

Summary

On a global scale air traffic is growing rapidly with approximately 4% on a yearly basis. One bears this growth in mind in the design and planning of the terminal area. It is of great importance to quickly transport airport passengers within the terminal building. To provide for the predicted growth, and reduce delays as much as possible, it is needed for airports to gain enough capacity within all facilities. Because it is getting more difficult to expand existing terminals, the solution has to come from other directions. Many technical solutions, which increase capacity, are and are being developed.

The airport terminal gives the passenger a logistical connection. When using this connection the passenger undergoes a number of processes. Some of these processes are specific to a certain group of passengers but some are applicable to all passenger groups. Insight in the different groups, and processes which are specific to them, gives the possibility to include it in terminal design and planning. Because the passenger flows are increasing but airline companies still have to use the same dedicated area for processes, improvements have to be found.

The configuration of an airport is of great importance for its performance. A poorly configured airport won't fulfill its needs for a very long time after it is build. When choosing an airport layout it is the task of the designer to achieve an acceptable balance between passenger convenience, operating efficiency, investments and aesthetics. Different design concepts have been developed during the years. Because performance is mostly measured in terms of walking distances it seems Finger pier designs are most optimal from this point of view.

Making a good prediction of future passenger flows is difficult and requires thorough investigation of current and past passenger flows. There are many rules of thumb that convert design hour flows into area requirements for each terminal facility. The results from these rules are not determining the final design, they only serve as a first concept to roughly determine the needed size of the terminal. Better results on terminal design can be achieved by also include planning the arriving and departing flights. Simulation can be used to compare the concepts.

Within the air transport sector several important changes are being made. New trends on passenger processes are set to accommodate predicted increase in passenger flows. Current technologies for use in boarding-passes are mainly restricted for use with paper passes only. With new techniques coming available for check-in, such as digital tickets and checking in by cellular phone, the need for a universal system for identifying a passenger has grown. This resulted in a newly developed 2-dimensional barcode system.

Minimizing walking distances is also a trend which offers many possibilities. To minimize walking distances it is important to consider two important aspects which have been neglected in previous studies. At first the role of transfer passengers is important and secondly the fact that airlines and airports minimize walking distances operationally has to be taken into account. Because in the past

simulating passenger flows seemed expensive and highly time consuming, research on this topic has been performed at Delft University of Technology. This research resulted in a software tool called SimPed. SimPed is a passenger simulation tool and can be used to simulate passenger flows within public transport facilities such as airport terminals. The tool uses different models and theories to simulate routes chosen by passengers, the pace at which passengers move within the complex and it also can deal with interaction between public transport facilities. Besides helping designers by simulating passenger flows, SimPed can also be used in planning public transport.

As simulation techniques become more available, also the size of simulation software increases. Because airport processes change quickly, it is important to be able to change simulation models with ease which was impossible with the increasing complexity of the available tools. This resulted in creating terminal buildings blocks. Delft University of Technology made it possible to let a block represent certain facilities and, when coupled together, let them simulate a whole airport terminal. The result is a modular system which can easily be adapted to any situation.

The use of RFID to track passengers is increasing. Research shows the smallest form of RFID has a signal strength which is too low. This causes the receiver not to recognize the tag at any time. OpTag is a research project that aims to develop a network of high resolution panoramic cameras that can be used to track passengers within an airport. The imaging system is combined with long range RFID tags, which can provide the information needed to identify individuals within the terminal. Passenger induced delays can be reduced by implementing a suitable passenger tracking system.

Improvements can be made at check-in. Passengers are already able to check-in completely without the aid of personnel, but baggage still has to be checked in at the regular check-in desks. Developments in passenger tracking technologies can be stimulated by starting research pilots. This will give insight into the maturity of different solutions. RFID has many possibilities for use in passenger tracking, the signal strength has to be increased and the combination with high resolution cameras has to be researched and further improved. By combining terminal area and terminal passenger throughput, one can quantify terminal performance and decide which development can possibly improve performance most.