



Aviation Solutions

Efficient planning



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Challenges

Optimizing security staff schedules

Securing an airport has several challenges. Security staff is needed to keep an eye on all areas of the airport. Furthermore, every departing passenger has to be searched and its baggage has to be checked. For all of these operations, many security agents are required. However, to have enough agents at all these places throughout the day can be a difficult planning puzzle.

From our experience in working with security companies, we know that scheduling all agents by hand is an almost impossible task. Especially since one needs to consider aspects as walking times, break times and the fact that sometimes a minimum number of male and/or female agents is required. Of course, a schedule can be created. However, it may not be very efficient.

At Syntro, we have developed a tool to create schedules for security departments. This tool produces shifts which have to be worked, given several input variables which need to be used. These shifts are not assigned to employees, but assigning personnel to all of these shifts covers all demand required at an airport. In this tool, it is both possible to assign individual employees and teams of employees to tasks.



Solutions

The tool works in a two-step approach. It starts with assigning personnel to all of the security locations, such that enough personnel is available at every location all the time. For some locations, having enough employees available is enough. During the day all tasks will be assigned among themselves.

However, for some locations there are simply too many agents to arrange this on the day itself. One can think of a large security filter, for this we have developed a lane planning tool. This tool will assign all agents to an individual lane.

In this approach, overall there are three possible types of solutions.

1. Give each individual employee a set of tasks and times for its entire shift. All tasks will be performed, but no team structure is used.
2. Create teams which do the same tasks and have identical working hours, these teams are mainly scheduled at the lanes. Though, such a team can go to multiple distinct places within a day.
3. Assign a team for X hours to a lane. The agents will work the whole day at the same lane with the same team. The breaks of these agents will be successively, such that the lane remains open for all X hours.

Those ways to fulfil all demand can be used independently. However, depending on the situation, it may be necessary to combine these. The model allows for this extension.

At some airports, the demand for agents is relatively stable. For this we can provide a one-off solution. Then again, when demand patterns change, this solution can easily be recalculated.

Other airports have a more varying demand pattern in which a week can be completely different compared to the week before. For this we can deliver a simple tool for which a schedule, multiple if required, is created for every single day. Within these tools, several input variables can be adapted such that planners have control of the tool. This can reduce the workload of the planner.

There are several ways in which a schedule can be established. For example when there is a demand pattern available weeks in advance, the creation of a schedule from scratch will fulfil.

In other situations, the demand for personnel for each location/filter is only available last minute. However, employees will have to know (approximately) at what times they start their shifts before this demand is available. The solution method can cope with this in various ways. When there is a provisional demand pattern available, a schedule will be built for this demand. After the final demand is known, the created schedule will be slightly adapted. Another method to cope with this is locking several timeslots in advance such that the final schedule will never be too far off.

Results & Conclusion

The solutions we create seem to work well in practice. Employees like our schedules, they know in advance what they will do the coming day and when they will go on a break. Furthermore, from the schedule it is clear which team they have to take over and which team will replace them.

On top of that, planners can easily adapt to working with the tool. The tool is insightful, can be tuned upon their wishes and has shown to be robust. The planners spend less time creating the schedules and can be done well ahead of time. Combined with the aspect that the efficiency gets roughly 5-10% better, all layers in the hierarchy of the organization are contented.





Syntro's Introduction

Syntro is a Dutch consultancy firm which has been established in 2009. Originally, the company focused on three main subjects: Sustainable and efficient scheduling, the organization of a planning department and the terms of employment related to working in irregular shifts.

Due to the steady growth of the company, it became possible to expand our activities to subjects connected to these main subjects. To give some examples, we provide training and coaching to planners and we have developed a simple tool in which employees have more control over their personal schedule on a weekly basis.

In the context of Operations Research, we use mathematical models to create very efficient schedules. Given a specified demand pattern, we are able to create an efficient set of shifts which satisfies that demand. Of course, taking into consideration the corresponding terms of employment and several social aspects. Within the model, it is possible to specify multiple activities (possibly at different places). The mathematical model can be used to calculate a single very efficient schedule when the demand pattern is identical on a day-to-day basis. Furthermore, we are able to provide the model as a tool to create schedules when demand patterns are different on a daily basis.