



**1Point2**

# Office workers and lifts

SUCCESS STORY N° 4

## ⇒ ISSUES:

- Check the capacity of office workers that the building is able to receive.
- Validate control point resources.
- Optimize the « smart » lifts' rules.

## ⇒ SOLUTIONS:

- Simulation model able to accept input concerning a great variability in the flow of people.
- Sophisticated algorithm of lift management.

## ⇒ ADVANTAGES:

- Validation of control and lift installations.
- Analysis of the system's reactions in extreme cases.
- In the end, optimization of the surfaces' assignment (type and density of offices, conference rooms) to maintain the best fluidity of the system.

1Point2 and ExtendSim were chosen to simulate the flow of office workers, at peak hours, in a Parisian office block. The lessor and the users obtained guarantees concerning the resources to be implemented and the daily flow of « comings and goings ».

This high-rise building is made up of two 19 000 m<sup>2</sup> sections, with 1 600 work stations. What is at the heart of the matter? The office block and, consequently, its set of problems. An access control system, situated in the block's reception area, determines the access to 2 sets of 4 lifts, supplying, independently, each part of the block. It can filter 120 people per minute (apart from special disabled people passageways, located in parallel).

Analysis of the occupied part allows to know the entry flow, between 8 and 9h30 am, as well as at lunchtime.

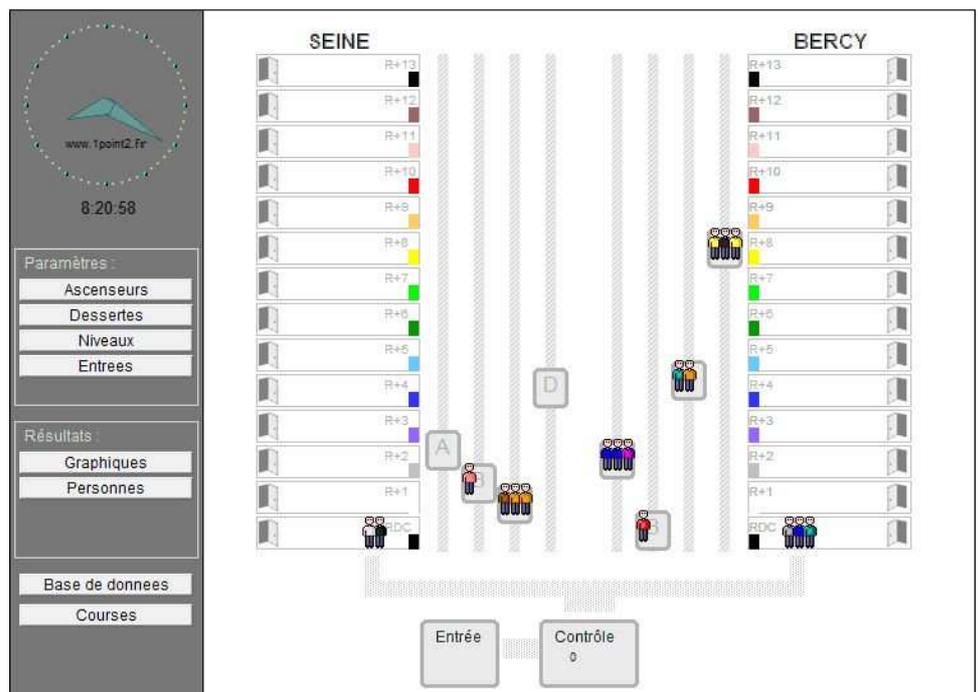
So, the question is whether the access control point and the lifts can absorb the current utilization, the saturation conditions, and if the distribution of the lifts is efficient.



The lifts are configured in detail:

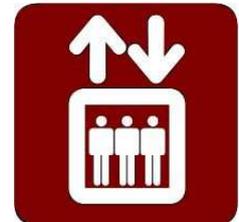
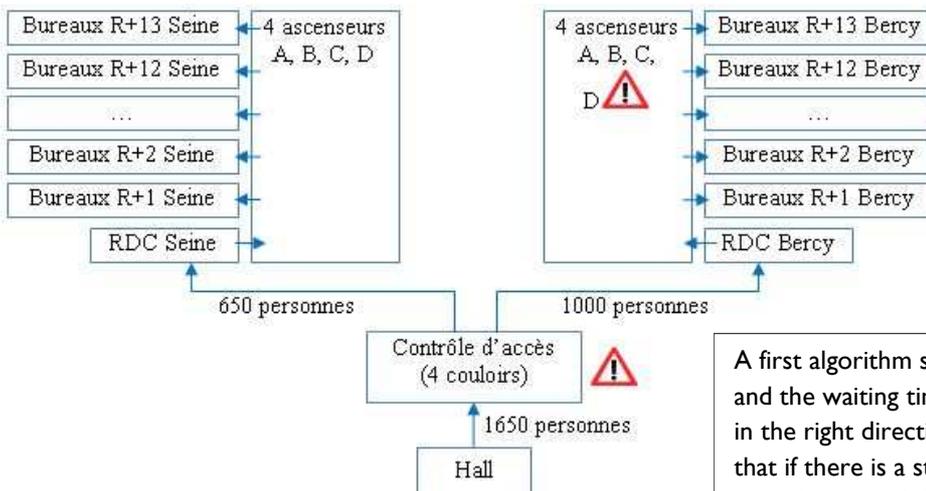
- Centralized call system, by touch screen, in the reception area, which shows the lift that should be taken.
- Accelerations and decelerations.
- Ascent/descent rate, standby time.

The system « knows » the departure floor, the destination floor and the number of people calling a lift. So we can test, realistically, several « smart » algorithms.



Simulation is one of the most powerful tools used to analyze complex systems. The advantages often go beyond the initial objectives. For example:

- ◆ **Understanding** the system's dynamics: how long (minimum/maximum time) does an office worker take to get back to his/her office? Where and when might there be long queues?
- ◆ **Anticipating** the operation of a new system, or **improving** the functioning of existing systems. Simulation can avoid making small or big mistakes!



A first algorithm sought to minimize the lifts' movements, and the waiting times, by proposing the nearest lift going in the right direction. But, the first trials quickly showed that if there is a strong influx from the ground floor, the specialization of the lifts is more efficient.

The present algorithm managing the lifts can adapt to this strong influx situation coming from the ground floor, and offers a more efficient operating mode. At peak hours, the waiting time is at worst of one rotation.

## Algorithms for « smart » lifts



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