

FINAL INVESTIGATION REPORT

INVESTIGATION INTO SERIOUS INCIDENT OF TCAS RA BETWEEN TWO FLIGHTS OF M/S PIAC FLIGHT # PK-340 (BOEING 737-800 REG#TC-TJI, SECTOR OPKC – OPFA) AND FLIGHT # PK-502 (ATR 42-500 REG #AP-BHP, SECTOR OPTU – OPKC) AT JIAP, KARACHI ON 21ST JANUARY 2015

The notification for conduct of a meaningful investigation was issued by the competent authority, in order to avoid recurrence in future. A detailed and thorough investigation was conducted at appropriate level. The details of investigation are appended in succeeding paragraphs.

Findings

The findings of the investigation are appended below:

1. At the time of occurrence, the runway in use was 25L and same was being transmitted on Automatic Terminal Information Service (ATIS), JIAP Karachi whereas the Duty Approach Controller at Area Control Centre (ACC) JIAP Karachi offered R/W 07R to M/s PIAC Flight # PK-502 which was at 271° / 35 nm from JIAP, Karachi maintaining 15000 ft. At this time M/s PIAC Flight # PK-340 (from Karachi to Faisalabad) had been given clearance for push back and start up.
2. Flight # PK-502 accepted R/W 07R and continued to follow the standard arrival procedure for landing on R/W 07R as per valid Jeppson chart. It was observed that there was no documented procedure for utilization of same runway for reciprocal traffic in respect of landing and takeoff.
3. At 10:09:45 UTC Flight # PK-340 asked permission from Duty Aerodrome Controller at ATC Tower JIAP, Karachi for line up R/W 25L when reciprocal traffic Flight # PK-502 was at distance 261° / 25 nm from JIAP, Karachi and descending through 14000 ft. The Duty Aerodrome Controller instructed him to hold at holding point and also informed him about weather warning of Faisalabad for thunderstorm rain up to 1100 UTC. The cockpit crew of Flight # PK-340 acknowledged said ATC instructions.
4. At 10:11:55 UTC the Duty Aerodrome Controller cleared Flight # PK-340 for line up at R/W 25L behind landing aircraft on approach at 6 nm. At this time reciprocal traffic ie Flight # PK-502 was at distance 247° / 17.5 nm from JIAP, Karachi and descending through 9400 feet.
5. At 10:12:25 UTC the Duty Aerodrome Controller informed Duty Approach Controller on intercom that first Flight # PK-340 will takeoff and then Flight # PK-304 would depart from R/W 25L. The Duty Approach Controller asked him to expedite as Flight # PK-502 was approaching for landing. At this time Flight # PK-502 was at distance 247° / 15 nm from JIAP, Karachi and descending through 7400 ft.

8. At 10:13:00 UTC Flight # ABQ-201 landed on R/W 25L behind which Flight # PK-340 was cleared for line up.
9. At 10:14:25 UTC the Duty Aerodrome Controller asked Flight # PK-340 if he was ready for immediate departure. The cockpit crew of Flight # PK-340 replied in affirmative. The Flight # PK-340 was given line up clearance for R/W 25L accordingly for immediate departure along with information, wind 180° / 10 Kts and caution for birds. The cockpit crew of Flight # PK-340 acknowledged ATC instructions, the aircraft started to move and at the same time cockpit crew requested clarification for Faisalabad weather warning.
10. At 10:14:45 UTC, cockpit crew of Flight # PK-502 informed Duty Approach Controller that they had runway in sight and would shortly be turning for final approach R/W 07R. At this moment Flight # PK-502 was at 250° / 5.9 nm from threshold R/W 07R and descending through 1000 ft.
11. At this time, the Duty Approach Controller talked to the Duty Aerodrome Controller on intercom and expressed his apprehension for ensuring required safe separation between both the arriving and departing flights. The Duty Aerodrome Controller replied him with confidence that both aircraft would be accommodated without any problem. However, the Duty Approach Controller remained apprehensive about the potential unsafe set of conditions as he subsequently asked the Duty Aerodrome Controller regarding position of departing aircraft / its departure profile and how he would ensure the required clearance / separation from the flight path of PK-502. The Duty Aerodrome Controller remained extremely confident and replied it will get out of the flight path of PK-502 and everything will be okay.
12. At 10:14:55 UTC Flight # PK-340 had lined up and not rolled for immediate takeoff, once again the cockpit crew requested for latest weather of Faisalabad from Duty Aerodrome Controller. The Duty Aerodrome Controller replied that he would give them weather later, however they should expedite takeoff due to approaching reciprocal traffic for landing R/W 07R.
13. At 10:15:20 UTC the Duty Approach Controller requested Flight # PK-502 to reduce speed to minimum permissible due to reciprocal aircraft on the takeoff roll and would be turning right after takeoff. Flight # PK-502 at this moment was at 257° / 4.3 nm from threshold runway 07R and maintaining 1000 ft. At this stage, the mutual distance is considered insufficient to ensure adequate separation / clearance between both the flights taking off / landing on the same runway in opposite directions.
14. At 10:15:30 UTC the Duty Aerodrome Controller advised Flight # PK-340 to disregard standard 'Badal Two Charlie' departure procedure and turn right on heading 360° after takeoff and said instructions were not acknowledged by the cockpit crew of Flight # 340. Flight # PK-502 at this time was at 256° / 3.8 nm from threshold runway 07R and descending through 900 ft.
15. At 10:15:40 UTC Duty Aerodrome Controller talked to Duty Approach Controller and informed him that Flight # PK-340 had taken off so he should hand over arriving Flight # PK-502 to him. Flight # PK-502 at this time was at 254° / 3.1 nm from threshold runway 07R and descending through 850 feet.

4. At 10:16:15 UTC Duty Approach Controller asked cockpit crew of Flight # PK-502 to change over to ATC Tower frequency. The instructions were acknowledged by Flight # PK-502. Flight # PK-502 at this moment was at 253° / 2.3 nm from threshold runway 07R and was descending through 800 ft. It was observed that till this stage Flight # PK-502 was being handled by the Duty Approach Controller whereas Flight # PK-340 was under control of Duty Aerodrome Controller. Hence, both flights remained unaware of each other's position / location by virtue of maintaining two different radio frequencies at very close ranges while approaching / departing from same operating surface from opposite ends / reciprocal headings.
5. At 10:16:20 UTC the Duty Aerodrome Controller once again asked Flight # PK-340 to turn right heading 360° which was acknowledged by the cockpit crew. At this time Flight # PK-502 was at 253° / 1.74 nm from threshold runway 07R and maintaining 900 ft whereas Flight # PK-340 was climbing through 1200 ft. Both aircraft crossed each other with a vertical separation of 300 ft and horizontal separation of 1033 ft (0.17 nm).
16. At 10:16:30 UTC when Flight # PK-502 was at 253° / 1.5 nm from threshold runway 07R and maintaining 900 ft contacted Duty Aerodrome Controller on ATC Tower frequency for landing clearance. The Duty Aerodrome Controller cleared the flight for landing on RW 07R after rechecking landing gears down & locked.
17. At 10:16:55 UTC the cockpit crew of Flight # PK-340 informed Duty Aerodrome Controller that they had TCAS RA activation with opposite traffic which was below him. The Duty Aerodrome Controller did not acknowledge the transmitted information and passed him the take off time along with instructions to change over to approach frequency. Flight # PK-502 at this time was at 263° / 0.9 nm from threshold runway 07R and descending through 400 ft whereas Flight # PK-340 was climbing through 2300 ft.
18. At 10:17:20 UTC Flight # PK-502 was at distance 0.1 nm from runway at 200 ft and requested Duty Aerodrome Controller again for landing clearance which was given to him. At this time Flight # PK-340 was climbing through 3000 ft.
19. At 10:19:00 UTC the Duty Aerodrome Controller informed Duty Approach Controller on intercom that Flight # PK-340 requested for Faisalabad weather when she had entered the runway as there was no time for passing the weather information due to arriving traffic so she was told to expedite the takeoff. If Flight # PK-340 would have asked for weather earlier, she would have been stopped from entering runway. That is why the takeoff got delayed.
20. At 10:21:20 UTC the cockpit crew of Flight # PK-340 contacted Duty Aerodrome Controller and once again informed him that they had TCAS RA activation after takeoff against traffic which was around 1-2 miles ahead and 300 feet below and they would be reporting TCAS RA activation to Civil Aviation Authority. The cockpit crew of Flight # PK-502 had also observed TCAS TA activation at almost the same location/ position but did not announce it in air.

1. At 10:23:15 UTC the Duty Aerodrome Controller talked to Duty Approach Controller on intercom and informed him that Flight # PK-340 had reported about TCAS RA activation which he failed to understand. He also advised Duty Approach Controller to discuss the matter with cockpit crew of Flight # PK-340 if they were in contact with him and make an entry in the relevant documents as well.
2. At one particular time the rate of closure between Flight # PK-340 and Flight # PK-502 had reached 320 Knots which means that both the aircraft were travelling into each other on collision course at 540 feet per second. The Duty Aerodrome Controller as well as Duty Approach Controller did not appreciate the high rate of closure and very limited time available to them for initiating the required remedial actions to prevent TCAS TA / RA activation.

Observations

The major observations made during the process of investigation are appended below:

1. After observing the Short Term Conflict Alert (STCA) on radar scope, the Duty Approach Controller did not take any remedial action to avoid unsafe set of conditions despite having the landing traffic on his frequency.
2. The Air Traffic Controllers were not having optimum proficiency level of various ATS units' system knowledge and procedures.
3. The refresher / recurrent training of Air Traffic Controllers was observed inadequate to keep the knowledge of ATS procedures at optimum level for various ATS units.
4. The categorization examination in respect of rating of Air Traffic Controllers is being conducted by the same directorate which exercises operational control over them.
5. A number of ratings are being held by one individual Air Traffic Controller whereas actually he is responsible and posted for one primary place of duty along with any other position as secondary.
6. At present, no limit on maximum number of ratings by one individual Air Traffic Controller is imposed by CAA Pakistan.
7. Duty approach and aerodrome controller qualified / achieved his various Air Traffic Control licence ratings and instructional qualification for respective ATS units starting from 1998 till 2012. It was observed that they never underwent any formal refresher training during their entire service career till date except regulatory requirements of minimum number of duties / watches in each ATS unit and categorization test.
8. The Equipment Control Room (ECR) ATC Tower JIAP Karachi time was behind the GPS supported UTC of ACC JIAP, Karachi by 7 minutes and 25 seconds at the time of occurrence.

Finalization

The serious incident took place as a result of combination of various factors which contributed directly and indirectly towards the causation of serious incident. The factors include:

1. The primary cause of TCAS RA activation include non compliance and non adherence of standard air traffic services procedures by the duty aerodrome controller to ensure minimum safe separation between both the flights as a result of his overconfident and complacent behaviour.
2. The duty approach controller inaction and inability to exert himself to avoid the unsafe set of conditions and situation despite his serious apprehensions while observing very close ranges of landing and reciprocal departing traffic contributed towards the causation of TCAS RA activation.
3. Lack of situational awareness and understanding of both the involved Air Traffic Controllers in respect of high rate of closure between reciprocal traffic during landing / take off phase on / from same operating surface also contributed towards the causation of TCAS RA activation.

Safety Recommendations

The safety recommendations are appended below to avoid recurrence in future:

1. Both the involved Air Traffic Controllers be made to undergo psychosomatic tests for their undesired over confident, complacent behaviour and inaction along with inability to exert himself while handling their respective air traffic.
2. After the psychosomatic tests and declaration of fitness of the involved Air Traffic Controllers for their assigned duties, they are to undergo refresher ground schooling related to their specific place of duty / position.
3. After satisfactory completion of the refresher ground schooling the involved Air Traffic Controllers be given appropriate number of under supervision watches / duties.
4. After satisfactory completion of defined under supervision watches / duties, the involved Duty Air Traffic Controllers be evaluated before clearing to undertake the duties independently.
5. CAA Pakistan is to ensure proper clock synchronization between all ATS Units.
6. CAA Pakistan is to study and devise more comprehensive curriculum for conduct of refresher / recurrent training of Air Traffic Controllers on monthly, quarterly and bi-annual basis along with formal record keeping.
7. CAA Pakistan is to study and review the existing categorization examination and rating procedure of Air Traffic Controllers by a specialist directorate / agency except Operations Directorate.

CAA Pakistan is to study and review the existing system of number of ratings for making it more stringent.

CAA Pakistan is to study and review the maximum allowable number of ratings by one individual Air Traffic Controller at a particular time in order to ensure optimum level of system knowledge and procedures.

CAA Pakistan may like to take up one time study / review of its existing air traffic services procedures in all domains and bring them in formal documented form.