APPLICATION OF INTEGRATED FLEET ASSIGNMENT AND CREW PAIRING MODELS FOR SMALL AIRLINES IN AVIATION SECTOR

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ABSTRACT

With the improvement of technology opportunities, with the beginning of 1900s, civil aviation transportation continue its development rapidly till nowadays. Not only with the economical importance but also with its contribution to cultural improvement and globalisation, aviation transportation sector is an important sector as it is the fastest transportation service in national and international dimensions.

In Turkish civil aviation sector, many local airlines get into the sector. But because of the variable aircraft fuel prices, high crew costs, operational capital difficulties, insufficiency of maintenance and other substructure possibilities, difficulties in finding the qualified personnel and the taxes that applied to airlines, airlines can not hold on the sector. Due to the disadvantages of these costs, airlines had to be shutted down. During the privatization of Turkish Airlines and having the sector free, taxes are reduced and legal handicups are removed for the airlines to increase the number of airlines that permanent in the sector. For holding on the sector, increasing competition and for the development of airlines, private airlines, that have great contributions in economies of countries, must maximize their flight and ground securities, must have good services and must generate a well-designed airline scheduling so as to have a strong economy.

In this study, it is aimed to solve the fleet assignment problem and crew pairing problem simultaneously for a small airline that have 44 flights, 12 airports, 5 fleet and 24 aircrafts, using operational research to solve the problem with mixed integer programming. In the result of this study, we determine which type of aircraft to fly at each flight segment and partition the flights to assign the crews to pairings. The integrated fleet assignment and crew pairing model that improved in this study can be a decision making tool for airline schedule planning that it can determine which fleets have excess aircrafts and determine renting or buying aircrafts from specific fleet or should show what to do when flights are cancelled or added.