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THE EFFECT OF STANDARD CHARGES OF CANADIAN AIRPORT OPERATIONS

By Adam Jaworski

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Several years ago the standardization of landing fees among Canadian airports was completed, consequently, all airports are charging the same domestic landing rates. This might be impressive to an American air carrier if he noted the recent survey conducted by the Department of Commerce of the State of New York, which showed that 136 airports in the United States are using 151 systems of fees for scheduled flights.

In September 1953, for most of the Canadian Airports, there was an increase of rates for the space occupied at the terminal buildings, and the hangars. Therefore, a brief survey of the current airport charges in Canada might be of some interest. Furthermore, for the last five years the ratio of revenues to maintenance expenses, excluding depreciation, was computed for about 40 top ranking Canadian airports. The results will be presented later in a graphical form.

Most Airports Are Federally Operated

The majority of Canadian scheduled airports are operated by the Department of Transport, which is an agency of the Federal Government. There are, however, some important airports under Municipal management; Vancouver, Calgary, and Edmonton might be quoted as examples in this respect. And in several instances, although the airport is operated by the Department of Transport, the Municipality is still the owner of the land. In addition to that, there are many small fields, mostly serving unscheduled flights, which are managed and owned by the airlines. To give a numerical illustration to the above, we may say that there are a total of about 300 civilian airports and anchorages, about 115 are operated by the Department of Transport, 100 by the municipalities, 36 by the airlines, and finally Provincial Air Service and the Department of Mines operate about 25 airports each.

All airport charges are standardized in Canada to a very high degree and the landing fees in particular; as there is only one level of landing rates for all airports. Obviously, the standardization of airport charges makes accounting easy for the aircraft operator, but on the other hand, life hard for the airport management.

Admittedly, operating costs per landing differ significantly among
the airports, and consequently, a universal rate cannot reflect accurately the costs of a particular airport. A standardized rate, however seems to be fully justified for the airports operated as one system; few large airports and several small ones forming one financial unit. For the majority of small airports operated individually, even in the long run, it would be practically impossible to introduce rates that could recover the total operating cost in full. Therefore, the airports should be operated on a system basis, probably by regions, in view to achieve self-sufficiency as a whole. That may be arguable; what is not arguable is the need for standardizing at least the methods which are used by the airport management for computing charges.

**High Operating Cost + Light Traffic = High Rates**

The operating costs at many Canadian airports are relatively higher than in the United States due to a long winter season which increases significantly heating cost and calls for frequent snow removal on the airfield and sanding of slippery runways. The situation is aggravated further by the fact that most of the Canadian airports do not enjoy the American level of traffic density; the 1953 yearly traffic at the two largest airports: Montreal and Toronto, amounted to about 34,000 scheduled aircraft movements and 750,000 passenger (deplaned and enplaned) in each of these two places.

Bearing in mind the two facts previously mentioned, namely, high operating costs in many of the airports, and light traffic, the conclusion is obvious; if a Canadian airport manager intends to recover the operating cost to the same extent as his colleagues in the United States —he must charge higher rates in general, and landing fees in particular. Even so, he might be faced with a relatively high deficit because the rates cannot be raised indiscriminately.

**Landing Fees are Increasing Faster Than Aircraft Gross Weight**

It has already been pointed out that landing fees are standardized throughout the country. In practice, the landing fees are related to the maximum take-off gross weight by a scale which results in large aircraft paying more per unit of weight than small aircraft. There are five weight blocks with the following rates per 1,000 pounds:

1. 10¢ when the gross weight is not over 15,000 lbs.
2. 12½¢ for the gross weight block of 15,001 to 30,000 lbs.
3. 15¢ for the gross weight block of 30,001 to 45,000 lbs.
4. 20¢ for the gross weight block of 45,001 to 75,000 lbs. and finally,
5. 25¢ for all gross weights over 75,000 lbs.

The above unit rates per 1,000 lbs. apply to all commercial aircraft in their continental flights. Figure 1 is shown below to illustrate the stepping. On the graph, as a comparison, La Guardia's rate\(^1\) and the

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\(^1\) Effective May 12, 1954, Chicago's new airport (O'Hare Field) has introduced the same unit rate as La Guardia, i.e. 20¢/1,000 lbs. with no sliding scale for frequent landings. Chicago's rate was calculated independently of La Guardia's figure.
COMMERCIAL AIRCRAFT'S
LANDING FEE
(FOR ONE LANDING)

Fig. 1
proposals by the Department of Commerce, State of New York\textsuperscript{2} have been added.

It should be underlined that there are no rebates for operators whose aircraft make large numbers of landings at a particular airport. Such practice, in certain cases, is considered by ICAO as discriminatory against operators with infrequent landings.\textsuperscript{3}

Private aircraft up to 5,000 pounds do not pay in Canada any landing fees at all, and above this gross weight, the charges are one-half of the commercial rates. A minimum landing fee of an order of 50\c has been introduced recently.

Trans-atlantic rates are much higher than the continental ones, because the former includes charges for the navigational facilities as well. As an example, the DC-6, with a gross weight of 93,200 pounds pays a trans-atlantic landing fee of $128.50, where the continental rate is only $23.70.

\textit{Charging the Heavier Aircraft More Per Unit Weight Than the Light Aircraft}

Looking into the criteria of airports cost on one side, and aircraft ability to pay on the other, it may be argued that:

(a) There are no apparent reasons why a light aircraft should share the additional costs of investment and maintenance for reinforcement and adding length to the runways to serve heavy aircraft types.

(b) Aircraft's earning power per landing increases more than in proportion to its gross weight, and earning time as indicated by the aircraft's block speed is not accounted by the gross weight factor at all.

Historically, Canadian landing fees based on the present formula were first introduced on April 1, 1947 and amended on March 15, 1948. The rates were calculated for several aircraft types on the criterion that for each aircraft the landing fee should not exceed 3 percent of the potential revenue; full payload less direct operating expenses calculated for the aircraft optimum stage length. Afterwards the figures were converted into ten block weight units which were amended to the present five, by reducing the stepping up for the heaviest types of aircraft.

\textit{Gasoline Concession Fee; \$0.83 Per U.S. Gallon}

Practically, when there is an airport concession fee on fuel the charges should be always considered jointly with the landing fees, otherwise a low level of landing fees might be misleading in case an air carrier is charged with a high fuel concession fee. There is a

\textsuperscript{2} Survey of Airport Landing Fees at Airports in the United States, by the State of New York, Department of Commerce, 1953.

\textsuperscript{3} ICAO, International Airport Charges, April 1954, page 20.
universal concession fee for dispensing aviation fuel at all Canadian airports in an order of 1¢ per Imp. Gall. of aviation gasoline and 5¢ per Imp. Gall. of aviation lubricants, i.e. the rates per U.S. gallon for the gasoline and lubricants amount to 0.83¢ and 4.15¢ respectively.

The concession fee on fuel is distinct from a fuel tax, even when both are passed directly to the consumer. An ICAO Study\(^4\) defines the distinction as follows:

"Concession charges are levied by the airport authority for the benefit of airport revenues and should not be confused with the fuel taxes which are levied by a government for the benefit of public revenues."

Although a standardized rate is charged on fuel, revenues collected from this source are credited in full to the airport where the collection was made, and this procedure applies to all airports operated by the Department of Transport or municipalities. In case an airport is operated by an airline, the arrangement is left entirely to the oil company and the airport's operator. Bearing these facts in mind, the above charge is definitely an airport concession fee, and not a tax on aviation fuel.

The revenue collected from aviation concessions represent about 22 percent of the revenue coming from landing fees, and therefore, it would be necessary to increase the latter at least by that amount (as a private aircraft operator pays only fuel concession fee), when the revenues from fuel concession fee would be replaced by the landing fees. It should be noted that the revenues from the fuel concession are unevenly distributed among the airports; they are highly concentrated at the airlines' refuelling stops. However, by coincidence, the fuel concession fee may correct the landing fees for the turbo- and jet-liners which are already in scheduled operations. (We hope that Comets' withdrawal from the service is only temporary.)

The gross weight as a general basis for landing fees in case of the turbo-prop and jets omits two facts; First, their high requirement in respect of runways, which consequently increases airports' costs. Second, the speed factor and comfort have raised the jet fleet's ability to pay over the piston aircraft. It is true that the airlines are not charging the passengers more on the Viscount and Comet flights, but the sales appeal has improved the load factor as compared to the piston aircraft, thus improving the revenue per plane mile too.

In short, the fuel concession fee for the jets and turbo-props, where the fuel consumption is higher than for the piston planes, corrects the landing fees as a gross weight which is usually taken as a basis for the landing fees, does not account for the fact that jet- and turbine-liners should and could pay more in landing fees than piston planes of the same gross weight.\(^5\)

\(^4\)ICAO, op. cit., page 16.
\(^5\)A reverse course was taken in England; a very high tax on aviation gasoline (29¢ per U.S. Gal.) and none on turbine fuel.
When a new structure of landing fees is considered, usually one of two things happens: either a rate is first determined for the still popular DC-3, and the rates for other aircraft types are related afterwards, or when a figure for a unit weight appears from some calculations, immediately a check is made to find out how much a DC-3 would pay as compared with other aircraft types.

Therefore, it might be interesting to express the performance data and the Canadian landing fees of some of the aircraft types commonly used by the airlines, by taking DC-3 as a basis for comparison. Bearing in mind that the number of aircraft types that are in scheduled operations is rather limited, and any new type is introduced after prolonged tests, it seems practicable that many airport charges and landing fees in particular, could be defined for each aircraft type in DC-3 units. On that basis, the airport charges might be standardized and shown in nondimensional units; like a Mach number in supersonics.

Obviously, the airport management could impose a dollar rate per DC-3 unit according to the requirement of a particular airport. Consequently, the method of charging will be standardized, but not the charges.

It might be mentioned that in Canada in scheduled operations the ratio of landings of two-engine aircraft and a four-engine one is about 3.8 : 1, but bearing in mind that the domestic landing fees for a DC-3 and a North Star are $3.30 and $19.50 respectively (a ratio of 1 : 5.9) we may conclude that all four-engine aircraft are bringing more revenues to the airports than the two-engine planes.

A numerical illustration of the DC-3 units for the aircraft general performance data and Canadian landing fees is submitted below. And to indicate the effect of the speed factor, the data for the Viscount and Comet 3 have been added, by taking for the former the average stage length of 600 mi. that for the Viscount is a representative on the European routes, and by assuming for Comet 3 the same stage length as is actually performed by the Constellation on the international flights.

From the figures in Table 1 it will be seen that:

(a) By comparing the landing fees (line B 2) with the gross weight (line A 1) the former—as may be expected—are increasing faster than the latter.

(b) The additional requirement on runways is not met by an additional increase of the landing unit rate (line A 2 and B 1 respectively).

(c) The total charge (line B 4) is always below the ability to pay as measured by the product of payload capacity and average stage (line A 6).
### Table 1

**AIRCRAFT GENERAL PERFORMANCE AND CANADIAN AIRPORT LANDING CHARGES RELATED TO DC-3**

*(DC-3 Data Taken as Units)*

<table>
<thead>
<tr>
<th>Aircraft Types</th>
<th>Convar 240</th>
<th>DC-4</th>
<th>Star (Domestic)</th>
<th>Const. L749</th>
<th>Viscount 701</th>
<th>Comet 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.* Gross Weight</td>
<td>1.7</td>
<td>2.9</td>
<td>3.0</td>
<td>4.2</td>
<td>2.3</td>
<td>5.6</td>
</tr>
<tr>
<td>2.* CAA Take-off Distance</td>
<td>2.0</td>
<td>2.5</td>
<td>2.6</td>
<td>3.2</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>3. Av. Stage in Internat. Operation</td>
<td>1.3 -</td>
<td>3.5</td>
<td>2.7</td>
<td>5.6</td>
<td>4.2</td>
<td>5.6**</td>
</tr>
<tr>
<td>4. Block Speed</td>
<td>1.2</td>
<td>1.3</td>
<td>1.4</td>
<td>1.6</td>
<td>1.6</td>
<td>2.5</td>
</tr>
<tr>
<td>5.* Payload Capacity</td>
<td>1.5</td>
<td>2.5</td>
<td>2.8</td>
<td>2.6</td>
<td>1.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6.* Payload Cap. x Av. Stage</td>
<td>3.1</td>
<td>8.8</td>
<td>7.7</td>
<td>14.6</td>
<td>5.0</td>
<td>15.7</td>
</tr>
<tr>
<td>7. Payload Cap. x Block Speed</td>
<td>1.3</td>
<td>3.1</td>
<td>4.0</td>
<td>4.2</td>
<td>2.3</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>B. Canadian Airport Charges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Landing Rate/1000 lbs. Domestic</td>
<td>1.2</td>
<td>1.6</td>
<td>2</td>
<td>2</td>
<td>1.6</td>
<td>2</td>
</tr>
<tr>
<td>2. Landing Fee</td>
<td>2.0</td>
<td>4.6</td>
<td>5.9</td>
<td>8.3</td>
<td>3.6</td>
<td>11.5</td>
</tr>
<tr>
<td>3. Fuel Concession Charge per Av. Stage Length</td>
<td>1.7</td>
<td>7.3</td>
<td>5.6</td>
<td>14.6</td>
<td>6.4</td>
<td>26.3</td>
</tr>
<tr>
<td>4. Landing Fee and Fuel Concession Fee per Av. Stage</td>
<td>1.9</td>
<td>5.5</td>
<td>5.9</td>
<td>10.0</td>
<td>4.4</td>
<td>15.6</td>
</tr>
</tbody>
</table>

*For the Convair 240, DC-4 and Constellation L 749, the ratios were computed from the absolute figures in international services as shown in the ICAO Report, International Airport Charges, op. cit., page 42, including an international DC-3 of 11.4 tons gross weight and 344 Km. for the average stage. The domestic North Star was referred to a domestic DC-3 of 26,400 lb. gross weight and 167 miles for the average stage length.

**The same ratio was taken as for the Constellation L 749.**

Example of Calculation: Landing Fee and Fuel Concession Fee (B.4) for the North Star (Domestic Operation):

Landing Fees ........................................... $19.50
Fuel Concession Fee on the consumption for av. stage length of 469 miles ....................................................... $ 5.31
Total airport fees per stage length .................................. $24.81

The landing fee of a DC-3 is $3.30 and on the domestic average stage length of 167 mi. the fuel concession fee amounts to $.94, thus bringing the total airport fees per stage to $4.24. Finally, the North Star figure expressed in DC-3 units equals $24.81 ÷ 4.24 = 5.851 = 5.9, and the last figure is inserted in the table.

(d) For a hypothetical case of the Comet 3, the correction by the fuel concession fee appears to be just right, because the ratio of payload capacity and block speed on the same distance for the Comet 3 and Constellation L 749 is 1.7 i.e. 7.0 ÷ 4.2 (line A 7) when on the
other hand, the ratio of total charges amounts to 1.6 i.e. $15.6 \div 10.0$ (line B 4).

Regarding the additional requirement on runways by the large aircraft, a plausible argument might be submitted that at the major airports which were primarily designed to serve four-engine aircraft, small aircraft, when calling for business there, should share the total cost of the runways too. Therefore, a higher dollar rate per DC-3 unit might be charged by the major airports.

**The Impact of Airport Charges on the Airlines' Expenses**

The significance of the Canadian landing fees and fuel concession fee may be illustrated by expressing these cost items as a percentage of total cost of the Trans-Canada Air Lines on their North American services, called domestic for abbreviation. The figures for the period 1948/52 are shown below with the corresponding data for the British European Overseas system.

<table>
<thead>
<tr>
<th>Year</th>
<th>T.C.A. (Domestic)</th>
<th>B.E.A.*</th>
<th>B.O.A.C.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>1.89</td>
<td>3.0</td>
<td>1.1</td>
</tr>
<tr>
<td>1949</td>
<td>1.90</td>
<td>3.6</td>
<td>1.4</td>
</tr>
<tr>
<td>1950</td>
<td>2.04</td>
<td>3.9</td>
<td>1.3</td>
</tr>
<tr>
<td>1951</td>
<td>2.19</td>
<td>3.5</td>
<td>1.5</td>
</tr>
<tr>
<td>1952</td>
<td>2.05</td>
<td>3.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>


It should be noticed that the ICAO Report, after analyzing the landing fees in relation to the airlines present revenues, came to the conclusion that "It seems probable that the International Transport Industry as a whole could bear some careful controlled increase in these payments."

When the landing fees and fuel concession fee are combined and expressed as percentage of TCA total expenses on the domestic system, the figure will run as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>TCA Domestic Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>2.41</td>
</tr>
<tr>
<td>1949</td>
<td>2.40</td>
</tr>
<tr>
<td>1950</td>
<td>2.57</td>
</tr>
<tr>
<td>1951</td>
<td>2.73</td>
</tr>
<tr>
<td>1952</td>
<td>2.58</td>
</tr>
</tbody>
</table>

It should be added that in the United Kingdom, instead of a fuel concession fee, the tax on aviation gasoline takes from the piston aircraft 14 percent of the passenger revenues, i.e. "On an average the fares of the first six passengers to board an airplane on United Kingdom internal services are required to pay fuel tax appropriate to the flight."

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6 Principal cost items of the TCA, Domestic System for the period 1946-1950, have been discussed by the writer in the May 1952 issue of the Journal of the Royal Aeronautical Society. Also see author's article "Trans-Canada Airlines' Progress, 1946-1950 — A comparison with U.S. Trunk Lines." 19 Jour. of Air Law & Com. 305 (1962).
7 ICAO op. cit., page 27.
Other Airport Charges

Non-Aviation Concessions—Most of the non-aviation concessions like food services, newsstand, telephones, insurance machines, taxi, and car parking (at major airports) are based as usual on a percentage from gross-sales. Two omissions from the normal list of non-aviation concessions should be pointed out; there is no liquor sale at the airports, except at Gander and no parking meters. It may be mentioned that the turnstiles which are admitting public to the observation roof at Toronto for a dime, are contributing to the airport's revenues more than $17,000 a year.

Terminal Building Rates; $3.00 and $4.00 Per Sq. Ft. Per Year—Effective September 1, 1953, there was two sets of rates at the terminal buildings operated by the Department of Transport; $4.00 per sq. ft. and $3.00 per sq. ft. The former applies practically at major airports and permanent terminals. Both rates, however, include all services, even such as cleaning and lights. It should be mentioned that in Canada at the international airports, the airlines are not charged for the custom and immigration space. Compared to the major American terminals, the Canadian rates are definitely much lower, especially when all services are accounted for.

Yearly Hangar Rates Per Square Foot: Typical 60¢ with all Services—But Only 1¢ for a Hangar Site—The Department of Transport is charging a hangar rate of 60¢ per sq. ft. per year with all services provided; including cleaning and lighting. The hangar rate is higher at Montreal and Gander, where the charge amounts to 80¢ per sq. ft. In case when the tenant takes less than one-quarter of a hangar, the rate goes up by 25 percent. On the other hand, when the carrier undertakes the hangar operation, the rate is lowered to 20¢ a sq. ft., which accounts only for the hangar depreciation and a small contribution to the airport's overhead. Offices and workshops at hangars' lean-tos are charged for at a rate of $1.50 and $1.00 a sq. ft. (with all services). The higher rate is charged for a better standard of accommodation. In several airports, the hangars are owned and operated by the airlines. As an incentive in this direction, the hangar sites are provided on a long term lease with a rate of about 1¢ a sq. ft. a year. This rate varies from airport to airport.

The hangar rate for the itinerant aircraft at all airports operated by the Department of Transport, except Montreal and Gander, is of an order of $1.00 per sq. ft. per year (which works out as .273¢ per sq. ft. per day). In Montreal and Gander, the rate is 10 percent higher, i.e. .3¢ per sq. ft. per day. The rate includes heating services during the winter. The assessment, effective September 1, was based on the outside dimensions of the aircraft; wing span \times length. The previous basis was more elaborate \( (\text{wing span}^2 \times .677) \), but for an outside storage such a basis still applies. Compared to the product a wing span
and length, the area calculated by the more elaborate base is slightly larger for small planes, but is less for the bigger ones. Very roughly, the charges for the aircraft outside storage works out as one-fifth of the hangar charges. There are no charges for a period less than six hours.

**Yearly Revenue of About $170,000 Needed**

It is a well-known fact that with a high level of revenues it is much easier to approach closely or to reach the self-support level than is the case when the level of revenues is low. A numerical illustration to this commonly known fact is presented by Figure 2, where the revenue/expense ratios are shown for about forty Canadian airports, during the last five fiscal years (1949/50 to 1953/54). The ratio of revenues and cash expenses for each fiscal year at a particular airport is marked by a number, i.e. 54 stands for the fiscal year 1953/54. To eliminate any differences in the method of assessing depreciation, taxes, interest rates, all these expense items have been eliminated. Capital expenses are omitted, of course. The same applies to the subsidies in the case of revenues.

It must be kept in mind that by eliminating the depreciation costs, a bias is introduced that favors large capital investments. It is conceivable that an old terminal building or a hangar when compared with a modern structure, might show an unimpressive ratio of revenues and cash expenses. But, with the depreciation charges accounted for, the old building might be still in the black when the modern one plunges deeply in the red.

When the ratio of revenues to maintenance expenses is low, it doesn't follow that the standard of airport management must be low too. Sometimes the ratio is beyond the control of the airport management, especially when the revenues are predetermined by light traffic and standardized rates, when, on the other hand, severe climatic conditions could push the operating expenses to an exceptionally high level. But, when the airport management finds out from Figure 2 that the points for his airport are below the General Trend Line, he will very likely investigate all circumstances which are bringing down his results below the average level of other airports where the revenues are of the same order. Some of these circumstances he might improve. The same applies when the trend line for his airport doesn't show up the same angle as the General Trend Line, i.e. the rate of progress is below the average. In both instances, the graph supplies to the management a good illustration of where the airport stands among others, in respect to its financial achievements.

An intersection point of the General Trend Line\(^9\) with the self-
support level indicates that in average a yearly revenue of an order of $133,000 is required to bring the ratio of revenues and expenses to a 100 mark, i.e. where the revenues are meeting the cash expenses for maintenance.

It might be expected that the picture, as shown on Figure 2, will continue to improve during the next few years, especially when the new rates at the terminal buildings and hangars will bring more revenues in addition to the increase of revenues caused by the traffic development.

In the ICAO Study, the expenses and revenues of 47 international airports are shown for the period 1948 and 1949. The total revenues of the airports amounted to 53.5 percent of the maintenance expenses, and when the capital cost is accounted for by taking 4 percent as depreciation rate and 3 percent as interest, the revenues expressed as a percentage of the total cost dropped to 24.8 percent.

Bearing in mind that the international airports are enjoying a higher traffic than small domestic ones, it is no wonder that for the same period i.e., fiscal year 1949/50, the Canadian airports (international and domestic) brought revenues which cover the maintenance expense in about 35 percent, and when following ICAO proposals, a depreciation and interest rate of 4 percent and 3 percent respectively is taken on the capital investment, the revenues as a percentage of the total cost represent about 16 percent.

We may conclude with a general remark. Economically, by and large, the airport charges should follow the airlines revenues, and the latter at the majority of airports are less than the fully allocated costs.10 If so, the revenues at the majority of the airports will not cover the expenses in the near future, and therefore is fully justified if the airports are operated as a system that the revenues in a few major airports — as is the case with the airlines — should exceed significantly airports’ expenses, thus helping to counter-balance, at least partially, the operating deficit at the majority of the airports. And even when the airport’s revenues are twice its cash expenses, the depreciation of the whole investment when accounted for, is likely to more than offset all the gains. In this respect, the airlines are in a much happier position.

was drawn through these three points. (The least squares method requires that the trend line must always pass through the middle point of all points, which was determined in the first step).

10 Ernst & Ernst's Air Mail Study has shown that in 1949 out of 928 stations, only 55 or about 6 percent of the total were profitable to the airlines.