

CH. 7

**SIGNALS AND
COMMUNICATION**

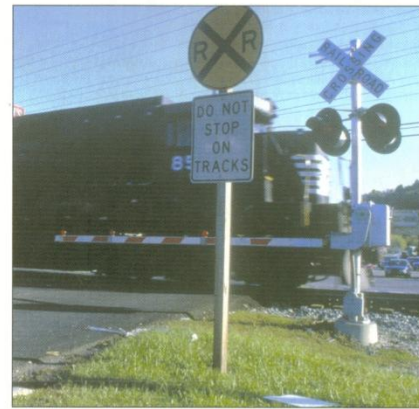
21.0 STATIONS LISTING AND DIAGRAM

MP/ Ctr Pt	↓ SOUTH ↓	STATIONS	SDG CAP (Ft)
KC9.9	CINCINNATI TERM. SD	Spring Lake	
4001		4.5	
KC14.4	No. 1	Ryland	
4002	No. 2	2.3	
KC16.7		Visalia	
4003		14.5	
KC31.2	No. 1	Lynn	
4004	No. 2	4.5	
KC36.1		Catawba	
4005		10.0	
KC46.1	No. 1	Uma	
4006	No. 2	10.5	
KC56.6		Robinson	
4007		11.5	
KC67.8	No. 1	Licking	
4008	No. 2	3.7	
KC71.8		Oliver	
4011	TTI RR	9.0	
KC80.8		Paris	
4012	No. 1	3.9	
KC84.7	No. 2	Clay	
4013		8.7	
KC93.4	OLD ROAD SD	James	
4014		2.7	
KC96.1		North Cabin	
4015		0.5	
KC96.6		Winchester	
		0.6	
KC97.2	No. 1	Patio	
4016	EK SD	1.1	
KC98.1		Sanderson	
4017	No. 2	3.7	
KC101.8		Flanagan	
4018		4.7	
KC106.9		Ford	
4021		16.6	
KC123.1		Fort Estill	18176
4023-4024		6.7	
KC129.8		Berea	
		6.3	

MP/ Ctr Pt	↓ SOUTH ↓	STATIONS	SDG CAP (Ft)
KC136.1		Gap	
4025	No. 1	5.4	
KC141.5	No. 2	Roundstone	
4026		7.7	
KC149.2		Dudley	
4027	SINKS SPUR	2.5	
C136.9	No. 1	Sinks	
4028	No. 2	1.2	
C138.1		Calif	
4031		5.9	
C144.0		Perth	15706
4032-4033		13.0	
C156.8		Bourne	19234
4034-4035		7.6	
C164.4		Frantz	
4036	No. 1	6.7	
C171.7	No. 2	Dortha	
		0.3	
C172.0		KD Subdivision	
177.1 MILES SPRING LAKE TO CORBIN TERMINAL			



- Guideway



- Safety & Efficiency & Capacity

- Scheduling & Dispatching



- Timetable – Schedule of Trains

How ABS (Automatic Block Signaling) works

TRAINS ARE MOVING IN THIS DIRECTION

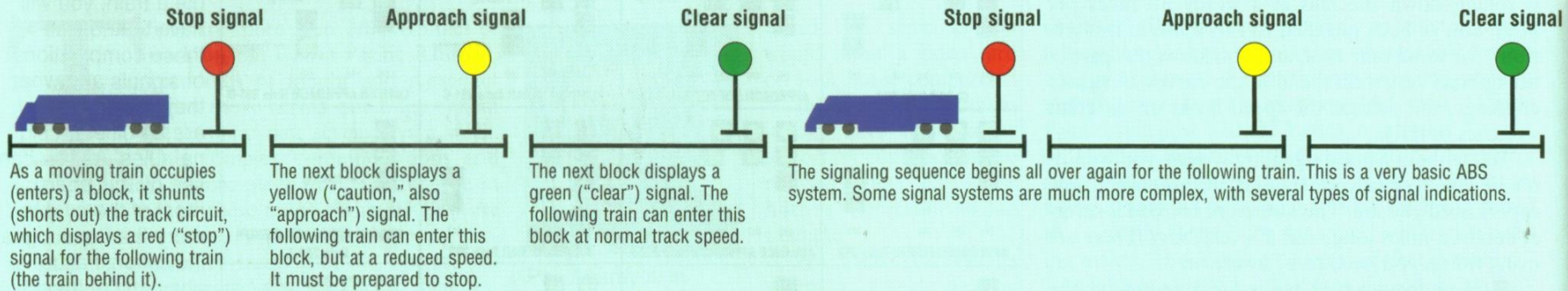
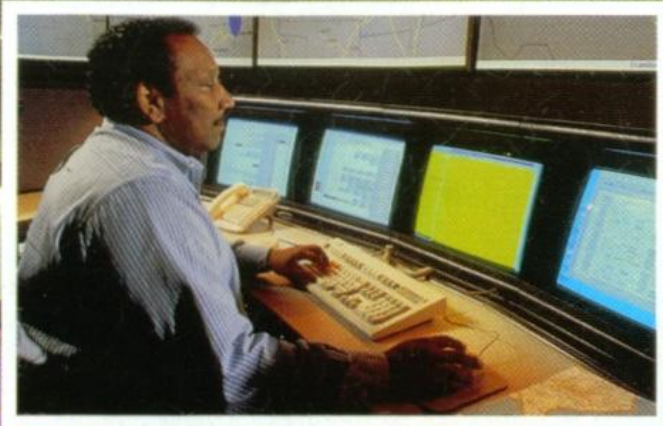


Illustration by William C. Vantuono



Burlington Northern and Santa Fe Railway's huge Network Operations Center (NOC) in Fort Worth, Texas, is the heart and brains of the railroad. From the NOC, BNSF employees dispatch trains (inset) across 26,000 miles of railroad and manage many communications networks. (BNSF photos)

- Timetable & Train Order
 - Telegraph
 - Telephone
- Time Spacing – Dark Territory
 - 59 mph (pass)
 - 49 mph (freight)
- 50% Safe Without Signals ?
 - Branch Lines

- Signal – Block

- Manual

- Stations 79 mph

- Automatic --Trains control (track circuit)

- Insulated joints

- Clear, Approach (slow), Stop
 - Need at least two block lengths



Sandia Software - DVD Image is Double this Size



Block Station D

Interlocking tower controlling railroad crossing at grade. Also serves as Block Station.

Block Station C

Block Signal put at stop when train passes signal and enters block - must remain at stop until train has left block and operator at D has so advised C.

Block Station B

Closed - Signal left at "Proceed." Block now extends from A to C. (Station open during periods of heavy traffic to expedite train movements.)

Home Signal - Block Station A

Cleared upon approach of train after receiving message from operator at C that preceding train has left block.

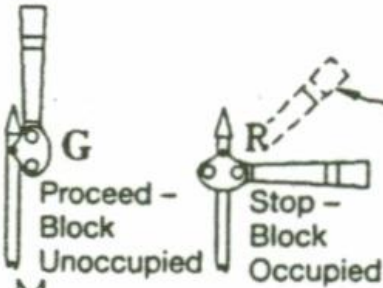
Stopping distance from maximum authorized speed

At points where distant signal is not provided, trains must approach each block station prepared to stop short of entrance to block.

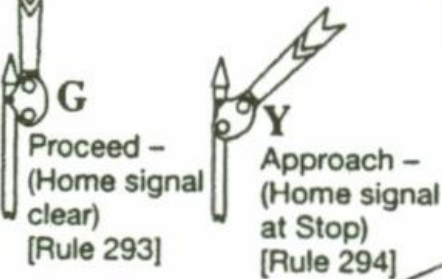
Typical Signal Aspects

(Color or Position - Light signals may be used)

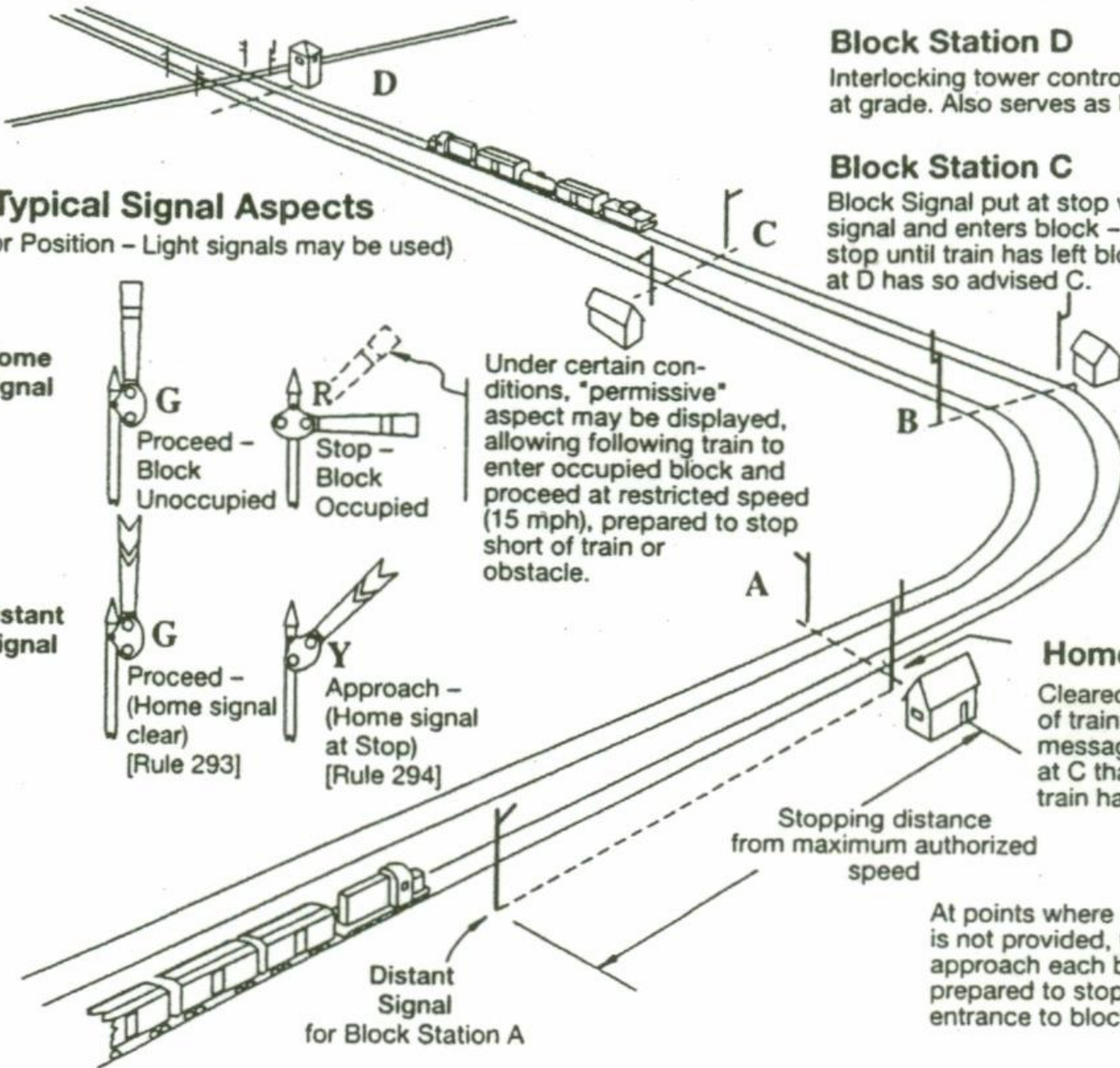
Home Signal



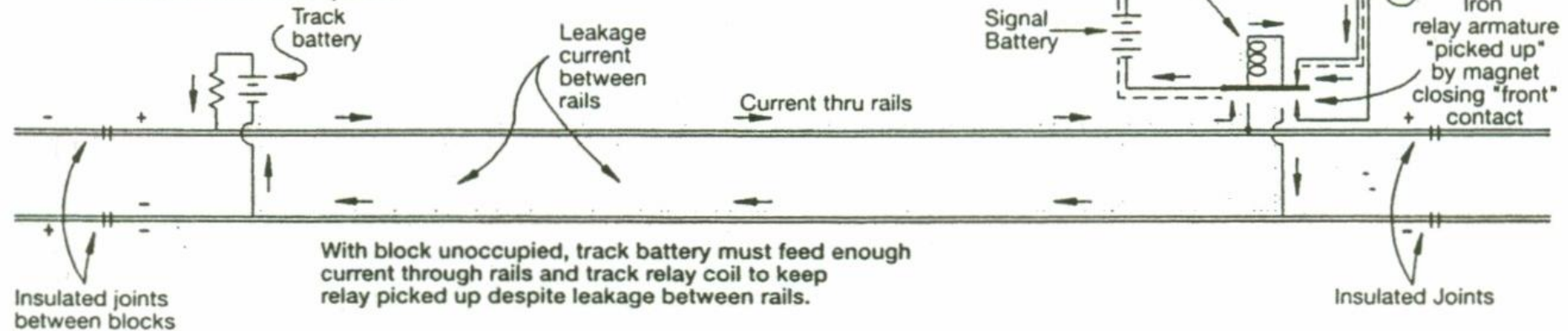
Distant Signal



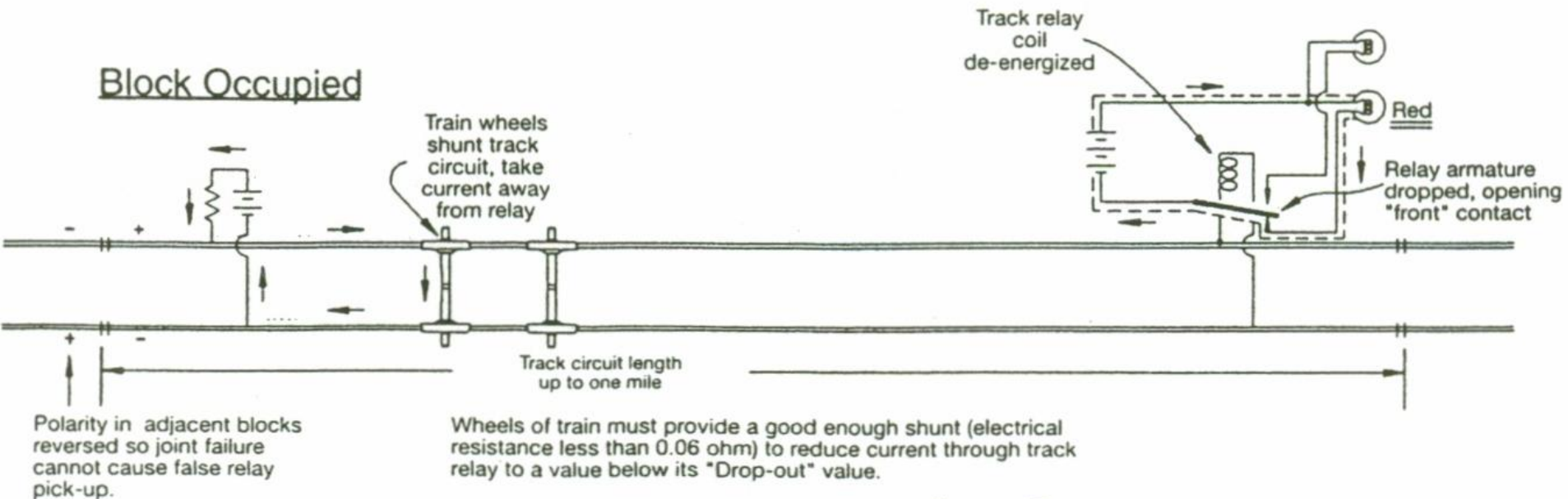
Distant Signal for Block Station A



Block Unoccupied



Block Occupied



- Interlocking
 - Crossings/Crossovers

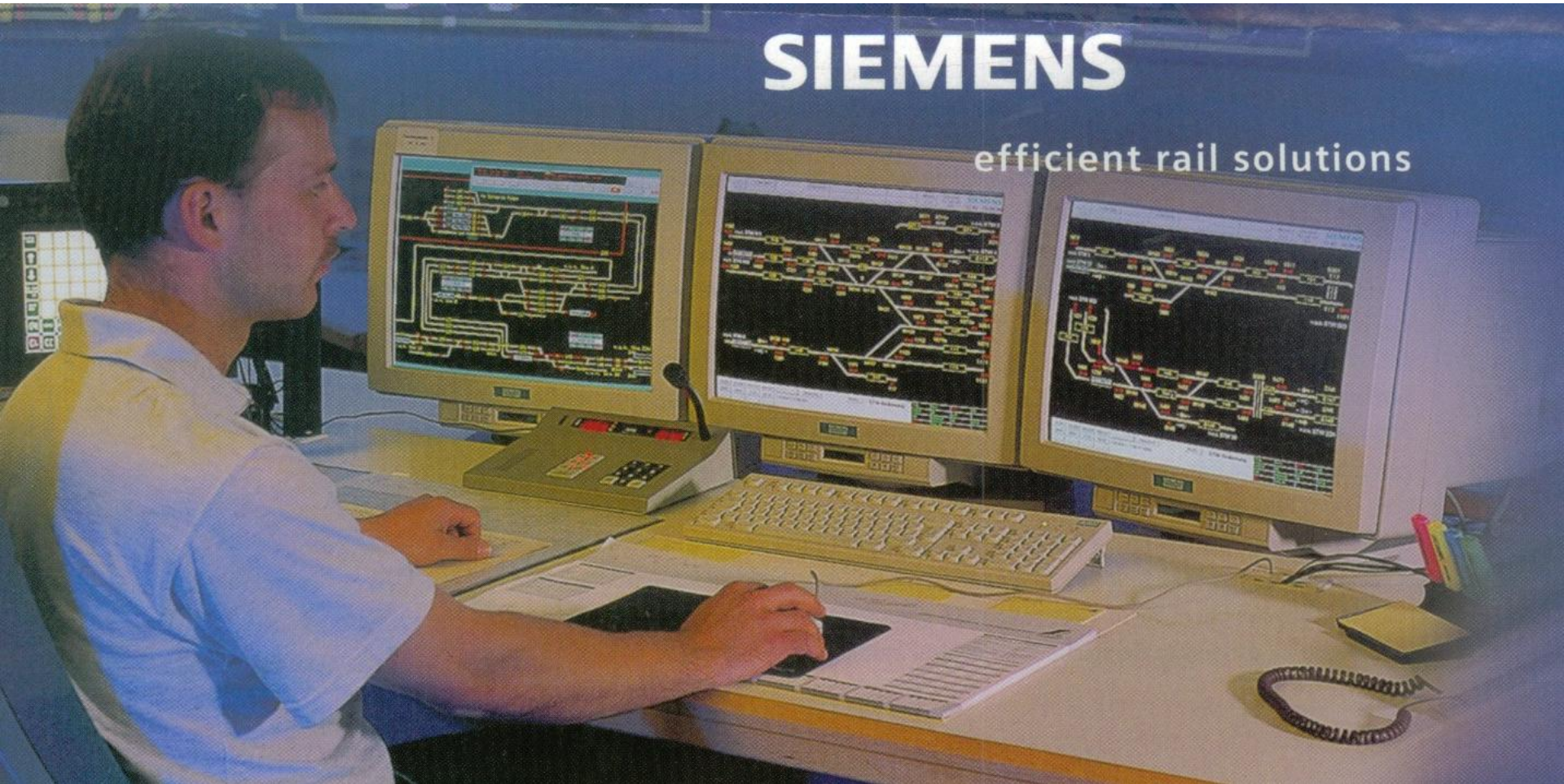
- CTC
 - Dispatcher throws switches
 - Machine clears signals
 - Used for heavily traveled single track lines
 - Handle approx. 70% of ABS double track



Above: Dispatchers control the movement of trains over hundreds, sometimes thousands, of miles of railroad lines from a central office. This dispatcher is in Forth Worth, Texas. She is dispatching a train in Chicago, Illinois. (BNSF photo)

SIEMENS

efficient rail solutions



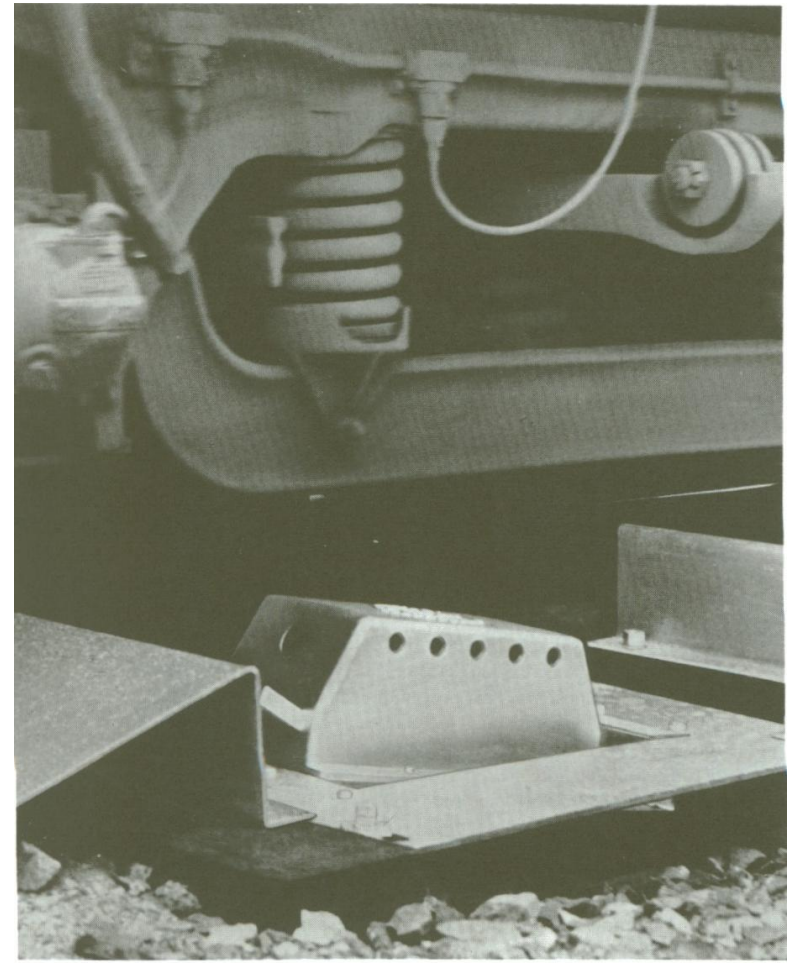
- Microwave
- APB
- Conflicting
- Control Center
- Computer Controlled

- Communications – helps with MBC
 - Telegraph
 - Wayside telephone
 - Portable radio
- DTC
- TWC



- Advanced Train Control (GPS, etc.)
- Positive Train Separation
 - Network
 - Fiber-Optic
 - Own System line and radio

- Other
 - Grade Crossing Protection
 - Hot Box / Dragging Detection
 - Wheel Impact
 - AEI



Stop, look, and listen at highway/rail grade crossings, and never walk around crossing gates that are down. They are blocking the tracks for only one reason: A train is approaching!

(Norfolk Southern photo)





**Hotbox/dragging
equipment
detector
installation**

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4013	No. 2	8.7	
KC93.4		James	
4014		2.7	
KC96.1		North Cabin	
4015		0.5	
KC96.6		Winchester	
		0.6	
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4016	No. 1	1.1	
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4036	No. 1	6.7	
C171.7	No. 2	Dortha	
		0.3	
C172.0		KD Subdivision	
<p>177.1 MILES SPRING LAKE TO CORBIN TERMINAL</p>			

70.0 OLD ROAD SUBDIVISION-OD

71.0 STATIONS LISTING AND DIAGRAM

1. The distance between MP W39.0 and MP W50.0 is 1.0 mile. Mile Posts 40 through 49 have been removed.
2. The distance between MP W93.0 and MP W97.0 is 0.8 mile. Mile Posts 94 through 96 have been removed.
3. The distance between MP W101.0 and MP VB99.0 is 1.6 miles.

MP/ Ctr Pt	↓ SOUTH ↓	STATIONS	SDG CAP (Ft)
W12.6	LCL SD	HK Tower	
W23.2		10.6 Simpsonville	1627
W30.6	BLOOMFIELD BRANCH	7.4 Bloomfield Jct.	
W31.1		0.5 Shelbyville	
W50.3		9.2 Lewis	5615
W64.8		14.5 West Frankfort	3835
W65.4		0.6 Frankfort	
W70.9		5.5 Jett	1819
W80.9		10.0 McKee	3290
W93.0	YD NS	12.1 Lexington	
VB104.7		10.8 Avon	
VB113.8	CC SD	9.1 North Cabin	
88.0 MILES HK TOWER TO NORTH CABIN			