101

The Experience:

I've been lucky enough to visit some of the tallest lift installations in the world over the years. Most when they still held the title of tallest, but all succumbed to those architects and engineers who strive to accept the challenge of pushing technology to its limit, and so they finally but gracefully take a lower station.

Initially as a young apprentice in the industry, I was **AWED** by the 1252 ft, 102 floor Empire State Building in New York, the epitome of my trade.

Empire State Building

AMP Building

But then I had the opportunity to work on the tallest buildings in hometown Melbourne Australia in the late 60's, beginning with the 370 ft high 28 floor **AMP Building** - with its 'square worm' cultural piece of air-conditioning duct on its plaza. This EPL / Express DMR lift control system screamed along at 500ft/min. (2.5m/sec).

BHP Building

Of course the AMP **AWE** didn't last long, because in the early 70's the all steel and glass **BHP** building soon rose just nearby, to top off around 500 ft , 41 floors, and with excessively fast 700ft/min. (3.5m/sec) lifts.

Sears Tower

Come the mid 70's I was living in Vancouver Canada, when an exploration of the United States drew me firstly in Chicago to ride the bronze-tinted glass and steel **Sears Tower** standing at an unimaginable 1454 ft, with lifts traveling at 1200 ft/min (6.0m/sec).

Of course when I reached New York City, I just had to ride the Empire State Building, but by that time as I peered through its wrought iron railings toward the Statue of Liberty, the 110 storey **Twin Towers** loomed above and beckoned.

So I was able to stand on the highest open observation deck in the world at that time at 1377 ft, also traveling up at speed of 1200 ft/min.

To end this magnificent period of **AWE** in the 70's, I departed the North American continent from Toronto, but not before a ride at 1200 ft/min to the top of the world's still tallest tower, the **CN Tower**.

This tower stands 1814 ft above the pavement and houses the most spectacular observation deck, the space pod at 1465 ft, where you can stand on the glass floor and see the foot of the tower below you. A real **AWE WOW**!

Years pass as I grow older in the industry with New York and Chicago still building tall in the 80's, then Hong Kong's late 80's Bank of China - CITIC Plaza Guangzhou - Shun Hing Square Shenzhen, and Jin Mao Building Shanghai China in the mid 90's, and the Emirates Tower One in Dubai in the late 90's, but all no threat to the aging Sears Tower as tallest.


The Petronas

Then in 1998, some 24 years as the tallest, the Sears Tower succumbs to SE Asia, and the **Petronas Towers** in Kuala Lumpur, because of two architectural towers on top of these twin magnificent Asian engineering feats that finally stretch the tallest building record by 33 feet to 1483 feet high, with lift speeds now up to 1400 ft/min.

But wait, this is not what this story is about. This opportunity arose when attending the ELEVCON Asia 2005 IAEE Conference held in Beijing, with my son living in Taichung, that's in Taiwan, 130 or so kilometers as the crow flies south West of Taipei, and Taipei is the new home to reputedly the tallest building with the fastest lifts in the world.

It begins around 7am after tossing and turning under a slow moving ceiling fan that only stirs the already warm humid air in a concrete apartment that seems to hardly fall below 30º all night. We climb into the Volkswagan Passat to merge into the packed narrow back streets of cars and scooters, as already the shop fronts above the tenements are open.

Taichung is cosmopolitan, the third largest city in Taiwan with a population around one million, and I understand the airbase with its 3650 meter long runway was once used by the Americans as a supply base to Vietnam back in the 60's war.

A short heavy shower of warm rain increases the stickiness as we make our way onto the wide boulevards and eventually the freeway system of highway 1 as the traffic builds.

We have a 10am appointment with the engineers from Toshiba, and I am concerned that the renowned morning peak will bring us to a halt as the many leather armchair seated

double-decker intercity buses and myriad of trucks join the highway to move commuters and goods up and down the 380 kilometer top to tip Island.

By the end of the year the Japanese built Shin Kansan high speed train that covers the same North South route as the highway comes on line to feed the airports and cities of Taiwan.

It ignites memories for me of days past way back in 1978 when traveling between Tokyo and Kobe in Japan on the first of the Shin Kansan design high speed trains fill my mind. We gain glimpses of the new elevated track as we snake through the rolling green hills, with its shrines; occasional golden Buddha's and temples of Western Taiwan, only slowing to pay the toll every 20kms or so.

Half past nine and at last on the Sun Yat Sen freeway, a familiar name from the Chinese philosopher who with Chiang Kai Shek fled to Taiwan to retain their freedom from the diametrically opposed Communist Mao Zedong.

Then suddenly off to the west, through the breaking rain showers and low hanging heat haze, the AWE returns as I point and yell, “look. look” when I catch my first glimpse of the purpose for this escapade, to experience the present highest building with the fastest lifts in the world, only to lose it behind road side buildings and then into one of the many tunnels that lead through the hills into Taipei.

Highway 1 skirts east west across the northern end of the city and lead to the Jiuguo S.N. Expressways and then onto the 6 laned - tropical tree lined boulevard of SinYi (Xinyi) Road. By now we have all sighted this 101 level -1,670 foot monolith completed in late 2003, the **Taipei Financial Centre 101 Building**.

Closer and closer we drive until we cannot crane our necks in the car sufficiently to be able to see more than the base of the building as its presence fills our entire view.

101 Facts:

- 101 is the first highest building opened in the 21st century at 508m.
- 101 found inspiration for design in traditional Chinese buildings and based design around the Chinese lucky number 8.
- 101 employed Feng Shui Masters as consultants on the design layout.
- 101 is to be the first building built in a known earthquake zone.
- 101 survived a 6.5 magnitude earthquake that hit during construction, but 4 people were killed when 2 cranes toppled striking cars and people in the streets.
- 101 incorporates a 660 metric tonne tuned mass damping system located on the 88 and 89th floors to stabilize the tower.
- 101 is the first building over ½ km tall.
- 101 has the tallest roof and occupied floors.
- 101 costs NT$350 to ride to the top enclosed observation deck on the 98th floor.
- 101 was to have an outdoor observation deck on the 91st floor.

101 Lift Installation Facts:

- 101 incorporates 61 Lifts and 50 escalators.
- 101 has 2 - 168 kw - 24 person ultra high speed lifts traveling at 1010m/min (16.8m/sec), a 34% increase on the current fastest lifts in Yokohama. Each lift incorporates an aerodynamic design, vibration control and pressurization system to bring the total cost per lift to US$2.0m each.
- 101 has 34 – 68 person 420 m/min (7m/sec) Double Deck lifts.
- 101 has 25 – 210m/min (3.5m/sec) standard large capacity lifts.
- 101 has 50 escalators

Standing at the base of a skyscraper does little to differentiate it from most other big city buildings, but usually it is a hive of activity at 10am on any Wednesday morning with pedestrians all going in different directions departing and returning to the home nest.

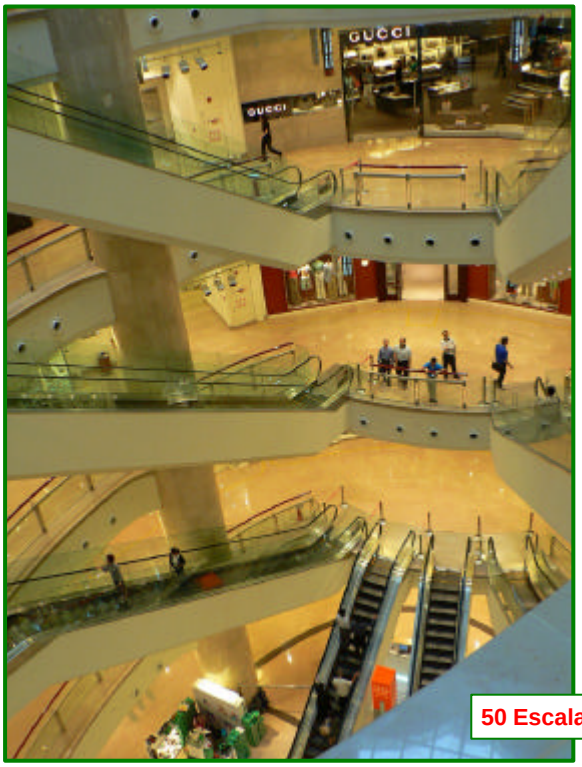
Here it is sedate, eerily so with just the occasional person entering or leaving through the main entry, a year and a half after opening the building.

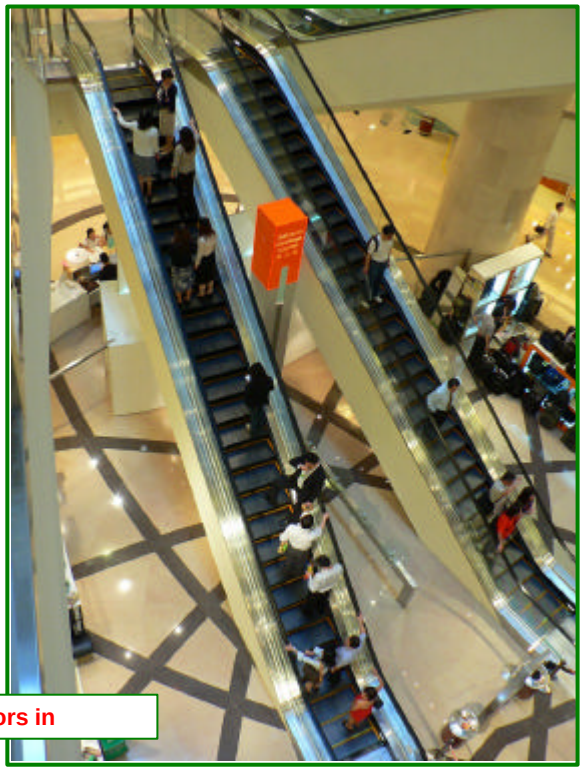
I had been concerned as I was to meet two Toshiba representatives at the main entry to arrange access to the building for us, and I imagined an airport arrivals gate with no sign-board. But I should not have worried, there were only two people standing there with smiles, Masato Kimura and Bing-Ching Huang, and they responded immediately to my "Nee Hau"! Thankfully their English was much better than my Chinese greeting.

As we entered the cavernous but empty foyer, and took the low rise Toshiba passenger lift to the 5th level tourists foyer, I had an opportunity to learn of some of the experiences these two had gained while overseeing this massive project entailing 61 lifts and 50 escalators.

Masato Kimura's role was as Deputy Manager for the Taipei Financial Center Project Group involved in overseeing the complete project, and now the initial period of operation. Bing-Ching Huang worked for the local Taiwan distributor company GFC, who provided all the local labour and supervision for the installation. I found it difficult to elicit any problems experienced with the installation, and a little devastated to hear they were not going to be able to provide me access to the shaft or machines.

But then, we were here to experience the final product, as much else has already been published about the technical aspects surrounding these two fastest lifts in the world.





50 Escalators in

Both representatives were a delight to meet and were very proud of what they had achieved, and rightly so. [B1]

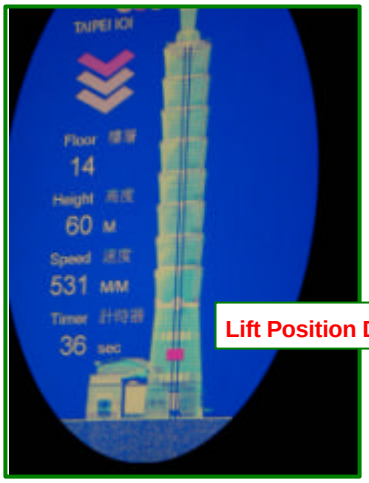
Through the generosity of Toshiba we didn't have to queue to pay the NT$350 (NZ15) entry fee, but we had to pass through the security detector to ensure we were not terrorists.

Although compared to the multiple arrivals, departures and emptying of pockets we had already been through at airports over the past days, this was more like an entry to an adventure ride.

Bing-Ching Huang - Masato Kimura

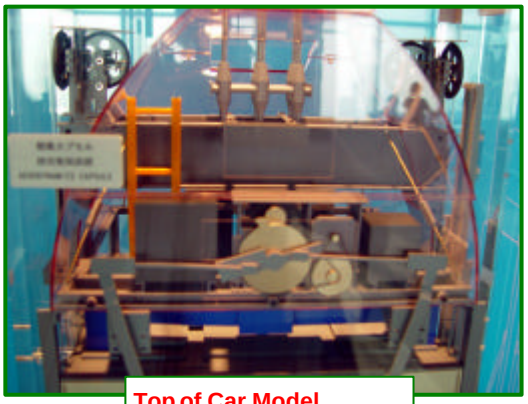
1010m/sec Lift

It is probably in the tens of thousands of times that I've entered a lift before, and here we had a side by side duplex pair with finishes not to dissimilar to the past thousand I had been in, that is with the exception of one feature, the Car Position Indicators. This was like a blue oval, 0.5m high glass viewing portal with one on each front return above the control buttons.
It was to provided a magic moving picture of the lift as it soared up the outlined tower of the 101 building, dynamically displaying the floor level, height above the ground, speed of the lift in m/min and fight time at each moment of the accent.



Lift Position Display

A welcome on board, like the hostess of an aero plane greeted us in both Taiwanese and English as the smooth silent stainless steel doors began to enclose us in our soon to be pressurized cocoon. The closing doors extinguished the bright light of the foyer, leaving us all bonded passengers bathed only in the blue haze of the information portal, and each glancing at one another in anticipation of not knowing what next to expect.

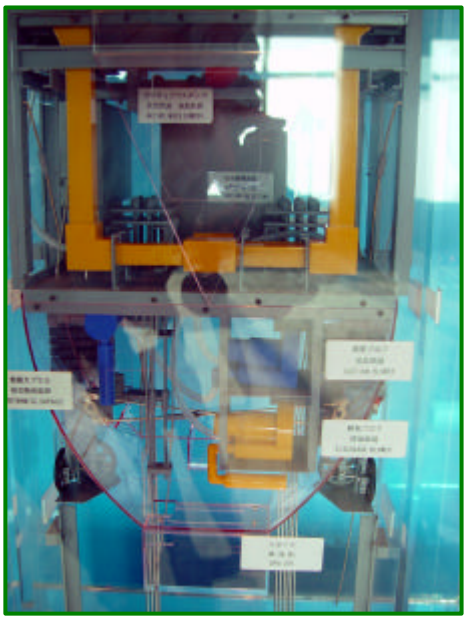


Top of Car Model

My entire sensory antennae were fully extended by now, a human diagnostic tool with all inputs on in a darkened rocket ship ready to blast off. The Oh so slight sense of movement confirmed the release of the brake allowing the barely perceptible roll of this mighty 77 ton rotating twin-winding variable frequency drive machine 90 or so floors above us, to begin to absorb its massive 1186 kw of maximum power output.

At this point this latest of Toshiba high speed motor controllers begins to[B2] **dynamically optimize** –

Under Car Model



- **Any unwanted electromagnetic resonance force mechanical vibration due to horizontal displacement.**
- **Any uneven atmospheric pressure generated through rapid ascent.**
- **Any aerodynamic wind noise to virtually remove the sensation of movement to the human captives.**

It takes over 28 floors and 14 seconds as the psychedelic music rises to a crescendo and the electronic viewing portal speed readout settles to indicate a top speed of 1010m/min (16.8m/sec) has been reached. What's this, the anticipation seems to have nearly turned to boredom in the eyes of the passenger, they don't seem to appreciate what is happening as without sensation they career up for the next 31 floors in 7 seconds, before the minutest of feelings tells me we must have rolled over into deceleration.

The music softens and the resounding; ***"Ladies and gentlemen we have arrived at eighty nine floor, thank you . . .Welcome"***, followed by a blast of blinding white light that seems to stun all as suddenly the lift doors part. Although I suspect some may think something has gone wrong and the doors have reopened, I know where I am as my eyes adjust to the changed light conditions, and out in the distance I can see the broad vista of the Taipei surrounds, but there is a surreal feeling that my body rejects the possibility that in just 37 seconds or so, in an environment well known to me, I have just traveled 84 floors of this building.

The enclosed observatory deck enables you to walk 360º around the 89th level of the buildings center service core, with a further two over-lapping shuttle lifts, one 5 stop, one 9 stop able to take you up to the highest 101st level. There is also an outdoor observatory on the 91st floor lower roof, but this was restricted to the public.


660 Tonne Passive

Able to be viewed in the center of the building on the 89th level is the 5.5m diameter 660 metric ton passive building wind damper costing NT$132 million (US$3.9m). Speaking of wind, the building has been designed to withstand wind velocities up to 60m/sec.(216 kph).

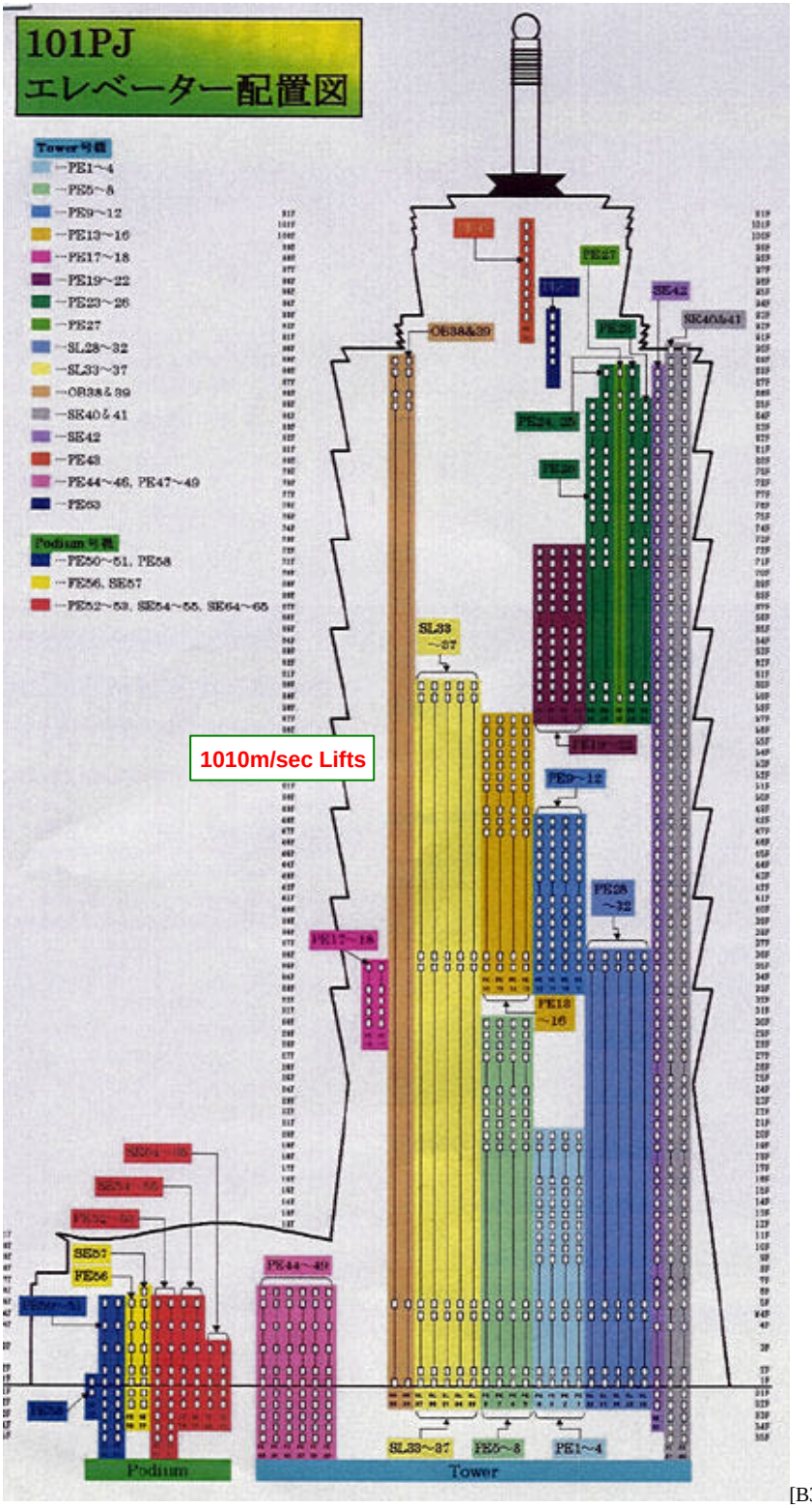
I understand that lift passengers are more susceptible to changes in velocity when traveling down, and maybe this is why the top speed down is reduced to a snails crawl - that is to those of us who have traveled real fast! – to a gentle 600m/min (10m/sec). Interestingly this still only takes 46 seconds for the trip down in comparison to the 37 sec ascent.

The decent profile looked something like this:-

- ***The first 9 floors down took 10 seconds to reach top speed.***
- ***Top speed travel covering 65 floors took 27 secs.***
- ***Deceleration took a final 10 floors over 9 seconds.***


Yong He Districts


Mingquan Bridge



DIAGRAMATIC LAYOUT OF ALL LIFTS SERVING THE 101 BUILDING.

[B3]

In 1949 when I took my first breath, the Republic of China established its Government in Taipei, which was little more than a rural town among rice fields and mud flats, and by the mid 60's only a few paved roads existed, and the primary means of transport was still the pedicab.

What I had just witnessed from the 89th level of the 101 Building, resulted from a similar freeing of the Chinese entrepreneurial spirit being witnessed in Mainland China today, only in Taiwan it was in the 70's when this staunchly traditional city lifted a ban on the construction of new hotels and other high rise building, to see the skyscraper come into its development.

Restriction on overseas travel was removed and economic expansion began as the well heeled residents donned the latest fashions, and by the late 70's Taiwan was being referred to as the Republic of Computers that continues through to today.

The 101 Building is located in the expanding eastern side of Taipei in the Sin Yi District, it retains the Chinese character in its architecture among a city of many Western influences. Taipei is a well serviced city with a sound infrastructure and over 6.5 million people, and now it has its own landmark to proudly reflect its growth and prosperity.

No matter how many times you do it, it is different to going in a plane, climbing a mountain or driving to a lookout. To take a lift up a tall building is an experience you cannot achieve any other way, and to transport yourself vertically the highest distance in the fastest time is recommended to all to put another tick in your life's achievements book.

Footnote:
I must thank Toshiba and all their staff who helped arrange this brief visit, and congratulate them on their exemplary achievement for the peoples of Taiwan, and us who make up the world lift industry.

BoB Johnston – LEC NZ.