NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Washington, DC 20594

DCA01MA034

Air Traffic Group Factual Report of Investigation

Attachment 11 – Reports and Forms completed by Mike Ahern, 4 pages

06-02-21/1 CAST

KS

FLIGHT PROCEDURES CONTROL

ACTION	DATE OPN	PCNUMBER	MASTER PC
FCHK	02/20/2001	20102940	20015554

PROCEDURE:	RNAV RWY 15	APRT ID: KASE	AMDT: ORIG.
AIRPORT:	ASPEN-PITKIN CO/SARDY FIELD		GPS #: 4190
CITY:	ASPEN	ST: CO	STAT: L
FAC TYPE:	FAC ID:	SPEC: BRANHAM, RICK	DATE: 02/20/2001 BRANCH: 20

PROCEDURE REVIEW

	REC'D	REL'D	INITIALS	COMMENTS
LEAD		2/20/01		TO FC
QC			✓	
LEAD				

RECEIVED FEB 20 2001

02/21/01

PROCEDURE REMARKS

FLIGHT INSPECTION

FLIGHT INSPECTION REMARKS	DATE SENT

LNAV

1) Cannot make straight IN to 15 from MAP. Need VDP 3NM prior (approx) To MAP for Descent for Landing on Rwy 15

2) Circling area not sufficient for Descent To Land Rwy 33

3) Should be no circling allowed at night

RECEIVED FEB [illegible] 2001

INSPECTION DATE	CREW#	N#	SAT	UNSAT
3-21-01	ok086	53		UNSAT

INSPECTION SIGN [redacted]

COMMENTS

Reimbursable Number: [redacted]

ASPEN, CO
IDENT: KASE

RNAV (GPS) RWY 15, ORIG

8260-2'S ATTACHED:
EXAXE, CO, ORIG
IDENE, CO, ORIG
LILXO, CO, REV 1
LILXO, CO, ORIG - INFO ONLY
MOPOE, CO, ORIG
NULEE, CO, ORIG
TUDEE, ID, ORIG
LINDZ, CO, REV 3 - INFO ONLY

PLEASE NOTIFY JOHN PANNELL, AVN-120, 405-954-4548 - FAX 405 - 954-9425

03/29/01

Michael F. Ahern
ASIP OKC FIFO

Tom Dorman - Mgr. OKC FIFO
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ASPEN CO. – Reasons for CIRCLING NA AT NIGHT, and possible solutions:

FAR 91.175 TAKEOFF AND LANDING UNDER IFR:

Subsection (c) Operation below DH or MDA. Where a DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA, or continue an approach below the authorized DH unless-

(1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers.

Aeronautical Information manual, Section 4 ARRIVAL PROCEDURES.

Subparagraph f. Circling Minimums: .... Published circling minimums provide obstacle clearance when pilots remain within the appropriate area of protection. Pilots should remain at or above the circling altitude until the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers. Circling may require maneuvers at low altitude, at low airspeed, and in marginal weather conditions. Pilots must use sound judgement, have an in-depth knowledge of their capabilities, and fully understand the aircraft performance to determine the exact circling maneuver since weather, unique airport design, and the aircraft position, altitude, and airspeed must all be considered.

The proposed RNAV (GPS) RWY 15 Original, at ASPEN-PITKIN COUNTY/SARDY FIELD, ASPEN, CO. provides for circling minimums up to and including CAT C aircraft. The field elevation is 7820 ft MSL, and the CAT C circling MDA is 10020ft MSL. The HAA (height above the airfield) is 2200ft. TERPs Para. 260 table 4 calls for a CAT C circling approach area radius of 1.7 miles.

If the pilot attempted to do what was intended in the circling maneuver, maintain the circling MDA until in position to land, the aircraft would wind up on about a 1.5NM final to runway 33 with 2200 ft of altitude to lose. That comes out to about a 13.5-degree descent gradient, exceeding even the maximum allowable descent gradient for helicopters.

An aircraft on a normal approach (3degrees) requires approximately 6.9 NM to descend through 2200 ft. So in order to make a normal straight in stabilized final to land on runway 33 the aircraft would have to go 5.2 miles beyond the protected circling area. Unfortunately if this were attempted the pilot would discover (one way or the other) that 11534ft Richmond Hill was between the aircraft and the runway. Given that the average pilot would not dare venture that far from the airport at night around Aspen, what would more likely happen would be that the pilot would attempt to stay within the protected 1.7 mile circling area. However in order to get down for the landing a descent would have to be initiated during the circling maneuver. The same 6.9 NM would be required for the descent, but in this case it would have to start at just a little over 1 NM after the missed approach point. If the aircraft were circling east, by the time it arrived at the 9700 ft terrain controlling the circling MDA east of the field the aircraft would be in the descent at approximately 9300 ft. On a dark night they would never see what was coming.

Bottom line, you can not get there from here. No semblance of a normal circling maneuver can be performed at Aspen Co. day or night. It might be argued that during the daylight hours the reference to the Aeronautical Information Manual pointing out the special requirements of the circling maneuver."Pilots must use sound judgement, have an in-depth knowledge of their capabilities, and fully understand the aircraft performance to determine the exact circling maneuver since weather, unique airport design, and the aircraft position, altitude, and airspeed must all be considered", might justify allowing for daytime circling. However, there is no way standard procedures can be followed for a circle to land, even during the day.

In reality pilots are going to maneuver as necessary to avoid terrain and obstructions, and get down for the landing. Aircraft that circle to land on runway 33 usually get very low along the rapidly rising terrain to the East, headed southeast and losing altitude as that terrain slopes downward into the valley where the town of Aspen is located. They then make a steep turn over the north end of town to stay within about 2.5 miles of the runway. Outside of that distance the mountain rises quickly to the south. If you are standing at the airport the aircraft might disappear behind a couple of large hills about 1.2 miles southeast of the field. They then pop out from behind the hills for a landing on runway 33. Basically that is the way it is done. There is no way that can be done without seeing the terrain and obstructions. At night it is impossible to assure both obstruction clearance, and adequate room for a normal descent for the landing out of a circling approach at Aspen.

Certainly aircraft do circle to runway 33 at night. If VFR it is up to the discretion of the crews. However, it does not seem prudent for the FAA to sanction and approve such maneuvers, especially when our criteria does not reflect the reality of the situation.

We take criteria designed for the flatlands and apply it in the mountains where it does not fit. A good example is departure criteria. A standard departure requires 200-ft/NM climb. This allows for a 40:1 obstacle clearance slope and 48 ft/NM required obstruction clearance. That gives an obstacle clearance that equals 24 percent of the overall climb gradient. When an obstruction is encountered requiring a greater than standard climb gradient we push the climb gradient up but do not require any more obstruction clearance. For example, A peak that is 1608 ft above the departure elevation sits 4NM out. Applying standard criteria it is determined that when the aircraft gets to the obstruction it needs (4x48) 192 ft of ROC. Add that to the obstruction height of 1608 and 1800 ft is the total altitude required. Divide by 4 and a climb gradient of 450 ft/NM is the results. The margin for error has gone from 24% down to 10% while the demands on the aircraft and crew, and the likelihood of error, have risen significantly.

At Aspen, on a hot summer day, all that is required for disaster is for a pilot to read the climb chart; find that at 180 knts a climb of 1350 ft/min is required; forget that the 180 knts is groundspeed not airspeed; put 180 on the airspeed indicator and 1350 on the VSI. The aircraft will impact the obstruction. It is noted that the criteria mentioned above is changing. The same 24% of ROC will be required regardless of the climb gradient. In this case 1608/4 = 402/.76 = 529 ft/NM climb gradient required. This will result in a much safer operation as fewer aircrews will be inclined to attempt it, and an increased margin for error will absorb the mistakes.

I am familiar with the above change in criteria, as I devised and implemented it while the procedures specialist in charge of Colorado. Circling was not allowed at night for the above reasons. We need to take a similar step and change our circling criteria so that it meets the needs of the users, and is relevant to the environments in which it is applied. This would clearly define where it does and does not apply day and night. The following are my suggestions:

1 – Basis premise: An aircraft should remain at the MDA during the circling maneuver until it is in position to descend at a normal rate with the runway lights or environment in sight for landing. This assures obstruction clearance during the circling maneuver and on the descent for landing. It also allows for the possibility of a successful missed approach in the event IMC conditions are encountered during the maneuver. It would require that the MDA altitude be maintained at least until on a short base leg.

2 – Flatland circling was designed to allow the aircraft to circle outside of a 3-degree descent gradient to the runway. Example CAT C circling radius 1.7NM at 300 ft above obstructions. If we assume the average obstruction is 100 ft then the aircraft would be 1.7NM from the runway and 400 ft up as it turns to final. It can proceed inbound to 1.26NM before intercepting a 3-degree descent slope. It could be as high as 540 ft above the airport and still turn on to a 3-degree descent slope.

3 – Assuming the above, it would seem reasonable and pru[redacted]expand the circling areas as a function of the height above the airport as it pertains to the normal 3 degree descent gradient. Possibly some higher descent gradient could be applied, however, it would have to remain within the limits of the aircraft using the procedures. I would think no more than 4 degrees. For example, in the case of Aspen using 3 degrees,

CAT C circling with a HAA of 2200 ft should be expanded to 6.9088 (7NM). Of course, in this case, if that were done the MDA would have to be raised to 13200 ft due to the 12380-ft mountain that would fall into the circling area. Even this would not help at Aspen as there is terrain at 11400ft 5NM out on final to runway 33 requiring a 7 degree descent gradient to get over it for landing. The obvious conclusion here is that, even with criteria that is relevant, circling at Aspen is not feasible or safe under IFR or night conditions.

4 – The procedure at Aspen needs a VDP approximately 3NM prior to the Missed Approach Point to alert the prudent pilot, who is aware of the hazards, that if not at 9800 ft with good visibility at this point a missed approach is in order. A stabilized straight in to rwy 15 at the prescribed 3.75 degrees descent gradient is no longer possible. If the airport comes into view at the missed approach point a descent gradient of 9 degrees would be required for a straight in to rwy 15, so some kind of circling maneuver outside of protected areas will be required to make the landing. I know of one case in which an aircraft in this situation attempted to make the descent for landing in a right circling maneuver to the northwest. It was night and fearing the unseen terrain, the turn was made to steep, to slow, and to close-in. The aircraft entered an accelerated stall and crashed short of the runway.

I am told that a VDP is not possible, as there are 20:1 penetrations. I assume that this is referring to the close in terrain just off the end of the runway. The procedure requires 2-½ miles visibility; the 20:1 penetrations are less than ½ mile from the runway, so what possible reasons could stand in the face of common sense to deny a very useful VDP on the basis of these penetrations? Answer, criteria. It seems we are wrapped up in minutia and blind to the blazingly obvious. We deny a very useful safety-enhancing tool, while at the same time invite disaster by allowing circling, all under the guise of criteria that does not fit the environment.

5- Aspen, and other places like it are special cases. I feel we should treat them as such and design procedures to best serve the public interest and enhance the safety of the user. Anyone flying into Aspen should be aware of the hazards and the responsibilities of attempting an approach there. They should not be lead to believe they are being protected by criteria that in fact does not protect them. I think there needs would best be served, and our liability limited, if a point-in-space procedure were developed with a "fly VFR to the airport" segment at it's missed approach point. This procedure could basically follow the valley, with a Final Approach fix in the vicinity of Snowmass and a Missed Approach point in the vicinity of Woody Creek, about 3 miles from the Aspen airport. I think we could get arriving aircraft down to about 9200 ft (1380 HAA), 680 ft lower than the new RNAV (GPS) RWY 15 procedure. Requiring 3 miles visibility, ½ mile more than presently required, would put them in VFR conditions for a landing at the airport. What they do from there is their call, as it is anyway. However, with less than a 30-degree right turn, and directions to the airport, they have a straight in approach to rwy 15. With 3 miles and the clear valley floor for maneuvering the 4.3-degree descent gradient should be no problem. If they prefer to land on rwy 33 they are at liberty to use whatever tricks they would have anyway under VFR conditions. In the event of a missed approach a right turn toward the airport with a climb should put them back on the established missed approach path for a climb out to the Northwest. I think this procedure should carry a note indicating that circling areas are not protected and attempting to maneuver for landing on rwy 33 is not advised at night.

Thank You.

Michael F. Ahern
OKC FIFO