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**Тема занятия:** «Сталь. Методы тепловой обработки стали».

# Основные источники: 1. Абрамова Р.Н., Болсуновская Л.М., Баранова А.В. Геология рудных месторождений и разведка полезных ископаемых. Часть 1. Горное дело. Профессиональный английский язык.

**Дополнительные источники:**

1.Англо-русский и русско-английский словарь. Карантиров С.И., «Дом славянской книги», 2011.  
2. Интернет-ресурсы:  
<https://www.study.ru>; [www.learn-english.ru](https://ped-kopilka.ru/go/url=http:/www.learn-english.ru)  
**Выполнение заданий (lesson instructions):**

**1. Study new words and expressions and translate them.**

alloy ,carbon, stiff ,to corrode, rusty, stainless, to resist, considerably ,tough, forging, welding, brittle, cutting tools, surgical instruments ,blade, spring , inclusion , to affect, manganese, silicon, rust-proof, nitrogen, tungsten.

**2. Read and translate the text.**

**«Steel»**

The most important metal in industry is iron and its alloy – steel. Steel is an alloy of iron and carbon. It is strong and stiff, but corrodes easily through rusting, although stainless and other special steels resist corro­sion. The amount of carbon in steel influences its prop­erties considerably. Steels of low carbon content (mild steels) are quite ductile and are used in the manufacture of sheet iron, wire, and pipes. Medium-carbon steels con­taining from 0,2 to 0.4 per cent carbon are tougher and stronger and are used as structural steels. Both mild and medium-carbon steels are suitable for forging and weld­ing. High-carbon steels contain from 0.4 to 1.5 per cent carbon, are hard and brittle and are used in cutting tools, surgical instruments, razor blades and springs. Tool steel, also called silver steel, contains about 1 per cent carbon and is strengthened and toughened by quenching and tempering.

The inclusion of other elements affects the properties of the steel. Manganese gives extra strength and tough­ness. Steel containing 4 per cent silicon is used for trans­former cores or electromagnets because it has large grains acting like small magnets. The addition of chro­mium gives extra strength and corrosion resistance, so we can get rust-proof steels. Heating in the presence of carbon or nitrogen-rich materials is used to form a hard surface on steel (case-hardening). High-speed steels, which are extremely important in machine-tools, contain chromium and tungsten plus smaller amounts of vana­dium, molybdenum and other metals.

**3. Answer the questions.**

***Questions:***

1. What is steel?
2. What are the main properties of steel?
3. What are the drawbacks of steel?
4. What kinds of steel do you know? Where are they  
   used?
5. What gives the addition of manganese, silicon and  
   chromium to steel?
6. What can be made of mild steels (medium-carbon  
   steels, high-carbon steels)?
7. What kind of steels can be forged and welded?
8. How can we get rust-proof (stainless) steel?
9. What is used to form a hard surface on steel?  
   10. What are high-speed steels alloyed with?

**4. Find the following words and word combinations in the text.**

1. сплав железа и углерода
2. прочный и жесткий
3. легко коррозирует
4. нержавеющая сталь
5. низкое содержание углерода
6. ковкость
7. листовое железо, проволока, трубы
8. конструкционные стали
9. пригодны для ковки и сварки

10. твердый и хрупкий

11.режущие инструменты

12.хирургические инструменты

1. инструментальная сталь
2. упрочнять

15.добавление марганца (кремния, хрома, вольфра­ма, молибдена, ванадия)

**5. Home task. Choose the correct variant.**

1. Alloys consist of …….. a) steel and cast iron

b) iron and stainless steel

c) simple metal and some other element

2. Carbon steel contains…… a) steel and cast iron

b) iron, carbon, an alloying elements

3. Alloy steels include……. с) only iron and carbon

4. The most important properties of a) electrical conductivity, resistance to

steel are……….. wear, magnetic properties

b) strength, ductility, machinability