20132025 Part 8.1.10

Recommended Direct-Current Track Circuit Test Record

Revised <u>20132025</u> (2 Pages)

Table 8110-1: Rail, Ballast Resistance and Other Data

	DIR	ECT C	CURREN	NT TRA	ACK CIF	RCL	JIT TI	EST RE	CORD	8.1.10	- 1			
			RAIL	, BALLA	ST RESIS	TAN	CE ANI	OTHER	DATA					
Town		DIVISION CIRCUIT No.												
TYPE OF CIRCUIT		RELAYED	POLARIZED	END FED	BENTER FEE	•	LE	NGTH			L =		_ M.F.T.	
RAIL ANGLE BARS IN:		ROSS TIES	BALLAST	BATTERY TYPE	HONDS TYPE	TIE	PLATES		EAST OR	REL	Y8	EAST OR	WEST O	
									NORTH RELAY	WEST OR SOUTH RELAY		NORTH RELAY	SOUTH RELAY	
ENBTH CONDITION NUM	MBER TRE	ATMENT	% FREE OF RAILS	LENGTH OF LEADS	SIZE GAUBE		THOO OF	MAKE			RATED RESIST.			
ANCHORB PER CON	ADITION CON	IDITION	% DRAINABE	GAUGE OF LEADS	LENGTH (IN)	то -	TIE TO RAIL	TYPE			# OF BONTACTS			
ROAD CROSSING # R.R. CROS	BBING #	STATIONS	#	Housing	# PER JOINT			LENGTH OF			RATED WORKING			
VATER SPOUTS # COAL STA	TIONS #	SWITCHES	#		EUNDITION	ĺ		GAUGE OF LEADS			RATED DROP AWAY			
FIG. 1. WITHOUT AMA		ED CIRCL		LIN CIRCUIT	<u> </u>	<u> </u>	Fig	. З WITHOUT		NTER FED CIRC	шт	AMMETER IN C	L	
FIG. 1 WITHOUT AMN		1	VITH AMMETER	R IN CIRCUIT	⊣ ⊢		F 103	7			FIG. 4 WITH	<u> </u>	I	
(E ₂)	(E ₃)	(E _s)			-	(E,	•	(E ₂)	E	(3)	, <u>(</u>	E _s)		
E		(I')			(")		WEST OF	(E_i)	TAST OR		(I')	EAST OR	(I")	
	(E ₄)	\$		(E	T k	(E ₈)	RELAY		E	.) E,	WEST OR SOUTH RELAY	RELAY	$\langle E_{\bullet} \rangle$	
H.E	H				I .	4		V. E			'/ L	\mathbb{H}	- 11	
	TES	T DATA				COMPUTED DATA (COMPENSATED FOR AMMETER RESISTANCE)								
NO. AND ARRANGEMENT M =					I	CURRE	NT AT BATTER	₹Y	$I' \times (E_2/E_5)$					
ATE SET UP		1				I_i	CURRE	NT AT RELAY		$I'' \times (E_4 / E_6)$				
NSERTED RESISTANCE AT BAT	1				R,	RESIST	TANCE OF RES	SISTANCE	(E - E ₁) / I					
OISTURE CONDITION OF BALL	1				R₅	RESIST	FANCE OF BAT	TERY RAIL	(E ₁ - E ₂) / I					
EMPERATURE OF AIR (F)	FIG. No.				R	RESIST	FANCE OF REL	AY RAIL	(E ₃ - E ₄) / I ₁					
E VOLTS AT BATTER	1 - 3				R,	RAIL R	ESISTANCE TO	DTAL	2 x (E ₂ - E ₃) (I + I ₁)					
E, VOLTS AT TRACK	1 - 3				r,		ESISTANCE PI		R _r / L					
${ m E_2}$ Volts at Rails,	1 - 3				R _b BALLAST RESISTANCE TOTAL				(E ₂ + E ₃) 2 x (I - I ₁)					
E ₃ Volts at Rails,	RELAY END	1-3				r₀	BALLA:	ST RESISTAND	DE PER 'M' FT	$R_b \times L$				
E ₄ VOLTS AT RELAY	1-3	•			* I		NT AT RELAY		I'''×(E ₈ /E ₉)					
E ₅ VOLTS AT RAILS,	2-4				* Resistance of Relay Rail				(E ₇ - E ₈) / I ₂					
E ₆ VOLTS AT RELAY	2-4				* R. RAIL RESISTANCE TOTAL				4(2E ₂ -E ₃ -E ₇)					
				<u> </u>	▙		SECULTATION D	en 'M' et ne	$(I + I_1 + I_2)$					
I' CURRENT AT BAT		2 - 4				^ r,	TRACK	(2000 FT RA	AIL)	R _r / L 2E ₂ + E ₃ + E ₇				
I" CURRENT AT REL	AY	2 - 4				* R	-	ST RESISTAND		4(I - I ₁ - I ₂)				
MAXIMUM SHUNT	RELAY END					* r _t	BALLA:	ST RESISTAND	DE PER 'M' FT	$R_b \times L$				
RESISTANCE ACROSS RAILS TO DROP RELAY	AT BATTERY					1	Сомри	TED BY				DATE		
	RELAY END													
RELAY WORKING, AMPER	ES ACTUAL						* =	ADDITION	IAL COMPL	ITATIONS FO	R CENTER F	ED CIRCUI	TS	
RELAY DROP-AWAY, AMPE					1				IONS FOR MAKI	NG TESTS				
\star \mathbb{E}_7 Volts at Rails,	3				2) (BATTERY 1		ULD BE CONS	TANT DURING P					
$*~\mathrm{E}_{\scriptscriptstyle{f B}}$ Volts at Relay	3				3) THE TRACK CIRCUIT SHOULD NOT BE SHUNTED OR OPENED DURING PERIOD TEST BEING MADE IF SHUNTED BY TRAIN OR OTHERWISE OPENED, THE TESTS SHOULD REPEATED AND THESE VALUES RECORDED.									
* E ₉ VOLTS AT RELAY	4				A) THE VOLTAGE READING SHOULD BE TAKEN ONE AT A TIME. 5) WHEN TAKING AMPERE READING I' THE METER AT RELAY END SHOULD NOT BE IN						7			
* I CURRENT AT REL	4				6) 1	CIRCUIT. WHEN TAK	ING AMPERE		OR I" THE METER					
RELAY WORKING, AMPERES A	<u> </u>				7) /		E RESISTANCI		USED ACROSS					
RELAY DROP-AWAY, AMPERES					WHICH RELAY DROPS AWAY. THE TOTAL RESISTANCE OF SHUNT WIRE AND VARIA UNIT SHOULD BE RECORDED. B) TO OBTAIN ACCURATE RESULTS THE TRACK CIRCUIT SHOULD BE FREE FROM FORE									
JBSERVED BY				DATE						TRACK CIRCUIT (URRENT FROM A			ION	
= ADDITIONAL TESTS						4								

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Table 8110-2: Effect of Rail Breakage or Removal and Other Data

		_																	
		Di						CUIT				8.1.10	-2						
											IER DAT								
TEST TO DET	ERMINE '	THE CUR	RENT FL	LEA	KAGE C	URRENT	THROUG	H GROUN	D AND A	CROSS .	TIES.	CIRCUIT,	AND TO DE	TERMINE RELA	ATIVE				
Town								DIVISIO				CIRCUIT	No						
TOWN	CUIT		NEUTRAL	RELAYED	POLARIZE	D END FEE	GENTER F	ED	LENG	тн	No of B4		_ L = _		M.F.T.				
CROSS TIES, KIND			TREATMEN	чт				CONDITIO	м					YEAR OLD					
TIE PLATES, KIND BATTERY, KIND	CROSS TIES, KIND TREATMENT TIE PLATES, KIND METHOD OF FASTENING TO TIES BATTERY, KIND MANUF. RELAY, RATED RESIST. ACTUAL RESISTANCE									TO RAIL									
RELAY, RATED RESIST				ACTUAL C	NAEGIED														
BALLAST, KIND MOISTURE CONDITIONS RAIL, WEIGHT RAIL RESISTANCE, R,										Ваг	LLAST RESIS	STANCE TOTA	⊾ R _b						
			TAKE CO	MPLETE	SET OF							.1.10-1		$\overline{}$					
											OR REM		. (//)						
T-TEST CONDITION			DINTS BY			R VOLTAG	SES E ₂ Ar	чо Е₃ сни	ANGE WHI	EN TRAC	K IS SHUN	NTED ON O	PPOSITE SII	DES OF JOINTS	3.				
SHUNTTO TEST INSULATED JOINT A																			
VIS							1												
G (T) (F)		Œ) (E.	₁)		(E3)	D	TESTS FOR CONDITION OF INSULATED JOINTS E ₂ NORMAL (RAILS NOT SHUNTED) VOLTS											
		L		В				E ₃	NORMAL	RAIL	в иот вн	UNTED)	Volts						
	F).	F	IGURE	1		(E)		E ₂ E ₃	WITH RA	IL SHUN	TED AT D		Volts Volts						
-1, 4			E ₃ WITH RAIL SHUNTED AT D VOLTS																
	TES	TFORR	RAIL BRE	BREAKAGE OR REMOVAL															
BATTERY POLARITY		No	RMAL			REV	/ERSE			Ave	ERAGE		T						
SWITCHES OPEN	A	В	A+B	NONE	A	Тв	A + B	NONE	Δ	В	A+B	NONE		REMARKS					
E	-	 	· · -		<u> </u>	 	 				+	1							
	-	-	<u> </u>			<u> </u>	<u> </u>				-	\vdash							
I																			
E ₂																			
E ₁₀																			
E ₁₁																			
E ₃																			
E ₄		1																	
RELAY COMPUTED	 	 	<u> </u>				 	1		-	1	1							
			<u> </u>	_		1													
				TESTS	FOR L	EAKAGE	ACROS	S GROU	ND AND	ACRO	SS TIES								
TRACK BATTERY A	ND RELA	Y SHOUL	D BE DIS									OLTAGE AF	PLIED FROM	M AUXILIARY B	ATTERY C				
-	L/4	L/	4	L/4			-	AT CENTE	ER OF TRA	CK CIRC									
	Ры			, A				TESTS FOR FIGURE 2											
B I W								Read voltage E_7 and current I_3 for both polarities of battery C.											
W G R J 2R ₁₂						w .	+	WITH W END OF CIRCUIT					REMARKS						
	2F	₹52△	(E)	4/\	_	Ì	•		Positi	VE I	VEGATIVE	AVERAG	i E						
C B					3			E ₇											
<			. (13)	F	IGURE	2		Ι3											
LIST OF Rb = TO												SE THROUGH							
SYMBOLS $R_r = To$	TAL RAIL RE	ESISTANCE F_		P				RT OF BALL				SE ACROSS T							
CALCULATIONS:	R _{b1} =	I2		- 1\r 8	- =		DHMS.		$R_{b2} =$	$R_b \times R_b$	<u> </u>		□нмв.						
		+3								IVD IVE	51								
THE ABOVE TEST	S SHOUL	D BE OB											, AND UNDE	ER BOTH WET A	AND DRY				
			BALL	AST CON	DITIONS,	, AND WIT	TH PRIMA	RY AND L	EAD PLA	TE STOR	AGE BATTI	ERIES.							
Teere W:						Da	/ED -::						D						
「ESTS MADE BY □BSERVED BY								DATE											
CALCULATIONS MADE BY DATE																			
REMARKS:																			