

Federal Railroad Administration Office of Safety Headquarters Assigned Accident Investigation Report HQ-2005-76

> Union Pacific (UP) Hanna, Wyoming September 10, 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.



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DEPARTMENT OF TRANSPORTATION       FRA FACTUAL RAILROAD ACCIDENT REPORT       FRA File # HQ-2005-76         FEDERAL RAILROAD ADMINISTRATION       FRA FACTUAL RAILROAD ACCIDENT REPORT       FRA File # HQ-2005-76																				
1.Name of Railroad O	1a. Alphabetic Code 1b UP					1b. 1	b. Railroad Accident/Incident No. 0905DV008													
2.Name of Railroad C	2a.	2a. Alphabetic Code   2b.					. Railroad Accident/Incident													
Union Pacific RR (	UP						N/A													
3.Name of Railroad R	3a.	3a. Alphabetic Code   3b.						Acciden	t/Incio	lent No.										
Union Pacific RR C		UP						0905D	V008											
4. U.S. DOI_AAR G		ssing ident	meau	on Nun	liber		5. L	5. Date of Accident/Incident 6. 7						cident/	Incide	ent				
		09		10	2005		04:20: AM 🖌 PM													
7. Type of Accident/I		7.	Hwy-rail crossing 10. Explosion-detonation 13. Other																	
(single entry in co	de box)	2. Head of	on coll	ision	5. Raking	g collisior	1	8.	9 Obstruction 12 Other impacts narrative)											
	6. Broke	ollision	9.	Obstructio	on	12.	Other in	npacts	pacts 0											
8. Cars Carrying		9. HAZMA	rs ed		10. Cars	Releasin T	g	g 11. Pe					12. Division							
0	0 Damaged/Deraned					0				L.	cuated			0	Denver					
13. Nearest City/Tow	/n				14. Milepost					15. Sta	5. State Abbr Code			. County						
	I	Hanna			(to nea			enth) 643.7	7		N/A	WY	, Z		CARBON					
17. Temperature (F)		18. Visit	oility	(sing	gle entry)	Code	19 W	Veath	er (single	e entrv)			de	20 Typ	) Type of Track			Code		
(specify if minus)	)	1.	Dawn	3.D	lusk	2	1	. Clea	ar 3. Ra	ain 5	.Sleet		uc	1. M	Main 3. Siding			cour		
70	F	2.	Day	4.I	Dark		2	. Clo	udy 4. Fo	og (	6.Snow		1	2. Yard 4. Industry			stry	1		
21. Track Name/Num	ber				22. FRA Track				Code	23. Ar	Annual Track Density			24. Time Table Dir			ction	Code		
		Mai	in Tra	ck No	2	Clas	SS (1-9, A	) 	4	(g m	ross tons i illions)	in	80		1. Nort	in 3.	East	3		
ODED ATING TO AIN #1																				
OPERATING TRAIN #1																				
Consist (single er	11.	spee. Mo	W Lqui	p. code	A	ttended?		Joue												
	3.	. Commute	r train	6. Cu	t of cars 9.	ispect.ca	r			1. Yes	2. No 1 CCOTSH05									
28. Speed (recorded	speed, if	available)	Cod	e 30.	. Method(s)	of Operati	on (	ente	r code(s)	that ap	oply)			30a. Rem	otely C	ontro	lled Loco	omotive?		
R - Recorded	atic t	block m.Special instructions					0 = Not a20500001 y to Wested													
E - Estimated	uble/ti	rain orders	n. Our	itive train	control		1 = Remote control portable 2 = Remote control tower													
29. Trailing Tons	. Track w	arran	nt control	p. Oth	er (Specif	fv in na	rative)	$v_{e}$ 3 = Remote control												
excluding power units) e. Traffic k. Direc									c control		Code(s	s)	i uuve)	transmi	itter - m	ore th	an one			
14408 f. Interlocking 1. Yard limits e N/A N/A N/A N/A remote control transmitter 0													0							
31. Principal Car/Unit	t	a. Initial	and N	umber	b. Positio	on in Train	n c. I	Loade	ed(yes/no)	32. If	railroad e	employe	e(s) teste	ed for drug	g/alcoho	ol use.		•		
(1) First involved			NI/A			20			Vac		enter the n	number	that were	positive i	Drugs					
(derailed, struck, e	etc)		IN/A			39			yes	1	the approp	oriate bo	ox.				0	0		
(2) Causing (if med	chanical	l UF	<b>2</b> 841	4	39				yes 33. Was th			consist	ransporti	ing passen	Y/N)		N			
34 Locomotive Units	Mid 7	Mid Train Rear F				35 Car	·			Lo	aded	Empty								
		End b. N		anual	c. Remote	d. Manua	l c. Rer	note	55. Cui	5			. Freight	b. Pass.	c. Fre	ight	d. Pass.	e. Caboose		
(1) Total in Trair	n	3		0 0		0	0		(1) Total	in Equ	pment Co	onsist	105	0	0	)	0	0		
(2) Total Deraile	(2) Total Derailed			0	0	0	0		(2) Total Derailed		ailed		40	0	(	5	0	0		
36. Equipment Damage				37. Track, Signal, W		Vay,			38. Primar		y Cause			39. Cont	ributing	g Cau	se			
This Consist	I	1427790		&	& Structure Damage 15775				Code	5C	Code N/A									
Number of Crew Members									Length of Time on Duty											
40. Engineer/	41. Firemen			42. Co	onductors	43. Br	akemen		44. Engi	Operator			45. Conductor							
N/A	/A 0				1	0				Hrs	Hrs 1		50		Н	Irs	1	Mi 50		
Casualties to:	46. Railı	road Emplo	oyees	47. Tra	in Passenger	s 48. 0	Other	49. EOT Device?						50. Was EOT Device Properly Armed?						
Fatal		0			0		0		1. Y	1	1. Yes 2. No 1									
						_			51. Caboose Occup			Occupied by Crew?								
Nonfatal N/A					0 0				1. Yes					. No N/A						
OPERATING TRAIN #2																				
52. Type of Equipment 1. Freight train 4. Work train 7. Yard/switching A. Spec. MoW Equip. Code 53. Was Equipment Code 54. Train Number/Symbol																				
Consist (single entry) 2. Passenger train 5. Single car 8. Light loco(s									Att											
55 Sport	3.	Commute	r train	6. Cu	t of cars 9.	Maint./in	spect.car	r act	n oo 1-7 \	th-t	N/A		1. Yes	2. No	otale C	ort	1N/P	motival		
R - Recorded									i code(s)		0 = Not a remotely controlled									
E - Estimated	N/A	MPH	N/A	а. ь	AICS	aue t t of t	of traffic n. Other than main track					1 = Remote control portable								
				0	. muo nami	Jonuol I										r				

DEPARTME FEDERAL R	ENT OF AILROA	TRAN AD AD	ISPORT MINIST	FATI FRAT	ON TION	FRA F.	ACTUA	L RAIL	ROAD A	ACC	CID	ENT I	REPO	ORT	F	RA File #	<u>HQ-200</u>	5-76		
56. Trailing Tons (gross tonnage, excluding power units)					c. d. e.	Auto trai Cab Traffic	e/train order ant control ffic control	in orders o. Positive train control control p. Other (Specify in narrative) Code(s)					2 = Remo 3 = Remo transmit remote c	N/A						
50 Deinsteal Conflict					f.	Interlockin	g 1	.Yard limits		1	N/A	N/A	N/A	N/A N/A		IN/A				
58. Principal Car/Unit a. Initial and Nui					Number	b. Posit	ion in Trai	in c. Lo	aded(yes/no	)	59. If	railroac	i emplo	oyee(s) teste er that were	ed for drug positive i	g/alcohol us	se,	Druge		
(1) First involved N/A (derailed, struck, etc)							N/A		N/A	the appropriate box.						N/A				
(2) Causing (if mechanical cause reported) N/A							N/A		N/A	60. Was this consist transporting passengers? (Y/N)								N/A		
61. Locomotive	Units a. Head End b. Ma			Mid ' Ianual	Train c. Remote	Re d. Manua	ear End	62. Ca	62. Cars L a. Freigh					oaded Empty t b. Pass. c. Freight d. P			e. Caboose			
(1) Total in Train N/A			N/A	N/A N/A		N/A	N/A	N/A N/A		(1) Total in Equi			quipment Consist N/A			N/A	N/A	N/A		
(2) Total D	erailed	railed N/A N		N/A	A N/A		N/A	(2) Tota	(2) Total Derailed				N/A	N/A	N/A	N/A	N/A			
63. Equipment D This Consi	Damage ist	e   6			64. Tra & \$	ack, Signal, Structure D	Way, amage	N/A	65. Prir Code	65. Primary Cau Code			N/2	4	66. Contr Code	N/A				
		1	Numbe	r of C	Crew Me	mbers	5 1					1		Length of	Time on D	uty				
67. Engineer/	6	8. Firei	nen		69. Co	nductors	70. Bi	rakemen	71. Eng	ginee	er/Ope	erator			72. Con	ductor				
Operators	N/	N/A				N/A		N/A		Н	Irs	N/A	M	i N/A	Hrs N/A			Mi N/A		
Casualties to	. <b>A</b> 73.	. Railro	ad Empl	oyees	74. Tra	in Passenge	rs 75. Ot	her	76. EO	De	vice?				77. Was	Armed?				
Fatal			N/A			N/A		N/A		1. Yes 2. No N/A						1. Yes 2. No				
Nonfatal			N/A			N/A		N/A	_ 78. Cal	boos	e Occ 1. Y	upied b es	y Crew	v? 2. No				N/A		
							Rail I	Equipment	t Involved	d										
79. Type	I. Other	Motor Val	iala	Code	83. Equ	83. Equipment														
A. Auto D. Pi B. Truck E. Va	icle	1.Train(units pulling)     4.Car(s) (moving)     7.Light(s) (standing)       N/A     2.Train(units pushing)     5.Car(s) (standing)     8.Other (specify in parrative)										N/A								
80. Vehicle Sp	ical)	Code	84. Posi	84. Position of Car Unit in Train																
(est. MPH at impact) N/A 1.North 2.South 3.East 4.West N/A										N/A										
82. Position				Code	85. Circ	ums Equ	tance	nt Struc	k High	way Usar				Code						
4. Trapped	r Crossing	N/A	2. Rail	Equ	ipme	nt Struc	k by H	lighway Use	er			N/A								
86a. Was the h		Code	86b. Wa	as the	ere a l	hazardo	us mat	erials releas	se by			Code								
in the imp	act transp	porting	hazardou	is ma	terials?	4 37 14		I N/A	1. H	ghw	av Us	ser 2.	Rail F	auipment	3. Both	<ol> <li>Neithe</li> </ol>	r	N/A		
1. Highway User     2. Rail Equipment     3. Both     4. Neither       N/A     1. Highway User     2. Rail Equipment     5. Both       86c. State here the name and quantity of the bazardous materials released if any															10/1					
obe. Blate here u	ne nume i	una qui	unity of	ine nu	Zuruous	inderidis i	neuseu, n	N/A												
87. Type of	87. Type of 1.Gates 4.Wig Wags 7.Crossbucks 10.Flagged by crew 88. Signaled Crossing Warning Code 89. Whistle Ban															Code				
Crossing 2.Cantilever FLS 5.Hwy. traffic signals 8.Stop signs Warning 2.Stop double FLS C. Audible 0.West									ec. in narr.)		(Se	e instru	ctions	for codes)		es D				
Code(s)	N/A	N	V/A	N/.	A	N/A	N/A	N/A	I/A N/A N/A 3. Unknown							ıknown	N/A			
90. Location of 1. Both Side	f Warning Code						91. Cross with	ing Warnin Highway S	i g Interconn Signals	ected	d Code 92. Crossin Light			Crossing Illu Lights or S	uminated b pecial Ligi	Code				
2. Side of Vehicle Approach								1. Yes						1. Yes						
3. Opposite Side of Vehicle Approach						N/A		N/A 2. INO 3. Unknown								N/A				
93. Driver's 94. Driver's Gender Code 95. Drive							Behind or	Train C	ain Code 96. Driver						ha Gata di Gi di Gi					
Age N/A	Age 1. Male N/A 2. Female N/A					and Struck or was Struck by Second I1. Yes2. No3. Unknown				2. Stopped and then Proceeded         5. Other (specify in narrative)           N/A         3. Did not Stop							N/A			
97. Driver Passed Standing Code 98. View of Track Obscured by (primary obstruction)											Code									
Highway Vehicle     1. Permanent Structure     3. Passing Train     5. Vegetation     7. Other     (specify in narrative)       1. Yes     2. No     3. Unknown     N/A     2. Standing Railroad Equipment     4. Topography     6. Highway Vehicle     8. Not obstructed														N/A						
101. Casulties to Highway-Rail							99. Drive	r Was	ograpity	Code 100. Wa					Driver in th	Code				
Crossing Users Killed					d	Injured	1. Killed	1 2.Injured	3. Uninjured	l	N/A 1.			1. Ye	es	N/A				
				N/A		N/A	102. High	le Property	Property Damage 103. Total Number of Highway-Rail Cr e) N/A (include driver)						Rail Cross	ing Users				
104. Locomotive	e Auxilia	ry Ligh	ts?				(est.	Code	105. Lo	com	otive	Auxilia	ry Ligi	nts Operatio	mal?		N/A	Code		
1. Ye	es		2. No	)				N/A		1. Y	es			2. No				N/A		
106. Locomotive Headlight Illuminated?								Code	Code 107. Locomotive Audible Warning Sounded?						Code					
1. Yes 2. No										1. Yes 2. No							N/A			

108. DRAW A SKETCH OF ACCIDENT AREA INCLUDING ALL TRACKS, SIGNALS, SWITCHES, STRUCTURES, OBJECTS, ETC., INVOLVED. 76.bmp



## 109. SYNOPSIS OF THE ACCIDENT

A loaded Union Pacific Railroad Company (UP) coal train derailed while traveling eastward on the UP Laramie Subdivision, part of the Denver Service Unit, 41 miles east of Rawlins, Wyoming, in Carbon County. The accident occurred on main Track No. 2 at UP Milepost (MP) 643.7 on September 10, 2005, at 4:20 p.m., Mountain Daylight Time (MDT).

Train Symbol CCOTSH-05 came to a stop following a tug, and an immediate undesired emergency brake application. Upon inspection, it was discovered that a total of 40 cars had derailed starting with the 39th through the 78th head cars. Main Track Nos. 1 and 2, and two side tracks were damaged. There were no injuries reported by the two-person crew, no hazardous materials involved, and no evacuations were required. Approximate monetary damages are \$1,427,790 to the train consist and \$1,587,755 to the track.

The train was being operated under Centralized Traffic Control (CTC), at a speed of 50 mph when the train experienced an undesired emergency brake application, as recorded by the event recorder of the controlling Locomotive No. UP 7125. The maximum operating speed for a loaded coal train at this location is 50 mph. The maximum allowed track speed at this location is 60 mph, as designated by the current UP Timetable No. 2, (Effective October 27, 2002).

At the time of derailment, it was daylight, clear, and the temperature was 70 oF.

The cause of the accident was due to a broken side frame on the B-end, left side (BL) truck of Car No. UP 28414.

## 110. NARRATIVE

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

Circumstances Prior to the Accident

The two-person crew of UP Train Symbol CCOTSH-5 included a locomotive engineer and a conductor. They first went on duty at 2:30 p.m., MDT, September 10, 2005, at the UP Yard in Rawlins. Each crew member received more than the statutory, off-duty period prior to reporting for duty at Rawlins. The engineer had received14 hours 15 minutes and the conductor, 14 hours 40 minutes.

The assigned freight train consisted of 3 locomotives and 104 loaded coal cars. The train was 5,845 feet in length and weighed 14,408 tons. The scheduled route of the loaded coal train was from Provo, Utah, to Cheyenne, Wyoming, and then to points east for unloading. The last Class 1 (Initial Terminal) brake test was performed at Provo, Utah, on September 5, 2005. Testing of the end-of-train device was conducted at Provo on the same date, prior to departure. These tests were conducted successfully by UP mechanical personnel.

The conductor stated that he and his engineer departed Rawlins with their train at 3:20 p.m., with Locomotive No. UP 7125 as the lead unit. The conductor also stated that the train passed two hot box/dragging equipment detectors at MP 672.9 and MP 650.2, and they did not receive a negative response from either detector. All indications from the crew, based on interviews performed by Federal Railroad Administration (FRA), revealed that the trip was uneventful prior to the derailment.

As the eastbound train approached the derailment site, both crew members were present in the control compartment of the lead locomotive. The engineer was positioned on the south side of the locomotive at the controls and the conductor was positioned in the conductor's seat on the north side of the locomotive.

In this area of the railroad, as Main Track No. 2 approaches the point of derailment (POD) at UP Milepost 643.7, there is a 2-degree 03-minute right-hand curve on a 0.082 percent descending grade.

The railroad timetable direction of the train was east. The geographic direction was also east. Timetable directions are used throughout this report.

#### The Accident

The train was being operated at speeds between 43 and 50 mph approaching the accident area. At the time the derailment occurred the train was being operated at 50 mph. Both speeds were recorded by the event recorder of controlling Locomotive No. UP 7125. The maximum authorized speed for loaded unit coal trains in this area is 50 mph, as designated in UP System Special Instructions, effective April 3, 2005, and as indicated on the train list for the crew of the CCOTSH-10, dated September 10, 2005. The maximum track speed for freight trains in this area is 60 mph as designated in the current UP North Platte Area Timetable No. 2, Effective October 27, 2002.

The train crew stated that they felt a tug or a slight jerk after the train proceeded over the switches at West Hanna near UP Milepost 643, and the train then experienced an undesired emergency brake application. The train came to a stop with the lead locomotive at UP Milepost 642. It was at this time that the crew observed large amounts of dust toward the rear of the train. The conductor walked back toward the dust cloud and observed derailed cars covering main Tracks No. 1 and No. 2, as well as both side tracks. The conductor then radioed the engineer, who then notified the UP dispatcher of the derailment.

# FRA FACTUAL RAILROAD ACCIDENT REPORT

Initial investigation by railroad officials found the point of derailment to be at UP Milepost 643.7. Evidence at the scene indicated a broken side frame on the BL truck of the 39th head car, UP No. 28414, causing this car to derail. The side frame on this truck was cast by national Casting of Mexico in August of 1998. At this point, the following 39 cars began to derail, blocking and damaging main Track Nos. 1 and 2 and both sidings. There were no other vehicles or persons involved. The two-person crew did not report any injuries. There were no hazardous materials involved or evacuations required. Monetary damage estimates include \$1,427,790 to the train consist and \$1,587,755 to track. The portions of the broken side frame and truck were transported to the UP Laboratory in Omaha, Nebraska, for further examination.

Both the engineer and conductor were transported to Rawlins for mandatory FRA post accident drug and alcohol testing. The railroad conducted FRA post accident drug and alcohol testing on the two crew members following the derailment. All tests were negative.

The UP's emergency wreck clearing crews and an emergency wreck clearing contractor, were called to help with removal of the cars, grade work, and laying of the new track through the derailment site.

Analysis and Conclusions

Analysis

The UP investigation at the derailment site indicated a broken side frame on the BL truck of Car No. UP 28414, which was the 39th head car. The side frame of this truck was cast in Mexico by National Casting of Mexico in August 1998. This casting of trucks was utilized on all UP 28000 series of coal cars. Both broken segments of the truck frame were sent to the UP Laboratory in Omaha for analysis by Rail Sciences. According to the preliminary report from Rail Sciences to the UP, the hardness of the steel was at the lower end of the required hardness range, but met minimum Association of American Railroad (AAR) requirements. In addition, it was discovered there was a notable amount of chromium and copper in the steel casting. These elements are not specified in the AAR requirements.

The report concluded that the side frame failed due to a chill not being incorporated into the truck side frame casting. The chill, a round rod approximately 3/8 inch in diameter, should have been melted by the molten steel and incorporated into the truck casting. After the derailment, the UP ordered all cars, in the 28000 series of coal cars, held for inspection of these truck side frames.

### Conclusions

The railroad was in compliance with their own and all applicable Federal Standards. Laboratory analysis by Railroad Sciences and investigation by UP concluded that the derailment was a result of a broken side frame on the BL truck of Car No. UP 28414, due to a chill not being incorporated into the truck side frame casting.

Probable Cause and Contributing Factors

The FRA determined the probable cause of the accident was due to a broken side frame on the BL truck of Car No. UP 28414.