Federal Railroad Administration
Office of Safety
Headquarters Assigned
Accident Investigation Report
HQ-2005-46

CSX Transportation (CSX)
Cumberland, Maryland
May 30, 2005

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-2005-46

1.Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
CSX Transportation [CSX]	CSX	000012692
2.Name of Railroad Operating Train #2	2a. Alphabetic Code	2b. Railroad Accident/Incident
CSX Transportation [CSX]	CSX	000012692
3.Name of Railroad Responsible for Track Maintenance:	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
CSX Transportation [CSX]	CSX	000012692

4. U.S. DOT_AAR Grade Crossing Identification Number	5. Date of Accident/Incident			6. Time of Accident/Incident
	Month	Day	Year	
	05	30	2005	01:30:00 ☐ AM ☑ PM

7. Type of Accident/Indicent (single entry in code box): 1. Derailment; 2. Head on collision; 3. Rear end collision; 4. Side collision; 5. Raking collision; 6. Broken Train collision; 7. Hwy-rail crossing; 8. RR grade crossing; 9. Obstruction; 10. Explosion-detonation; 11. Fire/violent rupture; 12. Other impacts; 13. Other (describe in narrative) — **04**

8. Cars Carrying HAZMAT	9. HAZMAT Cars Damaged/Derailed	10. Cars Releasing HAZMAT	11. People Evacuated	12. Division
0	0	0	0	BALTIMORE

13. Nearest City/Town	14. Milepost (to nearest tenth)	15. State Abbr	15. State Code	16. County
CUMBERLAND	175.9	N/A	MD	ALLEGANY

17. Temperature (F) (specify if minus)	18. Visibility (single entry) 1. Dawn 2. Day 3.Dusk 4.Dark	Code	19. Weather (single entry) 1. Clear 2. Cloudy 3. Rain 4. Fog 5.Sleet 6.Snow	Code	20. Type of Track 1. Main 2. Yard 3. Siding 4. Industry	Code
65 F		2		1		2

21. Track Name/Number	22. FRA Track Class (1-9, X)	Code	23. Annual Track Density (gross tons in millions)	24. Time Table Direction 1. North 3. East	Code
CLASS 2 TRACK (W02)		1	0.0		3

OPERATING TRAIN #1

25. Type of Equipment Consist (single entry): 1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car; A. Spec. MoW Equip. — Code: 7

26. Was Equipment Attended? 1. Yes 2. No — Code: 1

27. Train Number/Symbol: Y191-30

28. Speed (recorded speed, if available) R - Recorded E - Estimated: 6 MPH — Code: R

29. Trailing Tons (gross tonnage, excluding power units): 6418

30. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; c. Auto train stop; d. Cab; e. Traffic; f. Interlocking; g. Automatic block; h. Current of traffic; i. Time table/train orders; j.Track warrant control; k. Direct traffic control; l.Yard limits; m.Special instructions; n. Other than main track; o. Positive train control; p. Other (Specify in narrative) Code(s): n N/A N/A N/A N/A

30a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable; 2 = Remote control tower; 3 = Remote control transmitter - more than one remote control transmitter; 2. South 4. West — **3**

31. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)
(1) First involved (derailed, struck, etc)	N/A	94	yes
(2) Causing (if mechanical cause reported)	0	0	N/A

32. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.

Alcohol	Drugs
0	0

33. Was this consist transporting passengers? (Y/N): N/A

34. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote
(1) Total in Train	2	0	0	0	0
(2) Total Derailed	0	0	0	0	0

35. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Equipment Consist	43	0	51	0	0
(2) Total Derailed	8	0	3	0	0

36. Equipment Damage This Consist: 251410

37. Track, Signal, Way, & Structure Damage: 55000

38. Primary Cause Code: S102

39. Contributing Cause Code: N/A

Number of Crew Members

40. Engineer/ Operators	41. Firemen	42. Conductors	43. Brakemen
N/A	0	1	0

Length of Time on Duty

44. Engineer/Operator: Hrs 1 Mi 41

45. Conductor: Hrs 5 Mi 41

Casualties to:	46. Railroad Employees	47. Train Passengers	48. Other
Fatal	0	0	0
Nonfatal	N/A	0	0

49. EOT Device? 1. Yes 2. No — 2

50. Was EOT Device Properly Armed? 1. Yes 2. No — N/A

51. Caboose Occupied by Crew? 1. Yes 2. No — N/A

OPERATING TRAIN #2

52. Type of Equipment Consist (single entry): 1. Freight train; 2. Passenger train; 3. Commuter train; 4. Work train; 5. Single car; 6. Cut of cars; 7. Yard/switching; 8. Light loco(s).; 9. Maint./inspect.car; A. Spec. MoW Equip. — Code: N/A

53. Was Equipment Attended? 1. Yes 2. No — Code: N/A

54. Train Number/Symbol: N/A

55. Speed (recorded speed, if available) R - Recorded E - Estimated: 0 MPH — Code: N/A

57. Method(s) of Operation (enter code(s) that apply): a. ATCS; b. Auto train control; g. Automatic block; h. Current of traffic; m.Special instructions; n. Other than main track

57a. Remotely Controlled Locomotive? 0 = Not a remotely controlled; 1 = Remote control portable

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56. Trailing Tons (gross tonnage, excluding power units)	c. Auto train stop d. Cab e. Traffic f. Interlocking	i. Time table/train orders j.Track warrant control k. Direct traffic control l.Yard limits	o. Positive train control p. Other (Specify in narrative) Code(s)	2 = Remote control tower 3 = Remote control transmitter - more than one remote control transmitter
0			N/A N/A N/A N/A N/A	N/A

58. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	59. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First involved (derailed, struck, etc)	CSXT2 52122	1	N/A		N/A	N/A
(2) Causing (if mechanical cause reported)	0	0	N/A	60. Was this consist transporting passengers? (Y/N)		N/A

61. Locomotive Units	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End c. Remote	62. Cars	Loade a. Freight	Loade b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	0	0	0	0	0	(1) Total in Equipment Consist	5	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	4	0	0	0	0

63. Equipment Damage This Consist	64. Track, Signal, Way, & Structure Damage	65. Primary Cause Code	66. Contributing Cause Code
31021	0	S102	N/A

Number of Crew Members				Length of Time on Duty	
67. Engineer/ Operators	68. Firemen	69. Conductors	70. Brakemen	71. Engineer/Operator	72. Conductor
0	0	0	0	Hrs 0 Mi 0	Hrs 0 Mi 0

Casualties to:	73. Railroad Employees	74. Train Passengers	75. Other
Fatal	0	0	0
Nonfatal	0	0	0

76. EOT Device? 1. Yes 2. No | N/A

77. Was EOT Device Properly Armed? 1. Yes 2. No | N/A

78. Caboose Occupied by Crew? 1. Yes 2. No | N/A

Highway User Involved

79. Type — Code: N/A
A. Auto B. Truck C. Truck-Trailer. D. Pick-Up Truck E. Van F. Bus G. School Bus H. Motorcycle J. Other Motor Vehicle K. Pedestrian M. Other (spec. in narrative)

80. Vehicle Speed (est. MPH at impact): 0

81. Direction geographical) — Code: N/A
1.North 2.South 3.East 4.West

82. Position — Code: N/A
1.Stalled on Crossing 2.Stopped on Crossing 3.Moving Over Crossing 4. Trapped

86a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

Rail Equipment Involved

83. Equipment — Code: N/A
1.Train(units pulling) 2.Train(units pushing) 3.Train (standing) 4.Car(s) (moving) 5.Car(s) (standing) 6.Light Loco(s) (moving) 7.Light(s) (standing) 8.Other (specify in narrative)

84. Position of Car Unit in Train: 0

85. Circumstance — Code: N/A
1. Rail Equipment Struck Highway User
2. Rail Equipment Struck by Highway User

86b. Was there a hazardous materials release by — Code: N/A
1. Highway User 2. Rail Equipment 3. Both 4. Neither

86c. State here the name and quantity of the hazardous materials released, if any.
N/A

87. Type of Crossing Warning — Code(s): N/A N/A N/A N/A N/A N/A N/A
1.Gates 2.Cantilever FLS 3.Standard FLS 4.Wig Wags 5.Hwy. traffic signals 6.Audible 7.Crossbucks 8.Stop signs 9.Watchman 10.Flagged by crew 11.Other (spec. in narr.) 12.None

88. Signaled Crossing Warning Code (See instructions for codes)

89. Whistle Ban — Code: N/A
1. Yes 2. No 3. Unknown

90. Location of Warning — Code: N/A
1. Both Sides
2. Side of Vehicle Approach
3. Opposite Side of Vehicle Approach

91. Crossing Warning Interconnected with Highway Signals — Code: N/A
1. Yes 2. No 3. Unknown

92. Crossing Illuminated by Street Lights or Special Lights — Code: N/A
1. Yes 2. No 3. Unknown

93. Driver's Age: 0

94. Driver's Gender — Code: N/A
1. Male 2. Female

95. Driver Drove Behind or in Front of Train and Struck or was Struck by Second Train — Code: N/A
1. Yes 2. No 3. Unknown

96. Driver — Code: N/A
1. Drove around or thru the Gate 2. Stopped and then Proceeded 3. Did not Stop 4. Stopped on Crossing 5. Other (specify in narrative)

97. Driver Passed Standing Highway Vehicle — Code: N/A
1. Yes 2. No 3. Unknown

98. View of Track Obscured by (primary obstruction) — Code: N/A
1. Permanent Structure 2. Standing Railroad Equipment 3. Passing Train 4. Topography 5. Vegetation 6. Highway Vehicle 7. Other (specify in narrative) 8. Not obstructed

101. Casulties to Highway-Rail Crossing Users	Killed	Injured
	0	0

99. Driver Was — Code: N/A
1. Killed 2.Injured 3. Uninjured

100. Was Driver in the Vehicle? — Code: N/A
1. Yes 2. No

102. Highway Vehicle Property Damage (est. dollar damage): 0

103. Total Number of Highway-Rail Crossing Users (include driver): 0

104. Locomotive Auxiliary Lights? — Code: N/A
1. Yes 2. No

105. Locomotive Auxiliary Lights Operational? — Code: N/A
1. Yes 2. No

106. Locomotive Headlight Illuminated? — Code: N/A
1. Yes 2. No

107. Locomotive Audible Warning Sounded? — Code: N/A
1. Yes 2. No

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED.

109. SYNOPSIS OF THE ACCIDENT

On May 30, 2005 at approximately 1:30 p.m. at Cumberland Yard, Cumberland, MD. an eastward CSX Transportation (CSXT) RCL Yard Switcher Y191-30 operating a train of mixed freight was involved in a side collision with a five car block of loaded cover hoppers that had just been humped to WO3 track. The train consisted of two locomotives, 94 cars, and was operating at a speed of 6 mph. Reportedly, the RCL lost remote control communication resulting in the locomotives defaulting to a full service brake application of the air brake system. The brake application was applied to the two locomotives and the twelve lead cars that were charged with air. This action caused a coupler knuckle to break at mile post 177.1 between the 33rd and 34th cars allowing 61 cars to roll freely without the knowledge of the crew. The 61 cars rolled freely approximately 1.4 miles gaining speed estimated to be 15 to 20 mph, and struck the first west car of the five car block that was humped to WO3. Theses cars had not yet cleared the east switch for track W03. The impact derailed four of the humped cars, and eleven east cars of the 61 car runaway cut. Two of these cars struck the side of a standing intermodal train Q130-29 on track two main derailing the first east unit of articulated car TTXX 553348 and dislodging one of the a containers on onto number 1 main track from car TTXX 780310 . The two man crew was operating the RCL on track W02 in the classification yard after they were instructed to make-up train Q640-31.

There were no injuries reported and no hazardous materials involved.

Total damages are set at $337431.

The weather was clear with an ambient temperature reported to be 65 F degrees.

The probable cause of the derailment and subsequent collision is the loss of signal communication between the Remote Control Operator (RCO) and the receiving unit on the RCL which caused the locomotive to initiate an emergency stop resulting in the broken knuckle on the 33rd car allowing the east 61 cars to roll free.

110. NARRATIVE

The following information was obtained from an investigation that was conducted by the Federal Railroad Administration.

Circumstances Prior to the Accident:

The crew of train CSX Y19030 included two Remote Control Operators (RCO) assigned to operate a remote control locomotive consist in CSX Cumberland Yard. The job consisted of switching cars in the yard. The Remote Control Operator Foreman reported for duty at 07:59 am (EST) on May 30, 2005 with 16 hours of statutory rest and had been on duty for 5 hours and 41 minutes. The Remote Control Operator Switchman reported on duty at 11:00 PM (EST) May 29, 2005 on job Y39029 and worked until 6:05am. After 4 hours 8 minutes interim release, he reported for duty at 11:59 AM (EST) on
May 30, 2005 on job Y19030 and had been on duty for 1 hour and 41 minutes. He had a 72 hours of statutory rest period.

After receiving orders from the yardmaster to use remote control locomotives CSXT 2432 and 2431 the RCO's linked their Operator Control Unit(OCU) to the Remote Control locomotive Control Unit(LCU) on locomotive CXST 2431. After linking with the LCU their job was to build train Q640-31 on WO2. They assembled 94 cars of mixed freight, which consisted of 43 loads and 51 empties, and proceeded west on #1 yard track to clear the west end switch for WO2. The RCO Switchman was controlling the move west while seated in the cab of the lead locomotive CXST 2432, while the RCO Foreman was at the east end of one yard waiting for the last car to clear the switch for WO2. When the last car cleared, the RCO foreman told the controlling RCO by radio to stop. The train had stopped west of the WO2 switch and the RCO foreman lined the switch for WO2 and radioed clearance to proceed back for a distance of about 100 cars. The movement on #1 yard was on level, tangent track with a descending grade into track WO2 in the classification yard.

The Accident:
The RCO controlling the move from the lead locomotive CSXT2432 started east at a speed of 6 mph according to the locomotive event recorder. After the cars started back on WO2 the RCO foreman got in his All Terrain Vehicle(ATV) and drove down to the car shop area to crossover the yard to direct the movement back. As the RCO foreman got out of his ATV, he lost communication between his OCU and the LCU on the locomotive. A penalty full service brake application was initiated to both locomotives and the twelve lead cars with a charged air system on the west end. When the train stopped a knuckle broke between the 33rd car and the 34th car causing the east 61 cars to keep rolling east on track WO2. The separation occurred on level, tangent track, although the majority of the cars were on a descending grade. As the 61 cars proceeded to roll east on WO2 for a mile, they gained speed estimated to be between 15 and 20 mph.

The RCO's regained communication with the LCU after a few seconds and they reset their OCU's and proceeded with the east move without knowing that a separation had occurred. An outbound road crew Q353-30 reported to the yardmaster that the train on WO2 was separated in two pieces and one of the cars had broken coupler knuckle. Five cars had just been humped to WO3 and were not in the clear at the east end of WO3 switch.

A collision occurred when the east car of the 61 car cut, HARX 1018 struck car CSXT 252122 on WO3 sending HARX 1018 towards W01. This started a general pile up towards #2 main track which was occupied with a standing block of cars from intermodal train Q130-29. The momentum of this collision resulted in car SOU 530313 being shoved into the Q130-29, deraling the first east unit of articulated car TTXX 553348, also dislodging container ECMU 161677 on the west unit of the first car TTXX 780310 and sending it onto #1 Main track

Total equipment damages were set at $ 282,431 and total of $55,000 for track.

Analysis and Conclusions:

CSX Transportation at Cumberland, MD uses a remote control system that is manufactured by Cattron-Theimeg™. The two main components of this operating

system are the: Operator Control Unit and the Locomotive Control unit.
The Operator Control Unit is a portable radio remote control unit worn by the employee to control locomotive operations. It interfaces with the locomotive through a micro-computer electronic unit that "relays" command signals from the controller to the locomotive.
The Locomotive Control Unit is located on a remote control locomotive. The LCU responds to commands from the OCU and "relays" them to the locomotive's control system to cause the locomotive to move, adjust speed, or stop movement as directed by the OCU operator.
The LCU is designed in such a way that its default function is to keep the locomotive from moving or to stop locomotive movement. The OCU must send specific commands to the locomotive in normal switching and train operations.

Whenever a communication loss occurs while the locomotive is moving, a full service penalty will be initiated. A full service penalty consists of the throttle returning to idle, a full application of the locomotive independent brake, and a full service brake pipe reduction.
Some causes of communication loss are: when the remote control operator occupies a motor vehicle, goes inside a building, is out of range with the RCL, and when repeaters are used the RCO is in a communication zone other than the zone where the RCL is operating.

The CSX Communication Department and Cattron-Theimeg™ did joint testing of the radio signals the week of June 6th in the Cumberland yard to determine if any interference was causing some of the signal losses that were occurring periodically in the yard. They installed event recorders on the LCU of all RCL locomotives in the yard to verify any loss of communication between the LCU's and the OCU's.

The results of CSX Communication Department and Cattron-Theimg™ testing in Cumberland yard concluded that the communication repeater at the west end of the yard near Virginia Avenue had a low Radio Frequency coverage. The repeater may have been hit by lightning at some point, which later was found to have a burnt out duplexer. They also concluded that the repeater zone (#1) at Virginia Avenue and repeater zone(#2) at the hump were coinciding a little too much. The zones were coinciding near the car shop area where some of the communication losses were occurring.

To correct the communication losses in the yard CSX replaced the communication repeater at Virginia Avenue, raise both communication towers additional thirty feet in height and relocate the communication tower at the hump farther east to revise the zones. The estimated time for the planned improvements barring weather conditions is July 30, 2005. Additional testing of the radio frequency coverage is planned after the improvements have been made.

Inspection of the locomotives revealed all systems were functioning properly and were in compliance according to Federal regulations. The locomotive event recorder was operating and did verify the speed of the train at the time of the accident.. The remote control system on the locomotives functioned as designed when a loss of communication occurs.

No Post Accident Toxicological Tests were preformed on train crew Y19030.

Conclusions:

After lining the switch, the RCO Foreman instructed the RCO Switchman to control the shove move from the lead locomotive. Normally the Foreman would control the move from his end so that he could directly observe the entire movement. The Foreman, in this case, did not gain control of the move because he was driving a ATV to the location of the coupling. The railroad requires that an employee driving a vehicle cannot be in control of a remote control locomotive.

Through interviews, it was discovered that a loss of communication of the remote control equipment occurs frequently in this yard, especially near the high power lines at the car shop. The Foreman knew he would be driving his ATV through the area of the high power lines while the shove move was taking place.

After the loss of communication, and the subsequent full service application of the air brakes on the locomotives and the head twelve cars, the remote operators control units regained communication automatically within a few seconds, which is normal. After communication was restored, the Switchman immediately began the movement as originally instructed. At no time did the Foreman or the Switchman discuss the incident verbally.

Probable Cause

The FRA determined that the accident occurred because of the communication loss between the remote control operator unit and the remote locomotive control unit. This initiated a system penalty brake application on both remote controlled locomotives and the twelve cars with charged air brake. The brake application resulted in the train stopping abruptly causing the knuckle to break on the 33rd car, which subsequently caused 61 cars to roll freely.