

MANAGING FATIGUE IN TRANSPORT.

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BRISBANE)**

ENGINEER

A LICENSED AIRCRAFT MAINTENANCE

AIRLINE

EMPLOYED BY A MAJOR AUSTRALIAN

WORKING IN LINE MAINTENANCE

(OVERNIGHT AIRCRAFT SERVICING)

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BACKGROUND

This submission is based on the experience of myself, a 35yr old Licensed Aircraft Maintenance Engineer (L.A.M.E.) employed by one of Australia's major airlines.

I have been in this industry since leaving school at 18 and have worked in Line Maintenance in Brisbane since 1986 on a 24hr 7 days a week roster.

As I believe that knowledge of this side of the airline is not widespread in the community, I have included an overview of Line Maintenance and of the careers of Line Maintenance L.A.M.E.S'. I also hope, by including these briefs, that a more immediate appreciation and understanding is gained of the environment and limitations imposed on these engineers throughout their working lives and how fatigue plays a daily part in this workplace.

Although this is a private submission, it is intended to compliment submissions from L.A.M.E.S from other bases to create a more complete picture of this area of the airline industry on a national basis.

INTRODUCTION

*Australia's major airlines service their aircraft every night between 9 p.m. and 5 a.m.

*The people that carry out this regular overnight servicing are called Licensed Aircraft Maintenance Engineers.

*L.A.M.E.'S are at the mercy of climatic elements, flying schedules and the human body's natural tendency to demand sleep during these hours.

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These statements introduce you to the world of Line Maintenance L.A.M.E.'S.

As you can imagine, fatigue plays a major part in their worklife. This worklife is currently unprotected from duty hour limitations and other regulations that recognise the threat of fatigue to the safety of our skies. This safety centred workplace is now delicately balanced and is under further threat due to airline management's contempt for the limitations of the human body in the pursuit of profit.

In this submission I aim to clarify the above statements and from this basis report on the particular aspects of the Line Maintenance workplace that are relevant to the terms of reference for this enquiry into the management of fatigue in transport.

OVERNIGHT AIRCRAFT SERVICING

Every night in Sydney, Melbourne, Brisbane and Adelaide, and to a lesser extent in other minor ports, Australia's major airline Line Maintenance departments carry out scheduled and non scheduled maintenance on their aircraft. Line Maintenance is the department responsible for all the ongoing servicing required on aircraft in between their regular lay-up or hangar checks.

Overnight servicing of aircraft by airlines is not a new concept. In fact, since the genesis of each local airline this has been common practise for several reasons;

1/ RPT Aircraft operating under Australian registration required a daily check to qualify for subsequent maintenance releases during the next flying period;

2/ The only time available to maintenance crews to carry out servicing without interrupting revenue earning flight schedules was late at night at the end of the days flying which was generally 6 p.m. to 7 a.m.

In the DC-3 and Constellation days, propeller, cylinder and engine changes were carried out during the night as a matter of necessity and it was probably during these days that L.A.M.E.'S deservedly gained the reputation for performing miracles much the same as racing car pit crews have gained for working all night to repair the team car that crashed during practise. It is my belief that employers take this reputation for granted and since this new industrial climate has emerged, have found renewed energy to exploit it regardless of L.A.M.E. concerns and the limitations of their human bodies.

Today, Aux. Power Unit, wheel and brake changes are carried out during the night as well as the scheduled "A" level checks (after every 150 flying hours). These checks contain tasks such as detailed visual inspections of flight controls, the cables and hydraulic systems that

augment them, engine internal inspections via borescope, filter replacements, system operational checks and extensive airframe lubrication and corrosion prevention.

LINE MAINTENANCE L.A.M.E. WORKLIFE

A young person wanting to become a Line Maintenance L.A.M.E. would typically commence their 4 yr apprenticeship with the airline at approximately 18 yrs of age. Line Maintenance vacancies depend on operational requirements but, depending on qualifications and location, a L.A.M.E. can usually expect to start in this section somewhere between 22 and 30yrs of age.

Employment with an airline has always been seen as an opportunity of a lifetime. Because prospective L.A.M.E.'S commence their employment in this very specialised area at such a young age it is therefore commonplace for Line Maintenance L.A.M.E.'S to remain in this section for comparatively longer than employees in other sections of the airline.

Working in Line Maintenance also implies that you work a 24hr-7days a week roster. The current roster is 12 hours (2days followed by 2 nights) by mutual agreement, and up and till 11 yrs ago the roster was based on 8 hour shifts covering day, afternoon and nightshifts. To move to a section outside of Line Maintenance to avoid nightshift, (these sections are in Sydney and Melbourne only), is seen as a backward step careerwise and also financially.

The diversity of tasks a L.A.M.E. is trained to perform in Line Maintenance make the job interesting and challenging-mentally and physically. For a L.A.M.E. on the floor, the duties and the roster do not change for the whole of their working life. The crew system relies on individuals to pull their weight on shift, so if you are 59 or 29, you're still towing aircraft or changing wheels and brakes and turning up for 12 hours of work at 6 pm for 50% of your working life.

The reforms to improve productivity in Line Maintenance over the last 12 years have seen the adoption of the 12 hr shift, multi-tasking and

shift/crew numbers virtually stagnate whilst aircraft numbers, movements and flying hours have increased substantially. It is largely due to this latter factor that we start to see fatigue take hold of a vulnerable Line Maintenance workforce.

CAUSES OF FATIGUE IN THE LINE MAINTENANCE WORKPLACE

The causes of fatigue in the Line Maintenance workplace are;

1/An inherently inefficient and exposed workplace environment,

2/The inappropriateness of the 12 hour roster to provide "recovery" time of adequate value when current workloads are considered.

3/The diminishing numbers of hours available for Line Maintenance to perform critical tasks prior to the highest sleep propensity time of night.

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These are the main subjects under which the causes of fatigue can be classified and will be explained in more detail further on. The physical manifestations of fatigue in Line Maintenance are constant tiredness and impaired mental and physical skills. They exist because there is little or no management of fatigue in this workplace and therefore it is more by good luck than good management that a minor incident caused by fatigue, hasn't become a major incident.

CAUSES OF FATIGUE IN THE LINE MAINTENANCE WORKPLACE

1/ THE WORKPLACE ENVIRONMENT.

To understand why fatigue is a constant in Line Maintenance and in particular overnight servicing it is necessary to appreciate the physical environment in which this work is performed.

As you can imagine, to house every aircraft that required servicing is out of the question for airlines. The only alternative to this predicament is the very tarmac or apron adjacent to the airline terminal building. This workplace is ideal for aircraft but very inefficient for human beings.

The major functions of Line Maintenance are to repair or replace faulty components. To carry out these functions, in accordance with Maintenance Instruction Manuals, requires access to these Manuals, to tools and to aircraft spares for the replacement of these faulty components. Because of the vast tarmac layout a significant amount of time of each repair or replacement task is consumed by the necessary retrieval of each of these items. There are no assistants to retrieve this equipment nor is it easily at hand. The level of frustration and fatigue as a result of this daily "running around" must no longer be ignored when considering the major causes of fatigue in this working environment.

Most aircraft staying overnight will be parked in this environment as hangar space is at a premium. These aircraft will receive their daily check on the tarmac at the end of the days flying in addition to any extra work.

Hangars are used by Line Maintenance to perform "A" level checks (generally each base has an "A" check aircraft every night) and major

component changes e.g. hydraulic pump, A.P.U. and brake changes. The properties of the hangar environment are varied depending on location, and because of time and manpower limitations in Line Maintenance, more permanent fixtures such as docking and uplighting are not utilised as they would be for longer checks resulting in a compromised, less than ideal working environment.

Exposure to the elements, running around, artificial light, fighting sleepiness, and standing on concrete for most of the night are the environmental factors, that when combined, make fatigue unavoidable in this workplace.

CAUSES OF FATIGUE IN THE LINE MAINTENANCE WORKPLACE

2/THE INAPPROPRIATENESS OF THE 12 HOUR ROSTER TO PROVIDE "RECOVERY" TIME OF ADEQUATE VALUE WHEN CURRENT WORKLOADS ARE CONSIDERED.

Line Maintenance L.A.M.E.'S in Australia were one of the first working groups to adopt the 12 hour shift. Back in 1988, it seemed the way to go for airline and worker together; it improved productivity and drastically reduced the number of consecutive nightshifts. It was and still is based on a 38 hour week and follows the pattern of DDNN XXXX with starting times of 6 am and 6pm respectively. For the first few years, nightshift on this roster was sustainable as rest was achievable in between service completion and the morning departures.

Since this roster was adopted and while shift/crew numbers have remained the same in Brisbane, aircraft fleet numbers, daily movements and flying hours per aircraft per day have all increased dramatically. The appropriateness of the 12 hour roster to provide enough sleep time with sufficient "recovery" value, particularly in between nightshift, under the current workloads, is a serious concern among Line Maintenance L.A.M.E.'S.

A recent extensive study carried out by The Centre for Sleep Research, annexed to The University of South Australia, quite clearly indicates that sleep during the day provides considerably less recovery value than for sleep during the night for the same length of time. This comprehensive analysis of the effects of fatigue within the rail industry also shows that minimum break times in between shifts often do not take in to consideration the type of shift just worked when the break is taken. This is the case in Line Maintenance.

The rostering and the working environment of Line Maintenance L.A.M.E.'S have not even kept up with comparable sections of the same industry let alone the local rail industry. An independent study of the same depth as this rail industry report must be carried out on airline Line Maintenance crews as the conclusions in this report are unquestionably relevant to Line Maintenance.

CAUSES OF FATIGUE IN THE LINE MAINTENANCE WORKPLACE

3/ THE DIMINISHING NUMBER OF HOURS AVAILABLE FOR LINE MAINTENANCE TO PERFORM CRITICAL TASKS PRIOR TO THE HIGHEST SLEEP PROPENSITY TIME OF NIGHT.

Line Maintenance have no control over aircraft arrival times at the end of the days flying. This is the jurisdiction of airline operations. Furthermore the maintenance scheduling department produces the overnight workloads for each base.

Under public ownership an airline is expected to provide a return to shareholders and to achieve this a return on investment in capital equipment is required. Operations have increased aircraft utilisation rates over the last 6 yrs from approximately 7-8 hrs a day to just under 12 hours a day. The end results of this are greater wear and tear on aircraft and later and later arrival times at the end of the days flying. Starting a 5 hour "A" check at 11 p.m. is the resultant and the cause of sleep induced fatigue every night under this operating regime. Management's reply to our concerns are "tough" and a shrug of the shoulders!

In an effort to reduce the length of time an aircraft spends out of revenue service for a major lay-up, or "C" check, tasks from these heavy maintenance checks have been "acquired" by Line Maintenance. These tasks are more critical in nature and require less limitations of time and discernment. These tasks would also normally be performed during 8 hour day and afternoon shifts.

These fundamental shifts in Line Maintenance practise diminish the least affected hours in the night in which a Line Maintenance L.A.M.E. has to perform the critical tasks expected of him. In the

process of trying to beat your own body clock before it becomes too tired, (and as sure as the sun comes up it will), L.A.M.E.'S only end up more fatigued and sleepy. Should people be certifying for aircraft serviceability in this condition not only during the first night but only 12 hours later on the second night as well?

CONSEQUENCES OF FATIGUE IN LINE MAINTENANCE

The consequences of fatigue in Line Maintenance are either speculative or non-speculative. It goes without saying that if the physical effects of fatigue are reduced, by reducing the exposure to fatigue, then the speculative consequences will take on a less life threatening proportion.

These are a few of the major non-speculative consequences of fatigue in Line Maintenance overnight aircraft servicing;

- *The oversight of a defect during a visual inspection or functional check,

- *The entry of a clerical error which is also punishable by a \$5000 fine under Civil Aviation Orders,

- *The decrease in mental and physical capacity leading to the reduction of mechanical reasoning and fine motor skills,

- *Reduction of safety margins in a dangerous workplace,(the activation of aircraft hydraulic pressure augments 3000 psi to flight controls),

- *The depressed mental state that ensues from the inevitability of sleep propensity during nightshift and the hopelessness of fighting against this natural human biorhythm,

These are a few speculative consequences of fatigue;

- *Major aircraft system failure during flight causing it to crash into a highly populated Australian city,

- *The indication of aircraft system failure just prior to take-off,

*Falling asleep at the wheel of a car on the way home from nighshift.

Apart from the immediate personal threat of the last point, the most far reaching consequence of fatigue in this workplace is the oversight of a defect. This can remain undetected between 5 minutes to 5 years depending mostly on luck and is clearly a potential outcome of this type of work being performed at the wrong time of day by an already imperfect human being.

INITIATIVES ADDRESSING FATIGUE CAUSES AND
EFFECTS
IN LINE MAINTENANCE

It is not as easy to list the "anti-fatigue" initiatives as it is the airlines business initiatives. There are none of the former and many of the latter! For example;

*The shortening of major lay-ups and the lengthening of overnight checks,

*The increase in aircraft utilization per day delaying overnight check commencement times back to 23:00hours,

*Stagnant crew numbers whilst aircraft fleet numbers have increased,

*EBA'S that do not incorporate duty hour limitations, rest periods and facilities.

To put these facts into perspective; in the very same airline, pilots and flight attendants have the support of;

*Duty hour limitations,

*Crew rest facilities on the ground and in the air,

*Relief crew if someone reports in sick,

*Minimum break times that consider duties just worked.

The airline have telegraphed their future intentions to further increase nightwork for Line maintenance under their business plan. In the present industrial climate it is also more and more difficult for a

representative body to initiate work practises that address unsustainable work arrangements such as this proposal by the airline.

There has never been any shiftwork/fatigue education from the airline, nor workshops, forums, seminars, or exchange of any information that could be classified as an initiative for this insidious problem in Line Maintenance.

RECOMMENDATIONS TO ACHIEVE GREATER RESPONSIBILITY BY INDIVIDUALS, COMPANIES AND GOVERNMENTS .

INDIVIDUALS:

Currently there is very little an individual L.A.M.E. can do if they recognise that they themselves or their work companions are fatigued. The shift foreman has the prerogative to achieve as much as can be done on nightshift. The only personal course of action possible is to stand yourself down if you feel too tired, losing pay and loading your crewmates up for the rest of the night in the process. It is simply accepted that you will feel tired/fatigued but that the work must get done regardless. Any facility that would allow the individual L.A.M.E. to prohibit themselves from carrying out and certifying work at e.g. 04:30 due to tiredness and fatigue would not be accepted by any employer or the I.R.C. Currently, no statute exists to empower an individual L.A.M.E. with the authority to act with responsibility towards tiredness and fatigue in their workplace. This enquiry should investigate the benefits of legislation that addresses the current lack of this facility.

COMPANIES:

It would be a conflict of interest for an airline manager to reduce workloads on nightshift whilst attempting to achieve operational efficiencies that are expected of a public company in today's corporate world. It would also be extremely naive to believe that an airline would, of its own accord, take such responsible action that prevents overnight aircraft servicing between say 03:00 and 05:00 due to the risk of tiredness and fatigue. From their inception, Australian airlines have depended on the professional attitude of working groups like Line Maintenance L.A.M.E.'S to help achieve operational continuity and efficiency. Beyond minimum duty of care, today's airline will only reduce exposure to fatigue if obliged by law. Companies must also be

prepared to accept a mutual gain outcome from roster negotiations that seek to reduce exposure to fatigue.

GOVERNMENTS:

A L.A.M.E.S' license is issued by the Civil Aviation Safety Authority, just like an airline pilot. This enquiry must investigate why this aviation governing body has not enacted duty time limitations within its orders that apply to L.A.M.E.'S carrying out overnight aircraft servicing on a regular basis. These would safeguard against aggressive airline campaigns that will seek to maximize profits regardless of human limitations such as fatigue.

CONCLUSION

This submission is only a brief insight into the worklife of Line Maintenance L.A.M.E.'S. and in particular those of us who perform overnight aircraft servicing week-in, week-out.

It is hoped by myself and my work colleagues that by conducting this enquiry, the Minister for Transport has recognised that fatigue has been overlooked in this vital area of aviation and that ensuing investigations and findings will;

*Raise awareness of fatigue in overnight aircraft servicing,

*Provide incentives for airlines to reprogramme their maintenance to be carried out at times that are in tune with the human bodys' optimum performance,

*Support the representative body of L.A.M.E.S', the A.L.A.E.A., to commission a study, by The Centre for Sleep Research into fatigue, similar to the one carried out on the local rail industry.

During the last few years, the local airline industry has been through a dramatic period of change due to government policy and ownership. These changes have improved efficiencies where needed but at the same time exposed delicately balanced work arrangements, designed for less a competitive era, to the susceptibility of fatigue in the human body, particularly during overnight servicing.

Airline's have swooped on the opportunity of reforms made possible by an industrial climate that cannot refuse any initiative by management. Any working group unprotected by statutes that recognise the limitations on performance of the human body due to conditions like fatigue, will remain at the mercy of managers/directors, who will continue to act with a greater sense of responsibility towards

shareholders than to the flying public or to affected employees until this imbalance is restored by government intervention.

I commend the minister for conducting this enquiry and hope that information contained in this submission not only provides support for a thorough enquiry but also useful recommendations that can be realistically implemented to sustain safe working practises for overnight aircraft servicing.