



City of Miami Beach: representation of an authority having jurisdiction

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The City of Miami Beach is one of five jurisdictions delegated by the State of Florida to administer and enforce regulations governing the design, construction, installation, alteration, inspection and testing of more than 2000 City elevators. Utilizing standardized forms and reports, and demonstrating manpower flexibility with an inspection program that employs both private and City inspectors, costs have been controlled and program efficiency has been strengthened. This paper illustrates the structure of an Authority having Jurisdiction, including: State delegation of Authority, organization charts, inspection reports and forms, responsibilities of private inspectors, duties of City inspectors, and local ordinance process.

An advanced zoning system for a skyscraper; TWINS (L+A type)

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Each zone is served by a local system transporting passengers moving inside the zone, and an access system transporting passengers moving between the zone and a lobby. These systems consist of groups of 13 people 2 car with advanced collective control. Because of an efficient grouping of the small size 2 cars, the rentable ratio becomes larger than that of the sky lobby system. Also, RTT becomes a half of that of the conventional 24 people 6 car group. Thanks to the high handling capacity and unnecessary of the transfer at a sky lobby, passengers can evacuate safely, at an initial fire.

Energy efficiency of lifts. Developments

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Energy efficiency is hot. A good energy efficiency is becoming more and more a condition for the construction license of a new building in many countries. Besides in new buildings, energy could be saved in existing buildings. For lifts the standard VDI 4707-1 exists, by which the energy efficiency of a lift can be made measurable and visible by an energy label. The VDI 4707-1 and experiences in practice are explained in this presentation.

It is important that in the near future VDI 4707-1 will be adopted in the various methods and regulations to determine the energy efficiency of the building.

Energy efficiency solutions for modernisation of hydraulic drives

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Most of the installed lift facilities which are older than 20 years are hydraulic lifts, in Germany alone more than 325'000 according to VDMA. These installations contain a substantial energy saving potential which can be utilised with modern hydraulics drives. Essential in modernisation is to find the optimal solution for the specific application. These can range from modern electronic controlled hydraulic drives over frequency controlled units to using pressure accumulators as a hydraulic counterweight. An answer to this demand is the Bucher Hydraulics product range with a decades old record of proven performance.

A step by step modernisation requires communication between the existing lift controller and the replacement drive components which can be easily done using an universal and multifunctional interface.

The time is right for existing energy efficiency solutions to fulfil the substantial market demand.

Elevator installations near by the Bosphorus from Ottoman Era

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Between 18th and 19th centuries couple of palace and pavilions such as Dolmabahce Palace and Hidiv Pavilion was built near by the Bosphorus and were used for official matters and as the residence of Sultan or the summer home of the Sultan's family or used to host foreign guests in Istanbul. One of the best examples of "art-nouveau" style building in Istanbul is Hidiv Pavilion. There are three steam-powered elevator installations. They were not individually powered and driven by a central steam engine. Electrical drive machine replaced the steam-powered elevator. This paper briefly presents some aspects of old fashion elevator systems and also the early applications for elevators used in Istanbul.

Application of finite element method to design of progressive crush buffer concepts for elevators

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This paper presents a new design concept of buffer for elevators, which is based on dissipating impact energy by means of non-recoverable plastic deformation, but maintaining similar performance requirements of typical hydraulic buffers on a wide range of impacting masses and velocities. Firstly, it is presented an aluminium tube with specific geometry which provides folding behaviour under impact conditions. The design process and geometry optimisation are performed by means of F.E. dynamic crush simulations with the adequate material model for the aluminium, including damage initiation and evolution. The tube geometry is optimised for fulfilling a maximum average acceleration requirement within the specified ranges of cabin mass and impacting velocity, being finally validated with experimental results on full size prototypes. An alternative concept is shown as well, as combination of plastic deformation buffer with a simplified oil-based damper to satisfy critical vertical lengths requirements without modifying general geometry of buffer.

Importance of thermal balance for hydraulic elevators

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Heat generation of hydraulic elevator power units is a very important phenomenon and should be kept under control for good performance and long service life. Low temperatures cause sluggish behaviour of control valves and can also lead to cavitation problem. High temperatures, on the other hand, apart from declining travel performance, deteriorate lubricating properties and increase contamination level. A cyclic contaminating process decreases component life, results in frequent servicing and increases annual cost of the elevator.

A proper design should consider heat balance of the hydraulic elevator as one of the main design constraints. In most cases, coolers can be avoided by applying proper design rules, which reduce energy consumption as well.

In this paper, heat generation of hydraulic elevators are assessed with respect to the type of elevators, suspension ratio and various environmental conditions through a derived theoretical model. A list of recommendations to achieve good heat balance for hydraulic elevators is also given.

Helixator - helical escalators and moving walkways

Michel David

Helixator CTO

Helical escalators have been in the mind of engineers for many years. This paper examines the history of these magnificent machines, the different attempts to build them and the numerous benefits using such machines in the future. The paper reaches several conclusions; one of which is the description of a valid mechanical solution for the realization of helical escalators and moving walkways of complex geometries. It describes the process of developing the Helixator technology using state of the art tools and software, and investigates the various possibilities emerging with its invention. The paper shows how this technology answers the current need of contemporary cities for better mobility, and suggests a new approach capable of significant shifts within the vertical transportation trends and industry.

Semiconductor technologies for novel elevator sensors

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Starting in the late 80s, optical multi-beam safety sensors for door protection gained the majority of the market. Thus, everybody in the industry is familiar with light curtains. However, comparing the safety and the comfort of today's safety devices with those for production machines, elevator safety is way behind them. The crucial point for elevator door safety sensors was the lack of three dimensional area recognition. A first step was made with the introduction of 3D light curtains. Because of unsatisfying performance of these devices, limited success is visible. Novel semiconductor technologies allow closing this gap.

State-of-the-art traffic analyses

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In earlier days, traffic analyses for the design of elevator groups had been based on simple assumptions: Morning up-peak traffic conditions and conventional dispatching systems. It is known that today both assumptions must be revisited: Analyses must also cope e.g. with lunch time traffic conditions and with destination control systems. Therefore, simulation methods are now widely used. However, there are various ways how simulations can be applied, which can be confusing. We discuss differences of various approaches and present a method for traffic analyses based on simulations which is as simple and reliable as possible.

Fault-tolerant encoder and its application for Elevators

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Fault-tolerant systems must be able to detect, diagnose, compensate and recover from faults. They are used in safety critical applications and in systems where high availability is required.

The paper will describe a fault-tolerant encoder and the related fault diagnosis (implemented on CPLD). The encoder provides speed and direction information and is fault-tolerant for one sensor failure.

The paper will mention two possible applications in elevators:

- The speed and direction monitoring during rescue operation (see EN81-1:1998/A2:2004 (E) 6.6.2 and 14.2.1.4), where high availability is desired.
- Electronic overspeed governor (safety critical application), according to EN81-1/2:1998/A1:2005 and IEC 61508.

The "Beautiful" counterweight

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When, if ever, the lift industry decides to set itself free from the use of counterweights in pursuit of a new degree of freedom for passenger carrying cars travelling in a shaft the implications are enormous. This paper reviews the many advantages and attractions of retaining the counterweight but also explores recent inventions that might overcome the many obstacles of finally dispensing with the counterweight in vertical transportation systems of the future.

State of art of calculation methods for elevator energy consumption

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Demand for Energy Efficient Lifts is increasing boosted by European regulations such as the Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, the Directive 2005/32/EC on the eco-design of Energy-using Products (EuP), other initiatives at international level for building classification systems such as BREEAM, LEEDS and CASBEE, and other voluntary standardisation efforts such as ISO 25745 and VDI 4707. In some cases these proposals lead to proposals for classification of the elevators by means of lifts energy labels. Market and other social forces are also responsible for this renowned interest on energy efficiency.

Reliable methods to assess total energy consumption of an elevator must be developed as a primary tool to evaluate global energy efficiency. Different methods have been proposed over the years and in recent times new ones have been included in standardization projects.

This paper tries to gather some of these methods to make a comparative analysis using reference cases. Some conclusions will be drawn from this analysis.

Modern hydraulic power units with condition monitoring

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For several decades Bucher Hydraulics satisfies customer demands with its electronically controlled lift valve LRV-1. The next generation is based on this successful tradition of combining sophisticated hydraulics with intelligent electronics and software. The new designed valve continues this strategy with enhanced sensory feedback and information engineering enabled by the use of modern technology in research, production as well as innovative hydraulic design. Its mechatronic approach enables the new valve to automatically observe various operation parameters and allows an automatic parameterisation at start up. This information also provides the basis for the so called Condition Monitoring, e.g. the automated analysis of the system to monitor its maintenance condition. Of course also hydraulic-mechanic properties as well as system characteristics such as efficiency, ride comfort or noise emission to name a few, were also optimised in the development.

Advanced design of a lift test tower

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A new Lift Test Tower is going to be built in Badajoz by our Group INGELEV with the aim of Research, Innovate and Develop new Lifts and its components. This paper deals with the Design guidelines of a Lift Tower that mainly focus on these objectives. Criteria for the best selection of the tower shape and other limiting factors are given. A list of the tests facilities and experimental equipment is presented in order to improve the repeatability and reproducibility of the experiments. Special attention is devoted to the requirements that makes it increase productivity as the time reduction during a full lift assembly and handling operations.

"Stack" - How it effects lift performance

Roger Howkins

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Stack effect in buildings, can influence lift performance, safety, and ride quality of the installed lift systems.

The physics of stack effect in buildings are well documented, but not specifically lift related.

This paper will discuss lifts and how the impact of the architectural design and the measures to be considered to prevent at its best an annoyance manifesting itself as high pitch whistling through landing doors, reduced ride quality to building safety issues by emergency doors being forced open or kept open due to the stack effect.

It is therefore important that lift contractors, consultants, architects and general contractors understand this phenomenon and how design will mitigate the effects of stack.

Escalators - New developments of safety function and environment-friendly driving system

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People have come to be interested in their safety and environment in recent years. The concepts of this escalator are:

- (1) the enhancement of safety function,
- (2) the development of environment-friendly driving system,
- (3) the pursuit of convenience,
- (4) the precision improvement of predictive failure diagnosis.

This report distributes the new developments of safety function and environment-friendly driving system.

Energy saving techniques of elevator group control system

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While the current trend for reduction in greenhouse gas moves upward and work on post-Kyoto Protocol proceeds, the needs for energy-saving performance are on the increase in elevator market day by day. We develop new energy-saving techniques of elevator group control system. This paper shows the techniques and its performance given by simulation. Simulation uses passenger traffic flow data in a day in typical office and tenant building, which is made from actual building traffic flow data.

A development of a brake control system for elevators

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The recent technology evolution of the car weight reduction saves the energy and the resources. On the other hand, the elevator has the appropriate braking force for the inertia of the system including the car and the rated load. Therefore, the car weight reduction increases the deceleration on braking the running car and causes the rise of a necessary traction. To solve these problems associated with the car weight reduction, we have developed the brake control system that can achieve the low deceleration and maintain the adequate tractive force.

•Safe operation of an elevator drive without motor contactors

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The safety standards EN81-1 and EN81-2 require contactors between the drive and the motor when using a static converter. There is the choice to use 2 motor contactors or 1 motor contactor and an additional method to interrupt the energy flow to the motor. This paper presents a method to operate an elevator without motor contactors based on a high integrity STO input of an inverter which meets the requirements of EN81-1 and EN81-2. The advantage of this new solution is a dramatic reduction of space and noise (electrical and acoustic) emission, which allows new methods of construction and reduces the cost of the overall drive system.

Destination dispatching (D.D.) mega high rise applications

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Since its inception about 20 years ago, elevator group destination dispatching (D.D.) has evolved from use as an overlay control for office building modernizations, to sophisticated, mainstream application in major high rise¹ towers. Destination dispatching applications have gone from the initial skepticism “gimmick” phase, to acceptance and now to “desirability” for that competitive edge. Most major elevator companies now offer various forms of destination dispatching for high rise office building elevators, including double deck (4D), “Twin” and uses in major hotels and residential personal entry occupancies. This paper will explore the history of destination dispatching (similar to attendant controlled group operations), explain present D.D. mega high rise applications and explore future iterations of the systems (are we coming full circle?)

Statistical analysis of accidents regarding the use of elevators in Greece

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A statistical survey is being carried out in Greece regarding accidents on elevators and escalators, on the occasion of recent fatal accidents and for the past decade. The aim of this research is to provide the essential information needed to focus attention on certain crucial mistakes and misguided actions, in order to make the use of both lift and rolling stairs / corridors safer in the future. Results will help preventing similar accidents for the technical staff and the users, as well as designing and teaching a new culture and attitude from the users' side. This work presents some first statistical estimations and results of this analysis.

The studies in Europe and the energy efficiency guideline VDI4707

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The trend towards sustainability and energy efficiency does not stop when it comes to elevators. The study by the Swiss federal office of energy in 2005 took a pioneer role in the energy consumption research of elevators. Within the European Commission's Intelligent Energy Europe Programme, the Energy-Efficient Elevators and Escalators project got started to follow up the research.

Considering all the work available, the association of German engineers VDI has developed a voluntary guideline that defines energy measurement procedures and an energy efficiency label showing the relevant energy figures in an easily understandable manner.

Sensitivity analysis of lift car installation design variables to guide shoes wear

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A numerical sensitivity analysis of how several design variables of a lift car installation determine the wear of guide shoes is presented. Analysis is based on finite element simulations in combination with a user-developed model for polymer wear. The simulation of the wear process in the guide shoes follows a numerical-experimental methodology based on initial wear characterisation by means of reciprocating tests in tribometer at lab scale; from lab tests results it is possible to derive a wear model for the guide shoes material, which is later implemented in a commercial finite element code to carry out final wear predictions considering real installation parameters.

Improving maintenance strategies of elevators and escalators with condition monitoring

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In the escalator market, transit escalators represent about 50% of the total annual demand. As transit escalators are heavily and frequently used, e.g. in subways, equipment has to be designed to accommodate heavy duty conditions. In public transportation, the increase in ridership and the need to provide better accessibility for the disabled make elevators and escalators critical assets. In order to optimize their capability and availability, maintenance has to take less time and be carried out mainly during the night. Effective condition monitoring of critical equipment can contribute to a condition based maintenance strategy, enhancing not only elevator and escalator reliability and knowledge but also the Life Cycle Cost of these assets.

Design parameters and stress analysis of elevator guide rail brackets

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Elevator systems consist of too many components and guide rails are the most important ones in terms of elevator safety. For a safe, smooth and comfortable travel, guide rail bracket is one of the most important components along with guide rails. Guide rail brackets are used for installing the guide rails on the wall. In this study, results of guide rail calculation for different loading situations and analysed guide rail brackets were commented on.

Practical stress behaviour of complete rail fastening system

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Common elevator design considers rail clips, brackets and rail anchors as separate units. Hilti did an analysis about how the complete rail fastening system acts under loading.

The proposed paper discusses the distribution of forces in the complete rail fastening system (rail clips; brackets and wall anchors) based on loadings to the cabin rail. Practical test results disclose the failure mode of the different components of the rail fastening system and identify those components that cause the break down of the complete fastening system. Finally the consequences to design of an effective and cost efficient rail fastening system are discussed.

Short history of destructive elevator testing and today's non destructive approach – Forecast on future techniques

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Henning Testing Systems GmbH, Schwelm, Germany

Elevator testing has a long history, because elevators are designed for transportation of people. Therefore the particular attention of building owners, users, consultants and elevator manufacturers was all the time to create and run safe elevators. Since the days of Elias Otis elevators have been tested with destructive testing methods. The goal of this presentation is to give an-albeit incomplete-overview over methods of the past and to examine the possibilities of today's non destructive approach. Furthermore we will present a forecast on future techniques for non destructive elevator testing.

Designing elevator installations using modern estimates of passenger demand

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Research shows that the traditional assumptions of elevator passenger demand in office buildings may no longer be applicable to modern buildings. The differences between traditional and modern patterns of passenger demand in office buildings are discussed. The significance of these differences on elevator system design including the quantity and size of lifts as well as the environmental and financial impacts are explored.

New leakage current filter, “Passive Canceller” is breakthrough against noise of inverter unit

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We developed a leakage current filter, “Passive Canceller” for replacement of isolation transformer. Noise generated by leakage current caused from the inverter of elevator. It may give ill effects to the other equipments. The isolation transformer is the most effective to reduce this noise, but downscaling is essential. Further more, this means also environmental-friendly design. We had a good idea of countermeasure for this purpose. “Passive Canceller” extracts leakage current of high frequency to bypass-circuit, and returns it to inverter. This unit consists of a passive element, capacitor and reactor, instead of a semiconductor. We realized a reliable and high quality inverter controlled driving unit, compared to previous type one. We introduce this unit called “Passive Canceller” in this paper.

Study on parameters decreasing the bearing noise level – sealed spherical roller bearing case

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SKF, Gothenburg, Sweden

Noise is one of the main concerns when speaking about riding comfort. With the concept of the MRL, the traction machine has been located inside the hoistway. This brings noise emission inside the buildings, closer to apartments/offices and elevator users. The development of the more compact gearless design as a solution for MRL has led to a new bearing arrangement. Meeting the industry needs, the sealed spherical roller bearing has allowed manufacturers to increase the load carrying capacity of their machines while maintaining or even downsizing the bearing arrangement. Switching from ball to roller type, bearing noise has increased however. This paper presents a study on the bearing parameters influencing the noise.

Maintenance support tools for elevator equipments that use cellular phone

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A cellular phone is prevailed all over the world. It is used for communication tool in a various case. While, the number of installation of elevators is increasing day by day. Therefore, we adopted it for maintenance support tool of elevator equipments. The efficiency of the maintenance work should be high. We obliged to do all process of work for maintenance and adjustment, and to make up report promptly. Then, we mounted all functions necessary for them to the cellular phone. We overcame difficulties of shortening work hour.

We will introduce a cellular phone applying to the maintenance work for an elevator in this paper.

Small Ropes - Aspects for usage in elevator application

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The use of suspension ropes of less than 8 mm in diameter will increase in numerous elevator installations. Elevator product series have already been developed for several years. Special-design ropes for this applications, when compared with the conventional lift components included in the standard, require greater effort in design approval and acceptance of the actual lift. Test certificates issued by Notified Bodies are used to support producers, certifying the suitability of the special-design ropes for use as elevator suspension ropes. A summary shows the availability of certificates covering all applications also out of minimum number of trips deposited in EN81-1. The fact of separate expert evaluation for these ropes makes it permissible both to go below $D/d = 40$ and also to go below the 8 mm minimum diameter for ropes specified in the standard. Absolutely necessary is a clarification of the expectation of users and the life time of ropes in the practical application best before planning and contracting phase. The material of the deflection sheaves is discussed very often in case of reliable detection of rope discard. The influence of plastic sheaves on lifetime and discard will be presented.

Lifts energy consumption study

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Lifts energy consumption typically represents 3 to 8 % of the total energy consumption of buildings, depending on the structure and usage of the building, the type and number of lifts. Although the amount is relatively small for an individual building, the aggregate is large taking into account the 8,5 million lifts in operation worldwide. This study describes the work has been done by the lift industry worldwide in terms of standardization and also focuses on the energy measurements in the most common lift types.

Optical door sensor with planar detection area for elevators

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Conventional light curtains for elevators cannot detect a small object in gaps between beams. We have developed a new optical door sensor that has a planar detection area with no gap. This sensor has two elongate light sources and two image sensors that are embedded in door posts of an elevator car. The sensor can detect a passenger's finger or a small object and prevent it from being pinched by the doors before door opening and during door closing. Additionally, the elongate light sources blink by red light to alert the timing of the door moving to passengers

Electrically based intelligent escalator braking systems

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The braking system on an escalator is the most important safety device, as all other safety devices rely on it to bring the escalator to a complete standstill. Most escalators employ conventional open-loop braking systems that apply the same braking force regardless of the load on the escalator and the direction of travel. This leads to large variations in stopping distance, but more importantly, it causes a severe stop under light loading conditions. The consequence of this is the high risk of passenger falls under light load stopping conditions, with consequential injury. Moreover, the new revision of the European escalator standard, EN115:2008 stipulates that the maximum value of deceleration measured in the direction of travel must be less than 1 m/s². The motivation for this clause is to reduce the risk of passenger falls. Public service escalators carry larger numbers of passengers and are thus at a higher risk of passenger

falls and especially avalanche falls. This paper describes the design, implementation and testing of an electrically based intelligent braking system applied a public service escalator that significantly reduces the risk of passenger falls and meets the requirements of the standard. Of particular importance are the backup systems and the risk assessments implemented in order to provide the necessary safety assurance and ensure safe operation in the case of system failure.

Impact of traffic to annual elevator energy consumption

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Total elevator energy consumption consists of the power losses in the hoisting system and the standby energy. In order to estimate total energy consumption, both losses per trip and the actual usage of elevators must be known. Usually, calculation of annual energy consumption is based on the number of starts per year. These methods do not take into account how the usage varies in practice. Passenger traffic and control system affect to the distribution of elevator load and travel distance, which determine the energy consumption. In this paper, we study the factors that affect this distribution and annual energy consumption.

Improvement of vertical transportation service in existing buildings

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In recent years the life span of humans has increased considerably while the accessibility standards for disabled people have been updated.

Therefore it is today particularly important to provide means of safe vertical transportation for all lift users including disabled and elderly persons without assistance. This paper provides a description the means that can improve the vertical transportation service in existing buildings through the installation of new lifting systems and also through the reconstruction of existing systems

New machinery directive and its impact on the vertical transportation sector

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The new Machinery Directive 2006/42/EC came into force on 29 December 2009 replacing the old Directive 98/37/EC. This event is very important and interesting because one of the most important directives by scope and economic importance was improved and updated and also because the amendment of the Lift Directive included in the new Machinery Directive, which gives a clear statement for the borderline between the two directives. This paper examines the major differences between the old and new Directive, the impact of the new directive to the vertical transportation sector and also presents the systems that Kleemann has developed according to this new Machinery Directive.

Elevator system under use of variable speed transmission

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We propose a new traction elevator system which uses a continuous variable speed transmission between elevator car and counterweight. For each passenger load, the velocity of the car and the counterweight are adjusted to each other in such a way that the power to move the counterweight compensates the power required to move the car. Due to the different velocities, the distance travelled by car and counterweight per trip are different. As a consequence, the counterweight does not only serve as power balancing management but also as potential energy storage system, which stores and frees energy of descending and ascending passengers, respectively.

The use of cameras to evacuate people in elevators

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Using cameras extends the use of elevators to evacuating people at a much quicker rate during fire or other emergency situations. The cameras are used to see if the car, hoistway and motor room are clear of debris, damage and smoke. Additionally the system can be used for security applications. This paper discusses the technology needed to allow cameras to be reliably used and monitored, locally or through the internet from a remote location. The communication links are discussed showing the immense possibilities of the system to security managers, building owners and the emergency services.

Liftinstituut as notified body and accredited elevator/escalator certification organization (AECO)

ing. John L. van Vliet

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Elevator technology is becoming more and more advancing technology. To stimulate the deployment of new technologies, the United States decided to develop the so-called Performance Based Code for Elevator Safety.

In March 2009, the American National Standards Institute (ANSI) appointed three AECO's including Liftinstituut. AECO's are organizations, licensed to certify according to the new PBC. Because we provide the European certification for leading international manufacturers of elevators and escalators, we have broad experience with this new approach to regulation and certification in North America. What are the differences and similarities in approaching standards and codes, authorities, manufacturers, cultures, interpretations etc. between being a Notified Body or an AECO?

Traffic analysis / parameters suitable to middle east and south Asia

Rajah Venkatraman

Fortune Consultants Ltd.

The elevating traffic analysis and elevator design parameters consideration being reviewed from the Middle Eastern and South Asian background. Various factors are reviewed including their cultures, family sizes, behavior patterns, routines, habits, physical sizes, shapes, psychological factors, living arrangements, Hotel (holidaying) practices, attitude to professional working / office environment, shopping interests, desired entertainments, mental outlook to public places etc., and the impact on the parameters. Case studies are carried out in real life situation. The grading of the buildings are reviewed. The government regulations also influence the elevators requirements. All these are reviewed to understand how close to acceptability we can work towards the critical elevator design parameters.

New sliding clip push through force and seismic applications

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Monteferro Spa, Monvalle (VA), Italy

To satisfy the growing demand for improvement in "ride comfort" of elevators the sliding clip are replacing the traditional ones in high rise applications.

Monteferro developed a fixing system as an alternative to the traditional clips, also applicable in seismic areas.

In this system, the guides to be fixed are clamped between a round base and forged clips. Thanks to rubber elements interposed between the screw and shank nut it is possible to regulate the push through force.

The study has been developed through a FEM analysis simulating the extreme operational conditions and utilizing the stress and deformation results.

Efficiency of gearless machines and possibilities of increasing their efficiency

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When aiming at an increase in efficiency of elevators, the gearless machine must also be taken into account. The data sheets of machines show misleading values for these losses as they only refer to regular speed and do not take into account the acceleration and deceleration phase, where the losses of efficiency are considerably higher.

This paper gives an overview of the sources of the different losses and shows design improvements to reduce them. In the following, the paper is focused on the electrical design of the motor and shows that a variant of the synchronous motor is very advantageous.

Implementation of the EN81-1/A3 in elevator products, "prevention of uncontrolled movements of the car"

Franz Watzke and Christoph Kressirer

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For the implementation of the EN81-1/A3 and EN81-2/A3 different solutions are available. LM LIFTMATERIAL has designed an device/ system which is using an intelligent interface of an overspeed governor in combination with a descent protection. Furthermore a monitoring of the uncontrolled movement is available being fully independent from the controller.

Evacuation using elevators:

The Dutch approach

Jochem Wit Msc.

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This paper is about technical developments related to the Dutch Highrise Covenant. This Covenant is an agreement between public parties involved in highrise development. The goal of this Covenant is to determine reliable design criteria for highrise buildings, since the Dutch Building Decree does not exceed 70 meters and only requires similar safety above. It does not enable evacuation by elevators at the moment. One of the key issues of the Covenant is Vertical Transportation. This part includes 6 different design tools:

1) Evacuation by elevator

Different scenario's for full, staged and fractional evacuation: how, where, when, by stairs and/or elevators?;
An enhanced elevator model per scenario, which is based on CTBUH approach, but more specified and extended with the influences of zoning, staging, density and the building's function (office, residential or hotel);
An enhanced stairs model, which takes fatigue, blocking and demographic factors into account;
A combined stairs/elevator model for estimating the total evacuation time;
Recommendations for technical requirements, overpressure, communication, training/exercise, panic prevention et cetera;

2) Traffic Capacity

Design criteria for population, absenteeism, peak flow, simulation possibilities, waiting times, destination times et cetera

3) Energy consumption

Design recommendations including VDI4707, energy recuperation, reducing stand-by consumption, presence activated lighting et cetera

4) Ride Comfort

Design criteria for sound, vibration, acceleration/deceleration, jerk, pressure et cetera

5) Functionality

Car and door size, controls, signalling, separate service elevators et cetera

6) Facade Maintenance

The paper/presentation will focus mainly on part 1): Evacuation by Elevator.

CANopen application profile for lift control (CiA 417) completely revised

Holger Zeltwanger and Olga Fischer

CAN in Automation (CiA), Nuremberg, Germany

CiA 417 version 1.0 was published 2003 by CAN in Automation. The CANopen profile for lift control systems defines physical aspects for use of Controller Area Network in lifts, specifies application data and communication objects for data exchange using the CAN-based higher-layer protocol CANopen. Several companies implemented CiA 417. Technical meetings and plug-fests for CANopen in lifts showed that version 1.0 specifies data insufficiently and leaves room for interpretations resulting in incompatible implementations. CiA 417 version 2.0, previously available in 2010, will consider implementation experiences correcting known failures. The presentation will show changes from CiA 417 version 1.0 to 2.0.

Workshops

Workshop A

Problems to compare the efficiency of different destination control systems

Hans M. Jappsen

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Effect of stop losing times (which include time for deceleration, door times, start delays and acceleration) to the efficiency of elevators (with conventional or destination control).

Different input for destination control simulations which makes the results not comparable.

Inexactness of the simulation results due to the short simulation times.

Different simulation output (due to different lift companies).

Suggestion of standardizations for simulation input and output.

Workshop

Workshop B

Mega High Rise Elevator Designs

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During the past decade, the number of mega high rise towers, greater than 75 floors, has increased dramatically, particularly in the Middle East and now Asia. Many of these iconic tower projects make little economic sense, but rather serve to be an anchor to surrounding developments and to put a city or local area "on the map" as being a home to a "worlds'" newest tallest tower(s).

Most of these super tall buildings are usually mixed use projects containing; subterranean parking, podium/retail areas, office floors, a hotel, upper residential apartments, and observation/restaurants levels located at the very top.

These multi use spaces are typically served by various types and duties of local and sky lobby shuttle elevators and utilize multi sky lobbies.

During this workshop, we will discuss the latest "worlds' tallest tower(s)" elevating designs, some of the present limitations on the present elevator equipment such as, travels (~ 550-575m), maximum speeds (~ 16-18mps up and 10.0mps down) and human physiological impacts. We will also discuss emerging elevator design technologies and the most likely, future elevator equipment changes that will be needed to elevator even taller building structures.