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Unit 1

Section One: Reading Comprehension

The Emergence of Transportation

At medieval times, people mostly travelled by foot or on horseback and any form of transportation was mainly for moving goods.

The first railways were laid down in the seventeenth and eighteenth centuries for horse-drawn trains of wagons in collieries and quarries. These 'hauling ways' initially had a surface of stone slabs or timber baulks which soon proved unsatisfactory as the loads carried inevitably grew heavier.

As the Industrial Revolution progressed, the idea was developed further by adding cast iron or wrought iron plates to reduce wear on the wooden baulks. This evolved further to iron-edge rails enabling the use of flanged wheels for the first time.

By the time steam locomotives came on the scene, in the early nineteenth century, wrought iron rails and, later, steel rails were developed which were strong enough to support these heavy-axle loads without assistance from longitudinal timbers.

In essence, the track itself, together with its supports, had and still has the basic function of safely transmitting the loads and forces imposed by passing trains to the ground beneath.

Various other civil engineering skills were also involved in the construction of early railways.

These included the building of bridges, tunnels, and gravity walls as well as extensive earthworks and drainage.

From these earliest days, there was a need to balance the requirements

and interests of the various engineering disciplines involved. As an example, rolling-stock design has a considerable impact on the design and maintenance of fixed infrastructure and there needs to be mutual appreciation and close co-operation between engineers if the best is to be achieved in all areas. This may sometimes require compromise in certain disciplines for the good of the whole.

Development and Diversification

As for early railways the Boards would invariably appoint an engineer who would be responsible for all the engineering of the railway parts, both moving and fixed. He would also be involved in the actual day-to-day operating of the railway. This had a considerable advantage from the point of view of co-ordination.

As development of railways progressed, inevitably individual engineers became more specialised and there tended to be a loss of the overall or generalist view.

Part I. Comprehension Exercises

A. Put “T” for true and “F” for false statements. Justify your answers.

- 1. The early railway tracks with a surface of stone slabs or timber baulks were the most satisfactory means of transportation, especially for heavy loads.
- 2. The track itself, together with its supports, plays an important role in safely transmitting the loads and forces imposed on the ground beneath.
- 3. The first trains were drawn by powerful locomotives.
- 4. The engineer responsible for both moving and fixed railway parts was appointed by the Boards on the early railways.
- 5. The last quarter of the seventeenth century witnessed the use of wrought iron in railway tracks.
- 6. The construction of early railways involved various civil engineering skills in building bridges, tunnels, etc.

B. Choose a, b, c or d which best completes each item.

1. Ancient people generally transported their goods
 - a. by railway
 - b. by trucks
 - c. by horse-drawn trains
 - d. on tamed animals
2. When steam locomotives were utilized for the transportation of heavy loads, were developed.
 - a. stone slabs
 - b. steel rails
 - c. timber baulks
 - d. wrought iron plates
3. The iron-edge rails enabling the use of flanged wheels, for the first time, were developed by using cast iron on the wooden baulks to reduce the wear.
 - a. plates
 - b. rails
 - c. beams
 - d. slabs
4. To balance the requirements and interests of various engineering disciplines,
 - a. rolling stock must be designed properly
 - b. engineers must co-operate closely
 - c. railway services must be appreciated
 - d. no compromise must be allowed
5. More specialization in engineering became essential because the
 - a. engineer held a generalistic view
 - b. board was responsible for all jobs
 - c. engineer operated the railway
 - d. development of the railway gathered force

C. Answer the following questions orally.

1. How did the early man travel and transport his goods?
2. How was the wear on wooden baulks reduced?
3. When did man use metal rails in railway tracks?
4. What kind of civil engineering skills were involved in the construction of early railways?
5. What kind of activities did the boards expect the civil engineer to perform?
6. What was the advantage of appointing an engineer, responsible for all parts of the railway engineering?