

## 22-A The "Iron Horse"

The "iron horse" that pulls railroad passenger or freight cars is a power plant on wheels, complete in itself. The term *loCOMotive* is used for this type of power plant **only** when it can **be** uncoupled from the rail cars. Some power plants are part of a passenger car. They may **be** self-propelled rail-diesel cars. Others could **be** streamlined electric trains. The term *loCOMotive* is not used to refer to these power plants.

Until the 1950s, the steam engine loCOMotive ruled supreme. In North America, Europe, and much of the rest of the world, the steam loCOMotive has since been replaced by the diesel-electric loCOMotive. In areas of high rail traffic, as along the East Coast of the United States and in Central Europe, many rail lines have been electrified and use electric loCOMotives. Today, steam engines are used **only** in countries, such as China, where coal is much cheaper or more readily available than oil.

Many **large locomotives** actually **develop enough power** to supply **a small city**. **Most of the time**, however, **only a small fraction of this power is needed** to pull **a train**. Once it is underway, **a train needs only a few pounds** of pulling power to **keep one ton** of its **weight in motion**. Full power is needed at first to **start the train** and **then** to pull it up **a steep grade**. To **start a long train**, the **locomotive** first backs up to **loosen the couplings between cars**. In **this way**, one **car** after **the other** begins moving forward. **A long string of tightly coupled rail cars** cannot **be moved all at once**.

**The old steam locomotive** is driven by **a steam engine**. **Steam** from **the boiler** is fed to **the engine's cylinders** to **move pistons** back and forth. **Connecting rods** from **the pistons** **then** **move the driving wheels**. **The firebox** at **the rear end** of **the boiler** is fed with **coal** or **oil**. In **a large locomotive**, **the coal** or **oil** is stored in **a tender**, or **a separate, attached rail car**. **The tender** also **holds the water** that is turned into **steam**. **The exhaust** from **the steam cylinders** is directed up **the smokestack** to **create a heavy draft** for **the boiler fire**. **The discharge** of **the used steam** from **the cylinders** is

controlled by valves. The stop-and-go **release** of the **steam** up the **stack** **makes** the **noise** that **is** called the **locomotive's** puffing.