выкупа.
9. Переговорщики хотели, чтобы террористы освободили раненых пассажиров.

LISTENING AND SPEAKING

Ex. 1. You are going to listen to an incident report. Study the following word list.

former (<i>adj</i>)	БЫВШИЙ <i>e.g. Milton Torres, a former Air Force fighter pilot, says he had a close encounter with an UFO.</i>
fierce (<i>adj</i>)	СИЛЬНЫЙ, СВИРЕПЫЙ <i>e.g. At least three people were killed after a fierce but short-lived tornado which hit northern France.</i>
be in police custody	содержаться под стражей в полиции <i>e.g. The unruly passenger was taken into police custody.</i>

 **Ex. 2. Listen to the incident report and say whether the following statements about the incident are true or false. If you think they are false, correct them.**

1. The policeman whose name was Stefano Savorani hijacked an Alitalia flight.
2. He hadn't had any experience of that kind before.
3. He did it because he had argued with his wife the previous day.
4. He had never been prone to mental illnesses.
5. He had a bomb with a remote control unit.
6. He was a member of al-Qaeda.
7. After landing in Lyon he didn't hold the passengers as hostages on board the plane.
8. He was arrested by the police.
9. He had committed suicide before they arrested him.

Ex. 3. Read the report on p. 145 and check whether your answers were correct.

 **Ex. 4. Listen to another incident report and answer the questions.**

1. What can you remember about the identity of the hijacker?
2. What was he armed with?
3. Where did he conceal it?
4. What alerted the cabin crew member?

5. The flight crew helped the cabin attendants to subdue him, didn't they?
6. How many casualties were reported?
7. What happened to the hijacker after landing?

Ex. 5. Read the report on p. 146 and check whether your answers were correct.

Ex. 6. Role Play. You are one of the cabin crew who has just noticed something suspicious in Richard Reid's behaviour. Report it to the captain. The following word clusters may help you.

appear / seem / feel / look nervous

be shaking all over

behave aggressively / oddly / strangely / suspiciously

clasp something tightly

hide one's eyes

hold one's hand in the pocket

look round all the time

not / reply to the questions

seem to be intoxicated / be in a state of drug intoxication / be high on drugs

sweat heavily

Ex. 7. You are the captain of this aircraft. Report what has happened to the ATC controller.

Ex. 8. Work in pairs. One of you was a passenger on the same flight, the other is his friend, who is eager to know what happened and asks a lot of questions. Tell your friend about the incident and describe the hijacker's appearance using the photo of Richard Reid and the information below.



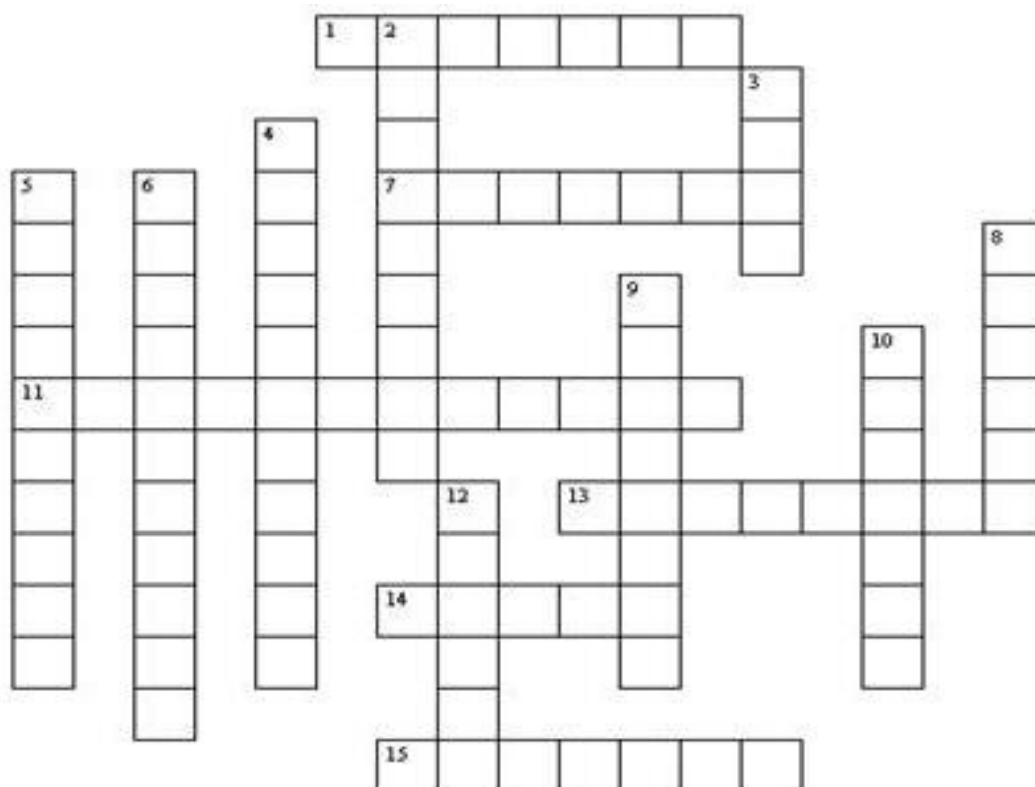
Age	young, middle-aged, elderly, old, in his 30's, in his late teens, in his mid-20's, in his early 40's
Build	overweight, fat, thin, slim, plump, medium-build, broad-shouldered

Height	short, 1.70 m, below average height, medium / average height, tall
Hair colour	black, brown, dark, red, fair, blonde, grey, white, dyed, a brunette, a blonde, a redhead
Hairstyle	long, short, straight, wavy, curly, untidy, with a fringe, swept back, a pony-tail, bald, balding
Face	thin, long, round, oval, square, high cheekbones, a high forehead, thin lips, full lips, a long nose, an aquiline nose, a straight nose, a turned-up nose, a broken nose, a double chin
Eyes	blue, grey, brown, with long eyelashes, with bushy eyebrows, with thin eyebrows
Teeth	big, gappy, sticking-out, even, crooked, broken, missing, healthy, pearl-white, yellowish, decayed, rotten
Complexion:	pale, tanned, fair-skinned, olive-skinned, brown, black, oriental
Clothes:	smart, well-dressed, elegant, fashionable, conservative, casual, shabby
Distinguishing features	a beard, a moustache, unshaven, clean-shaven, a scar, a mole, with freckles, with dimples, with wrinkles, with glasses

REVIEW

Ex. 1. Do the crossword puzzle. All the words are related to the hijacking issues discussed in this unit.

Across: **1.** (*n*) A person who is captured and held prisoner and who may be injured or killed. **7.** (*v*) To let somebody come out of a place where they have been kept as prisoners. **11.** (*n*) A person who helps other people to make an agreement by being a means of communication between them. **13.** (*n*) A person who is killed or injured in an accident. **14.** (*n*) A sharp object that is used for fighting or attacking somebody. **15.** (*v*) To bring goods or people secretly and illegally into or out of a country.



Down: 2. (*v*) To gain control over somebody completely by using greater strength, the synonym to "subdue". **3.** (*v*) To do what you are told or expected to do. **4.** (*n*) The people who have the power to make serious decisions. **5.** (*adj*) You feel like this when you think somebody has done something wrong or illegal. **6.** (*n*) Formal discussion between people who are trying to reach an agreement. **8.** (*n*) Harm done to somebody in an accident. **9.** (*v*) To say that you will cause trouble, hurt somebody if you don't get what you want. **10.** (*v*) To burst loudly and violently, causing damage. **12.** (*n*) Money that is paid to somebody so that they will release a person who is being kept as a prisoner by them.

Ex. 2. Discuss the following questions.

1. Do hijacks frequently happen nowadays?
2. What are hijackers' demands in most cases and what are their aims?
3. How can hijackers be identified and prevented from boarding?
4. Are all security checking procedures 100 % effective?
5. What weapons can be used by hijackers?
6. How can pilots be prepared for a real hijack situation?
7. Do you think pilots should carry handguns in the cockpit in order to be able to resist hijackers? Give your reasons.

8. Does a pilot need self-defense training? What for?
9. Is it necessary to have armed air marshals aboard each aircraft? How can they prevent hijacking?
10. Can hijacks be always concluded by the use of armed force?
11. Do you believe it is possible to negotiate with hijackers? Why?
12. What is the best way to protect an aircraft, its passengers and crew?

Ex. 3. Read the following information and compare your answers with it.

Aircraft Hijacking

Aircraft hijacking (also known as *skyjacking*) is the unlawful seizure of an aircraft either by an individual or by a group. In most cases, the pilot is forced to fly according to the orders of the hijackers. However, there have been cases where the hijackers have flown the aircraft themselves. In at least one case, a plane was hijacked by the official pilot.

Most aircraft hijackings are committed to use the passengers as hostages. Motives vary from demanding the release of certain prisoners to political purposes. Hijacking may also be carried out so as to use the aircraft as a weapon to target a particular location (September 11, 2001 attacks). Other hijackers may hold the hostages for ransom.

Most hijackings for hostages result in a series of negotiations between the hijackers and the authorities, followed by some form of settlement. However, these settlements do not always meet the hijackers' original demands. If the hijackers show no sign of surrendering, armed special forces may be used by authorities to rescue the hostages.

Informing Air Traffic Control

To communicate to air traffic control that an aircraft is being hijacked, a pilot should squawk 7500 or vocally, by radio communication, transmit "Aircraft callsign; Transponder seven five zero zero". This should be done when possible and safe. An air traffic controller who suspects an aircraft may have been hijacked may ask the pilot to confirm "squawk seven five zero zero". If the aircraft is *not* being hijacked, the pilot should *not* squawk 7500 and should inform the controller accordingly.

Prevention

Cockpit doors on most commercial airlines have been strengthened and are now bullet-resistant. In the United Kingdom, United States, Canada, Australia and France, air marshals have also been added to some flights to prevent hijackings. In addition, some have proposed remote control systems for aircraft whereby no one on board would have control over the plane's flight. Airport security plays a major role in preventing hijackers. Screening passengers with metal detectors and luggage with x-ray machines prevents weapons from being taken on to an aircraft. The Israelis alone implement decompression on all luggage to check for pressure sensor detonators.

Ex. 4. Translate the following incident into Russian.

Самолет, совершавший рейс из Лондона в Каир, был захвачен двумя вооруженными людьми в масках. Они сообщили, что в салоне самолета находится бомба, которую они готовы взорвать в любую минуту и что, кроме пистолетов, у них имеется две гранаты. Экипаж был вынужден изменить маршрут и следовать в Саудовскую Аравию. По прибытию в Эр-Рияд захватчики заявили, что экипаж и пассажиры будут являться их заложниками до тех пор, пока они не получат 5 миллионов долларов.

Они угрожали, что будут убивать по одному пассажиру каждый час, если их требования не будут выполнены. Между ними и официальными представителями Саудовской Аравии начались долгие переговоры.

Тем временем антитеррористическая группа проникла в самолет через заднюю дверь, уничтожила одного захватчика и захватила другого.

Один бортпроводник был ранен. Никто из пассажиров не пострадал.

AIRSPACE INFRINGEMENT

PREVIEW

Look at the photo and describe what is happening. The following questions will help you.



1. Doesn't this photo seem strange to you? Why?
2. What can you see in the photo?
3. Where is the plane?
4. How do you think it has appeared there?
5. What kind of plane is it?
6. Who are the people in the photo?
7. What are they doing?
8. How must they feel about the situation?
9. What do you think will happen in a while?
10. Have you guessed what we are going to talk about?

VOCABULARY AND READING

 **Ex. 1. Before reading the occurrence description look at the word list below. Listen to and repeat the words and sample sentences.**

infringement (*n*)

нарушение (закона, правил)

e.g. Airspace infringement occurs when an aircraft enters certain types of airspace without first obtaining clearance.

amateur (n)	любитель <i>e.g. Being certified as an amateur pilot takes much less time than becoming a professional one.</i>
track (v)	прослеживать, выслеживать <i>e.g. They continued tracking the plane on their radar.</i>
launch (v)	запускать, выпускать (снаряд, ракету) <i>e.g. The missiles were launched against enemy targets.</i>
confuse (v)	спутать, принять за что-либо другое <i>e.g. His plane was confused with one of the helicopters taking part in the rescue operation.</i>
confusion (n)	неразбериха, путаница <i>e.g. There is some confusion about what the correct procedure should be.</i>
regiment (n)	полк <i>e.g. The local air regiment was placed on full alert.</i>
pedestrian (n)	пешеход <i>e.g. Two pedestrians were injured when the car skidded.</i>
passer-by (n)	прохожий, проезжий <i>e.g. Police asked passers-by if they had seen the incident.</i>
sentence sb to sth (v)	приговорить кого-либо к чему-либо <i>e.g. He was sentenced to three years in prison for breaking the law.</i>
coincide (v)	совпадать, происходить в то же самое время <i>e.g. Their arrival coincided with our departure.</i>

Ex. 2. Read the description of the occurrence.

Landing in the Centre of Moscow

Mathias Rust, a 19-year-old amateur aviator from West Germany, was flying a rented Reims Cessna 172. After leaving Uetersen near Hamburg on May 13, 1987, Rust refuelled his aircraft in the morning of May 28, 1987 at Helsinki-Malmi Airport. He told air traffic control that he was going to Stockholm, but right after his final communication with traffic control he turned his plane to the

east. Traffic controllers tried to contact him as he was moving around the busy Helsinki-Moscow route, but Rust turned off all the communications equipment aboard.

Rust crossed the Baltic coastline in Estonia and turned towards Moscow. At 14.29 he appeared on air defense radar but did not reply to an IFF* signal. The military tracked his aircraft for some time, but failed to obtain permission to launch at him down.

Soon after, he disappeared from radars near Staraya Russa. Air defense re-established contact with Rust's plane several times, but confusion followed all of these events. The local air regiment near Pskov was on maneuvers, and, due to inexperienced pilots' tendency to forget correct IFF designator settings, local control officers assigned all traffic in the area friendly status, including Rust.

Near Torzhok there was a similar situation, as increased air traffic was created by a rescue effort for an air crash that had happened the previous day. Rust, flying a slow propeller-driven aircraft, was confused with one of the helicopters taking part in the rescue.

Several interesting events coincided with the final part of his route. The control system of the Central Air Defence District was unexpectedly turned down for unscheduled maintenance, and all flights around Sheremetyevo airport were forbidden for about twenty minutes — just for the time Rust was above it. The origins of these events are still unknown.

Around 7.00 p.m. Rust appeared above Moscow's center. He had initially intended to land in the Kremlin, but due to lack of proper landing space reverted to Red Square. Heavy pedestrian traffic didn't allow him to land there either, so after circling about the square one more time, he finally was able to land on a bridge by St. Basil's Cathedral. After taxiing past the Cathedral he finally stopped about 100 meters from the square, where he was greeted by curious passersby.

He was arrested soon afterwards and sentenced to four years for hooliganism, disregard of aviation laws and infringement of the Soviet airspace. He served his time at the Lefortovo jail in Moscow.

* IFF – a secondary surveillance radar based on the military **Identification, Friend or Foe** technology (запросчик системы опознавания государственной принадлежности цели).

Ex. 3. The following words are taken from the text. Match a word in column A with its definition in column B.

A	B
1. infringement	a) to think wrongly that a person or thing is someone or something else
2. confuse	b) to follow the movements of somebody / something, especially by using special electronic equipment
3. coincide	c) to damage something so badly that it no longer exists or works
4. track (v)	d) not to be successful in achieving sth
5. spot (v)	e) a fast military plane that may attack
6. fail to do sth	f) like something else but not exactly the same
7. interceptor	g) to order somebody not to do something
8. similar	h) right, appropriate or correct
9. forbid	i) to see or notice a person or thing, especially suddenly or when it is not easy to do so
10. proper	j) to happen place at the same time
11. destroy	k) an illegal action

Ex. 4. Match a word in column A with its synonym in column B.

A	B
1. previous	a) misunderstanding, mistake, mix-up
2. track (v)	b) military fighter
3. spot (v)	c) prison
4. confusion	d) notice
5. infringement	e) violation, offence
6. disappear	f) preceding
7. lack	g) vanish
8. jail	h) shortage
9. interceptor	i) prohibit
10. forbid	j) follow

Ex. 5. What is the difference in meaning (if there is any) between these pairs of words? Compare your ideas with a partner and then check in a dictionary.

1. break a law / infringe airspace
2. pedestrian / passerby
3. confusion / embarrassment
4. jail / prison
5. amateur / professional
6. aviator / pilot
7. occur / coincide
8. similar / the same
9. obtain permission / fail to obtain permission
10. bring to readiness / alert
11. he served his time / he spent his time

Ex. 6. The words in the chart below have all appeared in the text "Landing in the Centre of Moscow". Use your dictionary to find the other parts of speech.

Noun	Verb	Adjective	Adverb
	infringe	—	—
embarrassment			
	confuse		
	coincide		—
defense			
	—	similar	
	assign		—
		inexperienced	—
designator			—
recognition			

Ex. 7. Use the words in the previous exercise in the correct form to fill in the gaps.

1. The building was easily as an Aerodrome Tower.
2. People fear that security cameras could personal liberties.

3. The of Stansted as the third London airport did not surprise anyone.
4. Her questions about my private life me.
5. All pilots must be trained to themselves against hijackers' attacks.
6. A special committee was to investigate a balloon accident.
7. The captain has over twenty years' flying
8. Remarkable sometimes happen in real life.
9. Both of them are successful in their chosen careers.
10. In case of air space infringement extreme measures could be taken.

Ex. 8. Match a line in column A with a line in B to make an appropriate word cluster.

A	B
1. launch	a) for permission
2. bring the emergency services	b) on maneuvers
3. ask the authorities	c) a missile at the intruding aircraft
4. get	d) to three years in jail
5. be	e) the air rules
6. take part	f) the airspace
7. infringe	g) in the rescue operation
8. due to lack	h) to readiness
9. sentence the intruder	i) in contact with the pilot
10. break / violate	j) of the accurate information

Ex. 9. Make up your own sentences with each collocation found by you in the previous exercise.

SPEAKING

Ex. 1. Read the story "Landing in the Centre of Moscow" again and answer the questions.

1. What aircraft was involved in the incident?
2. What do you know about the pilot?
3. What was his destination according to his report to the Air Traffic Control?

4. Why do you think he changed his route?
5. Why did he turn off all the communications equipment aboard?
6. Did the Air Defense identify the unknown target on their radar?
7. Why didn't he reply to an IFF signal?
8. Was he assigned friendly or foe status?
9. Why couldn't the military pilots get in contact with him?
10. When did they receive the permission to shoot him down?
11. There is still confusion over how he managed to land safely in the centre of Moscow. Do you remember which factors had contributed to that?
12. What prevented him from landing in the Kremlin?
13. Why was he unable to land in Red Square, either?
14. What was the reaction of the people who happened to be on the site then?
15. Were the police waiting for him when the plane landed?
16. What was he sentenced for?
17. Have you any idea about what happened to him afterwards?

GRAMMAR

Ex. 1. Study the following grammar.

Some of the questions in ex. 1 on p. 110 are difficult to answer (e.g. questions 4, 5, 7, 11 and 17) because we don't know exactly what happened and how it occurred. In such cases it's a good idea to use modal verbs of probability. Study the grammar material given below.

Modal Verbs of Probability

Modal verbs **must**, **can't**, **could**, **may**, **might** and some others can be used to say that a situation is (or was) certain, impossible or probable.

Degrees of certainty	About the present	About the past
90 % certain	<i>He must be a millionaire now</i>	<i>He must have been crazy when he decided to fly to Moscow</i>
90 % certain	<i>He can't be in jail</i>	<i>There can't have been so many strange coincidences!</i>

50 % certain	<i>He could still be very famous</i>	<i>He could have calculated all the risks involved</i>
50 % certain	<i>He may be writing his memoirs now</i>	<i>His plane may have been shot down</i>
30 % certain	<i>He might be planning another flight to Russia</i>	<i>He might have become a professional pilot</i>

Note: Do not use **may** and **might** in questions and negative sentences. Use **could(n't)** or the phrase **be likely**:

e.g. Could it be that he wasn't identified by Air Defense?

It is unlikely that he served his full time in jail.

After modal verbs of probability different **forms of the infinitive** can be used:


Simple Infinitive	V₁	To talk about the present or future	<i>He must be very famous. He may visit Moscow again one day.</i>
Continuous Infinitive	be + V-ing	To talk about an action happening now	<i>He might be planning another flight to Russia.</i>
Perfect Infinitive	have + V₃	To talk about the past	<i>Rust's flight must have damaged the reputation of the Soviet military.</i>
Perfect Continuous Infinitive	have been + V-ing	To emphasize the duration of the past action	<i>He could have been flying at a very low altitude.</i>
Simple Passive Infinitive	be + V₃	To talk about the present or future in the passive voice	<i>He may be considered as one of the greatest adventurers. He could be invited to come to Russia.</i>
Perfect Passive Infinitive	have been + V₃	To talk about the past in the passive voice	<i>He may have been injured or even killed.</i>

Ex. 2. Using modal verbs of probability think of as many answers to questions 4, 5, 7, 11 and 17 in ex. 1 on p. 110 as possible.


Ex. 3. Translate the sentences into English using modals of probability.

1. Не может быть, чтобы он случайно нарушил Советское воздушное пространство.
2. Наверное, он обманул диспетчера, сказав, что летит в Стокгольм.
3. Возможно, у него отказало радиооборудование.
4. Сначала, по всей вероятности, его приняли за неопытного военного пилота.
5. Позднее, возможно, его самолет приняли за вертолет, который принимал участие в спасательной операции.
6. Не может быть, чтобы произошло столько совпадений.
7. Матиасу, должно быть, невероятно повезло.
8. Он, наверно, написал мемуары и заработал много денег.
9. В случае проникновения в запретную зону самолет-нарушитель может быть перехвачен и принудительно посажен.
11. Каждый пилот должен знать, что в случае нарушения воздушного пространства иностранного государства его самолет могут сбить.

LISTENING AND SPEAKING

 **Ex. 1. Listen to a summary of the incident with Mathias Rust, but it is not factually accurate. Find 8 mistakes.**

Ex. 2. Make your own summary with an accurate account of what really happened.

 **Ex. 3. You are going to listen to another air space infringement occurrence. Before listening try to guess the meaning of the following words using the sample sentences, which are taken from the story. Listen and repeat the words and sample sentences.**

fit (<i>v</i>)	The aircraft was not fitted with an inertial navigation system.
declination (<i>n</i>)	The pilots used the wrong sign of magnetic declination when converting between magnetic and true headings.

reconnaissance (<i>n</i>)	The plane was initially recognized by Soviet anti-aircraft defense radars as a United States Air Force reconnaissance Boeing 747.
intruder (<i>n</i>)	Military jets were sent to intercept the intruder.
convince (<i>v</i>)	The captain was ordered to shoot it down after trying to convince his superiors on the ground that the aircraft was not a military threat.
deliberately (<i>adv</i>)	They deliberately failed to obey the commands of the Soviet interceptors.
apology (<i>n</i>)	The Korean crew made a formal apology.

Ex. 4. Try to guess what happened. Use modal verbs of probability when appropriate.

 **Ex. 5. Listen to the story and answer the following questions.**

1. Where did the flight originate?
2. Where did the incident happen?
3. What caused it?
4. Were there any casualties?
5. How did it all end?

VOCABULARY

Ex. 1. The following words have been used in the occurrence description. Match a word in column A with its definition in column B.

A	B
1. intruder	a) be equipped
2. reconnaissance	b) make somebody believe that something is true
3. convince	c) done in a way that was planned, not by chance
4. puncture	d) the activity of getting information about an area for military purposes, using soldiers, planes, etc.
5. obey	e) a weapon that is sent through the air and that explodes when it hits the thing that it is aimed at
6. convert	f) an aircraft that enters an air space illegally

- | | |
|-----------------|-----------------------------------------------------------------------------------------------------|
| 7. apology | g) to change something from one form, purpose, system, etc. to another |
| 8. deliberately | h) make a small hole in something |
| 9. be fitted | i) a word or statement saying sorry for something that has been done wrong or that causes a problem |
| 10. superior | j) do what you are told or expected to do |
| 11. missile | k) a person of higher rank, status or position |


Ex. 2. Match a word in column A with its opposite in B.

A	B
1. initially	a) fatalities
2. superior	b) deny
3. deliberately	c) small
4. release	d) inferior
5. ignore	e) finally
6. enormous	f) comply with
7. survivors	g) accidentally, by chance
8. acknowledge	h) detain

PRONUNCIATION, LISTENING AND SPEAKING

 **Ex. 1. Listen to the pronunciation of the following words and repeat them.**

occur	occurrence	towards
enormous	recognize	reconnaissance
superior	intruder	threat
missile	survive	survivor
apologize	apology	

 **Ex. 2. Read and listen to the sentences with the words above and repeat them. Some of them contain modals of probability. Pay attention to them.**

1. In most cases unauthorized penetration of airspace *occurs* due to pilot error.
2. Air space infringement is not a rare *occurrence* despite all the efforts made by aviation authorities.
3. The pilot spotted two military interceptors flying *towards* him.

4. There must have been *enormous* changes in aviation security since September 11, 2001.

5. It could be the so-called swine flu, but the doctor didn't *recognize* the symptoms.

6. It might have been a plane on a *reconnaissance* mission.

7. He failed to follow a direct order from his *superior*.

8. The *intruder* was ordered to land as soon as possible.

9. Their unauthorized penetration into the foreign country's air space was a real *threat* to the passengers' lives.


10. The surface-to-air *missiles* fired at the intruder could have shot him down.

11. How many people *survived* in the crash?

12. There might have been no *survivors* at all.

13. The airline *apologized* for the late departure of our plane.

14. They made a formal *apology* for the incident.

 **Ex. 3. Listen to the story about the Korean Boeing 707 again to find out more details and answer the questions.**

1. What was the destination of the Korean Boeing 707?

2. What was its stopover aerodrome?

3. What was the reason for their deviation from the route?

4. Why didn't the Korean crew reply to the Soviet interceptors' commands to follow them?

5. What action was undertaken to prevent further infringement of the Soviet air space?

6. What damage did the Boeing 707 sustain?

7. What did the damage lead to?

8. Where did the Boeing land?

9. How many people were killed?

10. Who were the survivors rescued by?

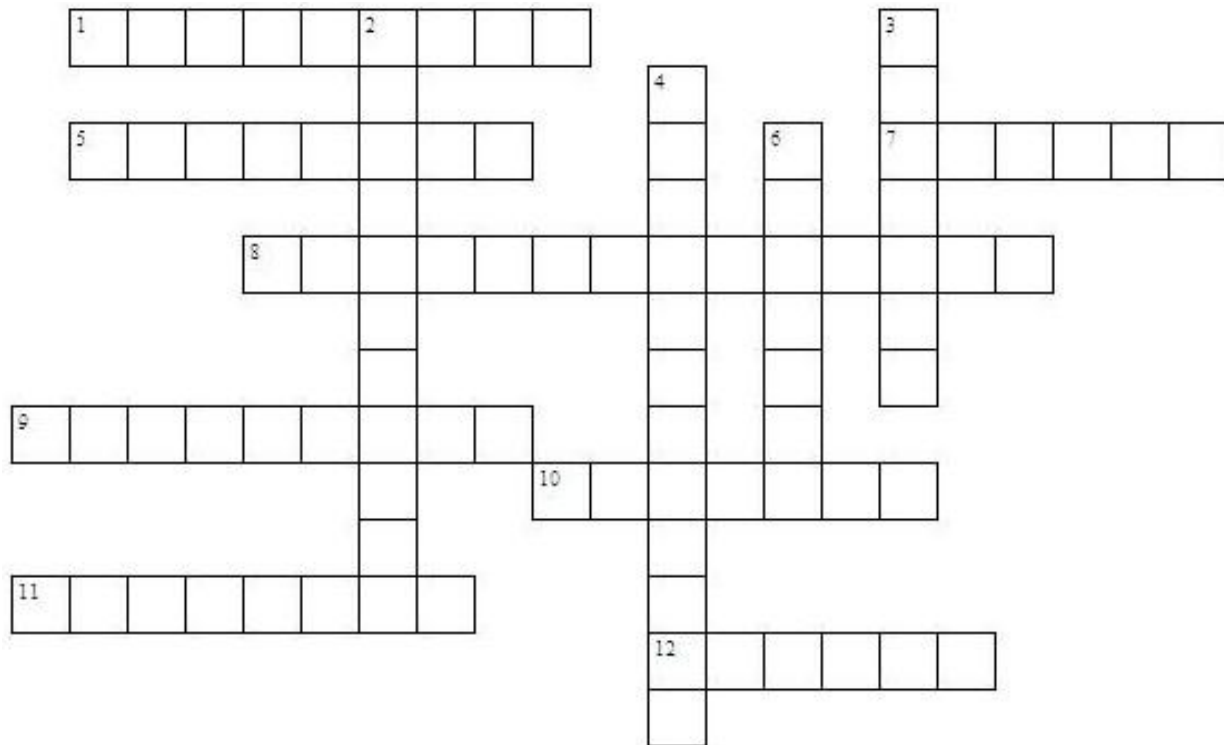
SPEAKING

Ex. 1. Make a short summary of what happened.

Ex. 2. Using modals of probability speculate about possible causes and probable consequences of the incident.

REVIEW

Ex. 1. Do the crossword puzzle. All the words are related to the airspace infringement issues discussed in this unit.



Across: **1.** (*v*) To prevent the intruder from further penetration into the prohibited airspace by force. **5.** (*n*) A person of higher rank, status or position, the opposite of "inferior". **7.** (*v*) To order that something must not be done. **8.** (*n*) The activity of getting information about an area for military purposes. **9.** (*v*) The verb with the same meaning as "vanish". **10.** (*n*) The opposite of "professional". **11.** (*n*) An aircraft who penetrates into a certain area illegally. **12.** (*v*) To send a missile, into the sky in order to destroy the chosen target.

Down: **2.** (*n*) The situation in which two things happen at the same time by chance, in a surprising way. **3.** (*n*) A range of measures that provide protection against attack from enemies. **4.** (*adv*) The opposite of "accidentally". **6.** (*n*) A weapon that is sent through the air in order to destroy the chosen target.

Ex. 2. Discuss the following questions.

1. Can you explain what air space infringement is?
2. Why is infringement of controlled air space regarded as a serious aviation hazard?

3. What are the major causes of unauthorized penetration into restricted, dangerous or prohibited areas?
4. Is it a rare or common occurrence?
5. What could be the consequences?
6. What should be done to prevent the risk of air space infringement?
7. What basic rules must a pilot adhere to so as not to penetrate restricted, dangerous or prohibited areas?

Ex. 3. Read the information below and compare your ideas with it.

Airspace Infringement

Airspace infringement is a serious aviation hazard, which occurs when an aircraft enters certain types of airspace without first obtaining clearance, or enters the airspace under conditions that were not contained in the clearance.

The airspace referred to above may be

- Controlled Airspace,
- Danger Area, Restricted Area or Prohibited Area.

Controlled airspace is airspace within which air traffic control services are provided to IFR flights and to VFR flights in accordance with the airspace classification. ICAO classifies airspace in seven classes from classes A to G. Controlled airspace is classes A to E.

A prohibited area is an airspace within which the flight of aircraft is prohibited due to security concerns. Such areas are depicted on aeronautical charts and are permanent until canceled. Some prohibited airspace may be added or expanded via NOTAMs.

A danger area is an airspace within which activities dangerous to the flight of aircraft may exist at specified times. These include, for example, military exercises involving live firing, parachute dropping, violent and unpredictable aircraft manoeuvres, or the use of unmanned aerial systems.

Most danger areas are operated by military authorities. Their vertical and lateral dimensions are publicized in national AIPs together with the hours of operation where applicable.

Usually, the danger area is monitored by the responsible authorities who cease operations if unauthorized penetration occurs. However, it is the responsibility of pilots to avoid penetration of danger areas.

A restricted area is an airspace within which the flight of aircraft is restricted in accordance with specific conditions. Such areas are typically effective for a few days or weeks.

Aircraft shall not be flown in such areas, except in accordance with the conditions of the restrictions or by permission of the State over whose territory the areas are established.

Although the majority of incidents reported involve General Aviation, particularly light aircraft flown by amateur pilots, all classes of aircraft are prone to airspace infringement.

Violating prohibited airspace established for national security purposes may result in military interception or the possibility of an attack upon the intruder.

Reasons

Aircraft enters the Danger, Restricted or Prohibited Area without clearance due to:

- lack of awareness of existence of the airspace (maps, briefing, etc.);
- poor navigation equipment or technique;
- poor air-ground communication technique;
- lack of understanding of procedure for obtaining clearance to enter.

Or an aircraft is forced into such areas by weather (low cloud, thunderstorms, etc.)

Effects

- Loss of separation from other aircraft, which may result in collision.
- Exposure to danger from military hazards, e.g. radiation, gun-firing or manoeuvring high-performance aircraft.
- Security risk if prohibited area is penetrated, which may result in military action.
- Damage to ground installations within prohibited areas, including vulnerable animals.
- Disruption of military or other special activities within restricted, danger or prohibited airspace.
- Distraction of controller from other tasks while the situation is resolved.

Defenses

- Good ATC radar coverage; accurate easy to use aircraft navigation systems e.g. Global Positioning System (GPS).
- Aircraft transponders to enable aircraft to be identified by ATS and to enable TCAS avoiding action to be taken.
- Improving standards of pilot training including, especially in:
 - Pre-flight briefing;
 - Navigation;
 - Air-Ground communications.
- Enhancing pilots and ATC controllers' airspace infringement awareness.

Ex. 4. Translate the following accident report into English.

Самолет Boeing 747–230В, принадлежавший южнокорейской авиакомпании Korean Air, выполнял регулярный рейс по маршруту Нью-Йорк–Сеул.

На борту находилось 246 пассажиров и 23 члена экипажа. Маршрут полета должен был проходить над Тихим океаном восточнее Камчатки, затем над Японией, огибая территорию СССР. Однако самолет значительно отклонился от намеченного маршрута к западу и вторгся в запретную зону советского воздушного пространства. Советская сторона пыталась установить связь с нарушителем на военных частотах, так как силы советской противовоздушной обороны приняли его за американский самолет-разведчик RC-135, который некоторое время находился в этом же районе. Поэтому пилоты гражданского Boeing могли просто не слышать требований советских военных.

Над островом Сахалин максимальное отклонение от обычной трассы достигло 500 километров, корейский лайнер был сбит двумя ракетами и упал в море. Все находившиеся на его борту погибли.

KEYS**DEPRESSURIZATION****Ex. 3, p. 7**

1 – f; 2 – a; 3 – j; 4 – b; 5 – h; 6 – c; 7 – e; 8 – g; 9 – d; 10 – i.

Ex. 4, p. 7

Noun	Adjective	Verb
<i>breath</i>	breathable	<i>breathe</i>
<i>event</i>	uneventful	–
discharge	<i>discharged</i>	<i>discharge</i>
<i>assistance</i>	unassisted	<i>assist</i>
<i>revelation</i>	<i>revealed</i>	reveal
<i>pressure, pressurization</i>	pressurized	<i>pressurize</i>
<i>diversion</i>	<i>divertive</i>	divert
<i>force</i>	forceful	<i>force</i>

Ex. 5, p. 7

1. assistance. 2. breath, breathe. 3. force. 4. events. 5. pressure. 6. pressurized.
7. discharged.

Ex. 6, p. 8

1 – f; 2 – g; 3 – d; 4 – i; 5 – c; 6 – h; 7 – a; 8 – b; 9 – e.

Ex. 7, p. 8

1. In case of rapid depressurization the oxygen masks **should be donned** immediately by the flight crew.
2. The flight crew began **to descend to a breathable** altitude.
3. The captain **declared an emergency** to the regional ATC.

4. The crew managed **to land the aircraft safely**.
5. The aircraft taxied **to the terminal under its own power**.
6. It was reported **that none of the passengers was injured**.
7. The **external inspection of the aircraft revealed** a sizeable rupture in the fuselage.
8. The depressurization was caused **by one of the oxygen cylinders in the forward hold which burst and ruptured** the cabin floor.

Ex. 3, p 11

British Airways Flight 5390 was bound for Málaga, Spain from Birmingham International Airport in England and was climbing through 17,300 feet when the left windscreen, which had been replaced prior to the flight, was blown out under effects of the cabin pressure. The commander was sucked halfway out of the windscreen opening with his body firmly pressed against the window frame and was restrained by cabin crew whilst the co-pilot managed to perform an emergency landing in Southampton with no loss of life.

The captain after being outside the cockpit for 21 minutes was taken to Southampton General Hospital, where he was found to be suffering from frostbite, bruising and shock, and fractures to his arm and wrist and a broken thumb. The flight attendant who held the captain to prevent him from flying out of the plane received a shoulder dislocation, minor cuts and bruises. Everyone else left the aircraft unhurt.

Ex. 4, p. 11

1. The aircraft was not bound for Madrid. Its destination was Málaga.
2. The windscreen was not smashed by a bird. It was blown out under effects of the cabin pressure.
3. It was not the right windshield that was blown out. It was the left one.
4. The captain did not die. He was sucked halfway out of the windscreen opening but was restrained by one of the cabin crew.
5. The first officer was unhurt. The captain, who had survived, was badly injured.
6. There were no injuries among the passengers, but the cabin attendant who had held the captain was slightly injured.

Ex. 6, p. 11

I think about what happened every day. It was a beautiful morning and I was up early because I was working on the British Airways 7.30 am flight from Birmingham to Malaga in Spain. I was 36, and had been an air steward with British Airways for 12 years, and loved my job with a passion.

It was 13 minutes after take-off and we had just reached 17,300 feet. I went onto the flight deck and asked if the pilots would like tea. Both of them released their shoulder harnesses, while the captain loosened his lap belt as well. I was just stepping out, with my hand on the door handle, when there was an enormous explosion and the door was blown out of my hands. I thought, "My God. It's a bomb". Explosive decompression made the whole cabin mist up like fog for a second - then the plane started to plummet.

I saw the front windscreen had disappeared and the captain was jerked out of his seat by the rushing air and forced head first out of the cockpit. All I could see were his legs. I jumped over the control column and grabbed him round his waist to prevent him from going out completely. His legs were jammed forward, disconnecting the autopilot, and the flight deck door was resting on the controls, sending the plane at nearly 650 kmh through some of the most congested skies in the world.

Luckily, the co-pilot was still wearing his safety harness from take-off, otherwise he would have gone, too. He got the autopilot back on but continued to increase speed to lessen the risk of a mid-air collision and to get us down to an altitude where there was more oxygen.

The aircraft was losing height so quickly that the pressure soon equalized and the wind started rushing in – at 630 kmh and –17 °C. Papers and other debris were blowing round all over the place and it was impossible for the first officer to hear air-traffic control.

Over the intercom he told the passengers we'd lost the windscreen. The cabin was silent as the grave. The other cabin attendants walked up and down, preparing the passengers for an emergency landing.

I thought it would never end and prepared for the worst. But, in spite of everything, the co-pilot did the most amazing and completely smooth landing.

There wasn't even any need to use the emergency chutes. We got all the passengers down the steps in an orderly fashion.

1. We have gained some more information about the cabin attendant who saved the captain's life: he was 36 at the time and had been working for British Airways for 12 years.

2. The incident happened 13 minutes into the flight.

3. When Nigel came onto the flight deck, both pilots had already released their shoulder harnesses, but the captain had loosened his lap belt as well.

4. At the moment when the windscreen was blown out there was such an enormous explosion that Nigel thought it was a bomb. There was fog in the cockpit.

5. The autopilot was disengaged by the captain's legs and the flight deck door was resting on the controls.

6. Papers and other debris were blowing round all over the place and it was impossible for the first officer to hear air-traffic control.

7. The co-pilot informed the passengers of what was going on and they were prepared by the cabin crew for an emergency landing. There was no panic.

8. After the safe landing there was no need to use emergency chutes. The passengers deplaned via the steps in an orderly fashion.

Ex. 2, p. 13

1. can / will be able to. 2. can; managed to / were able to. 3. will be able to. 4. can. 5. have not been able to. 6. managed to; succeeded in. 7. can; can't. 8. can; could. 9. can / could. 10. could.

Ex. 3, p. 14

1. The cabin altitude was rising fast. The crew were unable to control pressurization.

2. They couldn't continue their flight due to sudden depressurization.

3. The cabin crew managed to calm down the passengers and prepare them for an emergency landing.

4. A female passenger in the second row couldn't don her oxygen mask and the air hostesses helped her with that.

5. In spite of the adverse meteorological conditions the crew managed to land the aircraft successfully. (...succeeded in landing...).

6. There was gradual depressurization of the passenger cabin. The crew and passengers were able to breathe but did not get enough oxygen.

7. Request a stretcher as the sick passenger is unable to walk on his own.

8. The airline's cabin crews are well trained and will be able to render assistance even in case of emergency.

9. We couldn't establish contact with Domodedovo ATC. Can you tell them we are requesting landing at their aerodrome?

Ex. 3, p. 17

Across: 4. injury. 5. frostbite. 9. explosive. 12. incapacitation. 13. rupture.

Down: 1. harness. 2. breathe. 3. hypoxia. 6. breathable. 7. don. 8. debris. 10. puncture. 11. vomit.

Ex. 4, p. 18

The crash of an aircraft, which occurred on 14 August 2005, has been one of the deadliest aviation accidents in the history of Greece and Cyprus. The aircraft operating Helios Airways Flight 522 en route Larnaka – Athens – Prague crashed into a mountain near the community of Grammatiko 40 km north of Athens.

Shortly after the departure from Larnaka aerodrome the crew reported air conditioning problem but after entering Athens FIR did not reply to ATC calls. Greek Air Force were notified of the intruder and two interceptors were scrambled into the air.

After establishing visual contact with Flight 522 it was found out that both pilots were unconscious and without oxygen masks while in the passenger cabin there were oxygen masks hanging from the overhead compartments.

The aircraft hit a mountain after running out of fuel. There were 121 occupants on board the Boeing 737. The accident was caused by cabin depressurization and both pilots' incapacitation.

ICING

Ex. 3, p. 22

1 – d; 2 – f; 3 – a; 4 – g; 5 – b; 6 – e; 7 – c.

Ex. 4, p. 23

1 – d; 2 – a; 3 – f; 4 – e; 5 – c; 6 – b.

Ex. 5, p. 23

1 – d; 2 – h; 3 – b; 4 – j; 5 – a; 6 – e; 7 – c; 8 – k; 9 – l; 10 – f; 11 – i; 12 – g.

Ex. 6, p. 23

1. 25 seconds into the flight the pilots noticed noise and vibration from the engines.

2. The pilots reduced engines thrust due to noise and vibration from the engines.

3. The crew had to activate the fire extinguishing system due to fire warning in No. 1 engine.

4. The pilot's response was pitching the aircraft down before levelling it.

5. The pilots reported their intention to return to Arlanda to the ATC controller.

6. Stockholm Control was informed of the imminent emergency landing.

7. Ice from the wings was ingested into both rear-mounted engines.

8. The fuselage split into three pieces.

9. The crash was caused by ice ingestion into both rear-mounted engines.

10. The crew were insufficiently skilled in prescribed actions in case of engine surge.

Ex. 1, p. 26

1. at. 2. in. 3. for. 4. at. 5. to. 6. in. 7. during. 8. on. 9. of. 10. by. 11. with. 12. for. 13. to.

Ex. 3, p. 27

Text 1: was headed; were noticed; were selected; was informed; was broken; were injured; was found; had been caused; were not informed; were not trained; were not informed; was installed.

Text 2: was parked; was scheduled; was not detected; was fuelled; was done.

Ex. 4, p. 27

1. The aerodynamic shape of airfoils can be altered dramatically by clear ice.

2. Ice is gathered more readily on sharp components of the aircraft than on its blunt ones.

3. A careful preflight inspection of the aircraft should be conducted to ensure that there is no ice or frost on its surfaces before take-off.

4. Special equipment is used by ground staff to spray de-icing fluids on the wing.
5. Great distances can be passed over in a matter of minutes thanks to aviation.
6. The environmental problems caused by aircraft operation cannot be ignored by the aviation community.
7. Most airlines' crews are trained to deal with emergency situations.
8. The maneuvering areas must be kept clear of debris.
9. The aerodrome operation was disrupted by the crash-landing for 24 hours.
10. Aircraft may sometimes be damaged by ground vehicles.
11. The pilots who perform their duties being intoxicated should be fired.

Ex. 5, p. 28

The aircraft which *was operated* by Scandinavian Airlines System (SAS) *took off* on December 1991 at 08.47 from Stockholm / Arlanda airport. It *had landed* at Arlanda at approximately 22.10 hours the previous day and *had been parked* outdoors overnight. Prior to take-off the aircraft *was de-iced*.

The captain *made* a rolling take-off, which was normal up to the rotation. But while lifting off the crew *heard* an abnormal noise, which they could not identify.

After approximately 25 second flight the right engine *started* to surge. The captain *throttled back* on that engine, but without the surging ceasing. The surges *continued* until the engine stopped delivering thrust 41 seconds after the surges had started.

When the flight *had lasted* about 65 seconds the left engine also *started* to surge, which the pilots *did not notice* before this engine also *lost thrust*. This happened two seconds after the right engine *had failed*.

The crew *decided* to make an emergency landing. Approaching the field, which *was chosen* for landing, the plane *collided* with trees and the major part of the right wing *was torn off*. The tail of the aircraft *struck* the ground first. After impact the aircraft *slid* along the ground for approximately 110 meters before coming to rest. The fuselage *was broken* into three pieces. No fire broke out. One passenger suffered a disabling back injury. Apart from four persons, all on board *made* their own way out of the aircraft.

The Board of Accident Investigation found that the accident *had been caused* by SAS instructions and routines being inadequate to ensure that clear ice *had*

been removed from the wings of the aircraft prior to take-off. During lift-off clear ice came loose and was ingested by the engines causing damage to the fan stages of the engines, which led to engine surging. The engines *were destroyed* by the surges.

Contributory causes were:

- the pilots *were not trained* to identify and correct engine surges;
- ATR (Automatic Thrust Restoration) – which was unknown within SAS – *was activated* and increased engine throttles without the pilots' knowledge.

Ex. 6, p. 29

1. The deicing treatment had been completed 12 minutes prior to take-off.
2. The ice from the wing can be torn off and ingested into the engine.
3. Icy particles from the wing were sucked into the engines, which resulted in the surge.
4. The upper surface of the wing was covered with ice.
5. The aircraft was equipped with ATR, but SAS was not informed of that.
6. In-flight icing can be avoided by heating up the aircraft critical surfaces with electricity or hot air from the engines.
7. Anti-icing treatment is carried out to remove frozen precipitation from the aircraft surfaces or to prevent their formation.

Ex. 2, p. 30

Belavia Flight 1834 was a scheduled international passenger flight from Yerevan, Armenia, to Minsk, Belarus, operated by Belavia. On the morning of February 14, 2008, the Bombardier Canadair Regional Jet carrying 18 passengers and 3 crew crashed and burst into flames shortly after take off from Zvartnots International Airport near the capital city of Yerevan, in the country of Armenia.

Immediately after rotation when it was only 3 to 5 metres airborne, the aircraft banked sharply to the left, hit its left wing on the runway, crashed to the ground and rolled many times until coming to rest inverted near the runway.

All passengers and crew managed to escape the aircraft before it erupted into flames, partly due to the timely response of the fire and rescue crews. Leaking fuel triggered a ground fire, which was quickly brought under control by the airport fire fighters.

There were no fatalities, but between 4 and 10 people with serious burns and concussions were taken to hospital for treatment.

The most probable cause of the accident was:

– The asymmetric loss of aerodynamics properties of the wing during takeoff, which resulted in stalling the aircraft immediately after lift-off.

– The reason for stalling in the current weather conditions was frost contaminating the surfaces of the wings caused, most likely, by the temperature difference of air and cold fuel in the tanks.

Ex. 3, p. 30

There were 3 crew members.

The registration number of the flight was 1834.

The aircraft banked sharply when it was only 3–5 metres airborne.

The number of passengers who suffered from serious burns and concussions and who were taken to hospital after the crash was 4–10.

There were 18 passengers on board.

Ex. 2, p. 31

1. at. 2. for. 3. with. 4. in. 5. to. 6. at. 7. after. 8. with. 9. between. 10. on.

Ex. 3, p. 31

1. False. It describes the preflight procedures.

2. False. The total fuel was 2,600 l.

3. True.

4. False. The first officer didn't notice ice on the underside of the wing before refuelling and didn't inspect the a/c after it.

5. False. It's just the other way round. They activated the anti-ice system of the engines, but forgot to deploy the wing anti-ice systems.

6. True.

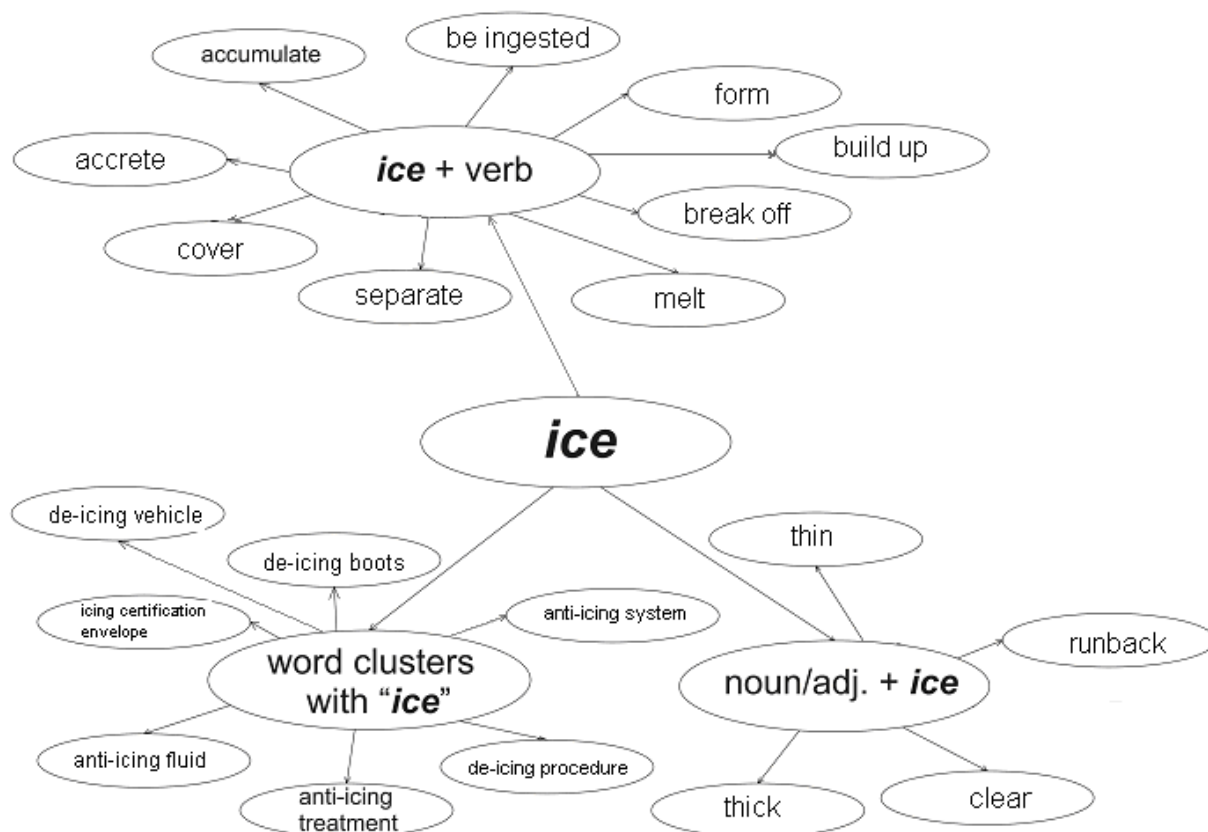
Ex. 3, p. 33

American Eagle Flight 4184 was operating a domestic flight en route from Indianapolis International Airport to O'Hare International Airport, Chicago, on October 31, 1994. Bad weather in Chicago caused delays and the crew was instructed to hold over the nearby LUCIT intersection at 10,000 ft.

While holding, the plane encountered freezing rain – a dangerous icing condition where supercooled droplets rapidly cause intense ice buildup. Soon after, they were cleared to descend to 8,000 ft. During this descent the aircraft experienced an uncontrollable roll excursion, which disengaged the autopilot. The plane went through at least one full roll, and the crew was unable to regain control of the rapidly descending aircraft. Less than two minutes later, contact was lost as the plane crashed into a soybean field killing all 64 passengers and 4 crew on board.

The probable cause of this crash was the flight into known icing conditions, with the aircraft being operated outside its "icing certification envelope". While the aircraft's (it was an ATR) de-icing boots were able to remove ice along the leading edge, it rapidly re-formed behind the boots as runback ice, where it could not be removed. This separated the airflow from the wing's surface and disabled the aileron control.

Ex. 1, p. 33



Ex. 4, p. 37

Across: 2. surge. 5. ambient. 8. abnormal. 11. insufficiently. 12. holdover.
13. treatment.

Down: 1. respond. 3. hangar. 4. contaminant. 6. authorities. 7. contributory.
9. disengage. 10. accumulate.

Ex. 5, p. 38

1. We have flown into freezing rain. There is a danger of icing. Request a higher level.

2. Our holdover time expires in 7 minutes.

3. We have already exceeded our holdover time. Request another anti-icing procedure and revised slot time.

4. Due to icing the right bank has reached 20 degrees. Unable to recover.

5. We have performed an external inspection of the aircraft. The surfaces are clean. De-icing is not required.

6. We have No. 2 engine surge. The probable reason is ice ingestion.

Ex. 6, p. 38

On 22 March, 1992, a Fokker F-28 crashed in the vicinity of La-Guardia airport. Anti-icing treatment procedures had been applied to the aircraft twice before its departure. However, the holdover time had been exceeded and ice accreted on the wing surfaces. After rotation the aircraft lost its speed, flipped over and crashed into the Flashing Bay. 27 out of 51 occupants were killed.

PROBLEMS WITH LANDING GEAR

Ex. 4, p. 42

1. become aware of.

2. make a low pass over the tower.

3. assess the damage to the aircraft.

4. attempt to land.

5. It was detected that... .

6. instead of landing.

7. take the decision to land.

8. take advantage of modern safety equipment.

9. mitigate the risk of fire.

10. lower landing speed substantially.

11. adopt a "brace for impact" position.
12. in advance of the landing.
13. severe damage to the aircraft.
14. come to a stop.
15. apply the reverse thrust.
16. following the incident.

Ex. 5, p. 43

1. hub. 2. lighten. 3. outstanding. 4. foam. 5. smooth. 6. scrape. 7. rotate. 8. assess. 9. mitigate. 10. injury. 11. troubleshoot.

Ex. 6, p. 43

- 1 – j; 2 – g; 3 – f; 4 – h; 5 – i; 6 – c; 7 – d; 8 – a; 9 – b; 10 – e.

Ex. 2, p. 44

1. The pilots were trying to assess the status of the right main gear.
2. Before taking the decision to make a belly landing, the captain carried out a detailed assessment of the risks involved.
3. The aerodrome is fully equipped with all the latest facilities.
4. TCAS is an aircraft system that operates independently of ground-based equipment and air traffic control.
5. A Boeing 737 main landing gear is located under the wings and rotates into wells in the aircraft's belly.
6. The aircraft taxied along the runway until its rotation speed was reached, then climbed into the air.
7. In case of an emergency landing passengers are asked to lean over and grab their knees with their feet firmly on the floor.
8. A satellite terminal is a building detached from other airport buildings, so that aircraft can park around it.
9. The plane was substantially damaged in the crash.
10. The nose wheel was jammed perpendicular to the direction of the fuselage.
11. The area where aircraft park next to a terminal to load passengers and baggage is called "a ramp" or "the tarmac".
12. The aircraft landed gear-up on foam-covered runway 22, suffering minimal damage.

Ex. 2, p. 46

Easily; far; fast; properly; fully; rarely; rapidly; manually; well; completely; considerably; quickly; thoroughly; safely; partially.

Ex. 3, p. 46

1. unsafe. 2. partially. 3. relatively. 4. confused. 5. fully. 6. formally. 7. full. 8. well. 9. excellent. 10. well, successfully. 11. uneventful. 12. awful. 13. manually. 14. unsafe, correctly, thorough. 15. normally. 16. low. 17. appropriate. 18. partially, full, effective. 19. rapidly. 20. fast. 21. aggressively.

Ex. 4, p. 48

1. uneventful. 2. fully. 3. manually. 4. unsuccessful. 5. visual. 6. unsafe. 7. well. 8. shortly. 9. quickly. 10. timely. 11. safely. 12. minor.

Ex. 3, p. 50**Accident: KD Avia B733 at Kaliningrad
on Oct 1st 2008, Belly Landing**

The crew of a KD Avia Boeing 737-300 performing an international flight from Barcelona to Kaliningrad with 138 passengers and 6 crew aborted the initial approach after reporting a technical problem controlling the plane's flaps. After a go-around the crew made several orbits to execute the QRH, but appear to have forgotten to lower the undercarriage for landing while manually switching off the related alarm and performed the gear-up landing.

The airplane hit the runway at an indicated airspeed of 158 knots with no deviation from the centerline and skidded 1,440 meters. The passengers had not been aware of any problem prior to landing as no announcement had been made from the cockpit. As the airplane was approaching the runway, they heard a scratching sound like metal on concrete from the underside.

The pilots did not realize initially, that they had landed gear up telling the Tower they would be able to taxi to the apron on their own.

The passengers and crew deplaned via stairs. No injuries were reported; however, both engine casings and the lower fuselage were considerably damaged.

The investigation concluded that the KD-Avia Boeing 737-300 crew had accidentally landed with the gear retracted after being distracted by an asymmetric flap problem which, in reality, had not existed.

1. False. They aborted approach due to problems with their flaps.
2. False. They circled the field in an attempt to troubleshoot the problem with flaps.
3. True.
4. False. The passengers were unaware of what was going on.
5. False. They certainly needed a tug although the crew thought everything was OK.
6. True.
7. True.
8. True.
9. False. The investigation revealed that the crew had forgotten to extend the gear being distracted by the flap problem.

Ex. 6, p. 51

Indonesian Merpati 737 loses wheel while taking off

As a Merpati Nusantara Boeing 737-400 was taking off from an airport in eastern Indonesia, a wheel on its left-hand side landing-gear fell off. The air traffic control informed the pilot-in-command about it during the process of take-off. The captain decided to continue with the take-off because if he had rejected it, there would have been more trouble. Besides, the affected landing gear still had one other wheel left.

Once the aircraft was in the air, the pilot did a go-around and burned fuel before landing safely back in Biak. There was no other damage to the 737 which was carrying 103 passengers and 8 crew.

The aircraft was grounded in Biak and was subject to an investigation by the civil aviation

Ex. 1, p. 51

Across: 2. brake. 4. manually. 6. troubleshoot. 7. mitigate. 8. foam. 10. unsafe. 11. retract. 13. abort. 14. red.

Down: 1. belly. 3. investigation. 5. collapse. 9. assess. 12. tire.

Ex. 4, p. 54**Ilyushin-86 Crash-landing at Dubai**

An Il-86 made a gear-up landing with flaps down at its destination aerodrome Dubai. For the purpose of noise abatement procedure the STAR at that aerodrome requires that landing gear be extended shortly before touchdown. Il-86 aircraft are equipped with landing gear warning light and horn systems which go off in case of flap landing position. The captain ordered to switch both warning systems off not to distract the crew in the period between setting flaps and extending landing gear. Afterwards the warning systems were not switched on. The flight engineer conducted the landing checklist, but incorrectly called gear down.

While the aircraft was sliding on the runway, a fire broke out in No. 2 and 3 engines and in the tail unit. After the plane had come to a halt, the passengers and crew were safely evacuated. The aircraft sustained considerable damage to the airframe and power plant and later was written off.

FIRES**Ex. 3, p. 59**

1 – d; 2 – f; 3 – a; 4 – i; 5 – b; 6 – h; 7 – e; 8 – c; 9 – g; 10 – j.

Ex. 4, p. 59

1 – h; 2 – e; 3 – g; 4 – a; 5 – b; 6 – d; 7 – i; 8 – c; 9 – f.

Ex. 5, p. 60

1 – f; 2 – e, g; 3 – i; 4 – k, g; 5 – j; 6 – a; 7 – e; 8 – b; 9 – d, h; 10 – d, c; 11 – c.

Ex. 6, p. 60

1. Weather information gives current weather. Weather forecast says what the weather will be like tomorrow or for the next few days.

2. Downpour is a heavy fall of rain that often starts suddenly, so it is very close in meaning to "heavy rain".

3. Headwind is a wind that is blowing towards a person or vehicle, so that it is blowing from the direction in which the person or vehicle is moving. Tailwind blows from behind.

4. We can use both "disconnect" and "disengage" talking of autopilot. But "disengage" is more often used.

5. A ravine is a deep, very narrow valley with steep sides. A valley is an area of low land between hills or mountains, often with a river flowing through it.

6. Debris is pieces of wood, metal, brick, etc. that are left after something has been destroyed. Waste is materials that are no longer needed and are thrown away.

7. An occupant is a person who is in a vehicle, seat, etc. at a particular time. A passenger is a person who is travelling in a plane and who is not operating it or working on it.

8. "Deploy" means "to use something effectively". "Activate" means to make something start working.

9. Both inflatable slides and emergency (or "escape") chutes are used to evacuate people from the plane in case of emergency. Inflatable slides need to be filled with air before being used. An emergency chute consists of a large piece of strong cloth for sliding down and does not need to be inflated.

Ex. 7, p. 60

Verb	Noun	Adjective	Adverb
<i>intensify</i>	<i>intensity</i>	intense	<i>intensely</i>
select	<i>selection</i>	<i>selective</i>	<i>selectively</i>
<i>succeed</i>	<i>success</i>	successful	<i>successfully</i>
<i>require</i>	<i>requirement</i>	required	–
<i>injure</i>	injury	<i>injured</i>	–
destroy	<i>destruction</i>	<i>destructive</i>	<i>destructively</i>

Ex. 8, p. 61

1. require. 2. intensity. 3. destruction. 4. successfully. 5. selective. 6. required. 7. injuries. 8. succeeded. 9. destructive.

Ex. 2, p. 64

1. Before departure, the flight crew obtained their arrival weather forecast, which included the possibility of thunderstorms.

2. On final approach, they received information that the crew of a preceding aircraft had reported poor braking action.

3. The aircraft stopped in a ravine and caught fire, following which an evacuation order was given.

4. The actions of the flight attendants, who ensured that all of the passengers quickly escaped from the plane, contributed to the successful evacuation.

5. The first officer was the last to leave the plane, which was evacuated within the required 90 second time frame.

Ex. 3, p. 64

1. An air hostess, *who detected a fire near the aft passenger cabin door*, reported it to the captain.

2. The in-flight fire, *which broke out in the cabin area*, resulted in panic among the passengers.

3. Hidden fires, *which are difficult to locate*, are very dangerous.

4. The crew, *who received fire warnings in the aft cargo compartment*, commenced descent immediately and began planning for an emergency landing.

5. The aircraft developed an in-flight fire behind the toilet, *which spread between the outer skin and the inner decor panels*.

6. The aircraft *that caught fire after landing* is still on the runway.

7. Smoke goggles are a pair of glasses *that fit closely to the face to protect the eyes from smoke and fumes*.

8. A strong noxious odor, *which was coming from the rear of the plane*, was first reported to the cabin crew around 19:00.

9. The flight attendant, *whose name was Judi Davidson*, traced the odor to the lavatory.

10. She attempted to look into the lavatory but was forced back by a thick grey smoke *that was rapidly filling the small room*.

11. The spreading fire burned through the crucial electrical cables, *which knocked out most of the instrumentation in the cockpit*.

Ex. 4, p. 65

1. which. 2. who. 3. which. 4. which. 5. whose. 6. that. 7. who. 8. which.
9. which. 10. who.

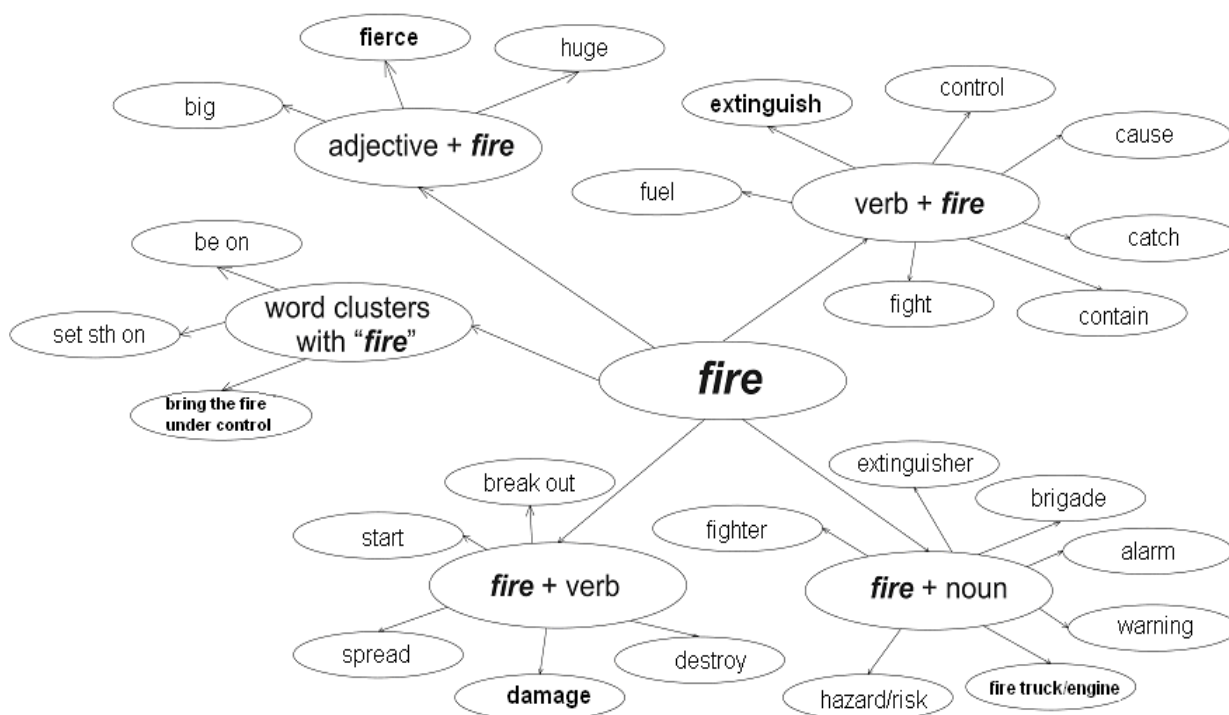
Ex. 2, p. 66

China Airlines Flight 120 was a regularly scheduled flight from Taiwan to Naha airport in Okinawa, Japan. The Boeing 737-800 aircraft operating the flight landed uneventfully and taxied to the gate area. The ground crew noticed flames coming from engine number 2 as the captain shut it down before gate connection. Informed of the situation by air-traffic controllers, the captain ordered an emergency evacuation. All the passengers and flight attendants managed to leave the aircraft safely through the four hatches using slides. The first officer and the captain left the aircraft through the cockpit windows. Immediately after the evacuation of the last person, the number 2 engine and right wing fuel tanks exploded and burst violently into flames, igniting a blaze that destroyed the aircraft. Four people (three from the aircraft and one ground crew) sustained injuries in the accident.

According to Naha Airport Air Traffic Control, there was no report of any abnormal situation on the aircraft during cruising and landing, and the status of the aircraft was normal.

The investigating team focused on the possibility that a fuel leak led to the fire. It was found that a bolt, which had come loose from the slat track, had punctured the right wing fuel tank, creating a hole 2–3 centimetres in diameter.

1. False. It was a B-737, but it was performing an international flight.
2. False. The fire started after landing.
3. False. It was the ground crew who noticed flames. But it happened when the aircraft stopped before gate connection.
4. False. The captain was informed of the fire by ATC.
5. False. All the occupants left the aircraft safely through the four hatches using slides. There was no information that one of them was damaged.
6. True.
7. False. There were only four injured.
8. False. There was a bolt, which had come loose from the slat track.

Ex. 1, p. 67**Ex. 2, p. 67**

1. firefighters. 2. destroyed. 3. broke out. 4. bring the fire under control. 5. on fire. 6. damaged. 7. fire extinguishers. 8. set ... on fire. 9. fueled. 10. had caught. 11. caused.

Ex. 3, p. 71

Across: 3. toxic. 4. heat. 5. spread. 6. fumes. 8. detect. 11. extinguish. 12. ignite.

Down: 1. smoke. 2. flame. 5. suffocate. 6. firefighter. 7. goggles. 9. don. 10. burn.

Ex. 4, p. 72

1. On 27 June, 2009, Flight 746, a McDonnell Douglas MD-80, carrying 149 passengers and five crew members on board, had to return to the departure aerodrome. During its take-off roll one of the tires burst and a piece of that tire was sucked into the portside engine, causing it to fail and momentarily catch fire. The crew shut down the engine according to the prescribed procedure, made a circle over the aerodrome and executed an emergency landing. No casualties were reported.

2. On 20 December, 2008, the Continental Airlines Boeing-737-800, operating a flight from Denver to Houston, during take-off hit its left engine on the runway surface, veered off the runway and caught fire. When the firefighters arrived at the site, the right side of the plane was on fire while the passengers were climbing out of the left side via emergency slides, being assisted by the flight attendants. None of the 115 people on board was killed, 38 occupants were injured including two critical injuries. The aircraft was severely damaged and later written off. The Investigation Board was unable to identify the real cause of the accident.

BIRD STRIKE

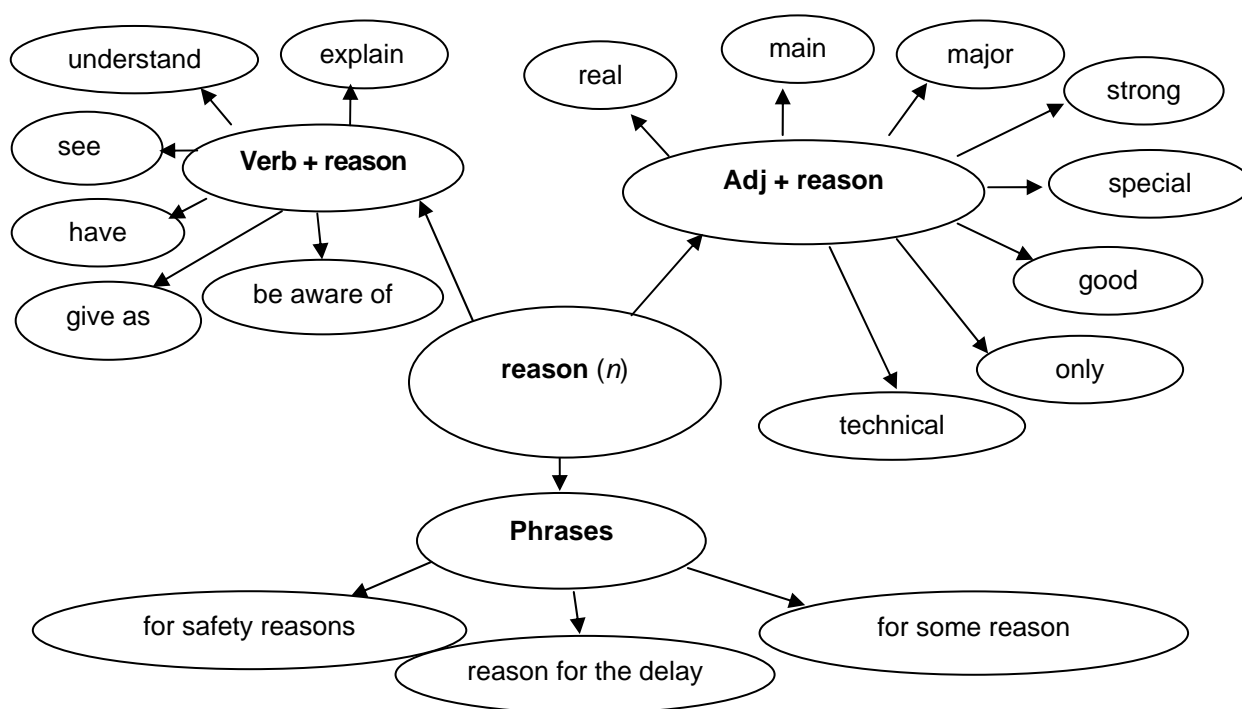
Ex. 4, p. 77

1 – e; 2 – i; 3 – j; 4 – k; 5 – g; 6 – a; 7 – b; 8 – l; 9 – c; 10 – h; 11 – f; 12 – d.

Ex. 1, p. 79

1. scheduled. 2. occupants. 3. approximately. 4. survived. 5. a flock of whistling swans. 6. cruising. 7. separated. 8. resulted. 9. loss.

Ex. 3, p. 80



Ex. 4, p. 81

1. They didn't have any reason to doubt that a passenger had a heart attack.
2. What was the cause of ditching? (What caused ditching?)
3. What is the reason for a go-around procedure?
4. Adverse weather conditions may cause big trouble in flight.
5. The captain had two strong reasons for changing the route.
6. The only reason why they abandoned take-off was an intensive bird activity in the aerodrome vicinity.
7. The pilot-in-command decided not to inform the passengers of the real reason for their returning to the departure aerodrome.
8. The reason for his decision soon became clear.
9. What was the cause of the stabilizer damage? (What caused the stabilizer damage?)
10. For safety reasons we've had to turn sharply to the right.
11. Human factor is a major cause of most incidents.

Ex. 2, p. 82

1. Why did the crew have to dump fuel?
2. Let's discuss it with our representative, shall we?
3. Is there a danger of bird strikes at higher altitudes?
4. What can be done to mitigate risks of bird strikes during take-off and landing?
5. Is there a doctor or a nurse on board to render professional assistance to the sick passenger?
6. When was the contact with the distress traffic lost?
7. What damage did the airframe sustain after encountering a flock of birds?
8. Haven't you heard about Tupolev 124 ditching into the Neva River in 1963?
9. Do you remember if there were any casualties among the crew and passengers?
10. What happened to the aircraft?
11. Who investigated the incident?

Ex. 3, p. 83

On November 28, 2004, **KLM Flight 1673, Boeing 737-400** departed from **Amsterdam Schiphol Airport** at 16.46 carrying 140 passengers and 6 crew members on board and headed to Barselona. During **take-off** the nose gear of the

plane hit a bird. This incident was reported to **air traffic control**, and the flight continued normally. Upon landing at 18:50 on Barcelona International Airport, the aircraft started to deviate to the left of the runway and eventually ran off the runway into a **construction pit**. All crew and passengers could leave the aircraft safely, but the aircraft itself **had to be completely written off**.

The cause turned out to be a **broken cable in the nose wheel steering system caused by the bird collision**. Contributing to the snapped cable was **the improper application of grease during routine maintenance**.

Ex. 6, p. 83

1. On January 7, 1997, a Boeing 737, struck over 400 blackbirds just after take off. Almost every part of the plane was hit. Pilot declared an emergency and made a precautionary landing without event. Substantial damage was found on various parts of the aircraft. Number 1 engine had to be replaced. The runway was closed for an hour. The ground personnel were sent to disperse another large flock on the airfield.

2. On January 9, 1998, a Boeing-727 was climbing through 6,000 feet when a flock of snow geese was encountered. Three to five birds were ingested. One of the engines lost all power and was destroyed, the radome was torn from the aircraft and the leading edges of both wings were damaged, the pitot tube for first officer was torn off. Intense vibration in airframe and noise level in the cockpit increased to the point that communication between crewmembers became difficult. Emergency was declared. Flight returned safely to Houston.

3. On August 27, 2000, just after take off of a Boeing 747 from Los Angeles International Airport at least one Western gull was ingested. Bystanders on a beach heard a giant backfire and saw flames. Three pieces of the engine fell to the ground, one five-foot piece landed on a beach where people were having a cookout. No one was injured. The pilot dumped 83 tons of fuel over the ocean and then made an emergency landing.

Ex. 6, p. 88

Across: 1. emergency. 3. occupant. 6. danger. 8. eagle. 10. impact. 11. waterfowl. 12. declare. 13. ingestion. 14. subsequently.

Down: 2. encounter. 4. bang. 5. migration. 7. evacuate. 9. gull.

Ex. 7, p. 89**AN-12 Crash at Domodedovo Airport**

An Antonov-12 freighter crashed just after lift-off from Domodedovo airport. Pieces of wreckage were found in the forest 4 km from the runway. There were 7 crew members on board, all of them died.

The cause of the accident was the ingestion of two large birds into both starboard engines at a height of 70–75 m while the aircraft was travelling at 160 kt, which resulted in their virtually simultaneous shut-down. The aircraft lost control in a right bank of more than 100°, hit trees and crashed in a few seconds after it took off.

HIJACKING**Ex. 3, p. 91**

1 – e; 2 – h; 3 – a; 4 – g; 5 – b; 6 – c; 7 – j; 8 – f; 9 – d; 10 – i.

Ex. 4, p. 92

Verb	Noun	Adjective	Adverb
seize	<i>seizure</i>	–	–
<i>explode</i>	<i>explosion</i>	explosive	<i>explosively</i>
obey	<i>obedience</i>	<i>obedient</i>	<i>obediently</i>
<i>threaten</i>	threat	<i>threatened / threatening</i>	<i>threateningly</i>
arm	<i>armaments, arms</i>	<i>armed</i>	–
injure	<i>injury</i>	<i>injured</i>	–
prevent	<i>prevention</i>	<i>preventive</i>	<i>preventively</i>
<i>mediate</i>	intermediary / <i>mediator</i>	<i>intermediary</i>	–
demand	<i>demand</i>	<i>demanding</i>	–

Ex. 5, p. 92

1. threat. 2. explosions. 3. injured. 4. demand. 5. threateningly. 6. explosive. 7. injuries. 8. armed. 9. demanding. 10. intermediary. 11. preventive.

Ex. 3, p. 95

1. gunmen. 2. recall. 3. blow up. 4. reject. 5. sufficient. 6. force. 7. ascend. 8. offload. 9. critically injured. 10. release. 11. multiple times. 12. persuade.

Ex. 4, p. 95

1. The aircraft was operating a flight from Kathmandu, Nepal, to Delhi, India.
2. The hijackers were armed with guns, knives and grenades.
3. The terrorists smuggled the offensive weapons on board the aircraft.
4. The senior cabin attendant was threatened by a masked hijacker.
5. The hijackers made the crew fly to Pakistan.
6. Pakistani authorities refused the permission to land at Lahore.
7. The crew didn't have sufficient fuel on board.
8. The hijackers became suspicious of the delay.
9. The ATC services were shut down by the airport authorities.
10. Their request to offload some female passengers and children was rejected.
11. A young man was fatally stabbed.
12. There were no more casualties among the passengers.
13. The United Nations official took the role of intermediaries.
14. The hijackers demanded huge \$ 200 million ransom money for the release of the hostages.
15. The terrorists were persuaded to reduce their demands.

Ex. 2, p. 96

1. All kinds of weapons are prohibited to carry on board the aircraft.
2. The terrorists were prepared to carry out their threat to blow up the bomb.
3. The hijackers threatened to kill one passenger every hour if their demands were not met.
4. The anti-terrorist squad seized the aircraft in a surprise attack.
5. The attempted hijacking ended with the capture of the terrorists.
6. The negotiators persuaded the hijackers to surrender to the police.
7. He ordered to fly to Saudi Arabia where he could seek political asylum.
8. The prime-minister declares that the government will not negotiate with terrorists.
9. They engaged the hijackers in lengthy negotiations to gain time.
10. The air hostess became suspicious of two passengers' behaviour and reported it to the captain.
11. Their endurance was not sufficient to reach the destination.

Ex. 2, p. 98

Ordered the captain to fly; wanted the crew to divert; forced the crew to take off; allowed the aircraft to land; persuaded the hijackers to reduce.

Ex. 3, p. 98

1. The hijackers forced the crew to change their route. (Or: The hijackers made the crew change their route.)
2. The captain warned the passengers not to resist the hijackers.
3. The intermediaries managed to persuade the hijackers to release women and children.
4. The cabin crew told the passengers to remain in their seats.
5. The captain advised the passengers to stay calm and to obey the hijackers' orders.
6. The impact was so strong that it caused the starboard engine to separate.
7. Pakistani authorities offered the hijackers to seek political asylum in Afghanistan; however, they allowed the plane to land at Lahore.
8. The mediator offered them to reduce the ransom money they demanded.
9. The negotiators wanted the terrorists to release the wounded passengers.

Ex. 3, p. 99

Stefano Savorani, a former policeman with a history of schizophrenia, hijacked an Alitalia flight from Bologna to Paris after he had had a fierce row with his wife. He had also hijacked another flight three years earlier. He used a television remote control unit to threaten the crew, claiming that he was armed with a bomb and a member of al-Qaeda. Once in the cockpit he instructed the pilot to fly to Lyon where he released the passengers and was arrested by the police who had been waiting for him. He committed suicide in police custody.

1. False. He was a former policeman.
2. False. He had also hijacked another flight three years earlier
3. Partly true. Another reason for hijacking was that he suffered from schizophrenia.
4. False. He had a history schizophrenia.
5. False. He had a fake bomb. Actually it was a TV remote control unit.
6. False. He only claimed that.
7. True.
8. True.
9. False. He committed suicide in police custody

Ex. 5, p. 100

28-year-old Richard Reid, who had been unemployed for two years and addicted to drugs, tried to blow up an American transatlantic airliner bound from Paris for Miami, using an explosive device which he had hidden in his shoes. After a flight attendant smelled smoke from a match, she identified Reid, who was trying to set fire to his shoes. The man was overpowered by passengers and cabin crew. One of the cabin attendants was slightly injured, the rest of the occupants were safe. The Boeing 767, escorted by two fighter jets, was diverted to Logan Airport where FBI agents detained the man for questioning.

Ex. 1, p. 101

Across: 1. hostage. 7. release. 11. intermediary. 13. casualty. 14. knife. 15. smuggle.

Down: 2. overpower. 3. obey. 4. authorities. 5. suspicious. 6. negotiation. 8. injury. 9. threaten. 10. explode. 12. ransom.

Ex. 4, p. 104

The aircraft operating a flight from London to Cairo was hijacked by two armed men in masks. They claimed to have a bomb on board, which they were ready to blow up at any moment, and that they had two grenades besides the guns. The crew was forced to change the route and proceed to Saudi Arabia. After the arrival at ArRiyadh the hijackers said that the crew and passengers would be held hostage until they got a ransom of \$5 million. They threatened to be killing one passenger every hour in case their demands weren't satisfied.

Saudi Arabia authorities engaged the hijackers in lengthy negotiations. Meanwhile the anti-terrorist squad broke into the plane through the rear door, killed one hijacker and seized the other. One of the cabin crew was wounded. None of the passengers was injured.

AIRSPACE INFRINGEMENT**Ex. 3, p. 108**

1 – k; 2 – a; 3 – j; 4 – b; 5 – i; 6 – d; 7 – e; 8 – f; 9 – g; 10 – h; 11 – c.

Ex. 4, p. 108

1 – f; 2 – j; 3 – d; 4 – a; 5 – e; 6 – g; 7 – h; 8 – c; 9 – b; 10 – i.

Ex. 5, p. 109

1. "Break a law" has a more general meaning, while "airspace infringement" is a violation of a specific law.

2. "Pedestrian" is a person walking in the street and not travelling in a vehicle. "Passer-by" is a person who is going past somebody or something (not necessarily on foot) by chance.

3. "Confusion" is the fact of making a mistake about who somebody is or what something is. "Embarrassment" is a situation in which you feel shy, awkward or guilty.

4. "Jail" and "prison" are synonyms.

5. "Amateur" is a person who takes part in a sport or other activity for enjoyment or interest, not as a job. "Professional" is a person who does a job that needs special training and a high level of education.

6. "Aviator" and "pilot" have the same meaning, but "pilot" is more specific (compare with "navigator" or "flight engineer").

7. "Occur" means "happen". The meaning of "coincide" is "to take place at the same time".

8. "Similar" means "like somebody or something but not exactly the same".

9. "Obtain permission" and "fail to obtain permission" are opposite.

10. "Bring to readiness" and "alert" have the same meaning.

11. "He served his time" means that he spent a period of time in prison. "He spent his time" means that he used some time doing something for a particular purpose.

Ex. 6, p. 109

Noun	Verb	Adjective	Adverb
<i>infringement</i>	<i>infringe</i>	–	–
<i>embarrassment</i>	<i>embarrass</i>	<i>embarrassed,</i> <i>embarrassing</i>	<i>embarrassingly</i>
<i>confusion</i>	<i>confuse</i>	<i>confused, confusing</i>	<i>confusingly</i>
<i>coincidence</i>	<i>coincide</i>	<i>coincident</i>	–

Noun	Verb	Adjective	Adverb
defense	<i>defend</i>	<i>defensive</i>	<i>defensively</i>
<i>similarity</i>	–	similar	<i>similarly</i>
<i>assignment</i>	assign	<i>assigned</i>	–
<i>experience</i>	<i>experience</i>	inexperienced	–
designator	<i>designate</i>	<i>designated</i>	–
recognition	<i>recognize</i>	<i>recognizable</i>	<i>recognizably</i>

Ex. 7, p. 109

1. recognizable. 2. infringe. 3. designation. 4. embarrassed. 5. defend. 6. assigned. 7. experience. 8. coincidences. 9. similarly. 10. defensive.

Ex. 8, p. 110

1 – c; 2 – h; 3 – a; 4 – i; 5 – b; 6 – g; 7 – f; 8 – j; 9 – d; 10 – e.

Ex. 3, p. 113

1. He can't have infringed the Soviet Union airspace accidentally.
2. He must have lied to the ATC when he said he was flying to Stockholm.
3. He might have had a radio equipment failure.
4. At first he must have been mistaken for an inexperienced Air Force pilot.
5. Then his aircraft could have been mistaken for a helicopter which was taking part in the rescue operation.
6. There can't have been so many coincidences.
7. Mathias must have been incredibly lucky.
8. He could have written memoirs and made a lot of money.
9. In case of penetration into a prohibited area, the intruder may be intercepted and forced to land.
10. Each pilot should be aware that in case of foreign airspace infringement, their aircraft may be shot down.

Ex. 1, p. 113

Mathias Rust, a 19-year-old *cadet of Aviation School* from West Germany, was flying *his father's Cessna* aircraft. After leaving Uetersen near Hamburg on May 13, 1987, Rust refuelled his aircraft in the morning of May 28, at Helsinki-

Malmi Airport. He told ATC that he was going to Stockholm, but turned his plane to the east. Traffic controllers were unable to establish contact with him *due to his communication equipment failure*. Rust crossed the Baltic coastline in Estonia and turned towards Moscow. At 14.29 he appeared on air defense radar but did not reply to an IFF signal. The military tracked him and *obtained permission to shoot him down but missed*. Suddenly he disappeared from radars near Staraya Russa. Then the contact with Rust's plane was re-established, but confusion followed all of those events. The local Air Defense thought Rust's plane was either one of the military aircraft on maneuvers or one of the helicopters taking part in the rescue operation being in progress at the time. *Only in the vicinity of Sheremetyevo he was assigned foe status*, but it was too late to take any extreme measures against him due to close proximity to the city. *So the military let him land in the Kremlin* because there was no pedestrian traffic there. He was immediately arrested by the police and later sentenced to *four months in prison*.

Ex. 5, p. 114

On April 20, 1978 the Korean Air Lines Boeing 707 aircraft, operating a scheduled flight and carrying 97 passengers and 12 crew members on board, left Paris, France on a course to Anchorage, Alaska, United States, where it would refuel and then proceed to Seoul, South Korea.

After passing the Canadian Forces Station Alert, located 640 km from the North Pole, the plane changed its course, flying south; not towards Anchorage, but in the opposite direction towards Murmansk. The aircraft was not fitted with an inertial navigation system, and the pilots failed to note the position of the sun, almost 180 degrees off from where it should have been. According to the official Korean explanation, the pilots in their navigation calculations used the wrong sign of magnetic declination when converting between magnetic and true headings. This caused the Boeing 707 to fly in an enormous right-turning arc towards the Barents Sea into Soviet airspace.

The plane was initially recognized by Soviet anti-aircraft defense radars as a United States Air Force reconnaissance Boeing 747. Military jets were sent to intercept the intruder. According to Soviet reports, the Korean crew repeatedly ignored commands to follow the interceptors. Su-15 pilot Captain A. Bosov was ordered to shoot it down after trying to convince his superiors on the ground that

the aircraft was not a military threat. He fired a pair of missiles, one of which caused heavy damage to part of the left wing of the Boeing 707 and punctured the fuselage, causing rapid decompression, and killing two of the passengers. After being hit, the airliner descended into cloud and was finally forced to land on the frozen Korpijärvi Lake 140 kilometers from the Finnish border. The 107 survivors were rescued by Soviet helicopters.

The passengers were released after two days, while the crew were held for investigation and released after they made a formal apology. The Korean pilots acknowledged that they deliberately failed to obey the commands of the Soviet interceptors.

Ex. 1, p. 114

1 – f; 2 – d; 3 – b; 4 – h; 5 – j; 6 – g; 7 – i; 8 – c; 9 – a; 10 – k; 11 – e.

Ex. 2, p. 115

1 – e; 2 – d; 3 – g; 4 – h; 5 – f; 6 – c; 7 – a; 8 – b.

Ex. 1, p. 117

Across: 1. intercept. 5. superior. 7. forbid. 8. reconnaissance. 9. disappear. 10. amateur. 11. intruder. 12. launch.

Down: 2. coincidence. 3. defence. 4. deliberately. 6. missile.

Ex. 4, p. 120

Korean Air Boeing 747-230B was operating a scheduled flight en route New York – Seoul. There were 246 passengers and 23 crew on board.

The aircraft had to pass over the Pacific Ocean to the east of Kamchatka peninsula, then over Japan detouring round the territory of the Soviet Union. However, the aircraft significantly deviated from its assigned route to the west and penetrated into the Soviet prohibited airspace. The Air Defence officials tried to establish contact with the intruder using military frequencies as they mistook the Boeing 747 for an American reconnaissance aircraft that was in the same vicinity. So the civilian crew of the Korean plane probably just couldn't hear their instructions. Over Sakhalin Island the deviation from the assigned airway had reached 500 km, the Korean airliner was shot down by two missiles and crashed into the sea. No one survived.

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Учебное пособие

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