



International Civil Aviation Organization

**Second Meeting of the Air Traffic Management
Performance Measurement Task Force**

(APM TF/2)
(Cairo, Egypt, 10 – 12 November 2014)

**Agenda Item 3: Development of the Second MID Region Air Navigation Environmental
Report**

SINGLE ENGINE TAXI OPERATIONS AT BAHRAIN INTERNATIONAL AIRPORT

(Presented by the Bahrain)

SUMMARY
This paper presents the single engine taxi operations implemented at Bahrain International Airport. Action by the meeting is at paragraph 3.
REFERENCES
- Bahrain AIP SUP 17/14 effective 14 November 2014

1. INTRODUCTION

1.1 The meeting may wish to note that Bahrain has adopted a procedure for single engine taxi at Bahrain International Airport, which will help in reducing CO2 emissions in accordance with the provisions of the 38th ICAO General Assembly A37-19.

2. DISCUSSION

2.1 Aircraft must consume fuel to supply the energy needed to move its mass on the ground and such manoeuvre is called “taxiing”, where fuel consumption is directly involved in running the engines by which forward momentum is therefore produced. By logic sequence this action would relatively consume high fuel depending on the size and weight of aircraft, if we are to compare it with the environmental pollution contributing factor.

2.2 During the said phase an average consumption of fuel for A320 aircraft when taxiing on the ground is approximately 20 kg of fuel per minute and for B777 is approximately estimated to consume 40kg of fuel per minute.

2.3 Since Bahrain CAA has bounded its airspace with necessary measures which would greatly reduce the greenhouse gases and are detailed as follows:

- Implementation of RNAV 1 on all routes within the Bahrain airspace

- Activating two approach radar sectors to resolve possible traffic conflicts that may arise during the peak hours at the confluence of routes within the terminal area of the airport.
- Partial implementation of CDO and CCO within Bahrain FIR, where full implementation is expected to take place by end 2016.
- New Shortest routes or enhanced ATS Route Structure is introduced to the aviation community as Contingency Route Implementation Plan which would consolidate a smoother traffic flow to Europe from UAE FIR through Tehran FIR. Such structure was implemented by 16th of October 2014.
- Restructuring the airspace with Tehran taking place 16th of October 2014 in such a way to accommodate more traffic thus relatively shortening the standard routes therein
- Procedures to reduce unanticipated delays in flight or on ground (Automated Departure Clearance supported with digital text) and Ground Movement Radar
- Availability of additional Flight Levels on some routes (RAGAS Eastbound traffic: due to the traffic from UAE to Tehran, RAGAS to be used for Westbound as well above FL300
- More efficient SID/STARS on RNAV1 basis is going to be implemented at BIA by the end of this year

2.4 However such achievement was only considered to be as a first stage of implementation, where the second upcoming stage was concerning the emission of burnt fuel of aircraft while on ground but was in pending mode then. The latter stage has preliminary laid a burden on the officials of BCAA and made the role of decision makers to come into play to seek for serious yet effective mitigation measures for reducing the gases being produced by aircraft on the ground. However, subject to certain directives, BCAA has conducted a survey for the unforeseen volume of gas emission in order to sense where BIA would stand from the pollution of aviation.

2.5 Surprisingly, the statistics have shown a stunning figure which revealed an average of nearly ninety departures compared to one hundred & thirty one arrivals using the international airport on daily basis, which implies that emissions may vary between 22,000kg for medium category two engines aircraft and 88,000kg for heavy four engines aircraft.

2.6 Accordingly, an initiative was yield by Bahrain CAA to reduce the total contribution to the environmental contamination as may be caused by the emission of CO₂, in addition, to make a substantial savings of fuel in favor of an aircraft be it an airliner or a private.

2.7 In this very context, BCAA has adopted a technique and made it available for pilots to use should they wish to in order to consume less amount of fuel thus reducing engine emissions and that technique is expressed in taxiing with single engine provided the aircraft is of two engines or more. Such technique may well be used while an aircraft is taxiing in after landing and bound for parking or while an aircraft is taxiing out for departure. For the best interest of safety, certain governing conditions have been laid down In order to ensure that the technique is properly and fully used.

2.8 Those conditions have been published out as an AIP supplement which have adequately described the technique and the relevant conditions and shall be as follows:

- a) The technique may be exercised by the pilot without prior approval from ATC, so as to reduce the workload on the controller as well as the frequency, however, it has been stipulated that pilot should at least be familiar in a reasonable manner with aerodrome layout before commencing the technique.
- b) Taxi time should not be less than five minutes. This condition was stipulated in order not to keep the pilot unnecessarily busy in starting the other engine/s in times of shorter than five minutes which it may result in further delays to successive aircraft whilst the pilot is handful with other internal procedures and/or checklists.
- c) Pilots should adhere to ATC instructions anytime during the single engine taxi operations without any delay. This condition is concise and clear enough to speak for itself.
- d) Not to be exercised, if the reported visibility is less than 5km.
- e) Not to be exercised, in windy conditions, if the wind speed is more than 25kts and/or gust of more than 10kts. These two conditions are set by the regulatory directorate in order to ensure that safety measures are not infringed at any stage as an ensue to strong winds.
- f) Not to be exercised, if taxiing or parking will involve a turn of 180 degrees or more. This condition was stipulated for the sole sake of the aircraft type of two engines, where the pilot would switch one engine off and taxi with one only, and when it comes to turning at angle of 180 degrees or more, then the pilot would normally apply more engine power to compensate for other engine and that power increase should imperatively produce more engine blast which could wash away anything within the turn range.

2.9 Not to be exercised, if the aircraft is on the runway or the pilot is requesting to cross the runway. This condition will render an assurance to the tower controller that a progressive taxi of aircraft will be maintained during either departing or arriving of an aircraft or while an aircraft is crossing the runway, in which case all engines have to be running in full numbers in order to ensure an expeditious vacating of the runway is carried out progressively.

