

---

**SUBJECT: AERODROME WORKS SAFETY**

**DATE: 01/08/2009**

## **GENERAL**

This Advisory Circular (CT) contains information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Authority. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate guidance document.

## **PURPOSE**

This Circular provides methods, acceptable to the Authority, for showing compliance with the works on aerodromes requirements of CV CAR Part 14 and explanatory material to assist in showing compliance.

## **RELATED CV CAR**

This circular relates specifically to CV CAR PART 14.

## **CHANGE NOTICE**

There was no previous issue of this CT, consequently no change is in effect.

## 1. INTRODUCTION

- A. The aerodrome operator is responsible for controlling any work in progress on the aerodrome and establishing the safety requirements and procedures. This circular provides guidance for compliance with these responsibilities and further guidance is contained in CT 42-004, Control of Obstacles.
- B. The "Plan of Construction Operations" is an acceptable "Means of Compliance" to the Cape Verde Civil Aviation Authority. The "Plan of Construction Operations (PCO)" is also part of the airport certification process. The AAC certifies the airport according to certain established criteria, be it airport physical characteristics, operational plans, security measures etc. These physical characteristics and operational plans will be modified, temporary or permanently, during and/or following the realization of a construction or major renovation project. Additional security measures shall be applied during the realization of the project.
- C. This documents aims at defining a "Plan of Construction Operations (PCO)" and to establish guidelines for the preparation of PCOs for any airport construction or major renovation projects. The contents of a PCO will be described as well as items to be reviewed while preparing a PCO. Finally the reader will find at Appendix "A" and "B" two examples of PCOs that were prepared for major construction project while Appendix "C" deals with a minor construction project.
- D. Although minor construction or maintenance work do not require the preparation of a PCO, a control system should be developed to ensure that:
  - (1) No work takes place on the active movement area without the knowledge of either the aerodrome operator or any applicable air traffic service unit: and
  - (2) Permitted times of work are strictly followed; and
  - (3) All individuals taking part in the work are briefed in detail on the following:
    - (a) precise areas in which the work may be done; and
    - (b) the routes to be followed to and from the work area; and
    - (c) the radiotelephone or other control procedures to be used, the maintenance of a radio listening watch, and the use of lookouts; and
    - (d) the safety precautions to be observed; and
    - (e) the reporting procedure to be followed on completion of the work; and
  - (4) At the conclusion of the work, the aerodrome operator inspects the work area to ensure that it has been left in a safe condition.

## **2. PLAN OF CONSTRUCTION OPERATIONS (PCO)**

### **3.1 Definition**

A PCO is a document that describes the mitigation measures that will be taken or applied during the realization of an airside construction or major renovation project. These mitigation measures can be defined, but not exclusively, as: signage, markings, markers, displaced threshold, NOTAMs, voice advisory, escort of personnel on the airside, means and lines of communication between the parties involved in the realization of the project.

### **3.2 Responsibilities**

A Plan of Construction Operations (PCO) is a document that is to be prepared by the Aerodrome operator staff and to be approved by the AAC. It is the responsibility of the Airport Manager or the person responsible for the operation of the airport to designate a project coordinator who will not only prepare the PCO but will coordinate with the stakeholders (airlines, service providers and the Contract/project manager) the realization of the project. The Aerodrome operator is assuming full responsibilities for the airport certification vis-à-vis the AAC.

### **3.3 The Consultation Process**

A. It is very likely that the realization of an airside project will impact the airport users at different degrees that could vary from negligible to very significant. Depending on the scope of the project the mitigation measures could vary from a voice advisory to the closure of a runway. As an example, it may happened that, for the overlay of a single runway airport, the runway width will be reduce by 50%, i.e. instead of landing on a 60 meter wide runway, aircraft will land on a 30 meter wide runway. At some other times, the runway length could be reduced. Navigational aids as well as visual aids could be unserviceable for a certain period of time. It may means that airlines will have to modify their regular schedule, to temporary change aircraft types, to schedule more experienced pilots etc... That is to say that the consultation process shall commence long time before the realization of the project. In some cases, consultation with the airlines and service providers should start over one (1) ahead of time. Consultations/communications shall be conducted during:

- (1) The planning stage of the project;
- (2) The pre-construction period and;
- (3) The construction period.

B. The consultation process is important not only for the airlines and service providers but also for the "to be" selected Contractor. The Contractor working conditions must be known before the tendering process is launched. The airport operating

conditions could have a very significant impact on the Contractor's costs. The Contractor may be imposed night working hours, broken hours, waiting time while clearing the runway to allow aircraft movements etc. etc.

- C. It is imperative that the aerodrome operator defines with the airlines and service providers the operating conditions during the realization of the project, at a time where the Contractor is not yet selected. Airport operating conditions will be specified in the project tender documents and the Contractor will bid knowing what his working conditions will be. Obviously the process is also coordinated with the project management responsible person as this person is directly responsible for the cost and the scheduling of the project. It should be however bear in mind that ultimately the aerodrome operator is assuming responsibility for the aerodrome certification.
- D. The sooner the airlines and other stakeholders are consulted, the better it is. Early consultations, in giving sufficient time to react, usually allow for the resolution of operational problems to the satisfaction of all parties.

### **3. AIRPORT OPERATIONS**

- A. Under normal circumstances the aerodrome operator is responsible to operate the airport according to the conditions specified in the Aerodrome Manual (AM).
- B. This Aerodrome Manual has been approved by the AAC that is to say that the AAC has approved the operating conditions of the aerodrome. Operating conditions may mean, but not exclusively:

#### **4.1 Runway:**

- Runway length
- Runway width
- Runway slope
- Runway surface type
- Touchdown zone elevation
- Thresholds elevation
- Thresholds coordinates
- Runway strip width
- Grades area width
- Obstacles limitation surfaces: approach, transitional and outer surfaces
- Runway lighting system
- Approach lighting
- Visual Approach Slope Indicator System or Precision Approach Path Indicator
- Runway identification lights
- Runway end lights
- Runway centre line lights

- Runway touchdown zone light
- Runway exit lights
- Threshold marking
- Centre line marking
- Touchdown zone marking
- Runway exit marking
- Declared distances: TORA, TODA, ASDA and LDA
- Etc.

#### **4.2 Taxiway:**

- Taxiway type of surface
- Pavement width
- Intersection lights
- Centre line
- Markers for taxiway edge
- Centre line marking
- Hold position
- Etc.

#### **4.4 Apron:**

- Dimensions
- Edge lights
- Flood lights
- Aircraft stand taxilane
- Aircraft stand
- Passenger path lines
- Etc.

- A. It is obvious that, when a significant maintenance project or a construction project is going to be realized on the airside, the operation conditions of the airport will be modified in one way or the other. Depending on the scope of the project, a few or many of the characteristics listed above will be modified. The aviation industry must be informed of these changes and these changes must be approved by the AAC.
- B. Therefore, a Plan of Construction Operation (PCO) shall be prepared for each non-routine maintenance project and for any construction project. Runway marking, runway crack filling, grading of graded area, replacement of bulbs on the runway lighting system do not usually require the preparation of a PCO. In some cases, however, the issuance of a NOTAM or a voice advisory is desirable. The aerodrome operator in coordination with the Air Traffic Services is responsible and competent in this matter.

#### 4. CONTENTS OF A PLAN OF CONSTRUCTION OPERATIONS

A Plan of Construction Operations (PCO) shall contain at least the following information:

(1) Description of the construction project:

Provide a full description of the planned construction project.

(2) Stages/phases of the construction & schedules:

List the different stages of the construction activities with anticipated start and finish dates.

(3) Types & frequency of air traffic:

List the types of aircraft and number of daily movements anticipated during the construction period.

(4) Disruptions to air traffic:

What will be the impact on and disruptions to the air traffic as listed above.

(5) Position and height of equipment (Relative to Runways & Taxiways):

(a) Provide the location and maximum working height of the construction equipment or vehicles and where that equipment will be working in

(b) relationship to the taxiway or runway edges/ends. This information is required to assess the impact on Obstacle Limitation Surfaces and object is.

(6) Work adjacent to Runway/Taxiway:

Temporary hazards on runway strips. Which zone will you be working in, which restriction and operational conditions will apply to your project.

(7) Markings, barriers and lighting provided:

Describe all markings, barriers and lighting to be used to indicate unserviceable areas of the airport.

(8) Displaced and/or Relocated Thresholds:

If the project will require a displaced or relocated threshold, provide an explanation as to why this is required, what percentage slope the calculations are based on, how will the new threshold be marked and lighted, what buffer is being provided for jet or prop blast, consideration.

(9) Declared distance during all phases:

Based on the above calculation what will be the revised declared distances.

- (10) Access control, vehicle operations and Escorts:

How will vehicles and equipment access the construction site, will Airport Vehicle Operator Permit be issued, are radio licenses required, will vehicles be escorted, whom will be providing the escorts.

- (11) Communications Plan (Prior to Construction & During Construction):

Every construction project requires a Communication Plan. The Plan will cover communication with the airport's clients/users, ATS and AAC during all phases of the project; #1: Planning Phase, #2: Pre-construction Phase #3: Construction Phase.

***Airport Ops ↔ ATS;***

***ATS ↔ Construction Site;***

***Airport Ops ↔ Construction Site;***

***Airport Ops ↔ Users (Stakeholders);***

***Airport Ops ↔ AAC.***

- (12) NOTAMs as per the NOTAM procedure manual:

Provide a draft of all anticipated NOTAMS. NOTAMs revising declared distances must be pre approved by AAC.

- (13) Drawing or Blueprints:

Provide any drawings required to support your Plan of Construction Operation. It is the aerodrome operator's responsibility to ensure the drawings and final product meet Aerodrome Certification requirements.

## **5. ISSUEDS TO BE REVIEWED**

**Here are some Issues to review while preparing a PCO:**

- (1) Minimum disruption of standard operating procedures for aircraft operations.
- (2) To maintain clear routes from rescue and fire-fighting stations to active aerodrome movement areas.
- (3) A procedure for notification, and authority to change safety-oriented aspects of the construction plan.
- (4) Location of equipment under approach and transitional surfaces
- (5) The height of obstacles & distance from the threshold
- (6) Marking and lighting of construction equipment

- (7) Parking of construction equipment and storage of material, when not in use
- (8) Relocation or displacement of threshold
- (9) Revised TORA, TODA, ASDA, LDA
- (10) Declared clearway available
- (11) Marking of relocated or displaced threshold
- (12) Operation of visual aids when the threshold is relocated or displaced
- (13) Is the PAPI off when the threshold is relocated or displaced
- (14) Coordination with airport & ATS for turning off lighting
- (15) Work in different zones such as 1,2 & 3
- (16) Work adjacent to taxiways & aprons
- (17) Shutdown, protection or interference with any electronic nav aids, such as a localizer
- (18) Size of trenches
- (19) Trenching & backfilling
- (20) Procedures to reopen full length when requested, emergency or weather limits are down.
- (21) Inspection checks before reopening movement areas
- (22) Lighting of runway during closures.
- (23) Closed markings on new runway during construction, & before relocation of lighting
- (24) Barricades lighting & markings at threshold, denoting construction area.
- (25) Spacing & colours
- (26) Barriers & lighting adjacent to trenches
- (27) NOTAM's, Initiation, Currency and Cancellation.
- (28) Commissioning of nav aids & visual aids (when & by whom)
- (29) Escort for contractor's employees when working on the airside, including the location for construction personnel vehicle parking and their transportation to and from the work site.



- (30) Vehicle Operator Permit on the airside
- (31) Location of the contractor plant
- (32) Designation of waste areas and disposal of waste
- (33) Debris cleanup responsibilities and schedule
- (34) Conspicuous identification of construction personnel and equipment
- (35) Security control of temporary gates and relocated fences
- (36) Revised vehicular control procedures, or additional equipment and personnel, ref. escort of contractor's staff
- (37) Explosives regulation and control
- (38) Dust, smoke, steam, and vapor controls.
- (39) Location of utilities
- (40) Location of power and control lines for electronic and visual navigational aids
- (41) The need to notify the rescue and fire-fighting unit when working on water lines
- (42) Provision of traffic directors, aircraft marshallers, wing walkers, and the like, as needed to assure clearance in construction areas.

## **6. EXAMPLES OF HAZARDOUS AND MARGINAL CONDITIONS**

- A. Analysis of past accidents and incidents have identified many contributory hazards and conditions.
- B. Conditions that should be watched carefully are listed below:
  - (1) Excavation adjacent to runways, taxiways and aprons;
  - (2) Stockpiles of earth, construction material, temporary structures and obstacles in proximity to aerodrome movement areas and runway approach and take-off surfaces;
  - (3) Runway projects resulting in excessive lips greater than 25 mm for runways and 76 mm for edges between old and new surfaces at runway edges and ends;
  - (4) Heavy equipment operating or idle near aerodrome movement areas;
  - (5) Proximity of equipment or material which may degrade radiated signals from, or impair monitoring of navigational aids;

- (6) Tall but relatively inconspicuous objects, such as cranes, drills, and the like, in critical areas such as safety areas and runway approach and take-off surfaces;
  - (7) Improper or malfunctioning lights or unlighted aerodrome hazards;
  - (8) Holes, obstacles, loose pavement, rubbish, or other debris on or near aerodrome movement areas;
  - (9) Failure to maintain barriers such as fences during construction to prevent unauthorized access;
  - (10) Improper marking or lighting of runways, taxiways and displaced threshold;
  - (11) Attractions for birds such as exposed earthworks, rubbish, grass seeding, or ponded water on or near aerodromes
  - (12) Inadequate or improper methods for marking temporarily closed movement areas including improper and unsecured barricades
  - (13) Obliterated markings on active movement areas.
- C. Safety encroachments, improper ground vehicle operations and unmarked or uncovered holes and trenches in the vicinity of aircraft movement surfaces are the most recurring threats to safety during construction.

## **7. PCO (EXAMPLES)**

- A. Examples of PCOs may be obtained from the AAC, Aerodromes Department. The available examples were obtained from other Authorities' guidance document and may be a valuable source of information for developing a PCO.
- B. No template can cover all the possibilities that could arise from an airside construction project. No project is exactly similar to another. The proponent judgment shall be exercised.

C. Additional information and assistance concerning the preparation of a "Plan of Construction Operations" can be obtained by contacting:

Agência de Aviação Civil (AAC)  
Aerodromes Department (AED 420)

Av. Cidade de Lisboa No 34, 4º E

Praia, Cabo Verde

(Tel: 260 3430)



Carlos Monteiro

President of the Board

--- o ---