



NTSB National Transportation Safety Board

*Office of Railroad, Pipeline and
Hazardous Materials Safety*

WMATA – Automatic Train Control System

Ruben Payan

Electrical Engineer

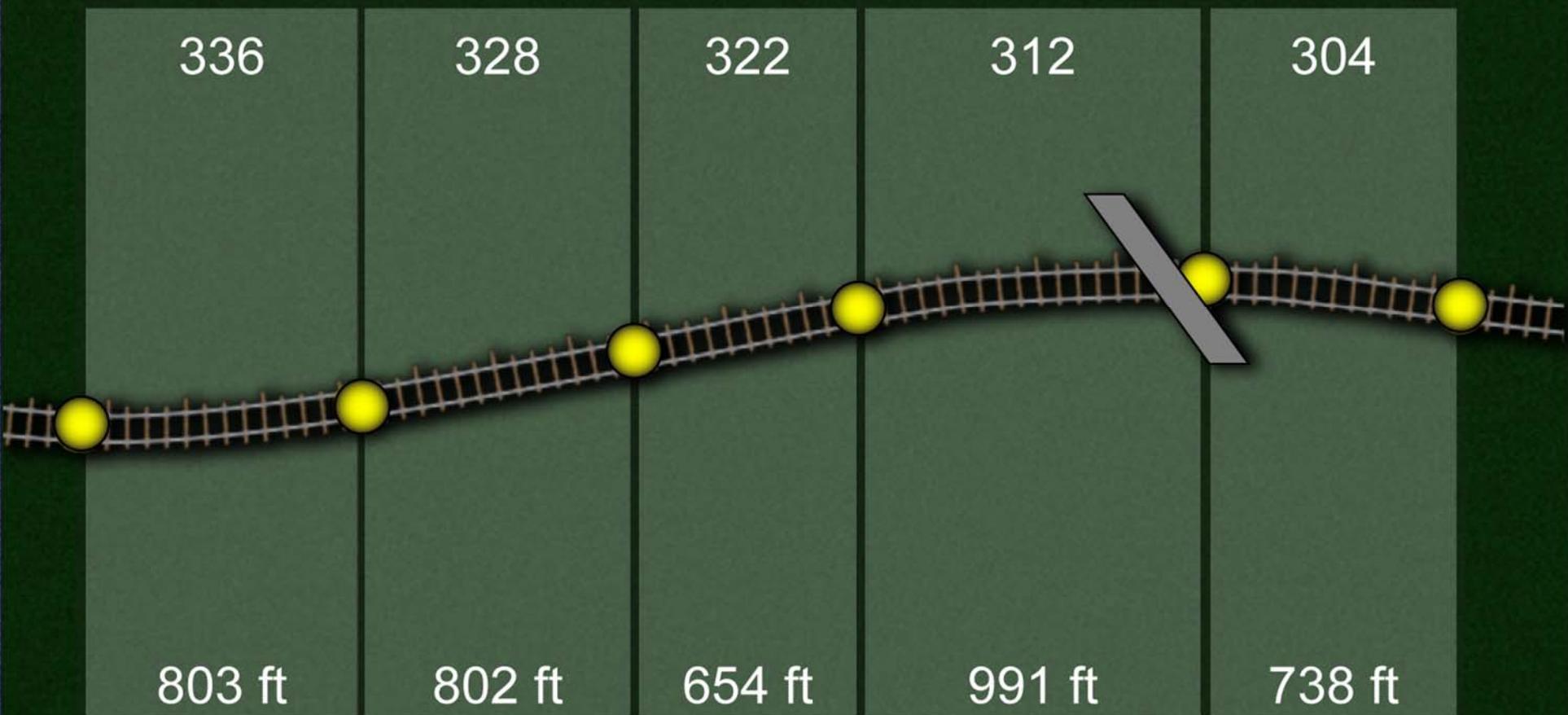
Signal & Train Control Investigation

Automatic Train Control System

- Maintain safe train separation
 - Speed commands provided to trains
 - Speed commands from signal on the rails
- Designed to control scheduling
 - Algorithm determines if schedule adjustment is needed
 - Acceleration profile transmitted to train
- Trains not allowed to accelerate past speed command



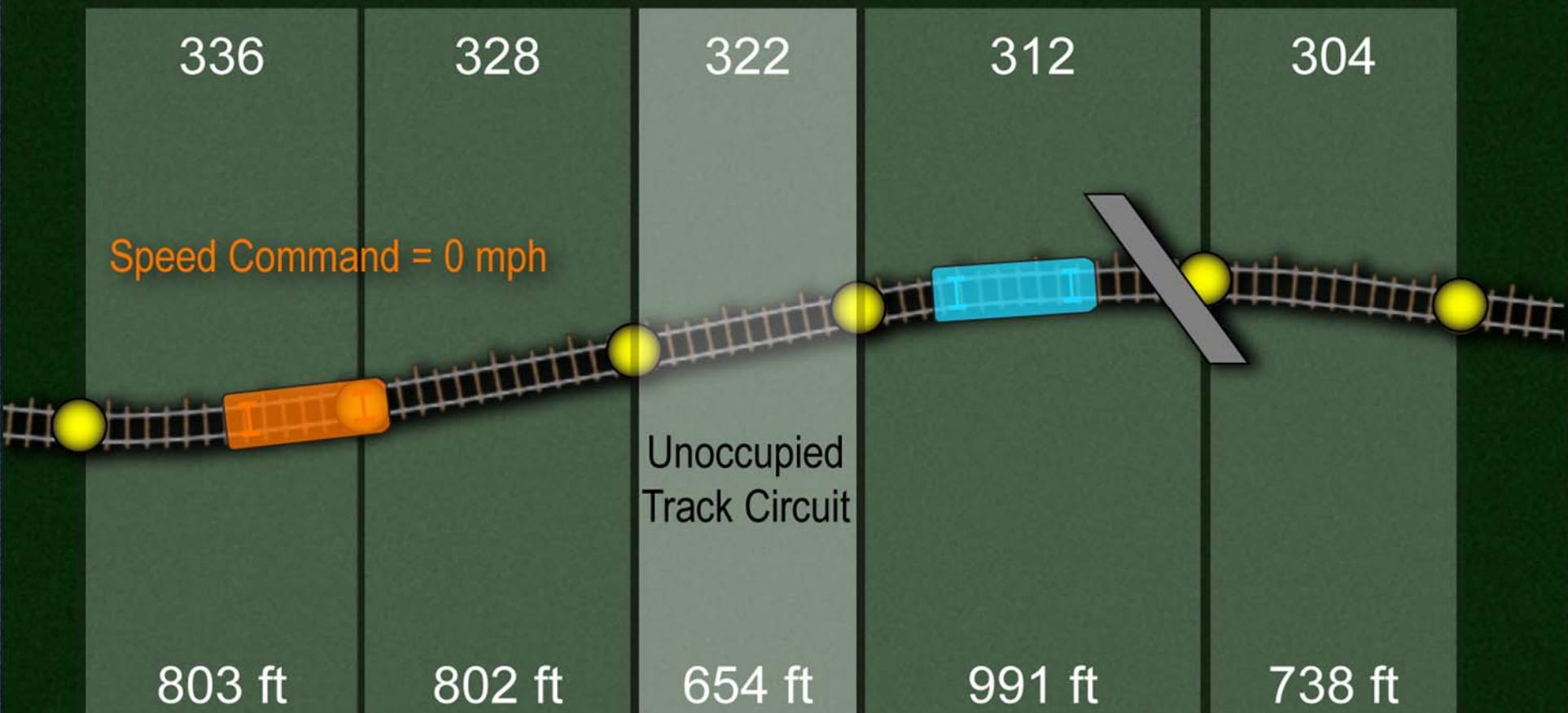
Automatic Train Control System



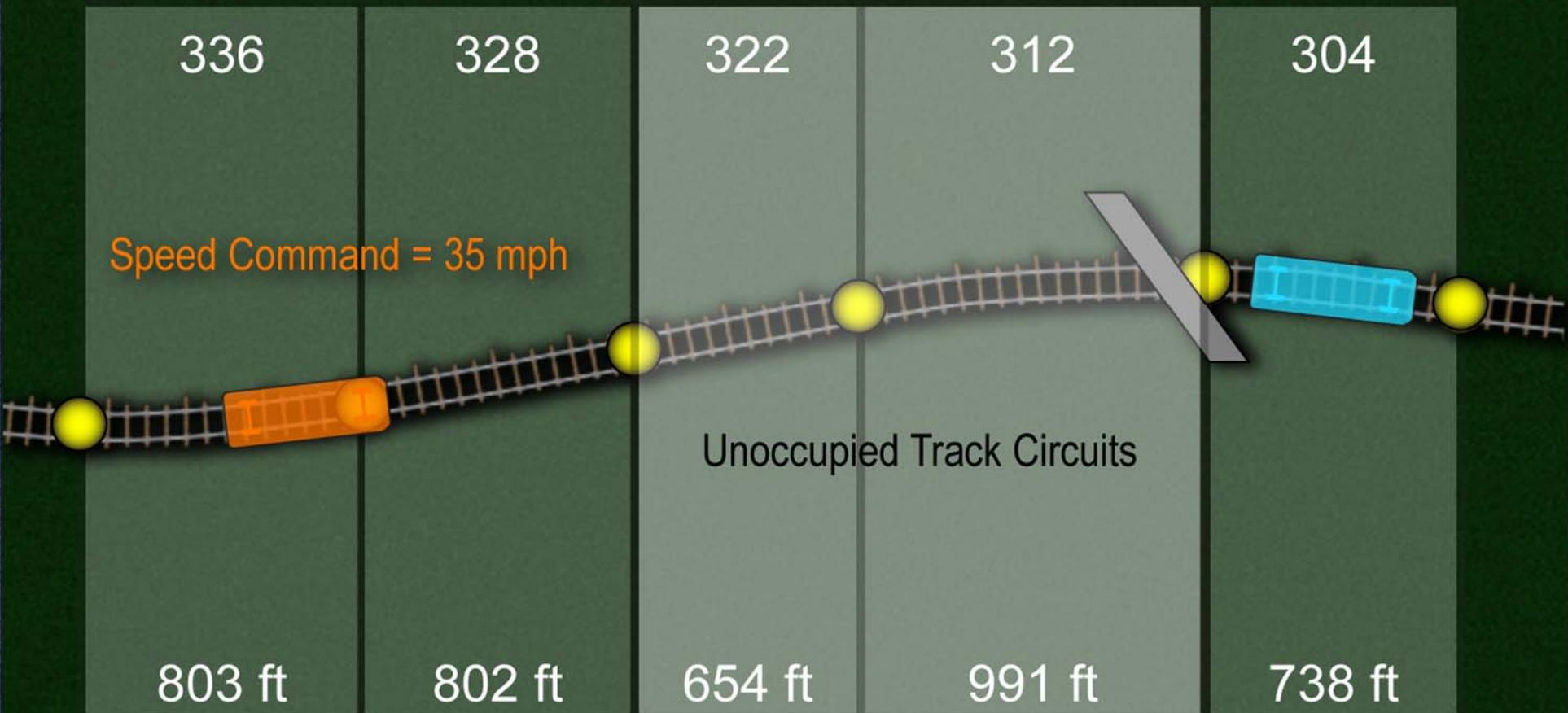
Track Circuit Signal

- Detect the presence of a train within an associated track circuit
- Transmit speed commands based on this information through the rails to maintain safe separation between trains

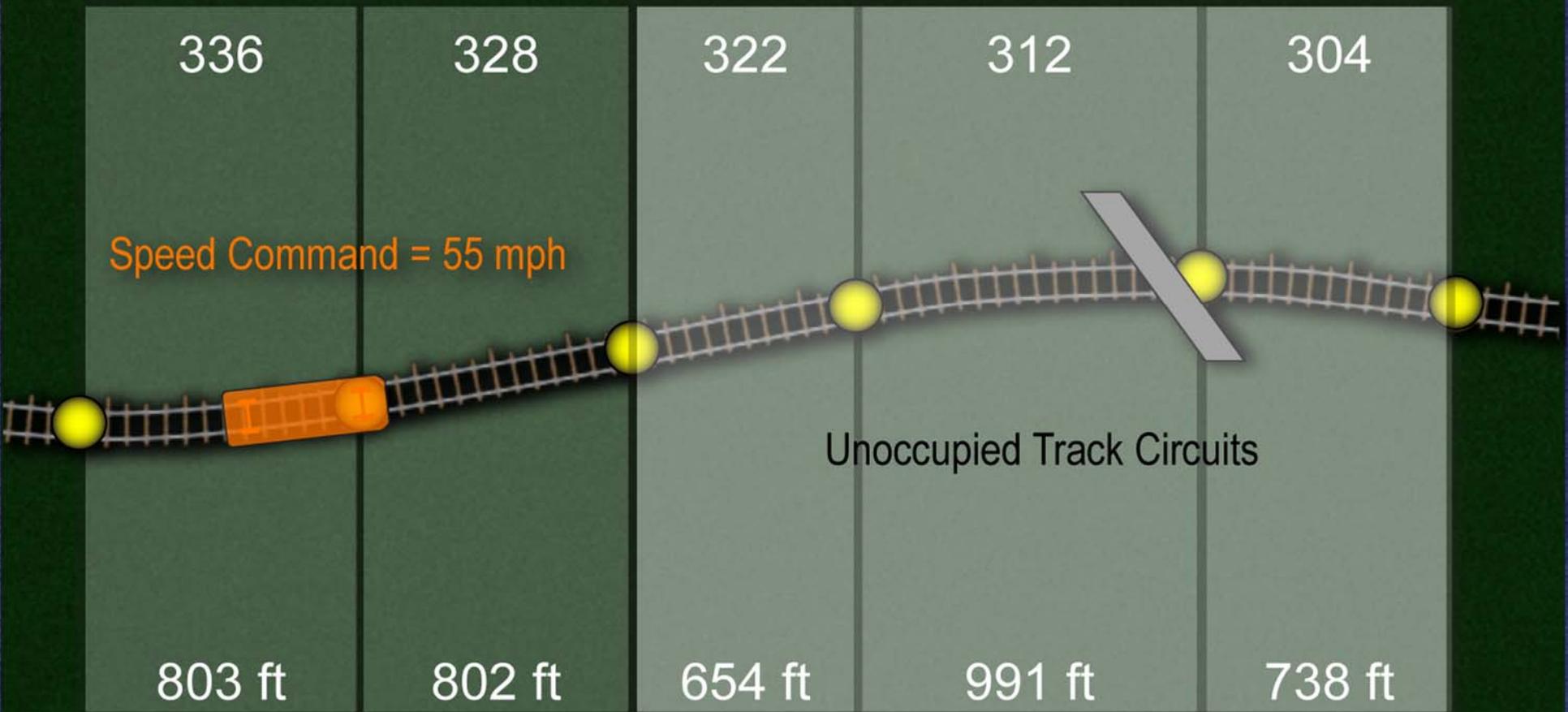
Automatic Train Control System



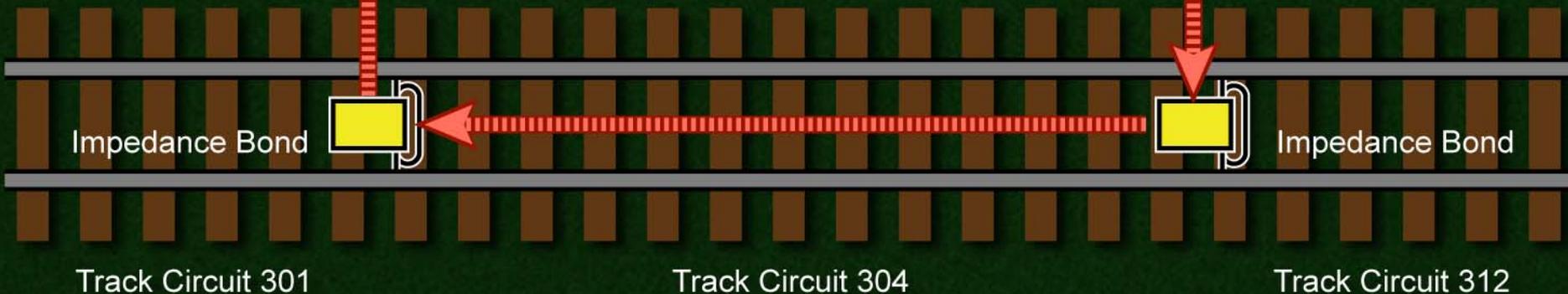
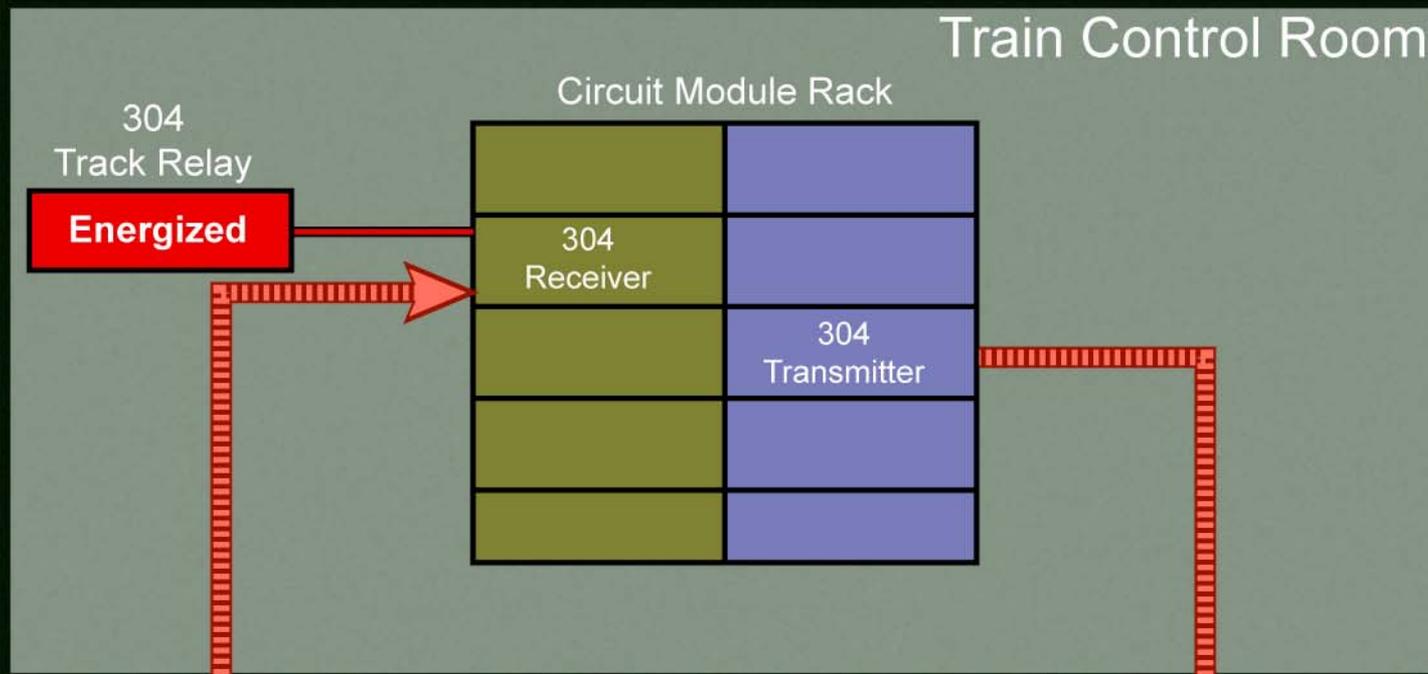
Automatic Train Control System



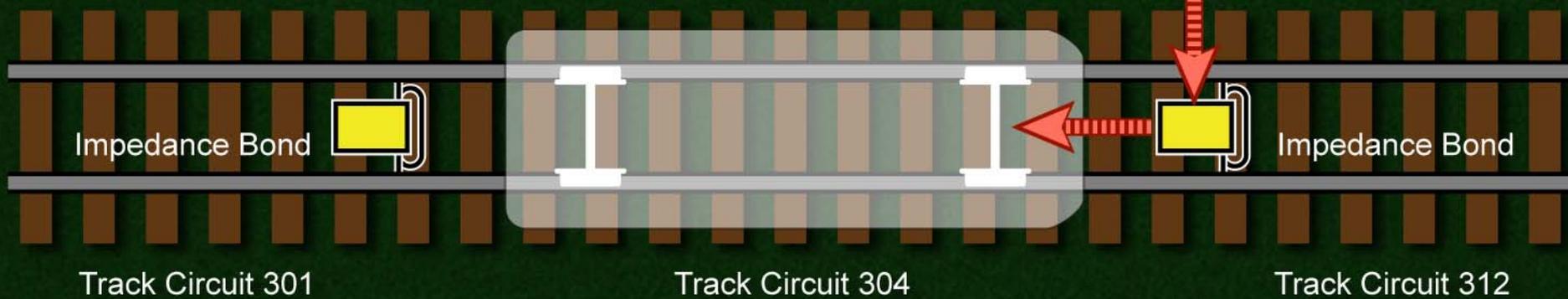
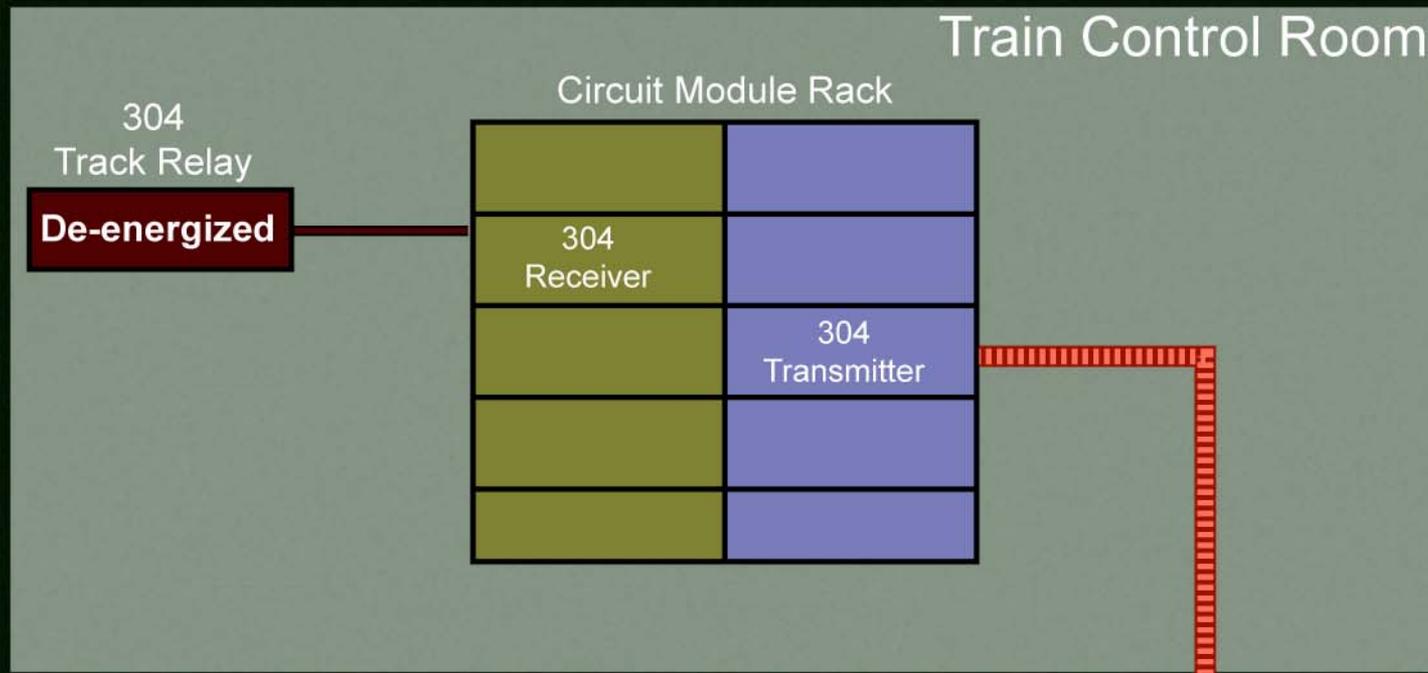
Automatic Train Control System



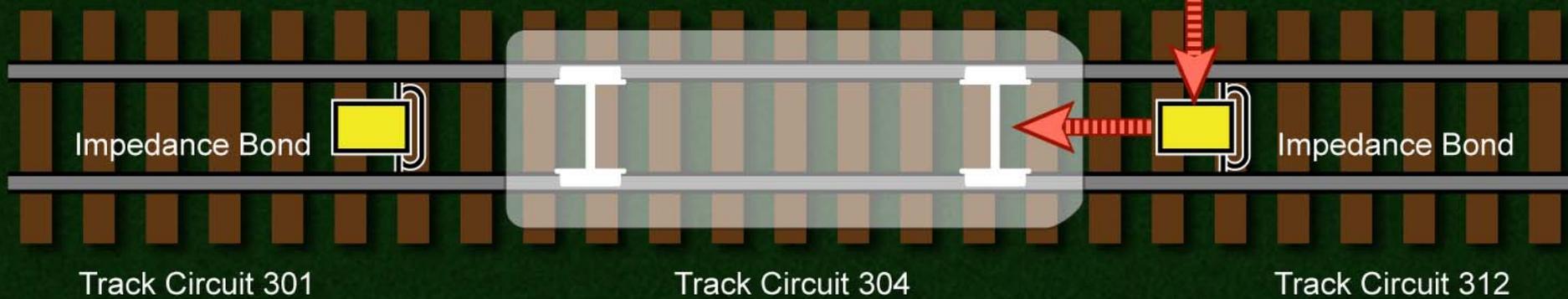
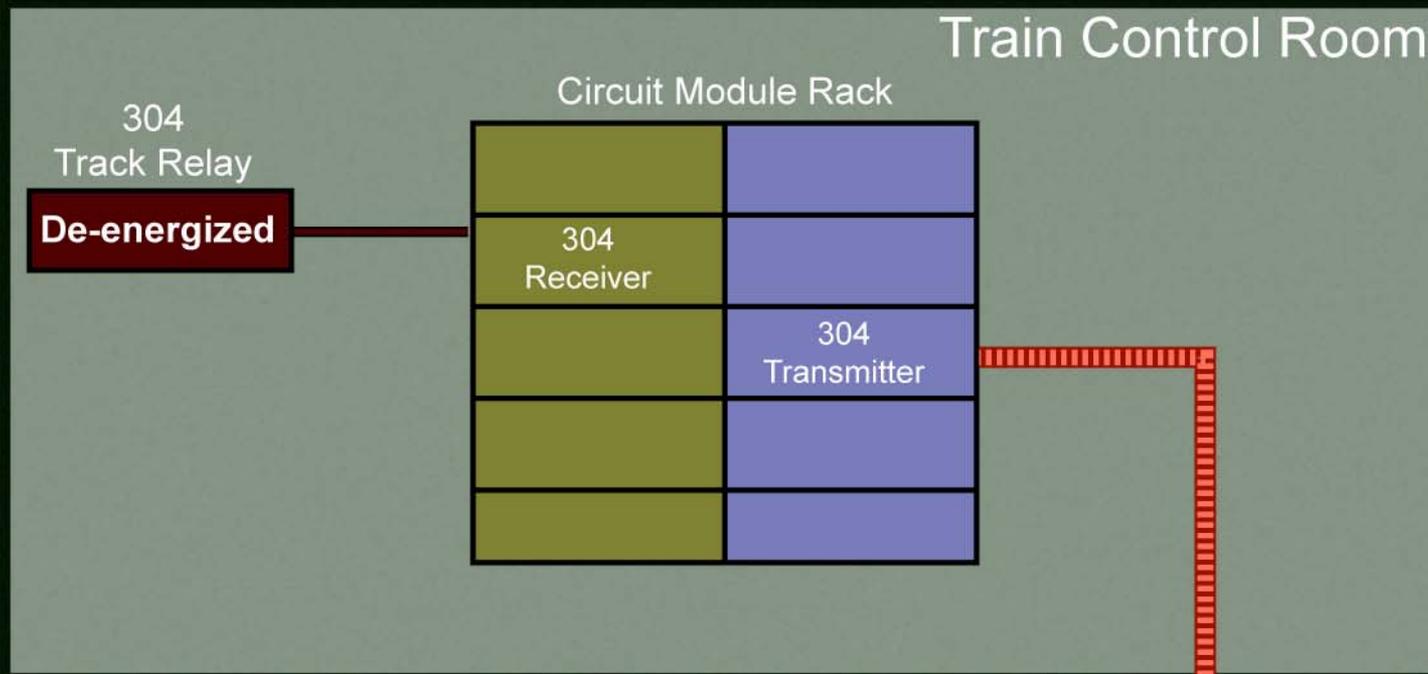
Unoccupied Track Circuit



Occupied Track Circuit



Occupied Track Circuit





NTSB