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**What is demand management?**

Demand management (or access control) refers to any set of regulations or other measures aimed at constraining the demand for access to a busy airfield and/or at modifying the temporal characteristics of such demand. Examples are slot restrictions and airport pricing schemes aimed at discouraging the scheduling of flights during peak traffic hours and inducing airlines to shift some operations to off-peak hours. In short, demand exceeds supply and it's unlikely that the supply of airport capacity will be able to accommodate growing demand in the foreseeable future. Some form of demand management may be the only available alternative, at least for short and medium terms. The demand management approach could be divided into three categories:

- Purely administrative
- Purely economic
- Hybrid (combinations of the two above)

A fundamental element of all administrative approaches to demand management is the concept of a slot. A slot is an interval of time reserved for the arrival or departure of a flight and is allocated to an airline or other aircraft operator for a specified set of dates. These approaches require a set of criteria for allocating slots:

- The length of time for which a flight has been operating
- The regularity of the flight
- The origin or destination of the flight
- The characteristics of the airline requesting the slot

All the criteria mentioned above overlap a lot with the schedule coordination approach of the IATA[1]. A fully coordinated airport must indicate the number of aircrafts movements per hour that the airport can accommodate. Thereby plays historical precedent an important role: an aircraft operator who was assigned in the same previous season ("summer" of "winter") and utilized that slot for at least 80 percent of the time, is entitled to continued use of that "historical slot". This means that, with the growing demand in compare to supply, it is very difficult for "new entrants" to get a slot. The main appeal of the IATA's purely administrative schedule coordination approach is that it "has been singularly successful in maintaining a high degree of coherence and stability in the international air transport system" (IATA, 2000).

Economic approaches to airport demand management utilize various forms of congestion pricing to exercise some control over airport access. Access to airports is paid through a landing fee, which is proportional to the weight of the aircraft. These access fees typically vary with the time of day, season and even by day of the week. Two things are truly striking. First, as the amount of traffic at a congested airport increase, the landing fees will decrease, because the cost of the airfield is divided among more users. Second, a fee based solely on

[1] They have classified airports into three categories. Level 1 airports are those whose capacities are adequate to meet the demands of users. Level 2 airports are those where demand is approaching capacity and some cooperation among potential users is required to avoid reaching an over-capacity situation. Level 3 airports are those deemed sufficiently congested to require the appointment of a schedule coordinator, usually supported by a committee of experts and stakeholders, whose task is to resolve schedule conflicts and allocate available slots.

the landing weight of the aircraft essentially charges aircraft according to their “ability to pay”, rather than in proportion to the costs they cause to others by operating at the airport. With growing congestion, the use of airport landing fees as an instrument to reduce delays and maximize efficiency at these very expensive and scarce facilities may be equally important as the use of these fees to generate airport revenues. It seems that many of strongest economically and most congested airports around the world can experiment with alternative revenues, because landing fees are becoming far less dominant in this respect.
Congestion pricing is a very difficult thing. The congestion costs depend on two factors: internal (private) delay cost, which means the cost that a particular user will incur due to a delay that user suffers or external delay cost, the cost of the additional delay to all other prospective facility users which is caused by this particular user. That impact of this congestion pricing is most severe on general aviation and on regional airlines. These two classes are the ones that can least afford to compensate others for external costs and oppose this as being discriminatory against them. The application of congestion pricing is likely to reduce significantly delays to major carriers, by “driving away” from the peak hours many general aviation and regional airline operations. As a result, major carrier operations face reduced costs, even after paying the higher landing fee. A few congestion pricing approaches have been developed:

- Surcharge: weight-based landing fee paid by aircraft operating during the airport’s peak period(s).
- Flat fee: entirely or partly independent of the aircraft’s weight, is imposed on all aircraft operating during the peak period.
- Multiplier: applied to the weight-based landing fee charged to aircraft operating during the peak period.
- Minimum landing fee: for aircraft operating during peak hours, to be applied only to aircraft that would otherwise have paid less than that amount.

Hybrid demand management systems combine administrative and economic mechanisms. The starting point is the number of slots to be made available at an airport (administrative) and instead of schedule coordinators, hybrid systems rely on such economic devices as congestion pricing, slot markets, and slot auctions to arrive at the final allocation of slots among potential airport users. The slots plus congestion pricing approach involves a few steps:

1. Specify the number of slots available in each time period.
2. Develop and announce a schedule of landing fees that vary by time of day/or day of week and/or season.
3. Invite requests for slots from prospective users.
4. Use a schedule coordinator to allocate slots.

The main difference between this and the purely administrative approach is that prospective airport users must now also consider the cost of access to the airport at different times when preparing their requests for slots.
Another hybrid approach treats airport slots as a commodity that can be bought and sold. An advantage over congestion pricing is that equilibrium can be reached easier, because buy-and-sell and slot auctions permit these prices to be determined directly by the market.
The last hybrid approach would use auctions to allocate slots. This approach involves a few steps:

1. Provide a clear explication of the extent and duration of the rights inherent in a slot.
2. Specify the number of slots available in each time period.
3. Airlines and other prospective users submit sealed bids for the slots they wish to obtain.

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4. After all the bids are received, the slots in each time period are awarded to the highest bidders.
5. The price that a user actually pays for an awarded slot is set equal to the lowest successful bid in each time period.

A more viable hybrid system may be one in which the slots at an airport are auctioned off to the highest bidders by the airport operator and/or by a civil aviation organization and then become commodities that can be bought and sold.

Interest in airport demand management is growing quickly throughout the world. It will probably expand in the future, with hybrid systems likely to be widely adopted.

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