rappelling techniques. In that case a novice rappeller (not on belay) lost control, fell, and was seriously injured. (Source: Edited from reports by Barry A. Whitaker, Superintendent, Pilot Mountain State Park; *journalnow.com*; Thursday, May 24, 2007, "Fire & Police Briefs—Scout Instructor Hurt During Training;" and Aram Attarian)

FALL ON ROCK, RAPPEL ERROR–RAPPELLED OFF END OF ROPE, NO KNOT IN END OF ROPES, DARKNESS, COMMUNICATION BREAKDOWN

Nevada, Red Rocks, Oak Creek Canyon

On February 10, Sheila Matz (50+), RH (Bob), JU (Joanne), MG (Marilyn), PB (Phil), MG (Mike) and JS (Jim) met to climb at Red Rocks. The day was clear and sunny with a light breeze and temperatures in the mid-60's. The Climbing experience of the group ranged from several years (Marilyn and Jim) to several decades (Bob and Joanne). Sheila, although having climbed for 10+ years, did not lead. Jim was a new leader. The group decided to go into the Solar Slab area of Oak Creek Canyon where multiple climbs of similar grades could be found.

Three teams were formed: Phil and Mike, Bob and Jim, and JU, SM, and MG. Hence, three different, three-pitch routes varying from 5.7 to 5.9 could be climbed. All of the routes ended on a large, football-field sized, low angle ledge below the Solar Slab itself, where options existed to either continue climbing higher on the slab or to descend down the gulley back to the base. The party of Bob and Jim finished their climb and arrived on the ledge first. From there, Jim chose to lead a single 5.5 pitch on the Solar Slab proper. Following that pitch, they rappelled back to the ledge area, where they started the seven single-rope rappels of the descent route—the Solar Slab Gulley. After the first short rappel, they made visual and vocal contact with Sheila, whose team had by then arrived on the ledge, and who tried to persuade Bob and Jim to climb back up to join the group for lunch and possibly more climbing. Bob chose to wait at the base of the gulley, since it was already 2:15 p.m. (complete darkness comes about 5:30 p.m.), and the descent would take about an hour to an hour and a quarter followed by a 45-minute hike back to the car. (Sheila & Bob had a dinner commitment at 6:30 p.m.) He was assuming that only one more pitch would be climbed by the teams now on the ledge.

Bob and Jim completed their rappels and reached the base of the gulley uneventfully. However, up on the slab area the team of JU, SM, and MG decided to climb two pitches of "Sundog," a climb on the Solar Slab, which Mike and Phil would follow. Sheila then joined Mike and Phil and rapped off of Sun Dog while JU and MG chose to continue to the top of the climb, two additional pitches. Sheila, Mike and Phil then waited for JU and MG in the gathering twilight. The group of five finally started down the Solar

Slab Gulley in the complete darkness. Two headlamps were produced. Sheila had been offered one of the headlamps, but this was declined.

On the second to the last rappel, MG and JU went first with one of the two headlamps so that they could fix the last rappel, whose anchors were six to seven feet (rappeller's) left of the natural fall line of the rappel. Sheila went third on that rappel, with her set-up being assisted by the headlamp that Mike and Phil had. She had previously rapped the route only once before, about three years ago. She expected that one of the two climbers ahead of her would be at the next rap station with the other light. Unbeknownst to her, both of them had descended to the ground. As she rappelled down, she called out to MG, who by then was on the ground with a headlamp. MG yelled back directions, but Sheila did not understand the response, and mentally was still expecting one climber to be at the next stance. She therefore passed the "unmanned" rap station. In the dark she could not see the bolts or the ropes that hung from them. She continued down and immediately thereafter, the end(s) of the unknotted rope slipped through her descending device.

She fell approximately 20 to 25 feet, landing on her hip in a small depression on a sloping ledge. Had she not "stuck" this landing, she would have fallen another 50 or so feet to the ground, undoubtedly a fatal fall. The impact fractured both her femur and pelvis. Fortunately, the impact did not involve the head, neck or back. Upon landing, she repeatedly screamed, "I fell, I fell." This cry was misinterpreted by Phil and Mike as, "Off rappel!" Mike therefore began his descent.

As Mike was rappelling down, the group finally understood what had happened and Mike, a surgeon, moved down the rap line more quickly so that he could provide assistance. Just below the ledge of the rap station he noticed that he too was running out of one end of the rope; he loudly cursed and also nearly fell. However, he managed to stabilize himself and was able to climb back up to the rappel station. After switching to the last rap line he, and later Phil, reached the victim. Mike proceeded to make an assessment of the injuries.

Meanwhile, below in the valley, Rob V, a climber independent of the original party, was hiking back from his day's exploratory outing and noted a headlamp that did not seem to move. It was 50 feet up the cliff. In the spirit of comradeship that has been a part of mountaineering for more than two centuries, and since he had done some guiding in West Virginia, he took it upon himself to climb up the steep, rocky, climber's approach trail to see if he could be of assistance. Upon reaching the base of the gulley, he climbed up to the scene of the accident. MG, an emergency room doctor, also climbed up to attend to the victim. Concurrently, cellphone contact had been made to 911 and, after being passed through the fire department,

was finally connected to the Las Vegas Search & Rescue (LVS&R) Team.

MG and Mike had both done a full assessment of Sheila and determined that there was probably a fractured femur and that there were no obvious neck or back injuries. (Extensive X-rays at UMC Trauma Center would later show their assessment to be correct.) To immobilize the fractured leg, it was tied to two of the backpacks. Additionally, Rob V rigged a chest harness so she could be lowered in the prone position, since she could neither sit up nor be lowered conventionally. With her head and feet being supported by MG and Mike while they themselves rappelled down, Rob V lowered Sheila approximately 50 feet further to the base of the gulley. (The victim's nutpick caught in the rock twice during the descent.)

Prior to the above events, Bob, who had not called in for a "late stay permit," had decided to hike back to the car to prevent an expensive fine and subsequently drove the car a few miles to the highway. After waiting for more than three hours for the non-arrival of his friends, coupled with the arrival of fire engines and an ambulance at the park exit, he was able to confirm the fact that there had been an accident with his group. He then convinced the fire chief to let him drive through the gate with the emergency vehicles.

Upon reaching the parking lot, RH was met by Jim, who informed him that the victim was Sheila. Bob then started up the trail, passing JU, who was headed out to meet the rescue personnel. (JU and Jim had assumed the LVS&R would hike into the scene. In fact they would be helicoptered in.) Soon a helicopter passed overhead. Bob, still on the flat part of the trail, observed the helicopter fly into the Solar Slab Gulley area, turn on its searchlight and hover. It then left the cliff heading back to the road and landed near Bob. Officer Clint M. emerged and spoke with Bob. Clint M. asked if Bob knew anything about an accident and said that a party in the area of the Solar Slab indicated that they did not need a rescue. Bob stated that there was indeed an accident in the Solar Slab area with his party and that the victim would be either on the cliff, at the base of the Gulley, or very close to the base. He surmised that if they had not given the "proper" signal, they might not have known what it was. Bob was able to convince the rescue party to return to the gulley.

The helicopter then returned to the Gulley, confirmed that their help was needed and proceeded to make several more trips in to deposit members of the (100 percent volunteer) Las Vegas Metro Search & Rescue Squad, two at a time, on the edge of a promontory rock. The touchdowns were "one-or-two-skid" touchdowns with a 30-foot drop-off behind the back half of the rotor, while the front half of the rotor was only about eight or ten feet from ground. For added interest, there were multiple trees less than a dozen feet in front of his rotor.

The victim, by this time on the ground at the base of the Gulley, was transferred by LVS&R to a backboard and litter. In the course of the next hour or so, she was then moved another 75 feet farther down the slope to a more clear area where the litter and a LVS&R member, Pete, were attached to a 50 foot cable hanging from the bottom of the helicopter for transport to an ambulance waiting on the road. Once in the ambulance, Sheila was transported to the Trauma Center of University Medical Center (UMC) where the fractured femur and pelvis were confirmed. Surgery took place the next day to insert a titanium rod inside the femur. Prognosis was for full recovery. By autumn she was climbing 5.9 again.

Analysis

As with so many accidents, a series of events chained together the altering of any one of them would break the chain and probably have prevented the accident:

1) Lack of full communication of the expectations for the day. If Sheila had known JU and MG wanted to climb until darkness, she would have descended with Bob and Jim. If Bob had known the full plan, he and Jim would have climbed back up to "pick up" Sheila for the rappel descent of the gulley. (The party had driven in two cars and JU had gotten a "late stay" permit, whereas Bob had **not** thought of doing so, nor would he have, knowing he and Sheila were due for dinner south of Vegas at 6:30 p.m.)

2) Assumptions. In her own words, Sheila made "*assumptions... thinking that they were standard practices for* all *climbers, whereas these were, in fact, only standards for those that we spend most of our time climbing with.* I.e.: *i. Knots on the end of the rope whenever the next belay is unknown, and ii. A person stationed on the bottom of each rappel to assist those who are following to 'land' safely.*"

Sheila's assumption that the person with the light would be at the next station was probably key. It had been based upon the fact that this had been the practice with this group for the first five rappels. And, right until the moment she fell, she thought the light *was* at the next station, when, in fact, it was on the ground.

3) Failure to knot the end of the rappel rope. Due to extensive experience with snagged ropes in the tough "live oak" trees of Red Rocks, the ropes were not knotted. Yet when there is no hurry, and there are "extra" ropes available in case of a snag, and when the odds tip against you, such as with nighttime rappels, this safety precaution is even more warranted. (NOTE: Five of the seven raps end on the flat, sandy floor of the gulley, so knots are totally superfluous.)

4) Lack of a Prusik back-up and lack of awareness of distance. Whether a prusik could have "engaged" in the moment between the end of the rope passing through Sheila's hand and belay device is not clear, but it might have provided an additional chance. Sheila knew the rappel was

less than 100 feet, but failed to consider that she might be approaching, and exceeding, that distance. However, in the dark, distance is even more difficult to judge. Also, in the natural fall line of the second to last rappel, the "landing ledge" is very small. It is only when one moves to rappeller's left, toward the bolts, does the "ledge" widen to a comfortable place to stand.

5) Before using rappel ropes, re-set them after an accident or apparent accident! The person *following* Sheila nearly "bought the farm." When rappelling after an apparent accident, the rappel ropes should be *reset*, as they may no longer be even.

6) Take an introductory rescue course, or read a book about rescue and then practice. While the combined climbing experience of the group at the scene probably was close to 100 years, it seemed that no one had experience in lowering an injured climber. Rob V arrived from the canyon floor and coordinated the technical lowering of the victim after the physicians had completed their assessment. True, in this case, the LVS&R could have done the job, but his assistance probably saved substantial time. It is believed that because of the relatively rapid response, the victim, although having lost an estimated two units of blood to internal bleeding, never went into shock. (Source: Robert B. Hall and Sheila Matz)

(Editor's Note: Only a Prusik is mentioned as a back-up. Autoblock systems are also standard protocol.)

FALL ON SNOW/ICE, INADEQUATE EQUIPMENT—ICE AX ON PACK INSTEAD OF IN HANDS, DARKNESS

New Hampshire, Mount Washington, Tuckerman Ravine

On March 31, a climber injured his leg after falling down Tuckerman Ravine. He was with two friends. The three of them climbed Central Gully, hiked across the Alpine Garden, and began descending into Tuckerman Ravine at dark. He was wearing crampons at the time of the fall, but his ice ax was secured to his pack. He said he was not using it because by the time he realized he needed it, the terrain was too steep to take his pack off.

During the descent, he lost his footing and fell between 400 and 600 feet to the floor of the Ravine, injuring his leg during the fall. One friend went to Hermit Lake to get help while the other assisted his friend to the rescue cache near the bottom of the Ravine. Snow Rangers, personnel from the Mount Washington Volunteer Ski Patrol and the AMC, and overnight guests staying at Hermit Lake responded to help the patient. The patient's leg was splinted and he was carried down to Hermit Lake, which involved one 300-foot rope lower. At Hermit Lake, the patient was reassessed and then transported to Pinkham Notch via snowmobile. This incident took 15 people 3.5 hours to complete.