
**PROTECTING THE HEALTH AND SAFETY OF PILOTS:
A CRITICAL ANALYSIS OF FLIGHT AND DUTY TIME
REGULATIONS IN CANADA**

by

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ABSTRACT

Civil aviation is the most regulated and likely the most competitive mode of transportation in the world. When commercial air transportation gained its economic momentum in the middle of the twentieth century, strong competition forced emerging airlines to find new ways to increase their profitability, such as optimising the utilisation of their pilots to reduce labour costs.

As new technology allowed pilots to fly transcontinental flights for extended hours, government regulators in the 1960s quickly realised that pilot fatigue was a developing threat to the travelling public. By focusing on human factors in the context of flight safety, flight and duty time (FDT) regulations were adopted to limit the number of hours airline pilots spent flying and working on duty.

This article will analyse the current FDT regulations in Canada. While many Members States of the International Civil Aviation Organization (ICAO) have modernised their FDT regulations in the last few years, Canada's regulatory approach to mitigate pilot fatigue is clearly outdated. This article will critically evaluate the existing and potential shortcomings of the pilot fatigue regulations currently in force in Canada. There is a genuine feeling in the industry that these regulations and current laws are inadequate or obsolete, as they do not reflect modern pilot fatigue science and place smaller carriers flying in unorthodox environments at risk.

RÉSUMÉ

L'aviation civile est le mode de transport le plus réglementé, et sans doute le plus concurrentiel au monde. Au moment où le transport aérien commercial connaissait son essor économique, au milieu du vingtième siècle, la forte concurrence a forcé les nouvelles compagnies aériennes, à trouver des solutions innovantes pour accroître leur rentabilité financière,

notamment en optimisant l'utilisation de leurs pilotes, afin de réduire les coûts de main-d'œuvre.

Alors que les avancées technologiques permettaient aux pilotes de voler de nombreuses heures sur les vols transcontinentaux, les organismes de réglementation gouvernementaux ont rapidement réalisé, dans les années 1960, que la fatigue des pilotes était une menace grandissante pour les voyageurs. En se focalisant sur les facteurs humains dans le cadre de la sécurité aérienne, des réglementations sur le temps de vol et de service (TSV) ont été adoptées pour limiter le nombre d'heures passées par les pilotes à voler et à travailler.

Cet article analysera la réglementation actuelle en matière de TSV au Canada. Alors que de nombreux États membres de l'Organisation de l'aviation civile internationale (OACI) ont modernisé leur réglementation applicable au TSV, au cours des dernières années, l'approche réglementaire du Canada, relative à la limitation de la fatigue des pilotes, est manifestement dépassée. Cet article évaluera, de manière critique, les lacunes réelles ou potentielles des normes en vigueur au Canada, sur la fatigue des pilotes. Il existe un sentiment tangible, au sein de l'industrie, que ces règles et lois actuelles sont inappropriées et obsolètes, ne reflètent pas les connaissances scientifiques actuelles sur la fatigue des pilotes, et mettent en danger les petits exploitants aériens volant dans des environnements inusuels.

KEYWORDS

Pilot Fatigue; Aviation Safety; Flight Time; Duty Time; Canada; Flight Crew; Labour Law.

I. INTRODUCTION

Professors Paul Dempsey and Laurence Gesell have stated that “[t]he tension existing between labor and management is probably as old as capitalism itself and the division of labor in society”.¹ Since commercial aviation operates twenty-four hours a day, every single day of the year,² air carriers have historically attempted to maximise the

¹ Paul Stephen Dempsey & Laurence E Gesell, *Airline Management: Strategies for the 21st Century*, 3rd ed (Chandler, Ariz: Coast Aire Publications, 2012) at 583 [Dempsey & Gesell, *Airline Management*].

² Temesha Evans-Davis, “Pilot Fatigue: Unresponsive Federal Aviation Regulations and Increasing Cockpit Technology Threaten to Rock the Nation’s Pilots to Sleep and Compromise Consumer Safety” (1999-2000) 65:3 J Air L & Com 567 at 579.

productivity and utilisation of their pilots at the lowest cost possible,³ with the adverse consequence of generating fatal accidents every now and then.⁴ Since unsafe transportation can endanger the lives of the travelling public worldwide,⁵ the international community's universal focus on elementary considerations for humanity⁶ has fortunately tempered this capitalist mentality with the adoption of air safety regulations. In light of this societal objective, Canada has invested considerable efforts to accomplish the lowest number of accidents *practically* achievable,⁷ with active regulatory oversight strategies to protect air safety as a universal necessity.⁸

Because 90% of aviation accidents are caused by human error,⁹ it can be concluded that *safety* is a dynamic variable¹⁰ shaped by external factors,

³ Dempsey & Gesell, *Airline Management*, *supra* note 1 at 605.

⁴ See generally Michael Quinlan, *Ten Pathways to Death and Disaster: Learning from Fatal Incidents in Mines and Other High Hazard Workplaces* (Annandale, NSW: The Federation Press, 2014) at 9 ("Work remains a prominent source of death even in the wealthiest and most advanced industrial societies"); Richard Johnstone, "Courts, Crime, and Workplace Disaster" in Eric Tucker, ed, *Working Disasters: The Politics of Recognition and Response* (Amityville, NY: Baywood Publishing, 2006) at 217 [Johnstone, "Courts"]; Jane Cherry, "Remembering How to Fly: How New Pilot Training Requirements May Do More Harm than Good" (2012) 77:3 J Air L & Com 537 at 544; US, National Transportation Safety Board, *Aircraft Accident Report: Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York, February 12, 2009* (NTSB/AAR-10/01) (Washington, DC: National Transportation Safety Board, 2009), online: NTSB <www.ntsb.gov/investigations/AccidentReports/Reports/AAR1001.pdf>. See, for instance, the 2009 crash of the Colgan Air Bombardier Dash 8-Q400 (N200WQ) near Buffalo (New York State), where pilot fatigue was found to be a contributing factor to the accident, which killed 50 people (49 people on board and another person on the ground). See also Nick Hopkins, "Airline pilots complain of dangerous fatigue in leaked documents", *The Guardian* (29 July 2016), online: The Guardian <www.theguardian.com/business/2016/jul/29/airline-pilots-complain-dangerous-fatigue-leaked-documents-flydubai>. On another note, early reports based on leaked documents indicate that the Flydubai crash in Rostov (Russian Federation) on 19 March 2016 was likely caused by pilot fatigue and organisational pressure forcing air crews to work under onerous work schedules. The crash killed everyone on board, including 55 passengers and 7 crew.

⁵ See Quinlan, *supra* note 4 at 5 (Quinlan concludes, "What is notable is that in transport-related incidents the great majority of those killed were members of the travelling public rather than transport workers").

⁶ See Jiefang Huang, "Aviation Safety, ICAO and Obligations Erga Omnes" (2009) 8:1 Chinese JIL 63 at 73.

⁷ See generally Mikolaj Ratajczyk, "Regulatory Framework for a 'Performance-Based' Approach to Air Safety Management in the European Union" (2011) 36:6 Air & Space L 401 at 402.

⁸ Paul Stephen Dempsey & Laurence E Gesell, *Air Transportation: Foundations for the 21st Century* (Chandler, Ariz: Coast Aire Publications, 1997) at 244 [Dempsey & Gesell, *Air Transportation*].

⁹ See James Reason, "Understanding Adverse Events: Human Factors" (1995) 4:2 Quality & Safety in Health Care 80 at 80 [Reason, "Understanding"].

¹⁰ See ICAO, *Safety Management Manual (SMM)*, 3rd ed, ICAO Doc 9859/AN/474 (Montreal: ICAO, 2013) at 2-1 [ICAO, *SMM*] ("Within the context of aviation, safety is 'the state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management.'").

including political, economic, and organisational impediments.¹¹ In this article, external factors refer to elements that can directly or indirectly influence the human performance (e.g., in-flight performance) of individual pilots. While economic and safety priorities have often been separately regulated by the State, an airline's decision impacting safety will have a positive or negative effect on profitability (e.g., increased operating costs) and, *vice versa*, a business decision will in many cases affect air safety,¹² such as the deterioration or improvement of flight crew performance.¹³ Since safety and profitability together form an indivisible prerequisite to ensure the sustainability of commercial air transportation, organisational decisions by an airline,¹⁴ such as flight crew scheduling, can foster either improved or inferior safety levels in the long run,¹⁵ depending on the latent impact of such choices.¹⁶

As these external factors can induce substantial variations in pilot performance,¹⁷ there has been a strong focus in aviation safety to study human behaviour, including the adverse effects of *pilot fatigue* on safety.¹⁸ Due to the demanding work and rest schedules imposed upon flight crews,¹⁹ pilot fatigue is a major regulatory priority in air transportation.²⁰ The modern duty and flight time restrictions emerged when aviation safety regulation progressively shifted its focus towards *human factors*²¹ in

¹¹ See Reason, "Understanding", *supra* note 9.

¹² Paul Stephen Dempsey, "The Rise and Fall of the Civil Aeronautics Board: Opening Wide The Floodgates of Entry" (1979-1980) 11:1 *Transp LJ* 91 at 167 [Dempsey, "The Rise and Fall"]; Australian Government, Civil Aviation Safety Authority, "Human factors", online: Civil Aviation Safety Authority <www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_100994>.

¹³ ICAO defines a flight crew member as "a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period". ICAO, (2010) 9 International Standards and Recommended Practices: Annex 6 to the Convention on International Civil Aviation: Part 1 International Commercial Air Transport: Aeroplanes, Attachment A, para 4.2.1 [*Annex 6*].

¹⁴ See generally René David-Cooper, "Landing Safety Management Systems (SMS) in Aviation: The Implementation of Annex 19 for Commercial Air Carriers in Canada" (2015) XL *Ann Air & Sp L* 445 [David-Cooper, "Landing"].

¹⁵ See Quinlan, *supra* note 4 at 17; Natalie N DuBose, "Flightcrew Member Duty and Rest Requirements: Does the Proposed Legislation Put to Rest the Concern Over Pilot Fatigue?" (2011) 76:2 *J Air L & Com* 253 at 256.

¹⁶ See Reason, "Understanding", *supra* note 8 at 81; Quinlan, *supra* note 4 at 17-18.

¹⁷ ICAO, *SMM*, *supra* note 10 at 2-7.

¹⁸ See *Annex 6*, *supra* note 13, ch 1.

¹⁹ See Eileen M Gleimer, "When Less Can Be More: Fractional Ownership of Aircraft—The Wings of the Future" (1998-1999) 64:4 *J Air L & Com* 979 at 979.

²⁰ Quinlan, *supra* note 4 at 69 ("Extended hours of work and fatigue can both contribute to serious incidents and have long-term health effects"); Kelsey M Taylor, "Sleeping on the Job: A Critical Analysis of the FAA's "Cargo Carve-out" under F.A.R. 117 and the Simple Solution that No One is Talking About" (2014) 79:2 *J Air L & Com* 401 at 403.

²¹ The field of Human Factors can be defined as "the discipline concerned with optimizing the relationships between people and their activities through the systematic application of the human sciences, integrated within the framework of system engineering". US, Federal Aviation Administration, "Introduction to Aviation Human Factors", online: FAA <www.faa.gov>.

the 1960s, to analyse how human dynamics could influence flight performance and overall safety levels.²² During this period, regulations were progressively introduced to optimise the working environments²³ for flight crews with the intent of providing pilots with the necessary “tools which take account of human strength and limitations”.²⁴ To address pilot fatigue, the field of human factors involves a multidisciplinary approach to safety, which aims to understand how humans perform in their workplace environment²⁵ based on “a set of personal, medical and biological considerations for optimal aircraft operations”.²⁶ The field of human factors, therefore, aims to develop enforcement policies and regulations to establish the benchmark for acceptable human behaviour,²⁷ including maximum flight and duty times²⁸ for flight crews.

Since fatigue constitutes a debt that can only be repaid with proper rest,²⁹ Canada has adopted several domestic flight and duty time (FDT) regulations to address pilot fatigue. In recent years, pilot fatigue and contraventions to FDT regulations continue, however, to be cited in numerous investigations conducted by the Transportation Safety Board of Canada (TSB).³⁰ This phenomenon has been further exacerbated by the

google.ca/url?sa=t&rcrt=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwisyahDraPWAhVJ7YMKHRR1BFUQFggyMAI&url=https%3A%2F%2Fwww.faa.gov%2Fabout%2Foffice_org%2Fheadquarters_offices%2Favs%2Foffices%2Ffaam%2Fcami%2Flibrary%2Fonline_libraries%2Faerospace_medicine%2Ftutorial%2Fmedia%2FII.8.1_Introduction_to_Aviation_Human_Factors.doc&usq=AFQjCNGvCBUhX0fGGJVxlqoOGycELna46g>.

²² ICAO, *Human Factors in Air Traffic Control*, Human Factors Digest No 8, Circular 241-AN/145 (1993) at 1 [ICAO, *Human Factors*].

²³ Quinlan, *supra* note 4 at 17.

²⁴ ICAO, *Human Factors*, *supra* note 22 at 1.

²⁵ Quinlan, *supra* note 4 at 17.

²⁶ ICAO, *Fundamental Human Factors Concepts*, Human Factors Digest No 1, Circular 216-AN/131 (1989) at 2.

²⁷ See Richard Johnstone, “Putting the Regulated Back into Regulation”, Book Review of *Corporate Regulation: Beyond ‘Punish or Persuade’* by Fiona Haines, (1999) 26:3 *JL & Soc’y* 378 at 378-79; Johnstone, “Courts”, *supra* note 4 at 211.

²⁸ For the purpose of this article, the FDT acronym will refer to both flight time and duty time limitations.

²⁹ See Taylor, *supra* note 20 at 437.

³⁰ See e.g. Canada, Transportation Safety Board of Canada, *Aviation Investigation Report: Runway Overrun: 1263343 Alberta Inc. (dba Enerjet), Boeing 737-700, C-GDEJ, Fort Nelson, British Columbia, 09 January 2012, A12W0004* (2012), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2012/a12w0004/a12w0004.pdf>; Canada, Transportation Safety Board of Canada, *Aviation Investigation Report: Airspeed Decay – Uncommanded Descent: Air Canada Jazz, Bombardier CRJ 705, C-FNJZ, Winnipeg, Manitoba, 180 nm SE, 01 August 2008, A08C0164* (2008), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2008/a08c0164/a08c0164.pdf>; Canada, Transportation Safety Board of Canada, *Aviation Investigation Report: Collision with Terrain: Summit Air Charters Ltd., Short Brothers SC-7 Skyvan C-FSDZ, Port Radium, Northwest Territories, 08 October 2000, A00W0217* (2000), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2000/a00w0217/a00w0217.pdf>; Canada, Transportation Safety Board of Canada, *Aviation Investigation Report: Controlled Flight into Terrain: Summit Air Charters*

modern “cockpit automation addiction”,³¹ which has enabled pilots to endure longer transcontinental flights through several time zones, often with little rest.³²

As such, we must ask ourselves if the current regulatory framework in Canada for pilot fatigue and crew scheduling is sufficient to safeguard the well-being of air crews and the safety of passengers. A literature review reveals that little academic research has focused on the Canadian legislation in this field. The purpose of this article is to critically analyse the current FDT regulations in Canada. In doing so, the article will examine the domestic legal framework applicable to commercial air carriers in Canada, both from a labour and air safety point of view. One of the main objectives of this article is to identify any potential or

Limited, Dornier 228-202 C-FYEV, Cambridge Bay, Nunavut, 13 December 2008, A08W0244 (2008), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2008/a08w0244/a08w0244.pdf>; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Runway Overrun: Trans States Airlines LLC, Embraer EMB-145LR N847HK, Ottawa/MacDonald-Cartier International Airport, Ontario, 16 June 2010, A10H0004 (2010), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2010/a10h0004/a10h0004.pdf>; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Controlled Flight into Terrain: Provincial Airlines Limited, De Havilland DHC-6-300 Twin Otter C-FWLQ, Davis Inlet, Newfoundland 2 nm NNE, 19 March 1999, A99A0036 (1999), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1999/a99a0036/a99a0036.pdf>; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Pitch Excursion: Air Canada, Boeing 767-333, C-GHLQ, North Atlantic Ocean, 55°00'N 029°00'W, 14 January 2011, A11F0012 (2011), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2011/a11f0012/a11f0012.pdf>; Canada, Transportation Safety Board of Canada, Aviation Occurrence Report: Engine Power Loss/ Loss of Control: Arctic Wings and Rotors, Pilatus Britten-Norman BN2A-20 Islander C-GMOP, Tuktoyaktuk, Northwest Territories 7.7 mi SE, 03 December 1993, A93W0204 (1993), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1993/a93w0204/a93w0204.pdf> [TSB, AOR: Engine]; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Wake Turbulence Encounter - Collision with Terrain: Integra Ops Ltd. (dba Canadian Air Charters), Piper PA-31-350 Chieftain, C-GNAF, Richmond, British Columbia, 09 July 2009, A09P0187 (2009), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2009/a09p0187/a09p0187.pdf> [TSB, AIR: Wake Turbulence]; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Controlled Flight Into Terrain: Régionnaire Inc., Raytheon Beech 1900D C-FLIH, Sept-Îles, Quebec, 12 August 1999, A99Q0151 (1999), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1999/a99q0151/a99q0151.pdf>; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Collision With Terrain: Northern Mountain Helicopters Inc., Bell 206B (Helicopter) C-GVQK, Bear Valley, British Columbia, 30 July 1997, A97P0207 (1997), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1997/a97p0207/a97p0207.pdf>; Canada, Transportation Safety Board of Canada, Aviation Investigation Report: Controlled Flight into Terrain: Cessna 182 D-EDOG, Timmins, Ontario, 03 August 2001, A01O0210 (2001), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2001/a01o0210/a01o0210.pdf>; Canada, Transportation Safety Board of Canada, Aviation Occurrence Report: Controlled Flight into Terrain: Cessna 402 N67850, Wabush, Newfoundland 23 nm NW, 22 October 1995, A95Q0210 (1995), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1995/a95q0210/a95q0210.pdf>; Canada, Transportation Safety Board of Canada, Aviation Occurrence Report: Collision with Terrain: Cessna 188 Agwagon C-GYUD, Marengo, Saskatchewan 2 mi S, 29 June 1994, A94C0119 (1994), online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/1994/a94c0119/a94c0119.pdf>.

³¹ See Cherry, *supra* note 4 at 567.

³² See Evans-Davis, *supra* note 2.

demonstrated shortcomings within the Canadian legislation and reveal any notable differences with international aviation standards. In addition, possible improvements to the current regulations will be suggested. This article's methodological approach will adopt a multidisciplinary analysis of TSB accident investigation reports, human factors, and legal sources in relation with FDT regulations.

II. THE INTERNATIONAL CIVIL AVIATION ORGANIZATION'S FDT STANDARDS AND RECOMMENDED PRACTICES

Before commencing an in-depth analysis of the FDT regulations, we must identify Canada's international legal obligations as a Member State of the International Civil Aviation Organization (ICAO). With 191 existing Member States,³³ ICAO is the United Nations' (UN) specialised agency responsible for ensuring "the safe and orderly growth of international civil aviation throughout the world"³⁴ and promoting "safety of flight in international air navigation".³⁵ ICAO's Standards and Recommended Practices (SARPs) comprehensively address technical and regulatory aviation issues, such as international operating standards, air routes and communications, aircraft licensing and airworthiness certification, aircraft registration, etc.³⁶ By exercising its quasi-legislative powers,³⁷ the ICAO Council adopted a wide variety of SARPs to improve air safety over the last seventy years,³⁸ which were incorporated into several Annexes to the Chicago Convention.³⁹

To address pilot fatigue, ICAO originally introduced FDT SARPs into Annex 6 to the Chicago Convention.⁴⁰ While ICAO SARPs only apply to international air transport operations, Annex 6 serves as an authoritative guidance for countries wishing to mitigate pilot fatigue in

³³ ICAO, "Member States" (7 October 2016), online: ICAO <www.icao.int/MemberStates/Member%20States.English.pdf>.

³⁴ *Convention on International Civil Aviation*, 7 December 1944, 15 UNTS 295, ICAO Doc 7300/9, art 44(a) (entered into force 4 April 1947) [*Chicago Convention*].

³⁵ *Ibid*, art 44(h).

³⁶ Laurence E Gesell & Paul Stephen Dempsey, *Aviation and the Law*, 4th ed (Chandler, Ariz: Coast Aire Publications, 2005) at 881-82 [Gesell & Dempsey, *Aviation*].

³⁷ *Ibid* at 881.

³⁸ *Ibid*.

³⁹ Paul Stephen Dempsey, *Public International Air Law* (Montreal: McGill University, Institute and Centre for Research in Air & Space Law, 2008) at 75 [Dempsey, *Public*].

⁴⁰ See *Annex 6, supra* note 13, Attachment A, para 4.2.1 ("Flight time, flight duty period, duty period limitations and rest requirements are established for the sole purpose of ensuring that the flight crew and the cabin crew members are performing at an adequate level of alertness for safe flight operations").

both domestic and international sectors of their civil aviation industry. In Canada, there is no distinction between domestic and international flight operations for FDT regulations, which stem from Annex 6. This illustrates how Annex 6 seems to remain the benchmark for FDT regulations in both domestic and international sectors of the Canadian aviation industry.

Under Annex 6, ICAO Member States are required to effectively regulate and manage pilot fatigue with the implementation of adequate regulations and government oversight.⁴¹ They are also required to prescribe daily, monthly, and yearly FDT limitations taking into account *transient fatigue*,⁴² *cumulative fatigue*,⁴³ and *circadian fatigue*.⁴⁴ Since many countries enjoy unique aviation cultures and have adopted different scientific and legal standpoints in the field of human factors,⁴⁵ Annex 6 does not contain any compulsory hour-specific or numerical FDT regulations.⁴⁶ Hence, several States possess different numeric restrictions within their domestic laws regarding the specific number of hours a pilot may fly and be on duty,⁴⁷ although FDT regulations are often comparable from one country to another.

ICAO Member States have an affirmative obligation to keep their domestic regulations uniform with the SARPs, including those under Annex 6.⁴⁸ However, if a State cannot comply with ICAO's SARPs, it must provide an *immediate* notification to ICAO⁴⁹ under Article 38 of the Chicago Convention.⁵⁰ Since SARPs are not part of the Convention *per se*,⁵¹

⁴¹ *Ibid*, Attachment A, para 1.1.

⁴² *Ibid*, Attachment A, para 1.2 (“Transient fatigue may be described as fatigue that is dispelled by a single sufficient period of rest or sleep”).

⁴³ *Ibid*, Attachment A, para 1.2 (“Cumulative fatigue occurs after incomplete recovery from transient fatigue over a period of time”).

⁴⁴ Taylor, *supra* note 20 at 404 (“Circadian fatigue occurs when an individual experiences diminished performance during a time when the body normally wants to be asleep (i.e., the “window of circadian low”), which for most people is between 2:00 a.m. and 6:00 a.m.”).

⁴⁵ See DuBose, *supra* note 15 at 272.

⁴⁶ Annex 6, *supra* note 13, Attachment A, para 4.1.3, provides:

When deciding what numerical values should be inserted, States should take into account the results of relevant scientific principles and knowledge, past experience in administering such regulations, cultural issues and the nature of operations intended to be undertaken.

⁴⁷ See Canada, Transport Canada, *Canadian Aviation Regulation Advisory Council (CARAC) Notice of Proposed Amendment (NPA): Flight Crew Fatigue Management*, CARAC Activity Reporting Notice 2014-019 (15 September 2014) at 5 [Transport Canada, *Flight*].

⁴⁸ *Chicago Convention*, *supra* note 34, art 12; Paul Stephen Dempsey & Laurence E Gesell, *Public Policy and the Regulation of Commercial Aviation* (Chandler, Ariz: Coast Aire Publications, 2013) at 692 [Dempsey & Gesell, *Public Policy*]; Dempsey, *Public*, *supra* note 39 at 72.

⁴⁹ Dempsey, *Public*, *supra* note 39 at 77.

⁵⁰ *Chicago Convention*, *supra* note 34, art 38.

⁵¹ “Under the Chicago Convention, SARPs may be adopted by two thirds of the ICAO Council, which is itself comprised of only thirty six member states. Thus, twenty four

they are “soft law”⁵² and are not subject to the international law of treaties.⁵³ As a result, they may not be binding on a State, which notifies ICAO of its non-compliance with a specific Annex 6 standard.⁵⁴ It follows that, unless and until a State adopts domestic laws incorporating ICAO’s SARPs, FDT regulations found in Annex 6 will not impose any legal obligations on airlines.⁵⁵

It appears that Canada is a delinquent country in the field of pilot fatigue, since it has not fully implemented all the FDT Standards contained in Annex 6. In support of this claim, we must note that, in 2009, ICAO amended Annex 6, requiring its Member States to introduce Fatigue Risk Management Systems (FRMS)⁵⁶ within their regulatory framework.⁵⁷ While an analysis of FRMS rules does not fall within the research scope of this article,⁵⁸ it is worth noting that Canada has yet to enact its own FRMS regulations reflecting modern fatigue science and is falling behind many countries in this regard.⁵⁹ Since Canada has not officially notified ICAO of differences regarding its non-compliance with this recent amendment,⁶⁰ all FRMS and FDT SARPs are binding upon Canada⁶¹ and, as such,

member states less than 13% of the [191] member ICAO Assembly can promulgate a SARP”. Paul Stephen Dempsey, “Compliance & Enforcement in International Law: Achieving Global Uniformity in Aviation Safety” (2004) 30:1 NCJ Intl L & Com Reg 1 at 62 [Dempsey, “Compliance”].

⁵² Dempsey, *Public*, *supra* note 39 at 175; David-Cooper, “Landing”, *supra* note 14 at 473.

⁵³ *Vienna Convention on the Law of Treaties*, 23 May 1969, 1155 UNTS 331 (entered into force 27 January 1980).

⁵⁴ Dempsey & Gesell, *Public Policy*, *supra* note 48 at 691.

⁵⁵ See Michael Milde, *International Air Law and ICAO* in Marietta Benkö, ed, *Essential Air and Space Law*, vol 4 (Utrecht: Eleven International Publishing, 2008) at 159; Md Tanveer Ahmad, *Adapting the Existing Regime for the Contemporary World to Achieve Global Civil Aviation Safety: A Developing Country Perspective* (LLM Thesis, McGill University Institute of Air and Space Law, 2009) at 14 [unpublished].

⁵⁶ FRMS is defined as

A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

Annex 6, *supra* note 13, ch 1. See also Taylor, *supra* note 20 at 411.

⁵⁷ Transport Canada, *Flight*, *supra* note 47 at 5.

⁵⁸ The International Air Transport Association (IATA), ICAO and the International Federation of Air Line Pilots’ Associations (IFALPA) developed an exhaustive guide explaining FRMS and detailing the implementation of this regulatory framework in civil aviation. See IATA, ICAO & IFALPA, *Fatigue Risk Management Systems: Implementation Guide for Operators*, 1st ed (July 2011), online: ICAO <www.icao.int/safety/fatiguemanagement/FRMS%20Tools/FRMS%20Implementation%20Guide%20for%20Operators%20July%202011.pdf>.

⁵⁹ The United States, the United Kingdom, Australia, the European Aviation Safety Agency, and even India have implemented FRMS in their respective civil aviation industries. See Transport Canada, *Flight*, *supra* note 47 at 5.

⁶⁰ Any difference with the SARPs should be immediately notified to ICAO. See *Chicago Convention*, *supra* note 34, art 38.

⁶¹ Dempsey, *Public*, *supra* note 39 at 77 (Without a notification of compliance, there is a “presumption of compliance, and arguably, binding applicability”).

Canada is presently in violation of its international air law obligations.⁶²

As demonstrated in Table 1 below, Canada's weekly and monthly FDT limitations are currently inadequate compared to similar regulations found in the United States (US), the United Kingdom (UK), Australia, the European Union (EU) member States, and India. The Canadian FDT regulations also do not specifically address night operations with more restrictive limits,⁶³ even though Canada is now required to do so under Annex 6.⁶⁴ It can, therefore, be concluded that Canada has outdated FDT regulations. Hence, it is argued that Canada should conduct a major overhaul of its air safety regulations to avoid any legal or political issues. Since ICAO Member States must adhere to the same set of norms,⁶⁵ a country's failure to comply with FDT and FRMS SARPs could, in theory, result in other States refusing the entry of air carriers registered in that delinquent country.⁶⁶ SARPs, therefore, "appear to have corresponding *de facto* 'hard law' attributes as well",⁶⁷ as there seem to exist strong legal, political, and economic imperatives persuading Canada to update its current domestic FDT laws.

⁶² Gesell & Dempsey, *Aviation*, *supra* note 36 at 881.

⁶³ DuBose, *supra* note 15 at 265. Transport Canada, *Flight*, *supra* note 47 at 4, notes:

The current requirements do not restrict the number of consecutive night duties that may be flown. The science shows that there is an exponential increase in risk over successive nights. When compared to the first night, the risk is 6% higher on the second night, 17% higher on the third night and 36% higher on the fourth night. There is already a 30% increase in relative risk when a night duty is compared to a day duty (8 am start). This risk compounds over successive nights – a significant decrease in performance.

⁶⁴ See *Annex 6*, *supra* note 13, Attachment A, para 4.8.1.1.

⁶⁵ *Chicago Convention*, *supra* note 34, arts 37, 38.

⁶⁶ Gesell & Dempsey, *Aviation*, *supra* note 36 at 79, assert:

When economically powerful States, such as the United States or the European Union, blacklist a nation's carriers, the economic impact can be severe. Under such circumstances, private sector insurance coverage for airlines and airports may be impossible to obtain. Moreover, the delinquent government would be responsible and arguably liable, should an aircraft collision or other aviation tragedy occur, the proximate cause of which was the failure of the government to comply with a relevant SARP.

See also Dempsey & Gesell, *Public Policy*, *supra* note 48 at 284; Md Tanveer Ahmad, *Climate Change Governance in International Civil Aviation: Toward Regulating Emissions Relevant to Climate Change and Global Warming* in Marietta Benkö, ed, *Essential Air and Space Law*, vol 17 (The Hague: Eleven International Publishing, 2016) at 63; Dempsey, "Compliance", *supra* note 51 at 132-33; *Chicago Convention*, *supra* note 34. This could be achieved by another country blacklisting some or all Canadian carriers from its airspace or by terminating any current bilateral transport treaties between both reciprocal countries.

⁶⁷ Dempsey, *Public*, *supra* note 39 at 80.

Table 1: FDT Regulations in Different Countries

Country	Weekly Flight Hours Limitation	Weekly Duty Hours Limitation	28 Days Duty Hours Limitation	28 days Flight Hours Limitation	365 days Flight Hours limitation
USA	n/a	60	190	100	1000
EASA	n/a	60	190	100	900
UK	n/a	55	190	100	900
CASA	30	40 - 60	n/a	100	1000
India	35	60	190	117	1000
Canada - Current	40/60	n/a	n/a	112/140	1200

Source: Transport Canada⁶⁸

III. THE LEGAL FRAMEWORK FOR COMMERCIAL AIR OPERATORS IN CANADA

A. THE AERONAUTICS ACT AND THE CANADIAN AVIATION REGULATIONS

Under the Aeronautics Act of Canada,⁶⁹ the Minister of Transport holds plenary jurisdiction over its federal government department, Transport Canada,⁷⁰ regarding the development of civil aviation safety regulations.⁷¹ With its primary mission of ensuring safe air transport for the travelling public,⁷² Transport Canada is responsible for promoting and developing safety in the Canadian national civil aviation network with adequate regulatory infrastructure and effective oversight over the commercial aviation industry.⁷³ As such, Transport Canada's

⁶⁸ Transport Canada, *Flight*, *supra* note 47 at 5. USA refers to the United States, EASA refers to the European Aviation Safety Agency responsible for promulgating aviation safety rules in the EU, UK refers to the United Kingdom, and CASA refers to the Civil Aviation Safety Authority (CASA) responsible for promulgating air safety rules in Australia. While India possessed, at the time of this writing, a Category 1 rating under the FAA's International Aviation Safety Assessment (IASA) programme, it has experienced a troubled safety record in the past and had a Category 2 safety record banning Indian airlines from increasing their flights to the US until 2015. See US, Federal Aviation Administration, Press Release, "U.S. Transportation Secretary Foxx Announces Improved Aviation Safety Rating for India" (8 April 2015), online: US FAA <www.faa.gov/news/press_releases/news_story.cfm?newsId=18575>.

⁶⁹ *Aeronautics Act*, RSC 1985, c A-2 [*Aeronautics Act*].

⁷⁰ See Dempsey, "The Rise and Fall", *supra* note 12 at 285 (in reference to the US Federal Aviation Administration (FAA)).

⁷¹ *Aeronautics Act*, *supra* note 69, s 4.2(1).

⁷² See Dempsey & Gesell, *Air Transportation*, *supra* note 8 at 188; Gesell & Dempsey, *Aviation*, *supra* note 36 at 286.

⁷³ See Transport Canada, "Civil Aviation", online: Transport Canada <www.tc.gc.ca/eng/

“responsibilities for maintaining public safety in its use of the national airspace are extensive”.⁷⁴ In reaction to pilot fatigue concerns, FDT restrictions for professional pilots have been federally regulated in Canada since the 1940s,⁷⁵ and are now firmly established in the Canadian Aviation Regulations (CARs),⁷⁶ which comprehensively support every other aspect of aviation safety.⁷⁷ In light of this safety imperative, Transport Canada has the necessary jurisdiction to periodically prescribe and revise “reasonable rules and regulations governing the maximum hours or periods of service airmen”,⁷⁸ such as FDT regulations. The Occupational Health and Safety Tribunal of Canada (OHSTC) stated in the recent *Black Sheep Aviation*⁷⁹ decision that “limitations standards to flying and duty time is a preventive measure designed to ensure that pilots are not called upon to fly in a condition of excessive fatigue”.⁸⁰

In the Canadian air commerce industry,⁸¹ FDT restrictions apply to aerial work operators (“702 carriers”),⁸² air taxi operators (“703

civilaviation/menu.htm>.

⁷⁴ Gesell & Dempsey, *Aviation*, *supra* note 36 at 287.

⁷⁵ Sarah Schmidt, “Pilots question Transport Canada’s stance on new fatigue guidelines”, *Canwest News Service*, online: Air Canada Component of the Canadian Union of Public Employees (CUPE) <www.accomponent.ca/en/news/pilots-question-transport-canadas-stance-new-fatigue-guidelines>.

⁷⁶ *Canadian Aviation Regulations*, SOR/96-433 [*Canadian Aviation Regulations*].

⁷⁷ Gesell & Dempsey, *Aviation*, *supra* note 36 at 301.

⁷⁸ *Ibid* at 379.

⁷⁹ *Black Sheep Aviation & Cattle Co Ltd* (2015), 2015 OHSTC 9 (Occupational Health and Safety Tribunal Canada), online: Government of Canada <www.canada.ca/en/occupational-health-and-safety-tribunal-canada/programs/decisions/2015/ohstc-2015-009.html> [*Black Sheep Aviation*]. On 31 March 2011, a de Havilland DHC-3 Otter operated by Black Sheep Aviation & Cattle Co. Ltd. departed from Mayo (Yukon) to deliver mining supplies to a client and crashed 19 minutes after departure following a catastrophic in-flight breakup. The pilot, the sole occupant in the aircraft, was fatally injured. Among other findings, the investigation determined that the pilot had deliberately made erroneous entries in journey logs. This was likely to circumvent FDT limits and aircraft maintenance schedules. It was found that, by exceeding the maximum duty time permitted by the CARs during a 7-day period, the pilot’s conduct had increased the risk of fatigue. It was also found that company procedures to monitor FDT compliance were lacking. While the accident was not caused by pilot fatigue *per se*, the investigation revealed serious issues regarding the industry’s imperfect compliance with FDT regulations and the potential for pilot fatigue.

⁸⁰ *Ibid* at para 34.

⁸¹ Dempsey & Gesell, *Air Transportation*, *supra* note 8 at 223 (“Air commerce is the carriage of persons or property for compensation or hire, or the carriage of mail by aircraft, or the operation or navigation of aircraft in the conduct of furtherance of a business or vocation”. Air commerce therefore excludes any State or military aircraft operations).

⁸² *Canadian Aviation Regulations*, *supra* note 76, s 702.01(1), defines an aerial work operation as:

- the operation of an aeroplane or helicopter in aerial work involving:
 - (a) the carriage on board of persons other than flight crew members;
 - (b) the carriage of helicopter Class B, C or D external loads;
 - (c) the towing of objects; or
 - (d) the dispersal of products.

The “operation of an ultra-light aeroplane, or in respect of the operation of an aircraft in aerial work involving sightseeing operations” is not considered as an aerial work operation.

carriers”),⁸³ commuter operators (“704 carriers”),⁸⁴ and airlines (“705 carriers”)⁸⁵ registered in Canada. In the aviation industry, 702, 703, and 704 operators are commonly referred to as “small operators” or “small carriers”,⁸⁶ while 705 carriers are referred to as “airlines” or “large carriers”.⁸⁷ As we shall see, FDT limitations will often differ depending on the category of operator. It is important to note, however, that FDT restrictions do not apply to flight training units (FTUs),⁸⁸ meaning that, in practice, no regulations in the CARs currently prevent flight instructors from working or flying beyond reasonable duty hours.⁸⁹

Ibid., s 702.01(2).

⁸³ *Ibid.*, s 703.01, defines an air taxi operator as:

- a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, of any of the following aircraft:
 - (a) a single-engined aircraft;
 - (b) a multi-engined aircraft, other than a turbo-jet-powered aeroplane, that has a MCTOW of 8 618 kg (19,000 pounds) or less and a seating configuration, excluding pilot seats, of nine or less;
 - (b.1) a multi-engined helicopter certified for operation by one pilot and operated under VFR; and
 - (c) any aircraft that is authorized by the Minister to be operated under this Subpart.

Ibid., s 101.01(1) provides: “MCTOW or maximum certificated take-off weight means the weight identified as such in the type certificate of an aircraft”.

⁸⁴ *Ibid.*, s 704.01, defines commuter operator as:

- a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, of any of the following aircraft:
 - (a) a multi-engined aeroplane that has a MCTOW of 8 618 kg (19,000 pounds) or less and a seating configuration, excluding pilot seats, of 10 to 19 inclusive;
 - (b) a turbo-jet-powered aeroplane that has a maximum zero fuel weight of 22 680 kg (50,000 pounds) or less and for which a Canadian type certificate has been issued authorizing the transport of not more than 19 passengers;
 - (b.1) a multi-engined helicopter with a seating configuration, excluding pilot seats, of 10 to 19 inclusive, unless it is certified for operation with one pilot and operated under VFR; and
 - (c) any aircraft that is authorized by the Minister to be operated under this Subpart.

⁸⁵ *Ibid.*, s 705.01, defines an airline operator as:

- a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, of any of the following aircraft:
 - (a) an aeroplane, other than an aeroplane authorized to operate under Subpart 4, that has a MCTOW of more than 8 618 kg (19,000 pounds) or for which a Canadian type certificate has been issued authorizing the transport of 20 or more passengers;
 - (b) a helicopter that has a seating configuration, excluding pilot seats, of 20 or more; or
 - (c) any aircraft that is authorized by the Minister to be operated under this Subpart.

⁸⁶ Transport Canada, *Safety Management Systems for Small Aviation Operations: A Practical Guide to Implementation*, TC-1001017, TP 14135E (09/2004) (Ottawa: Transport Canada, 2004) at 1, online: Government of Canada <publications.gc.ca/collections/Collection/T52-4-7-2004E.pdf>.

⁸⁷ *Ibid.*

⁸⁸ Flight training unit means:

- (a) in the case of an aeroplane or helicopter, the holder of a flight training unit operator certificate, or
- (b) in the case of a glider, balloon, gyroplane or ultra-light aeroplane, a club, school or other organization that conducts flight training[.]

Canadian Aviation Regulations, *supra* note 76, s 101.01(1).

⁸⁹ As discussed below, flight instructors employed by a flight training unit (FTU) would be covered under the Canada Labour Code and are, therefore, subject to daily and weekly maximum working hours.

B. THE UPCOMING LEGISLATIVE REFORM OF FDT REGULATIONS IN CANADA

While current FDT restrictions are designed to mitigate pilot fatigue, the existing regulations have not been amended in over twenty years.⁹⁰ Therefore, current FDT limits are, in some regards, obsolete. Transport Canada has even openly admitted that “the current limitations are not supported by today’s fatigue science and are not meeting ICAO’s SARPs”.⁹¹ Even in the opinion of Transport Canada, current regulations permit duty times that are too long, tolerate rest periods that are too short, and do not take into account human physiology, circadian cycles,⁹² and the effects of accumulated pilot fatigue.⁹³

In response to this apparent threat to flight safety, a Transport Canada working group published a report in 2012, resting on industry, legal, and scientific expertise.⁹⁴ Based on this report, the Canadian Aviation Regulation Advisory Council (CARAC) of Transport Canada released in 2014 a Notice of Proposed Amendment (NPA)⁹⁵ to outline its suggested amendments to the CARs in an attempt to harmonise the Canadian legislation with international air safety standards⁹⁶ – an implicit recognition that the CARs do not meet international standards. The general objective of this regulatory overhaul is to reduce fatigue-related human errors and improve the overall air safety standards in Canada.⁹⁷ This article will occasionally refer to the suggested amendments contained in the NPA to compare them with the existing CARs.

⁹⁰ FDT regulations in Canada were developed by a government working group in the early 1990s and were originally adopted in 1996. See Transport Canada, *Flight*, *supra* note 47 at 1.

⁹¹ *Ibid.*

⁹² See also Quinlan, *supra* note 4 at 70, 117.

⁹³ Transport Canada, *Flight*, *supra* note 47 at 1.

⁹⁴ Captain Dan Adamus & Jacqueline Booth, *Report of the Canadian Aviation Regulation Advisory Council (CARAC) Flight Crew Fatigue Management Working Group* (Transport Canada, 15 August 2012), online: Transport Canada <www.wapps.tc.gc.ca/Saf-Sec-Sur/2/npa-apm/doc.aspx?id=10019>.

⁹⁵ Transport Canada, *Flight*, *supra* note 47. Proposed regulatory amendments were published in the Canada Gazette in July 2017. At the time of this writing, these had not yet been adopted.

⁹⁶ *Ibid* at 2.

⁹⁷ *Ibid* at 1. The Air Line Pilots Association (ALPA), the most important pilot union in North America, stated that the NPA’s modernisation of flight and duty time rules “marks a significant step forward in advancing ALPA’s goals for combating pilot fatigue and further improving air safety throughout Canada”. “ALPA Hails Government Action to Update Canadian Pilot Fatigue Rules”, Cision (15 September 2014), online: Cision <www.newswire.ca/news-releases/alpa-hails-government-action-to-update-canadian-pilot-fatigue-rules-515626661.html>.

C. COMMERCIAL AIR TRANSPORTATION AND THE CANADA LABOUR CODE

While it is often ignored by some air operators, the Canada Labour Code⁹⁸ applies to pilots, since air transportation is a federal industry⁹⁹ under the exclusive legislative purview of the Parliament of Canada.¹⁰⁰ However, the Labour Code only applies to pilots employed by an air operator¹⁰¹ and to *dependent* air contractors.¹⁰² Independent contractor pilots, who generally represent a minority in modern-day commercial aviation,¹⁰³ are not covered by the Labour Code and must abide by FDT

⁹⁸ *Canada Labour Code*, RSC 1985, c L-2 [*Labour Code*].

⁹⁹ *Ibid*, s 2, provides:

In this Act, federal work, undertaking or business means any work, undertaking or business that is within the legislative authority of Parliament, including, without restricting the generality of the foregoing,

...

(e) aerodromes, aircraft or a line of air transportation[.]

¹⁰⁰ Constitutional case law in Canada has held for nearly a century that the federal government has exclusive jurisdiction to regulate aviation. See *In re the Regulation and Control of Aeronautics in Canada*, [1931] J.C.J. No 4, [1932] AC 54, [1932] 1 D.L.R. 58 (UK); *Johannesson v West St. Paul (Rural Municipality of)*, [1952] 1 SCR 292; *Air Canada v Ontario (Liquor Control Board)*, [1997] 2 SCR 581. In *Quebec (Attorney General) v Canadian Owners and Pilots Association*, 2010 SCC 39, [2010] 2 SCR 536 at para 28, the court stated:

The jurisprudence establishes that Parliament has power over aeronautics. Because commercial aviation was not foreseen in 1867, aviation is not articulated as a head of power under s. 91 of the Constitution Act, 1867. However, it has been held to be a matter of national importance and hence supported under the federal POGG power.

The court, *ibid* at para 29, further noted: "The matter was settled in 1951 in *Johannesson v Rural Municipality of West St. Paul* ... In five separate opinions, the Supreme Court of Canada unanimously held that Parliament has exclusive jurisdiction to regulate the field of aviation, confirming earlier dicta that aerial navigation is a matter of national interest and importance: *In re Regulation and Control of Aeronautics in Canada*, [1932] A.C. 54 (P.C.)."

¹⁰¹ *Labour Code*, *supra* note 98, s 3(1) provides:

employee means any person employed by an employer and includes a dependent contractor and a private constable, but does not include a person who performs management functions or is employed in a confidential capacity in matters relating to industrial relations[.]

¹⁰² *Ibid*. Under the Labour Code, *ibid*, s 3(1), a "dependent contractor" means:

(a) the owner, purchaser or lessee of a vehicle used for hauling, other than on rails or tracks, livestock, liquids, goods, merchandise or other materials, who is a party to a contract, oral or in writing, under the terms of which they are

(i) required to provide the vehicle by means of which they perform the contract and to operate the vehicle in accordance with the contract, and

(ii) entitled to retain for their own use from time to time any sum of money that remains after the cost of their performance of the contract is deducted from the amount they are paid, in accordance with the contract, for that performance,

(b) ...

(c) any other person who, whether or not employed under a contract of employment, performs work or services for another person on such terms and conditions that they are, in relation to that other person, in a position of economic dependence on, and under an obligation to perform duties for, that other person[.]

¹⁰³ Although self-employed pilots were more common in the early days of commercial operations in Canada, very few pilots still conduct freelance flight operations, mainly because of the increasingly high fixed costs associated with owning an air transportation company. A minority of freelance pilots, such as independent flight instructors, crop-duster pilots, tour guide operators or air taxi pilots, still operate as independent contractors not

regulations found in the CARs. For pilots covered by the Labour Code, the standard hours of work are 8 hours in any period of 24 consecutive hours and 40 hours in any period of 7 consecutive days.¹⁰⁴ Both these standards do not set any absolute limit; they can be exceeded if the employer meets certain criteria, namely by providing *overtime compensation* in some circumstances.

Since the aviation industry possesses an irregular and seasonal distribution of working hours, the Labour Code also allows pilots to average their standard weekly 40-hour limit over a period of two or more weeks under certain conditions upon their employer posting a notice to this effect to the attention of its employees.¹⁰⁵ This notice permits pilots to fly beyond the standard work schedule during a specific timeframe (e.g., during peak business periods).

Generally, employers cannot require their pilots to be on duty beyond 48 hours in a single week.¹⁰⁶ A carrier can, nonetheless, derogate from this limit if the average hours of work for a period of two or more weeks do not exceed 48 hours a week. However, this derogation must be agreed upon in writing by the employer and the trade union for employees subject to a collective agreement, or conversely, by 70% of its non-unionised employees.¹⁰⁷ An employer can also go beyond the weekly 48-hour limit if the air carrier obtains a ministerial permit exemption;¹⁰⁸ if regulations adopted by the Governor in Council expressly derogate from the standard limit;¹⁰⁹ or when a carrier conducts emergency work,¹¹⁰ such as aerial rescue or firefighting operations, for example. Hence, the Labour Code does permit pilots to fly well beyond the 40-hour standard in many circumstances.

covered by the *Labour Code*, *supra* note 98.

¹⁰⁴ *Labour Code*, *supra* note 98, s 169(1).

¹⁰⁵ *Ibid*, s 169(2). *Canada Labour Standards Regulations*, CRC, c 986, s 6(1) [*Labour Regulations*], provides:

Where the nature of the work in an industrial establishment necessitates that the hours of work of certain employees be irregularly distributed with the result that those employees

(a) have no regularly scheduled daily or weekly hours of work, or

(b) have regularly scheduled hours of work that vary in number from time to time, the hours of work of each of those employees in a day and in a week may be calculated as an average over an averaging period of two or more consecutive weeks.

¹⁰⁶ *Labour Code*, *supra* note 98, s 171(1). Therefore, a pilot may fly beyond the daily 8-hour limit and weekly 40-hour limit as long as any exceeding time is respectively compensated with a salary equal to 1.5 times the usual wage.

¹⁰⁷ *Ibid*, s 172.

¹⁰⁸ *Ibid*, s 176(1).

¹⁰⁹ *Ibid*.

¹¹⁰ *Ibid*, s 177(1).

Transport Canada has admitted that “current regulations do not have cumulative duty limitations” for pilots.¹¹¹ As such, the regulatory flight time limitations found in the CARs (a maximum of 60 flight hours in some cases, as discussed below) can result in *legally* permissible duty hours of up to 60 to 90 hours per week.¹¹² Therefore, the Labour Code’s standard work schedule may often clash with the maximum *duty time* permissible by the CARs for pilots employed by a carrier,¹¹³ unless an employer manages to benefit from an exception in certain circumstances set out by the Labour Code and the Labour Standards Regulations.¹¹⁴ As illustrated in Table 2 below, the CARs are, on a weekly basis, far more permissible than the Labour Code’s standard working hours. In many situations, the CARs enable pilots, excluding flight instructors,¹¹⁵ to work well beyond the Labour Code’s standard work schedule.

Table 2: Standard Hours of Work under the Canada Labour Code Versus Maximum Pilot Duty Times Permitted in the CARs

Canadian Law	Maximum Duty Time		
	Within 24 hours	Within 7 days	Within 2 weeks
<i>Canada Labour Code</i>	No maximum <i>per se</i> – Overtime compensation may apply after 8 hours	Generally, 40 hours. The limit can be extended if certain criteria are met	Generally, 80 hours. The limit can be extended if certain criteria are met
<i>Canadian Aviation Regulations</i>	14 hours	60 to 90 hours (depending on the type of operator), which result from the maximum flight time allowed in the CARs	120 to 180 hours (depending on the type of operator), which result from the maximum flight time allowed in the CARs

¹¹¹ Transport Canada, *Flight*, *supra* note 47 at 3. The US, the UK, Australia, and even India have regulated weekly duty time limits for pilots in the range of 55 to 60 hours a week.

¹¹² *Ibid* at 4.

¹¹³ *Canadian Aviation Regulations*, *supra* note 76, s 700.01, provides: employed on a full-time basis means working for an air operator on a continuous basis for at least the number of hours required to carry out the duties of the position for the safe operation of the commercial air service[.]

¹¹⁴ For employers seeking to adopt a modified work schedule or implement the averaging of employee work hours, which both exceed the normal work schedule of the Labour Code, see *Labour Regulations*, *supra* note 105, ss 4, 5, 6.

¹¹⁵ Since flight instructors are not covered by FDT regulations in the CARs, we can conclude that working time limitations for flight instructors employed by an FTU are exclusively governed by the Labour Code. On the other hand, self-employed flight instructors, being considered as independent contractors, would not be covered by the Labour Code, nor by the CARs either. There is, therefore, a regulatory vacuum for FDT limitations for freelance instructors, as these pilots can work and fly as many hours as they wish.

The Labour Code is ultimately more restrictive than the CARs when an employee averages his or her weekly work hours over an extended period of time. If we conceive a hypothetical scenario in the higher ranges where a person is capable of working up to 45 to 50 weeks in one year, a pilot who averages his or her work hours with a weekly average of 48 hours on duty would still be entitled to work between 2160 and 2400 hours a year under the Labour Code. If that same pilot reaches the maximum flight time allowed annually under the CARs, which is 1200 hours,¹¹⁶ it is quite unlikely that this pilot would breach the Labour Code given Transport Canada's approximate computation of duty time in relation to actual flight time, which roughly equates to three hours of total duty time for every two hours of flight time.¹¹⁷

Overall, while most large airlines have reasonable collective bargaining agreements that utilise their pilots within the legal limits established by the Labour Code and the CARs with respect to maximum working hours, smaller cash-strapped operators are, nonetheless, likely to utilise their pilots near the upper duty time limits, with a deleterious effect on flight performance.

IV. MONITORING SYSTEMS

To achieve a delicate balance between legal and business imperatives, commercial air operators are legally required to have an organised tracking system to monitor FDT limits for every employed pilot.¹¹⁸ In fact, it is a requirement under Annex 6 to regularly and accurately log all flight and duty times.¹¹⁹ A company must also openly communicate in their company operations manual information regarding the procedures in place to monitor FDT limitations for flight crews.¹²⁰ In

¹¹⁶ See *Canadian Aviation Regulations*, *supra* note 76.

¹¹⁷ Transport Canada, *Flight*, *supra* note 47 at 3. Calculations are based on weekly flight time limits (40-60 flight hours depending on the type of operator). Hence, a pilot who accumulates 1200 hours of flight time is likely to be on duty for 1800 hours that same year.

¹¹⁸ *Canadian Aviation Regulations*, *supra* note 76, s 700.14(1).

¹¹⁹ See relevant guidance in *Annex 6*, *supra* note 13, Attachment A, paras 4.11.1, 4.11.2:

4.11.1 To enable the operator to ascertain that the fatigue management scheme is functioning as intended and as approved, records should be kept for (*) months of the duties performed and rest periods achieved so as to facilitate inspection by the operator's authorized personnel and audit by the State of the Operator.

4.11.2 The operator should ensure that these records include for each flight and cabin crew member, at least:

- a) the start, duration and end of each flight duty period;
- b) the start, duration and end of each duty period;
- c) rest periods; and
- d) flight time.

¹²⁰ *Canadian Aviation Regulations*, *supra* note 76, s 700.14(1).

practice, technology has enabled carriers to efficiently monitor these time restrictions by utilising computerised programmes, which automatically alert managers when a flight assignment has the potential of exceeding the FDT limits.¹²¹ Pilots also have a legal obligation to notify their employer when a flight assignment may exceed the maximum FDT restrictions.¹²² Pilots are responsible for recording their flight times in a personal logbook¹²³ and must, therefore, conduct an individual assessment on a regular basis to determine whether they are working within the regulatory duty time limits.¹²⁴

The TSB has stated that an employer and his or her pilots should proactively monitor FDT compliance on a daily basis.¹²⁵ Although compliance with FDT regulations is a joint responsibility shared by both the employer and his or her pilots,¹²⁶ the OHSTC has asserted that pilots are ultimately responsible for *regularly* and *accurately* logging their hours.¹²⁷ This is an odd conclusion, since carriers are partly responsible for the safety and well-being of their aircrew. In light of the existing organisational pressures imposed on the average professional pilot, the burden of ensuring compliance with safety regulations should lie with the carrier,¹²⁸ not with pilots at risk of being pressured by management to take on more flight assignments. An opposite conclusion would condone turning a blind eye to ongoing violations by an employer's pilots and

¹²¹ See *Black Sheep Aviation*, *supra* note 79.

¹²² *Canadian Aviation Regulations*, *supra* note 76, s 700.14(2).

¹²³ The holder of a pilot licence is required under law to maintain a personal log book containing a record of all flights conducted by the pilot to evaluate his or her flight experience. This log must contain, for example, the specific dates when flights were conducted, the total flight time, and the type of flight conditions with respect to day, night, visual flight rules (VFR), and instrument flight rules (IFR). *Ibid*, s 401.08.

¹²⁴ See *Annex 6*, *supra* note 13, Attachment A, para 4.11.4.

¹²⁵ Canada, Transportation Safety Board of Canada, *Aviation Investigation Report: Loss of control - In-flight breakup: Black Sheep Aviation & Cattle Co. Ltd., de Havilland DHC-3 Otter C-GMCW, Mayo, Yukon, 38 nm NE, 31 March 2011, A11W0048* (2011) at 33, online: Transportation Safety Board <www.tsb.gc.ca/eng/rapports-reports/aviation/2011/a11w0048/a11w0048.pdf> [TSB, *AIR: Black Sheep*].

¹²⁶ *Ibid* at 30.

¹²⁷ *Black Sheep Aviation*, *supra* note 79 at para 31:

It seems clear to me that requiring the employer to verify the entries made by their employees is not supported by the wording of the Manual. Employees are, pursuant to section 126 of the Code, required to fulfill their obligations regarding matters of health and safety. The Manual clearly places the responsibility of accurately reporting flight hours in the log book, on the employees. I note that those hours include flight time for the appellant, but also with other operators or private flying. Requiring the employer to ensure the accuracy of all entries, including the latter, would imply some kind of independent investigation into the actual flying time of the pilots, which is not in my view a reasonable interpretation of the Manual. In my view, if that was the intended result, the wording of the section should have so expressed more clearly.

¹²⁸ Johnstone, "Courts", *supra* note 4 at 219 (In reality, "the alleged carelessness of the employee has very little to do with the offense of failing to provide a safe workplace").

encourage “blame-shifting” by airline managers.¹²⁹ While managers are often aware of such gaps or disconnects between legal standards and actual company practices,¹³⁰ they are ultimately accountable for any subsequent accidents.¹³¹

Transport Canada has identified numerous cases where operators have been caught inadequately monitoring the FDT of their flight crew members.¹³² The TSB has stated that exceeding permitted FDT limits increases the risk of fatigue and, therefore, poses a serious risk to safety.¹³³ In the *Black Sheep Aviation* accident, the pilot, who was fatally injured, was likely “smudging” his duty and flight time logs by routinely subtracting between 0.1 and 0.3 hours from the actual flight time according to the TSB, in an attempt to fly more hours and generate more income.¹³⁴ The reality is that many pilots flying for small operators are often paid based on each mile flown or per hour, plus an additional meagre monthly stipend.¹³⁵ In other cases, pilots are only paid for each completed flight.¹³⁶ Therefore,

¹²⁹ *Ibid* at 230.

¹³⁰ Quinlan, *supra* note 4 at 28.

¹³¹ *Ibid* at 106–07.

¹³² Transport Canada, “Monitoring of Flight time and Flight Duty Time”, Commercial and Business Aviation Advisory Circular No 0207 (13 May 2002), online: Transport Canada <www.tc.gc.ca/eng/civilaviation/standards/commerce-circulars-ac0207-1677.htm>.

¹³³ TSB, *AIR: Black Sheep*, *supra* note 125 at 29–30:

Performance and judgment degradation due to fatigue were also considered possible contributing factors, as the pilot was functioning in a high-tempo work environment, the pilot’s duty days had exceeded 14 hours several times in the previous 10 days, and the requirement for 1 extra hour of rest time per day was not being met. The pilot had also exceeded the 7-day 60-hour flight time limit imposed by regulations. Although it was estimated that the pilot’s sleep/work cycles were sufficiently regular to avoid fatigue, he was helping unload or attend to the aircraft during the day—physically demanding tasks that left him no opportunity for rest breaks during the duty days.

¹³⁴ *Ibid* at 30:

A downward adjustment of times recorded in aircraft journey log and flight duty records would have deferred flight interruptions due to scheduled maintenance and duty day limitations, increasing the pilot’s opportunity to fly. The more flying the pilot did, the greater the pilot’s income was, and the sooner the pilot could return to family life.

¹³⁵ *Anderson v Buffalo Airways Ltd*, 2001 NWTSC 3 at para 3 [*Anderson*]:

Joe McBryan, president and major shareholder of [Buffalo Airways], gave evidence of the defendant’s practice of recruiting and employing pilots over the past thirty [years] here in northern Canada. Pilots who are recent graduates of flying school are initially hired at “entry level” positions, e.g., ramp attendant, freight handler, flight attendant, etc. Within six months or so the person would work his/her way into a flying job, i.e., as a co-pilot. In 1993–1995, the pay was \$1300/month plus 13 cents mileage. Most pilots come to work for a northern operator in order to gain experience, in order to advance their career, in order to get lots of flying hours towards their “captain” qualification. Most are candid in acknowledging that their focus is eventually to go back south with one of the major airlines. As one pilot witness put it, “everyone was there as a stepping stone...”

¹³⁶ Transport Canada, “SATOPS”, Final Report, TP 13158 E (Spring 1998) at 34, online: Transport Canada <www.tc.gc.ca/media/documents/ca-publications/tp13158.pdf> [Transport Canada, “SATOPS”].

underpaid pilots are forced to maximise their flying and duty hours to achieve a decent salary.¹³⁷ Transport Canada has stated that these methods of remuneration negatively affect the safe decision-making of pilots,¹³⁸ especially for seasonal and contract pilots, and that a fixed salary method would likely offset this pressure.¹³⁹ Pilots and carriers should not make their operational decisions based on remuneration, but rather on safety imperatives.¹⁴⁰ Hence, there may be a correlation between pilot fatigue and remuneration structures.¹⁴¹

Likewise, there has been an unfortunate tendency with pilots flying for more than one operator to unintentionally or even deliberately omit the reporting of non-company time to their primary employer.¹⁴² Transport Canada has reminded pilots and operators in the past that all time spent working and flying for another operator must be calculated towards the primary employer's FDT.¹⁴³ In sum, properly logging FDT data is crucial to ensure a safe and reliable air transportation network, as rested pilots will perform better and will inevitably prevent further fatigue-related incidents from occurring.

V. FLIGHT TIME RESTRICTIONS IN THE CANADIAN AVIATION REGULATIONS

A. CALCULATING FLIGHT TIME FOR CANADIAN OPERATORS

Before analysing the current regulations, we must draw a fundamental distinction between "flight time limitations" and "duty time limitations".¹⁴⁴ Flight time limitations restrict the number of hours a pilot can fly within a given period of time. The CARs define flight time as:

the time from the moment an aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight[.]¹⁴⁵

¹³⁷ *Ibid.*

¹³⁸ Quinlan, *supra* note 4 at 184. There is a demonstrated correlation between the salary structure of a company's employees and the overall safety levels of an organisation.

¹³⁹ Transport Canada, "SATOPS", *supra* note 136 at 34.

¹⁴⁰ *Ibid.*

¹⁴¹ See Quinlan, *supra* note 4 at 184.

¹⁴² Transport Canada, "SATOPS", *supra* note 136 at 34.

¹⁴³ See *Black Sheep Aviation*, *supra* note 79. It is worth noting that such flight and duty time includes flying time flown for other operators and in private aircraft.

¹⁴⁴ See respective definitions in Part VI, below.

¹⁴⁵ *Canadian Aviation Regulations*, *supra* note 76, s 101.01(1). In practice, flight time is frequently calculated, as per most aircraft industry checklists, once the aircraft's engines start

Flight time restrictions, therefore, strictly refer to the specific time when an aircraft is operated by a pilot-in-command having the legal responsibility and authority over the operation and safety of such aircraft.¹⁴⁶ Flight time restrictions exclude any time spent working before or after a flight is completed. The applicable flight time limitations set out in the CARs are summarised in Table 3 below.

If a pilot conducts flights under more than one type of operation, for instance logs both air taxi and commuter flights during a specific period of time, either for the same operator or for more than one operator at the same time, Transport Canada has stated in its guidance materials that such a pilot would be limited to fly the “less restrictive flight time limits once the more restrictive limit has been reached”.¹⁴⁷ This scenario could materialise, for example, when a pilot starts flying for a new employer operating a different aircraft type than his or her previous employer, or if the pilot is assigned to fly multiple different aircraft types within the same company during the same period.

and until the engines are completely shut down.

¹⁴⁶ Pilot-in-command “means, in relation to an aircraft, the pilot having responsibility and authority for the operation and safety of the aircraft during flight time”. *Aeronautics Act, supra* note 69, s 3(1). Of course, some more complex aircraft require that the pilot-in-command be legally accompanied in the cockpit by a co-pilot and, in some cases, by a flight engineer.

¹⁴⁷ Transport Canada, *Guidance Material Concerning Flight Time and Flight Duty Time Limitations and Rest Periods*, R 740.15, online: Transport Canada <www.tc.gc.ca/media/documents/ca-standards/orientation700.pdf> [Transport Canada, “Guidance Material”].

Table 3: Flight Time Limitations (CARs 700.15)

	Within 365 consecutive days	Within 90 consecutive days	Within 30 consecutive days	Within 7 consecutive days	Within 24 consecutive hours
Aerial work	1,200 hours	300 hours	120 hours or 100 hours for flight crew members on call	60 hours	8 hours for single-pilot IFR operations
702 Operators					No flight time limits for VFR operations
Air Taxis	1,200 hours	300 hours	120 hours or 100 hours for flight crew members on call	60 hours	8 hours for single-pilot IFR operations
703 Operators					No flight time limits for VFR operations
Commuters	1,200 hours	300 hours	120 hours or 100 hours for flight crew members on call	40 hours if operating an aircraft other than a helicopter	8 hours for single-pilot IFR operations
704 Operators					No flight time limits for VFR operations
Airlines	1,200 hours	300 hours	120 hours or 100 hours for flight crew members on call	40 hours if operating an aircraft other than a helicopter	8 hours for single-pilot IFR operations
705 Operators					No flight time limits for VFR operations
Helicopter Operators	1,200 hours	300 hours	120 hours or 100 hours for flight crew members on call	60 hours	8 hours for single-pilot IFR operations
					No flight time limits for VFR operations

To illustrate this rule and the latter scenario, consider the example of a Canadian pilot flying for the same company a multi-engine Beechcraft 58 Baron with fewer than nine seats (i.e. an air taxi operation)¹⁴⁸ and a multi-engine Beechcraft 1900 with a 19-seat passenger configuration (i.e. a commuter operation).¹⁴⁹ If the pilot reaches the 40-hour limit applicable for commuters within 7 consecutive days flying either the Beechcraft 58 Baron or the Beechcraft 1900, or a combination of both aircraft at the same time, the remaining flight time of twenty hours allowed under air taxi regulations (60-hour limit within 7 consecutive days) can be completed as

¹⁴⁸ See *Canadian Aviation Regulations*, *supra* note 76, s 703.01. The Beechcraft Baron is configured to sit four to six passengers and can, therefore, operate as a 703 carrier, since it carries under 9 passengers and has a MCTOW ("means the weight identified as such in the type certificate of an aircraft") of less than 19,000 pounds.

¹⁴⁹ *Ibid*, s 704.01.

long as the remaining hours are flown entirely in the smaller air taxi aircraft class – the Beechcraft 58 Baron.¹⁵⁰ These regulations enable carriers to utilise their pilots with flexible flying hours in different aircraft types at the same time. These rules ultimately reach a safe compromise allowing carriers to maximise their permitted flying hours in each aircraft type, without allowing pilots to circumvent the CARs while flying longer hours in more complex and demanding aircraft.

B. ADMINISTRATIVE DEROGATIONS BY TRANSPORT CANADA

Carriers may also apply for a derogation from Transport Canada to increase their flight time limitations in its Air Operator's Certificate (AOC). This less restrictive derogation is known in the industry as an Operations Specifications (OPS Specs). For instance, OPS Specs 092¹⁵¹ allows any type of carrier, during six non-overlapping periods of 30 consecutive days within a 365-consecutive day period, to increase the total flight time permitted for each pilot to a maximum of:

- 1200 hours in any 365 consecutive days;
- 900 hours in any 180 consecutive days;
- 450 hours in any 90 consecutive days;
- 210 hours in any 42 consecutive days;
- 150 hours in any 30 consecutive days; and
- 60 hours in any 7 consecutive days.¹⁵²

Noticeable exemptions are found in the 30-day and 90-day periods. These exemptions permit high-tempo operations, including oil rig helicopter ferry pilots, or seasonal operators, such as tour guides or bush operators (e.g., float plane pilots), to maximise the use of their pilots during a short but profitable period of flying. If the pilot is provided with at least 5 days of consecutive rest,¹⁵³ free from any duties, the flight times accumulated for the 30-consecutive day, 42-consecutive day, and 90-

¹⁵⁰ See Transport Canada, "Guidance Material", *supra* note 147.

¹⁵¹ Transport Canada, "Operations Specification 092: Increase in Flight Time" (10 October 1996), online: Transport Canada <www.tc.gc.ca/eng/civilaviation/standards/commerce-certification-ops-092-1648.htm> ("This operations specification is issued pursuant to paragraph 700.15(2)(a) of the Canadian Aviation Regulations. An increase in Flight Time is authorized. This operations specification is valid if the air operator complies with the requirements of section 720.15 of the Commercial Air Service Standards").

¹⁵² OPS Specs 93 also allows an increase in flight duty time if authorised by Transport Canada. See Transport Canada, "Operations Specification 093: Increase in Flight Duty Time" (10 October 1996), online: Transport Canada <www.tc.gc.ca/eng/civilaviation/standards/commerce-certification-ops-093-1649.htm>.

¹⁵³ In this example, the calculation is made with the assumption that the carrier has not obtained an Operation Specification 092 derogation.

consecutive day period limitations may be reset to zero.¹⁵⁴

Unfortunately, the current flight time regulations do not take into account cumulative duty time fatigue,¹⁵⁵ as the current limitations found in *Operations Specification 092* can result in duty hours of up to 60 to 90 hours a week.¹⁵⁶ In *Anderson v Buffalo Airways*, for instance, the court noted that pilots working for Buffalo Airways, a northern airline operating out of Yellowknife, were often on duty between 250 and 300 hours per month.¹⁵⁷ Scientific evidence has concluded that working beyond 48 hours a week has a negative impact on work performance.¹⁵⁸ To address this problem, it has been recommended in the NPA that flight time limits in the CARs should be amended to a maximum of “112 flight hours in any 28 consecutive days”, “300 flight hours in any 90 consecutive days”, and “1,000 flight hours in any 365 consecutive days”,¹⁵⁹ which would far exceed the current minimum rest periods discussed later in this article. Shorter flight time limits would likely reduce the associated duty times and mitigate pilot fatigue. The deadly *Black Sheep Aviation* accident is evidence that allowing pilots to work extended number of hours can have fatal consequences.¹⁶⁰

C. SINGLE-PILOT IFR FLIGHTS

If a pilot conducts single-pilot IFR flights, meaning that an aircraft is operated under an Instrument Flight Rules (IFR)¹⁶¹ flight plan with a

¹⁵⁴ *Black Sheep Aviation*, *supra* note 79; Transport Canada, “Appendix D: Air Taxi, Aerial Work, and Helicopter Operations”, Commercial and Business Aviation Advisory Circular No 0091R (1 April 1996), online: Transport Canada <www.tc.gc.ca/eng/civilaviation/standards/commerce-circulars-ac0091r_att4-1631.htm>; Transport Canada, “SFO-9b Flight and Duty Times - 703”, online: Transport Canada <www.tc.gc.ca/eng/civilaviation/publications/tp13750-checklists-sfo9b-2574.htm>.

¹⁵⁵ See generally Quinlan, *supra* note 4 at 70.

¹⁵⁶ Transport Canada, *Flight*, *supra* note 47 at 4.

¹⁵⁷ *Anderson*, *supra* note 135. Interestingly, pilots were not paid for each hour worked, but rather based on each mile flown by them. Therefore, hours spent working on the ground were not entirely remunerated, aside from the base pay.

¹⁵⁸ Transport Canada, *Flight*, *supra* note 47 at 3-4:

During a study of medical interns, the weekly scheduled hours were reduced from an average between 77 to 81 hours to an average of between 60 to 63 hours per week. This reduction of weekly work hours had a marked effect on diagnostic errors. Interns made 5.6 times as many serious diagnostic errors during the longer work week than during the shorter work week – fatigue negatively affected their decision making abilities. Another study showed that working at least 12 hours per day was associated with a 37% increased hazard rate and working at least 60 hours per week was associated with a 23% increased hazard rate.

¹⁵⁹ *Ibid* at 21.

¹⁶⁰ See TSB, *AIR: Black Sheep*, *supra* note 125.

¹⁶¹ David-Cooper, “Landing”, *supra* note 14 at 459:

“IFR” refers to Instrument Flight Rules. When flying in IFR conditions (e.g. when flying in reduced visibility, in cloud, or on an IFR flight plan), pilots are required under law to be licensed to fly their aircraft using only their flight instruments, have

lone pilot not accompanied by any co-pilot, he or she may not fly beyond 8 hours in any 24 consecutive hours.¹⁶² This limitation applies whether or not the pilot has flown only a *single* second with an IFR flight plan or a total of eight hours.¹⁶³ For example, if a pilot takes off from an airport in IFR conditions, cancels his or her IFR flight plan minutes after departure, and continues his or her route under a Visual Flight Rules (VFR) flight plan,¹⁶⁴ the pilot will still be limited to 8 hours of flight time in the next 24 hours, regardless of the fact that he or she only flew only very few minutes in IFR conditions.¹⁶⁵ The mere fact that a flight is flown under an IFR flight plan will automatically trigger an 8-hour flight time restrictions for the next 24 hours. Otherwise, carriers would continuously fly below the 8-hour mark to avoid triggering this limitation.

It must be noted that, at times, IFR flying can be a strenuous and stressful exercise for pilots flying in challenging weather conditions. In IFR conditions, pilots must often fly and land their aircraft solely by following and monitoring complex avionics systems, without looking outside the cockpit window to visually orient themselves, in some cases until the aircraft is only seconds away from landing on the runway. Hence, these regulations aim to prevent single pilots from becoming overly fatigued when flying extended hours alone in challenging weather conditions whilst juggling with multiple flying tasks. Alternatively, carriers may implement company procedures requiring two pilots for IFR operations to avoid triggering the 8-hour flight time limit. As such, carriers wishing to maximise the use of their assets may do so by adding a co-pilot.

While hiring two pilots to fly IFR operations for a single flight might not be necessarily profitable, it may be a financially attractive option to utilise two pilots over an extended period of time. An additional co-pilot also decreases the risk of accidents, since he or she can identify mistakes

operational IFR avionics and adhere to certain weather minima.

All IFR flights must be, under law, flown with an IFR flight plan.

¹⁶² See *Canadian Aviation Regulations*, *supra* note 76, s 700.15(1).

¹⁶³ See *Ibid*, s 602.73(1); NavCanada, "The Life of a Flight Plan" in Transport Canada, *Aviation Safety Letter*, TP 185E, Issue 2/2009 (Ottawa: Public Works and Government Services Canada, 2009), online: Transport Canada <www.tc.gc.ca/media/documents/ca-publications/tp185e_2_2009.pdf>.

¹⁶⁴ See *Canadian Aviation Regulations*, *supra* note 76, s 101.01(1). VFR are "a set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going. Using the VFR Flight rules, the pilot must be able to operate the aircraft with visual reference to the ground, and by visually avoiding obstructions and other aircraft". International Virtual Aviation Organisation, "Visual Flight Rules", version 2.3 (18 October 2015), online: International Virtual Aviation Organisation <www.ivao.aero/training/documentation/books/PP_ADC_Visual_Flight_Rules.pdf>.

¹⁶⁵ See Transport Canada, "Guidance Material", *supra* note 147.

or intervene, if necessary. An additional pilot also allows the captain to delegate ancillary tasks to the co-pilot, such as monitoring flight instruments, navigating the aircraft, and communicating with air traffic control (ATC), while the captain focuses on flying the aircraft. In single-pilot IFR flights, the pilot-in-command must handle all these responsibilities at once, which can become an impossible task in the unlikely event of a serious emergency.¹⁶⁶

VI. DUTY TIME LIMITS IN CANADA

A. THE DEFINITION OF “DUTY TIME”

Similar to flight time restrictions, duty time limits vary depending on the type of flight operation conducted by each individual pilot. Distinct in nature from flight time, the current duty time definition contained in the CARs has a wider scope of application than flight time, as it applies to any time spent by a pilot once he or she reports for working duty¹⁶⁷ at his or her place of employment (e.g., the airport), on top of any flight time logged by a pilot, until the end of the final flight of the day or until the pilot is released by his or her employer.¹⁶⁸ This time includes preparation time before a flight is conducted and any operational delays encountered during this period.¹⁶⁹ According to ICAO, any tasks conducted at the behest of the carrier should be counted towards duty time.¹⁷⁰ According to the NPA, duty means “any task that a flight crew member is assigned by an air operator at a specific time, including flight duty, administrative work, training, positioning, and standby”.¹⁷¹ Irrespective of the type of operation, if a pilot reports for a flight assignment and the flight is subsequently cancelled, the time spent between reporting for duty and cancelling the flight should count towards the total duty time

¹⁶⁶ TSB, AOR: *Engine*, *supra* note 30 at 16 (“Pilot fatigue can, after an emergency or abnormality is detected, lead to errors in judgement”).

¹⁶⁷ ICAO defines reporting time as the “time at which flight and cabin crew members are required by an operator to report for duty”. *Annex 6*, *supra* note 13, Attachment A, para 4.2.3.

¹⁶⁸ *Canadian Aviation Regulations*, *supra* note 76, s 101.01(1).

¹⁶⁹ *Ibid.* In cases of operational delays (e.g., temporary mechanical issues or weather conditions), it is, therefore, not rare for passengers to have their flights either postponed or cancelled because flight crews have exceeded their permitted duty time, even though the aircraft is fit to fly and weather conditions become perfectly safe eventually.

¹⁷⁰ *Annex 6*, *supra* note 13, Attachment A, para 4.7.2.1, provides:

These include, but are not limited to: pre-flight preparation; conduct of the flight (whether or not this is commercial air transport); post flight actions; training given or received (classroom, flight simulator or aeroplane); rostered office/management time; and positioning. Standby should be included to the extent that it is likely to induce fatigue.

¹⁷¹ Transport Canada, *Flight*, *supra* note 47 at 10. Although it is not a legal requirement yet, the NPA suggests that, for duty times exceeding 6 hours, all types of operators should provide their pilots with the opportunity to eat and drink.

calculation.¹⁷² If the reporting time to the airport is delayed for more than 3 hours, for example, because of bad weather or aircraft maintenance difficulties, and the pilot is notified before leaving a rest facility, his or her duty time is also considered to start 3 hours after the scheduled reporting time.¹⁷³

For pilots conducting aerial work or air taxi operations, flight duty time is defined in the CARs as:

the period that starts when a flight crew member *reports* for a flight, or *reports* as a flight crew member on standby, and finishes at engines off or rotors stopped at the end of the final flight...¹⁷⁴

In the case of pilots flying for an airline or a commuter operator, the same duty time calculation applies, but must include an additional 15 minutes after the engines, or rotors in the case of helicopters, are shutdown to take into account post-flight duties.¹⁷⁵ Except for helicopter operations, duty time for airline and commuter pilots also includes the time required to complete any duties assigned by the air operator prior to the reporting time and the time required to complete aircraft maintenance engineer duties prior to or following a flight.¹⁷⁶

Therefore, duty time calculations for airlines and commuters must also include any time spent after a flight conducting ancillary flight tasks, such as completing administrative paperwork requirements (e.g., filling out aircraft journey logs), flight planning, parking and securing their aircraft, shutting down avionics systems, refuelling, escorting their passengers to a terminal, covering the aircraft surfaces and engines during the winter, etc.

This duty time distinction between the 702-703 and 704-705 operators is rather peculiar, since 702 and 703 pilots often work in challenging working environments and in remote areas with little or no

¹⁷² See Letter from Rebecca B MacPherson, Assistant Chief Counsel for International Law, Legislation and Regulations, US FAA, to Neal Boyle, Island Airways (12 October 2012) in US, Federal Aviation Administration, "Regulations Division: Legal Interpretations & Chief Counsel's Opinions", online: FAA <[www.faa.gov/about/office_org/headquarters_offices/agc/pol_adjudication/agc200/interpretations/data/interps/2012/boyle-islandairways%20-%20\(2012\)%20legal%20interpretation.pdf](http://www.faa.gov/about/office_org/headquarters_offices/agc/pol_adjudication/agc200/interpretations/data/interps/2012/boyle-islandairways%20-%20(2012)%20legal%20interpretation.pdf)>. As such, any time spent on duty, even if no flight is completed or even scheduled to be completed on a specific day, must be counted towards the total duty time.

¹⁷³ *Canadian Aviation Regulations*, *supra* note 76, s 700.18.

¹⁷⁴ *Ibid*, s 101.01(1) [emphasis added].

¹⁷⁵ *Ibid*, s 700.16(1).

¹⁷⁶ *Ibid*, s 101.01(1).

outside assistance and airport infrastructure. At first glance, it is interesting to note that 702 and 703 pilots may not count the completion of strenuous post-flight and pre-flight tasks towards their total duty time. On the other hand, 704 and 705 pilots, who often rely on more sophisticated company infrastructure, can generally rely on ground personnel, such as cargo handlers, ramp attendants, boarding agents, and flight attendants, to efficiently assist them in the completion of most ancillary flight tasks.¹⁷⁷ Although this difference likely exists to afford smaller carriers operational flexibility, this approach puts some pilots at the mercy of demanding work schedules, where gruelling tasks, such as loading and unloading passengers and cargo, are often not counted towards their total duty time.¹⁷⁸ ICAO has addressed this issue in Annex 6, according to which, time required to conduct pre-flight safety and service duties, otherwise referred to as pre-flight report time, as well as time spent conducting post-flight duties, should count as duty time.¹⁷⁹ As such, this distinction for 702 and 703 operators is contrary to Annex 6 SARPs.

B. MAXIMUM DUTY TIME

Under current duty time restrictions, flight crew members cannot be assigned to more than 14 consecutive hours of work within 24 consecutive hours when working for any operator.¹⁸⁰ Pilots are, therefore, allowed to obtain a minimum rest period of 10 hours within each period of 24 hours during which a pilot has worked. The NPA recommends that pilots should not be on duty for more than 12 hours to effectively manage flight crew fatigue.¹⁸¹ Considering that pilots are responsible for the lives of their passengers, it is difficult to imagine how effective a pilot's reflexes would be by the end of his or her 14-hour duty in challenging flying conditions.

¹⁷⁷ In fact, airline pilots, who fly their aircraft in elegant business attires, will rarely exercise any physical tasks, aside from their pre-flight ground inspection of the aircraft.

¹⁷⁸ Moreover, we can assume that, since these ancillary tasks are not counted towards their total duty time, this time is likely not remunerated either.

¹⁷⁹ Annex 6, *supra* note 13, Attachment A, para 4.7.3.2.

¹⁸⁰ *Canadian Aviation Regulations*, *supra* note 76, s 700.16(1).

¹⁸¹ Transport Canada, *Flight*, *supra* note 47 at 3, supports this assertion:

Research has shown that fatigue increases as shifts increase in length, with associated increases in accident likelihood. Studies have found a transient increase in risk after 2-4 hours with much larger increases observed after 9-10 hours and 12 hours on shift. A near two-fold increase in likelihood of incident or accident has been found following 10 hours compared to 8 hours on shift. A three-fold increase in accident likelihood has been found to occur after 16 hours. A study from the United States found that working at least 12 hours per day was associated with a 37% increased hazard rate. The science does not support a 14 hour flight duty period.

When looking at rest periods, a pilot must also be able to demonstrate that he or she has obtained 10 hours of consecutive rest within the past 24 consecutive hours preceding the planned completion time of a flight assignment.¹⁸² If a pilot working for a commuter or an airline¹⁸³ is assigned to three consecutive flight assignments exceeding 12 consecutive hours each, he or she must take a 24-hour minimum rest period before working again, unless a 24-hour break has been completed between each flight duty assignment.¹⁸⁴ The NPA further suggests that this rest period should allow the pilot to sleep at least 5 consecutive hours between 20:00 and 6:00 local time.¹⁸⁵ To ensure that pilots are appropriately rested, company management should conduct reasonable planning of a pilot's flight assignments based on actual trip conditions, such as the aircraft performance capabilities, operational circumstances, including weather and wind, expected air traffic and airport delays, etc.¹⁸⁶ For example, management should expect longer delays during holidays at major hub airports, in comparison with flights flown into less congested regional airports on a normal weekday with perfect weather conditions. As a shared responsibility, management has a key role when scheduling air crew rosters to ensure compliance with duty time regulations.

While the CARs permit a pilot to be on duty for up to 14 hours a day, the CARs do not set a limit for the pilot's "time since awakening", meaning that a pilot who wakes up several hours before his or her upcoming shift, or an on-call pilot who has been awake for a full day before receiving a call to come in for work, is not accounted for. If a pilot is on duty for 14 hours straight, we can easily imagine a scenario where the same pilot has been awake for close to 20 hours, if not more. Thus, there is a need to revisit the maximum permissible duty time. A fair solution would be to emulate the work limits found in the Labour Code

¹⁸² Alexander H Beringer et al, "Part 135 Rest & Duty - Gauging Your Compliance", National Business Aviation Association (10 February 2016) at 22. For example, if an air taxi pilot reports for duty at 7:00 local time and is scheduled to complete his or her last flight at 20:00 local time on the same day, the pilot must "lookback" 24 hours and determine if he or she has obtained the 10 hours of consecutive rest in the last day. In this example, the pilot would be required to rest for at least 10 hours between 20:00 local time on the previous day and 7:00 local time on the following day. As such, the pilot who reports to work at 7:00 local time would not be allowed to work beyond 21:00 local time the same day.

¹⁸³ This rule excludes helicopter flight operations.

¹⁸⁴ *Canadian Aviation Regulations*, *supra* note 76, s 700.16(2). However, these rules do not apply to 702 and 703 carriers.

¹⁸⁵ Transport Canada, *Flight*, *supra* note 47 at 16-17.

¹⁸⁶ See Beringer et al, *supra* note 182 at 23. *Annex 6*, *supra* note 13, Attachment A, para 4.4.3, provides:

Flights should be planned to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and turn-around times, and the nature of the operation. Minimum rest periods needed to provide adequate rest should be based upon the actual operation.

and bring maximum duty time closer to 8 hours a day.¹⁸⁷

C. DEADHEADING

Another interesting feature with the CARs is how duty time is only triggered once a pilot *reports* to his or her place of employment or reports for standby duties as a reserve pilot, and finishes when the aircraft engines are shutdown (or 15 minutes later in the case of commuters and airlines).¹⁸⁸ However, Annex 6 provides that the time spent by a pilot travelling from his or her home to the point of reporting for duty (i.e. commuting) does not count towards duty time,¹⁸⁹ even though ICAO asserts that this can have an adverse effect on pilot fatigue.¹⁹⁰ The CARs also infer that duty time does not include the time spent travelling as a flying passenger to and from another base of operations (i.e. an airport) to conduct flight operations,¹⁹¹ otherwise referred to in the industry as “repositioning”¹⁹² or “deadheading”.¹⁹³ However, this author suggests that, because it contributes to more pilot fatigue, deadheading is not a rest period and, *a contrario*, it should be considered as duty time as a best practice.¹⁹⁴ At the time of this writing, the CARs have not expressly identified whether or not deadheading time should be calculated in the total duty time.

This highlights a regulatory void where pilots may be required to commute considerable hours, without that time being included in their

¹⁸⁷ *Labour Code*, *supra* note 98.

¹⁸⁸ *Canadian Aviation Regulations*, *supra* note 76, s 101.01(1).

¹⁸⁹ *Annex 6*, *supra* note 13, Attachment A, para 2.3.2, provides:

A flight duty period does not include the period of travelling time from home to the point of reporting for duty. It is the responsibility of the flight or cabin crew member to report for duty in an adequately rested condition.

¹⁹⁰ *Ibid*, Attachment A, para 4.8.1.4, provides:

Travelling time spent by a flight or cabin crew member in transit between the place of rest and the place of reporting for duty is not counted as duty, even though it is a factor contributing to fatigue. Excessive travelling time undertaken immediately before commencing a flight duty period could therefore detract from a flight or cabin crew member’s ability to counter fatigue arising whilst on duty, and should therefore be taken into account when deciding where pre-flight rest should be taken.

¹⁹¹ Indeed, no laws or interpretative guidance regarding FDT regulations specify whether or not time spent deadheading must be calculated when monitoring FDT compliance.

¹⁹² ICAO defines “positioning” and “deadheading”, which are synonymous terms, as the “transferring of a non-operating crew member from place to place as a passenger at the behest of the operator”. *Annex 6*, *supra* note 13, Attachment A, para 4.2.5.

¹⁹³ See James L. Simmons & Jeffrey S. Forrest, “United States Aviation Safety Data: Uses and Issues Related to Sanctions and Confidentiality” (2005) 70:1 J Air L & Com 83 at 94; Blanca I. Rodriguez, “Recent Developments in Aviation Liability Law” (2000-2001) 66:1 J Air L & Com 21 at 86, 224-25; Eloise Cotugno, “No Rescue in Sight for Warsaw Plaintiffs from Either Courts or Legislature: Montreal Protocol 3 Drowns in Committee” (1992-1993) 58:3 J Air L & Com 745 at 764; Gleimer, *supra* note 19 at 996.

¹⁹⁴ Beringer et al, *supra* note 182 at 13.

duty time or even remunerated.¹⁹⁵ It appears from a literal interpretation of current duty time regulations that a pilot, who flies in the jump seat of another flight to report to another sub-base of operations¹⁹⁶ where he or she is scheduled to fly, will only start calculating his or her duty time once he or she *reports* at the latter base of operations.¹⁹⁷ Of course, many companies will manage this potentially unsafe interpretation of the CARs with adequate policies to manage pilot fatigue (e.g., voluntary FRMS) and thus fill this regulatory gap. However, smaller cash-strapped operators may be tempted to utilise their pilots up to the very limits permitted under the law, even if doing so may not be entirely safe.¹⁹⁸ In this regard, Annex 6 provides that pilots are responsible for refusing further flights if they suffer from fatigue, which may adversely affect flight safety.¹⁹⁹

For instance, a pilot who completes his or her last flight of the day will stop calculating the duty time after the aircraft engines are shutdown (or 15 minutes after in the case of commuters and airlines), but may not include the time spent repositioning after completing his or her duties either to his or her home base or another base of operations. If a pilot completes, for example, his or her last flight at 19:00 local time and is put on a 3-hour long repositioning flight an hour later at 20:00 local time to another base of operations where he or she is scheduled to fly at 7:00 local time, it is difficult to imagine how that person will achieve sufficient rest prior to the next flight and report fit for flying duties early the next morning. Unfortunately, the current duty time rules do not take into account the reality of many pilots who are often required to travel considerable hours by airplane or even by road to reach their next place of work.

Annex 6 expressly states that time spent deadheading *should* be counted towards duty time²⁰⁰ meaning that the CARs are not in sync with

¹⁹⁵ See DuBose, *supra* note 15 at 256-57.

¹⁹⁶ *Canadian Aviation Regulations*, *supra* note 76, s 700.01:

sub-base means a location at which an air operator positions aircraft and personnel and from which operational control is exercised in accordance with the air operator's operational control system[.]

¹⁹⁷ For example, a pilot living in Ottawa may be called on short notice by his or her employer to replace a sick pilot working for the same company in Vancouver on an important and lucrative flying contract. If the pilot is put on a red eye flight the preceding evening to replace the other pilot on a flight scheduled to take off on the following morning, no regulation would prevent that pilot from working another 14 hours of duty after completing a 6 to 8 hour positioning assignment.

¹⁹⁸ See generally Quinlan, *supra* note 4 at 117-21.

¹⁹⁹ *Annex 6*, *supra* note 13, Attachment A, para 2.3.4.

²⁰⁰ *Ibid*, Attachment A, para 4.10.3, provides:

All time spent positioning counts as duty, and positioning followed by operating without an intervening rest period also counts as flight duty. However, positioning should not count as an operating sector when planning or calculating a flight duty

the SARPs contained in Annex 6. To address this regulatory deficiency, the NPA has recommended that, when repositioning a flight crew member, the operator should count the time spent repositioning as duty time.²⁰¹ It is the author's opinion that, even though the NPA is not a binding document, it demonstrates legislative intent regarding upcoming changes to the CARs and its stance on calculating deadheading time should, therefore, be followed as a best practice by Canadian carriers. If the time spent deadheading exceeds the permitted duty time, the NPA recommends that the subsequent rest period should be as long as the preceding duty period if the extension is three hours or less, and twice as long as the previous duty time period when the exceedance is more than three hours.²⁰²

While they do not expressly consider deadheading as duty time, the CARs provide that, if a pilot is required by his or her employer to reposition to another location after reaching the FDT limits, the pilot must enjoy an additional rest period "at least equal to one-half the time spent travelling that is in excess of the flight crew member's maximum flight duty time".²⁰³ Therefore, if a pilot reaches the maximum permitted duty time of 14 hours and is required to reposition twice on a 2-hour flight each way, for a total of 4 hours deadheading before and after his or her daily flight assignment is completed, the pilot in question will have worked 18 hours in one single day and will only receive an additional 2 hours of rest, even though the pilot has worked 4 additional hours. As a result, pilots, who must deadhead from one base of operations to another on a regular or even a daily basis over a period of several months, will continuously accrue more and more cumulative fatigue, as deadheading time is only compensated at a 50% ratio. Therefore, future amendments to the CARs should include deadheading time into the calculation of duty time, as this would address serious pilot fatigue concerns.

D. MINIMUM REST PERIODS

Carriers must provide their flight crew with sufficient rest. The CARs define the minimum rest period as an 8-hour period "during which a flight crew member is free from all duties, is not interrupted by the air operator or private operator".²⁰⁴ This rest period must include sufficient

period.

In the wording of the SARPs, the term "should" indicates a non-binding recommended practice and is, therefore, not compulsory for ICAO Member States.

²⁰¹ See Transport Canada, *Flight*, *supra* note 47 at 21.

²⁰² See *ibid.*

²⁰³ *Canadian Aviation Regulations*, *supra* note 76, s 700.20.

²⁰⁴ *Ibid.*, s 101.01(1).

time to “sleep in suitable accommodation, time to travel to and from that accommodation and time for personal hygiene and meals”.²⁰⁵ Once a pilot completes a flight assignment, a pilot is entitled to obtain a minimum rest period (otherwise referred to as “time free from duty”) and, if there is a need, any additional time required to be fully rested before reporting to subsequent flight duties.²⁰⁶ This period cannot include any activities related to the company, such as training, company meetings, ground duties, or being on-call.²⁰⁷ *A contrario*, any time that is not considered as rest should be considered as company duty time.²⁰⁸ By defining duty time, we should automatically define rest time, since the latter automatically begins when the duty time ends.²⁰⁹

However, the current regulations do not take into account the fact that it takes for an ordinary person 9 hours in bed to achieve 8 hours of sleep and it requires at least 12 hours off duty to obtain the desired 8 hours of sleep.²¹⁰ This insufficient rest period may *de facto* contravene the Annex

²⁰⁵ *Ibid.*

²⁰⁶ *Ibid.*, s 700.16(3).

²⁰⁷ See also similar rules in the US: Letter from Donald P Byrne, Assistant Chief Counsel, Regulations and Enforcement Division, US FAA, to B Stephen Fortenberry, B-727 Chief Pilot, Evergreen International Airlines, Inc. (19 June 1991) in US, Federal Aviation Administration, “Regulations Division: Legal Interpretations & Chief Counsel’s Opinions”, online: FAA <www.faa.gov/about/office_org/headquarters_offices/agc/pol_adjudication/agc200/interpretations/data/interps/1991/fortenberry%20-%20(1991)%20legal%20interpretation.pdf> (Although not binding for Canadian-registered carriers, the US FAA’s highly authoritative legal memorandums define “rest” as follows: “A rest period must be prospective in nature. Stated another way, a flight crewmember must be told in advance that he or she will be on a rest period for the duration required [by the regulations]. In addition, a rest period must be free of all restraint. However, the Agency’s interpretations hold that receipt of one telephone call or beeper call does not constitute a violation of a rest period provision. Moreover, a flight crewmember in a rest period must be free of present responsibility for work should the occasion arise”). See also Letter from Rebecca B MacPherson, Assistant Chief Counsel, Regulations Division, US FAA, to Condace K Kolander, Coordinator, Air Safety, Health and Security Association of Flight Attendants (29 April 2005) in US, Federal Aviation Administration, “Regulations Division: Legal Interpretations & Chief Counsel’s Opinions”, online: FAA <www.faa.gov/about/office_org/headquarters_offices/agc/pol_adjudication/agc200/interpretations/data/interps/2005/kolander%20-%20(2005)%20legal%20interpretation.pdf> (“The agency has previously said that the nature of rest is the same, regardless of the operation or the subpart under which a flight assignment is performed. Rest must satisfy three conditions in order to qualify as a rest period: It must be 1) a continuous period of time, 2) determined prospectively, and 3) during which the crewmember is free from all restraint by the certificate holder, including freedom from present responsibility from work should the occasion arise”).

²⁰⁸ Beringer et al, *supra* note 182 at 35.

²⁰⁹ See DuBose, *supra* note 15 at 267.

²¹⁰ Transport Canada, *Flight*, *supra* note 47 at 4. DuBose, *supra* note 15 at 267 [footnotes omitted], notes:

[U]nder existing regulations, the rest-time clock begins when the pilot’s duty period ends. This means that commuting time—local or by air—is counted against the pilot’s rest period. The eight hour rest period under current regulations includes time spent in customs, travel from the airport, hotel check-in, shower, sleep, meals, and hopefully, rest. “At the very most, if you’re the kind of person that could walk into a hotel room, strip and lay down, you might get four and a half hours of sleep[.]”

6 recommendation of providing “crew members with adequate rest opportunity to recover from fatigue before commencement of the next flight duty period”.²¹¹ Therefore, minimum rest regulations should also be revisited. It has been recommended in the NPA that the 8-hour rest period be extended to 10 hours when staying at a rest facility away from the pilot’s ordinary home and 12 hours of rest when at home base²¹² to take into account the time required for commuting and the “necessities of life”.²¹³ This approach would bring the CARs in line with Annex 6.

Operators are as well required to provide flight crew members with time free from any duties during specific time windows. For airlines and commuter operators not operating helicopters, pilots must have at least 36 consecutive hours of rest within each 7 consecutive days,²¹⁴ or at least 3 full days of rest within 17 consecutive days.²¹⁵ These air carriers, therefore, have the opportunity to decide on two different scheduling schemes under the CARs.²¹⁶ On the other hand, aerial work operators, air taxis, and helicopter operators must afford their pilots with 24 hours of rest 13 times within each period of 90 consecutive days and 3 times within each period of 30 consecutive days.²¹⁷ Pilots who are on-call must enjoy a minimum rest period of 36 consecutive hours every 7 consecutive days (i.e. a maximum of 5.5 days of work per week)²¹⁸ and at least 3 consecutive days

²¹¹ *Annex 6, supra* note 13, Attachment A, para 1.3.

²¹² Transport Canada, *Flight, supra* note 47 at 11:

Home base means the location nominated by the operator to the crew member from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal circumstances, the operator is not responsible for the accommodation of the crew member concerned.

²¹³ *Ibid* at 4; Taylor, *supra* note 20 at 410.

²¹⁴ Transport Canada, “Guidance Material”, *supra* note 147, R 740.19(1):

The term consecutive days indicates that the requirement of the regulation must be satisfied throughout any of the period of consecutive days indicated. A moving or rolling window can be used to verify if the regulatory requirements are satisfied. For example, when verifying whether a flight crew member received a period of at least 3 consecutive calendar days free from duty within each 17 consecutive days, a 17 day window can be used. This sliding window can now be placed along the pilot’s schedule one day at a time; however, this technique cannot be used when the beginning of the window moves inside a period of time free from duty. If the time free from duty is always satisfied within the 17 day window, the schedule meets the requirement of the regulations.

²¹⁵ *Canadian Aviation Regulations, supra* note 76, s 700.19(1)(a).

²¹⁶ Transport Canada, “Guidance Material”, *supra* note 147, R 740.19(1)(a):

The intent was to provide the flexibility of two scheduling schemes, but it was expected that each scheme would be used independently from the other in a more or less continuous state. The regulation is not meant to authorize a mix of the two schemes in an arrangement that will produce a working schedule conducive to fatigue. The only acceptable way to change from one scheme to the other is to provide the pilot 3 consecutive calendar days off.

²¹⁷ *Canadian Aviation Regulations, supra* note 76, s 700.19(1)(b).

²¹⁸ See Transport Canada, “Guidance Material”, *supra* note 147.

of rest within a period of 17 consecutive days.²¹⁹ On-call pilots must also enjoy a sufficient rest period within each 24-hour period.²²⁰ However, operators may obtain derogations from these minimum rest periods if these are permitted under the carrier's operating certificate.²²¹ The reality of the aviation industry is that management and flight crews must cooperate closely when balancing flight schedules and minimum rest time regulations.²²² Pilots and management must learn to decline flight requests by customers, regardless of the value of the contract, if such flight might fatigue the flight crew. At the same time, the sales department of a carrier must coordinate closely with its crews to ensure that the company can meet its contractual obligations efficiently and economically, whilst remaining within the safety boundaries of the CARs.²²³

VII. ARE CANADIAN SKIES UNSAFE?

A. SMALL OPERATORS VERSUS AIRLINES

While pilot fatigue is a growing scourge in the aviation industry, it is likely more pronounced in some sectors of the industry. In 2016, 704, 703, and 702 operators contributed to 2, 26, and 16 accidents, respectively, whereas airlines suffered only one accident.²²⁴ Conversely, the only fatalities attributable to commercial air operators involved 703 operators (1 fatality) and 702 operators (2 fatalities).²²⁵ Although 702, 703, and 704 operators account for only 5% of the air transport market,²²⁶ these operators have been responsible together for "94% of all commercial air accidents and 95% of commercial air fatalities" in the period between 1 January 2002 and 5 July 2012.²²⁷ While fatigue might not be the only factor influencing these statistics, more permissive regulations likely exacerbate this sector-specific phenomenon. To further explain these disturbing statistics, the TSB has noted:

²¹⁹ *Canadian Aviation Regulations*, *supra* note 76, s 700.19(1)(c).

²²⁰ *Ibid*, s 700.21(1).

²²¹ *Ibid*, s 700.19(2).

²²² Beringer et al, *supra* note 182 at 42.

²²³ *Ibid*.

²²⁴ Transportation Safety Board of Canada, "Statistical Summary - Aviation Occurrences 2016", online: Transportation Safety Board <www.bst-tsb.gc.ca/eng/stats/aviation/2016/ssea-ssao-2016.asp>.

²²⁵ *Ibid*.

²²⁶ House of Commons, Standing Committee on Transport, Infrastructure and Communities, *Evidence*, 39th Parl, 1st Sess, Hansard TRAN No 040 (21 March 2007); Statistics Canada, "Table 401-0044: Air passenger traffic and flights: annual (number)", online: Statistics Canada <www5.statcan.gc.ca/cansim/a05?lang=eng&id=4010044&pattern=4010044&searchTypeByValue=1&p2=35>. 703 and 704 carriers carry approximately 3.9 million passengers annually.

²²⁷ TSB, *AIR: Black Sheep*, *supra* note 125.

Small operators typically face some interesting challenges. They are flying into remote areas that may have little or no infrastructure. They often use aircraft that are a little older, that may not have sophisticated navigational or warning systems. The crews will likely be on the lower end of the experience scale.²²⁸

While most airline pilots flying for 705 carriers benefit from the protective nature of collective bargaining agreements, strong managerial structures, and effective company fatigue risk management processes, the remaining categories of commercial operators must self-regulate their compliance with the FDT limits under informal processes, often utilising their flight crews up to the maximum number of hours permitted by the CARs. As illustrated earlier by Table 3, the CARs also permit 702 and 703 pilots to fly 20 hours above the 40-hour limit prescribed for 704 and 705 operations. Unfortunately, many 702, 703, and 704 flight crews operate in non-unionised working environments with imperfect safety cultures and operating practices, which leave many pilots flying for smaller carriers at the mercy of their employers' financial constraints and business priorities when exposed to demanding flight assignments in challenging and unorthodox work environments.²²⁹

Although there is no evidence establishing with certainty a correlation between the above-mentioned safety records and Canada's permissive approach to pilot fatigue, there appears to be a genuine need to revisit FDT regulations in smaller organisations, which may not adequately or proactively mitigate pilot fatigue. In the author's opinion, smaller operators should be subject to more stringent FDT regulations, ideally matching the standards prescribed for 704 and 705 operators.

²²⁸ Transportation Safety Board of Canada, "Air safety management systems", online: Transportation Safety Board <www.bst-tsb.gc.ca/eng/medias-media/videos/surveillance-watchlist/aviation/aviation-video-04.asp>.

²²⁹ However, even large airlines are not immune from pilot fatigue. See "Air Canada pilot fatigue to blame for dipping incident that left 16 injured", *National Post* (17 April 2012), online: National Post <nationalpost.com/news/canada/air-canada-pilot-fatigue-to-blame-for-dipping-incident-that-left-16-injured>; Wendy Gillis, "Sleepy Air Canada pilot mistook planet for plane, report finds", *The Star* (16 April 2012), online: The Star <www.thestar.com/news/canada/2012/04/16/sleepy_air_canada_pilot_mistook_planet_f_or_plane_report_finds.html>; "Tired pilot caused Air Canada mid-flight dive", *CBC News* (16 April 2012), online: CBC News <www.cbc.ca/news/canada/tired-pilot-caused-air-canada-mid-flight-dive-1.1139316> (In 2011, a fatigued Air Canada co-pilot on a transatlantic night flight from Toronto to Zurich mistook the planet of Venus for a nearby US Air Force Boeing C-17 and initiated a rapid descent, which injured 14 passengers and 2 flight attendants. In reaction to this incident, the chairman of the Air Canada Pilots Association, Barry Wiszniowski, publicly stated that Canada currently has the "worst rules in the planet" regarding pilot fatigue).

B. THE “STATE FACTOR”

In light of the foregoing, there is likely a relationship between air safety and a State’s regulatory framework and oversight for FDT. This factor can be coined as the “State Factor”, which can be regarded as a fourth contributing factor in James Reason’s accident causation model, in addition to other human, technical, and organisational factors.²³⁰ The “State Factor” can be defined as the positive or adverse influence of a State’s interventions aimed at establishing, improving, and maintaining the effectiveness and quality of safety risk controls in civil aviation, namely by means of active oversight strategies implementing corrective and proactive safety measures, direct enforcement actions, and adequate regulatory standards and policies. In other words, effectively managing the State Factor can provide the aviation industry with additional defences against the existing and emerging safety risks to ensure the effectiveness of present laws.

Although little research has addressed the impact of State Factors on accidents, one must wonder if we can establish a correlation between inadequate FDT regulations and the overall safety of civil aviation in Canada. While accident reports frequently identify pilot fatigue as a possible contributing factor, Canada does not publish comparative data highlighting the overall percentage of accidents directly caused by fatigue in relation to other contributing factors for any given year. Moreover, it is a challenging task for investigators to measure the correlation between fatigue and flight safety, especially when the flight crew has deceased or when surviving crew members are silent on this issue to avoid exposing themselves and their employer to liability, or simply because fatigue remains a taboo subject for many pilots in the industry.

In relation to current FDT regulations, it is difficult to claim with certainty that pilot fatigue represents a more significant threat in Canada in comparison with other Annex 6-compliant countries. Nonetheless, the author argues that a State’s imperfect approach to pilot fatigue, i.e. the State Factor, will inevitably lead to an imperfect safety record.

For instance, the US National Transportation Safety Board has found that there is a relationship between safety and the amount of time a

²³⁰ See James Reason, *Managing the Risks of Organizational Accidents* (Brookfield, Vt: Ashgate, 1997) at 22; “Chapter 5: Safety Management Systems” in Transport Canada Railway Safety Act Review Advisory Panel, *Stronger Ties: A Shared Commitment to Railway Safety: Review of the Railway Safety, November 2007* (Ottawa: Railway Safety Act Review Secretariat, 2007) 63, online: Transport Canada <www.tc.gc.ca/media/documents/railsafety/TRANSPORT_Stronger_Ties_Report_FINAL_e.pdf>.

pilot has been awake, otherwise referred to as “time since awakening”. It was observed that fatigued pilots were 40% more likely to make errors than non-fatigued pilots, primarily because of the probability of committing more omissions, procedural mistakes, and unwise tactical decisions.²³¹ Therefore, we can conclude that a country, such as Canada, who tolerates longer duty times, and thus longer times since awakening, endorses a more permissive regulatory regime where pilots are more likely to make errors and endanger flight safety.²³² In Australia, the Civil Aviation Safety Authority noted:

Sleep deprivation impairs the brain’s effectiveness, with research showing it can produce effects very similar to alcohol consumption. On-the-job performance loss for every hour of wakefulness between 10 and 26 hours is equivalent to about a .004 percent rise in blood alcohol concentration. Seventeen to 18 hours of wakefulness is usually considered to be equivalent to a blood alcohol concentration of about .05 per cent. In the safety-critical aviation environment, this could result in tragedy.²³³

²³¹ See IATA, ICAO & IFALPA, *Fatigue Management Guide for Airline Operators*, 2nd ed (2015), online: IATA <www.iata.org/publications/Documents/Fatigue-Management-Guide_Airline%20Operators.pdf>. The Guide, *ibid* at 13 [footnote omitted], provided:

The US National Transportation Safety Board has examined the relationship between time since awakening (TSA) and errors in 37 aircraft accidents (1978-1990) in which flight crew actions or inactions were causal or contributing factors. The median TSA at the time of the accident was 12 hours for captains and 11 hours for first officers. Six crews were classified as low TSA (both the captain and the first officer were below the median) and six crews were classified as high TSA (both the captain and the first officer were above the median). For low TSA crews, the median time awake was 5.3 hours for captains and 5.2 hours for first officers. For high TSA crews the median time awake was 13.8 hours for captains and 13.4 hours for first officers. Overall, high TSA crews made about 40% more errors than low TSA crews (12.2 versus 8.7 errors), primarily due to making more errors of omission (5.5 versus 2.0 errors). In terms of error types, high TSA crews made significantly more procedural errors and tactical decision errors than low TSA crews.

²³² The US FAA has further concluded that:

For 10-12 hours of duty time, the proportion of accident pilots with this length of duty period is 1.7 times as large as for all pilots. For pilots with 13 or more hours of duty, the proportion of accident pilot duty periods is over five and a half times as high ...

... 20% of human factor accidents occurred to pilots who had been on duty for 10 or more hours, but only 10% of pilot duty hours occurred during that time. Similarly, 5% of human factor accidents occurred to pilots who had been on duty for 13 or more hours, where only 1% of pilot duty hours occur during that time. There is a discernible pattern of increased probability of an accident the greater the hours of duty time for pilots.

Jeffrey H Goode, “Are Pilots At Risk of Accidents Due to Fatigue?” (2003) 34:3 J Safety Research 309 at 311.

²³³ Austl, Civil Aviation Safety Authority, “Fatigue - The Rules Are Changing” (2013) at 10, online: Civil Aviation Safety Authority <www.casa.gov.au/file/151091/download?token=Y67cN4ib>.

Currently, the maximum duty time in the CARs does not address “time since awakening”. As a result, it may not be uncommon for a pilot nearing his or her maximum duty time limit of 14 hours to be awake for up to 20 hours by the time he or she attempts his or her final landing of the day. That same pilot would have a level of impairment equivalent to a person with a blood-alcohol content of 0.08%, which is the legal threshold for impaired driving in Canada – a criminal offence.

Hence, the question: how safe are the Canadian skies? By deductive reasoning, it is apparent that the CARs tolerate working environments where a fatigued pilot is permitted to fly an aircraft at the same level of impairment where he or she would be prohibited under the Criminal Code of Canada from driving any motor vehicle. This deficient legal framework is inherently unsafe and puts the travelling public at risk.

Furthermore, an analysis of the public decisions rendered by the Transportation Appeal Tribunal of Canada, the quasi-judicial body established to hear reviews and appeals relating to the Aeronautics Act and the CARs, reveals that, between 1989 and 2016, only four decisions have found either a pilot or an operator guilty of contravening FDT regulations in Canada.²³⁴ Hence, we must ask ourselves if the existence of very few cases in the last three decades documenting FDT contraventions is indicative of a safe aviation industry immune from pilot fatigue, or rather an illusion concealing Canada’s deficient and flawed oversight of FDT regulations. Whilst this data only highlights cases that were appealed to the Tribunal, one must also wonder if there is sufficient State oversight to catch offending parties who fly under the radar of Transport Canada and ignore FDT regulations.

Needless to say, aside from publishing its NPA and promising to adopt new regulations, Canada has failed to uphold its commitment to the travelling public and ICAO by maintaining FDT standards that do not reflect the realities of modern aviation. In its struggle to reconcile safety and the economic pressures of the industry, Canada’s approach to pilot fatigue – namely its policies, their oversight and enforcement – is

²³⁴ *102643 Aviation Ltd v Minister of Transport* (15 June 2009), TATC File No W-3375-41, online: Transportation Appeal Tribunal of Canada <www.tatc.gc.ca/decision/decision.php?dc_id=1340&lang=eng>; *Blair William Jensen v Minister of Transport* (15 June 2009), TATC File No W-3373-33, online: Transportation Appeal Tribunal of Canada <www.tatc.gc.ca/decision/decision.php?dc_id=1339&lang=eng>; *Minister of Transport v Frederick Olaf Martin* (15 October 1997), CAT File No O-1473-33, online: Transportation Appeal Tribunal of Canada <www.tatc.gc.ca/decision/decision.php?dc_id=620&lang=eng>; *Minister of Transport v Peter George Dmytriw* (15 October 1997), CAT File No O-1474-33, online: Transportation Appeal Tribunal of Canada <www.tatc.gc.ca/decision/decision.php?dc_id=621&lang=eng>.

conducive to the development of unsafe practices in the industry. Exacerbated by political factors unfavourable to radical changes in the law in the near future, "State Factors" currently distort Canada's safety levels as far as pilot fatigue is concerned.

VIII. CONCLUDING REMARKS

Professor Dempsey has argued that no other industry has been more regulated with safety and economic intervention than civil aviation.²³⁵ Nonetheless, safety regulation possesses a cyclical nature and, unfortunately, its evolution is reactive rather than proactive.²³⁶ While the evolution of FDT regulations has stalled in Canada,²³⁷ this article has illustrated how Transport Canada has fallen behind several countries that have adapted their FDT regulations to the realities of present-day commercial aviation and modern scientific data.

Canada's regulatory framework has several inherent deficiencies, mainly because of the enforcement of obsolete regulations. The US Federal Aviation Administration brought forward up-to-date FDT and FRMS regulations after the Colgan Air crash had caused tragic deaths of 50 people.²³⁸ Will Canada complacently wait to modify its FDT regulations until a fully loaded airliner crashes due to pilot fatigue near a major city?²³⁹

As Richard Johnstone asserts, the tragic loss of life is often the reactive trigger for necessary changes to the law, rather than implementing proactive changes before tragedies arise.²⁴⁰ If flight safety is not proactively regulated by Transport Canada with modern FDT regulations, it is axiomatic that the "invisible hand" of safety will tolerate negative externalities caused by the driving business goals of the commercial aviation industry,²⁴¹ thus allowing carriers to utilise their

²³⁵ Dempsey & Gesell, *Public Policy*, *supra* note 48 at 301.

²³⁶ See Paul Stephen Dempsey, "Aviation Security: The Role of Law in the War Against Terrorism" (2002-2003) 41:3 *Colum J Transnat'l L* 649 at 649.

²³⁷ Evans-Davis, *supra* note 2 at 601:

At the nebulous core of this standstill is the ever-present economic factor of revision and change. No one wants exhaustion and fatigue to be intrinsic job characteristics for pilots, but few people are thrilled with increasing airline operating costs by billions of dollars to implement more responsive fatigue solutions.

²³⁸ See Cherry, *supra* note 4 at 551-52.

²³⁹ See Quinlan, *supra* note 4 at 10; Johnstone, "Courts", *supra* note 4 at 208-09; René David-Cooper, "Don't Drink and Drive, Smoke and Fly: A Clearance for Pilots to Get High?" (2014) XXXIX *Ann Air & Sp L* 555 at 576.

²⁴⁰ Johnstone, "Courts", *supra* note 4 at 217.

²⁴¹ See Paul Stephen Dempsey & Andrew R Goetz, *Airline Deregulation and Laissez-Faire Mythology* (Westport, Conn: Quorum Books, 1992) at 301, 306; Johnstone, "Courts", *supra* note 4 at 217.

fatigued pilots beyond sensible working hours, and putting the pilots and the travelling public at risk. If regulations are not amended, flight safety will be inevitably compromised at the mercy of the carriers' business imperatives.

At the time of this writing, Transport Canada has proposed new rules amending the CARs to combat pilot fatigue, with notable reductions in the number of hours a pilot can fly during any consecutive day or year.²⁴² However, promising regulatory changes is one thing; implementing them is an entirely different issue. While industry stakeholders have already expressed their opposition to these changes, we must avoid a tunnel vision approach and focus on broader issues in the industry, which have exacerbated the current pilot fatigue phenomenon in Canada.

Although Canada retains a legal obligation to bring its domestic legislation in line with ICAO SARPs, pilot fatigue concerns also have deep roots within the aviation industry's economic context. Therefore, the solution to pilot fatigue lies beyond elementary air safety considerations. Ever since the National Transportation Act of 1987²⁴³ deregulated the airline market in Canada,²⁴⁴ many Canadian air carriers have struggled to carefully balance operational efficiency with safety concerns,²⁴⁵ such as pilot fatigue. While the objective of establishing an openly competitive market with new entrants has been achieved,²⁴⁶ airline deregulation has

²⁴² *Regulations Amending the Canadian Aviation Regulations (Parts I, VI and VII – Flight Crew Member Hours of Work and Rest Periods)*, Proposed regulations, (2017) C Gaz I, 2909, online: Canada Gazette <www.gazette.gc.ca/rp-pr/p1/2017/2017-07-01/pdf/g1-15126.pdf>. "The proposed regulatory amendment would introduce a range of flight duty period from 9 to 13 hours" depending on the time when a flight is scheduled to take off. See *ibid* at 2915. Moreover, the number of hours a pilot would be entitled to fly each year would be reduced from 1,200 to 1,000 hours annually. Another notable change would be the introduction of a period of time free from duty of 33 consecutive hours every 8 days, where the time free from duty would commence no later than 22:30 and end no earlier than 7:30. This mandated period of time free from duty would provide pilots with two sleep opportunities and, therefore, allow them to recover from the effects of cumulative fatigue.

²⁴³ The *National Transportation Act* has since been repealed and replaced by the *Canada Transportation Act*, SC 1996, c 10.

²⁴⁴ John Christopher & Joseph P Dion, "The Canadian Airline Industry", 89-2E (revised 14 November 2002), online: Government of Canada <publications.gc.ca/Collection-R/LoPBdP/CIR/892-e.htm>.

²⁴⁵ Dempsey & Gesell, *Air Transportation*, *supra* note 8 at 225. Deregulation has brought about cutthroat pricing, a miserable level of industry profitability, insufficient capital to re-equip aging fleets, and a deterioration of service. Since deregulation began, the airline industry has suffered the worst economic losses in its history.

²⁴⁶ Laurence E Gesell, *Airline Re-Regulation* (Chandler, Ariz: Coast Aire Publications, 1990) at 43; Timothy M Vowles & Michael Lück, "Chapter 4: Low Cost Carriers in the USA and Canada" in Sven Gross & Michael Lück, eds, *The Low Cost Carrier Worldwide* (London: Routledge, 2016).

induced destructive competition among carriers²⁴⁷ and has brought a deleterious effect on airline safety.²⁴⁸ Intensive pricing wars have forced many operators around the world to adopt self-destructive practices to remain profitable,²⁴⁹ such as curtailing operational expenditures at the expense of flight safety.²⁵⁰ To reduce overhead and halt the erosion in carrier profitability,²⁵¹ labour costs, which account for 30 to 40% of an airline's expenses,²⁵² have been the primary target of airline managers.²⁵³ As a result, lower salaries have forced many struggling pilots to work more and fly longer hours.

With the entry of non-unionised carriers, deregulation sparked a serious labour crisis in aviation,²⁵⁴ which has still not fully subsided after nearly thirty years. While the NPA's suggested amendments could potentially result in the increase of operational costs by up to 30%,²⁵⁵ it is difficult to imagine how cash-strapped carriers will embrace this "impractical" regulatory reform.²⁵⁶ With airlines generating net profit margins hovering around 1%,²⁵⁷ it is doubtful that passengers will be willing to absorb another increase in ticket prices. Realistically, pilots are more likely to personally stomach this financial impact, given that air carriers could indeed reduce their salaries as a result of these changes. The

²⁴⁷ Dempsey & Gesell, *Air Transportation*, *supra* note 8 at 193-97.

²⁴⁸ *Ibid* at 305. See generally Quinlan, *supra* note 4 at 157.

²⁴⁹ Dempsey & Gesell, *Airline Management*, *supra* note 1 at 193-97.

²⁵⁰ Quinlan, *supra* note 4 at 157-58; Dempsey & Goetz, *supra* note 241 at 298.

²⁵¹ Dempsey & Gesell, *Airline Management*, *supra* note 1 at 526-27.

²⁵² *Ibid* at 606.

²⁵³ See Philippine Dumoulin, "Flying Through the Fog of Labour Law: How Does Ryanair Manage it?" (2014) XXXIX *Ann Air & Sp L* 577 at 580; Jody Hoffer Gittel & Greg J Bamber, "High- and Low-Road Strategies for Competing on Costs and their Implications for Employment Relations: International Studies in the Airline Industry" (2010) 21:2 *Int J Human Resource Management* 165 at 166.

²⁵⁴ Dempsey & Gesell, *Airline Management*, *supra* note 1 at 605:

With the advent of deregulation, the transportation industry suddenly found itself confronted with a labor crisis, when, for nearly four decades, labor relations had not been an overriding issue. Deregulatory policy removed the mechanism (i.e., economic regulation) used by management to protect it from having to deal head to head with organized labor. After deregulation, and faced with intense competition from non-unionized new entrants, management of the established, but unionized, carriers suddenly needed to minimize operational costs and to maximize employee productivity and efficiency in order to compete[.]

²⁵⁵ "Sleepy pilots target of new Transport Canada rules", *Metro News* (18 September 2014), online: Metro News <www.metronews.ca/news/canada/2014/09/18/sleepy-pilots-target-of-new-transport-canada-rules.html>. In a similar amendment to its rules, the FAA stated that a similar implementation in the American civil industry would cost airlines US\$ 803.5 million (CAD\$ 1.09 billion), to include expenses related to "flight operations, fatigue training, rest facilities, and schedule reliability". Taylor, *supra* note 20 at 413.

²⁵⁶ Evans-Davis, *supra* note 2 at 601.

²⁵⁷ See also Paul Stephen Dempsey, "The Financial Performance of the Airline Industry Post-Deregulation" (2008-2009) 45:2 *Hous L Rev* 421 at 424-27; "Why airlines make such meagre profits", *The Economist* (23 February 2014), online: The Economist <www.economist.com/blogs/economist-explains/2014/02/economist-explains-5>.

author believes that amendments to FDT regulations will certainly improve the current situation, but will not provide a sustainable solution to modern pilot fatigue concerns.

Unfortunately, it is now clear that financial difficulties triggered by deregulation²⁵⁸ have negatively affected several safety aspects of commercial aviation, including pilot fatigue.²⁵⁹ The author considers that there is a strong correlation between pilot remuneration and pilot fatigue.²⁶⁰ It is not rare for some commercial pilots to earn a meagre CAD\$ 25,000 per annum in Canada after investing at least CAD\$ 50,000 in their flight training.²⁶¹ Many pilots are forced to fly demanding flight schedules or even take on secondary employment positions to survive above the poverty line. Improved FDT regulations reflecting modern science will likely afford pilots with reasonable work schedules and adequate rest periods, thus reducing pilot fatigue and optimising their flight performances. However, FDT regulations will not change the fact that civil aviation is still suffering from post-deregulation financial anaemia.²⁶² We cannot ignore that reduced work schedules as a result of new FDT rules may result in reduced pay checks. Consequently, pilots might still be forced to work more hours in non-aviation positions to generate a reasonable salary, a practice which will defy the intrinsic purpose of FDT regulations and expose pilots to additional fatigue.²⁶³

The regulator has ignored that pilot fatigue originates, in part, from the financial distress of some air carriers, which has forced many of these to hire inexperienced pilots and have them work beyond sensible hours in the early stages of their careers. We must, therefore, ask ourselves if increased economic regulation is the long-term solution to the negative safety externalities,²⁶⁴ such as pilot fatigue, which have persisted in

²⁵⁸ See Quinlan, *supra* note 4 at 157-58.

²⁵⁹ Dempsey & Gesell, *Air Transportation*, *supra* note 8 at 372.

²⁶⁰ Quinlan, *supra* note 4 at 117-21. See, for example, the deleterious safety effects production bonuses had on the health and safety of miners in the period preceding the 2010 Pike River Mine disaster in New Zealand, which killed 29 people.

²⁶¹ Josh Dehaas, "Kurt Jahr, 26, is an Air Canada Jazz pilot", *Macleans*'s (15 August 2012), online: *Macleans*'s <www.macleans.ca/work/jobs/kurt-jahr-26-is-an-air-canada-jazz-pilot/>.

²⁶² Dempsey & Goetz, *supra* note 241 at 298.

²⁶³ TSB, *AIR: Wake Turbulence*, *supra* note 30 at 17. In the Canadian Air Charters crash, which killed both pilots, the TSB concluded that, because both pilots were working in non-aviation jobs on top of their normal flight duties, the pilots were at risk of being fatigued, even though no regulations prevented them from working part-time outside their normal flying duties. Since that time does not count towards duty time, nothing prevents a pilot from working numerous hours with another non-aviation employer before or after conducting flying duties with an air carrier.

²⁶⁴ See generally Quinlan, *supra* note 4 at 117.

Canada for many years.²⁶⁵ Indeed, we must come to grasp with the fact that economic deregulation has had the indirect effect of also deregulating certain aspects of flight safety.²⁶⁶ Moderate economic re-regulation is the only solution that would realistically enable the airline market to satisfy the public interest by accomplishing social goals, such as ensuring the travelling public's safety and well-being, with the added assurance that commercial pilots are adequately paid and well rested.²⁶⁷ Since safety cannot be separated from the economic health of airlines,²⁶⁸ the safety benefits of FDT regulations can only be achieved if we pay more attention to the economic health of the aviation industry itself.²⁶⁹

The State must not exclusively serve the dominant interests of the airline managers; “[i]t also has to respond to pressures *from below* to maintain the social conditions necessary for capitalist accumulation”²⁷⁰ by protecting its workforce.²⁷¹ If reintroducing economic regulation can temper market imperatives by eliminating the problems of imperfect competition, the industry will likely become more productive and efficient. As a result, pilot salaries could increase while preventing pilots from flying under onerous work schedules.

Changes in the law are not always the answer to every problem. At times, legal solutions can be imperfect if they are implemented without tackling other contributory issues, such as the current self-serving practices adopted by some air carriers to manage pilot fatigue. As Richard Johnstone points out, more “regulatory legislation actually reinforces rather than challenges this conception of the market as an autonomous, self-regulating sphere”.²⁷² It is time for Canada and other ICAO Member States to realise that the safety benefits pledged under Annex 6 can only be achieved if its implementation is combined with corresponding economic measures.

²⁶⁵ Gesell & Dempsey, *Aviation*, *supra* note 36 at 372.

²⁶⁶ See generally René David-Cooper, “The Transition to Safety Management Systems (SMS) in Aviation: Is Canada Deregulating Flight Safety?” (2016) 81:1 J Air L & Com 33; Quinlan, *supra* note 4 at 185 (“government authorities may also play a complicit role in this outcome by promoting production for national policy reasons or permitting regulatory [safety] regimes to corrode or be compromised”).

²⁶⁷ Dempsey & Goetz, *supra* note 241 at 341-42:

Nonetheless, the need for government to facilitate the market's ability to accomplish desirable social and economic objectives has long been recognized ... Like economic goals, political and social goals sometimes cannot be achieved through the economic system because they conflict with businesses' goal to maximize profits.

²⁶⁸ See generally Quinlan, *supra* note 4 at 24-25.

²⁶⁹ Dempsey & Goetz, *supra* note 241 at 350.

²⁷⁰ Johnstone, “Courts”, *supra* note 4 at 228 [emphasis in original].

²⁷¹ See also Quinlan, *supra* note 4 at 24.

²⁷² Johnstone, “Courts”, *supra* note 4 at 209.