

## exercises

**Please select technical terms from the text below and translate them:**

## Hot Rolling

Slabs are first reheated in reheating furnaces. There are two types of reheating furnaces: pusher furnaces and walking beam furnaces. They differ mainly in the way the slabs are transported through the furnace. In the pusher-type furnaces, the charging machine pushes the slabs transversely through the furnace. In the walking beam furnaces, water-cooled walking beams move the slabs longitudinally through the furnace. The slabs are ready to be rolled when they have reached a temperature of 1200 °C.

Prior to rolling, the scale layer of oxides formed on the slabs during reheating in the furnace has to be removed. This is done by the scale breaker, which cleans the top and underside of each slab with a water jet. After this, the slab is transported by the roller table to the roughing stand and then onto the finishing mill. Just in front of the finishing train there are cropping shears that remove the head and the tail of the sheet. After the cropping shears, the sheet passes through a second scale breaker, which removes the oxide scale that has again been formed on the steel. Each stand in the finishing mill reduces the thickness of the sheet until the final thickness required has been attained.

Hot rolling – Válcování za tepla

Slabs – Bramy

Furnace – Pec

Pusher furnace – Narážecí pec

Walking beam furnace – Kroková pec

Charging machine – Vsázecí stroj

Scale – Okuje

Roller table – Válečkový dopravník

Roughing stand – Předválcovací stolice

Finishing mill – Doválcovací trať

exe 2 cloze After hot rolling, the strip carries a layer of oxide scale . This scale consists of a chemical compound of iron and oxygen and it is hard and brittle . To prevent these oxides

being pressed into the sheet during subsequent processing, they have to be removed prior to cold rolling. This is done by pickling , during which the strip is passed through a warm acid bath. Some mills use hydrochloric acid and some sulphuric acid. Immediately after pickling , the steel strip is carefully rinsed and dried.

After pickling , rinsing and drying, the strip can be cut to the required width by the side trimmer . Subsequently, the strip is oiled, cut and coiled . The oil not only served as a protection against rust, but also acts as a lubricant during subsequent cold rolling. The shears cut the strip when the coil has reached the required size. The strip can be cut at the weld , or another location to obtain the required coil weight. The pickled coils can be sold as coils or sheets or can be passed on for further cold rolling.

exe 3

### **Translate the following into Czech:**

Pickling requires continuous and even contact between the pickling acid and the treated material. This means that the strip has to move through the pickling baths at as constant speed as possible. Coils are therefore joined head to tail at the entry to the pickling shop to produce a continuous strip. The join is made by means of a butt weld, whereby both ends are heated and then butted together. Subsequently the weld is planed to remove the excess thickness. The strip is then passed to the entry loop accumulator, which acts as a storage buffer between the discontinuous entry section and the continuous pickling section. After pickling, there is an exit accumulator to accommodate speed differences between the pickling process and the downstream treatment.

Pro moření je důležitý stálý a rovnoměrný kontakt mezi mořicí kyselinou a upravovaným materiálem. Aby se pás mohl pohybovat skrz mořící lázeň konstantní rychlostí, jsou začátky a konce svitků spojeny na vstupu do mořící linky tak, aby se vytvořil nepřetržitý pás. Toho je docíleno tupým svarem, zahřátím a spojením obou konců a jeho následným vyhlazením. Poté pás přejde do vstupního smyčkového akumulátoru, sloužícího jako vyrovnávací zásobník mezi nesouvislou vstupní částí a nepřetržitou mořící částí a po moření následuje výstupní akumulátor vyrovnávající rozdíly v rychlosti mezi mořením a následným zpracováním.

Všimněte si:

Pickling je rovněž nakládání (do octa), pickles – naložená zelenina (okurky apod.)



exe 4

**Please select technical terms from the text below and translate them:**

## Annealing

Steel acquires the desired mechanical properties through annealing in an inert atmosphere at a temperature of about 700°C. There are two possibilities: the coils are either annealed in the batch annealing furnace (BAF) or in the continuous annealing and processing line (CAPL).

In the batch annealing section, the steel coils are positioned on furnace supports. Up to four coils are stacked on top of each support. The stack is protected from the atmosphere by a protective cover around which the actual annealing hood is positioned. The air present inside the protective cover is replaced by a reducing gas (pure hydrogen or a mixture of hydrogen and nitrogen) to protect the sheet and prevent it from rusting during the annealing process. The gas also acts as a heat transfer medium. The annealing temperature depends upon the steel grade required, but will be about 700 °C. After annealing, the hood is removed and replaced by a cooling hood with a ventilator at the top, which cools the steel. The entire process takes several days.

Annealing – Žihání

Inert atmosphere – Ochranné prostředí

Batch annealing – Dávkové žihání

Continuous annealing – Kontinuální žihání

Coils – Svitky

exe 5

The continuous annealing process is designed as a fast method of providing the steel with homogenous and uniform heat treatment that should generate steel properties that are at least as good as of those resulting from the conventional batch annealing process. As implied by the term “continuous annealing and processing line”, the process entails more than just annealing: within ten minutes, a cold rolled coil is degreased, annealed, tempered in the skinpass mill, inspected and finished according to the requirements of the customer. In addition to the time saved by the continuous annealing process, there are also certain steel grades that can only be produced by continuous annealing.

exe 6

**Translate the following into Czech:**

In the continuous annealing line, the coils are welded to each other by a mesh seam weld so that a fully continuous strip can pass through the entire installation. First of all, the strip is completely degreased. After rinsing and drying, the strip arrives in the accumulator linking the discontinuous entry section and the continuous furnace section. In the furnace, the strip is heated to a temperature of about 700 - 800 °C, depending upon the metallurgical requirements. This annealing temperature is maintained for a short period only. In the first cooling stage, the temperature is reduced to approx. 400 °C and the strip is held at this temperature for a fixed period of time.

V kontinuální žíhací lince jsou svitky navařeny na sebe přerušovaným švovým svarem aby nepřetržitý pás mohl procházet celým zařízením. Nejprve je pás odmaštěn, a po opláchnutí a vysušení přiveden do akumulátoru spojujícího nesouvislou vstupní část s nepřetržitou pecní částí. V peci je pás zahřán na teplotu okolo 700 - 800 °C v závislosti na metalurgických požadavcích, ale tato žíhací teplota je udržována pouze po krátkou dobu. V první fázi chlazení je teplota snížena přibližně na 400 °C a pás je v ní udržován po určitou dobu.

exe 7

Hydrogen - Vodík

Hydrochloric acid - Kyselina chlorovodíková (Kyselina solná – triviální název)

Sulphuric acid - Kyselina sírová

Tempering - Popouštění

Skin pass - Válcovat povrchově za studena (plechy)