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General Aviation Maintenance Technician Fatigue and Work/Rest Periods

Blaise Eisenbeil

GENERAL AVIATION MAINTENANCE TECHNICIAN FATIGUE AND WORK/REST PERIODS

by

Blaise M. Eisenbeil

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Kim Kenville (Advisor)

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ABSTRACT

Fatigue has been studied extensively within the ranks of commercial airline pilots, and for them, regulations have been modified several times to include various rest and work periods. These regulations are often supplemented by union provisions found in contracts with airlines. Conversely, Aviation Maintenance Technicians (AMTs) have been largely overlooked, especially in the general aviation industry. The goals of this research project are to determine (a) if any rest/work rules are in place for 14 CFR (Code of Federal Regulations) Part 145 AMTs, and (b) the body of literature on fatigue in relation to operational errors by AMTs. Note: Any Part and Subpart of Title 14 CFR (e.g. Part 121.377) mentioned in this study will be henceforth prefaced with "Part."

CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of this study is to determine whether Part 145 Repair Station Aircraft Maintenance Technicians (AMTs) are afforded rest periods to the same degree as Part 121 airline pilots. The second objective is to determine the body of published literature addressing fatigue in AMTs in regard to their performance.

Statement of the Problem

While entire subparts of the Federal Aviation Regulations (FARs) cover work/rest periods for pilots, a single rule covers all AMTs in the industry. Part 121.377 is limited in scope, merely providing for 24 consecutive hours of protected time off during a seven consecutive day period. (ecfr.gov, 2015) This rule, and by extension the FAA, represents an important oversight. Certainly, studies exist, some conducted by the FAA itself, that identify fatigue as a legitimate issue in the workplace. However, the FARs are descriptive rather than prescriptive in regard to AMT work/rest periods. They are void of recommendations or mandates for companies to bolster their AMT scheduling practices or risk management programs. By comparison, the United States Air Force (USAF) is more stringent.

Significance of the Study

Flight safety requires an alert airman during preflight briefings, during all phases of flight, and during post flight debriefings. This requirement places a large physical and psychological demand on pilots, and without rest rules, pilots would not be able to safely, effectively, or efficiently conduct a flight.

The federal rules for domestic operations are expansive. Part 121.471 limits total flight time for domestic U.S. operations to 1,000 hours per year, 100 hours per calendar month, 30 hours in 7 consecutive days, and stipulates eight hours of rest between work periods. The same rule quantifies how many hours of rest must take place before a certain number of hours of scheduled flight time, and even provides the start timeframe of those rest periods. Moreover, Part 121.473 indicates that operators must apply a Fatigue Risk Management System that includes certain provisions, if flying time above limitations in Part 121.471 are possible. (ecfr.gov, 2015)

These exacting rules protect much-needed rest periods for pilots operating in challenging airports, in highly technical aircraft. On those aircraft, systems must repeatedly operate consistently under harsh conditions. As such, each part and system is scrutinized and tested to fine detail. For the necessary human interface, it takes a qualified and competent AMT who is well rested. Notably, this individual is often under substantial time pressure from the operators of the aircraft he/she repairs.

Because of these unique demands on a person who often functions in compressed timelines and tough climates, this study seeks to determine the extensiveness of regulation on Part 145 rest periods and whether or not fatigue has been extensively studied amongst this subsection of aviation professionals.

Research Questions

1. Are Part 145 AMT work/rest periods currently mandated by the FARs?
2. To what extent has fatigue in relation to performance amongst Part 145 AMTs been studied?

Limitations of the Study

Early in research for this Independent Study, it was determined that small amounts of literature existed on AMT fatigue, although articles about fatigue in pilots and those in other industries appear to be plentiful. In terms of guidance, the most relevant information could be derived from military instructions, from direct contact with individuals currently employed by Part 145 repair stations, or from others close to the Maintenance, Repair, and Overhaul industry. From the military, only Air Force Instructions (AFIs) are included in the study. Any statistical analysis results are limited to the cited studies and a Boeing Aero magazine publication.

CHAPTER 2

REVIEW OF SELECTED LITERATURE AND CORRESPONDENCE

Information used in this study came from numerous sources, such as military instructions, federal rules for civil applications, and contact with industry professionals. Several key word searches were performed on Google, Bing, and the Chester Fritz library websites. Search terms included: “aviation maintenance technician fatigue,” “AMT rest periods,” “pilot fatigue,” “FAR Part 145 AMT,” “Part 121,” “duty limitations,” “AFI 21-101,” and “Air Force maintenance rest periods.” The internet search for U.S. federal regulations yielded the following: There are several AFIs but only one FAR Part/Sub-part covering AMT work/rest periods. The UND htmlez Aviation graduate Thesis and Independent Study listing was referenced to discover past publications similar to this one.

Phone conversations and emails mirrored this study’s research questions, and occasionally, after further research, additional questions were asked. To locate repair station managers, the internet was searched for Part 145 certificate holders who could answer some basic questions and provide company policy documents. Existing professional contacts were called via email or phone to ask for the same information. An FAA Inspector was called to provide historical context and clarification on the Administration’s interpretation of Part 121 rest period requirements.

Results - Military Regulations

AFI 21-101, *Aircraft and Equipment Maintenance Management*, is a standard set of rules governing all aircraft or aircraft-related maintenance in the USAF. A specific portion is dedicated to personnel duty time. With some exceptions, personnel are not scheduled for more than 12 hours of duty; extra items like deployment processing count towards this 12 hours. Any extension is the decision of the applicable maintenance group commander, for a total duty time of no more than 16 hours. Moreover, commanders must provide a rest period after each shift that includes "the opportunity for 8 hours of uninterrupted sleep." (AFI 21-101, 2015) Personnel also may not perform maintenance on munitions or egress explosives beyond a continuous 12 hours; this time period may be exceeded for shift turnovers. Interestingly, the AFI contains certain language on fatigue. "Stop anyone if fatigue may jeopardize safety…supervisors [must] ensure aircraft maintenance personnel are not required to perform duty when they have reached the point of physical or mental fatigue rendering them incapable of performing their assigned duties safely and reliably." (AFI 21-101, 2015) However specific this may appear, it gives shift supervisors the decision-making authority and scheduling flexibility to prudently release personnel for meal breaks, short respites away from the duty location, or certain days of the week off; all of this happens while the mission goes on.

Similarly, AFI 21-202, *Missile Maintenance Management,* governs depot (heavy periodic) maintenance personnel hours. Collective bargaining agreements, along with federal, state, and local laws affect civil service employees (i.e. those with General Schedule or Wage Schedule pay scales). "Contracted civilian employee work hours are governed by the contract, federal, and state laws." (AFI 21-202, 2015) Shift leaders/schedulers must review union by-laws and the weather climate. The local medical group commander (an O-6) recommends local

work/rest schedules. (AFI 21-202, 2015) This manner of work hours regulation is due, in part, to the fact that many employees at a depot missile maintenance location are civil service or contract civilian employees. AFI 21-202 references other regulations as the parent governance.

Results - Civil Regulation

Part 145 Repair Stations (RS) have the authority to set their own work/rest rules based on the minimum prescribed by Part 121.377. As a result, RS manuals vary widely. Signature TechnicAir in St. Paul, MN applies “common sense” and does not address rest periods in its manual. (J. Buzzell, personal communication, October 16, 2015) Conversely, Fargo Jet Center (FJC), which supports non-commercial and occasionally some aircraft operating under Part 121, does not stipulate mandatory rest periods in company handbooks or its RS manual. This is because their 35 AMTs work a single dayshift. Some FJC maintenance personnel rotate through an on-call, 24 hours, 7 days a week schedule. Managers acknowledge that if an AMT is unexpectedly called out for an extended period of time during non-business hours, he or she is allowed to go home during the day to rest and return the next day. (R. Brekken, personal communication, October 2, 2015) Weber Aviation in Lancaster, PA utilizes one dayshift for five AMTs and works only on propeller driven, non-turbine aircraft. Weber AMTs are not unionized. (D. Clair, personal communication, October 12, 2015)

The University of North Dakota (UND) John D. Odegard School of Aerospace maintains about 100 training aircraft, with 22 non-union AMTs and various support personnel. Two shifts per week are the standard, with reduced coverage on Sunday. During peak periods, scheduled inspections are distributed to area maintenance shops. (F. Argenziano, personal communication, September 21, 2015) Of all the Part 145 repair stations contacted for this study, UND is perhaps the most prescriptive and protective of its employees in regard to fatigue management. A rest

period is considered a continuous and uninterrupted 10 hours, and “should include 6 to 8 hours of sleep.” (“UND Flight Operations Safety Policies and Procedures,” 2015) The most an AMT is permitted to work is 14 hours within any given consecutive 24 hour period; within 12 consecutive days, one day must not include working at a UND job. Moreover, AMTs must attend Human Factors training in fatigue management upon hiring and once annually thereafter (2015).

CHAPTER 3

FAA, NTSB AND OTHER INDUSTRY GROUPS

As we've seen, airline pilot work/rest schedules are heavily regulated in the FARs, and for good reason. Safety and passenger's lives are at stake. However, a review of the federal regulations pertaining to AMT work/rest periods indicates a minimum of comparable regulations. For comparison, Part 121.377 states, "Within the United States, each certificate holder (or person performing maintenance or preventive maintenance functions for it) shall relieve each person performing maintenance or preventive maintenance from duty for a period of at least 24 consecutive hours during any seven consecutive days, or the equivalent thereof within any one calendar month." (ecfr.gov, 2015) This is the extent of federal sanction on AMT work/rest periods.

It must be understood that Part 121.377 is the standing rule for all AMTs, whether they work for a Part 121 airline, or they are employed by a Part 145 repair station that supports a range of operations (Part 121 domestic, flag, Part 135 or Part 91 general aviation). Part 145 does not specify rest periods.

Past attempts by the FAA to interpret Part 121.377 met significant industry resistance. Traditionally, the industry "assumed mechanics could be on duty for more than *six* [emphasis added] straight days [a "block"], so long as at least 24 consecutive hours of rest was provided for each six-day block in a given calendar month." (Broderick, 2013) It appeared that the FAA chose to interpret 121.377 differently. The Administration said a work schedule "that generally provides for an average of one day off over several weeks cannot be said to be 'equivalent' to the more specific standard requiring one day off out of every *seven* [emphasis added] days." (2013)

Industry groups responded immediately. The Aviation Repair Station Association (ARSA) considered the change "substantive," and advised the FAA that it ignored the "equivalency thereof" component because it failed to use the Notice of Proposed Rulemaking (NPRM) process. (Broderick, 2015) The Transport Workers Union (TWU) also replied to the FAA writing, '"there is no basis in the language of the regulation for an interpretation that would turn it into a one day off in seven only" rule.' (Broderick, 2015) To whit, the FAA argued in favor of a seven day period in which a shift leader had to base an employee's schedule, but the industry has traditionally held for a six day period. This allows for more scheduling flexibility among a given employee group. It should be noted that the TWU, in the same response, lobbied the FAA to "convey a working group to help address mechanic fatigue issues that the agency attempts to address in its interpretation." (Broderick, 2015)

Eventually, the FAA agreed, and dropped its push for the seven day rule. The Administration recognized that its "proposed interpretation of the 'equivalency language' found in the 121.377 rest requirement…would change prior long standing precedent." (Broderick, 2013)

Nevertheless, in the absence of specific, prescriptive verbiage in a Part of the FARs, it seems that repair station in the United States schedule shifts in an un-regulated manner with little regard to work/rest periods. Rather, they self-prescribe, with or without union input, work/rest periods for their AMTs. Despite its own research findings that "AMTs often sleep fewer than 8 hours per night and that this presents a risk to safe performance," (Baron, 2009) the FAA testified to Congress that it will not regulate AMT work/rest periods. The FAA reasoned "that the extreme complexity of the issue of maintenance crew fatigue and duty time do not present

appropriate material for regulatory activity and that education and training" (2009) are more appropriate avenues. (2009)

The National Transportation Safety Board (NTSB) disagreed with this stance. In a 2006 communiqué, the NTSB encouraged the FAA, suggesting that their "education and training activities related to this issue can achieve the intent of this safety recommendation." (Baron, 2009) The Board, however, did not altogether endorse the FAA's education effort, finding "little in Advisory Circular (AC) 120-72 [*Maintenance Resource Management Training*] that provides guidance on human fatigue in maintenance crews other than generalized warnings that attention to fatigue is important and should be considered in MRM Training." (2009) The most recent version of AC 120-72 was published in September 2000 and it does not reference FAR Part 121.377. Notably, AC 120-72 is not a mandatory compliance item. (faa.gov, 2015)

Unfortunately, the issue of aircrew fatigue versus duty time is complex, and often only becomes a target for rulemaking when trends emerged on airliner crashes due to pilot fatigue. (Downs, 2015) As a consequence, the FAA produced the exacting pilot work/rest standards already discussed.

In sum, the FAA has elected to delegate the decision to regulate AMT work/rest periods to the certificate holders. Research did not discover any industry AMT fatigue working groups, as proposed by TWU, advocating for regulatory change. In this regard, a manual inspection of the FAA's website revealed the absence of Notice of Proposed Rulemaking (NPRM) efforts towards AMT fatigue since 1978. (rgl.faa.gov, 2015)

CHAPTER 4

RESEARCH ON FATIGUE AMONGST AMTs

Many NTSB cases and academic studies exist on causes of aircraft accidents and incidents, and some point only to a maintenance action as a culprit. The probable cause of a 1983 Eastern Airlines accident was "the omission of all the O-ring seals on the master chip detector assemblies" causing oil to leak from the engines and a subsequent in-flight shutdown. (NTSB/AAR-84/04, 1983) This particular accident report did not cite fatigue as a cause. One study on the contribution of maintenance to single-engine piston aircraft accidents discovered that between 1990 and 2013, "maintenance errors [were] no more likely to cause a fatal accident than accidents unrelated to a maintenance deficiency." (Boyd and Stolzer, 2015) While root cause analysis can pinpoint accident causes to an issue of insufficient training, maintenance processes, or even individual accountability and honesty, investigators must endeavor to trace an error "beyond the operator who committed it to identify predisposing characteristics of the environment and task." (Latorella and Prabhu, 1997)

In the course of one shift, an AMT will make dozens of decisions, some of them critical to the safety of flight. Judgment interference (JI) (Latorella and Prabhu, 1997) can occur at such decision moments. There have been found to be many causes of JI, as Jerome Lederer, President Emeritus of the Flight Safety Foundation, noted: "(Maintenance) error is not the cause of an accident. The cause is to be found in whatever it was that interfered with the (maintenance person's) judgment at a critical moment, the outcome of which was a maintenance error." (Foyle & Dupont (1995) as cited by Latorella and Prabhu, 1997) Possible sources of JI are stress, complacency, and namely, fatigue; these cause maintenance personnel to make erroneous decisions.

In a survey of Australian licensed AMTs, reported errors of maintenance personnel were associated with specific contributing factors. Memory lapse, a result of error in automatic processing (e.g. decisions not based on prescribed troubleshooting steps, but more on experience and intuition), "was associated with [time] pressure, fatigue, and the environment factor." (Hobbs & Williamson, 2003) Published results showed that when fatigue was a factor in reported errors, memory lapses occurred 2.4 times more than when fatigue was not involved. Comparatively, the study illustrated that when published rules or technical guidance are available and used, fatigue did not cause an increase in violations or knowledge-based errors. Crucial suggestions included (a) employees be trained in effective shift scheduling practices and time pressure coping skills; (b) parallel lessons could be drawn from error-producing situations on flight decks, and applied towards similar situations that an AMT would encounter. (Hobbs & Williamson, 2003)

From 1998 to 2000, the FAA conducted its own AMT sleep study. After collecting 50,000 hours of data, the study found that AMTs slept a little more than five hours per day compared to a recommended average of 8 hours. (Hall, Johnson & Watson, as cited by Rankin, 2011) In the same article from Boeing's Aero e-magazine, data were provided from the National Aeronautics and Space Administration's (NASA) Aviation Safety Reporting System (ASRS). Seventy-seven reports were completed by AMTs from 1990 to 2009. "Fatigue contributes to both errors of commission and errors of omission." (Rankin, 2011)

An FAA survey of maintenance human factors programs reported three substantial points. First, 82% of 414 respondents indicated that "fatigue is an issue in aviation maintenance." Second, 36% said fatigue is part of their in-house training program. Third, 25% said that a fatigue management program exists at their place of employment. (Hackworth, Holcomb, Banks,

Schroeder, Johnson, 2007) A TC assessment showed that AMEs' work week often exceeded 50 total hours and included 12-hour shifts. They often wanted overtime or they moonlighted during scheduled days off. Of 1209 AMEs surveyed, 50% "believed that overtime worked during night shifts "had a strong negative effect on their work." (Rhodes (2002) as cited by Aero Safety World, 2008)

In sum, determination of an "at fault" source in the course of an accident/incident investigation, while important, must assess conditions existing before the event. JI describes the primal cause of an AMT's erroneous decision. Fatigue is one JI, and was the predominant cause of memory lapse, or an error in automatic, intuitive processing. Despite this, AMTs routinely work overtime, but recognize their own endurance limitations due to lack of rest.

CHAPTER 4

HOW FOREIGN COUNTRIES HAVE ADDRESSED THE ISSUE OF AMT FATIGUE

Countries outside the U.S. have implemented processes that well-protect AMT work and rest periods. Efforts are progressive when compared to efforts in the U.S. and guidance provided to aviation mechanics is prescriptive in nature.

In the 2012 Airworthiness Advisory Circular (AAC) No 3 of 2011, India's directorate of civil aviation (DGCA) observed that aircraft maintenance personnel (AMP) were experiencing a number of ailments attributed to "long unregulated shifts, often more than 12 hours at a stretch." (AAC No 3 of 2011, as cited by Lalchandani, 2012) Citing the criticality of AMP work to airline safety, and human error as a weakest link in the safety chain," the directorate established that "aviation organizations, in line with pilot and cabin crew," should develop rules for AMP work/rest time limits. (2012) Indeed, the proposed rules encompassed specific time frames. Several changes were recommended. For example, shift durations are generally eight hours but should not exceed 12 hours to guard against fatigue. (Lalchandani, 2012) Adequate rest should be afforded in between shifts, and an employee who works a night shift should be given two days off following that shift. Regular day shifts should start between 0600 and 0800, with a minimum rest of 11 hours in between shifts. Similar to the FAA, "scheduled work hours should not exceed 48 hours in a period of seven successive days," (2012) with maximum hour limits per week.

These recommendations received the attention warranted from airlines, but it was widely recognized after a short time that AMPs worked double shifts. New regulation had not been fully implemented. Additionally, frequent "last minute work comes up for which staff is needed." (Lalchandani, 2012) No new regulations prescribing AMP work/rest periods were found. However, in addition to the aforementioned recommendations, the AAC contained three

program-related recommendations, summarized here: (a) employers should develop risk management (RM) systems to assist mechanics; (b) employers should have an education program targeting the dangers of shift work; (c) aircraft maintenance personnel should report to work after adequately rested. (DGCA AAC No 3, 2012)

Canadian Aviation Regulations (CAR) Standard (Stnd) 700.15, *Maximum Flight Time*, and CAR Stnd 700.16, *Flight Duty Time Limitations and Rest Periods*, outline a pilot's hourly flight time limitations during 365-day, 90-day, and 30-day periods, and 24-hour periods, similarly to Part 121.471. (laws-lois.justice.gc.ca, 2015)

Despite the absence of comparable mandatory rest periods for Canadian AMTs, CAR Stnd 573.06, *Approved Maintenance Organizations* (AMO), mandates that Fatigue Risk Management System (FRMS) will be part of an AMO's program. "Members of the civil aviation industry [asked] for assistance in complying with [Stnd 573]." (AC SUR-001, 2011) The circular introduces a FRMS toolbox, developed by TC Civil Aviation (TCCA) at University of South Australia Centre for Sleep Research. The toolbox is a series of publications that provides several means for, how to manage them at the organizational and individual levels. (2011) The seven publications introduce employers and employees to fatigue risks and culminates in a trainer's handbook that prepares facilitators to conduct a comprehensive workshop. (FRMS for the Canadian Aviation Industry, 2007)

The Canadian Council for Aviation and Aerospace (CCAA) provides a Fatigue Risk Management (FRM) workshop. This helps participants "understand and recognize fatigue" and "develop strategies to effectively manage fatigue in an operational environment." (avaerocouncil.ca, 2015) Not only are these workshops directed at AMTs, but specifically target

“senior management to understand and establish an effective Fatigue Risk Management Program.” (avaerocouncil.ca, 2015) This approach is beneficial to an entire organization since all employees would be on the same page.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

At the present time, the FAA does not consider the issue of fatigue among AMTs a high enough safety priority to pursue, and have argued instead that "incorporating fatigue risk management systems into everyday operations while the ultimate goal will take innovation in addressing a myriad of regulatory issues." (martindale.com, 2008) Industry groups and the NTSB have argued to the contrary.

Currently, certificate holders have devised the rules pertaining to rest periods but they vary widely across the country. This lack of standardization in the industry raises the question as to whether an aviation accident related to AMT fatigue is overdue. Certainly, in the past, when pilot rest periods weren't adequately covered by federal regulation, it took airplane accidents related to fatigue to change the FAA's mind. (Downs, 2009) For example, in February 2007, Colgan Air flight 3407 was on an instrument approach to Buffalo Airport in New York when it stalled and crashed. Several findings in the NTSB report suggested that fatigue degraded pilot performance, that pilots are responsible to "manage their off-duty time and effectively use available rest periods," and that the airline "did not proactively address the pilot fatigue hazards associated with operations at a predominantly commuter base." (NTSB AAR-10/01, 2009) Serious consideration should be given by the FAA to transition from a descriptive approach to a prescriptive one across the industry. Indeed there is adequate precedent: AFI 21-101 indicates that safety is the top priority in the military.

Additional urgency for prescriptive rules is evident in the relationship between the FAA, the employer, and the AMT. The governing administration is genuinely concerned about the safety and well-being of maintenance technicians. The employer is willing to adopt

recommended fatigue recognition and AMT scheduling practices. The AMT is aware that FRMS programs exist, is even willing to make those tenets part of their daily professional and personal lives. However, in a dichotomous fashion, there are a number of AMTs that still choose to work overtime, or an additional job. There are employers that still mount considerable time pressure on AMTs. The FAA limits itself to recommendations for FRMS, and suggestions that employers and industry groups provide the training. It is the recommendation of this study that the FAA seriously pursue prescriptive rules for AMT work/rest periods. How the FAA approaches this could be the focus of an additional study. In the meantime, each of the three groups addressed here should remember that "effective fatigue risk management requires a partnership between the employer and the employee" (Cavalcante, 2014) but this partnership must include Part 91, Part 135, Part 121, and Part 145 operators and associations, unions, the NTSB, and most especially, the FAA. This endeavor can potentially include experts from non-aviation transportation industries, such as trucking, rail, and shipping.

There are exemplar countries from which to draw examples of prescriptive government involvement and AMT fatigue management programs. Consultation with international partners on an issue of this magnitude would yield proactive measures to pre-empt an accident related to AMT fatigue.

Previous studies have cited a "paucity of research on maintenance-related general aviation accidents in piston aircraft." (Boyd & Stolzer, 2015) This study could be expanded to gather data on commercial, general, and with some diligence, military aircraft accidents resulting from maintenance errors caused by AMT fatigue. One well-known incident is the 1990 British Airways Flight 5390, a BAC 1-11 flight from England to Spain. After the left windscreen separated from the aircraft, the pilot was partially sucked out. It had been fitted with 84 screws

that were too small in diameter, and were installed by an engineer at a very early morning hour, when “circadian effect” (Cavalcante, 2014) was low. When “combined with lack of sleep before his shift, [this] may have contributed significantly to the mechanic’s perceptual judgmental error in selecting the wrong size bolts for the job.” (2014) The AMT believed that the screws were the correct size while the countersink was too large. Although this loss of a windscreen is “singular in nature,” (Dobbs, 2015) the likelihood of an AMT working late at night when circadian rhythm is low is common.

Fatigue studies have been conducted for non-aviation industries. Data and conclusions from those studies should be culled for potential lessons to be applied to AMT fatigue. “Links between errors and contributing factors” must be stressed so that “lessons learned in one context [may be] generalized to other domains.” (Hobbs & Williamson, 2003)

The aviation industry has greatly benefited people. It requires the concerted and expedited effort of a vast number of pilots, AMTs, air traffic controllers, and many more, to function safely and efficiently. Because this human population is prone to error, the resulting impact to the traveling public is substantial. Amongst these groups, cross-tell is important so people can learn from one another. Finally, where rulemaking is needed, the FAA, airlines, and repair stations must balance between economics and human behavioral tendencies. AMTs will conform to a simple set of clearly defined rules, and despite the fact that it takes about seven years to update the FARs (Downs, 2015), the industry needs to act now.

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