



Study of Airline's Flight Attendants Finds More Than Half of Injuries Affect Muscles and Bones in Back, Neck, Shoulders

A report on the Canadian study says that the primary risk factors were the handling of passenger baggage, the design of the galley, the design and maintenance of service trolleys, and flight attendant seating.

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FSF Editorial Staff

Because data showed that the average injury rate for flight attendants at AirBC¹ was 12.4 percent per 100 flight attendants per year from 1996 through 1998, compared with a company average of 6.7 percent and an aviation industry average of 4.7 percent, a study was conducted by the airline to assess risk factors and to identify methods of preventing injuries.

About 58 percent of the injuries to AirBC flight attendants were musculoskeletal injuries involving the back, neck or shoulders.

The study, conducted by the Environment, Health and Safety Group at AirBC, included an analysis of injury statistics, a questionnaire distributed to the company's 177 flight attendants, an ergonomic assessment and an analysis of the physical demands of the flight attendants' jobs.²

Back Injuries Were Most Frequent

AirBC records included flight attendants' claims filed as early as 1989 with the Workers' Compensation Board (WCB) of British Columbia for musculoskeletal injuries. Many of the early files were incomplete and/or unavailable; for this study, usable information was compiled that included claims filed from May 1989 through April 1998 involving musculoskeletal injuries.

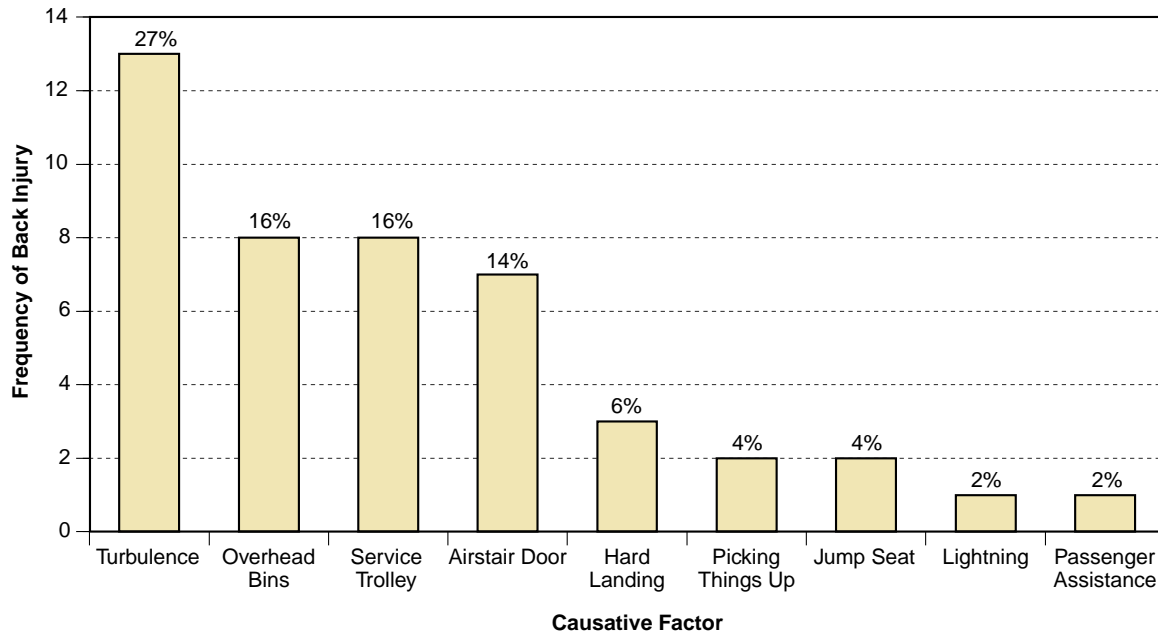


The data show that 72 flight attendants received musculoskeletal injuries while at work in company aircraft. (Two other flight attendants were injured outside aircraft; one injury was to the neck and back and resulted from a slip on a ramp, and the other injury was to the shoulder and back and resulted from a fall at a hotel while the flight attendant was on overnight duty.)

Of the 72 flight attendants with musculoskeletal injuries, 49 flight attendants (68 percent) received back injuries (Figure 1, page 2). The factor most frequently associated with back injuries was "turbulence," which was cited in 13 injuries (27 percent). The other most frequently cited factors were "overhead bin" and "trolley," each cited in eight injuries (16 percent), and "airstair door," cited in seven injuries (14 percent).

Of the 49 flight attendants with back injuries, 36 (73 percent) received injuries to the lower back, and 23 received injuries (47 percent) to the upper back. (The report said that injury reports that did not specify either the upper back or the lower back were considered to have involved both areas.) The factors cited most frequently for lower back injuries were turbulence (11 injuries [31 percent]), overhead bin (seven injuries [19 percent]) and service trolley (six injuries [17 percent]). For upper back injuries, turbulence, overhead bin and airstair door

Factors Associated With 49 Flight Attendant Back Injuries*



*Some injuries were associated with more than one factor. Four injuries were of unknown cause.

Source: Workers' Compensation Board of British Columbia

Figure 1

were cited most frequently (four injuries [17 percent] each), followed by service trolley (three injuries [13 percent]).

Of the 72 flight attendants with musculoskeletal injuries, 16 (22 percent) had shoulder injuries. The factors most frequently associated with shoulder injuries were airstair door (five injuries [31 percent]) and overhead bin and hard landing (three injuries [19 percent] each; Figure 2, page 3).

Head and/or neck injuries accounted for injuries to 24 of the 72 flight attendants (33 percent). Turbulence was the most frequently cited factor (six injuries [25 percent]), followed by overhead bin (four injuries [17 percent]) and hard landing and airstair door (three injuries [13 percent] each; Figure 3, page 3).

Ten injuries were reported to other body parts (wrist, elbow, arm, thigh and foot), with turbulence cited as a factor in three of the injuries (30 percent).

Injuries Most Frequent Among Flight Attendants With Four Years to Six Years Experience

The injured AirBC flight attendants most often were from age 26 through age 30; 41 percent of the injured flight attendants were in this age group. Flight attendants in two

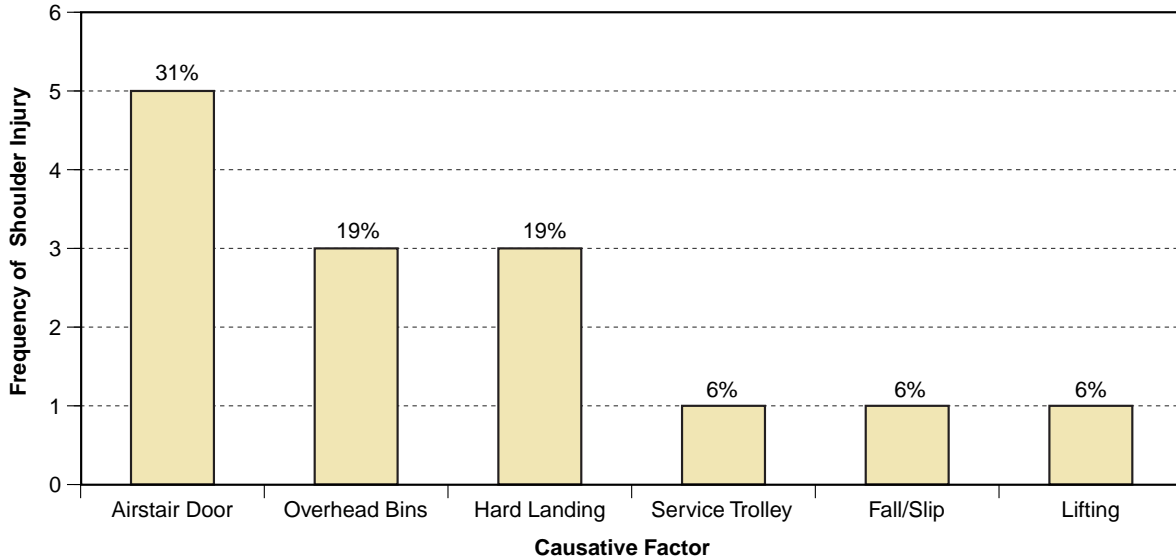
other age groups (from age 31 through age 35 and from age 36 through age 40) each accounted for 21 percent of the injuries (Figure 4, page 4).

Injuries were most frequent among flight attendants who had four years to six years of experience as flight attendants with AirBC; 34 percent of the injured flight attendants were in this category. Twenty-seven percent had seven years to nine years of experience, 20 percent had one year to three years of experience, 15 percent had 10 years to 12 years of experience and 5 percent had 13 years to 15 years of experience (Figure 5, page 5).

Time lost from work because of musculoskeletal injuries ranged from one day to 191 days. On average, shoulder injuries kept flight attendants off the job longer — an average of 52 days — than other injuries, such as upper back injuries (an average of 36 days), lower back injuries (an average of 29 days), neck injuries (an average of nine days), arm/hand injuries (an average of eight days) and leg/foot injuries (an average of one day; Figure 6, page 5).

Company records showed that 520 days were lost from work from 1989 through 1998 as a result of the flight attendants' musculoskeletal injuries. Most of the days lost from work involved lower back injuries (403 days). Shoulder injuries were involved in 310 days lost from work, and upper back injuries were involved in 290 days lost from work.

Factors Associated With 16 Flight Attendant Shoulder Injuries*

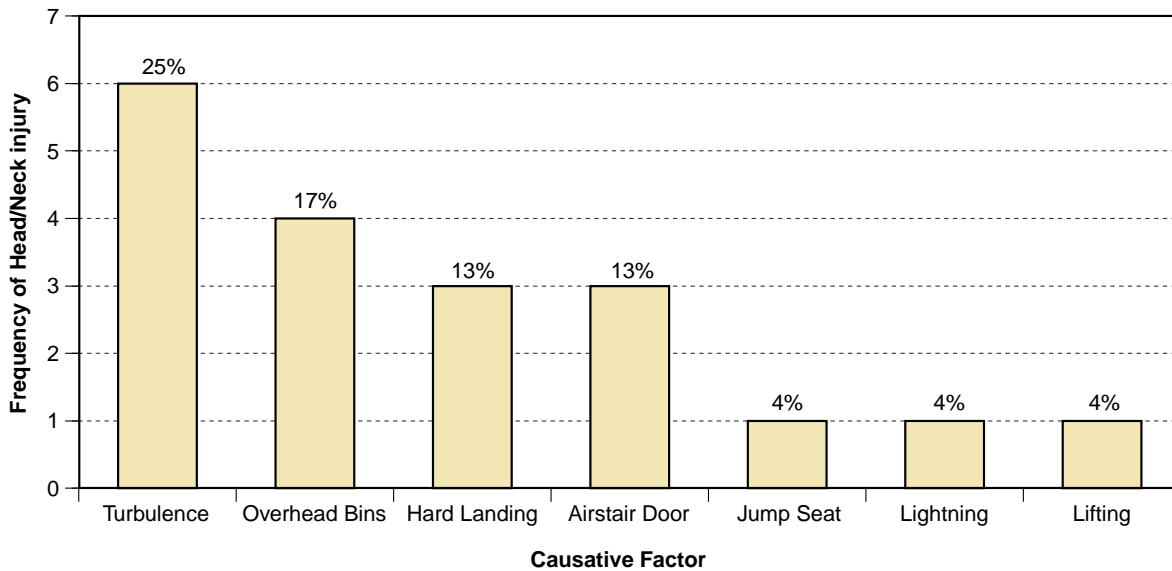


*Some injuries were associated with more than one factor. Two injuries were of unknown cause.

Source: Workers' Compensation Board of British Columbia

Figure 2

Factors Associated With 24 Flight Attendant Neck/Head Injuries*



*Some injuries were associated with more than one factor. Four injuries were of unknown cause.

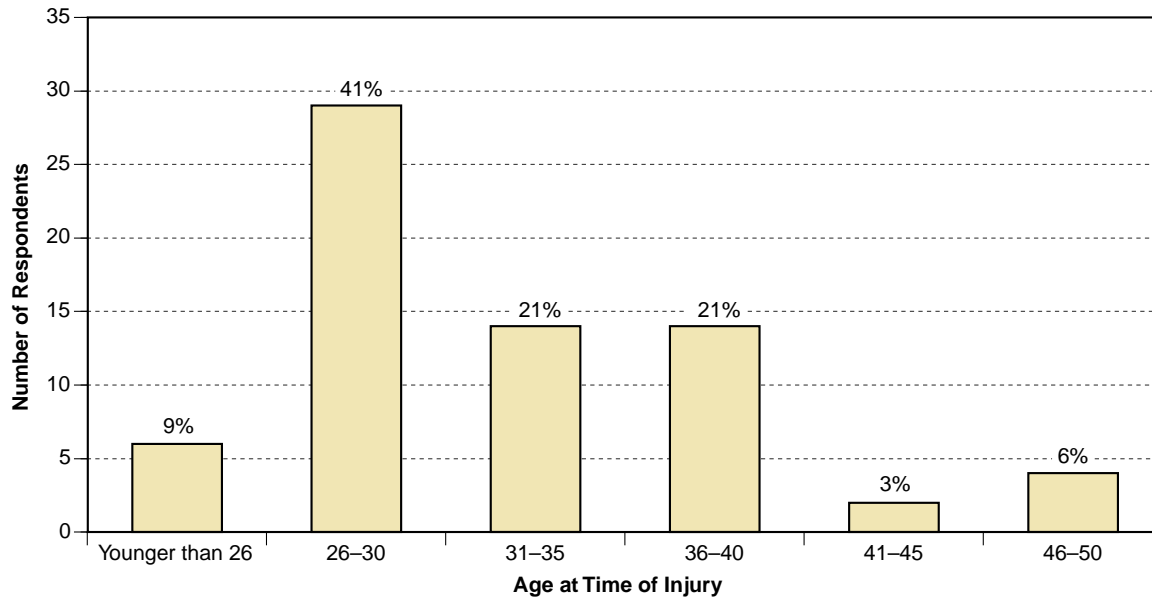
Source: Workers' Compensation Board of British Columbia

Figure 3

Data showed that direct WCB claims costs from April 1989 through 1998 for the musculoskeletal injuries totaled \$84,196 (Canadian). The average WCB direct claims cost per injury was

greatest for upper back injuries (\$2,275), followed by arm/hand injuries (\$2,237), neck injuries (\$1,675), lower back injuries (\$1,497) and leg/foot injuries (\$597; Figure 7, page 6).

Age of Flight Attendant at the Time of Musculoskeletal Injury



Source: Workers' Compensation Board of British Columbia

Figure 4

Fatigue, Inadequate Nutrition Associated With Injuries

The study, in a review of other reports that discussed flight attendant health issues and health risks, said that flight attendants on commercial short-haul air transport operations may experience “major problems with sleep loss, disruption to the circadian rhythm [behavioral rhythm and physiological rhythm associated with the 24-hour cycle of the earth’s rotation], fatigue and nutrition.”

“These problems, although not specific to musculoskeletal injuries, indirectly affect the severity of injury, as well as the recovery time required to heal the injury properly,” the report said.

“Generally, sleep loss and disruption to the circadian rhythm have a profound effect on a person’s alertness. The primary concern of the flight attendant is passenger safety. A reduced alertness may interfere with their ability to perform the expected duties, as well as [increase] the likelihood of injury to themselves. When fatigue increases, muscles are less able to exert forces and can incur injury at a lower stress level. In addition, a poorly nourished body is less equipped to repair damage than ... a healthy body, often resulting in prolonged rehabilitation and increased insurance costs.”

Other risk factors include irregular schedules; long duty days; early report times, which may become progressively earlier

during trips of several days; multiple flight legs (on average, 5.5 flight-legs per day); performing tasks while walking “uphill”; elevated gravity forces during aircraft turns, which can increase stress on joints; in-flight cabin vibration; mild turbulence while standing, which can increase muscular effort to maintain a standing position; heavy turbulence, which can result in shocks to the body; requirements for standing, bending, walking and pushing; difficulty lifting luggage to an overhead bin because of the bin height; increased snacking; lack of adequate rest facilities; and hurried service.

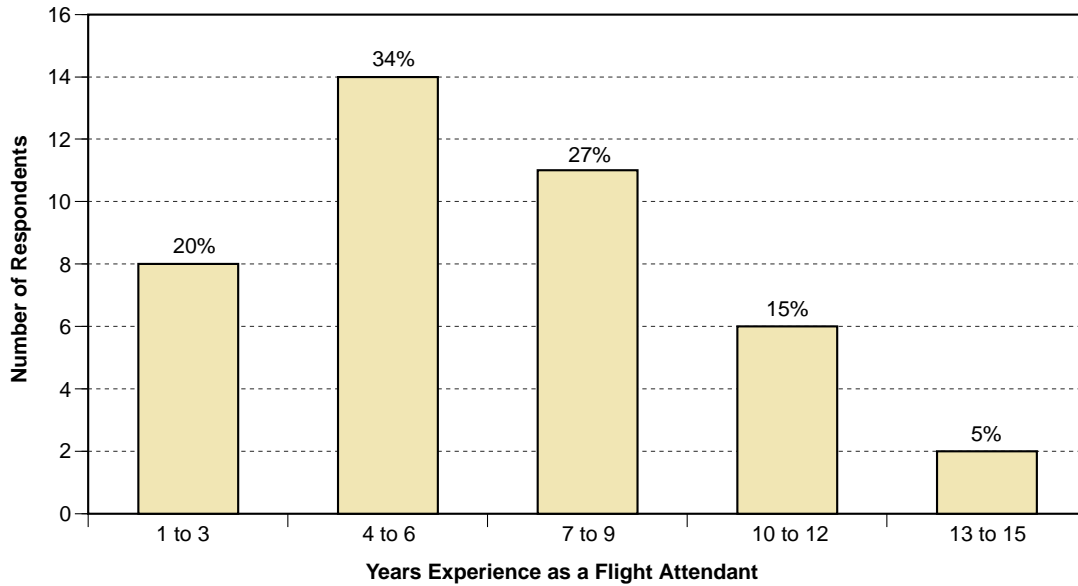
In addition, aircraft noise can contribute to stress levels and fatigue.

Videotapes Help Assess Ergonomics, Job Requirements

To assess aircraft ergonomics and the requirements of the flight attendants’ jobs, the AirBC study included observations and videotaping of flight attendants on some flight-legs during a three-day period. The observations involved flight-legs of different lengths on all aircraft types used by the company (BAE Systems 146 and de Havilland Canada Dash 8 Series 100, Dash 8 Series 300 and Dash 7 [no longer used by the company]). Cabin dimensions and galley dimensions also were obtained, and the pull forces required to move service trolleys were measured.

The report, citing design principles for human dimensions, said that that aircraft design should allow enough space for

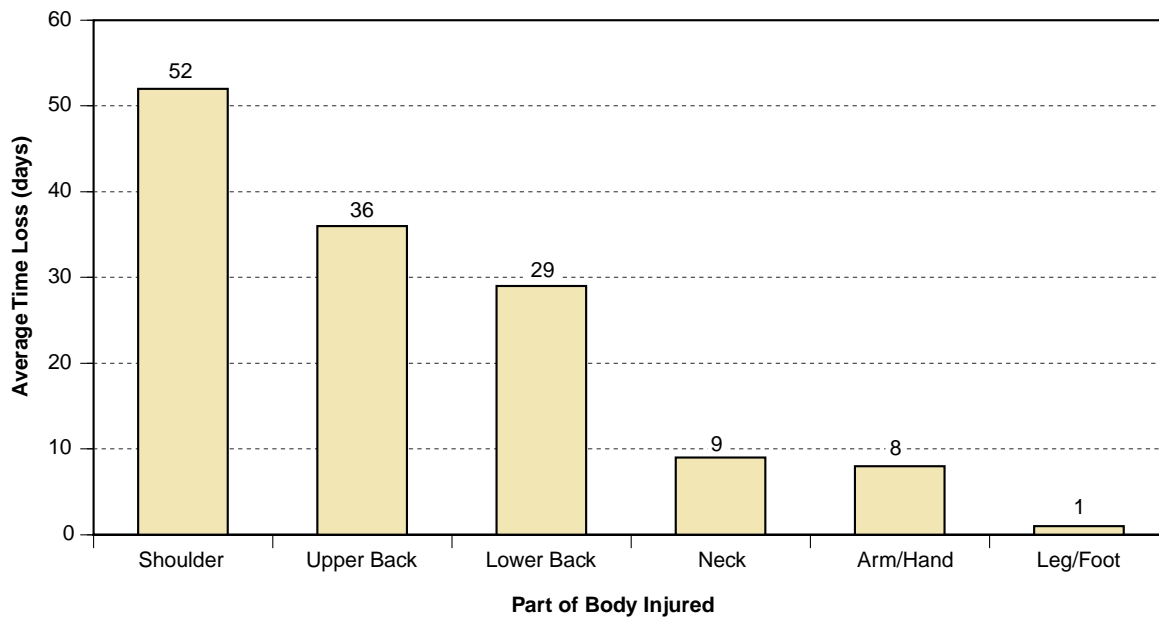
Number of Years Experience as a Flight Attendant When Injury Occurred



Source: Workers' Compensation Board of British Columbia

Figure 5

Average Time Loss per Flight Attendant Injury*



*Some injuries affected more than one body part and are included in more than one column.

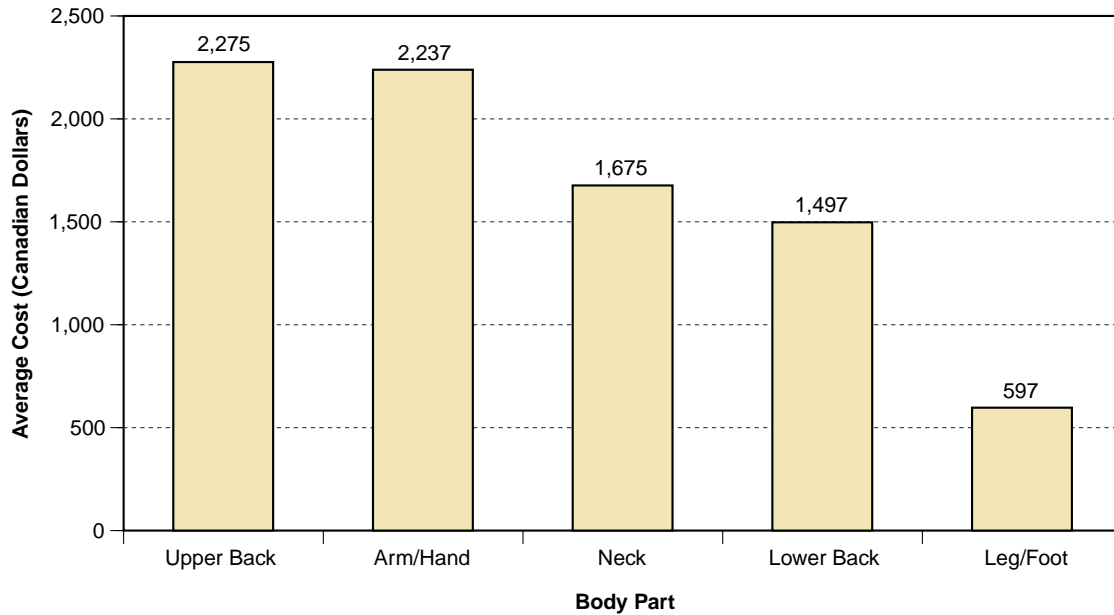
Source: Workers' Compensation Board of British Columbia

Figure 6

flight attendants who are six feet (1.8 meters) tall and for “easy reaches” by flight attendants who are five feet two inches (1.6 meters) tall. For example, the report said:

Aisle width for standing should be a minimum of 21 inches [53 centimeters] and up to 26 inches [66 centimeters] for dynamic movement. Standing in an aisle with a

Average Cost of Flight Attendant Injury*



*Some injuries affected more than one body part and are included in more than one column. Some recent injuries were excluded from the cost assessment because they are still incurring costs.

Source: Workers' Compensation Board of British Columbia

Figure 7

food tray should allow 36 inches [91 centimeters] clearance for standing and up to 40 inches [102 centimeters] for dynamic movement. Stooping in an aisle requires a minimum 36 inches, while squatting in an aisle requires a minimum of 31 inches [79 centimeters]. ... By contrast, the BAE 146 jet aisle widths are 19 inches [48 centimeters] and the Dash 8-100 [aisle widths] are 16 inches [41 centimeters]. This space forces the flight attendants to twist and rotate to serve passengers, rather than face them.

The report also said that:

- An easy reach for a “small” female is 24.7 inches (62.7 centimeters), an easy reach for an “average” (in height) female is 26.5 inches (67.3 centimeters), and an easy reach for a “large” male is 30.8 inches (78.2 centimeters). [The report did not define small, average and large.] A full-distance reach on a service trolley, however, is 31.5 inches (80 centimeters), and the depth of a Dash 8-300 galley counter is 42 inches (106.7 centimeters); and,
- Heights of overhead storage bins range from 64.5 inches (163.8 centimeters) in a Dash 8 to 67 inches (170.2 centimeters) in a BAE 146. (The report said that “principles of storage and reach” suggest that shelving should be between 30.5 inches (77.5 centimeters) and

75 inches (190.5 centimeters) high for tall individuals and between 27 inches (68.6 centimeters) and 58.5 inches (148.6 centimeters) for short individuals.

“Obviously, the overhead bins need to accommodate the passengers’ ability to stand and move to the aisle,” the report said. “By contrast, flight attendants under five feet four inches [1.6 meters] in height experiences less neck flexion and bending to attend to passengers, while the taller attendants were compromised by the bins.”

The study identified risk factors for musculoskeletal injuries, including the handling of heavy carry-on baggage; the extra effort required to pull, push and maneuver service trolleys; difficulty sliding drawers in and out; bending and squatting to reach items in the service trolleys and in the galley; reaching overhead for items in the galley and the overhead bins; inadequate seating; the increased work rate on shorter flights; providing service while on an incline or a decline; turbulence; “awkward” handles and small, sharp latches; frequent flexing of the neck and back and extension of the back; and frequent forward reaches and sideways reaches.

The report said that, in the years since the data were compiled, the task of opening the airstair door has been assigned to ground crew; as a result, flight attendant injuries associated with opening the airstair door have been reduced.

Also, the weight of the service trolleys has been reduced by 35 percent (from 102 pounds to 66 pounds [46 kilograms to 30 kilograms] for the full trolley and from 52 pounds to 34 pounds [24 kilograms to 15 kilograms] for the half-trolley). The report said that the weight reductions were a response to complaints by flight attendants and the number of injuries associated with the service trolleys.

“The most recent cases involving [service] trolleys have been linked to problems with maintenance of the [service] trolleys rather than their weight,” the report said. “Unfortunately, [service]-trolley maintenance is the responsibility of the catering company [that] provides the meals for the flights.”

The report said that further investigation should be conducted of injuries associated with airstair doors and service trolleys.

Survey Provides Details About Injuries, Treatments

A survey, designed in part to identify trends in injury rates and the needs for flight attendant education, was mailed to 177 AirBC flight attendants. Of the 60 completed questionnaires, 52 were completed by female flight attendants, and the remainder were completed by male flight attendants.

The respondents ranged in age from 21 years to 53 years, with an average age of 33.2 years. Their length of employment by AirBC ranged from two years to 15 years, with an average of 8.5 years. Their average experience as a flight attendant ranged from two years to 25 years, with an average of nine years.

Survey questions about their jobs revealed the following:

- Forty-seven percent described themselves as “highly satisfied” with their jobs, 47 percent said that they were “moderately satisfied,” and 5 percent said that they had “low satisfaction”;
- Twenty-seven percent most often flew on the BAE 146, 31 percent most often flew on the Dash 8-100, 19.5 percent most often flew on the Dash 8-300, and 22.5 percent flew equal amounts of time on all three aircraft types;
- Thirty-eight percent said that they preferred to fly on the BAE 146, 26 percent preferred the Dash 8-100, 26 percent preferred the Dash 8-300, and 10 percent had no preference;
- Forty-three percent said that they worked four hours to eight hours per shift, and 57 percent said that they worked more than eight hours per shift;
- Eighty-one percent said that they worked three days to four days per week, and 19 percent said that they worked five days to six days per week;

- Eighty-five percent said that they often worked for “three days continuously”;
- Seventy percent said that they often worked overnight shifts; and,
- Seventy-five percent said that they often worked eight hours with no more than a 30-minute break.

The respondents said that they had received various types of on-the-job injuries, but only musculoskeletal injuries were included in the study. Of the 60 respondents, 29 (48 percent) said that they had received work-related injuries, many of which involved more than one body part. The most frequently mentioned injury was to the lower back (17 injuries [59 percent]), followed by the neck (16 injuries [55 percent]), the shoulder (13 injuries [45 percent]), the upper back (10 injuries [34 percent]), the arm/hand (five injuries [17 percent]) and the leg/foot (two injuries [7 percent]).

Of the 29 respondents who had injuries, 11 (38 percent) said that they were injured more than once. Those who received additional injuries most frequently injured the neck (five injuries [45 percent]) and the lower back (four injuries [36 percent]); in each of three other categories — the shoulder, the arm/hand and the leg/foot — one injury (9 percent) was recorded. Of the additional injuries (which the respondents considered less serious), one injury was to the same part of the body.

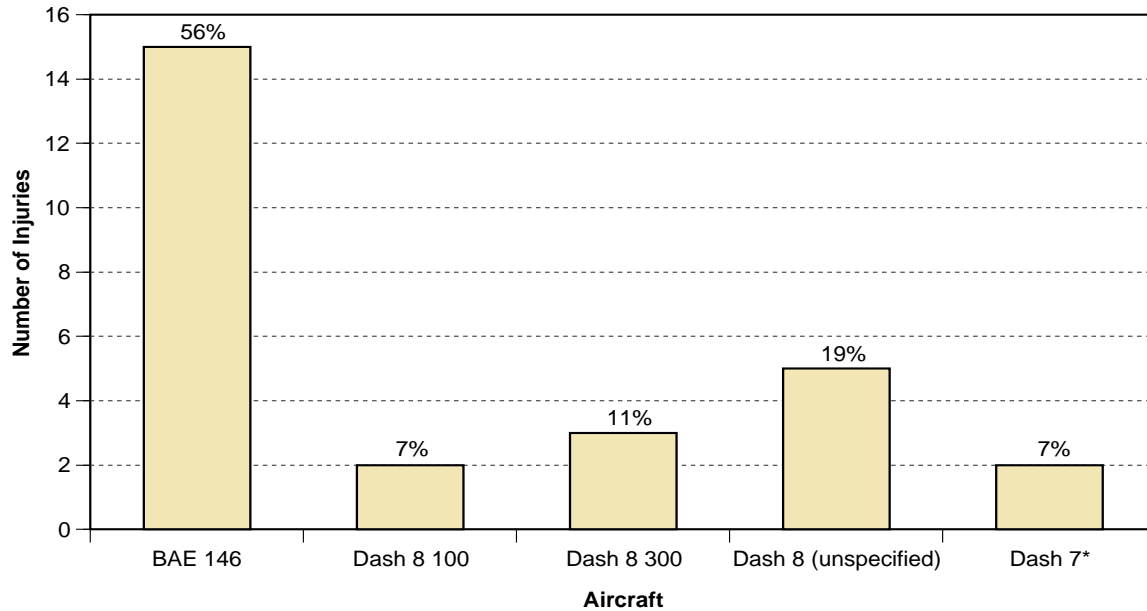
Non-work-related injuries reported by the respondents were a result of motor vehicle accidents (12 injuries), sports accidents (seven injuries), accidents in the home (seven injuries) and other types of accidents related to falling or complications from pregnancy (two injuries). Of these, nine injuries were to parts of the body that also were injured at work.

The factor cited most often for contributing to the primary work-related injury was the overhead bin, cited by 13 of the 29 survey respondents (45 percent). Service trolleys and passenger baggage each were cited by nine respondents (31 percent), turbulence was cited by eight respondents (28 percent), the airstair door was cited by four respondents (14 percent) and other factors were cited by two respondents (7 percent).

More than half of the respondents were working on the BAE 146 when they were injured (Figure 8, page 8).

“Considering that only 20 percent of the scheduled flights are on the [BAE 146], this incident rate would appear to be quite high,” the report said. “Working the [BAE 146] is unique in that there is no sky check (a baggage check-in cart located just outside of the aircraft for last-minute luggage drop-off) available to passengers. This can result in a greater number of passengers bringing luggage on board the aircraft.

Flight Attendant's Aircraft Assignment at Time of Injury



*The Dash 7 is no longer used by the company.

Source: Workers' Compensation Board of British Columbia

Figure 8

“In addition, the full-sized meal trolley is only available for use on the [BAE 146]. On the Dash 8 aircraft, flight attendants often opt to use the service trays in place of the half-sized drink trolley. This may indicate that the stresses involved with working on the [BAE 146] (i.e., service trolley use, as well as the increased chance of lifting passenger baggage into the overhead bin) pose a greater threat to the development of injuries.”

Twenty-two of the 29 respondents provided information about the circumstances involved in their injuries. Of the 22 flight attendants providing this information, 13 (59 percent) said that they were injured in the middle of the shift, five (23 percent) were injured at the beginning of the shift, and four (18 percent) were injured at the end of the shift. (Determinations of what was meant by “middle,” “beginning” and “end” were made by the respondents.)

Eleven of the 22 respondents (50 percent) said that they were injured in the evening, nine (41 percent) were injured in the afternoon, and two (9 percent) were injured in the morning. Four (18 percent) were injured during one-day trips; of those who were injured during three-day trips, eight (36 percent) were injured the first day, six (27 percent) were injured the third day, and four (18 percent) were injured the second day.

“The peaks in injury rates noted for the first and third days ... may be the result of separate phenomena,” the report said. “Often, the flight attendants work long-hour days and

subsequently have three or four consecutive days off (sometimes ... more). The longer time periods away from work may cause the flight attendants to be more awkward on their first day back. This may be one of the problems associated with an increase in injuries associated with this shift. Also, the third day of a block will often present itself as the last of three long shifts in a row, and fatigue may be a greater risk factor involved in this scenario.”

Of the 29 injured flight attendants who responded to the survey, 24 (83 percent) required time off from work to recover. Of the five (17 percent) who did not take time off, three flight attendants experienced “constant problems associated with the injured area (chronic injuries),” the report said.

The time off varied from one day to 180 days, and half of those who took time off were away from work for more than four weeks. The report said that, of those in this category, “42 percent had previous injuries to the same area, [and] 67 percent had moderate job satisfaction.”

The report said that health care professionals suggested that treatment during the six weeks immediately following an injury are critical in preventing the injury from becoming a chronic problem.

“Of those who get better within six weeks ... 70 percent will have at least three recurrences in the following few years,” the report said.

Of 23 respondents who submitted claims to the WCB, 20 claims (87 percent) were accepted, and one additional claim was accepted after an appeal of the initial rejection.

Twenty-eight respondents said that their injuries were examined and/or treated by a health care professional. Of that number, 26 respondents (93 percent) said that they had consulted their family doctor. Seventeen (61 percent) visited physical therapists, 14 (50 percent) visited massage therapists, and 11 (39 percent) visited chiropractors. Acupuncturists, orthopedic surgeons, bone specialists and other health care professionals were consulted by smaller numbers of respondents. Responses did not say which health care professionals provided most of their treatment.

Eighteen respondents said that diagnostic tests were conducted to identify the type and extent of their injuries. Of the 18 respondents, 12 (67 percent) had X-rays, five (28 percent) had ultrasound, two (11 percent) had magnetic resonance imaging (MRI), and one (6 percent) had flexibility tests; two (11 percent) could not remember what type of diagnostic test was conducted.

Twenty-one respondents received a specific diagnosis of the injury; for nine respondents (43 percent), the diagnosis was muscle strain. Other diagnoses included soft tissue injury, bursitis [an inflammation of the bursa, a fluid sac that eases the movement of some joints and muscles], sprain, slipped disc, sciatica [pain in the lower back, buttocks, legs or feet resulting from pressure on nerve roots in the lower back], cracked tailbone, carpal tunnel syndrome, vertebral subluxation [dislocation], bone spur/calcification, and pinched nerve.

Twenty-eight respondents received treatment on a regular basis, the report said. Three respondents (11 percent) received a total of one treatment or two treatments, 12 respondents (43 percent) received one treatment to two treatments per week for an average of 9.4 weeks, 10 respondents (36 percent) received three treatments to four treatments per week for an average of 38.4 weeks, two respondents (7 percent) received five treatments per week for an average of eight weeks, and one respondent (4 percent) received two treatments per month. (Percentages do not total 100 because of rounding.)

“A majority of the respondents only received treatment once or twice a week,” the report said. “In a number of cases, particularly those with ongoing/chronic treatment, ... undertreatment may be a factor in the long program durations.”

Of the 26 respondents who answered questions about their rehabilitation programs, all said that they had done stretching exercises to improve their flexibility. Eighteen respondents (69 percent) also performed strengthening exercises as part of their rehabilitation; smaller numbers participated in cardiovascular training and circuit training [combinations of exercises,

performed for specified periods of time with minimal rest between each exercise, to increase muscular strength, flexibility and/or cardiovascular fitness]. The frequency of the rehabilitation sessions varied from daily sessions to two sessions or three sessions a week; length of each session varied from 10 minutes to 5.5 hours.

“Determination of the specific structure of the program was not possible,” the report said. “It could be assumed, however, that those who participated in their program for more than one hour a day likely had a fairly structured program. Those who exercised for 20 [minutes] to 30 minutes on a daily basis likely had a moderately structured program. ... Those who participated only a few days a week for a short duration of time generally trained their body less than one hour a week. ... General maintenance conditioning requires strength training a minimum of three times a week, and cardiovascular benefits can only be observed after 20 minutes of vigorous activity a minimum of three times a week; [therefore,] it is likely that these flight attendants are becoming deconditioned in their time away from work.”

Of the 23 survey respondents who included comments on their pain and/or discomfort during and after their treatment sessions, 17 respondents (74 percent) said that they felt pain during and after treatment, two respondents (9 percent) felt pain during treatment, and four respondents (17 percent) felt pain after treatment.

Of the 23 respondents who assessed the extent of their recovery on a scale of one to 10 (with one representing “no recovery” and 10 representing “complete recovery”), the average was 5.4, or “partial recovery.” Four respondents (17 percent) scored their recoveries as 8.5 or more; of those, two respondents participated in structured work-conditioning programs that involved cardiovascular training, circuit training and exercises for flexibility and strengthening; a third respondent performed exercises for strengthening and flexibility for four hours a day, and the fourth respondent performed daily exercises for strengthening and flexibility for an unspecified length of time.

“Although it was difficult to determine the content and structure of the individual rehabilitation programs, it would appear that those programs which included more than four hours of conditioning, including flexibility and strength training at the least, were most effective,” the report said. “One individual [who was in treatment when the report was written] is involved in a current treatment program involving hot tub ... and massage equipment within the home environment on a daily basis. The effectiveness of this treatment was ranked [by the individual] as ‘one.’ The motivation for continuing with this apparently ineffective home program was unknown.”

The report said that, because management of work-related injuries varied, “it may be advantageous to develop a management protocol to ensure optimal care.” One suggested protocol included diagnosing the problem to ensure that disease

was not present, providing reassurance and education to the patient, providing pain relief, developing a rehabilitation program, identifying “psychosocial risk factors” of chronic injury and pain, and providing “a constant continuum of care,” including various treatments.

Six flight attendants returned to work in “modified-duties” programs, including four who participated in the airline’s formal “accommodated return-to-work program.” Two of the six performed non-flying duties, three performed non-flying duties and shadowing duties (working with another flight attendant), and one performed only shadowing duties. Those who did not participate in modified-duties programs either were injured before the formal program was established or were away from work for no more than one month.

Three of the four flight attendants in the formal modified-duties program had no difficulty performing the assigned tasks; one flight attendant was uncomfortable when sitting. Two flight attendants who returned to work before the formal program was established also experienced pain/discomfort. Of the three respondents who experienced pain/discomfort after their return to work on a modified-duties program, one respondent said that no changes were made to accommodate special needs. (This was before establishment of the formal program.)

All four respondents in the formal program said that changes were made to accommodate their needs, including being assigned to a Dash 8 instead of a BAE 146, working shorter schedules because of physical “swelling problems,” working four-hour shifts and performing office duties for two months.

The flight attendants who participated in the modified-duties programs assessed the effectiveness of the programs on a scale of one to 10, with 10 being “most effective.” Scores varied from three to 10; the average was 7.3, or “somewhat effective.”

The flight attendants remained in the modified-duties programs from two months to five months; the average was 2.6 months.

Of the 29 survey respondents, 15 (52 percent) experienced a recurrence of injuries after returning to full flying duties. Of the 15 respondents, four (27 percent) experienced problems immediately after their return to work, eight (53 percent) experienced occasional problems or ongoing problems, one (7 percent) experienced a recurrence of the injury one month after returning to work, one experienced a recurrence of the injury two years after returning to work, and one experienced a recurrence of the injury but could not remember when. The 15 did not indicate on the survey whether they required time away from work because of the re-injury.

Thirteen flight attendants surveyed said that work had aggravated non-work-related injuries, but there was no information about whether they were away from work because

of the recurring problem or whether they reported the problems that they experienced after returning to work.

“A high recurrence rate may point to chronic post-injury issues [that] need to be addressed further,” the report said.

In response to a question about what they believed were the most common injuries associated with their work, 71 percent of the 29 survey respondents cited back injuries. Other frequent responses included shoulder injuries; service-trolley-related injuries (no part of the body was specified); neck injuries; feet, leg and knee injuries; turbulence-related injuries (no part of the body was specified); and baggage-handling injuries (no part of the body was specified).

Their most frequent suggestions for minimizing the risk of injury were to improve maintenance on equipment such as service trolleys, doors and drawers (cited by 49 percent of respondents) and to enforce restrictions on carry-on baggage (cited by 42 percent). Other frequent responses included education about identifying injury risks, injury prevention, lifting techniques and related issues; improved communication between pilots and flight attendants about turbulence and/or enforcement of rules suspending service during turbulence; assigning two flight attendants to Dash 8-300 airplanes, and reducing the weight of service trolleys.

The respondents said that management of flight attendant injuries could be improved by requiring employees to recover fully before returning to flight duties; by improving communication between the employer, the injured employee and the insurance agency; by ensuring that employees seek help from appropriate professionals; by providing rehabilitation programs for flight attendants who work while injured and do not seek help; by returning to flight duties part time with a supplemental exercise program; and by being aware of personal limitations and practicing “good body mechanics” when performing work-related tasks.

Survey respondents also said that risk identification and awareness of common injuries should be included in educational material presented to flight attendants. Other suggestions included stretching exercises; information about hygiene, fatigue, nutrition, relaxation and posture; strategies for preventing injuries; and recurrent training on lifting techniques. Most said that the material should be presented in a brochure or a video.

The report said that injury statistics may not reflect the actual injury rates because not all flight attendants report their injuries. Of the 29 injured flight attendants who responded to the survey, two (7 percent) suffered work-related injuries that resulted in time away from work, but neither sought compensation from the WCB. Five flight attendants who were injured (17 percent) did not take time off from work because of the injury; of the five, three were “constantly experiencing problems (chronic injury) associated with the injured anatomy,” the report said.

Report Includes Recommendations for Baggage-handling, Galley Design

The report included recommendations in several areas.

Recommendations for carry-on baggage included the following:

- The 22-pound (10-kilogram) weight limit should be enforced. Carry-on baggage should be weighed at check-in, if possible, and heavy bags should be checked (surrendered for conveyance);
- Passengers who cannot manage their own carry-on baggage should check the baggage;
- Flight attendants should provide minimal assistance with passenger carry-on baggage; and,
- Flight attendants should avoid overhead lifting and shoulder lifting when possible. Baggage should be placed beneath passenger seats if the baggage is too heavy to lift.

Recommendations for the galley included the following:

- Frequently used items should be placed in areas that do not require frequent overhead lifting or frequent bending. Locations of items should be determined with input from flight attendants;
- Sliding drawers should move easily and should be equipped with handles or grips that do not create contact stress on hands and fingers; and,
- Standard human measurements for fingers and hands should be used in designing latch handles and grips.

Recommendations for the service trolley included the following:

- Older, heavier service trolleys should remain in the galley and should be used for service that does not require a moveable service trolley; newer, lightweight service trolleys should be used when service trolleys must be moved through the cabin;
- Maintenance should be improved; and,
- Effort and strain in handling service trolleys might be reduced by using service trolleys with larger wheel diameters and harder wheels to reduce the force required to move the service trolley, with a wider tread to increase the roll-resistance of the wheel, with swivel casters for easier maneuvering, and with bilateral vertical handles on each end of the service trolley for pushing and pulling.

The handle height should be at least 36 inches, compared with the current center-handle height of 20.5 inches (52.1 centimeters).

The report recommended that flight attendant seating be evaluated to ensure adequate shock absorption. The report said that “trauma could be sustained from lack of shock absorption in the seating or from the combined presence of whole-body vibration and its effect on soft tissue.”

Recommendations for education and training included the following:

- Training on risk-reduction should begin with hiring and should be updated annually;
- Injuries to the back, neck and shoulder that do not involve turbulence should be assessed for cause, and appropriate modifications should be made, perhaps by the training department;
- Risks associated with the heights of some individuals should be described to prospective flight attendants to ensure that they are aware of the increased risk of shoulder injuries for short flight attendants and the increased risk of lower back injuries for taller flight attendants;
- Training should include injury-reporting protocol; and,
- The occupational health program and the modified-duties return-to-work program should be readily available, and flight attendants should be informed about the return-to-work process.

Other recommendations included the following:

- Flight crew should inform flight attendants as early as possible of expected turbulence;
- Turbulence procedures should be enforced. The report said, “Safety of flight attendants is foremost over passenger service, but many flight attendants were observed still moving about the cabin during turbulent conditions”;
- Handholds throughout the cabin could provide flight attendants with a “handy grip in trying to avoid bumping or falling into passengers”;
- Fitness/lifestyle programs should be considered for all crewmembers. Informal interviews with flight attendants revealed that those who participated in regular fitness routines that emphasized upper-body strength were less fatigued, less likely to be injured and more likely to perform their jobs easily; and,

- Regular equipment maintenance should be performed to reduce the need for flight attendants to exert excessive forces to move equipment.♦

Notes

1. AirBC is a former Air Canada regional airline that merged with other Air Canada regional airlines in March 2002 to form Air Canada Jazz.
2. Other air carriers were invited to provide injury statistics for inclusion in the study, and all but one declined. That carrier — described as a short-haul carrier based in Ontario, Canada, but not identified by name — provided data that showed that the injury rate per 100 flight attendants per year was 16.8 percent and that the musculoskeletal injury rate was 9.4 percent per 100 flight attendants. The value was based on data from January 1998 through August 1998.

[FSF editorial note: This article, except where specifically noted, is based on *Musculoskeletal Injury Prevention Project: Report on the Flight Attendant Group*, 1150-20 A 1997, prepared for the Workers' Compensation Board of British Columbia [Canada]. The report was written by Anne Logie, Lisa VanDerDoe and Andrea Ryan of AirBC. The 82-page report contains appendixes and figures.]

Further Reading From FSF Publications

FSF Editorial Staff. "Strategies Target Turbulence-related Injuries to Flight Attendants and Passengers." *Cabin Crew Safety* Volume 36 (January–February 2001).

FSF Editorial Staff. "Working in, Around Aircraft Cabins Requires Awareness of Fall Prevention." *Cabin Crew Safety* Volume 35 (January–February 2000).

FSF Editorial Staff. "Increased Amount and Types of Carry-on Baggage Bring New Industry Responses." *Cabin Crew Safety* Volume 32 (November–December 1997).

Coleman, Patricia J. "Turbulence-related Injuries Pose Continued Risk to Passengers and Cabin Crew." *Cabin Crew Safety* Volume 29 (May–June 1994).

Livingston, Ralph D. "Aviation Safety Programs Should Boost Occupational Safety Awareness in the Cabin." *Cabin Crew Safety* Volume 27 (July–August 1992).

Elliott, Jeanne M. "Carpal Tunnel Syndrome: A Menace to Health." *Cabin Crew Safety* Volume 26 (November–December 1991).

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