ARTICULATED FUNICULATOR

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2013.06.19
VERTICAL TRANSPORTATION

ELEVATOR

Funicular

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WHAT HAPPENS IF A FUNICULAR IS TURNED VERTICAL AND PLACED INSIDE A TALL THIN SKYSCRAPERS SUCH AS...?
CHALLENGE

Tall and supertall buildings struggle with:

- Large number of conventional elevators
- Large number of elevator shafts
- High electricity consumption
- Relatively slow elevator speeds
- Low floor area utilization ratios

Floor utilization ratios for building with a central core:
0.596 – 0.745 (0.6705 average)
THE ARTICULATED FUNICULATOR IS BORN!
WHAT IS THAT?

- Designed by TYRÉNS
- A new and innovative solution to vertical transportation
- Connected system of vertical trains
- Moves people in masse
- Sustainable “Sky Subway”
BASIC CONCEPTS

One train is made of several train cars

Trains in vertical legs

Trains parked at horizontal stations
BASIC CONCEPTS

- A continuous, connected system of trains
- Moves people in masse
- Sustainable "Sky Subway"

- Prototype building
- Trains in vertical legs
BASIC CONCEPTS

- Trains transition from horizontal alignments at the stations to vertical alignments between stations
- Passengers remain standing

- Prototype building
- Trains parked at horizontal stations
- Prototype Building
- Cut away
- Trains in vertical legs
Ultra high speeds $\rightarrow$ Short cycle times

- Loading and un-loading: 10-15 seconds
- Horizontal to vertical transitions (2): 10 seconds
- Rises and falls (200m – 500m): 9-14 seconds

Total cycles times between trains: 29-39 seconds

Cycle times can be reduced during off peak times

For example:
1000 m building w/3 stations
time from bottom to top:
78 seconds!
Floor utilization ratios for building with the Articulated Funiculator and the Tubed Mega Frame: 0.808 – 0.914

Approximate percentage increase in floor utilization:

\[
\frac{0.861}{0.6705} = 1.28
\]

28% increase in rentable / sellable floor space
CONCLUSIONS

- Reduced number of conventional elevators
- Reduced number of elevator shafts
- Increased rentable / sellable floor area ratios
- Dynamic braking  ➔  Energy storage and re-use
  ➔  Sustainable system
- Ultra fast speeds
- Short cycle times