

**Міністерство освіти і науки України**  
**Харківський державний політехнічний коледж**

**Іноземна мова (за професійним спрямуванням)**

**Методичний посібник  
для самостійної роботи студентів**

**зі спеціальності 5.273 «Залізний транспорт»**

**спеціалізації 5.273.1 «Монтаж, обслуговування та ремонт  
автоматизованих систем керування рухом на залізничному транспорті»**

**2019 р.**

Методичний посібник для самостійної роботи студентів з дисципліни “Іноземна мова (за професійним спрямуванням)” спеціальності 5.273 «Залізний транспорт», спеціалізації 5.273.1 «Монтаж, обслуговування та ремонт автоматизованих систем керування рухом на залізничному транспорті».

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Методичний посібник розглянутий та рекомендований цикловою комісією гуманітарних та соціально-економічних дисциплін

Протокол № \_\_\_\_\_ від “\_\_\_\_” \_\_\_\_\_ 20\_\_\_\_р.

Голова циклової комісії \_\_\_\_\_ (Діброва Л. М.)

Схвалено методичною радою Харківського державного політехнічного коледжу

Протокол № \_\_\_\_\_ від “\_\_\_\_” \_\_\_\_\_ 20\_\_\_\_р.

Голова методичної ради \_\_\_\_\_ (Величко В. О.)

В методичному посібнику запропоновані матеріали для самостійного вивчення курсу іноземної мови за професійним спрямуванням спеціальності 5.273 «Залізний транспорт». Збірка матеріалів містить в собі англomовні тексти за фахом, розроблені для них завдання, підбір лексики з даної теми, що дозволяють студентам всебічно оволодіти основами усного та писемного мовлення та розвинути навички читання.

Запропоновані методичні рекомендації призначено для студентів третього курсу за спеціальністю 5.273.1 «Монтаж, обслуговування та ремонт автоматизованих систем керування рухом на залізничному транспорті».

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**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

*Read the catalog. Then choose the correct answers.*

#### Railroad Couplers.

*Product catalog.*

**Buckeye Couplers** - Our buckeye couplers use high quality *knuckles*. This system lets you *couple* your cars safely and reliably.

**Bar Couplers** - These bar couplers are preferable for semi-permanent coupling. Uncoupling of this system must take place in a yard or shop.

**3-link Coupling** - Our 3-link coupling system is a chain and hook coupling system. It can be easily joined or unhooked.

**Fully Automatic Coupling Systems** - We've come a long way from the *link and pin* coupling of old. Automatic systems *connect* cars from the safety of the cab. Remember, such systems are now required on all freight cars.

- 1 What is the catalog describing?
  - A. types of coupling systems for sale
  - B. a comparison of coupling manufacturers
  - C. recommendation of coupling manufactures
  - D. safety rating for coupling systems
- 2 Which of the following is NOT a type of coupling for sale?
  - A. 3-link coupling
  - B. buckeye couplers
  - C. link and pin
- 3 What is true of automatic coupling systems?
  - A. Uncoupling them must occur in a yard
  - B. They include a chain and hook system.
  - C. They were replaced by link and pin coupling.
  - D. They must be used on freight cars.



## ***Vocabulary***

*1 Fill in the blanks with the correct words or phrases from the word bank*

|                      |                        |                        |                           |                               |
|----------------------|------------------------|------------------------|---------------------------|-------------------------------|
| <b><i>couple</i></b> | <b><i>knuckles</i></b> | <b><i>couplers</i></b> | <b><i>bar coupler</i></b> | <b><i>3-link coupling</i></b> |
|----------------------|------------------------|------------------------|---------------------------|-------------------------------|

1. Rail cars are joined together with\_\_\_\_\_
2. \_\_\_\_\_ is joined using chains and hooks.
3. The yard master asked the worker to \_\_\_\_\_ the incoming freight cars.
4. A buckeye couple relies on \_\_\_\_\_ to latch cars together.
5. Because the cars were joined by a \_\_\_\_\_ the ycould not be unlatched easily.

*2 Read the sentences and choose the correct words or phrases.*

1. Workers had to ***buckeye couple / connect*** the cars to the locomotive before the train could leave the yard.
2. Steve was able to couple the cars from the cab using the ***fully automatic coupler / link and pin***.

## ***Writing***

*1 Answer the questions.*

1. How are train cars latched together?
2. What are some types of coupling?

*2 Use the catalog to complete the note about ordering railroad couplers.*

The train we are building in the yard is going to need new couplers. We would like to order 3-link  because it is easy to operate. This type of coupler may be too expensive, though. In that case we can order  coupling. These couplers will let us latch and unlatch cars  and reliably. We cannot use fully  coupling because that system is over our budget.

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

*Read the inspection report. Then, choose the correct answers.*

#### Hayes Inspection

Report: #1093

Inspector: Wheeler

Section: 32987

The track in area 32987 was inspected and is safe for operation. The **grade** and **camber** of this area is intact. The **embankment** on which the track rests is in good condition. The **ballast** and **sub-ballast** on the **formation** are in acceptable condition. However, additional ballast will be needed soon. The **sub-structure** is adequate to **support** normal rail travel. There is one pressing issue. Some of the **drains** were clogged with debris. These must be cleared immediately. Additional inspections are required if rail companies wish to **lay** any new track in this area.

- 1 What is the purpose of this report?  
A/ to give instructions for rail workers  
B/ to explain why a section of rail must be closed  
C/ to assess how successful several repairs were  
D/ to inform about the safety of an area of track
- 2 Which of the following is NOT in good condition?  
A/ the drains                      B/ the grade  
C/ the camber                      D/ the ballast
- 3 Why would additional inspections be required?  
A/ if the camber of the substructure is changed  
B/ if the drains are cleared  
C/ if the embankment is levelled  
D/ if companies wish to install new track



## Vocabulary

1 Write a word that is similar in meaning to the underlined part.

1. The curve of the substructure allows water to run off of it.  
c \_ \_ b \_ \_
2. The area designated for the collection and removal of water runs alongside the train tracks.  
\_ r \_ i \_
3. The level of an area of land must be even to support a train's weight properly.  
\_ \_ a \_ e
4. The system of support beneath train tracks is comprised of three primary parts.  
\_ \_ b \_ \_ r \_ \_ t \_ \_ \_

2 Read the sentence pairs. Choose which word best fits each blank.

### 1. ballast / sub-ballast

- A. The \_\_\_\_\_ is the first layer of support in a substructure.
- B. The \_\_\_\_\_ is usually made of granite or basalt.

### 2. support / lay

- A. Rail companies \_\_\_\_\_ new track to create new routes.
- B. A substructure is required to \_\_\_\_\_ the weight of a train.

### 3. formation / embankment

- A. A track that runs above ground level can be built on a(n) \_\_\_\_\_.
- B. The \_\_\_\_\_ lies beneath the sub-ballast.

## Writing

1 Answer the questions.

1. What are the parts of a railroad sub-structure?
2. How is land leveled for a railroad sub-structure?

2 Use the inspection report to complete the track inspection form.

| Track Inspection Form   |   |
|---|---|
| The   | <input type="text"/> and sub-structure are in decent condition. |
| I recommend that the  | <input type="text"/> be reinforced and the                      |
| <input type="text"/>  | <input type="text"/> be replaced to maintain safe rail travel.  |
| At this time it is not safe for trains to operate on this section of track. |   |



**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the newspaper article. Then, choose the correct answers.

#### Renovation Planned for Danton station

by Miranda Reyes

The old Danton Station is getting a new look. Yesterday, the Transportation Department approved major renovation plans. Danton Station is currently the **terminus** of the Silver **Line**. After construction, it will also be a **depot** for the Red Line. Inside, **escalators** will replace several **stairwells**. Construction will take twelve weeks. Operations at Danton will cease temporarily in May. After that, all trains will **halt** at Hayes Station instead. But riders can still reach other **stops** from there. The Silver Line currently **intersects** all other lines at Hayes Station. Danton Station's bus line **connections** also serve Hayes Station.

1 What is the main idea of the article?

- ☐ A a plan for renovating a station    ☐ B information about navigating a station    ☐ C destinations available from a particular station    ☐ D a design for a new type of station

2 Which of the following is NOT an event described in the article?

- ☐ A adding a depot for the Red Line    ☐ B increasing the number of lines going through Danton Station    ☐ C adding new platforms to Hayes Station    ☐ D replacing stairwells with escalators

3 What is true of Hayes Station?

- ☐ A It will become the Red Line depot.    ☐ B It will no longer be a Silver Line stop.    ☐ C It has the same bus line connections as Danton Station.    ☐ D It is having escalators installed to replace stairwells.

### Vocabulary

Match the words (1-6) with the definitions (A-F).

- 1\_ connection  
2\_ escalator  
3\_ intersect  
4\_ stairwell  
5\_ station  
6\_ terminus



- A/ a building or platform where trains stop for passengers  
B/ a situation in which a passenger exits one train and boards another train  
C/ the final stop on a train line



D/ to pass through the same area as something else

E/ a moving staircase that transports people from one level to another

F/ an area where people can walk from one level to another

*Read the sentences and choose the correct words.*

1. Passengers can board or exit a train at a **stop** / **stairwell**.

2. A **depot** / **line** is a designated route that a train will take.

3. When the train **halts** / **intersects**, passengers can exit.

4 The rail line sells tickets at the **escalator** / **depot**.



### **Writing**

*1 Answer the questions.*

1. What are different parts of a rail line?

2. What are different areas of a train station?

*2 Use the newspaper article to complete the station directions.*

Use these directions to find your .

Check your ticket to find your train  and

number. Tracks 1-5 are located down the

. If this is the terminus of your train, you can exit the

depot by heading up the stairs to the exit.

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the webpage. Then, choose the correct answers.

#### Station Solutions

#### Previously Completed Work

Station Solutions has designed **platforms** for various major rail projects.

*North Avenue Station construction* - Trains enter a **tunnel** to access this station. It features **side platforms** with platform screen doors.

*Green Street Crossing renovation* - This above-ground station features **island platforms**. We raised the **height** of the original platforms. This reduced the **gap** between the platforms and train doors. We also installed the hardware for the **level crossing** at Green Street.

*Kostner Street Stop renovation* - We built **through platforms** and **bay platforms** for the recent remodeling.

Contact us for rates on new construction or remodeling.

1 What is the main idea of the webpage?

- ☐ A the safest types of train platforms    ☐ B materials needed to build a train platform    ☐ C train platforms that a company has completed    ☐ D common problems with different train platforms

2 Which of the following is NOT a feature of Green Street Crossing?

- ☐ A island platforms    ☐ B access to the station through a tunnel    ☐ C increased platform height    ☐ D reduced gap between platform and doors

3 According to the webpage, what feature does North Avenue Station have?

- A/ platform screen doors    B/ island platforms  
C/ level crossing    D/ bay platforms



## Vocabulary

Write a word or phrase that is similar in meaning to the underlined part.

1. The doors that protect passengers from moving trains opened just after the train pulled into the station.

\_ \_ \_ t \_ r m      s \_ \_ e \_ \_      \_ o \_ \_ s

2. A platform with a dead end allows passengers to board and exit a train.

b \_ \_      \_ \_ \_ \_ f \_ \_ m

3. A platform that runs alongside a set of train tracks gives passengers access to one \_\_\_\_\_ direction of a train route.

\_ h \_ \_ u \_ \_      \_ \_ a \_ f \_ \_ \_

4. The train car darkened as the train passed through the artificial passage built underground.

\_ \_ n \_ \_ l

Read the sentence pairs. Choose which word or phrase best fits each blank.

### 1. gap / height

A/ Platforms are usually built at the same \_\_\_\_\_ as train doors.

B/ The passenger dropped her glove into the \_\_\_\_\_ between the train and the platform.

### 2. platform / level crossing

A/ Cars are often stopped for trains at a \_\_\_\_\_.

B/ A \_\_\_\_\_ is where passengers board and exit a train.

### 3. island platform / side platform

A/ A(n) \_\_\_\_\_ provides access to trains traveling in one direction,

B/ A(n) \_\_\_\_\_ provides access to trains traveling in two directions.

## Writing

1 Answer the questions.

1/ What are some different types of train platforms?

2/ What are some features of train platforms and crossings?

2 Use the webpage to complete the instructions for an employee.

Hello Robert,

Today I need you to take care of all the platforms at the station. You need to sweep the  platforms. I also need you to empty the garbage cans at the through . Tomorrow we will work on clearing debris out of the  and level .

## Unit 5

## Train Travel

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the train ticket. Then, mark the following statements as true (T) or false (F).

**Passenger Name:** Penny Rosario  
**Departure City:** Stephenville, Downtown Station  
**Time of Departure:** 6:45 p.m.  
**Destination:** Willow Springs, North Junction Station  
**Time of Boarding:** 6:15 p.m.  
**Expected Time of Arrival:** 8:45 p.m.  
**Reservation Type:** [ | **Compartment** [\*] **Open-car Seating**

Policies: This **reservation** is only valid for the passenger listed above. Fees may apply in the case of **cancellation**. RailTraq is not responsible for **delays** to departure or arrival times. Passengers should arrive at least 30 minutes prior to departure time. Please review your ticket and notify RailTraq immediately of any errors.

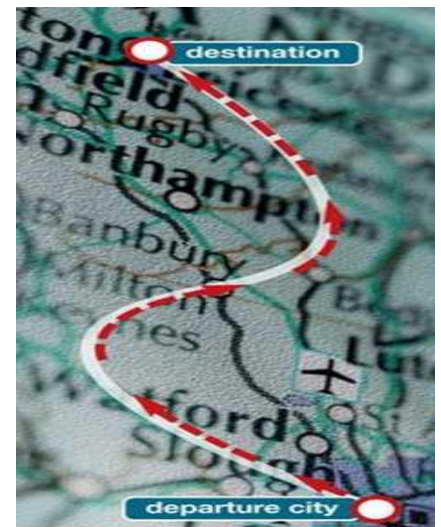
- 1 \_ The ticket guarantees the passenger a seat in a compartment.
- 2 \_ The train will arrive at North Junction Station in Willow Springs.
- 3 \_ Passengers should arrive half an hour before the train starts boarding.

### Vocabulary

Match the words (1-6) with the definitions (A-F).

- 1 \_ compartment
- 2 \_ delay
- 3 \_ depart
- 4 \_ departure city
- 5 \_ destination
- 6 \_ open-car seating

- A. a situation in which a train departs or arrives later than expected
- B. a place where a passenger ends their journey
- C. a system in which passengers are allowed to choose their own seats
- D. an enclosed area on a train car
- E. to leave a station, stop, or city
- F. the place where a passenger starts to travel







Read the sentence pairs. Choose which word or phrase best fits each blank.

**1. arrive/ board**

A. If a train departs late, it will usually \_\_\_\_\_ at its destination late, too.

B. Passengers can safely \_\_\_\_\_ a train when it makes a complete stop in a station.

**2. cancellation /reservation**

A. A \_\_\_\_\_ guarantees a passenger a seat on the train,

B. A \_\_\_\_\_ erases an existing record of a ticket

**Writing**

1 Answer the questions.

1. What information does a train ticket display?

2. What can disrupt a train reservation?

2 Use the train ticket to complete the rail ticket.

**Passenger Name:** Mark Ronson

**Departure**  : Clearwater Falls, Gatt Station

**Time of**  : 12:45 a.m.

**City:** Lewberg, Midtown Station

**Time of**  : 12:15 a.m.

**Expected**  **Time:** 8:45 p.m.

**Reservation Type:** ☐ compartment

☒ open-car

**Policies:** This  is only valid for the passenger listed on the ticket. Fees may apply for .

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the radio guide. Then, choose the correct answers.

### Radio Communication Guide

#### Ch 1: Introduction to Radio Communication

**Radio communication** is vital to safe operations. Follow the correct procedure every time you **operate** a radio. First, make sure the **channel** you're using is free. Otherwise, you may be unable to **transmit** your message. It might also interrupt another person's message. Use the radio controls to tune into a strong **frequency**. Then, wait a few moments. This ensures no one else is using it. The next step is to provide your **identification**. To do this properly, you must know the **phonetic alphabet**. At the end of communication, say "**over**" if you need a response. If you do not need a response, say "**out**."

- 1 What is the purpose of the article?  
 A/ to explain where to find someone's radio identification  
 B/ to define different kinds of radio transmissions  
 C/ to give basic information about using the radio  
 D/ to discuss different uses for radio communication
- 2 According to the chapter, which of the following is NOT part of transmitting a message?  
 A/ providing identification  
 B/ making sure the channel is free  
 C/ announcing the time and date of the transmission  
 D/ saying "out" when the communication is finished
- 3 When should speakers use the phonetic alphabet?  
 A/ when changing frequencies  
 B/ when waiting for a response  
 C/ when the transmission is finished  
 D/ when giving identification

|   |          |              |
|---|----------|--------------|
| A | Alpha    | Al fah       |
| B | Bravo    | Brah voh     |
| C | Charlie  | Char lee     |
| D | Delta    | Dell tah     |
| E | Echo     | Eck oh       |
| F | Foxtrot  | Foks trot    |
| G | Golf     | Golf         |
| H | Hotel    | Ho tell      |
| I | India    | In dee ah    |
| J | Juliet   | Jew lee ett  |
| K | Kilo     | Key loh      |
| L | Lima     | Lee mah      |
| M | Mike     | Mike         |
| N | November | No vem ber   |
| O | Oscar    | Oss cah      |
| P | Papa     | Pah pah      |
| Q | Quebec   | Keh beck     |
| R | Romeo    | Row me oh    |
| S | Sierra   | See air rah  |
| T | Tango    | Tang go      |
| U | Uniform  | You nee form |
| V | Victor   | Vik tah      |
| W | Whiskey  | Wiss key     |
| X | Xray     | Ecks ray     |
| Y | Yankee   | Yang key     |
| Z | Zulu     | Zoo loo      |

**phonetic alphabet**

### Vocabulary

Match the words (1-6) with the definitions (A-F).

- 1 \_ operate
- 2 \_ over
- 3 \_ out
- 4 \_ radio communication
- 5 \_ phonetic alphabet
- 6 \_ channel





- A. a system in which words represent individual letters
- B. a word that indicates a response is required
- C. to control the function of something
- D. a message sent through radio waves
- E. a word that indicate a response is not required
- F. a range of frequencies used by a particular station to transmit radio messages

*Read the sentences and choose the correct words or phrases.*

1. He couldn't receive a message because he wasn't tuned in to the correct **frequency** /**phonetic alphabet**.
2. You need to give your **channel** /**identification** before beginning a message.
3. You can use the radio to **transmit** / **operate** a message.

### **Writing**

*1 Answer the questions.*

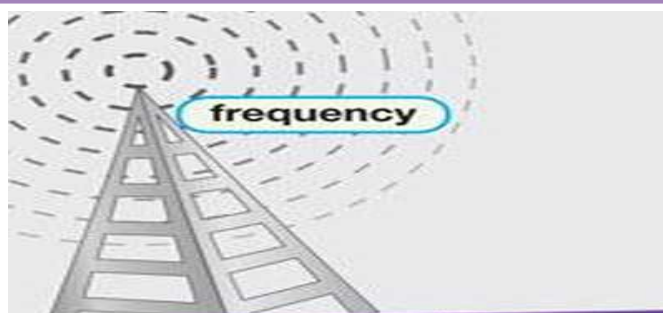
1. Why is radio communication important in the rail industry?
2. What is the purpose of using the phonetic alphabet in radio communication?

*2 Use the radio guide to complete the rail ticket.*

### **R & R Railroad**

#### **Procedure for effective radio communication:**

1. Find an available .
2. Announce your .
3. Speak your message. Use the  alphabet to spell words.
4. Say "over" to indicate you expect a . Say "out" to indicate you do not expect a .



**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### **Reading**

*Read the job description. Then choose the correct answers.*

#### **Job descriptions**

If you love trains and want to work around them, look no further! We have jobs to meet anyone's experience levels and interests. If you are interested in working directly with trains, you can start off as a **brakeman** or **switchman**. These entry-level positions can lead to opportunities to advance to **conductor** or **yardmaster**. After working as a conductor, you can move to locomotive engineer. If you have mechanical experience, consider applying to be a **mechanic**: or **carman**. We also have positions for **welders** and **track laborers**. Finally, if you enjoy working with people, a **porter** position might be great for you.

1 What is the purpose of the article?

- A to give tips on applying for railroad jobs
- B to list qualifications for various open positions
- C to describe changes to the companies hiring policies
- D to outline available job opportunities in the rail industry

2 Which of the following is NOT a career that can be reached by starting as a brakeman?

- A conductor    B locomotive engineer    C porter    D yardmaster

3 Which of the following requires mechanical experience?

- A carman    B yardmaster    C brakeman    D track laborer

#### **Vocabulary**

*Match the words (1-6) with the definitions (A-F).*

1\_ *porter*

2\_ *brakeman*

3\_ *conductor*

4\_ *track laborer*

5\_ *locomotive engineer*

6\_ *welder*

A a person who maintains rail tracks

B a person who operates a train

C a person who makes repairs and performs maintenance by welding

D a person responsible for the freight and people on a train

E a person who assists customers with luggage, takes tickets, and shows people to their seats

F a person who works in the yard inspecting train parts and putting together railroad cars



Read the sentence pairs. Choose which word or phrase best fits each blank.

**1 carman / switchman**

- A A \_\_\_\_\_ maintains and repairs railroad cars.  
 B The \_\_\_\_\_ works in the yard inspecting switches and tracks.

**2 mechanic / yardmaster**

- A If a train needs to be repaired, call the \_\_\_\_\_.  
 B The \_\_\_\_\_ is in charge of everything going on in the yard.

**3 porter / welder**

- A The \_\_\_\_\_ must help people find their seats on the train.  
 B A \_\_\_\_\_ repairs rail tracks.

**Writing**

*1 Answer the questions.*

- What are some jobs available in the rail industry?
- What are some qualifications that might be necessary for railroad jobs?

*2 Use the job descriptions to complete the email.*

From: s.jones@smith&nelsonRR.com  
 To: human\_resources@smith&nelsonRR.com  
 Subject: Immediate openings!

Hi Patty,

I talked to Lucy about job openings. We need several \_\_\_\_\_, a conductor, and some \_\_\_\_\_ right now. We are mostly concerned with getting the \_\_\_\_\_ positions filled.

Please make this your top priority.

Thanks,  
 Stu

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

**Vocabulary:**

current pulses

running rail

coil

high-density

dual-control system

conveyed

mounted

*Read the text. Then, answer the questions.*

A system for controlling automatic trains operates by coded **current pulses**, transmitted through the **running rails** and picked up inductively by **coils** on the train. Under this system speed and braking are continuously controlled, and means are provided to ensure safe spacing of trains, even in **high-density** traffic. In London trials with an automatically driven train that runs in passenger service on a short section of the District line between Stamford Brook and Ravenscourt Park stations are being carried out.

The system adopted by London Transport could be described as semi-automatic, as it is invented that one attendant shall always be on the train to open the doors at a station, close them after passengers have entered or left and press the starting button. Thereafter the operation of the train would be entirely automatic until it was stopped at the next station.

The special feature is a **dual-control system** that incorporates – safety signaling of the train to prevent the possibility of collisions – a command system that performs the automatic driving. It responds to the push-button for starting the train, slows or stops it if there is a train in front, restarts the train when the track ahead is clear and brakes it in the station at the correct stopping point.

All signals to the train are **conveyed** by induction from currents in the running rails, picked up by coils **mounted** on the front of the train about 6-8 above the rails. The system provides for two working speeds-full speed and 22 mile/h when approaching another train on the track in front.

**Questions:**

1. By what pulses does the automatic system control trains? 2. What automatic systems do you know? 3. What automatic system has no automatic correction of errors? 4. What do we call the self-correcting circle of events?

**Make negatives and questions:**

1. Under this system speed and braking are continuously controlled. 2. The system adopted by London Transport could be described as semi-automatic. 3. All signals to the train are conveyed by induction from currents in the running rails.

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the webpage. Then, choose the correct answers.

#### METRO RAIL NEWS

Metro Rail is proud to announce the construction of a new coastal line. To complete the project, new employees are needed to fill dozens of job openings. Positions include **train driver/locomotive engineer** and **network controller/dispatcher**. The engineer position requires experience as a conductor. However, **apprenticeships** are available. Applicants for both positions must have relevant classroom training. Current employees and other qualified parties are encouraged to apply.

Engineering professionals are also in demand. **Civil engineers** and **structural engineers** are needed to plot and build the line. We'll be hiring **environmental engineers** to monitor conditions, and **software engineers** to streamline our processes.

Other open positions required for construction are **telecommunication engineers**, **electrical engineers**, and **mechanical engineers**. For those interested in new technology, a **specialist engineer** will be hired.

This is a great time to advance your position with Metro Rail, or to bring in new valued employees. Apply or notify qualified candidates today!

1 What is the main purpose of the webpage?

- |  |  |   |  |
|--|--|---|--|
| <input type="radio"/> A to introduce new employees | <input type="radio"/> B to define the roles of different employees | <input type="radio"/> C to offer training for employment advancements | <input type="radio"/> D to announce employment opportunities |
|--|--|---|--|

2 Which of the following will work outside the construction of the new line?

- |   |   |  |  |
|---|---|--|--|
| <input type="radio"/> A civil engineers | <input type="radio"/> B environmental engineers | <input type="radio"/> C locomotive engineers | <input type="radio"/> D mechanical engineers |
|---|---|--|--|

3 What can you infer about dispatchers?

- A They are promoted from network controller positions.
- B They have completed formal classroom training.
- C They are qualified to be train drivers.
- D They are involved in design of railroad.

### Vocabulary

Match the words (1-8) with the definitions (A-H).

1\_ train driver

2\_ mechanical engineer



- 3\_ network controller
- 4\_ structural engineer
- 5\_ apprenticeship
- 6\_ telecommunication engineer
- 7\_ environmental engineer
- 8\_ electrical engineer

- A an employee that manages train operations
- B the process of working closely with someone to learn a trade
- C an employee that deals with environmental impacts
- D an employee that develops electrical systems
- E an employee that designs trains
- F an employee that oversees construction of railway infrastructure
- G an employee that operates trains
- H an employee that designs communication networks

*Read the sentence pairs. Choose which word or phrase best fits each blank.*

**1 specialist engineer /software engineer**

- A) A \_\_\_\_\_ utilizes new technology.
- B) A \_\_\_\_\_ develops computer programs.

**2 environmental engineer /civil engineer**

- A) A(n) \_\_\_\_\_ is concerned with infrastructure.
- B) A(n) \_\_\_\_\_ is concerned with the outside world.

**3 locomotive engineer /dispatcher**

- A) The train can't leave until the \_\_\_\_\_ releases the brake.
- B) The \_\_\_\_\_ instructed one train driver to wait and told another to proceed.

**Writing**

*1 Answer the questions.*

1. What are some non-engineering related railroad employment opportunities?
2. What types of engineers are needed in the railway industry?

*2 Complete the instructions for an employee.*

| Metro Railway  |
|--|
| Employment Announcement  |
| <p><b>Open positions:</b> We currently are accepting applications for _____ positions. These positions include _____ in civil, structural, and _____ engineering. We also have an opening to fill a specialist engineering position.</p> <p><b>Why these positions are needed:</b> Metro Railway has been selected to build a new rail _____. We currently employ mainly electrical, _____, and telecommunication engineers. We need _____ who can work on the development of railway _____.</p> |





**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

Read the FAQ page. Then, choose the correct answers.

#### ElectroPans, Inc.

##### Frequently Asked Questions

ElectroParts, Inc. is the leading producer of **E-P brakes**. Read our FAQs to find out about our systems.

*What are E-P brakes?*

Electro-pneumatic brakes take the air brake system and make it better. Brake valves are controlled electrically. Sometimes, the E-P brake functions as a **service brake**, while the air brake is reserved for emergencies.

*Now do E-P brakes work?*

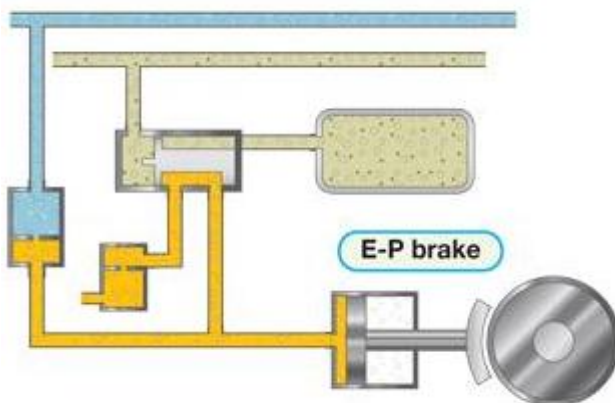
Air brakes open and close valves with air pressure changes. E-P systems do it with electrical wires. They don't interfere with the air brake's **fail-safe** mechanisms. And they use the same driver's brake valve settings—**release**, **running**, **lap**, **application**, and **emergency**. Electrical signals energize and de-energize valves depending on the chosen setting. Some E-P systems use a **P-Wire control**, which reduces multiple wires to just one.

*How are E-P and ECP brakes different?*

E-P brakes are used most often used on passenger trains. You can find them on subways and high-speed rail lines. **ECP brakes** are found in freight trains.

*What are the benefits of E-P brakes?*

E-P brakes reduce stopping distance and eliminate **slack action**. Electric signals reach each car simultaneously, eliminating any **time lapse**. In fact, the **propagation rate** is almost zero! With traditional air brakes, it takes seconds for the braking action to reach the back of the train. In an emergency, that is valuable time



1 What is the purpose of the passage?

- A to explain the differences between brake valve settings
- B to provide information about a brake system
- C to discuss the pros and cons of E-P brakes
- D to give instructions for using a brake system

2 What can be inferred about E-P systems without P-Wire controls?

- A They rely on air pressure changes
- B They lack fail-safe mechanisms
- C They operate more
- D They have many wires

3 Why are E-P brakes more efficient than air brakes?

- A They extend the propagation rate
- B They add a fail-safe braking mechanism
- C They brake from the back to the front of a train.
- D They apply brakes in each car at once.

### **Vocabulary**

*Fill in the blanks with the correct words or phrases from the word bank.*

#### **Word Bank**

|            |                |              |           |            |             |           |
|------------|----------------|--------------|-----------|------------|-------------|-----------|
| time lapse | P-Wire control | slack action | fail-safe | E-P brakes | application | emergency |
|------------|----------------|--------------|-----------|------------|-------------|-----------|

1 The operator moved the brake valve to \_\_\_\_\_ when he saw a car on the track.

2 Before the \_\_\_\_\_ was installed, the train had too many wires.

3 Air brakes tend to have a long \_\_\_\_\_ in applying the brake to all cars

4 Put the driver's brake valve on \_\_\_\_\_ to stop the train.

5 \_\_\_\_\_ don't replace air brakes completely; they just improve them

6 Even a system that is \_\_\_\_\_ can have problems.

7 Electronic brakes eliminate \_\_\_\_\_, so all of the cars slow down at the same time and speed.

*Read the sentence pairs. Choose which word or phrase best fits each blank.*

#### **1 release / lap**

A The driver chose \_\_\_\_\_ when he saw the "all clear" signal.

B The brake is partially applied in the \_\_\_\_\_ setting.

#### **2 propagation rate / ECP brakes**

A The \_\_\_\_\_ dropped from three seconds to less than one second.

B The railroad company is testing \_\_\_\_\_ for its freight trains.

#### **3 service brake / running**

A When the train is in \_\_\_\_\_, the feed valve has been activated.

B Always use then \_\_\_\_\_, unless there is a problem.

### **Writing**

*1 Answer the questions.*

1. Why is proper training in brake system operation important?

2. What are the advantages of electronic systems over traditional mechanical

**Objectives:** to enrich vocabulary on the topic; to develop skills you need to succeed in a professional work situation; to broaden your mind.

### Reading

*Read the manual. Then, mark the following statements as True or False.*

#### LE-732 KEY PARTS

Before operating the LE-732 *electric locomotive*, familiarize yourself with its basic components.

##### Power Supply

The LE-732 is a passenger train. It uses a conductor that runs along the train tracks, known as a third rail. Third rails provide high-voltage **AC**. The locomotive also has a **battery** in case of electrical failure.

##### Master Controller

Use the controller to start the locomotive, accelerate, apply the brakes, and reverse the train. For operating instructions see page 34.

##### AC Power Transmission

The LE-732 uses AC, making it ideal for long distances and lines with heavy traffic. It can achieve power levels up to 50,000 volts. It also makes use of a **DC drive**. AC goes through a **rectifier** and converts to **DC**. If the LE-732 is ever used for short-distance routes, this can save power. Power will reach about 3,000 volts.

##### Converters

The LE-732 has rectifiers and **inverters** to change power types as needed.

##### Temperature Regulation

A **cooling fan** automatically regulates temperature, ensuring that the locomotive does not overheat.

##### Circuitry

The LE-732's **circuit breaker** is on the locomotive's roof. This system stops overloaded circuits before they damage other parts.

##### Relays and Contactors

Relays control low-power switches, while contactors handle ones with more power. See page 85 for more information.

- 1 \_ The train primarily gets power from an onboard battery.
- 2 \_ DC is used for long routes, while AC is better for shorter ones.
- 3 \_ The circuit breaker is located next to the master controller.

### Vocabulary

*Match the words (1-6) with the definitions (A-F).*

- 1 \_ AC
- 2 \_ DC
- 3 \_ cooling fan
- 4 \_ contactor
- 5 \_ inverter
- 6 \_ DC drive



- A a device that prevents the locomotive from getting too hot
- B a device that passes AC through a rectifier and converts to DC to power a motor
- C a current that only flows in one direction
- D a device that opens and closes a circuit
- E a device that converts DC to AC
- F a current that can change directions

*Read the sentences and choose the correct words or phrases.*

- 1 The operator can increase the train's speed by using **the master controller / DC**
- 2 The **DC drive / battery** powered the lights while the engine was being repaired.
- 3 He looked at the **cooling fan /circuit breaker** to find out where the system failed.
- 4 The **electric locomotive / AC** gets energy from an overhead power line.
- 5 **Contactors / Inverters** and relays are similar, but relays use a lower voltage.
- 6 Trains usually have two **cooling fans / rectifiers** to convert currents.

### **Writing**

*1 Answer the questions.*

1. What are some parts of electrically powered vehicles?
2. How does the railroad industry use electric locomotives

*2 Complete the email to your supervisor about the problems with a locomotive.*

Ms. Ericson,

Yesterday, a mechanic inspected our electric locomotive. He found a couple problems with it. First of all, the engine seems to be

, especially when the weather is hot. The

fan is fine, but the  needs to be

replaced. In addition, our  power system is not

operating as it should. The  are not providing enough

power, so we need to replace them.

To fix these problems, we need to order some  from

Railway Supply Co. The model number for the alternator is the Cooler

. We also need eight

batteries. We need to replace these parts as soon as

possible, so overnight  is preferable.

Thanks,

Jack Garrett

## Glossary

### Unit 1

**3-link coupling-** 3-link coupling is a coupling system that uses a set of three links hung from hooks on each car and connected by a chain.

**bar coupler-** A bar coupler is a semi-permanent coupling system that connects cars using a bar.

**buckeye coupler** - A buckeye coupler is a common automatic coupling system that uses locking knuckles.

**connect** - To connect train cars is to latch them together using a coupling system.

**coupler** - A coupler is any system that allows train cars to be joined together.

**fully automatic coupling system** - A fully automatic coupler is a coupling system that can be operated from the cab of a train car. Most freight operations require automatic couplers.

**knuckle** - A knuckle is the rotating and locking component of a buckeye coupler.

**link and pin-** A coupling system is link and pin if it uses bars inserted into conjoining loops to secure train cars together.

### Unit 2

**ballast-** Ballast is material, usually basalt, used to form the bed of a railroad track.

**camber** - Camber is the arched shape of the formation under a railroad track designed to ensure water run-off.

**drain-** A drain is a channel meant for carrying off liquid that is found on either side of the base of a railroad track.

**embankment** - An embankment is a raised bank of earth designed to carry a railroad over low ground.

**formation** - A formation is the ground below the ballast, upon which track will be laid.

**grade** - A grade is the level and angle of an area of land.

**lay** - To lay railroad track is to install it and its substructure.

**sub-ballast** - Sub-ballast is a layer of small crushed stones that gives support to the ballast.

**sub-structure** - A sub-structure is the pail of the track consisting of the formation, the sub-ballast, and the ballast.

### Unit 3

**connection** - A connection is a situation in which a passenger exits one train or bus and boards another.

**depot** - A depot is a place from which trains are dispatched for service.

**escalator** - An escalator is a moving staircase that carries people from one level to another level in a building.

**halt** - To halt is to stop moving.

**intersect** - To intersect something is to pass through the same area as it while going in a different direction.

**line** - A line is a particular route that a train travels along.

**stairwell** - A stairwell is an area that contains stairs for walking from one level to another in a building.

**terminus** - A terminus is the final stop of a railroad route.

#### **Unit 4**

**bay platform** - A bay platform is a dead-end platform that is generally shorter than a through platform.

**gap** - A gap is the distance between a train and a platform when a train is halted at a station or stop.

**height** - Height is a measurement of how tall or short something is.

**island platform** - An island platform is a platform that is positioned between two tracks, usually for lines traveling in opposite directions.

**level crossing** - A level crossing is a place where a track intersects a road.

**platform screen doors** - Platform screen doors are barriers that separate the platform from trains until the trains are safe to board.

**side platform** - A side platform, also called a through platform, is a platform that is positioned along one track.

**through platform** - A through platform, also called a side platform, is a platform that is positioned along one track.

#### **Unit 5**

**arrival** - Arrival is the act of reaching an intended destination.

**boarding** - Boarding a train is the act of entering it with the intention of riding it.

**cancellation** - A cancellation is the act of stopping a reservation.

**compartment** - A compartment is an enclosed area of a train car.

**delay** - A delay is a situation in which a train arrives or departs later than expected.

**departure city** - A departure city is a place where a passenger begins to travel.

**destination** - A destination is the place where a passenger ends their journey.

**open-car seating** - Open-car seating is a system in which passengers are allowed to choose any seat within a car.

#### **Unit 6**

**channel** - A channel is a range of frequencies used by a particular radio station for sending receiving signals.

**frequency** - A frequency is a particular band of wavelengths at which radio signals are transmitted or received by a particular station.

**identification** - Identification is a means by which individuals differentiate themselves from others, usually using some kind of unique number or code.

**operate** - To operate something to control the movement or function of something.

**out** - Out is a radio term that is used by a speaker to indicate that he or she is finished speaking and no response is expected.

**over** - Over is a radio term that is used by a speaker to indicate he or she is finished speaking and expects a response.

**phonetic alphabet** - The phonetic alphabet is a system used for spelling aloud in which each letter is represented by a different word.



**transmit** - To transmit something is to communicate it from one person or device to another.

## **Unit 7**

**brakeman** - A brakeman is a person who takes apart and puts together railroad cars at the yard and inspects and operates train parts and switches in the yard.

**carman** - A carman is a person who is responsible for maintaining, inspecting, and repairing the rail cars.

**conductor** - A conductor is a person in charge of the equipment, freight, and crew on the train.

**locomotive engineer** - A locomotive engineer is a person who operates a train.

**porter** - A porter is a person who has the job of helping people onto a passenger car, including carrying luggage, taking tickets, and showing them to their seats.

**switchman** - A switchman is a person who inspects switches and tracks and relays signals in the yard.

**track laborer** - A track laborer is a person who maintains, improves, and repairs railroad tracks.

**yardmaster** - A yardmaster is a person who is in charge of supervising what happens in a yard.

## **Unit 9**

**apprenticeship** - An apprenticeship is the process of working under an individual to learn a trade.

**civil engineer** - A civil engineer is an engineer that designs and develops infrastructure.

**dispatcher** - A dispatcher is a person that manages the operation of trains on the tracks.

**electrical engineer** - An electrical engineer is an engineer that develops and manages the electrical systems.

**environmental engineer** - An environmental engineer is an engineer who studies and prevents environmental damage.

**locomotive engineer** - A locomotive engineer is a person that drives a train.

**mechanical engineer** - A mechanical engineer is an engineer that designs and develops machines and mechanical systems.

**network controller** - A network controller is a person that manages the operation of trains on the tracks.

**specialist engineer** - A specialist engineer is an engineer that addresses issues through new technology to improve systems.

**structural engineer** - A structural engineer is an engineer that oversees the construction of infrastructure.

**telecommunication engineer** - A telecommunication engineer is an engineer that designs and monitors the telecommunications systems and broadcasting equipment.

## **Unit 10**

**application** - Application is a setting on the driver's brake valve that decreases pressure in the brake pipe by releasing air.

**fail-safe** - If a device is fail-safe, it is able to prevent or minimize damage in the event of a mechanical failure.

**ECP brakes** - An ECP (electronically controlled pneumatic) brake is a system that uses electronic devices to apply brakes to each car of a freight train at the same time.

**E-P brakes** - An E-P brake is a type of air brake where the brake can be applied immediately through an electronically-controlled system. It is generally used on multi-car passenger trains.

**lap** - Lap is a function on the driver's brake valve that is used to apply the brake, but not completely. It prevents the system from taking in air from the atmosphere once the brake has been applied.

**propagation rate** - The propagation rate is the amount of time it takes for a signal to travel from the front of the train to the back.

**P-Wire control** - A P-Wire control is a single wire that transmits electrical signals about brake rates.

**release** - Release is a setting on the driver's brake valve that allows air pressure to enter the brake pipe so that the train can begin moving.

**running** - Running is a setting on the driver's brake valve that allows a steady flow of air into the brake pipe from the feed valve so that the train can move continuously.

**service brake** - A service brake is the main braking system.

**slack action** - Slack action is the movement of one car before that motion is transferred to the car behind it.

**time lapse** - A time lapse is the amount of time it takes for a signal to travel from the front of the train to the back.

## **Unit 11**

**AC** - AC is an abbreviation for "alternating current," which is a current that can change direction very fast as it travels along a conductor.

**battery** - A battery is a device that provides power used when the locomotive starts and when other power sources fail.

**circuit breaker** - A circuit breaker is a device that can detect a problem in an electrical circuit and interrupt the circuit to stop the electrical flow.

**cooling fan** - A cooling fan is a device that regulates the temperature of the electronic power system.

**DC** - DC is an abbreviation for "direct current," which is a current that travels along a conductor in one direction.

**DC drive** - A DC drive is a device that passes alternating currents through a rectifier so that it can power a motor that uses direct currents.

**electric locomotive** - An electric locomotive is a locomotive that uses electric power supplied by overhead electric lines, a conductor on the tracks, or a battery on the train itself.

**inverters** - An inverter is a device that changes direct currents into alternating currents.

**rectifier** - A rectifier is a device that changes alternating currents into direct currents.

## References

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