



**Scissor guide auditorium riser, at the Hans Otto Theatre, operated by LinkLift 30**



**Orchestra elevator operated by six LinkLift 80 lifting columns**



**Auditorium in raked format**

## Raise the stage: Actuation systems allow greater flexibility for entertainment venues

Over the last 10 years Serapid has built an enviable reputation for its specialist linear actuation systems for the vertical and horizontal movement of scenic elements and elevators.

Recently Serapid's LinkLift systems have been used for applications in flexible auditoria, and Serapid has just launched a new system designed specifically for the deployment of telescopic seating stands.

Serapid's patented LinkLift has been used extensively for the actuation of orchestra and stage elevators, and with the introduction of the new compact LinkLift 30 designed for orchestra, choral and auditoria risers, the Serapid range of LinkLifts can cater for all stage and auditoria elevator applications.

The arts are always under pressure for funding, and entertainment venues are having to become more commercially orientated, relying on hosting a diverse range of performances to achieve high levels of occupancy in order to balance their finances. This often necessitates a high degree of flexibility when it comes to auditorium layout

and seating arrangements. Flexibility allows a venue to cater for a wider range of events, even ones that aren't theatrical performances. A single venue may host everything from opera to boxing, Shakespeare to fashion shows. The ability to do this allows venues to significantly increase their revenue streams.

There are systems that allow flexibility to be introduced to a venue, from totally manual systems using a demountable or stacking podium and loose chairs, to fully automated systems using multiple elevators and self-erecting chairs or telescopic seating tribunes. The manual systems have the advantage of low initial cost outlay, but require high levels of manpower and time to effect changes. The fully automated systems require little manpower and are quick to reconfigure, but require a very high initial capital investment.

A growing number of venues are now adopting a middle way approach where several auditoria elevators are used in combination with seating wagons (often powered or travelling on air castors) or

detachable seats to allow quick changes to the auditorium layout.

The Serapid LinkLift system is being increasingly called upon to operate auditorium elevators that are designed to provide a high level of flexibility of use for that venue.

The use of auditorium elevators with seating wagons allow the format of the venue to be changed quickly with a minimum staffing level, at a price that is much lower than with other automated systems.

### Differing approaches to flexibility

At the Teatro Franco Parenti theatre in Milan, the installation of seven auditorium elevators is nearing completion. The seven lifts are each operated by four LinkLift 80 rigid chain-lifting columns, with travels ranging from 1.8 to 4.5m. With speeds of 135mm/s, the configuration of the auditorium can be swiftly transformed from a raked format to a flat floor, with or without an orchestra pit.

The seating is fitted on wagons, which can be easily transferred to a seating store in the void under the auditorium. The orchestra elevator is used to quickly transport the seating wagons to and from the seating store. The wagons are designed to be easily transferred into this area using a minimal amount of labour, and the format of the hall can be completely transformed in about one hour.

Another project, that was recently completed is the Potsdam at the Hans Otto



**Auditorium risers, seen from orchestra elevator**

Theatre, where again the theatre has achieved a flexible layout very cost effectively. The system is very simple, using a series of elevators that can be set to varying heights. Loose seating is then used, which locks together to form rows, with every sixth seat fitting into a set of sockets to ensure the correct positioning of the seating rows.

In total there are 51 elevators, one orchestra elevator and fifty auditorium elevators. The orchestra elevator is of a traditional bowed design and operated by six Serapid LinkLift 80 columns with a travel of 2,850mm. The flexibility in the auditorium is derived from the fifty scissor elevators. These are of slightly differing dimensions in order to fit the overall auditorium dimensions, and each designed for a static floor loading of 7.5 kN/m<sup>2</sup> and dynamic loading of 2.5kN/m<sup>2</sup>. The motorisation provides for a speed of 50mm/s, allowing a quick height change.

The lifts are designed for travels from 200mm to 2,000mm allowing differing degrees of rake and seating configuration, although a travel of at least 1,600mm is provided on every lift top, allowing access under the elevators for maintenance.

Each lift is operated by the new Serapid LinkLift 30 columns, which were chosen because of their very low closed height of 180mm and their cost effectiveness. The auditorium can be set up as a flat floor or with a wide variety of levels and configurations.

### Telescopic seating on the move

Serapid has also recently launched a new product: a Rigid Chain Module specifically for electrically extracting and retracting telescopic seating modules. The system uses a Serapid Rigid Chain, driven by an electric motor, to push the telescopic seating units out and then pull them back into their storage position.

This new system follows on from the Serapid SCT silent rigid horizontal chain system, which is already widely used throughout the theatre industry for both fixed installations where it provides for the movement of band and scenery wagons, and also in production where systems have been widely utilised for show applications in the West End of London and on Broadway in New York.

Just like the original Serapid Rigid Chain systems, the chain locks up in the horizontal plane to become a rigid pushing bar in the direction of travel, with the ability to coil up into a compact magazine as it is retracted. The system is based on a modified version of Serapid's CH 60 rigid chain, which has extended axles and is fitted with highly durable rubber wheels fitted at regular intervals along the chain, that have been selected to allow the system to operate on a wide variety of floor finishes, including concrete, wood, tiles and carpet.

Guides are fitted to the underside of the telescopic seating unit and these are deployed or retracted with the seating units. These allow the Serapid chains to be deployed over significant distances without the need for any floor tracks or guides.

The system is extremely smooth and quiet in its operation and allows the telescopic seating to be deployed with a very high degree of accuracy, with the distance of movement being able to be controlled to within plus or minus 1mm.

A single unit is able to provide up to 6,800N of thrust force, and can be designed to operate over virtually any distance. Prototype systems have been supplied to companies in Germany and the USA with one of these operating over 15m at speeds up to 9m per minute, allowing the rapid deployment of telescopic systems in a very controlled and accurate manner.

The system will allow operators to control the operation of their telescopic seating at the flick of a switch, enabling them to optimise their seating capacity or venue format to suit the nature of the event being staged.

Because of the nature of the Serapid system equipment, (which is available in indoor and outdoor versions) the system is suitable for use in all types of venue including stadia, concert halls, convention centres or any type of multi-purpose venue.

Flexibility appears to be the way forward for an increasing number of entertainment venues. There are a wide variety of solutions available, offering differing degrees of automation at vastly differing costs. These enable virtually any venue operator to achieve some level of flexibility to be introduced at a cost to suit their budget. The important thing is to consider flexibility at an early stage in the planning of the venue, decide what are the most important factors, and select a system that matches both the budget and the operational requirement.

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