

2.2.2 Hazard/Mitigation table

Hazard Ref.	Applicability	Fatigue description hazard	Possible mitigation measures
1. Duty Hours			
2.1	All operations	Combination of flight duties with ground duties (e.g. administrative, managerial, simulator, etc.)	<ul style="list-style-type: none"> a) Reduced duty/flight duty periods b) Limitations on combining flight and ground duties
2. Cumulative Duty			
2.1.	All operations	High cumulative workload	<ul style="list-style-type: none"> a) Limit on successive long duty periods together b) Rolling limits on duty and flying hours c) Cumulative fatigue management through a required minimum number of days off (to be defined), including longer rest periods d) Spread out duty as evenly as possible e) Rest period increased periodically
3. Basic Maximum Flight Duty Period			
3.1.	All operations	Length of Flight Duty Period	<ul style="list-style-type: none"> a) Clear maximum FDP limit (table) b) Extra rest requirements c) Inclusion of positioning at the behest of the operator immediately before flight duty in FDP d) Break (relief from duties) during duty e) Meal opportunity f) Break on the ground g) Inclusion of post-flight duty in FDP, taking into account number of seats and configuration
3.2	Operations encompassing duties between 02:00 and 05:59	Sleep deprivation/deficit due to waking-up/staying awake/finishing duty in the WOCL	<ul style="list-style-type: none"> h) Reduce the allowable maximum FDP for duties where the crew member reports after wakes in/actually reports in/finishes in or FDP encompasses the WOCL i) Additional rest j) Maximum number of these duties in a work block or number of days k) Planning of these duties to enable flow of work and optimum sleep opportunity
3.3	All operations (more on short-haul)	Number of Sectors/Workload	<ul style="list-style-type: none"> l) Allowable FDP decreased by the number of sectors worked
4. Night, early and late duties			
4.1	Night operations	Consecutive Night Duties	<ul style="list-style-type: none"> a) Definitions applicable to this section b) Reduce allowable FDP/DP, maximum numbers of such duties allowed in a work block or number of days, sole night freight operation with set rest requirements and pattern construction c) Limit the number of sectors d) Limit the number of consecutive night duties e) Additional rest after a series of night duties
4.2.	All operations	Consecutive series of early starts and/or late arrivals	<ul style="list-style-type: none"> f) Limit the number of consecutive Earlies (define) and/or Late finishes (define) and provide an extended rest period between such series of duties

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			<ul style="list-style-type: none"> g) Limitations on FDP for regular services with early starts and/or late arrivals h) Consecutive early start duties should never start earlier than the day before i) Limit the number of consecutive early starts j) Additional rest after a series of early starts
5. Duty Extensions			
5.1	All operations	Company extension of planned duty periods of duty/flight	<ul style="list-style-type: none"> a) Maximum limit on extension b) Restriction on the number of times a week/month that extensions are allowed c) Extra rest requirements surrounding the extended duty d) Notification of the 1-hour extension
6. Duty extensions due to in-flight rest			
6.1	All relevant operations	Flight sectors beyond maximum FDP	<ul style="list-style-type: none"> a) Consistent in-flight relief planning b) Augmented flight/cabin crew when applicable (to be defined) c) Minimum rest period onboard requirement d) Extension of FDP dependent on type of onboard rest, facilities and number of additional crew carried e) Use of depart window to optimise crew alertness during critical phases of flight f) Requirement of prior notification of crew position for optimal rest planning (operating or relief crew) g) Limit the number of sectors h) Augmented Cabin Crew i) Minimum rest at destination j) Minimum rest at home base following extended FDP
7. Positioning & Travelling			
7.1	All operations	Positioning duties — before an FDP, immediately after an FDP	<ul style="list-style-type: none"> a) Position duties to count as FDP when immediately prior to an FDP b) Post-FDP positioning should be limited to prevent an excessive Duty day c) The FDP and all post-FDP positioning to be taken into account for subsequent Rest period
7.2	All operations	Excessive travelling time	<ul style="list-style-type: none"> d) Require a set home base (define) with a maximum travelling time beyond which crew are recommended to have alternative accommodation closer to base. e) Limit travelling time out of base
8. Extension by on-ground break			
8.1	All operations (predominantly short-haul)	Split Duty beyond maximum FDP	<ul style="list-style-type: none"> a) Establish minimum consecutive number of hours for the break b) Establish maximum FDP based on the length of the break and the time of the day c) Suitable accommodation for the break d) Take account of split duty for subsequent rest calculation e) Limitation on number of sectors after the split f) Limit the number of consecutive Split Duties g) Take account of (non) acclimatisation

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9. Pilot-in-command discretion				
9.1	All operations	Disruption — on the day		<ul style="list-style-type: none"> a) Adapt schedules or crewing arrangements when actual operation exceeds planning over a defined period of time b) Process for Commander to extend an FDP based on the circumstances on the day and of his/her crew. c) Process for Commander to reduce a rest period based on the circumstances on the day and of his/her crew. d) Process for the Commander to reduce FDP and/or increase rest in case of fatigue risk e) Report to NAA above a certain threshold f) Focused oversight by NAA g) Establish limits on the number of Commander's discretion
10. Airport Standby				
10.1	All operations	Standby — Airport		<ul style="list-style-type: none"> a) Take account of airport standby time in duty/flight duty period and rest calculation b) Quality and type of airport standby facilities c) Limit on Standby duration d) Minimum rest after standby with no FDP
11. Standby other than airport				
11.1	All operations	Standby — elsewhere		<ul style="list-style-type: none"> a) Take account of standby time in duty/flight duty period and rest calculation b) Standby callout requirements [immediate readiness/long call/contactable (?)/available (?)] used to develop different levels of requirement based on worst case fatigue level c) Quality and type of standby facilities d) Limit on Standby duration e) Calculations of cumulative duty hours dependent on type of standby and whether crew are called out or not
12. Basic Rest				
12.1	All operations	Disruption — before the day		<ul style="list-style-type: none"> a) Prepare and publish rosters giving crews time to adapt and recover from cumulative fatigue b) Focused oversight by NAA
12.1	All operations	Lack of rest opportunity and rest at sub-optimal periods		<ul style="list-style-type: none"> c) Set a minimum rest period and recuperative sleep opportunity between duties d) Minimum number of sleep hours over a specific preceding period of time
13. Basic Rest — reduced rest				
13.1	Predominantly regional operations	Lack of rest opportunity		<ul style="list-style-type: none"> a) Minimum duration of reduced rest b) Augmentation of rest period following reduced rest c) Reduced max FDP d) Limit the number of reduced rest occasions e) Limit the length and number of sectors under reduced rest f) Limit the effect of time zone de-synchronisation under reduced rest g) Limit the possibility of interaction of split duty and reduced rest h) Publish roster sufficiently in advance

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			i) Establish conditions for applicability of reduced rest
14. Extended & Recovery Rest			
14.1	All operations	Circadian Disruption — mixing duty transitions between early/late/night duties	a) Regulations around duty construction with restrictions on the number of early/late/night transitions in a work block, reduced max FDP ----- b) Extended rest periods ----- c) Consistent scheduling, limiting mix of day/night duties
14.2	Predominantly long-haul operations	Time zone de-synchronisation	d) Duty restrictions for a set period of time or based on rest period based on the number of time zones ----- e) Limit max FDP according to daytime & acclimatisation ----- f) Minimum time set before a crew could be considered time zone adjusted or acclimatised (to be defined)
15. Time zone crossing			
15.1	Predominantly long-haul operations	Time zone de-synchronisation	a) Minimum rest/days off requirements at home base following time zone crossing ----- b) Additional minimum rest at destination away from home base ----- c) Avoid or limit the number of alternating east-west rotations per month ----- d) Additional rest between rotations home base-west-home base & home base-east-home base
16. Other elements			
16.1	All operations (predominantly short-haul)	Lack of meal and drink opportunity	a) Include meal and drink opportunity (ground/flight) in planning
16.2	All operations	Lack of fatigue risk awareness	b) Provide fatigue management training
16.3	All operations	Improper implementation of fatigue as a safety issue in the operator's safety management system	c) Implementation of effective SMS/FRMS ----- d) Reporting on fatigue-related issues