

## Vertical Transportation Planning – TWIN®

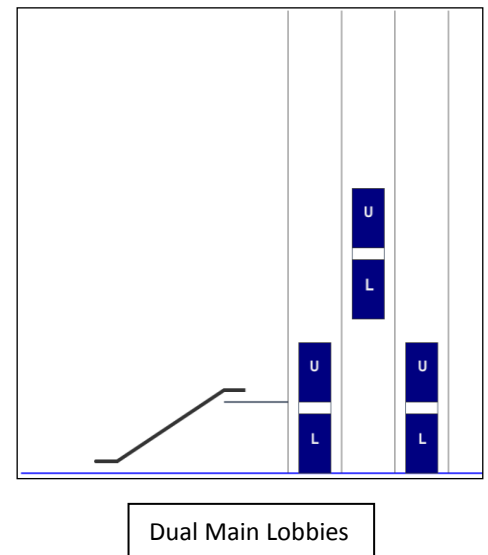
This brief is to provide an overview of the ThyssenKrupp TWIN® technology. This paper will provide an overview of the product, its architectural benefits, design guidance, and conclude with projects reviewed.

### TWIN®

The ThyssenKrupp TWIN® solution includes two independent lift running in a common hoistway. The system is designed to boost handling capacity while reducing core space taken by the lifts.

The system is designed with two independent lifts running in the same hoistway. Any concerns regarding car interference have been addressed by the dispatching and redundant safety systems.

To date we have considered the TWIN® in situations with dual main lobby floors similar to a double deck system. This arrangement has resulted in increased handling capacity. Escalators have been included to provide a connection between the two main lobbies. This design also provides the flexibility for other bidders to provide a double deck solution.



The TWIN® system can be designed with one main dispatching lobby as long as there is sufficient pit depth below the main landing for the lower car to “hide.” However, this application will not boost the handling capacity as much as the dual main landings.

### Architectural Benefits

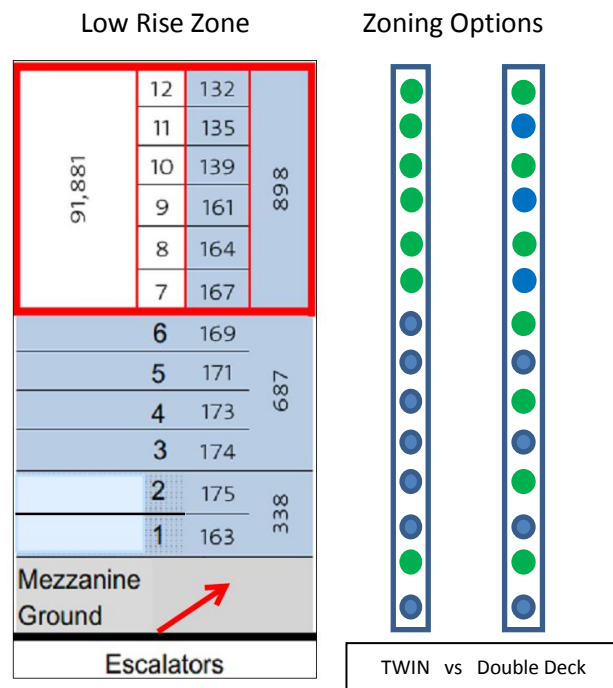
**Space Savings:** The TWIN® system is similar to a double deck application where group handling capacity is improved over a single deck application, i.e. six TWIN® cars do the work of eight single deck cars serving the same zone. Thus, the architectural benefit is the reduction in core.

Our analysis calculations have concluded similar handling capacities between the TWIN® and double deck configurations. In some analyzes we have concluded three TWIN® + one single deck will do the same work as four double decks. Consequently, the addition of a fourth TWIN within the group allows for designers to plan for higher densities.

**Energy Savings:** The TWIN® solution results in lower energy consumption. The application uses two smaller machines versus one larger double deck machine. During off peak periods, when car loads are small, the system is starting a smaller motor to move only one of the two lifts within the hoistway.

**Tenant Options:** The system offers leasing benefits over a double deck application. For example, the TWIN® zoning changes the users experience when a larger single tenant leased multiple, contiguous floors within a single zone.

In the example zoning below, employees of a single tenant leasing floors 7-12 would enter the building, journey together up to the upper main lobby and board the upper TWIN® car. From a design point of view, this allows the upper main floor to have a reception lobby, tenant signage and other appointments specific to the single tenant. In addition, the employees will experience a level of connectivity not possible with double decks.

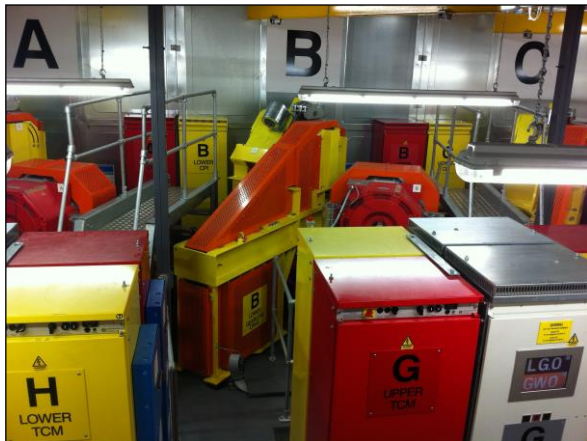


Whereas, with a double deck solution, with cars serving even an odd floors, the employees separate at the floor. Their journey may include stops at 1-12, and their journey may include other tenants. Destination dispatching can be applied to the double deck solution to minimize travel with other tenants, however, based on the tenancy, the average waiting times may be longer.

**Floor Heights:** The TWIN® system allows for varying floor heights. Ground and Mezzanine can have taller floors, typical floor heights can be reduced. The most economical double deck application requires fixed floor heights throughout the zone; an articulating double deck can be designed, however, the solution is only available from a limited number of vendors and the maximum variation is usually about 2 meters.

### Planning Dimensions

The TWIN® system is designed with the equipment for two lifts within the footprint of one hoistway and machine room. The two lifts share the same guiderails and landing entrances, all other components are specific to each lift. In the machine room, all components are color coded to distinguish between the lower and upper lift.



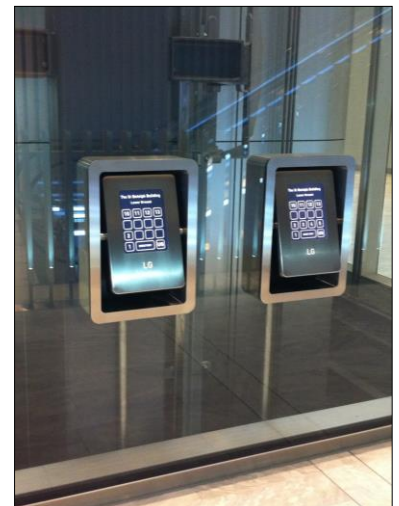
TWIN® Machine Room

To date we have found that planning for a TWIN® application will accommodate the dimensions required for a double deck application. This allows for competitive bidding from multiple sources.

### Destination Dispatching

Destination dispatching has become the world's standard dispatching system in Class "A" office buildings. The system is used to minimize Average Waiting Time while maximizing Handling Capacity. It is applied to single decks, double deck, and in the case of the TWIN® system, is used to manage car separation.

Destination dispatching systems requires the user to enter their floor destination on a touch screen display at the lobby. The system then directs the user to their designated lift. The ability to direct traffic allows for assignment of persons traveling to the same or adjacent floor to the same lift. Ultimately, this assignment increases the number of dispatches in a five-minute period, which increases group Handling Capacity.



Lobby Input Stations  
St. Botolph's House  
London

### **Options**

The TWIN® product is available in the typical capacity and speed options. For lower zones both cars are provided at the same speed, for mid and upper zones the lower car is provided at a slower speed than the upper car.

The most common capacity for Class “A” office buildings is 1600kg. However, both a TWIN® or double deck configuration can sometimes be provided with the 1350kg capacity cars while still meeting the Handling Capacity requirements as the car loads are smaller. The savings is approximately 250mm in hoistway depth.

### **Persons with Disabilities**

There are a couple of options for accommodating Persons with Disabilities (PWD) with the TWIN® system. Some group applications include a single deck lift combined with TWIN® lifts. In these applications the dispatching system will assign the PWD to the single lift which serves all floors in the zone.

In an all TWIN® group configuration, the options are:

- A “virtual” landing below the ground floor where the lower car can reside while the upper car travels down to Ground to pick up the PWD.
- Programming of the system to transfer the PWD from the lower car to the upper car at upper main landing; this requires the PWD to exit the lower lift and re-board the upper lift at the upper landing.
- A two-stop lift that connects the lower and upper lobby.

### **Projects**

To date we have reviewed TWIN® installations in the Stuttgart University Building in Stuttgart, BMW Headquarters in Munich, Royal London Hospital in London, and St. Botolph’s House in London. Each project had a unique reason that necessitated the TWIN® application. However, in all cases, we found to TWIN® application satisfied the unique reason, and each installation operated sufficiently to meet the passenger traffic demand.

### **Summary**

In our opinion, the ThyssenKrupp TWIN® system is a viable option for client consideration. The handling capacity is similar to a double deck system and the TWIN® offers other benefits described herein. To date ThyssenKrupp has approximately 110 units installed or under construction in projects in Europe, Russia, Korea and the Middle East. To our knowledge there has yet to be a TWIN® installation in the U.S. where code approval may be more difficult.

To ensure a competitive tender we recommend clients consider both the TWIN® and double deck installations when planning their project.