



The Articulated Funiculator

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Abstract

The Articulated Funiculator is a quantum leap in vertical transportation in tall buildings, deep underground subway stations and deep mines. The Funiculator is an integrated vertical transportation system, not just an elevator. The Funiculator is a connected system of pods that moves people in masse, a vertical sky subway system. A single Funiculator system utilizes shaft sharing and requires only two vertical shafts which dramatically increases the percentage of usable floor space in tall buildings and reduces the amount of tunneling in deep subway stations and deep mines.

Keywords: Shaft Sharing, Sky Subway, Pods, Floor Efficiency Ratios, Integrated Vertical Transportation System, Dynamic Placement and Removal of Pods.

1 Background

The Articulated Funiculator was first presented in [1] and [2] and has been published by Elevatori, Elevator World, Lift Report and the New Civil Engineer.

1.1 Time for a change

The mechanical lift was invented by Otis in 1854 and the first production elevators were sold by Otis Brother & Co in 1900 and since that time the concept of the elevator has remained the same. Every elevator requires its own shaft, tracks, cables, motors and counterweights and this redundancy is inherently inefficient. A Funiculator system with several pods all share the same shafts, tracks, cables and motors and the pods themselves replace the counterweights. This

greatly reduces redundancy and brings substantial economic and passenger flow efficiencies. The challenge of conventional elevators is obvious as demonstrated by the floor plans of current high-rise buildings. It is not uncommon to have thirty (30) to forty (40) elevator shafts across a floor plan and over one hundred (100) total elevators in a single building. This results in floor efficiency ratios as low as 60%. Funiculator systems require only two shafts and predict floor efficiency ratios of about 90%. An Articulated Funiculator system uses less vertical transportation units than a comparable conventional elevator system and is more beneficial for egress purposes in tall buildings when compared to conventional elevators [3]. Figure 1 are renditions of building cutaways with conventional elevators and a Funiculator system.