



# IronWood Technologies

Railroad Accident Reconstruction

## Federal Railroad Administration

### False Proceed Signal Database

January 1, 1995 through May 3, 2004

All Reports - State of North Carolina

Report #	Date	Reporting Carrier	Block System	Interlocking	Auto. Systems	Loco or Train No.	Device that Failed	Location	Collision or Derailment?
8	1/17/1995	CSXT	CTC			Train F767-17	Signal 269	Lilesville, NC	N
<b>Failed Equipment or Device - Relay</b>									
<p>On January 17, 1995, Train F767-17 reported APPROACH MEDIUM signal at M.P. SF-269. This signal or route was not intended by CSXT due to the signal in advance being a control signal and at STOP.</p> <p>Signal system was removed from service. Signal personnel, along with FRA personnel investigated the incident making all operational tests. The incident could not be duplicated. It was determined that the signal system was functioning as intended. Signal system is restored to service.</p> <p>(Handwritten notes on bottom of form: "CD Relay failing - pitted contacts")</p>									
135	7/8/1997	CSXT	CTC			U33730	None	N.E. Waxhaw, Waxhaw, NC	N
<b>Human Error - Signal Circuit Design Error, Inadequate Service-Testing</b>									
<p>On July 8, 1997, south bound train U33730 reported to the dispatcher receiving a MEDIUM APPROACH signal at the north end of Waxhaw siding, which was already occupied by south bound train Q61908. The signal should have been RESTRICTING. U33730 did not take the signal. The dispatcher held the trains in position until signal personnel could arrive and investigation.</p> <p>Investigation by signal personnel confirmed the false proceed indication. The siding track relay was observed coding. The coding was caused by energy supplied from the track isolation unit. The block operates by reversible DC code. The isolation unit would discharge on the off cycle of DC code in the block. The discharge routed through the axle of the approaching train and was the proper polarity to energize the siding track relay, thereby upgrading the signal. The isolation unit was removed from the circuit and the track relay stopped coding. The crossing and signal location were tested for proper operation and the signals placed back in service.</p> <p>The isolation unit was installed as part of a grade crossing warning device installation. The relays were tested and found to be within specification. Two isolation units were installed at a different point in the circuit to prevent the situation from re-occurring. The signal system was tested for proper operation and found to be functioning as intended.</p>									

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443	7/31/1998	CSXT	CTC			Q22929	None	East Junction, Hamlet, NC	N
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**Vandalism - Instrument Case, Cable, or Junction Box Damaged**

At approximately 0130 on the morning of July 31, Q22929 reported the distant signal to East Junction at CLEAR with no signal requested at East Junction. The signals were removed from service and signal personnel dispatched to investigate.

Signal personnel arrived at approximately 0200 and verified the CLEAR signal at the distant signal. The investigation revealed that the signal case at East Junction was hit by a vehicle. Upon opening the signal case at East Junction, signal personnel found the DR relay on its side. The contacts on the relay were made, thereby causing the false signal.

The relay was righted, operational tests performed, and the signals were placed back in service at 0300.

Signal maintainer verified that bungalow was struck by City vehicle. CSX police spoke to City personnel [GVH].

310	1/4/2001	NS	CTC			P42P3	Phantom Signal	Thicketty, NC	N
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**Phantom Signal - Due to Sun Angle**

At approximately 5:04 p.m. on 1/4/01, train P42P3 running northbound reported a signal problem with the 4354 northbound intermediate signal at MP 435.4. Train P42P3 was northbound on track two returning to a cut of 15 cars it had left on track two north of the 4354 intermediate signal. Upon approaching the 4354 signal northbound, the crew first observed a RESTRICTING Red over Red aspect. As they got closer to the signal, it appeared to them as an APPROACH, Yellow over Red aspect. The engineer called the dispatcher and reported that he thought there were signal problems at the location. The dispatcher called signal personnel to investigate. Investigation revealed no exceptions with signal circuits, grounds or relay operation. However, it was determined that the sun was shining directly into the signals at the time of the incident and the situation would be reenacted at 5:00 p.m. on 1/5/01, as a phantom aspect was suspected.

Conditions were almost identical to the previous day during the reconstruction. The same crew and train P42P3 were used, with signal officers on board to observe the signals. At a distance the RESTRICTING aspect was visible on signal 4354. When the train got within 600' of the signal, an APPROACH aspect could be distinguished and the top head green lens appeared dimly lit on signal 4354.

It was observed that the signal was affected by the sun's glare, and the top head appeared to have all three units (green, yellow, and red) burning dim and of equal intensity. Such an aspect would have been interpreted as an improperly displayed signal, rather than an APPROACH. However, the possibility of an APPROACH aspect could not be discounted.

Adjustments were made to make the signal aspects easier to discern in the afternoon sun. This involved bulb voltage adjustments, sighting alignment and installing long signal hood covers.

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315	9/18/2001	NS	CTC			P83P918	Signal "HD" Circuits	Charlotte, NC	N
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**Human Error - Signal Circuit Design Error, Inadequate Service-Testing**

At approximately 4:40 p.m. on 9/18/01, Train P83P918, running southbound on Track #1 approaching the control point at North Advance, MP 379.6 on the Piedmont Division observed a DIVERGING CLEAR aspect on the southbound control signal. This was after receiving a RESTRICTING aspect at the approach signal at Summitt Avenue, MP 378.4. They were anticipating a STOP signal at N. Advance due to an occupied block indication between N. Advance and Charlotte Jct., MP 380.6 for Track #1. Switch was requested and indicating normal at N. Advance.

Investigation revealed that the track circuit between N. Advance and Charlotte Jct. for Track #1 was a center fed DC track circuit with two track relays. One on the north end of the circuit and one on the south end. "HD" information for N. Advance is sent from Charlotte Jct. to N. Advance in a multiconductor cable between the two control points.

A track production gang had worked track between Charlotte Jct. and N. Advance earlier that day and caused track leads for the south track relay at Charlotte Jct. to open, de-energizing the relay. Contacts of the relay were in the indication circuits and indicated an occupied block. However, they were not in the 227LBHD circuit and did not de-energize this circuit. Dispatcher had requested a follow-up move at N. Advance. The 227LBHD relay was energized and allowed the DIVERGING CLEAR (Red/Green/Red) to display.

Circuits were corrected adding contacts of the 221RT track relay in the 227LBHD circuit to open the circuit with the track relay deenergized.

The corrections were implemented and tested on 9/19/01.

347	2/27/2002	CSXT	CTC			R27627	None: Phantom	NAS Contentnea #2 Tr., Contentnea, NC	N
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**Phantom Signal - Due to Sun Angle**

On February 27, 2002 at about 1545 hours the crew of K27627 reported a RESTRICTING signal (R/R/L) at the NAS Contentnea, NC Number 2 Track at MP A139.0. Investigation revealed that the signal was working as intended and the RESTRICTING aspect was due to being sunlit and was verified as a phantom aspect. The signal backgrounds were painted, outer lens replaced and realigned signal to the apex of the curve. Phantom screens were ordered and will be installed upon receipt. After the mitigating action the signal was rechecked under similar conditions and now exhibits no aspect exceptions. We are reporting this event but we do not consider this to be a false proceed.

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			<b>Cause</b>							
			<b>Narrative</b>							
<b>350</b>	5/17/2002	CSXT	CTC			Q69617	None - Phantom	Monroe, NC	N	
			<b>Phantom Signal - Due to Sun Angle</b>							
			Train Q69617 arrived at Monroe from Charlotte at about 1800 hours. Dispatcher is lined for a mainline move at the north end of Monroe but will put signal to STOP and route Q69617 NB out of the siding onto #1 track. The Engineer on Q29217 states he called the signal as a SLOW CLEAR and as he approached the switch it was lined for main so he stopped train and reported incident to the train dispatcher. Signals were removed from service and signal personnel dispatched to the site. Investigation revealed that the signal was working as intended and the SLOW CLEAR aspect was due to interference from the sun and was verified as a phantom aspect. Individual hoods were installed on the affected signal and phantom reducing screens were installed. After this mitigating action the signal was rechecked under similar conditions and now exhibits no exceptions. We are reporting this event but we do not consider this to be a false proceed.							
<b>351</b>	8/14/2002	CSXT	CTC			K650-13	Relay	St. Stephen, NC	N	
			<b>Human Error - Signal Equipment Improperly Installed</b>							
			At 0630 on August 14, 2002, train crew report on K65013 while operating northbound on the single main track to #2 track over a reversed switch, observed and reported a CLEAR indication (Green) at the intermediate signal MP A355 and a LIMITED CLEAR (Red over Flashing Green) at South St. Stephen when the intermediate signal should have displayed an APPROACH LIMITED (Yellow over Flashing Green). The signals were removed from service at 0645 and a team was dispatched to the site to investigate this event. Investigation revealed that the RHHR relay, a DN-11 style shelf relay, had vibrated off the shelf and was found inverted, hanging by the wires in the equipment house at St. Stephen which caused a signal to be displayed at the intermediate signal indicating better than conditions warranted. The relay was up righted and an anti-vibration assembly was installed. Complete operational tests were performed with no exceptions taken. Signals were restored to service at 1100 on 8/14/02.							

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<b>364</b>	12/16/2002	NS	CTC			P40	Signal Circuits	Kannapolis, NC	N
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**Failed Equipment or Device - Track Isolation Unit**

At 7:50 a.m., December 16, 2002, southbound train P40 observed the northbound 339.8 intermediate signal, as his southbound train passed the adjacent southbound proceed signal at the 339.9 intermediate signal location.

P40's train had passed the 339.9 southbound signal by approximately 3 - 4 car lengths, as Engineer observed an APPROACH DIVERGING (Y/G) signal at the adjacent northbound 339.8 intermediate signal. At this time, P40 still occupied the track circuit north of the 339.8 northbound signal with approximately 1/2 mile of train. The APPROACH DIVERGING signal was displayed for 3-4 seconds before displaying a RESTRICTING signal (R/R with number plate). The signal remained RESTRICTING until P40 Engineer could no longer observe the 339.8 signal.

C&S personnel investigated and were able to duplicate the signal as observed by Engineer. Investigation found shorted blocking diodes in a trackcode isolation unit located at the 339.8 signal location along with excessive current on the track circuit. The current limiting diodes shorted in the isolation unit allowed the track relay to pick up from the kick back circuit generated by the inductor magnetic field collapse. The track relay followed the code being generated for a following move due to the stick circuit being energized. The code following track relay allowed the BD relay to energize and display the northbound APPROACH DIVERGING aspect. Track circuit current levels were adjusted, the isolation unit was changed out and the signal system tested. Returned to service at 3:30 p.m. on 12/16/02.

<b>363</b>	12/17/2002	NS	CTC			908P217	Relay Circuit	Burlington, NC	N
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**Human Error - Field Wiring Error, Inadequate Service Testing**

At 12:01 p.m. on 12/17/02, train 908P217 with engine 5196 handling 1 load 11 empties, passed the westbound STOP signal at control point Merrill, M.P. H23.5. Train passed the STOP signal by approximately 182 feet. Train crew reported to dispatcher that the non-automatic signal at Haw River, NC, M.P. H25.5 displayed a CLEAR aspect. The controlled holdout signal at MP H23.5 displayed a STOP aspect.

Investigation of the incident revealed the CLEAR signal indication at the non-automatic signal at MP H25.5 displayed account of improper temporary wiring made by signal personnel during a signal cutover on 12/13/02. The "H" and "D" output of the Electrocode unit were wired together to the coil of the relay used to light the CLEAR aspect, allowing either the "H" or "D" to display the CLEAR.

The wire was removed from the "H" output to the relay coil and the system was tested and returned to service at 2:00 p.m. on 12/17/02.

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400	6/21/2003	NS					Track Circuit	Greensboro, NC	N
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**Maintenance - Improper Adjustment, Track Circuit**

At approximately 7:20 p.m. on 6/21/03, train Amtrak 74 was running northbound on Track #1 when it received a Green over Red (G/R) CLEAR aspect at the intermediate signal at MP 285.6. Amtrak 74 should have received a Yellow over Green (Y/G) APPROACH DIVERGING aspect. The Control Point at Elm MP 284.5 was lined for a turnout move onto the H-Line and displayed a Red over Green (R/G) DIVERGING CLEAR aspect. This is Trackcode territory with color light signals and GRS 5H power switch machines. The condition was reproduced during testing. An invalid Trackcode pulse was being transmitted from CP Elm to the intermediate signal at MP 285.6. A (+ - +) was being transmitted and deciphered as a (- +) and displayed the CLEAR aspect. When the pulse was adjusted with the NPL adjustment pot to slow down the rate, a (+ -) was sent and deciphered at MP 285.6, displaying the proper aspect, Yellow over Green APPROACH DIVERGING. Current levels on the track were within specifications, all cables were meggered and relays tested with no exceptions found.

Track circuit was adjusted to proper rate and engineering change made in the AD & BD relays to prevent this type of signal aspect display in the future.

407	11/3/2003	NS		Automatic		F729729	Signal System	Durham, NC	N
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**Human Error - Improper Circuit Jumper in Place**

At approximately 12:00 p.m. on November 3, 2003, CSX train F729729 approached the D&S Interlocking at MP H57.4 on the H-Line and MP D86.40 on the D-Line, westbound on the CSX track which intersects both the H-Line and D-Line at this interlocking. As F729729 approached the interlocking, the signal controlling CSX westbound movement across the diamond, displayed a PROCEED aspect, Green over Red. The crew then noticed NS train E22 had fouled the interlocking limits, attempting to make a northbound move on the D-Line through the interlocking.

Train E22 stopped at the 2R signal of the interlocking, the signal was dark and E22 acted in accordance with the time table special instructions for movements across the interlocking with signal outages or troubles. E22 had moved across the joints at the signals and fouled the interlocking 2T OS track but had not fouled the diamond when F729729 observed E22. E22 was waiting the prescribed 5 minutes before proceeding across the diamond. The CSX signal should have displayed a STOP, Red over Red aspect.

Investigation found that the 2T OS and 2L approach track circuit relays had been energized with temporary jumpers during new construction at this interlocking. The D-Line had been taken out of service during the new work. While out of service, the 2T OS and 2L track wires were destroyed during grading and temporary jumpers were applied to get the interlocking back in service for CSX train moves. The D-Line was then restored to service without the 2T OS and 2L approach track relay jumpers being removed.

The D-Line is currently out of service pending restoration of damaged interlocking cable and the 2T OS track circuit has been restored to service and tested.

No. of Reports Shown in this Listing: 12