

CROWD SIMULATION AT ABDICATION OF THE QUEEN OF THE NETHERLANDS

CITY OF AMSTERDAM



INDUSTRY

Crowd Simulation & Infrastructures

APPLICATION AREA

Events

COUNTRY

The Netherlands

OBJECTIVE

Creating a safe, comfortable and efficient environment for all visitors in Amsterdam.

FACTS & FIGURES

- Around 800,000 visitors from out of town.
- From which at least 239,000 by train.
- Every hour 38 trains arrived and departed from Amsterdam Central Station.
- This means the Dutch Railways is taking care of 35,000 – 37,000 train passengers every hour for one station.
- The police planned 10,000 shifts, of which 6,000 on the day itself.

“Simulation helped us a lot in creating a reliable and safe dispersion of pedestrians around Amsterdam Central Station.” – Daniël van Motman, Senior Advisor Traffic Management

ABDICATION QUEEN OF THE NETHERLANDS

The Dutch Queen's birthday is a national holiday and celebrated each year in the Netherlands with many concerts and special events in public spaces, particularly in the city of Amsterdam. In the year 2013 it was on this day that Queen Beatrix of the Netherlands abdicated and Prince Willem-Alexander became King. Associated with this official occurrence several additional events were organized, such as the coronation ceremony, a palace balcony scene and the Royal Boat Parade.

The city of Amsterdam expected a lot more visitors than during a regular Queen's Day, including many royal guests. Therefore additional safety measures were taken. The special task force Mobility & Crowd Management of the city of Amsterdam asked INCONTROL to participate and support the decision making about these measures.

OBJECTIVE

INCONTROL was involved in the organization process at an early stage. The objective of the project was to create a safe, comfortable and efficient environment for the hundreds of thousands of visitors in the crowded central areas of Amsterdam, by using simulation models of the expected pedestrian flows.

The simulation model created with Pedestrian Dynamics® took into account all the events and festivities that were organized during this day in Amsterdam, including their time schedules, expected numbers of visitors and the pattern and modus of arrivals. The model infrastructure comprised all available roads and paths in the city center, all emergency routes and the numerous positions where pedestrians can be guided or redirected by dynamic signing and crowd management agents. The focus was in particular on the area of the central station as the vast majority of the



of the visitors arrives and departs by train.

The city of Amsterdam used the simulation software to evaluate several different scenarios, to make justified decisions and reduce risks and uncertainties. These scenarios included creating new routes, changing routes to prevent passing specific areas and relocating the crowd management teams.

RESULTS FOR THE CITY OF AMSTERDAM

With Pedestrian Dynamics® one can easily and quickly simulate complex infrastructures and test different scenarios. The city of Amsterdam used the simulation of these scenarios in particular for:

- Validating and substantiating routing solutions: several routing variants, including construction of temporary pedestrian bridges or pontoons to cross roads and the many canals, were evaluated and the required widths of sections determined.
- Determining Crowd Management measures: the position, direction and capacity of dynamic signage, static signage, guidance teams.
- Communication to authorities and the outside world: The organization is in control and is prepared for all kinds of situations.

The findings of the simulation study consisted of flows and densities in all areas during the day. These findings have resulted in both changes in infrastructure and confirmation of the available walkway capacity and crowd management measures as proposed

by the authorities in Amsterdam. Some actual examples are:

- Determining that a temporary bridge over a road in front of the station –closed for the royal procession and emergency traffic– was a good solution to further improve the flows to other quarters of the city of Amsterdam.
- Determining the location of the crowd control teams that had to close the walking route to the Dam Square, in front of the royal palace, when it was getting too crowded and determining the moment to do so.
- Controlling the flow distribution to the events at the west and to the Royal Boat Parade at the river side of the central station. The model provided insight in the best ratio between the available paths.

To use the available capacity as effectively as possible during the day, the city of Amsterdam was deploying all available resources and means. They did not only use signage, matrix signs, traffic controllers and crowd control coordinators, but also distributed maps with all event areas, time schedules and preferred routes. They even developed an app for mobile devices to provide visitor information, but also to show the actual bustle and real-time calculation of the fastest route to a destination.