PLANNING, DESIGNING, AND CONSTRUCTING AIRPORTS IN MEXICO

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In Mexico as in some other countries, airports are not operated by municipalities or states or even by airport authorities as they are in the United States. Most of them, at least the principal airports, are managed and operated by the federal government through a special organization that is not attached to any ministry or secretary or department, but is a separate organization that works under a council. Planning, design, construction, and maintenance of all the paved areas at airports are done by the Ministry of Public Works. The Department of Communication and Transport through the civil aeronautics director controls the crews, controls the airplanes, and establishes the rules. Another agency provides the air traffic control services. That agency operates much like a private company although it is under the control of the government.

We, therefore, have 4 main organizations: one for construction, one for operation and administration, one for air traffic control, and one for aeronautical control. These give us an advantage in that, as we face problems with land acquisition or with highways or with any other transportation mode, coordinating is easier because we are all within the federal government. This has the disadvantage, of course, of lack of competition and lack of a variety of ideas for solutions to the problems.

Another advantage is that we do not have competition between airports and any other transport facility. We recognize that airports are a physical part of our communication network, the same as are highways, microwaves, telephone links, and buses. We believe that transportation modes have to be complementary and never, if it is possible, competitive. We already have a railroad network, highways, airports, and water ports that have been

constructed at considerable expense. This construction has been supported by the country itself, and we cannot waste what we have already invested in. In many cases, therefore, it is simple for us to make a decision regarding the construction or the operation of an airport.

Notwithstanding this, naturally our experience is quite small. We have fewer airports and considerably less traffic than do other countries like the United States, France, England, or Canada. However, we have one of the greatest rates of air travel growth in the world. Mexico City has had a growth rate of approximately 12 percent each year for the last 5 years. In 1965 Acapulco had a 200 percent growth rate in 1 year and then stabilized at approximately 25 percent for the last 5 years. And Puerto Vallarta, thanks to the Night of the Iguana, has had a 33 percent rate for the last 4 years.

Fortunately we started low, but we are growing fast. In the conference workshops, participants were worried about forecasts. All of us worry about forecasts. But there is no way to have any foresight into the future, at least in our case. If we had said 5 years ago that Puerto Vallarta would have a growth of 33 percent per year, we would probably now be in jail because nobody would have believed us—not even ourselves.

We use more or less the same forecast technology as used in the United States because we borrow U.S. experience and in many cases U.S. engineers and advisors. We make a forecast to study the financial condition of the airport, which is, in certain respects, academic because the justification of the airport is not only in economical terms but, in most of the cases, in terms of the indirect benefits to the region and even indirect benefits to the country.

So we use the forecast to see how much we are going to lose directly during the next years. We study the forecast of the volume of the demand, and we design for the volume of demand, but we are not concerned about dates. When the demand occurs does not worry us too much. If it happens in 1985, that is all right. If it happens in 1987, well that is all right, too. If it happens in 1983, then we have to start the expansion of the airport in advance, and so we change our forecast conditions. We do it with the same technology, but the interpretation is a little different.

So instead of the economical justification of the airport, we are interested in the cost of maintenance and cost of operation itself of the airport. In our design and planning of small airports, our first consideration has to be that the operating organization spends as little as possible in operation and in maintenance. Therefore, the designer has to be almost an expert in airport operation so that the design is based on that expertise. In the last 10 years, we have changed practically all of the construction and design specifications of our airports.

We consider the airport to be the link between 2 modes of transportation: the air transportation and the ground transportation. Theoretically, it is also a port, or it could be a bus station. The airport, therefore, has to meet the requirements of the 2 modes of transportation: on the one side, the airplanes; and on the other side, the ground transportation; and in the middle, an interface portion.

We also consider our airports to be a connected system or an assembly of systems, each formed by different parts of the airport. The total capacity of the system is not the sum of the individual capacities of the system parts, but the capacity of that system that has the least capacity.

The first system that we consider is the air space—not only the congestion of the air space by planes but also the congestion by obstacles. Wherever we try to build an airport, on the centerline of a proposed runway is certain to be a mountain.

The second system that we consider is the taxiways and the aeronautical portion of the apron because, if we do not have much demand on the airport itself, we do not need to build so many taxiways, aprons, and platforms. Therefore, we carefully revise the capacity of the runways with various possibilities, considering the demand, but not dates.

Quite a few of our airports have parallel taxiways because we can use our runways for taxiways and increase the rate of occupancy of the runway because we do not have the demand. We thus reduce costs of construction and maintenance. We can add taxiways in the future as we need them because they are provided for in the master plans.

The third system is the terminal complex formed by the airside and the landside of the apron.

The fourth system is the access road. Why are we so concerned about the access road if we do not have so many passengers and so many operations? We cannot locate airports as close to our cities as we would like because the location depends on avoiding the mountains. Therefore, the access road is important. We divide the access road into 3 parts: (a) from the front of the terminal complex to the boundary of the airport itself; (b) from the boundary of the airport, which normally connects with the highway, to the boundary of the nearest community or village; and (c) within the community. We recognize, of course, that the volume of traffic created at the airport cannot create congestion in the city. The city is already congested, with or without the airport traffic. But we must consider the traffic within the city because it increases the total travel time of the passenger.

The final system that we consider is the installation. If the electrical services fail, navigation aids, buildings, and runway lighting fails, we reduce the capacity (we never risk the safety of the airplanes). We include the installation as a system (facilities, mechanical installation, baggage delivery belts) because it affects the capacity.

There may be other systems, but we think only these 5 affect capacity.

I do not know of any other conferences that have been held to discuss landside capacity at airports. Many international conferences have discussed airside capacity. We understand operation capacity and approach capacity. We know how to handle takeoffs and landings and how to simulate them. But we have hardly paid any attention to the landside. This is why we in Mexico are quite interested in what was discussed at this conference.

I would like to suggest that the landside be considered as a total, from the terminal building to the community. I know that we have different problems and different kinds of organizations for airports and highways and other forms of transportation. But whether the highway is a state, interstate, municipal, or federal highway, it is a highway and is connected with the airport. The traffic congestion, the traffic signals, and other operations affect the airports.

The airport is a total, conjunctive system. At the same time, we can separate the airport system into subsystems because the units of demand for each are different. We measure air space in number of operational hours, either landing or takeoff, or even touch-and-go operations. We handle so many passengers per hour, but the peak passenger hour does not necessarily have to be the peak operations hour—or the peak hour for access roads and parking lots. So we have to separate the airport, analyze each system by its subsystem, and consider the demand for each part of the airport.

Each part of the airport could then be treated or built separately, in relation to the total capacity of the airport. This means that we can increase each part of the airport, independent of the others. It means that, if we need more aprons, we do not have to build more ticket counters. We might need more ticket counters if we add more airlines, and this is one of our air problems at Mexico City Airport.

Mexico City Airport handles about 6 million passengers and 35 airlines, which is not an operation as big as that in many other international airports. If each airline wants a ticket counter with a sign and some poster on it just for prestige and operates the counter 2 hours per week, the cost for the airport is extraordinarily high and is without a real return. The efficiency of that portion of the ticket counter is low because it operates only 3 to 10 hours per week; the rest of the time it is empty. In the meantime we have to provide the building, the air-conditioning, and the lighting.

If we separated all the subsystems, but coordinated them in such a manner that they could grow separately, depending on the particular demand, we could just expand a portion of the building or the ticket counter to accommodate more airlines. But the airlines should not affect the operation peak hour or the passenger peak hour because they could operate at a different hour.

We are trying this in Mexico, and it is working fine so far. We do not have enough experience yet to be sure that it will work in the long range. We have master airport plans that are based on volumes of demand for a 20- to 25-year period. The first stage of the airport is the size of the dimension of the airport. We then study the operation,

which has a certain flexibility, for 2 to 5 years. Some subsystems, for instance, the fueling facilities, could increase capacity easily if needed.

If to increase the capacity of the apron is a matter of more pumps, we just install the pumps. The increase in the capacity of the fueling facility takes no more than a week, but the increase in capacity of the runways and taxiways could take years. The systems will, therefore, require varying periods of operation and then varying amounts of time to expand.

Just a final word. In the conference discussions, everybody considered the airport problems from the viewpoint of the building. We seemed to forget that the airport and the airlines are for passengers. Our main purpose is to move people. The airport design, the airline's operations, the access road—all have the main purpose of moving people. The more flexible and simple the solutions are, undoubtedly the more efficient the airport will be.