

**BROTHERHOOD OF LOCOMOTIVE ENGINEERS
AND TRAINMEN**

*A DIVISION OF THE RAIL CONFERENCE
INTERNATIONAL BROTHERHOOD OF TEAMSTERS*

SAFETY TASK FORCE

INDEPENDENCE, OHIO

BEFORE THE NATIONAL TRANSPORTATION SAFETY BOARD

NTSB Accident Number: RRD20LR005

Class: Regional

July 29, 2020

Proposed findings, probable cause, and safety recommendations, in connection with the derailment and subsequent partial fire of railcars on a Union Pacific Railroad (“UPRR”) mixed freight train near Tempe, Arizona on July 29, 2020

S. J. Bruno, BLET-Safety Task Force, National Chairman
J. Maynard, BLET-Safety Task Force, Party Spokesman

Final Submission

The Brotherhood of Locomotive Engineers and Trainmen (“BLET”), a division of the Rail Conference of the International Brotherhood of Teamsters (“IBT”), was assigned party status by the Board in the above-referenced investigation. BLET respectfully submits these proposed findings, probable cause, and safety recommendations to the Board for consideration.

ACCIDENT SYNOPSIS

On July 29, 2020 at approximately 6:06 AM (“MST”)¹, a westbound Union Pacific Railroad (“UPRR”) mixed freight train ² (MTUPX-29) derailed twelve (12) cars at Milepost (“MP”) 913.9 on the UPRR Phoenix Subdivision near Tempe, AZ. The train crew consisted of a Locomotive Engineer, a Conductor and a Brakeman. The territory where the accident occurred is single main track, controlled by track warrant control/automatic block system (“TWC/ABS”).³

The derailment occurred on the Tempe Town Lake Bridge, resulting in a bridge strike, fire and collapse of the first bridge span. The derailed cars included three (3) hazardous material tank cars of cyclohexanone,⁴ two of which fell from the bridge. Weather reports from the nearby Phoenix Sky Harbor International Airport reflected at the time of the derailment established the temperature was approximately 90° F with winds from the north to northwest at five (5) to eight (8) miles per hour (“MPH”). The skies were clear with a visibility of ten (10) miles. Damages are estimated at approximately \$8.5 million.

¹ All times throughout report will be Mountain Standard Time (“MST”).

² Mixed freight trains are also known as manifest trains. Unlike unit trains, which carry just one type of cargo in a single type of train car, mixed freight trains carry numerous different car types and cargo.

³ Track Warrant Control (“TWC”) is a method used to authorize train movements or protect men or machines on a Main track within specified limits in a territory designated by the timetable. An Automatic Block Signal System (“ABS”) is a series of consecutive blocks governed by block signals, cab signals, or both. The signals are activated by a train or by certain conditions that affect the use of the block.

⁴ Cyclohexanone is classified as a Class 3 flammable liquid, packing group III.



Figure 1 - Overview of derailment (Photo courtesy of CNN)

ACCIDENT NARRATIVE

On July 28, 2020, the crew for the UPRR train MTUPX-29 reported for duty at 9:05 PM at Tucson, AZ (UPRR Los Angeles Service Unit). According to post-accident interviews, the train crew reviewed their paperwork, assembled their train, and completed the required air tests in preparation for departure from the Tucson Yard. Their train was destined for Phoenix, AZ. At the time of departure, the train consisted of three (3) locomotives and 102 railcars.

While in route to Phoenix, the crew completed a delivery of six (6) cars to Western Emulsion in Randolph, AZ and picked up one (1) railcar. None of the hazardous railcars were set off at Western Emulsion. UPRR train MTUPX-29 from Randolph, AZ to Phoenix, AZ consisted of ninety-seven (97) railcars.

At approximately 6:04 AM, the MTUPX-29 was traveling at 22 MPH and was approaching the Temple Town Lake Bridge.⁵ According to crew interviews, the trip had been “uneventful” up to this point. After the leading portion of the train had crossed the Temple Town Lake Bridge, the train experienced an undesired emergency brake application (“UDE”) at approximately 6:06 AM.⁶

⁵ See Appendix 1. The maximum authorized speed (“MAS”) for this segment of track is twenty-five (25) MPH.

⁶ Undesired Emergency Application (“UDE”) – An emergency brake application of the train brakes not initiated by crew members. “Emergency” refers to the emergency application of a train’s air brakes. Emergency application of the

The train came to a stop, and the Brakeman began to inspect their train in compliance with UPRR rules regarding emergency application of the train's air brakes.⁷ While leaving the operating compartment to perform a visual inspection of the train, the Brakeman observed smoke on the other side of the freeway near the south end of the Tempe Town Lake Bridge and immediately informed the Conductor and continued his inspection of the train. Shortly after the UPRR Risk Management Communications Center ("RMCC")⁸ contacted the UPRR Train Dispatcher and informed him of a call from a local citizen that had reported that the train was derailed and on fire. After receiving this information, the Train Dispatcher called the crew via radio to notify them of the new information regarding their train. By this time, the Brakeman had reached the curve prior to the bridge and confirmed that the train was on fire. The Brakeman relayed a car number to the Conductor via radio, in order to verify which cars were on fire.

The train crew, assisted by a UPRR officer, separated the non-derailed equipment from the derailed equipment. The crew successfully salvaged the leading portion of the train, which included the train's locomotives and forty-eight (48) railcars, and moved the non-derailed equipment off of the Tempe Town Lake Bridge. Eventually, the crew secured the remaining portion of the train and were taken to a facility to provide body fluid samples for toxicology testing. After the toxicology samples were taken, the crew were interviewed by agents of the Federal Bureau of Investigation ("FBI") and the local Tempe, AZ police. The FBI secured the scene for the first two days while investigating possible criminal activity.

The derailment and subsequent fire caused the Tempe Town Lake Bridge to collapse onto the Rio Salado Parkway (*see figure 2*). The Parkway was shut down on account of debris, fire containment and hazardous material clean up. A relatively small area was evacuated. Air traffic from Phoenix Sky Harbor International Airport was diverted away from the area account heavy black smoke accumulation. Two emergency responders were treated and released from a local hospital for minor injuries.

brakes is caused by the rapid exhaust of the train's brake pipe air system. This action results in maximum braking effort on a train.

⁷ See Appendix 2 at the end of this report.

⁸ "RMCC" refers to the UPRR Risk Management Communications Center for reporting railroad-related emergencies, unusual or suspicious activity on railroad premises, and rough/damaged grade crossings.



Figure 2- Photo of Rio Salado Park way after bridge collapse (Photo courtesy of SMART-TD)

UP Rules and/or Documents for TY&E:⁹

- General Code of Operating Rules (“GCOR”), *effective 5/1/2020*
- UP Sunset Area Timetable No.5, *effective 5/10/2019*
- UP System Special Instructions, *effective 5/10/2019*
- UP Air Brake and Train Handling Rules, *effective 5/10/2019*

No additional information was provided regarding the documentation and/or rules in effect at this time of this accident.

Train Information:

At the time of the derailment, the MTUPX-29 consisted of three (3) locomotives (UP 7390, UP 7892, UP 3056) and 97 railcars (89 loads, 8 empties). The train was 6,895 feet in length, and weighed 11,194 tons.

⁹ Train, Yard and Engine employees.

Point of Derailment:

The point of derailment (“POD”) was estimated to be MP 913.9 and the general pileup of the twelve (12) derailed cars came to rest to the north of that approximate location (*see Figure 3 below*).



Figure 3 – Photo of derailed cars after fire was extinguished (Photo courtesy of SMART-TD)

UPRR Track and Geometry Rail testing leading up to the Point of Derailment:

Track inspection records establish that the rail was last geometry tested on 7/13/2020 and no significant defects were noted. A UPRR Track Inspector conducted the most recent physical track inspection on 7/28/2020 and no exceptions were reported.

UPRR Tempe Town Lake Bridge Inspection:

The Tempe Town Lake Bridge inspection records had multiple entries for inspection dates between 6/27/2020 and 7/13/2020. The following is an excerpt from the inspection records (*emphasis added*):

RAIL: 136 LB Continuously Welded
SPEED: 25 MPH (FREIGHT)
FRA CLAS: 4
ALIGN: TANGENT

NO GUARDRAIL ON BRIDGE SEGMENT TRACK - Status Date: 05/23/16

The UPRR had experienced a previous derailment at the Tempe Town Lake Bridge on 6/26/2020. UPRR reported that the cause of the derailment was a “wide gauge” condition.¹⁰ The location of the point of derailment was reported by UPRR to the Federal Railroad Administration (“FRA”) as MP 914.0.

Track Image Recorder (“TIR”):

A review of the UPRR 3390 locomotive’s TIR (on-board video recorder) revealed that a portion of the inner guard rail was present on the north end of the Temple Town Lake Bridge approach; however, the same type of inner guard rail construction was not present where the flare portion would have joined with the inner guard rails at the south end of the steel super structure. The inner guard rail construction had been missing from the south end of the structure for an extended period of time. The images did not reflect abnormalities of the track itself to the naked eye.

Toxicology:

Quest Laboratory conducted post-accident toxicology testing for the Locomotive Engineer, Conductor and Brakeman in accordance with federal regulations.¹¹ The results of the toxicology tests for all crew members were negative.

EMERGENCY RESPONSE

In post-accident interviews, the train crew stated that, after walking back to investigate the cause of the emergency application of the brakes, the Brakeman observed that the train was derailed and on fire. At this time, the Train Dispatcher was also notified of the train being on fire. The Train Dispatcher notified the crew members that the Tempe Fire Department was enroute.

¹⁰ “Wide gauge” refers to the distance between the top of the left and the right rail. If the distance is greater than 56.6 inches, it is deemed as “wide gauge”. This measurement is taken from 5/8 inch below the top of the rail.

¹¹ Quest Laboratory tested specimens for alcohol, amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, MDMA/MDA, methadone, opiates/opioids, phencyclidine, tramadol, brompheniramine, chlorpheniramine, diphenhydramine, doxylamine and pheniramine.

The following cars were derailed:

POSITION IN TRAIN	CAR NUMBER
49	NATX 160112
50	GATX 6479
51	TTZX 861493
52	TTZX 856969
53	TTZX 862290
54	TILX 540850
55	GACX 55605
56	TILX 540613
57	GATX 90208
58	ACFX 72540
59	DCBX 201081
60	GATX 1384

(Note: Highlighted car numbers indicate cars that were on fire during the derailment)

According to interviews, at no point did the Tempe Fire Department talk with the train crew to confirm information regarding the contents of the burning railcars. The Tempe Fire Department Dispatcher contacted the UPRR RMCC for information regarding the train’s consist and railcar contents. The Tempe Fire Department proceeded to fight the lumber fire on the railcars while a Hazardous Material team worked to contain the derailed railcars containing Cyclohexanone. The Hazardous Material team, along with the Tempe Police Department, also created a perimeter surrounding the accident.

PROBABLE CAUSE

The Brotherhood of Locomotive Engineers and Trainmen concludes that the probable cause of this accident and the derailment of twelve (12) railcars was the failure of the north rail at MP 914.0 due to compound fracture fissures. The derailment, led directly to the subsequent bridge strike and eventual partial bridge collapse.

PROPOSED RECOMMENDATIONS

TO THE UNION PACIFIC RAILROAD (“UPRR”):

1. Ensure compliance with existing UP Bridge Safety Management Program (“BSMP”) standards and procedures emphasizing inner guardrails on bridges spanning areas that are commonly occupied by citizens, or areas that would pose great risk to the environment.
2. Develop and implement a form of communication that encourages different departments to work together to assure that repairs are made completely and in a timely manner.
3. Develop and implement an emergency response plan for local municipalities that will facilitate a timely response to railroad related emergency situations. Within this plan, emphasize compliance with existing Instructions for Handling Hazardous Materials that includes a requirement to explain where to locate updated paperwork and car placement information.
4. Develop and implement an annual meeting for all federal, state and local agencies to train specifically for hazardous material derailments and spills. This training would include emergency response procedures for all involved parties.

TO THE FEDERAL RAILROAD ADMINISTRATION (“FRA”):

1. Continue to develop and implement new tank car design and construction to ensure added safety in case of derailment and fire.
2. Propose and issue new rules requiring inner guardrails be mandatory on bridges spanning areas that are commonly occupied by citizens, or areas that would pose great risk to the environment. In addition, take necessary steps to ensure that proposed and existing rules are enforced and standards are met.
3. Propose and issue new rule making mandating the use of two-person crews on all trains transporting hazardous materials.
4. Propose and establish a uniform process for Emergency responders responding to railroad emergencies and hazardous material spills. Within this process, emphasize compliance with existing Instructions for Handling Hazardous Materials that includes a requirement to explain where to locate updated paperwork and car placement information.

CERTIFICATE OF SERVICE

I certify that I have on this date, August 10, 2021 electronically served upon Mr. Richard Hip-kind (hipskind@ntsb.gov), Investigator in Charge RRD20LR005, a complete and accurate copy of these proposed findings regarding the derailment and subsequent fire occurring on the UPRR property on July 29, 2020, near Tempe, Arizona. An electronic copy of same was also forwarded to the individuals listed below in this certificate of service, as required by 49 CFR § 845.27 (Proposed Findings).

Mr. Richard Hipkind
Investigator-in-Charge, RRD20LR005
National Transportation Safety Board
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Sincerely yours,



Stephen J. Bruno
Brotherhood of Locomotive Engineers & Trainmen
National Secretary-Treasurer
National Chairman, Safety Task Force
7061 East Pleasant Valley Road
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Appendix 1

PHOENIX SUBDIVISION (0685)

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		Radio Display:					
		Picacho to CP PX962 - 014-014 '65 CP PX962 to MP 802.8 - 045-045 '65					
Mile Post	Track Layout	Rule 6.3	CP #s	WEST Stations/Control Points	EAST Stations/Control Points	Sta. #s	Siding Capacity
979.7		CTC	SP937	WEST PICACHO (0.4)			
979.3				PICACHO WYE (1.7)	T		
977.5		TWC ABS	PX979 PX977	CP PX977 (Hold) (15.2)			
962.4				PX962 COOLIDGE (12.9)		LB377	
949.5 948.3				MAGMA (11.6)		LB389	
937.9 936.2				GERMANN (26.0)		LB400	8207
911.9 910.8				KENDALL (5.9)		LB427	5383
906.0				PHOENIX (0.6)	BTY	LB432	
905.4				BNSF CROSSING (11.9)	(X)		
893.5 892.5				CASHION (17.5)		LB445	4825
876.0 875.2				BUCKEYE (14.4)		LB462	3707
861.6 860.8				ARLINGTON (39.7)	T	LB476	3628
821.9 822.3	HYDER (19.1)		LB515	3688			
802.8	END OF MAIN TRACK						
(176.9)							
SI-01 MAIN TRACK AUTHORITY							
CTC between: CP SP937 and CP PX962; CP SP936 and CP PX979 (west leg Picacho wye). ABS between: MP 962.4 and MP 802.8. TWC between: MP 962.4 and MP 911.0; MP 899.0 and MP 802.8. Yard Limits between: MP 911.0 and MP 899.0.							
SI-02 MAXIMUM SPEED TABLE							
Maximum Speed				MPH			
Between Mileposts							
979.7 and 802.8							
(Except as Below)							
979.7 and 979.3				25			
959.5 and 956.5				40			
924.2 and 922.1				40			
922.1 and 921.8				20			
921.8 and 920.8				25			
920.8 and 915.8				40			
915.8 and 912.7				25			
912.7 and 908.2				40			
908.2 and 904.7				20			
904.7 and 901.7				25			
901.7 and 858.6				40			
858.6 and 802.8				10			
SI-03 OTHER SPEED RESTRICTIONS							
Maximum Speed				MPH			
1. Thru Sidings & Turnouts.							
All sidings				10			
2. Dual Control Switch Turnouts.							
3. Misc. Speed Restrictions.							
All movements within Palo Verde Power Plant with locomotive bell ringing ... 5							
Picacho: west leg of wye				10			
Magma: Copper Basin and Magma RR yard tracks and west lead between tracks							
602 and 604				5			
Campo: Yard 5-all curves in tracks							
113, 720, 736, 745 & 760				5			
4. Key Trains: Crude Oil / High Hazard Flammable							
Between Mileposts							
MP 949.0 and MP 878.0				40			
SI-04 MAIN TRACK DESIGNATIONS							
Main Track out of service between MP 858.6 and MP 802.8. Any movement between these limits must be under the supervision of Maintenance of Way employee(s) and track inspected prior to use.							
SI-05 MILEPOST EQUATIONS							
Phoenix Sub. MP 979.69 - MP 936.68 Gila Sub.							
MP 958.42 - MP 957.09							
MP 924.20 - MP 924.18							
SI-06 RCL OPERATIONS							
Remote Control Area:							
All tracks between MP 911.0 and MP 899.0.							
Remote Control Zones:							
For all Phoenix Yard Zone Status Contact: Phoenix Yardmaster. Channel: 066-066							
See Superintendent Bulletin for detailed RCL operation information.							
Zone 1: Starting at the west fouling point of the 131 switch, eastward to the fouling point of track 001.							
Zone 1A: Starting at track 760 (work lead), at the west fouling point of the 14 switch, eastward to the west fouling point of the 131 switch to include the west fouling points of all inside track switches.							
Note: Zone 1A may only be established in conjunction with Zone 1 and/or Zone 4.							
Zone 2: Track 131 beginning at the fouling point west of the 19 switch (run around track), westward to and including the west fouling points of the Auto Facility and support tracks (132, 781-791, 872-874).							
Zone 3: Begins at the fouling point west of the 14 switch, westward down the freight lead to a point east of fouling 4th Street.							
Zone 4: Starting at east fouling point of the 760 crossover, eastward on track 001, to fouling point of 760 lead (work lead).							
SI-07 ITEM 13 TRAIN DEFECT DETECTORS							
± 975.8		± 937.8		± 880.0			
± 975.6		± 931.9		(#+) 874.3			
(#+) 969.9		(#+) 927.5		(#+) 836.5			
(#+) 953.0		(#+) 911.0		(#+) 816.5			
(#+) 941.6		± 899.0		± 808.9			
± 939.5		(#+) 890.5					

SUNSET Area Timetable No. 5 - Effective: 05/10/2019

Appendix 2

6-12 GCOR—Eighth Edition—April 1, 2020

6.21.2 Water Above Rail

Do not operate trains and engines over tracks submerged in water until the track has been inspected and verified as safe.

Operate engines at 5 MPH or less when water is above the top of the rail. If water is more than 3 inches above the top of the rail, a mechanical department supervisor must authorize the movement.

6.21.3 Track Obstruction / Unusual Conditions

When a train is advised in the words, "Between (location) and (location) be governed by Rule 6.21.3", within the specified limits train must move as directed in the special instructions.

6.22 Maintaining Control of Train or Engine

Crew members must consider train or engine speed, grade conditions, and air gauge indications to determine that the train or engine is being handled safely and is under control. If necessary, take immediate action to bring the train or engine under control.

6.23 Emergency Stop, Severe Slack Action, or Actuation of Shifted Load or Dragging Equipment Detector

When a train or engine is stopped by an emergency application of the brakes, severe slack action occurs while stopping, or a train actuates a shifted load or dragging equipment detector take the following actions:

Obstruction of Main Track or Controlled Siding

If an adjacent main track or controlled siding may be obstructed, immediately:

- Warn other trains by radio, stating the exact location and status of the train and repeat as necessary.
- Place lighted fusees on adjacent tracks.
- Notify the train dispatcher or control operator and, when possible, foreign line railroads if necessary.

Warning to other movements is no longer necessary when:

- It is known adjacent tracks are not obstructed.

or

- The train dispatcher or control operator advises the crew that protection is provided on adjacent tracks.

Inspection of Cars and Units

- All cars, units, equipment, and track must be inspected as outlined in the:
 - Special Instructions.
 - Air Brake and Train Handling Rules.

Train on Adjacent Track

A train on an adjacent track that receives radio notification must pass the location specified at restricted speed and stop short of any portion of the stopped train fouling their track. When advised that the track is clear and it is safe to proceed, this restriction no longer applies.

6.24 Movement on Double Track

On double track, trains must keep to the right unless otherwise instructed.