ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

УПРАВЛЕНИЕ ДИСТАНЦИОННОГО ОБУЧЕНИЯ И ПОВЫШЕНИЯ КВАЛИФИКАЦИИ

Кафедра «Иностранных языков»

Методические указания

по профессионально-ориентированному чтению текстов по дисциплине

«Английский язык»

Авторы
Кривцова Н.Л.,
Кочетова В.А.

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Аннотация

Методические указания по профессионально-ориентированному чтению предназначены для обучающихся второго курса по специальности 08.05.01 «Строительство уникальных зданий и сооружений».

Авторы

Преподаватель кафедры «Иностранных языков» Кривцова Н.Л.
Преподаватель кафедры «Иностранных языков» Кочетова В.А.

Оглавление

UNIT 1. GREEN BUILDING

1. Discuss in pairs what the phrase "green building" means.

2. Read the text and make a plan of it.

Green architecture, or green design, is an approach to building that minimizes harmful effects on human health and the environment. The "green" architect or designer attempts to safeguard air, water, and earth by choosing *eco-friendly* building materials and construction practices.

Green building (also known as green construction or sustainable building) is a process that is environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the design team, the architects, the engineers, and the client at all project stages.

Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective is that green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation.

Reducing environmental impact

Green building practices aim to reduce the environmental impact of buildings, so the very first rule is: the greenest building is the building that doesn't get built. New construction almost always degrades a building site, so not building is preferable to building. The second rule is: every building should be as small as possible. The third rule is: do not contribute to sprawl (the tendency for cities to spread out in a disordered fashion). No matter how much grass you put on your roof, no matter how many energy-efficient windows, etc., you use, if you contribute to sprawl, you've just defeated your purpose. Urban infill sites are preferable to suburban "greenfield" sites.

Buildings account for a large amount of land. According to the National Resources Inventory, approximately 107 million acres (430,000 km^2) of land in the United States are developed. The International Energy Agency released a publication that estimated that existing buildings are responsible for more than 40% of the world's total primary energy consumption and for 24% of global carbon dioxide emissions.

Notes:

to safeguard – сохранить

eco-friendly – экологически-чистый

sustainable building – устойчивое строительство

environmentally responsible – ответственный за окружающую среду

resource-efficient – ресурсосберегающий

siting – подбор места для строительства

operation - эксплуатация

maintenance – содержание

to complement - дополнить

occupant – житель

contribute – вкладывать деньги

to sprawl – расшириться

in a disordered fashion – в беспорядочной форме

3. Read the text again and find out if the following statements are true or false:

1) Green architecture is an approach to landscaping that minimizes harmful effects on human health and the environment.

2) Green building requires only working of the design team.

3) Green building is the same as green construction or sustainable building.

4) A building's life-cycle includes siting, design, construction, operation, maintenance, renovation, and demolition.

5) Efficiently using energy, water, and other resources is the only way to reduce the overall impact of the built environment on human health and the natural environment.

6) The third rule is: do not occupy much space for building.

4. Find the passage describing the rules of green building and translate it into Russian.

5. Answer the following questions:

1) What is green building?

2) What does the "green architect" attempt to do?

3) What does green building require?

4) What three ways to reduce the overall impact of the built environment on human health and the natural environment?

5) How do you understand the first rule "the greenest building is the building that doesn't get built".

UNIT 2. SMART BUILDINGS

1. Discuss the following questions:

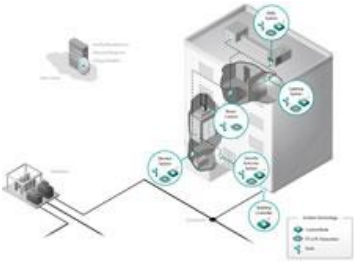
What does the word "smart" mean?

What can be smart? Enumerate as many word combinations as you can.

What makes buildings smart?

2. Read the text and make a plan of it:

Smart Buildings



Smart building technologies are not only saving building owners and their tenants some cash, they are also offering significant help in saving the planet. Due to Internet based networks, new digital technologies are ready to make dramatic contributions in how buildings function, particularly in reducing their energy consumption.

The idea of smart buildings has been around for decades. Now, however, Internet networks are providing the foundation to unify a wide variety of building automation tasks.

Though it might still sound a bit far-fetched for bricks and mortar to have a brain, industry experts say today's technology is now more than capable of giving buildings this kind of intelligence. With advances in such areas as "smart dust" micro-sensors and wireless mesh communications, Internet networks can now plug into some pretty cool stuff for making buildings work better.

A smart building can be almost any structure, from a shopping mall or home to a hospital or an office high-rise. They all share the common ability of "knowing" what is going on inside their walls and being able to respond accordingly. Smart buildings control what the industry calls «building automatic systems» for monitoring and regu-

lating such tasks as heating, air conditioning, lighting and other environmental variables. They can also oversee other building functions such as security, fire suppression, and elevator operations.

Beyond integration, smart building technologies focus on bringing more detailed monitoring "awareness" to buildings. Typically, heating and cooling systems have one thermostat for an entire office floor. But new smart building networks can now cost-effectively provide far more detailed monitoring of the conditions inside a building, helping a structure's environmental systems deliver just enough heat, air, or cooling when and where it's needed.

Smart buildings equipped with an integrated array of sensors can also monitor such things as the amount of sunlight coming into a room and adjust indoor lighting accordingly. And advanced smart buildings can know who is visiting a building after hours (based on the key swipe from the security system) and turn on the appropriate lights, equipment, and environmental controls.

But smart building technologies are not just improving new constructions. There is a huge opportunity in existing buildings as well. Studies show that a great return can be taken on retrofitting a 30-year-old building with an integrated environmental system.

With the right public opinion and industry initiatives, smart buildings could do much more than turn the lights off when you leave the office. They could well be a key to turning the tide on climate change.

Notes:

Smart building - интеллектуальное здание
significant – значительный
digital - цифровой
energy consumption - энергопотребление
far-fetched - надуманный
wireless mesh – беспроводная сеть
environmental variables – погодные (климатические) изменения
heating – отопление
air conditioning - воздушное кондиционирование
fire suppression – пожарная безопасность
equipped – оборудованный
integrated array of sensors – встроенная панель датчиков
to improve – улучшать

3. Read the text again and find out if the following statements are true or false:

1. Smart building technologies do not offer significant help in saving the planet.
2. Today's technology is now more than capable of giving buildings a kind of intelligence.
3. A smart building can be only a small structure.
4. Smart buildings can also monitor such things as the amount of sunlight coming into a room and adjust indoor lighting accordingly.
5. But smart building technologies are only for new constructions.

4. Match the English words to their Russian meanings:

1. security	a) интеллектуальное здание
2. mortar	b) освещение
3. smart building	c) лифт
4. lighting	d) раствор, известь
5. elevator	e) внутренний
6. tenant	f) кирпич
7. turn off	g) оборудование
8. indoor	h) выключать
9. equipment	i) безопасность
10. brick	j) жилец

5. Answer the questions:

1. What are the advantages of smart buildings?
2. What kind of structure can be smart?
3. What are «building automatic systems»?
4. Can smart buildings monitor what is going on inside?
5. Is there an opportunity to reconstruct old buildings into smart ones?

UNIT 3. THE DYNAMIC TOWER

1. Discuss the following questions:

1. What is the dynamic architecture?
2. Have you ever seen a dynamic building? Try to describe it.

2. Read the text:

The Dynamic Tower

The **Dynamic Tower** (also known as **Dynamic Architecture Building** or the **Da Vinci Tower**) is a planned 420-metre (1,378 ft), 80-floor moving skyscraper in Dubai, United Arab Emirates, designed by architect David Fisher.

Similar to the Suite Vollard completed in 2001 in Brazil, each floor will be able to rotate independently. This will result in a constantly changing shape of the tower. Each floor will rotate a maximum of 6 metres (20 ft) per minute, or one full rotation in 90 minutes.

It will be the world's first prefabricated skyscraper with 40 factory-built modules for each floor. 90% of the tower will be built in a factory and shipped to the construction site. This will allow the entire building to be built in only 22 months. The core of the tower will be built at the construction site. Part of this prefabrication will be the decrease in cost and number of workers (90 at the work site and 600 at the factory instead of 2,000 needed). The total construction time will be over 30% less than a normal skyscraper of the same size. The majority of the workers will be in factories, where it will be safer. The modules will be preinstalled including kitchen and bathroom fixtures. The core will serve each floor with a special, patented connection for clean water, based on technology used to refuel airplanes in mid-flight.

The entire tower will be powered from wind turbines and solar panels. Enough surplus electricity should be produced to power five other similar sized buildings in the vicinity. The turbines will be located between each of the rotating floors. They could generate up to 1,200,000 kilowatt-hours of energy. The solar panels will be located on the roof and the top of each floor.

In 2008, Fisher said that he expected the skyscraper to be completed in 2010. In 2009, Fisher said construction would be complete in late 2011. However, as of January 2013, construction has not started yet, and there has been no official announcement of the building site. Fisher did not "say where the tower would be built, [...] because he wanted to keep it a surprise." Fisher acknowledges that he is not well known, has never built a skyscraper before and has not practiced architecture regularly in decades.

Notes:

Dynamic – динамический
moving skyscraper – движущийся небоскреб
similar – схожий, подобный
to rotate – вращаться
floor – этаж
prefabricated – сборный
construction site – строительная площадка
surplus – избыток
vicinity – близость, соседство

3. Answer the following questions:

1. How was the dynamic tower planned?
2. What is special about the dynamic tower?
3. What is a prefabricated skyscraper? Explain.
4. Is the dynamic tower energy-efficient? Why?
5. Why is this tower environmentally friendly?

4. Scan the text and find the context where the following word combinations are used:

Moving skyscraper, to rotate independently, factory-built modules, the core of the tower, the majority of the workers, powered from, the solar panels.

UNIT 4. MUSEU OSCAR NIEMEYER

1. Work in pairs and discuss the following questions:

a) Museum of the Eye. Tell why it is so called?

b) Look at the picture below and say what the annex on the top of the building looks like?

2. Read the text and check whether your ideas are right.

From time to time, there is a great artist that changes the way we perceive masterpieces and other people and gives us new emotions. Still, humanity gives birth to visionaries in other domains as well. And architecture is yet another great field where these bright minds create marvels and change perspectives.

Some architects are even responsible for creating masterpieces with an emotional impact on people and can change the way we perceive cities and countries. Artists or not, these farsighted architects, were and many continue to be, the masters in redesigning our future.

Oscar Niemeyer (b. December 15, 1907)

Oscar Ribeiro de Almeida Niemeyer Soares Filho is considered to be a pioneer in creating new possibilities for using the reinforced concrete just for aesthetical reasons. He started with designing the first state-sponsored skyscraper in the world, for the Brazilian government. It was completed in 1943 and after decades it was recognized as the first example of Brazilian modernism.

He was part of the international team that designed the UN headquarters in New York and his conceptual plan was the main source of inspiration for the constructors. His membership in the Brazilian Communist Party limited his chances of working in the United States and got him exiled up until 1985. By the time the exile ended, he designed the main administration buildings in Brasilia, the country's new capital city.

While in Europe, he created several buildings, including the headquarters of the French Communist Party and the Mondadori Publishing House office near Milan. After returning to his home-country, Niemeyer continued to design impressive structures around Brazil such as: Niterói Contemporary Art Museum, the Catedral Militar Igreja de N. S. da Paz, the Memorial dos Povos Indigenas and many

others. At his age (103), he continues to work at his office in Rio de Janiero.

Museu Oscar Niemeyer

Building type – art museum

Construction system – reinforced concrete, tile mosaic, glass curtain wall

Climate – warm temperate

Context – urban

Style – expressionist modern

Notes – "Eye Museum" is a popular English nickname for the landmark building in Curitiba.

The Oscar Niemeyer Museum is located in the city of Curitiba, in the state of Paraná, in Brazil. It was inaugurated in 2002 with the name New Museum. With the conclusion of remodeling and the construction of a new annex, it was reinaugurated on July 8, 2003, with the current denomination to honor its famous architect who completed this project at 95 years of age. It is also known as Museu do Olho or Museum of the Eye, due to the design of the building.

The museum focuses on the visual arts, architecture and design. For its magnificence, beauty and for the importance of the collection, it represents a cultural institution of international significance. The complex of two buildings, installed in an area of 35 thousand square meters (of which 19 thousand are dedicated to exhibition space), it is a true example of architecture allied with art. The first building was designed by Oscar Niemeyer in 1967, faithful to the style of the time, and conceived as an educational institute. It was remodeled and adapted to function as a museum, for which Niemeyer

designed the annex, reminiscent of an eye, imprinting it with a new characteristic identity.

The museum features many of Niemeyer's signature elements: bold geometric forms, sculptural curved volumes placed prominently to contrast with rectangular volumes, sinuous ramps for pedestrians, large areas of white painted concrete, and areas with vivid murals or paintings. The Niemeyer museum is placed within a Burle Marx garden designed by landscape architect Roberto Burle Marx, which occupies an area of 144 thousand square meters of woodland. Though rooted in modern architecture Niemeyer's designs have much in common with postmodern architecture as well and this is as a contemporary building as the artwork it displays.

Notes:

annex – пристройка
allied – связанный, близкий
conceived – задумывался
reminiscent – напоминающий
bold geometric forms – отчетливые геометрические формы
curved – изогнутые
sinuous – извилистый
ramps – склоны
vivid murals or paintings – фресковая живопись

3. Answer the following questions

a) When was The Oscar Niemeyer Museum inaugurated?
b) What does the museum focus on?
c) What area does the complex occupy?
d) When was the first building designed and what was conceived as?
e) What Niemeyer's signature elements were used in the structure?
f) In what park is it placed and what area does this park occupy?

4. Match the English equivalents to their Russian ones:

1) the reinforced concrete	a) несмотря на то, что корнями уходит в современную архитектуру
2) the main source of inspiration	b) установлена
3) the exile ended	c) оставаясь верным стилю того времени
4) the current denomination	d)культурное учреждение международного значения
5) focuses on the visual arts,	e) задумано, как международный институт
6) a cultural institution of international significance	f) пример архитектуры, связанный с искусством
7) installed	g) запечатлев его новой характерной чертой
8) example of architecture allied with art	h) железобетон
9) conceived as an educational institute	i) главный источник вдохновения
10) faithful to the style of the time	j) современное название
11) imprinting it with a new characteristic identity	k) изгнание закончилось
12) though rooted in modern architecture	l) сосредоточен на визуальном искусстве

5. Retell all you have known about the architect Oscar Niemeyer and his masterpiece The Eye Museum

UNIT 5. FRANK GEHRY. THE GUGGENHEIM MUSEUM BILBAO

1. Talk about these questions:

a) Have you heard the term Deconstructivism? What do you think it means?

b) What do you know about The Guggenheim Museum Bilbao?

c) Look at the picture below and say what it looks like?

2. Read the text

Frank Gehry (b. 28 February 1929)

Awarded with "the most important architect of our age" by *Vanity Fair*, Frank Gehry has an amazing portfolio, whose works are said to be the masterpieces of contemporary architecture. Even if this statement might be arguable, one thing is clear: Gehry's buildings (including his private residence) are world's hottest tourist attractions. He was the only major architect of our times that became famous through his private residence in Santa Monica, California.

Frank Gehry is definitely *an advocate* of the Deconstructivism. This style, also called DeCon architecture, is a development of postmodern architecture characterized by ideas of fragmentation by manipulating the surfaces. Unlike the most styles in use, the main belief in DeCon is that forms do not *follow* function. Although many specialists are criticizing this type of buildings, they always manage to catch a passerby's eye.

Gehry designed tens of buildings all over the world and currently other 23 projects are in construction or on hold. Some of his most prominent works include: The Walt Disney Concert Hall in Los Angeles, The Guggenheim Museum in Bilbao, Der Neue Zollhof in Düsseldorf and the Marqués de Riscal Vineyard Hotel in Elciego.

The Guggenheim Museum Bilbao

The Guggenheim Museum Bilbao is a museum of modern and contemporary art, designed by Canadian-American architect Frank Gehry, built by Ferrovial, and located in Bilbao, Basque Country, Spain.

It is built alongside the Nervion River, which runs through the city of Bilbao to the Atlantic Coast. The Guggenheim is one of several museums belonging to the Solomon R. Guggenheim Foundation. The museum features permanent and visiting exhibits of works by Spanish and international artists.

The museum is *clad* in glass, *titanium, and limestone*.

The Solomon R. Guggenheim Foundation selected Frank Gehry as the architect, and its director, Thomas Krens, encouraged him to design something *daring* and innovative. The curves on the exterior of the building were intended to appear random; the architect said that "*the randomness of the curves* are designed to catch the light". The interior "is designed around a large, light-filled *atrium* with views of Bilbao's estuary and the surrounding hills of the Basque country." The atrium, which Gehry nicknamed *The Flower* because of its shape, serves as the organizing center of the museum.

When the Guggenheim Museum Bilbao opened to the public in 1997, it was immediately hailed as one of the world's most *spectacular* buildings in the style of Deconstructivism (although Gehry does not associate himself with that architectural movement), a masterpiece of the 20th century. Architect Philip Johnson described it as "the greatest building of our time", while critic Calvin Tomkins, in *The New Yorker*, characterized it as "a fantastic dream ship of undulating form *in a cloak* of titanium," its *brilliantly reflective panels* also reminiscent of *fish scales*.

The museum is seamlessly integrated into the urban context, unfolding its interconnecting shapes of stone, glass and titanium on a 32,500-square-meter site along the Nervión River in the old industrial heart of the city; while modest from street level, it is most impressive when viewed from the river. With a total 256,000 square feet, it had more exhibition space than the three Guggenheim collections in New York and Venice combined at that time. Eleven thousand square meters of exhibition space are distributed over nineteen galleries, ten of which follow a classic *orthogonal* plan that can be identified from the exterior by their stone finishes. The remaining nine galleries are irregularly shaped and can be identified from the outside by their *swirling organic forms* and titanium *cladding*.

Notes:

Vanity Fair – ярмарка тщеславия
an advocate – сторонник
follow – придерживаться
clad – покрыт
titanium – титан
limestone – известняк
daring – смелое, дерзкое
the randomness of the curves – беспорядочность изгибов
atrium – открытая площадка в центре здания
hailed – назван
spectacular – эффектных
undulating – волнообразной
in a cloak – в мантии
brilliantly reflective panels – блестящие, сверкающие панели
fish scales – чешуя рыбы
orthogonal – прямоугольный
swirling organic forms – завивающиеся организованные формы
cladding – покрытие

3. Complete the following sentences:

1. The museum is *clad* in _____
2. Thomas Krens, encouraged him to design _____
3. The randomness of the curves are designed _____
4. It was immediately hailed as one of the world's _____
5. A fantastic dream _____

6. Reminiscent of _____
7. The museum is seamlessly integrated _____

4. Talk about these questions:

Would you like to visit the Guggenheim Museum Bilbao? Why?
What buildings of unusual architecture are there in your city?
Can you identify these buildings in you city?
The tallest building: _____
The oldest building: _____
The most beautiful building: _____

UNIT 6. SANTIAGO CALATRAVA. TURNING TORSO

1. Discuss the following with your partner

a) What the greatest architects do you know? Do you know anything about Santiago Calatrava?

b) What unique buildings in Spain do you know?

c) What are the tallest buildings in the world?

2. Read the text and answer the following questions:

a) The architect of what country is Santiago Calatrava?

b) What has he designed?

c) What can you say about the height of Turning Torso?

d) Give an illustration of the general structure of the Turning Torso.

e) Who is Johnny Örbäck and how is he connected with the Turning Torso?

Santiago Calatrava (b. 28 July 1951)

Calatrava was born in Valencia and is one of the greatest architects, sculptors and structural engineers Spain has seen in the last century. The early world-wide recognition led to offices opening in Valencia, Zürich, Paris and New York City.

He started his career running numerous civil engineering projects, such as bridges and train stations. The bridge Puente del Alamillo in Seville is the most prominent work as a civil engineer and it rapidly became a landmark of the city. The Montjuic Communications Tower in Barcelona and the Allen Lambert Galleria were his first works as an architect. The 54-story twisting tower in Malmö, Sweden (HSB Turning Torso) was also designed by Calatrava and is the second tallest residential buildings in Europe.

Calatrava has less than two decades of designing amazing buildings, but he holds an impressive portfolio that will open more record-breaking opportunities in the future. He is currently designing the future station at World Trade Center Transportation Hub and it is planning numerous other projects.

Turning Torso

HSB Turning Torso is the tallest skyscraper in Sweden and the Nordic countries, situated in Malmö, Sweden, located on the Swedish side of the Öresund strait. Upon completion, it was the tallest building in Scandinavia. It is presently the third tallest residential building in Europe, after the 264-metre (866 ft) Triumph Palace in Moscow and the 212-metre Sky Tower in Wrocław. A similar, taller skyscraper featuring a 90° twist is the Infinity Tower, currently under construction in Dubai, United Arab Emirates. Prior to the construction of Turning Torso, the 86-metre (282 ft) Kronprinsen had been the city's tallest building.

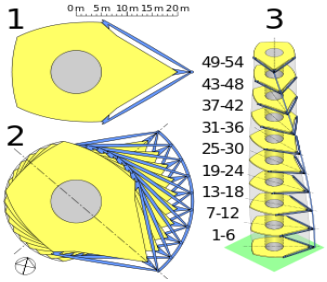


Illustration of the general structure of the Turning Torso. (1) shows a typical floor plan, where the grey circle denotes the core and blue shapes denote the steel framework. (2) shows the way the nine

segments fit around the core, and (3) is a dimetric projection of the tower.

The vision of HSB Turning Torso is based on a sculpture called *Twisting Torso.* The sculpture is a white marble piece based on the form of a twisting human being.

In 1999, HSB Malmö's former Managing Director, Johnny Örbäck, saw the sculpture in a brochure which presented Calatrava in connection with his contribution to the architectural competition for the Öresund Bridge. It was on this occasion that Johnny Örbäck got the idea to build HSB Turning Torso. Shortly thereafter he traveled to Zurich to meet with Calatrava and ask him to design a residential building based on the idea of a structure of twisting cubes.

The building is constructed in nine segments of five-story pentagons that twist as it rises; the topmost segment is twisted ninety degrees clockwise with respect to the ground floor. Each floor consists of an irregular pentagonal shape rotating around the vertical core, which is supported by an exterior steel framework. The two bottom segments are intended as office space. Segments from third to ninth house 147 luxury apartments.

Notes:

twisting tower – закрученная башня
the Infinity Tower – бесконечная башня
Turning Torso – закрученный торс (вращающийся корпус)
house – вмещают

3. Choose the right variant:

1. He started his career running numerous
a) military engineering projects
b) civil engineering projects
c) road engineering projects

2. According to the text he has designed the …….. .most prominent structures.
a) three
b) four
c) five

3. It is presently the third tallest residential building
a) in Europe
b) in Scandinavia
c) in Dubai, United Arab Emirates

4. Johnny Örbäck is
a) an architect
b) managing director
c) Calatrava's friend
5. HSB Turning Torso is
a) a residential building
b) an office building
c) a station

4. Translate the part HSB Turning Torso into Russian language in writing.

UNIT 7. BEIJING NATIONAL STADIUM, 'THE BIRD'S NEST'

1. Have you watched the 2008 Olympic Games in China? If yes, did you pay attention on the stadium? Did it make an impression on you? Why?

2. Read the text and make a plan of it.

The £300m Beijing National Stadium, located at the south of the centerpiece Olympic Green, is a stunning landmark building, which staged the 2008 Olympic Games from 8 August to 24 August 2008. The opening and closing ceremonies and athletic track and field events of the 29th Olympiad took place at the stadium. It also hosted the Summer Paralympics from 6 September to 17 September 2008 and Race of Champions 2009.

The stadium has two independent structures, a red concrete seating bowl and the outer steel frame around it at a 50ft distance. As this was an Olympic *venue*, there were many standards that the design consortium had *to conform to*. Everything from the width of the track to the size and location of the long and high jump *pits* needed to satisfy the requirements set out by the International Olympic Committee (IOC) and the International Amateur Athletics Federation (IAAF).

National Stadium 'Bird's Nest' architecture

The team wanted an optimum balance between making sure every spectator had a good view, creating a good atmosphere and designing an elegant building. It also needed to be aware of the

different uses of the stadium; for example, when used as an athletics stadium, the most important view is at the finish line of the running track but when used for football, the best views are at the center line.

Getting everyone close enough in such a big venue was a real challenge and getting the calculations right was an immense task. For example, changing the height of the first row of seating by just 100mm would make the stadium significantly larger and higher and increase the cost by several million pounds.

To achieve the optimum design, the team relied heavily on parametric design software. This helped to work out the sightlines, the bowl geometry, airflow to keep the grass in good condition, seismic studies and the design of the external envelope.

While the surface of the structure is simple, the geometry is complex – the calculations were so numerous and complicated that they could not be solved manually. Software was needed to make sure that the web of twisting steel sections fitted together, as they have to twist and bend to follow the surface accurately.

The main elements support each other and *converge* into *a grid formation*. *The stand* of the stadium is a seven-storey *shear* wall system with a concrete *framework*. The upper part of the stand and the stadium steel structure are actually separated from one another, but both of these are based on a joint foundation.

The "nest" structure, however random it might look, follows the rules of geometry and contains 36km of unwrapped steel. The shape of the roof was inspired by yin yang, the Chinese philosophy of balance and harmony.

The roof is covered with a double-layer membrane structure, with a *transparent* ETFE (ethylene tetrafluoroethylene) membrane fixed on the upper part of the roofing structure and a *translucent* PTFE (polytetrafluoroethylene) membrane fixed on its lower part. A PTFE acoustic ceiling is also attached to the side walls of the inner ring.

The spaces in the structure of the stadium are filled with *inflated* ETFE cushions. On the façade, the inflated cushions are mounted on the inside of the structure where necessary, to provide wind protection.

Since all of the facilities – restaurants, suites, shops and restrooms – are all *self-contained* units, it is possible to do largely without a solid, enclosed façade. This allows natural ventilation of the

stadium, which is the most important aspect of the stadium's sustainable design.

To keep costs down, all the structural elements of the stadium are contained within it, so there are no towers or cable nets. The bowl of the structure is split into eight zones, each with its own *stability system*, making each zone effectively as its own building.

Entrance to the stadium is controlled by tripod barriers supplied and fabricated by Kaba Gallenschütz of Germany. The project involved the installation of 138 of these units at the 12 entrances to the stadium.

Notes:

venue – место состязаний
to conform to – согласовывать с
pits – ямы
converge – сводить
a grid formation – решетчатое строение
the stand – подпора
shear – срез
framework – обрамление
transparent – прозрачный
translucent – просвечивающий
inflated – надутые
self-contained – самосдерживающие
stability system – система прочности

3. Read the text again and find out if the following statements are true or false:

1. The stadium has two independent structures, a red concrete seating bowl and the outer steel frame around it.

2. When used as an athletics stadium, the most important view is at the at the center line of the running track.

3. Changing the height of the first row of seating by just 100mm would increase the cost by several million pounds.

4. The team helped to work out the sightlines, the bowl geometry, airflow to keep the grass in good condition, seismic studies and the design of the external envelope.

5. The calculations were so numerous and complicated that they could not be solved manually.

6. The "nest" structure is random.

7. The shape of the roof was inspired by yin yang, the Chinese philosophy of balance and harmony.

8. Natural ventilation of the stadium is the most important aspect of the stadium's sustainable design.

4. Match the column on the left to the column on the right

срез	outer steel frame
беспорядочный	an immense task
огромная задача	random
подушки	double-layer membrane structure
устойчивый проект	cushions
тройные барьеры	sustainable design
внешний стальной каркас	tripod barriers
конструкция из двухслойной мембраны	shear

5. Translate the part "National Stadium 'Bird's Nest' architecture" from English into Russian.

LIST OF LITERATURE AND THE INTERNET RESOURCES

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