

## Miscellaneous Data

The following data relating to Recruitment and Retention, Duties and Qualifications, and Training Costs are provided to the Conciliation Board in an effort to provide important information in a more readily accessible format and to better facilitate the Board's analysis of the current issues.

### Recruitment & Retention Information

A CAI supervisor in the National Capital Region (NCR) who is running competitions to fill vacant positions stated that in a March 2002 competition to fill one position there were eight candidates, two of whom qualified for an interview. However, both accepted other positions prior to the interview. In another competition the supervisor indicated that after lowering prescreening criterion there were fifteen candidates of which only three qualified for an interview.

In a recent Transport Canada review (January 2001) there were 934 applications on file. Five hundred and eighty five met the minimum requirement of an ATPL. When applications were referred to regional management for specific review, 50 applicants qualified for 63 positions. Of the 50 deemed qualified, 31 passed the written test and 44 passed an interview, 32 were hired leaving 31 vacant positions as of January 2001.

Strength numbers from Transport Canada as of March 2001 show the following distribution of AO positions:

<b>Civil Aviation Function</b>	<b>Strength</b>
Aerodrome Safety	25
Aircraft Certification ETP	6
Aircraft Services CAI	27
HPS	41
Air Navigation & Airspace	13
Civil Aviation	1
Commercial & Business	162
General Aviation	74
Maintenance & Manufacturing	2
Program Strategies & Coordination	3
Regulatory & Enforcement	40
Safety Services	19
<b>Total</b>	<b>413</b>

## **Duties and Qualifications**

CFPA members are employed in a wide array of very specialized and highly technical positions. Their duties are critical to the maintenance of a safe and efficient air transportation system. Many areas of expertise are unique to their function, however, they all require as a foundation significant experience as a professional pilot. Many of these jobs are interdependent and collectively they form the framework that insures the continuing health of the air transportation system.

The following are generic and generalized synopses describing the typical duties and qualifications for most of the functional areas described in the strength chart above. For a more detailed verification of these synopses, please examine the enclosed copies of the actual job descriptions for a representative position in each of the functional areas. For brevity and ease of reference we have included only the Job Skills - Job Content Knowledge section from each of the documents.

### **Aerodrome Safety Inspector**

The Aerodrome Safety Branch is responsible for inspecting and certifying airports and aerodromes in Canada, from large metropolitan airports to single strip community airfields. Branch specialists develop rules, standards and procedures for all aspects of airside safety, including aerodrome physical and operational requirements, land use and zoning. They also evaluate the impact of noise on residential communities and wildlife. Based on factors such as traffic volume and traffic patterns, specialists evaluate requirements for maintenance, lighting, markings, emergency response plans, and aircraft fire fighting services.

In addition to the minimum requirements of an Airline Transport Pilot Licence, Aerodrome Safety Inspectors require extensive experience in aeronautics in Canada gained by flying as PIC (pilot-in-command) of a variety of aircraft types in a wide variety of operational environments. They also require experience in project management and experience in the preparation and presentation of reports.

### **Aircraft Certification Engineering Test Pilot (ETP)**

Engineering Test Pilots (ETP) all work in the Flight Test division of Aircraft Certification. These ETPs are responsible for performing flight testing to determine whether new or modified aircraft comply with accepted international design standards with respect to flying qualities, performance, system operation and overall level of safety. In order to do so they are specially trained and have experience in theory of flight and aircraft systems operation, flight test theories

and techniques, aeronautical system design standards, safety issues, and human factors engineering.

In addition to the minimum requirements of an Airline Transport Pilot Licence, Engineering Test Pilots require a four-year engineering degree, at least three years of operational flight experience, successful completion of a one-year Test Pilot School (cost in excess of \$1,000,000.00 US), as well as at least three years of flight test experience.

### Aircraft Services

Aircraft Services includes two major components, the training division, and the Coast Guard operations division. The training division largely employs Civil Aviation Inspectors (CAI) as training and check pilots while Coast Guard operations predominately involves Helicopter Pilots (HPS).

### Aircraft Services Training Pilot (CAI)

CAIs in the training division are the training pilots and check pilots for Transport Canada's own flight operations. These pilots train and instruct all the other pilots who operate Transport Canada aircraft. They design and present the ground training courses as well as conduct the simulator-based and in-flight portions of the syllabus. They also conduct the flight training in TC aircraft and simulators and conduct the check rides to approve other pilots for operation of Transport Canada aircraft.

Aircraft Services Training Division pilots require an Airline Transport Pilot Licence with a minimum of 3000 flying hours gained by flying as (pilot-in-command) of a variety of aircraft types in a wide variety of operational environments, and significant experience in conducting pilot training and flight tests. Experience as a company check pilot, an air carrier inspector, or an air operations supervisor are assets.

### Aircraft Services Helicopter Pilot (HPS)

Coast Guard Helicopter pilots are assigned to ships for Shipboard Operations for periods of up to 4 weeks (longer under certain circumstances) and conduct all weather operations, ice/pollution patrols, and ship and lighthouse re-supply. They also maintain the Marine Navigation System. This is the largest program in terms of hours flown involving the helicopter transport of crews and equipment to maintain lights, markers and marine radio navigation aids. HPS pilots are also assigned to provide helicopter support to RCMP activities such as the International Border Enforcement Team (IBET). HPS pilots support hydrographic surveys and ice reconnaissance. They conduct External Load Operations where cargo is transported while being suspended below the

helicopter, as well as Vertical Reference External load operations where the pilot maneuvers a load that is suspended on a 100 foot lanyard, by leaning out of the helicopter to visually pick up or place the load accurately. In addition to supporting Wildlife Agencies and conducting operations in support of the Fisheries Act and the Navigable Water Way Protection Act, the HPS pilots are pollution prevention officers under the Canada Shipping Act and the Arctic Waters Pollution Act and are called upon to support pollution incidents. HPS pilots also hold Search and Rescue (SAR) standby credentials and respond to SAR incidents and Medivac requests including Rescue Hoist operations for retrieval of victims.

For the last 10 years, the hiring standard has been a commercial helicopter license with an instrument rating and 3000 hours pilot-in-command of helicopters. In the early 1990's the Airline Transport Pilot License - Helicopter (ATPL-H) was introduced and most HPS pilots now have an Airline Transport Pilot Licence. In summation, these are among the most qualified all-weather, all terrain, helicopter pilots in the world.

### Air Navigation and Airspace

Inspectors in Air Navigation and Airspace supervise the development and dissemination of legislation, regulations, airspace standards, procedures and guidance materials, which incorporate state-of-the-art technological advancements to ensure safe operations within Canadian airspace. They develop legislation, regulations and national airspace standards and the procedures for pilots to operate safely in Canadian airspace. They conduct analysis of proposed deviations from approved standards and oversee acceptable means of compliance. They conduct audits and evaluations of the effectiveness of compliance practices and review national and regional practices of air navigation service providers and conduct the safety oversight of the Air Navigation System.

In addition to the minimum requirements of an Airline Transport Pilot Licence with a minimum of 3000 flying hours, Air Navigation and Airspace inspectors require a comprehensive knowledge of the relationship and operation of the various components of the following: the entire Air Navigation System that includes Airspace Structure and Classification, Pilot Procedures, Air Traffic Control Procedures, Performance of Navigation Aids and Navigation Systems, Instrument Procedure Design Criteria, and knowledge of the demands placed on the system by aircraft performance, aircraft size, commercial and general aviation operations.

### Inspector Air Carrier Operations (Commercial and Business Aviation)

Specialists in the Commercial and Business Aviation Branch are responsible for safety regulation, inspection and monitoring of all Canadian business and commercial air operators, as well as foreign air operators who operate in Canadian airspace. Inspectors conduct inspections, audits and evaluations in the areas of flight operations. The monitoring includes training programs and facilities as well as technical performance evaluations on simulators and other training devices. In Headquarters (Ottawa), specialists also develop policies, standards and regulations pertinent to Commercial and Business Aviation.

Pilots in Airline Inspection Division positions require licence qualifications such as PIC (pilot-in-command) in jet aircraft of an all up weight of 40,000 pounds or greater, or turbo-prop aircraft of an all up weight of 100,000 pounds or greater. Experience as a Company Check Pilot, an Air Carrier Inspector, or an Air Operations Supervisor and experience in long range navigation, policy and standards development and implementation and project management are all assets.

### Inspector Operational Standards (Commercial and Business Aviation)

Specialists in the Commercial and Business Aviation Branch are responsible for safety regulation, inspection and monitoring of all Canadian business and commercial air operators, as well as foreign air operators who operate in Canadian airspace. Inspectors conduct inspections, audits and evaluations in the areas of flight operations. The monitoring includes training programs and facilities as well as technical performance evaluations on simulators and other training devices. In Headquarters (Ottawa), specialists also develop policies, standards and regulations pertinent to Commercial and Business Aviation.

Inspectors in Operational Standards positions in Commercial and Business Aviation require licence qualifications as PIC (pilot-in-command) of multi-engine turbo-jet aeroplanes of an all up weight of 25,000 pounds or greater, multi-engine turbo prop aeroplanes of an all up weight of 35,000 pounds or greater, or transport category multi-engine helicopters. Experience as an air carrier inspector or approved company check pilot, or experience as PIC (pilot-in-command) in global operations is an asset.

### Flight Training Inspector (General Aviation)

Inspectors develop and administer safety regulations, standards, policy and procedures regarding flight crew licensing, training and examinations in support of general aviation activities which include, among others, recreational aviation and special aviation events such as air shows. Inspectors monitor and certify Flight Training Units, develop written examinations and conduct flight tests for

flight crew licensing, and license new members of the aviation community.

In addition to the minimum requirements of Airline Transport Pilot Licence with a minimum of 3000 flying hours, inspectors in these positions require 500 hours multi-engine experience as PIC (pilot-in-command), significant experience in conducting pilot flight tests, and in training and testing of flight instructors. A valid Class I Instructor Rating may be required for certain positions. For some positions, pilot qualification in aircraft other than aeroplanes and helicopters and experience in a variety of special flight operations may be an asset. Experience in the development of written examinations may also be an asset.

### Aviation Enforcement Inspector

The Regulatory Services is responsible for developing and maintaining aeronautical legislation through the Canadian Aviation Regulation Advisory Council. It is responsible for enforcing the regulations and taking corrective action (through fines, prosecutions and licence/certification suspensions). A legal team assists in presenting cases before the Civil Aviation Tribunal. Specialists also develop and standardize aeronautical terminology to facilitate an understanding of the regulations, nationally and internationally. There is an air operations contingency function that completes contingency planning, prepares and runs exercises, and monitors day-to-day activities of civil aviation and coordinates emergency responses for national and international civil air transportation crises.

In addition to the minimum requirements of an Airline Transport Pilot Licence, Enforcement Inspectors in Regulatory Services require experience in: flight operations; planning and conducting research and analysis projects; communicating with a wide range of public and private sector officials; and, the ability to develop strategies and systems for the collection, analysis and interpretation of data.

### Aviation Safety Officer

The Safety Services Branch ensures the formulation and ongoing development of safety promotion and safety evaluation standards and practices for monitoring the National Civil Aviation Transportation System (NCATS). Specialists are responsible for developing, implementing and maintaining safety policies for the five regional System Safety offices. As well, they are responsible for the production, publication and distribution of a family of aviation safety newsletters, various videos, brochures and posters.

In addition to the minimum requirements of an Airline Transport Pilot Licence, Aviation Safety Officers require experience in flight operations; training or experience in functions related to safety evaluations and risk assessment; safety

program development and/or management; experience in writing and public speaking.

### Transportation Safety Board (TSB) Investigator

A TSB Investigator conducts investigations into aviation occurrences to determine findings as to causes and contributing factors, identifying safety deficiencies, assessing risks, proposing risk mitigation options, developing safety communications, and communicating with industry, regulators, media and the public. When designated as an Accredited Representative to a foreign investigation, the TSB Investigator represents Canada and leads the team of Canadian industry advisors engaged in investigation activities in support of the foreign investigation. A TSB investigator writes confidential draft reports; prepares and responds to representations by persons with a direct interest in the investigation; drafts safety communications, including recommendations, advisories, and information letters; and monitors and assesses industry responses to safety communications. They also lead project teams and working groups associated with TSB initiatives.

TSB investigator pilots require an Airline Transport Pilot Licence with significant flying experience gained by flying as PIC (pilot-in-command) of a variety of aircraft types in a wide variety of operational environments. They are required to maintain professional investigator currency through participation in specialized investigation courses and self-study in order to maintain a preparedness to take on the investigation responsibilities. They must maintain currency in air transportation operations and foster an awareness of both the political and economic aspects of safe operations in addition to their professional pilot currency in the operational aspects of the industry to maintain discipline proficiency and certification.

### Inspector Training Costs

The following chart, *Civil Aviation Associated Costs with the Training of a New Inspector*, was submitted by Transport Canada to the Joint Committee and can be found in the data book which was used to produce the Joint Committee report (Tab 12 of the Union's submission). It is worth pointing out that although the cost of training is only documented for a one-year period, Note 1 clearly points out that it takes two years before an inspector can undertake fully unsupervised duties. In addition it is note worthy that, according to Note 5, aircraft type training on a large commercial jet (i.e. Airbus 320) costs \$57,000.00; the costs for training inspectors in the region is approximately the same due to the requirement to be qualified on more than one aircraft type. It is interesting that more than two-thirds of the inspectors in C&BA fall into the latter category.

Indications for the Transportation Safety Board show that the training investment for their investigators easily exceeds those referenced above.

## CIVIL AVIATION

### ASSOCIATED COSTS WITH THE TRAINING OF A NEW INSPECTOR

- Note 1:** The elapsed time before an inspector can undertake fully unsupervised duties has been estimated at 2 years. However, a newly appointed staff member can perform basic tasking throughout this period. That the time required for courses as well as on-the-job training would equate to a full year, is a conservative estimate. The salary cost is based on CAI-03 starting level and includes the R&R and extra duty allowances. Some of the Regional offices hire inspectors at a CAI-02 level that would decrease the salary cost to \$65.7 or \$67.1K (depending of their R&R Group). Note that C&BA hiring inspectors at above minimum salary is being used as a recruitment tool (usually at the median CAI-03 level of \$67 836). The overtime costs required have not been factored in and would add approximately a 10% additional cost above basic salary.
- Note 2:** Based on the Citation Course cost provided by Aircraft Services Operations Branch of TC. Cost charges are taken from cost recovered by TC for providing training for the RCMP (break even cost); which includes 7 days of ground school (\$200 per day), manuals (\$400) and 25.5 hours of simulator (\$229 per hour). In addition, 29.5 hours of flight training and checking are provided (\$750 per hour). Half of the training is conducted at the home-base and the other half is conducted in Ottawa for an estimated per diem cost of 14 days totaling \$2.8K.
- Note 3:** Cost is based on the following three areas:
- \$200 per day per inspector for per diem, travel and accommodation;
  - Course delivery (based on latest C&BA contract); \$22K per course for a consultant (max loading of 20 participants which equates to \$1100 per inspector) and;
  - \$70K per annum for the Program Manager in charge of development and delivery (5 courses per year for 100 participants at a cost of \$700 per inspector). The total non-per diem/travel/accommodations equates to \$1800 for 8 days of training at an average cost of \$225 per participants per day.
- The sum of the above equates to \$425 per day per participant. This average has been applied for every TC delivered course.
- Note 4:** Based on the course cost of \$3.5K and per diem, accommodation and travel of \$1.0K.
- Note 5:** Based on an Airbus A320 rating (median cost aircraft, delivered by a Canadian carrier) with 35 days of training, per diem and accommodations. Training with the Region is less expensive for aircraft types; however, the majority of Regions have inspectors maintaining currency on two types. As an example of cost: an inspector can have a Lear 35 rating (median aircraft \$12K US – 21 days per diem at \$4,2K US). Note that the majority of courses on small aircrafts are currently available solely in the United States. The difference in cost between the training on one large aircraft and the training required on two smaller aircrafts is considered negligible.

## CIVIL AVIATION

### ASSOCIATED COSTS WITH THE TRAINING OF A NEW INSPECTOR

	C&BA	ANS & A	ENF	GA	AGA SFTY	SS		
Salary Cost (See Note 1)	78 336.00	71 451.00	72 852.00	71 451.00	71 451.00	71 451.00	Course Duration	Course Provider
Citation Initial Training Course (See Note 2)	32 564.00	32 564.00	32 564.00	32 564.00	32 564.00	32 564.00	28 days	TC
Basic Aviation Enforcement Course (See Note 3)	2 125.00	2 125.00	2 125.00	2 125.00	2 125.00	2 125.00	5 days	TC
Check Pilot Training (See Note 4)	4 500.00						5 days	Industry
Aircraft Type Training (See Note 5)	57 000.00						35 days	Industry
Risk Management Course	1 325.00	1 325.00	1 325.00	1 325.00	1 325.00	1 325.00	3 days	TC
Audit Procedures Course	1 325.00	1 325.00	1 325.00	1 325.00	1 325.00		3 days	TC
Communications Skills Course	2 125.00	2 125.00	2 125.00	2 125.00	2 125.00	2 125.00	5 days	TC
C&BA Specialty Course	3 400.00						8 days	TC
ANS & A Regulatory Practices		1 275.00					3 days	TC
Case Presenting Officer Course			2 550.00				6 days	TC
General Aviation Orientation Course				3 825.00			9 days	TC
Aeordrome Safety Specialty Course					4 250.00		10 days	TC
System Safety Specialty Course						4 250.00	10 days	TC
<b>TOTAL COST</b>	<b>\$182 700.00</b>	<b>\$112 190.00</b>	<b>\$114 866.00</b>	<b>\$114 740.00</b>	<b>\$115 165.00</b>	<b>\$113 840.00</b>		

Please see Attached Note Sheet

Aerodrome Safety Inspector

Skills

(7) Job Content Knowledge

Principles of mathematics and geographical interpretation to interpret technical drawings, survey plans, construction blueprints and topographic charts; to plot geographic coordinates, perform trigonometric calculations to determine the most restrictive dimensions of protected airspace and zoning surfaces, and to assess and determine potential impacts on airport and aircraft operations.

The management and operations structures and organizations of the various aerodromes, heliports and airports in the region and the interactions between airport authorities and operators, NAV CANADA, other levels of government, and Transport Canada, to provide advice and guidance in the development of airport operations manuals, to assess risks, conduct investigations, and other regulatory activities.

Theories, techniques and procedures of avionics systems, structures, propulsion and electronics systems and the training and experience necessary to qualify for and to maintain an Airline Transport Pilots Licence and/or Commercial Helicopter Licence and instrument rating.

Airport inspection and appraisal methods and techniques to conduct audits and inspections of airports/aerodrome facilities and applicable standards, policies, procedures, guidelines and level of service requirements to assist service providers with public consultation regarding proposed changes in levels of service.

Aircraft types, especially those operating in the region in order to effectively apply the regulations when carrying out audits and inspections .

Investigative techniques and observation, analytical and conflict resolution skills to identify regulatory and compliance infractions; evaluate impact; take corrective action and/or resolve compliance problems and conflicts with stakeholders.

Airside operations at large and small airports and the methods, techniques and practices involved in operating a vehicle in this environment. This knowledge is required to conduct surveillance and monitoring activities of aerodrome, heliport and airport operations and to ensure compliance.

Wilderness survival skills including the use of firearms. This knowledge is required to to act as pilot of an aircraft in sparsely settled areas.

Methods, techniques and practices involved in providing formal training, including the use of classroom teaching aids in order to assess, approve and deliver training programs.

Project and priority management skills combined with the methods and techniques involved in conducting comprehensive audits and inspections to lead projects and/or participate in national working groups and audits; to plan, organize and implement audit and inspection programs, and to prepare work plans.

Aerodrome Safety Inspector - cont'd

Knowledge, skill and experience to review, assess and approve the effectiveness of operators administrative policies and operational procedures and amendments.

Methods, techniques and practices of gathering and safeguarding evidence for use in court proceeding; courtroom decorum and the practices involved in presenting evidence as a subject matter expert witness before judicial or quasi judicial proceedings.

The principles and techniques of emergency preparedness planning to evaluate the emergency response plans of aerodromes, heliports and airports and to evaluate emergency response exercises.

Problem solving and negotiating techniques to develop solutions to problems of noise management and land-use control (e.g. airport zoning regulations) and to develop cost effective solutions to problems of non-compliance.

Trends and developments in auditing regulatory and safety programs, in the assessment and management of associated risks, emergency response planning and fire fighting, and in airport and heliport safety.

Presentation techniques and interpersonal skills to represent the Department at meetings and committees; to deliver clear and comprehensible presentations to various audiences within the aviation community, and to respond to public inquiries/complaints.

## Engineering Test Pilot - Aircraft Certification

### Skills

#### (7) Job Content Knowledge

Knowledge of engineering theory and principles at a level associated with certification as a Professional Engineer, in order to make engineering decisions.

Knowledge and experience to obtain and retain an Airline Transport Pilot Licence and Instrument Rating which requires acquisition of professional piloting knowledge of the theory of flight, aircraft systems and characteristics, meteorology and the rules and practices of commercial instrument flight. This knowledge is re-tested on an annual basis.

Additional comprehensive knowledge and experience to obtain and retain engineering test pilot status, equivalent to that which would be gained from a one year post-graduate course at a recognized test pilots' school, plus experience doing test pilot certification work. Specifically, the work requires in-depth knowledge, fundamental understanding and significant experience in the principles, theories and practices of the following disciplines and aptitudes:

- i) aerodynamic theory and aircraft dynamics;
- ii) design characteristics and principles of operation of aircraft systems including avionics equipment, mechanical systems, and powerplant systems;
- iii) systems safety assessment methods;
- iv) test pilot techniques and procedures for assessment of performance, handling qualities, human factors, system failures and pilot workload;
- v) flight test procedures, methods and practices associated with aircraft flight test data acquisition instrumentation systems;
- vi) hazards associated with the flight testing of uncertified aircraft; and
- vii) industry practices and processes for the design, developmental flight testing, manufacture, and production flight testing of aeronautical products. This includes knowledge of the methods, techniques, and practices for interpreting aeronautical engineering flight test data analysis, drawings, schematics and specifications relating to those products.

The work requires aircraft certification process knowledge, normally gained through industry or government experience in the application of regulatory standards as related to aeronautical product certification and consists of:

Knowledge of the practices employed in the national and international aeronautical product certification processes, in particular, the various methods of determining

Engineering Test Pilot - cont'd

compliance in accordance with the applicable regulations, standards, and advisory material. This knowledge is required in order to maintain and develop appropriate procedures and policies for both the HQ and regional engineering specialists.

Knowledge of the methods, techniques, and practices for developing policies, regulatory recommendations, standards, audit criteria, and procedures in order to develop and recommend changes to existing practices.

The work requires project management knowledge normally acquired through formal training and experience in industry and the government and consists of:

Knowledge of the theories, methods, techniques, and practices for project management in order to coordinate multi-disciplinary projects within the division, and to support project tasking by other divisions within the matrix organization.

Air Navigation and Airspace Inspector

## Skills

## (7) Job Content Knowledge

The position requires knowledge of the concepts, theories, and practices pertaining to the Air Navigation System at the subject matter expert level, in order to provide technical input into the development of standards and regulations. This degree of knowledge is normally acquired through formal education at the post-secondary level and on-the-job training and experience. This also includes pilot training and experience, in order to bring the user dimension into the day-to-day requirements of the position. The work requires knowledge of the Air Navigation System and of the relationship between the various components, knowledge of the demands placed on the system by aircraft performance, aircraft size, surveillance systems, commercial operations and an appreciation of economic/cost-benefit impacts. This background knowledge is needed in order to undertake risk evaluation of proposed changes or deviation from standards.

The work requires knowledge of the methods, techniques and practices pertaining to risk management in order to evaluate programs, new equipment or systems and new operating procedures.

The work requires research and analytical skills to absorb and integrate a vast body of technical and operational data into the formulation of recommendations for improved or new regulations and standards.

The work requires knowledge of The Aeronautics Act and the Canadian Aviation Regulations and incorporated standards, particularly Parts VI and VIII, the Civil Air Navigation Services Commercialization Act, the Chicago Convention on International Civil Aviation and associated annexes. This background knowledge is acquired through training and experience.

The work requires the training, knowledge and experience necessary to qualify for and maintain an Airline Transport Pilot License (ATPL). This provides the needed background to assess standards and regulations from a user perspective.

Commercial and Business Aviation Inspector

## Skills

## (7) Job Content Knowledge

Theories, techniques and procedures of avionics systems, structures, propulsion and electronics systems and the training and experience necessary to qualify for and to maintain an Airline Transport Pilots Licence and/or commercial Helicopters Licence.

Investigative techniques and observation, analytical and conflict resolution skills to identify regulatory and compliance infractions; evaluate impact; take corrective action and/or resolve compliance problems and conflicts with stakeholders.

Airside operations at large and small airports and the methods, techniques and practices involved in operating a vehicle in this environment. This knowledge is required to conduct surveillance and monitoring activities of air operations and ground de-icing operations at airports, and to ensure compliance.

Aircraft types, especially those operating in the region in order to effectively apply the regulations when carrying out inspections and audits.

Wilderness survival skills including the use of firearms. This knowledge is required to assess Air Operators training programs and/or to act as pilot of an aircraft in sparsely settled areas.

Methods, techniques and practices involved in conducting comprehensive audits and inspections of Canadian Aviation Document holders.

Methods, techniques and practices involved in providing formal training, including the use of classroom teaching aids in order to assess, approve and deliver training programs.

Project and priority management skills combined with the methods and techniques involved in conducting comprehensive audits and inspections to lead projects and/or participate in national working groups and audits; to plan, organize and implement audit and inspection programs, and to prepare work plans.

Knowledge, skill and experience to review, assess and approve the effectiveness of operators administrative policies and operational procedures, personnel training manuals, and minimum equipment lists and amendments.

Methods, techniques and practices of gathering and safeguarding evidence for use in court proceeding; courtroom decorum and the practices involved in presenting evidence as subject matter expert witness before judicial or quasi judicial proceedings.

Presentation techniques and interpersonal skills to represent the Department at meetings and committees; to deliver clear and comprehensible presentations to various audiences within the aviation community, and to respond to public inquiries/complaints.

General Aviation Inspector

## Skills

## (7) Job Content Knowledge

Theories, techniques and procedures of avionics systems, structures, propulsion and electronics systems and the training and experience necessary to qualify for and to maintain an Airline Transport Pilot Licence and/or Commercial Helicopter Pilot Licence.

Investigative techniques and observation, analytical and conflict resolution skills to identify regulatory and compliance infractions; evaluate impact; take corrective action and/or resolve compliance problems and conflicts with stakeholders.

Airspace structures, the function and use of aids to air navigation, instrument's flight procedures, operational requirements of various aircraft types, aircraft systems. This knowledge is required to respond to inquiries from individuals attempting, or flight training units and flight instructors preparing training programs and students for written examinations conducted for personnel licensing purposes.

Wilderness survival skills including the use of firearms. This knowledge is required to act as pilot of an aircraft in sparsely settled areas.

Human resource management principles, techniques, methods and practices to supervise, train, motivate and evaluate staff performance and to foster team work and project participative decision making.

Interpersonal, communication and conflict resolution skills and techniques to direct, counsel, advise and evaluate work performance of staff; to represent the Department on national working committees; to develop solutions to aviation safety issues and stakeholders concerns often of a unique nature, and to determine the immediate response to emergencies.

Project management methods, techniques and practices to provide cost benefit and risk analysis, develop and recommend budgets for audits and inspections, and to control and monitor project expenditures.

Methods, techniques and practices involved in providing formal training, including the use of classroom teaching aids in order to assess, approve and deliver training programs.

Project and priority management skills combined with the methods and techniques involved in conducting comprehensive audits and inspections; to plan, organize and implement audit and inspection programs, and to prepare work plans.

Knowledge, skill and experience to review and evaluate the effectiveness of proposed special flight operations programs and procedures.

General Aviation Inspector - cont'd

Methods, techniques and practices of gathering and safeguarding evidence for use in court proceeding; courtroom decorum and the practices involved in presenting evidence as subject matter expert witness before judicial or quasi judicial proceedings.

Presentation techniques and interpersonal skills to represent the Department at meetings and committees; to deliver clear and comprehensible presentations to various audiences within the aviation community, and to respond to public inquiries/complaints.

Aviation Enforcement Inspector

## Skills

## (7) Job Content Knowledge

Theories, techniques and procedures of avionics systems, structures, propulsion and electronics systems and the training and experience necessary to qualify for and to maintain an Airline Transport Pilots Licence and/or commercial Helicopters Licence.

Investigative techniques and observation, analytical and conflict resolution skills to identify regulatory and compliance infractions; evaluate impact; take corrective action and/or resolve compliance problems and conflicts with stakeholders.

Airside operations at large and small airports and the methods, techniques and practices involved in operating a vehicle in this environment. This knowledge is required to conduct surveillance and monitoring activities of air operations and ground de-icing operations at airports, and to ensure compliance.

Aircraft types, especially those operating in the region in order to effectively apply the regulations when carrying out inspections.

Wilderness survival skills including the use of firearms. This knowledge is required to assess Air Operators training programs and/or to act as pilot of an aircraft in sparsely settled areas.

Methods, techniques and practices involved in conducting comprehensive investigations of CAD holders.

Methods, techniques and practices involved in providing formal training, including the use of classroom teaching aids in order to assess, approve and deliver training programs.

Project and priority management skills combined with the methods and techniques involved in conducting comprehensive investigations, to lead projects and/or participate in national working groups; to plan, organize and implement regulatory investigation programs, and to prepare work plans.

Knowledge, skill and experience to review, assess and approve the effectiveness of operators administrative policies and operational procedures, personnel training manuals, and minimum equipment lists and amendments.

Methods, techniques and practices of gathering and safeguarding evidence for use in court proceeding; courtroom decorum and the practices involved in acting as case presenting officer and/or presenting evidence as subject matter expert witness before judicial or quasi judicial proceedings.

Presentation techniques and interpersonal skills to represent the Department at meetings and committees; to deliver clear and comprehensible presentations to various audiences within the aviation community, and to respond to public inquiries/complaints.

System Safety Inspector

## Skills

## (7) Job Content Knowledge

The work requires knowledge of:

Air laws, regulations and procedures, flight management systems, airframes, engines and aircraft systems, meteorology, Air Navigation System (ANS), instrument flight guidance systems, principles and use of radio communications and aids to navigation, flight operations, and the theory of flight and human factors effecting flight safety in order to operate government aircraft. This knowledge is also required to direct the operations and the delivery of regulatory safety compliance and certification programs including audit and inspections of operations, assessment of obstacles to aviation safety, effectiveness of visual aids, respond to pilot various queries and participate in aeronautical studies.

Human factors theories and principles, including risk management, stress, communications, and fundamental aviation psychology theories to develop and deliver human factor training sessions.

Basic aircraft accident investigation techniques to carry out duties under the Minister's Observer program.

Methods, technique and practices associated with inspection and investigation, risk assessment, scientific information and data analysis and interpretation, regulatory compliance assessment, and report interpretation. This is necessary to carry out, understand and evaluate the results of inspections and investigations.

Problem solving techniques that include research, identifying, analyzing, consulting and determining sources of problems in order to effectively monitor the operations in the air transportation system and to recommend improvements;

Current and evolving technologies in order to assess their impact safety in the aviation industry;

Methods and techniques of professional development and training in order to develop and present promotional and educational programs related to air operators, pilots and all other stakeholders in the aviation industry;

Processes for inspections according to requirements of the Act and to maintain continuity of evidence and seized property to provide information for hearings and tribunals;

Computer skills and operating software to document the safety observations and the information uncovered during safety reviews and follow-up activities of occurrences, and input into departmental data bases;

System Safety Inspector - cont'd

Methods, techniques and practices to lead/participate on committees to identify risks, safety issues, develop training/information sessions and conduct inspections to modify or develop regulatory policy in transportation safety;

Methods, techniques and practices to participate in teams that develop regional and national strategic plans, including setting goals and priorities to establish and maintain consistent quality assurances in all safety programs.

Methods, techniques and practices to research, analyze and interpret data for the preparation and presentation of reports, the conduct of surveys to identify potential problems, hazards and deficiencies, and the offering of seminars, briefings, educational programs, workshops and symposia.

## Transportation Safety Board - Senior Investigator, Investigation Branch - Air

### Skills

#### Job Content Knowledge

##### Scientific Investigation Knowledge:

To effectively lead and conduct investigations into a wide range of transportation occurrences and provide investigators with on the job training, the work requires a knowledge of: Integrated Safety Investigation Methodology (ISIM) (i.e. risk assessment and risk control options, event and causal factors methodology, defence barrier analysis), data search techniques, interviewing and deception detection techniques, human factors, critical and perishable evidence preservation, continuity of evidence, metallurgy and fracture analysis, event and data recorder format and interpretation); dangerous goods/toxicity and exposure measurement; personal protective clothing - ABC protection levels; first aid and CPR; salvaging methodology; still and video photography; on-site trouble shooting; fuel sampling techniques; methods and techniques used to keep investigative equipment operational; and test and analysis requirements. This knowledge is acquired through training in basic accident investigation; occurrence survival investigation; witness interviewing; media relations; human factors; team building methodologies; report writing techniques; basic management skills; risk assessment and control options, and through experience in a variety of accident investigations.

Knowledge is also required of national modal safety issues to provide expert advice/information to assist in the development of the “Significant Safety Issues List” (SSIL), to ensure the appropriate response to an occurrence (if a particular occurrence is related to SSIL) and to support the macro analysis group.

##### Modal Knowledge:

As a technical resource for the Air Investigations Branch and the Board on all matters concerning aircraft operation practices:

- provides direction and guidance to Branch investigators for the timely and accurate identification of safety deficiencies through various means (analysis of collected materials and information, development of findings, determination of causes and contributing factors, and the proposal of safety action);
- develops and implements a performance measurement program for measuring investigation efforts, conducting quality control activities and ensuring investigative efforts are optimized to bring to light safety deficiencies and advance transportation safety; and
- develops and implements Branch investigation and report writing standards, procedures and a training program to ensure consistent, quality investigations are performed.

This work requires a comprehensive knowledge of: trends and developments in aircraft design; aircraft certification; performance and operating characteristics; aircraft operating procedures; performance characteristics of a variety of rotary and fixed wing aircraft; fundamental air traffic control procedures; airspace characteristics and rules; air navigation systems; aircraft design; maintenance; power plants; structures, materials, hydraulic and electronic systems; cockpit resource management, systems and procedures; meteorology; and advances in passenger safety.

TSB Investigator - cont'd

There is a requirement for the knowledge and skill necessary to maintain pilot-in-command status to fly rotary or fixed wing aircraft and possession and maintenance of a Commercial Helicopter Licence (IFR Group 3) or an Airline Transport Pilot's Licence (ATPL). The professional aviation knowledge is based on international standards and requires ongoing periodic re-certification using simulators and/or practical and written examinations for the issuing of a "Pilot Proficiency Check" (PPC). To maintain a current licence in the ever-evolving aviation field, regulations and standards must be constantly studied. A volume of other new information should be read for awareness.

Airline Transport Pilot's Licence (ATPL) - Must have a knowledge of the aviation industry obtained through professional training and practical experience, be in possession of a valid ATPL, a valid radio operator's licence, and a valid Category 1 medical certificate. There is a requirement to pass written examinations such as: SAMRA (Meteorology, Radio Aids to Navigation and Flight Planning); SARON (Air Law, Airplane Operation and Navigation General), and INRAT (Instrument Ratings). Must have knowledge of aerodynamics and theory of flight, meteorology, airframes, engines, systems, radio and electronic theory, navigation, flight operations, licensing requirements, and human factors, including pilot decision-making. It normally takes between 5 and 10 years to gain the required experience. OR,  
Helicopter Commercial Licence - Must have a knowledge of the aviation industry obtained through professional training, and be in possession of a valid CPHEL, radio operator's licence, and a valid Category 1 medical certificate. There is a further requirement to pass written examinations including INRAT (Instrument ratings), Canadian aviation regulations, instrument flight rules and procedures, meteorology, instruments, radio and radar systems and navigation. Must have knowledge of aerodynamics and theory of flight, meteorology, airframes, engines and systems, flight instruments, radio and electronic theory, navigation, flight operations, licencing requirements and human factors including pilot decision making. It normally takes between 5 and 10 years to gain the required experience.

There is a requirement to develop and maintain a knowledge of current investigation techniques and of trends and developments in the aeronautics industry through membership in professional associations, by reviewing technical papers, and attending periodic training courses, conferences and symposia.

Quality Assurance and Performance Management Knowledge:  
Knowledge of Quality Management Systems (i.e. TQM, Kaizen) and Quality Standards (ISO) is required to design and implement a quality assurance system to ensure the TSB processes adhere consistently to the level of quality defined under the TSB quality policy.

Knowledge is required of performance measurement theories, concepts, standards, practices and techniques to select appropriate methodologies, keep abreast of current trends and provide solid recommendations to Branch management on the development and implementation of improvements.

Knowledge is required of innovative developments (i.e. results-based management, performance measurement reporting, risk management, values and ethics initiatives ) in

TSB Investigator - cont'd

the academic, public and private sectors. This knowledge is required to: put in place a Quality Assurance System; develop appropriate standards, processes, systems and procedures that are in keeping with current trends and developments; maintain contemporary skills; and provide up-to-date advice to senior management.

Knowledge is required of audit and evaluation theories, concepts, standards and principles to direct and participate in TSB quality audit activities, select and assess appropriate methodologies, design, test or pilot new and innovative applications, keep abreast of current trends, and train and instruct Quality Assurance and Branch investigators involved in the audits.

Knowledge is required of research methods, tools, and techniques (e.g. surveys, interviews, focus groups, case studies, qualitative and quantitative analysis) to select appropriate methodologies to measure performance and monitor investigative activities. Knowledge is required of learning methodologies and coaching practices and techniques to assess the content of existing training and development methods and materials. Designs and develops new programs which include various approaches (self-directed and team learning, multimedia, interactive and distance learning) to achieve improvements in the methods and techniques used to carry out investigations and by extension the quality of Branch investigations.

There is a requirement to maintain a broad knowledge of current trends and developments in the industry through membership in professional organizations/associations by reviewing technical papers, and attending conferences and symposia . Ensures the most up to date standards, methods and practices are used in the training and development of investigators

**Project Management Knowledge:**

Skill is required in project management and team leadership to plan, manage and coordinate work, provide advice and guidance, prepare position papers, develop options and strategies, and ensure overall transportation occurrence investigations are carried out according to TSB's policies and procedures. Formal project management training is a current requirement.

Knowledge is required of the practices and procedures used to manage the human, financial and material resources allocated to an occurrence investigation.

Knowledge is required of marketing and communication methods, principles and techniques to: develop presentations, reports, summaries, briefing notes and correspondence for senior management; conduct interviews and working group sessions; and to ensure the recommendations resulting from audits, investigation reports and safety communications have an impact on the targeted audience.

**Computer Skills:**

Knowledge of data entry, manipulation and retrieval techniques and a variety of software programs such as WordPerfect, Excel, Naturel, Power Point, MS Project, E-Mail, Presentations, Schedule+ and Windows NT is needed to prepare statistical reports and

TSB Investigator - cont'd

presentations on the progress of occurrence investigations, and to draft components of technical and occurrence reports.