June 22, 2021

TO: Mark Maziarz, Sergeant
Tampa Police Department

FROM: Joe Blanco, Flight Officer
Tampa Police Department

SUBJECT: Training Incident

Sergeant:

During the week of 6-21-21 the Tampa Police Department Aviation Unit utilized the contracted services of Helicopter Institute to conduct Night Vision Goggle (NVG) recurrent and initial training. Ray Schumacher, who is a Certified Flight Instructor with Helicopter Institute, conducted the training. On 6-21-21, I was scheduled to fly the first of three training flights with Ray. Knowing this, I went out to the aircraft (N512TP), which was parked inside the hangar, and conducted a thorough pre-flight. I inspected the aircraft as dictated in the aircraft flight manual. The only thing I found abnormal was a severed wire to the main rotor sensor that is used for track and balance of the main rotor. I called our Director of Maintenance, Kris Gunter, to advise him of the situation and express concern with the length of the wire possibly interfering with the main rotor driveshaft. We agreed that the remedy was to zip tie the wire back over on itself and secure it. Brian Alofs and I did exactly that and cut the excess off the zip tie, ultimately confirming that the pliers were secured away before continuing.

Upon conclusion of the pre-flight inspection, I performed a final walk around to make sure all the hatches and latches were secured and that nothing looked abnormal with the aircraft. At approximately 2100 hours Ray, Mike Hinson, Brian Alofs, and I met at police helicopter N512TP, which was parked in the north helipad at the TPD hangar. Ray discussed with us what the training session would entail and that conversation included aborted maneuvers and CRM, emphasizing positive exchange of controls. During that time, we also checked the weather and confirmed that it was safe to fly. After the conversation, Ray asked if we had any questions, and we did not. Ray and I then entered the aircraft and ultimately departed Tampa International Airport (TPA) around 2118, heading toward Tampa Executive Airport (VDF) under NVG's. I obtained the current altimeter reading from Tampa Tower and entered it into the Garmin 500H.

En route, Ray discussed further what to expect from the flight, with it being recurrent NVG training. As we got closer to VDF, Ray talked about dealing with bright light while under NVG's. One of the strategies he presented me was to "fight light with light" by using my landing light while entering areas of high environmental light. Once we arrived in the vicinity of VDF, I set up for an approximate 2 mile final into runway 05.

For the duration of the flight, I made all of the traffic calls on VDF CTAF (Common Traffic Advisory Frequency). I made a standard approach to the numbers for runway 05.

During this time, he continued his discussion about using the landing light while under NVG's and when it can be helpful. He explained that this tactic could be beneficial when landing at an airport with a VASI. After the discussion, we conducted two quick stop maneuvers down runway 05. We then departed runway 05 and made a left (west) turn to join the final approach leg for runway 18. The purpose of this maneuver was so that I could see how something as simple as a VASI could impact visibility under NVG's and how the landing light could help when coming in to land. I made a standard approach to the numbers of runway 18. After that discussion, Ray asked me to pick it up and hover the taxi back to the numbers of runway 05. Once in position on runway 05, we did one more quick stop and then transitioned to hovering autos. Ray then discussed the proper procedure for performing a hovering auto, and once I was ready, we performed the maneuver. I executed the first one from 2-3 feet above the runway, and the second was from 4 feet. Both autos were performed with a little bit of forward creep, but the maneuver overall was performed to an acceptable level. We discussed the aspects of forward creep, and then Ray took the controls and performed a hovering auto himself so that he could get a feel for the aircraft.

We then transitioned to performing straight-in, full touch down autorotations. Under the aid of NVG's, I departed runway 05 and stayed in the pattern conducting left closed traffic. I climbed up to 1000’ indicated altitude and maintained an airspeed of approximately 90-95 knots. I made a left turn, base to final, for runway 05 and lined up in preparation for the execution of a straight-in autorotation. I looked at the Garmin 500H and saw that my indicated altitude was about 950', airspeed was about 90 knots, and the wind was off the front right of the aircraft nose at 12 knots. I confirmed that the landing light was on and observed that there was light precipitation on the windscreen. Ray advised me to go ahead and perform the autorotation, at which time I rolled the throttle to idle and lowered the collective all the way down. This is a standard procedure to simulate engine failure during practice autorotations. I entered aft input into the cyclic and brought the airspeed back to approximately 60 knots, and started my descent down to the predetermined spot of landing (left side of the 1000' markers for runway 05).

At about 450' indicated altitude, I looked at the Garmin 500H and saw that my airspeed was 62 knots. I did not hear anything abnormal from the rotor head during this time, like high or low rotor rpm. We continued down toward our landing spot, and as we transitioned through 100-90' Above Ground Level (AGL) I entered the flair. At that point, my rotor rpm was approximately 99-100% rpm and everything felt very normal. At the bottom of the flair, the rotor rpm again sounded normal, confirmed by what Ray observed to be 103-104%. I then bumped up the collective to arrest the rate of descent and leveled out. At that time, I would estimate my altitude to be between 7-10’ AGL. Once level, I felt like the bottom of the helicopter started to fall out from underneath it. I then pulled in collective, and it did not affect the sink

rate. At about halfway to the ground, I heard the low rotor RPM horn as I continued to pull collective in hopes of arresting the sink rate. Nothing I did, including pulling full collective, seemed to impact the helicopter's vertical sink. We ultimately impacted the runway in what felt like squarely on the skids with a little bit of nose-forward attitude. From the time we leveled off to impacting the ground seemed like a split second, and nothing we did provided the traditional cushioned landing that is supposed to be experienced at the end of an autorotation.

Once on the ground, we rolled off the throttle, turned the fuel valve off, turned the battery off, and engaged the rotor brake. When the blades stopped turning, we exited the aircraft, and at that time, I observed the tail boom to be severed by the main rotor blades just aft of the horizontal stabilizer. I also noted that the wind was blowing down the runway at approximately 10 knots. I immediately followed our accident protocol and contacted Sgt. M. Maziarz to advise him of the incident. I then contacted Tampa International Tower by phone and requested contact information to shut down the runway. I was provided the phone number to Tampa International Police Department and coordinated getting the runway shut down with their assistance. I then stood by until other police units responded to assist.

The information contained in this synopsis is provided at the best of my recollection as I remember it before the impact. At this time, I have nothing further to report.

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Joe Blanco, Police Flight Officer
Tampa Police Department

EVENT NARRATIVE

Event Details:
Bell 407 N512TP Hard Landing
Tampa Police Department
Tampa, Florida

Narrative by:
Raymond Schumacher / HI Instructor
June 23rd, 2021

Summary by:
Randy Rowles / HI President
June 23rd, 2021

Incident Narrative for Raymond Schumacher describing the hard landing in N512TP (Bell 407) during an intended autorotation while conducting NVG recurrent training for Tampa Police Department departing Tampa International Airport and ending at Tampa Executive Airport on 6-21-2021

I arrived at Tampa PD aviation hangar at 1700 local time (Loc) and conducted initial NVG ground training for two (2) Tampa Police officers (Mike/Brian) and completed ground training at 1910 Loc.

The original plan was to fly with Mike and then Brian for primary flight maneuvers to orient them to the NVG environment, scan, hover characteristics, etc. and then to fly with Joe Blanco.

Chris Sheppard (Tampa PD Chief Pilot) requested that we invert the schedule to fly with the more experienced pilot (Joe) for his recurrent NVG flight so that we could orient me to the area and give me some more insight into their typical areas of operation.

Joe and I departed Tampa International airport and proceeded directly to Tampa Executive where we began the training maneuver package.

Preflight brief approximately 2140 EST containing the following:

- Set weather minimums for return at basic VFR conditions
- Established TPD pilots as Pilot flying with me as instructor (non-primary flying)
- 3 way change of controls at all times
- Nav/comm responsibility to TPD
- Scheme of maneuver (direct to Tampa Exec. For basic maneuvers, possible confined area 2-3nm NE of Exec.)
- Accident/incident/emergency procedures
- Review of any “high points” identified in NVG Flight Risk Assesment

We departed TPA at approximately 10:10pm EST and arrived at Tampa Executive Airport (VDF). The following is an overview of the conditions and maneuvers initially conducted upon arrival at Tampa Executive Airport:

- Wind 060-070@7-10kts
- Normal approach and landing to numbers of runway 05
- Pickup to hover discussing eye position for hover (down/45deg)
- Quick stops along runway 05 (x2)
- Crosswind approach and landing to numbers runway 18 discussing light discipline in face of PAPI lights
- Hover taxi to reposition to left side 1000' mark of runway 05
- Discussed hover autorotations, procedure, and standards. Conducted x 4.
- 2 hover autos lights on, 1 hover auto lights off (both pilots performing hover autos to standard
- Quick stop on rwy 05
- Verify with windsock wind still 060-070@7-10kts

We then landed and discussed autorotations from pattern altitude. Our intent was to conduct power off (ground contact) landings. We discussed the following prior initiating the maneuver:

- Straight-in autorotation runway 05
    - Final approach 900-1000AGL/~85kts
- Established minimums for flare configuration (60kts minimum, rpm 100%)
- If unstable, go around, if stable but unsuitable for touchdown, I would announce power recovery and Joe would perform it.

At this time, we conduct a traffic pattern to execute the maneuver. At the proper entry point, Joe places throttle to idle, decelerates to 70kts.

Autorotation was stable until 300'AGL where speed had slowly decreased to 59kts (55kts is OEM minimum rate of descent speed per OEM). I pointed this out to joe who recovered speed to 62kts by 200'AGL, rotor RPM still 100%

I cross-checked the Radar Altimeter at 110'. At 100' passing into 90', Joe initiated the flare.

Flare stabilizes at normal rate with RPM increasing to ~103/104 at the apex.

At 30' cabin height, Joe has the aircraft in a decelerating flare, an Joe added 2-3" of collective off the bottom stop to decrease forward ground speed and vertical speed.

Ship was at its 5-7deg nose high hover attitude at a perceived height of approximately 5-7'AGL, Rotor RPM near 100% as the runway end came into view over the instrument console.

As Joe initiated the cushioning pull of the collective, the RPM rapidly decayed through 95% low rotor horn with no apparent deceleration of the aircraft's vertical rate of descent.

I cross-checked down/45deg view with ship-front view and announced, "we are falling too fast" and joined Joe in raising the collective, with still no apparent deceleration in aircraft sink rate.

At 2-3' it became clear that the collective had travelled to full up stop with never having decelerated the vertical rate, I announced "we are going to hit hard".

Aircraft impacted the ground and we felt the skids deform. Joe performed an immediate engine shutdown, and we then worked as a crew to ensure aircraft systems were powered down and fuel shut off, as well as rotors stopped before we exited the aircraft and began notification procedures.

Summary: (by Randy Rowles)

All aspects of the maneuver were within normal range. As this flight was conducted using Night Vision Goggles (NVG), all aspects for the success execution of the maneuver required accurate visual cues. In this case, both pilots did not recognize significant changes to the runway environment adversely affecting visual cues due to a runway pavement project that had just completed.

The TPD pilot having conducted hundreds of NVG power-off landings to this exact location had not executed an autorotative descent to this area since completion of runway paving.

The HI instructor had knowledge that previous HI instructor had completed countless years of successful power-off landings to this exact location, however not since completion runway paving.

The newly paved runway is a deep, dark black color. Due to this fact, its Albedo is near zero. Albedo is a non-dimensional, unitless quantity that indicates how well a surface reflects solar energy. Albedo commonly refers to the "whiteness" of a surface, with zero meaning black and 1 meaning white. A value of zero means the surface is a "perfect absorber" that absorbs all incoming energy (Definition: www.nsidc.org Thermodynamics: Albedo). Essentially, it looks like a black hole. The previous runway color was light gray with mid to high Albedo.

Although the profile was correctly flown by the flight crew, the crew encountered a near zero Albedo of the runway surface in the final, most critical aspect of the maneuver which is during the power-off landing phase. This caused an optical illusion of false height and speed relative to the ground. Once a contrasting element was visual (1000' touchdown zone) which is white in color (extremely high Albedo), the crew immediately realized their situation and reacted appropriately by leveling the helicopter and adding all the collective remaining to slow their rate of descent. Any attempt to go-around or adding throttle may have worsened the situation.