

## Structural design of Revolving Entrance Doors

### Barbara SIEBERT

Dr.-Ing.

Dr. Siebert Consulting Engineers

Munich, Germany  
[bsi@ing-siebert.de](mailto:bsi@ing-siebert.de)



Civil engineering degree from TU München. Own consulting Eng. office, special field: application of glass, facades. PHD: calculation of point fixed glass. Independent, publicly appointed and sworn expert for structural glass.

### Andreas HAESE

Dr.-Ing.

Dr. Siebert Consulting Engineers

Munich, Germany  
[aha@ing-siebert.de](mailto:aha@ing-siebert.de)



Civil engineering degree from TU München. Degree master of business administration. PHD: Contribution to the design of steel-glass elements with in pane loads

## 1 Abstract

Revolving entrance doors - usually built as some kind of all glass structure - are part of many publicly accessible buildings. As the architectural demands rise regarding transparency and slenderness of façade members, the entrance doors have to and do go along with these demands. But even if the façade is designed carefully and verified according all relevant standards, the revolving doors are usually considered as a machine, coming with some certificate. This point of view is mostly shared by the manufacturer and the basis for the call for proposals. The certificates provided by the door manufacturer considers the electrical safety, the safety aspects for people handling and using the doors regarding the risk of persons being jammed or hit by the turning door leaves, but not the structural safety of the door system in means of resistance to live, dead, wind or earthquake loads. If we look at the design and verification effort made for standard façade elements, even windows on the one hand, and the different failure consequences for windows and revolving doors on the other hand, it becomes obvious that especially to non-standard and large-scale doors should be paid some attention regarding its structural safety. Below the legal situation of revolving doors is considered in the European context and two quite different examples of revolving doors are discussed regarding their structural assessment.

**Keywords:** revolving entrance doors, case study, structural glass, design optimization - glass

## 2 Introduction

This paper considers the safety of revolving entrance doors regarding its structural capacity and structural safety. Details about the regulatory situation will be given in the following chapters, but the main conclusion from recent experience is, that for most installed revolving doors no structural verification is made. That leads to a situation where e.g. standard windows are verified according the given codes, taking into account climatic, wind, handling, impact loads ensuring a certain failure probability whereas the entrance doors passed a

functionality test only [8], [9]. Nevertheless, vigilant builder-owners and/or their façade consultants are aware of this and demand structural verification for the doors to be installed, independent of the regulatory situation.

## 3 Classification of revolving doors and corresponding regulations

### 3.1 Classification

Typical revolving doors can be differentiated regarding their drive function. There are

- manually operated revolving doors

<https://doi.org/10.2749/newyork.2019.2099>

Distributed by Structurae