

UNIT 7 Crane safety**Part 1**

Read the extract from a handbook about crane safety. Then discuss the questions about the underlined keywords with a partner.

When cranes are used correctly, they are very useful machines. But, if used incorrectly, they can be extremely dangerous. Modern cranes are fitted with numerous automatic safety systems to help prevent working loads from being exceeded. However, crane safety is about much more than just staying within SWL limits – there are a wide range of issues to consider.

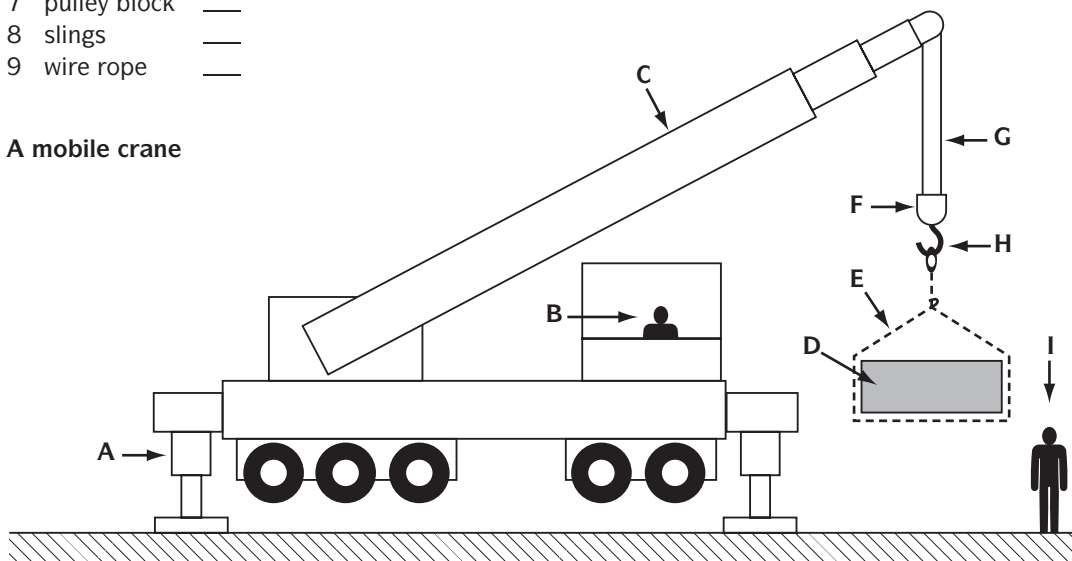
- 1 How useful are cranes? Discuss some different ways they can be used.
- 2 What do you think 'SWL' stands for?
- 3 How dangerous are cranes? Talk about the kinds of accidents that could happen with them.

Part 2

a Look at the drawing of a mobile crane. With a partner, try to match the terms in 1–9 to the labels (A–J).

- 1 banksman ___
- 2 hook ___
- 3 jib ___
- 4 load ___
- 5 operator ___
- 6 outriggers ___
- 7 pulley block ___
- 8 slings ___
- 9 wire rope ___

A mobile crane



b Now match the words from Exercise a to the descriptions below.

- | | |
|---|-------|
| 1 a person who sits inside a crane and controls it | _____ |
| 2 a person who uses hand signals and/or walkie-talkie to guide the crane operator | _____ |
| 3 an object that a crane picks up and moves from one place to another | _____ |
| 4 the long arm of a crane that can reach vertically or horizontally | _____ |
| 5 the long metal cable of a crane that runs along the jib | _____ |
| 6 a curved, rigid piece of metal that the sling hangs from | _____ |
| 7 a mechanical device with a group of wheels which ropes move around | _____ |
| 8 horizontal 'legs' that extend to give a mobile crane a wider, more stable base | _____ |
| 9 chains that can be wrapped around a load and fixed to the hook of a crane | _____ |

Part 3**a All of the things and people in Part 2 are important in the safe operation of cranes. Working alone, make notes on:**

- possible accidents involving the things and people in Part 2
- the conditions which might cause or increase the risk of those accidents

b Discuss your ideas with a partner. Decide together what safety precautions should be taken to prevent each kind of accident.

The following language from Unit 7 of *Cambridge English for Engineering* may be useful for your discussion.

Describing safety hazards

The main danger/hazard is ... Another danger/hazard is ... There's a risk of ...-ing
You have to be (very) careful ...

Describing safety precautions

To be safe you need to ... You have to take care that every single ...
It's essential/crucial/vital ... Under no circumstances at all times ...

Part 4

Read the extracts from a crane safety handbook and compare them with your ideas in Part 3.

Discuss the following questions with a partner:

- 1 Which hazards in the texts did you discuss with your partner in Part 3? Are there any that you missed?
- 2 Were your safety precautions the same as those described in the texts?
- 3 Did you think of any safety issues that are not mentioned in the texts?

1

The majority of crane accidents are caused by human error. To help prevent potentially dangerous mistakes, the crane **operator** should be qualified and trained to operate the specific model of crane being used. It is also essential to have a qualified **banksman** on the ground. The banksman directs the crane operator using standard hand signals and, where necessary, with instructions via a walkie-talkie. It is also the banksman's responsibility to ensure that loads are properly attached to the **slings**, in order to prevent **loads** or parts of loads from falling.

2

A high percentage of mobile crane accidents occur due to incorrect positioning and levelling of the **outriggers**. The outriggers should be fully extended and located on solid ground. Under no circumstances should outriggers be placed on ground covered by puddles of water which prevent the operator from seeing the ground conditions clearly. On softer ground, 'floats', for example, wooden sleepers or steel plates, should be placed below the outriggers.

3

All lifting devices, such as **wire ropes, pulley blocks, hooks** and **slings**, should be inspected regularly by a trained person in order to check for wear and damage. A written certificate should be kept for every single lifting device. The certificate should state the device's last inspection date and its safe working load (SWL). It should also certify that the device has been tested to ensure it can withstand the stated SWL.

4

Cranes should never be operated in windy weather. The forces exerted by the wind on the **jib** and the **load** can be extremely high. This can cause the crane to tip over. Windy conditions also make it difficult for the **operator** to control the crane and position the load accurately.

5

Special care should be taken when cranes are used close to high-voltage power lines in order to prevent the **load, jib** or other lifting devices coming into contact with live electrical conductors. The relevant authorities should be contacted in order to determine safe distances between the crane and power lines.

Cambridge English for Engineering

TEACHER'S NOTES

UNIT 7 Crane safety

Before you begin ...

Tell students that this case study will be about safety precautions for using cranes (write up 'crane'). Invite students to explain, briefly, what a crane is, and to describe some different types of crane. During the discussion, you could give the specific terms for different types of crane, below.

Suggested answers



- A crane is a machine that can lift heavy objects.
- The three most common types of crane are:
mobile cranes – cranes with wheels that can be driven on the road
tower cranes – tall, static cranes with a lattice structure, commonly used on construction sites
gantry cranes – horizontal lifting beams that can move backwards and forwards, with a lifting 'trolley' that can move sideways (see the photo in *Cambridge English for Engineering*, page 50).

Part 1

Students complete the task in pairs. Possible vocabulary students may need during the task are suggested in the box below.

tip over	stable/unstable	wear/be worn	overload
rupture/collapse	power line	electrocute	current
arc	erect	assemble	harness

Suggested answers



- 1 Cranes are often used for lifting heavy objects into position during the construction of buildings and for loading and unloading heavy items on ships, trucks and trains.
- 2 SWL stands for 'Safe Working Load'.
- 3 Note that this is a predictive task. Possible answers are covered in Parts 3 & 4. Listen to students' ideas and deal with any vocabulary questions they have here. Don't give any feedback on possible answers. Tell the students they will read about crane safety issues later in the lesson.

Part 2

a Students complete the task in pairs.

Answers

1 I 2 H 3 C 4 D 5 B 6 A 7 F 8 E 9 G



b Students complete the task in pairs.

Answers

1 operator 2 banksman 3 load 4 jib 5 wire rope
6 hook 7 pulley block 8 outriggers 9 slings



Extension Activity

If students are interested (this task might appeal especially to civil engineers) you could ask questions about types of crane in more detail based on the information in the notes and specific terms in bold, below. (The focus here is on aspects of mobile crane design, as these are the most dangerous type of crane.)

- Most mobile cranes have a **telescopic jib**, which can extend like a telescope. However, very large mobile cranes have a **lattice jib**, made from a lattice of steel tubes, similar to the kind used on tower cranes.
- Mobile cranes can have a small lattice jib fitted to the end of their telescopic jib as a temporary extension to increase their reach. This extension is called a **fly jib**.
- The jibs on most tower cranes cannot be pivoted upwards – they remain horizontal. However, some tower cranes can lift their jibs upwards. A jib of this kind on a tower crane is called a **luffing jib**.

Part 3

a Students work alone to prepare for speaking task.

b Students complete the task in pairs.

Part 4

Hand out the sheet containing the extracts from the handbook (page 3).

Key vocabulary in these texts that students may need help with:

(fully) extended	determine (v = decide)	device	electrical conductors
floats (n)	high-voltage power lines	human error	puddles
specific model	standard hand signals	tip over	walkie-talkie
wear (n)	withstand	wooden sleepers	

Students read alone and then discuss the questions in pairs. You could ask pairs to feed back to the whole class on question 3.