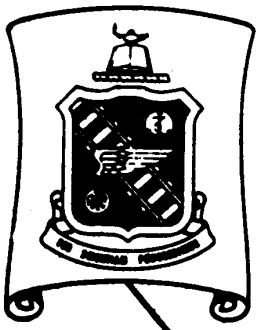
CORRESPONDENCE COURSE OF THE
U. S. ARMY
TRANSPORTATION SCHOOL



RAIL OPERATIONS, DISPATCHING

LESSON BOOKLET
TRANS SUBCOURSE 638

THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM

AIPD

READINESS/ PROFESSIONALISM

THRU GROWTH

Important: Electronic Examination Information

This paper subcourse does not contain the examination. The examination response sheet is included only as a mailing label. You must go to the following web site to complete the examination and submit it for grading.

http ://www .aimsrdl.atsc.army.mil/accp/accp_top.htm

Registered students (those with ACCP userids and passwords) should key in the userid and password to LOGON, then click on the EXAM button to access the examination.

Students who have not yet registered should click on the REGISTER button on the lower right corner of the screen. Follow directions to create a userid and password. Then click on the EXAM button to access the examination.

CORRESPONDENCE COURSE OF THE
U. S. ARMY TRANSPORTATION SCHOOL
SOLUTIONS

TRANS SUBCOURSE 638.....Rail Operations, Dispatching.

(All references are to Reference Text 638.)

LESSON 1

Weight	Exercise		Weight	Exercise	
2	1.	F. (par. 1.5)	3	17.	T. (par. 1.8d)
2	2.	T. (par. 1.8c)	3	18.	T. (par. 1.8d)
2	3.	F. (par. 1.10)	3	19.	T. (par. 1.8d)
2	4.	T. (par. 1.6)	3	20.	F. (par. 1.8d)
2	5.	T. (par. 1.5)	2	21.	T. (par. 1.7f)
2	6.	F. (par. 1.6)	2	22.	F. (par. 1.7e)
2	7.	T. (par. 1.3)	2	23.	F. (par. 1.7c)
2	8.	F. (par. 1.6)	2	24.	T. (par. 1.7e)
2	9.	T. (par. 1.3)	2	25.	T. (par. 1.7a)
2	10.	T. (par. 1.3)	2	26.	F. (par. 1.9)
2	11.	F. (par. 1.4)	2	27.	T. (pars. 1.8b, 1.9)
2	12.	T. (par. 1.4c)	2	28.	T. (par. 1.9)
2	13.	T. (par. 1.4c)	2	29.	F. (par. 1.9)
2	14.	T. (par. 1.4)	2	30.	T. (par. 1.9)
2	15.	F. (par. 1.4)	2	31.	F. (par. 1.5)
3	16.	T. (par. 1.8)	2	32.	T. (par. 1.5)

All concerned will be careful that neither this solution nor information concerning the same comes into the possession of students or prospective students who have not completed the work to which it pertains.

Weight	Exercise			Weight	Exercise		
2	33.	F.	(par. 1.5)	3	42.	D.	(par. 1.9)
2	34.	T.	(par. 1.5)	3	43.	B.	(par. 1.10)
2	35.	F.	(par. 1.5)	2	44.	C.	(par. 1.7d)
2	36.	F.	(par. 1.10b)				When a train loses its markers, it is no
2	37.	T.	(par. 1.10c)				longer a train.
2	38.	T.	(par. 1.10a)	2	45.	C.	(par. 1.8c)
2	39.	F.	(par. 1.10a)				Single-lining is running against the
2	40.	T.	(par. 1.10a)				current of traffic.
3	41.	B.	(par. 1.10)	2	46.	A.	(par. 1.3)

LESSON 2

2	1.	F.	(par. 3.8)	2	13.	T.	(par. 2.9)
2	2.	T.	(par. 2.3)	2	14.	F.	(par. 2.9)
2	3.	F.	(par. 3.13)	2	15.	T.	(par. 2.9)
2	4.	T.	(par. 3.13)	2	16.	F.	(par. 2.9)
2	5.	F.	(par. 3.13)	2	17.	T.	(par. 2.9)
2	6.	T.	(par. 3.13)	2	18.	F.	(par. 3.3)
2	7.	F.	(par. 3.13)	2	19.	F.	(par. 3.3)
2	8.	T.	(par. 2.5)	2	20.	F.	(par. 3.3)
2	9.	T.	(par. 2.5a)	2	21.	T.	(par. 3.3)
2	10.	F.	(par. 2.5a)	2	22.	T.	(par. 3.3)
2	11.	F.	(par. 2.5a)	2	23.	F.	(par. 2.6)
2	12.	T.	(par. 2.5d)	2	24.	F.	(par. 2.6b)

Weight	Exercise		
2	25.	F.	(par. 2.6d)
2	26.	T.	(par. 2.6b)
2	27.	T.	(par. 2.6a)
2	28.	T.	(par. 2.2)
2	29.	T.	(par. 2.2)
2	30.	F.	(par. 2.2)
2	31.	T.	(par. 2.2)
2	32.	F.	(par. 2.2)
2	33.	T.	(par. 2.12)
2	34.	F.	(par. 2.12)
2	35.	T.	(par. 2.12)
2	36.	T.	(par. 2.12)
2	37.	F.	(par. 2.12)
2	38.	E.	(par. 2.10)
2	39.	B.	(par. 2.8)
2	40.	D.	(par. 2.5)
2	41.	C.	(par. 2.11a)
2	42.	A.	(par. 2.7)
2	43.	A.	(par. 3.12)
2	44.	C.	(par. 3.11)
2	45.	B.	(par. 3.10)
2	46.	A.	(par. 2.11a)
2	47.	C.	(par. 3.4e(2), footnote)
2	48.	B.	(app. II)
2	49.	C.	(app. II)
2	50.	B.	(app. II)

LESSON 3

Weight	Exercise		
1	1.	F.	(par. 4.6)
1	2.	F.	(par. 4.3a(2))
1	3.	T.	(par. 4.4a)
1	4.	T.	(par. 4.3a(1))
1	5.	T.	(par. 4.5)
2	6.	T.	(par. 4.8e)
2	7.	F.	(par. 4.8e)
2	8.	T.	(par. 4.8e)
2	9.	F.	(par. 4.8e)
2	10.	F.	(par. 4.8e)
1	11.	F.	(par. 4.11a)
1	12.	T.	(par. 4.11b)
1	13.	T.	(par. 4.10a)
1	14.	F.	(par. 4.11a)
1	15.	T.	(par. 4.11a)
2	16.	F.	(par. 4.3d)

Weight	Exercise		
2	17.	T.	(par. 4.4a)
2	18.	T.	(par. 4.4a)
2	19.	F.	(par. 4.4a)
2	20.	T.	(par. 4.3d)
2	21.	F.	(par. 4.10a)
2	22.	F.	(par. 4.10b)
2	23.	T.	(par. 4.10a)
2	24.	F.	(par. 4.10b)
2	25.	T.	(par. 4.10a)
1	26.	T.	(par. 4.9)
1	27.	T.	(par. 4.9b)
1	28.	F.	(par. 4.9a)
1	29.	F.	(par. 4.9b)
1	30.	T.	(par. 4.9b)
2	31.	T.	(par. 4.3c)
2	32.	T.	(par. 4.3a(3))
2	33.	T.	(pars. 4.3c, 4.5)
2	34.	T.	(par. 4.3c)
2	35.	F.	(par. 4.3d)
2	36.	F.	(par. 4.7a)
2	37.	T.	(par. 4.7a)
2	38.	F.	(par, 4.7a)
2	39.	T.	(par. 4.7)
2	40.	F.	(par. 4.7a; footnote)
2	41.	T.	(par. 4.8d)
2	42.	T.	(par. 4.8a)
2	43.	F.	(par. 4.8e)
2	44.	F.	(par. 4.8)
2	45.	T.	(par. 4.8b)
2	46.	T.	(par. 4.7a)
2	47.	F.	(par. 4.7a; footnote)
2	48.	F.	(par. 4.7a)
2	49.	F.	(pars. 4.2a, b, 4.7a; footnote)
2	50.	T.	(par. 4.7a; footnote)
2	51.	F.	(par. 4.7)
2	52.	F.	(par. 4.6)
2	53.	T.	(par. 4.6)
2	54.	F.	(par. 4.6)
2	55.	T.	(par. 4.6)
1	56.	B.	(par. 4.3a(1))
1	57.	A.	(par. 4.3a(3))
1	58.	C.	(par. 4.4a)
1	59.	B.	(par. 4.3a(2))
1	60.	B.	(par. 4.3a(1))

LESSON 4

Weight	Exercise	Weight	Exercise
1	1. T. (par. 5.4)	2	22. T. (par. 5.7)
1	2. F. (par. 5.4)	2	23. F. (par. 5.7)
1	3. F. (app. III, rule 206(8))	2	24. T. (par. 5.7)
1	4. F. (app. III, rule 200)	2	25. T. (par. 5.18)
2	5. T. (app. III, rule 206(6))	2	26. T. (par. 5.18)
2	6. F. (app. III, rule 206(4))	2	27. F. (par. 5.19)
2	7. F. (app. III, rule 206(5))	2	28. T. (par. 5.18)
2	8. F. (app. III, rule 206(1))	2	29. F. (par. 5.19)
2	9. F. (app. III, rule 206(6))	2	30. T. (par. 5.8)
2	10. T. (par. 5.6)	2	31. T. (par. 5.8)
2	11. F. (par. 5.6)	2	32. F. (par. 5.8)
2	12. T. (par. 5.6)	2	33. F. (par. 5.8)
2	13. T. (par. 5.6)	2	34. F. (par. 5.8)
2	14. F. (par. 5.6)	2	35. F. (par. 5.9)
2	15. T. (par. 5.5d)	2	36. T. (par. 5.9)
2	16. T. (par. 5.5c)	2	37. F. (par. 5.9)
2	17. T. (par. 5.5c)	2	38. T. (par. 5.9)
2	18. F. (par. 5.5c; app. III, rule 208(2))	2	39. F. (par. 5.9)
2	19. F. (par. 5.5c)	2	40. F. (app. III, rule 204(3))
2	20. F. (par. 5.7)	2	41. T. (app. III, rule 204(4))
2	21. T. (par. 5.7)		

Weight	Exercise
2	42. T. (app. III, rule 204(3))
2	43. F. (app. III, rule 204(2))
2	44. F. (app. III, rule 204(1))
1	45. A. (par. 5.20)
1	46. E. (par. 5.21)
1	47. D. (par. 5.23)
1	48. F. (par. 5.24)
1	49. J. (par. 5.11)
1	50. I. (par. 5.14)
1	51. H. (par. 5.28)
1	52. B. (par. 5.22)
2	53. D. (par. 5.1)
2	54. A. (app. III, rule 201(2))
2	55. A. (par. 5.13)
2	56. C. (par. 5.10)

Dispatchers on Duty

1. J. A. Brice, SGT from 2330 M. to 0730 M.
2. ______ from ______ M. to ______ M.
3. ______ from ______ M. to ______ M.
4. ______ from ______ M. to ______ M.
5. ______ from ______ M. to ______ M.
6. ______ from ______ M. to ______ M.

DISPA

WEST / SOUTH WARD

U.S. GOVERNMENT PRINTING OFFICE

(Col 8)

Extra
9510
Wise
Terry
Kime
Wagner
Johns
1715
1900

1230/11,200
1800
1809
1822
1831
1842

DELAYS

[For quick reference, delays are shown on the face rather than on the reverse of this sample]

Extra 4220 West delayed 10 minutes at Conroy making air test
Extra 4220 West delayed 20 minutes at RK meeting Extra 205 East
Extra 4220 West delayed 30 minutes at BO setting off cars
Extra 194 West delayed 15 minutes at Conroy making air test

(Read down)

LOCATION OF STAFF

NAME	LOCATION

{Column headings and other parenthetical notes are shown merely for quick identification when reading the text.}

1. Weather conditions a... in each dispatching ...
2. Each train dispatche...
3. The A.M. or P.M., as...
4. The number of cars i...
5. Time of trains passir... departing time shall ...
6. Interruptions - delays...

DA FORM 1 JAN 45 55-205 REPLACES WD TC MRS FORM 200 UNDATED WHICH IS OBSOLETE

TCHERS' RECORD OF TRAIN MOVEMENTS

(TM 55-206)

714th RAILWAY OPERATING BATTALION

{SINGLE TRACK} Conroy (PLACE) 15 Mar (DATE), 1976 C.

(Col 6)		(Col 4)	(Col 2)	Kilometers	TRAIN SYMBOL	SIDING CAPACITY	(Col 1)	(Col 3)		(Col 5)
										Psgr
xtra		Extra	Extra		Train		Extra	Extra		34
550		194	4220		Engine		205	210		222
uck		Ramsey	Hamilton		Conductor		Sands	Locke		Port
osh		eall	Brown		Brakeman		Keens	Sims		Saul
odd		Doak	Smith		Brakeman		Wilkes	Tear		Singer
ele		Booker	Jones		Engineer		Linder	Jones		Wilde
en		Alsop	Herman		Fireman		Boyle	Black		Sellar
645		0430	0130		Time Reported		0030	0415		1630
			0530		Time Relieved		0430			1915
					Stations					
90/3 7820		1010 3300	1210 1456							
		0515	0210	0.0	Conroy	Yard	0420			
		0525	0218	7.9	DN	140	0410			
		0540	0234	27.1	BL	150	0350			2025
		0548	0250	37.5	MD	150	0338			2005 2000
		0553	0310 0330	49.8	RK	140	0325			1920 1917
			0349	61.3	OG	135	0313			1904 1900
			0352	71.8	WD	80	0300			1850 1841
			0400	81.0	FY	115	0250			1811
			0420 0440	99.2	BO	135	0230 0215 1005/1400	0537		1800 1735
			0500	119.1	LY	120	0150	0523		1722 1717
			0518	131.9	AY	65	0125	0508		1704
			0522	137.0	MAXEY	Yard	0115 [illegible]	0500 [illegible]		1700
		(Read down)	(Read down)				(Read up)	(Read up)		(Read up)

Fey [illegible]

Extra 2

Extra 2

Extra 2

INSTRUCTIONS

l temperatures shall be reported at least once in six hours by and recorded for at least one station strict, and shall be recorded for such other stations as report weather conditions

shall sign his name and record the time of going on and off duty in space provided.

he case may be, shall be shown at the initial and final time of each movement

each train shall be shown at least at one station, and at such other stations as may be required

reporting stations shall be recorded; where trains stop at reporting stations, both arriving and recorded.

occurrences of military or historical interest will be shown on back of sheet.

REC

STATION	12:01 A. M.
DN	Cold - Snowing
RK	Clear - Cold
WD	Cold - Light Snow
BO	Cold - Heavy Snow
AY	Cold - Snow + Sleet

SAMPLE

ANNEX B
REFERENCE TEXT 538
RAIL OPERATIONS DISPATCHING
MARCH 1976

C. O.

M. Wilson, Capt. TC
Chief Dispatcher.

EAST [redacted] WARD

DELAYS

ck reference, delays are shown on the face
thon the reverse of this sample]

5 East delayed 15 minutes at Maley making air test

5 East delayed 15 minutes at Ao making setoff

2 East delayed 15 minutes at Maley making air test

ORD OF WEATHER

6:00 A. M.	12:01 P. M.	6:00 P. M.

Dispatchers on Duty

1. B Seltzer Sgt from 2330 M. to 0730 M.
2. B Cline, Sgt. from 0730 M. to 1530 M.
3. _____ from _____ M. to _____ M.
4. _____ from _____ M. to _____ M.
5. _____ from _____ M. to _____ M.
6. _____ from _____ M. to _____ M.

DISPA

WEST WARD

DELAYS

[For quick reference, delays are shown on the front rather than on the reverse of this sample.]

Extra 9519 West delayed 15 minutes at Conway making air test

Extra 9570 west delayed 15 minutes at Conway making air test

LOCATION OF STAFF

NAME	LOCATION

Column headings and other parenthetical notes are shown merely for quick identification when reading the test.

1. Weather conditions in each dispatching
2. Each train dispatch
3. The A.M. or P.M., a
4. The number of cars
5. Time of trains pass departing time shall
6. Interruptions - de

TCHERS' RECORD OF TRAIN MOVEMENTS

(TM 55-206)

714th RAILWAY OPERATING BATTALION

{DOUBLE TRACK}

Conroy (PLACE) 22 Mar, 1976 (DATE)

(Col 8)	(Col 6)	(Col 4)	(Col 2)	Kilometers	TRAIN SYMBOL	Siding Capacity	(Col 1)	(Col 3)	(Col 5)	(Col 7)
	Psgr	Psgr						Psgr	Psgr	
Extra	85	61	Extra		Train		Extra	62	86	Extra
9570	370	851	9519		Engine		1990	420	450	2520
…oors	Greg	Crosby	Merty		Conductor		Brown	Locke	Neal	Nichols
…ate	Morgan	Wills	Neal		Brakeman		Jones	Sims	Teer	Watts
…art	Pugh	Poole	Clark		Brakeman		Hunt	Tapper	Snow	Burt
…ark	Rouse	Dooks	Dunk		Engineer		Frone	Conn	Lane	Lewis
…yne	Lewis	Job	Ramsey		Fireman		Carr	Blow	Knox	Blue
…845	0800	0541	0200		Time Reported		0100	0580	0840	0900
	1015	0930	0530		Time Relieved		0530	0820	1100	
					Stations					
30	0800	0611	0245	0.0	Conroy	Yard	0512	0807	1047	
40	0809	0619	0255	7.9	DN	45/70	0500	0800	1040	
	0851	0637 / 0636	0317	27.1	BL	75/0	0433	0714 / 0712	1027	
	0857	0646 / 0648	0331	37.5	MD	53/72	0419	0733 / 0731	1020	
	0905 / 0907	0658 / 0700	0343	49.8	RK	42/83	0358	0722 / 0720	1012 / 1010	
	0915	0710 / 0712	0359	61.3	OG	80/0	0349	0711 / 0709	1005	
	0923	0720 / 0722	0419	71.8	WD	0/94	0330	0702 / 0700	0958	
	0927	0730 / 0732	0419	81.0	FV	80/115	0320 / 0253	0650 / 0648	0953	
	0936 / 0938	0745 / 0747	0428	99.2	BO	37/72	0240	0634 / 0632	0939 / 0937	1016
	0950	0803 / 0805	0444	117.1	LY	65/35	0218	0618 / 0616	0927	0957
	1000	0815 / 0817	0503	131.9	AY	75/65	0157	0606	0916	0940
	1007	0823	0515	137	MAXEY	Yard	0145	0600	0910	0910
	(Read down)	(Read down)	(Read down)				(Read up)	(Read up)	(Read up)	(Read up)

SAMPLE

INSTRUCTIONS

d temperatures shall be reported at least once in six hours by and recorded for at least one station strict, and shall be recorded for each other stations as report weather conditions.

shall sign his name and record the time of going on and off duty in space provided.

the case may be, shall be shown at the initial and final time of each movement.

each train shall be shown at least at one station, and at such other stations as may be required.

reporting stations shall be recorded; where trains stop at reporting stations, both arriving and r recorded.

vances … y or historical interest will be shown on back of sheet.

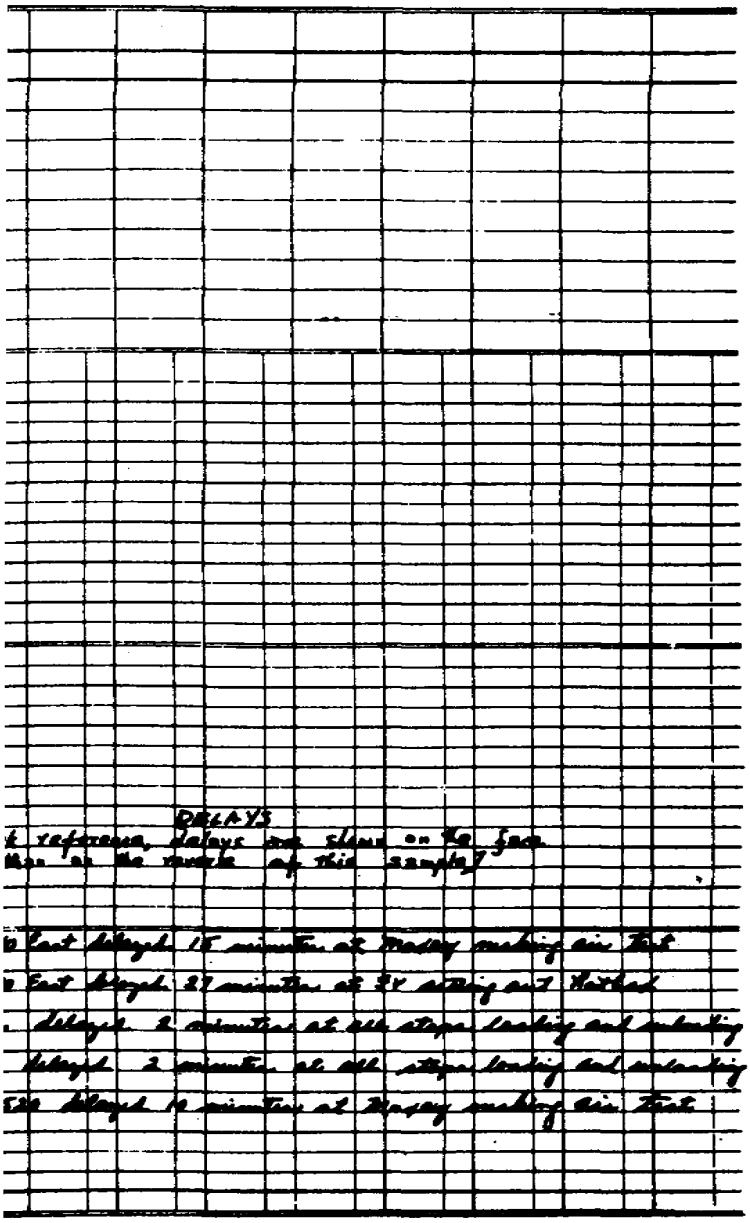
REC

STATION	12:01 A. M.
DN	Clear - Cold
RK	Clear - Cool
WD	Cloudy - Windy
BO	Cool - Light Rain
AY	Raining - High Winds

C. O.

J. R. Wilson, Cpt. TC.
Chief Dispatcher.

EAST [redacted] WARD



ORD OF WEATHER

6:00 A. M.	12:01 P. M.	6:00 P. M.
Clear - Cold		
Clear - Cold		
Clear - Cool		
Cloudy - Cool		
Heavy Rain - Cool		

RAIL OPERATIONS, DISPATCHING
SUBCOURSE TR0638
EDITION 6

14 CREDIT HOURS

INTRODUCTION

He has often been described as the mastermind behind the movement of all freight and passenger trains over a railroad division. He remains entirely in the background; however, his influence is exerted through all tower and station operations along the way who copy and deliver his instructions to the passing train crews. He is the train dispatcher.

Single-track railroading does not change geographically; however the inherent danger in operating opposing trains on the same track does not lessen with the locale. Planning well in advance, exercising a keen mind, issuing proper orders, and making certain they are understood represent the contribution a train dispatcher can make to safe, efficient train movement. Properly interpreting and executing the orders rest with the road crews hauling the moving trains.

While no text can possibly qualify you as a train dispatcher, an understanding of the fundamentals of the subject should place you in a better position to carry out any military assignment you may receive that involves moving troops and supplies by rail. The scope of this subcourse covers the basic principles and fundamentals of dispatching; the duties of those in the dispatch office; dispatcher communications; the right and superiority of trains; and samples of different train orders.

This is a four-lesson subcourse, including four lesson exercises, lesson solutions and an examination:

	Credit Hours
Lesson 1 - Principles	3
Lesson 2 - Documents, Staff, and Communications	3
Lesson 3 - Superiority of Trains	3
Lesson 4 - Train Orders	3
	2

To complete this subcourse, you must--

- Study the text material assigned for each lesson.
- Answer each question in all the lesson exercises.
- Check your answers against the solutions if you answered any question incorrectly. Study the reference and evaluate all possible exercise solutions; make sure you understand why the correct answer is the best choice.
- After completing the lesson exercises to your satisfaction, complete the examination.

Text and Materials Furnished: Trans Subcourse TR0638, Rail Operations, March 1976, with annexes A through D.

LESSON 1.....	Principles.
CREDIT HOURS.....	3.
TEXT ASSIGNMENT.....	Reference Text 638, pars. 1.1-1.11; annex A.
MATERIALS REQUIRED.....	None.

LESSON OBJECTIVE..... To enable you to explain fundamental principles of train dispatching and the different methods of dispatching used when the number of main tracks varies.

SUGGESTIONS..... None.

EXERCISES

Weight True-False

(Write T or F beside each question.)

2 1. Centralized Traffic Control is used primarily on double track.

2 2. In single-lining, you get a train around an obstruction by running it against the current of traffic.

2 3. In a CTC system, a train crew must know in advance its exact path of travel.

2 4. The timetable authorizes a first-class train to proceed according to schedule.

2 5. In a theater of operations, troop trains may be assigned a higher priority than passenger trains.

Cluster True-False

(Each of the following groups of questions is related to the statement that precedes them. Write by each question T or F.)

FIRST GROUP

With regard to train orders, it is true that they:

2 6. Are delivered to the engine and train crew by the dispatcher.

2 7. May be either helpful or restrictive.

2 8. Tell a crew what not to do.

2 9. Contain the dispatcher's instructions.

Weight

2 10. Help to operate the trains not listed in the timetable.

SECOND GROUP

Of operating rules 86 and S-87, you learned that they:

2 11. Are taken word for word from the standard rules that all rail lines use.

2 12. Are superseded when train orders conflict with them.

2 13. Both apply to extra trains.

2 14. Both apply to single tracks.

2 15. Both apply to double tracks.

THIRD GROUP

To accomplish a single-lining movement on double track involving a stalled westbound train, a first-class westbound train, and a second-class eastbound train, the dispatcher would probably:

3 16. Hold the eastbound train.

3 17. Issue a form D-R order and a form J order.

3 18. Annul the holding order when the single-lining is completed.

3 19. Permit the least delay possible to the first-class train.

3 20. Permit the eastbound train to run against the current of traffic.

FOURTH GROUP

Of the single-track example is paragraph 1.7 involving an eastbound extra, a westbound first-class train, and a westbound extra, it is true that:

2 21. After the meet, the eastbound extra proceeded to OG under the authority of rule S-87.

Weight

2 22. To accomplish this meeting and passing, the first-class train would need train orders.

2 23. The westbound extra would take the eastbound siding at the meeting point.

2 24. The train orders of the two extras would not affect the first-class train.

2 25. Train No. 9 is operating strictly according to the timetable.

FIFTH GROUP

In your study of multiple-track systems, you learned that:

2 26. The dispatcher usually refuses to switch a train from high- to low-speed track.

2 27. If both tracks in one direction were blocked or unsafe, it would be necessary to run against the current of traffic.

2 28. Fast freights and express trains must run as fast as passenger trains when using high-speed tracks.

2 29. High-speed tracks are used exclusively by passenger trains.

2 30. High-speed tracks normally are on the outside.

SIXTH GROUP

In a theater of operations, train dispatching is characterized by which of the following?

2 31. Passenger trains maintain the highest priority.

2 32. A phase of operations may exist wherein civilians operate the railroads while the military controls them.

2 33. Heavy trains at high speed are necessary.

2 34. Damaged rail facilities may necessitate a change in the dispatching method used.

Weight

2 35. The method of dispatching differs little from that used on commercial railroads.

SEVENTH GROUP

Among the dispatching operations which can be accomplished from the CTC board are:

2 36. Changing a train's permissive route after the signal becomes visible to the engineer.

2 37. Allowing two trains to pass without stopping either.

2 38. Directing a train into a siding.

2 39. Observing the progress of trains on other divisions.

2 40. Checking on a train's speed.

Matching

The four basic types of rail operation have individual characteristics which affect dispatching methods. Column I lists some of the individual characteristics and column II lists the types of rail operation. Match the types in column II with their characteristics in column I by writing the proper letter beside the question. Choices in column II may be used once, more than once, or not at all.

	Column I	Column II
3	41. Can provide nonstop meets by remote control.	A. Single track.
		B. CTC.
3	42. Provides both high- and low-speed tracks.	C. Double track.
3	43. Is the simplest rail operating method of the four.	D. Multiple track.

Analytical

Using the following key, state your reaction to each of the next three questions by writing the proper letter by each question.

Weight

A. The underscored statement is true, and the reason for it or result of it is true.

B. The underscored statement is true, but the reason or result is false.

C. The underscored statement is false.

2 44. If the caboose loses its markers, a train can still fulfill a meet because a train still exists.

2 45. Current of traffic is the same as single-lining when the superior direction is eastbound.

2 46. The timetable establishes the class and directional superiority of trains, but train orders may amend, annual, or supersede it.

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 638 Rail Operations, Dispatching.

LESSON 2 Documents, Staff, and Communications.

CREDIT HOURS 3.

TEXT ASSIGNMENT Reference Text 638, pars. 2.1-3.14; appendix II; and annexes B, C, and D.

MATERIALS REQUIRED None.

LESSON OBJECTIVE To enable you to explain how some of the important records of the dispatching office are maintained, what the duties of dispatching office personnel are, and how the dispatcher communicates with others.

SUGGESTIONS None.

EXERCISES

Weight — True-False

(Write T or F beside each question.)

2 1. The TRS installs and maintains any radio facilities authorized for its use in a theater.

2 2. Each employee engaged in train operation must possess a copy of the current employees' timetable.

Cluster True-False

(Each of the following groups of questions is related to the statement that precedes them. Write T or F by each question.)

FIRST GROUP

When the dispatcher uses the fleet operation method, it is true that:

Weight

2 3. Operations are being conducted on double track.

2 4. Every train would be operating as an extra.

2 5. Communication facilities would be operational.

2 6. Its use is generally limited to a theater of operations.

2 7. The last train in a specified direction would run without train orders.

SECOND GROUP

The train sheet is a written record that:

2 8. Shows at a glance how each train is faring.

2 9. Shows the OS time in such a way that the dispatcher can easily change meeting points.

2 10. Indicates the westbound trains in the columns to the right of the station call letters.

2 11. Has the OS time of westbound trains reading from bottom to top.

2 12. Includes a column for weather entries from the various stations.

THIRD GROUP

Basic problems of the dispatcher in getting trains over the road on schedule include:

2 13. Keeping extra trains rolling to prevent their stalling.

2 14. Keeping extra trains sidetracked as much as possible.

2 15. Preventing the delay of first-class trains by extras.

2 16. Keeping extras moving fast when they are hauling expedite tonnage.

Weight

2 17. Avoiding the necessity of pusher assistance from other engines.

FOURTH GROUP

If a dispatcher were sending a train order over the wire, it would be permissible to interrupt him to:

2 18. Ask if No. 6 will be displaying signals.

2 19. Ask the correct time if your watch had stopped.

2 20. Inquire if No. 4 were on time.

2 21. Report a wreck.

2 22. Report a condition that might affect the order he is sending.

FIFTH GROUP

Concerning the methods employed by the dispatcher in handling extra trains, it would be correct to state that:

2 23. The crew of an extra is unaware of the presence of scheduled trains except through train orders.

2 24. The dispatcher determines the actual meeting point of two opposing trains in the first meet order.

2 25. Two extras in opposing directions generally average the same number of kilometers in a specified period of time.

2 26. When a dispatcher permits extra trains to oppose each other, he gives both trains a meet order.

2 27. A dispatcher does not simply run an extra train--he creates it.

SIXTH GROUP

It is true of the employees' timetable that it:

2 28. Lists the locations of passing sidings and their capacities.

Weight

2 29. May interpret some of the railroad's standard rules.

2 30. Lists company dentists and podiatrists.

2 31. Indicates reduced speed areas.

2 32. Seldom includes instructions on how to proceed in special situations.

SEVENTH GROUP

Regarding distributing cars in a theater of operations, it is true that:

2 33. The procedure is extremely different from that followed in peacetime.

2 34. Adherence to boxcar classification is strictly enforced.

2 35. All cars must be unloaded immediately when received at forward points.

2 36. It is vital to keep all empty cars moving from front to rear areas for reloading.

2 37. A surplus of empty cars usually exists.

Matching

A number of key personnel in the dispatching office are concerned with the orderly and efficient dispatching of trains and with maintaining important records and reports. Column I outlines some of the duties or qualifications of the personnel; column II lists some of these individuals. Match the individuals listed in column II with the duties or qualifications in column I by writing the proper letter beside the question. Choices in column II may be used once, more than once, or not at all.

Column I	Column II
2 38. Receives consists of trains moving toward his terminal.	A. Chief dispatcher.

Weight

	Column I	Column II
2	39. Must relieve a trick dispatcher in an emergency.	B. Assistant chief dispatcher.
2	40. Maintains train sheet.	C. Car distributor.
2	41. Advises when trains of empties are to be moved.	D. Train dispatcher.
2	42. Is in charge of a division terminal's dispatching office.	E. Telegraph operator.

Multiple Choice

(Each question in this group contains one and only one correct answer. Make your choice by circling the proper letter.)

2 43. The three parts of a radiotelephone message are:

A. The heading, text, and ending.
B. The call sign of the station called, the proword THIS IS, and the call sign of the calling station.
C. OVER, ROGER, and WILCO.
D. The heading, the proword MESSAGE FOLLOWS, and the ending.

2 44. Procedure words may be described as those words or phrases used:

A. In the phonetic alphabet.
B. Exclusively in the heading of a radio message.
C. As a substitute for one or more sentences in any part of a radio message.
D. Exclusively on the dispatcher's telephone circuit.

2 45. Along with other members of the military services, the TRS uses _____ in radiotelephone transmission.

A. International Morse Code.
B. International Civil Aviation Organization phonetic alphabet and numerals.
C. International Telephone and Telegraph phonetic code.
D. Western Union's phonetic alphabet and numerals.

Weight

2 46. On the average railroad, in what way are empty cars handled? They:

A. May be moved along the railroad in stages if moved toward a point where they will be loaded eventually.
B. Are reported on a separate situation report when they have not been switched.
C. Are stored at one point and moved only as required for loading.
D. Are requested by individual shippers on a form sent directly to the train dispatcher.

2 47. If a crew sees a signal giving a "yellow block, " it should:

A. Reduce speed to 5 kph.
B. Stop for train orders.
C. Proceed, prepared to stop at next signal.
D. Expect a message to be delivered at the next station.

SITUATION

A railroad's employees' timetable is a ready source of information for its personnel. Appendix II of the reference text contains the employees' timetable for the Elwood division.

REQUIREMENT

Answer the following three multiple-choice questions on the basis of the employees' timetable in appendix II. Each question contains one and only one correct answer. Make your choice by circling the proper letter.

2 48. Elwood division's longest siding has a capacity of _____ cars.

A. 109.
B. 115.
C. 125.
D. 133.

Weight

2 49. According to the speed restrictions in the Elwood division timetable, the authorized speed when passing or meeting trains on opposing tracks is _____ kph.

A. 25.
B. 35.
C. 40.
D. 50.

2 50. Siding capacity estimates in the Elwood division are based on trains having:

A. 60 percent of 50-foot cars and 40 percent of shorter cars.
B. 80 percent of 40-foot cars and 20 percent of longer cars.
C. 82 percent of 50-foot cars and 18 percent of shorter cars.
D. 85 percent of 40-foot cars and 15 percent of longer cars.

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 638.....Rail Operations, Dispatching.

LESSON 3.....Superiority of Trains.

CREDIT HOURS.....3.

TEXT ASSIGNMENT.....Reference Text 638, pars. 4.1-4.12.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to explain the superiority of trains and to cite specific examples of how right, class, direction govern the handling of trains.

SUGGESTIONS.....None.

EXERCISES

Weight — True-False

(Write T or F beside each question.)

1 1. When a freight extra has more than one engine, both display white flags by day.

1 2. Class is superior to right.

1 3. The class of a train may be taken away from it if the dispatcher decides to run it as an extra.

1 4. Right is conferred by train order; class and direction by timetable.

1 5. Time and symbol freights are sometimes permitted to run ahead of slow passenger trains.

Cluster True-False

(Each of the following groups of questions is related to the statement that precedes them. Write by each question T or F.)

Weight

FIRST GROUP

In the example in paragraph 4.8e, the flagman whose faulty memory caused a bad wreck could have averted it if he had:

2 6. Complied with rule 108.

2 7. Kept completely out of sight of the approaching train.

2 8. Remembered whether he was “in” or “out”.

2 9. Personally been able to learn from the dispatcher when to expect a train.

2 10. Protected against all scheduled westbound trains.

SECOND GROUP

A train loses its schedule when:

1 11. It is first class and is on time arriving at and 10 minutes late departing from a station.

1 12. The timetable changes and the train is not shown in the new timetable.

1 13. It is issued a run-late order by the dispatcher.

1 14. It is exactly 12 hours late arriving and only 11 hours 59 minutes late departing.

1 15. It arrives at a station more than 12 hours late.

THIRD GROUP

In your study of class and superiority of trains, you learned that:

16. An extra is usually superior to a fourth-class train going with the current of traffic.

2 17. An extra train has no class superiority.

Weight

2 18. Class cannot be raised or lowered by train order, but it can be taken away.

2 19. A second-class train may be changed to first-class by train order.

2 20. An extra is inferior to all regular trains.

FOURTH GROUP

From the discussion of the train orders often given to scheduled trains that are late, you learned that:

2 21. If a run-late order is issued and the engineer is told to run late the exact number of minutes he is behind schedule, he is free to make up the entire delay.

2 22. The run-late order cited in the text permits No. 19 to arrive at its destination earlier than does the wait order also shown.

2 23. If a train is late and no train orders are issued, the engineer can be allowed to make up some of the delay.

2 24. A wait order requires an engineer to make up the exact number of minutes specified by the dispatcher in the order.

2 25. When a dispatcher “puts out time” on a delayed train, his action may be helpful to inferior trains.

FIFTH GROUP

Concerning timetable schedules, it is true that:

1 26. A train order may help a train get back on schedule.

1 27. Yard crews must respect published schedules until they receive a train order directing otherwise.

1 28. A regular passenger train can run substantially ahead of schedule.

1 29. According to the example in paragraph 4.9, if a scheduled train were 5 minutes late at DN, BL, and MD (fig. 1.1), a crew at FV could expect the train to be late there also.

Weight

1 30. A timetable schedule cannot be permanently amended by train order.

SIXTH GROUP

According to the rules of train superiority, which of the following statements are true and which false?

2 31. A first-class train meeting a second-class one on a single track usually holds main track.

2 32. Direction is superior between trains of the same class.

2 33. A first-class train would be held to clear a second-class train if the latter had a train order giving it right.

2 34. In a single-track passing situation, a third-class westbound train would take siding to clear a second-class westbound one.

2 35. A westbound scheduled train must yield to an eastbound extra.

SEVENTH GROUP

A train order reading "Second 87 Eng 464 Run One Hour Late Conroy to Maxey" tells you that:

2 36. No. 87 has had trouble along the line.

2 37. An earlier train order had been issued to First 87.

2 38. First 87 would be an hour late at Maxey.

2 39. There are at least two sections to No. 87.

2 40. Green signals would be displayed if it is the last section.

EIGHTH GROUP

In connection with safe work-train operation, it is evident that:

2 41. Trains of superior class may have to protect against work trains in a theater of operations.

Weight

2 42. The work-train conductor must consult the timetable.

2 43. The flagman must flag the main track whenever the work train is in a siding.

2 44. Only scheduled trains need to be cleared without delay.

2 45. A work train may hold orders permitting it to work without protecting during certain hours.

NINTH GROUP

If you see a train composed of passenger coaches with green flags flying on the front of the locomotive, you would know that:

2 46. One or more sections are to follow and would bear a similar train number to the one you observed.

2 47. It would be safe to block the main after the train passed.

2 48. Only extra trains would be following on the same track until after dark.

2 49. It is superior by right, class, and direction.

2 50. It is a scheduled train with another section following.

TENTH GROUP

A train will be an extra if it:

2 51. Runs as the second section of a regularly scheduled first-class train.

2 52. Has green lights showing on the front of the locomotive.

2 53. Is run only when a yard has sufficient tonnage to justify its operation.

2 54. Is listed in the timetable.

2 55. Carries white flags on the front of the locomotive during daylight.

Weight | Matching

Right, class, and direction are the principles on which train dispatching is based. Column I contains statements which are true of right, class, or direction. Match the terms in column II with the statements in column I by writing the proper letter beside the question. Choices in column II may be used once, more than once, or not at all.

	Column I	Column II
1	56. Conferred by train order.	A. Direction.
1	57. Superior between trains of the same class.	B. Right.
		C. Class.
1	58. Cannot be reduced by train order.	
1	59. Superior to the other two designations.	
1	60. Not conferred by timetable.	

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 638.....Rail Operations, Dispatching

LESSON 4.....Train Orders.

CREDIT HOURS.....3.

TEXT ASSIGNMENT.....Reference Text 638, pars. 5.1-5.29; appendix II.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to (1) explain the various forms of train orders used in single- and double-track train dispatching; and (2) describe the extreme care necessary in transmitting, repeating, delivering, interpreting, and executing such orders.

SUGGESTIONS.....None.

EXERCISES

Weight — True-False

(Write T or F beside each question.)

1 1. Slow orders are usually in effect for a certain length of time.

1 2. A correct way of stating the time in a train order would be 1600 hours.

1 3. When handling train orders directly with the conductor or engineer, the "X" response must be used.

1 4. Train orders delivered by messenger have more authority than those issued by other means.

Cluster True-False

(Each of the following groups of questions is related to the statement that precedes them. Write T or F beside each question.)

Weight

FIRST GROUP

Rules for writing, relaying, and delivering train orders in appendix III include the following provisions:

2 5. The order must be sent to the relay office in the usual manner.

2 6. In transmitting train orders by telephone, the names of stations, sections, and direction of regular trains must merely be clearly pronounced.

2 7. The dispatcher underscores each word and figure in the order as he transmits it to the relay office.

2 8. When two or more engines are coupled, the numbers of both are used to designate the train.

2 9. The dispatcher gives "complete" directly to the destination office when a train order has been transmitted through a relay office.

SECOND GROUP

Concerning the use of the "X" response, it is true that it:

2 10. Is used to avoid delays to inferior trains.

2 11. Is used when the operator copying the order for the inferior train repeats the order last.

2 12. Is used in conjunction with orders involving at least two trains.

2 13. Changes the order to the superior train to a holding order.

2 14. May be given by two operators on the dispatcher's wire when both copy a train order.

THIRD GROUP

When a dispatcher transmits a train order to three operators:

Weight

2 15. The dispatcher underscores each word as each operator repeats it.

2 16. They copy the train order simultaneously.

2 17. The dispatcher writes the order in his train order book as he dictates to the operators.

2 18. The order is addressed first to the train farthest away to comply with rule 208.

2 19. They copy as much of the order as they need and deliver it to the trains involved.

FOURTH GROUP

Information found on the train register usually includes:

2 20. Train order instructions for arriving and departing trains.

2 21. Names of conductors on arriving and departing trains.

2 22. Type of signals displayed on a train, if any.

2 23. Names of engineers on all trains arriving and leaving.

2 24. Class and numbers of trains that have departed.

FIFTH GROUP

Concerning work trains and appropriate train orders for them, it would be correct to state that:

2 25. If the work-train crew is unable to comply with instructions to clear the main by a specified time, a flagman must protect the work train.

2 26. Work trains protect against other extra trains.

2 27. A train order that applies to a work train on double track would be termed a form D-J order.

2 28. A work train order should not tell the crew to protect against extras unless the crew has been previously told not to protect.

Weight

2 29. For maximum safety in work-train operation, the working limits should extend 10 km or more.

SIXTH GROUP

A train message is sometimes used to:

2 30. Caution an engineer about exceeding the speed limit.

2 31. Annul previous instructions from the dispatcher.

2 32. Relay information to a number of trains simultaneously.

2 33. Amend previously issued train orders.

2 34. Stop trains for orders which require signatures.

SEVENTH GROUP

It is true of the 19 and 31 orders that:

2 35. The operator is responsible for reading the 31 order to the flagman.

2 36. The 19 order is delivered by a message loop.

2 37. Military railroads are required to use them.

2 38. When the 31 order is delivered, the train must be stopped and the order signed for.

2 39. They are red and blue in color.

EIGHTH GROUP

According to rule 204 in appendix III, train orders are handled and distributed as follows:

2 40. Firemen are unconcerned with the contents of train orders.

2 41. Each engineer on a train should be supplied with a copy of all orders affecting the train.

Weight

2 42. If necessary, the brakeman should remind the engineer of the contents of a train order.

2 43. Orders addressed to operators restricting train movements are for their use only.

2 44. Train orders meant for a train are addressed to the train by engine number only.

Matching

The various forms of train orders each has a specific purpose of applicable condition, as listed in column I. The forms of train orders are listed in column II. Match a form of train order in column II with the purpose of condition listed in column I by writing the proper letter beside the question. Choices in column II may be used once, more than once, or not at all.

	Column I	Column II
1	45. When the dispatcher desires to hold a train.	A. Form J.
1	46. A schedule is being annulled.	B. Form L.
1	47. To annul part of an order on double track.	C. Form G.
1	48. To supersede an order or part of an order on single track.	D. Form D-M.
1	49. Provides for a meet on single track.	E. Form K.
1	50. Authorizes a train to run late.	F. Form S-P.
1	51. Is a slow order.	G. Form D-R.
1	52. An order is being annulled.	H. Form X.
		I. Form E.
		J. Form S-A.

Weight | Multiple Choice

(Each question in this group contains one and only one correct answer. Make your choice by circling the proper letter.)

2 53. When the dispatcher issues a train order, he must be certain that it:

A. Specifies time in even hours when possible.
B. Can be easily explained to the road crews by the operator.
C. Supplements the knowledge of the situation held by the train crews.
D. Is expressed in language that is impossible to misinterpret.

2 54. Rules for properly issuing train orders for movements not provided by timetable require that:

A. No erasures, alterations, or interlineation be on the written copy.
B. The orders be lengthy for clarity.
C. Figures should be surrounded by brackets.
D. They bear the signature of the trick dispatcher.

2 55. The train order form that gives an inferior train right over an opposing superior train on single track between named points is:

A. Form S-C.
B. Form S-E.
C. Form S-M.
D. Form S-P.

2 56. Form J, K, and L orders apply to both tracks while form S-A, S-C, and S-E apply to _____ tracks.

A. Double.
B. Secondary.
C. Single.
D. Superior.

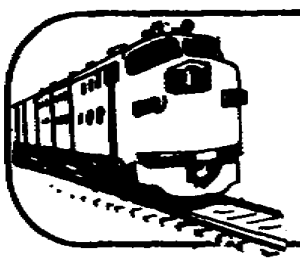
REFERENCE TEXT
638

RAIL OPERATIONS, DISPATCHING

The information contained herein is provided for instructional purposes only. It reflects the current thought of this school and conforms to printed Department of the Army doctrine as closely as possible. Development and progress render such doctrine continuously subject to change.

U. S. ARMY TRANSPORTATION SCHOOL
Fort Eustis, Virginia

CONTENTS



INTRODUCTION

John B. Wiggins, district sales manager for Forrester Products, hurried through the train gates at Central City and boarded a waiting passenger train to Criner. To express it mildly, Mr. Wiggins was not in the best of humor. Arising late and being forced to skip his usual substantial breakfast had started it off. Then having to leave his cab in a traffic jam and practically run the last block to the station had not helped to improve his frame of mind.

As Mr. Wiggins selected a seat near the front of a coach, the train started to move. He opened his morning paper and glanced at the headlines, but his thoughts soon strayed from them. The weekly sales meeting to which he was going, a trip which he contemplated with no particular relish, was on his mind. He hadn't quite met his monthly sales quota, and he could almost hear the high-pressure lecture he was certain to receive. Could he help it if his district was in its normal seasonal slump? Another thing, why didn't his expense account allow for a plane trip to the home office instead of this slow train ride?

An hour later, at a point halfway to Criner, a jerking motion told him that the train was stopping. Looking out a window, he was mildly surprised to see that the stop was far out in the country away from any town or station. Mr. Wiggins fussed, "Why couldn't the railroad confine its stops to those listed in the timetable?" He saw the conductor alight almost before they had completely stopped, and in some 3 or 4 minutes return to the coach. Then the conductor pulled a bell cord to signal the engineer to start moving. Mr. Wiggins noticed, after the train progressed a few yards, a square two-story building bearing the sign "VO Tower." He wondered idly whether they had stopped for the conductor to make a phone call or to transact some other routine business.

Once under way, the train soon reached maximum speed, but in a few minutes started to slow down once more. Now what? Soon the coach lurched; the train was changing tracks. Now Mr. Wiggins became alert--and concerned--even though he knew nothing about the technical side of railroading. But he had made this trip often enough to know that westbound trains always traveled on the right-hand track, and the track they were now entering was always reserved for trains running in the opposite direction. Why, this didn't make sense! Suppose another train were approaching in the opposite direction and there was a head-on collision! This was terrible.

Mr. Wiggins soon noticed the reason for changing tracks, but this, in itself, was scarcely reassuring. A long freight train, apparently stopped, was on the track they had just left. Even so, how did the engineer know it was safe to proceed at such speed? Had someone been told to keep the track they were now on clear? Suppose he forgot? Why, it was almost like a motorist speeding the wrong way down a one-way street! But soon the passenger train passed the head end of the halted freight, reduced its speed, and crossed back to its original track. Mr. Wiggins breathed easier, but he still wondered.

* * * * * * * * * *

High up in an office building a long way from our fidgety, confused traveler, a man wearing a green eyeshade makes some notes on a large sheet on the desk before him. It is he who caused the train to stop at VO Tower, take the opposing track, and later return to its original track. Scarcely a day passes during which he doesn't cause both passenger and freight trains to diverge and move onto any track he desires, much the same as a hobbyist with a model train having automatic track control. In his daily manipulation of trains, however, he seldom has an audience to watch, marvel, and sometimes worry about consequences. Also, he is the man who had, through years of training and experience, prevented some of Mr. Wiggins' apprehensions from becoming realities. However, he is not nearly so well known and honored by the traveling public as is the engineer, yet he is the individual whose planning, watchfulness, and unfailing accuracy provide a safe, speedy trip for all trains. He is one of the least known, yet one of the most important, of all railroaders. He is the train dispatcher.

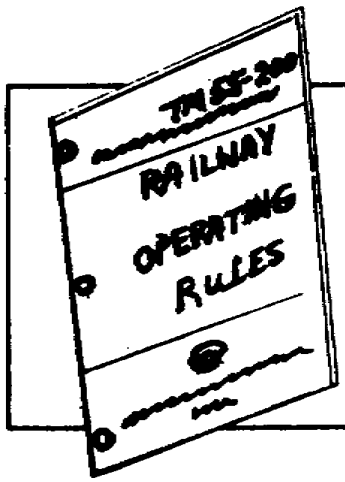
This reference text on dispatching bridges a span of knowledge that would probably approach a lifetime of practical experience in telegraph and dispatching offices. However, it avoids those aspects of

the subject that even chief dispatchers disagree on. Moreover, it condenses and limits discussion on certain phases of the subject, especially where lengthy elaboration might tend to confuse rather than enlighten the average reader. For example, complete textbooks could be written on the subject covered by a single paragraph--change of timetable and loss of schedule. Although the lay reader is kept foremost in mind throughout the five chapters, it is realized that a reader without railroad operating experience may not grasp all of the lessons stressed in a first reading of the text. Therefore, a second reading is recommended, especially of chapters 1, 4, and 5. This may clarify some of the important points that make for safer, more efficient train operation.

Always remember: every operating rule, every train-order rule, and every form of train order are the direct results of wrecks that occurred before the rule or the particular form of train order existed. Study thoroughly the principles of right, class, and direction, and their ramifications in and applicability to single-track railroading. When you have mastered this phase, you will be ready for operations under any conditions. But remember that study must always be combined with practical experience. Learning the material in the reference text does not qualify you as a train dispatcher. However, it does acquaint you with the nerve center of the operating department of all railroads. This knowledge places you in a better position to understand how train dispatching can affect almost any military assignment involving rail transportation of men and supplies.

The text contains five chapters. The first explains principles of dispatching; the second discusses the dispatching staff and the documents and forms they handle. Chapter 3 informs you of the dispatcher's means of communications, chapter 4 discusses train superiority, and chapter 5 explains various forms of train orders.

Four appendixes and four annexes are included. Appendix I is a list of the references used in preparing the text; appendix II is an example of employees' timetable; appendix III contains pertinent railway operating rules; and appendix IV is a glossary of some of the terms used in dispatching. Annex A portrays the single-track Elwood Division; annexes B and C are a dispatcher's records of train movements--train sheets--one for single track and one for double track; and annex D contains a consolidated empty car report.



Chapter 1

PRINCIPLES

1.1. GENERAL

During World War II when the manpower barrel was nearly empty, a local Selective Service Board official told a railroad executive that a train dispatcher could easily be trained in 6 months. If this official, who obviously knew little about railroading, eliminated the word "easily" and revised his estimate to 6 years, he would have been more nearly correct.

Without doubt, dispatching trains on a busy section of railroad is one of the most exacting tasks in the entire transportation field. The requisites--and sometimes the unhappy lot--of a train dispatcher are dear, rapid, and correct thinking; making instant decisions with absolutely no margin for error; lacking time for conferences with superiors, and being unable to relegate decisions to subordinates.

A dispatcher needs to know the minute details of the physical characteristics of the main-track layout of his division. To refresh this knowledge, he is required to ride over his division periodically. Why? Because each dispatcher must be able to sit at his desk and visualize what is happening at the other end of his division. When, for instance, he instructs a road conductor to "Head in at BO tower, pull through the cutoff, back your head end off on the river lead, and cut the road crossing," he must be intimately familiar with every detail of the area and with the location of every switch, crossover, and derail so that his instructions can be carried out.

A dispatcher must have full knowledge of the capabilities of the various types of locomotives in use and frequently judge the capability of individual locomotives only by their number designators. Moreover, he frequently possesses, and often bases decisions on, an intimate knowledge of the ability of individual engineers to get their trains over the road, Every railroad has engineers with

reputations for making good time under almost any conditions, and occasionally a smaller number who never seem to maintain schedules or come up to reasonable expectations despite a good locomotive and the most favorable conditions.

Centralized Traffic Control, two-way radio communication between moving engines and cabooses, and other modern innovations in train dispatching have probably partially taken some of the occupational strain off many dispatchers. However, many single- and double-track lines still operate without these refinements. On many railroads where the number and length of sidings have not increased with the greater train density of the past few years, the job of train dispatching is more exacting than ever.

Chapter 1 describes dispatching principles and the methods used in moving trains over the various track systems. First, the timetable, the dispatcher's train orders, and the operating rules are explained. Then the dispatching methods used on single-, double-, and multiple-track lines, and the Centralized Traffic Control method are described.

1.2. TIMETABLE

A timetable authorizes the movement of scheduled trains. A sample timetable representing the division illustrated and discussed in this text is contained in appendix II. It shows trains as first, second, third, and even fourth class: their relative superiority is established by the designators shown for them in the timetable. First-class trains are superior to all others, second-class next, and so on. Extra, or unscheduled, trains are inferior to all regular trains having a class designator; no superiority or inferiority exists between extra trains. However, the timetable on single track specifies the superior direction, which was decided on by the railway's officials. On the Elwood division used as an example in this text, the superior direction is east. This means that if first-class trains were opposing each other, the eastbound train would be superior. Opposing trains are those traveling toward each other on single track. Direction is superior only between regular trains and

only if class is equal; it does not apply to two extra trains in opposing directions on single track. Thus, in this text, a first-class westward train is superior to a second-class eastward train.

1.3. TRAIN ORDERS

Train orders are written orders delivered to train crews to convey the dispatcher's instructions. The orders may help or restrict; they may amend, annul, or supersede the class and directional superiority that the timetable establishes, as chapter 4 explains. They are the tools a dispatcher uses to operate trains not listed in the timetable. On occasion, he also uses them to establish rules for moving trains efficiently over a division when unusual operating problems occur. A train order, however, does not waive compliance with a rule for one train unless it instructs another crew to protect the first train. Train orders are discussed further in chapter 5.

1.4. OPERATING RULES

Each American railroad has its own set of operating rules. They are based on a standard code but are tailored to fit the operating needs of the particular line. Even though the rules themselves may be modified, the rule numbers remain the same. Rule 99, for instance, means the same thing to a railroader in Iowa as it does to one in Ohio. Although the rules number in the hundreds, all are important to the safe and efficient operation of trains. The rules cover standard time, timetables, signals, train superiority, movement of trains and engines, and train orders.

Operating rules for military railroads are contained in Technical Manual (TM) 55-200, Railway Operating Rules; a number of them are quoted in appendix III. Two rules are of particular importance to the immediate discussion, rules 86 and S-87, which are quoted and discussed in the subparagraphs following. Note that a rule number without a letter prefix applies to single and two or more tracks, one with an S to single tracks, and one with a D to two or more tracks.

a. Rule 86 reads: "Unless otherwise provided, an inferior train will clear the time of a superior train in the same direction by not less than 10 minutes, but must be clear at the time a superior train in the same direction is due to leave the next station in the rear where time is shown."

b. Rule S-87 provides: "An inferior train must keep out of the way of opposing superior trains and, failing to clear the main track by the time required by the rules, must be protected as prescribed by rule 99. Extra trains must clear the time of opposing regular trains not less than 5 minutes, unless otherwise provided, and will be governed by train orders with respect to opposing extra trains "

c. Rules 86 and S-87 mean that extra trains must operate with respect to train orders, the timetable, and the operating rules. They may proceed until the crew notes from the timetable that a superior train is getting close; then they must enter a siding or a yard to clear the train. Similarly, when operating against--opposing--a superior train, the crew knows from the timetable when to take siding to clear the opposing train. However, if a train has certain types of orders, they may conflict with rules 86 and S-87. When this occurs, the orders automatically supersede the rules. Also, train orders may confer superiority to a westbound train and restrict an eastbound one of equal class. This conflicts with superiority of direction established by the timetable and, again, the orders supersede the timetable. They may also grant a second-class train right over a first-class one; they have then superseded the established class of trains as set forth by the timetable. In brief, train orders may supersede any normal method of regulating train movement, or they may temporarily set aside certain operating rules and the timetable. Therefore, train orders are the last word of authority and remain in effect until fulfilled, superseded, or annulled. The crew's actions can fulfill the orders, but nothing can supersede or annul them except other orders from the dispatcher.

1.5. METHODS

The method of dispatching varies according to the type of rail operations. The four basic types are: single track, double track, multiple track, and Centralized Traffic Control (CTC) which applies chiefly to single track. Since CTC and multiple track are refinements rarely encountered in foreign theaters, this text deals principally with single- and double-track systems. However, to ignore CTC and multiple-track operations entirely would restrict a reader's understanding of the subject as a whole. Therefore, they are discussed but not stressed as much as the other dispatching methods. The remaining paragraphs of chapter 1 discuss the various methods, but before that discussion begins, the method used in a theater of operations is described.

Train dispatching in a theater of operations necessarily differs from that on commercial railroads. In a theater where civilians operate the trains and the military control them, dispatching may remain unchanged if passenger-train service is continued. However, troop, ambulance, and ammunition trains may be assigned even higher priority than passenger trains. As armies advance, however, and the railroad is operated by the transportation railway service exclusively for military purposes, the method of dispatching trains may undergo radical changes dictated by the particular combat or logistical conditions. Retreating enemy forces may destroy trackage, bridges, signals, and other facilities to retard advances over the line. When service is resumed, what was formerly a double-track, high-speed road with automatic block signals may be a single track with restricted speed and an improvised signal system. Then dispatching becomes more difficult and complex. Single-track operation will prevail; light trains carrying less tonnage at lower speeds will be the rule; and circumstances will determine movement priority.

1.6. SINGLE-TRACK OPERATION

In single-track operation, dispatching is carried out by written train orders. These are the dispatcher's instructions received over telephone or telegraph wires by operators along the line who copy them in longhand and deliver copies to the train and engine crews to whom addressed. As chapter 5 explains, many types are used to cover every conceivable situation, and they may be either helpful or restrictive. They tell a crew what to do--never what not to do, and they frequently carry qualifications.

Basically, a first-class train depends upon the timetable schedule for its authorization. On leaving the starting terminal, the crew is authorized to travel along the route according to the published time figures in the schedule columns of the timetable. On a single-track line, the timetable specifies the superior direction, for example, eastward. Therefore, a first-class train traveling east (Maxey to Conroy, figure 1.1) would be superior to all other trains on the line. The crew would expect all trains in each direction to clear and not delay their train. A crew with a first-class train traveling west--Conroy to Maxey--would expect all trains except first-class eastbound trains to clear them. “To clear" means to get a train completely off the main track by going into a siding or yard, and to line the switch for the main track.

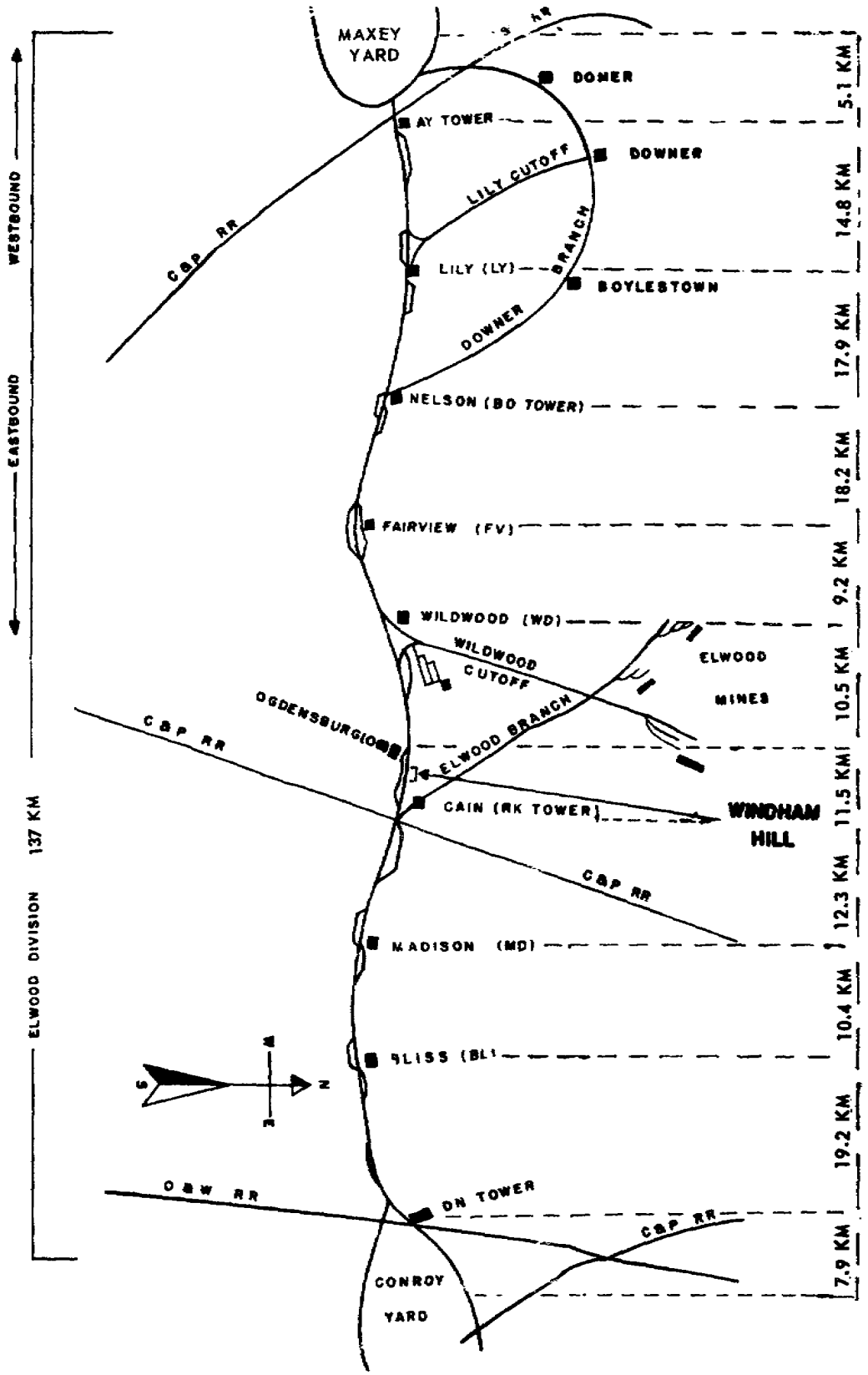


Figure 1.1. Single-Track Elwood Division.

Extra trains are not scheduled in the timetable, have no class, and hence have no superiority. When extras are moving without train orders other than the ones that created them, they are said to be "operating with respect to the timetable." This means that they are adhering to the provisions of rule S-87, by clearing the main track for trains scheduled in the timetable. When it is impossible to clear the track for a superior train, the rules require that the train be protected against the movement of other trains. To do this, a flagman is sent in the direction from which the train is expected to flag it to a stop. On double track, one is sent to the rear; but on single track, one must be sent to the front as well as one to the rear to stop any trains. Rule 99 is the rule requiring such protecting or flagging. Proper clearing and clearing without delay are said to be accomplished when the trains being cleared are not stopped or delayed, as paragraph 1.4 explains.

If all extras on single track could always operate with respect to the timetable only, the subject of train dispatching would be much easier to understand. An extra train, after being allowed to move out of its starting yard, would proceed on its way until the timetable, rule S-87, and the crew's watches told the crew to "take siding." After the superior train passed, the crew would again consult the timetable. They would know the exact distance to the next siding, and the approximate number of minutes it would take to reach there. If the crew could make the siding without sticking--delaying--a superior train that was close, they would proceed. If they lacked sufficient time to clear a train in either direction or had the least doubt that their train could clear in time, the crew would remain where they were until they did have enough time. Thus, an extra train would travel over a division in stages, heading into a siding when necessary and remaining until the superior train passed. It might then possibly pass up the next siding, and perhaps enter a third, to clear one or more scheduled trains in either or both directions.

The method just described is cited primarily to show the principle of extra movement, but it seldom works out in actual practice. The reason for its being more theoretical than practical has not been taken into account: the extra trains that may be, and generally are, operating in the opposing direction. Regular trains have no way of knowing about extras, and extras ordinarily do not know about other extras in the same or opposing direction. Therefore, they are advised of the presence of opposing extras by the dispatcher's train orders. When operational difficulties occur, the dispatcher's train orders affect scheduled--superior--trains. A

dispatcher may assist an inferior train by giving it a helping train order. When he does, this same order restricts a superior train which is also given a copy of the order. Similarly, a dispatcher often assists a heavy extra at the expense of a light train of superior direction.

1.7. SINGLE-TRACK EXAMPLE

The single-track Elwood division, which is 137 kilometers long, is illustrated in figure 1.1. The various stations are marked by the name of the city or town, with the call letters of the telegraph office of each shown in parentheses. Each office is manned by an operator who works with the dispatcher; who copies orders and delivers them to the proper train crews; and who reports arrival, departure, and passing times of trains.

To condense much of the information given in paragraph 1.6, a typical example is presented. It is explained and discussed in some detail in subparagraphs a through g following. In addition, figure 1.1 is duplicated in annex A and cutout blocks provided to enable you to move three trains exactly as specified by the train orders that follow. The oblong blocks printed at the left of the illustration represent the three trains. Cut out the blocks and place them as follows: No. 9 Eng 345 at Conroy; Extra 4220 East at Maxey yard; and Extra 9552 West along the line with the wording "Wildwood cutoff." Point the blocks in the directions the trains are heading. When they are correctly placed, lay the entire sheet aside where it cannot be disturbed and continue with the text.

a. Statement of problem. Assume that Extra 9552 West is ready to leave the Wildwood cutoff and proceed over the main track toward Maxey. Number 9, a first-class train running from Conroy to Maxey, left Conroy a few minutes before. Some 5 minutes before No. 9 departed, Extra 4220 East left Maxey with orders to "run extra Maxey to Conroy." From the timetable, the conductor of Extra 9552 West knows of the presence of No. 9 on the railroad and that he must clear this train as specified by rule S-87. Without specific orders to the contrary, it is left to his judgment as to exactly where he is to clear No. 9. A glance at the division map in the employees' timetable tells him that Fairview (FV) would probably be the most logical place, for Extra 4220 East to take siding and permit No. 9 to pass. With Extra 9552 West in the picture, the dispatcher must now enter the scene with his train orders. Up to this point, the running orders of Extra 4220 East authorizing movement from Maxey to Conroy and the timetable schedule of No. 9 from Conroy to Maxey have governed.

b. Action of dispatcher. Before the dispatcher can permit Extra 9552 West to leave the Wildwood cutoff, he must issue a train order to establish a meet for the two extras. This particular point is explained and stressed in paragraphs 2.6 and 5.15--the lesson they teach must never be forgotten in dispatching trains. The dispatcher calls the operators at Nelson (BO) and Wildwood (WD) and dictates the following train order: "Extra 4220 East Meet Extra 9552 West at FV." This order is given to Extra 4220 East at BO. A copy of it, addressed to the conductor and engineer of Extra 9552 West, is delivered to the crew at WD, along with running orders authorizing the train to run extra WD to Maxey. The order is also given to the operator at FV under rule 208(2). Holding this order, Extra 9552 West will take siding at the meet, and the other train will "hold main track," as paragraph 4.4a explains.

c. First move of all blocks. You are now ready to make the first move of the cutouts on your division map in annex A. Move No. 9 to Bliss, its approximate position when Extra 9552 West leaves Wildwood cutoff. Now, move Extra 4220 East to BO tower where the crew is given the meet order. Move Extra 9552 West to the siding north of the main line between Wildwood and Fairview. Now, bring Extra 4220 East past the westbound extra on the siding, and advance No. 9 to Madison. Move Extra 4220 East into the siding opposite Ogdensburg; advance Extra 9552 West to the siding at BO tower.

d. Explanation of first move. Why was this first move made in this way? When Extra 4220 East arrived at FV siding, it could not proceed unless Extra 9552 West was there. If Extra 9552 West arrived first, it would have to wait for the eastbound extra. Technically, a train is not a train unless the last car or caboose displays the rear-end markers shown in figure 1.2. Therefore, a meet cannot be properly fulfilled until the markers are met. If a train loses its markers, it is no longer a train. Consequently, one train cannot meet another unless it meets the markers. For example, if Extra 20 East had a meet with Extra 21 West at RK, and Extra 21's caboose became detached before it reached the siding at RK, it would enter the siding without rear-end markers. Extra 20 East could not proceed past RK because, technically, it would not meet a train, and the meet order would not be properly fulfilled. The reason and importance of this is obvious: if Extra 20 East did pass RK siding, there would be a danger of its colliding with a stationary caboose somewhere beyond RK.

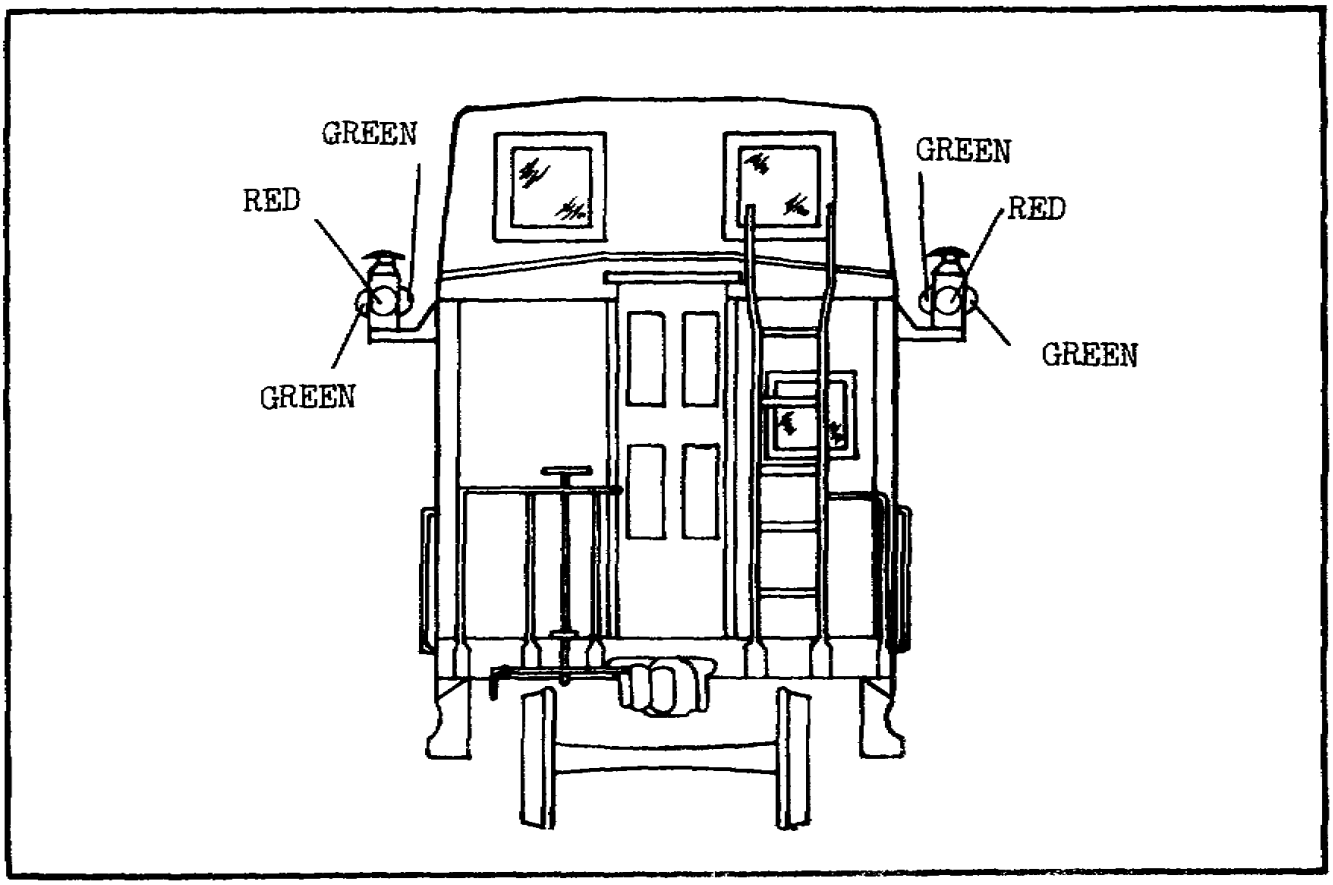


Figure 1.2. Caboose With Markers.

e. Move of No. 9. The next move is to be made by No. 9. Move it past the sidetracked train at Ogdensburg--OG--and past the westbound extra, which is in the clear at BO tower, into Maxey. Now each extra is free to proceed in its respective direction until other orders or the timetable schedule of a superior train restricts it. When No. 9 passes the two extras in their respective sidings, the presence or absence of the two extras is of no concern to the crew of No. 9. It holds no orders that involve either extra and, consequently, their presence on the railroad is not known to the crew of No. 9. In brief, the timetable, as shown in the sample in appendix II, notifies all trains what regular trains are to be expected and the departure time from each station. The dispatcher's train orders notify the crews of extra trains of the presence of opposing extras. Unless such orders interfere with or restrict the progress of regular trains, their crews are not given copies.

f. Move of extras. To complete the example, move Extra 9552 West into Maxey and Extra 4220 East into Conroy. One aspect of the advancing after the meat needs further explanation. After the meet between the extras, the eastbound train moved from FV to OG siding on the authority of rule S-87. Similarly, the westbound extra

advanced from FV siding to BO tower under the authority of rule 86. If each train had lacked time to conform to the respective rule, each would have remained in its respective FV siding and cleared No. 9 there.

g. Relation to actual practice. This greatly simplified example shows how a dispatcher keeps two inferior trains out of the way of a superior train, and how he progresses each as far along the way as possible before putting it into a siding. In actual practice, however, a division of this length would be much more congested. When five or six trains are operating on a single track, the dispatcher is required to do much more planning and issue many more orders to carry out his objective.

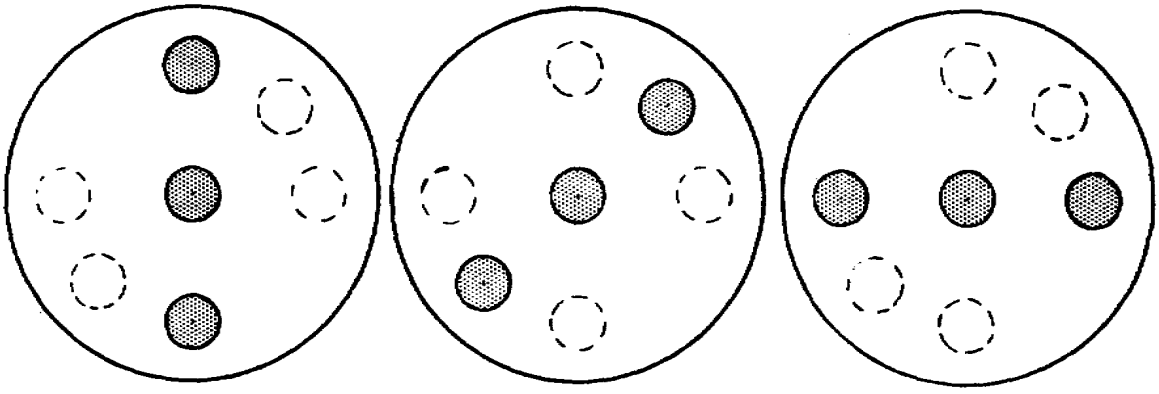
1.8. DOUBLE-TRACK OPERATION

When operating on double or multiple tracks, a dispatcher is relieved of considerable strain, and his advance planning is reduced materially. However, he is still thinking and planning 3 or 4 hours ahead but chiefly about new trains that may come out on the road. With double track, one is designated, for example, westbound and the other eastbound; no deviation by crews is permitted without the dispatcher's specific orders. Since no meets are scheduled and opposing trains are separated, he proceeds as though operating separate railroads. His work of keeping inferior trains moving, yet out of the way of superior ones, still goes on. If it appears that double-track operations are quite a bit simpler than single-track operation, remember that the density of traffic is generally two or three times greater than on a single line. Double-track procedures are discussed in the following subparagraphs.

a. Signals. Most double-track lines are equipped with automatic block signals by which it is possible for an observer to determine if any trains occupy the track for the next couple of kilometers ahead. Many kinds of signals are used, but only the position-light block signals, currently used on most American railroads, are discussed. This signal and the name, indication, and significance of each aspect is shown in figure 1.3. An aspect is the color or position of a signal as it faces an approaching train. With the use of such signals, the dispatcher has the problem of spacing the trains so that the progress of none is hindered by the reduce-speed and stop signals of the train ahead of it.

Proper train spacing is a delicate phase of dispatching. If trains get too close to each other, a great deal of stopping and

starting occurs. Starting from a standstill requires a great deal of fuel and often delays other trains excessively. Conversely, a dispatcher cannot deliberately hold trains back to the extent that the train capacity of his division would be seriously reduced.



(SHADED PORTIONS ARE RED OR ORANGE COLOR)

ASPECT 1	ASPECT 2	ASPECT 3
Name: Clear. Indication: Proceed. Significance: The next two blocks are clear.	Name: Approach. Indication: Proceed prepared to stop at next signal. Significance: The next block is clear but the one beyond it is occupied.	Name: Stop. Indication: Stop. Significance: The next block is occupied.

Figure 1.3. Position-Light Signal With Three Aspects.

b. Current of traffic. The movement of trains on a main line in the direction specified in the rules of the railroad is called the current of traffic. As an example, look at figure 1.4 that shows the Elwood division, the same one illustrated in figure 1.1 except that it is now pictured as double track. Trains traveling west from Conroy to Maxey use the right-hand or westward track and those in the opposing direction, the left-hand or eastward track. However, because of any one of numerous operational difficulties, the dispatcher night frequently be required to run trains against the current of traffic to pass stalled or disabled trains. Other reasons for running a westbound train over an eastward track might be a rock slide, a washout of ballast, or temporary removal of rails by a section gang.

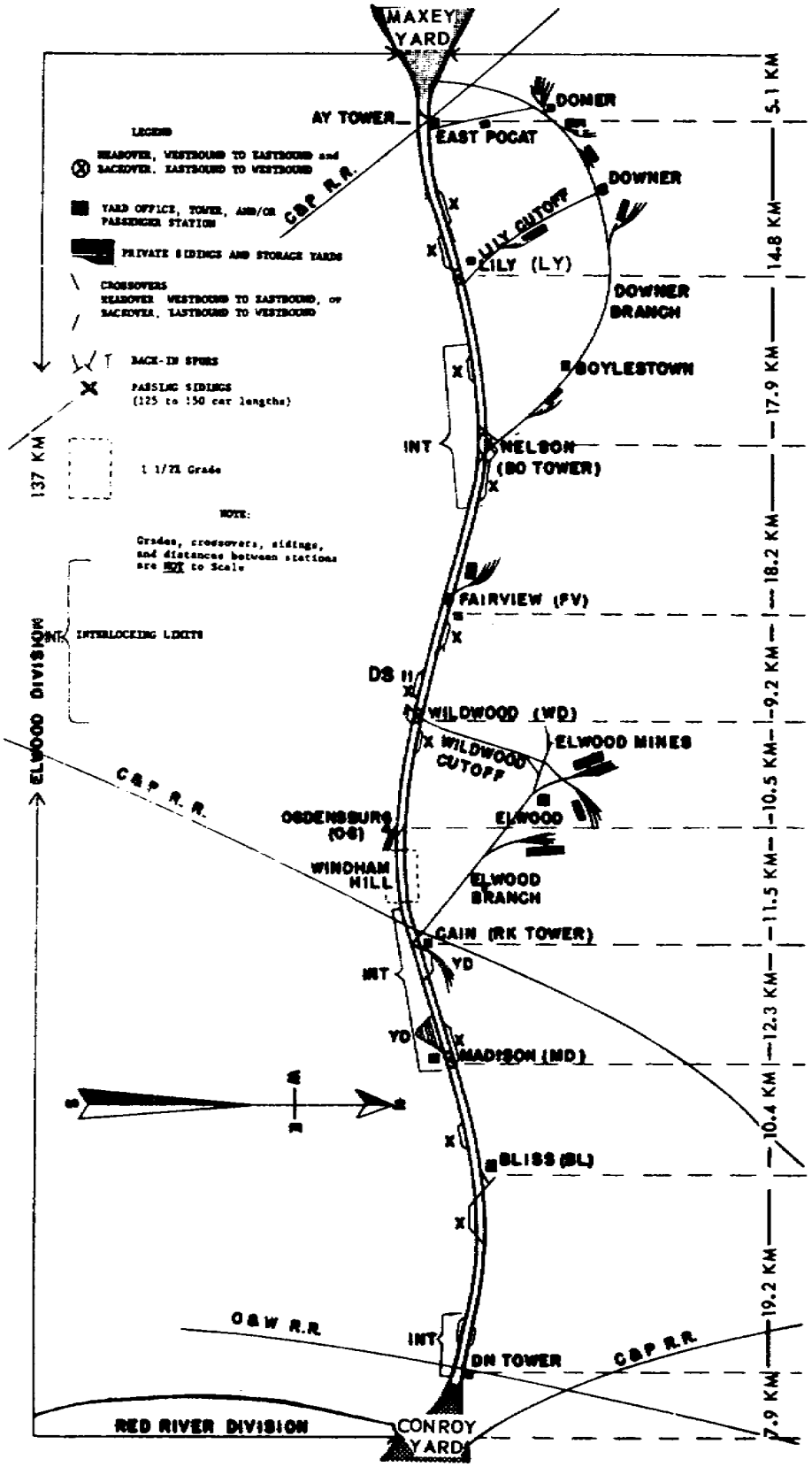


Figure 1.4. Double-Track Elwood Division.

c. Reverse movement. Getting a train around an obstruction by running it against the current of traffic is called single-lining or reverse movement. The first term comes from the dispatcher's changing, operationally speaking, a section of double track to single. Refer to figure 1.4 and assume that a dispatcher has an extra westbound train disabled halfway between FV and BO. If restricted by the current of traffic, he would be forced to let all his westbound movements pile up behind the disabled train. Instead, he looks over his train sheet, discussed in paragraph 2.5, and notes that a westbound first-class train is at RK, and a second-class eastbound train is nearing LY. Normal running time would put both trains in the vicinity of the obstruction at approximately the same time.

d. Train orders. The dispatcher must know how to make use of his train orders to keep delay to the first-class train to a minimum. He rings BO tower and dictates a holding order the second-class train. This type of order, called a form J order, is illustrated and explained in paragraph 5.20. It may cite the second-class train by train and engine number, or it may instruct the operator to hold all eastbound trains. The dispatcher then rings OG, WD, and FV operators and tells them to stand by for a for D-R order (explained in paragraph 5.27), one that allows the first-class train to turn against the current of traffic. When they are ready, he dictates an order for the first-class train to use the eastward track from FV to BO. Although all three operators copy the order simultaneously, only the BO operator is responsible for delivering it to the train crew. The FV operator must know the provisions of the order because the train is going to cross over to the eastward track at his station. Having the WD operator copy the order is a precautionary measure. If the telephone at OG should fail before the dispatcher finished the order, it could be delivered to the first-class train at WD. Or if something occurred that allowed the train to get past OG without getting the order, it could be delivered at WD. When the reverse movement is completed, the dispatcher will annul the form J order to the BO operator. The transmission and delivery of all forms of train orders are covered in chapter 5.

1.9. MULTIPLE-TRACK OPERATION

Although multiple-track systems are rare in military operations, their principles of operation are decidedly pertinent to the teaching of train dispatching, Logically, on three- and four-track systems, the operating problems are further reduced. Four tracks are ideal because they provide high- and low-speed tracks in both directions. Normally, the high-speed tracks are on the outside to

permit passenger trains to load at stations. Although these tracks are often thought to be reserved for passenger trains only, many dispatchers permit their express trains and fast freights to use them if they can make passenger-train running time. The current of traffic, defined in paragraph 1.8b, can be more rigidly enforced on a four-track system because of the two tracks in each direction. If a dispatcher lets a fast freight out on the high-speed track and it has trouble or fails to progress as expected, he can have it switched bark to the low-speed one. As the following subparagraphs point out, a distinction may or may not be made between the standards of the high- and low-speed tracks.

a. Some railroads make a strict distinction between the standards of the two types of track. On the low-speed track, lighter rail is used and less ballast and subballast maintenance performed. Tie renewal may be considerably less frequent than on the high-speed track. The tracks are generally designated either freight or passenger, and interchangeability of types of trains is not permitted except in emergencies. Continual operation of heavy freights over passenger tracks requires constant maintenance work, to keep them in the condition required to give maximum riding comfort.

b. Many railroads make no distinction between the standards of the two types of track; the weight of the rail is identical, and the ties and subgrade are the same. The terms "high speed" and "low speed" are used to describe these tracks, but the timetable would refer to them as Nos. 1, 2, 3, and 4. Generally, the only time it would be necessary to run against the current of traffic would be when both tracks in one direction were blocked or unsafe.

1.10. CENTRALIZED TRAFFIC CONTROL

Operating a rail division controlled with Centralized Traffic Control (CTC) is much simpler than by the other methods. The dispatcher, who may be many kilometers from the point where a train crew wants to enter the main track, merely flips a switch on his CTC panel that opens a yard switch and lights a proceed signal for the train. A modern CTC panel is shown in figure 1.5. The dispatcher does not advise the train crew of his plans nor are written orders necessary. Tracks have signals facing in each direction, and there is no established current of traffic in CTC-controlled areas. This gives the dispatcher complete flexibility of train movements; he may run trains on any track in either direction. Regardless of the class of a train, it can continue to move against or ahead of trains of a superior class as long as a signal tells it to do

so. When a dispatcher wants a train to stop, wait for, and meet an opposing train, a signal light shows where and when to make the stop. When the opposing train clears, the stop signal changes to proceed.

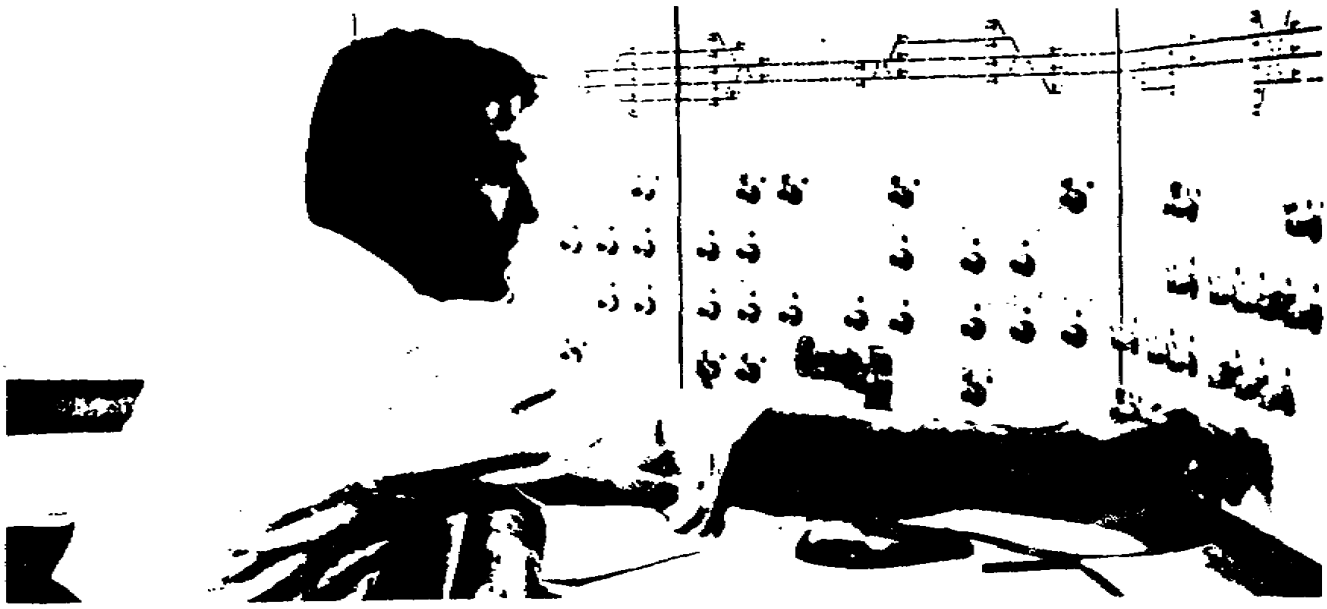


Figure 1.5. Dispatcher Working at CTC Panel.

This system eliminates reading, repeating, interpreting, and remembering the provisions of numerous train orders that would ordinarily be received as much as 2 hours before the time to carry them out. The crew receives visual orders, as it were, from the signal lights at the time and the point where they are to be executed. Rules 86 and S-87 do not apply in CTC territory. The following subparagraphs discuss the CTC's system control panel, safety features, and advantages, but before that discussion begins, electric interlocking controls are explained.

Electric interlocking, an early form of CTC, is used on foreign railroads. The layout may extend for several kilometers on each side of the control tower from which the interlocking plant is operated by a towerman. However his control ends where the tracks join the area under the control of the dispatcher. A towerman at work is shown in figure 1.6. Such installations, generally used at congested junctions and terminals, allow the dispatcher and the tower operator more flexibility in handling trains and yard movement in yard limits.

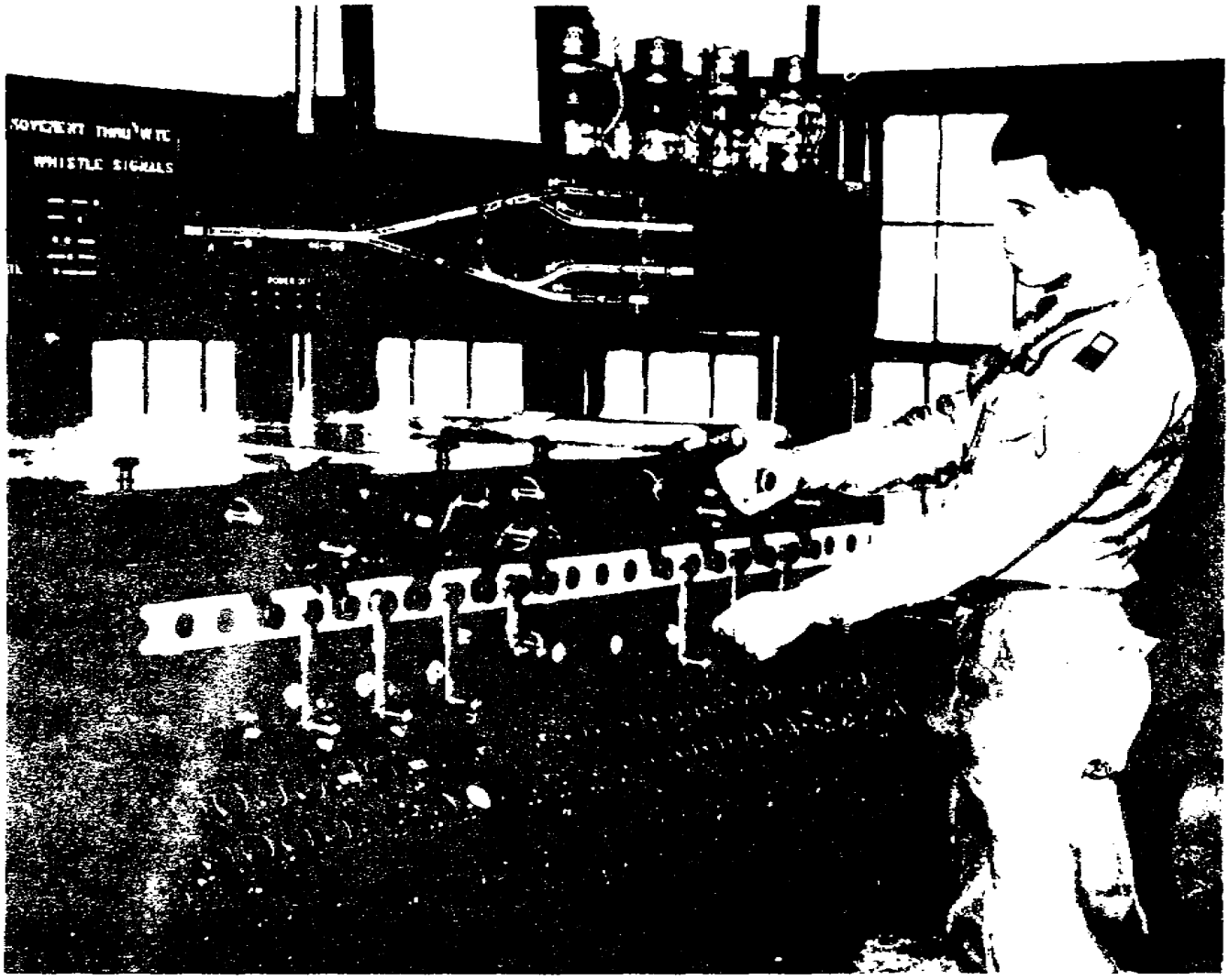


Figure 1.6. Towerman Operating Electric Interlocking Controls.

a. Control panel. The dispatcher's control panel, or board, has diagrams representing the track layout, as shown in the upper part of figure 1.5. All areas under his jurisdiction controlled by CTC are shown on the panel. Small indicators, mounted at intervals along the board, light up as the train reaches the point on the railroad represented by each particular indicator. Thus, a dispatcher can watch the progress of any train within his jurisdiction merely by observing the lights, and he can check the speed of a train by timing it between two lights. Also, he knows when a train makes an unscheduled stop or when it is losing considerable time. He can direct a train into any siding and let it out the other end, or he can switch a train from the eastbound to the westbound, or from the high- to the low-speed tracks and back again, merely by manipulating the small electric switches before him. The engine crew

never knows its exact path of travel until a short distance before reaching a point of divergence. Reduce-speed signals, however, are displayed sufficiently in advance of a change of track to give an engineer time to slow down. The engine crew relies on the permissive and restrictive aspects of the signals, automatically displayed when the dispatcher opens or closes switches ahead of them, and they know they are taking the route prescribed by the dispatcher.

b. Safety. The Centralized Traffic Control system has a safety feature that makes it impossible for a dispatcher to suddenly take away a permissive route for a train after the engineer comes in sight of the signal. Although the dispatcher can take away the displayed permissive signal and flash a restrictive signal "in the face" of the crew, the switches controlling the track route cannot change if the engineer lacks sufficient time to comply with the changed signal. The system is so wired that the dispatcher cannot set up conflicting moves. Single-track installations are so connected that if a train fails to make a stop specified by a signal, other signals in advance of the train are automatically displayed to stop a train that may be approaching on the same track from the opposite direction. Also, the CTC system eliminates misunderstandings among crew members about the interpretations of written train orders--misunderstandings that have accounted for numerous collisions on single track.

c. Advantages. Since Centralized Traffic Control is used principally on single-track sections, some railroads have converted double-track sections to single-track layouts. Reduced maintenance-of-way costs and accelerated freight train schedules resulted. Use of CTC frequently permits an increase in train density, because the delay formerly caused by wait-and-meet orders is reduced. With CTC, a dispatcher is frequently able to get two trains by a given point without stopping either one, by keeping one moving through a siding while the other passes on the main track. If a siding is long enough or if a single track branches for several kilometers into a double track, a dispatcher may likewise have a train pass another in the same direction without reducing the speed of either. A nonstop meet can be fully appreciated only by crews who in past years waited for hours for other trains, or by dispatchers who were once required to dictate several complicated train orders to do what CTC may often get done with less delay by the dispatcher's moving two or three controls.

1.11. SUMMARY

A division's timetable is the authority for moving scheduled trains; it establishes their superiority and the superior direction of the tracks. For example, first-class trains are superior to second class. Unscheduled trains--extras--are inferior to scheduled ones and have no class designator. The superior direction is decided by the line's officials. Train crews receive train orders from the dispatcher. They supersede the superiority established by the timetable. Operating rules of both civilian and military lines are based on a standard code, to provide safe and efficient train operation. Rules 86 and S-87 cover procedures followed by extra trains.

The four methods of dispatching are single-track, double-track, multiple-track, and Centralized Traffic Control. Single-track dispatching, conducted by using written train orders to tell the crew what to do, is more complicated than double-track dispatching. The latter depends mainly on automatic block signals and on proper spacing of trains. However, the dispatcher must enforce the established current of traffic except when single-lining or reverse movement is called for. Train orders, too, are used to avoid delay to top-priority trains.

Operating problems are further reduced on multiple-track lines, especially where there are four tracks: high- and low-speed tracks for each direction can be designated. Some railroads make a strict distinction between the high- and low-speed tracks, with lighter rail being used and less roadbed maintenance being performed on the latter. Other lines make no distinction between the two; the rail, ties, and subgrade for both are the same.

Centralized Traffic Control is the simplest method of dispatching and provides the dispatcher the greatest flexibility in manipulating trains. Small indicator lights on a control panel come on as trains reach particular points on the line. The lighted indicators permit the dispatcher to check the train's progress and speed. By flipping a switch on the panel, the dispatcher can give a train a proceed sign or divert it to another track. The system is safe--the dispatcher cannot set up conflicting moves, and restrictive signals flashed in the crew's face cannot be complied with if there is too little time. Among the system's advantages are reduced maintenance-of-way costs, accelerated freight train schedules, increased train density at times, and less delay because of fewer wait-and-meet orders.

Chapter 2

DOCUMENTS AND STAFF

2.1. GENERAL

Operating trains over a division involves considerable paperwork for the dispatcher and his staff. The train sheet, a written record that depicts the progress of each train from one end of the division to the other, is maintained by the dispatcher. Other forms dealing with clearances and messages affecting operations, while usually dictated by the dispatcher, are frequently compiled by the telegraph operator. To present a clearer picture, the timetable, which governs to a great extent the dispatcher's method of operation, and the train sheet, which presents an animated, ever-changing picture of each train's progress, are discussed before the specific duties of the key individuals in the dispatching office.

Additionally, written accounts of train dispatching frequently deal solely with loaded cars and trains from which the railroad derives its revenue. Often overlooked, however, are the empties which the railroad must move over its lines and furnish to shippers. Many think of this particular phase of railroading as relating principally to the freight or traffic department and being handled through the car distributor in the operating department. There is a direct connection between the car distributor and the dispatcher in moving trains of empty cars. Therefore, the car distributor's function, how he maintains a record of empties on the railroad, and how it affects the dispatcher, are covered in some detail.

2.2. EMPLOYEES' TIMETABLE

The employees' timetable is the authority for moving all regular trains. Its pages dealing with schedules appear similar to those in the timetables furnished to the traveling public. However, the two timetables should not be confused because the employees' timetable goes much further. In a sense, it becomes a supplementary book of rules. It may amend, supplement, extend, and even interpret many of the standing operating rules, because of peculiar

operating instructions or because of unusual physical characteristics of the rail layout. For example, under "Special Rules" in the employees' timetable of a large commercial rail line, the following appears:

> Rule 813. Amended to include: when radio communication is being used in connection with a train or yard movement, in lieu of hand signals, proper identification and continuous contact must be maintained. Should contact be lost with employee directing the movement, immediate stop must be made until communication is restored or other signals are used to complete the movement.

In addition to the schedule of trains, a typical employees' timetable includes a variety of information. Listed below are the various types of data and instructions that may be found in an employees' timetable.

- Reduce-speed areas
- Yard limits
- Weight limitations of--
  - Track
  - Bridges
  - Trestles
  - Coal tipples
- Engine restrictions
- Close-clearance points
- Location of--
  - Fuel and watering facilities
  - Standard clocks
  - Telegraph offices
  - First aid supplies and stretchers
- Company doctors, surgeons, and oculists
- Special signal indications by name, location, and significance
- Passing sidings and their capacity in cars
- Location of and special instructions regarding--
  - Spring switches
  - Time relay switches
  - Derails
  - New or nonstandard switching and signaling mechanisms
- Special instructions on, for example,
  - Care and lubrication of journal boxes
  - Handling of cars having overheated journal bearings (hotboxes)

2.3. ISSUING AND SUPERSEDING TIMETABLES

All employees whose duties are connected with train operation must secure and carry a copy of the current employees' timetable. They must study it carefully and familiarize themselves with all portions affecting their duties. Such persons are required to sign a receipt showing that they have received a copy. Each time a new timetable is issued, employees must note the time and the date it becomes effective and study it carefully for changes in train schedules; special rules seldom change. The old timetable must be destroyed or turned in. Because of changes in train schedules, to leave an out-of-date timetable laying around is to invite trouble.

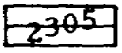
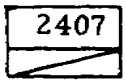
2.4. TYPICAL TIMETABLE

Appendix II consists of a sample timetable based on the double-track division illustrated in figure 1.4. The timetable contains some of the information specified in paragraph 2.2. The purpose is general familiarization only; in actual practice it would require considerably more information and detail to cover all operating procedures and details of a division 137 kilometers long. Most of the special instructions could also apply to the single-track division in figure 1.1. However, the time figures on the two pages showing the schedules of the 12 trains would be changed completely because of two-way operation over a single track.

2.5. TRAIN SHEET

The Dispatcher's Record of Train Movements, usually called the train sheet, is maintained by the train dispatcher and is an important written record in the dispatching office. It shows at all times the picture of train movements over the division, what trains are in transit, and the time each one passes each station along the line. Knowing the running time between two stations, the dispatcher can determine at a glance whether a train is having difficulty in its progress. At the same time, he knows whether it is exceeding established speed limits. When the rear end of a train passes a telegraph station, the operator reports the exact time to the dispatcher who enters it on the train sheet in the column opposite the station's call letters. When the operator reports the train's time, he is said to "OS" the train. Using the train sheet in dispatching operations is discussed further in the following subparagraphs.

a. Typical train sheet. Annex B shows a train sheet as it would appear in use on the single-track division in figure 1.1. The columns to the left of the station call letters indicate the westward

trains; those to the right, the eastward. The "OS" time of the westbound trains as they pass each station reads from the top to the bottom, while the eastbound side reads from bottom to top. This method of recording the time in opposite order makes it easier for the dispatcher to make plans for changing meeting points. The three extra trains shown in columns 1, 2, and 8 have completed their runs, while Extra 194 West (col 4) and Extra 210 East (col 3) are approximately halfway over the division. The figures $\frac{125/0}{11,500}$ beside Extra 205's time out of Maxey yard show that it had 125 loaded cars, no empties, and a gross tonnage of 11, 500 tons. The figures are reduced at BO tower because the train made a setoff of cars and tonnage amounting to the difference between the two sets of figures. Where two time figures are shown at a station, the earlier time is the arriving time and the later one is the departing time. Passing time is written diagonally across both  blocks. When a train terminates its run, a diagonal line is drawn through the next block  .

Officially, the stops are considered delays and they must be explained on the train sheet, usually on the reverse side. For quick reference, delays are shown on the face of the sample train sheets. Freight trains generally have 30 minutes preparatory time, and the delays shown for making an air test do not start until 30 minutes after the time shown in the "Time Reporting" column.

b. Meets. An examination of columns 3 and 4 of the train sheet shows that either Extra 210 East or Extra 194 West will have to take siding to clear the other. This has already been arranged by the dispatcher before Extra 194 West left the yard. It is explained in paragraph 1.7b, and the reasons are stressed in later chapters. Assume, then, that the dispatcher has set up a meet at WD by instructing the crew of Extra 210 East to meet Extra 194 West there. Because eastward direction is superior on this railroad, Extra 210 East will hold main track, and Extra 194 West will take siding. Suppose, however, that Extra 210 East had 70 cars instead of 90, and that Extra 194 West had 90 cars instead of 70. Because the capacity of WD cutoff is only 85 cars, the dispatcher would be forced to permit the train moving in the inferior westward direction to hold main track, and make the train in the superior eastward direction take siding. This would have to be specified in the meet order. This example illustrates how the dispatcher may supersede the superiority of direction; later chapters show how he may supersede any normal procedure to regulate superiority.

c. Double-track train sheet. Annex C shows a train sheet as it might be maintained for the double-track division illustrated in figure 1.4. The method of compiling the sheet is identical with that of the single-track sheet. Outwardly, the sheets are the same; however, one difference can be noticed upon close examination. When two trains in opposing directions pass a given point, no delay is shown for either train. On double track, movements are separated and cannot interfere with each other. In contrast, note the time entries at RK tower in columns 1 and 2 on annex B when trains met on single track.

d. Weather entries. In addition to the train entries, the weather columns are also important. Every 6 hours the dispatcher receives from various stations along the line a report on the weather at the reporting office. These weather columns, in the lower right of the train sheet, are more than routine. Knowledge of the weather along the line may well enter into the dispatcher's planning. A sudden drop in temperature 75 kilometers away might require that tonnage be reduced on future trains. Heavy snow, wind, and sleet storms, as well as torrential rains that may cause flood threats, must be reported and recorded so that the dispatcher may use this information in his planning. Knowing exactly what the weather is at various points on the line enables the dispatcher to issue reduce-speed orders if necessary, or provide engine pusher assistance at points where trains may be stalling on wet or ice-covered rails. Any other unusual occurrences during the dispatcher's tour of duty, which might be useful as a matter of permanent record, should be entered on the reverse side of the train sheet.

2.6. HANDLING EXTRA TRAINS

Chapter 1 shows how a dispatcher may create an extra train and permit it out on the main line to run with respect to the timetable. Because the train sheet serves as a quick, visual aid for the dispatcher to fix meeting points for extra trains, the method of handling extras is recounted in some detail at this point in the text. If extras on single track ran in one direction only and regular trains were always on time, train orders would seldom be required. However, extras must be operated in both directions, and the dispatcher's orders are the only means of notifying crews of the presence of opposing extras. Additionally, when scheduled trains run behind schedule, as so frequently happens, operations on the division are disrupted. Then the orders are used to lessen delay to other trains and to assist late trains in getting back on schedule. The following subparagraphs describe some of the tasks involved in operating extra trains.

a. Creating an extra. When the dispatcher authorizes an extra to go out on the main track and proceed over the road to a specified point, he is said to "create" the train. Once the extra is created, it proceeds toward its destination with only the timetable or train orders to restrict it. Read rule 201(1), given in appendix III.

b. Fixing meets. If a dispatcher creates an extra at a time when there is another moving on single track toward the newly created train, he must immediately set up a meeting point for the extras and inform each train crew where it is. If he fails to establish one in a meet order given to each train, they will collide. Look again at figure 1.1. If a dispatcher had a westbound extra by DN tower at 0711 hours and an extra ready to leave AY tower going in the opposite direction, he would probably establish a meet at WD. Each train crew would be given orders to meet at WD. The objective is not to attempt to determine in advance the actual meeting point, but to set one even if selected at random.

c. Changing meeting points. Assume that the westbound train mentioned above had 100 loaded cars and had work--stops--at both MD and RK, while the eastbound train at AY had only 65 empty hoppers. Obviously, the lighter train would arrive at the WD meet before the heavier one. Initially, this does not concern the dispatcher. The important thing is to establish a meet somewhere on the railroad before one extra starts to oppose another. The meeting point can always be changed later after the dispatcher watches the progress on his train sheet for an hour or so.

To permit two extras to oppose each other without having an established meet and to plan to give them one when they come within 20 kilometers of each other is not only highly dangerous but also universally prohibited. The dispatcher might drop dead and the relieving dispatcher might not notice that the trains were without a meet until they collided. More likely, however, the dispatcher would get busy with other work and simply forget about the lack of a meet until it was too late.

d. Superseding meet orders. Actually, to try to fix the final meet exactly in the first order is almost pointless. Normal running time, generally the only basis that could be used, depends on the type of locomotive and the tonnage of the train. However, one train might make excellent time while the other might encounter delay caused by one or more of such things as engine failure,

stalling, setting out hotboxes, doubling a hill*, or even a grade-crossing accident. Therefore, the dispatcher picks a meeting point at will and then watches the progress of the trains until they are an hour or so apart. Then, if necessary, he changes the meeting point by issuing another train order to supersede the first.

e. Figures. When extra trains leave a terminal on a double-track line, the dispatcher has the telegrapher send a wire to the destination yard to acquaint the yardmaster with the details of the train. These include engine number, conductor's name, number of cars, the tonnage, and the estimated arrival time or "figure." Often, a breakdown of the train according to the grouping destinations of the cars may be included. All of these details, popularly known as "lineups," make it possible for a receiving yardmaster to make plans for handling the train.

Dispatchers in general have a remarkable ability for figuring accurately in advance the time of a train's arrival into a yard 75 to 100 kilometers distant. Often, the actual arrival time does not vary 10 minutes from the figure. In calculating this time figure, dispatchers include the capability of the locomotive, the engineer's ability, the train's tonnage, the stops for picking up and setting off cars, the possible stops for fuel and water, the train density of the division, and the weather. On single track, all of these as well as delays at meeting points must be included in the figure. Occasionally, of course, operational difficulties may delay a train, discussed later in paragraph 3.4d. When a train "falls back" 30 minutes or more, the dispatcher generally calls the yard and gives the yardmaster a revised figure. On the whole, dispatchers' estimates are remarkably accurate; however, this particular phase of their work, which many yardmasters think of as routine, is in reality one of the most exacting aspects of train dispatching.

2.7. CHIEF DISPATCHER

A dispatching office is generally located at a division terminal, and a chief dispatcher is always in charge. He directs train movement over the division, supervises the men under him, reroutes rail traffic in an emergency, determines train tonnage, orders motive power, determines rail-line capacity, and establishes train-movement priority. He reports to, receives instruction from, and is responsible to the superintendent; but all orders, messages,

*Taking the train over a hill in two sections.

and instructions are signed with the chief dispatcher's initials. In any matter affecting main-track operations, he speaks for the superintendent.

2.8. ASSISTANT CHIEF DISPATCHER

Assistant chief dispatchers may be assigned at division terminals. An assistant chief must be qualified to assume full charge in the absence of the chief dispatcher, as well as to take over the desk of any train dispatcher working in the particular office. In emergencies, he is required to relieve the dispatcher working a particular shift, sometimes called the trick dispatcher. A large portion of his work may be devoted to processing telegraphic accident reports and to preparing train-delay reports needed by the office trainmaster or superintendent. He does other related work as prescribed by the chief dispatcher. On some railroads, the chief dispatcher works days only, while assistant chief dispatchers are assigned to the two night shifts.

2.9. TRAIN DISPATCHER

A train dispatcher is responsible for main-line movement of passenger and freight trains on a division. His objective is to get scheduled trains from one end of the division to the other according to their published timetables, and to get extras over the road in the briefest possible time consistent with safety. To do this, the dispatcher wages a mental battle with a basic problem of main-track railroading: preventing the second-class and extra trains from delaying the first-class ones, and preventing the extras from delaying first- and second-class ones. Paragraph 1.1 gives further details of the dispatcher's job.

Since modern, economical railroading often prescribes as much tonnage for extra trains as the locomotives are capable of handling, another facet of the dispatcher's basic problem is to keep the extra trains on the move as much as possible and to prevent their stalling and requiring pusher assistance from other engines along the line. Their stalling with the resultant delays would not in itself be serious, because, being extras, they are not hauling expedite freight. However, they must be kept moving, to prevent delay to superior class trains that may be following them.

2.10. TELEGRAPH OPERATOR

A telegraph operator is generally assigned to the dispatching office, and frequently he is qualified or is being trained as a

dispatcher. When the dispatching office is not located directly adjacent to the tracks, the operator is relieved from reporting trains by "OS'ing." Often, his work is purely telegraphic and involves wiring train consists, messages dealing with high-priority freight, and administrative communications from the superintendent's office to all points on the railroad. Frequently, the operator relays messages to connecting railroads delivering rush cars to their final destinations. When he receives consists of trains moving toward his terminal, he relays them by telephone to the yardmaster. Where teletype is used, they are received by the yardmaster and the operator simultaneously. Messages from all departments on the railroad as well as from connecting railroads are received by the operator, who sees that they are transcribed and delivered to the proper officer or department. He also receives telegraphic accident reports and transcribes them for use by the pertinent officers.

2.11. CAR DISTRIBUTOR

The car distributor is usually located in the dispatching office. He has the important function of seeing that enough empty cars are on hand at all points on the railroad where they are needed for loading. In general, he is not involved with loaded cars. The following subparagraphs discuss his functions in detail.

a. Duties. A car distributor's chief function in moving empty cars is to act as a link between yardmasters and the dispatcher, and between the freight department and commercial shippers. From reports telephoned or wired to him at regular intervals, he always knows where empty cars of all types are located. He knows, too, from reports the freight department gives him where and when empties are required for loading. He advises the dispatcher of this, who in turn arranges to have trains of empties moved from where they have accumulated to where they are needed. Frequently, storing empties in a yard handicaps the yardmaster--he is almost always pressed for clear tracks. The yardmaster confers almost continually with the car distributor and attempts to get his empties moved, especially when they are occupying an entire track. If they are a type needed for immediate loading, generally no difficulty is encountered in getting them moved. But if they are a type not particularly in demand, the dispatcher is generally reluctant to move them from one yard to another. While easing the crowded condition in one yard, he may be creating a storage problem in another.

Unwanted empties may be moved along a division in stages to relieve congestion if taken toward a point where they will ultimately

be loaded. For example, empty coal cars accumulating at Conroy or Maxey could be moved toward or directly to the Elwood mines, about midway between the two points, as figure 1.4 shows. They could be accepted to the limit of the area's storage capacity since it would be known that they would eventually be loaded. Car distributors, however, must be careful not to advise moving empty cars to a particular point where they may remain unloaded for several days, only to have them needed at a point past which they have just been hauled. With few exceptions, to backhaul loaded cars is regarded as inefficient, but to backhaul empties, except in rare instances, is not tolerated. To backhaul means to move a car or shipment back toward its origin after it has reached a more distant point.

b. Special cars. Not only does the car distributor have the responsibility for providing a great many of the common types of empty cars for large-scale loading but also for furnishing a smaller number of those of special type and design. These include automobile boxcars, depressed-center flatcars, extra-long flatcars, boxcars, and gondolas. Freight agents along the line receive requests for empties from individual shippers. The requests are consolidated and forwarded to the car distributor through the freight or traffic department. The location of special-purpose empties is usually furnished the car distributor by the office of the superintendent of car service, the office that always knows the location of every car the railroad owns. However, information on the location of large quantities of commonly loaded equipment comes to the car distributor from situation reports telephoned or wired to him by all yards on the division.

c. Situation reports. At regular intervals, usually every 4 or 6 hours, situation reports are compiled to show the status of empties at a particular yard. The reports are telephoned or wired to the car distributor who consolidates all reports and enters the information on a master sheet. The yard reports are usually divided into two parts: empties that are switched and ready to be moved, and those on hand which are not switched. Some cars are separated on reports according to capacities and others according to length. Boxcars are always reported according to their class: 1, 2, 3, or 4. Class 1 boxcars are comparatively new, clean inside, and suitable for loading grain or other high-class merchandise. The other classes, 2 through 4, range from perfect condition and fairly clean interiors to cars with rough, greasy floors and leaky roofs. The latter are often used for such rough lading as steel castings and car wheels. Any other commodity that would be unharmed by dirt, grease, moisture, and floor nails may also be loaded in class 4

boxcars. The following subparagraphs discuss two of the reports a car distributor uses in performing his duties: The yard situation report and the consolidated empty car report.

(1) Yard situation report. Figure 2.1 shows a yard situation report for Maxey Yard at 2400 hours. It includes columns for practically all types of empties, although those on hand are principally boxcars and hoppers. Empty tank and empty refrigerator (reefer) cars do not appear on the report. Empty tank cars travel on revenue waybills to specified destinations; empty reefers almost always belong to private companies and are handled in strict accordance with the owners' standing instructions.

EMPTY CAR SITUATION REPORT

Maxey YARD — 2400 HOURS — DATE 15 March 1976

SWITCHED

HOPPERS		BOXCARS					GONDOLAS		GONDOLAS		FLATS	STOCK CARS		50-T	COV. HOPPERS	SPL. FLATS	NO DISPO.
50-T	70-T	1	2	3	4	50ft	FB	HB	CP	65FT		SD	DD	FLATS			
27	19							16									
38	20							19									
10	15																
TOTALS 75	54	2	18	17	15	2	9	35	2	0	0	2	1	0	3	1	0
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	XX

NOT SWITCHED

30	38					32											
28	27					24											
	60					21											
TOTALS 58	125	8	7	0	5	78	0	2	9	0	3	2	0	0	5	0	0
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	XX

INSTRUCTIONS

1. This report must be compiled every 6 hours beginning at midnight and phoned to the Car Distributor.
2. Use legend below to report cars by type.
3. Use column "G" for box cars which have not been classified.
4. Use "Remarks" column to describe any type of car not shown in legend.
5. Show under "Remarks" any cars on which the air has been tested and which are ready for immediate movement.
6. Indicate under "Remarks" how many tracks are blocked by empties ready for movement.

REMARKS

75 50-ton hoppers ready for movement — air OK.

Expect to have 50 C-3 boxcars by 0600

LEGEND

A--50-Ton Hoppers
B--70-Ton Hoppers
C--Class 1 Box Cars
D--Class 2 Box Cars
E--Class 3 Box Cars
F--Class 4 Box Cars
G--50-foot Box Cars and unclassified box.
H--Flat-bottom Gondolas
I--Hopper-bottom Gondolas
J--Composite Gondolas
K--65-foot Gondolas
L--Flat Cars
M--Single-deck Stock Cars
N--Double-deck Stock Cars
O--50-Ton Flat Cars
P--Covered Hopper Cars
Q--Well or Depressed Center Flat Cars
XX--Tank or Refrigerator Cars Without Disposition

Figure 2.1. Six-Hour Situation Report.

(2) Consolidated empty car report. The number of empty cars shown on the various yard reports are totaled by the car distributor and entered on the consolidated empty car report.

The forms of the reports vary considerably among railroads and between civilian and military railroads. Basically, they serve the same purpose wherever and however used. As empties move out of a yard, the car distributor deducts them from his master report. The next report from the yard forwarding the empties omits those moved but includes others accumulated since the previous report. Frequently, a report from a yard does not change greatly from its previous one, the principal change being in the "switched" and "not switched" figures. Over a period of 8 or 12 hours, however, considerable changes may be reflected in the reports. Annex D shows a consolidated empty car report representative of what might be maintained on the Elwood division shown in figure 1.1.

2.12. CAR DISTRIBUTION IN A THEATER OF OPERATIONS

In time of war, and particularly in a theater of operations, car distributing differs radically from that described in the foregoing paragraphs. No surplus of empties will exist; the opposite will prevail. In a theater, adherence to boxcar classification will scarcely be practical and any piece of equipment that will haul any type of freight will have to be used. Hopper and gondola cars constructed to haul bulk commodities or aggregates may have to be pressed into service to haul crated goods; they might be the only ones on hand. Cars with leaky roofs might have to be used to haul high-grade commodities even if it requires covering the lading with tarpaulins or other protective covers. Few rules can be given for full and efficient use of equipment because of unknown and highly varying conditions in a theater, but two basic rules must be strictly followed: unload all cars with dispatch when received at forward points, and keep all empties moving from front to rear for reloading.

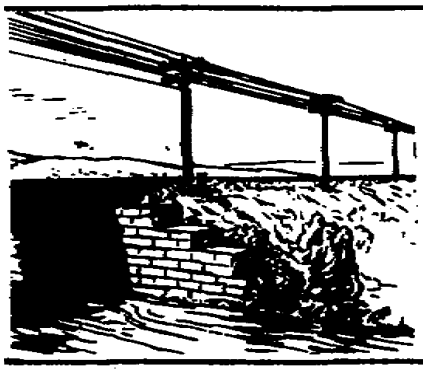
2.13. SUMMARY

Moving trains over a rail division involves considerable paperwork for the dispatcher. Included in it is one important document known as the train sheet. It provides a clear picture of the movement of trains on a rail division. The dispatcher can determine from looking at the train sheet how many trains are operating and whether they are exceeding the speed limits or losing time. He can also find out about the weather at various points along the line: it may very well enter into the dispatcher's plans. For example, a severe drop in temperature may cause the dispatcher to reduce the tonnage on future trains, issue orders to reduce speed, or provide for engine pusher assistance at points where trains may stall.

Another document, the employees' timetable, authorizes the movement of all regular trains. It determines the method the dispatcher should use in moving trains. Along with the time schedule of all regular trains, it contains such special instructions as a list of company doctors and oculists, speed restrictions at specific locations within the division, number of handbrakes to be used on cars on certain tracks, capacity of sidings, engine restrictions, and close-clearance points.

Because of the large amount of work the chief dispatcher has to do, an assistant chief dispatcher assists him in carrying out his duties. The assistant chief must be able to assume the duties of the chief dispatcher and also the duties of any train dispatcher in the office. Others on the chief dispatcher's staff are a telegraph operator and train dispatchers.

The car distributor is also usually located in the dispatching office, and he sees that enough empty cars are on hand wherever they are needed for loading along the rail line. He works closely with the dispatcher and the yardmasters. A car distributor must be careful when advising the dispatcher on moving empty cars. They must not be moved to a point where they will sit empty while they are needed at another station. The two documents a car distributor uses in doing his job are the yard or situation report and the consolidated empty car report. From them, the car distributor can tell the numbers and types of all empty cars he has on hand. Two important things to remember about car distributing in a theater of operations are that all cars should be unloaded as soon as possible after arriving at forward areas, and all empty cars should be kept moving toward the rear for reloading.



Chapter 3

COMMUNICATIONS

3.1. GENERAL

Operating a railway, involving the movement of trains over hundreds of miles of track, makes adequate and dependable communication systems imperative. To control trains properly, a train dispatcher needs adequate communications. A special system results: the dispatcher's telephone circuit. Also, in the early stages of an operation, the transportation railway service (TRS) may need radio communication. When wire lines are cut, down, destroyed, or nonexistent and when the building or rebuilding of them does not keep pace with track reconstruction, the TRS can request the installation of radio-communication facilities. When there are no communication facilities and manual block systems are not in operation, the fleet operation method is another way that the dispatcher can control train movement.

The next six paragraphs describe the telephone circuit and its use in getting trains over the rail lines. Radio communications for the dispatcher are discussed in paragraphs 3.8 through 3.12, followed by one paragraph describing the feet method of operation.

3.2. TELEPHONE CIRCUIT

The train dispatcher's telephone circuit is used for train movements by train order and for control of trains through towermen and station agents within a division. The telephones connected to this circuit and located at strategic points along the division are equipped with a push-to-talk, release-to-listen button. A typical dispatcher's telephone is shown in figure 3.1. The button holds the circuit open when a particular telephone is not in use. Consequently, anyone on the division may lift a receiver at any point on the line and listen to all conversations.

Figure 3.1. Dispatcher Dictates a Train Order Over His Telephone.

In the dispatcher's office, a foot pedal instead of a button is cut into the telephone circuit. The dispatcher depresses the pedal to talk and releases it to listen. This gives him free use of both hands. The telephone circuit has selective ringing that permits the dispatcher to call any station individually or all stations simultaneously. Usually, the ringing keys are connected with an answer-back signal so that a dispatcher knows the telephone in the station he is calling is actually ringing. This assures promptness in answering a dispatcher's telephone--something that is vital to safe and efficient railroading.

A large part of a dispatcher's work may consist of answering questions from and furnishing information to workmen along the line. On a division with high traffic density, a dispatcher's wire is a busy one with conversations going on almost continually. Ideally, there will be three circuits: a dispatcher's circuit used exclusively for the transmission of train orders, a message circuit used for messages concerning train movement other than train orders, and a third circuit for messages of a general nature not directly concerned with train movement.

3.3. PRIORITIES

Transmitting train orders over the telephone circuit carries the highest priority. Such conversations may account for most of those held over the wire, particularly if the division consists of a single main track. Ordinarily, a dispatcher does not permit train order transmittal to be interrupted because of the importance of his listeners' copying and repeating the orders correctly. An interruption should not be made unless a person is certain it is warranted. However, on rare occasions interrupting a conversation is justified. A person may want to break in upon a train order transmittal to report a wreck, washout, rock slide, or some other occurrence which conceivably might cause the dispatcher to change the train order he is dictating or having repeated. Other reasons might be an immediate need to contact the dispatcher to prevent a wreck or serious delay to main-line trains.

Most users calling the dispatcher try to establish their own priorities. However, because of the extreme complexity in trying to set such priorities, no hard-and-fast rules as to who may speak first can be made. The callers simply compare the importance of their business with what is being discussed at the particular time. A silence of 3 or 4 seconds after a conversation ends generally signifies that nobody is going to speak and that anyone with low-priority business can break in.

Frequently, several individuals may be waiting for an opportunity to talk to the dispatcher when train orders are not being transmitted. Again, this brings up the problem of priority of business which is probably best explained by discussing the types of calls ordinarily made over the usual dispatcher's circuit. These may be roughly divided into three categories and are treated in paragraphs 3.4 through 3.6 in the general order of their importance. Emergency calls that are not directly related to main-track operations are covered in paragraph 3.7. The detailed conversations in the following paragraphs are keyed to the double-track Elwood division illustrated in figure 1.4. To gain a better understanding of the types of calls made over the circuit, refer to the map and try to place yourself in the caller's location.

3.4. FIRST CATEGORY

Frequent calls to the dispatcher deal with matters directly connected with main-track operation. The five principal sources of calls in this category are telegraph operators, yard crews, yard masters, road crews, and tower operators.

a. Telegraph operators--along the line who report the passing of each train.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "Extra 4886 West by RK tower at 1143 with 124 cars."
Dispatcher: "Okay."

b. Yard crews--along the line who wish to use or cross the main tracks and must request the dispatcher's permission to make such moves.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "Yard engine 337, Conductor Brown, light*, would like to cross No. 1 and 2 main at Bliss for work at Standard Brick Company."
Dispatcher: "Okay. I have an extra going by DN in a couple of minutes so make it snappy and don't stop him."
Caller: Okay."

c. Yardmasters or telegraph operators--who request permission for yard crews to use, cross, or block the main track in doing their work. A typical example follows.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "This is Jones, yardmaster at Wildwood. I have to make a 50-car double** and must go out on the westbound main. After No. 61 goes, how about Conductor Williams on engine 314 using the westbound for about 10 minutes?"
Dispatcher: "Okay; after 61."
Caller: "Okay."

d. Members of a road crew--whose train may encounter trouble while occupying the main track, be stalled, or be faced with the necessity of making an unscheduled stop. The following example is typical.

Caller: "Dispatcher?"
Dispatcher: "Yes?"

---

* Without cars or caboose.
** Moving cars off one track and coupling them to cars on another.

Caller: "This is Conductor Folan on Extra 194 West. We have just made an emergency stop about 2 kilometers west of Wildwood. We have probably broken in two or maybe broken an air hose. Is anyone close to us in either direction?"
Dispatcher: "No, nobody close. Where are you calling from?"
Caller: "Phone box DS11."
Dispatcher: "Where's your caboose?"
Caller: "About 20 car lengths west."
Dispatcher: "All right, let's see. You have 125 cars, and you are 20 car lengths back of the caboose. The track between the phone and the road crossing holds less than 100 cars. That right?"
Caller: "Correct."
Dispatcher: "Okay. That means your engine is well past the crossing, so it's probably not involved in a grade-crossing accident. Your engine should be pretty close to that phone box near the Sands River bridge, so I should soon be hearing from your head end. Have your flagmen protect both eastbound and westbound mains*, and then you start going over your train. I want a report on whether anything from your train is fouling the eastbound main as soon as I can hear from you. The eastbound local just passed AY tower and has work both at Lily and Fairview, so he shouldn't be looking at you for at least an hour. If you are fouling the eastbound, I can hold the local at Fairview. Let me hear from you as soon as you know."
Caller: "Okay."

e. Tower operators--who are seeking information for crews who cannot reach the dispatcher. Frequently, a road crew may be having difficulty in making progress and may throw off a message rather than stop to call the dispatcher. An example of each situation follows.

(1) Towerman--relaying a road crew's message.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "RK Tower. Extra 198 West by at 1531 hours with a hotbox 38 cars back from the engine. The head end threw off a message advising that they want to set it off at Ogdensburg."

---

*Rule 102.

Dispatcher: "Okay. Does the rear end know about it?"
Caller: "Yes. I read the message and handed it to the caboose when it passed."
Dispatcher: "Good. He's about 40 minutes ahead of No. 87 and should be able to make Wildwood siding to clear 87's time. I'll line up the operator at OG and see if he can have his yard engine reach out and take the hotbox when they pull up to clear the crossover. Okay?"
Caller: "Okay."

(2) Towerman--reporting on a train's poor progress.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "RK tower. Extra 210 West has started by me, but he's not doing too well."
Dispatcher: "You haven't given him a yellow block* since he left Madison have you?"
Caller: "No, he's had a clear block all the way. It's getting a lot colder here."
Dispatcher: "What's the temperature?"
Caller: "It's 18 above. It's dropped 5 degrees in the last couple of hours."
Dispatcher: "Well, it looks like I'll have to cut the tonnage again. How's he doing now--picking up any?"
Caller: "About the same. His rear end is in sight now, so he'll be able to make it past the tower."
Dispatcher (ringing Conroy yard): "All right, the pusher engine is at OG. I'll bring him down the eastbound, and you put him up behind the 210. Tell the pusher to shove him all the way to OG."
Caller: "Okay."
Voice: "Are you ringing Conroy yard, dispatcher?"
Dispatcher: "Yes. That Extra 210 out of there--he wasn't overloaded, was he?"
Voice: "No, he had 7,527 tons. We double checked it. Why?"
Dispatcher: "Well, he's stalling even before he gets to Windham hill. It's much colder up there so we had better figure on cutting the tonnage to 7,000 on later trains. I'll put out a message."
Voice: "Okay."

---

*A block signal meaning "proceed, prepared to stop at next signal."

3.5. SECOND CATEGORY

Calls falling into the second category are requests for information that do not directly affect main-track operations but are related. Yardmasters, trainmasters, signal maintainers, and others may make the calls; they request a wide range of information. Three typical examples follow.

a. First example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "This is Trainmaster Duncan at RK tower. What do you have on the railroad?"
Dispatcher: "Just about the normal run for this time of week, sir. Have you a pencil ready?"
Caller: "Shoot!"
Dispatcher: "All right, coming east I have Extra 9525 with 125 empty hoppers by LY at 1757. Maxey has another mixture of loads and empties COD* at 1800. Have not received a consist yet. Going west, an extra with 125 cars of coal should be entering Maxey right now. Another tonnage train should be hitting BO bell any minute. That's about the works!"
Caller: "I see. Is Conroy going to have anything else before the symbol freights** get here?"
Dispatcher: "No, not before. It looks like a solid AY train right after midnight and a cleanup train a couple of hours later."
Caller: "How does it look for the symbol trains?"
Dispatcher: "According to Conroy yardmaster, it looks like CM-1** will be a little heavy--75 to 80 cars. But CM-3 will be about the usual length--50 to 60 cars. Both should be out of Conroy right on time."

---

* Called on duty.

** A symbol train is usually a freight train carrying high-priority goods. It operates on a somewhat regular schedule and may or may not be listed in the timetable. Such a train takes priority over an extra carrying regular freight. The designator it carries shows its points of origin and destination as well as its direction. For example, BC-3 would indicate a westbound train traveling from Boston to Chicago. The odd number 3 shows it is westbound; an even number would appear in the designator of an eastbound train.

Caller: "Good. I have my car here and I am going to drive over to Elwood mines. I'll call you from there. If anyone is looking for me, I'll be around RK and Wildwood until after the symbol trains go. I'11 keep in touch."
Dispatcher: "Okay."

b. Second example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "West yard, Maxey. That Extra 2770 West you figured here for 1315--is he going to make that figure?"
Dispatcher: "Hardly; I was just going to ring you and change it. He's setting off a hotbox at Lily."
Caller: "Good!"
Dispatcher: "Good? What's the matter, no clear tracks as usual?"
Caller: "Not by 1315. What time do you figure him now?"
Dispatcher: "Well, let's see. He will have to leave Lily in time to clear No. 5 at AY tower. Let's figure him by AY at 1400 and in the yard by 1415."
Caller: "Okay. We can take him then. Thanks."
Dispatcher: "Okay, Joe."

c. Third example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "This is Jordan, the signal maintainer. That dwarf signal at RK tower is back in operation at 1430."
Dispatcher: "Okay, fine. Did you get that report on the flashing lights on the grade crossing at Elwood?"
Caller: "Yes, I did. I'm ready to leave here now with the gasoline rail car. Do you have anything on the branch?"
Dispatcher: "I have a crew switching at Elwood mines, but they won't be ready to leave there for an hour. You should be able to duck over and back before they're ready to leave. I'm not sure the lights are actually out. The report supposedly came from a motorist, but I can't raise the station agent, to see if he knows anything about them. Go 'over and check on them, but don't start back without calling me."
Caller: "Okay."

3 6. THIRD CATEGORY

Calls in the third category are frequently unimportant from the dispatcher's viewpoint but may be important to the individual making the call. Typical examples follow.

a. First example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "What is the correct time?"
Dispatcher: "2231."
Caller: "Okay--thanks."

b. Second example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "Madison station--how's No. 5?"
Dispatcher: "On time."
Caller: "Okay, thanks."

c. Third example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "Fairview station. Do you know whether No. 85 is going to stop here this morning?"
Dispatcher: "Don't know yet. Haven't heard from Conroy."
Caller: "Well, I have a passenger going beyond Maxey. I'll have to flag No. 85 if it's not going to stop."
Dispatcher: "Check with me in 15 or 20 minutes. I should know by then."
Caller: "Okay."

d. Fourth example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "BO tower. Is conductor Bunce coming west, or COD yet at Conroy?"
Dispatcher: "No, he isn't. Who wants to know that?"
Caller: "Just had a phone call from his home."
Dispatcher: "Suppose you call the Conroy crew dispatcher. He can tell you how Bunce stands."
Caller: "Okay."

e. Fifth example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "RK tower. How's No. 86?"
Dispatcher: "Ten minutes late leaving Maxey. 'High Wheel' Johnson is pulling it though, so he'll probably be looking at you on time."
Caller: "Okay."

3.7. EMERGENCY USE

Occasionally, the dispatcher circuit is used for conversations that have no connection with main-track business, and in which the dispatcher has no interest. An example might be that of using the dispatcher's circuit to connect two yards 30 or 40 kilometers apart, when it is impossible to place the calls over the usual long-distance lines. Such calls should not be made over the dispatcher's circuit unless they are important and cannot be completed otherwise. The dispatcher's wire is usually the most dependable on the railroad, and dispatchers in general are cooperative about its use if the circuit is not particularly busy. However, they usually insist that such conversations be as brief as possible, and they usually await a lull in business before completing such a call. Following is a typical example.

Caller: "Dispatcher?"
Dispatcher: "Yes?"
Caller: "This is Billings, yardmaster at Maxey. Can you ring the West yard at Conroy? Our operator can't raise them."
Dispatcher: "Okay, I'll try."
Voice: "West yard, Conroy."
Caller: "Billings, Maxey yard. Engine 2840, Conductor Boyle, out of there about 4 hours ago, had UP 105104 and no waybill. What can you tell me about it?"
Voice: "Just a minute.... Yes, we have the bill. It's a car of merchandise for the Crawfordsville freight house. I have a couple of new clerks here, who must have slipped up. This place is a madhouse."
Caller: "I know what you mean, but that car is hot stuff. How soon can you get the waybill to us?"
Voice: "Well, No. 61 will be leaving here in 20 minutes. I'll see that the bill is put on the express car if you can have someone meet the train."

Caller: "We'll meet it, but make sure to address the bill to the Yardmaster, West yard."
Dispatcher: "All right, all right, break it up."
Voice: "Okay, dispatcher. Thanks."

3.8. RADIO COMMUNICATION

Radio communication facilities can be provided the transportation railway service in the early stages of theater operation. Such facilities are established only when conditions warrant their use, wire lines are not available, and the theater army commander authorizes the installation. Then signal units provide the required radio relay or other supplementary communications. Teams from TOE 11-500, attached to the railway battalion, install, operate, and maintain the radio equipment.

The TRS uses radio communications to increase control, coordination, efficiency, and safety of rail operations and train movements. Radio communications are employed in three ways: (1) operational control in yards and terminals, in yard offices, of switch crews, and of yard personnel; (2) administrative and technical control of operating and administrative units; and (3) en route train operational control between dispatcher and stations, train crew members, stations, dispatcher and trains if range is adequate, stations and trains, and crews of different trains.

In radiotelephone transmission, certain basic rules of procedure are observed, the phonetic alphabet and numbers and procedure words are used, and the message has three main parts. These are discussed in paragraphs 3.9 through 3.12. Radio operating rules Nos. 680 through 686 are given in appendix III.

3.9. BASIC RULES OF RADIO PROCEDURE

Delay and inaccuracy result when correct radiotelephone procedures are not followed. Four basic rules follow.

a. Rule 1. Before transmitting, be certain no other station or operator is transmitting.

b. Rule 2. Know precisely the content and wording of the message to be transmitted.

c. Rule 3. Be brief and to the point. Preciseness is politeness; "please" and "thank you" are unnecessary.

d. Rule 4. Hold microphone directly in front of the mouth. Speak directly into, rather than across, the face of the microphone. Lips should lightly touch the mouthpiece. Without straining, raise voice pitch as much as possible. Speak distinctly, emphasize every syllable of every word, and avoid "ers" and "uhs" between words. Natural sentence rhythm and intonation are preferred.

3.10. PHONETIC ALPHABET AND NUMERALS.

In radiotelephone transmission, the U. S. military services use the International Civil Aviation Organization phonetic alphabet and numerals. They follow in subparagraphs a and b.

a. Phonetic alphabet. The phonetic words used to represent the letters of the alphabet are:

A.....Alfa
B.....Bravo (Brah-vo)
C.....Charlie
D.....Delta
E.....Echo
F.....Foxtrot
G.....Golf
H.....Hotel
I.....India
J.....Juliet
K.....Kilo (Key-lo)
L.....Lima (Leema)
M.....Mike
N.....November
O.....Oscar
P.....Papa
Q.....Quebec (K-beck)
R.....Romeo
S.....Sierra
T.....Tango
U.....Uniform
V.....Victor
W.....Whiskey
X.....X-ray
Y.....Yankee
Z.....Zulu

b. Phonetic numerals. The phonetic pronunciation of the numerals is given below.

0.....zero
1.....wun
2.....too
3.....thuh-ree
4.....fo-wer
5.....fi-yiv
6.....six
7.....seven
8.....ate
9.....niner

3.11. PROCEDURE WORDS

To expedite radiotelephone message handling, certain words and phrases are universally used and understood by U. S. military service operators. Generally called procedure words, or prowords, they are used as applicable in TRS radio transmission to substitute for one or more sentences in a message. The words or phrases and their meanings follow.

WORD OR PHRASE	MEANING
Acknowledge	I want an acknowledgement to be sure you have received, understood, and will comply with this message.
Break	I hereby indicate the separation of the text from the other portions of the message.
Correction	An error has been made in this transmission (or messages indicated). The correct version is--that which follows is a corrected version in answer to your request for verification.
Disregard this transmission	This transmission is in error. Disregard it. (This proword shall not be used to cancel any message already transmitted for which acknowledgment has been received.)
From	The originator of this message is indicated by the address designation immediately following.
Groups	This message contains the number of groups indicated by the numeral following.
I read back	The following is my response to your instructions to read back.
I say again	I am repeating transmission or portion of message indicated.
I verify	That which follows has been verified at your request and is repeated. (This is used only as a reply to VERIFY.)
Message follows	A message which requires recording is about to follow (to be transmitted immediately after this call.)

WORD OR PHRASE	MEANING
Out	This is the end of my transmission to you, and no answer is required or expected.
Over	This is the end of my transmission to you, and response is necessary. Go ahead; transmit.
Read back	Repeat this entire transmission back to me exactly as received.
Relay (to)	Transmit this message to all addressees or to the address designations immediately following.
Roger	I have received your last transmission satisfactorily.
Say again	Repeat all your last transmission. Followed by identification data means repeat portion indicated.
Silence	Cease transmissions immediately. (Maintain silence until instructed to resume).
Silence lifted	Resume normal transmission. (Silence can be lifted only by the station imposing it or higher authority.)
This is	This transmission is from the station whose designation immediately follows.
That is correct	You are correct, or, what you have just transmitted is correct.
Time	That which immediately follows is the time or date-time group of the message.
Unknown station	The identity of the station with whom I am attempting to establish communication is unknown.
Verify	Verify entire message (or portion indicated) with the originator and send correct version.
Wait	I must pause for a few seconds.
Wait out	I must pause longer than a few seconds.
Wilco	I have received your message, understand it, and will comply.

WORD OR PHRASE	MEANING
Words twice	Communication is difficult. Transmit each phrase (word or code group) twice. (This proword may be used as an order, request, or information.)
Wrong	Your last transmission was incorrect; the correct version is ----------

3.12. MESSAGE COMPOSITION

Each radiotelephone message is made up of three parts. They are the heading, the text, and the ending, discussed in subparagraphs a, b, and c.

a. The heading always includes the call. An example is HICKORY 6--THIS IS--MAPLE 7--MESSAGE FOLLOWS. HICKORY 6 is the call sign of the station called, THIS IS is a proword found in every transmission, MAPLE 7 is the call sign of the calling station, and MESSAGE FOLLOWS is a proword spoken just before the text of the message begins.

b. The text may be in plain language, code, or cipher groups.

c. The ending of a transmission may include authentication if being used, and concludes with either "over" or 'but," never both. Either "roger" or "wilco," to acknowledge receipt of the message, may precede "over" or "out."

3.13. FLEET OPERATION

Before signal systems and communication facilities are restored to service in a theater, the dispatcher uses the fleet operation method to control train movement. Fleet operation is a method of operating trains on a single track in each direction for alternate periods. For an unspecified length of time, all trains travel westward, for example, and when such movements have cleared the main at the westward point, trains start moving in the opposite direction. Assume a section of railroad runs from A to H. Imagine that A represents a port with a rail terminal, and that H represents a railhead 60 kilometers to the west with a capacity of 10 trains of a given length. Arrangements might be made to run cars amounting to 60 or 70 percent of A's storage capacity. Each westbound train operated would be classed as an extra and would carry running orders

authorizing movement from A to H. The last train would carry an order stating that it was the last of the westbound movements. When this train reaches H, the order would be the authority for the yard there to start moving empties back to A. When the last eastward train arrives at A, the order that it carries then authorizes westward movement to begin again.

Thus, trains may go in one direction for a period of several hours to several days, before movement starts in the opposite direction. This system can also be used by specifying certain inclusive hours or days for westward movements and an equal period for returning empties eastward. These may be established in 4-, 8-, 12-, or 24-hour periods as required. How long each direction is used continuously depends entirely on the capacities of the yards, railheads, and terminals at the forward points.

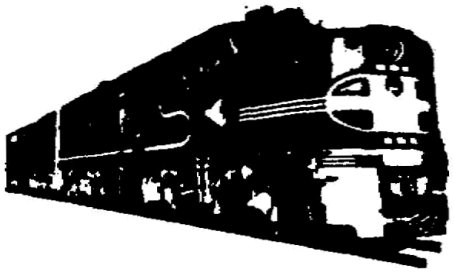
3.14. SUMMARY

In addition to transmitting train orders, the dispatcher's telephone circuit is used for furnishing information to and answering questions for employees along the line. Because of the importance of copying and repeating train orders correctly, the dispatcher usually does not permit interruption of their transmittal. However, it may be justified to make a report which might cause the dispatcher to change the order being dictated or to prevent a wreck or serious delay to trains.

Transmitting train orders is the first order of business over the circuit. The priority of other calls must be established when several persons are waiting to speak to the dispatcher. Usually, calls in the first category are those dealing with main-track operations; in the second, those requesting information related to but not directly affecting main-track operations; and in the third, those that are ordinarily unimportant from the dispatcher's point of view but important to the person making the call.

In the early stages of theater operations, the transportation railway service may request radio facilities. If approved, signal units install, maintain, and operate the equipment. Basic rules of radio procedure are followed to prevent delay and inaccuracy. Use of the phonetic alphabet and numerals is standard in radiotelephone transmission. Procedure words--prowords--are used and understood in TRS radio transmission. A message consists of a heading, a text, and an ending.

When there are no communication facilities, the method of dispatch changes. Usually, the fleet method of operation is used. However, when communication facilities are operational and the dispatcher's circuit is again in use, calls are made in the order of their importance, and the fleet operation method is no longer used.



Chapter 4

SUPERIORITY OF TRAINS

4.1. GENERAL

"A train is superior to another train by right, class, or direction," as stated in rule S-71 of the railway operating rules covered in Technical Manual 55-200. This rule and the others establishing superiority are probably the most simply stated and easiest to understand of all railroad rules.

Applying the provisions of these rules to any two trains of the same or a different class moving in opposite directions on a single track is comparatively basic. However, when three trains of different classes become involved in two-way movement on a single track, superiority and the correct interpretation of numerous train orders can present a complex problem to the persons involved. However, the right of a train to be in a particular location at a given time is easily asserted and proven. But if that right is not fully respected by all train crews, some may find themselves little better off than a motorist in a hospital bed who insists he had the right-of-way. This chapter discusses the superiority of trains and the dispatching methods involved in changing that superiority.

4.2. SUPERIORITY AND RIGHT

On a railroad, you may hear the words "timetable rights." However, they convey a mistaken idea. “Right," as a dispatcher uses it, can be conferred by train order alone. On the other hand, "superiority" is granted by the timetable. Subparagraphs a and b define the terms and explain the differences between the two. Both "right" and "superiority" must be clearly understood by students of train dispatching.

a. Right can be conferred on a train only by train order and never by timetable.

b. Superiority is conferred by the timetable, based on a train's superior class or superior direction. A regular train may have timetable authorization or timetable superiority but not necessarily superiority by right. If such a train is issued a train order that helps it but restricts another superior train, then the first train has superiority by right in addition to timetable superiority.

4.3. RULES ESTABLISHING SUPERIORITY

The rules quoted in this paragraph from Technical Manual 55-200 establish the superiority of trains. Those rules with an "S" prefixed apply to single track, those with a "D" to double track, and those without a prefix to both single and double track.

a. Rule S-71. General. A train is superior to another train by right, class, or direction.

(1) Right is conferred by train order; class and direction by timetable.

(2) Right is superior to class or direction.

(3) Direction is superior between trains of the same class.

b. Rule D-71. General. A train is superior to another train by right or class.

(1) Right is conferred by train order; class, by timetable.

(2) Right is superior to class.

c. Rule 72. Class and Direction. Trains of the first class are superior to those of the second, those of the second class are superior to those of the third, and so on. Trains in the direction specified by the timetable are superior to trains of the same class in the opposite direction.

d. Rule 73. Extra Trains. Extra trains are inferior to regular trains.

4.4. CLASS AND DIRECTION

Both class and direction are conferred by timetable. The two terms are defined and discussed in subparagraphs a and b.

a. Class is conferred by the timetable and cannot be raised or lowered by train order. However, the class can be taken away from a train if the dispatcher annuls its schedule and runs it as an extra. First-class trains are superior to those of second class, second is superior to third, third is superior to fourth, and so on. Some railroads even have fifth class, but in the interest of a basic presentation, this text avoids using any below the second in the examples given. Extra trains are inferior to all others. However, on most railroads when two extras meet on single track, the train going in the superior direction holds main track, and the other takes siding.

b. Direction is also conferred by timetable. For example, a railroad may specify that the eastward direction is superior to westward. At a meeting point between trains of the same class, the one moving in the inferior timetable direction must take siding unless otherwise provided in a train order.

4.5. RIGHT

Right is conferred by train order, and it is superior to class and direction. An illustration of how right may be superior to direction is shown in paragraph 2.5b; the following illustration shows how right may be superior to class. While reading this example, you may wish to refer to figure 1.1. Assume that a 125-car westbound extra, loaded to the engine's rated capacity, approaches Wildwood about 15 minutes before first-class train No. 62 is due there from the opposite direction. Although train No. 62 is first-class, it is a slow, daily local hauling mostly baggage, express, and only a few passengers. Since 5 or 10 minutes delay to this kind of first-class train is relatively unimportant, the dispatcher may sidetrack it just before it reaches Wildwood to keep from stopping the heavy extra. If, instead, the extra were sidetracked to clear No. 62, pusher assistance might be needed to get it started again, and other trains in both directions might be delayed. The extra, of course, would need a written train order to proceed into an area on a first-class train's time. The eastbound passenger train would also need a train order to take siding because both its class and direction are superior, and consequently, its crew expects to hold the main track against all trains. The dispatcher, then, would issue a train order transferring the right to the extra and stripping the superiority from the passenger train. However, this change is effective only until the trains meet, at which time each reverts to its former status. Remember, then, in the absence of orders to the contrary, the superior train holds main track.

Many railroads sidetrack slow-moving passenger trains to let "time" and symbol freights pass. While usually classified as extras, these trains operate on a time schedule even though their schedules are not listed in the operating timetable. They haul high-class freight that usually produces more revenue than the first-class trains. They exercise no right over regular trains, however, unless such right is conferred on them by train order.

4.6. EXTRAS

A large number of the trains on any railroad may be designated as extras. They are not listed in the timetable and run whenever sufficient freight or tonnage is in a yard to justify their operation. Also, it may be necessary to run additional passenger sections, especially during the vacation and holiday seasons. In addition, extra work trains--work extras--may also be run.

For the purpose of documentation, all extra trains are always so designated, such as Extra 310 East, or Work Extra 9220. Work extras are work-trains from which employees perform track maintenance and construction along the right-of-way between specified points. Because these trains must move in both directions; no such designator is used when referring to them. Unless otherwise provided in a train order, a work extra must clear all regular trains and protect against other extras in both directions. A work extra may not protect against a regular train, that is, work on the time of an overdue scheduled train under flag protection, unless instructed to do so by a train order.

To distinguish between extra trains and those regularly scheduled, the extras display white flags by day and white lights at night on the front of the locomotive. Note the white flags mounted on the passenger extra shown in figure 4.1. If more than one locomotive is used on the head end, only the forward engine carries the signals. These extras must always comply with rules 86 and S-87 quoted in paragraph 1.4a, b. Scheduled trains do not display signals except under the conditions cited in paragraph 4.7.

4.7. SECTIONS

In handling passenger trains, running additional sections is frequently necessary. A section is one of two or more trains running on the same schedule. Technically speaking, and especially in the dispatching and telegraph offices, there is no such thing as a passenger train. It is either a train with a class designator, or it is an extra. This is important for operating employees also. If a

Figure 4.1. Passenger Extra Displaying White Flags.

conductor were waiting "in the clear" for a first-class train, he could not assume, simply because he saw a train with several passenger coaches go past him, that that was the train for which he was waiting. He would have to note the engine number to be certain. The one he saw might be a string of empty coaches and might be

designated an extra. It would seem logical, then, that if technically there were no "passenger train, " there certainly could be no "extra passenger train." Some railroads require that all trains be designated by class or as extras.

Many other railroads, however, recognize the need for the extra passenger train designation and use it for trains which cannot be run on another train's schedule. This designator demands and receives more respect from yard crews and from crews of trains of equal class who at least know that this train is more important than a train of coal. Crews of scheduled trains, however, must regard the "extra passenger" as inferior to their own.

When an overflow of passengers requires another train, the dispatcher may authorize--create--an additional train and call it a "section." To give this section first-class standing, the dispatcher often runs it as a continuation of a first-class scheduled train and calls it a "second section." As an example, assume that first-class No. 87 leaves Conroy at 1700 hours, and a section must be run 30 minutes later. The dispatcher can give this section right over other trains that would otherwise be superior by calling the section "Second 87." By doing so, regular 87 becomes "First 87." The train orders that the dispatcher issues and their interpretation are given in the subparagraphs following.

a. Orders. To the crew of First 87 and to all telegraph offices and stations along the line would go this train order: "Engine 450 Display Signals* and Run as First 87 Conroy to Maxey." To acquaint all personnel with details of the second section and its expected time, the following order would also be necessary: "Engine 464 Run as Second 87 Conroy to Maxey and Wait at Conroy Until 1730 Hours."

b. Interpretation. The first order requires that all engines and trains clear First 87 on its regular time the same as if the order had not been issued. In addition, it requires that the engineer of First 87 blow one long and two short blasts on his whistle to notify every train of the same class, every inferior train in the same direction, and all yard engines that his train is displaying signals for another section. An engine so notified must acknowledge this signal by two short blasts. The second order is the authority on

---

* On all sections except the last, two green flags are displayed during the day and, in addition, two green lights at night (rule No. 20).

which engine 464 proceeds as Second 87 and requires that it be regarded simply as though it were regular No. 87 and were running 30 minutes late.

4.8. WORK TRAINS AND WORK EXTRAS

Trains hauling work gangs and their tools and equipment to perform maintenance and construction work along the right-of-way are called work trains. They have a regular train crew in addition to the maintenance or construction workers; however, this text deals only with the train crew. Work trains must give way to other trains as promptly as practicable. In emergencies, however, it may be necessary to make them superior to other trains and, sometimes, to all trains. Paragraph 5.19c explains this further. An example would be a wreck train that must clear the right-of-way before any train could move. The following subparagraphs discuss operations involved in using work trains.

a. Protecting. A train is said to "protect" when the crew stations a flagman sufficiently ahead or to the rear to stop any approaching train that might otherwise collide with the stationary one. Since work trains are nearly always stationary, it is most practical to have them protect themselves against all trains. They generally locate where they are reasonably close to a siding so that they can enter it to clear the main track when another train approaches. The work train's conductor sees that his train clears all regular trains, as specified by rules 86 and S-87. When a wayside dispatcher telephone is near, the conductor maintains almost constant contact with the dispatcher on the whereabouts of extras and knows when to take siding. The work train has a flagman who must flag the main track while the work train is occupying it; he is relieved from flagging only when his train clears the main. He is advised of this clearance by the engineer's sounding the appropriate number of blasts on the locomotive whistle, discussed in subparagraph e.

b. Work train orders. When a work train must move back and forth frequently for the work crew to get the job done, it is impractical to have the flagman walk ahead of the train. The dispatcher, knowing the kind of work being done and the extras moving in the area, attempts to issue an order that permits the work train to move unhampered. If, for instance, no extra is to arrive at the work limits before 1001 hours, the dispatcher would issue a train order that permits the maintenance men to carry out their tasks without protecting against extras until that time. Such an order might read: "Engine 325 Works Extra 0701 Hours Until 1501 Hours Between RK and WD Not Protecting Against Extra Trains Until 1001 Hours."

Or, if desired, he could add: "Not Protecting Against Second- and Third-Class Trains." This permits it to work on the time of these scheduled trains without flag protection. Train orders for work trains, discussed more fully in paragraph 5.18, are thought to be the most difficult of all to use intelligently, to get the maximum work done with the least delay.

c. Protecting against work trains. Trains of superior class do not protect against work trains. On double track, all operating crews know the location of the work train's area both from copies of this extra's orders and often from notices posted in crew offices along the line. In general, the notices specify the work area, the number of days the work will be in progress, and a reduce-speed limit for the area. On single track, however, all trains in each direction are given copies of the work extra's train orders. While instructions generally require all work extras to clear all trains without delay, no approaching train, regardless of superiority, tonnage, or importance, would run past a work-train flagman.

d. Military work trains. Frequently in a theater of operations, it may be necessary for all trains to protect against work trains, signifying that they are given a higher priority than those hauling troops or supplies. In civilian practice, a work train and its crew may be in a particular location solely to do work to improve passenger riding comfort or to make long-range repairs necessary to protect capital investment. It is much more economical to insist that such a work train protect against and clear the time of all trains. Why? Because it is small, is generally close to a siding, and can clear the main track much more conveniently than a heavy train can stop, wait until the work train clears, and then resume its run.

The military work train, however, may be found blocking the main track because of different and more pressing reasons. In a theater, passenger comfort and long-range maintenance are inconsequential, and work trains operate only when absolutely necessary, to keep trackage reasonably fit for supply and troop trains moving toward the front. At times, work trains are justifiably superior to all other trains simply because failure to do trackwork speedily would result in a blockade in which no trains would be able to move. Stopping other trains while the work train clears the main is not serious because military trains are frequently relatively short and restarting them is not ordinarily a problem.

e. Proper work-train flagging. In discussing proper work-train flagging, it would be almost impossible to overemphasize its importance. When the train is on the main track, the flagman

protects its rear by stationing himself far enough back to stop any approaching train. On single-track lines, the forward end of the train must be protected in the same way. When the work-train engineer pulls into a siding and clears the main, he sounds an appropriate number of blasts on the whistle. This is called "whistling in" the flagman. Before the train again blocks the main, the engineer sounds a specified number of blasts and the flagman again goes out to flag. This is called "whistling out." The number of blasts varies according to the direction in which the train is headed and to the number of main tracks.

The alternate whistling in and whistling out, which occurs when a work train clears and blocks the main, involves a hazard that operating rules do not stress and safety spokesmen seldom point out. The danger stems from a possible human failure during the flagging--a danger which is probably best illustrated by the following true story.

An experienced flagman was assigned to flag for a work extra on a single track not having block signal protection. The work train had about 6 hours work in one location approximately 251 meters from a siding. The train crew held orders to protect itself against eastbound extras only. The conductor was able to station himself close to a wayside dispatcher telephone and, as unscheduled trains came within a few kilometers of the area, he would have the work train enter the siding and call in the flagman. This would relieve the flagman and he'd return to the side of the tracks and let the approaching train by. After it passed, the work-train engineer would whistle out the flagman and then return to the main track; the flagman would again assume a position in the center of the track ready to stop all eastbound extra trains.

Several hours passed during which the flagman had been whistled out and in perhaps a half-dozen times while as many trains safely passed. Late in the afternoon, a fast, high-priority freight appeared in sight of the flagman about a kilometer away. He, in turn, was a kilometer from his train which was around a curve and out of sight. The flagman, sitting on a pile of ties, got up when he saw the approaching train and walked to the center of the track. He looked in both directions and returned to the tie pile. Soon he got up again, walked over to the track as if to flag the train, and suddenly turned around and returned to the pile of ties. The engineer on the approaching train, expecting to be stopped, had eased off on the throttle, but he resumed full speed when the flagman walked to the side of the right-of-way a second time. A kilometer up the track

from the flagman the 45-kph freight crashed into the work train, demolished the caboose and two work cars, and stopped with its front end buried deep in the work-train engine. Two section men were killed, and property damage was estimated at nearly $100,000.

What happened? It's rather basic when given a little thought. The flagman simply couldn't remember whether he was "in" or "out." He didn't know whether his train was on the main or in the siding. He had two choices, and he guessed wrong. If he had recalled the simple provisions of rule 108--"In case of doubt or uncertainty, personnel will take the safe course," he would have stopped the train and prevented a tragedy.

4.9. TIMETABLE SCHEDULE

Earlier the text states that if scheduled trains were always on time, train orders would seldom be needed. When schedules are worked out--strung--for publication in a single-track timetable, the meets of scheduled trains are planned to the extent that train orders are unnecessary. However, scheduled trains may frequently run late. When they do, train orders must be issued to other trains on the line to assist the overdue trains in getting back on schedule or to prevent them from delaying other trains or operations. The following subparagraphs further discuss operating trains with respect to the timetable.

a. Running ahead of schedule. The right of a regular train to occupy the main track at a particular time is established in the timetable. However, the train must travel in strict accordance with the published time figures in the train schedule columns, as shown in the timetable in appendix II. This means that a train cannot gain time en route and arrive at the various stations substantially before it is due. Logically, a passenger train could not make a practice of departing stations early because of the clamor which would surely be raised by the traveling public, and rightly so. A train may gain time between any two successive stations, but it must not pass the advance station earlier than the time shown in the timetable. To do so would disrupt operations ahead of the train. When a yard crew desires to cross or foul main tracks, or when an inferior train occupies a track ahead of a superior one, the crews adhere strictly to the published time figures in the timetable. They always give thought to, but never depend upon, the possibility of the scheduled train's being late but NEVER early.

b. Running behind schedule. When a train becomes late on its schedule, numerous other delays to inferior trains running over

the division are brought about. Likewise, yard engines required to use or cross the main tracks in doing their work may also be delayed. When a regular train becomes late, the average dispatcher is cautious in authorizing movements that might interfere with its progress. Knowing that the engineer is trying to make up lost time, the dispatcher is naturally reluctant to authorize any movement that might conflict with the engineer's efforts to get back on schedule. Additionally, and probably more important, the dispatcher has no way of knowing how many minutes the engineer may have gained since he was reported past the last station. If the dispatcher takes no positive action, the crews on the division, even though they know the train is late, cannot use the time represented by the number of minutes it is running behind. They must respect the published time until they receive a train order directing otherwise.

If a train were traveling on the Elwood Division from DN to BO and a yard crew at FV knew that it was 5 minutes late leaving DN, BL, and MD, they could not depend on using those extra minutes at FV. The reason is that the train might make up the lost time between MD and FV and arrive at the latter station on time--5 minutes before the yard crew expected it. In brief, a train keeps its right to the time in the published schedule unless and until the dispatcher temporarily amends it with a train order. When he does, he notifies the train crew and all appropriate operating employees of the order.

4.10. ORDERS AFFECTING SCHEDULED TRAINS

Chapter 5 deals exclusively with the many forms of train orders; earlier paragraphs in the text touch upon certain orders and show in detail how they affect the overall movement of trains over a division. From an instructional standpoint and in fairness to the reader, it seems unwise to completely avoid discussing orders until the last chapter. Therefore, those earlier paragraphs, in which basic dispatching principles are cited, explain some of the train orders that dovetail with the particular discussion. In the subparagraphs that follow, specific examples are given of some of the train orders necessary in handling scheduled trains. In explaining many of the orders ahead of chapter 5, you are given a working knowledge and an understanding of the intent of some of the many orders before beginning the detailed discussion in that chapter.

a. A run-late order to a train has the same effect as changing its published schedule for the particular trip. It sets back the schedule by as many minutes as the train is late. Assume that No. 19, a first-class train running from Conroy to Maxey, is held

50 minutes at its starting point awaiting a mail car from a connecting railroad. In handling this train, the dispatcher has three choices: (1) giving the crew a run-late order to run 50 minutes late from origin to destination; (2) issuing no restricting orders and permitting the crew to make up as much of the 50 minutes as possible during the run from DN to AY; or (3) giving the crew a wait order which would specify the earliest time the train could depart the stations shown in the wait order, discussed in subparagraph b.

If the dispatcher gave the train a run-late order, it would read as follows:

No. 19 Engine 3130 Run 50 Minutes Late Conroy to Maxey
FMB

This order would change No. 19's leaving time at each station. Its regular schedule is shown below in column 1; its revised schedule in column 2.

Stations	Column 1	Column 2
DN	Leave 1712	Leave 1802
BL	1729	1819
MD	1740	1830
RK	1750	1840
OG	1801	1851
WD	1810	1900
FV	1819	1909
BO	1837	1927
LY	1852	1942
AY	Arrive 1906	Arrive 1956

This order would not help No. 19 because it does not permit the train to make up any of the 50 minutes. Of course, inferior trains might find it helpful. When a dispatcher issues such an order, he is said to be "putting out time" on the scheduled train involved. Actually, he is amending the timetable schedule for the particular train for the particular trip. He is, in effect, granting to others the use of the time represented by the difference in minutes between the advertised and the run-late time.

If the dispatcher takes no train-order action, however, the delayed train would be free to make up some of the time. The dispatcher would advise anyone who inquired that the train was late and would give its reported--OS--time past the last station. However,

he would not predict or guarantee to anyone that the train was going to be 50 minutes late at every station between its points of origin and destination. Other trains and yard crews would not know the precise time to expect the train, and they could not depend on using the full 50 minutes because this figure might be progressively reduced as the train traveled over the division. When the dispatcher issues the run-late order, he is guaranteeing to everyone concerned that the 50 minutes will not be reduced.

b. A wait order, also called a time order, may be issued instead of a run-late order. The latter is not popular with all dispatchers; some railroads even prohibit its use. A wait order permits the engineer to make up time and tells everyone concerned approximately how much time. It predicts, without guaranteeing, just how much time will be made up. In effect, it is saying: "No. X will be allowed to make up 20 minutes between A and E. It might make up less, but it's not going to be permitted to make up any more." The order specifies that the train may not leave a station before the time shown opposite the station name. A wait order for No. 19, under the conditions just given, might read as follows:

No. 19 Engine 3130 Wait at
Bliss Until 1815 Hours
Madison 1823 Hours
Cain 1831 Hours
Ogdensburg Until 1838 Hours
Wildwood 1845 Hours
Fairview 1852 Hours
Nelson 1905 Hours
Lily 1918 Hours
AY Tower Arrive 1929 Hours

FMB

The dispatcher, in effect, writes a new schedule for most of the run. Also, he shortens by a few minutes the individual running time between certain stations. A comparison of the running time between stations can be made by examining the two columns that follow. The times and stations of the run-late order are shown in column 1; the stations and departing times of the wait order are listed in column 2.

Column 1--Run-Late Order		Column 2--Wait Order	
DN Tower Leave	1802 Hours		
Bliss	1819 Hours	Wait at Bliss Until	1815 Hours

Column 1--Run-Late Order		Column 2--Wait Order	
Madison	1830 Hours	Madison	1823 Hours
Cain	1840 Hours	Cain	1831 Hours
Ogdensburg	1851 Hours	Ogdensburg	1838 Hours
Wildwood	1901 Hours	Wildwood	1845 Hours
Fairview	1909 Hours	Fairview	1852 Hours
Nelson	1927 Hours	Nelson	1905 Hours
Lily	1942 Hours	Lily	1918 Hours
AY Tower Arrive	1956 Hours	AY Tower Arrive	1929 Hours

An examination of the two columns shows the exact number of minutes in the shortened schedule in column 2. The engineer on No. 19 will make up all the time he can within the limits set forth in column 2. If he fails to meet the faster schedule, his train will be permitted to leave the stations later than the time shown. Under no circumstances will the train be permitted to leave earlier.

4.11. LOSS OF TIMETABLE SCHEDULE

On occasion, a scheduled train may lose its right and its schedule. With a loss of schedule, the train loses its right to continue occupying the main track. Losing its schedule and having its superiority restricted, however, are entirely different and the distinction must be clearly understood. A train may have its timetable superiority temporarily suspended by a train order which restricts it. Two examples would be (1) putting a relatively unimportant scheduled train into a siding to eliminate stopping and delaying a heavy extra or (2) sidetracking a scheduled eastbound train (when east is the superior direction) while a westbound of equal class is kept moving. These restrictions are only temporary, and the train continues on its normal schedule after the train order is fulfilled. However, on two occasions the train actually loses its schedule and hence its superiority: when it is more than 12 hours late and when the timetable changes.

a. More than 12 hours late. When a scheduled train becomes more than 12 hours late, it is said to "die on its schedule." This means that it has lost its schedule and that all train orders, if it holds any, are annulled. The train can proceed from the point where it loses its schedule only on new train orders from the dispatcher. Rule 82 of TM 55-200 provides that "...Regular trains more than 12 hours behind either their scheduled arriving or leaving time at any station lose both right and schedule, and thereafter can proceed only as authorized by train order."

Since the rule specifies both arriving and leaving time, it follows that a train due to arrive at a station at 0700 and depart at 0707 could continue on its schedule if it could arrive exactly at 1900 and depart exactly at 1907. If, however, it arrived at 1901, it would then lose its schedule, and it would have no right to leave even if it could complete its unloading aid loading and be ready to depart by 1906. Conversely, if it arrived before 1900 and couldn't depart until 1909, it would likewise die on its schedule. In the first instance, it would be because of late arrival and in the latter because of late departure. In either event, the dispatcher would have to recreate the train as an extra, or run it as a section of another scheduled train, as explained in paragraph 4.7. If the schedule of no other train were convenient, the dispatcher could create the train as an extra and, because it was so long overdue, probably confer on it right over all other trains until its destination was reached, or until a division terminal was reached and another dispatcher had jurisdiction. Loss of schedule is not a common occurrence because most dispatchers take some positive action to assist a train or annul its schedule before it becomes 12 hours late. However, this is not always possible.

b. Change of timetable. A train may possibly lose its schedule because a new timetable is issued. Assume that a first-class train operates daily to and from a summer resort from 1 June through 30 September. Because the train operates exclusively for the convenience of the resort patrons, it is annulled effective the first day of October. Therefore, at midnight on the last day of September a new timetable takes effect. Since the train is due to arrive at its home terminal at 2330 hours, the new timetable has no effect on the train if it completes its last return run on schedule.

Suppose, however, on the last return trip, the train is an hour late leaving the resort station and the dispatcher "puts out" an hour on the train, as explained in paragraph 4.10a. At midnight--technically at 0001--the train loses its schedule and its right to be occupying the main track because its schedule does not appear in the new, and now current, timetable. The hour's time that the dispatcher has put out on the train cannot be carried over to the new timetable. Therefore, when the train's schedule expires at 0001, it would have to be handled exactly like the train discussed in subparagraph a.

Under the conditions outlined in the example just given, the dispatcher takes different action. When he sees that the train is an hour late leaving its initial station and is going to overlap a new timetable, he annuls the train's schedule. He then creates it as an extra and gives it right over all trains to its destination.

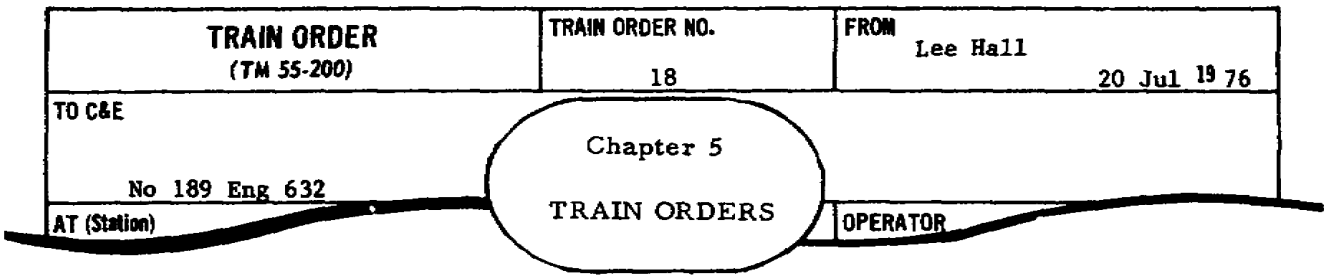
Rule 4 of TM 55-200 provides that:

> Each timetable, from the moment it takes effect, supersedes the previous timetable. All trains operating on schedules not provided for in the new timetable will secure valid authorization from the dispatcher to continue their runs and do so as extra trains.

4.12. SUMMARY

Right is conferred by train order, and class and direction by timetable--the basic roots of dispatching theory and practice. The dispatcher, to accomplish his objective, can change the order of precedence of these governing rules to suit a particular operation. All rule books, no matter where you may be railroading, contain a section of rules outlining the method of determining the superiority of trains. This section of the operating rules, as well as those in appendix III, should be consulted the moment you are assigned to any railroad operating task, whether it be in train or engine service, in any phase of dispatching work, or in any rail supervisory capacity involving the movement of road trains.

As a student of train dispatching, you are reminded that this entire reference text is intentionally general; it cannot be construed as being standard for all railroads for all conditions of train operation. The rules that establish superiority, however, are standard on all American railroads and are identical to those in military use. Operational procedures based on fundamental rules and practices that might be suitable in peacetime railroading may be totally inadequate in a theater of operations. The dispatcher has broad powers in handling trains, but he must stay within the limits of operating policy dictated by higher authority. The timetable, the established rules, and the particular dispatching policy always govern; they must be examined before assuming that all the fundamentals outlined here always apply.



5.1. GENERAL

Before the successful commercial application of the telegraph in the late 1840's, the employees' timetable was the supreme authority for operating all trains on any railroad. It specified the classes of all trains, exactly where they must meet and pass and which must take siding, as well as the superior direction. The timetable's provisions permitted early railroaders to operate reasonably safely, provided scheduled trains were always on time and everybody obeyed the rules set forth in the "bible."

Scheduled trains, however, were frequently several hours late. Then, too, there were always a few impatient and venturesome crews who practiced "railroading on the other man's smoke." This meant advancing, on single track, into an area on another train's time, watching for the opposing engine's smoke, and hoping the other crew was watching theirs. At best, moving on "smoke orders" was a highly dangerous practice; but its proper alternative of abiding by the timetable usually meant waiting for hours in sidings for overdue, superior trains. A century ago railroaders carried their lunches in half-bushel baskets; the lengthy time away from home made it necessary. Frequent and seemingly endless waiting in sidings accounted for a great deal of the crews' time on the road.

In 1851 when Charles Minot was superintendent of the Erie, he decided to do something about these long waits. Once while on one of his westbound freights, sidetracked at what is now Harriman, New York, he became extremely impatient while waiting for a superior eastbound train. After some time, he went to a nearby commercial telegraph office and had the telegrapher inquire of the railroad signal operator at Goshen, 15 miles to the west, if the eastbound train had yet passed. Receiving a negative reply, he then had the telegrapher send the following message to the operator at Goshen: "Hold Eastbound Train Until Further Orders. Charles Minot, Superintendent." To his conductor and engineer, he handed a written

order reading, "Run to Goshen Regardless of Opposing Train." The engineer refused to make the run on the strength of the doubtful safety of a holding order transmitted by wire.

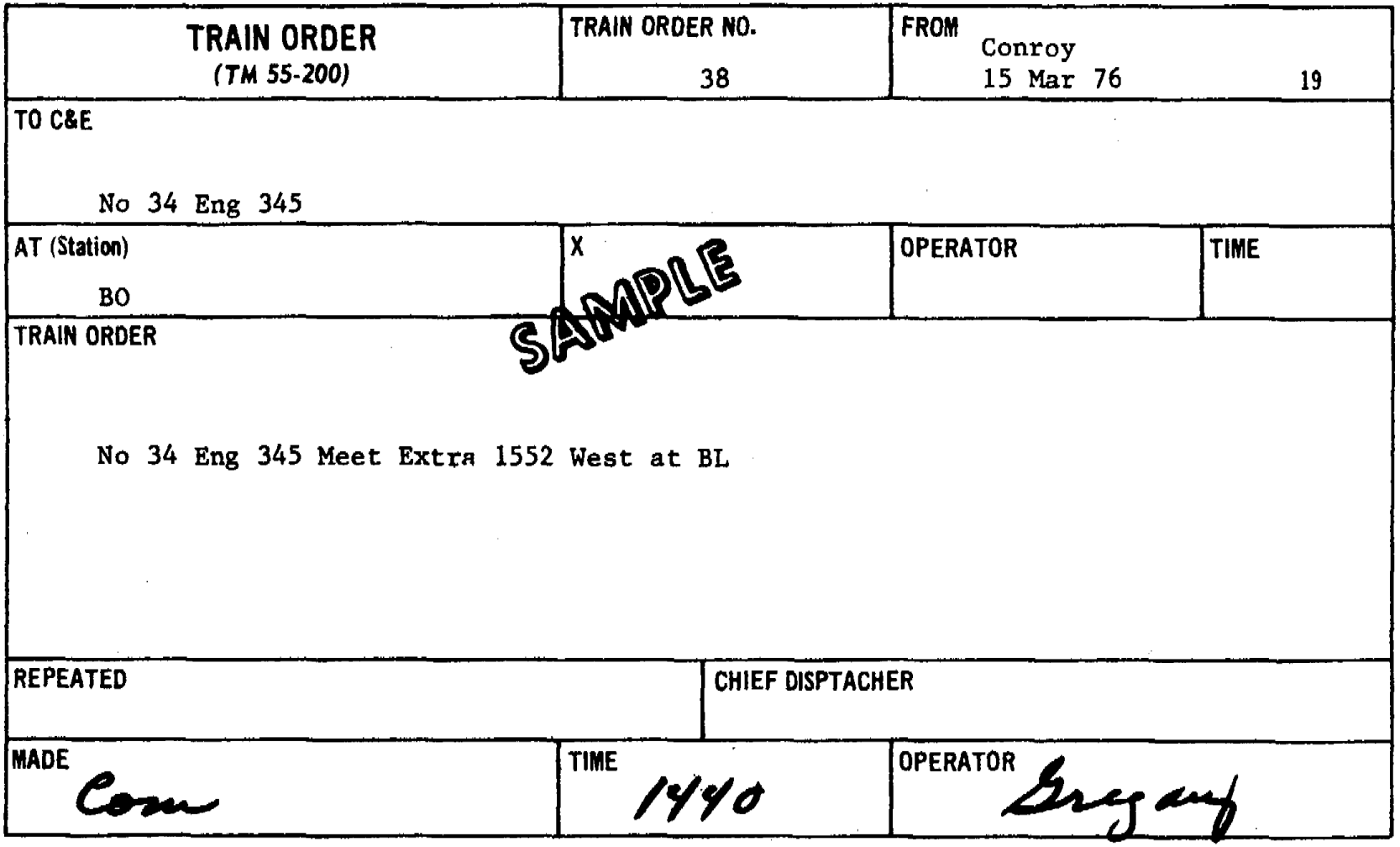
Superintendent Minot appears to have been a man of wide abilities as well as vision, for he himself took the throttle and ran the train to Goshen. Arriving and not finding the superior train there, he wired the next station ahead to hold the train. History does not record whether the engineer was by then convinced of this new system's safety, but after a series of-wires sent ahead, the train was able to reach its destination several hours earlier than if it had adhered to the timetable.

Many changes have come about in train orders since their humble beginning, but their basic principles and extreme importance are identical today. Perhaps there is no industry in the world where seemingly minor errors can result in the deaths and property damage that can occur in single-track railroading. When movements on single track are controlled by train orders, not only must the dispatcher's movement plan be scrupulously correct, but also the transmitting, relaying, and delivering of the orders must be done in a virtually foolproof way. Moreover, the language of the orders must be so unmistakably clear that it cannot possibly be misinterpreted. Strict accuracy of stated time, engine numbers, station call letters, and direction is vital. As shown in figure 5.1, the body of a train order is written with no punctuation; however, some of the examples of train orders given in this text are punctuated to provide proper grammatical structure necessary for a clear understanding of the text material. In writing orders, the dispatcher must step out of his role as their originator and place himself in the position of the crews. He must then ask himself if he would thoroughly understand the orders if he were the addressee and not in possession of the knowledge held by him as the dispatcher.

This chapter discusses in detail the use of train orders in moving trains over the rail line. However, before that discussion begins, give your attention for a moment to the train-order rules given in appendix III. They are rules 200 through 223, quoted from Technical Manual 55-200. For you to attempt to memorize them would be impractical, but do read them carefully for general familiarization and refer to them as you study this chapter.

5.2. INTERPRETATION

Crews receiving train orders have a grave responsibility in reading, interpreting, and properly executing them. Careful reading



TRAIN ORDER
(TM 55-200)

TRAIN ORDER NO. 38

FROM Conroy
15 Mar 76 19

TO C&E

No 34 Eng 345

AT (Station) BO

X

OPERATOR

TIME

TRAIN ORDER

SAMPLE

No 34 Eng 345 Meet Extra 1552 West at BL

REPEATED

CHIEF DISPTACHER

MADE Conv

TIME 1440

OPERATOR Gregory

DA FORM 4092-R, 1 MAY 73 Replaces DA FORM 55-203, 1 AUG 53, which is obsolete.

Figure 5.1. Train Order.

and concentration are necessary with some involved orders or series of orders; crew members must read, repeat, and listen to others read and repeat them. It is dangerous indeed and often prohibited for one member to read an order and then tell others what it means before they read it. The other members may be influenced by the oral interpretation, which may be incorrect, and they in turn may also read it wrong. Discussing complicated orders is advisable, and complete and unanimous agreement must exist before acting on them. Sometimes it is a simple matter to get dispatcher clarification, but more frequently the crews are unable to contact him.

5.3. COPYING

When a dispatcher writes a train order in his train-order book, he dictates the order over his wire to one or more operators along the division. The handwriting in the train-order book should be clear and legible, but it does not require the extreme writing care required of operators. Frequently, written orders must be read by poor light on lurching engines and cabooses without the writer being present to interpret any unreadable words or phrases.

5.4. NUMBERING AND WRITING

Train orders are numbered consecutively each day beginning at 0001 hours. When subdivisions of a railroad are under the jurisdiction of more than one dispatching office, a different series of numbers is used by each. This prevents duplicating numbers for crews operating in more than one dispatcher's territory. One might use the numbers from 1 through 200; the other, the numbers from 201 to 400.

"Slow orders" are train orders that restrict speed to suit the track, a certain bridge, or a particular work area. They are often recorded in a special book. Slow orders are relatively few and are often in effect for a stated period--often several days. Some railroads post these speed restrictions on a bulletin board that road crews must read and sign before going out on a road affected by slow orders. Other roads give every road crew a slow order written on a regular train-order form.

In writing orders, such even hours as 1000 or 1500 should not be used in stating time. Specifying it in even hours is peculiarly conducive to misunderstanding--something that can be disastrous in single-track operations. When time normally would be 1300, it is necessary to move it a little ahead or a little behind to, for example, 1301 or to 1259.

5.5. TRANSMITTAL

The way the dispatcher transmits train orders and the way operators receive and deliver them are illustrated in the example detailed in the remainder of this paragraph. It conforms to previous instructions and to rules cited in appendix III and illustrates the planning that must be done by the dispatcher. It shows how he must occasionally exercise his right to restrict a superior train to assist an inferior one.

Refer to figure 1.1, which illustrates the single-track division, and to columns 5, 6, and 8 of the single-track train sheet given in annex B. The columns represent trains intended to illustrate a specific example. From a standpoint of time and continuity, they do not dovetail with the remainder of the train sheet. Neither will No. 34 be found in the timetable in appendix II. The particular trains are used merely to present as many situations as possible in the same illustration. The delays are cited in the text but not itemized on the train sheet.

a. Superior train restriction. When the dispatcher created Extra 4550 West at Conroy and authorized it to go out on the main track and proceed to Maxey, he provided, by train order, for it to take siding at RK to clear No. 34. The latter's crew was given a copy of the order, and they knew, despite the train's schedule shown in the timetable, that their train's superiority would be restricted unless Extra 4550 West was at RK upon their arrival.

b. Dispatcher planning. Assume, however, that No. 34 is delayed at BO for 25 minutes awaiting a mail truck connection, and a minor grade-crossing accident at FV delays it another 30 minutes. To permit the RK meet order to remain in effect would now mean that Extra 4550 West would probably be delayed at RK for 40 to 50 minutes while waiting for No. 34. This delay would not be particularly serious to an extra train, but now something else enters into the dispatcher's planning. He has Extra 9510 West called at Conroy at 1715 hours, as column 8 on the train sheet in annex B shows. It is a heavy train and this particular engine is overdue in the back shop for major repairs. Consequently, the dispatcher would like to keep the 4550 well ahead of the 9510 to prevent the danger of the latter's engine stalling on Windham Hill, shown on the map in figure 1.1. Previously, the dispatcher had fixed a meet at MD for Extra 9510 West and No. 34.

c. Superseding an order. Because of the 55-minute delay to No. 34, the dispatcher decides to put Extra 4550 West over

Windham Hill before it meets No. 34. This means that the new meeting point has to be at OG. Such a move gets the advance extra over the hill and out of an area where it could delay the extra behind it. This move might, of course, delay No. 34 even more. However, assume that No. 34 carries mostly express and mail and only a few revenue passengers. The dispatcher would probably decide that a few minutes more delay would be secondary to the possibility of Extra 9510 West's stalling and having to "double" over Windham Hill--take the train over in two sections. Paragraph 2.6d describes how meet orders are superseded. The MD meet between No. 34 and Extra 9510 West can now be advanced to RK. Once the railroad is clear between RK and OG, Extra 9510 West should have no trouble in getting over Windham Hill.

Since the dispatcher can reach No. 34 at WD and get new train orders delivered to Extra 4550 West at RK tower, he calls the operator at WD and advises him to "copy a train order, East." He rings RK tower and tells the operator to "copy a train order, West." Then he advises each operator how many copies of the orders are to be made. Because the operator at MD has to copy and deliver the new meet order for Extra 9510 West, the dispatcher gets MD station on the wire also. Because No. 34 is superior, even though the orders are to be transmitted and copied simultaneously, the dispatcher must address No. 34 first. When all operators are ready, the dispatcher dictates the following orders:

No. 34 Eng 222 Meet Extra 4550 West at OG Instead of RK
FMB

No. 34 Eng 222 Meet Extra 9510 West at RK Instead of MD
FMB

When dictating the orders, the dispatcher writes in the train-order book as he reads. He records, in this book, all stations and trains to which the order is addressed. Each operator copies in longhand the text of the order and inserts his particular call letters in the heading: RK, MD, or WD. The text must be copied in its entirety. In the same sequence in which the operators were addressed, they repeat the order from their copy. Figures, engine numbers, and dates are given thus: Eng 345--three hundred forty-five, 3-4-5; 14 November--fourteen, 1-4. This form is used in dictation and in the repeating. Read rule 206 in appendix III.

d. Completing the order. After the order is copied, the first operator addressed by the dispatcher, the one copying the order for the superior train, reads the order back. As the operator repeats the order, the dispatcher underscores each word. If the repetition is correct in all respects, the dispatcher completes the order by saying "complete" and giving the exact time, such as 0931 hours. This, in effect, is saying, 'Okay, you've got it correct at 0931 hours. You are free to deliver the order to the train when it arrives." The word "complete" is generally abbreviated "com," and it is written along with the time in the appropriate spaces at the bottom of the train order (fig. 5.1). Then in turn each of the other operators repeats the order from his written copy, as the dispatcher underscores each word in his train-order book and completes the order as he did for the first operator. Now, they, too, are authorized to deliver the orders to their respective trains along with a Clearance Form "A" (par. 5.8).

In short, train orders have no validity until they have been completed, and the completing is done according to the superiority of the particular trains. This means that the order for the superior train, which is being restricted, must be completed before the one for the inferior train which the order helps. The only exception to this procedure is known as the "X" response, discussed in the next paragraph.

5.6. THE "X" RESPONSE

Train-order rules require that, when an order has been transmitted to several offices, the receiving operators are to repeat it at once from their copy and in the succession in which the several offices have been addressed. Therefore, the last operator addressed is the last one to repeat it. The dispatcher and all operators on the wire listen for any flaws or omissions in the repetitions.

Occasionally, however, the last operator must necessarily repeat the order first. This is permitted when it can be completed and delivered to an inferior train which would otherwise be delayed while several other operators are repeating the order to the dispatcher. When this occurs, he directs that the operator receiving the order for the superior train give the "X" response, as rule 212 in appendix III explains. Then he permits the operator copying the order for the inferior train to repeat his first and, when he's finished, to deliver it. Once the "X" response is given, the order may be repeated and made complete to the inferior train before the operator copying for the superior train repeats his order. When this

response has been given, the order to the superior train becomes a holding order and cannot be delivered until it has been repeated and completed.

Suppose, for example, that the power failed after the order had been copied but before it had been completed. The "X" response has already been given and a copy of the completed order to the inferior train has already been delivered. The inferior train would execute its part of the order. However, the superior train could not pass the office holding an order for it which lacked the dispatcher's final approval. The operator would set a train-order signal against the superior train and cause it to stop. Even then, when the operator and the crew knew the contents of the order, the crew could not act on it. Flagmen would have to be sent both forward and to the rear of the waiting train until power was restored or until the dispatcher could get additional instructions to the operator holding the superior train.

5.7. TRAIN REGISTERS

When a train prepares to leave its starting point, the crew has no way of knowing whether all superior trains have arrived and departed. Neither has the crew any way of knowing whether any superior trains that have passed were displaying signals for following sections (par. 4.7). In some localities, the dispatcher advises a crew by a form R order of the superior trains for which they must wait before going out on the main track. At other locations, train registers are maintained to furnish this information for all concerned. When a train arrives at a station where it has work or when it reaches a junction point, the conductor signs the register. He writes in the number, class, and arrival time of his train, and the type of signals it is displaying, if any. Just before the train leaves, the conductor checks the register for other arrivals or departures that may be superior and then enters his departure time. Generally, extra trains having no stops where the register is located are not stopped simply to register, and timetables of most railroads provide that they may register without stopping. Instead, the crew throws off a message containing the necessary information and the operator enters it.

Information from the register is conveyed to a passing crew in the form of a train order which might read as follows:

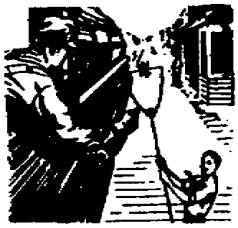
Extra 198 West
All Superior Trains Due at RK Before 2130 Hours
Have Arrived and Left
FMB

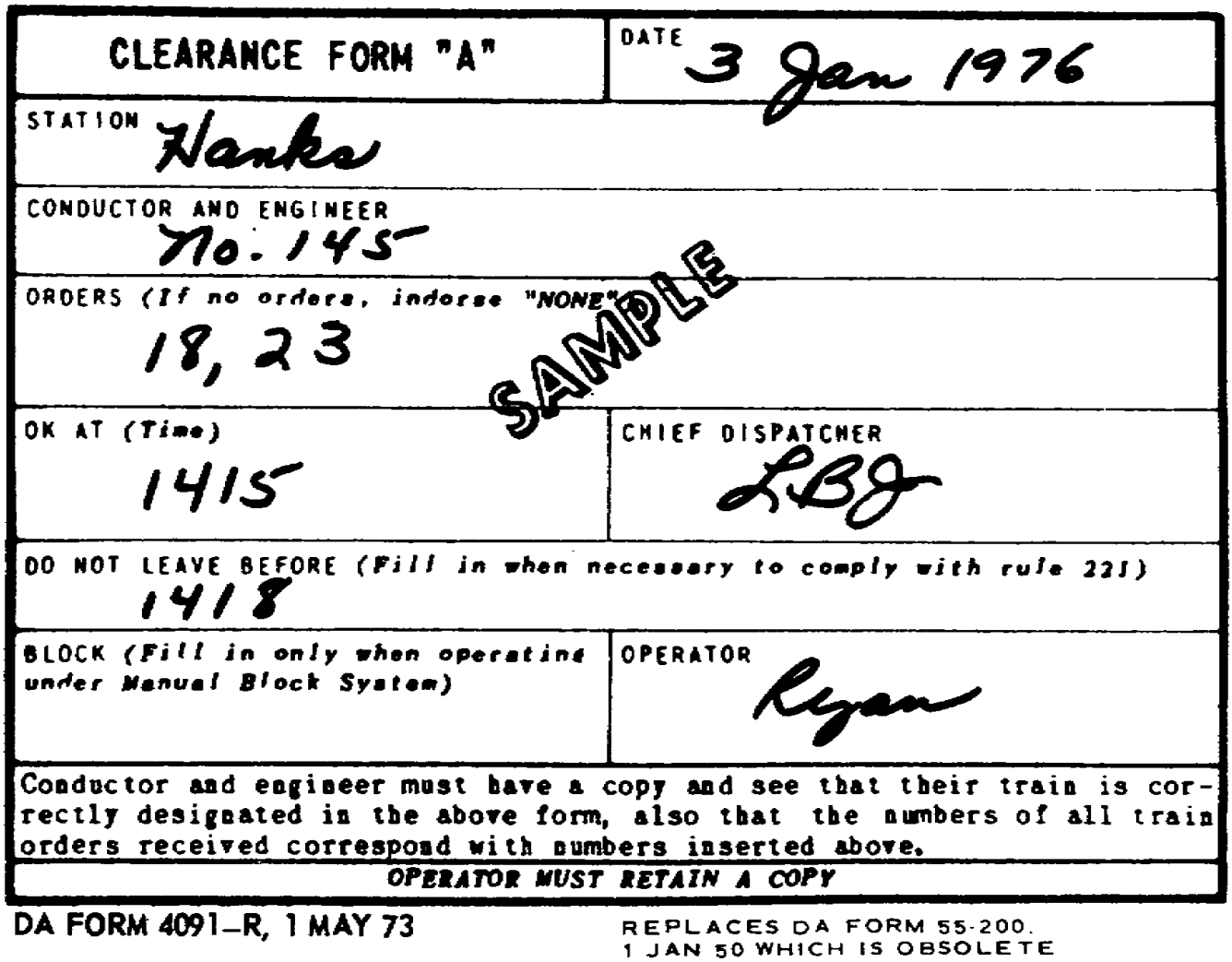
The train receiving this order would continue with respect only to any superior trains due after 2130 hours. The timetable would be the governing authority for superior trains due after that, and the moving train would prepare to take siding only when a superior train to the rear came within 20 minutes of it. Actually, the rules specify that an inferior train must clear by 10 minutes the time of a superior train as shown at the next station to the rear. However, stopping a train, opening a siding switch, restarting the train, and then closing the main-track switch when the train is in the clear takes some time. Therefore, ordinarily 20 minutes is a safer allowance.

Registering without stopping often saves considerable time and, when it can be done safely, produces more economical operations. Should a train start its run from a nonregister station, the dispatcher often advises the conductor over the telephone what trains are overdue before he lets the train move out on the main track.

5.8. DELIVERING ORDERS AND MESSAGES

The timetable designates which telegraph-office stations are train-order offices, that is, those equipped with train-order signals. When approaching these offices, trains are not stopped unless they are to receive orders requiring the crew's signatures. The normal position of the train-order signal is "stop" when an operator is on duty. When a train for which the operator holds no orders approaches within sighting distance of the signal, he changes it for the train to proceed. This is called “clearing the block.” After the train passes the station, the signal is restored to its normal "stop" position. On the other hand, when a train arrives at a station and orders requiring the crew's signatures are held for it, the train-order signal is kept in "stop" position. After halting the train, the crew reports for its orders. In addition, a Clearance Form "A", DA Form 4091-R, shown in figure 5.2, which lists by number all orders that are being delivered, is given to the crew. If none of the orders for the train restrict it at that particular station, it is not stopped. The operator attaches the clearance form and train orders to a message loop, or hoop, as shown in the sketch, and hands them to someone on both the engine and caboose as they pass the station. If, however, the orders restrict the train at that point, the engine must stop clear of the fouling point of the switch at which an opposing train may enter the siding.





CLEARANCE FORM "A"	DATE 3 Jan 1976
STATION Hanks	
CONDUCTOR AND ENGINEER No. 145	
ORDERS (If no orders, indorse "NONE") 18, 23	
OK AT (Time) 1415	CHIEF DISPATCHER LBJ
DO NOT LEAVE BEFORE (Fill in when necessary to comply with rule 221) 1418	
BLOCK (Fill in only when operating under Manual Block System)	OPERATOR Ryan

Conductor and engineer must have a copy and see that their train is correctly designated in the above form, also that the numbers of all train orders received correspond with numbers inserted above.

OPERATOR MUST RETAIN A COPY

DA FORM 4091-R, 1 MAY 73 REPLACES DA FORM 55-200. 1 JAN 50 WHICH IS OBSOLETE

Figure 5.2. Clearance Form "A."

Even though signals are clear, crews are always on the lookout when passing any telegraph office. Messages affecting their work along the way are frequently delivered to the crew "on the fly" by the operator who attaches communications to message loops. Messages are often informal and never involve other trains. They might be used to amend, supplement, or annul previous instructions--but not train orders--from the dispatcher or even from yardmasters and station agents along the line where the train is scheduled to stop. Often a message can save a crew from stopping at a station to pick up cars when it develops, after the crew has been instructed to stop, that the cars will not be ready. Dispatchers often use messages to ask crews about delays between stations and to warn engineers about exceeding speed limits. Messages may often be used to advise crew members about defective cars in their train.

Occasionally, a running conversation between the dispatcher and the crew is carried on without stopping the train. The dispatcher's query is delivered to the crew at the first station, and the

crew replies at the next. The dispatcher may seek additional information or clarification which he requests at the third station; then the crew replies at the fourth telegraph office. A humorous although farfetched story, which illustrates the point, is told about an engineer who had difficulty negotiating a hill. At the station beyond it, he received this message from the dispatcher: "What was the delay on Fulton hill?" At the next telegraph office, the engineer threw off a reply reading, "Out of sand." At the third station, a dispatcher message asking for additional details was waiting for the engineer. “What were you doing on Fulton hill without sand?" At a fourth station, the engineer threw off this terse but perfectly logical reply: "Slipping."

5.9. FORMS 19 AND 31

Two distinct kinds of train orders in use on commercial railroads are known and numbered form 19 and form 31. The form 19 is green and form 31 is canary yellow. Both forms are printed on a fine grade of transparent tissue paper and are popularly known as "flimsies" because of their texture. They are so thin that numerous carbon copies can be made easily. Their transparency makes it possible to read them at night by holding them in front of a lantern or other light that would ordinarily be inadequate for reading.

These train orders are always referred to as "a 19 order" or "a 31 order," and the principal distinction, aside from their color, is the way in which each is delivered. When delivering a 31 order, the train must be stopped and the crew must acknowledge receipt by signing for it. Generally, the delivering operator first reads the order to the crew members who then read it back to the operator and sign a receipt. Both the engineer and the conductor read the order and familiarize the other crew members with its contents. Everything is done to insure that, first, the operator has copied it correctly by his reading it to the dispatcher, and second, that it has been read by the operator to the conductor and engineer who have read it back and acknowledged their understanding of it. The engineer sees that the fireman, if one is aboard, understands it, and the conductor does the same with the head brakeman and flagman. A 19 order, however, is delivered to moving trains with a message loop and no signatures are required. Nevertheless, it is vital that the crew's interpretation of the order be correct.

After train orders are received, all members of the train and engine crew should have easy access to them at all times. This is often done by having, on both the engine and the caboose, a clipboard to hold the orders, located where anyone can examine an order quickly.

Some railroads, including military railroads, do not use the 19 and 31 orders. The single green form shown in figure 5.1 is used instead. It is known simply as a train order. Using it eliminates stopping a train for the crew's signatures when the train is going to be restricted at a point in advance of the station issuing the order. If it were being restricted at the station where the order was issued, using the single form would be just as effective as a 31 order. Regardless of whether the single or dual system is used, the importance of properly issuing, repeating, interpreting, and executing orders remains the same.

5.10. MESSAGE CATEGORIES

When a train order is written, the kind of message it contains places it in one of a number of definite categories, each identified by letter designators. These show that the order conforms to rules having a similar designator. All two-letter ones begin either with the letter "S" for single track or "D" for double track. All single-letter ones apply to both single and double track.

To illustrate how every train order falls into a definite category, the following explanation is given. A DA form 55-203 is a train-order form, and whenever a message is written on it, it becomes a train order. If the message should advise one train to meet another, it becomes, in classification terminology, a meet order. Technically, the order is now designated a form S-A order because it fixes a meeting point--something that can occur only on a single-track line. The "S" denotes the single track and the "A" identifies the order as being a meet order. These initials, however, are neither printed nor written on the train order. They are used merely as a quick reference to describe the type of instructions contained in the order. Form S-H describes a train order applying to a work extra operating on single track. Similarly, form D-M indicates a train order annulling part of another train order on double track, the letter 'D" applying to the track and the letter "M" denoting the partial annulment. A train order with a single-letter designator, such as form F, applies to single or double track. The numerous other designators for train orders, with specific examples, are discussed in detail in the following paragraphs.

5.11. FORM S-A

The form S-A train order fixes meeting points for opposing trains on single track. Typical examples are:

No 61 Eng 201 Meet No 62 Eng 310 at RK
No 7 Eng 3220 Meet No 12 Eng 210 at BO

Note that no direction is specified because the train number denotes this. Odd train numbers indicate movements in the inferior direction, and even numbers designate movements in the superior direction.

5.12. FORM B

The form B train order directs a train to pass or run ahead of another, as the following examples show.

Extra 550 West Pass No 3 Eng 112 at MD
Extra 9564 West Run Ahead of No 61 Eng 345 DN Tower to RK

5.13. FORM S-C

The form S-C train order gives right over an opposing train. It has the effect of making an inferior train superior to the other named train between the points specified in the order. Examples are:

No 61 Eng 1245 has Right Over No 62 RK to FV
Extra 199 East has Right Over No 3 BO to OG

5.14. FORM E

Form E train orders are time orders and are discussed in paragraph 4.10. They are also called '"un-late" or "wait" orders. Three typical ones, each slightly different in scope, follow.

No 11 Eng 2245 Run 50 Minutes Late DN Tower to AY Tower
No 11 Eng 2245 Run 50 Minutes Late DN Tower to RK and 30 Minutes Late RK to AY Tower
No 11 Eng 2245 Wait at RK Until 1959 Hours FV Until 2035 Hours and BO Until 2115 Hours

5.15. FORM S-E

A form S-E train order is a conditional wait order. The first-named train will wait at the point designated until the last-named train arrives, or the specified time is passed, whichever occurs first. Examples follow.

No 5 Eng 2520 Wait at MD Until 0930 Hours for No 2 Eng 4570
No 33 Eng 3840 Wait at FV Until 2155 Hours for No 34 Eng 3006

In the first example, if No. 5 arrives at MD at 0925 hours and finds No. 2 already there, then it has fulfilled its order and may proceed. If, however, No. 2 has not arrived, No. 5 is required to wait until 0930 hours before it may proceed. This form is used to assist the last-named train without delaying the first beyond the time specified in the order.

5.16. FORM F

The form F train order is used when trains are run in sections and when signals are displayed that indicate one or more sections of the same train will be operating on the schedule of the train carrying the signals. The examples following show the wide application of this order.

Eng 195 Run as Second 17 DN Tower to AY Tower
Eng 195 Display Signals and Run as Second 87 RK to BO
Engs 198, 199, and 200 Run as First, Second, and Third 17 DN Tower to AY Tower
Eng 210 Instead of Eng 195 Display Signals and Run as Second 87 RK to BO
Second 17 Eng 2530 Take Down Signals at LY
Engs 199 and 200 Reverse Positions and Run as Second and Third 17 RK to AY Tower

5.17. FORM G

The form G order is used for extra trains. On some railroads, extras may represent the classification of the majority of the daily trains. Examples of the form G order follow.

Eng 3240 Run Extra BL to AY Tower
Eng 205 Run Extra WD to FV This Order Annulled at 1550 Hours
After Extra 9550 Arrives at FV Eng 9002 Runs Extra FV to AY Tower
Eng 9005 Run Extra MD to RK and Return to DN Tower

5.18. FORM S-H

The form S-H train order pertains to an extra work train on single track. It authorizes the train to occupy the main track and do right-of-way work in the area designated and between the hours specified. The working limits or time limits of a work extra cannot be extended by superseding the original order to the work train. If an extension of either or both time and work limits of the work extra is necessary, the original order must be annulled and a new order issued. Copies of this order inform all other crews traveling in the area of the presence of the work extra and the flagging instructions it holds, if any. An example follows: "Eng 5440 Works Extra 0930 Hours Until 1701 Hours Between MD and RK."

In this order, no flagging instructions are specified. Basically, all work extras are required to protect, that is, flag, against all other extras and, of course, against all other trains of superior class. Because this order specifies nothing to the contrary, everybody reading it knows that the work extra is to protect itself against all movements in both directions. This order, however, may be amended to read: "Eng 5440 Works Extra 0930 Hours Until 1701 Hours Between MD and RK Not Protecting Against Westward Extra Trains." Or, "...Not Protecting Against Extra Trains." The designated area can be stated as between kilometer posts instead of between stations. Paragraph 5.19 explains this more fully.

Work extras must, unless otherwise instructed, protect against extra trains in both directions. Therefore, it is improper to tell a work extra to protect against an extra until after it has been told not to protect. Occasionally, it might be necessary to make a work extra superior to all trains. This might occur when a wreck train is called to an accident scene. If so, the following order might be typical: "Work Extra 9510 Has Right Over All Trains Between DN Tower And BL From 1330 Until 1830 Hours."

5.19. FORM D-H

The form D-H train order is used for work extras on double track or on two or more tracks, as well as specifying the track or tracks the work train is to occupy. The rules provide that the working limits should be as short as possible. In the few books published on dispatching, examples show the working limits as the areas between two or more adjoining stations, as the examples in subparagraphs a through c specify. In actual rail operations, however, the working limits may frequently be only 2 or 3 kilometers long. Where the working area is comparatively short, kilometer posts instead of

stations may be specified. Kilometer posts are wooden or concrete signs posted along the track and numbered consecutively from one end of the division to the other. Inserted in the orders instead of the station designators would be "....From Kilometer Post 27 to Kilometer Post 29...." or "...From Kilometer Post 32 to Kilometer 33.5...." The approximation used is necessary because the posts are spaced only in whole kilometers. Another form of area designation might be '....From Kilometer Post 13 to Bridge 127...." This method pinpoints the work train's area and eliminates an approaching train's expecting to see work-train flagmen anywhere in the 10 or 15 kilometers between two stations, if they had been specified instead of kilometer posts.

When the time specified in orders expires, the work extra is in the same position as a regular train that has lost its schedule; it is dead with respect to any train standing. It must clear the main and seek new orders or authorization to return to its home terminal. If the work-train crew finishes its work an hour before the time expires, the crew cannot start back to its home terminal without contacting the dispatcher. Why? Because the train's original right is confined to the area specified by the working limits in the original orders. Three examples of form D-H orders are given in the subparagraphs following.

a. First example. “Eng 3031 Works Extra on Eastward Track 0801 Hours Until 1701 Hours Between AY Tower and LY."

b. Second example. “Eng 3031 Works Extra on Eastward and Westward Tracks 0801 Hours Until 1701 Hours Between AY Tower and LY.” Such orders may be supplemented with the following: "...Not Protecting Against Extra Trains." or "...Not Protecting Against Eastward (or Westward) Trains.” Once a work train has received orders not to protect against extra trains, and it is later desired to have it protected against a designated extra, the following additional order may be used: "Work Extra 3031 Protects Against Extra 210 West Between FV and BO After 1330 Hours.” This order tells the crew of Extra 210 West that it must not enter the area specified before the time shown in the order. After 1330 hours, however, the crew can expect the work extra to be in the clear or protecting itself according to the terms of the order. Should the order specify that the "Work Extra Will Clear" and for some reason it cannot do so, the flagman of the work train would be far enough to the rear to stop Extra 210 West.

c. Third Example. The widest range of right that could be conferred upon a work train in a designated area would be as follows:

"Work Extra 3031 Has Right Over All Trains on Eastward and Westward Tracks Between DN Tower and RK From 0930 to 1130 Hours." It permits the work train to occupy one track and foul the other or to use both tracks alternately. However, regardless of the type of orders held, work trains must yield the right-of-way to other trains as promptly as possible.

5.20. FORM J

The form J train order is a holding order and is addressed only to the station operators It is transmitted and completed in the same way as other train orders and is delivered to a train or to each train the operator is holding. The order may pertain to an individual train, to all westbound trains, or to all trains. Examples follow.

Hold No 2
Hold All Westward Trains
Hold All Trains

When trains are held by a form J order, they may be released by annulling the holding order or by a new order superseding the form J. Examples follow.

No 2 May Go
Order No _____ (the holding order) Is Annulled

This form is generally used in emergencies when the duration of the holding order is not known. Washouts, snow or rock slides, and derailments are examples of emergencies which might require its use.

5.21. FORM K

The form K train order is used for annulling a schedule or a section. Typical examples follow.

No 61 Due to Leave DN Tower 15 March is Annulled
Second 5 Due to Leave RK 15 March Is Annulled RK to AY Tower

In these examples, both the schedule and the section are annulled for the trip on the date shown. A schedule annulled by this form of order cannot be restored by revoking the order that canceled the schedule.

5.22. FORM L

The form L train order is used for annulling an order and is the most simply stated one of all. For example, it might read--"Order No 15 is Annulled." The order number must always be specified, and all crews holding that particular one are to disregard its contents. An annulling order should not be delivered to a train not yet having the order which is annulled by the form L. For example, suppose a crew receives an order that annuls order 15, but order 15 has not yet been delivered to them. Confusion results. The crew would rightfully want to see a copy of order 15 which might supersede some instructions held in other orders.

5.23. FORMS S-M AND D-M

Both forms S-M and D-M train orders are used to annul part of an order: form S-M for single track and D-M for double. The forms should be used only when the part of the order not annulled is perfectly clear in its wording after the annulled part is deleted. Two typical examples read:

That Part of Order No 14 Reading No 2 Meet No 1 at RK is Annulled
That Part of Order No 21 Reading No 17 Pass No 9 at FV Is Annulled

5.24. FORM S-P

The form S-P train order is used to supersede an order or part of an order simply by inserting the words "instead of." An order cannot be construed as superseding an order with which form S-P conflicts unless these two words are added. Once an order has been superseded, it cannot be reissued under its original number. Typical examples of the S-P order follow.

No 1 Eng 9520 Meet No 18 Eng 9002 at FV Instead of RK
No 5 Eng 520 has Right Over No 6 Eng 313 WD to AY Instead of WD to LY

5.25. FORM P

The form P train order serves the same purpose as form S-P: a part of an order may be superseded without interfering with the remainder. Just as in an S-P order, the keywords "instead of" must be used. The form P order is a convenient type, because a dispatcher may use it to change even an engine number by saying

"...Eng 9002 Instead of Eng 4006...." Without this order, the dispatcher might have to annul an order and issue a new one merely to change an incorrectly reported engine number. However, the form P should never be used where it is not appropriate. For instance, it should never be used to supersede any form E order, the so-called run-late or wait order discussed in paragraph 5.14. When times must be changed, the form E must be annulled and a new order issued.

5.26. FORM R

The form R train order is used for a check of trains in place of checking the train register, as described in paragraph 5.7. This form of order is similar to the following examples.

All Superior (First-Class) Trains Due at RK Before 1720 Hours Have Arrived and Left

All Superior (First-Class) Trains Due at RK Before 1720 Hours Have Arrived (Have Left) Except No 15

5.27. FORM D-R

The form D-R train order authorizes a movement against the current of traffic. Its usual form as well as a modified one is shown below.

No 1 Has Right Over Opposing Trains on Eastward (or No 2) Track DN Tower to BL

After No 4 Eng 9090 Arrives at OG No 3 Has Right Over Opposing Trains on Eastward (or No 2) Track OG to WD

5.28. FORM X

The form X train order is a reduced speed order and is commonly referred to as a slow order. Train orders reducing speed should show the kilometer post, bridge number, and other recognized locations. When practicable, the number of meters to or from the nearest kilometer post may be used. In the examples below, the abbreviation KMP stands for kilometer post.

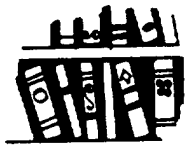
Reduce Speed to 10 Kilometers Per Hour Over West Siding Switch at WD

Reduce speed to 15 Kilometers Per Hour From KMP 37 to KMP 39 From 0730 Until 1630 Hours

5.29. SUMMARY

The various train order forms are the dispatcher's tools. They give him the flexibility and latitude necessary to handle efficiently a busy single-track division with its ever-changing operations. They permit the dispatcher to cope with unexpected events and with emergencies. Both must always be expected in railroading. As dispatcher tools, the train orders represent the dispatcher's right to supersede the timetable. This right probably best illustrates the old railroad saying: "The timetable giveth, but the dispatcher taketh away."

The examples of orders shown are standard on commercial railroads and are approved for military use. However, train orders used in any theater are necessarily governed by local operations, and rail operations may change radically from theater to theater or even from division to division. What will remain constant will be the objective of the train orders: to enable the dispatcher to operate as many trains in each direction as <u>safely</u> and <u>expeditiously</u> as possible to help accomplish the overall military objective.



Appendix I

REFERENCES

Army Regulations

AR 310-25 Dictionary of United States Army Terms.

AR 310-50 Authorized Abbreviations and Brevity Codes.

Field Manuals

FM 55-20 Army Rail Transport Operations and Units.

Technical Manuals

TM 55-200 Railway Operating and Safety Rules.

TM 55-206 Railway Train Operations.

Commercial Publications

Josserand, Peter, Right of Trains, New York, N. Y., Simmons-Boardman Publishing Corp., 1957.

Roxbury, Lawrence E., Let's Operate a Railroad, Warwick, Va., High-Iron Publishers, 1957.

Appendix II

RAILROAD TIMETABLE

BE CAREFUL

THINK - LOOK

and

LIVE

SAFETY IS OF THE FIRST IMPORTANCE IN THE DISCHARGE OF DUTY

GOLD HILL, SLATE RIVER,

& WESTERN RAILROAD

ELWOOD DIVISION

TIMETABLE NO. 7

EFFECTIVE 0001 HRS

SUNDAY, 22 FEBRUARY 1976

EASTERN STANDARD TIME

DESTROY ALL TIMETABLES

OF PREVIOUS DATE

FOR INFORMATION OF

EMPLOYEES ONLY

W. B. Wenger — General Manager

F. A. Falke — Supt. Freight Trans.

M. A. Hubbard — General Supt.

R. H. Ramsey — Superintendent

C. A. Torian
C. W. Dail
A. L. Kimberlin
} Trainmasters

COMPANY SURGEONS

B. J. Allen, Chief Surgeon
General Offices, Conroy
Phone 826-3382

Note: Efforts will be made to use the services of the following doctors. However, in case of serious illness or injury to passenger or employee, or injury to a trespasser, the first available doctor must be called.

		Office Phone	Residence Phone
Bliss	J. D. Murdoch	826-2941	826-6480
Cain	J. B. Blount	596-7018	596-1860
Wildwood	A. M. Manty	596-0969	596-0929
Fairview	C. D. Smith	244-4709	244-6219
Nelson	P. A. Parkinson	244-5259	244-6651
Maxey	J. D. Browne	838-3376	722-4112
	W. M. White	838-3376	898-2665
Elwood	A. C. Clarke	596-6304	596-1001
Oakwood	A. M. Dent	838-4312	838-9061
Downer	W. J. Parker	838-2159	838-4517
Domer	B. F. Crown	838-3712	838-0844

Oculists

Conroy	J. D. Bunce	826-2837	723-6278
Cain	R. J. Worrell	596-8769	877-3655
Maxey	W. J. Brown	838-3526	838-2665

Hospitals

Conroy
Conroy Mercy Hospital
2nd and Main Sts.
Phone 826-1440

Maxey
St. Mary's Hospital
County Line Rd.
Phone 838-2200

HANDBRAKES

To prevent cars from running out of tracks and fouling leads, sidings, and main tracks, the following number of effective handbrakes must be set on cars first out on the following tracks:

	Track	Handbrakes
Conroy--West yard	All	2
Conroy--East yard	All	2
4.9 kilometers west DN, siding	West end	3
Bliss	Station spur	2
Madison	All yard tracks	2
RK	Westbound siding	3
Cain yard	All	2
Ogdensburg yard	All	3
Wildwood	Westbound siding	2
	Station spur	2
WD to BO tower	All westbound sidings	2
BO to WD	All eastbound sidings	3
Lily	Station spur	2
Maxey yard	All north yard tracks	3
	All south yard tracks	3
Downer Branch Elwood Branch	All sidings, all spur and storage tracks, company-owned and private sidings	3

SPEED RESTRICTIONS

Elwood Division and branch lines	Speed limit is 96 kph except in the following locations:
All yard limits	48 kph
Interlocking limits	48 kph
On or through passing sidings	32 kph
Elwood Branch	40 kph
Wildwood Cutoff	32 kph
Downer Branch	40 kph
Lily Cutoff	24 kph
Domer Cutoff	24 kph
When passing or meeting trains on opposing tracks, or when passing stationary trains on siding, or when passing trains having work, camp, or wreck cars	40 kph

SIDING CAPACITY

Estimates are based on trains having 80 percent of 40-foot cars and 20 percent of longer cars.

ELWOOD DIVISION---WESTBOUND	NUMBER OF CARS
5.1 kilometers west of DN tower	70
0.9 kilometers west of Madison	72
0.4 kilometers east of RK tower	83
1.7 kilometers east of Wildwood	94
1.2 kilometers east of Fairview	115
1.1 kilometers east of BO tower	72
8.3 kilometers west of Lily	75
1.7 kilometers west of AY tower	65

ELWOOD DIVISION---EASTBOUND	
3.2 kilometers east of AY tower	75
0.6 kilometers west of Lily	65
6.5 kilometers west of BO tower	37
3.0 kilometers west of Fairview	80
0.8 kilometers east of Ogdensburg	80
2.5 kilometers west of RK	42
5.1 kilometers east of Madison	53
1.1 kilometers west of Bliss	45
4.6 kilometers east of Bliss	30
6.5 kilometers west of DN tower	45

ELWOOD BRANCH	
5.1 kilometers north of RK tower	45
5.7 kilometers north of RK tower	50

DOWNER BRANCH	
3.8 kilometers north of BO tower	30
4.3 kilometers south of Boylestown	45
0.9 kilometers north of Oakwood	40
3.2 kilometers north of Downer	30
4.8 kilometers south of Domer	35

WILDWOOD CUTOFF	
3.8 kilometers north of Wildwood	35
4.8 kilometers north of Wildwood	50

ENGINE RESTRICTIONS

Locations	Class of Engine					
X denotes that the class of locomotive is permitted to operate on the track at location shown below.	0-4-0, 100 hp, Switcher	0-4-4-0, 380 hp, Switcher	0-6-6-0 1,000 hp, Road Switcher	0-6-6-0 1,600 hp, Road Switcher	0-4-4-0 1,000 hp, Road Switcher	0-4-4-0 1,500 hp, Road Switcher
CONROY EAST AND WEST YARD	X	X	X	X	X	X
Dead Storage Yard	X	X	X		X	X
All private sidings, except Swiff Packing	X	X	X		X	X
Swiff Packing Co.	X	X				
All Main Tracks and Sidings, Conroy to Maxey	X	X	X	X	X	X
Elwood Branch	X	X	X		X	
Downer Branch	X	X	X		X	
Wildwood Cutoff	X	X			X	
Lily Cutoff	X	X			X	
Cain Standard Brick Co.	X	X	X		X	
Bliss Bliss Sand & Gravel	X	X				

CLASSIFIED SCHEDULE

WESTWARD									TIMETABLE NO. 7 EFFECTIVE 0001 HRS 22 Feb 76	EASTWARD								Distance From Conroy, Km	Station Symbols
SECOND CLASS					FIRST CLASS					FIRST CLASS					SECOND CLASS				
		Symbol CP 3	Symbol CP 1		85	61	19	5	STATIONS	6	20	62	86		Symbol MC 4	Symbol MA 8			
WO IYP		L2300	L2124		L1700	L1241	L0827	L0609	TO R CONROY	A0814	A1116	A1357	A2014		A1702	A2336		0.0	C
P		2309	2135		1712	1251	0837	0619	R DN TOWER	0803	1105	1346	2003		1655	2330		7.9	DN
WP		2328	2152		S1729	1311	0851	S0636	TO BLISS	S0742	1043	1326	S1944		1635	2312		27.1	BL
P		2338	2201		S1740	1321	0859	S0648	TO MADISON	S0733	1033	1315	S1934		1625	2303		37.5	MD
WO P		S2349	S2213		S1750	S1332	S0907	S0708	TO R CAIN	S0722	S1022	S1305	S1921		S1615	S2254		49.8	RK
YP		2357	2222		S1801	1341	0915	S0720	TO OGDENSBURG	S0711	1012	1255	S1910		1608	2245		61.3	OG
W OP		0005	2232		S1810	1349	0923	S0729	TO R WILDWOOD	S0702	1004	1247	S1901		1601	2235		71.8	WD
P		0012	2243		S1819	1355	0927	S0740	TO FAIRVIEW	S0650	0955	1241	S1850		1553	S2224		81.0	FV
WO P		S0028	S2300		S1837	S1406	S0938	S0754	TO R NELSON	S0634	0942	S1228	S1833		S1535	S2206		99.2	BO
P		0043	2315		1852	1417	0950	S0808	TO LILY	S0618	0927	1216	S1817		1521	2150		117.1	LY
P		0054	2327		1906	1429	1000	0819	R AY TOWER	0606	0916	1207	1807		1508	2140		131.9	AY
WO IYP		A0101	A2334		A1912	A1435	S1007	A0825	TO R MAXEY	L0600	L0910	L1201	L1800		L1500	L2130		137.0	ZO

CLOSE CLEARANCES--OVERHEAD

Personnel working in the following locations are warned that there is no clearance for crew members on top of cars at the individual points listed. Telltales are installed except where otherwise noted.

ELWOOD DIVISION		OBSTRUCTION
Location		
4.3 kilometers west of DN tower		Overhead footbridge.
11 kilometers west of DN tower		Cattle-crossing trestle.
Bliss yard--All yard tracks		Overhead wires.
Bliss Sand and Gravel Co., both sidings and spur, Kiln building		Gravel conveyor and chutes. Crane cabs. NO TELLTALES.
0.1 kilometers west of Bliss station		Overhead bridge.
Madison station		Overhead steam line.
Cain	Standard Brick Co	
	Warehouse #1	Overhead door.
	Warehouse #2	Power wires.
	Freight Station	Telegraph wires.
	Team track	Station roof overhang.
0.3 kilometers east of Wildwood		Concrete trestle.
Fairview	Team Track	Power wires.
Lily	Freight station	Counter weights. NO TELL-TALES.
0.1 kilometers east of AY tower #2 old main track		Light shade.
0.3 kilometers east of Maxey yard		Footbridge.

ELWOOD DIVISION

TELEGRAPH CALL LETTERS AND FACILITIES AT STATIONS
("X" DENOTES WHERE FACILITIES EXIST)

	TELEGRAPH CALL LETTERS	STANDARD CLOCK	BULLETIN BOARD	REGISTER BOOK	DISPATCHER PHONE	FUEL STATION	WATER STATION
CONROY GENERAL YARD OFFICE	C	X	X	X	X	X	X
WEST YARD OFFICE		X	X		X		
SWITCHTENDER OFFICE					X		
DN TOWER	DN	X	X		X		
BLISS STATION	BL (D)				X		X
MADISON STATION	MD (D)				X		
RK TOWER	RK	X	X	X	X		
CAIN STATION	RK				X	X	X
OGDENSBURG STATION	OG (D)				X		
WILDWOOD STATION	WD			X	X	X	X
FAIRVIEW STATION	FV				X		
NELSON STATION	BO	X	X	X	X	X	X
LILY STATION	LY	X			X		
AY TOWER	AY	X	X		X		
MAXEY: WEST YARD OFFICE		X	X		X		
EAST YARD OFFICE		X	X	X	X	X	X
GENERAL YARD OFFICE	ZO						

(D) OPEN 0700 TO 1500

SPEED TABLE

NOTE-- This table is for information only and does not authorize exceeding speed restrictions of time-table or special instructions.

Kilometers per hour	Time to go 1 kilometer
60	1 min 00 sec
58	1 2
54	1 7
52	1 9
50	1 12
48	1 15
40	1 30
36	1 40
32	1 53
30	2 00
24	2 30

Appendix III

RAILWAY OPERATING RULES, EXTRACT FROM TM 55-200

Rule S-71. General. A train is superior to another train by right, class, or direction.

(1) Right is conferred by train order; class and direction by timetable.

(2) Right is superior to class or direction.

(3) Direction is superior as between trains of the same class.

Rule D-71. General. A train is superior to another train by right or class.

(1) Right is conferred by train order; class by timetable.

(2) Right is superior to class.

Rule 72. Class and Direction. Trains of the first class are superior to those of the second; trains of the second class are superior to those of the third; and so on. Trains in the direction specified by the timetable are superior to trains of the same class in the opposite direction.

Rule 73. Extra Trains. Extra trains are inferior to regular trains.

Rule 82. Schedule Duration. Timetable schedules, unless fulfilled, are in effect for 12 hours after their time at each station. Regular trains more than 12 hours behind either their scheduled arriving or leaving time at any station lose both right and schedule, and thereafter can proceed only as authorized by train order.

Rule 86. Clearing Time. Unless otherwise provided, an inferior train will clear the time of a superior train in the same direction by not less than 10 minutes, but must be clear at the time a superior

train in the same direction is due to leave the next station in the rear where time is shown.

Rule S-87. Meeting Trains. An inferior train must keep out of the way of opposing superior trains and, failing to clear the main track by the time required by the rules, must be protected as prescribed by rule 99. Extra trains must clear the time of opposing regular trains not less than 5 minutes, unless otherwise provided, and will be governed by train orders with respect to opposing extra trains.

Rule 99. Flagging.

(1) When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection. There he will place two torpedoes on the rail on the engineer's side about 75 feet apart, and, when necessary, in addition, display lighted fusees. When ready to proceed, the engineman will recall the flagman. The flagman may return when he is recalled and safety to the train will permit, or when he is relieved by another flagman.

(2) When conditions require, the flagman will leave a lighted fusee.

(3) The front of the train must be protected in the same way, when necessary, by the head brakeman or fireman.

(4) When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection. By night, or by day when the view is obscured, lighted fusees must be thrown off at proper intervals.

(5) When day signals cannot be plainly seen because of weather or other conditions, night signals also must be used. Conductors and enginemen are responsible for the protection of their trains.

(6) When work train crews, trackmen, or other personnel are performing work requiring flag protection, the flagman will be furnished written instructions which will be shown to the engineer of all trains flagged and also to the trainman on the leading car when it is being pushed by an engine.

(7) When necessary to flag from one station to another by placing a flagman upon another train, the conductor will give the flagman written instructions, and the flagman will ride on the engine.

Rule 102. Protection of Stalled Train.

(1) When a train is disabled or is stopped suddenly by an emergency application of the airbrakes or for other causes, adjacent tracks as well as tracks of other railroads that are liable to be obstructed must be protected until it is ascertained that they are safe and clear for the movement of trains.

(2) When for any reason an engine leaves its train or part of its train on the main track, a sufficient number of handbrakes must be set, when necessary, to keep the train from moving. By night, or when the view is obscured, two torpedoes will be placed a safe distance in advance of the rear portion of the train to warn engineman returning. When practicable, a trainman will protect the head and the rear portion of the train.

(3) When stopping on heavy grades and the engine is to be detached, a sufficient number of handbrakes must be set to hold the train or draft of cars.

Rule 200. Delivery of Train Orders. The quickest and most reliable means available will be used for deliverying train orders to train crews in the absence of telephone or telegraph communication. Orders delivered in such manner will have the same authority as those delivered by telephone or telegraph.

Rule 201. Procedure.

(1) For movements not provided for by timetable, train orders will be issued by authority and over the signature of the chief dispatcher and will contain only information or instructions essential to such movements.

(2) Train orders must be brief and clear; in the prescribed format when applicable; and without erasure, alteration, or interlineation.

(3) Figures in train orders must not be surrounded by brackets, circles, or other characters.

Rule 202. Identical Wording. Each train order must be given in the same words to all personnel or trains addressed.

Rule 203. Numbering. Train orders will be numbered consecutively each day beginning at 0001 hours. When more than one dispatching subdivision is operated from one office, train order numbers on each subdivision will differ. For example, one subdivision may begin with No. 1 and another subdivision with No. 201.

Rule 204. Addressing.

(1) Train orders must be addressed to those who are to execute them, naming the places at which they are to receive their copies. Those for a train must be addressed to the conductor and engineer and also to anyone who acts as its pilot. A copy for each person addressed must be supplied by the operator.

(2) Orders restricting the movement of trains which are addressed to operators must be respected by conductors and enginemen just as if addressed to them.

(3) Train orders, clearances, and check of train register must be shown by the conductor to at least one brakeman and to others, when practicable. They must be shown by the engineer to the fireman and when practicable to the forward brakeman. Brakemen and firemen must read and return them; compare their understanding of the orders with the conductor or engineer, calling attention to errors or omissions; and should there be occasion to do so, remind the conductor or engineer of the contents.

(4) When more than one engine is attached to a train, each engineer must be supplied with copies of all orders affecting the movement of the train.

Rule 205. Recording. Each train order will be written in full in a book provided for that purpose at the office of the train dispatcher. With the train order, there will be recorded the time and signals which show when, from what office, by whom the order was repeated, and the responses transmitted. The train dispatcher's initials will also be recorded. The records must be made at once and never from memory or memorandums. Additions to train orders must not be made after they have been repeated.

Rule 206. Writing, Transmitting.

(1) In train orders, regular trains will be designated by number, as "No. 2," and sections as "Second 2," adding the engine number. Extra trains will be designated by engine number and the direction, as "Extra 605 East." Work extras will be designated by

engine number, as "Work Extra 611." The initials, as well as the engine number, will be used for the movement of an engine of another railroad. The number of the leading engine will be used when two or more engines are coupled and a designation is made by engine number.

(2) Even numbers such as "1500" hours must not be used in stating time in train orders.

(3) In transmitting and repeating train orders by telegraph, time may be stated only in figures.

(4) In transmitting train orders by telephone, the names of stations, sections, and direction of extra trains must be plainly pronounced and then spelled, letter by letter, thus: Dallas, D-a-l-l-a-s; Second, S-e-c-o-n-d; East, E-a-s-t. Order numbers and train, engine, and other numbers must first be pronounced and then followed by pronouncing each figure, thus: one hundred five, 1-0-5; twenty-seven fifty-six, 2-7-5-6, except where the number is but one figure when it must first be pronounced and then spelled, thus: one, figure 1, O-n-e. Time must first be pronounced, thus: ten twenty, then spelled, letter by letter, thus: t-e-n t-w-e-n-t-y, followed by plainly pronouncing each figure, thus: 1-0-2-0. The letters duplicating names of stations and numerals will not be written in the order book nor upon train orders.

(5) When train orders are transmitted by telephone, the train dispatcher must write the train order in the train order book as he transmits it and underscore each word and number as repeated by each office. When transmitted by telegraph, the order must be written in the train order book as repeated by the first office and each word and number underscored as repeated by each succeeding office.

(6) To relay a train order, it must be transmitted in the usual manner to the relaying office. The operator at the relaying office must transmit the order to destination. The person receiving the order at destination must repeat the order to the operator at the relaying office, who must underscore on his copy each word and number as repeated. He must then repeat the order to the train dispatcher, by whom "complete" will be given to the relaying operator, who will transmit it to destination. If the order also is addressed to a superior train at the relaying office, the "X" response must be given before it is transmitted to the inferior train.

(7) Before transmitting an order to a conductor or engineman over a telephone circuit, the person who is about to receive the order must first give his name, train identification, and location.

(8) The "X" response must not be used when handling train orders directly with the conductor or the engineman.

Rule 207. Transmitting Train Orders. To transmit a train order, the dispatcher will state: "train order," and give the direction, to each office called. He will also specify the number of copies required, such as, "train order West, copy 5."

Rule 208. Simultaneous Order.

(1) A train order to be sent to two or more offices will be transmitted simultaneously to as many of them as practicable. When it is not sent simultaneously to all, the order will be sent first to the superior train.

(2) The several addresses will be in the order of the superiority of trains, each office taking its proper address, and, when practicable, except within automatic block system limits, must include the operator at the meeting or waiting point.

(3) Copies of the order addressed to the operator at the meeting or waiting point must be delivered to the trains affected until all have arrived from one direction.

(4) A train order restricting the movement of a train must not be issued for it at the point where such movement is restricted if it can be avoided. When an order is so sent, the fact will be stated in the order, the train will be brought to a stop before delivery, and special precautions taken to insure safety.

Rule 209. Receiving Orders.

(1) Operators receiving train orders must write or typewrite them in manifold during transmission. If the requisite number of copies cannot be made at one writing, others must be made from the original copy and repeated to the train dispatcher from the new copies each time additional copies are made. Operators must retain a copy of each train order. The time, the "complete" response, and the signature of the operator must be in the operator's handwriting.

(2) When an error in transmitting or copying a train order is made before it has been repeated or the "X" response has been

sent, all copies will be destroyed immediately and the order will be marked "void" in the train order book. Another number will be given the order if it is reissued. An erroneous order will be annualled by train order Form L if it has been repeated or the "X" response has been sent.

Rule 210. Train Order. When a train order has been transmitted, operators must, unless otherwise directed, repeat it at once from the manifold copy in the succession in which the several offices have been addressed. Each operator receiving the order must observe whether the others repeat correctly. When the order has been repeated correctly by the operator, the response "complete," and the time, with the initials of the chief dispatcher will be given by the train dispatcher. The operator receiving this response will then write in the space provided on the order the abbreviation "com," the time, and his last name in full. He will personally deliver a copy to each person addressed without taking his signature. When delivery to an engineer will take the operator from the immediate vicinity of his office, the engineer's copy may be delivered by a member of the train crew or the fireman.

Rule 211. Restricting Order.

(1) Under the following conditions, a train order restricting the superiority of a train must not be repeated, nor the "X" response sent, until the dispatcher has received assurances from the operator that the engineer and also the conductor, when practicable, are in the office and that it is understood by them that the train is to be restricted:

(a) When a train has received a clearance, or the engine of the train has passed the train order signal indicating "proceed."

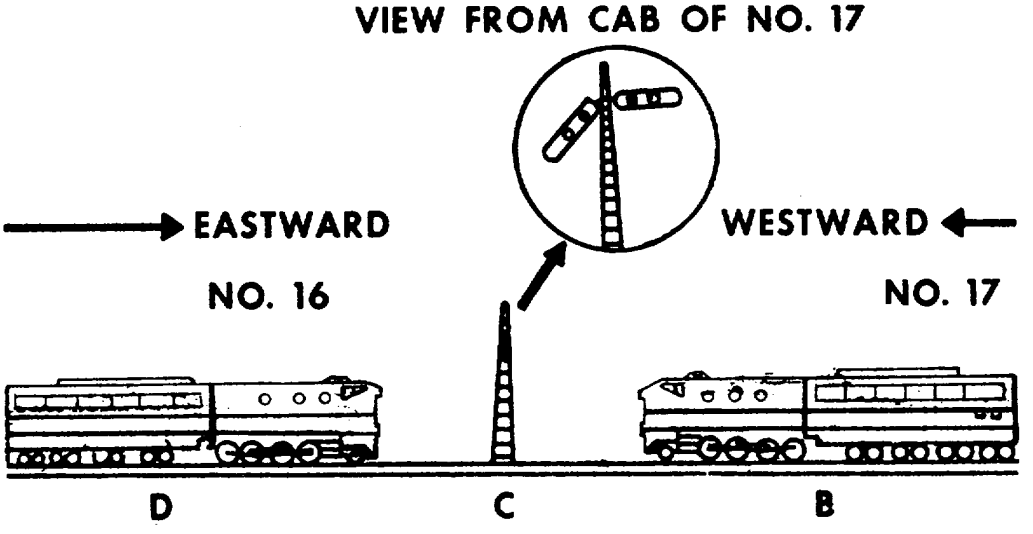
(b) When the authority of a work extra is being annulled, unless the movement is otherwise safeguarded.

(c) When it is necessary for the dispatcher to know that an order has been delivered to a train before its use by another train may be authorized, unless the movement is otherwise safeguarded.

(2) A train order restricting a superior train for an opposing movement must not be sent to the train at the point of restriction if it can be avoided. When so sent to a point other than its initial station, the order must state that the superior train receives the order at that point; thus: "No. 15 gets this order at Ranger" or

"Extra 654 East gets this order at Mingus." Special precautions must be taken to insure safety.

(3) Under circumstances like those shown in the illustration below, a train order addressed to a superior train at the restricting point must also state which train will hold the main track and, in addition, that the train gets the order at that point.



Eastward trains are superior by direction as between opposing trains of the same class.

Order No. 5:

No 17 Eng 901 gets this order hold main track and meet No 16 Eng 902 at C instead of D.

OR

Extra 654 West gets this order hold main track and meet Extra 655 East at C instead of D.

(4) Train orders addressed to a superior train at the restricting point must not be delivered to any member of the train or engine crew until the train has stopped and, outside of automatic block system limits, the dispatcher must not give his OK to the clearance until he has been assured by the operator that the train has stopped.

Rule 212. "X" Response. When so directed by the train dispatcher, a train order may be acknowledged before repeating, by the operator's responding: "(number of train order) to (train number), X," with the operator's initials and office signal. The operator then

must write his initials on the order and the time in the space provided.

Rule 213. "Complete" Response. "Complete" must not be given to a train order for delivery to an inferior train until the order has been repeated or the "X" response sent by the operator who receives the order for the superior train.

Rule 214. Holding Order.

(1) When a train order has been repeated or "X" response sent, and before "complete" is given, the order must be treated as a holding order for the train addressed, but must not be otherwise acted on until "complete" has been given.

(2) If the means of communication fails before an office has repeated an order or has sent the "X" response, the order at that office is of no effect and must be treated there as if it had not been sent.

Rule 216. Delivery of Orders by Dispatcher. When the train dispatcher issues a train order that is to be delivered to a train by the dispatcher, a carbon impression must be made in the train order book at the time the order is written. If later the order is to be sent to another office, it will be transmitted from the copy in the book. The requirements for delivery are the same as at the other offices.

Rule 217. Forwarding. A train order to be delivered to a train at a point which is not a train order office or at a point where the office is closed, will be addressed to: "C and E (train number) at (station), care of (person delivering)." It will be forwarded and delivered by the conductor or other person in whose care it is addressed. When sent in care of the conductor or engineman of a train, the number of the order must be shown in the usual manner on the Clearance Form "A" for the train making delivery, the same as if addressed to it. Copies of the order must be provided for the conductor and the engineer of the train making delivery and for the conductor and engineer of the train addressed. An order sent in the manner herein prescribed to a train, the superiority of which is thereby restricted, will be delivered by the conductor or other person in whose care it is addressed. Signatures of the conductor and the engineer will be taken on the face of the order, with time of delivery shown, and the signature copy delivered to the first opperator available who must at once transmit the signatures of the conductor and the engineer to the train dispatcher and preserve the copy.

Rule 218. Designation by Schedule Number. When a train is designated in a train order by its schedule number alone, all sections of that schedule are included and each will have copies delivered to it.

Rule 220. Term of Effect.

(1) Train orders once in effect continue so until fulfilled, superseded, or annulled. Any part of an order specifying a particular movement may be superseded or annulled.

(2) Orders held by or issued for, or any part of an order relating to a regular train become void when such train loses both right and schedule as prescribed by rules 4 and 82,* or when its schedule is annulled.

(3) When a conductor or engineman, or both, are relieved before the completion of a trip, all train orders and instructions held must be delivered to the relieving conductor or engineman. The relieving conductor or engineman must compare such orders and instructions with the engineman or conductor being relieved before proceeding.

(4) Train orders relation to track conditions, unless annulled, must be respected by conductor and engineman on all trips made during the tour of duty on which such orders are received.

Rule 221. Train Order Signals and Clearance Form "A" (DA Form 4091-R).

(1) Unless otherwise provided, a fixed signal must be used at each train order office. The signal will indicate "stop" where there is an operator on duty, except when changed to "proceed" to allow a train for which there are no train orders to pass. If the operator does not hold an order for an approaching train, unless otherwise directed he must clear the signal after the train has reached a point from which the signal can be seen plainly by the engineman. After having been cleared for a train the signal must be restored to "stop" position as soon as practicable after the rear of the train has passed.

*Rule 4 covers the timetable. Rule 82 is quoted in this appendix.

(2) When the signal indicates "stop", the train will not proceed without a Clearance Form "A" (DA Form 4091-R), except to do station work or enter a siding after proper understanding with the operator. Until it has been ascertained that the train is not to receive a train order which restricts the train at that point, it must not pass the fouling point of the switch at which an opposing train may enter the siding.

(3) Operators will have the proper appliances for hand signaling ready for immediate use if a fixed signal should fail to work properly. If a signal is not displayed at a night office, trains which have not been notified will stop and ascertain the cause and prepare a narrative report of the facts to the train dispatcher from the first available point of communication.

(4) Before delivering train orders, operators must carefully read the address of each order and fill out Clearance Form "A" (DA Form 4091-R) entering thereon, without alteration or erasure, the number of orders for the train and the number of each order. The operator will transmit the address and order numbers from the clearance form to the train dispatcher, who will check the correctness thereof against his record in the train order book. The dispatcher will give OK, time, and initials of the chief dispatcher, and make proper record. The operator will enter this information on Clearance Form "A" (DA Form 4091-R) after which the clearance, together with all train orders will be delivered to the train.

(5) When means of communication have failed, Clearance Form "A" DA Form 4091-R, may be issued by the operator without the dispatcher's OK, provided he has no train orders for the train which have not been made "complete."

(6) When a clearance is received by a train, the conductor and engineer must know before leaving that the numbers shown correspond with the orders received and that all information required on the clearance form is properly shown.

(7) Outside of automatic block system limits, operators must space trains moving in the same direction 10 minutes apart. The train order signal and clearance will be used for this purpose. When necessary to space trains in this manner the time the following train will be permitted to proceed must be shown on the clearance form in the space provided for that purpose. The conductor and engineer must respect that time.

Rule 222. Recording and Reporting Trains.

(1) Operators will promptly record (on DA Form 4093-R) (Station Record of Train Movements and Operator's Transfer) and report to the train dispatcher the time of arrival and departure of all trains and the direction of extra trains. They must observe trains and report at once to the train dispatcher if the proper signals are not displayed.

(2) Operators in relieving each other must make a transfer of outstanding train orders and undelivered messages addressed to, or in care of, trains. The operator assuming duty must not handle the train-order signal, nor deliver train orders, until transfer has been made and signed.

Rule 223. Signal; abbreviations. The following signals and abbreviations may be used in train orders:

(1) Initials for the signature of the chief train dispatcher.

(2) Such office and other signals as are authorized.

(3) The usual abbreviations for the names of the months and stations.

(4) C&E--Conductor and engineman.

(5) Com-Complete.

(6) Condr--Conductor.

(7) Dispr--Dispatcher.

(8) Dist--District.

(9) Div--Division.

(10) Eng--Engine.

(11) Engmn--Engineman.

(12) Frt--Freight.

(13) Jct--Junction.

(14) Mins--Minutes.

(15) MP--Milepost.

(16) MPH--Miles per hour.

(17) No--Number.

(18) Opr--Operator.

(19) OS--Train report.

(20) Psgr--Passenger.

(21) SD--"Stop Displayed."

(22) Sec--Section.

(23) Subdiv--Subdivision.

(24) X--Train will be held until train order is made "complete".

Rule 680. All personnel, except those specifically authorized to do so, are prohibited from making any adjustments to railroad radio equipment. If it appears that a radio transmitter is not operating properly, its use shall be discontinued and the train dispatcher notified as promptly as possible.

Rule 681. Personnel will not knowingly transmit any false distress communications and unnecessary, irrelevant, or unidentified communications via radio.

Rule 682. Personnel will not divulge the contents or meaning of any communication, distress communications excluded, except to the person for whom intended or other railway personnel whose duties may require knowledge of the communication.

Rule 683. Before transmitting, personnel operating a radio transmitting set will listen a sufficient time to be sure the frequency is not already in use, particularly for distress traffic.

Rule 684. A distress call will be preceded by the word "EMERGENCY," repeated three times. Such calls will be used to cover initial reports of derailments, storms, washouts, fires, obstructions on tracks, or other matters which could delay train traffic or damage personnel or property. Internationally, the word "MAYDAY" indicates a distress message; distress messages have priority. Railroad

personnel may hear such messages sent by aircraft or in coastal areas by ships or boats. Personnel hearing distress messages will report them immediately to the train dispatcher or other higher authority.

Rule 685. For the best reception, railway personnel using radio will hold transmitter close to mouth and speak slowly and distinctly. Words must not be garbled; calls must be answered promptly.

Rule 686. To avoid confusion and misunderstanding, special care will be used when identifying personnel, engines, and trains. Railway personnel will transmit business by alternating calls and being as brief as possible. The following procedure will be used:

(1) Conductor or trainman on caboose desires to talk to the engine: "Caboose, train 123 calling engine 456, over"

(2) Engineman desires to call caboose: "Engine 456, calling caboose, train 123, over"

(3) Personnel on engine of one train calling engine of another train: "Engine 456, train 123 calling engine train 234, over"

(4) Conductor of train calling wayside operator: "Conductor, train 123 calling operator at XYZ, over"

(5) Yardmaster, ABC, calling a train: "Yardmaster, ABC, calling engine 456, train 123, over".

Appendix IV

GLOSSARY

Clear--moving a train completely off the main track and into a siding or yard.

Division--that portion of a railroad assigned to the supervision of a superintendent.

Extra train--train not authorized by a timetable schedule, which may be designated as: (1) extra--for any extra train, except passenger extra or work extra, (2) passenger extra--for passenger-train extra, or (3) work extra--for work-train extra.

Main track--system of tracks, extending through yards and between stations, upon which trains are operated by timetable or train order, or both, or the use of which is governed by block signals.

Meet--procedure whereby two opposing trains meet at a designated location. A meet is said to have occurred when the last car, having signal markers, of one train passes the last car of another train.

Protect--stationing a flagman sufficiently ahead or to the rear of a stationary train to stop any approaching train that might otherwise collide with it.

Reduced speed--proceed, prepared to stop short of a train or an obstruction.

Regular train--train authorized by a timetable schedule.

Schedule--that part of a timetable which prescribes class, direction, number, and movement for a regular train.

Section--one of two or more trains running on the same schedule displaying signals or for which signals are displayed.

Siding--track auxiliary to the main track for meeting or passing trains.

Subdivision--portion of a division designated by timetable.

Superior train--train having precedence over another.

Train--one, or more engines, coupled, with or without cars, displaying markers.

Train of superior class--train given precedence by timetable.

Train of superior direction--train given precedence in the direction specified by timetable between opposing trains of the same class.

Train of superior right--train given precedence by train order.

Yard--system of tracks within defined limits, provided for making up trains, classifying and storing cars, and other purposes, over which movements not authorized by timetable or by train order may be made, subject to prescribed signals and rules or special instructions.

INDEX