

INSIGHT

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LEAN AIRPORT

LEAN MANAGEMENT'S APPLICATIONS FOR AIRPORTS TO FLUIDIFY PASSENGERS JOURNEY. EXAMPLES ON THE ARRIVAL PASSENGERS JOURNEY



To meet the steady growth of passenger traffic, there are 2 main solutions for airports: build new terminals or improve existing ones.

1 billion passengers in 1987, 4.4 billion in 2017, and 6 billion in 2030 according the International Civil Aviation Organization (ICAO): air transport is constantly growing. [1]. To allow this development, an evolution of airports is required (and possible). In the case of new terminal construction, numerous obstacles are encountered, like the project duration that last for many decades, infrastructure costs, or environmental impacts (ecological footprint, noise and visual nuisances). Some projects as Notre Dame des Landes airport (Nantes, France) can be prospected for years before eventually being dropped. In this context, the redesign or the improvement of the existing infrastructure could be the most favorable solution.

Improving is Lean’s main goal: it’s a combination of methods and tools based on principles created in the 50’s by Toyota and used in Europe since the 80-90’s. Its objective is to produce in the most effective way in order to meet customer demand: avoid waste, remove non-value-added activities, standardize processes and adapt production to the demand.

Lean Management at airports

Since the 2000s, Lean Management has been expanded in the aeronautic industry and the service sector. Numerous companies are using its methods to optimize the use of both material and human resources, and increase customer and collaborator satisfaction. Operational excellence, of which Lean Management is a component, is even going so far as to be an integral part of corporate culture and part of the strategic plans of international hubs.

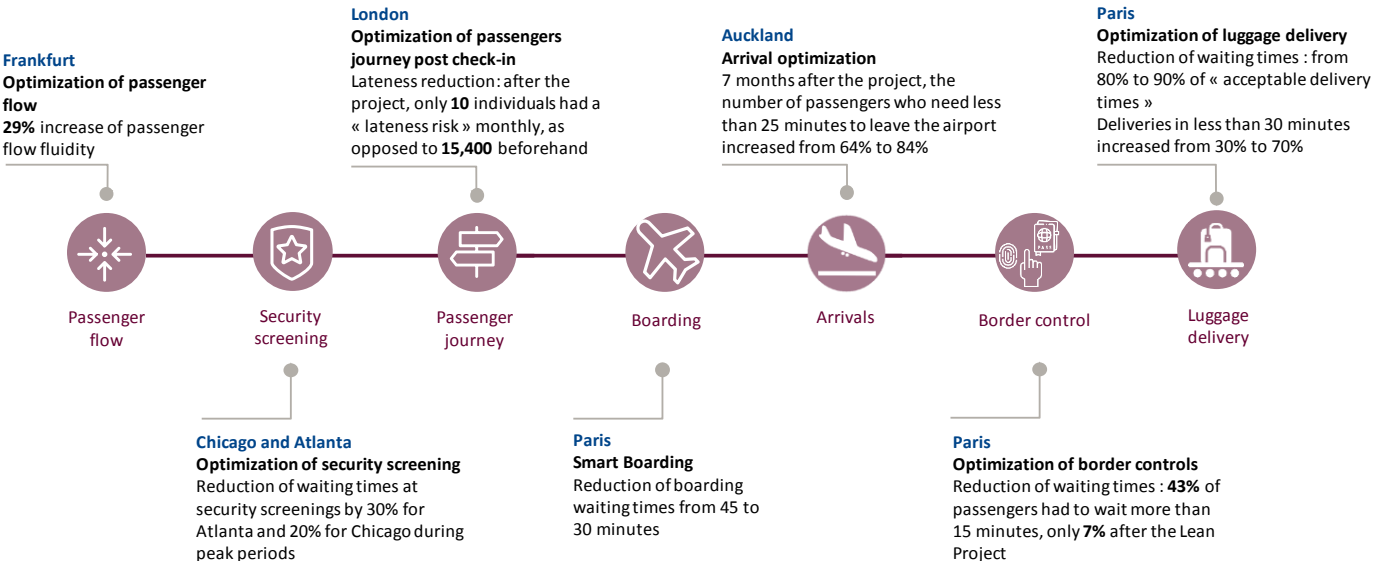
London Heathrow Airport, for instance, used Lean principles to increase passenger traffic flow at departure and reduce the number of passengers risking tardiness, from 15.400 to 10 each month.

Francfort airport has improved the fluidity of passenger flows by 29% thanks to Lean application. In the USA, Chicago and Atlanta airports applied Lean Management to their security checkpoints reducing waiting times between 20 and 30% on average.

Arrival routes can also garner significant gains, as did Parisian airport Roissy Charles de Gaulle with projects focused on border police or baggage delivery. Auckland airport also increased the percentage of arriving passengers who leave the airport within 25 minutes by 50%.

In what follows, we expand on three projects

EXAMPLES OF LEAN MANAGEMENT PROJECTS IN INTERNATIONAL HUBS



regarding passenger arrival route.

Business Case: How to streamline passenger arrival route using Lean Management methods?

Arrival route in airports

For a passenger, the arrival route in the airport starts at the landing of the aircraft. The first step consists of the aircraft runway on the taxiways from the landing strip to the gate. This step can last from a few minutes to tens of minutes according to the distance between the airstrip and the terminal, and the circulation of priority aircrafts.

Next comes the aircraft deboarding through a gateway or a stepladder. Once on the airport ground, the passenger could go through a passageway's maze, border control, and the baggage delivery before exiting the airport. These two last steps, often synonymous with waiting and frustration for passengers, are subject to Lean Management project in airports worldwide.

Project 1: Border police controls, often synonymous of waiting and frustration

In France, the control by the border police is a mandatory step for all flights coming from airports outside the Schengen area [2]. Passengers have to go through the control booths in order to justify their right of entry into the territory. The passenger's wait before the control depends on several factors such as the number of opened booths, the lack of preparation from the passengers concerning the documents that need to

be controlled, the organization of the pathway, the passenger flow, and number of flights which land at the same time in the same terminal.

In order to improve this process, Roissy – Charles de Gaulle airport used a Lean Management methodology named DMAIC (Define, Measure, Analyse, Improve, Control) to reduce the waiting times created by border control. This project leads to a reduction of the percentage of passengers who wait more than 15 minutes from **43% to 7% in one year**. [3]

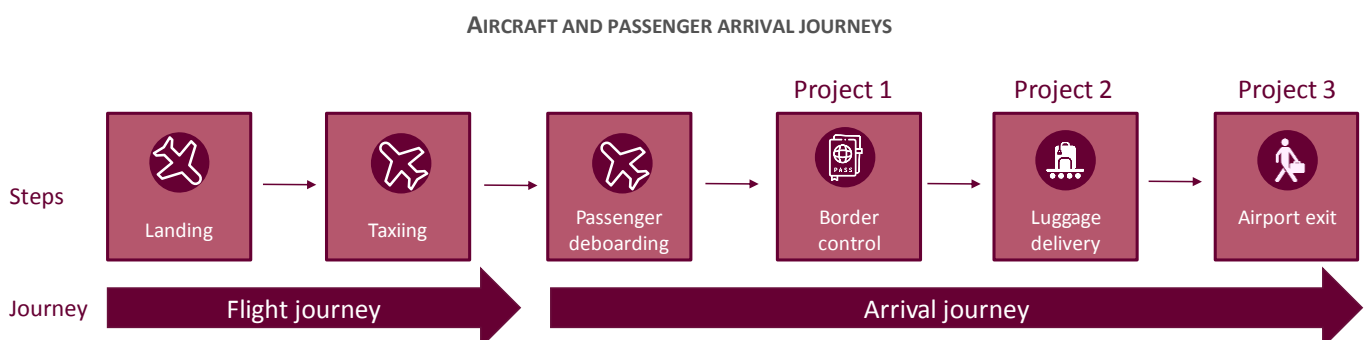
First, measures were performed on the field to identify the main cause of the important waiting times in front of the control booths: **the airport structure (1.5 km long for terminal 2) extends police movements in case of a last-minute change of the deboarding gates**. Several actions were recommended following this study, such as the communication of the flight passenger number for a better sizing of the border police agents, or an improvement of passenger comfort in the waiting lines. Television sets have been installed to entertain, inform and mitigate the frustration of passengers. The optimization of the officers has been studied as well. [3]

Project 2: Baggage delivery, last passenger impression of the airport

Baggage delivery is very often a source of waiting and dissatisfaction, especially since it's the last step before leaving the airport.

Contrary to common belief, this activity isn't directly under the control of airport operators, and is handled **by a ground-handling company appointed by the airline**. During the baggage delivery, the ground-handling company has to unload the luggage bay then transport them to the conveyor affected to the flight.

Two actors are part of this process:



DMAIC METHODOLOGY STEPS

DMAIC methodology is made up of 5 steps:
Define: Define the problem, resources, objectives
Measure: Collect data on the field. These data are the basis of the project
Analyse: Analyse collected data to prioritize root causes
Improve: Initiate actions to answer main root causes
Control: Control and standardize led actions

- The ground-handling company has to manage both humans and material resources in order to be ready when the aircraft lands.
- The airport which makes infrastructure available: gate, conveyor

During this process, the ground-handling company must respect a delivery time that can minimize passengers waiting time and allow loading the next flight's baggage in order to respect the turnaround time (25-30 minutes for an EasyJet Airbus A319 in Lyon, 2h for an Air France Boeing 787 Dreamliner in New York). [4]

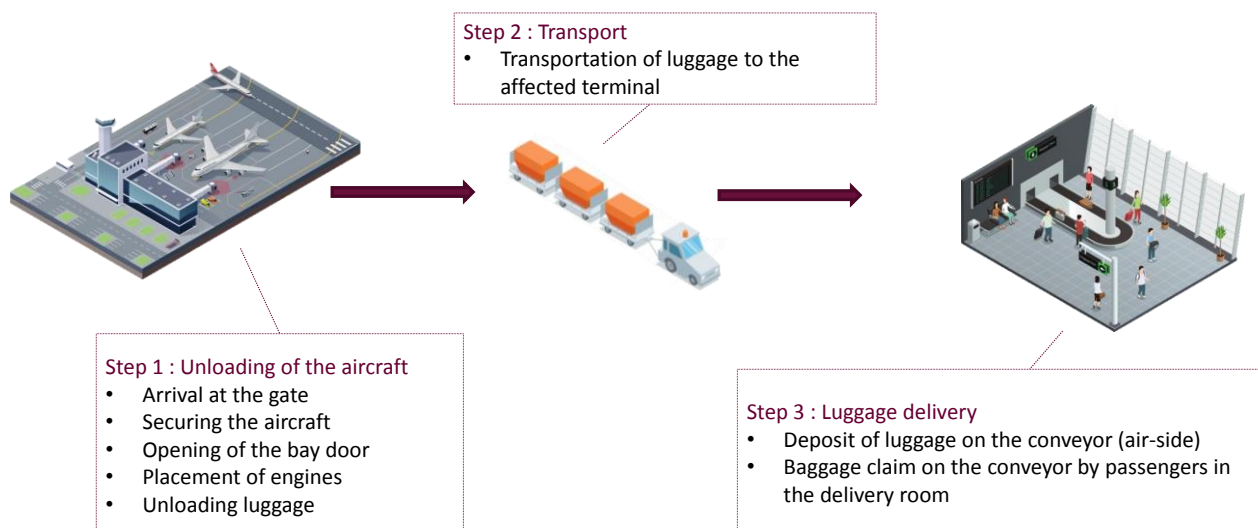
It's crucial to synchronize the path of passengers and baggage for a simultaneous arrival at the delivery room. This synchronization reduces waiting time, but also limits potential luggage theft in case the baggage arrives before their owner.

Roissy – Charles de Gaulle airport launched a Lean Management Project on luggage delivery to reduce waste all along the process. This project started with a characterization of flights according to various criteria: passenger ground travel time according to the deboarding gate, aircraft type, mandatory border control.

Observed wastage has been classified in 3 categories: MURIs (« Which are unreasonable »), MURAs (« Which is not regular ») and MUDAs (« Which is not needed »).

- MURIs (« Which is unreasonable ») focus on the reduction of the different excesses, either due to excessive resource allocations or a physical overload. In this context, it's possible to adapt the aircraft type (luggage bay number, luggage capacity of bays, use of containers) with the engines number used or adapt the time passed by the handling agent carrying luggage every day;
- MURAs projects (« Which is not regular ») are realized to standardize processes thanks by creating norms such as floor markings to optimize the vehicle parking time of engines, or normalizing the number of agents and engines according to the type of aircraft or airline company;
- MUDAs (« Which is not needed ») are used to eliminate the different waste (overproduction, waiting, transporting, inappropriate processing, unnecessary inventory, excess motion, defects). Several actions are possible for the

OPERATIONAL STEPS OF LUGGAGE DELIVERY



baggage delivery process, like the limitation of the movement of operators or the definition of the best canal to communicate information such as the conveyor affected to the flight.

Project 3: The airport maze

In some airports, employees guide passengers from the deboarding gate to the border control. Once arrived at the airport, it's not always easy for passengers to know where they are supposed to go.

Auckland airport (NZ) worked on its passenger journey in 2011. Actions were taken to **standardize and strengthen** signage.

Thanks to this project, passenger's arrival journey (from the aircraft to the airport exit) is faster than before: the percentage of passengers who complete the journey in less than 25 minutes increased from **64% to 84%**.

A major project on signage was also led by Philadelphia international airport. In 2012, the airport used standards created by the Airport Cooperative Research Program (ACRP Report 52) to enable a total redesign of its signage, including a standardization of colors and calibration of font sizes [5]. To execute this project, the airport's teams went on the field to study the different situations a passenger can face. The airport replaced 2000 signs and added 3000 new ones.

This project has improved passenger satisfaction and had a positive effect on the commercial activities of the airport: satisfied passengers **consume on average 40% more** [6]. In both cases, project teams of Philadelphia and Auckland airports used two key principles of Lean Management: **field studies** to understand the problem's root cause and the principle of **standardization**. The standardization is a central pillar of all Lean methodology or culture, which makes processes more efficient thanks to the normalization of resources and methods. This efficiency reduces the time variability of the passenger's journey to get as close as possible to the target.

Conclusion

Lean Management is a strength for airports just as much as it is for the industry. With the constant

growth of air traffic and the reluctance of people and governments to build new airports, Lean Management is becoming an essential component of strategic plans. Combined with the *smart airport innovations*, [7] Lean Management's principles adapt existing processes and infrastructures to meet new passengers' expectations.

Sources

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