Střední průmyslová škola strojnická Olomouc, tř.17. listopadu 49

Výukový materiál zpracovaný v rámci projektu „Výuka moderně“
Registrační číslo projektu: CZ.1.07/1.5.00/34.0205

Šablona: III/2 Anglický jazyk

Sada: 2

Číslo materiálu v sadě: 20

Tento projekt je spolufinancován Evropským sociálním fondem a státním rozpočtem České republiky

Název: Metal - joining processes

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Předmět: anglický jazyk

Jazyk: anglický, český

Klíčová slova: metal-joining processes, welding, soldering, adhesive bonding, riveting, bolting

Cílová skupina: žák 3. ročníku

Stupeň a typ vzdělání: střední odborné

Očekávaný výstup: Žák si procvičí slovní zásobu k tématu „spojování kovových materiálů“.

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Metodický list/anotace:

Žáci si na základě této prezentace rozšíří slovní zásobu k tématu „spojování kovových materiálů“ a dokážou jednoduše popsat některé ze zmíněných procesů. Při vypracování úloh využívají znalostí z odborných předmětů.

Datum vytvoření: 20. 3. 2013

1. Read the text.

Metal-joining processes

Joining of metal materials is required when the desired component cannot be made by means of metal forming or machining. The main metal-joining operations are: **welding, soldering, adhesive bonding, riveting** and **bolting**. Each of these processes has its pros and cons.

WELDING is the most common way of joining metals. It is the technique used for joining two workpieces to produce a single piece of metal. It is done by applying heat, pressure or both and the weld is made when the edges of workpieces are melted so that they fuse permanently. This is done with or without the use of a filler material. According to the energy sources used for joining we distinguish several types of welding: **gas welding, arc welding, laser welding, electron beam welding** and **resistance welding**.

- **Gas welding** – it is a fusion process in which the heat source is obtained by combustion of oxygen with other gas, especially acetylene.
- **Arc welding** – it is a process which uses electricity to melt and join base materials. In arc welding the heat source is the electric arc created between welding electrode and the workpiece.
- **Laser welding** – it is a process where the heat source is a highly concentrated beam of light. The welding temperature is extremely high, it reaches 30 000 C.
- **Electron beam welding** – it is a process using the heat which is created by a beam of high-velocity electrons. This welding process is very expensive. It is used in space industry.
- **Resistance welding** – it is a process using electrical resistance. It creates the heat which can melt and create a fusion.

Vocabulary:

(to) apply – aplikovat, vynaložit
adhesive bonding – lepení
arc welding – svařování el. obloukem
beam – paprsek
bolting – spojení šrouby
combustion – spalování
(to) distinguish – rozlišovat
edge – okraj, hrana
electron beam welding – svařování elektronovým paprskem
filler – tmel, výplň
gas welding – svařování plamenem
(to) fuse – tavit, roztavit
fusion – tavení
heat – teplo
(to) join – spojit, spojovat
(to) melt – tavit
(to) obtain – získat
permanently – trvale
pressure – tlak
pros and cons – klady a zápory
(to) require – vyžadovat
resistance – odolnost
resistance welding – svařování el. odporem
riveting – nýtování
soldering – pájení
source – zdroj
velocity – rychlost
weld – svar
welding – svařování

2. Match the highlighted words in the text with the definitions.

1. advantages and disadvantages = _____
2. a thing or a place from which something comes or is obtained = _____
3. temperature = _____
4. (to) melt = _____
5. outside limits of an object = _____
6. (to) recognize the differences between the things = _____
7. a ray of light = _____
8. burning = _____

Key:

1. advantages and disadvantages = pros and cons
2. a thing or a place from which something comes or is obtained = source
3. temperature = heat
4. (to) melt = (to) fuse
5. outside limits of an object = edges
6. (to) recognize the differences between the things = (to) distinguish
7. a ray of light = beam
8. burning = combustion

3. Read the text.

SOLDERING is a joining process in which two workpieces are joined together with a molten metal, a **solder**. The solder is characterized by a lower meting point than the joining metal. It is available in various forms such as bars or wires.

ADHESIVE BONDING is a joining process used to fasten two workpieces together through an **adhesive**. The choice of adhesive depends on the materials which are bonded.

RIVETING is a joining technique wherein two workpieces are connected by **rivets**. A rivet is a permanent metal fastener in a shape of a pin. Riveting is relatively cheap, strong and can join dissimilar materials with different thicknesses.

BOLTING is a joining technique wherein the workpieces are connected by **bolts**. The bolts are screwed in a hole passing through the workpieces and then fully tightened. This method is very rapid and it is tension resistant.

Vocabulary:

adhesive – lepidlo
adhesive bonding - lepení
available – dostupný
bar – tyč
bolt - šroub
bolting – spojení šrouby
(to) bond – spojovat
(to) connect – spojit, spojovat
(to) depend on sth. – záviset na…
dissimilar – různý, rozdílný
(to) fasten – připevnit
fastener – spojovací prvek
hole - díra
(to) join – spojovat, spojit
low – nízký
melting point – bod tání
molten – roztavený
(to) pass through – procházet
permanent – trvalý
pin – špendlík
rapid – rychlý
rivet – nýt
riveting – nýtování
(to) screw – šroubovat
solder – pájka
soldering – pájení
tension resistant – odolný proti napětí
thickness – tloušťka
(to) tighten – přitáhnout
wire – drát

4. Are the sentences true or false?

1. Riveting is a joining technique wherein two workpieces are connected by bolts. _____
2. In the soldering process the solder has a higher meting point than the joining metal. _____
3. Riveting is a cheap metal-joining process. _____
4. Bolting is a technique which is tension resistant. _____
5. Adhesive bonding is a process used to fasten two materials together through an adhesive. _____
6. Riveting cannot be used for joining materials with different thicknesses. _____

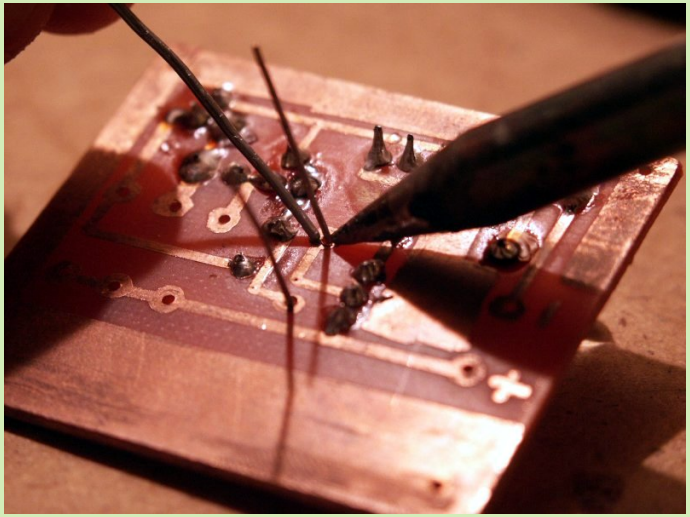
Key:

1. Riveting is a joining technique wherein two workpieces are connected by bolts. false; rivets
2. In the soldering process the solder has a higher meting point than the joining metal. false; lower
3. Riveting is a cheap metal-joining process. true
4. Bolting is a technique which is tension resistant. true
5. Adhesive bonding is a process used to fasten two materials together through an adhesive. true
6. Riveting cannot be used for joining materials with different thicknesses. False; it can be used…

5. Answer the questions.

1. What are the main metal-joining processes?
2. What types of welding do you know?
3. What is used as a joining material in adhesive bonding?
4. How do we call the fastener used in the riveting process?
5. What are the people in the pictures doing?

Picture 1



Picture 2

Key:

1. The main metal-joining processes are welding, soldering, adhesive bonding, riveting and bolting.
2. We distinguish several types of welding: gas welding, arc welding, laser welding, electron beam welding and resistance welding.
3. We use an adhesive.
4. It is called a rivet.
5. In the first picture the man is welding and in the second picture the man is soldering something.

Použitá literatura:

vlastní zdroje

DEUTSCH, P., HENDRYCHOVÁ, P. *Technická angličtina zaměřená pro střední průmyslové školy se zaměřením na elektrotechniku a strojírenství*. Olomouc, 2011.

Internet

Picture 1

BARRIOS, J. *Wikimedia Commons* [online].[cit. 20. 3. 2013]. Dostupné na: http://commons.wikimedia.org/wiki/File:Hombre_Soldando.jpg

Dostupné na Public Domain.

Picture2

TLAPICKA. *Wikimedia Commons* [online].[cit. 20. 3. 2013]. Dostupné na: http://commons.wikimedia.org/wiki/File:Soldering-PCB-a.jpg

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