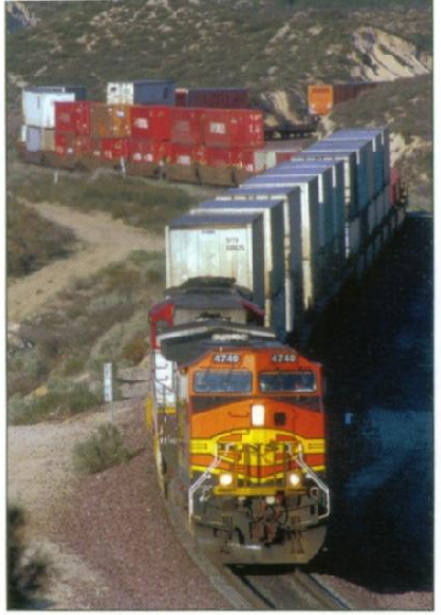
CH. 6

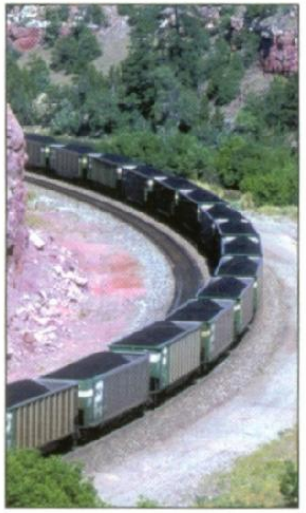
THE TRAIN

"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)

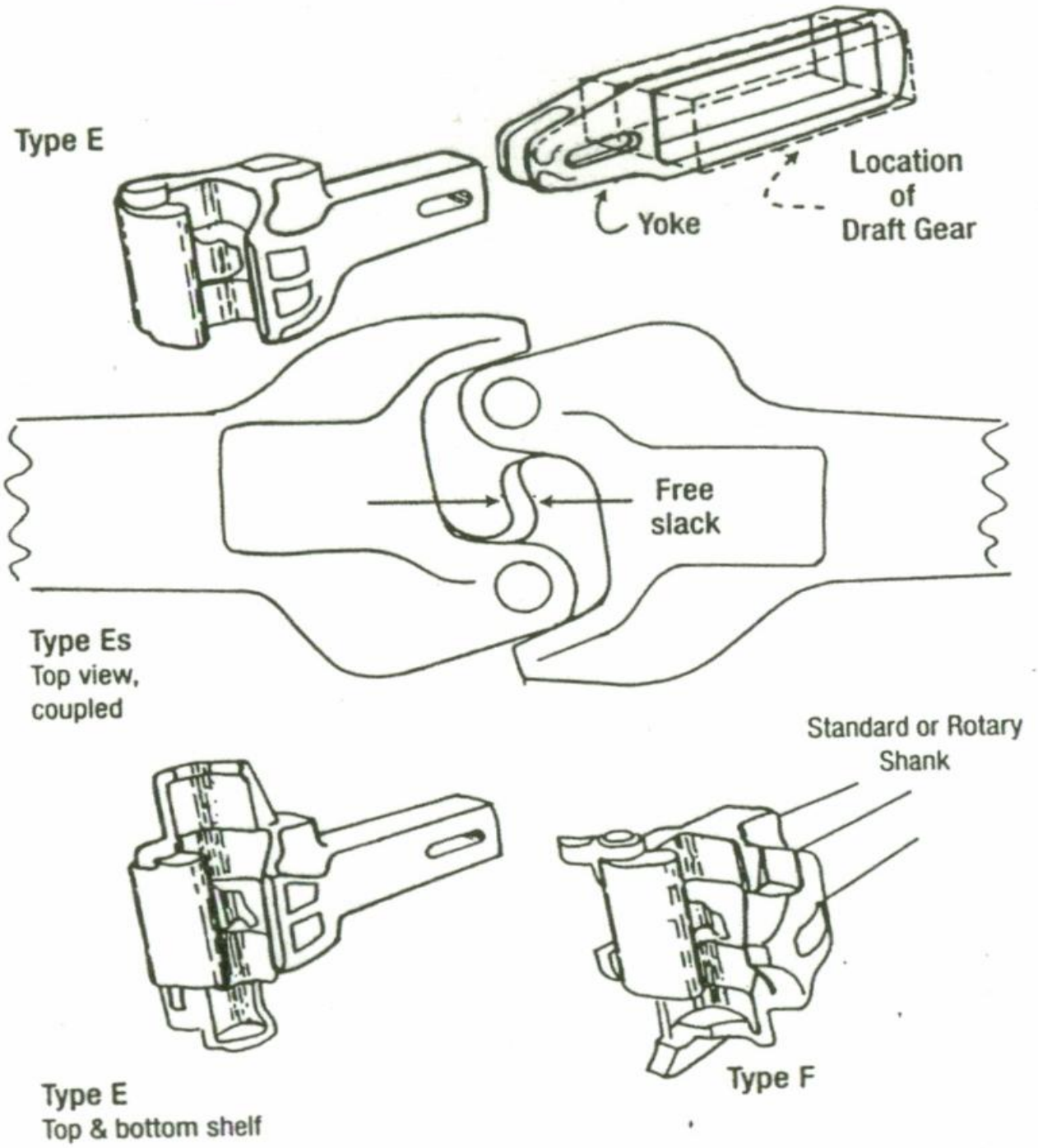


Coal trains are the most common type of unit train, and the heaviest. (BNSF photo)

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
Free
slack
Type Es
Top view,
coupled
Standard or Rotary
Shank
Type E
Top & bottom shelf
Type F

Draft Gear

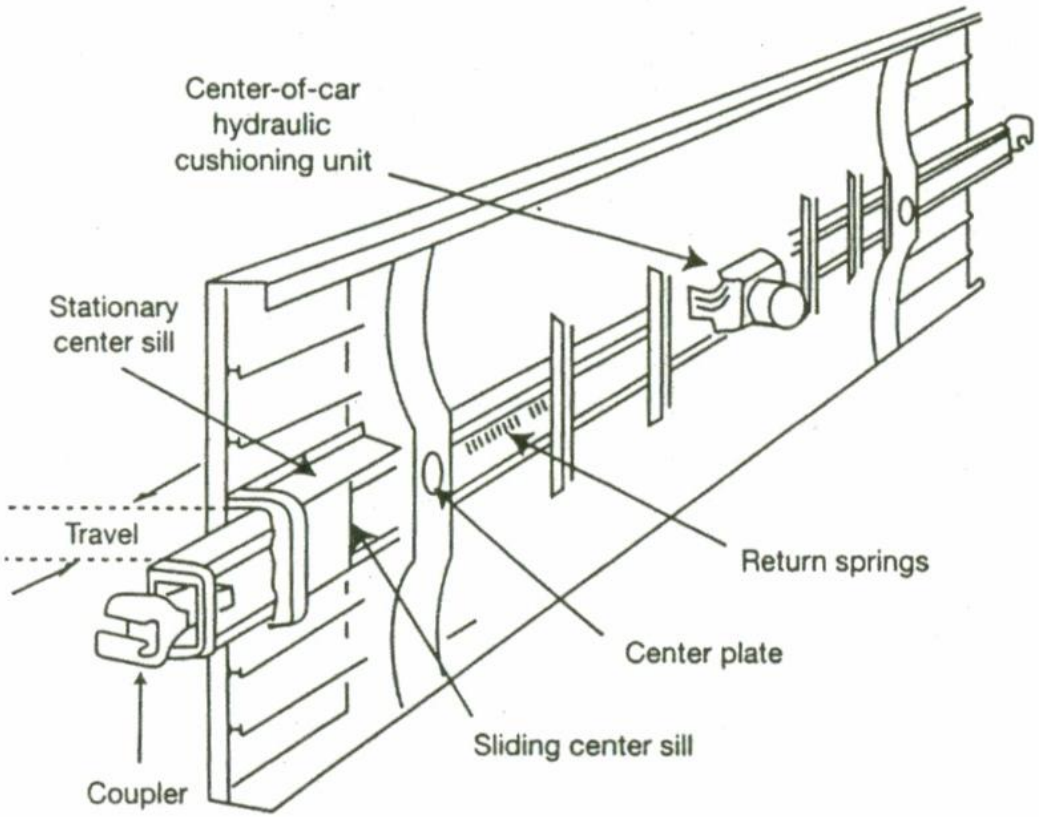
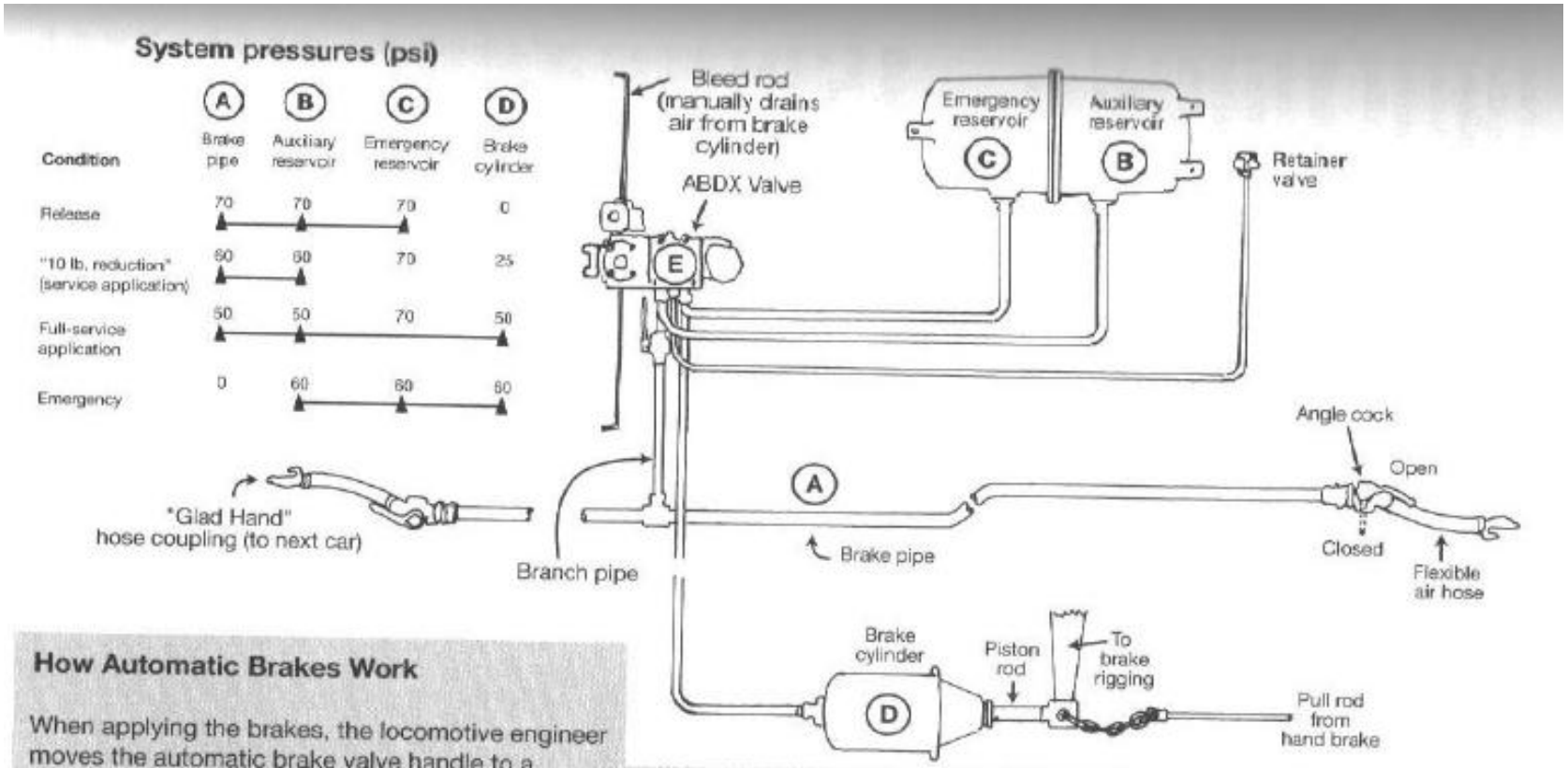


Fig. 6-2. Sliding Center Sill Cushioning. In the sliding center sill system, the car body, with its trucks, "floats" on the separate sill connecting the couplers, which are isolated from shocks by a center-of-car hydraulic cushioning device with travel of 15, 20, or 30 inches in either direction. A return 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



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.

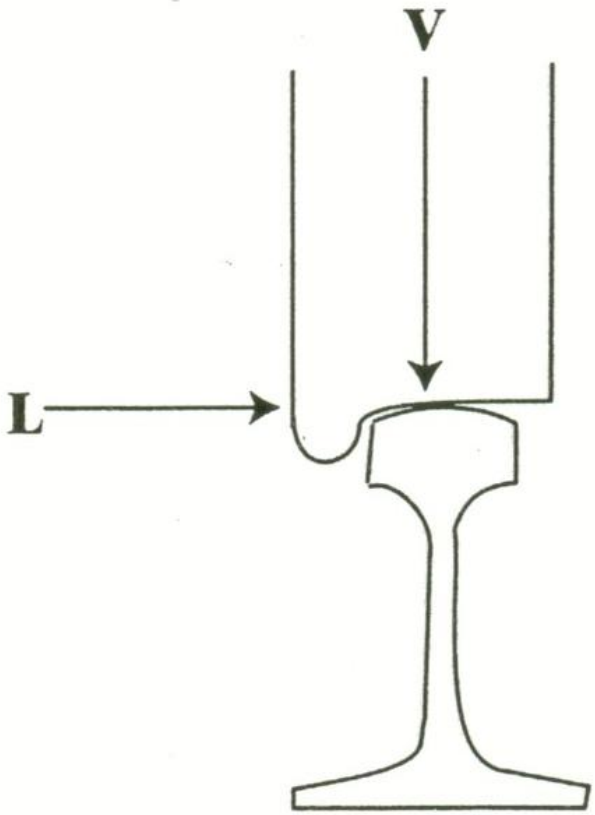
Braking

- Air Brakes
- Dynamic Brakes
- Independent Brakes

Cab Interior of Canadian National SD40-2 5389 (formerly operated by CP but owned by Ontario Hydro), built by GM in 1978 with dynamic brakes, on 25 June 1997. Photo & scan copyright Pat & David Othen (othen@ns.sympatico.ca)

- EOT
- Fail-Safe
- Slack Action

- Electronically Controlled Braking
- Train Dynamics
- L/V Ratio

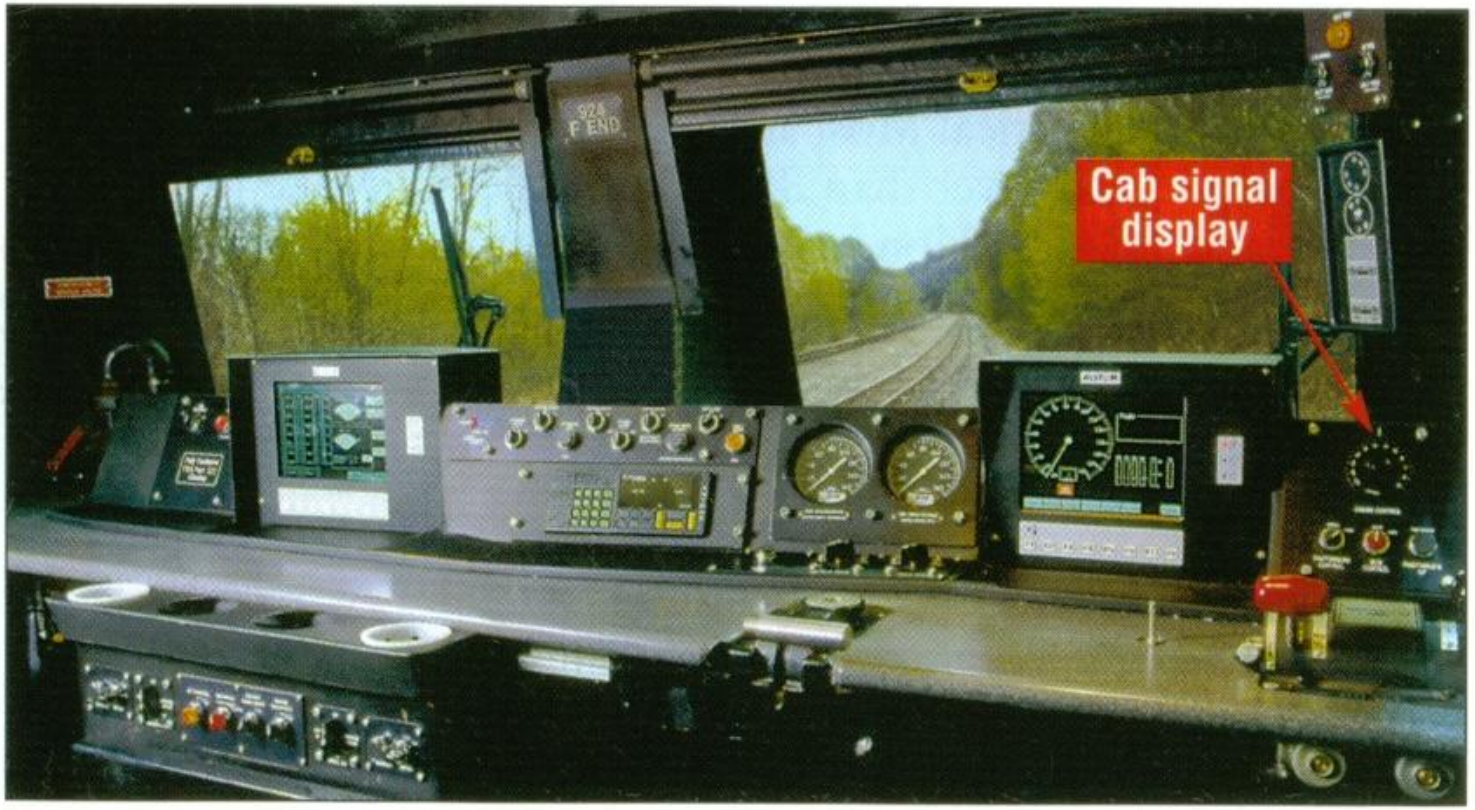


Effect	Lateral to vertical Wheel force ratio
Incipient wheel climb (New rail)	1.29
Incipient wheel climb (Worn rail)	0.75
Rail overturn	0.64
Wheel lift (Zero speed on superelevation)	0.82

- Vehicle/Track Dynamics
  - Simulators
  - Cab Displays

- Vehicle/Track Dynamics

  – 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)