FlightGlobal

AIRLINE SAFETY & LOSSES

ANNUAL REVIEW

2018

2018 among safest despite rise in fatalities

A rise in the number of passenger and crew fatalities made 2018 disappointing in comparison with the previous year – though 2017 was exceptionally safe.

Flight Ascend Consultancy analysis shows a total of 515 passengers and crew were killed in 10 airline accidents[1] during 2018, including 482 revenue passengers. Where there was a similar number of fatal accidents to the nine recorded in 2017, only 39 passengers and crew died in these crashes. Only five revenue passengers were killed that year.

The number of passengers and crew fatalities last year was the highest since 2014, when the figure was 588. But while it is worse than the current decade's average of about 400 per annum, it is well below the previous decade's average of nearly 800.

With so few accidents but the potential for a large number of fatalities in a single one, it does not make sense to try to draw conclusions – positive or negative – from a single year. The long-term trend is still for ever-improving safety. Nowadays, some nine or 10 fatal accidents might be expected each year worldwide, and the number of fatal accidents in 2018 is in line with this trend. Unfortunately, unlike in 2017, some of the accidents in 2018 resulted in a high loss of life.

Putting the number of accidents within the context of total flights undertaken serves to further illustrate the improved safety record of the industry. Preliminary figures show the overall fatal accident rate in 2018 as one per 4.55 million flights. On this basis, 2018 was the third-safest year ever – only surpassed in 2015, when there were eight fatal accidents, giving a fatal accident rate that year of one per 4.9 million flights, and in 2017, when the fatal accident rate was one per 4.83 million flights.

However, from passengers' point of view, 2018 was only the fifth-safest year, as there was a lower passenger fatality rate in four of the last five years. With 482 revenue passenger fatalities in 2018, the accident rate worsened to one passenger fatality per 9.7 million carried. This was worse than the five-year average passenger fatality rate of one per 15 million passengers carried and the long-term trend, which is currently one per 18 million passengers carried.

On average, from the point of view of passengers, these statistics suggest that the airline industry as a whole is now about three times safer than it was as recently as 10 years ago; and 10 times safer than 20 years ago.

[1] The accident statistics in this report are for commercially operated jet or turboprop powered airliners or commuters of more than 14 passengers or their cargo equivalent and exclude operations by piston engine aircraft, helicopters or smaller jet or turboprop aircraft. Therefore, the fatal accident to the Ju-Air Junkers Ju52/3m HB-HOT that crashed on August 4, 2018, killing all on board, 3 crew and 17 passengers, is excluded.

Insurance – All-Risk[2]

From the point of view of insurers' nothing much happened in 2018. There were no 'catastrophes' in insurance terms and, as far as is known, only one airline all-risk loss incurred during the year is expected to exceed $100.0 million. Only three all-risk losses in 2018 are believed to have individually exceeded $50.0 million.

Nevertheless, it was certainly not a good year for insurers. The continuing erosion in premium income may, at last, have stopped and rates may now be increasing but the cost of the known incurred claims still exceeded the whole of the written net premium income for the year.

Catastrophes and other headline grabbing accidents are fortunately now rare but the steady rain of minor or attritional losses, slips and falls, scalds from hot coffee, lost luggage and so on, continues and, in many years, is now thought to account for at least 50% of the total cost of incurred losses.

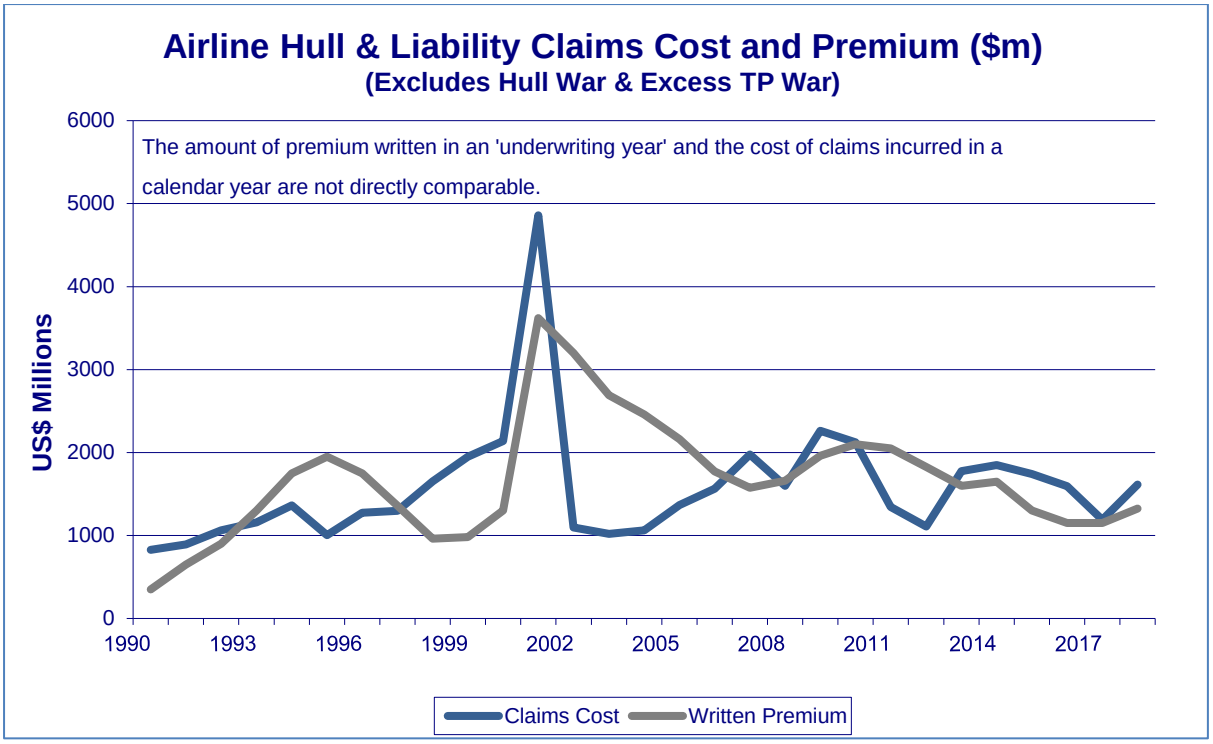
We currently estimate that the cost of incurred airline hull and legal liability losses for 2018 is about $1,600 million. This is some $400 million more than the estimated cost of claims in 2017. This should not be considered exceptional, 2018 might better be thought of as a typical year.

It is thought that, in 2018, airline insurance rates, overall, increased by something between 5 and 10% with written net premium increasing by perhaps as much as 15%. We estimate that airline net written premium in 2018 increased by about $175 million to a total of $1,325 million but incurred claims in the year still exceeded this by about $300 million. 2018 is now the sixth year running where claims have exceeded premiums.

Airline 'All-Risk' Hull & Liability Claims Costs and Written Premium 2009 – 2018 (US$ Millions)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Written Premium	1,960	2,100	2,050	1,825	1,600	1,650	1,300	1,150	1,150	1,325
Hull Cost	858	1,262	729	457	777	514	692	774	509	762
Liability Cost	930	361	88	102	422	734	425	172	7	153
Minor Liability	475	500	525	550	575	600	625	650	675	700
Total Cost	2,263	2,123	1,342	1,109	1,774	1,848	1,742	1,596	1,191	1,615

[2] At the time of writing, it is still not known whether the disappearance of the Malaysia Boeing 777, MH370, in March 2014 will be confirmed as a war or an all-risk loss. Currently, for the sake of these statistics, we are treating the loss itself as an accident. However, we understand that the hull claim is currently being met, 50/50, by the all-risk and war-risk markets and this is reflected in our cost of hull claims numbers. The claim is due to go to arbitration in March 2019.



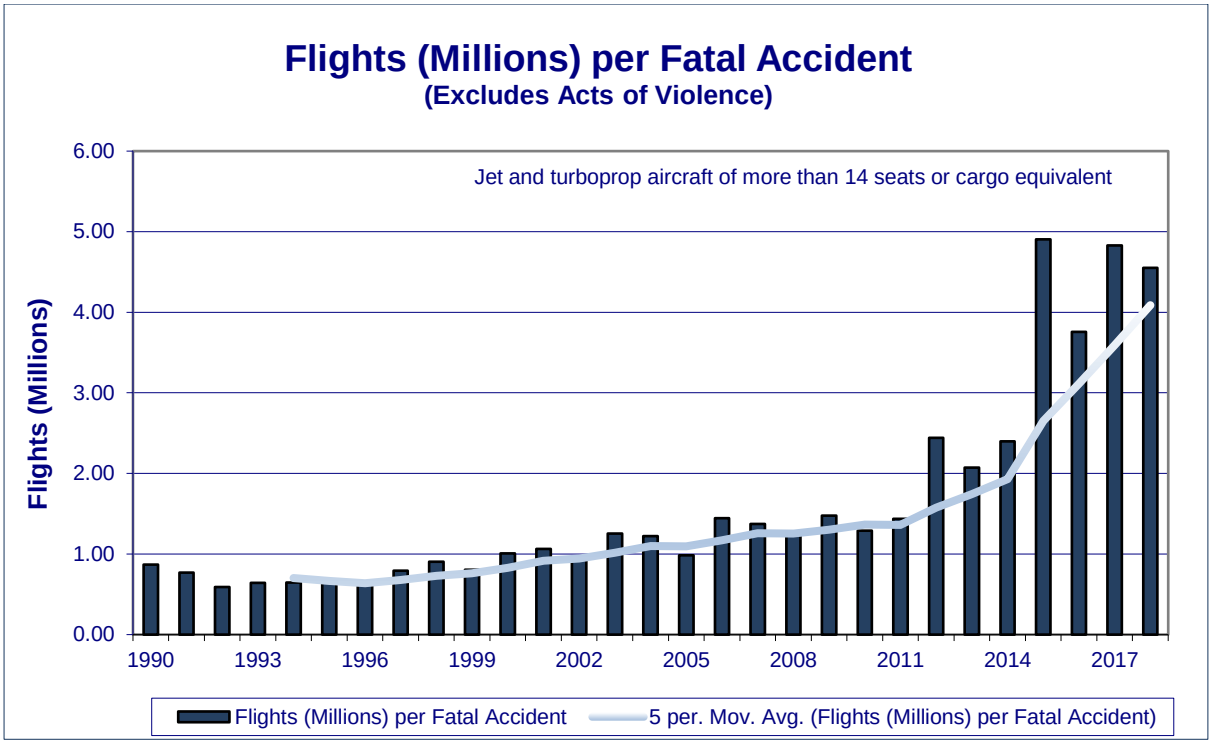
Accidents (Airline Operations)

Depending on what metric is used, 2018 was, perhaps surprisingly given the number of high profile fatal accidents during the year, still one of the safest years ever with a global fatal accident rate of one per 4.55 million flights. On this basis, only two other years have been safer, 2015 when the fatal accident rate was one per 4.9 million flights and 2017 when the rate was one per 4.83 million. The fatal accident rate for 2016 was one per 3.76 million flights and the five-year moving average to the end of 2018 was just over one per 4.0 million flights.

Although some years have been better than others, the fatal accident rate has been improving for very many years with the rate of improvement having markedly increased in recent years. At the start of the 1990s, the rate was about one per 0.6 or 0.7 million flights. Therefore, based on this metric, airline operations are now some five or six times safer than they were 25 years ago.

The five worst accidents in 2018 were

1) The Lion Air Boeing 737 Max (PK-LQP) that crashed into the sea off Jakarta, Indonesia on October 29 killing the seven crew and 181 passengers on board.
2) The Global Air, Mexico Boeing 737-200Adv (XA-UHZ) on May 18 that crashed on take-off from Havana, Cuba, killing all six crew and 106 of the 107 passengers on board. The aircraft was operating a service on behalf of Cubana.
3) The Saratov Airlines Antonov AN-148 (RA-61704) on 11 February that crashed shortly after take-off from Domodedovo Airport, Moscow, Russia killing the six crew and 65 passengers on board.
4) The Iran Aseman Airlines ATR 72 (EP-ATS) that flew into high ground on February 18 during the descent into Yasouj, Iran, killing the four crew and 62 passengers on board.
5) The US-Bangla Airlines DHC Dash 8-400 (S2-AGU) that crashed while attempting to land at Kathmandu, Nepal killing all four crew and 47 of the 67 passengers on board.



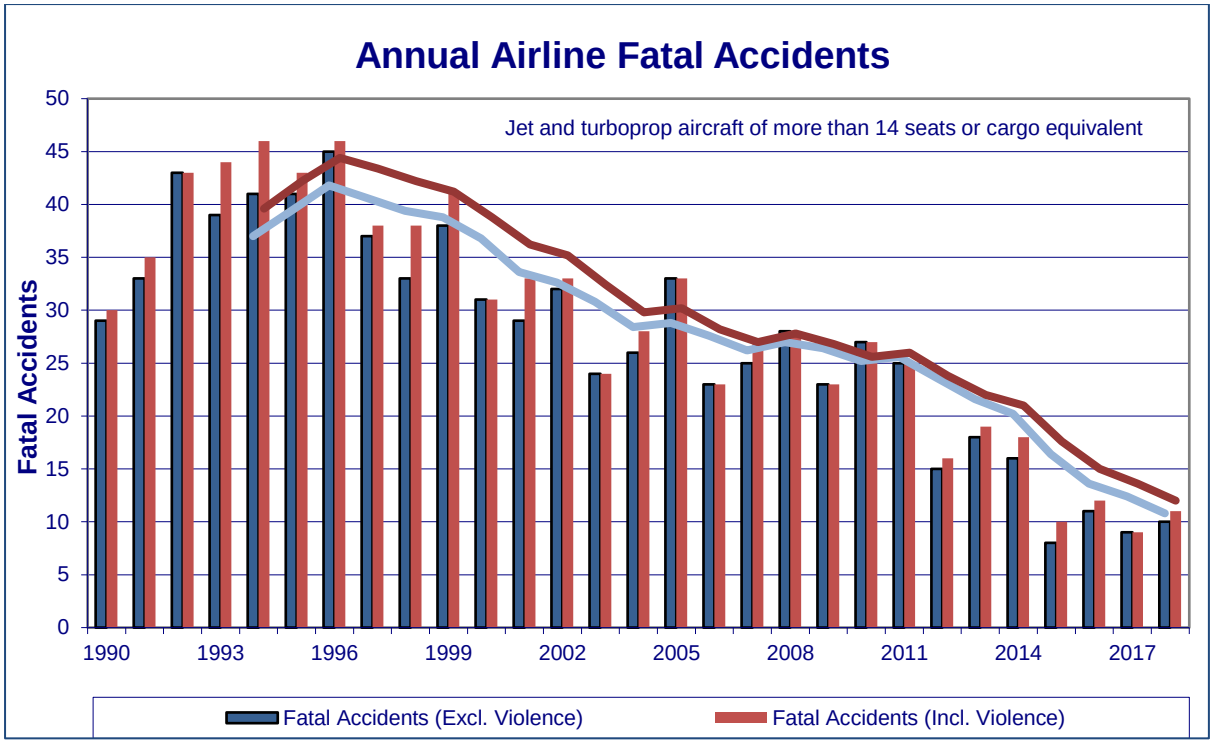
The number of fatal accidents in 2018, at ten, was generally in line with recent years, being one more than in 2017 but one less than in 2016. There were eight fatal accidents in 2015 but 16 fatal in 2014. In 2010, there were 27 fatal accidents. Almost all, nine out of ten, of the 2018 accidents happened on a revenue passenger flights.

The average annual number of fatal accidents for the current decade is now 15.4, mainly reflecting the poor results in the early years of the period. The annual average for the period 2000 - 2009 was 27.4 while the 1990s average was 37.9. The annual averages for the 1980s and 1970s were 33.1 and 40.0 respectively. The annual number of fatal accidents has fallen even more markedly in the last few years and, typically, is now perhaps about only 30 percent of what it was earlier in the decade.

Annual Fatal Accidents (jet and turboprop aircraft) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018[3]**
Fatal Accidents	23	27	25	15	18	16	8	11	9	10

Fatal Accidents (jet and turboprop aircraft) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	40.0	33.1	37.9	27.4	15.4

[3] The statistics in this report are for Jet and Turboprop airliners and therefore exclude the fatal accident to the Ju-Air Junkers Ju52/3m HB-HOT that crashed on 4 August 2018 killing all on board, 3 crew and 17 passengers.



The number of passenger and crew fatalities last year, 515, was the worst result since 2014 when there were 667 fatalities. This was disappointing after 2017 when there were only 39 fatalities but 2017 could be seen as a fluke year. In 2016, 291 passengers and crew died in accidents. In 2015, 158 people were killed. However, with so few fatal accidents and fatalities in any one year, annual numbers, by themselves, have little meaning.

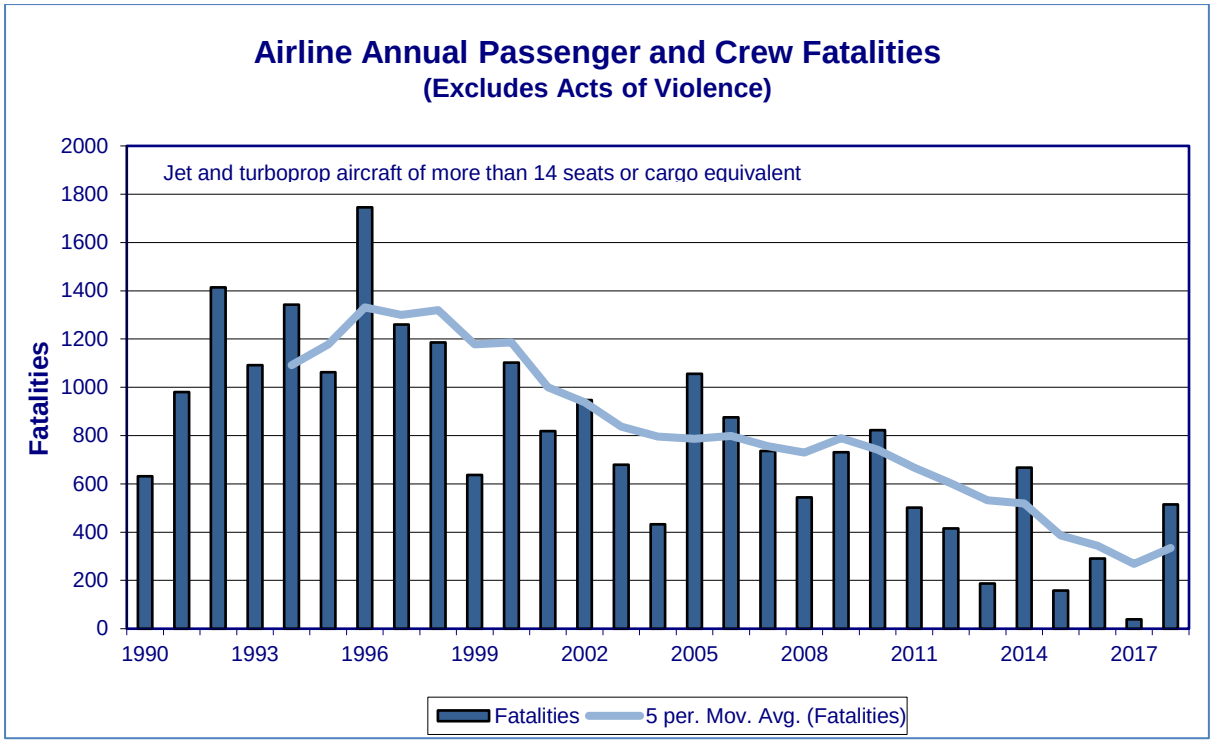
On average, over the last five years, there have been some 334 fatalities per year compared to perhaps 800 a year ten years ago and maybe 1,200 per year 20 years ago. However, with generally so few fatalities in airline operations nowadays, one “bad” accident can make all the difference to the result.

The annual average number of fatalities for the period 2010 – 2018 was 400 for 2000 - 2009 793 and that for the 1990s was 1,135.

Annual Passenger & Crew Fatalities (jet and turboprop aircraft) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatalities	731	822	502	416	188	667	158	291	39	515

Passenger & Crew Fatalities (jet and turboprop aircraft) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	1467.4	1072.2	1135.0	792.5	399.8

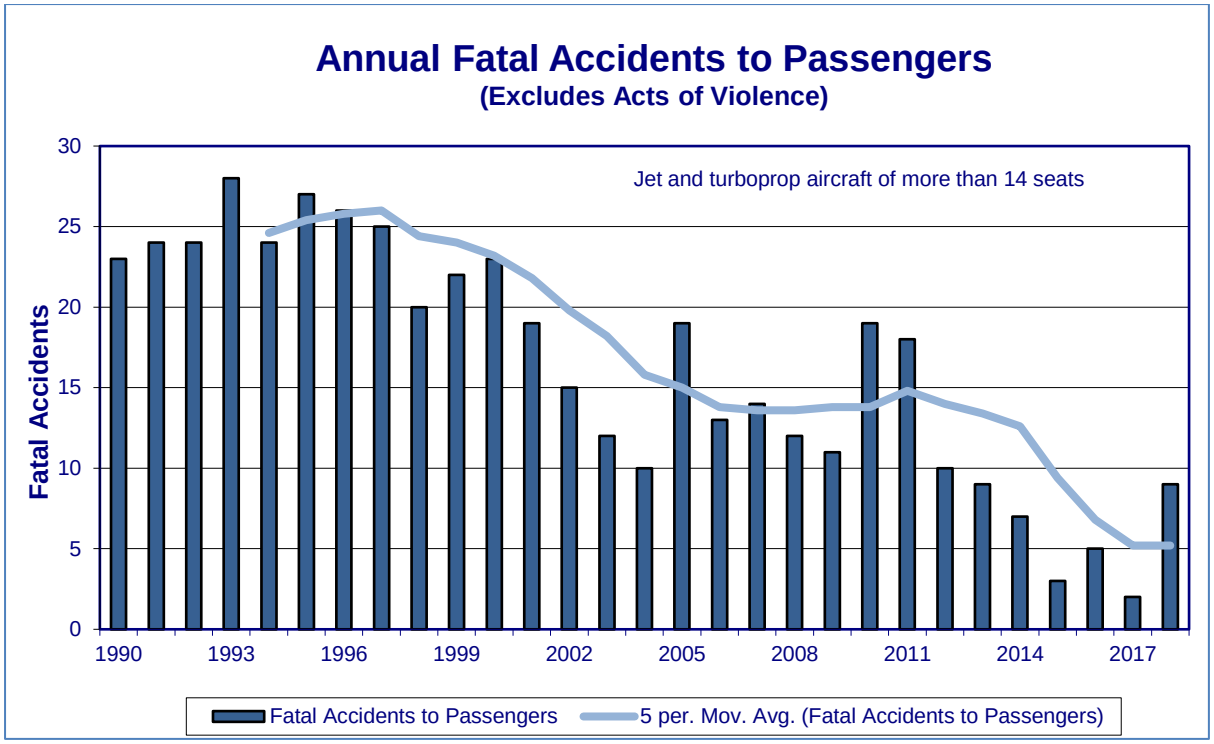
To put these improvements into perspective, if the current decade’s annual average is maintained, almost 4,000 fewer passengers and crew will be killed in airline accidents during the period 2010 - 2019 than in the previous decade and almost 8,000 fewer than during the 1990s.



On a more restrictive basis, the nine fatal accidents involving passenger deaths on revenue passenger flights in 2018 was the worst result since 2013 when there were also nine such accidents. There were only two accidents with revenue passenger fatalities in 2017. There were five fatal accidents in 2016, three in 2015 and 7 in 2014. However, there were 18 such accidents in 2011 and 19 in 2010 so the annual average so far for this decade is still 9.1. The annual average for the decade 2000 - 2009 was 14.7. The annual average number of fatal accidents involving revenue passengers for the 1990s was 24.3, which was almost the same as for the 1980s, 24.6 and only slightly better than the 1970s.

Annual Fatal Accidents to Passengers (jet and turboprop aircraft) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents	10	19	18	10	9	7	3	5	2	9

Fatal Accidents to Passengers (Jet and turboprop aircraft) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	28.8	24.6	24.3	14.7	9.1



The nine fatal accidents in 2018 resulted in 482 revenue passenger deaths (there were just five passenger fatalities in 2017). This was the highest number of passengers killed since 2014 when 588 passengers were killed. There were 96 passenger fatalities in 2015.

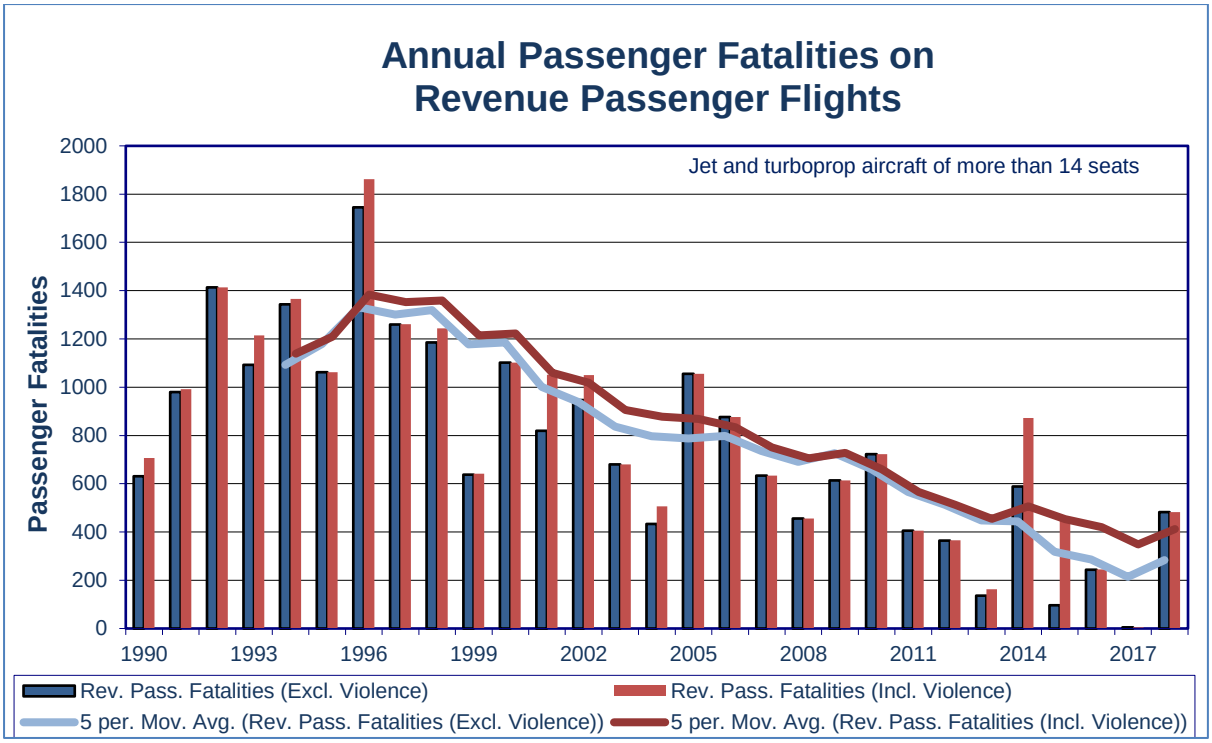
The annual average number of passenger fatalities so far this decade is now 338.1, less than half the average for the previous decade, which was 680.4, and very considerably less than the average for the 1990s, which was 962.0.

Annual Passenger Fatalities on Revenue Passenger Flights (jet and turboprop aircraft) – 2009 - 2018

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities	614	722	406	364	136	588	96	244	5	482

Passenger Fatalities on Revenue Passenger Flights (jet and turboprop aircraft) – Decade Averages

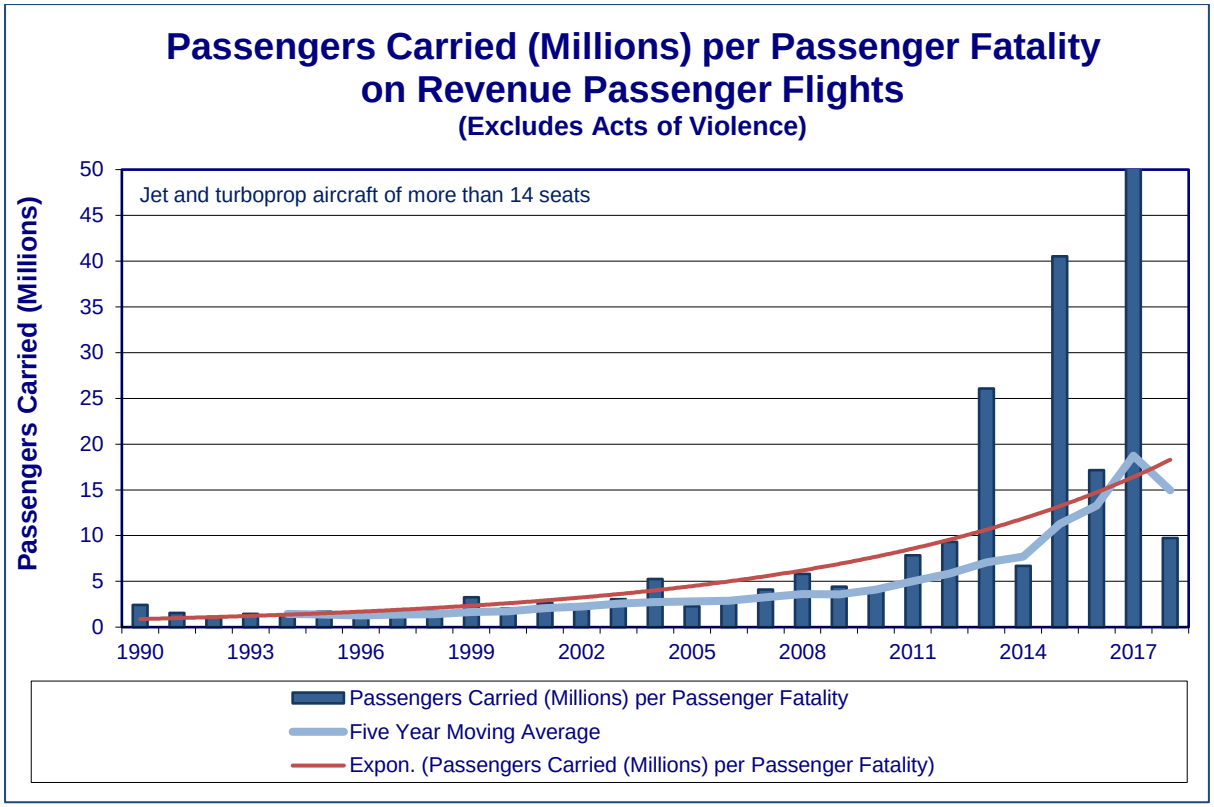
Period	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2018
Annual Average	1289.3	945.0	962.0	680.4	338.1



A total of 482 revenue passengers were killed in 2018 giving an estimated passenger fatality rate for the year of one per 9.7 million passengers carried. However, with so few fatal accidents and fatalities in any one year nowadays, annual numbers are of little value and a better guide would be the five-year moving average. The passenger fatality rate for the five years to the end of 2018 was one per 15 million carried.

On average, from the point of view of passengers, the airline industry as a whole, over the last five years was almost five times safer than it was as recently as ten years ago and more than 10 times safer than 20 years ago.

As noted earlier, despite the relatively poor result for 2018, the rate of improvement in safety seems to have accelerated in the last few years with the average fatality rate now being markedly better than any year before 2013. The passenger fatality rate for the previous decade (2000 - 2009) was one per 3.1 million and for the 1990s only one per 1.6 million.



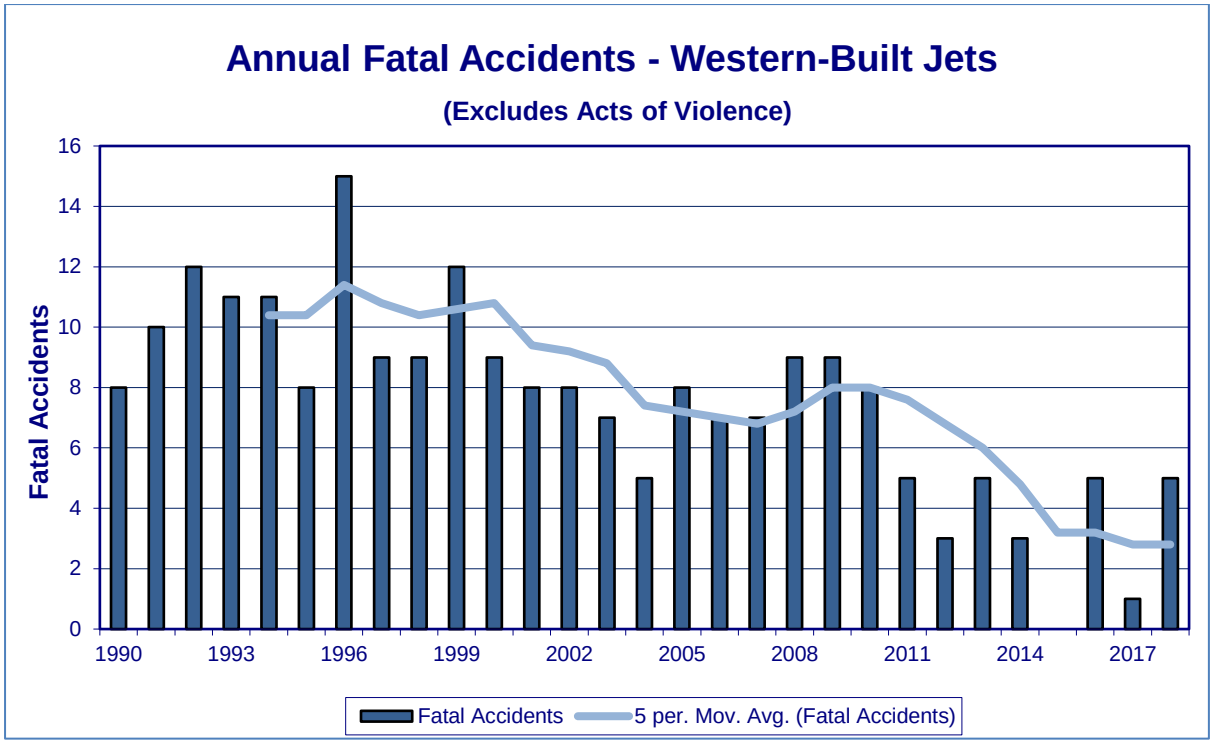
Western-Built Jets

During 2018, western-built jets, which carry more than 90% of the world's traffic, suffered five fatal accidents. This is a considerable worse than in 2017 when there was only one such accident. The class also suffered five accidents in 2016.

The annual average number of fatal accidents for the current decade is now 3.9. The annual average for the previous decade was 7.7 and that for the 1990s, 10.5.

Annual Fatal Accidents (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents	9	8	5	3	5	3	0	5	1	5

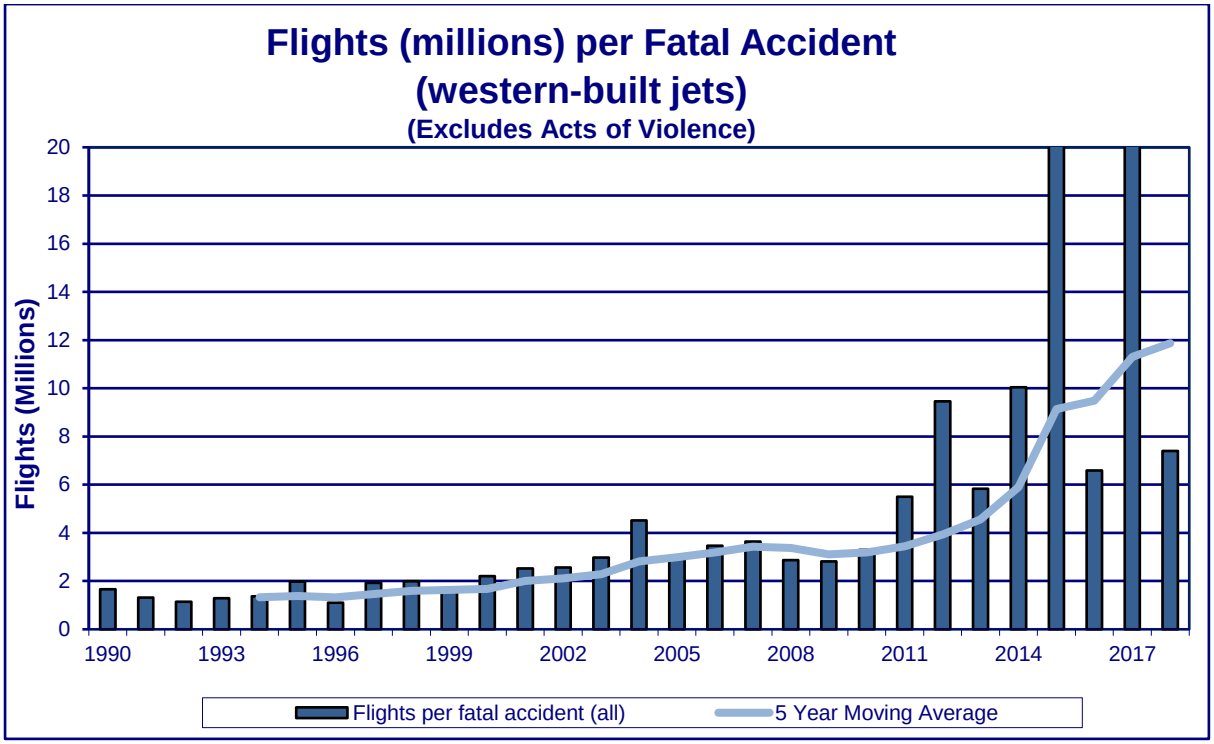
Fatal Accidents (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	12.1	10.5	10.5	7.7	3.9



Western-built jets made some 37 million flights in 2018 and suffered five fatal accidents giving a simple accident rate of one fatal accident per 7.4 million flights. This is considerably worse than in 2017 but with so few fatal accidents being suffered by this class of aircraft, annual statistics are no longer very useful. The overall fatal accident rate for the last five years for this class of aircraft stands at about one per 12 million flights.

The fatal accident rate for the current decade is one per 7.3 million flights. On this basis worldwide western-built jet operations are now more than twice as safe as they were 10 years ago, about five times safer than in the 1990s, seven times safer than in the 1980s and more than 10 times safer than in the 1970s.

Fatal Accident Rate (western-built jets)					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Flights (millions) per Fatal Accident	0.67	1.05	1.49	3.0	7.3



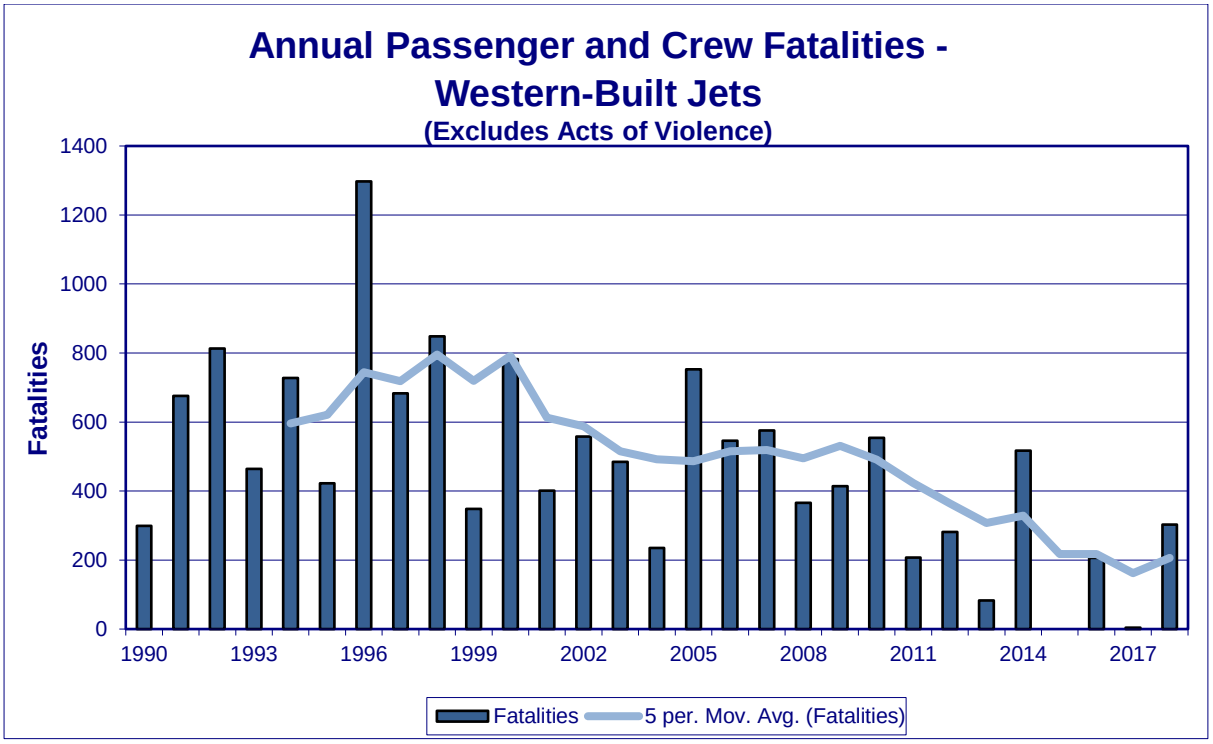
The annual average for passenger and crew fatalities, so far, for the current decade (2010 - 2018) is 244.3, that for the previous decade was 511.6 and the average for the 1990s was 657.8.

Annual Passenger & Crew Fatalities (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatalities	414	554	207	281	83	517	0	206	4	303

Passenger & Crew Fatalities (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	761.5	587.0	657.8	511.6	244.3

Average Passenger & Crew Fatalities per Fatal Accident (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Average Fatalities	46.0	69.3	41.4	93.7	16.6	172.3	-	41.4	4	60.6

Passenger & Crew Fatalities per Fatal Accident (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Average Fatalities	62.9	55.9	62.6	66.5	62.6

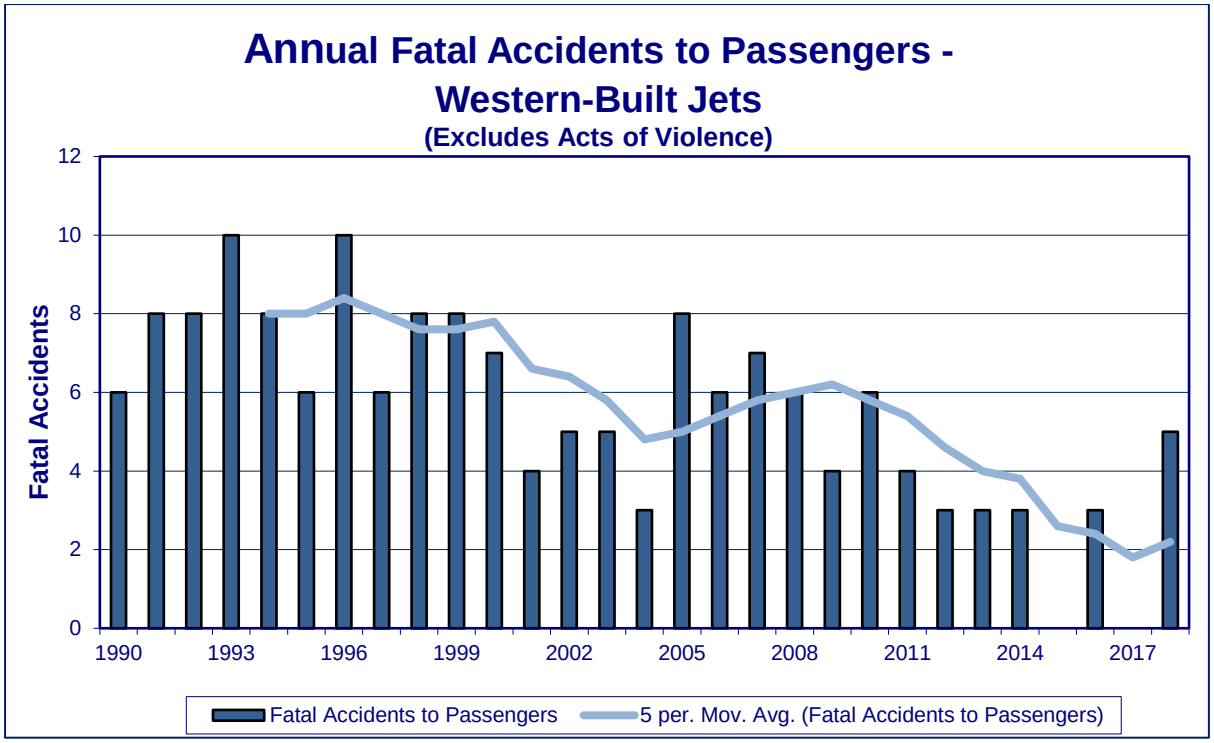


There were five fatal accidents in 2018 involving passenger fatalities on revenue passenger flights operated by western-built jets. However, three of these accidents resulted in only one passenger fatality each. There were no fatal accidents in 2017, three in 2016, none in 2015 and three in 2014. The five fatal accidents in 2018 gave rise to 290 passenger fatalities. In 2017, with no fatal accidents there were, of course, no fatalities. There were 493 passenger fatalities in 2016.

Annual Fatal Accidents to Passengers (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents	4	6	4	3	3	3	0	3	0	5

Fatal Accidents to Passengers (Western-Built Jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	9.1	8.5	7.8	5.5	3.0

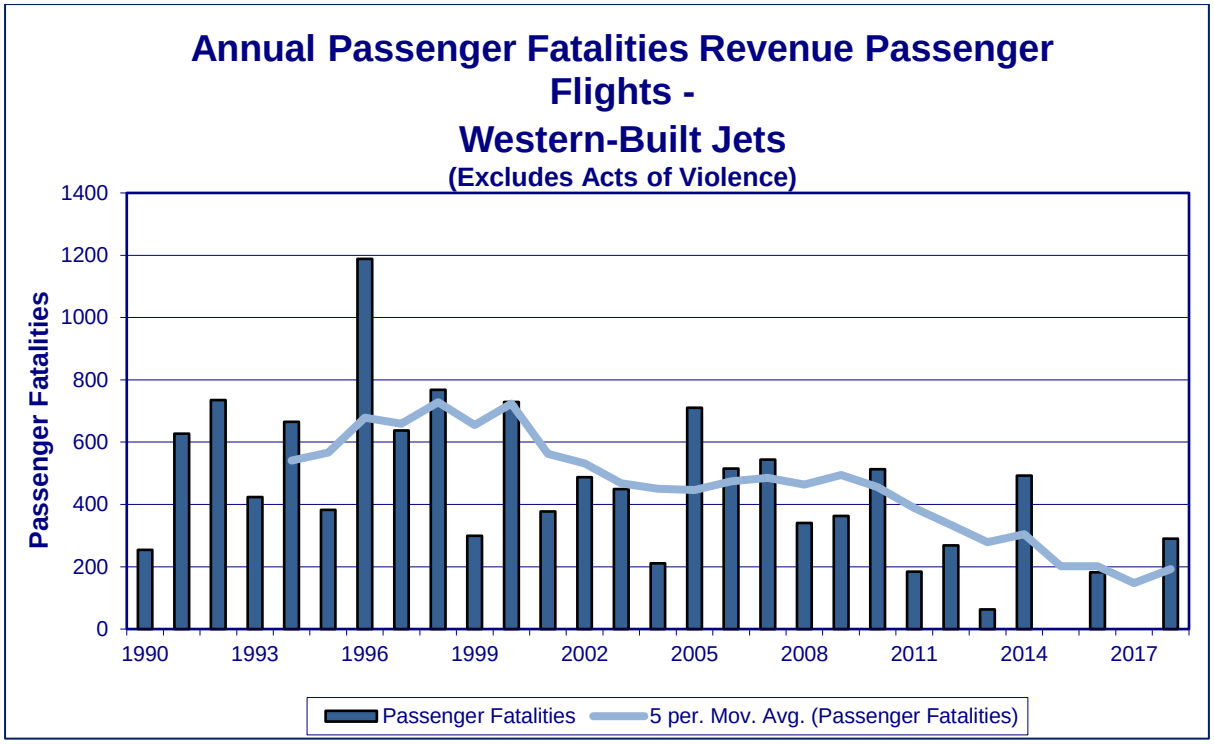
The average annual number of fatal accidents (to passengers) so far this decade is 3.0, almost 50% down on the last decade's average of 5.5 and considerably better than that for the 1990s of 7.8.



The annual average number for passenger fatalities for the current decade so far is 221.6, less than half of that for the previous decade, 472.6. The annual average for the 1990s was 598.

Annual Passenger Fatalities on Revenue Passenger Flights (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatalities	363	513	184	269	63	493	0	182	0	290

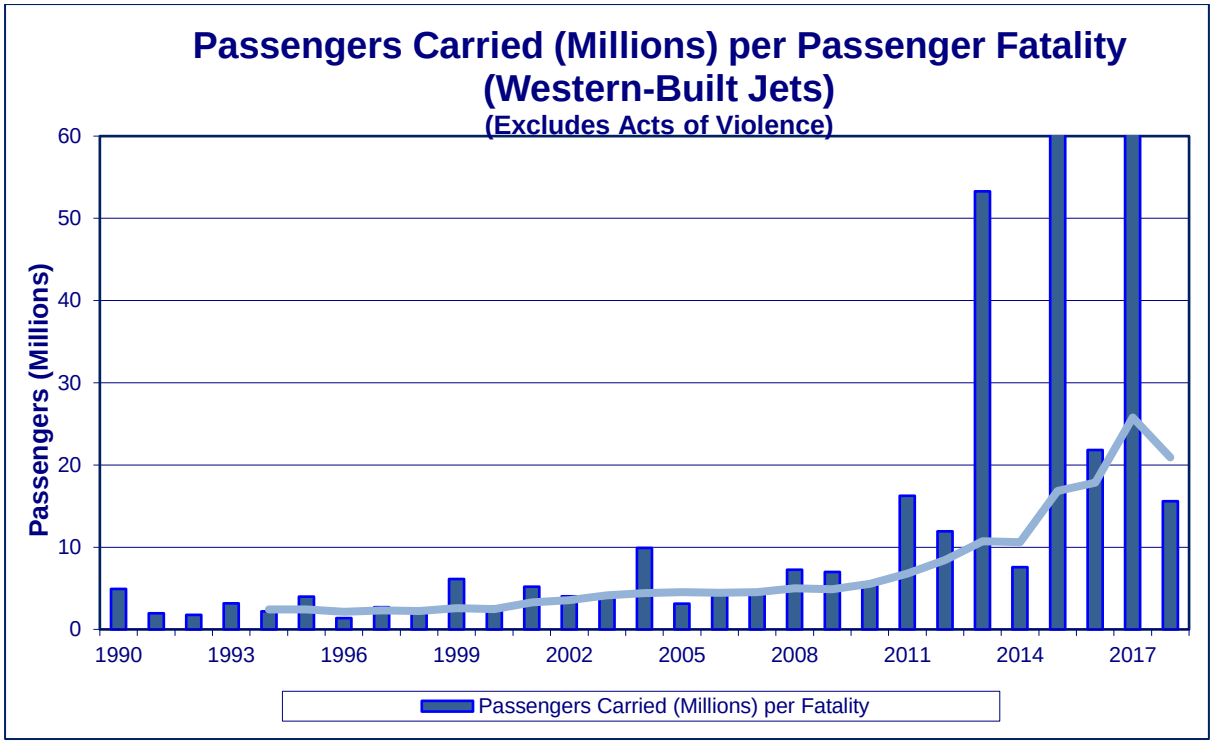
Passenger Fatalities on Revenue Passenger Flights (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	695.3	539.6	598.0	472.6	221.6



An estimated 4.5 billion passengers were carried on western-built jets in 2018. During the year, the class suffered five accidents where revenue passengers were killed. A total of 290 passengers were killed in these accidents. This was a disappointing result after 2017 and other recent years. However, it was still good compared to previous decades. The fatal accident rate in 2018 was one per 15.6 passengers carried. The passenger fatality rate for the last five years is one per 20.9 million carried.

The passenger fatality rate for the current decade so far is one per 16.3 million passengers carried while that for the period 2000-2009 was one per 4.8 million and for the 1990s, one per 2.5 million. This suggests that, as far as accidents are concerned, passengers on western-built jet flights are now more than three times safer than in the 2000s more than seven times safer than during the 1990s and some 18 times safer than in the 1970s.

Passenger Fatality Rate (western-built jets)					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Passengers Carried (Millions) per Passenger Fatality	1.05	2.0	2.5	4.8	16.3

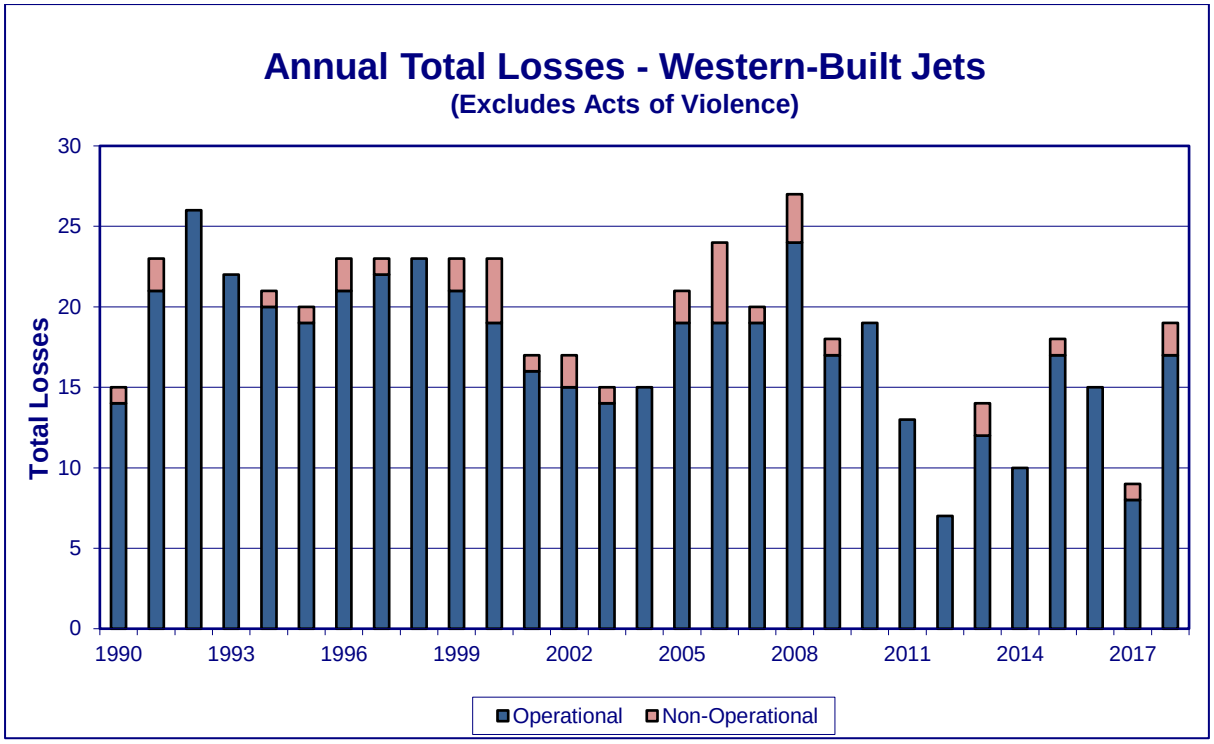


At the time of writing, western-built jets had suffered 17 confirmed operational all-risk insurance total losses during 2018. This is nine more than in 2017 when there were only eight known operational total losses. In these terms, 2018 was a poor year, more akin to previous decades than to this one.

The average annual number of operational total losses for the current decade is 13.1, increasing to 13.8 if non-operational losses are also included. For the previous decade, it was 17.7 (19.7 including non-operational losses) and for the 1990s, 20.9 (21.9).

Annual All-Risk Total Losses (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Operational	17	19	13	7	12	10	17	15	8	17
Non-Operational	1	0	0	0	2	0	1	0	1	2
All	18	19	13	7	14	10	18	15	9	19

All-Risk Total Losses (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average Operational	17.6	16.5	20.9	17.7	13.1
Annual Average All	18.1	17.4	21.9	19.7	13.8



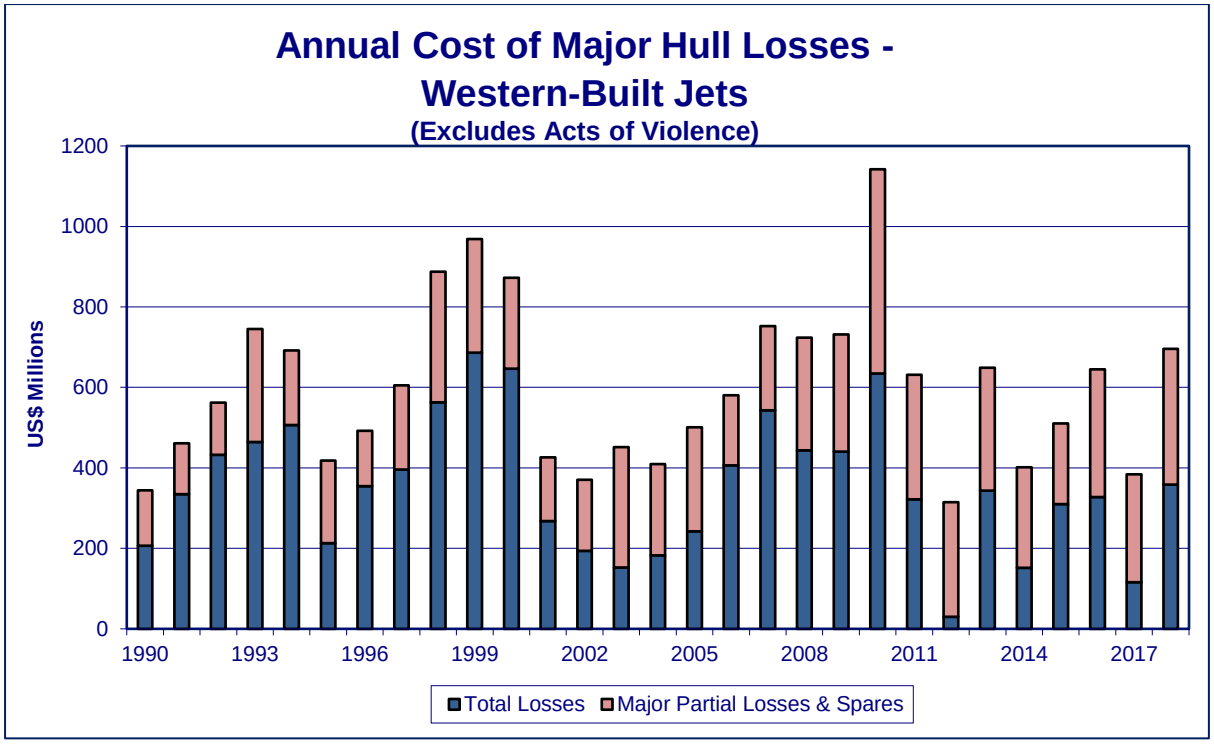
The estimated cost of major hull claims (total losses and major partial losses) in 2018 is provisionally estimated at $696 million. This is the worst result since 2010 when losses totaled $1,142 million. The cost of major hull claims in 2017 was $385 million.

The result for 2018 also compares poorly to the annual average for the current decade of $579 million. The annual average for the previous decade was $580.7 million and for the 1990s, $617.7 million.

Annual Cost of Major Hull Claims $m (western-built jets) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total Losses	440	635	322	30	344	152	310	328	116	359
Major Partial	291	357	223	275	305	227	201	318	269	337
Spares*	0	150	86	10	0	23	0	0	0	0
Total	731	1,142	631	315	649	402	511	646	385	696

* Spares – significant losses falling on the airline's hull policy only.

Cost of Major Hull Losses $m (western-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average Total Losses	121.0	194.2	415.6	351.6	288.4
Annual Average Major Partial	31.1	92.6	202.1	227.6	279.1
All (including spares)	152.1	286.8	617.7	580.7	597.4



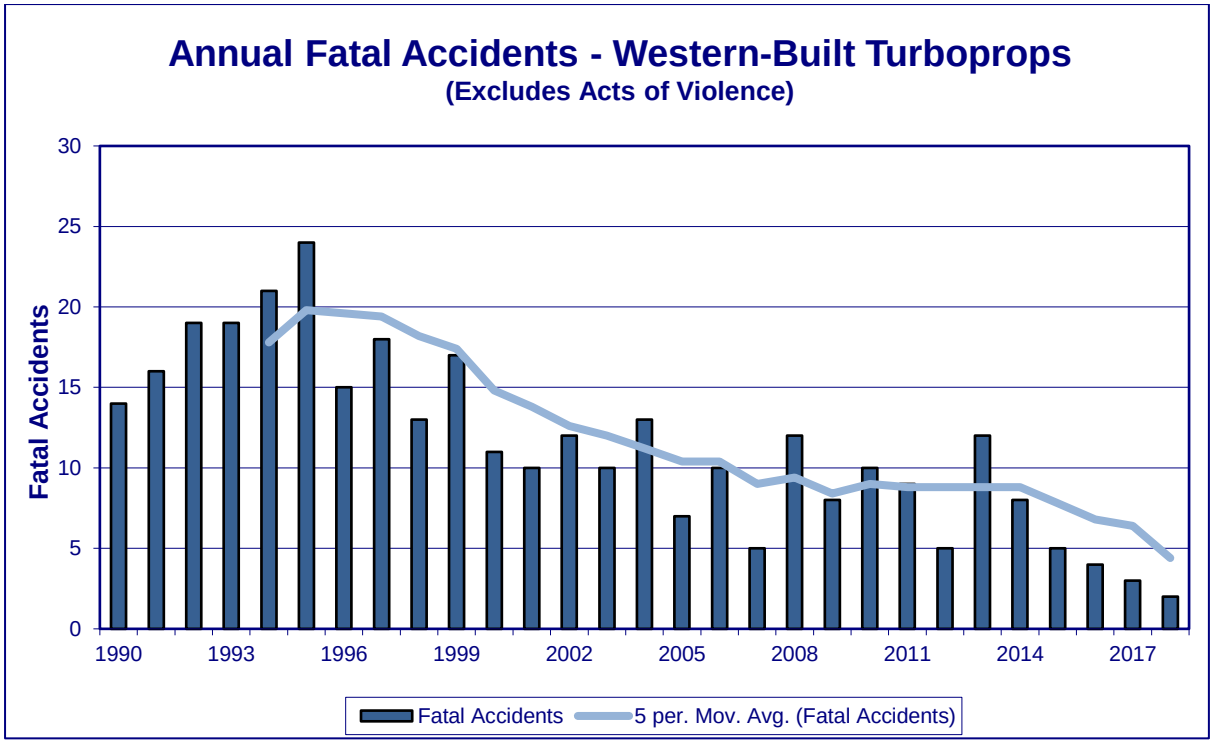
Western-Built Turboprops

During 2018, western-built turboprops (of more than 14 passenger seats or cargo equivalent) suffered two fatal accidents resulting in 117 passenger and crew deaths. This is the lowest number of fatal accidents suffered by the class in any year for more than 60 years and one less than in 2017. Unfortunately, both of the fatal accidents in 2018 resulted in a high number of passenger and crew deaths so the number of fatalities in the year was more typical.

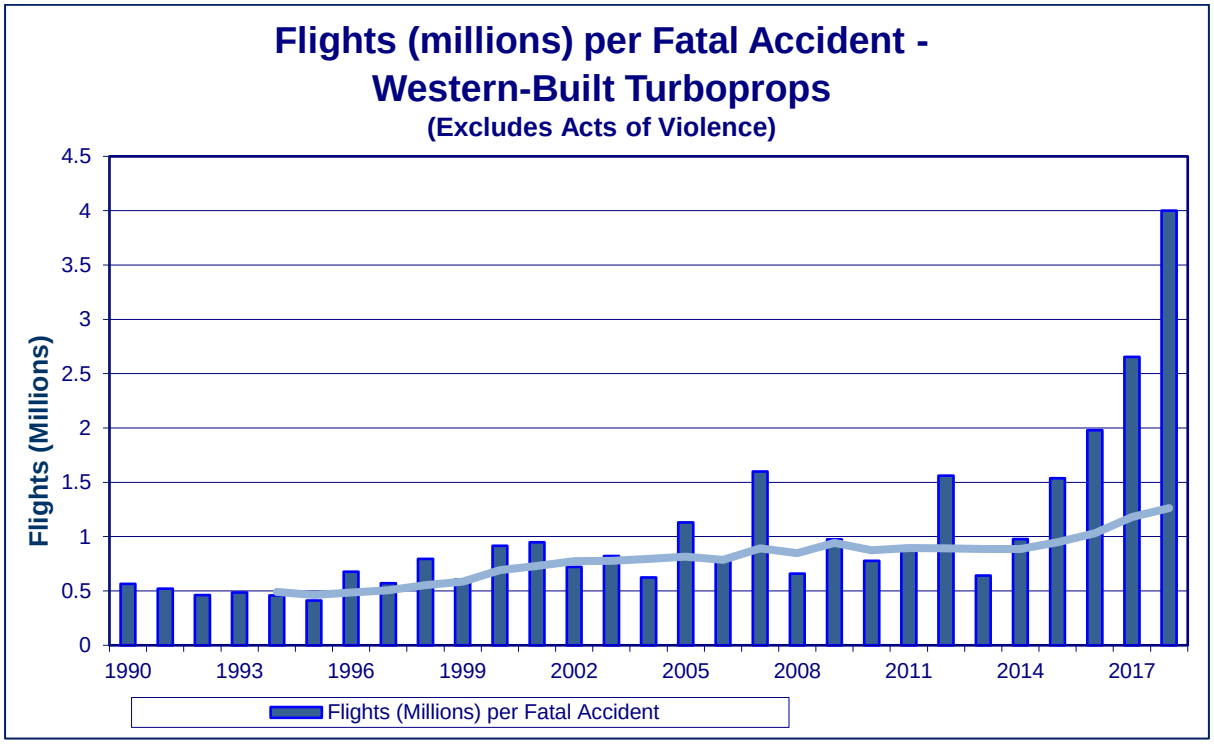
The average annual number of fatal accidents so far in this decade (2010 - 2018) is 6.4 while the average for the previous decade was 9.8. In comparison, the annual average for the 1990s was 17.6.

Annual Fatal Accidents (western-built turboprops) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents	8	10	9	5	12	8	5	4	3	2

Fatal Accidents (Western-Built Turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	15.8	15.1	17.6	9.8	6.4



The fatal accident rate for western-built turboprops in 2018 is estimated at about one per 4.0 million flights, the best result ever by far and the fourth year running of significant improvement but still a long way behind that of the western-built jets. The good result in 2018, following 2017, 2016 and 2015, may, at last, represent the beginning of improvement to the safety of this class of aircraft (although this is not the case for the class's passenger fatality rate). Until now, there has been no significant sustained improvement in the fatal accident rate for this class, which, on average, had been at around one per 0.8 or 0.9 million flights since about the end of the 1990s.



The number of passengers and crew killed on western-built turboprops in 2018, at 117, is considerably worse than in 2017 when only 10 people were killed on board this class of aircraft.

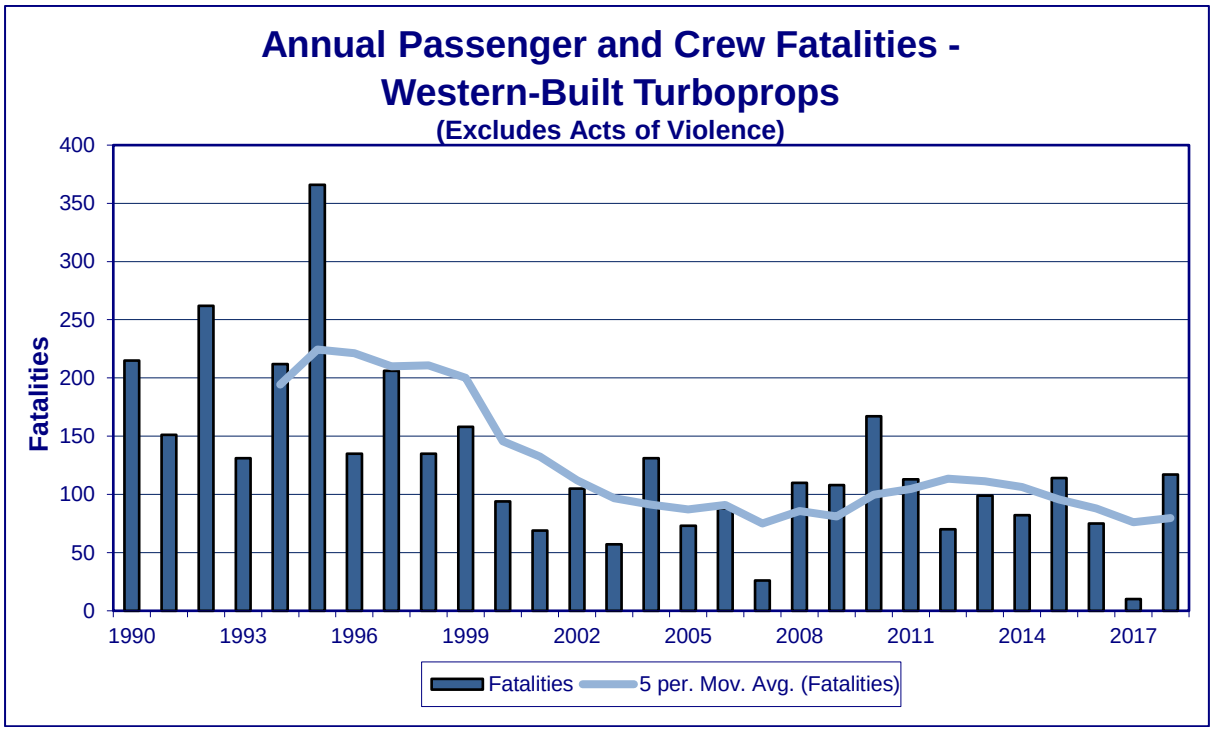
The annual average for passenger and crew deaths on this class of aircraft so far in this decade is 94.1, about 10% worse than the annual average for the previous decade of 86.1. The average for the 1990s was 197.1, for the 1980s, 199.1, and for the 1970s, 258.9.

Annual Passenger & Crew Fatalities (western-built turboprops) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatalities	108	167	113	70	99	82	114	75	10	117

Passenger & Crew Fatalities (western-built turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	258.9	199.1	197.1	86.1	94.1

Average Passenger & Crew Fatalities per Fatal Accident (western-built turboprops) 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Average Fatalities	13.5	16.7	12.6	14.0	8.3	10.3	22.8	18.8	3.3	58.5

Passenger & Crew Fatalities per Fatal Accident (western-built turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Average Fatalities	16.4	13.2	10.9	8.8	14.7

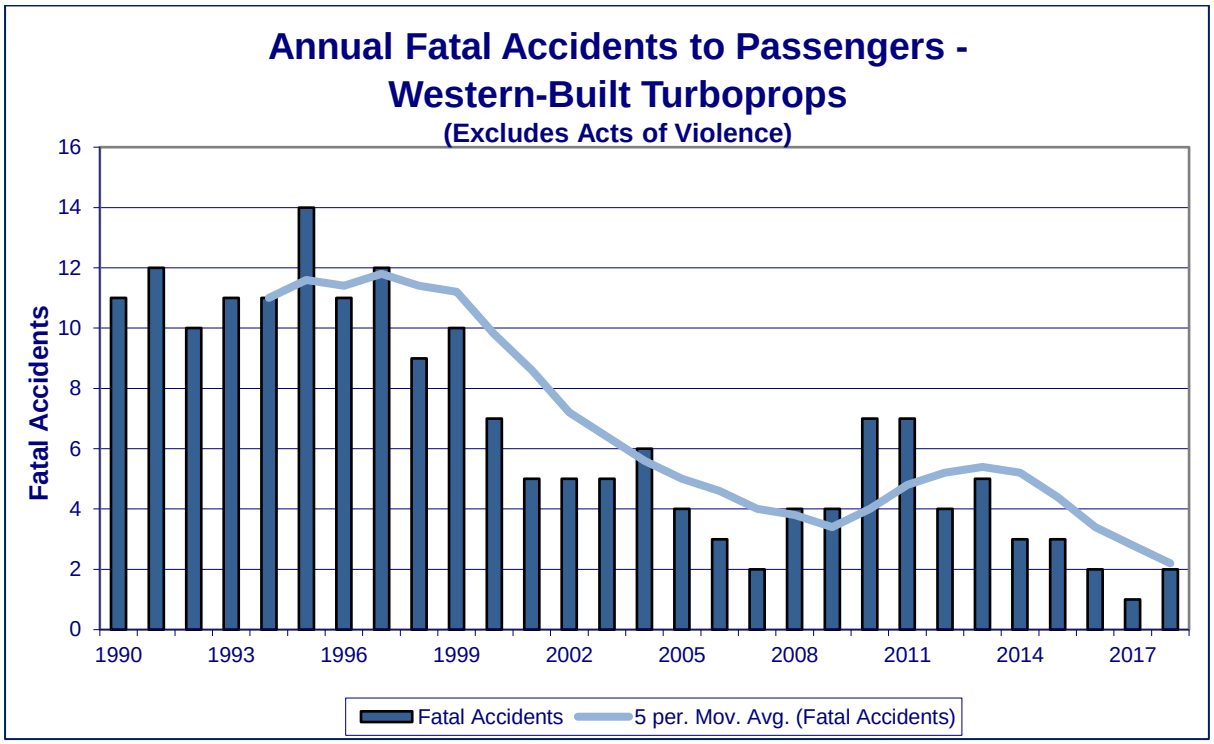


There were two fatal accidents to passengers on revenue passenger flights on western-built turboprops during 2018; one more than in 2017.

The average annual number of fatal accidents (to passengers) for the current decade is 3.8, about 15% less than that for the previous decade, 4.5. The average for the 1990s was 11.1.

Annual Fatal Accidents to Passengers (western-built turboprops) – 2009 - 2018										
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatal Accidents	4	7	7	4	5	3	3	2	1	2

Fatal Accidents to Passengers (western-built turboprops) – Decade Averages					
Period	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2018
Annual Average	10.6	10.0	11.1	4.5	3.8

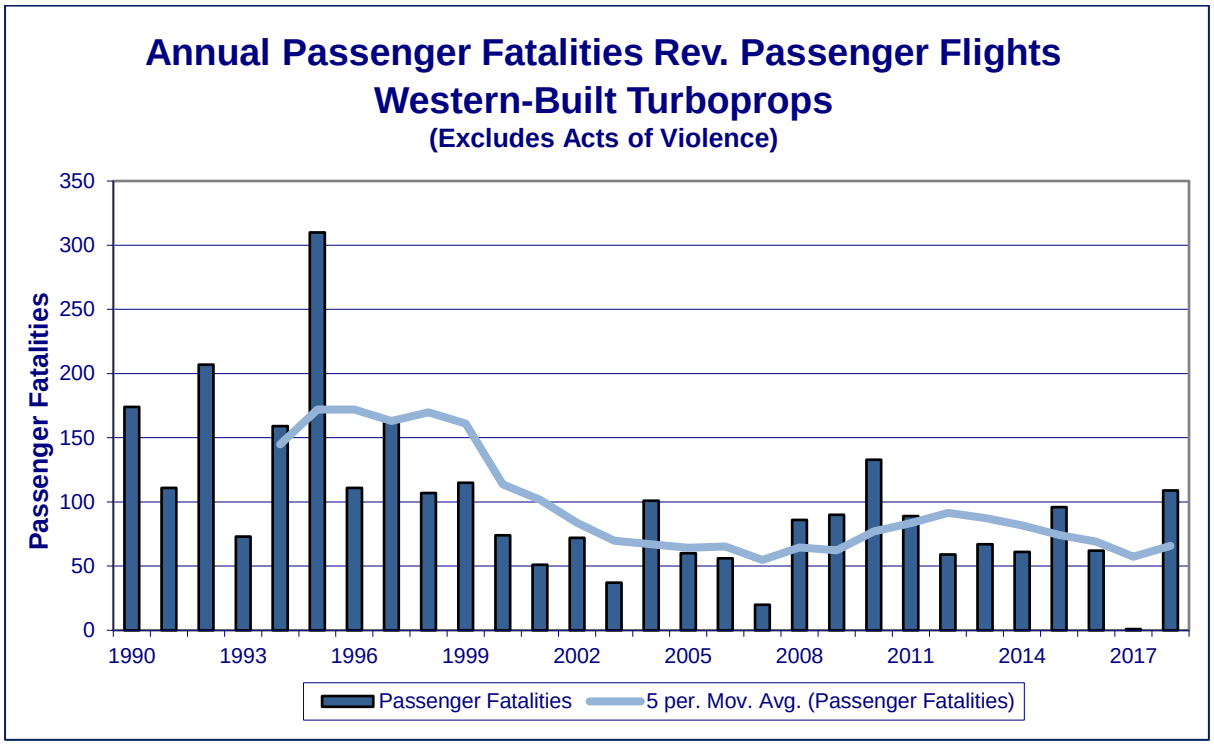


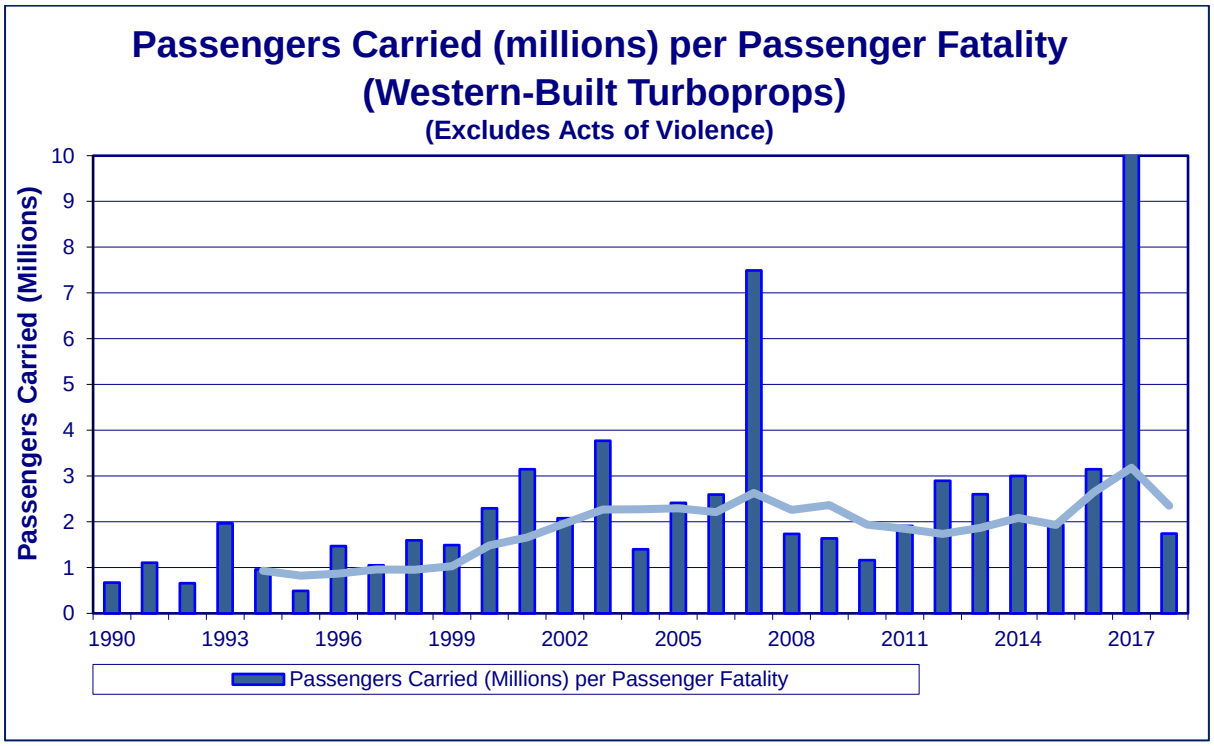
A total of 109 passengers were killed on revenue passenger flights operated by western-built turboprops during 2018. This was considerably worse than in 2017 when only one passenger was killed and worse than any year since 2010. There were 62 passenger fatalities in 2016 and 96 in 2015.

The average annual number of passenger fatalities for the current decade is 75.2. The annual average for the previous decade (2000-2009) was 64.7 and that for the 1990s was 152.9.

Annual Passenger Fatalities on Revenue Passenger Flights (western-built turboprops) – 2009 - 2018										
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities	90	133	89	59	67	61	96	62	1	109

Passenger Fatalities on Revenue Passenger Flights (western-built turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average	213.4	155.2	152.9	64.7	75.2





With 109 passenger fatalities in 2018 on western-built turboprops, the simple passenger fatality rate for the year fell to about one per 1.75 million passengers carried. The five-year moving average also reduced, going from a rate of one passenger fatality per 3.2 million carried to one per 2.35 million. This is disappointing after 2017 and, to a lesser extent, other recent years and there seems to have been no sustained improvement in the class's fatality rate in the last 20 years.

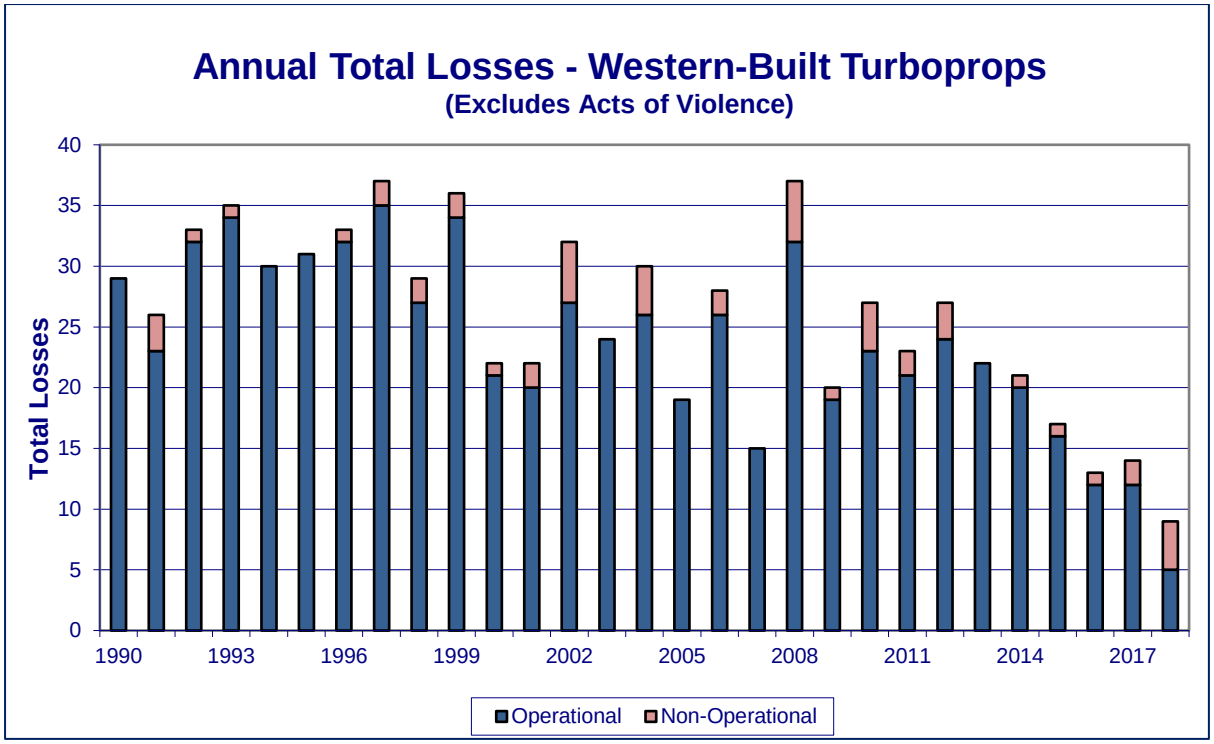
The number of confirmed airline insurance total losses suffered by western-built turboprops during the year, currently standing at 9 (including four non-operational losses), is three fewer than the 14 recorded for 2017 and is the lowest number of such losses in any year for more than 40 years.

Based on experience, it is thought likely, that more total losses will be confirmed in the coming months and that the final figure for 2018 will probably be closer to 12. However, this will still be considerably lower than the average for the decade so far and all previous decades.

The annual average for the current decade so far is 17.2 (19.2 including non-operational losses), for the previous decade 23.1 (25.1) and for the 1990s, 30.7 (31.9).

Annual Total Losses (western-built turboprops) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Operational	19	23	21	24	22	20	16	12	12	5
Non-Operational	1	4	2	3	0	1	1	1	2	4
All	20	27	23	27	22	21	17	13	14	9

Total Losses (western-built turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average Operational	26.2	27.8	30.7	23.1	17.2
Annual Average All	27.7	29.5	31.9	25.1	19.2



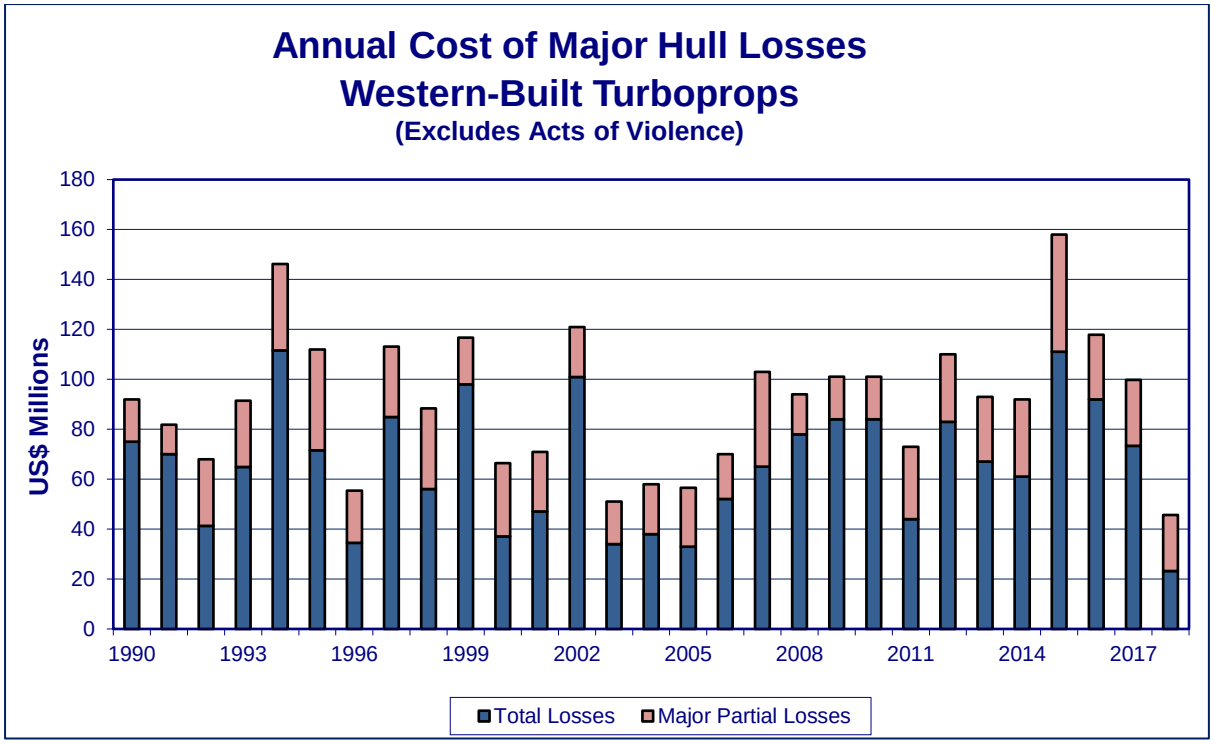
The estimated cost of major hull claims (total losses and major partial losses) in 2018 for western-built turboprops is provisionally estimated at $45 million. This is considerably better than the $100 million incurred in 2017 and $118 million in 2016 and is the best result for many years.

The annual average for the current decade for turboprop major hull claims is $99.1 million and that for the previous decade, $79.2 million. The annual average for the 1990s was $96.5 million.

Annual Cost of Major Hull Losses $m (western-built turboprops) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total Losses	84	84	44	83	67	61	113	92	73	23
Major Partial	17	17	29	21	26	31	47	26	26	22
Spares*	0	0	0	6	0	0	0	0	0	0
Total	101	101	73	110	93	92	160	118	100	45

* Spares – significant losses falling on the airline's hull policy only.

Cost of Major Hull Losses $m (Western-Built Turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average Total Losses	24.9	48.8	70.8	56.9	71.1
Annual Average Major Partial	2.9	11.1	25.7	22.3	27.2
All (including spares)	27.8	59.9	96.5	79.2	99.1



Eastern-Built Jets

In 2018, the airline-operated fleet of eastern-built jets suffered a single fatal accident resulting in the deaths of 6 crew and 65 passengers. This came after five years, from 2013 through to 2017, without a fatal accident and six years without a revenue passenger fatality. However, the operational eastern-built jet fleet has reduced very considerably over recent years and, in 2018, these aircraft probably accounted for less than one percent of the world's total airline operations. With so little exposure, it is not surprising that the fleet had been loss free.

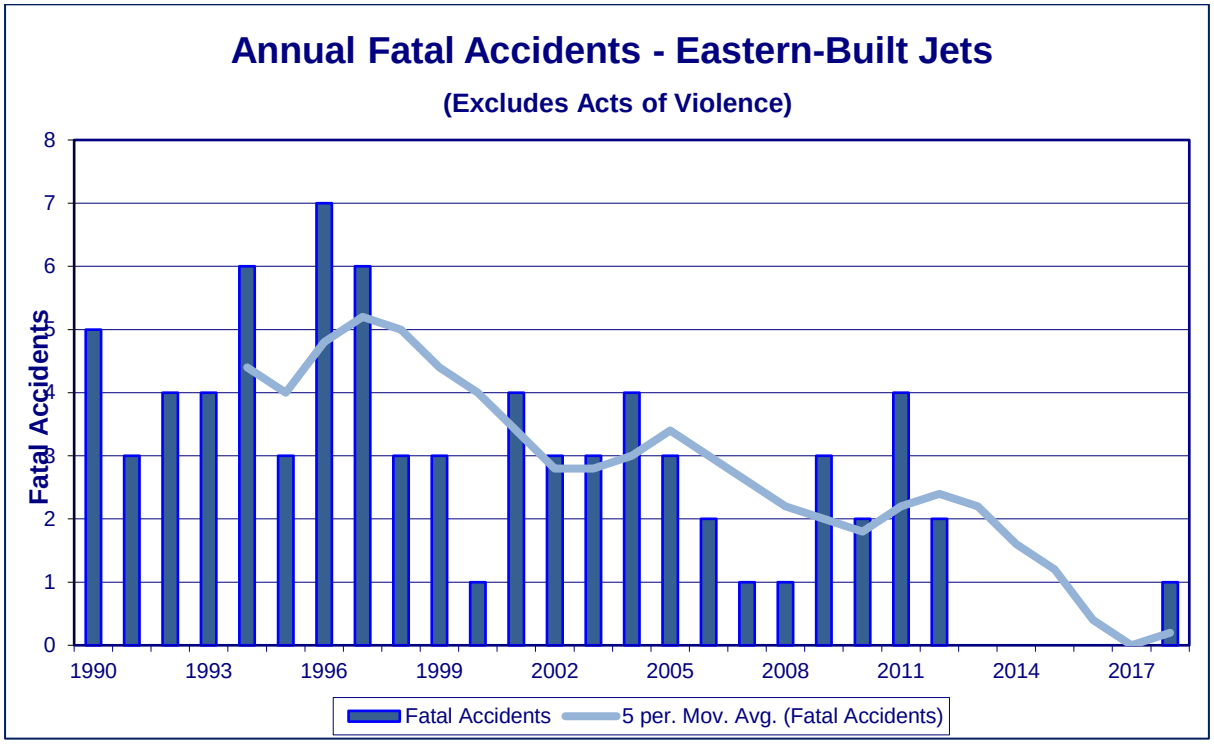
The current decade average for the fleet is one fatal accident per year and one accident every two years where a revenue passenger is killed but this mainly reflects the poor experience of the class in the early years of the period.

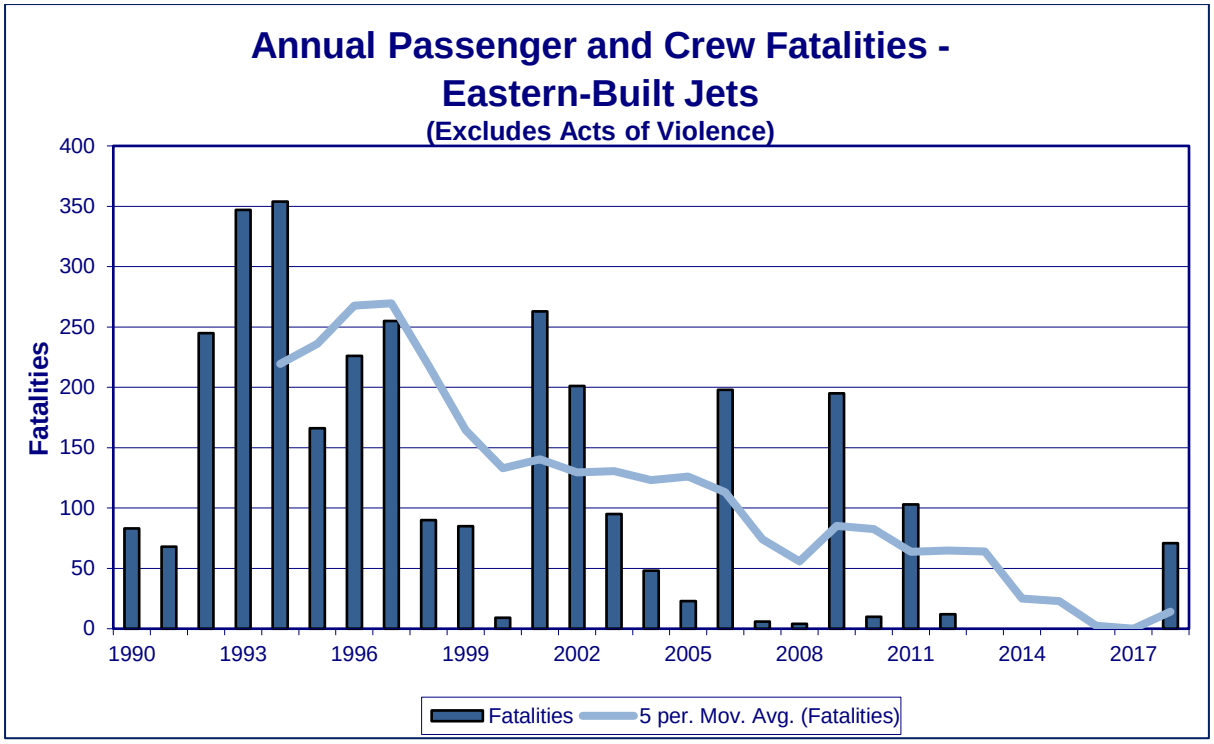
Annual Fatal Accidents (eastern-built jets) – 2009 – 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents (All)	3	2	4	2	0	0	0	0	0	1
Fatal Accidents (Passengers)	2	1	3	0	0	0	0	0	0	1

Fatal Accidents (eastern-built jets) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Annual Average (All)	5.5	3.8	4.4	2.5	1.0
Passenger Accidents	4.7	3.5	3.0	1.3	0.6

Annual Fatalities (eastern-built jets) – 2009 - 2018										
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities (All)	195	10	103	12	0	0	0	0	0	71
Fatalities (Passenger)	161	2	79	0	0	0	0	0	0	65

Annual Fatalities (eastern-built jets) – Decade Averages					
Period	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2018
All Accidents	234.6	219.7	191.9	104.2	21.8
Passenger Accidents	207.0	200.5	155.9	84.5	16.2





Eastern-Built Turboprops

Eastern-built turboprops suffered three fatal accidents during 2018, two less than in 2017 and an improvement on the annual average for the current decade so far of 4.1. The annual average for the previous decade (2000-2009) was 7.4.

A total of 32 passengers and crew died in these accidents. This was up on 2017 when 25 people were killed but still better than the annual average for the nine-year period 2010 - 2018, which was 45.2.

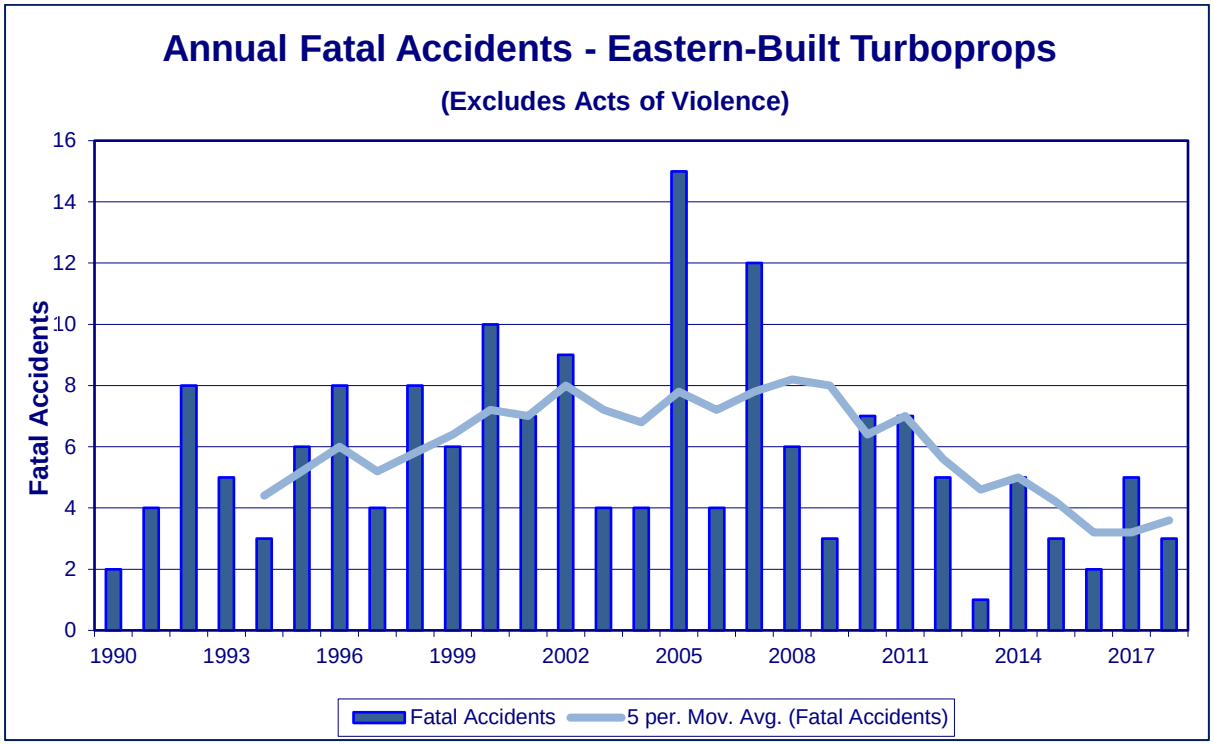
There was one fatal accident where a revenue passenger was killed in 2018. Eighteen revenue passengers died in this accident. The annual average for passenger fatalities for the current decade is 25.0.

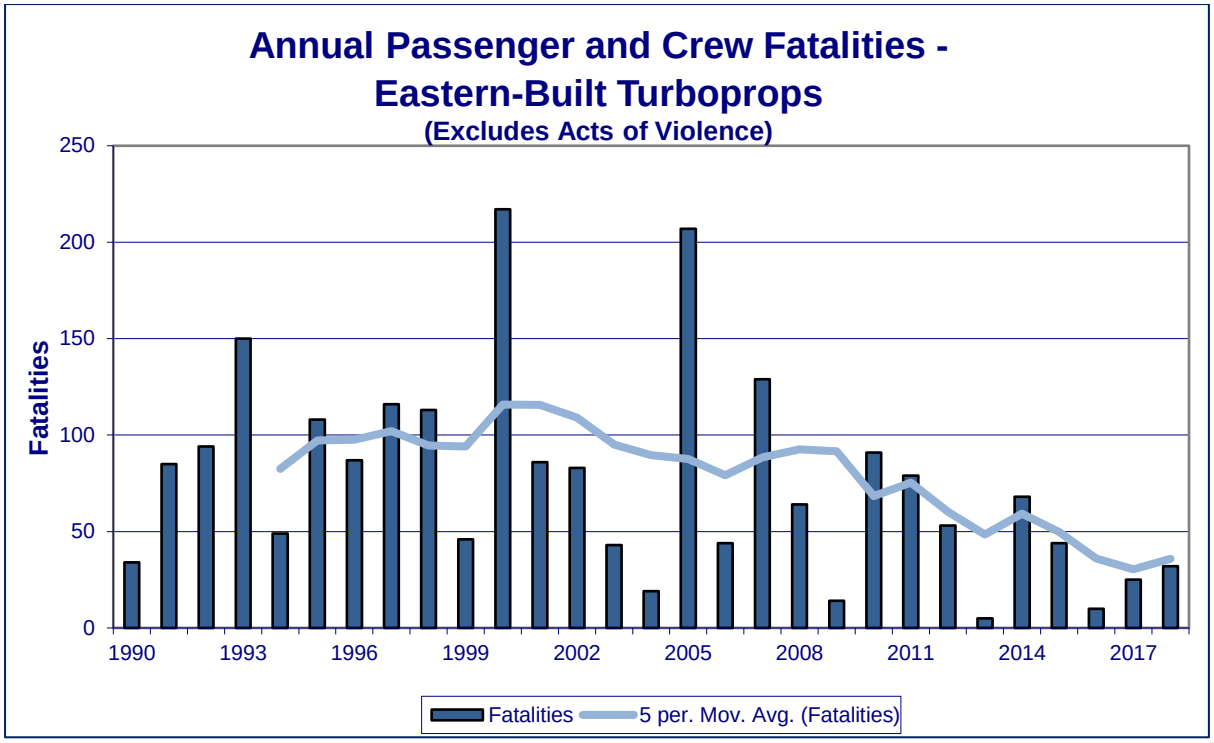
Annual Fatal Accidents (eastern-built turboprops) – 2009 - 2018										
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Fatal Accidents (All)	3	7	7	5	1	5	3	2	5	3
Fatal Accidents (Passengers)	0	5	4	3	1	1	0	0	1	1

Fatal Accidents (eastern-built turboprops) – Decade Averages					
Period	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - 2009**	**2010 - 2018**
Fatal Accidents (All)	6.6	3.7	5.4	7.4	4.2
Passenger Accidents	4.4	2.6	2.4	3.4	1.8

Annual Fatalities (eastern-built turboprops) – 2009 - 2018										
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Fatalities (All)	14	91	79	53	5	68	44	10	25	32
Fatalities (Passenger)	0	74	54	36	5	34	0	0	4	18

Annual Fatalities (eastern-built turboprops) – Decade Averages					
Period	1970 - 1979	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2018
All Accidents	212.4	66.4	88.2	90.6	45.2
Passenger Accidents	173.6	49.7	55.2	58.6	25.0





War-Risk Losses

There were two known war-risk total losses in 2018, both involving DHC Dash 8s. These included a Link PNG aircraft allegedly set on fire by demonstrators while parked on the ramp at Mendi, Papua New Guinea on June 14, 2018 and a Horizon Air aircraft that crashed into the sea off Tacoma, Washington, United States after being taken from the ramp at Seattle on August 10, 2018. The person flying the aircraft died in the crash.

An Alpha Star Aviation Services Airbus A320 was also substantially damaged when the 'kill' payload of a drone struck it while it was parked on the ramp at Abha, Saudi Arabia on May 26, 2018.

These three insured losses are believed to have cost the war-risk market $37.1 million.

There were also a number of aircraft damaged to varying degrees during continued fighting in Libya.

Paul Hayes, London, 2 January 2019

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Contacts

Market Enquiries
Paul Hayes
Director, Safety and Insurance, FlightGlobal
paul.hayes@flightascendconsultancy.com
+44 (0) 20 8564 6738

Media Enquiries
Rachel Humphries
Corporate Communications Manager, FlightGlobal
Rachel.humphries@flightglobal.com
+44 (0) 7966 151 962