



**SURVIVAL FACTORS and VEHICLE GROUP CHAIRMAN'S
FACTUAL REPORT**

Miami, FL

HWY18MH009

(10 pages)

**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C.**

**SURVIVAL FACTORS and VEHICLE GROUP CHAIRMAN'S
FACTUAL REPORT**

A. SURVIVAL FACTORS GROUP

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B. BRIDGE COLLAPSE SUMMARY

The date of the bridge collapse was March 15, 2018 and the NTSB # is HWY18MH009.

For a summary of the bridge collapse, refer to the Preliminary Reports and Updates that have been issued for this investigation.

C. DETAILS OF THE SURVIVAL AND VEHICLE FACTORS INVESTIGATION

The Survival and Vehicle Factors investigation collected limited evidence pertaining to the vehicles, the occupants, and the emergency response. Detailed inspections of the vehicles or injuries were not conducted as they were not causal to the incident, and the vehicles and bridge were not designed to be survivable in the event of a collapse. Basic documentation is provided. The emergency response was documented.

1. Vehicles and Vehicle Occupants Involved

There were 8 vehicles involved in the bridge collapse, 7 of which were occupied. The following sections summarize the vehicles, the occupants, and injuries that were involved. Further information about the location of vehicles relative to the bridge collapse is available in the Bridge Factors Group Chairman's Factual Report.¹ Figure 1 provides a diagram of the scene with the vehicle reference numbers. The following sections provide further information according to the vehicle reference numbers.

¹ Available in the accident docket.

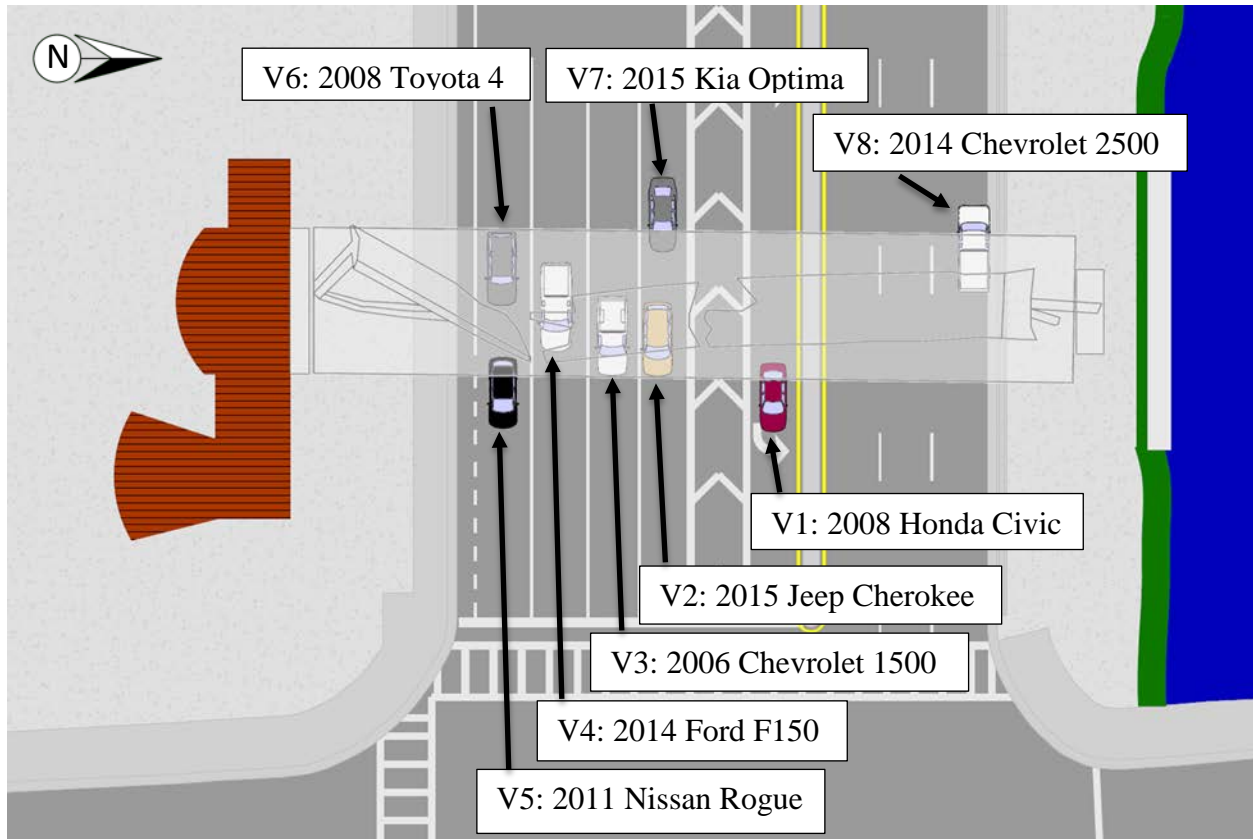


Figure 1. Scene Diagram with Vehicle Reference Numbers

1.1. 2008 Honda Civic

The Honda Civic was traveling eastbound on SW 8th street at the time of the collapse. The vehicle was partially crushed by falling debris, and was found on the east side of the collapsed bridge with the back portion of the vehicle crushed. The Honda was occupied by the driver, who was able to evacuate the vehicle. The driver was a 22 year old female. She was transported to Kendal Regional Medical Center by Miami-Dade Ambulance Service unit 142 and suffered minor injuries. She noted that the bridge collapsed onto the back of her car, and the roof of the car hit her head. She was treated for head, neck and back pain.

1.2. 2015 Jeep Cherokee

The Jeep Cherokee was traveling eastbound on SW 8th street at the time of the collapse. The vehicle was crushed by falling debris, and was found on the east side of the collapsed bridge. The Jeep was occupied by the 60 year old male driver, who was fatally injured. An autopsy was performed, case 2018-0079. The cause of death was blunt trauma. There were blunt injuries to the head and torso, and abrasions and contusions of skin and extremities.

1.3. 2006 Chevrolet 1500 Pickup

The Chevrolet 1500 pickup was traveling eastbound on SW 8th street at the time of the collapse. The vehicle was crushed by falling debris, and was found on the east side of the collapsed

bridge. The Chevrolet pickup was occupied by a 53 year old male driver and a 57 year old male passenger. Both were fatally injured. Autopsies were performed on the driver and passenger, cases 2018-0080 and 2018-81 respectively.

The cause of death for the driver was blunt trauma. There were blunt injuries to the head and extremities. The cause of death for the passenger was blunt trauma. There were blunt injuries to the head, torso and extremities.

1.4. 2014 Ford F150 Pickup

The Ford pickup was traveling eastbound on SW 8th street at the time of the collapse. The vehicle was crushed by falling debris, and was found on the east side of the collapsed bridge. The Ford was occupied by the 39 year old male driver, who was fatally injured. An autopsy was performed, case 2018-0089. The cause of death was blunt trauma. There were blunt injuries to the head and neck, torso, and extremities.

1.5. 2011 Nissan Rogue

The Nissan Rogue was traveling eastbound on SW 8th street at the time of the collapse. The rear of the vehicle was crushed by falling debris, and was found on the east side of the collapsed bridge. The Nissan was occupied by a 32 year old female driver. She was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R23. She suffered minor injuries including concussion without loss of consciousness, lumbar spine pain, and anxiety.

1.6. 2008 Toyota 4 Runner

The Toyota 4 Runner was traveling eastbound on SW 8th street at the time of the collapse. The front of the vehicle was crushed by falling debris, and was found on the east side of the collapsed bridge. The Toyota was occupied by an 18 year old female driver and a 19 year old male passenger.

The driver was fatally injured and an autopsy was performed, cases 2018-0085. The cause of death was traumatic asphyxia. The autopsy findings included scalp laceration and hemorrhage, cerebral edema, fracture of the left side of mandible, abrasions of left cheek, multiple rib fractures, and abrasions of left shin.

The 19 year old male passenger was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R48. He suffered minor injuries including a L4 spinous process fracture, and abrasion of the right lower leg.

1.7. 2015 Kia Optima

The Kia Optima was traveling eastbound on SW 8th street at the time of the collapse. The vehicle was crushed by falling debris, and was found on the east side of the collapsed bridge. The Kia was occupied by a 42 year old female driver and a 34 year old male passenger.

The driver was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R48. She suffered minor injuries including a left hip, knee, and foot contusions, acute pain and stress due to trauma, anxiety, and cervical neck sprain.

The male passenger was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R48, and he sustained serious injuries. His injuries included a left tibial plateau fracture, a lumbar fracture, and spinal cord injury.

1.8. 2014 Chevrolet 2500 Pickup

The Chevrolet 2500 pickup was parked facing westbound on the shoulder of NW 8th St., and was not occupied. The vehicle was crushed by falling debris.

2. Occupants, Construction Workers, and Others Involved

The crash involved 16 total people. This included 10 people that were in vehicles damaged in the collapse, as described in sections 1.1 through 1.7. There were 6 construction workers involved, as described in Section 2.1.

Table 1 summarizes the injury severity for those involved and Table 2 provides information about the location and injury severity of those involved.

Table 1. Injury Table

Injuries ²	Construction Workers	Vehicle Occupants	Total
Fatal	1	5	6
Serious	4	2	6
Minor	1	3	4
None	0	0	0
Total	6	10	16

² Title 49 CFR 830.2 defines a fatal injury as: any injury that results in death within 30 days of the accident. A serious injury as: an injury which requires hospitalization for more than 48 hours commencing within seven days from the date the injury was received; results in a fracture of any bone (except simple fractures of the fingers, toes, or nose); causes severe hemorrhages, nerve, muscle, or tendon damage; involves any internal organ; or involves second or third degree burns, or any burns affecting more than 5 percent of the body surface.

Table 2. Location and Injury Severity of People Involved

Vehicle/location	Driver	Passenger	Worker	Total
Construction Workers	NA	NA	Minor 1 Serious 4 Fatal 1	Minor 1 Serious 4 Fatal 1
Honda Civic	Minor 1	NA	Honda	Minor 1
Jeep Cherokee	Fatal 1	NA	NA	Fatal 1
Chevrolet 1500 Pickup	Fatal 1	Fatal 1	NA	Fatal 2
Ford F250 Pickup	Fatal 1	NA	NA	Fatal 1
Nissan Rogue	Minor 1			Minor 1
Toyota 4 Runner	Fatal 1	Serious 1	NA	Serious 1 Fatal 1
Kia Optima	Minor 1	Serious 1	NA	Minor 1 Serious 1
Chevrolet 2500 Pickup	NA	NA	NA	NA
				Minor 4 Serious 6 Fatal 6

2.1. Construction Workers

There were 6 construction workers on the bridge at the time of the collapse. A brief summary of the workers position, location on the bridge, gender, age, and injuries is provided here.

A technician employed by Structural Technologies was performing re-tensioning operations on the canopy of the north end. The 34 year old male, was fatally injured. He was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R58. He suffered multiple cardiac arrests, and died in the operating room. He was pronounced deceased at 6:32 p.m. His injuries included Concussion and fractures of the skull, cervical spine, hip and right femur. He also had flail chest, pneumoperitoneum, pneumothorax, pulmonary contusion, respiratory arrest, traumatic brain injury and urological injury. The autopsy case was 2018-00860. The cause of death was blunt trauma. The autopsy findings included blunt trauma to the neck and other injuries.

A foreman employed by Structural Technologies was supervising re-tensioning operations on the canopy of the north end. The 38 year old male was transported to Kendal

Regional Medical Center and suffered serious injuries. His injuries included head and neck injuries with skull and spinal fractures as well as other closed head injury. He suffered chest injuries including flail chest, pulmonary contusions and pneumothorax; organ injuries including intra-abdominal injury, splenic injury. He also suffered pelvic, hip, and extremity fractures.

A quality control technician employed by MCM was observing the re-tensioning on the canopy of the north end. The 55 year old male was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R69, and suffered serious injuries. His injuries included a laceration to the lower left lip, a mid-forehead laceration, pulmonary contusion, colon injury, spinal injury, fractured left radius, and scattered abrasions to both lower extremities.

A senior project engineer employed by Bolton Perez and Associates was monitoring the bridge on the deck of the north end. The 40 year old male was transported to Kendal Regional Medical Center and suffered serious injuries. His injuries included a concussion with loss of consciousness, a left mandible fracture, a facial laceration, a right posterior scalp laceration, and a right anterior iliac spine avulsion fracture.

A senior inspector employed by Bolton Perez and Associates was observing the re-tensioning on the canopy of the north end. The 47 year old male was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R69, and suffered serious injuries. His injuries included a left complex periorbital laceration, a concussion without loss of consciousness, and a non-displaced left humeral fracture.

A technician employed by Structural Technologies was performing re-tensioning operations on the canopy of the north end. The 22 year old male was transported to Kendal Regional Medical Center by Miami-Dade Fire Rescue unit R47, and suffered minor injuries. His injuries included a concussion with loss of consciousness, a lip laceration, and pain in the right knee and right arm.

3. Law Enforcement Information

3.1. Miami-Dade Police Department (MDPD)

The Miami-Dade Criminal Investigations Division, Homicide Bureau located at 9105 NW 25 St, Suite 2088, Doral FL 33172, assumed the role of the lead investigating agency for the loss of life and injury for this incident. The preliminary police report number PD180315098886 was obtained.³ The Florida Highway Patrol investigated the incident classified as an Industrial Accident in the report.

The MDPD Incident Recall report was obtained.⁴ This report listed the 911 calls, and the first was received at 1:47:08 p.m. Multiple units were dispatched and enroute by 1:49 p.m. and the first MDPD unit was noted as arrived at 1:52 p.m. The incident call remained open from the 15th of March to the 18th of March, when it was closed out at 12:50 p.m.

³ SF Attachment Miami-Dade Police Report

⁴ SF Attachment Miami-Dade PD Incident Recall Report

3.2. Florida Highway Patrol (FHP)

The Florida Highway Patrol, located at Florida Highway Patrol, 1011 NW 111th Ave, Miami, FL 33172, had concurrent jurisdiction at SW 8th Street. The FHP Incident Call Record was obtained.⁵ The call was received at 1:56 p.m. and there were units reported on scene starting at 2:03 p.m. The call record was closed out on March 19th at 3:00 p.m.

The PIO for the FHP described the codes used by the FHP Incident Call Record as follows: X4 is OK, X6 is busy, X12 is together, X39 is message has been delivered, X49 is another agency, X51 is enroute, X54 is negative, X56 is meeting, X97 is arrival, S14 is information. He also noted that 102 identifiers denoted supervisors.

3.3. Florida International University

3.3.1. FIU Police Department (FIUPD)

The FIUPD located at 11200 SW 8th St., PG5-210, Miami, FL 33199 had jurisdiction for the university campus, which included the surroundings of the bridge. The FIUPD provided their Communications Event Report for event ID:2018-009252.⁶ The call was noted as received, routed, and with first dispatch and enroute at 1:48 p.m. The first to arrive was logged at 1:52 p.m. The event log listed 33 officers that were onscene over the course of the call, which had the last entry on March 19, 2018 at 3:58 p.m.

The FIU Police Department Report for Incident Case Number 2018-0315005 was obtained.⁷ It provided narrative accounts of the response from 14 units that responded.

3.3.2. FIU Disaster Management and Emergency Operations

Co-located with the FIUP is Disaster Management and Emergency Operations. The Department of Emergency Management operates an Emergency Operations Center (EOC). The staff became aware of the event within minutes as the office was located about 1 block away from the bridge. The Assistant Vice President immediately opened the EOC and delegated IC to the Director of the Department of Emergency Management. The EOC provided support to the emergency responders and also provided the facilities and logistics support for the family assistance center. The Red Cross was the primary agency running the family assistance center.

The FIU EOC director provided the incident action plans created to support the recovery and work following the bridge collapse.⁸ The FIU EOC also provided the statements made by the EOC to support the FIU community following the event.⁹

⁵ SF Attachment FHP Incident Call Record.

⁶ SF Attachment FIUPD Communications Even Report

⁷ SF Attachment FIUPD Report

⁸ SF Attachment FIU EOC Action Plans.

⁹ SF Attachment FIU EOC Statements.

3.4. Sweetwater Police (SP)

The Sweetwater police have jurisdiction for the municipality of Sweetwater, located just to the north of the FIU campus. The City of Sweetwater Police are dispatched by the MDPD, and a separate Incident Recall Report was obtained.¹⁰ The incident was initiated at 1:48 p.m. and an officer noted his arrival also at 1:48 p.m. Other officers were noted to be enroute by 1:51 p.m. There was a note that an officer was conducting CPR on a victim at 1:52 p.m. The incident report was closed on March 16th at 12:40 a.m.

A follow up incident report was initiated on March 16th at 3:45 a.m. and closed on March 18th at 12:50 p.m.

3.5. City of Doral Police Department (DPD)

The City of Doral Police Department also had units respond. The DPD is dispatched by the MDPD and the Incident Recall Report was obtained.¹¹ The incident was initiated at 2:03 p.m. and units had arrived on scene at the same time. The call was closed out on March 18th at 12:50 p.m.

3.6. Miami-Dade County Medical Examiner Department

The Miami-Dade Medical Examiner's office located at 1 Bob Hope Road, Miami Florida, 33136 conducted autopsies of the deceased. The autopsy cases were 2018-00860 (construction worker), case 2018-00879 (occupant of the Jeep), cases 2018-00880 and 2018-00881 (occupants of the Chevrolet 1500 pickup), case 2018-8885 (occupant of the Toyota), and case 2018-00889 (occupant of the Ford pickup).

4. Fire/Rescue and EMS

4.1. Miami-Dade Fire Rescue MDFR

Miami-Dade Fire Rescue had jurisdiction for the bridge collapse. The Alarm Detail Report for alarm number 8057170 was obtained.¹² There were 6 Rescue units that treated and transported patients (R29, R23, R48, R58, R69, R47); a unit that treated and transferred a patient (E40); five that assisted (R43, ARN, E48, E37, R09, R40), and two that were cancelled (E58, R28).

Call times for some of the units were included in medical records. These were as follows: Unit R47 was dispatched at 1:49 p.m., enroute 1:50 p.m., at scene at 1:57 p.m., departed scene at 2:13 p.m., at destination at 2:13 p.m. Unit R48 was dispatched and enroute 1:54 p.m., at scene at 1:57 p.m., departed scene at 2:03 p.m., at destination at 2:15 p.m. Unit R58 was dispatched and enroute at 1:54 p.m., at scene at 1:57 p.m., departed scene at 2:05 p.m., at destination at 2:20 p.m. Unit R69 was dispatched at 1:51 p.m., enroute at 1:53 p.m., at scene at 2:01 p.m., departed scene at 2:17 p.m., at destination at 2:24 p.m.

¹⁰ SF Attachment City of Sweetwater PD Incident Recall Report.

¹¹ SF Attachment City of Doral PD Incident Recall Report.

¹² SF Attachment MDFR Alarm Detail Report.

The Battalion Chief on duty indicated that about 95% of the MDRF fire fighters (FF) were also paramedics, and can be assigned to either an EMS unit or a fire apparatus. He also noted that the fire stations were typically small, with usually one EMS and one fire unit at each station. A rescue unit was the first MDRF unit to arrive on scene, followed by a Battalion Chief (BC), who assumed the role of Incident Command (IC).

5. Hospital Information

Kendall Regional Medical Center, located at 11750 Bird Road, Miami FL, 33175-3530 was the local level 1 trauma center. It received all the EMS transported patients from the scene, and had one patient walk into the facility on the evening of March 15, 2018. There were 10 patients transported to Kendall Regional Medical Center by the MDRF.

Medical records for all treated victims were obtained and these records were used to provide the summary of the injuries provided in Sections 1 and 2.

D. INTERVIEWS

NTSB investigators interviewed first responders, a bystander who assisted, and hospital staff. Summary notes from the interviews is provided.¹³

E. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS

SF Attachment Miami-Dade Police Report
SF Attachment Miami-Dade PD Incident Recall Report
SF Attachment FHP Incident Call Record
SF Attachment FIUPD Communications Event Record
SF Attachment FIUPD Report
SF Attachment FIU EOC Action Plans & Statements
SF Attachment City of Sweetwater PD Incident Recall Report
SF Attachment City of Doral PD Incident Recall Report
SF MDRF Alarm Detail Report
SF Attachment: NTSB Interviews

END OF REPORT

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¹³ SF Attachment: NTSB Interviews