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भारत सरकार
नागर विमानन विभाग
महानिदेशक नागर विमानन का कार्यालय
सफदरजंग एयरपोर्ट के सामने
नई दिल्ली - ११० ००३

OPERATIONS CIRCULAR 9 of 2010

Subject: **ADVERSE WEATHER OPERATIONS - MONSOON OPERATIONS**

1. **Background**

The meteorological term Monsoon is traditionally defined as a seasonal reversing wind pattern accompanied by seasonal changes in precipitation. It is now also used to describe seasonal changes in atmospheric circulation and precipitation. The major monsoon systems of the world include the West African and Asia-Australian monsoons. The North and South American monsoons, however, comprise an incomplete wind reversal.

In hydrology, monsoon rainfall is considered to be that which occurs in any region that receives the majority of its rain during a particular season. This allows other regions of the world to qualify as monsoon regions as well.

The term "monsoon" being used in the context of this circular refer to the big seasonal winds that blow from the Arabian Sea and Bay of Bengal in the southwest bringing heavy rainfall to the area. India experiences a Monsoon season every year which, due to the country's geographical location and geological characteristics, is unique in extent, intensity and coverage.

The season usually lasts from June to September and is dominated by the humid southwest summer monsoon, which slowly sweeps across the country beginning in May or early June. Monsoon rains begin to recede from North India at the beginning of October.

The actual dates of arrival and departure of the Indian Monsoon are forecast each year by the India Meteorological Department (IMD) of the Ministry of Earth Sciences. These can be perused on the website of IMD.

This Circular supersedes Operations Circular 10 of 2009.

2. **Purpose:**

Despite the annual occurrence and predicted regularity of the Indian Monsoon, aviation incidents/ accidents occur every year. Analysis has shown that most of the incidents and accidents, that have occurred, were not generally attributable to inadequacies in aircraft performance but occurred mostly due to various deficiencies/shortcomings of the human element.

Operating techniques applicable to each aircraft, under various generic adverse weather conditions, exist in flight manuals and must be adhered to. However, to ensure an enhanced level of safety, the reinforcement of these operating practices in the context of the Indian Monsoon with relevant, specific and mandatory regulatory guidelines is essential.

3. **Ground School for All Pilots prior to the Monsoon Season:**

All Operators are to provide Ground School training to all their Pilots irrespective of the fact that they may have flown during previous/ earlier monsoon periods. This ground training shall cover, but not be limited to:

- Aircraft Performance during Take-off and Landing with specific emphasis on wet and contaminated runway conditions.
- Calculation of Take-off and Landing field lengths and impact of individual failure events, specific to aircraft type.
- Indian Monsoon climatology
- Techniques of Weather Avoidance.
- Use of Weather Radar (type specific)
- ALAR & Adverse Weather Tool Kit (earlier issued by DGCA). Additionally, Operators not in possession of this shall seek this information through the Flight Safety Foundation's website. It is mandatory for all pilots to be given training on this tool-kit and be individually issued the course contents and the CD by the Operator. The module of ALAR Tool- kit shall be reviewed alongwith recent experiences of related exceedances and incidents, every year in the course of annual technical refresher.
- Detailed briefing on CANPA approaches and procedures.

4. Release of New Commanders during Monsoons

All Operators are required to comply with the following requirements prior to release of New Commanders to operate as PIC in monsoon conditions. Release of Commanders who have operated as PIC in monsoons on any other type prior to being released on subsequent type will also be governed by this Circular.

5. Pilots who have obtained command rating for the first time:

Pilots who have obtained command rating for the first time are required to be subjected to adverse weather/monsoon training and a check before being released to fly as PIC in actual or forecast, adverse weather/ monsoon conditions.

Note: Pilots, who have obtained their command rating on Jet Transport aircraft for the first time, will fall under this category, even if they have flown earlier in Turbo-prop aircraft.

The following additional criteria must be fulfilled:

- (i) Should have operated as a P2 during a minimum of one monsoon season prior to obtaining PIC rating on a new type.
- (ii) Should have at least 100 hours PIC experience before being taken up for Simulator training.

In cases where a PIC is short of the 100 hours requirement or his endorsement has been obtained prior to or during adverse weather/monsoons, the PIC may continue to fly from LHS with Examiners/Instructors/Check Pilots during the monsoons till they achieve 100 hours.

Note: *For the purpose of this circular, 100 hours of PIC must include actual time in the left seat and NOT include hours logged as a cruise captain.*

Such flying would maintain his continuity and could be covered as "P1 Performance Monitoring". On completion of 100 hours in such cases, the pilot will comply with (iii) below.

- (iii) (a) Two hours simulator session (in the form of LOFT) for adverse weather operations covering all aspects of adverse weather conditions likely to be encountered en-route and in terminal areas covering aircraft performance related to wet/contaminated runway conditions combined with MEL despatch. Increased emphasis on landing performance should be given including assessment of landing distance required in reduced

braking effectiveness vs. actual Landing Distance Available (Safety Margins). This will be followed by a check of two hours in the simulator. Training and check for adverse weather conditions to cover pre-monsoon, monsoon and post monsoon period.

- (b) Aircraft not having Simulator: Pilots of such Operators will undergo Ground Training as given in Para 3 above. This training should be arranged close as possible to the onset of Monsoon season as forecast by the Indian Meteorology Department.
- (iv) (a) In case of any adverse remarks during Simulator Check (Route Check if applicable). Operators must arrange ground classes as given in Para 3 above and simulator adverse weather training followed by a Simulator Check (Route Check) by Instructor/Examiner, before being cleared to operate independently in adverse weather conditions/ monsoon period.
- (b) Operators are to ensure that only pilots qualified as per this circular are detailed for flights into adverse weather/ monsoon affected regions.
- (c) Aircraft not having simulators: Who have complied with para 5 iii (b) above, should carry out two sector Route Check on aircraft. The check has to be done in ACTUAL adverse weather/ rain conditions for landing.
- (d) Operators who do not have any Training Captains must detail their qualified and experienced Pilots having a minimum of 500 Hrs PIC experience on type, to act as Co-pilots to Non-Monsoon qualified Pilots and give guidance and help making decisions for at least two sectors, actual adverse weather/monsoon conditions (en-route and departure/ arrival airfield).

6. Pilots who have operated as PIC in Monsoons on another type:

Pilots with previous experience as PIC in Monsoons who have newly obtained PIC rating on another type, must, after Ground Training as per Para 3 above, comply with the following:

- (i) Two hours simulator session (in the form of LOFT) for adverse weather operations covering all aspects of weather conditions likely to be encountered in monsoon (with related weather radar operations to negotiate weather) including Aircraft Performance related to wet/contaminated runway condition combined with MEL Dispatch. The Pilots shall review the ALAR and Adverse Weather Tool Kit issued by DGCA. . This training should be arranged as close as possible to the onset of Monsoon season as forecast by the Indian Meteorology Department. This will be followed by a 2 hours check in the Simulator by Instructor/Examiner.

- (ii) For Aircraft not having Simulator, two route checks to be carried during the period as 5 (iv) (c) above.

7. **General Conditions:**

- (i) Minimum total cockpit experience level of the PIC and the Co-Pilot should not be less than 500 hours on type.
- (ii) No supervised take-offs and landings in actual adverse weather/monsoon conditions.
- (iii) Approach briefing prior to Top of Descent shall include wet/contaminated Landing Distance Required calculation. Scheduled Operators shall prepare a quick analysis table for wet/contaminated LDR in view of the high cockpit work-load environment.
- (iv) A list of newly released commanders is forwarded to Flight Standards Directorate, DGCA Hqrs., by all the Operators, by 15th of May of every year. The names of Commanders released subsequent to this date till the onset of pre-monsoon shall also be forwarded at the earliest.
- (v) ILS approaches are to be preferred to non-precision approaches. In case of non-precision approaches, emphasis must be given on Constant Angle Non-Precision Approaches (CANPA) Ref. Operations Circular 1 of 2005. Operators who have not introduced/ adopted CANPA in their flight procedures are required to do so, alongwith flight crew training, at the earliest.
- (vi) Greater emphasis on stabilized approaches (Refer Operations Circular No. 1 of 2003 on "ALAR India Training Tool Kit and Circular No.9 of 2009 – Standard Operating Procedures).
- (vii) PANS OPS procedures for speed control in terminal areas must be followed.
- (viii) Flight Manual limitations and Company SOPs must be strictly adhered to.
- (ix) Go around procedure in case of wind shear, stall and recovery must be reviewed as per Operations Circular 2 of 2001.
- (x) All Operators are required to follow a non-reprisal policy for Go around and Diversion,
- (xi) Documentation about upset recovery technique for specific airplane must be reviewed.
- (xii) Full flap landing and adequate usage of Reverse thrust and consideration of extra en-route/ terminal fuel computation shall be adhered to. (Type specific manufacturer's guidance accepted)

8. MEL Requirements

The following equipment shall be serviceable during adverse weather/monsoon conditions operations in Indian Airspace.:

- (a) (i) For aircraft requiring transponder and TCAS, both must be serviceable.
- (ii) GPWS/EGPWS must be serviceable.
- (iii) All deceleration devices including Thrust reversers must be serviceable.
- (iv) Anti-skid system must be serviceable.
- (v) Wind shield wipers on both sides must be serviceable.
- (vi) Anti – icing and de-icing must be serviceable.
- (vii) At least one Weather RADAR system must be serviceable.
- (viii) Groove on tyres must be visible out of base stations.

The following items even though un-serviceable, could be accepted “to return direct to base station for maintenance” (i.e. one landing only) subject to acceptable weather conditions at departure and destination station”.

- (b) (i) Transponder/TCAS (not in RVSM airspace)
- (ii) GPWS/EGPWS – subject to all other instrumentation (to co-relate position) being serviceable and flight crew to have satisfactory terrain awareness.
- (iii) One Thrust reverser provided other decelerating devices are serviceable – Subject to additional margin of minimum 1000 feet to field length requirement for take-off and landing.
- (iv) Anti-Skid system – Subject to performance limitations.
- (v) Wind-shield Wipers – Subject to the PIC side (LHS) being serviceable.
- (vi) Anti-icing and De-icing – Subject to performance limitations.

Note: Clubbing of 8 (b) (iii) & (iv) is not permitted. So also, any system degradation causing impact on Flight Controls/Thrust Reversal/Anti-skid must be carefully weighed.

The above waivers to the MEL restrictions will in any case never be applied if the MEL/ other regulatory requirements are not permitting the same for any other specific operations.

For Simulator Monsoon Training and checks: the ADL must be revised to reflect the following functions must be operative:

- Weather Radar.
- Appropriate Hi-Fidelity Special Effects for weather, turbulence/ wind shear, wet/contaminated runway etc. as applicable.

Related Reading Material:**OPERATIONS:**

Circular No. 3 of 1996 -	Missed Approach by Pilots during Final Approach to Land.
Circular No. 2 of 2001 -	Operational Training & Procedures: Pilots.
Circular No. 4 of 2010 -	Approach And Landing Accident Reduction (ALAR) And Controlled Flight Into Terrain (CFIT) Prevention Training.
Circular No. 1 of 2003 -	ALAR India Training Tool Kit.
Circular No. 1 of 2009 & 11 of 1995	Controlled Flight into Terrain.
Circular No. 5 of 2002 -	Enhanced Ground Proximity Warning System (EGPWS) - Operation and Training.
Circular No. 3 of 2009 -	Reduced Effectiveness Of TAWS/EGPWS Equipment.
Circular No. 1 of 2005 -	Guidance to Operators for Conducting Constant Angle Non-Precision Approaches (CANPA).
Circular No. 9 of 2009 -	Standard Operating Procedures.
Circular No. 6 of 2009 -	Line Operational Simulations: Line-Oriented Flight Training, Special Purpose Operational Training.
Circular No. 8 of 2009 -	Crew Resource Management Training.
Circular No. 2 of 2009 -	Communication And Coordination Between Flight Crew members And Cabin Crews.
Circular No. 3 of 2010 -	Pilot's Spatial Disorientation.
Circular No. 3 of 2010 -	Vertical Speed Indicator.
Circular No. 1 of 2010 -	Mode Awareness and Energy State Management Aspects of Flight Deck Automation.
Circular No. 4 of 2009 -	Dispatcher/ Flight Operations Officer Resource Management Training.

AIR SAFETY :

Circular ASC 7 of 2005
 Monsoon Circular 2007
 Circular ASC 4 of 2002

References: -

1. Ramage, C., *Monsoon Meteorology*. International Geophysics Series, Vol. 15, 296 pp., Academic Press, San Diego, Calif. 1971.
2. Trenberth, .K.E., Stepaniak, D.P., Caron, J.M., 2000, The global monsoon as seen through the divergent atmospheric circulation, *Journal of Climate*, **13**, 3969-3993.

3. Glossary of Meteorology (June 2000). "Monsoon". American Meteorological Society.
4. International Committee of the Third Workshop on Monsoons. The Global Monsoon System: Research and Forecast.

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