

Photo credit: Kraftwerk Living Technologies

CHIMELONG OCEAN KINGDOM - 5D CASTLE THEATER



ZHUHAI, CHINA
ASIA/PACIFIC/OCEANIA

When Chimelong Ocean Kingdom opened its doors in March 2014, it set no less than five Guinness World Records. The monolithic aquatic theme park in Zhuhai, China, was accredited as being the largest aquarium on planet earth. It also set records for having the biggest underwater viewing dome, plus the largest aquarium tank, aquarium window, and acrylic panel to boot. Just over 12-months later, with the addition of the 5D Castle Theater, the biggest just got even bigger. In keeping with its surroundings, the latest addition to Chimelong Ocean Kingdom's supersized offering of aquatic entertainment is on the larger side of life. The 5D Castle Theater boasts the largest number of 4D seats in one venue and the biggest 3D screen on earth. The feats continue all the way throughout the technical infrastructure,

which was designed and implemented by Kraftwerk Living Technologies.

As the design-build vendor, Kraftwerk Living Technologies' responsibilities were expansive, leading the technical design, detailed planning, supply, integration, programming and commissioning for the entire venue. This included all the technological elements like the 3D screen, projection system, audio, 4D motion seats including auxiliary equipment - water system and compressed air system - control and show control systems, show lighting and special effects.

An intensive design phase of over 16-months, which was led by the company in close cooperation with Chimelong's design team, was followed by an equally intensive integration and implementation phase of nine-months onsite. It proved to be a challenging yet rewarding experience, which involved coordinating a range of disciplines. Thanks to a combination of knowledge, expertise and experience of working on projects of a similar nature, the integration specialist



Photo credit: Chimelong Ocean Kingdom

was well placed to meet the demands of the project. Kraftwerk Living Technologies has been in business for nearly 25 years, in which time it has delivered audiovisual integration and 4D/5D theatres to ground-breaking theme park attractions around the world. Based in Wels, Austria, the company has branches in China, Belarus and Russia - employing over 100 people worldwide.

The aim in Zhuhai was to create something magnificent - that would work with the other attractions within the park and raise the overall standard even higher. This was tackled in two ways. Firstly, go big - the size of the room, the size of the screen and the predetermined number of visitors per show. These factors alone have been a real challenge for the technical design of the attraction. Secondly, deliver consistent and unforgettable experiences - guarantee that every

single visitor embarks on the same overwhelming and stunning 5D adventure, no matter where they are placed within the auditorium. At times, these requirements led Kraftwerk Living Technologies to the limits of the existing technical possibilities. But then the company would go beyond the old parameters by creating bespoke solutions. This was very much the case when it came to the projection system and 4D seating.

Kraftwerk Living Technologies' new 4D SFX Motion seats have been used for the first time at the 5D Castle Theater. This is the third generation version of the seats, which feature enhanced movement and programming capabilities. The upgraded model features a number of in-built special effects, including: neck blast, poke effect, seat vibration and leg ticklers. For this particular project, they have also ►

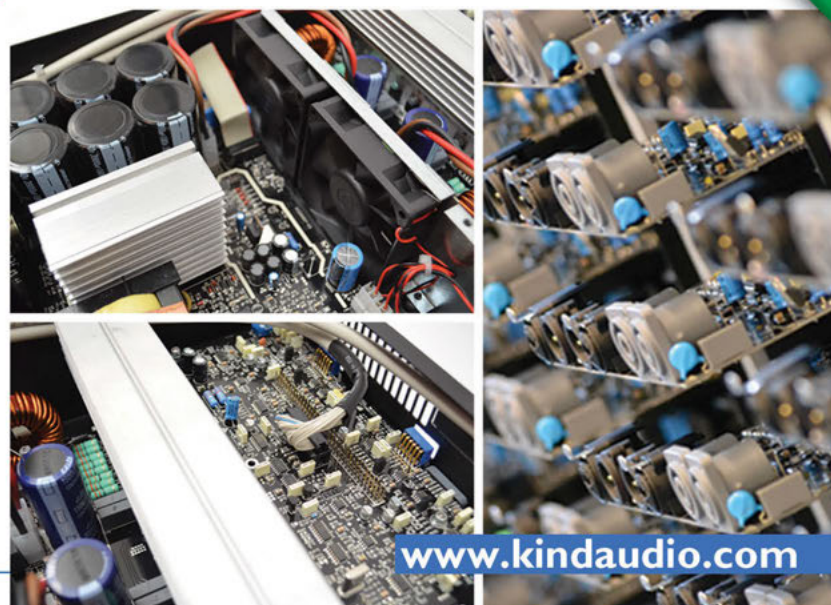


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TECHNICAL INFORMATION

SOUND

14 x Meyer Sound 600-HP subwoofer; 56 x Meyer Sound MICA curvilinear array loudspeaker; 15 x Meyer Sound 700-HP subwoofer; 22 x Meyer Sound HMS-12 cinema surround loudspeaker; 12 x Meyer Sound UPQ-2P narrow coverage loudspeaker; Meyer Sound D-Mitri digital audio platform; 2,000 x In-seat SFX loudspeaker; In-seat SFX audio signal distribution; Crestron system wide control system; Brainsalt show control system

LIGHTING, VISUAL & EFFECTS

62 x Robe Robin MMX Spot moving head; 46 x Robe Robin 1200 LEDWash moving head; 20 x Martin Professional Atomic 3000 DMX strobe; 128 x Birket SB-011QD strobe; 1 x Spitz 3D cinema screen measuring 87,828mm x 18,000mm; 12 x Christie D4K3560 projector; 1 x Brainsalt central controller server; 1 x Brainsalt network attached storage; 12 x Brainsalt one-channel native uncompressed 4K video server; 1,000 x Kraftwerk Living Technologies 4D armrests including water blast, air blast, wind system, scent system special effects and LED lighting

<http://zh.chimelong.com/Oceankingdom/EN/>

been equipped with the company's bespoke in-seat stereo effect loudspeakers.

The seats are driven by a pneumatic motion base, featuring four 'Dimensions of Freedom' real analogue movement, to pitch forward and backward, roll side to side, tilt up and down, and sway from left and right. Each motion base supports three or four seats.

The truly bespoke innovation, which is specific to the challenges of the 5D Theater, is the newly developed Special Effects Armrest. It provides a number of high-performance effects, including wind, scent, water blast, air blast, strobe lighting and coloured LED lighting - all of which can be programmed to precise timings.

Compared to other installations, this personalised approach guarantees a much better performance as the special effects are more focused on the individual in comparison to them coming from the ceiling, railings or the seat's backside. This is especially important for such a large theatre.

The Special Effects Armrest also features a unique seat occupancy sensor that makes it possible to deactivate unoccupied seats. This marks an important efficiency breakthrough for the sustainable operation of multi-dimensional theatres.

As well as the personalised movements and effects, the auditorium boasts room features, including splash/rain effect, strobes, ground fog, smoke, snow and scenic lighting - plus an animatronic plane from Advanced Animation.

There are 1,000 4D SFX Motion seats installed, along with two

wheelchair bays. Every member of the audience, regardless of their position within the theatre, is afforded a prime view of the huge 3D screen. The record-breaking hyper-panorama silver screen measures a mind-blowing 88-metres wide and 18-metres high (10344 x 2120 pixels), and has a curvature radius of 29-metres. It supports both 2D and 3D projection.

The 5D Castle Theater is installed with a Christie Digital projection system, comprising 12 D4K3560 high frame-rate, three-chip DLP, 4K projectors, with customised lenses. These are served by a Brainsalt media server system, which handles frame synchron playback, alignment, warping and blending. The media server system's heart is the central controller server which serves 12 one-channel native uncompressed 4K video servers (slaves) featuring 60 fps, an alignment server and a network attached storage server.

Christian Hofer, Managing Partner and Technical Director of Kraftwerk Living Technologies explained: "The goal was to provide an immersive experience for every single visitor - therefore a 180° screen layout was necessary. After defining these parameters, we had to set up a high-performance projection system - 4K projection was needed due to large viewing distances and the extremely high image resolution of 10344 x 2120 pixels. Although we had chosen the highest performance projector available in the market, we realised that we still had too little light output. Our specialists' knowhow and experience was put to the test at this point.

"After carrying out some special analysis and with a little outside ►

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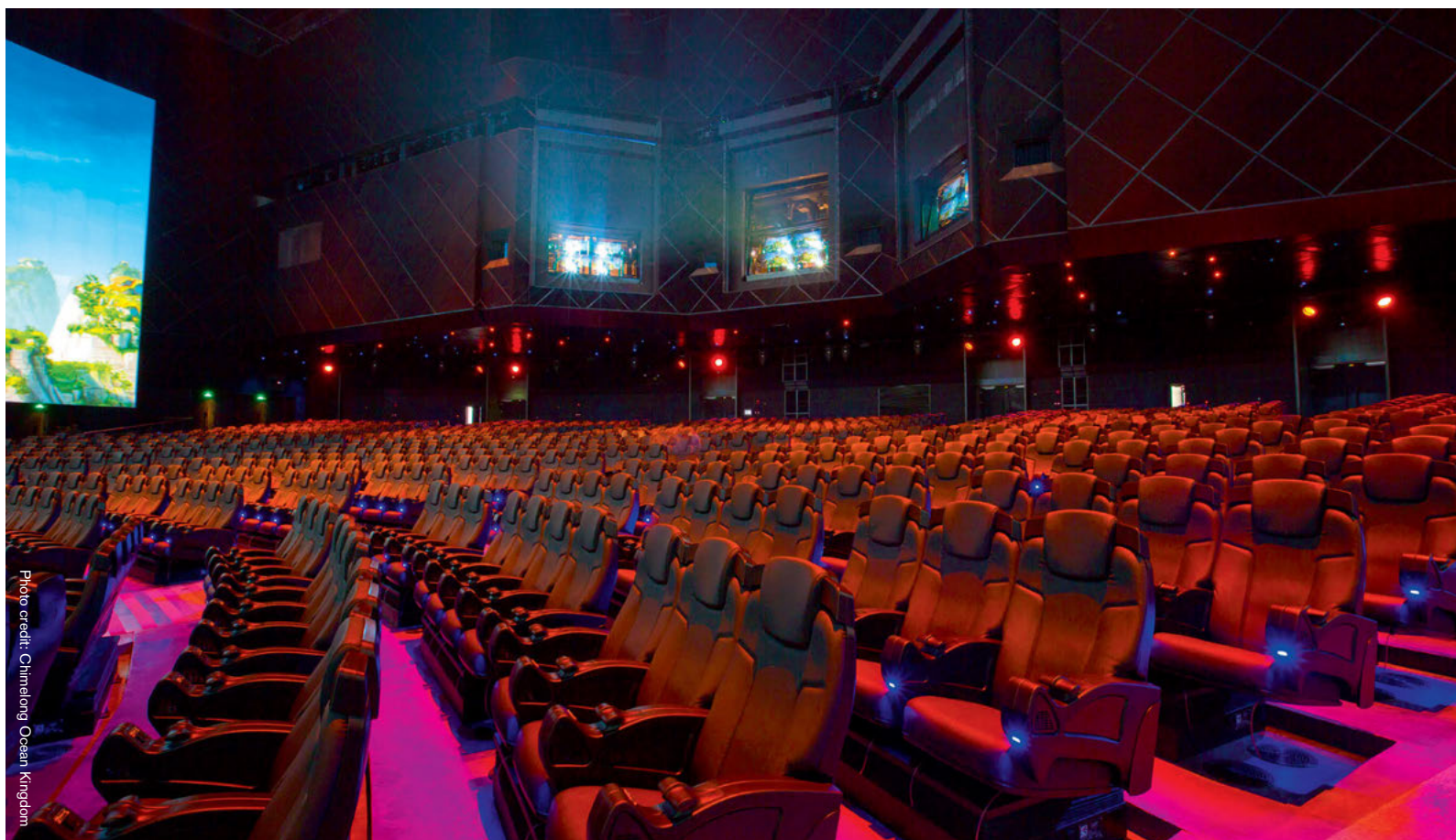


Photo credit: Chimelong Ocean Kingdom

the box thinking, they found the solution: to achieve the light output that was needed, the projection had to be divided into three sections, each featuring four projectors. So far, so good - but now the next challenge appeared. How would these 12 projectors be combined to get the projection beams through the three relatively small projection windows?

"But because the challenge was so demanding, our specialists had to develop some special lenses. These lenses helped us to meet all the requirements for projection angles and for optimising the light. It wouldn't have been possible to realise this projection system with standard lenses. The result is highly impressive and we are very proud of this one of a kind installation, which has definitely set a new benchmark."

In keeping with the ground-breaking precedent set by the rest of the technical infrastructure, the sound set-up is described by Kraftwerk Living Technologies as 'the largest cinema audio system in the world'. At a total of 2,119 loudspeakers, there seems little reason to doubt that claim.

It features a Meyer Sound room system, comprising seven main screen channel arrays, each consisting of two 600-HP high-power subwoofers and eight MICA curvilinear array loudspeakers. The system is complemented by a main subwoofer cluster comprising 15 700-HP ultra high-power subwoofers, 22 HMS-12 surround effect speakers and 12 UPO-2P point source special effect loudspeakers. The system is managed by a Meyer Sound D-Mitri digital sound processor, which is designed for high-resolution audio - offering 96 kHz sample rate, up to 64-bit floating-point processing and 24-bit A/D/A conversion. Remote monitoring of the system is possible via the RMS Server.

Discussing why Meyer Sound was the right choice for this particular project, Christian explained: "Generally, when it comes to high-end cinema audio systems, there is only a handful of potential suppliers. In this case, in consideration of the huge dimensions and the exceptional listening distances, there is definitely no cinema audio system available on the market that could meet the requirements for this huge cinema venue. Even high-performance cinema audio systems can cover listening distances of about 30 metres maximum, but in the 5D Castle Theater there are listening distances of up to 44

metres.

"Again, the idea that was finally developed by our audio specialists was the result of their extensive knowhow and outside the box thinking. As Meyer Sound not only provides state-of-the-art cinema audio systems but is also renowned for its high-performance concert sound systems, we had the idea to combine these two disciplines in the 5D Castle Theater. With the integration of the concert technology in the form of line arrays, the acoustic energy could be increased to ensure that the entire auditorium could be filled with professional sound. By executing numerous simulations of the sound propagation, our specialists were able to precisely define the position of every single speaker and ensure a perfect sound experience in the entire auditorium.

"Meyer Sound was the best choice for this project because of their high-level competence in both cinema audio systems and concert audio systems. We look back on a long-term symbiotic collaboration with Meyer Sound and have always been very satisfied with their high-end products."

Each of the seats has been installed with two SFX loudspeakers. Audio signal distribution for the seat speakers arrives via one of the largest AVB networks in the world - designed by Kraftwerk Living Technologies in cooperation with Meyer Sound.

The auditorium is also home to a serious amount of dynamic lighting - more than 155 fixtures in total. There are 62 Robe ROBIN MMX Spots, 46 ROBIN 1200 LED Wash lights, 20 Martin Professional Atomic 3000 DMX strobes and a Birket LED strobe system with 128 strobes.

Christian continued: "Through our sightline studies, we realised that there was a lot of 'empty' space off the screen - on the floor and ceiling. As the goal was to create the most immersive environment possible, the logical conclusion was to also utilise this available space to enhance the immersive experience. The implemented lighting system provides almost endless possibilities for creating various lighting scenarios that supports the story. For example, thanks to the moving heads, it is possible to create a wave effect supporting aquatic film scenes. The 128 LED strobe lights are pixel mapped to the screen in order to support the film's visual effects. The lighting system is the finishing touch that enhances the visitor experience and therefore is ►

MISSED IT?*

T20



B10



C5



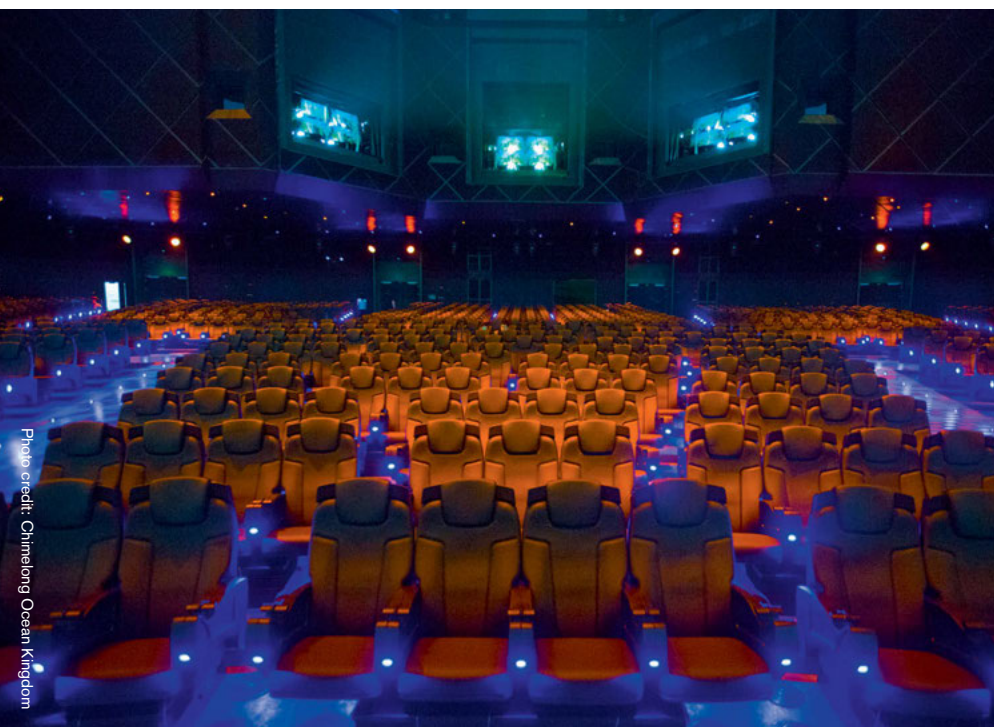
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an indispensable part of the 5D Castle Theater."

The different technological elements are brought together by a Crestron/Brainsalt Media control system for the feature show - 'Kaka's Great Adventure'. The 18-minute production has been produced by Prana Studios, with music composition by Klaus Badelt and creative lead from Rick Rothschild of Far Out! Creative Direction Inc.

Of course, the project was not without a challenge or two along the way.

Manfred Meier, CEO of Kraftwerk Living Technologies, explained:

"Although we are a very experienced provider of 4D attractions - we built our first 4D theatre exactly 10 years ago and have installed nearly 100 4D attractions all over the world since then - this project was, due to the exceptional dimension and incredible complexity, a very special challenge for us. In order to achieve the project's design, technical and time schedule goals, all aspects of staffing, design, procurement, production, shipping, installation and programming had to be scaled up."

"However, the most challenging task was the coordination of all disciplines and parties involved. Even if Kraftwerk Living Technologies has not been responsible for show production and content production, close collaboration with the responsible parties has been essential. Only when every single party is focussed on providing a high-end solution, a project like this can be successfully implemented.

"To guarantee perfect coordination, Kraftwerk Living Technologies decided to engage an experienced industry expert for onsite integration management. Looking back, this was one of the most important success factors. At this point, we would like to point out that the realisation of this project would not have been possible without the total commitment of our entire team at our headquarters in Wels and on site."

Project Manager, Werner Spiegel, added: "The challenge of working with local sub-contractors - in terms of language barrier - further heightened the complexity of this installation. However, a very cooperative and dedicated local team made up of several sub-contractors, under the guidance of Chimelong, allowed for a multi-lingual site."

Chimelong Ocean Kingdom set out to create something truly unique when its creative team hatched plans for the 5D Castle Theater.

Kraftwerk Living Technologies has helped them to do just that - a multi-sensory experience that visitors are likely to remember for long after their visit. Reflecting on the project, Manfred said: "This project sets a new benchmark in the industry. It will bring back 4D theatres as main attractions to parks. Now, more creative ideas are called for that will utilise these advanced technical resources. This not only applies to 4D theatres, but to all kinds of media-based attractions." 

FRANÇAIS

Lorsque le Chimelong Ocean Kingdom a ouvert ses portes, le site a obtenu pas moins de cinq records du monde Guinness. Ce splendide parc aquatique situé à Zhuhai, en Chine, fut reconnu comme étant le plus grand aquarium sur la planète terre. Un peu plus de 12 mois plus tard, avec l'arrivée du Castle Theatre en 5D, ce qu'il y avait de plus grand est devenu encore plus grand ! Ce théâtre en 5D possède le plus grand nombre de sièges 4D réunis en un seul lieu et le plus grand écran 3D du monde. D'importantes responsabilités reposaient sur les épaules du fournisseur de conception et de construction Kraftwerk Living Technologies qui mena la conception technique et les études, et s'occupa de l'approvisionnement, de l'intégration, de la programmation et de la mise en service de l'ensemble du site. Ceci comprenait tous les éléments technologiques comme l'écran 3D, le système de projection, le système audio, les sièges modulables en 4D ainsi que l'équipement auxiliaire, le contrôle et les systèmes de contrôle de spectacles, l'éclairage des spectacles et les effets spéciaux. Le Castle Theater en 5D est muni d'un système de projection Christie Digital alimenté par un système de serveur de médias Brainsalt. En plus du système principal, quelque 2 119 haut-parleurs ont été fournis par Meyer Sound, et l'éclairage dynamique par Robe, Martin Professional et Birket. Les responsables du parc à thème et univers aquatique Chimelong cherchaient à créer quelque chose de vraiment unique lorsque leur équipe créative élaborait les plans du théâtre en 5D à l'architecture de château, le Castle Theatre. La société Kraftwerk Living Technologies les a aidés à créer exactement cela — une expérience multisensorielle dont les visiteurs se souviendront longtemps.

DEUTSCH

Bei der Eröffnung des Chimelong Ocean Kingdom wurden nicht weniger als fünf Guinness-Weltrekorde aufgestellt. Der monolithische Aqua-Themenpark in Zhuhai, China, gilt als das größte Aquarium der Welt. Gut 12 Monate später wurde der Größte mit der Erweiterung um das 5D Castle Theater noch größer. Das 5D Castle Theater weist die meisten 4D-Sitze in einem Veranstaltungsort und die weltweit größte 3D-Leinwand auf. Die Verantwortung des Generalplaners Kraftwerk Living Technologies war sehr groß. Sie kümmerten sich um die technische Konzeption, die detaillierte Planung, Beschaffung, Integration, Programmierung und Inbetriebnahme für das gesamte Projekt. Dies umfasste alle technologischen Elemente wie die 3D-Leinwand, das Projektionssystem, Audio, 4D-Bewegungssitze einschließlich Zusatzausrüstung, Kontroll- und Show-Kontrollsysteme, Showlicht und Spezialeffekte. Im 5D Castle Theater wurde ein digitales Christie Projektionssystem installiert, das durch ein Medien-Server-System von Brainsalt bedient wird. Insgesamt 2.119 Lautsprecher, das Hauptsystem von Meyer Sound und dynamische Beleuchtung von Robe, Martin Professional und Birket. Chimelong Ocean Kingdom wollte etwas wirklich einzigartiges anbieten, als das Kreativteam die Pläne für das 5D Castle Theater ausgebrütet hat. Kraftwerk Living Technologies unterstützte sie genau dabei - eine multisensorische Erfahrung, an die sich die Besucher noch länger erinnern werden.

ITALIANO

Quando Chimelong Ocean Kingdom ha aperto le sue porte ha ottenuto almeno cinque record mondiali. Il monolitico parco a tema acquatico di Zhuhai (Cina) è stato accreditato come il più grande acquario sul pianeta terra. Poco più di 12 mesi più tardi, con l'aggiunta della Castle Theatre 5D, quello che era già considerato grande lo è diventato ancora di più. La Castle Theatre in 5D vanta il maggior numero di sedie in 4D nello stesso luogo ed il più grande schermo 3D sulla terra. A Kraftwerk Living Technologies (azienda che si occupa di progettazione e costruzione) è stata affidata la responsabilità di estendere e portare avanti il progetto tecnico, di fare una pianificazione dettagliata, fornire, integrare, programmare e commissionare l'intera struttura. Ciò includeva tutti gli elementi tecnologici come lo schermo 3D, il sistema di proiezione, il sistema audio, le sedie mobili 4D (comprese le apparecchiature ausiliarie), i sistemi di controllo sia generale che dello spettacolo, l'illuminazione dello spettacolo e gli effetti speciali. Nel Castle Theatre 5D è stato installato un sistema di proiezione Christie Digital che è servito da un sistema di media server Brainsalt. Un totale di 2.119 altoparlanti con il sistema principale fornito da Meyer Sound e l'illuminazione dinamica da Robe, Martin Professional e Birket. Chimelong Ocean Kingdom ha deciso di pensare a qualcosa di veramente unico quando il suo team creativo ha pianificato il Castle Theater 5D. Kraftwerk Living Technologies li ha aiutati a fare proprio questo: un'esperienza multi sensoriale che i visitatori sono propensi a ricordare per molto tempo dopo la loro visita.

ESPAÑOL

Cuando el Chimelong Ocean Kingdom abrió sus puertas, marcó no menos que cinco records mundiales Guinness. El monolítico parque de atracciones acuático en Zhuhai, China, fue considerado como el acuario más grande de todo el planeta tierra. Poco más de 12 meses después, con el agregado del Castle Theater en 5D, el más grande de todos se volvió más grande aún. El Castle Theater en 5D presume de tener la mayor cantidad de asientos 4D en el mismo lugar y la pantalla 3D más grande del planeta. Las responsabilidades de Kraftwerk Living Technologies, como vendedor del diseño edilicio, eran las de ampliarse, encabezar el diseño técnico, la planificación detallada, el suministro, integración, programación y contratación del lugar entero. Esto incluía todos los elementos tecnológicos como la pantalla 3D, el sistema de proyección, el audio, los asientos móviles en 4D incluyendo el equipamiento auxiliar, los sistemas de controles para el show, la iluminación del show y los efectos especiales. El Castle Theater en 5D fue instalado con un sistema de proyección Christie Digital servido por un sistema de servidores media Brainsalt. Un total de 2.119 altoparlantes con el sistema principal provisto por Meyer Sound e iluminación dinámica de Robe, Martin Professional y Birket. Chimelong Ocean Kingdom tenía la intención de crear algo verdaderamente único cuando el equipo creativo se le ocurrió planificar el Castle Theater en 5D. Kraftwerk Living Technologies los ayudó a hacer exactamente eso- una experiencia multi-sensorial que los visitantes pudieran recordar durante mucho tiempo luego de la visita.



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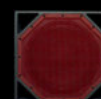


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