THE 'LONGEVITY LIFT' - A PLEONASM?

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ABSTRACT

Lifts, as design elements of architecture, bear some responsibility for the ultimate general appearance of our environment. Our towns and cities continue to grow. Business quarters and domestic estates are impossible to envisage without lift systems. Lifts extend the useful life of buildings through their own operational life to over 50 years. They enable the elderly and disabled to remain resident in their own neighbourhoods and make life easier for the young. Lifts perform their tasks at an above average level of consideration for resources and environment. Their design should be based on these maxims and fulfill many long term requirements.

Is the expression 'Longevity Lift' really a pleonasm, such as for instance ' black raven', or is it rather a 'white raven' , because of its inherent inconsistencies?

Listed below is some criteria applicable to lifts. The subject covers:

1. The lift,
   and element in architecture

2. The lift,
   a contribution to urban development

3. The lift,
   a major factor in the usefulness of a building

4. The lift,
   a friend to humanity

5. The lift,
   an environmentally sound means of transport

6. The lift,
   an ingredient of industrial design.

This paper is a paper on architectural design and, for this reason, any references to design should be made at the beginning.

1. The Lift, An Element in Architecture

Throughout history, architectural styles have been subject to changes, as have architectural elements. Are they, therefore, to be regards as being subjective to fashion or rather to modernity? What is new for the architect of today is the vast range of elements, which, to a very marked extent, are created by industrial designers. 60% of a building consists of finishings/refurbishings and of these as many as 50-70% are the creations of industrial designers. Nowadays, the lift is one such architectural design element.

Architecture and the lift are integral to the traffic flow within a building. "Architecture in Movement" is today "Movement in Architecture". This term not only covers the showing of movement but all transitional spaces, lift car interiors and external facades of Panorama lifts. The immediate links between architecture and design then manifest themselves in construction elements and the modularity, materials surface structures, colours and flow of movement. Good design in an integral part of construction and as such has a long-term effect on the appearance of our surroundings.

The construction of a building demands the incorporate of a vast number of well designed products. The lift is one of those products.

May I remind you of the lifts in use at the turn of the century; they were models of artistry and incorporated into the representative halls and stairwells of the buildings of that time. The passenger could see and was seen. The lift car he/she used was artfully decorated with wrought iron work and decor features made of brass and gold. Shafts were 'open', doors were much decorated and of an open design, with generous access dimensions.

The functions of up and down movement were visible but not dominant. Form and function were in harmony and if they have not died long ago they are running to this very day. Since such lifts are truly long-term products. unless they have become the victims of the modern passion for reconstruction - the question of a true long-term design arises.

2. The Lift - A Contribution to Urban Development

Let us think back to the twenties and thirties. Those were the years when lifts, with their facility for opening up vertical dimensions, made the construction of high-rise (skyscrapers) buildings a viable enterprise. The history of lifts is irrevocably linked with the history of skyscrapers/high rise buildings and the development of inner cities. The world famous skyline of Manhatten would simply not exist if it were not for lifts.

Buildings from that period bear the mark of functionality and their lifts are true work horses: solid, safe and fast. The function of vertical transport with performance criteria, such as transport capacity and speed were priorities. Design and appearance were secondary engineering maxims and confined themselves to some decorative elements. The lift developed into an efficient, reliable and safe transport system. Most of these lifts are still in use today, some of them having been in use for more than 60 years.

And now we come to the sixties. Can you envisage the post-war cities with their stores, modern offices and blocks of flats without lifts? For the rapidly rising demands of that period, lifts have to be developed which were subject to short delivery schedules, were standardised and sold at favourable prices. Standardisation triumphed, form and design were 'also-rans'. This was the period of the friendly 'residential silo' with the standard facade. Even though, these buildings may now look old and worn, they still contain lifts which function reliably, that is if they had lifts at all.

Nowadays, such buildings without lifts are equipped with external lifts or with lifts newly integrated into the stairwell. Once again, for an operating lift of more than 40 years.
In today's buildings for our cities of tomorrow, architects have turned once more to concepts, such as more space, more light, greater transparency and designer elements. Lifts have been released from their concrete corsets of dark shafts, technical functionality, is on display and lift cars are made either partially or wholly of glass. To begin with, such lifts were to be found in the generous multi-storey atriums of exclusive hotels. There they created locations for movement and were centre of interest, owing to their animation of form, colour and movement. The static, three dimensional building is extended by the fourth dimensions, i.e. time, through the exposed technology of lifts and escalators. Fashion or long-term trend?

When panorama lifts glide from floor to floor along the outer facades of tall building, continually providing ever-changing viewpoints, transport function becomes an adventure function. As an example, one can cite the facade of the Hopewell Tower in Hong Kong.

The view from this lift offers an overwhelming panorama of this exciting city, and it may be said that, in contrast, our modern cities present an ever-moving element amongst a background of static building blocks of yesteryear.

By the way, the first Panorama lift in the world was erected as long ago as 1904 on the slopes of the Buergenstock near Lucerne in Switzerland. After 90 years, it has hardly changed in appearance because it has always been updated and modernised in easy stages. Thus, we may well expect that the resurrected 'Panorama' lift will be a 'long-term' lift which will contribute to the further development of the cities of tomorrow.

3. The Lift - A Major Factor in the useful Life of a Building

A lift, or better, a lift system, consists of modular assembly groups such as the shaft, car, drive, control system, doors and the ergonomics of the user-machine interface. Within each of these assembly groups elements of varying operational life-spans are used. For instance: car interiors, illuminated ceilings, operating elements on the one hand and door drives, motors and gearing on the other hand. It goes without saying that these elements are subject to wear and tear in any lifts which operates at something lift 200 trip/hr and 400-plus door movements per hour. But, as we all know, an electromotor practically never changes.

Even so, there comes a time for renovation or modernisation in any lift, no matter how well it has been maintained and cared for. After 30 or 40 years of so, voices are raised in the quest for greater speed, quieter running, faster door movement or improved monitoring. These elements will make older buildings attractive again for tenants and/or owners. Such demands are usually met by the replacement of individual features and not by replacing the whole lift. New drive technology provides markedly better travel comfort and a feedback of energy, even in small lift installations. With the use of microprocessors, older lifts can be modernised to such a degree that they provide the same levels of availability, service and travel comfort that one would expect to find in the most modern lift.

In comparison with other industrial plants, a life span of 50 years or more for a lift goes far beyond the average of that which might be expected for any other industrial plant.

After gentle, phased modernisation, both owner and general users travel in a practically new lift and do not have to 'throw the old model on the scrap heap'.

This means that as far as the lift producer is concerned the question of recycling is not one of major importance, copper and motor metals already being subject to re-use. As far as lifts are concerned the use of plastics is confined to car interiors and even here, only flame resistant, non toxic materials are used owing to fire and safety regulations. On most cases such materials can also be recycled.

Thanks to phased modernisation and regular maintenance the lift this becomes a long-term product, in other words, an important factor in the useful life of any building.

4. The Lift - A Friend to the User

Thanks to the lift, elderly people can continue to live in their own homes and accustomed surroundings. To begin with, countries such as Sweden, with their majority of two and three floor houses, have discovered that it is not only more humane but also considerably more economical to allow older people to remain in their own homes, that it would be to accommodate an ever increasing number of old people in residential homes. The subsequent installation of lifts is, therefore, much subsidised in these countries. For the disabled and others who are confined to wheelchairs, the lift is an essential aid to their lifestyle. As far as new buildings are concerned, lift should, from now on, always be so dimensioned that they can facilitate the use of wheelchairs and be user friendly to the handicapped. The same should be attempted at least whenever modernisations are being undertaken.

But why should they be an advantage only to those who are diabled or elderly? Think of the young housewives and mothers who wish to transport a pram or pushchair into their own home; think of those who prefer to follow the modern trend of only going shopping 3 or 4 times a week, thus having to transport relatively greater amounts of goods on their return home from the shops. Even if they were asked to climb ONLY to the 3rd or 4th floor, carrying the shopping, perhaps a small child trailing along, blocks of flats without a lift facility would be very difficult to let to such tenants.

Yet one other human aspect relating to the use of lifts should not be forgotten in these considerations: using a lift is safer than climbing stairs. Still, I was not able to ascertain statistically viable figures relating to accidents whilst climbing stairs or descending stairs. According to the Swiss Accident Insurance Company, the ratio of injuries or accidents in lifts to those on stairs should very likely lie at some 1 : 10'000. In that sense, lifts increase the longevity of their user and this, in turn, enhances the long-term usefulness of lifts!

5. The Lift - An Environmentally Sound means of Transport

The lift does not emit noxious gases, it creates little noise, and no waste products and as far as transportation is concerned it uses a relatively small amount of energy. Here some comparative figures, which will, no doubt amaze you: a person weighing the European average of 75 Kg, who would have to climb a 20 m staircase to the top floor of an office building, would, at a climbing speed of 0,1 m/s need 200 seconds, thus requiring about 15 kW's climbing energy. This person, during this arduous task, would emit some 500 W lost heat into his/her surroundings, i.e. some 100 kW's. In total he/she therefore requires 115 kW's. As you can seem the human body is an extremely bad piece of machinery with a low degree of efficiency. As a result of the nutritions he/she requires to be able to produce the necessary energy he/she produces waste, requires heat etc.

The lift, for overcoming the same height difference, requires barely 20 seconds and thus used only 3 kWs. If one includes energy losses through friction, heating etc. one will arrive at some 6 - 8 kWs. How is it possible that a lift uses less energy than a person? This is due to the fact that some lifts apply a well-known principle of compensating its own weight using a counterweight in the shaft, therefore needing a minimum of travel energy.

There is yet another ration of energy consumption as applicable to the lift. 200 trips per day for a lift in an average dwelling would consume an average continuous load equivalent to a 100 w light bulb.

And yet another equation:

Of the total energy consumption of such a dwelling, including household energy, heating, lighting etc., the lift will use an average of only 1-2%. (In office buildings with much travel: about 2-3%) energy savings would therefore have to be given priority to the other energy consuming elements. And yet, during recent years, energy saving potentials of 40% have been realised on lifts, thanks to new technology such as microprocessor control units. Such enormous savings in energy consumption on the part of other users could only be achieved after extremely high investment costs. For a lift this cost would amount to only 10-20% of its new replacement value.

One could present further arguments with which to reinforce the list of merits on this environmental friendly transport medium. To begin with, there is the fact that, thanks to the relatively cost efficient lifts (in the average office complex some 1-2% of entire construction costs) one can build taller buildings, thus providing more utility space on less land. In countries with high standards of living, building space is at a premium and will become scarcer; this will force us to yet higher parameters for the utilisation of the space we have, in other words: minimise car area to shaft area ratios and construct taller buildings.

Reference has been made to the lift as a transport vehicle. The step towards a comparison with the motor car is a brief one. Let us assume that 18 families live in a 6 floor apartment building. Each family will have at least one car and this car will, on average, be replaced by a new one after 6 to 8 years. During those 50 years, during which the lift, uncomplainingly, provides its services, roughly 100 cars will be used by those 18 families. But, for the production of an entire medium-rated lift, only about the same amount of materials and energy will be consumed as is the case for the average motor car. In comparison to the longevity lift the longevity car will be a utopian concept.

6. The Lift - An Ingredient of Industrial Design

This brings us back to the question raised at the beginning: Is there such a thing as a long-term design for the longevity lift? Or is this concept a total contradiction in any case? One might be led to think so if one listens to the views of known as less well-known designers.

We are surely allowed to raise the question of long-term design for lifts in a somewhat provocative manner.

What are the demands which will have to be addressed as far as design is concerned?

- Lifts are architectural design elements, but architectural trends change with the times. The question is: Is there a rhythm to such changes?
  Should design, as part of architecture, not contribute increasingly through lasting features instead of being a slave to fashion?

- Lifts are an integral part of modern cities, with the inner cities, in particular, being subject to constant development. In a wider sense, could not design also be beneficial to our cities, instead of being dominated by building regulations and town planning procedures?

- Lifts are long-term investment products, thanks to their modularity and facility for phased modernisation. Could not design also encompass modular elements which make step-by-step updating over long periods entirely possible?

- Lifts are environmentally friendly servants which, in their turn, demand our services and maintenance. Should design not regard the protection of the environment as a priority? Is design not also a service which should avoid wastefulness and wear and tear?

- Lifts are user-friendly products to which people, in turn, should be kind to and which should not be subjected to vandalism. Is design by definition not always user friendly? Why then can it not also be such that it will remain valid for longer than just one or even half a generation span?

If you can answer these question with a 'YES' the circle will be complete: The lift and its design offers long-term utilisation, not only by its functionality but also through its specific design features. The longevity lift <u>really is</u> a pleonasm!

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