

3. Studienleistung im Pflichtfach Englisch
29.06.2002

von

Roland Steffen
SFT1

Titanium and its Alloys

Good morning, ladies and gentlemen and welcome to the University of Applied Sciences or HTW. My name's Roland Steffen and I study sensor technology and precision engineering. In my presentation, I'm going to talk about titanium and its alloys. The purpose of this presentation is to inform you about the properties and applications of these materials. My presentation will last about 10 minutes and I'd be glad to answer any questions you might have at the end of it.

I've divided my presentation into two parts. First, I'll talk about the properties of titanium and its alloys. Secondly, I'll show you four examples from the applications of these materials.

So, let's start with the properties of titanium and titanium alloys.

First of all, titanium and its alloys are both light weight and very strong. Consequently they are characterised by a superior strength-to-weight ratio.

In addition to this, titanium and its alloys show excellent corrosion resistance. Thus they are immune to corrosive attacks by salt water, acids or industrial chemicals.

Furthermore, these materials are heat resistant and therefore they perform well at high temperatures.

Finally, titanium and its alloys are at least twenty times more erosion resistant than copper nickel alloys.

Now we come to the second part of my presentation, the applications of titanium and titanium alloys. There is a wide range of applications and in the following I'm going to show you four examples of them.

First and foremost, titanium and its alloys are used in the aerospace industry. Due to their exceptional strength-to-weight ratio, high temperature performance and corrosion resistance so is the aerospace industry the largest market for titanium products. For example, jet engine and airframe components which are subject to temperatures up to 1100° are made of titanium alloys because they withstand high operating temperatures and are lighter than steel components.

Secondly, titanium and titanium alloys are used by the medical industry. Titanium alloys are the standard material for medical devices. Due to their high strength and resistance to attacks by body fluid they are more biocompatible than all other metals. As a result titanium alloys are widely used as implants such as artificial knees and hips.

Thirdly, titanium and its alloys are used by the recreation industry. For example, bicycle frames, golf clubs and tennis racquets are made of these materials. Thus they are light weight, strong and flexible.

Last of all, titanium and its alloys are used by the manufacturing industry. For example, robot hands that make assembly work in factories and complicated maintenance work in special environments are made of titanium and titanium alloys. These robot hands are driven by actuators which consist of wires made of SMA nickel titanium. The wires are pulled and stretched by strings. Heat makes the SMA wires remember their original unstretched length and return to it.

That about brings me to the end of my presentation. But before I stop, let me just say that titanium and its alloys are technically superior and cost-effective materials with a wide range of applications. And now, before we finally conclude, I would like to thank you for your attention and invite any questions that you might have. Thank you.