ANNUAL SMS PERFORMANCE OF AIRPORTS AUTHORITY OF INDIA

Year 2015

Aviation Safety Directorate, CHQ

Introduction

'Safety Performance Monitoring and Measurement' is one of the elements, in the SMS component of 'Safety Assurance' as envisaged by ICAO and set forth in DGCA CAR on 'Establishment of a SMS'. After the Safety Performance Indicators and their corresponding Targets have been established, the performance outcome of each Indicators needs to be monitored. This helps in identifying whether there are any safety concerns that need to be addressed and rectified. Further, a consolidated summary of the overall target and performance outcomes is to be compiled to measure the Safety Performance of the Organization as a whole.

This document provides annual summary of Safety Performance Indicators (SPIs) of Airports Authority of India, of which Safety Performance Targets (SPTs) were set for the year 2015. The annual SMS performance summary of AAI SPI package-2015 annotated with their respective Alert and Target level outcomes.

The summary is derived from the safety data with respect to Safety Performance Indicators (SPIs) of 2015, as set forth vide Aviation Safety Circular 01 of 2015. The source of data of Aerodrome Operations is mainly from control room messages received and managed by Aviation safety directorate. The aircraft movement data is extracted from AIMS (Airport Information Management System). In respect of ATM and CNS, safety data related to SPIs is compiled and managed by respective directorate. ATM data regarding SMI for the year 2013 & 2014 has been modified after finalization of investigation in conjunction with DGCA. ATM Data for the year 2015 is provisional and subject to change for the same reason.

A revised Annual SMS performance summary format has been used in this document in line with the guidance provided in Doc. 9859 (Safety Management manual) 3rd edition, where more weightage for 'Not breaching Alert level criteria' in comparison to 'Achieving Target level criteria' has been assigned for both high consequence indicators & low level consequence indicators. The new numerical value has been assigned as follows:

High consequence Indicators:	Alert Level not breached:	[Yes (4); No (0)]
	Target achieved:	[Yes (3); No (0)]
Low consequence Indicators:	Alert Level not breached:	[Yes (2); No (0)]
	Target achieved:	[Yes (1; No (0)]

Such a summary provides overview of the SMS performance of Airports Authority of India. However, due to lack of historical data and data integrity issues, some the Safety Performance Targets could not be established for their corresponding SPI's. Therefore, a more quantitative summary measurement could be done, once Safety Performance Targets (SPTs) of all corresponding Safety Performance Indicators (SPIs) are established with an effective comprehensive safety data management system.

The guidelines to collect the Safety data has been published vide Aviation safety Circular 01 of 2015, to emphasize the importance of accurate and comprehensive data collection for effective Safety Management System. Further, for ease of reporting of safety data by field airports, Aviation safety Directorate is working in the direction of electronic reporting & managing of safety data through Airport Information Management System (AIMS).

22/3/16.

S.V. Satish
Executive Director (AVS)

Aerodrome Operations

SAFETY PERFORMANCE INDICATORS (SPIs) FOR AERODROME OPERATIONS

A. High Consequence Indicators

1. Number of reported bird strikes per 10,000 Arrivals and Departures

1.1 Definition

As per DGCA Air safety circular 02/2011, Wildlife (bird/animal) strike are defined in following two categories:

Confirmed Strikes

a) Any reported collision between a bird or other wildlife and an aircraft for which evidence in the form of a carcass, remains or damage to the aircraft is found.

b) Any wildlife (bird/animal) found dead on an airfield where there is no other obvious cause of death (e.g. strike by vehicles in the operational area, etc.).

Unconfirmed Strike

Any reported collision between a bird or other wildlife and an aircraft for which no physical evidence is found.

1.2 Source of Data

a) Traffic data is derived from Airport Information Management System (AIMS) data Base.

b) Reports of bird strikes are extracted from source of AAI control room messages, which includes reports of pilots, controllers, WSOs, Airport-in-charges, Airlines, AFTN messages and Wildlife (Bird/Animal strike forms).

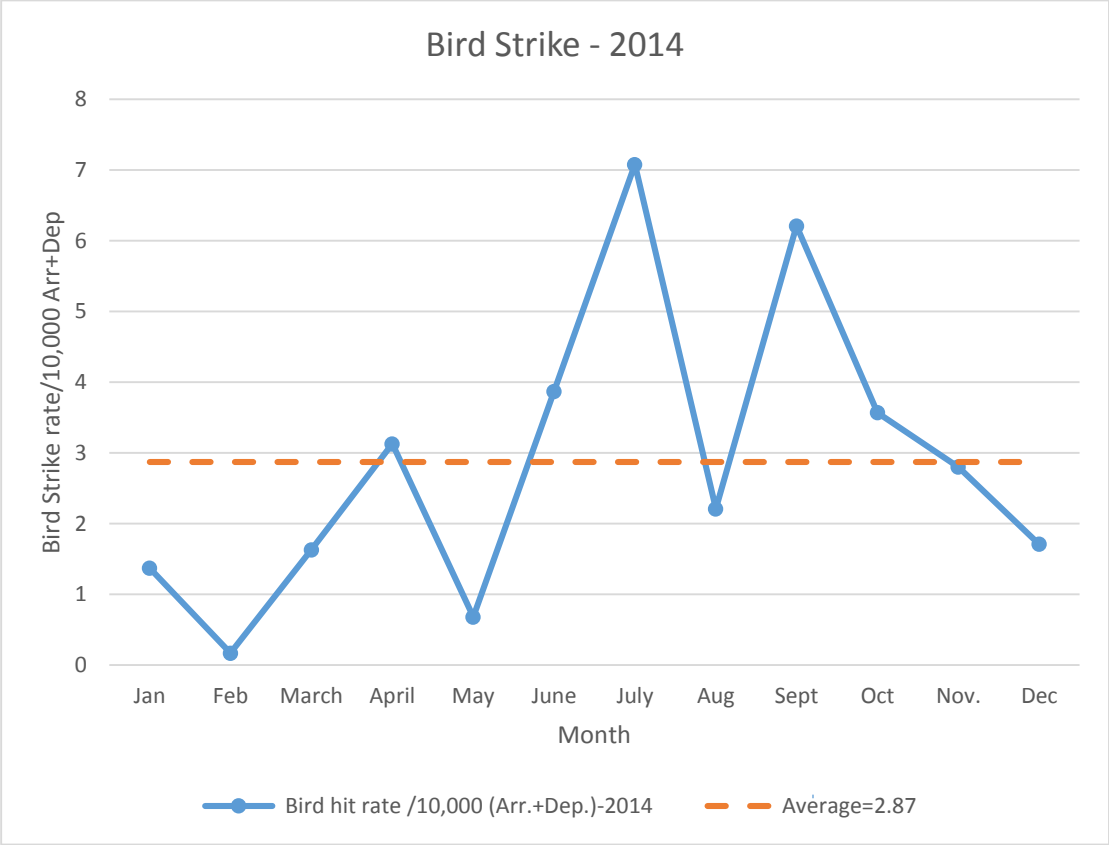
1.3 Data 2014 :

Number of reported bird strikes per 10,000 Arrivals and Departures during last year i.e. 2014 and detailed analysis is appended below:

Year 2014 (1st January - 31st December)					
No. of Bird strikes Per 10,000 Arrivals + Departures					
Month	**Total no. of Arrivals + departures**	**No. of Reported Bird Strikes**	**Incident Rate (Per 10,000)-(x)**	**Average (μ)**	**$(x- \mu)^2$**
Jan	58347	8	1.371107341	2.87	2.246679
Feb	55881	1	0.178951701	2.87	7.241741
March	61013	10	1.638994968	2.87	1.515373
April	60574	19	3.136659293	2.87	0.071107
May	58439	4	0.684474409	2.87	4.776522
June	54193	21	3.875039212	2.87	1.010104
July	53638	38	7.084529625	2.87	17.76226
August	54117	12	2.217417817	2.87	0.425864
Sept.	54666	34	6.219588044	2.87	11.21974
Oct	58703	21	3.577329949	2.87	0.500316
Nov	57096	16	2.802297884	2.87	0.004584
Dec	58198	10	1.718272106	2.87	1.326477
Average			**2.87**		**$\Sigma(x- \mu)^2/12$=**4.008397
SD = $\sqrt{\Sigma(x- \mu)^2/12}$			2		

Safety Performance Target (SPT) for 2015	
Current year (2015) Safety Performance Target (SPT) is 5% average rate improvement over the average rate for preceding year (2014)	2.87 – 5% of 2.87 = **2.73**

Alert Level Setting		
Alert Level 1	Alert Level 2	Alert Level 3
Average + 1 SD	Average + 2SD	Average + 3 SD
4.87	**6.87**	**8.87**



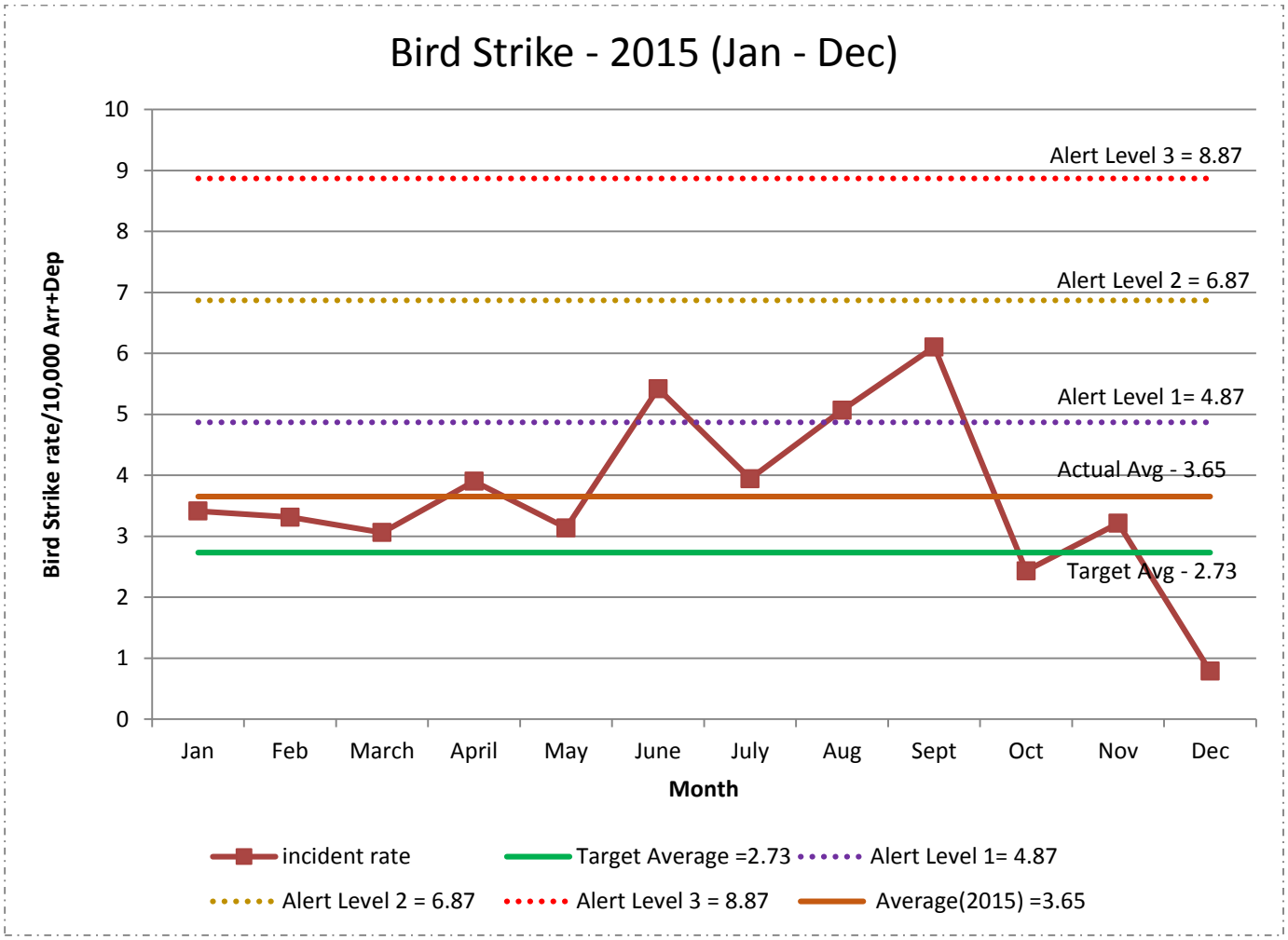
1.4 Target Achievement at the end of monitoring period (i.e. 2015)

At the end of the current year 2015, if the average rate for the current year is atleast 5% or more, lower than the preceding year 2014's average rate i.e. **2.73 or lower**, then the set target of 5% improvement is deemed to have been achieved.

1.5 Performance Analysis - 2015 (1st January to 31st December 2015)

Performance analysis of the SPI for the monitoring period i.e. 1st January to 31st December 2015 is as under:

Year 2015 (1st January – 31st December)							
No. of Bird strikes Per 10,000 Arrivals + Departures							
Month	**Total no. of Arrivals + departures**	**No. of Reported Bird Strikes**	**Incident Rate (Per 10,000)(x)**	**Target Average**	**Alert level 1**	**Alert level 2**	**Alert level 3**
Jan	58614	20	3.41	2.73	4.87	6.87	8.87
Feb	54317	18	3.31	2.73	4.87	6.87	8.87
March	58817	18	3.06	2.73	4.87	6.87	8.87
April	58932	23	3.90	2.73	4.87	6.87	8.87
May	60593	19	3.14	2.73	4.87	6.87	8.87
June	57187	31	5.42	2.73	4.87	6.87	8.87
July	58318	23	3.94	2.73	4.87	6.87	8.87
Aug	59195	30	5.07	2.73	4.87	6.87	8.87
Sep	60601	37	6.11	2.73	4.87	6.87	8.87
Oct	65742	16	2.43	2.73	4.87	6.87	8.87
Nov	62240	20	3.21	2.73	4.87	6.87	8.87
Dec	63424	5	0.79	2.73	4.87	6.87	8.87
Average			**3.65**				



1.6 Alert Level Trigger

An alert (abnormal/unacceptable trend) is indicated if any of the conditions below are met for current monitoring period (2015):

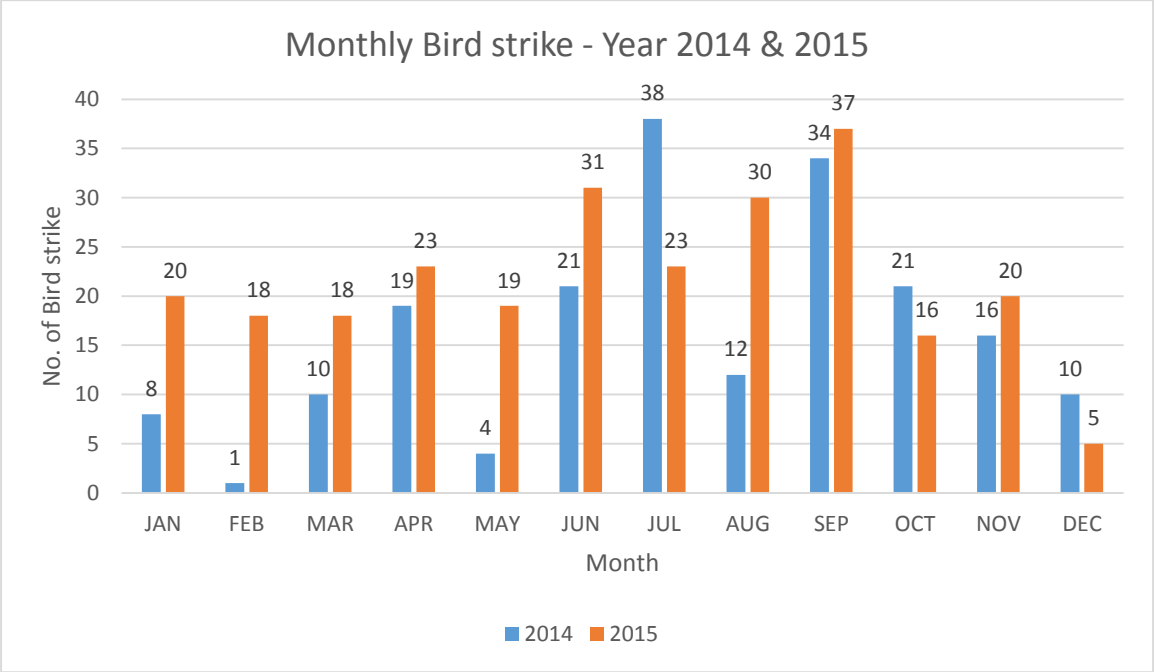
- Any single point is above the Alert level 3 line
- 2 consecutive points are above the Alert Level 2 line
- 3 consecutive points are above the Alert Level 1 line

When Alert is triggered (potential high risk or out of control situation), appropriate follow-up action is expected, such as further analysis to determine the source and root cause of the abnormal incident rate and any necessary action to address the unacceptable trend.

1.7 Data Analysis

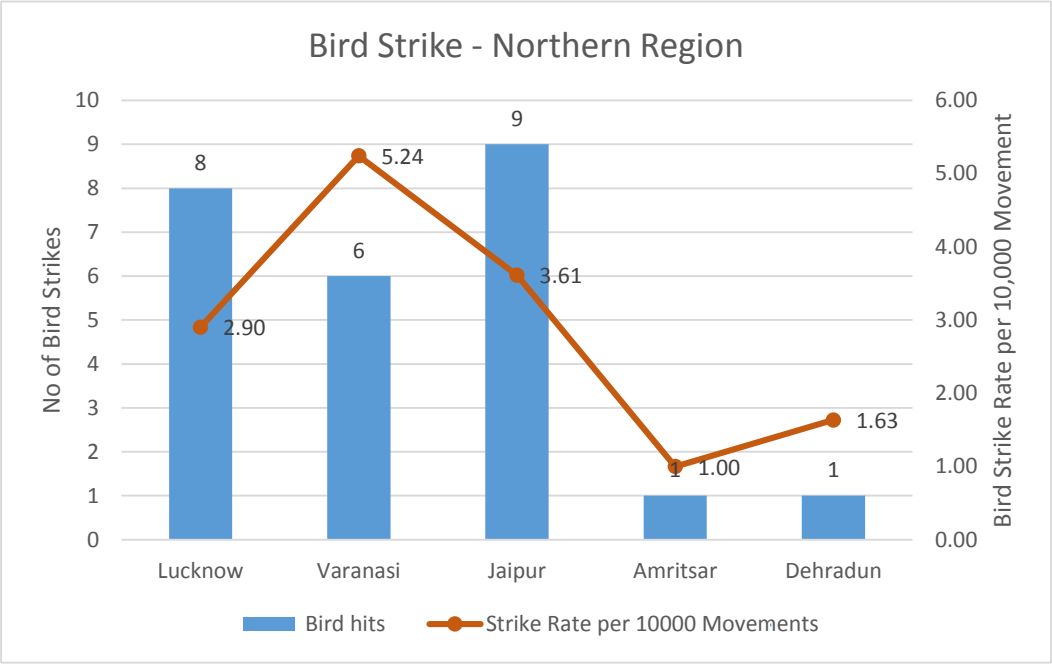
The graphical presentation of number of Bird strike month wise for the year 2014 & 2015 and 'Bird strike' & ' 'Bird strike rate per 10,000 aircraft movement' region wise / airport wise for the year 2015 are appended below:

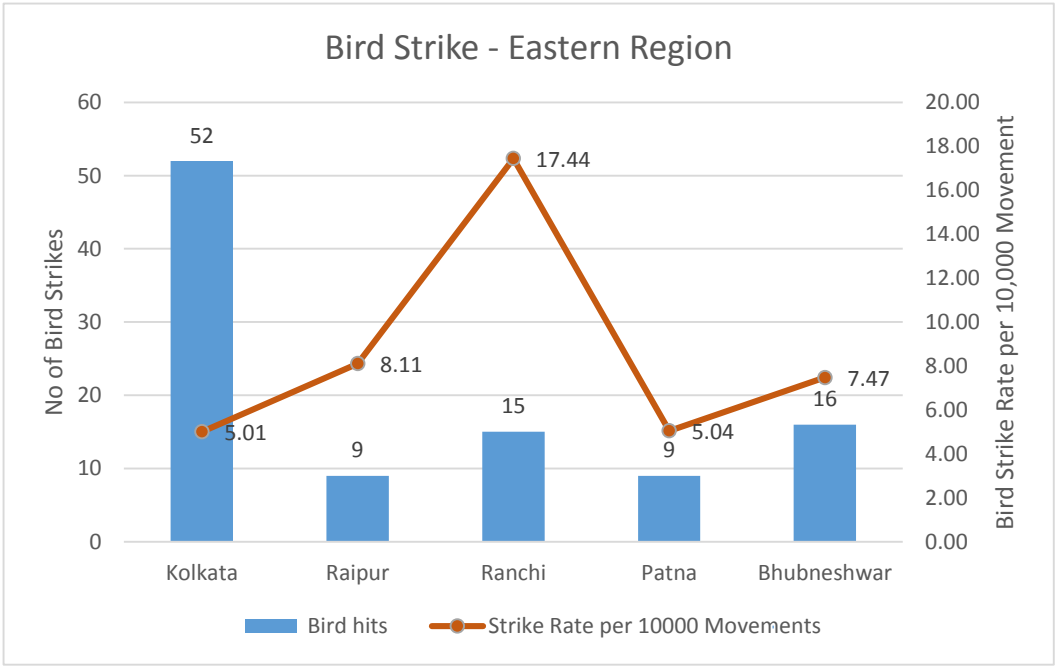
1.7.1 Monthly Bird strike – 2014 & 2015

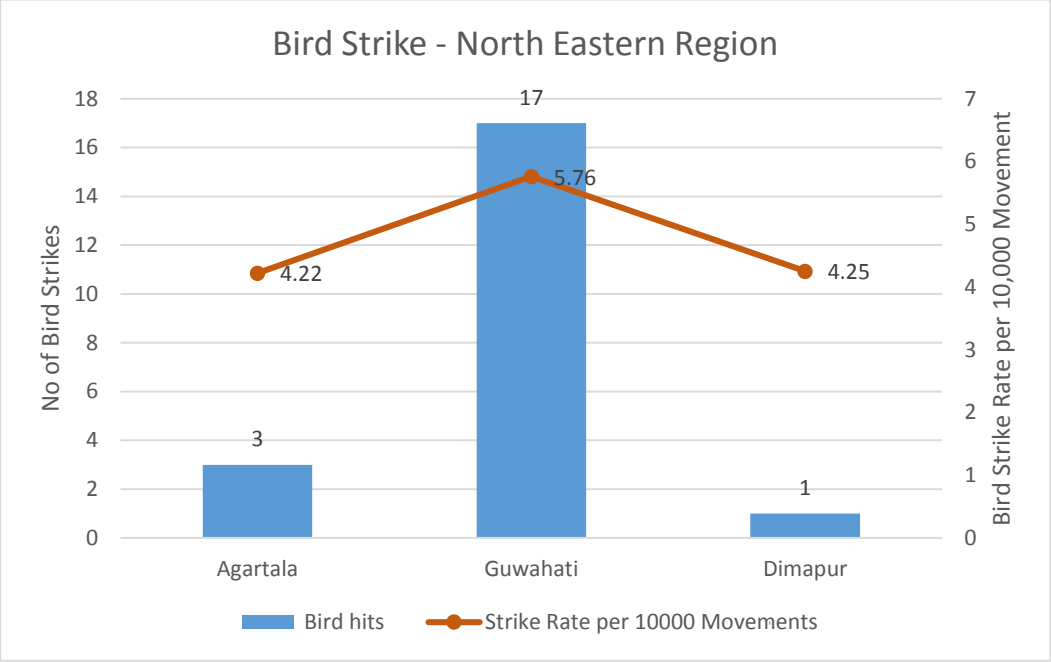


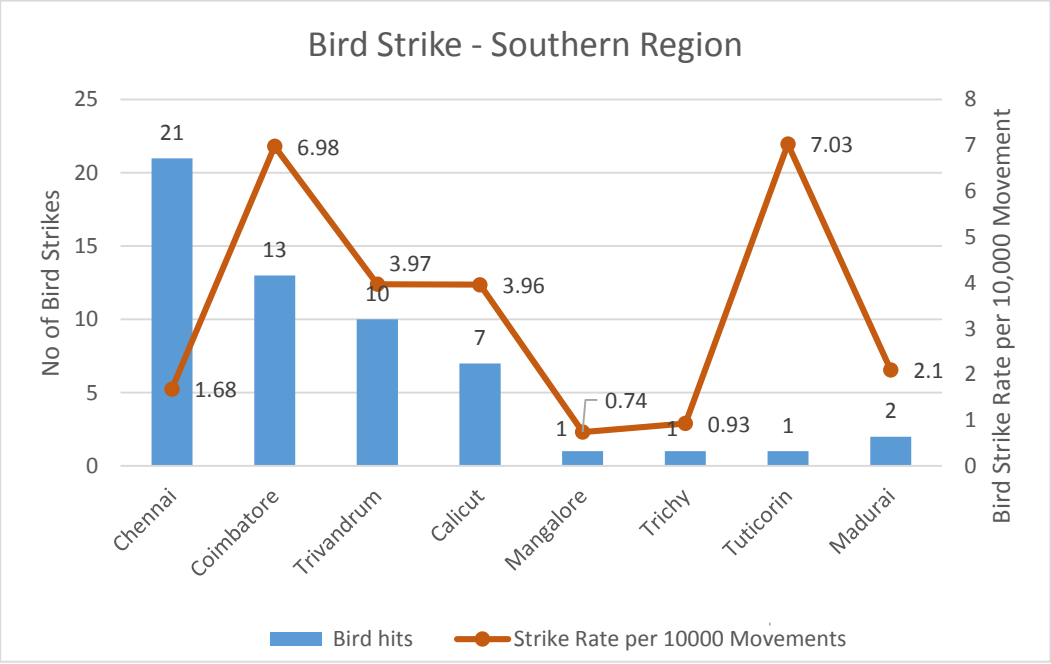
1.7.2 Bird Strike - 2015 (Region & Airport wise)

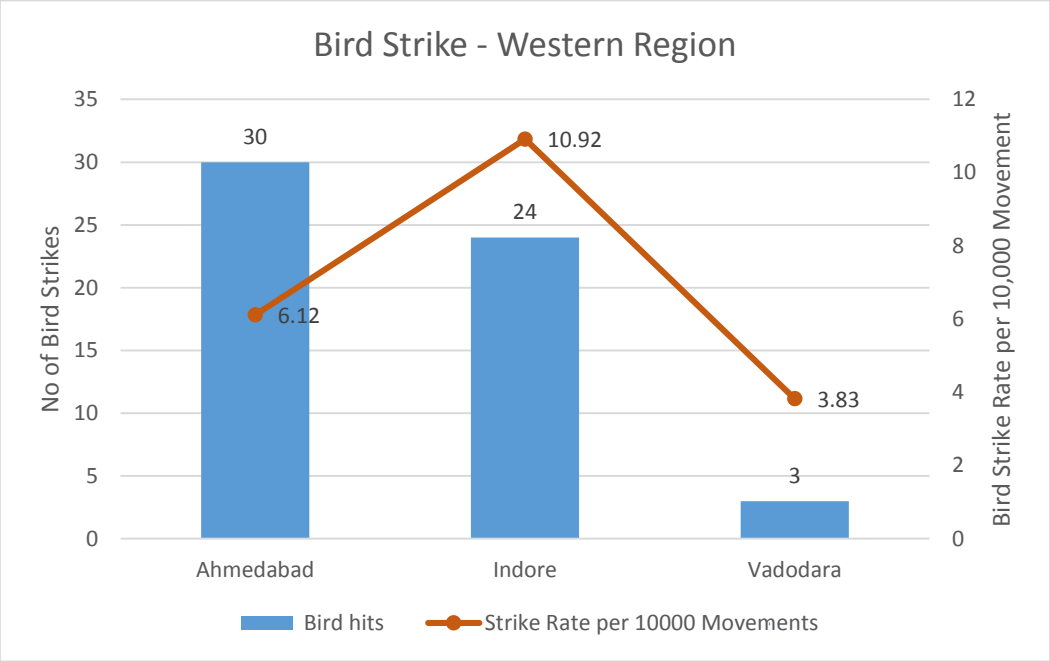
Airport	No. of Bird strike	Total Aircraft Movement -2015 (Arrivals + Departures)	Incident rate per 10000 movements (Arrivals + Departures)
Northern Region			
Lucknow	8	27572	2.90
Varanasi	6	11446	5.24
Jaipur	9	24916	3.61
Amritsar	1	10010	1.00
Dehradun	1	6117	1.63
Eastern Region			
Kolkata	52	103873	5.01
Raipur	9	11101	8.11
Ranchi	15	8600	17.44
Patna	9	17840	5.04
Bhubaneswar	16	21408	7.47
North - Eastern Region			
Agartala	3	7106	4.22
Guwahati	17	29507	5.76
Dimapur	1	2354	4.25
Southern Region			
Chennai	21	124847	1.68
Coimbatore	13	18627	6.98
Trivandrum	10	25187	3.97
Calicut	7	17692	3.96
Mangalore	1	13453	0.74
Trichy	1	10712	0.93
Tuticorin	1	1422	7.03
Madurai	2	9506	2.10
Western Region			
Ahmedabad	30	49024	6.12
Indore	24	21981	10.92
Vadodara	3	7840	3.83


Bird Strike - Northern Region
No of Bird Strikes
Bird Strike Rate per 10,000 Movement
10
9
8
7
6
5
4
3
2
1
0
6.00
5.00
4.00
3.00
2.00
1.00
0.00
8
6
9
1
1
2.90
5.24
3.61
1.00
1.63
Lucknow
Varanasi
Jaipur
Amritsar
Dehradun
Bird hits
Strike Rate per 10000 Movements


Bird Strike - Eastern Region
No of Bird Strikes
Bird Strike Rate per 10,000 Movement
60
50
40
30
20
10
0
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
52
9
15
9
16
5.01
8.11
17.44
5.04
7.47
Kolkata
Raipur
Ranchi
Patna
Bhubneshwar
Bird hits
Strike Rate per 10000 Movements


Bird Strike - North Eastern Region
No of Bird Strikes
Bird Strike Rate per 10,000 Movement
18
16
14
12
10
8
6
4
2
0
7
6
5
4
3
2
1
0
17
5.76
4.22
4.25
3
1
Agartala
Guwahati
Dimapur
Bird hits
Strike Rate per 10000 Movements


Bird Strike - Southern Region
No of Bird Strikes
Bird Strike Rate per 10,000 Movement
25
20
15
10
5
0
8
7
6
5
4
3
2
1
0
21
6.98
1.68
13
3.97
10
3.96
7
1
0.74
1
0.93
1
7.03
2.1
2
Chennai
Coimbatore
Trivandrum
Calicut
Mangalore
Trichy
Tuticorin
Madurai
Bird hits
Strike Rate per 10000 Movements



1.7.3 Conclusion

The summary shows increase in both 'number of bird strike' and average 'bird strike rate per 10,000 aircraft movement'. The total number of bird strike in 56 licensed AAI airports is 260 during 2015 against 194 during the year 2014.

The average bird strike rate for the year 2015 is about 27% more than the average 'Bird strike rate' of 2014 and hence, Safety Performance Target for the monitoring period 2015, which was set as atleast 5% lower than the preceding year 2014's average bird strike rate i.e. 2.73 or lower, is not achieved. Also, in three occasions during the monitoring period, the bird strike rate has breached the Alert level-1.

The bird hit data and trend for the year 2014 and 2015 indicates that bird strike rate shows increasing trend between June to September. This may be due to rainy season during the period mentioned. Number of bird hits is quite high at Kolkata, Ranchi, Bhubaneswar, Guwahati, Chennai, Ahmedabad and Indore airports, whereas bird strike rate per 10,000 movements is in double digit at Ranchi and Indore airport.

2. Number of reported wildlife strikes per 10,000 Arrivals and Departures

2.1 Definition

As per DGCA Air safety circular 02/2011, Wildlife (bird/animal) strike are defined in following two categories:

Confirmed Strikes

a) Any reported collision between a bird or other wildlife and an aircraft for which evidence in the form of a carcass, remains or damage to the aircraft is found.

b) Any wildlife (bird/animal) found dead on an airfield where there is no other obvious cause of death (e.g. strike by vehicles in the operational area, etc.).

Unconfirmed Strike

Any reported collision between a bird or other wildlife and an aircraft for which no physical evidence is found.

2.2 Source of Data

a) Traffic data is derived from Airport Information Management System (AIMS) data Base.

b) Reports of bird strikes are extracted from source of AAI control room messages, which includes reports of pilots, controllers, WSOs, Airport-in-charges, Airlines, AFTN messages and Wildlife (Bird/Animal strike forms).

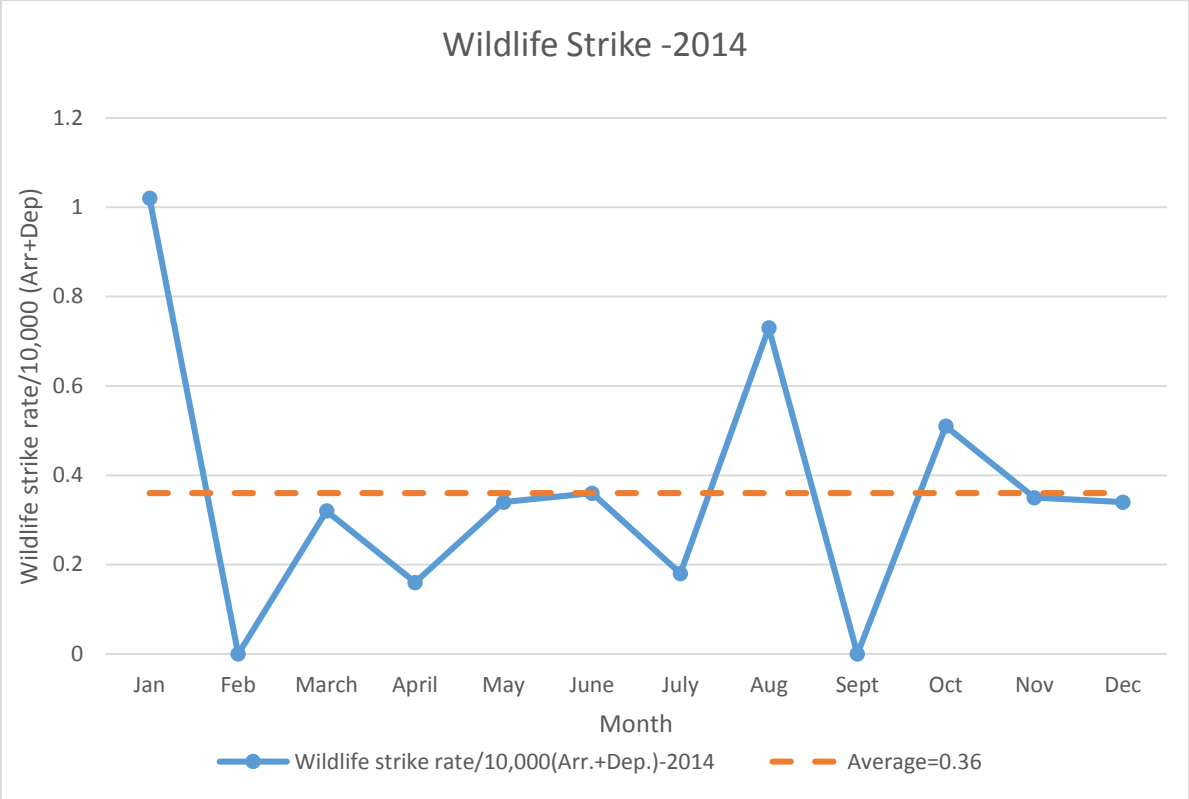
2.3 Data 2014 :

Number of reported wildlife strikes per 10,000 Arrivals and Departures during last year i.e. 2014 and detailed analysis is appended below:

Year-2014(1st January - 31st December)					
No. of Wildlife Strikes per 10,000 Arrival + Departure					
Month	**Total Arrivals + Departures**	**No. of Reported wildlife Strikes**	**Incident Rate (Per 10,000)-(x)**	**Average (μ)**	**$(x-u)^2$**
Jan	58347	6	1.028330505	0.36	0.446666
Feb	55881	0	0	0.36	0.1296
March	61013	2	0.327798994	0.36	0.001037
April	60574	1	0.165087331	0.36	0.037991
May	58439	2	0.342237205	0.36	0.000316
June	54193	2	0.369051353	0.36	8.19E-05
July	53638	1	0.18643499	0.36	0.030125
August	54117	4	0.739139272	0.36	0.143747
Sept.	54666	0	0	0.36	0.1296
Oct	58703	3	0.511047136	0.36	0.022815
Nov	57096	2	0.350287236	0.36	9.43E-05
Dec	58198	2	0.343654421	0.36	0.000267
Average			0.36		**$\Sigma (x-u)^2/12$**=0.078528
SD= $\sqrt{\Sigma(x-u)^2/12}$			0.28		

Safety Performance Target (SPT) for 2015	
Current year (2015) Safety Performance Target (SPT) is 5% average rate improvement over the average rate for preceding year (2014)	0.36 – 5% of 0.36 = **0.34**

Alert Level Setting		
Alert Level 1	Alert Level 2	Alert Level 3
Average + 1 SD	Average + 2SD	Average + 3 SD
0.64	0.92	1.2



2.4 Target Achievement at the end of monitoring period (i.e. 2015)

At the end of the current year 2015, if the average rate for the current year is atleast 5% or more, lower than the preceding year 2014's average rate i.e. **0.34 or lower**, then the set target of 5% improvement is deemed to have been achieved.

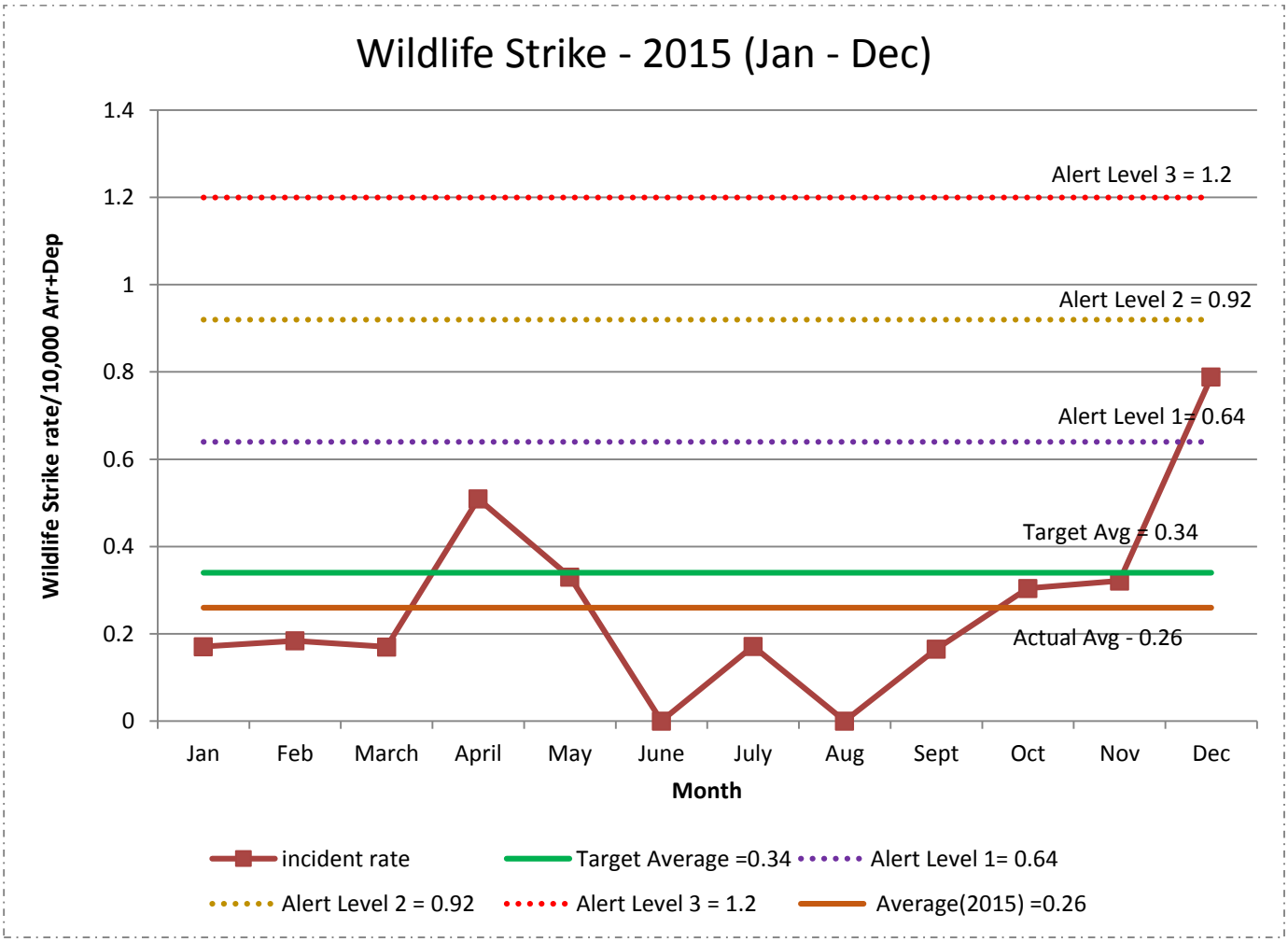
2.5 Performance Analysis (1st January to 31st December 2015)

Trend analysis of the SPI for the monitoring period i.e. 1st January to 31st December 2015 is as under:

Year 2015 (1st January - 31st December)

No of Wildlife Strike Per 10,000 Arrivals + Departures

Month	Total Arrivals + Departures	No. of Reported wildlife Strikes	Incident Rate (Per 10,000)(x)	Target Average	Alert level 1	Alert level 2	Alert level 3
Jan	58614	1	0.17	0.34	0.64	0.92	1.2
Feb	54317	1	0.18	0.34	0.64	0.92	1.2
March	58817	1	0.17	0.34	0.64	0.92	1.2
April	58932	3	0.51	0.34	0.64	0.92	1.2
May	60593	2	0.33	0.34	0.64	0.92	1.2
June	57187	0	0.00	0.34	0.64	0.92	1.2
July	58318	1	0.17	0.34	0.64	0.92	1.2
August	59195	0	0.00	0.34	0.64	0.92	1.2
September	60601	1	0.17	0.34	0.64	0.92	1.2
October	65742	2	0.30	0.34	0.64	0.92	1.2
November	62240	2	0.32	0.34	0.64	0.92	1.2
December	63424	5	0.79	0.34	0.64	0.92	1.2
Average			**0.26**				



2.6 Alert Level Trigger

An alert (abnormal/unacceptable trend) is indicated if any of the conditions below are met for current monitoring period (2015):

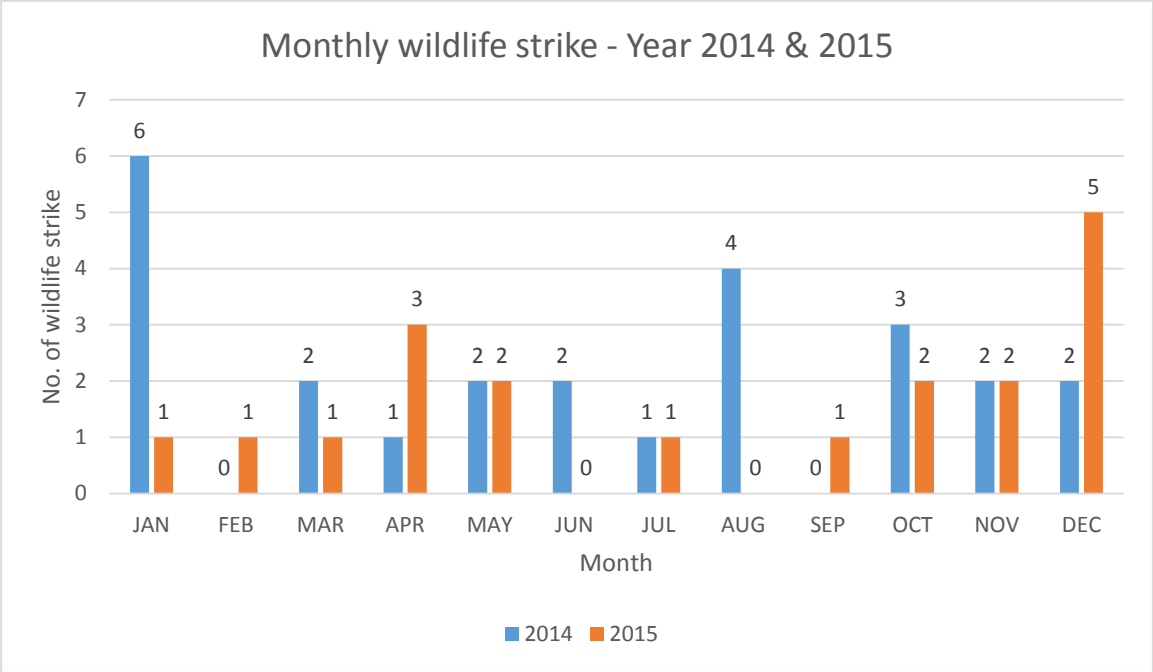
- Any single point is above the Alert level 3 line
- 2 consecutive points are above the Alert Level 2 line
- 3 consecutive points are above the Alert Level 1 line

When Alert is triggered (potential high risk or out of control situation), appropriate follow-up action is expected, such as further analysis to determine the source and root cause of the abnormal incident rate and any necessary action to address the unacceptable trend.

2.7 Data Analysis

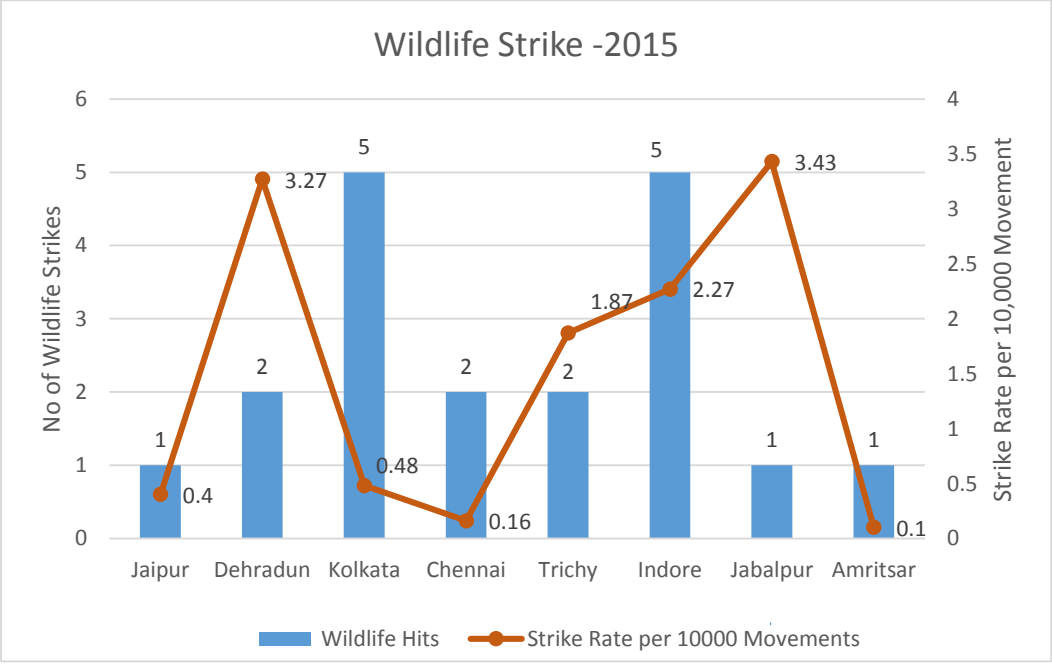
The graphical presentation of number of Wildlife strike month wise for the year 2014 & 2015 and 'Wildlife strike' & 'Wildlife strike rate per 10,000 aircraft movement' region wise / airport wise for the year 2015 are appended below:

2.7.1 Monthly wildlife strike – 2014 & 2015



2.7.2 Wildlife Strike - 2015 (Airport wise)

Airport	No. of Wildlife strike	Total Aircraft Movement -2015 (Arrivals + Departures)	Incident rate per 10,000 movements (Arrivals + Departures)
Northern Region			
Jaipur	1	24916	0.40
Dehradun	2	6117	3.27
Amritsar	1	10010	0.10
Eastern Region			
Kolkata	5	103873	0.48
Southern Region			
Chennai	2	124847	0.16
Trichy	2	10712	1.87
Western Region			
Indore	5	21981	2.27
Jabalpur	1	2918	3.43



2.7.2 Conclusion

'Number of wildlife strike' and average 'wildlife strike rate per 10,000 aircraft movement' both shows decreasing trend during the monitoring period 2015, except in the month of December the wildlife strike rate has breached Alert level-1. The total number of wildlife strike in 56 licensed AAI airports is 19 during 2015 against 25 during the year 2014.

Safety Performance Target for the monitoring period 2015, which was set as atleast 5% lower than the preceding year 2014's average wild life strike rate 0.34 or lower, is achieved. The achieved wildlife strike rate is 0.26, which is approximately 28% lower than average 'wildlife strike rate' of 2014.

No specific trend is emerging from wildlife strike data of 2015. However, wildlife strike rate in Dehradun, Jabalpur airport is high and number of wildlife strike is high in Kolkata and Indore airport.

3 Number of runway excursion per 10,000 Arrivals and Departures

Historical data of number of runway excursion is not available, data will be collected in current year 2015 and Safety Target will be set in 2016.

B. Low Consequence Indicators

1. Number of reported ground incidents per 10,000 Arrivals and Departures

Historical data of number of reported ground incidents is not available, data will be collected in the year 2015 and Safety Target will be set in 2016.

2. Number of reported incident of Foreign Object debris (FOD) per 10,000 Arrivals and Departures

Historical data of number of reported incident of Foreign Object debris (FOD) is not available, data will be collected in the year 2015 and Safety Target will be set in 2016.

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Air Traffic Services

SAFETY PERFORMANCE INDICATORS (SPIs) FOR AIR TRAFFIC SERVICES (ATS)

A. High Consequence Indicators

1 Separation Minima Infringements (SMI) with Direct/Indirect ATC Contribution: Number of occurrences per 100,000 Aircraft Movements:

1.1. Scope:

a) Separation minima infringement means infringement of applicable separation minima between two IFR flights in AAI administered airspace. Applicable separation minima is as given in Chapter 6 and Chapter 7 of Manual of Air Traffic Services-Part 1.

b) Only those occurrences of separation minima infringements will be considered in which ATC has directly or indirectly contributed to the incident have occurred in AAI administered airspace. However, this does not include those occurrences of separation minima infringements which were caused by the ANSPs other than AAI, pilots, Military ATC Units or any other agency.

1.2. Source of Data:

a) Traffic data will be derived from AIMS data base.

b) Number of aircraft movements means total number of arrivals, departures and over-flights. Number of over-flights will not be counted based on number of Indian FIRs, it has flown. An over-flights means an aircraft entering Indian airspace,

c) Reports of Separation Minima Infringements (SMI) are received from sources such as pilots, controllers, WSOs, ATS Incharge, DGCA, other ANSPs, Airlines, Air Safety Reports, AAI Control Room messages, AFTN messages. Only those separation minima infringements will be accounted which have been validated by ATM Directorate of AAI.

1.3. Data 2013 and 2014:

Data of number of occurrences of Separation Minima Infringements per 100, 000 aircraft movements during last two years is as appended below:

	1st Quarter (Jan-Mar)	2nd Quarter (Apr-Jun)	3rd Quarter (Jul-Sep)	4th Quarter (Oct-Dec)	Annual value	
Year 2013						
Number of occurrences	5	5	6	3	19	
Number of movements	451810	460339	463303	503815	1879267	
SMI/100K movements	1.11	1.09	1.30	0.60	1.01	
Year 2014						
Number of occurrences	4	4	6	6	20	
Number of movements	496141	500087	493302	511286	2000816	
SMI/100K movements	0.81	0.80	1.22	1.17	1.00	
Mean of Quarterly SMI/100 K aircraft movements for 2013 & 2014	0.95	0.94	1.25	0.89	**1.01**	
Two yearly aggregate (Mean) SMI						**1.01**
Standard Deviation (SD)						0.14
Alert level 1= Mean + 1 SD						1.15
Alert level 2= Mean + 2 SD						1.29
Alert level 3= Mean + 3 SD						1.43

NOTE: *The data for the year 2013 & 2014 has been revised after finalization of investigation of occurrences which took place in 2013 and 2014.*

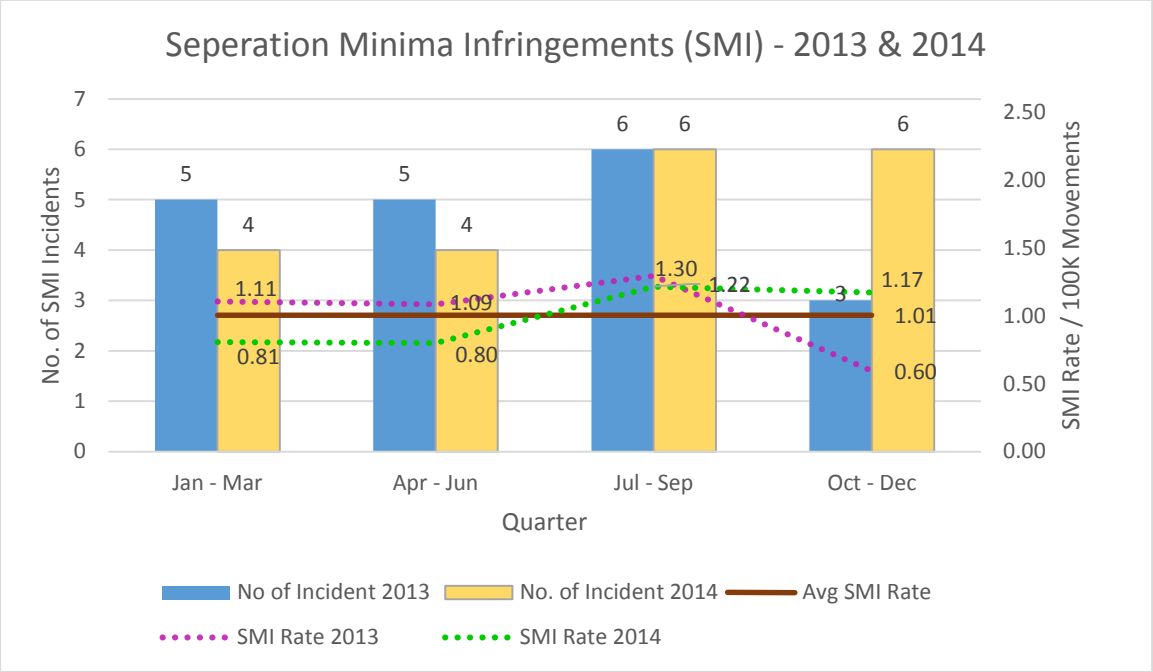
1.4 Safety Performance Target:

a) 5% improvements on two year average (mean) of number of occurrences of separation minima infringements per 100, 000 aircraft movements.

b) Safety Target for 2015 = Aggregate of SMI for 2013 and 2014 – 5% of (Aggregate of SMI for 2013 and 2014)

= 1.01 – 0.05 (5% of 1.01)

= **0.96**



1.5 Target achievement assessed at the end of monitoring period (i.e. 2015)

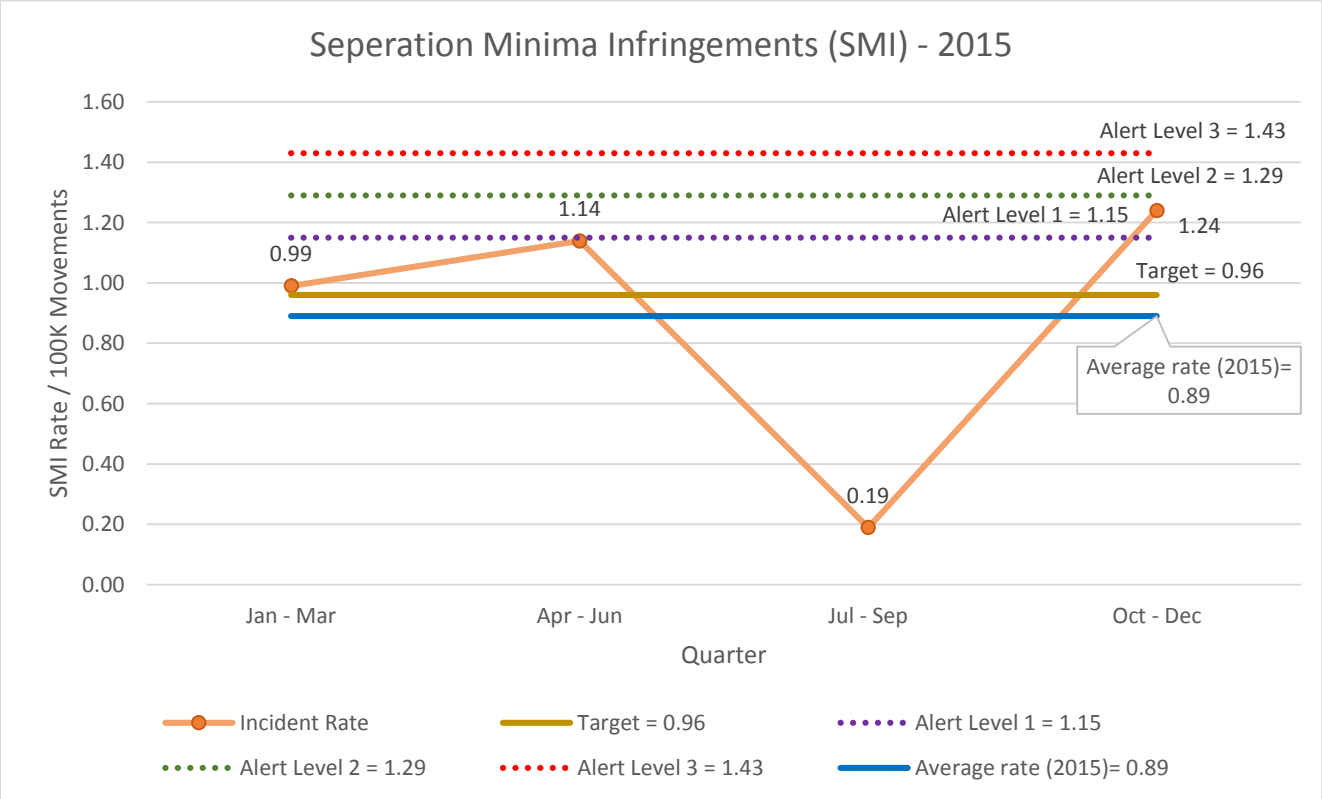
At the end of the current year 2015, if the average rate for the current year is atleast 5% lower than the preceding two years' (2013 & 2014) average rate i.e. **0.96 or lower**, then the set target of 5% improvement is deemed to have been achieved.

1.6 Performance Analysis - 2015 (1st January to 31st December 2015)

Trend analysis of the SPI for the monitoring period i.e. 1st January to 31st December 2015 is as under:

Year 2015						
	1st Quarter (Jan – Mar)	2nd Quarter (Apr – Jun)	3rd Quarter (Jul – Sep)	4th Quarter (Oct – Dec)	Annual value	
Number of occurrences	5	6	1	7	19	
Number of movements	504980	526829	529399	566745	2127953	
SMI/100K movements (Occurrence Rate)	0.99	1.14	0.19	1.24	**0.89**	
Safety Target - SMI rate for 2015	(Mean SMI Rate for 2013 & 2014 – 5% of mean SMI Rate for 2013 & 2014)					**0.96**

NOTE: Data for 2015 is provisional



1.7 Alert Level Trigger

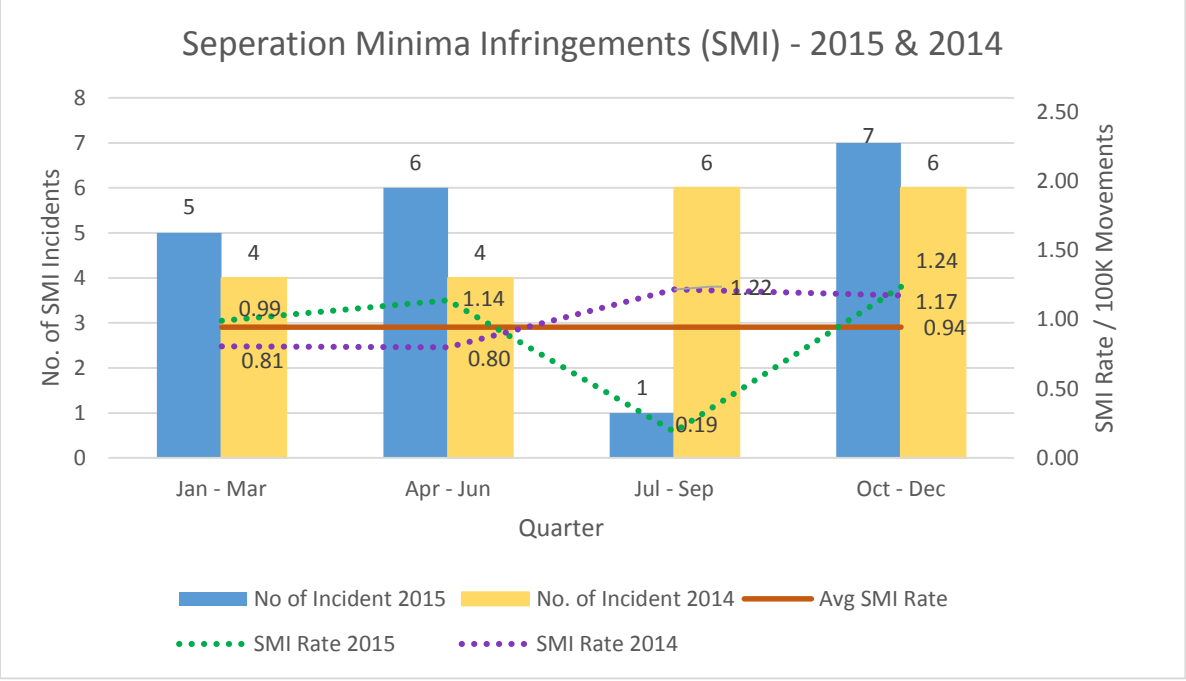
An Alert (abnormal/ unacceptable trend) is indicated if any of the conditions below are met for the current monitoring period (current year):

- Any single point is above 3 SD line
- 2 consecutive points are above 2 SD line
- 3 consecutive points are above 1 SD line

When an Alert is triggered (potential high risk or out of control situation), appropriate follow-up action is expected, such as further analysis to determine source and root cause of the abnormal incident rate and any necessary action to address the unacceptable trend.

1.8 Data Analysis

The comparison of number of Separation Minima Incursion (SMI) and SMI rate per 100,000 for 2014 & 2015 is shown below:



2 Runway Incursions (RI): Number of Runway Incursions (RIs) per 10,000 Arrivals and Departures:

2.1 Scope:

Runway Incursion means any occurrence at and aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.

2.2 Source of Data

a) Traffic data will be derived from AIMS data base.

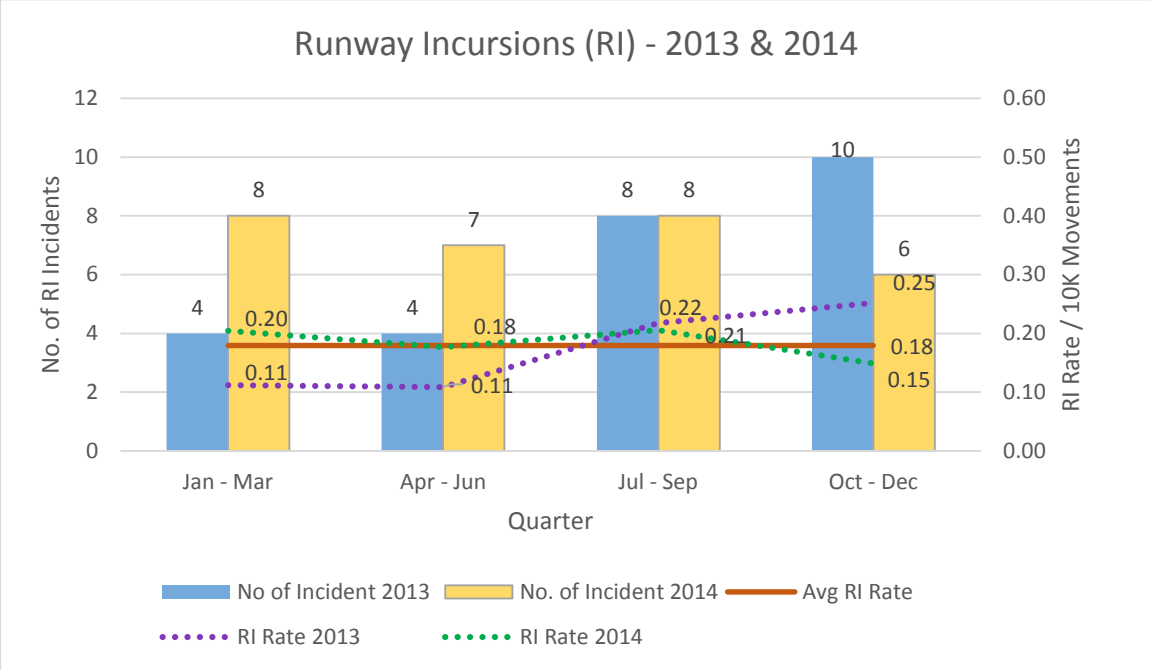
b) For total number of arrivals and departures, only those airports would be considered where ATC is provided by AAI.

c) Reports of RIs are received from sources such as pilots, controllers, Airlines, ATS Incharge, DGCA, aerodrome operators, Air Safety Reports, AAI Control Room messages, AFTN messages. Only those RIs will be accounted which have been validated either by ATM Directorate of AAI or Runway Safety Team.

2.3 Data 2013 and 2014 :

Data of number of occurrences of RIs per 10, 000 arrival and departures during last two years is as appended below:

	1st Quarter (Jan-Mar)	2nd Quarter (Apr-Jun)	3rd Quarter (Jul-Sep)	4th Quarter (Oct-Dec)	Annual value	
Year 2013						
Number of occurrences	4	4	8	10	26	
Number of arrival & departures	357510	367464	367898	397065	1489937	
RI/10K arrival & departures	0.11	0.11	0.22	0.25	0.17	
Year 2014						
Number of occurrences	8	7	8	6	29	
Number of arrival & departures	391592	395946	388787	402314	1578639	
RI/10K arrival & departures	0.20	0.18	0.21	0.15	0.18	
Mean of Quarterly RI/10K arrival & departures for 2013 & 2014	0.16	0.14	0.21	0.20	**0.18**	
Two yearly aggregate (Mean) RI						**0.18**
Standard Deviation (SD)						0.03
Alert level 1= Mean + 1 SD						0.21
Alert level 2= Mean + 2 SD						0.24
Alert level 3 = Mean + 3 SD						0.27



2.4 Safety Performance Target:

a) 5% improvements on two year average (mean) of number of occurrences of Runway Incursions per 10,000 arriving and departing aircraft.

b) Safety Target for 2015 = Aggregate of RIs for 20134 and 2014 - 5% of (Aggregate of RIs for 2013 and 2014)

= 0.18 - 0.01 (5% of 0.18) = **0.17**

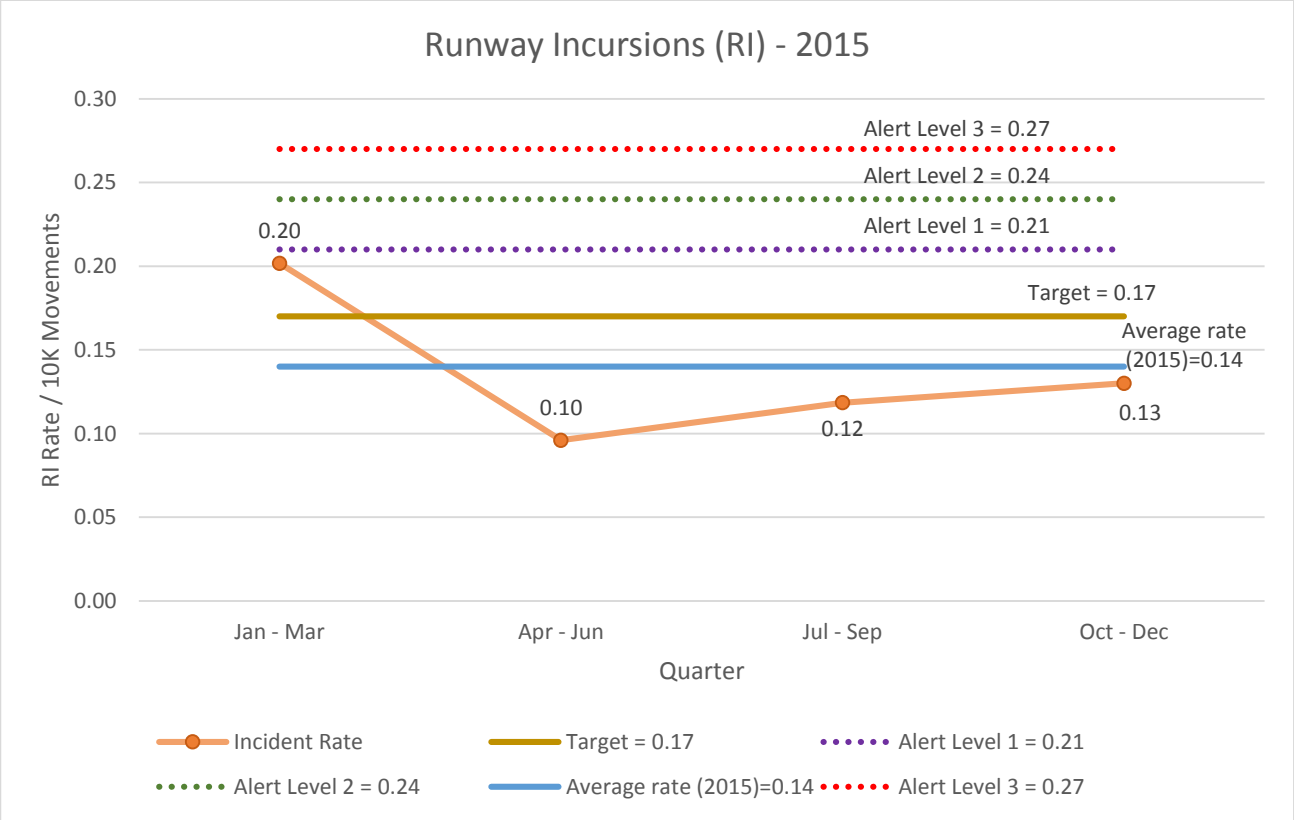
2.5 Target achievement assessed at the end of monitoring period (i.e. 2015):

At the end of the current year 2015, if the average rate for the current year is atleast 5% lower than the preceding two years' (2013 & 2014) average rate i.e. **0.17 or lower**, then the set target of 5% improvement is deemed to have been achieved.

2.6 Performance Analysis - 2015 (1st January to 31st December 2015):

Trend analysis of the SPI for the monitoring period i.e. 1st January to 31st December 2015 is as under:

Year 2015						
	1st Quarter (Jan – Mar)	2nd Quarter (Apr – Jun)	3rd Quarter (Jul – Sep)	4th Quarter (Oct – Dec)	Annual value	
Number of occurrences	8	4	5	6	23	
Number of arrival & departures	396632	416622	422281	452158	1687693	
RI/10K movements (Occurrence Rate)	0.20	0.10	0.12	0.13	**0.14**	
Safety Target - RI rate for 2015	(Mean RI Rate for 2013 & 2014 – 5% of mean RI Rate for 2013 & 2014)					**0.17**



2.7 Alert Level Trigger

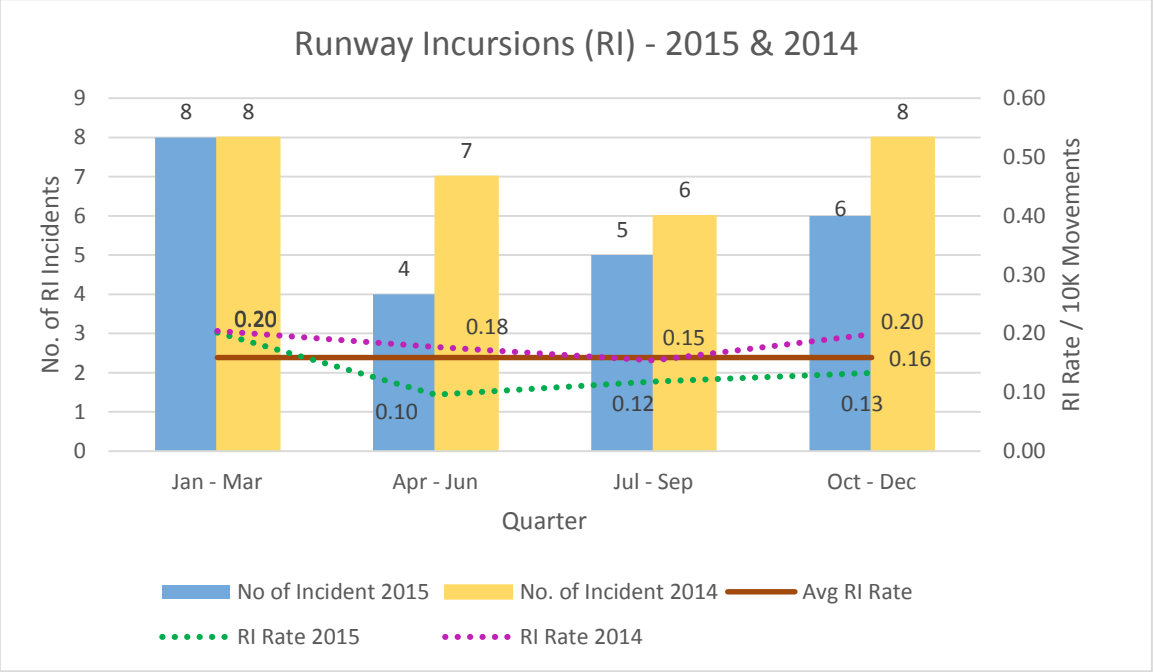
An Alert (abnormal/unacceptable trend) is indicated if any of the conditions below are met for the current monitoring period (current year):

- Any single point is above 3 SD line
- 2 consecutive points are above 2 SD line
- 3 consecutive points are above 1 SD line

When an Alert is triggered (potential high risk or out of control situation), appropriate follow-up action is expected, such as further analysis to determine source and root cause of the abnormal incident rate and any necessary action to address the unacceptable trend.

2.8 Data Analysis

The comparison of number of Runway Incursion (RI) and RI rate per 10,000 for 2014 & 2015 is shown below:



B. Low Consequence Indicators

1. Number of level bust per 1,00,000 Aircraft Movements

Historical data of number of level bust is not available, hence data this safety indicators is to be collected during the period of 2015 & 2016 and thereafter, Safety Target will be set for 2017.

2. Number of safety occurrences due Communication errors (SOCE) per 1,00,000 Aircraft Movements

Historical data of number of safety occurrences due Communication errors (SOCE) is not available, therefore data to be collected during the period of 2015 & 2016 and Safety Target will be set for 2017.

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Communication, Navigation & Surveillance

SAFETY PERFORMANCE INDICATORS (SPI) FOR COMMUNICATION, NAVIGATION & SURVEILLANCE (CNS)

A. High Consequence Indicators

1. Mean Time Between Failures (MTBF) of Landing/Navigational aids(ILS,DME, VOR, Locator & Marker) per year

Safety Performance Target will be set in the year 2016, based on the data of 2015. Available historical data is insufficient, as failures of less than 30 minutes were not captured. Failures for which NOTAM action had been initiated, were only captured.

2. Mean Time Between Failures (MTBF) of Surveillance aids(ADS-B, MSSR, TAR, RSR and ASMGCS) per year

Safety Performance Target will be set in the year 2016, based on the data of 2015. Present data is insufficient, as failures of less than 30 minutes and ADS- B data (which was operationalized in mid of 2014) were not captured.

B. Lower Consequence Indicators

1. Number of degradation in ATS automation system per year

Safety Target pertaining to this SPI will be set in 2016, as historical data of number of degradation during last year is not available. Data pertaining to this SPI, will be collected in current year 2015.

2. Number of VHF/VCCS failures per year

Historical data of number of reported incident of VHF / VCCS failures is not available. Current available data is insufficient to carry out analysis. Data will be collected in the year 2015 and Safety Target will be set out in 2016.

AAI SMS Performance Summary - 2015

AAI SMS Performance Summary – 2015

High Consequence SPIs

SPI Description	SPI Alert Level Criteria (for 2015)	Alert Level not breached [Yes(4)/ No(0)]	SPI Target Level Criteria (for 2015)	Target Achieved [Yes(3)/ No(0)]
Aerodrome Operations				
Number of reported bird strikes per 10,000 arrivals/departures	Avg.+1SD=**4.87** Avg.+2SD=**6.87** Avg.+3SD=**8.87**	NO	**2.73** i.e. 5% improvement from mean rate of last year (2014)	NO
Number of reported wildlife strikes per 10,000 arrivals/departures	Avg.+1SD=**0.64** Avg.+2SD=**0.92** Avg.+3SD=**1.20**	NO	**0.34** i.e. 5% improvement from mean rate of last year (2014)	YES
Air Traffic services(ATS)				
Number of infringement of separation minimum per 100,000 aircraft movements	Avg.+1SD=**1.15** Avg.+2SD=**1.29** Avg.+3SD=**1.43**	NO	**0.96** i.e. 5% improvement from mean rate of last 2 years (2013 & 2014)	YES
Number of runway incursions per 10,000 arrivals & departures	Avg.+1SD=**0.21** Avg.+2SD=**0.24** Avg.+3SD=**0.27**	YES	**0.17** i.e. 5% improvement from mean rate of last 2 years (2013 & 2014)	YES
Communication, Navigation & Surveillance (CNS)				
Mean time between failures (MTBF) of Landing/Navigational aids per year	To be defined in 2016	-	To be defined in 2016	-
Mean time between failures (MTBF) of Surveillance aids (ADS/MSSR/TAR/RSR/ASMGCS) per year	To be defined in 2016	-	To be defined in 2016	-

Low Consequence SPIs				
SPI Description	**SPI Alert Level Criteria (for 2015)**	**Alert Level not breached [Yes(2) / No(0)]**	**SPI Target Level Criteria (for 2015)**	**Target Achieved [Yes(1) / No(0)]**
Will be assessed next year (2016) due to lack of quality data.				

NOTE 1: A quantitative annual SMS performance measurement may be done, once Safety Performance Targets (SPTs) of all corresponding Safety Performance Indicators (SPIs) are established with an effective comprehensive safety data management system. Hence, currently only qualitative annual SMS performance overview is presented.

NOTE 2: A revised Annual SMS performance summary format has been used, which is in line with the guidance provided in Doc. 9859 (Safety Management manual) 3rd edition. More weightage has been given to 'Not breaching Alert level criteria' in comparison to 'Achieving Target level criteria' for both high consequence indicators & low level consequence indicators. The new numerical value has been assigned as follows:

High consequence Indicators:	Alert Level not breached:	[Yes (4); No (0)]
	Target achieved:	[Yes (3); No (0)]
Low consequence Indicators:	Alert Level not breached:	[Yes (2); No (0)]
	Target achieved:	[Yes (1; No (0)]