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A NEW BOARDING STRATEGY

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ABSTRACT
Airline companies are in a high competition with the rising of demand in the direction of air travels, consequently this requires paying more attention about decreasing the turnaround time. Turnaround time falls out the time between two flights that include boarding the passengers to aircraft and settling them into their seats. Aircraft boarding is an important issue in airline operations because it affects directly turnaround time. Thus, airlines have been overrated to this problem. Up to now, reducing the boarding planning studies were tried for narrow body aircrafts with different strategies. In this study, it is considered double aisle layout and proposed a new strategy, elastically reverse pyramid to be inspired by reverse pyramid, to smooth out interferences among passengers. Customer satisfaction is the first objective of the strategy. A model by Arena is developed and determined block sizes and time intervals with the implementation of three destinations in eight consecutive weeks for each in with the help of data from Turkish Arilines. Initial results show that the new strategy performs high success about preventing the interferences between passengers.
Keywords: Boarding strategy; Airline operations; Simulation

1. INTRODUCTION
Airlines sometimes have difficult times about finance. There are several things that causes problem like increasing the fuel prices or competition with low cost carriers. The airlines make profit when their aircrafts are flying and a plane standing on the ground reduces the gain. Therefore, if the time between arrival and departure of flights is decreased then the plane could fly more. So, the turnaround time is reduced. The more decreasing turnaround time means that the better utilization of aircraft [1]. The factors of turnaround time are taxi – times, passenger/baggage deplaning, maintenance checks, fueling, passenger/baggage boarding, airplane servicing, cargo handling. If we decrease the passenger boarding time, then turnaround time also declines. That is a major factor of success of airline. In addition, it is important for customer satisfaction. Nowadays, many airlines use hub-and-spoke system. Passengers are conveyed to their destination points from their hubs. So the better customer satisfaction requires less waiting them at the hub. Faster transfers of the passengers denote less turnaround time of the plane.

This study examines a new strategy, elastically reverse pyramid which is inspired from reverse pyramid [1], to solve the interferences problem among passengers. Elastically reverse pyramid is developed for providing the boarding passengers together related to sold tickets. This new strategy considers the rates of tickets that located relationships block destinations. This boarding strategy is applied double aisle layout. It is promoted that a model by Arena and settled block sizes and time intervals with the execution of three destinations in eight consecutive weeks for each in international airline operations.

Needless to say, reverse pyramid is the most efficient strategy that is commonly used for boarding however; it is not suitable for customer satisfaction. In reverse pyramid strategy, passengers board into the aircraft in order to the numbers that is defined due to this strategy. Furthermore, a passenger who sits with his/her family or colleagues must board into plane alone. In this study, this position is prevented with the aim of customer satisfaction.

2. ELASTICALLY REVERSE PYRAMID

2.1. Definition of Approach

In this method, firstly we defined our block sizes and time intervals between passengers. Then, it is implemented that reverse pyramid method to the aircraft. Passengers are given boarding numbers from 1 to 5 on their tickets according to coming to aircraft. After boarding first classes with giving them as a calling number on their tickets 1, it is determined that remained passengers as calling order in figure 1. However, this prevents our customer satisfaction. A customer who comes with his/her family or colleagues has to be separated if they are called due to the reverse pyramid. A new method is improved, elastically reverse pyramid to board passengers who does not board alone together.

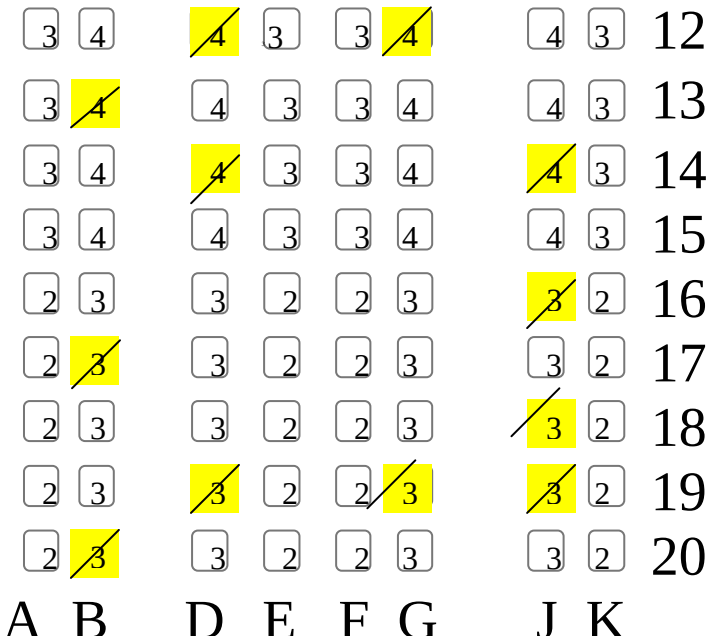

Figure 1: Elastically reverse pyramid

2.2. Expression of the Method

In this approach it is thought about A 330–200 which has 250 passengers capacity. 22 of them are first classes. They are boarded first so they have tickets with the given number of 1 about their priority. This refers that 228 passengers will be settled into their seats within a minimum time. It is considered that every passenger is alone and reverse pyramid exists into our empty double aisle layout. If two passengers sit abreast then the shape of pyramid can be changed according to the seat position of them. Main purpose is labeling the tickets beginning back to front of the aircraft as it is shown in figure 1. The simulation model is also determined around this idea. Taking all these points into consideration, elastically reverse pyramid is thought to board passengers in least tardiness in a wide body aircraft. The new appearance looks like an elastically shape. That is the reason why its name is ‘Elastically Reverse Pyramid’. Customer satisfaction is considered because of unregimented passengers with their relations. In this part that is told how boarding numbers are given on tickets. Figure 1 shows a section of layout row numbers from 12 to 20. In figure 1, 20A and 20B seat together so it is given as a number 2 on seat 20B instead of 3. Although reverse pyramid tells to give that seat 3, elastically reverse

pyramid refuses this type of settling because of customer satisfaction. On figure 1; 18J, 18K, 19J, 19K sit together thus the J column of these rows have to be given 2 instead of 3 as boarding sequence.

2.3. Implementation

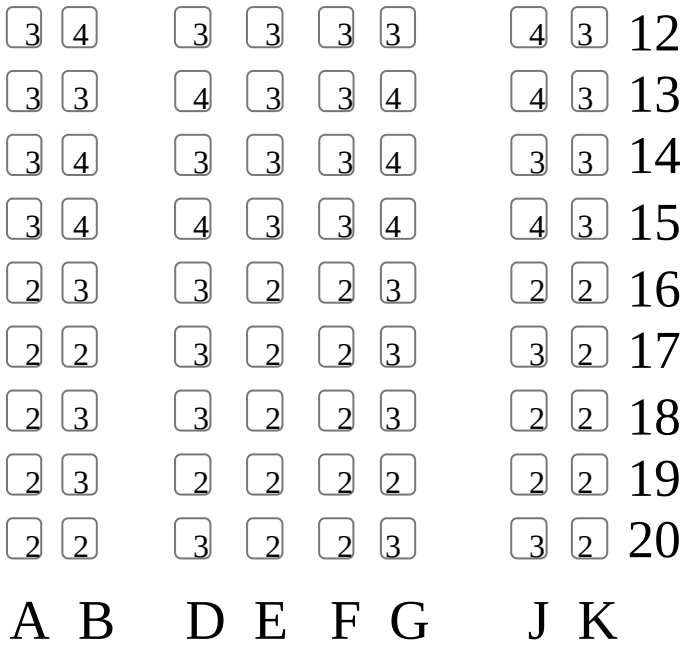

Figure 2: Implementation of the method

Consequently, passengers are boarded in a sequence from 2 to 4 with the numbers on their tickets in figure 2. For instance, the passenger who sits in 20 B bought his/her ticket with 20 A in figure 2. Thay are boarded together because of their check-in operation. The last boarding numbers are shown in figure 2 according to elastically reverse pyramid method.

This study is applied to Arena with a new model. Passengers are boarded in an entrance. Passenger boarding time is a major topic that has to be considered as an important point which affects directly the turnaround time. So, it is studied that bring a new dimension to this subject with a new method, elastically reverse pyramid. Some applications were tried on narrow body aircrafts with the help of some mathematical models. The simulation based approach is also considered firstly and determining of passenger blocks is identified with this information [2]. However, none of them shows the most efficient method; elastically reverse pyramid and also the program which is constructed by Arena. Application of the new method to a wide body aircraft, A 330-200 with 250 passenger capacity is the most distinctive specialty which makes this study different from the others. Data of the information of three destinations in eight consecutive weeks are got from Turkish Airlines and determined block sizes and time intervals with the implementation of passenger sitting distributions. Optimum boarding time is determined with the help of simulation model in Arena. This model could be applied in wide body aircrafts with the aim of reducing the boarding time and also the cost of flights.

3. CONCLUSION

Passenger boarding time is a major topic that has to be considered as an important point which affects directly the turnaround time. So, it is studied that bring a new dimension to this subject with a new method, elastically reverse pyramid. Some applications were tried on narrow body aircrafts with the help of some mathematical models. The simulation based approach is also considered firstly and determining of passenger blocks is identified with this information. However, none of them shows the most efficient method; elastically reverse pyramid and also the program which is constructed by

Arena. Application of the new method to a wide body aircraft, A 330-200 with 250 passenger capacity is the most distinctive specialty which makes this study different from the others. Data of the information of three destinations in eight consecutive weeks are got from Turkish Airlines and determined block sizes and time intervals with the implementation of passenger sitting distributions. Optimum boarding time is determined with the help of simulation model in Arena. This model could be applied in wide body aircrafts with the aim of reducing the boarding time and also the cost of flights.

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