International Civil Aviation Organization

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Agenda Item 11: Capacity Building, including Human Factors and Air Traffic Safety Electronics Personnel (ATSEPs**)** related training

FORMULATION OF AIR TRAFFIC SAFETY ELECTRONICS PERSONNEL WITH CONSIDERATION OF FATIGUE RISK MANAGEMENT SYSTEM IN INDONESIA

(Presented by Indonesia)

SUMMARY

This paper is to share experiences on how ANSPs in Indonesia determine the formulation of Air Traffic Safety Electronics Personnel (ATSEP) requirements by referring to fatigue management.

1. INTRODUCTION

1.1 The purpose of this paper is to share experiences on how ANSPs in Indonesia determine the formulation of Air Traffic Safety Electronics Personnel (ATSEP) requirements by referring to fatigue management. This approach considers working hours, time off, and workload in the performance of their duties and obligations.

1.2 In details, the criteria for personnel deployment shall considered the operating hours of the facilities, the amount of traffic, the condition and configuration of the facility and the environmental state at the site. Furthermore, the requirements to consider the Fatigue management to formulate the number of ATSEP has already stipulated to the national provisions.

2. DISCUSSION

2.1 Consideration of Fatigue Management

2.1.1 In daily operations, the ATSEP shift pattern arrangement in Indonesia adheres to the ICAO Document Guidance on Human Factors for ATSEP, which is outlined as follows:

a) Number of night shifts not undertaken for three consecutive nights.
b) The ideal downtime after a night shift is 48 hours and not less than 24 hours.
c) Shift workers should have more days off than day workers.
d) Night shift duration is kept as short as possible.

e) Time-off for shift workers who are required to work emergency duties must be appropriately provided; and
f) Workplaces must give workers at least 48 hours' notice of the shift start time due to schedule changes.

2.1.2 Based on the implementation of the above criteria, working time parameters are determined as one of the considerations in formulating ATSEP requirements, namely:

No.	Parameter	Limitations
1	Working hours per shift	minimum of 8 hours, may be extended to up to 12 hours with consideration of facilities and operating hours.
2	Maximum working hours per shift	maximum 40 hours per week.
3	Inter-shift breaks	the time interval between the end of the shift and the start of the next shift is at least 11 hours.
4	Night shift setup	after the night shift, It must be followed by at least 30 hours of rest before carrying out the next shift.

2.1.3 Other than working time parameter limitations, the shift pattern arrangement is also determined for airports with operational hours that are less than the facility's operational time (24-hour operation).

No.	Workload categorizes	Type of Facilities	Working hours per Shift
1	High	> 3 facilites	8 Hours
2	Medium	= 3 Facilities	10 Hours
3	Low	1 – 2 Facilities	12 Hours

2.2 Formulation of ATSEP Requirements

2.2.1 The information used in formulating ATSEP requirements per branch is as follows:
a) The time required includes the duration for carrying out maintenance, as well as the preparation and travel time to and from the facility location, and
b) Total effective working days in hours per year.

2.3 Thus, the formula for ATSEP requirements becomes:

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

The details of the simulation for formulating ATSEP personnel requirements are provided in the attachment to this information paper.

2.4 Implementation of Maintenance

2.4.1 In operational activities, maintenance carried out by ATSEP is divided into two types:

a) Maintenance onsite is maintenance carried out by ATSEP by coming directly to the location of the facility including preventive maintenance and repair services.
b) Remote Maintenance, with detailed provisions as follows:
   i. ATSEP personnel can remotely determine the operational state of the facility.
   ii. There is back up equipment and power supply so that availability and continuity can be maintained and well guaranteed.
   iii. Direct maintenance is still carried out regularly every 3 (three) months.

2.4.2 We also identify several aeronautical telecommunications facilities for which maintenance can be carried out remotely. These include:

a) Very High Frequency Air Ground Communication (VHF A/G) Portable.
b) Voice Recorder < 8 (less than or equal to eight) channels.
c) AFTN Teleprinter in the form of a Personal Computer (PC).

2.4.3 Generally, the criteria for carrying out maintenance are as follows:

No.	Facility Maintenance Criteria	Maintenance Program
1	Locations that have a variety of facilities, operating hours 24 hours service provision	a. Daily, weekly, monthly, and annual maintenance is conducted immediately. b. Personnel are stationed at the site.
2	Locations that only have VHF Portable, Recorder < 8 (less than or equal to eight) channels, and/or AFTN Teleprinter in the form of Personal Computer (PC).	a. Daily and weekly maintenance is performed remotely. b. Facilities are equipped with back up equipment and power supply; and c. Deployment to the location is made every 3 (three) months to carry out daily, weekly, monthly, and annual maintenance.
3	Locations with facilities that are used for 24-hour services to support FIR, for example: In locations with AFIS services, there are Very High Frequency Air Ground Extended Range (VHF A/G ER), Radar (PSR, SSR, MSSR), and/or ADSB/ADSC equipment facilities.	a. Daily, weekly, monthly, and annual maintenance is performed immediately; and b. Personnel are assigned both on-site (dedicated) and overlapping assignment or detachment patterns.

4	Locations that have supporting facilities, such as generator sets	a. Daily, weekly, monthly, and annual maintenance is performed immediately. b. Personnel are stationed on site.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Take note of the information contained in this paper, and

b) Discuss any relevant matter as appropriate.

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ATTACHMENT to IP/xx

Formulation of ATSEP personnel requirements:

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

For Example:
Branch A

Location	**Airport Operating Hours**	**Group of Facilities**	**Service Hours of The Facility**	**Total Hours of Maintenance**
Branch A	24 hours	CNSD	24 Hours	37376
Sub-branch A1	13 hours	CND	13 Hours	3687
Unit A2	10 hours	CN	10 Hours	2986
Unit A3	10 hours	CNS	24 Hours	5655
Unit A4	-	-		1069
Total				50773

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

$$= \frac{50773}{1880} = 27{,}01 \sim 28 \text{ (rounding up)}$$

1. Shift simulation of Branch A

a. Total working hours based on workload of Branch A

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

$$= \frac{37376}{1880} = 19{,}88$$

b. Operating hours of service: 24 Hours
c. Operating hours of Facilities: 24 Hours

Group / Date	**A**	**B**	**C**	**D**	**E**
1	M	H	H	N	D
2	D	M	H	H	N
3	N	D	M	H	H
4	H	N	D	M	H

5	H	H	N	D	M
6	M	H	H	N	D
7	D	M	H	H	N
8	N	D	M	H	H
9	H	N	D	M	H
10	H	H	N	D	M
11	M	H	H	N	D
12	D	M	H	H	N
13	N	D	M	H	H
14	H	N	D	M	H
15	H	H	N	D	M
16	M	H	H	N	D
17	D	M	H	H	N
18	N	D	M	H	H
19	H	N	D	M	H
20	H	H	N	D	M
21	M	H	H	N	D
22	D	M	H	H	N
23	N	D	M	H	H
24	H	N	D	M	H
25	H	H	N	D	M
26	M	H	H	N	D
27	D	M	H	H	N
28	N	D	M	H	H
29	H	N	D	M	H
30	H	H	N	D	M

Notes : M = Morning Shift
D = Day Shift
N = Night Shift
H = Holiday

d. Based on the results of calculations based on workload, personnel are divided into 5 groups therefore all the shifts are covered.

2. Shift Simulations of Sub-Branch A1

a. Total working hours based on workload of Sub-Unit A1

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

$$= \frac{3687}{1880} = 1{,}96$$

b. Operating hours of service: 13 Hours
c. Operating hours of Facilities: 13 Hours

Group / Date	A	B	C
1	M	H	D
2	M	H	D
3	D	M	H
4	D	M	H
5	H	D	M
6	H	D	M
7	M	H	D
8	M	H	D
9	D	M	H
10	D	M	H
11	H	D	M
12	H	D	M
13	M	H	D
14	M	H	D
15	D	M	H
16	D	M	H
17	H	D	M
18	H	D	M
19	M	H	D
20	M	H	D
21	D	M	H
22	D	M	H
23	H	D	M
24	H	D	M
25	M	H	D
26	M	H	D
27	D	M	H
28	D	M	H
29	H	D	M
30	H	D	M

Notes : M = Morning Shift
D = Day Shift
N = Night Shift
H = Holiday

d. Based on the results of calculations based on workload, personnel are divided into 3 groups therefore all the shifts are covered.

3. **Shift Simulations of Unit A2**

a. Total working hours based on workload of Unit A2

Maintenance time + Preparation and Travel time in hours X 1 Person

Total effective working days in hours per year

$$= \frac{2986}{1880} = 1{,}59$$

b. Operating hours of service: 13 Hours
c. Operating hours of Facilities: 13 Hours

Group / Date	A	B	C
1	M	H	D
2	M	H	D
3	D	M	H
4	D	M	H
5	H	D	M
6	H	D	M
7	M	H	D
8	M	H	D
9	D	M	H
10	D	M	H
11	H	D	M
12	H	D	M
13	M	H	D
14	M	H	D
15	D	M	H
16	D	M	H
17	H	D	M
18	H	D	M
19	M	H	D
20	M	H	D
21	D	M	H
22	D	M	H
23	H	D	M
24	H	D	M
25	M	H	D
26	M	H	D
27	D	M	H
28	D	M	H
29	H	D	M
30	H	D	M

Notes : M = Morning Shift
D = Day Shift
N = Night Shift
H = Holiday

d. Based on the results of calculations based on workload, personnel are divided into 3 groups therefore all the shifts are covered.

4. **Shift Simulations of Unit A3**

a. Total working hours based on workload of Unit A3

$$\frac{\text{Maintenance time + Preparation and Travel time in hours}}{\text{Total effective working days in hours per year}} \text{ X 1 Person}$$

$$= \frac{5655}{1880} = 3{,}01$$

b. Unit A3 is a unit under the supervision of branch A that has 10 operating hours, but there are facilities that run for 24 hours, such as ADSB and VF ER (2 facilities).

Location	**Operating Hours**	**Facilities that run for 24 hours**	**Workload Category**	**Work Shift**
Unit A3	10 Hours	ADSB, VHF ER	Low	12 Hours

c. Shift pattern in unit A3

Group / Date	**A**	**B**	**C**	**D**
1	MD	H	H	N
2	N	MD	H	H
3	H	N	MD	H
4	H	H	N	MD
5	MD	H	H	N
6	N	MD	H	H
7	H	N	MD	H
8	H	H	N	MD
9	MD	H	H	N
10	N	MD	H	H
11	H	N	MD	H
12	H	H	N	MD
13	MD	H	H	N
14	N	MD	H	H
15	H	N	MD	H
16	H	H	N	MD
17	MD	H	H	N
18	N	MD	H	H
19	H	N	MD	H
20	H	H	N	MD
21	MD	H	H	N
22	N	MD	H	H
23	H	N	MD	H

24	H	H	N	MD
25	MD	H	H	N
26	N	MD	H	H
27	H	N	MD	H
28	H	H	N	MD
29	MD	H	M	N
30	N	MD	M	H

Notes : M = Morning Shift
D = Day Shift
N = Night Shift
H = Holiday
MD = Morning-Day Shift

d. Based on the results of calculations based on workload, personnel are divided into 4 groups therefore all the shifts are covered, so to fulfill 24 hours of operation with 12 hours of working hours per shift, 1 additional person is needed.

Hence there are 30 ATSEP in total needed for branch A and its sub-branches and subordinate units.