

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ**

**Український державний університет  
науки і технологій**

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Кафедра «Перекладу та іноземних мов»

*В авторській редакції*

**МЕТОДИЧНІ МАТЕРІАЛИ ДО ПРАКТИЧНИХ  
ЗАНЯТЬ З ДИСЦИПЛІНИ «ПЕРЕКЛАД У ГАЛУЗІ  
МЕТАЛУРГІЇ, ЕКОНОМІКИ І МЕНЕДЖМЕНТУ»**

Методичні вказівки

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Методичні матеріали до практичних занять з дисципліни «Переклад у галузі металургії, економіки і менеджменту»: методичні вказівки / упоряд. Н. Ф. Шаркова; Укр. держ. ун-т науки і технологій. – Дніпро : УДУНТ, 2024. – 24 с.

Методичні вказівки призначені для використання студентами безвідривної форми навчання спеціальності «Германські мови та літератури (переклад включно), перша – англійська» (бакалаврський рівень) під час практичних занять з дисципліни «Переклад у галузі металургії, економіки і менеджменту».

Методичні вказівки базуються на аналізі текстів та доповнені різними лексичними тренувальними вправами, призначеними для засвоєння матеріалу, а також тренування словникового запасу, словотворчих моделей, передбачених програмою з даної дисципліни.

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## ВСТУП

Метою навчальної дисципліни "Переклад у галузі металургії, економіки і менеджменту" є правильне розуміння й адекватний переклад науково-технічних текстів, що передбачає вміння аналізувати наявні у тексті граматичні конструкції та лексичні особливості. Дане навчально-методичне видання відповідає робочій програмі навчальної дисципліни і є продовженням комплексу підручників, які спрямовані на більш глибоке опрацювання автентичних технічних текстів. Запропонований матеріал відповідає принципам особистісно-зорієнтованого підходу до навчання. Методичні вказівки, що пропонуються, сприятимуть вдосконаленню навичок опрацювання, критичного аналізу та інтерпретування фахової літератури англійською мовою. Переклад текстів допоможе майбутнім фахівцям на практиці засвоїти різні стратегії перекладу та навчить їх аналізувати мовні одиниці, та визначати їхню взаємодію. Лексичні й граматичні вправи, що надані після кожного тексту сприятимуть кращому засвоєнню студентами термінів, розвиватиме вміння знаходити лексичні відповідники в тексті, а також краще розуміти базові поняття та процеси в галузі металургії, менеджменту та економіки.

Запропонований матеріал складається з окремих текстів за певною тематикою та різноманітних тренувальних вправ. Текстовий матеріал до вправ підібраний з американських та європейських джерел. Методичні вказівки допоможуть індивідуалізувати вивчення мови та підвищити ефективність контролю за роботою студентів на практичних заняттях.

## **TEXT 1**

### **The Steelmaking Industry**

Steel is an alloy of iron usually containing less than 1% carbon. It is used most frequently in the automotive and construction industries. Steel can be cast into bars, strips, sheets, nails, spikes, wire, rods or pipes as needed by the intended user. Based on statistics from The 1992 Census of Manufacturing, 1,118 steel manufacturing facilities currently exist in the United States. Steel production is a \$9.3-billion-dollar industry and employs 241,000 people.

The process of steelmaking has undergone many changes in the 20th century based on the political, social and technological atmosphere. In the 1950s and 1960s, demand for high quality steel encouraged the steelmaking industry to produce large quantities. Large, integrated steel mills with high capital costs and limited flexibility were built in the U.S. Integrated steel plants produce steel by refining iron ore in several steps and produce very high quality steel with well controlled chemical compositions to meet all product quality requirements.

The energy crisis of the 1970s made thermal efficiency in steel mills a priority. The furnaces used in integrated plants were very efficient; however, the common production practices needed to be improved. The large integrated plants of the 1950s and 1960s tended to produce steel in batches where iron ore was taken from start to finish. This causes some equipment to be idle while other equipment was in use. To help reduce energy use, continuous casting methods were developed. By keeping blast furnaces continually feed with iron ore, heat is used more efficiently.

As environmental concerns have gained importance in the 1980s and 1990s, regulations have become more stringent, again changing the steelmaking industry. In 1995, compliance with environmental requirements was estimated to make up 20-30% of the capital costs in new steel plants. Competition has also increased during the period due to decreasing markets and increasing foreign steel production plants. The competition has forced steelmaking facilities to reduce expenses and increase quality.

To meet these changing needs, just-in-time technology has become more prominent and integrated steel plants are being replaced with smaller plants, called mini-mills that rely on steel scrap as a base material rather than ore. Mini-mills will never completely replace integrated steel plants because they cannot maintain the tight control over chemical composition, and thus cannot consistently produce high quality steel. Mini-mills have a narrower production line and cannot produce the specialty products produced by

integrated plants. Although technology continues to improve, in the mid-1990s, mini-mills captured less than half of the quality steel market.

(From "Recent Developments in Ironmaking and Steelmaking" by Chatterjee, A.)



1. Write 7 – 10 questions to the text that test its general understanding.

2. Find the English equivalents for the words and word-combinations in the text:

Будівельна промисловість; виробниче обладнання; спонукати; витрати основного капіталу; очищення залізної руди; хімічний склад; вимоги щодо якості продукту; партія, дозування, продукт, отриманий після однієї виплавки; непрацюючий; метод безперервного лиття; дотримання вимог довкілля; обов'язкова постанова; конкуренція; витрати; сталеливарний завод; встановити жорсткий контроль; на постійній основі; потокова лінія; спеціальний асортимент; захопити ринок.

3. Match pictures with the following products: a) strip, b) spike, c) bar, d) wire, e) rods, f) nail, g) pipe, h) sheet, i) flanges, j) gears



4. Choose the terms from the following list of words and word combinations:

quality requirements; batches; bars; chemical composition; casting; mini-mill; blast furnace; thermal efficiency; equipment; integrated plant; continuous casting; steel scrap, technology, lance, vessel, fluxing agents, facility, lime, ingot, damage, heavy machinery.

## TEXT 2

### Steel Production from Iron Ore

Steel production at an integrated steel plant involves three basic steps. First, the heat source used to melt iron ore is produced. Next the iron ore is melted in a furnace. Finally, the molten iron is processed to produce steel. These three steps can be done at one facility; however, the fuel source is often purchased from off-site producers.

#### *Cokemaking*

Coke is a solid carbon fuel and carbon source used to melt and reduce iron ore. Coke production begins with pulverized, bituminous coal. The coal is fed into a coke oven which is sealed and heated to very high temperatures for 14 to 36 hours. Coke is produced in batch processes, with multiple coke ovens operating simultaneously.

Heat is frequently transferred from one oven to another to reduce energy requirements. After the coke is finished, it is moved to a quenching tower where it is cooled with water spray. Once cooled, the coke is moved directly to an iron melting furnace or into storage for future use.

#### *Ironmaking*

During ironmaking, iron ore, coke, heated air and limestone or other fluxes are fed into a blast furnace. The heated air causes the coke combustion, which provides the heat and carbon sources for iron production. Limestone or other fluxes may be added to react with and remove the acidic impurities, called slag, from the molten iron. The limestone-impurities mixtures float to the top of the molten iron and are skimmed off after melting is complete.

Sintering products may also be added to the furnace. Sintering is a process in which solid wastes are combined into a porous mass that can then be added to the blast furnace. These wastes include iron ore fines, pollution control dust, coke breeze, water treatment plant sludge, and flux. Sintering plants help reduce solid waste by combusting waste products and capturing trace iron present in the mixture. Sintering plants are not used at all steel production facilities.

#### *Steelmaking with the Basic Oxide Furnace (BOF)*

Molten iron from the blast furnace is sent to a basic oxide furnace, which is used for the final refinement of the iron into steel. High purity oxygen is blown into the furnace and combusts carbon and silicon in the molten iron. The basic oxide furnace is fed with fluxes to remove any final impurities. Alloy materials may be added to enhance the characteristics of the steel.

The resulting steel is most often cast into slabs, beams or billets. Further shaping of the metal may be done at steel foundries, which re-melt the steel and pour it into molds, or at rolling facilities, depending on the desired final shape.

(From "*Recent Developments in Ironmaking and Steelmaking*" by Chatterjee, A.)



1. Write 7 – 10 questions to the text that test its general understanding.

2. Find the English equivalents for the words and word-combinations in the text:

Джерело тепла; джерело палива; розплавлювати; зовнішній підвід тепла; вуглецеве паливо; жирне вугілля; ізолювати; переробка матеріалу порціями; одночасно; гасильна вежа; зрошування водою; чавуноплавильна піч; сховище; вапняк; лужні домішки; підніматися на поверхню; знімати верхній шар; агломераційна фабрика; кисневий конвертер; очищення; лігатура; виливниця.

3. Match the words (I) with the opposite meaning (II):

I. Integrated; heated; float; melt; purchase; solid; frequently; finally; added; remove; cause; basic; reduce; top.

II. Bottom; add; solidify; result in; rarely; liquid; distract; increase; initially; sell; separate; advanced; sink; cooled.

4. Read and translate the following chemical terms. Explain the difference in meaning:

Silica – silicon, magnesia – magnesium, alumina – aluminum; chromia – chromium.

5. Match types of steel with the proper chemical content and products:

|                 |   |  |
|-----------------|---|--|
| Mild steel      | has about 1.5% carbon, it also contains the largest amounts of added elements | is mainly used in bridges, ships, water pipes, automobile bodies             |
| Medium steel    | has about 0.25% carbon  | is mainly used in beams and girders for skyscrapers, gears, motors and pumps |
| Tool steel      | has about 0.5% carbon   | is mainly used in eating utensils and exterior walls of buildings            |
| Stainless steel | has 0.15% carbon content + about 18% chromium + 8-10% nickel                  | is mainly used for cutting and drilling machine tools                        |



### TEXT 3

#### The types of metal forming

A lot of metal working processes have been developed for certain applications. They can be divided into five broad groups: rolling; extrusion; drawing; forging; sheet-metal forming.

One of the most widely used bulk metal forming processes, where metal is deformed plastically by flowing between two rollers, rotating in opposite directions is called *rolling*. Plastic deformation reduces the initial thickness of the workpiece to a predefined final thickness, and the gap between the two rotating rolls, which is less than the initial thickness, determines the final thickness. During rolling, velocity of the workpiece increases as material flow rate remains same all throughout the deformation. The main manufactured products include bloom, billet, slab, plate, strip, sheet, etc.

Cross wedge rolling, or briefly *cross rolling*, is a forming operation using wedge-shaped tools. Billets with a circular cross-section are placed between the two tool halves which are working in opposite directions. The tools contain the negative contour of the final workpiece shape. The radial penetration of the wedges into the billet is followed by the redistribution of the material in the axial direction. This causes a reduction of the initial diameter. Alloys especially suitable for cross rolling include materials with high ductility and high necking capacity. The main manufactured products include intermediate shapes with accurately defined mass distribution. They can be made for final machining, or they can be left without further processing. The cross rolling process ensures high surface quality, constant processing allowances and low tolerances

*Helical rolling* is a remarkably effective technique for producing axisymmetric parts such as ball studs. In this process, balls are formed by two rolls positioned askew relative to the axis of the billet (cylindrical rod). The roll faces have helically wound flanges, which periodically cut into the workpiece, confining in the roll pass a material volume that is equal to the volume of the ball being formed. A correct position of the billet between the rolls is maintained by guides that close the roll pass on the two other sides [12].

The process in which metals are formed and shaped using compressive forces is called *metal forging*. It is one of the oldest and most significant metallurgical processes. There distinguish the open die and the closed die forging.

In open die forging, heated metal parts are shaped between a top die attached to a ram and a bottom die attached to a bolster, anvil, or hammer. With open die forging the

metal is never completely confined or restrained in the dies. This process is used to produce larger, simpler-shaped parts such as bars, rings, and hollows.

Closed die forging is a process in which dies (called tooling) that contain a pre-cut profile of the desired part move towards each other and cover the workpiece in whole or in part. The heated raw material, which is approximately the shape or size of the final forged part, is placed in the bottom die. Commonly referred to as closed-die forging, impression-die forging of steel, aluminum, titanium and other alloys can produce a variety of 3-D shapes that range in weight from mere ounces up to more than 25 tons. Because metal flow is restricted by the die contours, this process can yield more complex shapes and closer tolerances than open-die forging processes. Additional flexibility in forming both symmetrical and non-symmetrical shapes comes from various pre-forming operations (sometimes bending) prior to forging in finisher dies.

A manufacturing process that forms metal work stock by reducing its cross-section is called *drawing*. Drawbenches and drawing machines reduce the size of sheet metal, bars, wire, and tubes by pulling and stretching the metal through a mold, die or smaller cross sectional area. Dies must be very hard so they tend to be made from steel or chilled cast iron. However, tungsten carbide and even diamond are increasingly used because of their greater ability to retain shape. A complete drawing apparatus may include up to twelve dies in a series sequence. The process is typically performed cold, which is done to ensure accurate tolerances, better grain structure and surface finish, as well as improved material properties. Ductile or malleable materials, such as steel, stainless steel, copper, and nickel are usually formed

A process that involves pushing material through a die or mould in order to create a shape or cross-sectional profile is called *extrusion*. A bar or metal is forced from an enclosed cavity via a die orifice by a compressive force applied by a ram. Since there are no tensile forces (like in drawing), high deformations are possible without the risk of fracture of the extruded material. The extruded articles of both simple and complex shapes are very versatile and have the desired, reduced cross-sectional area, with a good surface finish so that further machining is not needed. This process can be used with both metals and plastics to create parts with an even wall thickness or profile. Extrusion products include rods and tubes with varying degrees of complexity in cross section, aluminum cans, collapsible tubes and gear blanks.

An incredibly versatile and efficient manufacturing process used to convert flat metal sheets or coils into precisely shaped and intricate parts is called *metal stamping*.

This process offers low costs and higher lead times both for short and long production runs while keeping consistent quality, dimensional accuracy, and repeatability of the manufactured parts. Stamping can include a number of metal forming techniques, such as punching, using a machine press or stamping press, blanking (cutting out the desired shape), embossing, bending (creating angles or curves), flanging, coining (adding fine details) and punching (making holes or cutouts), to name a few [2]. This could be a single stage operation where every stroke of the press produces the desired form on the sheet metal part, or could occur through a series of stages. The process is usually carried out on sheet metal, but can also be used on other materials, such as polystyrene. The stamped products include body panels, brackets, chassis parts, engine mounts, suspension components, aircraft structural parts, fittings, connectors, terminals, heat sinks, shielding components, panels, enclosures, handles, surgical instruments, orthopedic implants, fasteners, hinges, and cladding panels to name a few [12].



1. Write 7 – 10 questions to the text that test its general understanding
2. Find the English equivalents for the words and word-combinations given below:

Процес обробки металів тиском; поперечне вальцювання; поперечно-гвинтове вальцювання; робоча поверхня валка; калібр; заготовка; швидкість; швидкість потоку; круглий поперечний переріз; в напрямку осі; сплави, що легко деформуються; зменшення площини поперечного перерізу; чистова обробка; точний розподіл маси; подальша обробка; висока якість поверхневого шару; припуски; точні допуски; симетричні деталі; валки розташовані під кутом, відносно до осі заготовки; напрямна; деформуючі навантаження; вільне кування; кування в штампах; верхня половина штампа, прикріплена до баби молота (поршня, штока); нижня половина штампа, прикріплена до шабота (ковадла, станини) молота; гнуття; волочіння; волока (волочильна дошка); зберігати форму; структура зерна; продавлювання матеріалу крізь матрицю; порожнина; рівномірність товщини стінки виробу; формування під тиском; незмінна якість; точність розмірів; штампування; пресування; карбування; гнуття листового металу; карбування монет; прошивання; секції корпусу; кріпильні деталі; деталі шасі; шарові опори; підвіска автомобіля; деталі для авіа будівництва; фітинги; муфти; клема (затискач); охолоджуюча плита; захисні деталі; листи обшивки; кожухи; руків'я; хірургічні інструменти; ортопедичні імплантати; зажим; завіси (петлі); наплавлення.

3. Match pictures with the following products: a) billet; b) structural steel shapes; c) ball studs; d) complex shapes; e) non-symmetrical shapes; f) collapsible tube; g) gear blanks; h) coils



4 Complete each sentence with the words in the box. Change the form of it if necessary. Some words can be used more than once. Translate the sentences.

|         |          |          |         |            |           |        |         |
|---------|----------|----------|---------|------------|-----------|--------|---------|
| Alloy   | aluminum | beam     | belt    | cantilever | component | copper | ductile |
| elastic | flexible | parallel | plastic | stiff      | rubber    | sheet  | steel   |

1. An \_\_\_\_\_ is a mixture of metals AlZnMgCu is used in airplane wings.
2. The tracks of a railway line must be \_\_\_\_\_.
3. A hammer has only two \_\_\_\_\_: the handle and the head.
4. The parking places are shaded by a \_\_\_\_\_ roof.
5. Water pipe are often made of \_\_\_\_\_ because the metal does not oxidize in contact with water.
6. The roof is supported by several steel \_\_\_\_\_.
7. Some modern guns are made from strong \_\_\_\_\_ which means they do not show up on airport X-ray machines.
8. A spring needs to be made from a \_\_\_\_\_ and \_\_\_\_\_ material.
9. Steel is strong and \_\_\_\_\_, but corrodes easily through rusting.
10. Knowledge of tensile stress, \_\_\_\_\_ limits, and the resistance of materials to creep and fatigue are of basic importance in engineering.
11. To make the roof of an automobile from a flat \_\_\_\_\_, the edges are gripped and the pieces pulled in tension over a lower die.
12. A \_\_\_\_\_ is a \_\_\_\_\_ supported at one end and carrying a load at the other end or supported along the unsupported portion.
13. A conveyor \_\_\_\_\_ is adapted to carry a load between two points.

## TEXT 4

### Hot metal forming

Hot forming process is used very frequently for casting of industrial products and parts. A crude estimate for a hot working temperature  $T$  for a particular metal or alloy is that it must be greater than  $0.6T_m$  (where  $T_m$  is the melting point in degrees Kelvin). In this process, heat is applied to soften the piece of metal. Then some form of pressure is used to alter the shape of the metal. The lower bound for the hot working temperature varies for different metals, depending on factors such as purity and solute content. Thus, a highly pure metal will undergo recovery and recrystallization at a particular hot working temperature more readily than an alloyed metal. During hot working the porous cast structure, often with a low mechanical strength, is converted to a wrought structure with finer grains, enhanced ductility and reduced porosity. The hot forming process can form a variety of complex parts and hold relatively tight tolerances [13, 8].

Parts produced by hot forming are characterized by high strength, complex shapes and reduced springback effects [7].

Hot forming processes include *hot rolling*, *hot forging* and *hot extrusion*.

- Hot rolling involves passing heated slabs of metal through rollers to reduce the size of the bar or slab. This process is performed at a hot rolling mill to create a longer thinner product and is utilized on products that do not normally require exact tolerances.
- Hot forging is the process of deforming metal at high temperatures with any press or hammer. It is used to manufacture small and precise parts as well as a variety of long product shapes.
- Hot extrusion is the process of pushing a hot steel blank or workpiece through a die of a desired cross-section, that will reduce the cross section of the extruded piece. The extruded piece will have the same cross-section or shape throughout the whole piece and will contain an elongated grain structure [8].



1. Write 7 – 10 questions to the text that test its general understanding

2. Find the English equivalents for the words and word-combinations given below:

Промислові товари і деталі; приблизні підрахунки; змінювати; нижня межа; склад розчину; відновлення металу; жорсткі допуски; залежати від; покращена ковкість; складні форми; вимагати; проходити відновлення; точні деталі; дрібна фракція зерна; валок; використовувати, застосовуватись; сталева заготовка.

3. Match the terms with their definitions:

|                   |   |
|-------------------|---|
| Springback effect | a) occurs when the material tries to return to its original shape |
| Grain             | b) a finished shape is produced in molds where it solidifies      |
| Wrought structure | c) irregular crystals in the crystalline structure of a metal     |
| Cast structure    | d) a finished shape has been heated and worked with tools         |
| Cross-section     | e) a measure of the void spaces in the material                   |
| Porosity          | f) a straight cut through something                               |

4. Match the products with processes:

|               |   |
|---------------|---|
| hot rolling   | aircraft engines; joints; pipeline fittings; valves; flanges                          |
| hot forging   | hollow sections; products with several hollow cavities; electrical wires; tubes; bars |
| hot extrusion | angles; beams; channels; plates; pressure vessels; racking                            |

5. Complete each sentence with the words in the box. Change the form of it if necessary. Some words can be used more than once. Translate the sentences.

|             |                   |       |           |       |         |
|-------------|-------------------|-------|-----------|-------|---------|
| Reduces     | forging technique | waste | yield     | force | surface |
| distinguish | tensile strength  | below | annealing |       |         |

Except hot metal forming there (1) \_\_\_\_\_ warm and cold metal forming. Cold forming is a (2) \_\_\_\_\_ used to shape metal materials at near room temperature. If the rolling is finished cold, the (3) \_\_\_\_\_ will be smoother and the product stronger. Cold forming (4) \_\_\_\_\_ the amount of time and materials needed to produce high-quality metal parts. When compared to high-heat formation methods, cold formed products are harder, produce greater (5) \_\_\_\_\_, feature higher (6) \_\_\_\_\_. This process maximizes material usage and significantly reduces production (7) \_\_\_\_\_.

Warm working is carried out above the temperature range of cold working, but (8) \_\_\_\_\_ the recrystallization temperature of the metal. This process reduces the (9) \_\_\_\_\_ required to perform the operation as well as the amount of (10) \_\_\_\_\_ of the material. The unique combination of high pressure and relatively low temperature provides a cost efficient forming process for alloys like titanium and magnesium.

## TEXT 5

### Types of rolling mills

At its most basic principle, a rolling mill is a machine that reduces the thickness of a metal without sacrificing any of the material – meaning material is always displaced and never lost. By design and function, rolling mills do not generate scrap. Roll stands, holding pairs of rolls, are grouped together into rolling mills that can quickly process metal, typically steel, into products such as structural steel (I-beams, angle stock, channel stock, and so on), bar stock, and rails. Rolling mills can be designed with specialty tooling to impart patterns on the material – this is known as an embossed mill. Additionally, grooved mills can be used to reduce round and bar stock by reducing the overall area of the material but maintaining the shape. There are many different types of rolling mills that can be used for various rolling applications:

- Breakdown rolling of either straight lengths or coil to coil
- Finish rolling of tight tolerance thin gauge stock – commonly a 4-high mill or cluster mill
- Powder metallurgy rolling utilizing a horizontal mill – designed for plastics and battery industries
- Bonding of dissimilar metals
- Camber correction of BI-metal strips after Electron-beam welding
- Grooved rolls for rod rolling – square or circular sections
- Embossed rolls can be used for pattern rolling
- Laboratory rolling mills can be used for research and development [2]

Metal processing machinery includes:

*Two high rolling mill* consists of two rolls rotating in opposite directions. They typically have larger diameter work rolls that are positioned with actuators. This type of mill can be either reversing or non-reversing. In non-reversing mill rolls rotate only in one direction, and the slab always moves from entry to exit side. In reversing mill direction of roll rotation is reversed, after each pass, so that the slab can be passed through in both directions. This permits a continuous reduction to be made through the same pairs of rolls.

Rolling mill consisting of three rolls is known as *three high rolling mill*. It is typically used for performing multiple reduction passes by wrapping material around the center mill roll and performing another reduction on the opposite mill roll pair. Such mills can also be used with varying mill roll sizes to induce the specific percentage of reduction

of material on a single side of a work piece. This can be beneficial for clad materials or for conditioning a single side of strip.

*Four-high rolling mills* can be put in tandem with two or more close-coupled stands where the reduction is achieved by the inter-stand tension(s) and the compressive force between the work rolls. Two work rolls can be large in diameter which allows large spindles or universals or flex couplings to transfer substantial torque into the work roll. They can also be equipped with dual motor drives so that one work roll can be ground a little different in diameter than the opposing work roll. This type of mill is very common for steel, aluminum, copper and any high production rolling.

*Cluster rolling mill* is a special type of four-high rolling mill in which each of the two working rolls is backed up by two or more of the larger backup rolls which are able to roll hard materials. Hard materials including stainless steels, titanium alloys and nickel alloys may be rolled in these mills.

With a *continuous rolling mill* the same amount of material passes through each stand in a given period of time using a series of rolling mills. If the cross section is reduced, the speed must be increased proportionally. The speed of each set of rolls is synchronized so that the input speed of each stand is equal to the output speed of the preceding stand. The uni-coiler and wind up reel not only feed the stock into the roll but also provide back tension from front tension to the strip.

*Planetary rolling mill* consists of a pair of heavy backing rolls surrounded by a large number of small planetary rolls. The main feature of this mill is that it hot-reduces a slab to coiled strip in a single pass. The operation requires feed rolls to introduce the slab into the mill and a pair of planishing rolls on the exit to improve the surface finish [6].



1. Find the English equivalents for the word-combinations given below:

Прокатний стан; кліть прокатного стану; конструкційна сталь; двотавр; кутник; швелер; штаба; рейки; фреза; обжим (чорнова прокатка); рулон смугового металу; чистова прокатка; листовий метал з малими допусками; груповий стан; біметалева пластина; електронно-променево зварювання; виправлення вигинів; калібровані валки; прокат прутів; робочий валок; привід; реверсивний стан; матеріали для здійснення наплавлення; розтяг (фізична сила); сила стиснення; шпindel (з'єднуючий вал); пружна муфта; обертальний момент; моторний привід; груповий прокатний стан; опорні валки; безперервний прокатний стан кліть; розмотувач; намотувач; планетарний прокатний стан; рулонна смуга.



## TEXT 6

### The Science of Economics

Economics is the social science that studies the production, distribution, and consumption of goods and services. The term *economics* comes from the Greek and means “rules of the household”. A definition that captures much of modern economics is that of Lionel Robbins in a 1932 essay: “the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.” Scarcity means that available resources are insufficient to satisfy all wants and needs. If there is absence of scarcity and alternative uses of available resources, there is no economic problem. Thus the defined subject involves the study of choices as they are affected by incentives and resources.

Areas of economics may be divided or classified into various types, including:

- microeconomics and macroeconomics;
- positive economics ("what is") and normative economics ("what ought to be");
- mainstream economics and heterodox economics;
- fields and broader categories within economics. E.g., international economics, development and growth economics, financial economics, managerial economics, agricultural economics, environmental economics, etc.

One of the uses of economics is to explain how economies, as economic systems, work and what the relations are between economic players (agents) in the larger society. Methods of economic analysis have been increasingly applied to fields that involve people making choices in a social context, such as crime, education, the family, health, law, politics, religion, social institutions, and war.

Although discussions about production and distribution have a long history, economics in its modern sense as a separate discipline is conventionally dated from the publication of Adam Smith's *The Wealth of Nations* in 1776. In this work, he describes the subject in these practical and exacting terms: “Political economy, considered as a branch of the science of a statesman or legislator, proposes two distinct objects: first, to supply a plentiful revenue or product for the people, or, more properly, to enable them to provide such a revenue or subsistence for themselves; and secondly, to supply the state or commonwealth with a revenue sufficient for the public services. It proposes to enrich both the people and the sovereign.”

Smith referred to the subject as *political economy*, but that term has been replaced in general usage to *classical economics*.

Smith notably discusses the benefits of the division of labor as well as the subject of resource allocation. Just how individuals can best apply their own labor or any other resource is a central subject in the first book of the series. Smith claimed that an individual would invest a resource, for example, land or labor, so as to earn the highest possible return on it. Consequently, all uses of the resource must yield an equal rate of return (adjusted for the relative riskiness of each enterprise). Otherwise reallocation would result. This idea, wrote George Stigler, is the central proposition of economic theory. French economist Turgot had made the same point in 1766.



1. Write questions to the following answers:

.....  
*“Rules of the household”.*

.....  
*In 1776.*

.....  
*To fields that involve people making choices in a social context.*

.....  
*Adam Smith.*

.....  
*The relation between economic players (agents) in the larger society.*

2. Match the English words and word-combinations with their definitions:

|    |         |  |
|----|---------|--|
| 1  | Loan    | a) Extra money that you are paid                                 |
| 3  | Income  | b) Money you get from working or from investing money            |
| 4  | Profit  | c) An amount of money that you borrow                            |
| 5  | Bonus   | d) Money you make from selling something                         |
| 6  | Tax     | e) Pre-payment   |
| 7  | Fee     | f) Money you pay to a professional or institution for their work |
| 8  | Fare    | g) Money you have to pay to the government                       |
| 9  | Bill    | h) Money you pay for a journey                                   |
| 10 | Deposit | i) Money you owe someone for goods or services you received      |
| 11 | Revenue | j) Profit on money that you have invested                        |
| 12 | Return  | k) Income from business activities or taxes                      |

## TEXT 7

### The Theory of Supply and Demand

The theory of demand and supply is an organizing principle to explain prices and quantities of goods sold and changes thereof in a market economy. In microeconomic theory, it refers to price and output determination in a perfectly competitive market. This has served as a building block for modeling other market structures and for other theoretical approaches.

For a given market of a commodity, *demand* shows the quantity that all prospective buyers would be prepared to purchase at each unit price of the good. Demand theory describes individual consumers as "rationally" choosing the most preferred quantity of each good, given income, prices, tastes, etc. A term for this is constrained utility maximization (with income as the "constraint" on demand). Here, *utility* refers to the (hypothesized) preference relation for individual consumers. Utility and income are then used to model hypothesized properties about the effect of a price change on the quantity demanded. The law of demand states that, in general, price and quantity demanded in a given market are inversely related. In other words, the higher the price of a product, the less of it people would be able and willing to buy it (other things unchanged). As the price of a commodity rises, overall purchasing power decreases (the *income effect*) and consumers move toward relatively less expensive goods (the *substitution effect*). Other factors can also affect demand; for example, an increase in income will shift the demand curve outward relative to the origin.

*Supply* is the relation between the price of a good and the quantity available for sale from suppliers (such as producers) at that price. Producers are hypothesized to be profit-maximizers, meaning that they attempt to produce the amount of goods that will bring them the highest profit. That is, the higher the price at which the good can be sold, the more of it producers will supply. The higher price makes it profitable to increase production. At a price below equilibrium, there is a shortage of quantity supplied compared to quantity demanded. This pulls the price up. At a price above equilibrium, there is a surplus of quantity supplied compared to quantity demanded. This pushes the price down. The model of supply and demand predicts that for a given supply and demand curve, price and quantity will stabilize at the price that makes quantity supplied equal to quantity demanded. This is market equilibrium.

Demand and supply can also be used to model the distribution of income to the factors of production, including labour and capital, through *factor markets*. In a labour

market for example, the quantity of labour employed and the price of labour (the wage rate) are modeled as set by the demand for labour (from business firms etc. for production) and supply of labour (from workers).

Demand and supply are used to explain the behavior of perfectly competitive markets, but their usefulness as a standard of performance extends to any type of market. Demand and supply can also be generalized to explain macroeconomic variables in a market economy, for example, quantity of total output and the general price level.



1. Write 7 – 10 questions to the text that test its general understanding.

2. Find the English equivalents for the words and word-combinations given below. Use them in the sentences of your own:

Відносно, загальне виробництво, зміна ціни, кількість, конкурентоспроможний ринок, корисність, макроекономічні змінні, попит (на), постачальник, працевлаштування, прибуток, ринкова економіка, рівень заробітної платні, рівень цін, споживач, теоретичні підходи, товар, товари-замісники, якість, при інших рівних умовах, ринкова рівновага, пропозиція, купувати, чому віддають перевагу.

3. Explain the difference between the words and word-combinations:

Utility/usefulness; supply/demand; quality/quantity; income/capital/profit; theory/law; model/structure; supplier/producer; wage/salary; to purchase/to sell.

4. Match whether these statements are true (T) or false (F). Explain your answer.

A. When people give money for particular goods, they indicate that a demand exists.

B. Money is usually valuable in itself.

C. People do not usually have everything they want.

D. Basic needs come before luxuries.

E. Our decisions on how to use our money show what we need most and what we are willing to do without.

F. Demand for essential commodities is always elastic.

5. Find the words with the opposite meaning in the text:

Constant, pull, misbalance, excess, straight line, cheap, increase, fall, collective, seller, input, purchase; glut in the market, accumulation,

## TEXT 8

### Interpipe Group

Interpipe is a Dnipro-based company that is among the world's top ten producers of seamless pipes and is the third largest producer of solid rolled railway wheels. For last six to eight years its total investments in new steel production, modernization of pipe and railway wheel facilities exceeded \$1 billion. To be successful in the international markets our company had to bridge multiple gaps – the technology gap, the quality management gap and the perception gap. Nowadays we supply products up to 80 countries of the world, in all main markets of steel consumption, except for Japan and China.

Interpipe has already entered certain premium niches in the global pipe market, such as high-level gas-tightness connections for the oil and gas industry in the Middle East and the US. In addition, we develop and supply new steel pipes for customers in mechanical engineering and construction in Europe. We are intensifying cooperation with European, Turkish, and Indian railway companies. These markets are more competitive and have lower capacity, but Interpipe is able to work in premium niches, such as wheels for high-speed passenger trains. Our diversification has mitigated risks and made us resilient. This diversification is not only geographical but also industrial. We are in the railway industry producing wheels, axles and wheelsets. We are in the energy industry with our pipes. We are also in the construction industry. Every third building in Dubai has our pipes inside of them. The airport, the metro, they're all built using our pipes.

We have a positive dynamic. In the second half of 2018 we reached our target capacity utilization of 500,000 tons of steel, in 2019 our output was one million tons throughout the year. We want to stay at this level even though plant capacity is slightly bigger. However, there are a lot of challenges. Every country and every block is trying to limit access to its markets. Ten years ago everyone was talking about globalization, and now we see a bit of withdrawal. The steel industry, like the oil industry, is global. The majority of iron ore is located in just a few regions in the world – Ukraine, Australia, Brazil. It is better to produce steel where iron ore is located because you don't want to move a lot of low value-added product around the world – it's too costly, inefficient and bad for the environment. There is oil in Saudi Arabia and in Texas, and people buy it from the big suppliers. The situation in the steel industry is different. You rarely hear of someone introducing quotas or duties on oil imports, but it's always the case with steel.

After the war, a certain issue will arise very acutely. It is a fundamental modernization of production facilities. Without this, the future of Ukrainian steel industry

seems to be problematic. Europe won't make exceptions for our products if we do not modernize facilities in accordance with modern environmental requirements.

(From Interpipe official website)



1. Write questions to the following answers:

.....  
*Up to 80 countries of the world*

.....  
*Seamless pipes, railway wheels and gas-tightness connections*

.....  
*We are able to work in premium niches*

.....  
*Japan and China*

.....  
*If we do not modernize facilities*

2. Fill in the gaps in the following sentences with the words from the text:

- a) Zirconium dioxide is also used as the \_\_\_\_\_ electrolyte in electrochromic devices.
- b) Central planners allocated approximately one-third of the national output into capital \_\_\_\_\_.
- c) The total hardness of water should not \_\_\_\_\_ seven milligrams per liter.
- d) I want to help you \_\_\_\_\_ the gap between creativity and business.
- e) In this description there is a large \_\_\_\_\_.
- f) He has his own \_\_\_\_\_ in the literary world and personal style.
- g) Our benefits are \_\_\_\_\_ salary rates, continuous job, bonus, different training programs for Company employees.
- h) But this multipolar \_\_\_\_\_ also generates instability.
- i) Some units provide strict time limits to respond to a \_\_\_\_\_.
- j) The plan should take into account your specific company and its \_\_\_\_\_.

3. Make a list of questions you would like to ask the President of Interpipe Group.

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