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Airline Quality Rating Report

National Institute for Aviation Research

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## The Airline Quality Report 1994

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NIAR Report 94-11

# The Airline Quality Report 1994

Brent D. Bowen  
Dean E. Headley

1994

NIAR  
National Institute for Aviation Research

The Wichita State University

## ABOUT THE AUTHORS

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## AIRLINE QUALITY RATING 1994

Brent D. Bowen, University of Nebraska at Omaha  
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### Abstract

The Airline Quality Rating was developed and first announced in early 1991 as an objective method of comparing airline performance on combined multiple factors important to consumers. Development history and calculation details for the AQR rating system are detailed in The Airline Quality Rating (NIAR Report 91-11) issued in April, 1991, by the National Institute for Aviation Research at Wichita State University. A full reporting of the monthly Airline Quality Rating scores for 1991 and 1992 is available in Airline Quality Report 1992 (NIAR Report 92-11) and Airline Quality Rating Report 1993 (NIAR Report 93-11) by contacting Wichita State University.

The Airline Quality Rating 1994 (NIAR Report 94-11) is a summary of month-by-month quality ratings for the nine major domestic U.S. airlines operating during 1993. Using the Airline Quality Rating (AQR) system and monthly performance data for each airline for the calendar year of 1993, individual and comparative ratings are reported. This research monograph, NIAR Report 94-11, contains a brief summary of the AQR methodology, detailed data and charts that track comparative quality for major domestic airlines across the 12 month period of 1993, and industry average results. Also, comparative Airline Quality Rating data for 1992 is included to provide a longer term view of quality in the industry.

### The Airline Quality Rating (AQR)

The majority of quality ratings available rely on subjective surveys of consumer opinion that are infrequently done. This subjective approach yields a quality rating that is essentially noncomparable from survey to survey for any specific airline. Timeliness of survey based results can be a problem as well in the fast changing airline industry. Before the Airline Quality Rating, there was effectively no consistent method for monitoring the quality of airlines on a timely, objective and comparable basis. With the introduction of the AQR, a multi-factor, weighted average approach became available. This approach had not been used before in the airline industry. The method relies on taking published, publicly available data that characterizes airline performance on critical quality factors important to consumers and combines them into a rating system. The final result is a rating for individual airlines with ratio scale properties that is comparable across airlines and across time.

The Airline Quality Rating (AQR) is a weighted average of 19 factors (see TABLE 1) that have importance to consumers when judging the quality of airline services. Factors included in the rating scale are taken from an initial list of over 80

factors. Factors were screened to meet two basic criteria; 1) a factor must be obtainable from published data sources for each airline; and 2) a factor must have relevance to consumer concerns regarding airline quality. Data used in calculating ratings represent performance aspects (i.e. safety, on-time performance, financial stability, lost baggage, denied boardings) of airlines that are important to consumers. Many of the factors used are part of the Air Travel Consumer Report maintained by the Department of Transportation.

Final factors and weights were established by surveying 65 airline industry experts regarding their opinion as to what consumers would rate as important (on a scale of 0 to 10) in judging airline quality. Also, each weight and factor was assigned a plus or minus sign to reflect the nature of impact for that factor on a consumer's perception of quality. For instance, the factor that includes on-time performance is included as a positive factor because it is reported in terms of on-time successes, suggesting that a higher number is favorable to consumers. The weight for this factor is high due to the importance most consumers place on this aspect of airline service. Conversely, the factor that includes accidents is included as a negative factor because it is reported in terms of accidents per hours flown, suggesting that a higher number is unfavorable to consumers. Because safety is important to most consumers the weight for this factor is also high. Weights and positive/negative signs are independent of each other. Weights reflect importance of the factor in consumer decision making, while signs reflect the direction of impact that the factor should have on the consumer's rating of airline quality. When all factors, weights and impacts are combined for an airline and averaged, a single continuously scaled value is obtained. This value is comparable across airlines and across time periods.

The Airline Quality Rating methodology allows comparison of major domestic airlines on a regular basis (as often as monthly) using a standard set of quality factors. Unlike other consumer opinion approaches which rely on consumer surveys and subjective opinion, the AQR uses a mathematical formula that takes multiple weighted objective factors into account in arriving at a single rating for an airline. The rating scale is useful because it provides consumers and industry watchers a means for looking at comparative quality for each airline on a timely basis using objective, performance-based data.

TABLE 1

AIRLINE QUALITY RATING FACTORS, WEIGHTS AND IMPACT

	FACTOR	WEIGHT	IMPACT (+/-)
1	Average Age of Fleet	5.85	-
2	Number of Aircraft	4.54	+
3	On-Time	8.63	+
4	Load Factor	6.98	-
5	Pilot Deviations	8.03	-
6	Number of Accidents	8.38	-
7	Frequent Flier Awards	7.35	-
8	Flight Problems <sup>a</sup>	8.05	-
9	Denied Boardings <sup>a</sup>	8.03	-
10	Mishandled Baggage <sup>a</sup>	7.92	-
11	Fares <sup>a</sup>	7.60	-
12	Customer Service <sup>a</sup>	7.20	-
13	Refunds <sup>a</sup>	7.32	-
14	Ticketing/Boarding <sup>a</sup>	7.08	-
15	Advertising <sup>a</sup>	6.82	-
16	Credit <sup>a</sup>	5.94	-
17	Other <sup>a</sup>	7.34	-
18	Financial Stability	6.52	+
19	Average Seat-Mile Cost	4.49	-

<sup>a</sup>Data for these factors is drawn from consumer complaints as registered with the Department of Transportation and published monthly in the Air Travel Consumer Report.

The basic formula for calculating the AQR is:

$$\text{AQR} = \frac{-w_1F1 + w_2F2 + w_3F3 +/- \dots w_{19}F19}{w_1 + w_2 + w_3 + \dots w_{19}}$$

## What the Airline Quality Rating Tells Us for 1993

Since the Airline Quality Rating is comparable across airlines and across time, monthly rating results can be examined both individually and collectively. The pages following these summary comments outline the AQR scores by airline, by month for 1993. For comparison purposes, results for each airline are also displayed for 1991, 1992 and 1993 on a single chart. A composite industry average chart that combines the nine airlines tracked for 1993 is shown, as well as industry average tracking for 1991, 1992 and 1993. The AQR results for 1993, when compared with results for 1992, indicate that:

- Southwest Airlines displaced American as the highest rated airline based on the 12 month average AQR score. While there was some decline in Southwest's scores from April through September, they recovered to post the highest levels of AQR scores of any of the nine major airlines rated for 1993. Southwest was, on average, nearly identical in 1993 to their 1992 level of performance. Unstable ratings since November, 1992 are notable and are somewhat hidden by only looking at the yearly averages.
- American Airlines continued a downward slide in AQR scores in 1993 that was noted in the 1992 scores as well. This generally lower score trend slipped American from the top rated position for the first time since the AQR was first published in 1991. American finished the year with a lower AQR score than even it's lowest point in 1992, and a noticeably lower 1993 average (second largest decline of all airlines rated) score than in 1992.
- United Airlines maintained it's third position in the 1993 ratings, but not without a noticeable downward trend in their monthly AQR scores. The average AQR score for 1993 was decidedly lower than the 1992 score. For the year, United was a relatively consistent quality performer, just at lower levels than for 1992.
- Delta Airlines also shows a marked downward trend in AQR scores from October, 1992 through March, 1993. Some recovery was made in the middle months of 1993, but another slide can be seen starting in September, 1993. Overall, the difference in Delta's average 1993 AQR score compared to their 1992 average score is the fourth largest decline of the airlines rated.
- The consistency of US Air in it's monthly AQR scores is maintained from March, 1992 through March, 1993. In early 1993 an improvement in AQR scores is noted until July, 1993, when a downturn is again seen. 1993 was a year US Air made strides in quality performance that are best understood with monthly score evaluation. US Air was one of only three carriers to post a positive gain in average AQR score from 1992 to 1993.

- Northwest Airlines made some recovery in 1993 to a more stable AQR score level. This stability at a lower score level would seem to be desirable over the erratic nature of 1992 AQR scores. Compared to 1992, the 1993 monthly scores are more consistent. Northwest had the third largest drop in average AQR score of all airlines rated.
- Trans World Airlines has the most improved AQR score of any airline rated. Moving from the lowest rated position, TWA jumped over America West and Continental in the rating hierarchy. The upward trend noted in July, 1992 was briefly interrupted in late 1992, with a return to improved scores until July, 1993. A brief downturn in the fall of 1993 was overcome, to finish at a dramatically higher level than in 1992.
- Except for the spring months, America West had consistently lower AQR scores for 1993 than for 1992. A general upward trend in early 1992 dropped off in October, 1992 through January, 1993. From early 1993 until fall, America West was improving and posting a consistent level of quality performance. A drop in late 1993 took the overall AQR score average to a lower level than in 1992.
- Continental Airlines continued a slide in AQR scores across 1993. The downturn in December, 1992 was never recovered in 1993, and Continental posted the largest decline in average AQR score of any airline rated in 1993. Even though the scores are lower, 1993 was a more consistent year than 1992.
- For 1993 the overall industry average AQR score remained relatively steady across the 12 month tracking period. Although the AQR industry score for 1993 is lower than for 1992, the consistency of monthly scores is an improvement over the more erratic 1992 industry picture.

## Previous Airline Quality Reports

Bowen, Brent D., Dean E. Headley and Jacqueline R. Luedtke (1991), Airline Quality Rating, National Institute for Aviation Research Report 91-11, Wichita, Kansas.

Bowen, Brent D., and Dean E. Headley (1992), Airline Quality Rating Report 1992, National Institute for Aviation Research Report 92-11, Wichita, Kansas.

Bowen, Brent D., and Dean E. Headley (1993), Airline Quality Rating Report 1993, National Institute for Aviation Research Report 93-11, Wichita, Kansas.

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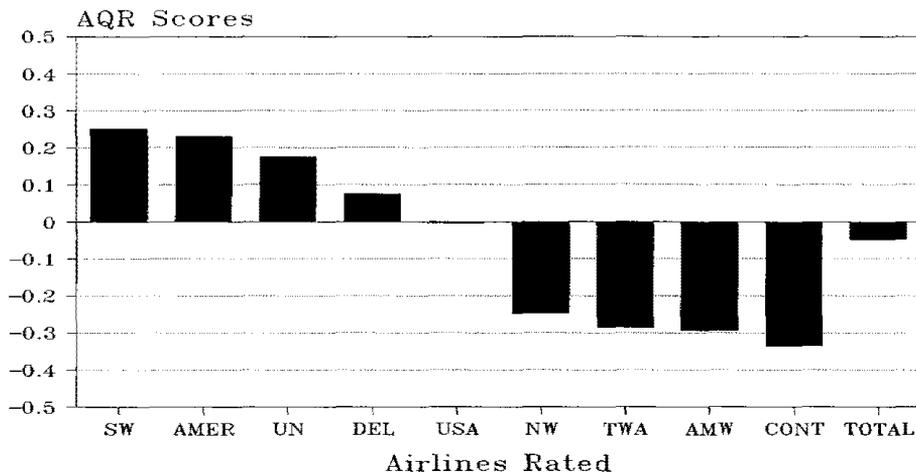
For copies of AQR reports contact:

National Institute for Aviation Research  
Wichita State University  
Wichita, KS 67260-0093

Office: 1-800-642-7978

## AIRLINE QUALITY RATING

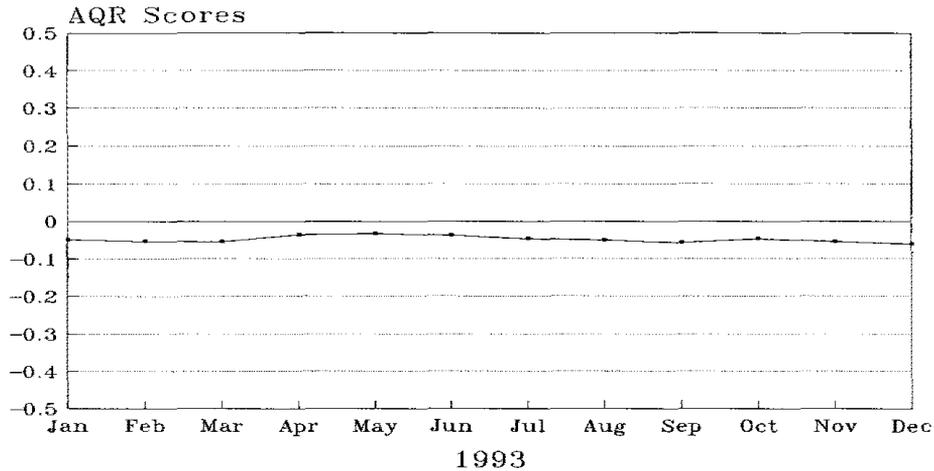
### MEAN AQR SCORES - 1993



### Industry Average AQR Scores for Major U.S. Airlines

	1993 Mean AQR Score	1992 Mean AQR Score	1991 Mean AQR Score
Southwest	0.252	0.251	0.220
American	0.231	0.290	0.323
United	0.176	0.214	0.168
Delta	0.076	0.123	0.193
US Air	-0.003	-0.024	0.115
Northwest	-0.247	-0.193	-0.143
Trans World	-0.286	-0.398	-0.435
America West	-0.294	-0.267	-0.325
Continental	-0.336	-0.274	-0.266
Total Average	-0.048	-0.031	-0.017

## AIRLINE QUALITY RATING ALL AIRLINES



### Average Monthly AQR Scores for U.S. Major Airlines

	1993	1992	1991
January	-0.049	-0.011	-0.040
February	-0.053	-0.003	-0.028
March	-0.054	-0.034	-0.032
April	-0.035	-0.027	-0.006
May	-0.032	-0.024	-0.027
June	-0.038	-0.042	-0.021
July	-0.046	-0.029	-0.006
August	-0.050	-0.031	-0.008
September	-0.056	-0.024	0.002
October	-0.047	-0.016	-0.009
November	-0.054	-0.060	-0.007
December	-0.061	-0.076	-0.019
Average	-0.048	-0.031	-0.017



## APPENDIX

### Detail of Frequently Cited Airline Performance Factors

Consumer interest is usually high regarding such issues as lost baggage, on-time performance, and denied boardings. Since these factors are part of the AQR calculations, it seemed useful to provide more complete data on these consumer interest areas. The following data tables and charts provide a detailed look at the performance of each major U.S. airline for the 12 months of 1993 regarding lost baggage, on-time performance, and denied boardings. Data was drawn from the Department of Transportation monthly Air Travel Consumer Report. The displays offer an opportunity to look at individual airlines and at industry performance in a level of detail that is not published elsewhere.

In addition to the more obvious consumer issues just discussed, a more obscure, but potentially more important issue is also addressed. Noise around airports has been and continues to be a source of consumer unrest. To that end, the 1990 Noise Act was passed that sets standards for noise levels of aircraft operation that must be met by 1999. This has immediate financial implications for airlines and ultimately for passengers. Over the next five years, all U.S. jet airplanes must meet the noise level guidelines. This has become known as "stage 3 readiness". Essentially this means that aircraft operating in the U.S. must have quieter engines. For many older aircraft this means either refitting the engines with "hush kits" or replacement of the aircraft with newer, quieter aircraft. Either way this is an expensive proposition and the public will certainly benefit, but at some cost. The following table gives a picture of the age of the domestic passenger jet fleet for each major U.S. airline and the current stage 3 readiness of that airlines fleet. According to The National Commission to Ensure a Strong Competitive Airline Industry report of August, 1993 (pg. 10), the average cost could be approximately \$2.5 million per airplane for conversion to noise compliance standards. With 38% of the 3,349 planes in the domestic fleet (1273 planes) needing attention, this could amount to a \$3.2 billion investment (1273 x \$2.5 million) over the next five years for the industry. This will certainly put additional pressures on an already financially troubled industry.

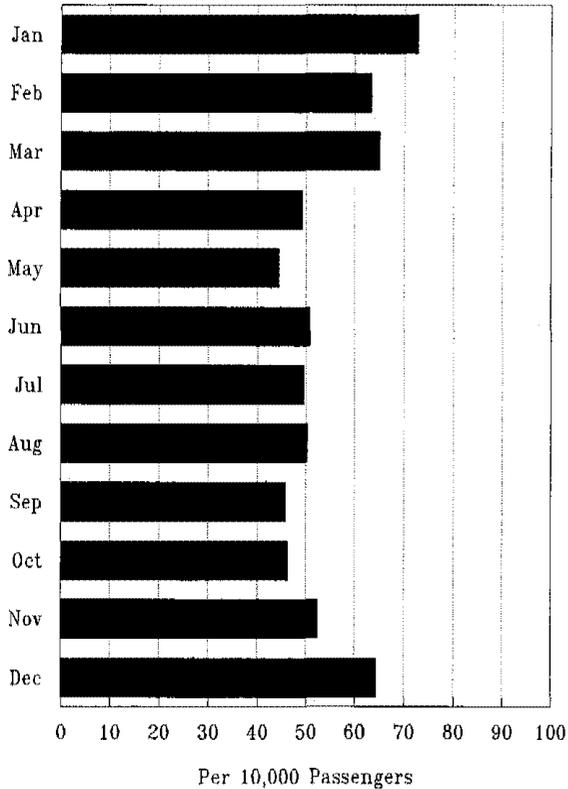
**1993 Mishandled Baggage\* by Month  
for Major U.S. Airlines**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Airline Average
<b>American</b>	68.0	58.7	62.4	51.4	47.1	54.1	59.3	59.2	52.2	55.2	57.1	58.6	56.9
<b>America West</b>	68.3	49.5	41.1	37.3	36.5	41.1	40.4	45.2	36.7	36.6	41.8	55.0	44.1
<b>Continental</b>	82.9	68.0	69.2	56.9	50.7	54.2	54.9	56.5	50.9	53.8	59.4	76.0	61.1
<b>Delta</b>	83.1	75.3	82.6	58.0	51.9	59.5	55.0	41.8	44.4	40.8	40.4	54.2	57.3
<b>Northwest</b>	81.0	71.5	70.4	50.0	44.9	58.4	53.5	55.2	47.0	48.3	56.1	70.0	58.9
<b>Southwest</b>	48.2	39.4	41.4	34.5	33.3	36.5	35.3	36.8	32.8	35.4	38.3	45.0	38.1
<b>Trans World</b>	62.0	58.5	61.4	44.5	42.6	44.4	46.6	49.6	45.4	43.2	47.1	60.7	50.5
<b>United</b>	85.8	72.5	75.4	57.4	48.6	61.4	55.1	58.9	54.1	53.3	73.4	81.7	64.8
<b>USAir</b>	74.8	75.1	80.9	52.5	45.2	47.5	45.5	49.5	48.0	50.2	58.4	80.2	59.0
<b>Monthly Avg.</b>	72.7	63.2	65.0	49.2	44.5	50.8	49.5	50.3	45.8	46.3	52.4	64.6	54.5

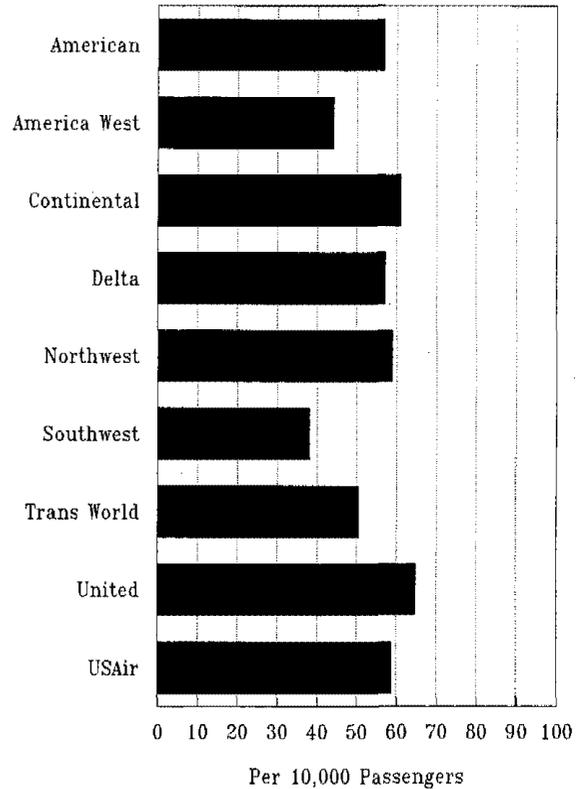
\* Figures shown are per 10,000 passengers.

Source: *Air Travel Consumer Report*, U.S. Department of Transportation, Office of Consumer Affairs.

## 1993 Mishandled Baggage Monthly Averages for Major Airlines



## Mishandled Baggage 1993 Averages for Major Airlines



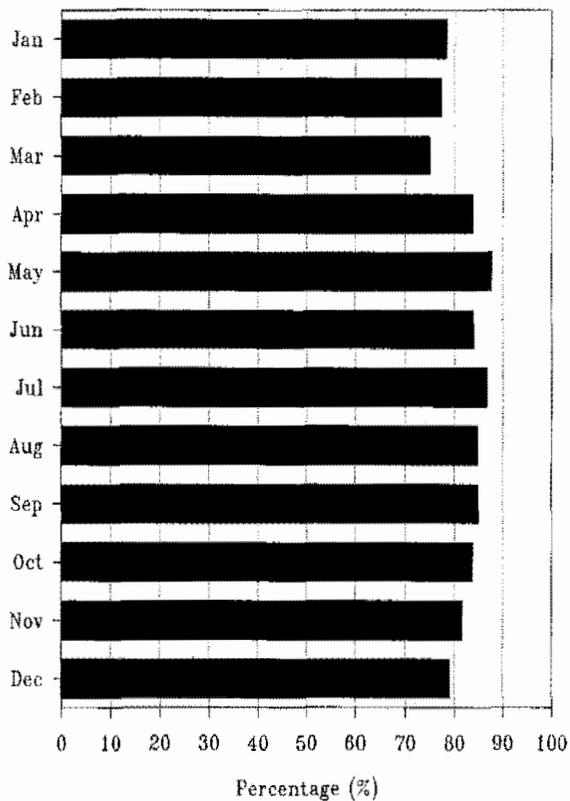
**1993 On Time Percentage by Month  
for Major U.S. Airlines**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Airline Average
<b>American</b>	.766	.796	.739	.792	.856	.804	.864	.825	.863	.826	.774	.793	.808
<b>America West</b>	.783	.828	.828	.891	.894	.859	.896	.863	.901	.891	.825	.799	.855
<b>Continental</b>	.788	.740	.695	.784	.847	.832	.859	.848	.790	.783	.771	.746	.790
<b>Delta</b>	.709	.708	.673	.786	.825	.780	.807	.776	.802	.768	.798	.772	.767
<b>Northwest</b>	.818	.798	.775	.871	.912	.855	.883	.873	.885	.891	.888	.857	.859
<b>Southwest</b>	.805	.855	.876	.905	.923	.898	.954	.939	.931	.902	.877	.880	.895
<b>Trans World</b>	.840	.738	.741	.858	.898	.859	.860	.846	.814	.835	.830	.779	.825
<b>United</b>	.735	.736	.692	.820	.859	.797	.807	.804	.825	.824	.774	.737	.784
<b>USAir</b>	.825	.769	.718	.848	.891	.875	.886	.869	.843	.835	.819	.767	.829
<b>Monthly Avg.</b>	.785	.774	.749	.839	.878	.840	.868	.849	.850	.839	.817	.792	.824

Source: *Air Travel Consumer Report*, U.S. Department of Transportation, Office of Consumer Affairs.

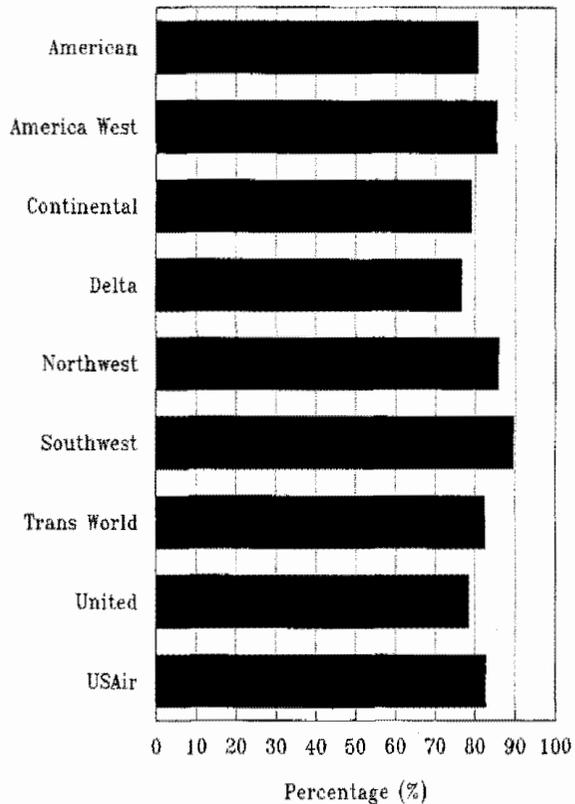
## 1993 On Time Percentage

Monthly Averages for Major Airlines

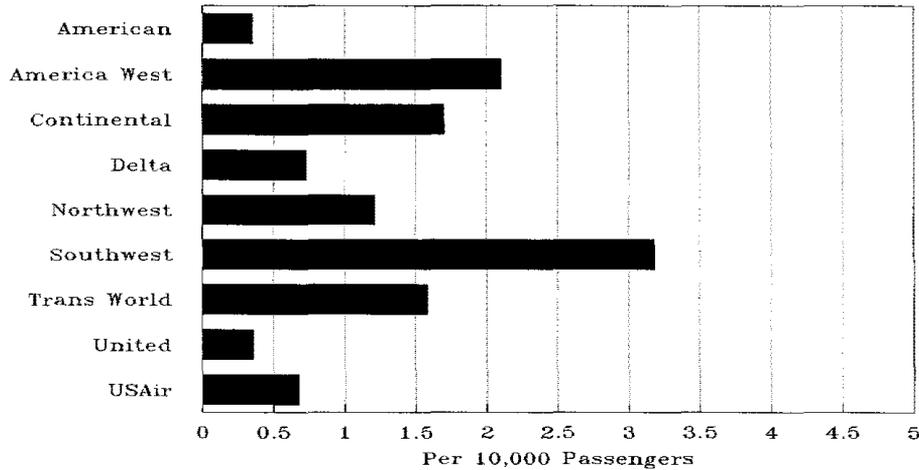


## On Time Percentage

1993 Averages for Major Airlines



## 1993 Denied Boardings Averages for Major U.S. Airlines



### 1993 Denied Boardings\* by Quarter for Major U.S. Airlines

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1993 Average
<b>American</b>	0.304	0.272	0.474	0.367	0.355
<b>America West</b>	2.086	1.477	1.711	3.121	2.100
<b>Continental</b>	1.559	1.550	1.450	2.216	1.694
<b>Delta</b>	1.150	0.725	0.491	0.602	0.728
<b>Northwest</b>	1.370	1.161	1.071	1.269	1.212
<b>Southwest</b>	2.512	3.589	4.766	2.398	3.180
<b>Trans World</b>	1.263	1.224	2.435	1.285	1.580
<b>United</b>	0.313	0.314	0.397	0.428	0.364
<b>USAir</b>	0.845	0.505	0.420	0.947	0.675

\* Figures shown are per 10,000 passengers.

Source: *Air Travel Consumer Report*, U.S. Department of Transportation, Office of Consumer Affairs.

### Size, Age and Stage 3 Readiness of the U.S. Major Carrier Jet Fleet\*

	Number of Aircraft	Average Age of Fleet (yrs)	Percent of Fleet @ Stage 3
<b>American</b>	679	8.88	79%
<b>America West</b>	84	7.58	74%
<b>Continental</b>	331	15.33	51%
<b>Delta</b>	545	9.09	64%
<b>Northwest</b>	381	16.40	43%
<b>Southwest</b>	144	7.30	66%
<b>Trans World</b>	177	18.73	42%
<b>United</b>	541	10.76	69%
<b>USAir</b>	467	11.02	53%
<b>Industry</b>	<b>3349</b>	<b>11.43</b>	<b>62%</b>

\* Source: *World Aviation Directory*, Winter, 1993. All figures are for aircraft operated during the first quarter of 1993.

Note: Stage 3 readiness is described in Federal Regulation 14 CFR Part 36. Known as the 1990 Noise Act, it requires that all commercial jet aircraft meet strict noise level standards by the end of 1999. Acceptable noise levels are established using a complicated formula. Essentially, a maximum decibel level for take-off, approach, and side line points are established. An airplane is considered Stage 3 ready if it does not exceed the combined limits of these noise standards.

## Individual Factor Detail

The individual factor detail charts in this Appendix present graphically the impact that average individual factor performance had on the average AQR score for each airline over the course of 1991 through 1993. It should be noted that the values represented by the bars are average values for the factor for the year. These average values are presented as additional information to help in better identifying what combination of factors might have impacted the various individual AQR scores for various airlines over the past few years.

Numbers along the horizontal axis represent the 19 individual factors. TABLE 1, in the body of the report, outlines the corresponding labels for the factors. The values shown along the vertical axis represent a 12 month average calculated value for a particular factor. This average is arrived at by taking the actual factor scores for each month and averaging them over the 12 month period. First, a monthly factor value is calculated using the actual airline data for the period multiplied by the weight and impact sign shown in TABLE 1 for that particular factor. The monthly scores for each of the 19 factors are combined to arrive at the AQR score for the monthly periods. Only after all 19 weighted factor values are combined using the AQR formula is the final AQR score achieved for any period. While some of the factors appear to have either great or small influence on the AQR score, it must be kept in mind that each individual factor is relative to the actual performance of the airline on that factor and that all airlines are on the same footing within each factor. The factors may have differential influence on the final AQR score, but only to the extent that they reflect the actual average performance by the airline for the year. A large or small average value is best compared to other airline values for the same factor. Since the airlines are on the same footing, this comparison best identifies the differential influence that performance might have had on that factor for that airline over the course of any year.

# ALL AIRLINES

## MEAN -- WEIGHTED FACTORS

