CH. 6

THE TRAIN
"Unit trains" are made up of one type of freight car carrying one type of freight, sometimes between the same places (like a coal mine and an electrical generating station). This Florida East Coast train is carrying gravel, which, like rocks or sand, is an "aggregate." (Al Pfeiffer photo)

This BNSF double-stack intermodal train is also a unit train. The stack cars with their containers are 20 feet tall. (Chuck Fox photo)

Railroads transport 70% of all cars and trucks sold in the United States. This new pickup truck is being unloaded from a bi-level (double-deck) Union Pacific autorack car at a distribution center in California. Autoracks also come in tri-level configuration. (Chuck Fox photo)

Coal trains are the most common type of unit train, and the heaviest. (BNSF photo)
The 2,900-mile Wisconsin Central, which Reilly McCarren runs, is one of the largest of the regional railroads. (Wisconsin Central/Steve Glischinski photo)

The 186-mile Elgin, Joliet & Eastern is just one of over 500 short line railroads in the United States. (Howard Ande photo)
Couplers

Type E
- Yoke
- Location of Draft Gear

Type Es
- Top view, coupled

Free slack

Standard or Rotary Shank

Type E
- Top & bottom shelf

Type F
Fig. 6-2. Sliding Center Sill Cushioning. In the sliding center sill system, the car body, with its trucks, “floats” on the separate sill connecting the couplers, which are isolated from shocks by a center-of-car hydraulic cushioning device with travel of 15, 20, or 30 inches in either direction. A return spring recenters the sill between impacts. A regular draft gear is still needed at each coupler to prevent a blow from traveling through the cushioned car and hitting the next car, with the added mass of an uncushioned center sill. The sliding sill system adds about 3 tons to the weight of a 50-ft car.
Braking

System pressures (psi)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Brake pipe</th>
<th>Auxiliary reservoir</th>
<th>Emergency reservoir</th>
<th>Brake cylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>&quot;10 lb. reduction&quot; (service application)</td>
<td>60</td>
<td>60</td>
<td>70</td>
<td>25</td>
</tr>
<tr>
<td>Full-service application</td>
<td>50</td>
<td>50</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>Emergency</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>50</td>
</tr>
</tbody>
</table>

How Automatic Brakes Work

When applying the brakes, the locomotive engineer moves the automatic brake valve handle to a position within the "service" (normal) braking range corresponding to the amount of braking desired. This reduces the air pressure in the brake pipe (A) running through the train. The air pressure reduction causes the brake valve in each freight car (E) to use air from the auxiliary air reservoir (B) to build up air pressure in the brake cylinder (D), applying the brakes.

The system is "fail-safe," meaning that a sudden loss of air pressure in the system caused by a broken part will cause the brakes to apply and the train to stop. In emergency braking, the engineer releases (dumps) all the air out of the brake pipe. This causes both the auxiliary and emergency (C) air reservoirs on each car to empty their contents into the brake cylinders, applying the brakes full force.
Braking

- Air Brakes
- Dynamic Brakes
- Independent Brakes
• EOT

• Fail-Safe

• Slack Action
- Electronically Controlled Braking
- Train Dynamics
- L/V Ratio
• **Vehicle/Track Dynamics**
  
  – Simulators

  – Cab Displays
The cab signal display in Amtrak’s AEM7 electric locomotives is located on the right-hand side of the engineer’s desktop-style control console. The red button on the display is the “acknowledge” button. (Alstom Transport photo)