THE ROPELESS ELEVATOR SYSTEM

NEXT GENERATION TECHNOLOGY

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By 2050 cities will contain almost 70% of world’s population.
THE 21ST CENTURY
THE FIRST METROPOLITAN CENTURY

- The equivalent of a 1-million people city is being built every day
- Since 2000 the number of high-rise buildings (>200 meters) has tripled
- Over 180 buildings currently under construction are above 250 meters

BOTTLENECK ELEVATOR
TKE PROVIDES AN OPERATING SYSTEM BY MEANS OF ALL...

**LINEAR MOTOR TECHNOLOGY**
- Own linear motor technology and competence
- Technology already proven in applications as Maglev Train or ACCEL
- High degree of safety and comfort

**ADVANCED SAFETY FEATURES OF TWIN**
- Two cabs independent in one shaft
- Successful use of TWIN concept with independent safety procedure on highest safety level (SIL3)
- Advanced destination dispatch algorithm

**CONTINUOUS PASSENGER TRANSPORTATION**
- Former technology in the nineteen fifties
- Various cabs per shaft, moving continuously, enable high transportation capacities
- Based on actual safety standards, the system is not applicable any more since 1974

...ALL PIECES ARE TOGETHER FOR THE NEW PICTURE

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**MULTI – THE NEXT DIMENSION**

- A revolutionary idea, but it’s not just a new elevator – It’s an exciting new “vertical and horizontal transportation system”.
- NO CABLES and no traveling cable required
- Application of totally new technologies, like
  - Linear motor and drive
  - Exchanger, which moves cabin from one shaft to the other
  - New materials (light weight cabin & cabin door)
- It’s a shaft-changing cabin system with multiple cabins, running in one shaft – loop. However horizontal links between several loops or to a horizontal track is possible at exchanger levels
The basic approach is a circulating system (paternoster) with an available cabin every 15 - 25s.
The safety concept is based on the TWIN know-how, collision prevention and high level safety features.
Targeted speed: up to 5 m/s, extension possible up to 7 m/s.
Ideal with 8 - 10 cabins per side which means 16 - 20 in total in one loop for 600m driveway or 300m height - however not limited.

MULTI – THE NEXT DIMENSION

FROM THE IDEA TO A MODULAR CONCEPT

MULTI – THE NEXT DIMENSION

VERTICAL MOVEMENT
MULTI – THE NEXT DIMENSION

...VERTICAL MOVEMENT ELIMINATED ROPES

Applying proven technology of Maglev Train to move an elevator vertically and horizontally by means of linear drive.

ACTIVE PRINCIPLE OF LINEAR MOTOR WITH PERMANENT MAGNETS

- Magnetic flux from permanent magnets
- Permanent magnet
- Stator with concentrated coils
- Travelling wave, generated by 3-phase current with variable frequency – supplied by inverters

DOUBLE ACTIVE ARRANGEMENT FOR MULTI

- Coils in non-magnetic carrier
- Permanent magnet
- Magnetplates (U-Shape in sideview)
- Airgaps

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...WITH HORIZONTAL MOVEMENT

- The miracle of an elevator moving horizontally is the use of linear drive
- Exchanger system which allows a 90° turning of the linear drive and guiding equipment
Main tasks of Brake system:

- Parking Brake
  - hold car on position for load and unload of cabin (when propulsion system is deactivated)

- Emergency Brake
  - decelerate car in case of an emergency stop

- Safety gear
  - Backup brake, if there is any failure of Parking Brake or Emergency Brake
MULTI – THE NEXT DIMENSION

WITH EXCHANGER DEVICE FOR HORIZONTAL MOVEMENT

- Vertical movement turns into horizontal movement, using the same linear drive system
- Exchanger module can be placed where needed
- Modular design, with great potential for modular construction
- Horizontal movement provides separate service space

MULTI – THE NEXT DIMENSION

TECHNOLOGY FOR NEW VERTICAL TRANSPORTATION CONCEPTS

Layout-Example for a double-shaft arrangement
MULTI – THE NEXT DIMENSION
TECHNOLOGY FOR NEW VERTICAL TRANSPORTATION CONCEPTS – PRELIMINARY SCHEDULE

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2016: TEST TOWER ROTTWEIL – BUILT FOR MULTI

- 3 x 100m shafts built for MULTI, connected to each other
- 6 other high speed test shafts available
- Test Tower will be ready for testing by the end of 2016 with MULTI