

80 Technical English



REACHING FOR THE SKY

An architect starts with an **aesthetic** vision of what a **skyscraper** will look like, and an engineer then turns this **unique** concept into a safe and practical building. For skyscrapers, which have more **physical constraints** than the average building, this is no easy task. To **comply with** building **regulations**, any structure reaching high into the sky has to be capable of **supporting** its considerable weight and able to **withstand** high winds and earthquakes. They have to **undergo** a **thorough** process of testing, and if results indicate there may be **excessive** movement, engineers have to find ways to restrict this **motion** and ensure the building will be **structurally** sound.

A skyscraper will also have many users – e.g. office workers, residents, hotel guests – so it must **meet** their various **needs**, as well as the strict rules concerning protection from fire and flooding.

The **construction** of a skyscraper begins with laying the **foundations** on rock deep beneath the ground. Steel or **reinforced concrete** columns are **inserted** into holes within the foundations, and concrete is then poured around them. Large **cranes** erect the vertical columns of the building's **framework**, after which **girders** are attached horizontally between them. It is this structure that gives **support** to the enormous **load** the building must bear. **Panels** made of materials such as glass or metal are built onto the framework to complete the skyscraper's exterior.

GLOSSARY

aesthetic	made in an artistic way and beautiful to look at	structurally	the way in which sth is built or organized structure <i>n</i>
unique	very special and unusual	meet the needs of sb/sth	satisfy the needs of sb/sth
constraint	a thing which limits your freedom to do sth: physical/ financial/political constraints <i>SYN restriction; restrict</i> <i>v</i>	construction	the process or method of building or making sth, especially roads, bridges, etc. construct <i>v</i>
comply (with sth)	obey a rule, order, law, etc.	foundation <i>(usually pl)</i>	the bricks, concrete, etc. that form the solid underground base of a building
regulation	an official rule made by a government or other authority	reinforced	made stronger, especially by the addition of another material
support	hold sth in position or prevent sth from falling support <i>n</i>	concrete	a building mixture of sand, cement, small stones and water
withstand	be strong enough not to be hurt or damaged by extreme conditions, the use of force, etc. <i>SYN resist; resistance</i> <i>n</i>	insert	put sth into sth else, or between two things
undergo	experience sth, especially a change or sth unpleasant	framework	the parts of a building or an object that supports its weight and gives it shape
thorough	done completely; with great attention to detail	girder	a long piece of wood or metal, used to support weight
excessive	more than is reasonable, appropriate, or permitted	load	the amount of weight or pressure that is pressing against or down on sth: <i>a building's vertical load</i>
motion	the act or process of moving: <i>The train is already in motion.</i>	panel	a square or rectangular piece of wood, glass or metal that forms part of a larger surface, such as a door or wall

1 Is the pronunciation of the underlined letters the same or different? Write S or D. Use the APP to help you.

- | | | | | | |
|------------|------------|-------|-------------|--------------|-------|
| 1 concrete | construct | | 5 concrete | reinforced | |
| 2 support | comply | | 6 unique | resist | |
| 3 thorough | undergo | | 7 aesthetic | unique | |
| 4 thorough | foundation | | 8 comply | structurally | |

2 Match 1–8 with a–h.

- | | | |
|---------------|-------|-----------------------------------|
| 1 meet | | a the horizontal load adequately |
| 2 comply with | | b a number of changes |
| 3 resist | | c one tube inside the other |
| 4 undergo | | d the effect of strong winds |
| 5 construct | | e the architect's freedom |
| 6 insert | | f the regulations |
| 7 support | | g the needs of the users |
| 8 restrict | | h the road going under the bridge |

3 Circle the odd one out.

- | | | | | | |
|------------------|-----------------|---------------|-----------------|----------------|---------------|
| 1 a) restriction | b) construction | c) constraint | 5 a) rule | b) law | c) regulation |
| 2 a) detailed | b) thorough | c) reinforced | 6 a) withstand | b) resist | c) comply |
| 3 a) panel | b) girder | c) concrete | 7 a) regulation | b) framework | c) structure |
| 4 a) framework | b) motion | c) movement | 8 a) base | b) foundations | c) concrete |

4 Replace the underlined word(s) with a word or phrase that keeps the same meaning.

- 1 They've added sand, cement, stones and water to the foundations.
- 2 The foundations will need to be made stronger.
- 3 We will wait until the process is moving and happening.
- 4 I'm not sure these girders can support the amount of weight.
- 5 Most architects have to operate within various financial restrictions.
- 6 Basically, the fence comprises six rectangular pieces of wood.
- 7 The building has experienced a number of changes of use.
- 8 High-rise buildings have to comply with detailed safety checks.
- 9 The amount of force was greater than is reasonable or appropriate.
- 10 There are an increasing number of very tall buildings in the city centre.

5 Complete the text.

After the building has been designed, the (1) of the building is the responsibility of the engineers, and they have to ensure that the design is (2) sound. This involves testing the (3) of the building to the effects of strong winds, and if the movement is too great, the engineers have to find various ways to restrict its (4) This may bring the engineer into conflict with the architect, who might feel the (5) quality of his design is being reduced.

6 What can you remember from the text on the other page? Write answers to the questions, or talk to another student.

- 1 What are the two physical constraints that affect skyscrapers?
- 2 What does a skyscraper need to satisfy apart from the needs of the users?
- 3 Why do skyscrapers have to undergo thorough tests?
- 4 What is the purpose of wind tunnel tests?
- 5 What is inserted into the foundations of the building?
- 6 What is then poured on top?
- 7 How are the vertical supports put in position?
- 8 What are placed between the vertical supports?
- 9 How are the exterior walls then constructed?



TEST YOURSELF