



## VISITOR FLOW SIMULATION FOR THE WORLD EXPO SHANGHAI 2010



### INDUSTRY

Crowd simulation

### APPLICATION AREA

Commercial venues

### COUNTRY

China

### CHALLENGE

The goal of the project was to measure the “performance” of the pavilion under different scenarios.

### RESULTS

When the initial design was simulated conclusions were drawn. In two of the six theme areas the average density was too high (>2 persons/m<sup>2</sup>). Either the surface of the theme areas was too small or the shows were too long. Also in the initial design two escalators were planned to be built, however one escalator was enough. This meant a significant difference in the investment of the construction

With the use of simulation, INCONTROL Simulation Solutions helped Kossmann.dejong in creating a clear view on the visitors flow of a pavilion on the World Expo Shanghai 2010.

### INTRODUCTION

In the year 2010 the World Expo is held in Shanghai, China. The Dutch design studio Kossmann.dejong was awarded one of the five theme pavilions called the “Urbanian Pavilion”. In total, the World Expo has 200 participants, for duration of six months. About 70 million visitors are expected. On average 40.000 people will visit the “Urbanian Pavilion” daily. Important decisions concerning the infrastructure and visitors flow were made. With the use of simulation, INCONTROL Simulation Solutions helped Kossmann.dejong in creating a clear view on the effect of different scenarios on the visitors flow. In total, the visitors will walk 800 meters through the pavilion. During this trip they will enter six theme areas. In each of these areas a different show is presented.

### OBJECTIVE

The goal of the project was to measure the “performance” of the pavilion under different scenarios. Important issues were:

- average stay time inside the pavilion
- average waiting time in the queue before entering the pavilion
- quality of experience
- an emergency situation

The quality of experience was defined as the key performance indicator of the project. This quality is measured with the value of the density (m<sup>2</sup>/person). As this quality of experience is stated an important issue, the minimum desired value of the density is 2 m<sup>2</sup>/person. With this minimum desired value Kossmann.dejong believes that every visitor will have enough space to enjoy the pavilion in a comfortable way.

With the use of simulation INCONTROL helped the exhibition architects in making the right decisions concerning the design of the pavilion.

#### PARAMETERS

There are several parameters that influence the quality of experience:

- The size of the theme area's (m<sup>2</sup>)
- The duration of the shows in the theme area's (minutes)
- Entry rate of the visitors (persons/hour)

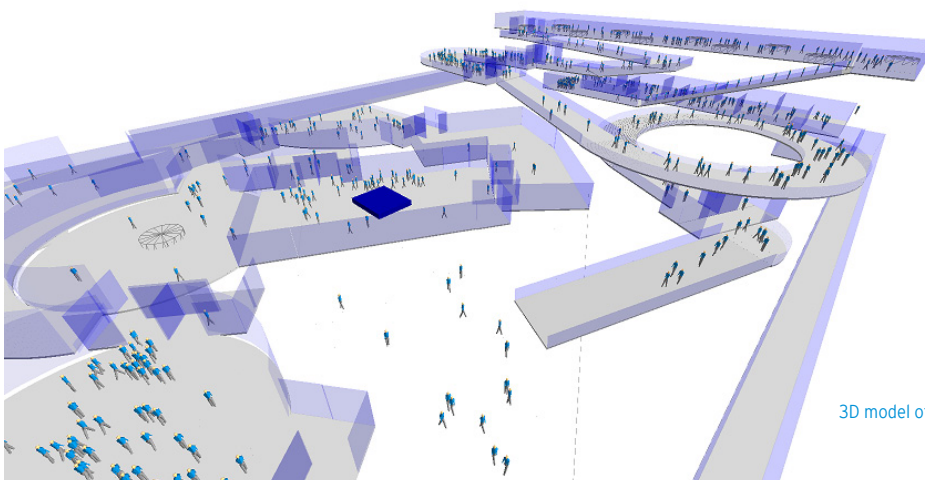
#### THE MODEL

Based on the knowledge and atoms about the pedestrian flows used in the airport and railing industry, INCONTROL constructed a simulation model of "The Urbanian Pavilion". New shapes of walking areas where constructed to build a realistic representation of the true pavilion infrastructure. With the model the stay time inside, the waiting time and the density of the theme areas can be monitored. Also an emergency event can be created. In an emergency situation visitors increase their walking speed and will move to the closest (emergency) exit. With this event the total evacuation time can be analyzed.

#### RESULTS & BENEFITS

When the initial design was simulated conclusions were drawn. In two of the six theme areas the average density was to low (<2 m<sup>2</sup>/person). Either the surface of the theme areas was too small or the shows were too long. Also in the initial design two escalators were planned to be built, however one escalator was enough. This meant a significant difference in the investment of the construction. The average travel time inside pavilion was about 45 minutes, but the client thought this duration was too long.

In a phase of close collaboration with INCONTROL, Kossmann.dejong made a redesign of the pavilion. This redesign consisted of both infrastructural as functional changes. After this phase the design of the pavilion met all its requirements. And with the help of demonstration videos and pictures Kosmann.dejong improved their communication and convinced the client of the optimality of their new design.



3D model of "The Urbanian Pavilion"