FAA Technical Center Capacity Seminar

Helen's Rules of Thumb

Presented to: Capacity Seminar Participants

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Federal Aviation Administration

1 Runway -- Arrivals Only

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IFR: **There is usually 2 minutes between arrivals. Therefore,**

                   Expect: 60 minutes ÷ 2.0 minutes per arrival = 30 arrivals per hour in IFR

                   By experience, it is frequently 30 - 32 arrivals per hour in IFR.

VFR: **There is usually 1.5 minutes between arrivals. Therefore,**

                   Expect: 60 minutes ÷ 1.5 minutes per arrival = 40 arrivals per hour in VFR

                   By experience, it is frequently 42 arrivals per hour in VFR.

1 Runway -- Departures Only

(If no departure restrictions)

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VFR: There is usually 1 minute between departures. Therefore,

       Expect: 60 minutes ÷ 1.0 minute per departure = 60 departures

       per hour in VFR

IFR: About the same as VFR.

       By experience, VFR & IFR have about 58-59 departures per hour.

› ---------- › <u>1 Runway -- Mixed (Arrivals & Departures)</u>

There must be sufficient time to insert a departure between 2 arrivals.

IFR: With 2 minutes between arrivals, there can be a departure between 2 arrivals.

Expect: 30 arrivals & 30 departures per hour

VFR: There should be about 1.75 minutes between arrivals to insert a departure --

0.75 minutes (45 seconds) arrival occupancy time & 1 minute for Departure/Arrival separation.

60 minutes ÷ 1.75 minutes per arrival = 34 arrivals per hour in VFR

Expect: 34 arrivals & 34 departures per hour in VFR

When a runway has low occupancy times and fast approach speeds, it is theoretically possible to have 0.75 minutes for arrival occupancy time and 0.75 minutes for Departure/Arrival separation. The result could be 40 arrivals & 40 departures per hour in VFR -- but this is the maximum one could get.
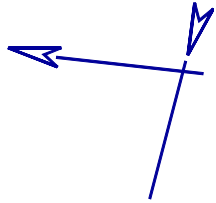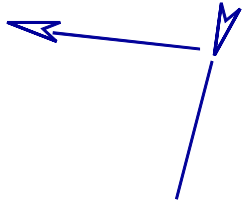
2 Intersecting Runways

Aircraft arrive & depart from closed end of "V"

IF THE RUNWAYS <u>INTERSECT</u> & THE ARRIVAL FLIES OVER

THE DEPARTURE RWY:

You can insert a departure between 2 arrivals. The arrival needs to cross the intersection before the departure can roll. Because the intersection is near the arrival threshold, it is similar to the case with mixed operations on a single runway.

IFR: 30 arrivals & 30 departures per hour

VFR: 34 arrivals & 34 departures per hour

2 Non-Intersecting Runways

Aircraft arrive & depart from closed end of "V"

IF THE RUNWAYS <u>DON'T INTERSECT</u> & THERE IS SUFFICIENT SPACE FOR THE DEPARTURES TO QUEUE UP AND ROLL, INDEPENDENT OF THE ARRIVALS:

IFR: The runways are dependent and they are treated as if they intersect. Using example from RIC (Richmond, VA-- 1994 Study) in which the intersections of the 2 runways are close.

30 arrivals & 30 departures per hour

If there is great enough distance between the intersections of the 2 runways so that the operations are independent, then:
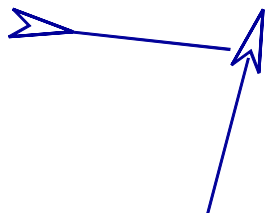
30 arrivals & 60 departures per hour

VFR: The runways are dependent if there is departure jet blast:

40 arrivals & 40 departures per hour

The runways are independent if there is no departure jet blast:

40 arrivals & 60 departures per hour

2 Runways
## Aircraft arrive & depart at open end of "V"

IF THE RUNWAYS <u>DON'T INTERSECT</u>:

IFR: The runways are dependent.   The arrival must have landing assured before the departure can roll.   When the departure rolls, the arrival must be separated sufficiently to allow for a missed approach.

30 arrivals & 30 departures per hour

VFR: The runways are independent.

40 arrivals & 60 departures per hour
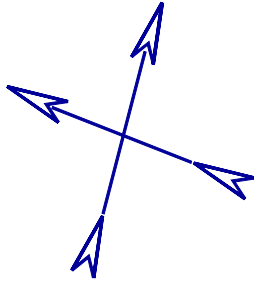
2 Intersecting Runways
Intersection is in middle of the runway

THE RUNWAYS <u>INTERSECT</u> SO THE OPERATIONS ARE DEPENDENT.

IFR: 30 arrivals & 30 departures per hour

VFR: 34 arrivals & 34 departures per hour

Caution for Intersecting Runways

Beware of applying the "rules of thumb" to intersecting runways. The examples have greatly simplified intersecting runways and crossing runways. The examples do not consider LAHSO (Land and Hold Shorts). Where the runways cross and the angle of the intersection can greatly affect the runway dependencies and flow rates. Consult the tower at the airport you are working on.

Federal Aviation Administration

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