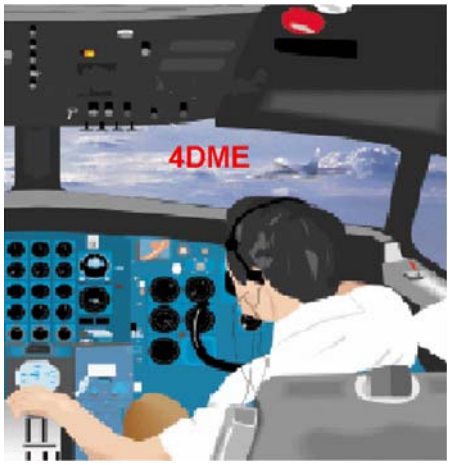
AVCO

Noise

Abatement Compliance Statistics

Contents:



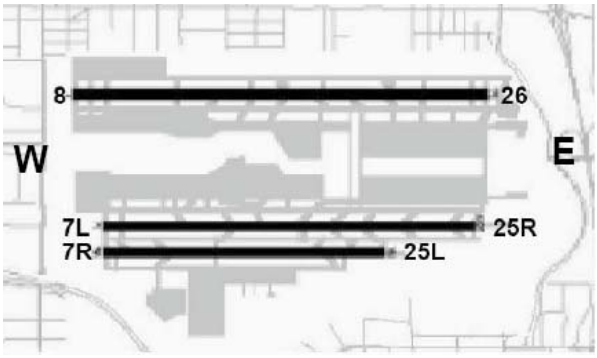
Statistics show that:

- Compliance with 4DME noise abatement procedure has been less consistent after a third runway was added at Phoenix Sky Harbor International Airport.
- Runway use projections in PHX FAR Part 150 has not been fullfilled.

Report prepared for TAVCO by the City of Tempe, 255 East Marigold Lane, Tempe AZ 85281

1. Introduction

This report is assembled for the Tempe Aviation Commission (TAVCO) to examine trends in airline compliance rates with a noise abatement departure route procedure in place for all turbojet and large turboprop[1] aircraft departing towards the east from the Phoenix Sky Harbor International Airport. The 4 DME departure route procedure requires the aircraft to keep over the riverbed of the Salt River in north Tempe until a point located approximately at Price Road when aircraft can turn away from the riverbed. In a 1994 Intergovernmental Agreement where the City of Tempe agreed to settle a lawsuit with the City of Phoenix[2] over the plans to construct a third runway at Phoenix Sky Harbor International Airport and continue noise mitigation flight procedures already in use over Tempe; the 4 DME departure route procedure and a runway use program that intends to equalize jets and large aircraft departures between east and west during daytime and nighttime hours on an annual basis. The agreement also introduced a new noise mitigation arrival procedure for the new third runway. The City of Tempe is located directly east of the Phoenix Sky Harbor International Airport. The airport has 3 parallel runways and is owned and operated by the City of Phoenix. TAVCO consists of 13 Tempe residents appointed by the Tempe Mayor with of the City Council to assist and advice on aviation noise and other issues relating to the Phoenix Sky Harbor International Airport.



The east departure route procedure was described in a 1993 EIS. Departures to the east from the new runway would follow the so-called "One-DME" Standard Instrument Departure procedure (SID) similar to the SID already in use by aircraft departing to the east[3]. The continued use of the "One-DME procedure was also stated in the Record of Decision (ROD) for the final EIS, where the FAA approved the 1989 master plan update that included the plans for a third runway. When the cities of Phoenix and Tempe signed the Intergovernmental Agreement (IGA) on noise mitigation flight procedures over Tempe, the FAA reaffirmed its commitment to uphold these procedures[4]. The "One-DME procedure" became the "4 DME procedure" when a navigational aid (VORTAC) was moved closer to the airport.

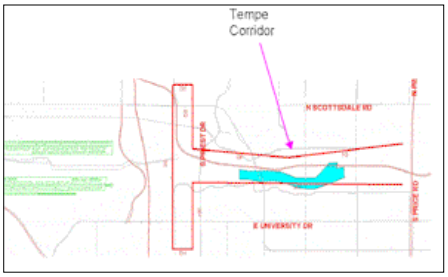
[1] Aircraft certified and operated according to Title 14 FAR Part 121 or 135 with gross weight exceeding 12,500 pounds

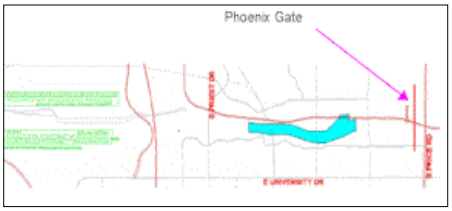
[2] Maricopa Recorder: 9/28/1994, reference number 94-0706551

[3] Source: Final Environmental Impact Statement Phoenix Sky Harbor International Airport Master Plan Update Improvements, November 1993, Section 5.

[4] The FAA made an amendment dated September 13, 1994 to the original ROD of January 18, 2004, where it reaffirmed its commitment to noise mitigation measures described on page 15 in the original ROD.

2. Compliance Measure

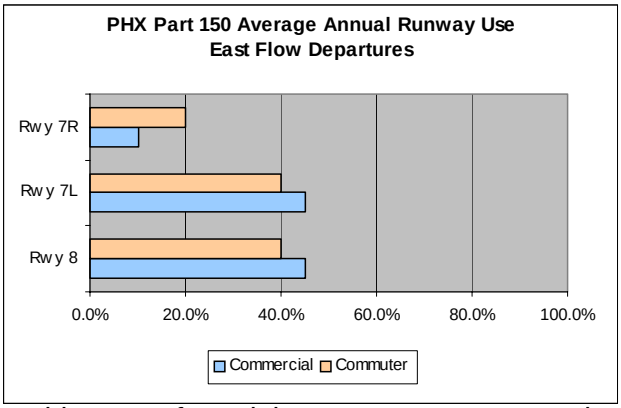




This report applies a measure developed by TAVCO to determine airline compliance with the 4 DME departure route procedure. The measure was based on the 4-DME Standard Instrument Departure procedure (SID) in place at the time the 1994 Intergovernmental Agreement was made. The Tempe measure is based on a corridor concept using the Noise and Flight Track Monitoring System that Phoenix had agreed to install, and which became operational in 1996. Runway headings and natural drift because of winds were examined to come up with a buffer zone to adjacent noise sensitive areas on both sides of the riverbed. This measure does not correspond to the measure used by the City Phoenix to determine compliance. The Phoenix measure is a 4-DME Gate or a 5,500 feet long vertical line at approximately Price Road aircraft have to pass through before turning away from riverbed. Using the Tempe Corridor as measure, also means including large turboprop aircraft departures that the cities agreed would be using the 4 DME departure route procedure. However the procedure has not been enforced towards airlines that operate these aircraft. The large turboprop aircraft have routinely been routed on diagonal paths away from the Tempe Corridor, used for turbojet departures. The City of Phoenix agreed to give notice of deviation to airlines that did not follow the 4 DME SID and applies the 4 DME Gate measure to identify violations. The use of large turboprop aircraft for commuter service has dropped over the years due to fleet conversions to regional jets.

3. Runway Operations

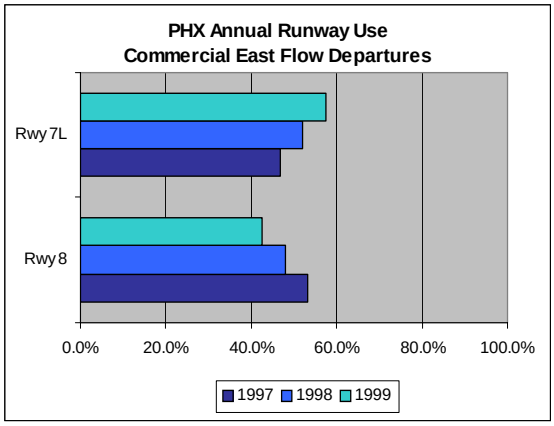
The airport F.A.R. Part 150 Noise Compatibility study from September 2000 included a study that recommended utilization of the runways aligned with noise compatible corridors to achieve reductions in noise impact created by aircraft arrivals and departures[5]. For departure noise abatement this study assumed that most of the departure traffic towards the east over Tempe would be conducted from the north runway (Runway 8) and the center runway (Runway 7L). 90% of all commercial departures and 80% all commuter departures were assumed to be using these runways on east flow. Only 10% of all commercial departures and 20% of all commuter departures were assumed to use the new south runway (Runway 7R)[6]. This would have corresponded to the runway use in place for commercial departure operations prior to 2000, and assumed average annual runway use included in the operational data for mapping expected noise exposure[7]. The September 2000 study recommended the airport to continue the runway use program calling for equalization of departure operations east and west and to further consider a preferential runway use program that would maximize the use of existing noise compatible corridors.

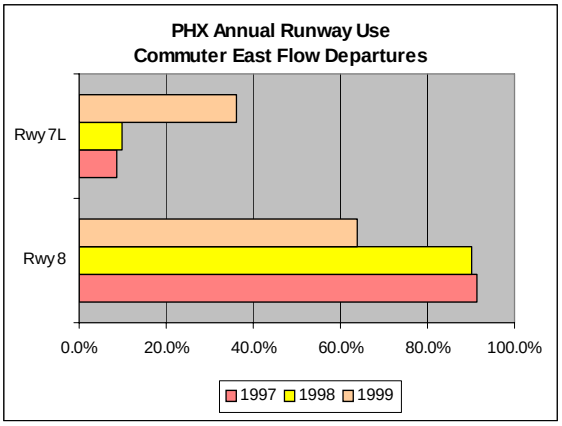


[5] Source: Phoenix Sky Harbor International Airport F.A.R. Part 150 Noise Compatibility Study, September 2000 page 4-7 and 4-30, Alternative 1 – Evaluate Runway Use for Noise Abatement. The proposed measure was not added to Chapter 6, - Noise Compatibility Program.

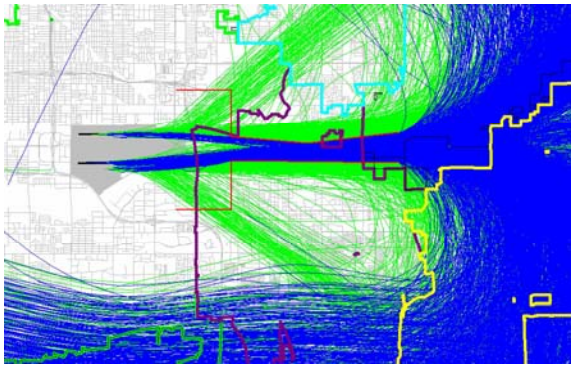
[6] Source: Table 4D, Average Annual Runway Use By Aircraft Class, Alternative Runway Use Program

[7] Source: Phoenix Sky Harbor International Airport F.A.R. Part 150 Noise Compatibility Study, Noise Exposure Maps, Table 2F page 2-13.





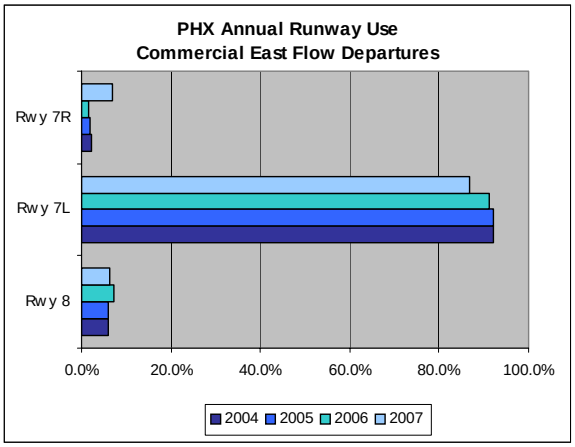
Commuter departures towards the east prior to 2000 appears to mainly have been allocated to the north runway where turbo props where directed largely outside Tempe boundaries on headings towards the northeast.



Runway use after 2000 has largely contained all commercial and commuter turbojet departure activity to the center runway.

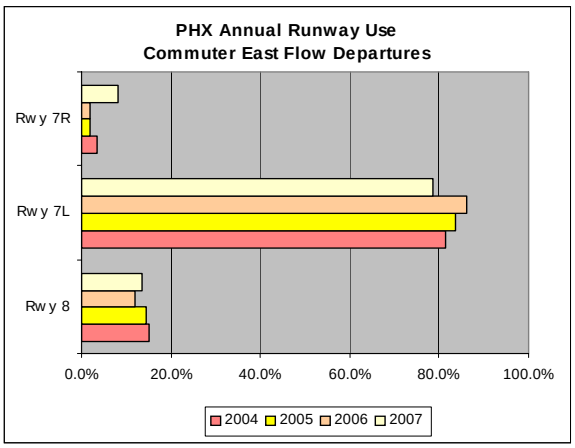
Commercial east flow departures

More than 80% off east departure operations by commercial carriers has since 2000 been directed to center runway, resulting in relatively small number of departures going east from the north runway. This has resulted in compressed operation activity off the center runway during peak hours, with little need for staging departures from the north and center runway to enable the flight paths from the parallel runways to merge over the riverbed in Tempe. The assumption of a 45% commercial split between the two runways has not been utilized as recommended for noise abatement purposes.



Commuter east flow departures

About 80% of off east departure operations commuter aircraft has been directed to the center runway as well. The Part 150 study assumed 40% split between north and center runways. This change is assumed to have been influenced by the growth after 2000 in the use of smaller regional jets.

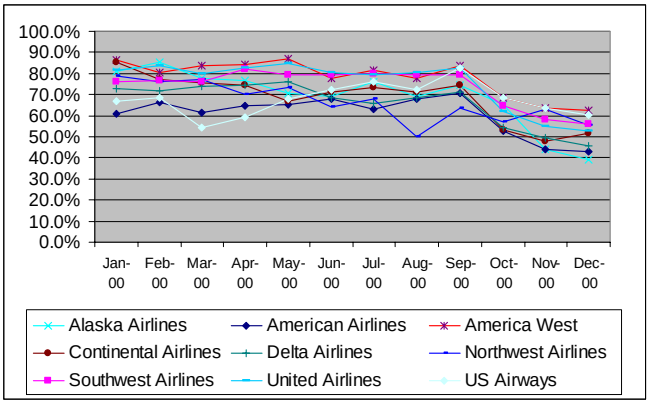


The use of the third runway has increased from around 2% during years after 2004, to 7% for commercial and 8 % for commuter departures in 2007.

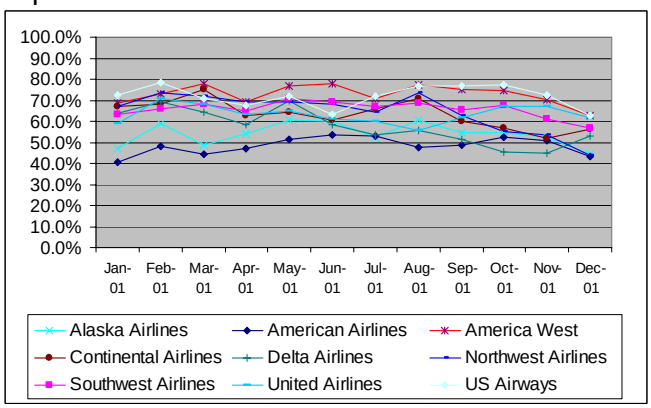
4. Compliance Rates

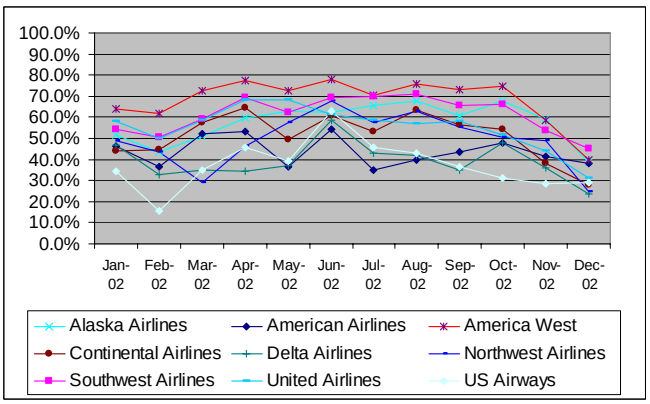
Monthly compliance rates with the 4 DME departure route procedure have been assembled for selected airlines. Because of the measure used, the Tempe Corridor computes all large turboprop aircraft departures as deviations because these aircraft immediately after take off roll are routinely routed on approximate departure angles of 120° and 60° the airline using large turboprop aircraft at the airport on a larger scale is not included. The fleets of airlines compared in this report consist of turbojet aircraft only.

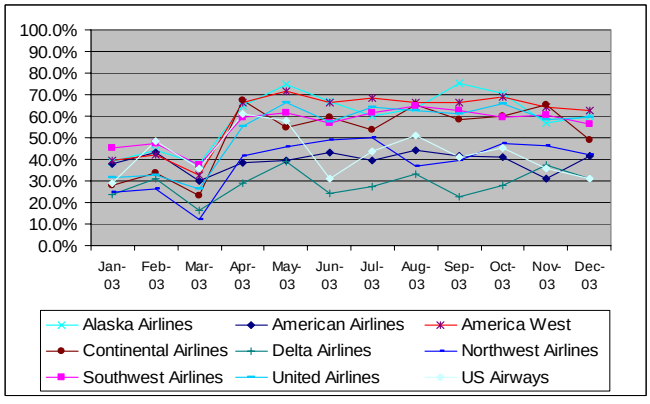
2000
Most of the year airport was run with two runways in operation. This was prior to the preferential runway use established after the third runway was opened for departure or arrival traffic.
In November and December 2000 the third runway was phased in, all departure and arrival plates were modified to accommodate the addition of a third runway.

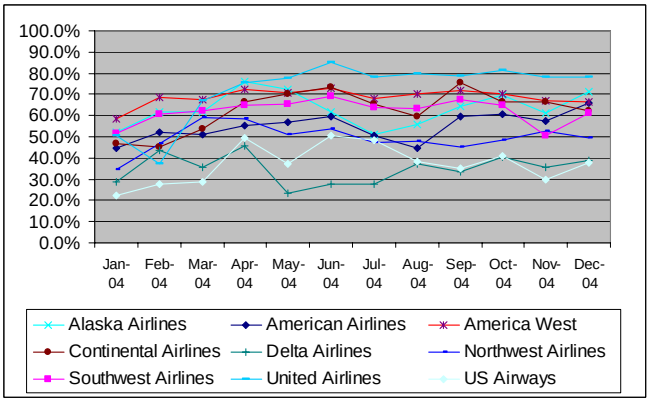


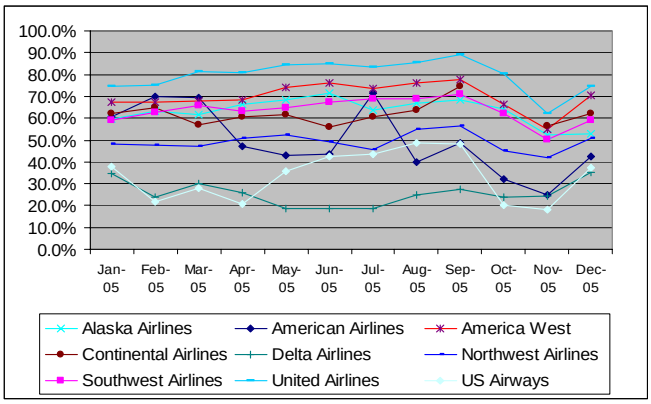
Subsequent years show an increasing spread in compliance between the larger airlines operating at the airport.

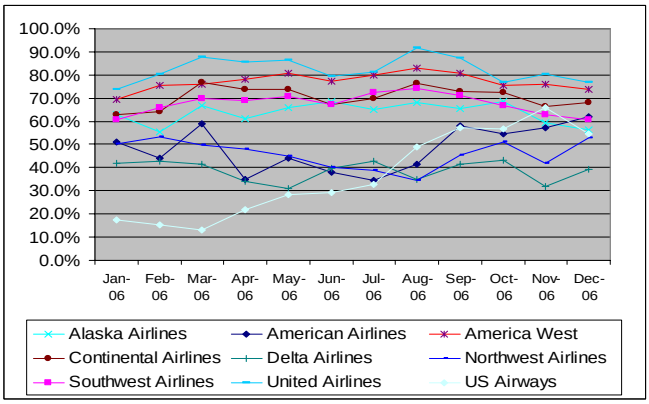




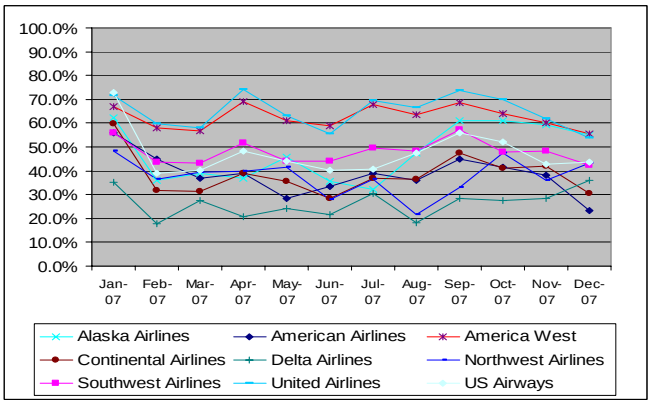








The monthly compliance rates for the airlines have varied over the years and come down even for the best performing airline. This was particularly apparent during 2007.



It is likely that the change in the way runways were used after the third runway was opened with new ATC vectoring procedures have negatively influenced compliance rates. In-trail departures off the center runway largely eliminated staging staggered departures off the north and center runway to facilitate the merge of the flight paths to a common departure heading over the riverbed. The concentration of departures off the center runway appears to have opened up the airspace for more discretionary decisions aimed at adjusting departure headings in the horizontal plane for aircraft in-trail to keep separation and avoid the effects of wake turbulence from the aircraft ahead, and to be able to anticipate the turn to an assigned heading after reaching 4 DME, bringing more departures towards the outer edges of the area for the noise abatement in Tempe.